# APM Conceptual Design and Cost Estimate Update Deep Geological Repository in Crystalline Rock

**NWMO Input to Cost Estimate** 

APM-REP-00440-0009

October 2011

**Nuclear Waste Management Organization** 



**Nuclear Waste Management Organization** 22 St. Clair Avenue East, 6<sup>th</sup> Floor Toronto, Ontario M4T 2S3 Canada

Tel: 416-934-9814 Web: www.nwmo.ca

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#### **EXECUTIVE SUMMARY**

The Nuclear Waste Management Organization (NWMO) is implementing Adaptive Phased Management (APM), Canada's plan for the long-term management of its used nuclear fuel. The APM approach includes centralized containment and isolation of used nuclear fuel in a deep geological repository constructed within a suitable host rock formation such as crystalline rock or sedimentary rock. APM also includes a used fuel transportation system.

From 2009 to 2011, NWMO and SNC-Lavalin updated the previous conceptual design and cost estimate for the APM deep geological repository (DGR) in crystalline rock prepared by CTECH and for the APM used fuel transportation system prepared by Cogema. The cost estimating activities for the APM update were allocated as follows:

- NWMO was responsible for estimating APM costs for siting, design development, safety assessment, licensing, approvals, program management and related support to APM facility construction, operation decommissioning and closure.
- SNC-Lavalin was responsible for estimating APM costs for final design, construction, operation, extended monitoring, decommissioning and closure of the APM facility and for the used fuel transportation system.

Two used nuclear fuel inventory scenarios are considered in the APM cost analysis for long-term management. The Base Case assumes 3.6 million used CANDU fuel bundles and the Alternate Case assumes 7.2 million used CANDU fuel bundles.

#### Methodology

For each case (identified as '560' for the Base Case, and '561' for the Alternate Case), the scope of the APM project was systematically divided into separate areas of effort to create a project Work Breakdown Structure (WBS). Many of these work areas were subsequently broken down into sub-tasks of increasing detail to allow formulation of reasonable cost and schedule estimates.

The Level 2 WBS for NWMO's input to the APM cost estimate is identified as:

- 05 Building Relationships
- 10 Adapting to Change
- 15 Siting
- 20 Design Development & Safety Case
- 25 Research & Confidence Building
- 30 Site Verification & Licence Support
- 90 Common Services

Each of the evaluated work elements from the WBS was assessed in terms of required internal labour, material and equipment, other and allowances. The WBS components are scheduled in project years. Year 1 is 2010. Estimated costs are stated in constant 2010 Canadian dollars.

Microsoft Excel workbooks were used to collect, consolidate and report the NWMO's portion of the APM cost estimate. Separate workbooks were created for case 560 and 561.

#### **APM Implementation Schedule**

For financial planning purposes, the overall schedule for implementing APM is illustrated below for the Base Case used fuel scenario with 3.6 million used fuel bundles:

Illustrative APM Implementation Schedule				
Calendar	Year	Major Activities and Assumptions for Financial Planning & Work Program		
Year				
2007		Government Decision		
2008		1 1 000	B	
2009		develop Sit	ing Process	
2010	Y01	1 10 1	1 1	
2011	Y02	Initial screening of communities	Initiate siting process; outreach activities	
2012	Y03	Feasibility studies in potential sites	Briefings & resources for communities	
2013	Y04	Prelim field investigations	Third-party reviews	
2014	Y05	0 ( 0 ) ( ; ; ; ; ; ;	Engage potentially affected communities	
2015	Y06	Surface & subsurface investigations in	Socio-economic impact assessments	
2016	Y07	candidate sites	Detailed site investigations in collaboration	
2017	Y08	Design & safety assessment work	with communities; discussion of benefits	
2018	Y09	Select preferred site	Negotiate terms & conditions for agreement	
2019	Y10	Apply for Site Prep & Construction Licence	NWMO & community ratify formal	
2020	Y11	Finalize site-specific design & safety	agreement to host facility	
2021	Y12	assessment work for EA & licence	Benefits to host community	
2022	Y13	Submit EIS & licensing documents	Establish centre of expertise (surface), in	
2023	Y14	Obtain Site Preparation & Underground	partnership with community	
2024	Y15	Demo Facility Licence	Participant support to EA process	
2025	Y16	Construct Underground Demo Facility		
2026	Y17	Begin site-specific demonstrations of	Establish centre of expertise (underground)	
2027	Y18	repository technology	Community offsets & benefits	
2028	Y19	Final design & safety assessment	Socio-economic impact monitoring	
2029	Y20	Obtain DGR Construction Licence		
2030	Y21			
2031	Y22	Apply for Operating Licence	Centre of expertise (surface / underground)	
2032	Y23	Construct initial components of DGR	Community offsets & benefits	
2033	Y24	Obtain Operating Licence	Socio-economic impact monitoring	
2034	Y25	, ,		
2035	Y26	begin APM D	GR operation	
2064	Y55		R operation	
2065	Y56	begin Extended Monitoring		
2134	Y125	end Extended Monitoring		
2135	Y126	begin Decommissioning & Closure		
2159	Y150	end Decommissioning & Closure		
2160	Y151	begin Postclosure Monitoring		

The Alternate Case extends the end of APM DGR operations to Y85 with all subsequent dates pushed by 30 years into the future.

#### **Estimated APM Costs**

Estimates have been prepared for labour, materials and equipment, other costs and contingency.

Subject to the inclusions, exclusions, assumptions and limitations presented in the report, the estimated cost of the NWMO input to the APM cost estimate for a DGR is (in 2010 \$):

• Base Case (3.6 million used CANDU fuel bundles): \$2.94 billion; and

• Alternate Case (7.2 million used CANDU fuel bundles): \$3.68 billion

Costs by APM implementation phase for the Base Case were estimated as follows:

#### NWMO Input to APM Cost Estimate - Base Case (3.6 million fuel bundles)

APM Implementation Phase	Cost (2010K\$)
Siting (Years 1-9)	\$766,875
Construction Licence Application (Years 10-15)	\$500,721
Construction UDF(Years 16-20)	\$274,246
Construction DGR (Years 21-25)	\$268,041
DGR Operations (Years 26-55)	\$473,524
Extended Monitoring (Years 56-125)	\$446,239
Decommissioning (Years 126-150)	\$139,072
Postclosure Monitoring (Years 151+)	\$67,969
Total Cost	\$2,936,687

Costs by APM implementation phase for the Alternate Case were estimated as follows:

#### NWMO Input to APM Cost Estimate - Alternate Case (7.2 million fuel bundles)

APM Implementation Phase	Cost (2010K\$)
Siting (Years 1-9)	\$956,796
Construction Licence Application (Years 10-15)	\$511,041
Construction UDF(Years 16-20)	\$279,617
Construction DGR (Years 21-25)	\$272,161
DGR Operations (Years 26-85)	\$957,503
Extended Monitoring (Years 86-155)	\$480,475
Decommissioning (Years 156-180)	\$158,532
Postclosure Monitoring (Years 181+)	\$67,969
Total Cost	\$3,684,094

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#### 1. INTRODUCTION

The Nuclear Waste Management Organization (NWMO) is implementing Adaptive Phased Management (APM), Canada's plan for the long-term management of its used nuclear fuel. The APM approach includes centralized containment and isolation of used nuclear fuel in a deep geological repository constructed within a suitable host rock formation such as crystalline rock or sedimentary rock. APM also includes a used fuel transportation system.

From 2009 to 2011, NWMO and SNC-Lavalin updated the previous conceptual design and cost estimate for the APM deep geological repository (DGR) prepared by CTECH (2002; 2003) and for the APM used fuel transportation system prepared by Cogema (2003a; 2003b). The cost estimating activities for the APM update were allocated as follows:

- 1. NWMO was responsible for estimating APM costs for siting, design development, safety assessment, licensing, approvals, program management and related support to APM facility construction, operation decommissioning and closure.
- 2. SNC-Lavalin was responsible for estimating APM costs for final design, construction, operation, extended monitoring, decommissioning and closure of the APM facility (SNC-Lavalin 2011a; 2011b) and for the used fuel transportation system (SNC-Lavalin 2011c; 2011d).

The Work Breakdown Structure (WBS) defines the APM project work elements for cost estimating purposes and is discussed in further detail in Section 2.2. NWMO's input to the APM cost estimate addresses:

- 05 Building Relationships
- 10 Adapting to Change
- 15 Siting
- 20 Design Development & Safety Case
- 25 Research & Confidence Building
- 30 Site Verification & Licence Support
- 90 Common Services

SNC-Lavalin's input to the APM cost estimate addresses:

- 40 Facility Design & Construction
- 45 Facility Operation
- 55 Environmental Assessment & Monitoring
- 60 Decommissioning & Closure

This report presents the NWMO portion of the updated APM cost estimate for a repository constructed in crystalline rock for two possible used nuclear fuel inventory scenarios. The Base Case scenario assumes 3.6 million used CANDU fuel bundles and the Alternate Case scenario assumes 7.2 million used CANDU fuel bundles (SNC-Lavalin 2011a). These used fuel bundles are assumed to be produced at Canadian nuclear facilities owned by Ontario Power Generation Inc. (OPG), New Brunswick Power Nuclear (NBP), Hydro-Québec (HQ) and Atomic Energy of Canada Limited (AECL).

The cost estimate for the NWMO portion of the APM facility was prepared by NWMO subject matter experts based on the WBS listed above, and reviewed and updated the Work Element Definition Sheets (WEDS) previously prepared by OPG and incorporated into the cost estimate prepared by CTECH (2003). The WEDS were subsequently reviewed within NWMO to validate APM content and ensure the estimates were prepared consistent with APM assumptions which are outlined in Section 1.2.

#### 1.1 PURPOSE OF COST ESTIMATE

The purpose of the updated conceptual APM lifecycle cost and schedule estimate for a deep geological repository and associated used fuel transportation system is to allow NWMO to examine the financial implications of managing Canada's used nuclear fuel over the long term.

This report documents the NWMO's portion of the updated cost estimate for an APM deep geological repository. The cost estimate for the balance of the APM deep geological repository can be found in a companion report prepared by SNC-Lavalin (2011b). The cost estimate for the used fuel transportation system can be found in SNC-Lavalin (2011d).

#### 1.2 COST ESTIMATING ASSUMPTIONS

The APM cost estimate has been based on a number of high-level assumptions. Many of these assumptions are for financial planning purposes. Actual implementation of APM may differ substantially. These assumptions can affect the scope of work and the timing of the activities. The major APM cost estimating assumptions are outlined below:

#### **Cost Estimating Assumptions:**

#### Siting Phase

- 1. All APM technical development work will be completed by the time of construction of the APM deep geological repository. Demonstration of repository technology may occur in the Underground Demonstration Facility (UDF).
- 2. APM technical work program activities will proceed in parallel with the schedule for APM siting to support advancement of the siting process, design development and the safety case for a used fuel deep geological repository.
- 3. The cost estimate assumes the APM program will be continuous with no hold points or abnormal periods of inactivity whilst awaiting funding approvals, management reviews or licensing decisions. However, the cost estimate has assumed reasonable time periods for the completion of siting tasks.
- 4. The design of the APM facility will accept and accommodate the total Canadian used nuclear fuel inventory of 3.6 million used CANDU bundles (Base Case) and 7.2 million used CANDU bundles (Alternate Case).
- 5. The used fuel container (UFC) design will be optimised and a prototype container built prior to submission of the Canadian Nuclear Safety Commission (CNSC) licence and federal environmental assessment (EA) hearing for a preferred site.
- 6. It is assumed that up to two candidate sites would be subject to detailed site characterisation and evaluation and as a result, two sites would be purchased or have options to purchase.

#### **Construction Phase**

- 7. Detailed engineering design and <u>Engineer</u>, <u>Procure and <u>Construction</u> (EPC) costs have been prepared by SNC-Lavalin (2011b).</u>
- 8. Detailed final engineering design and the preparation of working drawings for the facility will commence immediately following award of a site preparation and construction licence by the CNSC.
- 9. The APM facility includes construction of a campsite. Any improvement or expansion of town site services or infrastructure is a contingent item subject to discussions between the NWMO and the community.
- 10. The underground portion of the APM facility is assumed to be a network of horizontal tunnels and placement rooms for the UFCs excavated at a depth of 500 m in plutonic rock, with vertical shafts extending to surface. During construction of the underground facilities, unsuitable rock conditions are assumed for 10% of the in-floor borehole excavations in the placement rooms.
- 11. The APM facility is designed to accommodate underground characterisation, technology demonstration and monitoring tests during operations and a period of extended monitoring until the site is ready for decommissioning.
- 12. NWMO staff increases during construction are required for owner's acceptance of drawings, engineering packages, and general constructor oversight.

#### **Operations Phase**

- 13. The APM facility operations will commence following the construction of the surface facilities, shafts, underground infrastructure and initial placement room panels and with the successful submission of the Final Safety Report and award of an Operating Licence by the CNSC.
- 14. The design throughput of the APM facility will be 120,000 used fuel bundles per year resulting in 333 UFCs/year.
- 15. All used fuel assumed to be transported to the APM facility via road. (Other modes of transport, such as mostly rail and mostly water, are possible).
- 16. The APM facility will have all necessary staff and equipment to unload a transportation cask from the transport vehicle, conduct radiological surveys, unload used nuclear fuel from the cask and to prepare the empty cask for the return journey.
- 17. The Used Fuel Packaging Plant (UFPP) is located at the APM facility site.
- 18. All used fuel delivered to the APM facility will be received at the packaging plant in transportation casks and then packaged for placement underground.
- 19. The UFC copper container and inner vessel will be fabricated at an unspecified offsite location(s) and then shipped 1,000 km to the APM facility. The cost of the copper container and inner vessel will include the cost of transportation to the site.
- 20. NWMO's input to the cost estimate includes support required for licence renewals, monitoring, geoscience and social support during operations and long-term monitoring.

#### **Extended Monitoring Phase**

- 21. The APM site infrastructure, surface buildings and underground works will be held in a care and maintenance regime for an extended period of monitoring following the completion of UFC placement operations. After this time the site infrastructure and surface buildings will be made good for use during the decommissioning of the overall facility. By adopting this philosophy, all facilities will also be available for use should monitoring of the DGR identify the need to retrieve placed UFCs at any time during extended monitoring.
- 22. During this preclosure period the placement rooms will be sealed but the tunnels and shafts will remain open so that monitoring and access to the placement rooms is maintained.

#### **Decommissioning and Closure Phase**

- 23. Decommissioning work is conducted by others.
- 24. NWMO's staff support includes work required for licence renewals, monitoring, geoscience and social support.
- 25. All major surface facilities are decontaminated, dismantled and removed. All underground tunnels, shafts and exploratory boreholes are backfilled and sealed.
- After major decommissioning activities are complete, institutional control, site security and monitoring of remaining infrastructure are maintained until a Site Abandonment licence has been obtained from CNSC.

#### **Postclosure Monitoring**

27. The specific requirements and activities associated with closure of the APM facility such as the nature and duration of postclosure monitoring are not known and will be decided in collaboration with a future society.

#### General

- 28. All labour, equipment and material costs are inclusive of any profit.
- 29. The estimate is based on an APM facility design that receives CANDU used fuel bundles from the Canadian nuclear fuel waste owners (i.e., OPG, NBP, HQ and AECL).
- 30. The scope of this estimate excludes consideration of non-standard nuclear fuels.
- 31. All costs reflect the cost of local labour and materials.
- 32. The cost estimate is prepared and budgeted in January 2010 current dollars and will be scheduled in elapsed time.

More detailed estimating assumptions associated with lower levels of the APM project work breakdown structure (WBS) are included on work element definition sheets (WEDS) for each individual work element (see Appendices A and B).

For financial planning purposes, Figure 1.1 illustrates the assumed sequence of APM activities and their durations through the phases of siting, design, construction, operation, decommissioning and closure.

		Illustrative APM Implementation Schedule		
Calendar	Year	Major Activities and Assumptions for Financial Planning & Work Program		
Year				
2007		Government Decision		
2008		develop Sit	ing Process	
2009		develop on		
2010	Y01	Initial screening of communities	Initiate siting process; outreach activities	
2011	Y02	Feasibility studies in potential sites	Briefings & resources for communities	
2012	Y03	Prelim field investigations	Third-party reviews	
2013	Y04	Trelliti field irrvestigations	Tima party reviews	
2014	Y05	Surface & subsurface investigations in	Engage potentially affected communities	
2015	Y06	Surface & subsurface investigations in candidate sites	Socio-economic impact assessments	
2016	Y07		Detailed site investigations in collaboration	
2017	Y08	Design & safety assessment work Select preferred site	with communities; discussion of benefits	
2018	Y09	Sciest preferred site	Negotiate terms & conditions for agreement	
2019	Y10	Apply for Site Prep & Construction Licence	NWMO & community ratify formal	
2020	Y11	Finalize site-specific design & safety	agreement to host facility	
2021	Y12	assessment work for EA & licence	Benefits to host community	
2022	Y13	Submit EIS & licensing documents	Establish centre of expertise (surface), in	
2023	Y14	Obtain Site Preparation & Underground	partnership with community	
2024	Y15	Demo Facility Licence	Participant support to EA process	
2025	Y16	Construct Underground Demo Facility		
2026	Y17	Begin site-specific demonstrations of	Establish centre of expertise (underground)	
2027	Y18	repository technology	Community offsets & benefits	
2028	Y19	Final design & safety assessment	Socio-economic impact monitoring	
2029	Y20	Obtain DGR Construction Licence	,	
2030	Y21			
2031	Y22	Apply for Operating Licence	Centre of expertise (surface / underground)	
2032	Y23	Construct initial components of DGR	Community offsets & benefits	
2033	Y24	Obtain Operating Licence	Socio-economic impact monitoring	
2034	Y25	, ,		
2035	Y26	begin APM D	GR operation	
2064	Y55		R operation	
2065	Y56	begin Extended Monitoring		
2134	Y125	end Extended Monitoring		
2135	Y126	begin Decommissioning & Closure		
2159	Y150		ioning & Closure	
2160	Y151	begin Postclosure Monitoring		

Figure 1.1: Illustrative APM Implementation Schedule for 3.6 Million Bundle Scenario

#### 1.3 LEVEL OF COST ESTIMATION

The APM design and cost estimate for a deep geological repository is currently at a concept level of development and has been prepared for financial planning purposes as part of the NWMO funding formula and is not a project control estimate.

No site has been identified for the APM facility. It is assumed that initial screening will be performed for interested communities, followed by desktop feasibility studies, preliminary field investigations, detailed site characterization and planned selection of a preferred site by 2018.

Engineering design for the APM facility is at the conceptual level. NWMO's effort through siting and into construction licence submission is focused on advancement of unique APM technology and site characterization activities. Therefore, NWMO engineering design development cost estimates are based on concept advancement, development of prototypes and pre-production demonstration of repository technology. For example, CANDU fuel transfer operations in a Used Fuel Packaging Plant (UFPP) have not been defined at a detailed level. Specialised technology for implementation will need to be developed and will require proof of principle to manage technology risk followed by prototype development.

The safety case for a deep geological repository will require refinements in safety assessment tools and methods, supporting science and preparation of a preliminary safety case as well as a final safety case prior to obtaining an Operating Licence.

Regulatory affairs effort and expenses are based on facilitating pre-project and other submissions to the CNSC as well as cost recovery expenses from the CNSC.

Geoscience activities are in support of the siting process through screening and evaluation of site characteristics to ensure site suitability for its intended purpose.

The APM cost estimate has been developed using 2010 dollars. Unless otherwise stated, all cost estimates in this report are in 2010 dollars.

Year 01 costs are defined as APM costs incurred in 2010.

#### 2. OVERVIEW OF APM WORK PROGRAM

#### 2.1 OVERVIEW

The APM design process that has led to the facility description provided in this report and described in detail by SNC-Lavalin (2011a) has involved the application of design parameters and specifications set by previous development work (CTECH 2002). Using these parameters and specifications together with information from existing repository design experience drawn from other national radioactive waste management organizations with repository development programs, a conceptual APM facility incorporating the placement of used fuel containers (UFCs) at a depth of 500 m beneath ground level was produced and analysed.

The work program for the APM design presented covers all aspects in the implementation of the project, from initial siting studies through to the closure of the site, after which there will be no institutional controls in place. Operational activities begin at the receipt of used fuel consignments at the APM facility, and therefore the cost of handling and transporting used fuel prior to its receipt at the APM facility are addressed elsewhere in the program.

#### 2.2 WORK BREAKDOWN STRUCTURE

Figure 2.1 shows the APM facility WBS work elements at Level 2 of the program. The WBS incorporates eleven Level 2 work elements that cover all the aspects of a program to site, design, develop, construct, operate, monitor, decommission and close an APM facility for long-term management of Canada's used nuclear fuel.

The WBS also indicates the work element identifiers and the organisations (e.g., NWMO and SNC-Lavalin) that prepared the cost estimate for the various areas of the project, on which the total APM cost estimate has been based.

Table 2.1 shows the general structure of the WBS to Level 4 of the NWMO input to the APM cost estimate:

- Level 1: Project
- Level 2: Objective
- Level 3: Functional Area
- Level 4: Project Stage

The WBS to the lowest level of the NWMO input to the APM cost estimate is Appendix A.

The WBS example in Table 2.1 has been developed for an APM facility with 3.6 million used CANDU fuel bundles in crystalline rock.

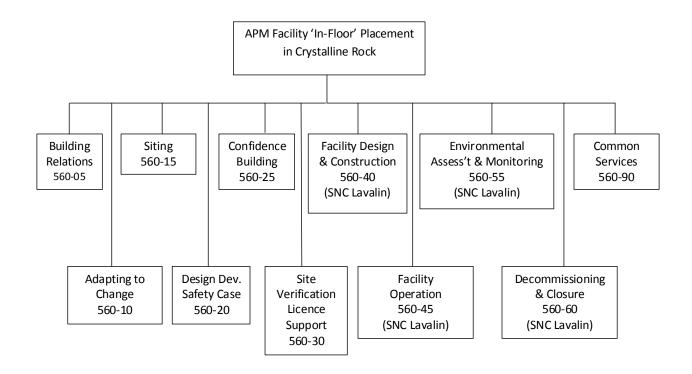


Figure 2.1: APM Work Breakdown Structure (WBS)

Table 2.1: APM WBS to Level 4 - NWMO Input to APM Cost Estimate

L1: Project	L2: Objective	L3: Functional Area	L4: Project Stage
560 – 3.6 million used fuel bundles	05 – Building Relationships	10 – Social	10 – Siting (Y1 – Y9)
in crystalline rock	10 – Adapting to Change	20 – Geoscience	20 – Construction Licence Application (Y10 – Y15)
	15 – Siting	30 – Repository Safety	30 – Construction (Y16 – Y25)
	20 – Design Development & Safety Case	40 – Regulatory Affairs	40 – Operation (Y26 – Y55)
	25 – Research & Confidence Building	50 – Repository Engineering	50 – Extended Monitoring (Y56 – Y125)
	30 – Site Verification & Licence Support	60 – Finance	60 – Decommissioning (Y126 – Y150)
	90 – Common Services	70 – Quality Assurance	70 – Closure (Y151)
		80 – Office of the President & Head Office	

The following subsections describe the activities associated with the Level 2 work elements indicated in the WBS.

#### 2.2.1 560-05, Building Relationships

Critical to the success of Adaptive Phased Management (APM) is the involvement of the Canadian public, including Aboriginal people, at all stages of implementation and in key decisions through open, transparent and inclusive engagement processes. In building relationships, the NWMO will seek and be responsive to a diversity of views and perspectives. NWMO will communicate and consult actively, promoting thoughtful reflection and facilitating a constructive dialogue in different aspects of APM implementation.

A continuum of briefings, collaborative projects and partnerships will be advanced to support the further development and maintenance of relationships with municipal, Aboriginal and federal and provincial governments.

#### 2.2.2 560-10, Adapting to Change

A fundamental tenet of APM is the ongoing incorporation of new learning and knowledge to guide decision making. NWMO has established a process for ongoing monitoring, review and reporting in areas of technological developments and societal views and expectations relating to APM implementation. NWMO reports regularly on its progress in implementing APM, especially in response to the advice of Canadians and the changing external environment.

#### 2.2.3 560-15, Siting

The process to select an APM site in an informed and willing host community was initiated in May 2010. The siting process begins with a period of learning and capacity building for communities. The APM program assumes communities elect to progress through subsequent steps of screening, feasibility study and field investigations. The assumptions for this cost estimate are:

- Up to 2 sites enter detailed characterization and evaluation
- 1 preferred site selected

The end of the process is achieved with selection of one preferred site selected which is assumed to be completed in Year 09 or 2018.

Although the activities related to siting are completed upon successful site selection, some financial obligations continue beyond Year 09. These include infrastructure commitments to the successful community and modeled commitments for a centre of excellence.

#### 2.2.4 560-20, Design Development & Safety Case

Design Development and Safety Case includes all activities related to the development of conceptual, feasibility and preliminary designs for the APM facility. The work activities include advancement of generic design concepts in support of site selection, site specific design

advancement, unique technology advancement, generic and site specific safety cases. Specific activities focus on:

- Container development, demonstration and fabrication
- Site dependent repository designs
- Used fuel packaging plant conceptual design and demonstration
- Placement and retrieval systems
- Sealing materials
- Management support

Areas where technology requires additional development for deployment in the APM program are generally focused around the used fuel processes. Although a copper container has been produced by other national waste management organizations such as SKB (Sweden) and Posiva (Finland), their container dimensions are different from NWMO's current reference design for cost estimating. Application engineering would be required to customize the demonstrated products for NWMO's specific container type and size. While the UFPP can reference a significant portion of established technology from SKB's more mature and demonstrated technologies with respect to container sealing, inspection and deployment underground, the Canadian CANDU fuel transfer operations for the UFPP require advancement of concepts in preparation of prototype units for technology demonstration.

Canada has demonstrated leadership in CANDU fuel transfer operations and this domestic expertise will be investigated for fuel transfer operations. Similar advancement programs are required for monitoring, container placement and retrieval, and sealing system demonstration.

#### 2.2.5 560-25, Confidence Building

A number of technical and scientific activities are being conducted to further increase confidence in the safety case for the APM facility and to improve NWMO's understanding of key scientific processes that may influence repository safety.

These confidence building and process understanding activities include models of the engineered barrier system, groundwater flow system evolution, integrated safety assessment models and full-scale demonstration of repository technology both in Canada and with international partners in joint research facilities.

#### 2.2.6 560-30, Site Verification & Licence Support

NWMO site verification and licensing support activities ultimately lead/support confirmation of site characteristics in support of licensing and environmental assessments. Also, site verification and licensing support provide ongoing technical support required to obtain and maintain the various licences through construction, operation, long-term monitoring, decommissioning and site closure of the APM facility. The functional areas contributing most significantly to site verification and licence support include repository safety, geoscience and regulatory affairs. Repository engineering also has some involvement in support of the licensing processes and monitoring technologies. Specific areas of work scope include:

- Establishing a geoscience information management system
- Geoscience activities to support:

- Supporting the regulatory process by addressing regulatory questions
- Monitoring at the preferred site
- Numerical analysis during construction
- o DGR operation, extended monitoring, decommissioning and closure
- Repository Safety activities to support:
  - Update of safety case data sets
  - Preclosure and postclosure safety cases
  - o ALARA, conventional, and radiological safety assessments
  - Natural analogues
  - Biosphere characterization and monitoring
  - Preparation of PSR and FSAR safety case reports
  - Human health monitoring included during extended monitoring
  - o Operations, monitoring, decommissioning and closure safety assessments
  - Support the regulatory review
- Regulatory Affairs activities to support:
  - o Preparation for EA, EA submission and public hearings
  - o Government approvals at the federal, provincial and municipal level
  - Licence applications and hearings
  - Licence maintenance through all phases of the APM lifecycle
- Repository Engineering activities are in support of:
  - Ongoing monitoring activities
  - Safeguards

#### 2.2.7 560-40, Facility Design & Construction (SNC-Lavalin)

The APM DGR Facility Design & Construction has been outlined in detail by SNC-Lavalin (2011b). The scope includes:

- Preferred Site Confirmation (excludes NWMO's scope of work)
- Site Improvements
- Construction Phase Indirects
- Surface Process Facilities
- Surface Auxiliary Facilities
- Underground Facilities
- Common Services (infrastructure structure for electrical distribution, communication, water system, sewerage, etc.)

#### 2.2.8 560-45, Facility Operation including Extended Monitoring (SNC-Lavalin)

The APM DGR Facility Operation has been outlined in detail by SNC-Lavalin (2011b). The scope includes operation and management functions for surface and underground facilities for the receipt of used fuel transported from the interim storage facilities to the UFPP at the APM facility, re-packaging the used fuel into long-lived UFCs and placement of the UFCs in the deep geological repository from Year 26 to Year 55 (Base Case).

APM facility operation and the UFPP have been designed to receive 120,000 used fuel bundles per year with an annual throughput of about 333 UFCs per year for placement in the repository. The Sealing Materials Compaction Plant will prepare the clay-based bentonite buffer rings and disks, backfill blocks and gap fill material for the underground placement rooms.

Following placement of the final UFC, operation of the APM facility will continue with a period of extended monitoring for up to 70 years from Year 56 to Year 125 (Base Case). The duration of extended monitoring will be decided in collaboration with a future society.

#### 2.2.9 560-55, Environmental Management & Monitoring (SNC-Lavalin)

The APM DGR Environmental Management and Monitoring has been outlined in detail by SNC-Lavalin (2011b). The scope includes operation and management of the APM facility during extended monitoring following the final UFC placement underground.

#### 2.2.10 560-60, Facility Decommissioning & Closure (SNC-Lavalin)

The APM DGR Facility Decommissioning and Closure has been outlined in detail by SNC-Lavalin (2011b). The scope includes decommissioning management, construction and operation of related facilities and decommissioning and closure of the surface and underground. The nature and duration of postclosure monitoring will be decided in collaboration with a future society.

#### 2.2.11 560-90, Common Services

Common Services for the NWMO portion of the APM cost estimate describes the preoperational program management costs from Year 1 to Year 25 and includes senior-level APM staff direction to the program, as well as project management and financial and business support for the program up to the point where operations commence.

Corporate quality assurance (QA) staffing for NWMO have been costed separately from Common Services and are carried in the NWMO estimate through Year 01 to the end of the project at Year 151 for the base case and Year 181 for the alternate case.

As a point of clarification, the SNC-Lavalin report (SNC-Lavalin 2011b) identifies this same function as Operations Program Management.

#### 3. OVERVIEW OF APM ACTIVITIES BY PHASE

Generally, the majority of NWMO's project activities forming the basis of the cost estimate are pre-operational APM activities incurred in the initial twenty-five years of the project. During this period, the NWMO will be performing activities necessary to:

- Obtain a site preparation and construction site
- Communicate and consult facilitating constructive dialogue in different aspects of APM implementation
- Advance unique technologies currently not in a production ready state
- · Reduce technology and licensing risks
- Mature the overall design in preparation for an EPC contract
- Maintain and build an organization capable of performing the EPC Management

Following the start of APM DGR operation in Year 26, the NWMO cost estimate identifies those unique costs not included in the SNC-Lavalin cost estimate (SNC-Lavalin 2011b) for activities beyond Year 25 such as:

- Site licence maintenance through all project phases.
- Performance monitoring of the APM facility.
- Ongoing community consultation and communication.
- Support operations, long-term monitoring, decommissioning and closure.

#### 3.1 SITING PHASE (YEARS 1-9)

The siting phase covers the time period in which a suitable location for the APM facility is being sought. It begins after a formal decision is made to start the process of finding a suitable site and ends once the preferred site is selected.

The siting phase involves developing a siting process and site screening criteria, site screening and site evaluations.

Site characterisation activities during the Siting Phase would involve an iterative process of investigation. Initially, a preliminary screening exercise would be performed on up to fifteen sites followed by non-invasive surface-based feasibility studies on up to eight candidate areas. These studies would then be followed by preliminary field studies on up to four sites followed by invasive surface-based studies at up to two candidate sites to arrive at the final preferred site. These activities would provide an understanding of site specific geosphere and biosphere conditions necessary to assess and communicate possible site suitability to host an APM facility. These site characterisation activities would be coupled with stakeholder consultation to gain consensus and to select a preferred APM site.

During the siting phase, preliminary conceptual APM designs would be prepared for each site being evaluated. Design work would be completed for the surface and underground facilities primarily to establish the access, utility and infrastructure requirements. These requirements would be assessed during site screening to ensure that they could be met at potentially suitable site locations in the areas selected for detailed evaluation. Details of the environmental and APM monitoring program would also be developed, and the plan to incorporate this program

into subsequent site evaluation activities would be prepared during site screening. The end point of the siting phase is selection of a preferred site.

#### 3.2 CONSTRUCTION LICENCE APPLICATION (YEARS 10-15)

Upon successful selection of a preferred site, the APM program will move into preparation of safety assessment and environmental impact documents, participation in public consultations and hearings, and the preparation of licence applications.

The implementing agency would be required to demonstrate, during the Environmental Assessment process, that there would be no adverse impact on the environment resulting from the construction, operation, decommissioning and closure of the APM facility, and during the post-closure period. Whilst there would inevitably be much focus on the radiological component on the environment, the more conventional environmental concerns would also be addressed. A comprehensive environmental survey to measure and record the current background conditions at the proposed site would be conducted.

A preliminary APM facility design specific for the site would be completed prior to entering into the Environmental Assessment process.

#### 3.3 CONSTRUCTION UDF PHASE (YEARS 16-20)

The Construction UDF Phase in the life cycle of the APM facility is the period when the Underground Demonstration Facility (UDF) and some functional surface and underground facilities and infrastructure are constructed. The phase begins with the receipt of regulatory approval to begin construction at the site and ends when the inactive commissioning of some facilities are completed for the UDF and related facilities.

The construction phase, by others, would involve constructing the infrastructure and surface facilities needed for the UDF and the underground access ways and service areas. The UDF would be the first area to be developed underground and the UDF may be used to test and confirm the configuration, equipment, and methodologies used to develop and operate the underground portion of the APM facility. The other main objective of the UDF would be to assess the characteristics of the geosphere within which the UFC repository will be developed and identify any major geologic features which could affect repository layout and construction. The UDF may operate for several years prior to the commencement of used fuel disposition and could have a continuing role over the life of the underground repository.

#### 3.4 CONSTRUCTION DGR PHASE (YEARS 21-25)

The construction of the DGR will be conducted by contractors. The NWMO will have project oversight and all licensing, social and regulatory scope related to the project as well as performing the unique geoscience characterization work required to ensure the APM project proceeds as expected.

After the underground evaluation studies have been carried out during the UDF construction phase and the final designs completed, the construction of the full-scale APM facility can begin. The purpose of the construction is to build all the facilities necessary for the operation of the APM facility and its components. Provision is made in the design for concurrent excavation during the operations phase to provide further placement rooms at the required time.

NWMO activities include site characterization, UDF experimentation, social activities required to maintain social licence, preparation of the required safety cases, securing all required licences, advancement/demonstration of unique technologies and maintenance of an organization to execute the project. The phase begins with the receipt of regulatory approval to begin construction of the used fuel repository and ends when the inactive and active commissioning of the facilities are completed prior to receiving the first formal shipment of used fuel for placement

#### 3.5 OPERATION PHASE (YEARS 26-55)

The Operation Phase is based on a 30 year period from Year 26 to 55, during which used fuel is packaged into UFCs and transferred underground and placed in the repository placement room.

The operation phase involves receiving used fuel transported to the APM facility, sealing it in corrosion resistant UFCs, placing and sealing the UFCs in placement room, and constructing and preparing additional placement rooms. The operation phase ends upon the start of extended monitoring.

#### 3.6 EXTENDED MONITORING PHASE (YEARS 56-125)

For cost estimating purposes, 70 years of extended monitoring of the repository has been assumed from Year 56 to 125, during which the evolution of the APM facility is monitored to ensure performance evolves as expected. The precise duration of extended monitoring will be a decision taken by a future generation, the host community and the NWMO.

Extended monitoring (Years 56 – 125) would involve monitoring and assessing the conditions in the vicinity of the APM facility prior to its decommissioning and closure. The extended monitoring program would make use of the shafts and underground access tunnels while still available, prior to APM facility sealing during the decommissioning phase. Extended monitoring activities would include environmental monitoring, monitoring UFC performance and monitoring rock mass behaviour. The monitoring data would be used to confirm and improve the long-term safety assessment of the sealed APM facility. The extended monitoring phase ends when approval is given to start decommissioning the APM facility.

#### 3.7 DECOMMISSIONING PHASE (YEARS 126-150)

Following the period of extended monitoring, the Decommissioning Phase is the 10 year period (Years 126 – 135) in the life cycle of the APM facility during which the major surface facilities are decontaminated, dismantled and removed. As well, the underground facilities are decontaminated (if necessary) and dismantled, and the access tunnels and shafts are backfilled and sealed.

Following these major decommissioning activities, the APM facility would enter into a 15 year closure period (Years 136 – 150) with continued institutional control, site security and monitoring of the remaining infrastructure and facility until a licence to abandon the site is obtained.

#### 3.8 POSTCLOSURE MONITORING (YEARS 151+)

The specific requirements and activities associated with the closure of the APM facility such as the nature and duration of any postclosure monitoring are not known and will be decided in collaboration with a future society. The objective is to return the site to a state such that safety would not depend on institutional controls.

#### 4. COST ESTIMATE

#### 4.1 BASIS OF ESTIMATE

A cost estimate has been developed for NWMO's scope of activities for the siting, design, construction, operation, preclosure monitoring, decommissioning and closure of an APM facility. The estimate is based on a conceptual design that includes the receipt of used fuel bundles, their packaging in UFCs and their subsequent placement in the underground excavations. The estimate also includes extended monitoring of the APM facility following placement of the used fuel prior to decommissioning and closure of the facility. The complete APM estimate is comprised of two independent estimates as documented by SNC-Lavalin (2011b) and this report.

The complete APM lifecycle cost estimate is the sum of the cost estimates in these reports.

The estimate documented in this report was developed through a bottom-up estimate of the conceptual and demonstration work by NWMO. A series of internal reviews confirmed assumptions and clarified scope. The authors of the estimates defined the content of their estimate in Work Element Definition sheets (WEDs) and the WEDs provide qualitative and quantitative scope descriptions. Detail of the work scope and content beyond this report can be obtained through review of the individual work elements used to generate the cost estimate.

#### 4.2 METHODOLOGY

This section describes the methodology by which costs for the various work elements of the project were established.

The WBS was re-organized to permit financial data definition by timeline and to be consistent with business planning processes as defined in Section 2.2.

The original 2003 CTECH work element sheets (essentially unique word documents containing task descriptions to the lowest meaningful level) for the deep geological repository concept were circulated to the NWMO content experts for review and update reflective of the 2010 state of knowledge. A basis of estimate document was generated to go along with the content update. A new WEDs structure was created and an excel workbook was used to capture content and present the numerical results in a tabular form. The WEDs workbook became the live financial model to generate the cost estimate on which this report is based.

Upon completion of the Excel WED workbook (financial model), a series of reviews were performed among authors, mid level management and senior level management. The reviews were completed to challenge the estimates and the underlying assumptions, validate consistency of approach and ensure organizational alignment of the WEDs content.

In addition to the high level assumptions, further assumptions were made to allow lower level work elements to be estimated. The importance of these lower level assumptions and their effect on the final estimated cost was documented during their formulation.

The financial model is the detailed back-up supporting the numbers generated in this report.

Costs included in the estimate presented have been established using various estimating methods, with the particular method used dependent upon the work element under consideration. Typical estimating techniques adopted and sources of information include:

- Previous experience, i.e., to estimate Licensing and Approval costs, nuclear facilities construction and decommissioning, mining facilities construction
- Comparison with similar facilities
- Research i.e. UFC procurement costs
- Construction from base levels i.e. identification of individual process activities to establish resource levels.

The overall management structure and staffing levels were determined and cross-checked with comparable facilities where possible.

#### 4.3 COST CATEGORIES

This section describes the four major cost categories that have been used in the cost estimate for each work element i.e. labour, materials and equipment, other and allowance.

#### 4.3.1 LABOUR COSTS

All labour costs are fully burdened costs, whether the labour costs are internal or external purchased services labour costs.

The labour resources together with the basis for the calculated rates are given in Section 4.6. To reduce the number of different labour resources applied to the project, a selection of composite labour resources have been identified for each of the organisations involved in the implementation of the project. These organisational categories can be summarised as:

- Nuclear Waste Management Organization (NWMO)
- Purchased Services

A composite labour resource was taken as the average of a group of grades that would make up a typical team representing that resource. This range of grades, or job descriptions, would reflect the hierarchy within the group under consideration. For example a composite administration resource may account for example; 1 administration manager, 10 senior clerical and 10 junior clerical grades. In this case, the composite labour resource gross hourly rate would be the total of each grades rate per hour divided by 21.

The manning levels for each activity were estimated using differing methods depending on the activities being considered, details of these are given on the WEDS for each lower level activity.

#### 4.3.2 MATERIAL AND EQUIPMENT COSTS

Where sufficient definition in the work scope permitted identification of materials and equipment costs, those costs were described in the work element description and financial summary. Typically for NWMO, material and equipment would be experimental equipment or prototyping equipment required to demonstrate technology or processes.

#### 4.3.3 OTHER COSTS

In most cases it was not possible to define the blend of unique material and equipment costs. In those instances, reliance on the technical subject matter experts and external references and benchmarks (e.g., SKB, Sweden) were used to generate estimates for contract costs expected to develop technology. The costs defined were identified as "other" since these costs will be a blend of labour, equipment and materials but the distributions within these categories is not known with certainty. The consolidated estimate update has been cross referenced against the previous CTECH cost estimate and other external benchmarks to validate the estimate generated.

#### 4.3.4 CONTINGENCY

A contingency of 25% has been allocated to the "Allowance Field" in the WEDS prepared by NWMO.

#### 4.4 ASSUMPTIONS

The major APM cost estimating assumptions are listed in Section 1.2. More detailed assumptions are compiled in the WEDS found in Appendix B.

#### 4.5 COST ANALYSIS OF LEVEL TWO WORK ELEMENTS

A summary of all costs can be found in the WEDS listing which can be found in Appendix B.

#### 4.5.1 560-05, Building Relationships

#### Base Case: 560. 3.6 M Bundles

The NWMO must communicate and consult actively to facilitate dialogue throughout the implementation of the APM program. A continuum of briefings, collaborative projects and partnerships will be advanced to support the further development and maintenance of relationships with municipal, Aboriginal and federal and provincial governments.

The total cost for the 3.6 million fuel bundle case is \$533.3 M for the duration of the project for Building Relationships.

Table 4.1: Base Case: APM Building Relationships Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$77,036,367
Construction Licence Application (Years 10-15)	\$60,452,565
Construction UDF (Years 16-20)	\$42,553,633
Construction DGR (Years 21-25)	\$42,478,633
DGR Operation (Years 26-55)	\$140,616,982
Extended Monitoring (Years 56-125)	\$135,702,760
Decommissioning (Years 126-150)	\$34,260,570
Postclosure Monitoring (Years 151+)	\$156,250
Total	\$533,257,760

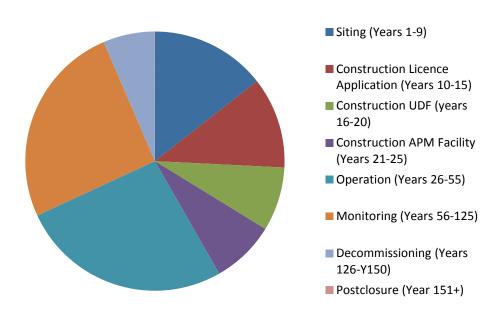


Figure 4.1: Base Case: APM Building Relationships Costs Through Project Phases

Alternate Case: 561, 7.2 M Bundles

Table 4.2: Alternate Case: APM Building Relationships Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$77,598,867
Construction Licence Application (Years 10-15)	\$61,390,065
Construction UDF (Years 16-20)	\$43,178,633
Construction DGR (Years 21-25)	\$43,103,633
DGR Operation (Years 26-85)	\$250,681,558
Extended Monitoring (Years 86-155)	\$135,702,760
Decommissioning (Years 156-180)	\$34,260,570
Postclosure Monitoring (Years 181+)	\$156,250
Total	\$646,072,336

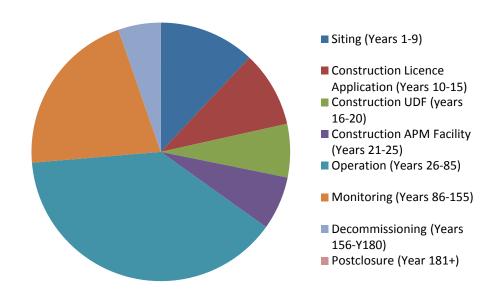


Figure 4.2: Alternate Case: APM Building Relationships Costs Through Project Phases

#### 4.5.2 560-10, Adapting to Change

#### Base Case: 560, 3.6 M Bundles

The NWMO has established a process for ongoing monitoring, review and reporting in areas of technological developments and societal views and expectations relating to APM implementation. NWMO reports regularly on its progress in implementing APM, especially in response to the advice of Canadians and the changing external environment. The total cost for the 3.6 million fuel bundle case is \$28.5 M for the duration of the project for Adapting to Change.

Table 4.3: Base Case: APM Adapting To Change Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$9,765,312
Construction Licence Application (Years 10-15)	\$4,864,283
Construction UDF (Years 16-20)	\$1,020,954
Construction DGR (Years 21-25)	\$590,505
DGR Operation (Years 26-55)	\$2,952,275
Extended Monitoring (Years 56-125)	\$6,888,641
Decommissioning (Years 126-150)	\$2,460,229
Postclosure Monitoring (Years 151+)	\$0
Total	\$28,542,199

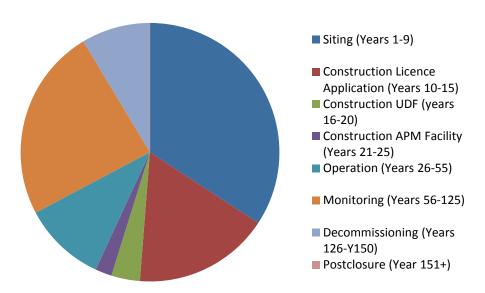


Figure 4.3: Base Case: APM Adapting To Change Costs Through Project Phases

Alternate Case: 561, 7.2 M Bundles

Table 4.4: Alternate Case: APM Adapting To Change Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$9,765,312
Construction Licence Application (Years 10-15)	\$4,864,283
Construction UDF (Years 16-20)	\$1,020,954
Construction DGR (Years 21-25)	\$590,505
DGR Operation (Years 26-85)	\$5,904,549
Extended Monitoring (Years 86-155)	\$6,888,641
Decommissioning (Years 156-180)	\$2,460,229
Postclosure Monitoring (Years 181+)	\$0
Total	\$31,494,473

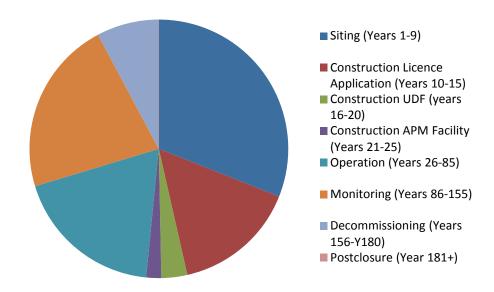


Figure 4.4: Alternate Case: APM Adapting To Change Costs Through Project Phases

#### 4.5.3 560-15, Siting

Base Case: 560, 3.6 M Bundles

Siting costs for the full duration of the project are \$568 M for the base of case of 3.6 million CANDU fuel bundles. Infrastructure costs for siting continue for 15 years after site selection.

Table 4.5: Base Case: APM Siting Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$457,496,780
Construction Licence Application (Years 10-15)	\$59,427,443
Construction UDF (Years 16-20)	\$11,468,750
Construction DGR (Years 21-25)	\$8,368,750
DGR Operation (Years 26-55)	\$22,500,000
Extended Monitoring (Years 56-125)	\$8,750,000
Decommissioning (Years 126-150)	\$0
Postclosure Monitoring (Years 151+)	\$0
Total	\$568,011,723

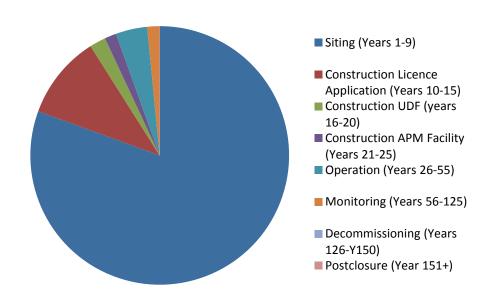


Figure 4.5: Base Case: APM Siting Costs Through Project Phases

Alternate Case: 561, 7.2 M Bundles

Table 4.6: Alternate Case: APM Siting Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$646,855,255
Construction Licence Application (Years 10-15)	\$59,427,443
Construction UDF (Years 16-20)	\$11,468,750
Construction DGR (Years 21-25)	\$8,368,750
DGR Operation (Years 26-85)	\$45,000,000
Extended Monitoring (Years 86-155)	\$8,750,000
Decommissioning (Years 156-180)	\$0
Postclosure Monitoring (Years 181+)	\$0
Total	\$779,870,198

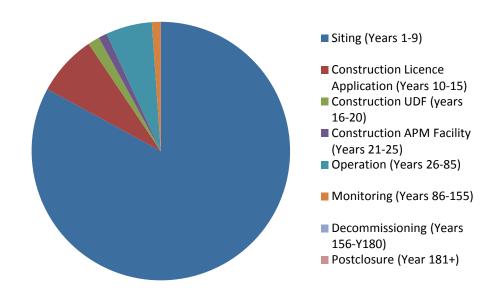


Figure 4.6: Alternate Case: APM Siting Costs Through Project Phases

## 4.5.4 560-20, Design Development & Safety Case

## Base Case: 560, 3.6 M Bundles

Design Development & Safety Case includes all activities related to the development of conceptual, feasibility and preliminary designs for the DGR. The work activities include advancement of generic design concepts in advance of site selection, site specific design advancement, unique technology advancement, generic safety cases and site specific safety cases.

Total Design Development & Safety Case costs for the full duration of the project are \$425.5 M for the base of case of 3.6 million CANDU fuel bundles.

Table 4.7: Base Case: APM Design Development & Safety Case Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$90,121,558
Construction Licence Application (Years 10-15)	\$186,367,888
Construction UDF (Years 16-20)	\$84,457,192
Construction DGR (Years 21-25)	\$42,563,509
DGR Operation (Years 26-55)	\$10,577,385
Extended Monitoring (Years 56-125)	\$11,391,030
Decommissioning (Years 126-150)	\$0
Postclosure Monitoring (Years 151+)	\$0
Total	\$425,478,562

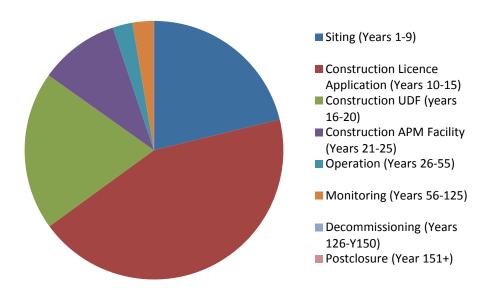


Figure 4.7: Base Case: APM Design Development & Safety Case Costs Through Project Phases

Table 4.8: Alternate Case: APM Design Development & Safety Case Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$90,121,558
Construction Licence Application (Years 10-15)	\$186,367,888
Construction UDF (Years 16-20)	\$84,457,192
Construction DGR (Years 21-25)	\$42,563,509
DGR Operation (Years 26-85)	\$20,341,125
Extended Monitoring (Years 86-155)	\$11,391,030
Decommissioning (Years 156-180)	\$0
Postclosure Monitoring (Years 181+)	\$0
Total	\$435,242,302

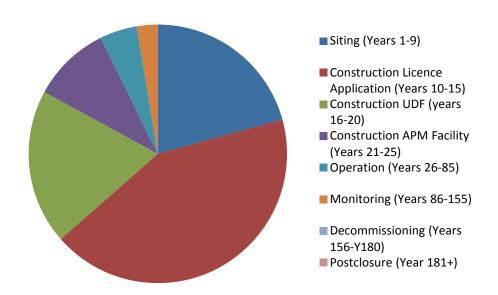


Figure 4.8: Alternate Case: APM Design Development & Safety Case Costs Through Project Phases

# 4.5.5 560-25, Confidence Building

## Base Case: 560, 3.6 M Bundles

Confidence building are those family of activities required to enhance the scientific understanding required to successfully implement the APM technology. These activities are designed to increase the understanding of the underlying assumptions key to the safety case.

Total Confidence Building costs for the full duration of the project are \$183.9 M for the base of case of 3.6 million CANDU fuel bundles.

Table 4.9: Base Case: APM Confidence Building Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$45,180,277
Construction Licence Application (Years 10-15)	\$27,250,000
Construction UDF (Years 16-20)	\$23,625,000
Construction DGR (Years 21-25)	\$59,750,000
DGR Operation (Years 26-55)	\$28,125,000
Extended Monitoring (Years 56-125)	\$0
Decommissioning (Years 126-150)	\$0
Postclosure Monitoring (Years 151+)	\$0
Total	\$183,930,277

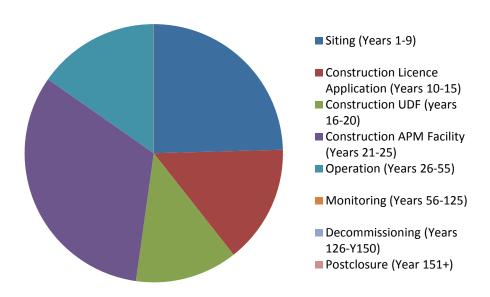


Figure 4.9: Base Case: APM Confidence Building Costs Through Project Phases

Table 4.10: Alternate Case: APM Confidence Building Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$45,180,277
Construction Licence Application (Years 10-15)	\$27,250,000
Construction UDF (Years 16-20)	\$23,625,000
Construction DGR (Years 21-25)	\$59,750,000
DGR Operation (Years 26-85)	\$46,875,000
Extended Monitoring (Years 86-155)	\$0
Decommissioning (Years 156-180)	\$0
Postclosure Monitoring (Years 181+)	\$0
Total	\$202,680,277

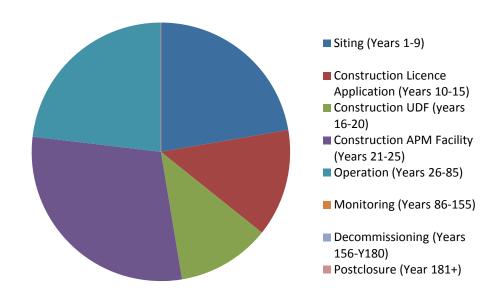


Figure 4.10: Alternate Case: APM Confidence Building Costs Through Project Phases

## 4.5.6 560-30, Site Verification & Licence Support

## Base Case: 560, 3.6 M Bundles

NWMO site verification and licensing support activities ultimately lead/support confirmation of site characteristics in support of licensing and environmental assessments. Also, site verification and licensing support provide ongoing technical support required to and maintain the various licences through construction, operation, long term monitoring decommissioning and site closure of the APM facility.

Total Site Verification & Licence Support costs for the full duration of the project are \$877.9 M for the base of case of 3.6 million CANDU fuel bundles.

Table 4.11: Base Case: APM Site Verification & Licence Support Costs Through Project
Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$2,185,380
Construction Licence Application (Years 10-15)	\$87,668,389
Construction UDF (Years 16-20)	\$62,117,352
Construction DGR (Years 21-25)	\$65,706,004
DGR Operation (Years 26-55)	\$241,836,811
Extended Monitoring (Years 56-125)	\$269,615,232
Decommissioning (Years 126-150)	\$80,959,973
Postclosure Monitoring (Years 151+)	\$67,812,786
Total	\$877,901,927

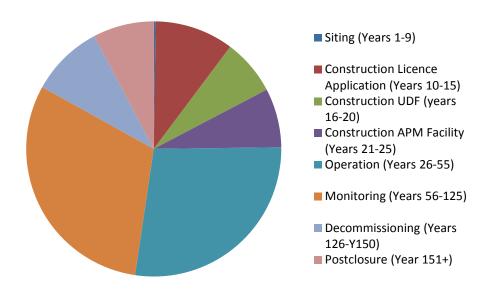


Figure 4.11: Base Case: APM Site Verification & Licence Support Costs Through Project
Phases

Table 4.12: Alternate Case: APM Site Verification & Licence Support Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$2,185,380
Construction Licence Application (Years 10-15)	\$97,051,137
Construction UDF (Years 16-20)	\$66,863,392
Construction DGR (Years 21-25)	\$69,202,044
DGR Operation (Years 26-85)	\$522,069,572
Extended Monitoring (Years 86-155)	\$295,968,762
Decommissioning (Years 156-180)	\$96,351,717
Postclosure Monitoring (Years 181+)	\$67,812,786
Total	\$1,217,504,790

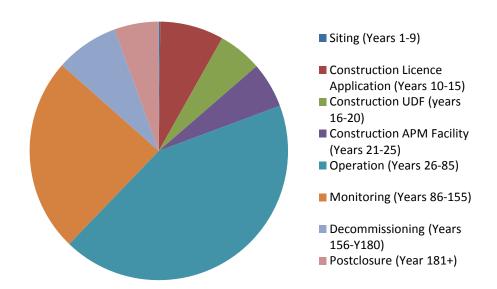


Figure 4.12: Alternate Case: APM Site Verification & Licence Support Costs Through Project Phases

# 4.5.7 560-40, Facility Design & Construction (SNC-Lavalin)

The Facility Design & Construction estimate is as defined in the "Deep Geological Repository Lifecycle Cost and Schedule Report" authored by SNC-Lavalin for the Base and Alternate case.

## 4.5.8 560-45, Facility Operation including Extended Monitoring (SNC-Lavalin)

The facility operation and extended monitoring costs are to be found in the "Deep Geological Repository Lifecycle Cost and Schedule Report" authored by SNC-Lavalin for the Base and Alternate case.

# 4.5.9 560-55, Environmental Management & Monitoring (SNC-Lavalin)

The environmental management system costs are to be found in "Deep Geological Repository Lifecycle Cost and Schedule Report" authored by SNC-Lavalin for the Base and Alternate Case.

## 4.5.10 560-60, Facility Decommissioning & Closure (SNC-Lavalin)

The facility decommissioning and closure estimate is as defined in the "Deep Geological Repository Lifecycle Cost and Schedule Report" authored by SNC-Lavalin for the Base and Alternate Case.

# 4.5.11 560-90, Common Services

## Base Case: 560, 3.6 M Bundles

Common Services include senior-level staff direction to the program, as well as, project management and financial and business support for the program up to the point where operations commence.

Corporate QA staffing for NWMO were estimated separately from Common Services but are included in the NWMO Common Services estimate.

Table 4.13: Base Case: APM Common Services Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$85,089,516
Construction Licence Application (Years 10-15)	\$74,690,152
Construction UDF (Years 16-20)	\$49,002,926
Construction DGR (Years 21-25)	\$48,583,254
DGR Operation (Years 26-55)	\$26,915,837
Extended Monitoring (Years 56-125)	\$13,891,030
Decommissioning (Years 126-150)	\$21,390,990
Postclosure Monitoring (Years 151+)	\$0
Total	\$319,563,705

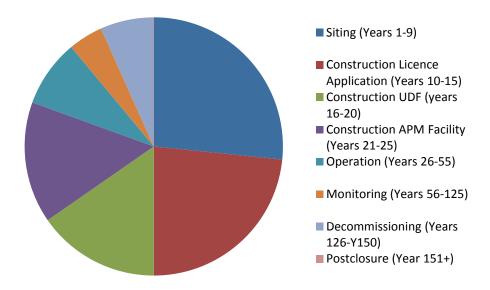


Figure 4.13: Base Case: APM Common Services Costs Through Project Phases

Table 4.14: Alternate Case: APM Common Services Costs Through Project Phases

APM Project Phase	Estimate (2010 \$)
Siting (Years 1-9)	\$85,089,516
Construction Licence Application (Years 10-15)	\$74,690,152
Construction UDF (Years 16-20)	\$49,002,926
Construction DGR (Years 21-25)	\$48,583,254
DGR Operation (Years 26-85)	\$66,631,997
Extended Monitoring (Years 86-155)	\$21,774,045
Decommissioning (Years 156-180)	\$25,459,215
Postclosure Monitoring (Years 181+)	\$0
Total	\$371,231,105

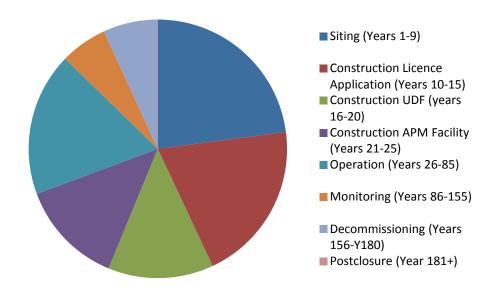


Figure 4.14: Alternate Case: APM Common Services Costs Through Project Phases

#### 4.6 STAFFING

The staffing levels required by NWMO were estimated at the program activity level for the duration of the APM project. The details of NWMO staffing and hourly rates are found in Tables 4.15, 4.16, 4.17, 4.18, 4.19, and 4.20. These tables document the NWMO labour requirements through each of the APM project phases. NWMO's staffing profile pertaining to this estimate is found in Figure 4.15 (base case) and 4.16 (alternate case).

NWMO's portion of the APM cost estimate for staff loading is front end loaded, meaning that NWMO's most significant effort is in securing a site and obtaining a construction licence by Year 15. Although the SNC-Lavalin cost report estimates most costs, some scope is included in this estimate to account for scope not integrated into the SNC-Lavalin cost report. These staff will be supporting ongoing submissions to the regulator and verifying repository system performance.

**Table 4.15: Labour Category Definition and Hourly Rates** 

Job Category	Description	Hourly Rate (\$/h)
NWMO1	President, Vice President, Department Manager, Director	\$150.58
NWMO2	Administration	\$57.01
NWMO3	Section Manager, Engineer, Advisor, Technical Specialist	\$88.56

Table 4.16: Summary of NWMO Staffing Levels Years 1 to 25 Base Case

By Year		NWM01	NWMO2	NWM03	Total
Year 1	2010	13.0	1.5	31.6	46.1
Year 2	2011	25.1	8.4	56.3	89.8
Year 3	2012	28.3	8.5	70.9	107.7
Year 4	2013	29.6	8.5	84.5	122.6
Year 5	2014	31.1	9.5	84.8	125.4
Year 6	2015	31.1	9.5	84.6	125.1
Year 7	2016	33.2	9.9	87.6	130.7
Year 8	2017	33.2	9.9	87.9	131.0
Year 9	2018	34.5	10.1	91.4	136.0
Year 10	2019	35.5	11.2	101.5	148.2
Year 11	2020	35.5	11.2	101.5	148.2
Year 12	2021	35.3	11.2	99.3	145.7
Year 13	2022	34.3	10.2	96.8	141.2
Year 14	2023	32.4	9.2	94.1	135.7
Year 15	2024	32.4	9.2	93.1	134.7
Year 16	2025	22.4	7.8	75.9	106.1
Year 17	2026	22.4	8.0	74.7	105.0
Year 18	2027	22.4	8.0	76.7	107.1
Year 19	2028	22.6	8.0	76.6	107.2

By Year		NWM01	NWMO2	NWM03	Total
Year 20	2029	22.6	8.0	77.2	107.8
Year 21	2030	23.1	8.0	73.0	104.1
Year 22	2031	22.2	7.9	69.3	99.5
Year 23	2032	22.2	7.9	69.3	99.4
Year 24	2033	22.6	7.9	69.3	99.8
Year 25	2034	22.6	7.9	69.3	99.8

Table 4.17: Summary of NWMO Staffing Levels Years 26 to 55 Base Case

By Year		NWM01	NWMO2	NWM03	Total
Year 26	2035	12.5	3.0	34.1	49.5
Year 27	2036	12.3	3.0	33.1	48.3
Year 28	2037	12.3	3.0	33.1	48.3
Year 29	2038	12.5	3.0	34.1	49.5
Year 30	2039	12.5	3.0	34.1	49.5
Year 31	2040	12.5	3.0	33.1	48.5
Year 32	2041	12.3	3.0	31.1	46.3
Year 33	2042	12.3	3.0	31.1	46.3
Year 34	2043	12.5	3.0	32.1	47.5
Year 35	2044	12.5	3.0	32.1	47.5
Year 36	2045	5.5	1.0	26.5	33.0
Year 37	2046	5.3	1.0	25.5	31.8
Year 38	2047	5.3	1.0	25.5	31.8
Year 39	2048	5.5	1.0	26.5	33.0
Year 40	2049	5.5	1.0	26.5	33.0
Year 41	2050	5.5	1.0	26.5	33.0
Year 42	2051	5.3	1.0	25.5	31.8
Year 43	2052	5.3	1.0	25.5	31.8
Year 44	2053	5.5	1.0	26.5	33.0
Year 45	2054	5.5	1.0	26.5	33.0
Year 46	2055	5.5	1.0	26.5	33.0
Year 47	2056	5.3	1.0	25.5	31.8
Year 48	2057	5.3	1.0	25.5	31.8
Year 49	2058	5.5	1.0	26.5	33.0
Year 50	2059	5.5	1.0	26.5	33.0
Year 51	2060	5.5	1.0	26.5	33.0
Year 52	2061	5.3	1.0	25.5	31.8
Year 53	2062	5.3	1.0	25.5	31.8
Year 54	2063	5.5	1.0	26.5	33.0
Year 55	2064	5.5	1.0	26.5	33.0

Table 4.18: Summary of NWMO Staffing Levels Years 56 to 125 Base Case

By Year		NWM01	NWMO2	NWM03	Total
Year 56	2065	2.5	1.0	16.0	19.5
Year 57	2066	2.5	1.0	16.0	19.5
Year 58	2067	2.5	1.0	16.0	19.5
Year 59	2068	2.5	1.0	16.0	19.5
Year 60	2069	2.5	1.0	16.0	19.5
Year 61	2070	2.5	1.0	16.0	19.5
Year 62	2071	2.5	1.0	16.0	19.5
Year 63	2072	2.5	1.0	16.0	19.5
Year 64	2073	2.5	1.0	16.0	19.5
Year 65	2074	2.5	1.0	16.0	19.5
Year 66	2075	2.5	1.0	16.0	19.5
Year 67	2076	2.5	1.0	16.0	19.5
Year 68	2077	2.5	1.0	16.0	19.5
Year 69	2078	2.5	1.0	16.0	19.5
Year 70	2079	2.5	1.0	16.0	19.5
Year 71	2080	2.5	1.0	16.0	19.5
Year 72	2081	2.5	1.0	16.0	19.5
Year 73	2082	2.5	1.0	16.0	19.5
Year 74	2083	2.5	1.0	16.0	19.5
Year 75	2084	2.5	1.0	16.0	19.5
Year 76	2085	2.5	1.0	16.0	19.5
Year 77	2086	2.5	1.0	16.0	19.5
Year 78	2087	2.5	1.0	16.0	19.5
Year 79	2088	2.5	1.0	16.0	19.5
Year 80	2089	2.5	1.0	16.0	19.5
Year 81	2090	2.5	1.0	16.0	19.5
Year 82	2091	2.5	1.0	16.0	19.5
Year 83	2092	2.5	1.0	16.0	19.5
Year 84	2093	2.5	1.0	16.0	19.5
Year 85	2094	2.5	1.0	16.0	19.5
Year 86	2095	2.5	1.0	16.0	19.5
Year 87	2096	2.5	1.0	16.0	19.5
Year 88	2097	2.5	1.0	16.0	19.5
Year 89	2098	2.5	1.0	16.0	19.5
Year 90	2099	2.5	1.0	16.0	19.5
Year 91	2100	2.5	1.0	16.0	19.5
Year 92	2101	2.5	1.0	16.0	19.5

By Year		NWM01	NWMO2	NWM03	Total
Year 93	2102	2.5	1.0	16.0	19.5
Year 94	2103	2.5	1.0	16.0	19.5
Year 95	2104	2.5	1.0	16.0	19.5
Year 96	2105	2.5	1.0	16.0	19.5
Year 97	2106	2.5	1.0	16.0	19.5
Year 98	2107	2.5	1.0	16.0	19.5
Year 99	2108	2.5	1.0	16.0	19.5
Year 100	2109	2.5	1.0	16.0	19.5
Year 101	2110	2.5	1.0	16.0	19.5
Year 102	2111	2.5	1.0	16.0	19.5
Year 103	2112	2.5	1.0	16.0	19.5
Year 104	2113	2.5	1.0	16.0	19.5
Year 105	2114	2.5	1.0	16.0	19.5
Year 106	2115	2.5	1.0	16.0	19.5
Year 107	2116	2.5	1.0	16.0	19.5
Year 108	2117	2.5	1.0	16.0	19.5
Year 109	2118	2.5	1.0	16.0	19.5
Year 110	2119	2.5	1.0	16.0	19.5
Year 111	2120	2.5	1.0	16.0	19.5
Year 112	2121	2.5	1.0	16.0	19.5
Year 113	2122	2.5	1.0	16.0	19.5
Year 114	2123	2.5	1.0	16.0	19.5
Year 115	2124	2.5	1.0	16.0	19.5
Year 116	2125	2.5	1.0	16.0	19.5
Year 117	2126	2.5	1.0	16.0	19.5
Year 118	2127	2.5	1.0	16.0	19.5
Year 119	2128	2.5	1.0	16.0	19.5
Year 120	2129	2.5	1.0	16.0	19.5
Year 121	2130	3.0	1.0	17.0	21.0
Year 122	2131	3.5	1.0	18.0	22.5
Year 123	2132	3.5	1.0	18.0	22.5
Year 124	2133	3.5	1.0	18.0	22.5
Year 125	2134	3.5	1.0	18.0	22.5

Table 4.19: Summary of NWMO Staffing Levels Years 126 to 150 Base Case

By Year		NWM01	NWMO2	NWM03	Total
Year 126	2135	4.0	0.5	14.5	19.0
Year 127	2136	4.0	0.5	14.5	19.0
Year 128	2137	4.0	0.5	14.5	19.0
Year 129	2138	4.0	0.5	14.5	19.0
Year 130	2139	4.0	0.5	14.5	19.0
Year 131	2140	4.0	0.5	13.5	18.0
Year 132	2141	4.0	0.5	13.5	18.0
Year 133	2142	4.0	0.5	13.5	18.0
Year 134	2143	4.0	0.5	13.5	18.0
Year 135	2144	4.0	0.5	13.5	18.0
Year 136	2145	4.0	0.5	13.5	18.0
Year 137	2146	4.0	0.5	13.5	18.0
Year 138	2147	4.0	0.5	11.5	16.0
Year 139	2148	4.0	0.5	11.5	16.0
Year 140	2149	4.0	0.5	11.5	16.0
Year 141	2150	4.0	0.5	11.5	16.0
Year 142	2151	4.0	0.5	11.5	16.0
Year 143	2152	4.0	0.5	11.5	16.0
Year 144	2153	4.0	0.5	11.5	16.0
Year 145	2154	4.0	0.5	11.5	16.0
Year 146	2155	4.0	0.5	11.5	16.0
Year 147	2156	4.0	0.5	11.5	16.0
Year 148	2157	5.0	0.5	12.5	18.0
Year 149	2158	5.0	0.5	12.5	18.0
Year 150	2159	5.0	0.5	12.5	18.0

Table 4.20: Summary of NWMO Staffing Levels Years 151 to 155 Base Case

By Year		NWM01	NWMO2	NWM03	Total
Year 151	2160	1.0	0.0	2.0	3.0
Year 152	2161	1.0	0.0	2.0	3.0
Year 153	2162	1.0	0.0	2.0	3.0
Year 154	2163	1.0	0.0	2.0	3.0
Year 155	2164	1.0	0.0	0.0	1.0

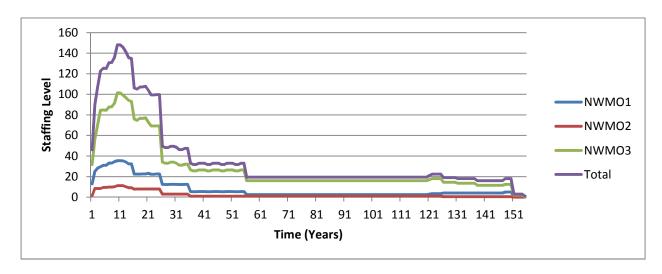


Figure 4.15: NWMO Labour Profile Base Case

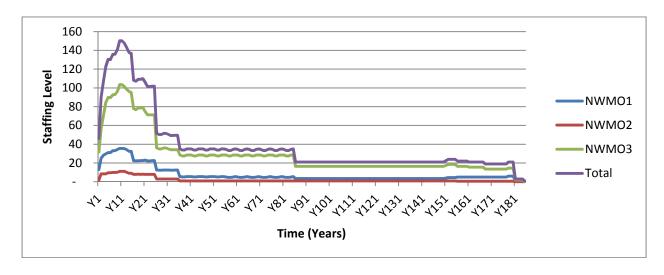


Figure 4.16: NWMO Labour Profile Alternate Case

#### 4.7 MANAGING COMMUNITY IMPACTS

Managing Community Impacts includes community infrastructure programs and community offsets and benefits in conjunction with the APM project. Any improvement or expansion of town site services or infrastructure is a contingent item subject to discussions between the NWMO and the community.

The potential cost of Goods and Services Tax (GST) has not been included in the cost estimate. Land purchase and land transfer tax are included in the site acquisition costs.

Property Tax is carried in the SNC-Lavalin (2011b) input to the APM cost estimate as the timing of purchase site of coincides with start of construction.

#### 4.8 INSURANCE

Allowances for insurances are included in the Common Services work elements of the estimate.

Commercial general liability \$65,000/annum Director's & officer's liability \$70,000/annum All risk property insurance \$40,000/annum

These rates are only applicable for Year 1-25 after which the SNC-Lavalin (2011b) input to the APM cost estimate captures insurance costs.

#### 5. SUMMARY OF COST ESTIMATE

The detailed cost estimates for the siting, development, construction, operation, decommissioning and closure of an APM facility are presented in the consolidated WEDs listings (see Appendix B).

The NWMO's total life cycle cost for a DGR that can accept 3.6 million used fuel bundles over 30 years is approximately \$2.94 billion (2010 constant dollars). Tables 5.1 and 5.2 present the cost estimate for an APM facility by Level 2 work element and development phase, respectively. Costs by project phase and Level 2 work breakdown structure for the Base Case can be found in Table 5.5 with an annual cash flow plotted in Figure 5.1.

Table 5.1: NWMO Input to APM Cost Estimate by Level 2 WBS - Base Case

WBS	NWMO Scope Description	Cost (2010k\$)
560.05	Building Relationships	\$533,258
560.10	Adapting To Change	\$28,542
552.15	Siting	\$568,012
552.20	Design Development & Safety Case	\$425,479
552.25	Research & Confidence Building	\$183,930
552.30	Site Verification & Licence Support	\$877,902
552.90	Common Services (Years 1>>25)	\$319,564
Total Cost		\$2,936,687

Table 5.2: NWMO Input to APM Cost Estimate by Phase - Base Case

APM Implementation Phase	Cost (2010K\$)
Siting (Years 1-9)	\$766,875
Construction Licence Application (Years 10-15)	\$500,721
Construction UDF(Years 16-20)	\$274,246
Construction DGR (Years 21-25)	\$268,041
DGR Operations (Years 26-55)	\$473,524
Extended Monitoring (Years 56-125)	\$446,239
Decommissioning (Years 126-150)	\$139,072
Postclosure Monitoring (Years 151+)	\$67,969
Total Cost	\$2,936,687

The NWMO's total life cycle cost for a DGR that can accept 7.2 million fuel bundles over 60 years is approximately \$3.68 billion (2010 constant dollars). Tables 5.3 and 5.4 present the cost estimate for a DGR facility by level two work element and development phase, respectively. Costs by project phase and Level 2 work breakdown structure for the Alternate Case can be found in Table 5.6 with an annual cash flow plotted in Figure 5.2.

Table 5.3: NWMO Input to APM Cost Estimate by Level 2 WBS - Alternate Case

WBS	NWMO Scope Description	Cost (2010k\$)
560.05	Building Relationships	\$646,072
560.10	Adapting To Change	\$31,494
552.15	Siting	\$779,870
552.20	Design Development & Safety Case	\$435,242
552.25	Research & Confidence Building	\$202,680
552.30	Site Verification & Licence Support	\$1,217,505
552.90	Common Services (Years 1>>25)	\$371,231
Total Cost		\$3,684,094

Table 5.4: NWMO Input to APM Cost Estimate by Phase - Alternate Case

APM Implementation Phase	Cost (2010K\$)
Siting (Years 1-9)	\$956,796
Construction Licence Application (Years 10-15)	\$511,041
Construction UDF(Years 16-20)	\$279,617
Construction DGR (Years 21-25)	\$272,161
DGR Operations (Years 26-85)	\$957,503
Extended Monitoring (Years 86-155)	\$480,475
Decommissioning (Years 156-180)	\$158,532
Postclosure Monitoring (Years 181+)	\$67,969
Total Cost	\$3,684,094

Table 5.5: Base Case NWMO APM Project Cash Flow

Development Phase	TOTAL	05 Building Relationships	10 Adapting To Change	15 Siting	20 Design Development & Safety Case	25 Confidence Building &Process Understanding	30 Site Verification & Licensing Support	90 Common Services
Siting (Y1-9)	\$766,875,190	\$77,036,367	\$9,765,312	\$457,496,780	\$90,121,558	\$45,180,277	\$2,185,380	\$85,089,516
Construction Licence Application (Y10-Y15)	\$500,720,720	\$60,452,565	\$4,864,283	\$59,427,443	\$186,367,888	\$27,250,000	\$87,668,389	\$74,690,152
Construction UDF (Y16-Y20)	\$274,245,807	\$42,553,633	\$1,020,954	\$11,468,750	\$84,457,192	\$23,625,000	\$62,117,352	\$49,002,926
Construction DGR (Y21-Y25)	\$268,040,655	\$42,478,633	\$590,505	\$8,368,750	\$42,563,509	\$59,750,000	\$65,706,004	\$48,583,254
Operation (Y26- Y55)	\$473,524,290	\$140,616,982	\$2,952,275	\$22,500,000	\$10,577,385	\$28,125,000	\$241,836,811	\$26,915,837
Extended Monitoring Y56-Y125)	\$446,238,693	\$135,702,760	\$6,888,641	\$8,750,000	\$11,391,030	\$0	\$269,615,232	\$13,891,030
Decommissioning & Closure (Y126- Y150)	\$139,071,762	\$34,260,570	\$2,460,229	\$0	\$0	\$0	\$80,959,973	\$21,390,990
Postclosure Monitoring (Y151)	\$67,969,036	\$156,250	\$0	\$0	\$0	\$0	\$67,812,786	\$0
TOTAL	\$2,936,686,153	\$533,257,760	\$28,542,199	\$568,011,723	\$425,478,562	\$183,930,277	\$877,901,927	\$319,563,705

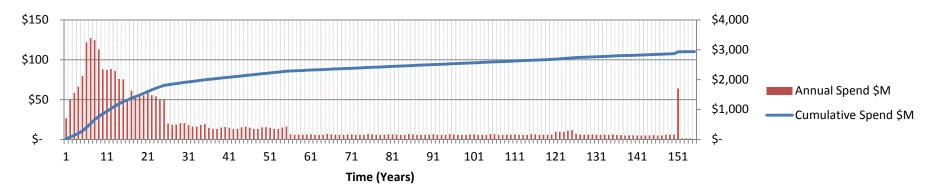


Figure 5.1: Base Case NWMO APM Project Annual Cash Flow and Cumulative Costs

Table 5.6: Alternate Case NWMO APM Project Cash Flow

Development Phase	TOTAL	05 Building Relationships	10 Adapting To Change	15 Siting	20 Design Development & Safety Case	25 Confidence Building &Process Understanding	30 Site Verification & Licensing Support	90 Common Services
Siting (Y1-9)	\$956,796,165	\$77,598,867	\$9,765,312	\$646,855,255	\$90,121,558	\$45,180,277	\$2,185,380	\$85,089,516
Construction Licence Application (Y10-Y15)	\$511,040,968	\$61,390,065	\$4,864,283	\$59,427,443	\$186,367,888	\$27,250,000	\$97,051,137	\$74,690,152
Construction UDF (Y16-Y20)	\$279,616,847	\$43,178,633	\$1,020,954	\$11,468,750	\$84,457,192	\$23,625,000	\$66,863,392	\$49,002,926
Construction DGR (Y21-Y25)	\$272,161,695	\$43,103,633	\$590,505	\$8,368,750	\$42,563,509	\$59,750,000	\$69,202,044	\$48,583,254
Operation (Y26- Y55)	\$957,503,801	\$250,681,558	\$5,904,549	\$45,000,000	\$20,341,125	\$46,875,000	\$522,069,572	\$66,631,997
Extended Monitoring Y56-Y125)	\$480,475,238	\$135,702,760	\$6,888,641	\$8,750,000	\$11,391,030	\$0	\$295,968,762	\$21,774,045
Decommissioning & Closure (Y126- Y150)	\$158,531,731	\$34,260,570	\$2,460,229	\$0	\$0	\$0	\$96,351,717	\$25,459,215
Postclosure Monitoring (Y151)	\$67,969,036	\$156,250	\$0	\$0	\$0	\$0	\$67,812,786	\$0
TOTAL	\$3,684,095,481	\$646,072,336	\$31,494,473	\$779,870,198	\$435,242,302	\$202,680,277	\$1,217,504,790	\$371,231,105

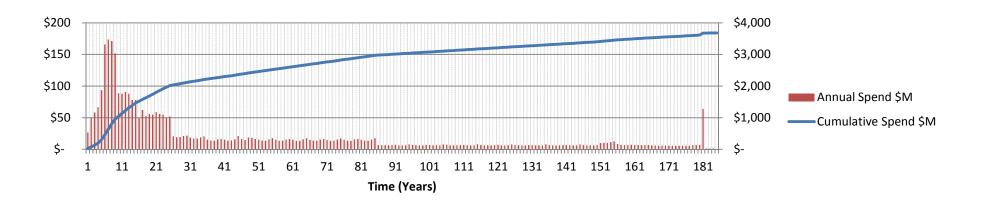


Figure 5.2: Alternate Case NWMO APM Project Annual Cash Flow and Cumulative Costs

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APPENDIX A: WORK BREAKDOWN STRUCTURE TO THE LOWEST LEVEL

	WBS Number				WBS Title
560	05				BUILDING RELATIONSHIPS
560	05	10	10	10	TITLE: APM Social – Staffing – Building Relationships
560	05	10	10	20	EXHIBITS AND EDUCATION TOOLS
560	05	10	10	30	ABORIGINAL ENGAGEMENT – ELDERS FORUM, NIIGANI
560	05	10	10	40	NATIONAL ABORIGINAL ORGANIZATIONS
560	05	10	10	50	ABORIGINAL PROVINICAL ORGANIZATIONS
560	05	10	10	60	ABORIGINAL YOUTH INITIATIVES
560	05	10	10	70	ABORIGINAL AWARENESS BUILDING
560	05	10	10	80	STAFF TRAVEL COSTS – ABORIGINAL
560	05	10	10	90	ABORIGINAL COMMUNICATIONS – MATERIAL PRODUCTION
560	05	10	10	100	PROVINCIAL STAKEHOLDER ENGAGEMENT
560	05	10	10	110	COMMUNITY, SERVICE and ADVOCACY BRIEFINGS
560	05	10	10	120	MUNICIPAL FORUM MEETINGS
560	05	10	10	130	MUNICIPAL ASSOCIATIONS
560	05	10	10	140	GOVERNMENT RELATIONS MEETINGS
560	05	10	10	150	EDUCATION SUPPORT/CURRICULUM/SCHOLARSHIPS
560	05	10	10	160	CONTRACTED WRITING
560	05	10	10	170	MEDIA MONITORING
560	05	10	10	180	WEBSITE MAINTENANCE
560	05	10	10	190	DIRECTED COMMUNICATIONS
560	05	10	10	200	TRANSLATION
560	05	10	10	210	MEDIA RELATIONS
560	05	10	10	220	CORPORATE CITIZENSHIP
560	05	10	10	230	MAILING
560	05	10	10	240	PREMIUM PROGRAM
560	05	10	10	250	YOUTH COMMUNICATIONS
560	05	10	10	260	TRIENNIAL REPORT
560	05	10	10	270	TRACKING PUBLIC OPINION
560	05	10	20	10	TITLE: APM Social – Staffing – Building Relationships
560	05	10	20	30	ABORIGINAL ENGAGEMENT – ELDERS FORUM, NIIGANI
560	05	10	20	40	NATIONAL ABORIGINAL ORGANIZATIONS
560	05	10	20	50	ABORIGINAL PROVINICAL ORGANIZATIONS
560	05	10	20	60	ABORIGINAL YOUTH INITIATIVES
560	05	10	20	70	ABORIGINAL AWARENESS BUILDING
560	05	10	20	80	STAFF TRAVEL COSTS – ABORIGINAL
560	05	10	20	90	ABORIGINAL COMMUNICATIONS – MATERIAL PRODUCTION

	WBS Number				WBS Title
560	05	10	20	100	COMMUNITY, SERVICE and ADVOCACY BRIEFINGS
560	05	10	20	110	MUNICIPAL FORUM MEETINGS
560	05	10	20	120	MUNICIPAL ASSOCIATIONS
560	05	10	20	130	GOVERNMENT RELATIONS MEETINGS
560	05	10	20	140	EDUCATION SUPPORT/CURRICULUM/SCHOLARSHIPS
560	05	10	20	150	CONTRACTED WRITING
560	05	10	20	160	MEDIA MONITORING
560	05	10	20	170	WEBSITE MAINTENANCE
560	05	10	20	180	DIRECTED COMMUNICATIONS
560	05	10	20	190	TRANSLATION
560	05	10	20	200	MEDIA RELATIONS
560	05	10	20	210	CORPORATE CITIZENSHIP
560	05	10	20	220	MAILING
560	05	10	20	230	PREMIUM PROGRAM
560	05	10	20	250	TRIENNIAL REPORT
560	05	10	20	260	TRACKING PUBLIC OPINION
560	05	10	30	10	TITLE: APM Social – Staffing – Building Relationships
560	05	10	30	20	NATIONAL ABORIGINAL ORGANIZATIONS
560	05	10	30	30	ABORIGINAL PROVINICAL ORGANIZATIONS
560	05	10	30	40	ABORIGINAL YOUTH INITIATIVES
560	05	10	30	50	ABORIGINAL AWARENESS BUILDING
560	05	10	30	60	STAFF TRAVEL COSTS – ABORIGINAL
560	05	10	30	70	ABORIGINAL COMMUNICATIONS – MATERIAL PRODUCTION
560	05	10	30	80	COMMUNITY, SERVICE and ADVOCACY BRIEFINGS
560	05	10	30	90	MUNICIPAL FORUM MEETINGS
560	05	10	30	100	MUNICIPAL ASSOCIATIONS
560	05	10	30	110	GOVERNMENT RELATIONS MEETINGS
560	05	10	30	120	EDUCATION SUPPORT/CURRICULUM/SCHOLARSHIPS
560	05	10	30	130	CONTRACTED WRITING
560	05	10	30	140	MEDIA MONITORING
560	05	10	30	150	WEBSITE MAINTENANCE
560	05	10	30	160	DIRECTED COMMUNICATIONS
560	05	10	30	170	TRANSLATION
560	05	10	30	180	MEDIA RELATIONS
560	05	10	30	190	CORPORATE CITIZENSHIP
560	05	10	30	200	MAILING
560	05	10	30	210	PREMIUM PROGRAM
560	05	10	30	230	TRIENNIAL REPORT
560	05	10	40	10	TITLE: APM Social – Staffing – Building Relationships

WBS Number					WBS Title						
560	05	10	40	20	ABORIGINAL COMMUNICATIONS – MATERIAL PRODUCTION						
560	05	10	40	60	GOVERNMENT RELATIONS MEETINGS						
560	05	10	40	70	DUCATION SUPPORT/CURRICULUM/SCHOLARSHIPS						
560	05	10	40	80	ONTRACTED WRITING						
560	05	10	40	90	MEDIA MONITORING						
560	05	10	40	100	WEBSITE MAINTENANCE						
560	05	10	40	110	DIRECTED COMMUNICATIONS						
560	05	10	40	120	TRANSLATION						
560	05	10	40	130	MEDIA RELATIONS						
560	05	10	40	140	CORPORATE CITIZENSHIP						
560	05	10	40	150	MAILING						
560	05	10	40	160	PREMIUM PROGRAM						
560	05	10	40	180	TRIENNIAL REPORT						
560	05	10	50	10	TITLE: APM Social – Staffing – Building Relationships						
560	05	10	50	20	ABORIGINAL COMMUNICATIONS – MATERIAL PRODUCTION						
560	05	10	50	30	GOVERNMENT RELATIONS MEETINGS						
560	05	10	50	40	EDUCATION SUPPORT/CURRICULUM/SCHOLARSHIPS						
560	05	10	50	70	WEBSITE MAINTENANCE NIU						
560	05	10	50	80	DIRECTED COMMUNICATIONS						
560	05	10	50	90	TRANSLATION						
560	05	10	50	120	MAILING						
560	05	10	50	150	TRIENNIAL REPORT						
560	05	10	60	10	TITLE: APM Social – Staffing – Building Relationships						
560	05	10	60	20	ABORIGINAL COMMUNICATIONS – MATERIAL PRODUCTION						
560	05	10	60	30	EDUCATION SUPPORT/CURRICULUM/SCHOLARSHIPS						
560	05	10	60	40	DIRECTED COMMUNICATIONS						
560	05	10	60	50	TRANSLATION						
560	05	10	60	60	MAILING						
560	05	10	60	70	TRIENNIAL REPORT						
560	05	10	70	10	TRIENNIAL REPORT						
560	10				ADAPTING TO CHANGE						
560	10	10	10	10	ABORIGINAL TRADITIONAL KNOWLEDGE						
560	10	10	10	20	ETHICAL FRAMEWORK FOR APM IMPLEMENTATION						
560	10	10	10	30	TRACKING BEST PRACTICES AND EXTERNAL ADVICE						
560	10	10	10	40	TITLE: APM Social – Staffing – Adapting to Change						
560	10	10	20	10	ETHICAL FRAMEWORK FOR APM IMPLEMENTATION						
560	10	10	20	20	TRACKING BEST PRACTICES AND EXTERNAL ADVICE						
560	10	10	20	30	TITLE: APM Social – Staffing – Adapting to Change						
560	10	10	20	40	ABORIGINAL TRADITIONAL KNOWLEDGE						

WBS Number					WBS Title						
560	10	10	30	10	TITLE: APM Social – Staffing – Adapting to Change						
560	10	10	40	10	TITLE: APM Social – Staffing – Adapting to Change						
560	10	10	50	10	TITLE: APM Social – Staffing – Adapting to Change						
560	10	10	60	10	TITLE: APM Social – Staffing – Adapting to Change						
560	10	50	10	10	REPOSITORY SYSTEM DEVELOPMENT MANAGEMENT, APM SITING PHASE TECHNOLOGY WATCH						
560	15				SITING						
560	15	10	10	10	SITE ACQUISITION AND IMPROVEMENTS						
560	15	10	10	20	FITLE: APM Social – Staffing – Siting Process						
560	15	10	10	30	COMMUNITY CAPACITY BUILDING – Community support for participation of Step 1 and Step 2 of the Siting process (information and initial screening)						
560	15	10	10	40	MUNICIPAL FORUM AND TOOL DEVELOPMENT						
560	15	10	10	50	CAPACITY BUILDING OF OTHERS – Non profit organizations/ academics						
560	15	10	10	60	OMMUNITY CAPACITY BUILDING – Community support for participation Step 3 of the Siting process (feasibility study)						
560	15	10	10	70	THIRD PARTY REVIEWS						
560	15	10	10	80	STAKEHOLDER MAPPING FOR SITING REGIONS						
560	15	10	10	90	IATIONAL WORKSHOPS ON SOCIAL CONSIDERATIONS OF SITING						
560	15	10	10	100	STAFF TRAVEL COSTS – NON ABORIGINAL						
560	15	10	10	110	STORE FRONT NWMO OFFICES						
560	15	10	10	120	ASSESSMENTS OF SITE SUITABILITY (SOCIAL ASPECTS)						
560	15	10	10	130	MANAGING COMMUNITY IMPACTS (Community Benefits)						
560	15	10	10	140	DVDs FOR SITING						
560	15	10	10	150	COMMUNITY CAPACITY BUILDING – Community support for participation in Step 4/5/6 of the Siting process (detailed site characterization)						
560	15	10	10	160	CENTRE OF EXPERTISE (NEW)						
560	15	10	10	170	PRODUCTION, TRANSLATION OF SITING PROCESS DOC						
560	15	10	10	180	EXPERT ADVICE, WORKSHOPS						
560	15	60	40	10	SUSTAINING RELATIONSHIPS/ COLLABORATION DURING OPERATIONS						
560	15	10	20	10	SITE ACQUISITION AND IMPROVEMENTS						
560	15	10	20	20	TITLE: APM Social – Staffing – Siting Process						
560	15	10	20	30	STAFF TRAVEL COSTS – NON ABORIGINAL						
560	15	10	20	40	STORE FRONT NWMO OFFICES						
560	15	10	20	50	MANAGING COMMUNITY IMPACTS (Community Benefits)						
560	15	10	20	60	CENTRE OF EXPERTISE (NEW)						
560	15	10	20	70	STAKEHOLDER MAPPING FOR SITING REGIONS						
560	15	10	30	10	STAFF TRAVEL COSTS – NON ABORIGINAL						
560	15	10	30	20	STORE FRONT NWMO OFFICES						
560	15	10	30	30	MANAGING COMMUNITY IMPACTS (Community Benefits)						

	WB	S Nun	nber		WBS Title						
560	15	10	30	40	CENTRE OF EXPERTISE (NEW)						
560	15	10	40	30	MANAGING COMMUNITY IMPACTS (Community Benefits)						
560	15	10	40	40	CENTRE OF EXPERTISE (NEW)						
560	15	10	50	10	CENTRE OF EXPERTISE (NEW)						
560	15	20	10	10	DATABASE AND INFORMATION SYSTEMS						
560	15	20	10	20	GEOSCIENCE TECHNICAL SITING MANAGEMENT AND SUPPORT TO ENGAGEMENT						
560	15	20	10	30	INITIAL SCREENING						
560	15	20	10	40	DESKTOP FEASIBILITY STUDIES						
560	15	20	10	50	PRELIMINARY FIELD STUDIES IN SUPPORT OF FEASIBILITY ASSESSMENTS						
560	15	20	10	60	CHARACTERISATION AND MONITORING PLANS FOR 2 SITES						
560	15	20	10	70	DETAILED SITE CHARACTERISATION (CRYSTALLINE SITE)						
560	15	20	10	80	GEOSPHERE MONITORING DURING DETAILED SITE CHARACTERIZATION AT 2 SITES						
560	15	30	10	10	SAFETY ASSESSMENT FOR SCREENING						
560	15	30	10	20	BIOSPHERE CHARACTERIZATION FOR SCREENING						
560	15	30	10	30	SAFETY ASSESSMENT FOR CANDIDATE SITES						
560	15	30	10	40	IOSPHERE CHARACTERIZATION FOR CANDIDATE SITES						
560	20				DESIGN DEVELOPMENT & SAFETY CASE						
560	20	20	10	10	TECHNICAL SUPPORT FOR SITING AND ILLUSTRATIVE SAFETY ASSESSMENT STUDIES						
560	20	30	10	10	ILLUSTRATIVE SAFETY ASSESSMENT STUDIES FOR HYPOTHETICAL SITES						
560	20	40	10	10	LIAISON WITH CNSC						
560	20	40	10	20	CNSC Pre-licensing Review						
560	20	40	10	30	SECURITY AND SAFEGUARDS INPUT TO DESIGN						
560	20	50	10	10	REPOSITORY SYSTEM DEVELOPMENT MANAGEMENT, APM SITING PHASE DESIGN & COST UPDATE						
560	20	50	10	20	PREL CONTAINER DESIGN ENGINEERING						
560	20	50	10	30	CONTAINER FABRICATION, INSPECTION & SEALING TECH DEV						
560	20	50	10	50	SITE DEPENDENT REPOSITORY DESIGNS						
560	20	50	10	60	UFPP CONCEPTUAL DESIGN, SITING						
560	20	50	10	70	PLACEMENT SYSTEMS ENGINEERING, SPECS & PSAR INPUT						
560	20	50	10	80	RETRIEVAL SYSTEMS ENGINEERING, SPECS & PSAR INPUT						
560	20	50	20	10	REPOSITORY SYSTEM DEVELOPMENT MANAGEMENT, CONSTRUCTION LICENSE PHASE						
560	20	50	20	20	FABRICATION, INSPECTION & SEALING DEMONSTRATIONS						
560	20	50	20	30	REFERENCE CONTAINER DESIGN & ENGINEERING						
560	20	50	20	40	CONDUCT REPOSITORY DEVELOPMENT STUDIES						
560	20	50	20	50	UFPP PRELIMINARY DESIGN FOR PSAR, EA AND CONSTRUCTION						

	WB	S Nun	nber		WBS Title						
					LICENSE APPLICATION						
560	20	50	20	60	SEALING MATERIALS ENGINEERING – FINALIZE SITE SPECIFIC DEVELOPMENT						
560	20	50	20	70	SEALING MATERIALS ENGINEERING PROTOTYPE AQUISITION						
560	20	50	20	80	PLACEMENT SYSTEMS ENGINEERING, SPECS & PSAR INPUT						
560	20	50	20	90	RETRIEVAL SYSTEMS ENGINEERING, SPECS & PSAR INPUT						
560	20	50	30	10	REPOSITORY CONSTRUCTION MANAGEMENT, CONSTRUCTION UDF & OBTAIN FSR						
560	20	50	30	20	DEVELOPMENT AND DEMONSTRATION OF SERIAL PRODUCTION OF JFC COMPONENTS AND UFCS						
560	20	50	30	30	REFERENCE CONTAINER DESIGN & ENGINEERING						
560	20	50	30	40	TECH SPECS FOR REPOSITORY & UFPP						
560	20	50	30	50	UFPP Construction/Technology Demonstration						
560	20	50	30	60	SEALING MATERIALS ENGINEERING						
560	20	50	30	70	PLACEMENT SYSTEMS ENGINEERING, SPECS & FSAR INPUT						
560	20	50	30	80	RETRIEVAL SYSTEMS ENGINEERING, SPECS & FSAR INPUT						
560	20	50	40	10	Repository Engineering Program & Project Costs - Operation						
560	20	50	50	10	Repository Engineering Program & Project Costs - Extended Operation/Monitoring						
560	25				RESEARCH AND CONFIDENCE BUILDING						
560	25	20	10	10	TECHNICAL SUPPORT DURING CANDIDATE SITE PHASE						
560	25	20	20	10	TECHNICAL SUPPORT DURING EA AND PSR PHASE						
560	25	30	10	10	TECHNICAL SUPPORT FOR APM TECHNICAL PROGRAM OBJECTIVE #3 DURING SCREENING PHASE						
560	25	30	10	40	TECHNICAL SUPPORT FOR APM TECHNICAL PROGRAM OBJECTIVE #3 DURING CANDIDATE SITE PHASE						
560	25	30	20	10	TECHNICAL SUPPORT DURING EA AND PSR PHASE						
560	25	30	30	10	TECHNICAL SUPPORT FOR OPERATING LICENCE APPLICATION						
560	25	50	10	10	GENERIC REPOSITORY SEALING SYSTEMS						
560	25	50	10	20	CANDIDATE SITES REPOSITORY SEALING SYSTEMS, SITING						
560	25	50	10	30	DEVELOPMENT OF REPOSITORY MONITORING STRATEGIES AND TECHNOLOGIES						
560	25	50	20	10	PREFERRED SITE REPOSITORY SEALING SYSTEMS, LICENSE PHASE						
560	25	50	20	20	REPOSITORY MONITORING AND TECHNOLOGY DEVELOPMENT						
560	25	50	30	40	PLAN UDF DEMONSTRATIONS and UDF SPECIFICATIONS						
560	25	50	30	50	CONDUCT UDF DEMONSTRATIONS - INITIATE						
560	25	50	30	60	MONITORING SYSTEMS DEVELOPMENT AND DEMONSTRATION						
560	25	50	30	70	MONITORING SYSTEMS AND PROGRAM – DGR CONSTRUCTION PHASE						
560	25	50	40	10	CONTINUING UDF DEMONSTRATIONS - OPERATIONS						
560	30				SITE VERIFICATION & LICENCE SUPPORT						

WBS Number					WBS Title						
560	30	20	20	10	DATABASE AND INFORMATION SYSTEMS						
560	30	20	20	20	GEOSPHERE SUPPORT AND MONITORING AT PREFERRED SITE DURING REGULATORY PROCESS						
560	30	20	30	10	DATABASE AND INFORMATION SYSTEMS						
560	30	20	30	20	GEOSCIENCE SUPPORT AND MONITORING DURING UDF CONSTRUCTION						
560	30	20	30	30	GEOSCIENCE SUPPORT AND MONITORING DURING UDF OPERATION						
560	30	20	40	10	GEOSCIENCE SUPPORT AND MONITORING DURING DGR OPERATION						
560	30	20	50	10	GEOSCIENCE SUPPORT DURING EXTENDED MONITORING						
560	30	20	60	10	GEOSCIENCE SUPPORT AND MONITORING DURING DGR DECOMMISSIONING						
560	30	20	70	10	GEOSCIENCE SUPPORT AND MONITORING DURING DGR ABANDONMENT						
560	30	30	20	10	SAFETY ASSESSMENT FOR EA AND PSR						
560	30	30	20	20	SUPPORT FOR REVIEW AND HEARINGS FOR CONSTRUCTION LICENCE						
560	30	30	20	30	BIOSPHERE CHARACTERIZATION FOR EA AND PSR						
560	30	30	30	10	SAFETY ASSESSMENT FOR FSR						
560	30	30	30	20	BIOSPHERE MONITORING						
560	30	30	30	30	HUMAN HEALTH MONITORING						
560	30	30	30	90	SUPPORT FOR REVIEW AND HEARINGS FOR OPERATING LICENCE						
560	30	30	40	10	OPERATIONS SAFETY ASSESSMENT						
560	30	30	40	20	BIOSPHERE MONITORING						
560	30	30	40	30	HUMAN HEALTH MONITORING						
560	30	30	50	10	EXTENDED MONITORING						
560	30	30	50	20	BIOSPHERE MONITORING						
560	30	30	50	40	HUMAN HEALTH MONITORING						
560	30	30	60	10	BIOSPHERE MONITORING						
560	30	30	60	20	DECOMMISSIONING						
560	30	30	70	10	ABANDONMENT						
560	30	40	10	10	OTHER GOVERNMENT APPROVALS – REQUIREMENTS						
560	30	40	10	20	PREPARATION FOR ENVIRONMENTAL ASSESSMENT						
560	30	40	20	10	SITE PREP. AND CONSTR. LICENCE (CNSC) APPLICATION						
560	30	40	20	20	LICENSING REVIEW INCLUDING PUBLIC HEARING						
560	30	40	20	30	ENVIRONMENTAL ASSESSMENT						
560	30	40	20	40	OTHER GOVERMENT APPROVALS – FEDERAL						
560	30	40	20	50	OTHER GOVERNMENT APPROVALS – PROVINCIAL						
560	30	40	20	60	OTHER GOVERNMENT APPROVALS – MUNICIPAL/REGIONAL						
560	30	40	30	10	OTHER GOVERMENT APPROVALS – FEDERAL						
560	30	40	30	20	OTHER GOVERNMENT APPROVALS – PROVINCIAL						

	WB	S Nun	nber	WBS Title					
560	30	40	30	30	OTHER GOVERNMENT APPROVALS – MUNICIPAL/REGIONAL				
560	30	40	30	40	MAINTAIN CONSTRUCTION LICENCE DURING THE SITE PREPARATION AND CONSTRUCTION OF THE UNDERGROUND DEMONSTRATION FACILITY (UDF)				
560	30	40	30	50	MAINTAIN THE CONSTRUCTION LICENCE DURING THE CONSTRUCTION OF THE DEEP GEOLOGICAL REPOSITORY (DGR) COMPONENTS				
560	30	40	30	60	OPERATING LICENCE (CNSC) APPLICATION				
560	30	40	30	70	LICENSING REVIEW INCLUDING PUBLIC HEARING				
560	30	40	40	10	MAINTAIN OPS LICENCE DURING OPERATIONS/APPLY TO RENEW LICENCE				
560	30	40	40	20	LICENSING REVIEW INCLUDING PUBLIC HEARING				
560	30	40	50	10	MAINTAIN/RENEW OPS LICENCE DURING EXTENDED MONITORING				
560	30	40	50	20	DECOMMISSIONING LICENCE (CNSC) APPLICATION				
560	30	40	50	30	LICENSING REVIEW INCLUDING PUBLIC HEARING				
560	30	40	50	40	EA FOR CNSC DECOMMISSIONING LICENCE				
560	30	40	60	10	LICENCE TO ABANDON (CNSC) APPLICATION				
560	30	40	60	20	LICENSING REVIEW INCLUDING PUBLIC HEARING				
560	30	40	60	30	MAINTAIN DECOMMISSIONING LICENCE (CNSC)				
560	30	40	70	30	LICENCE TO ABANDON (CNSC)				
560	30	50	20	10	PROVIDE ENGINEERING INPUT TO PSAR				
560	30	50	20	20	ENGINEERING SUPPORT DURING LICENSING REVIEW AND EA HEARINGS				
560	30	50	30	10	PROVIDE ENGINEERING INPUT TO FSAR				
560	30	50	30	20	SAFEGUARDS INTERFACE IMPLEMENTATION				
560	30	50	30	30	PRODUCE SPECS AND INPUT TO FSAR (FINAL SAFETY ASSESSMENT REPORT)				
560	30	50	40	10	MONITORING SYSTEMS AND PROGRAM – DGR OPERATION PHASE				
560	30	50	50	10	EXTENDED MONITORING PERIOD				
560	30	50	60	10	DECOMMISSIONING PERIOD				
560	90				COMMON SERVICES				
560	90	50	10	10	Common Services (Y01-Y09), Siting Phase				
560	90	50	20	10	Common Services (Y10-Y15), Construction License Phase				
560	90	50	30	10	Common Services Y16-Y25, Construction Phase				
560	90	70	10	10	QUALITY ASSURANCE PROGRAM SITING				
560	90	70	20	10	QUALITY ASSURANCE PROGRAM LICENCE APPLICATION				
560	90	70	30	10	QUALITY ASSURANCE PROGRAM UDF and DGR CONSTRUCTION				
560	90	70	40	10	QUALITY ASSURANCE PROGRAM, DGR OPERATIONS				
560	90	70	50	10	QUALITY ASSURANCE PROGRAM, EXTENDED OPERATIONS				
560	90	70	60	10	QUALITY ASSURANCE PROGRAM, DECOMMISSIONING & CLOSURE				

# APPENDIX B: WORK ELEMENT DEFINITION SHEETS (WEDS)

B.1 Base Case 3.6 Million Bundle Work Element Definition Sheets

## **Work Element Definition Sheet**

WBS (New)	560	10	50	10	10				Prepared By:	A. Murchis	son			
WBS (Old)	552	20	2	<u> </u>										
WBS Title	REPOSITO	RY SYSTEM I	DEVELOPM	ENT MANA	GEMENT, AF	PM SITING PHASE TECH	INOLOGY WAT	СН						
Description	- Tech	Provide overall management of the repository system development during repository siting. Tasks include: - Technology watch on alternative used fuel management approaches Identify and provide technical risk management recommendations to the executive												
Deliverable	- Tecl	nagement of hnology wa fuel manag	tch througl			on such topics as Re-	processing & t	ransmutati	ion, very deep	borehole dis	sposal,			
Assumptions				SITORY SYS	STEM DEVEL	OPMENT MANAGEMEI	NT, APM SITIN	G PHASE DE	ESIGN & COST U	PDATE				
	Description Year Watching I	2 Brief \$!	2010 20 52k \$75	11 2012 k \$75k	\$75k \$7	Y06 Y07 Y08 014 2015 2016 75k \$75k \$75k	Y09 2017 2018 \$75k \$75k							
Schedule	Start Year			i 1	2010	eri contructs.	Finish Year	α	2018					
Jenedule	Start rear				2010		Tillisii real	,	2010					
Туре	Fixed													
Calculations and Notes:														
Labour	Costs		al Costs		r Costs	Subtotal	Allowance	25%		al Cost				
\$	-	\$	-	\$	652,000	\$ 652,000	\$	163,000	\$	81	.5,000			

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	10					Prepared By: B. Belfadhel			
WBS (Old)	552	15	20	40		<u> </u>							
			*****										
WBS Title	DATABASE	AND INFOR	RMATION SY	'STEMS									
	Develop the infrastructure for an integrated electronic geographic and geologic database and information management system. System design intended for spatial and temporal analysis, interpretation, integration and communication of site specific characterisation and monitoring data. Information System would be applied and, as required, up-graded throughout the repository siting process. It would further serve to archive site specific geosphere/biosphere data and create traceable data sets that would evolve as siting proceeded toward confirmation of the preferred site and UCF construction/operation.  Databases would be accessible by a suite of analyses and visualization applications (GIS, Gocad,), which would likely evolve over the timeframe of the project. Interoperability is essential.  Databases would be structured to include data information on transportation, natural environment, remote imaging, airborne geophysics, seismicity, geology, borehole data, municipal/ regional boundaries, aboriginal lands, surface hydrology, topography and groundwater resources. Results of geosphere model development and associated numerical simulations will also be archived in a suitable database. Database would facilitate internet access by project team members and other stakeholders, if appropriate.												
Deliverable	Integrated Electronic Information system and infrastructure to apply in support of repository siting, Environmental Assessment, conceptual geosphere model development, Performance and Safety Assessment.												
Assumptions	Cost (Y01-Y09):  - DBS Equipment start-up costs (software, server): \$100k for Y02;  - Annual Licensing fees and upgrades: \$100k/a for Y03-Y09;  Database/Information management system maintained through Geoscience and monitoring support beyond Y25.												
Schedule	Start Year			1	2010			Finish Year	9	2018			
Туре	Fixed												
Calculations and Notes:													
Labour (	Costs	Materia	al Costs	Other	Costs	Subto	tal	Allowance	25%	Total Cost	-		
\$	-	\$	800,000	\$	-	\$	800,000	\$	200,000	\$ 1,000,00	00		

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	20					Prepared By: B. Belfadhel	J		
WBS (Old)	552	15	10										
WBS Title	GEOSCIEN	CE TECHNIC	AL SITING N	<i>M</i> ANAGEME	NT AND SU	PPORT TO	ENGAGEMEN	VT					
Description	Requires tl	he planning	and co-ord	lination of f	ield, labora	tory and n		dies, as well	as, electroni	ss for a Deep Geologic Reposi c information systems to sup			
	- Prov - Tech - The - Liais	viding suppo nnical suppo administrat	ort for comnort for reposition and for ternational	nunity enga sitory desigr mation of te	igement act n/engineerii echnical adv	ivities. ng, reposit risory and p	Feasibility Stu ory safety an peer review p nagement pr	d environme panels.	ntal assessm	•	vities		
Deliverable			ation and N	0.	J	hout the s	iting process						
Assumptions	NWMO Staffing:												
Y01: 1 x NWMO-1 and 4.6 x NWMO-3: Travel of \$15k Y02: 1 x NWMO-1 and 10.8 x NWMO-3; Travel of \$30k Y03: 1 x NWMO-1 and 12.5 x NWMO-3; Travel of \$35k Y04: 1 x NWMO-1 and 20.7 x NWMO-3; Travel of \$55k Y05 to Y09: 1 x NWMO-1 and 20.2 x NWMO-3 Travel of \$50k/a													
Schedule	Start Year			1	2010			Finish Year	9	2018			
Туре	Fixed												
Calculations and Notes:	Staffing sco		sumed. e trip per ye	ar per staff									
Labour	•		ial Costs		r Costs	Su	btotal	Allowance	25%	Total Cost			
\$	21,467,580	\$	-	\$	385,000	\$	21,852,580	\$	5,463,145	\$ 27,315,	,725		

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	30					Prepared By	y: B. Belfadhel	
WBS (Old)												
WBS Title	INITIAL SC	REENING										
Description	screening space, and intrusion, is to allow eliminating on the am	is a desktop absence of s and avoiding sites or area g those sites ount of site	study base ignificant ng known ge as that cleas or areas thinformation	d on readily atural envir oscientific c rly have the nat are clear n that will be	available in onment and onditions the potential to ly unsuitable e available.	nformation. If heritage for the heat would contain the host a use le. The level A more det	The five Inicatures, mire ompromise discount of detail at ailed assess	tial Screening nimal possibili repository safuel repository which these with the section will be desired.	Criteria relaty of future fety. The overto be move various aspectonducted a	ate to a site he disruption de disruption de de disruption de forward in the cets will be a the feasibil	ocess. The initial naving sufficient ue to human re of initial screening the process, while ssessed will depend lity stage provided te selection process.	
Deliverable	- All o	data sets use for future re	ed in the sc eference an	reening assed	essment wil y.	l be stored	in the NWN	fy suitability for the following for the followi	ngement sys		udy. panied with necessary	
Assumptions	<ul> <li>15 communities have expressed interest in entering voluntary siting process.</li> <li>Information Management System infrastructure is operational.</li> <li>Screening assessment methodology is in place, one or more external service providers are familiar with the NWMO approach to screening and relevant geoscientific data are available.</li> <li>Staffing included in WED 560.15.20.10.20 entitled "Geoscience Technical Siting Management and Support to Engagement".</li> </ul>											
	- Initi - Y1: ! - Y2: !	Cost: - Purchased Services: Geoscience consultants to complete screening assessments and reporting at 14 communities (2010-2011): - Initial screening costs average \$50k/ community Y1: \$317k (4 communities) - Y2: \$500k (10 communities)  Year 1 includes \$67k of the detailed plan for initial screening and geotechnical feasibility studies.										
Schedule	Start Year			1	2010			Finish Year	2	2011		
Туре	Fixed											
Calculations and Notes:												
Labour (	Costs		al Costs		Costs		total	Allowance	25%		Total Cost	
\$	-	\$	-	\$	817,000	\$	817,000	\$	204,250	\$	1,021,250	

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	40					Prepared By:	B. Belfadhel
WBS (Old)	552	15	50	20			<u> </u>				
WBS Title	DESKTOP F	EASIBILITY S	STUDIES								
Description	the detaile using publ having sel multiple si Dependin below. If	ed safety-rel lished availa ected a spec tes from wit g on the de field investi	ated criteria able inform cific site. Ir thin that are esktop stud gations are	a based on ation. Som i such case ea that have y findings, deemed n	geoscientifi e interested s, the feasib e the potent the feasibili	c factors id d communi pility study cial to meet ity studies y, the site i	entified in N ties are exp will initially the detailed may potent s moved fo	NWMO site se pected to pro examine the d safety-relate sially include rward for fur	election prod opose larger ese larger ar ed criteria. preliminary	cess. The study rareas for con eas and identif	e potential to med will be conducted sideration without fy a specific site of tions, as described mpared with other
Deliverable	- All metadata	data sets us for future re	sed in the feference and	easibility st	ty.	e stored ir	the NWM	O data mana			ied with necessal
Assumptions	plans and - Desl - Info - Woi	undertake tl ktop Feasibil rmation Ma	he studies in lity Studies nagement S v external co	n an efficient would be consisted in the constructions.	nt manner. onducted at astructure is NWMO Staf	: 8 Candidat	e sites. al.				evelop site-specif
	1		-	-	es for four si es for four a	-		2,000K per site): \$2,00	00K		
Schedule	Start Year			2	2011			Finish Year	3	2012	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	4,000,000	\$	4,000,000	\$	1,000,000	\$	5,000,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	50					Prepared By: B. I	Belfadhel
WBS (Old)	552	15	50	30							
WBS Title	PRELIMIN <i>A</i>	RY FIELD ST	TUDIES IN S	UPPORT OF	FEASIBILITY	/ ASSESSMENTS	) 				
·	this is an i The first s required to and necess key feature iii) reconn lineament	mportant fi tep in the of increase consary approaces, in order aissance le analysis; vii	nal data ga decision monfidence i ch. These fi to assess p vel geolog ) Landsat/F	thering ster aking proce in the suitable eld studies articular cor ic/structura	p, before these is to assolity of the swould be denditions. Pre I mapping; a analysis; variety is to be the second of the second	e decision is meess the extent site. A prelimine esigned to focu eliminary field vi) surface ba	nade to proceed, nature and co ary field study p s on addressing studies may inclused geophysica	to detaile ast of the polan would site-specifude: i) airb al surveys;	d chara prelimi be pre ic safet orne go v) top	a particular site. Whence the control of the contro	or more sites. hat would be requirements rinvestigating photography; vi) structural
Deliverables	- Preli - All ( metadata l	minary Field data sets de for future re	d Investigat eveloped du eference an	uring field s d traceabili	and updated tudies will l ty.			J	•	em accompanied v	vith necessary
Assumptions	DI		lite - Ct - d - i -	l +:£: l				- f d	.1.5	reliminary field stud	·
	- Up t - Wor - Com Fit Ai Tr re  Cc - Y	o 4 prelimin k is done by munity and eld studies p rborne Geo ansportatio port (\$500k ost:	nary field st v external co l Offsets & I per site will physics(500 n/Access/F (); external	udies are co ontractors. Benefits ass include: Sit Dk); field geo ield Expens advice and field investia ary field inv	empleted be NWMO Staf umed to pro e field study ology and lir es/equipme review (\$15	pvide compensity plan (\$150K); neament mappint: \$500K; proj OK). \$ 3, 500K p	in WED 560.15. ation to communication to communication to communication (\$100K); 3 peect coordination over site	nities to pe	Radarsa orehol synthes	arly borehole activit at (\$50k); DEM/Lida es including analysis sis and update of fea al sites: \$5,725k	r (\$50k); s (\$1,500);
Schedule	Start Year			2	2011		Finish Y	'ear	4	2013	
Туре	Fixed										
Calculations											
Calculations and Notes: Labour O	osts	Materi	al Costs	Othe	r Costs	Subtota	ıl Allowa	ance 2	5%	Total Co	ost

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	60					Prepared By: B. Belfadhel
WBS (Old)										
WBS Title	CHARACTE	RISATION A	ND MONIT	ORING PLAI	NS FOR 2 SIT	ΓES				
Description	surface ba Geoscient	sed and bor	ehole geos del. The pla	phere chara n would be	cterization designed to	activities to support Sa	confirm site fety Assess	e suitability an ment activities	d provide i	will focus on the co-ordination of nput to the development of a rground Characterisation Facility
	revise the designed t the 5-year	basis for the o establish s period to ac	e geoscienti site specific ccount for a	ific models a baseline m acquired kno	at the prefer onitoring prowledge and	rred sites, v ograms. Th d remaining	vould be co- ne site chara needs. Dev	ordinated. Sit	e characte ans would b he plan and	I modelling activities to confirm or risation activities would be pe reviewed and revised during d its subsequent review would s.
Deliverable	- Pha	se I Detailed se II Detailed se III Detaile	d Site Chara	cterisation	and Monito	oring Plans f	or two sites			
Assumptions	- Woi - Site	sites both i k is done by Characteris includes pe	, external co ation activit	ontractors. ties proceed	NWMO Staf	•		15.20.10.20		
	Cost:									
	- Y05 - Y06	Develop de Revise deta	etailed site o ailed site ch	characteriza aracterizati	ntion and mo on and mor	onitoring pl nitoring plar	ans for secons for both s	site: \$600K and site: \$600k ites : \$650K ites : \$650K		
Schedule	Start Year			4	2013			Finish Year	8	2017
Туре	Fixed									
Calculations and Notes:										
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	_	Ś	_	Ś	2,500,000	\$	2,500,000	Ś	625,000	\$ 3,125,000

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#### **Work Element Definition Sheet**

WBS (New)	560	15	20	10	70					Prepared By: B. Belfadhel	
WBS (Old)	552	15	70	30							
WBS Title	DETAILED 9	SITE CHARA	CTERISATIO	N (CRYSTA	IIINE SITE)						
WD3 TILLE	DETAILED S	JIL CHARA	CILIII	ii (CIII3IA	LLIIVE SITE)						
Description	characteris Engineerin designed t monitoring developme	sation activi g functions o establish g informati	ties would including baseline c on would iderground	involve lab the design onditions v serve to Characteri	oratory and of an Unwill be estanderine imp	d field inve derground blished an pacts resu	stigations to Characteris d managed Iting from	o support Geo sation Facility under WBS 5 on-going site	oscience, Sa (UCF). Sit 660 15 40 4 c character	lately 10 to 20 km2 in area. Site fety Assessment and Repository is specific monitoring programs to and WBS 560 15 40 50. This ization activities and eventual also support the Environmenta	
	particular f seismicity i purpose of GIS and Vi analyses o uncertainty safety. Mo	the acquisitin the region creating a rtual Realit f the Site gybased on	ion of fraction around to a round to a round to a roundwate field observould services.	ture netwo he sites. I nal Descrip gies for int er flow syst rvation and	rk statistics Field and la tive Site Ge tegration an tem would d boundary	s A networ aboratory a cosphere M and interpre be conduct condition	c of boreho ctivities wo odel DGSM etation of m cted and do s at time s	le seismograp uld be describ . Database su nulti-disciplina ocumented. T cales relevant	hs would bed in a ser pport activi ry data set the simulati	ution of bedrock lithology and in the established to monitor micro- ies of supporting reports for the ities would include application of s. Three-dimensional numerica- ions would explore flow system fory construction and long-term entially suitable repository scale	
	from the I		tudies. Sur	face based	investigat	ions will in				e extent of available information geophysical surveys (such as 2D	
	that will be assume the involve: Ge	e required i at a full de eophysics 21	s site speci tailed site ( D and Field	fic. Howeve characteriza geological	er, based o ation would mapping; o	n the Swed d cost \$100 drilling, test	lish experie DM per site. ing and ana	nce and the C Site characters of 20 cor	PG-DGR prerization acred borehol	zation. The number of boreholes oject, it would be reasonable to ctivities at each site would likely les; the drilling and testing of 20 f site descriptive model.	
	Geopl \$13.0 These activ	hysics = \$5.5 M; and pee	5M; 20 core r reviews = osts are co	ed BH x \$3.0 \$1.5M. nsistent wit	OM=\$60M; th the Swed	20 percuss	ion BH x \$1.		eosynthesis	v include: s, Descriptive site model = peen investigated in detail. They	
	a.c a.sc cc			0 2 0 11 0 11							
Deliverable	- Supp	criptive Geo porting geos ated Site Da	sphere char	acterisatio	n document		ow system r	nodelling.			
Assumptions	Two crystalline sites are available for detailed investigation.  Sites are investigated in parallel.  Characterization activities are conducted by external contractors. NWMO Staffing is included in 560.15.20.10.20.  Electronic database and Information systems are operational.  Assumed total cost is \$100M per site spread over 5 years based on Swedish experience.  Cost flow:  Y05: \$14M (\$7M per site)  Y06: \$46M (\$23M persite)										
	•			(\$25M per	site) and Y	09: \$40M (	\$20M per si	te)			
Schedule	Start Year			5	2014			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost	
\$	-	\$	-	\$ 20	00,000,000	\$ 2	00,000,000	\$ 5	0,000,000	\$ 250,000,000	

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## **Work Element Definition Sheet**

WBS (New)	560	15	20	10	80					Prepared By: B. Belfadhel
NBS (Old)		<u> </u>	<u> </u>							
WBS Title	GEOSPHER	E MONITOR	RING DURIN	IG DETAILE	O SITE CHARA	ACTERIZATION	AT 2 SITES			
Description	in part to c further add characteriz the site an with contin	obtain prima dressing the zation plan d for monit nued boreho	ary data on eir suitabilite also require oring the na ole characte	the geologi y and to sup es establishinatural time- erization act	c, hydrogeolo pport the dev ng permaner varying trend tivities. Moni	ogic, hydroged velopment of t nt installations ds in specific go itoring installa	chemical and he Descriptive for the purpo eosphere proptions may be e	geomechanica Geoscientific se of developi perties and res established in a	al characteristic Model ( Site Model ( ng the basel ponses as we a step-wise f	7(09). These activities are directed stics of the sites for the purpose of DGSM). The detailed site ine, or undisturbed conditions of ell as potential changes associated ashion throughout the detailed sit and report the new data sets.
	(~ 100 m), monitoring hydrogeoc	multiple-lev g will consis hemical and	vel groundv t of periodic alyses. Only	vater monit c (ex: quarte routine ma	oring system erly) measure iintenance of	s in deep bore ements of hyd f the monitorir	holes (~ 1000 raulic pressure ng well networ	m), borehole ses and periodic rk and equipme	seismograph collection o ent is anticip	ow groundwater monitoring wells is and GPS stations. Groundwater of groundwater samples for pated during this phase. The routine maintenance.
Deliverable		-		_		and evaluation		nt system		
Assumptions	- A - C - A - L under E	All monitorii Groundwate An electroni Ocal climate Biosphere C	ng installation or pressure or information e monitorin haracteriza	ons are mad monitoring on manager g, such as ra tion for can	will take pla ment system ainfall and sr didate sites.	al as part of de ce quarterly a is operational now accumulat	nd sampling w ion, as well as	terization activ iill take place s s surface water d site characte	emi-annuall r monitoring	y is assumed to be undertaken
	Purchase S	Services:								
	Y06-Y09:									
	\$330k (	\$165k per s	site); Y09 \$4	180k (\$240k	per site) <sup>1</sup> .	sample collect	·		(\$21k/site);	Y07 \$180k (\$90k per site); Y08
	- A	Analytical co	sts for both	sites: Y06	\$8k; Y07 \$36	k; Y08 \$66k ar	ıd Y09 \$96k.			
Schedule	Start Year			6	2015	5		Finish Year	9	2018
Гуре	Fixed									
Calculations and Notes:	hydraulic p installed no stage will g 560.15.20.	oressure pro etwork will gradually es	ofiling and gonly commocalate throumonitoring	roundwater ence in the ughout the p	r sample colle first year of to period as mo	ection where path of the licensing path of t	permeability contains the conta	onditions pern WED 560.15.20 instrumented	nit. Far-field 0.10.70. Mor as per the b	vel wells will be available for monitoring activities on the entire nitoring during the characterization udget allocations in WED calate over the 4 year period from
Labour	Costs	Materi	ial Costs	Othe	er Costs	Sub	total	Allowance	25%	Total Cost

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#### **Work Element Definition Sheet**

WBS (New)	560	15	30	10	10					Prepared	N. Hunt, P.
WBS (Old)											Gierszewski
				i			·····				
WBS Title	SAFETY ASSESSMENT FO	R SCREEN	ING								
Description	This task is to provide sat	ety asses	sment supp	ort for the	initial scree	ening and f	easibility as	sessments fo	r prospect	ive sites.	
	The overall approach is t	o apply in	formation	learned fror	n the gene	ric safety a	sessments	for hypother	tical sites to	the potentia	l sites.
	The assessment will foci	us on ide	ntifying an	y key aspec	ts of the s	ite that wo	uld be of p	otential ben	efit or con	cern with res	pect to construction,
	transportation, operation	n or postc	losure safe	ty. These w	ould follov	v the points	noted in t	ne NWMO si	ting guideli	nes.	
Deliverable	<ul> <li>Screening and Fea</li> </ul>	sibility As	sessments	for the pros	pective site	es as requir	ed.				
Deliverable	- Participation in inf	ormation	and angag	ement activ	itios as ron	uirad					
	Tarticipation in ini	OTTITUTION	ana ciigagi	CITICITE GCCIV	11103 43 104	uncu.					
	- The screening an	d feasibili	itv assessm	nents will b	e based p	rimarily on	informatio	n generated	in WBS !	560.20.30.10.	10 (Illustrative Safety
	Assessment Studies for I		-		-	-		-			
Assumptions	Objective #3 During Scre	ening Pha	se).					·			•
Assumptions	- Initial screening is	for 15 cor	nmunities :	and feasibili	tv assessm	ents are fo	r 8 commur	nities			
	<ul> <li>Preliminary field in</li> </ul>				, 455255	c u. c . c	0 0011111101				
	, , , , , , , , , , , , , , , , , , , ,										
	- The staffing mode	is consist	ent with th	ne current s	tatus quo (i	.e., more b	uy than ma	ke oriented)	•		
	The total NWMO Safety	Assessme	ent staff re	quirements	are 0 FTE	for Y1, 1.9	FTE for Y2	and 2.9 FTE	for Y3 (see	the Calculati	on Section below for
	more information and jo	b categor	ization).								
	Funding for contractor s	upport is	\$50K for Y	2. Allowand	e is for an	alysis or da	ta collectio	n as needed	to evaluat	e any site-spe	ecific issues identified
	during screening phase.										
			4	4							
	Overhead allowances (O	ther) are	\$0K for Y1	, \$50K for \	72 and \$30	K for Y3 (4	person-trip	s x 10 sites	x 2k\$/trip)	. This will co	ver travel and special
	presentation material.										
Schedule	Start Year			2	2011			Finish Year		3 2012	
	July 1 cui			i	2011						
Туре	Fixed		***************************************			***************************************	•••••••		***************************************		
Calculations	Biosphere and transporta	ation Safe	ty Assessm	ent staffing	requireme	nts are not	included h	ere.			
and Notes:											
			<u>Y1</u>	<u>Y2</u>	<u>Y3</u>						
	Dir, NWMO-01		0.25		0.50						
	Mgr UF SA, NWMO-01		1.00		1.00						
	Sr Scientist, NWMO-03		0.75		0.75						
			3.00		5.00						
	Sci/Eng, NWMO-03		F 00								
	Total FTE		5.00		7.25						
	Total FTE Utilization Factor		0.00	0.30	0.40						
	Total FTE			0.30							
	Total FTE Utilization Factor		0.00	0.30	0.40						
\$	Total FTE Utilization Factor		0.00	0.30 1.88	0.40		total 847,353	Allowance \$	25% 211,83		Total Cost 1,059,191

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#### **Work Element Definition Sheet**

WBS (New)	560	15	30	10	20					Prepared N.	Hunt, P.
WBS (Old)										Gi	erszewski.
WBS Title	BIOSPHERE	CHARACTE	RIZATION F	OR SCREEN	IING						
Description	This task is	to provide	high level b	oiosphere ch	naracterizati	on data in s	support of t	he initial scree	ning and fe	easibility assess	ments.
	•									rarity might be	
		•					-			the prospective	
	=									ironmental Ass	
	=									ffects of a projet selected VECs	
	•							used by the Pr		selected vecs	represent
	illealilligiu	illeasures	or the envir	Ullillelitai t	lialiges allu	errects tria	i illay be ca	used by the Pi	oject.		
	L										
	Readily ava			will be colle	cted with re	spect to:					
			terology								
			face hydrol	ogy							
			d use a/fauna								
			a/rauna ⁄ironmental	Letroccoc							
		_			wledge (AT	K)					
			Jingiliai iia		Wicuge (A)						
Deliverable	- Cont	ribution to	the screeni	ng and feas	sibility asses	sments as r	equired				
					,		- 1				
Assumptions	- Initia	al screening	is for 15 co	mmunities	and feasibil	ity assessm	ents are for	8 communitie	:S.		
	- Preli	minary field	l investigati	ions are for	4 sites.						
	- Wor	k would be	primarily v	via desktop	review, cor	nsultation w	ith provinc	ial or regional	authoritie	s (e.g. Conserv	ation councils,
	Ministry o	f Natural R	esources) a	and limited	local field	work. Loca	ıl field wor	k likely limited	d to verify	ing key feature	es rather than
	surveys.										
	- Initi	al contacts	would be	made with	First Natio	ns in the a	rea. Intent	would be to	learn abou	ut environmen	tal or spiritual
	=									ly require tim	
	E									gather any re	
	informatio		Ü	•			,			,	,
	NWMO Saf	fety Assessr	nent staffin	g for hiospl	here charact	erization a	nd related a	activities is 0.2	5 NWMO-0	3 FTE for Y1, 1	NWMO-03
	•	and 1 NWM			nere charac	iciization ai	ia relatea a		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	3	
	Funding fo	r contractor	support is	\$0 for Y1, \$	3160K for Y2	and \$240K	for Y3. Ass	umes approx.	\$300k for s	ite biosphere o	lata collection,
	•				ith local Firs					·	ŕ
Schedule	Start Year			1	2010			Finish Year	3	2012	
Scriedule	Start rear			1	2010			i iiiisii ieai	J	2012	
Туре	Fixed										
. 150	. IACU										
Calculations	Cost based	on assumir	ng a blanket	t contract w	ith a contra	ctor to prov	vide suppor	t and summary	of availab	le information	at all sites.
and Notes:			J = =			p. o	SP P OI		,		
Labour	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Tota	Cost
\$	292,912	\$	-	\$	400,000	\$	692,912	\$	173,228	\$	866,140
•	•			•	-	•	*	•	*	•	*

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	30	10	30					Prepared By: N. Hunt, P. Gierszewski.
WBS Title	SAFETY ASSESSMENT FOR CA	ANDIDATE S	SITES							
Description	This task is to provide preclo The approach will be to use Hypothetical Sites) as the ba	the generic	safety asse	essments fo	r hypotheti	cal sites fro	m WBS 560	0.20.30.10.10	) (Illustrative	e Safety Assessment Studies f
	The preclosure assessments natural environment during				_	-	rmal, upset	and acciden	t conditions	. Anticipated effects on the
	The postclosure assessment radiological and non-radiolo			-		in and non-	human biot	a following o	decommissio	oning and abandonment. Bot
Deliverable	Safety Assessment for Ca Safety Assessment for Ca									
Assumptions	- Two candidate sites ir - Detailed geoscience ir	•		sites is not	available i	nitially, but	results fror	n at least on	e deep bore	hole would be provided by Y5
	- The generic safety ass Sites) provide a basis for pro				-		0.10.10 (III	ustrative Safe	ety Assessm	ent Studies for Hypothetical
	- The safety assessmen	t staffing m	odel is con	sistent with	the curren	t status quo	i.e., more	buy than m	ake oriented	1).
	NWMO Safety Assessment s	taff require	ments are	7.75 in Y4,	7.5 in each	of Y5 and Y	6, 6.75 in Y	7, 7.0 in Y8 a	nd 7.75 in Y	Э.
	This includes the effort for n Objective #3 During Candida	-				•		•		ort for APM Technical Prograr on.
	Funding for contractor supports are based on experier								Y8 and \$2.7	M for Y9.
	Costs for transportation safe	ety assessm	ents are in	WBS 660.2	0.30.10.10	(Transporta	tion Safety	Assessment	).	
	Overhead allowances (Othe licences, graphics, and misce			ted at \$60	)k/a. This	will cover	travel (tec	nnical meeti	ngs, CNSC),	software
Schedule	Start Year			4	2013			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:	Biosphere and transportatio	n staffing re	equirement	s are not ir	ncluded her	e.				
	Safety Assessment	<u>Y4</u>	<u>Y5</u>	<u>Y6</u>	<u>Y7</u>	<u>Y8</u>	<u>Y9</u>			
	Dir Mgr UF	0.75 1.00	0.75 1.00	0.75 1.00	0.50 1.00	0.50 1.00	0.75 1.00			
	Sr Scientist , NWMO-03	1.00	1.00	1.00	0.75	0.75	1.00			
	Sci/Eng, NWMO-03	5.00	4.75	4.75	4.50	4.75	5.00	-		
	Safety Assessment FTE	7.75	7.50	7.50	6.75	7.00	7.75	Allow	350/	Total Cast
\$	6,672,301	Materia \$	-		Costs 13,010,000		total .9,682,301	Allowance \$	<b>25%</b> 4,920,575	Total Cost \$ 24,602,8
7	0,072,301	ų		د ب	.5,010,000	1 با	.5,002,301	۲ ا	+,320,373	24,002,6

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	30	10	40					Prepared	N. Hunt, P. Gierszewski
WBS Title	BIOSPHERI	E CHARACTE	RIZATION F	OR CANDID	ATE SITES						
Description	domain inf construction Construction Reconnaise meteorolo environme communite communic	formation, to on/operatio on Licence p sance level f gical data; f ental signific y. Informati ation. A cor	o aid charad n. The info process. field activition lora and fau ance would ion gatherenceptual Bio	es would pr una; soils; su be defined d would be osphere mo	of terrestria collected w ovide the burface hydro based on p entered intidel would b	conditions ill be includ asis for class ology; and s ublic domai o a biosphe e developed	and identified in the E sification or urface/sub- n and field re GIS base d that woul	y potential re nvironmental f land use; for surface hydro data, as well information : d serve as a b	eceptors/imp Assessment eest, wildlife ologic interfa as by consul system for a wasis for prel	tation with po nalysis, interpo iminary impac	from a DGR part of the sources; natural and/or tential host
	This is inte		vide a signi	ficant amou	ınt of site bi	osphere ch	aracterizati	on to support vel of field eff		ection. Furthe	r work at the
Deliverable	- Bios	phere Chara	cterisation	reports, inc	luding a co	nceptual Bio	sphere mo	del, for two 0	Candidate Si	tes.	
	- Supp - Surv	ey of Aborig	rts docume	nting reconi Knowledge	naissance fi (english and	eld investig	Nations lan	guage versior	ns).	nvironmental a	reas of significance. ct analyses.
Assumptions	- Sites - Field - Mos - Elec	parate Cand s are "green d work unde it meteorolo tronic Inforr ocals can be	-field" (i.e., rtaken over ogical inforn mation data	no significa 3 years/2 f nation can b bases are o	nt existing sized seasons on compiled perational.	s. from local	stations.				
	Projected (	Costs are:									
	- N	NWMO Safe	ty Assessme	ent staff req	uirement is	1 NWMO-0	3 FTE/a				
	- (	· Pro · San · Equ · Tra animal p	oject manag mple analyso uipment: \$2 insportation opulation so	er plus 4 FT es: \$75k/a f 00k per can n/Access/Ex urveys.	E/a for 3 ye for 3 years p adidate site. penses: \$33	ars per candidat er candidat Ok per cand	didate site. e site. lidate site.		modest allo		s: transportation for
	once th	ne Candidate	e Sites are s uling purpo	elected give ses that the	en that the refort occu	equirements at the fir	t is to have	the informati	on is availab	ole for use in th	led at any time ne EA activities. It is o Y8. This leaves Y4
	- (	· \$20	00k in Y4 foi 00k in Y9 foi	r planning a r assessmen	nt and sumn	nary reports		/surveys/tran	slations.		
Schedule	Start Year			4	2013			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	To	otal Cost
\$	781,099	\$	-	\$ 1	12,600,000	\$ 1	3,381,099	\$	3,345,275	\$	16,726,374

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## **Work Element Definition Sheet**

WBS (New)	560	20	20	10	10			Prepared By	<b>'</b> :	A. Vorauer				
WBS (Old)														
WBS Title	TECHNICAL	SUPPORT F	OR SITING	and illust	RATIVE SAF	ETY ASSESSI	IENT STUDIES							
	.j													
Description	influence r to the sele and creatio	epository sa ction of can on of the Fin cludes parti	fety (APM 1 didate sites, al Safety Re	Technical Pr , analysis su port.	ogram Obje pport for th	ctive 5). Kno e Environm	owledge gained w	rill be applied in , creation of the	subseque Prelimina	processes that may int tasks pertaining ary Safety Report, ins interested in				
Deliverable	technical n - 5a: Ad sedime	nemoranda. Ivance the u ntary setting	These sub- nderstandir gs.	objectives	nclude: affecting g	eosphere st	Fechnical Program  ability and its long	g-term stability	for both c					
Assumptions	- 5c: De crystalli NWMO sta ("Geoscien Hypothetic	velop metho ine and sedi ine an	mentary set	managing a	ctivities in s	upport of Al	PM Technical Proent" and "Illustra	gram objectives tive Safety Asse	are incluc ssment Stu	led in others WEDs				
	r unung 10		заррог гог	,	J 13 QI.7 JZIV	,			······································					
Schedule	Start Year			1	2010		Finish Ye	ar 3	2012					
Туре	Fixed													
	:													
Calculations and Notes:	1 Contracto	or funding c	osts extract	ed from "Te	echnical RD	Program 20	11 - 2015_R4a"							
			osts extract		echnical RD	Program 20 Subto		nce 25%		Total Cost				

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#### Work Element Definition Sheet

WBS (New) WBS (Old)	560	20	30	10	10					Prepared	l By:	N. Hunt
WBS Title	ILLUSTRATIVE SAFETY ASS	SESSMENT S	STUDIES FO	R HYPOTH	ETICAL SITE	S						
Description	This captures all activities items (i.e., 1a and 1g). Thimprovements to existing information produced will support site selection.	ne captured codes and	tasks supp improveme	ort a CNSC ents to the	pre-licensii long-term s	ng review of afety case	of the met through o	hodology, acqu container corro	isition and sion and g	d testing of eosphere g	new co	omputer codes, on studies. The
Deliverable	Deliverables are specific t	o individua	l sub-objec	tives and w	vill consist o	f reports a	nd technic	cal memoranda	. The prin	icipal sub-o	bjectiv	es are:
	Objective #1: Prepare upt rock and in sedimentary r 1b) Complete an illustrati 1c) Initiate illustrative pre 1d) Maintain and improve 1e) Acquire and test then 1f) Improve the long-tern	ve postclos eclosure safi e the systen mal-hydrau	ure safety a ety analyse n level safe lic-mechan	assessment s and trans ty assessm ical modell	t for a deep sportation r ent softwar ing tools to	geological isk assessn e evaluate a	repositor nent. and assess	y in crystalline groundwater f	rock low and ge	eomechanio	cal pro	perties.
	- Engineering will pro- Geoscience will pro- The staffing model The NWMO Geoscience s The NWMO Safety Assess The NWMO Repository Er These safety assessment for APM Technical Progra- funding estimates are for document. These change to update the staffing cha Contractor costs are \$2.0 Overhead allowances (Ot miscellaneous expenses.	ovide the re is consister taff require sment staff ngineering s staff estima am Objectiv Y1 to Y6 is se sextended anges to min	ference ged at with the ments are requirements staff require ates include we #3 Durin due to cha the fundin nimize the	osphere ch current sta 6.4 FTE for nts are 5.0 ement is 1. e the effort g Screenin nges to th g into Y4 to cascading 6	aracteristic: tus quo (i.e. Y1 and 5.0 FTE for Y1, 75 FTE for 6 t for manag g Phase). I is WEDS im y 16. Since 1 ffect. The	for Y2 to Y 4.4 FTE for each of Y1 ement of t Note that to blemented the staff ne total staffil	y than ma  3. Y2 and 4. to Y3. echnical s the reason to match eeded for Y ng count r	4 FTE for Y3.  upport contrac n the staff esti the Jan 2011 ( Y4 to Y6 are acc emains unchan	mates are Rev 4) ver counted fo ged. d \$0.65M f	for Y1 to sion of the r in other V for Y6.	Y3 whi APM T VEDS i	ile the contractor echnical Program t was decided not
Schedule	Start Year			1	2010			Finish Year	6	2015		
Туре	Fixed											
. 190	. med											
Calculations and Notes:	Biosphere and transporta	tion staffin	g requirem	ents are no	t included l	nere.	-				-	
	Geoscience	<u>Y1</u>	<u>Y2</u>	<u>Y3</u>			<u>Y1</u>	<u>Y2</u>	<u>Y3</u>	<u>Y4</u>	<u>Y5</u>	<u>Y6</u>
	Sci/Eng, NWMO-3  Geoscience FTE  Safety Assessment	6.40	5.00		<u> </u>	1b 1c 1d 1e	\$777 \$82 \$196 \$91	\$1,140 \$110 \$89	\$1,100 \$100 \$200	\$700 \$0 \$200	\$0 \$0 \$300 \$0	\$0 \$300
]	Dir, NWMO-01 Mgr UF SA, NWMO-01	0.25 1.00	0.50 1.00	0.50 1.00		1f	\$871	\$150 \$1,000	\$150 \$1,000	\$150 \$700	\$450	
	Sr Scientist, NWMO-3	0.75	0.75	0.75			40			A4		
	Sci/Eng, NWMO-3 FTE	3.00 5.00	4.00 6.25	5.00 7.25	-	total	\$2,017	\$2,489	\$2,550	\$1,750	\$750	\$650
	Utilization Factor Safety Assessment FTE	1.00 <b>5.00</b>	0.70 <b>4.38</b>	0.60 <b>4.3</b> 5	<u>)</u>							
	Repository Engineering											
	Sci/Eng, NWMO-3 Repository Engineering FTE	1.75 <b>1.75</b>	1.75 1.75	1.75 1.75								
Li	abour Costs	Materia	al Costs		r Costs	Subt		Allowance	25%		Total	
\$	4,896,973	\$	-	\$ :	10,326,000	\$ 15,	222,973	\$ 3,	805,743	\$		19,028,716

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#### **Work Element Definition Sheet**

WBS (New)	560	20	40	10	10					Prepared	By: A. Khan
WBS (Old)	552	30	30	<u> </u>	İ		<u> </u>				
WBS Title	LIAISON WITH CNSC										
Description	Liaise with CNSC and other r	egulatory a	gencies pri	or to filing t	he Notice o	f Intent to	apply for a	Site Preparati	on/Constru	iction Licen	se (Y01 - Y09)
			.ge.ieies pii				арріў іоі а	once i reparati			
	To maintain good relations v design. This translates into a development of safety criter CNSC staff on candidate site and will incorporate the rele	deliverab ia. The de investigati	le that inclu liverable als ons, consul	ides identifo o includes tation with	ying applica agreed proc CNSC staff o	ble regulate esses, cons on process	ory docume ultation wi	ents, regulato th CNSC staff	y requirem on feasibili	ents and cr ty study pla	iteria, and the ns, consultation with
Assumptions	It is assumed that:										
Schedule Type Calculations and Notes:	1. NWMO Regulatory Affassessments for such things - Security and safeguard - Geoscientific site chard - Human factors; - Emergency management - Fire protection; - Mining; and - Other government rec 2. NWMO Regulatory Aff 3. NWMO Regulatory Aff 4. NWMO Regulatory Affaround the Y04 time frame. 6. NWMO Regulatory Affaround the Y04 time frame. 6. NWMO Regulatory Affaboriginal communities as id During this time, interested 7. NWMO Regulatory Affacoundents the licensing pregroups and contractors, and 8. The costs associated will change and are captured Environmental Assessment ( - Y01 is considered the part way into the year; - Y02-Y04 is the time as includes CNSC arrangements - Y05-Y06 is the time the requirements and to be used CNSC staff; and - The years of Y07-Y09 a support of preparing for the 9. The costs associated w  CNSC Licensing Fees (\$k) NWMO-1 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing fees are calcudollars; NWMO-1 values represent t NWMO-3 values represent t	as:  ds (see WB acterization)  ent;  quirements fairs will are fairs will are fairs will are fairs will suffairs will suffairs will suffairs will suffairs will suffairs will proposed fairs will be fairs will	such as Trarange the A ordinate for proport the S poort the Glates on the mmunicate the Service servic	ansport Cannual Tech edback to tafety Asses deback to tafety Asses described and the control of	ada (see Winical Program Inical Program Inical Program Inical Program Inical Program Inical Program Inical	as 560.30.4 m Updates the develop in develop senting the y05/Y06. e CNSC in s cNSC and NSC office ( time frame licensing sc CNSC liaisc VEDS), CNS ected to oc eview (see see WBS 50 ommunity al design(s) the NWM ne CNSC, pr .40.10.20).  CNSC liaisc Y05 2 8	in the function of the state of	ided to the Cregulatory docable safety createrization plane.  APM engagem fective April 1 sits per year). Sits	usc. uments. iteria. Ins to CNSC ent activiti , 2008 and using proce esource rec ps since the VBS 560.20 frames: Ind includes service Arra; and includes are:  Y08 340 0.5 1.75 8 9 9 \$\$250. This	es with the in effect undure, NWM quirements emajor activ. 40.10.20) at the launch angement in design input terization plus terization plus terization plus terization plus 1.0.95   2.95   8   2018	is expected to occur general public and til March 31, 2014.  O-PROC-RG-02) that from other NWMO vities during this time and preparation for the of the siting process oted above that s, to meet regulatory lans and activities with investigations in
	Travel expenses are calculate	ed assumin	g that 1 pe	rson-trip to	Ottawa cos	ts \$1000. T	nis total is	also reported	ın thousan	ids of dollar	S.
	- For information purpo				g fees for th	e three sep	arate activi	ties (this WEI	s, WBS		
	560.20.40.10.20, and WBS 5	60.30.40.1 <b>Y01</b>	0.20) are as <b>Y02</b>	follows:	Y04	Y05	Y06	Y07	Y08	Y09	1
	CNSC Licensing Fees (\$k)	370	1050	1050	755	480	480	745	745	745	
	Labour Costs	Mata:	al Costs	Oth-	Costs	C.,L.	total	Allowans	3F9/		Total Cost
	Labour Costs	iviateri	al Costs	Otnei	Costs	Sub	total	Allowance	25%		rotal Cost

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#### **Work Element Definition Sheet**

WBS (New)	560	20	40	10	20					Prepared By: A. Khan
WBS (Old)										
WBS Title	CNSC Pre-licensing Review									
Description	Conduct a CNSC pre-licensin	a review as	agreed to	hy the NIM/	MO and the	CNSC (VO1	_ V05\			
Description	Conduct a CN3C pre-licensii	g review as	agreeu to	by the ivvi	vio and the	CN3C (101	- 103)			
Deliverable	Obtain CNSC review results regulatory requirements (as									cerns with the concepts meeting
Assumptions	It is assumed that:									
	<ol> <li>NWMO Regulatory Al</li> <li>CNSC Pre-licensing Review</li> </ol>		•					•	d in April 2	013 for their review (Report Title
	2. The April 2011 submi				nd the Apri	2013 subm	ission will l	e for Sedime	ntary Rock.	
	<ul><li>Input for these submi</li><li>Engineering Division;</li></ul>	ssions will b	e optained	i trom:						
	- Geosciences Division;	and								
	- Safety Assessment Di	vision.								
	1 .		upport the	CNSC revi	ew as outli	ned in the A	APM Desigi	n Review Prod	ess docum	ented in correspondence to the
	CNSC (APM-CORR-00531-00	•								
							sions (not i	ncluding time	required b	by engineering/technical staff for
	their input into the submiss	ions) and to	support Ci	NSC reviews	s are as folio	ows:				
		Y01	Y02	Y03	Y04	Y05				
	CNSC Licensing Fees (\$k)	260	500	200	760					
	NWMO-1 (FTE)	0.13	0.2	0.2	0.2					
	NWMO-3 (FTE)	0.5	0.5	1.3	1.3	0.5				
	Travel (\$k)	5	5	5	5					
Schedule	Start Year			1	2010			Finish Year	5	2014
·····	e									
Туре	Fixed									
Calculations	CNSC licensing fees are calc	ulated assur	ning that 1	FTE equals	1800 hours	and is cha	rged at an h	ourly rate of S	\$250. This	total is reported in thousands of
and Notes:	dollars;		5 2	34-310			J	, 232 31.		
	NWMO-1 values represent t	he FTF effo	rt required	by NWM∩	manageme	nt:				
	NWMO-3 values represent t			•	•					
	Travel expenses are calculat		•	,		,	This total is	also reported	in thousan	ds of dollars.
	Labour Costs	Materia	al Costs	Otho	r Costs	Sub	total	Allowance	25%	Total Cost
Ś	695,339		-	\$	1,740,000		2,435,339		608,835	

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## **Work Element Definition Sheet**

WBS (Old)  WBS Title SECURITY AND SAFEGUARDS INPUT TO DESIGN  Description Liaise with CNSC specialists focused in the area of Security and Safeguards to ensure that regulatory requires and appropriately used as inputs to facility design (Y01 – Y09)	ements are well understood
Description Liaise with CNSC specialists focused in the area of Security and Safeguards to ensure that regulatory requires	ements are well understood
	ements are well understood
Deliverable Security and Safeguards Design Inputs	
Assumptions It is assumed that:  1. NWMO Regulatory Affairs will support activities to confirm that CNSC expectations in the area of Secumet. This will be achieved by confirming that the facility will meet the Security Regulations as well as internated facilitating the IAEA's additional protocol.  2. The costs associated with and the resources needed to prepare the design inputs and interface with CN staff (not including time required by engineering/technical staff for their input) have been captured in the effort the CNSC (see WBS 560.20.40.10.10).	national agreements such as
Schedule Start Year 1 2010 Finish Year 9 2	2018
Type Fixed	
Calculations CNSC licensing fees are calculated assuming that 1 FTE equals 1800 hours and is charged at an hourly rate of \$2 and Notes:  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO technical staff; and  Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in	·
Labour Costs Material Costs Other Costs Subtotal Allowance 25%	Total Cost
\$ - \$ - \$ - \$	-

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	10	10				Prepared By:	A. Murchison
WBS (Old)	552	20	2							
WBS Title	REPOSITOR	RY SYSTEM	1 DEVELOPN	MENT MAN	AGEMENT, AI	PM SITING PHASE DES	SIGN & COST U	PDATE		
Description	- Asse - Deve - Cond - Over - Prep	emble and elop/approduct integorsight of doaration of	maintain move concept rated transpe emonstration	nanagemen tual & preli portation, p on of fabric ence design	nt team responding team responding teach againg plant cability of keyon updates and	evelopment during re nsible for container a n requirements for co nt and repository faci DGR components d cost update as requi ecommendations to t	nd repository syntainer and replity studies	ystem optim pository syste	ization;	
Deliverable	o Update o Status I o Concep o Fabrica o Demon	reports on tual & Pre ted full siz strated co	epository sy the reposite eliminary co se UFC container fab	tory system ontainer de ainer. orication an	d inspection s			pment and p	procedures (ge	eneric URL).
	o Surface o Identifi executive o Update o 2+ year	e based and cation of options de APM de activity o	d undergroot technical ris available. sign & cost nce contrac	und charac sks that co estimate in ct let (RFP p	terisation required impact licens 2010/2011 appropriate to the control of the con	ing plant and reposito quirements/information censing, schedule or co and next updated API endering, contract as for construction licen	on for engineer osts as they many design & cost signment assign	ing gathered ay arise and estimate in	l and defined. provide recor 2014/2015.	mmendations to the
Assumptions	Duration o	f work: Y0	1 to Y09.							
	Staff requi	rements a design de	re 2.25 fte I	NWMO-01 (surface)	(Y01), 3.25 ft	IENT MANAGEMENT, e NWMO-01 (Y02-Y04				ICENSE)
	Description Year APM Cost I NWMO03	Update	2010 \$2,250k \$6	600k \$40	012 2013	2014 2015	07 Y08 Y09 2016 2017 \$600k \$0k			
	Contract co	osts based	on recent	experience	for technolog	gy advancement cont	racts.			
Schedule	Start Year				1 2010	)	Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:										
Labour (	Costs	Mate	rial Costs	Oth	ner Costs	Subtotal	Allowance	25%	T	otal Cost
\$	13,556,674	\$	-	\$	10,250,000	\$ 23,806,67	4 \$	5,951,668	\$	29,758,342

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	10	20					Prepared By: G. Kwong
WBS (Old)	552	20	10	10						
WBS Title	PREL CON	TAINER DESI	IGN ENGINE	EERING						
D	Tl!	l								
Description			ion constr	aints, the	•	•	•	-	•	in relation to the DGR size, UFPP rial capabilities / practices for
			I UFC comp	onents. (l	JFC compon	ents includ	e (i) the cop	per tube and	l lid; steel t	for fabrication demonstrations of tube and lid; and steel basket(s).) arate work task.
	3. technology	y demonstra		-	validate des	sign basis t	hrough lim	ited fabricati	on trials (f	abrication effort per fabrication
	4. physical te	est).			•					udy includes creep modelling and
	5.		Car	ry out struc	tural analys	es of the co	nceptual ste	eel UFC design	١.	
	6. alternative 7. 8.	e). Revise pr	eliminary d Sup	esigns for be	ooth copper facturing tri	and steel U als as requir	FCs incorpored to ensure	rating all obta	ined results with respec	ct to specifications.
Deliverable	- - drawings.					•		ks # 1, 3, 4, 5, conceptual l		cal specifications and engineering
	-		Fina	al optimize	d design of a	UFC by 201	.8 (Y09).			
Assumptions	0.5 NWM0	our included 0-03 fte Y01 Services Ca 9M 0.35M	in Reposite and 1.5 fte		ering Manag Y09	ement:				
Schedule	Start Year				l 2010			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	1	al Costs		r Costs	1	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	2,139,000	\$	2,139,000	\$	534,750	\$ 2,673,750

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	10	30					Prepared By: P. Maak
WBS (Old)	552	20	10	20						
WBS Title	CONTAINE	R FABRICAT	ION, INSPE	CTION & SE	ALING TECH	DEV				
Description	•						_			l container (UFC) conceptual
	designs as	defined in V	NBS 560.20	.50.10.20, F	Preliminary (	Container D	esign Engin	eering. Task	s include:	
	-	Identify qua	alified supp	ly base						
	-	Perform en	gineering a	ssessment	and test tria	ls for evalu	ation techno	ologies for fa	bricating, ins	specting and sealing the copper
	and ste	el UFC desig	gns.							
	-	Identify pre	ferred cop	per and stee	el UFC desig	ns based or	n manufactu	rability and i	inspectability	y of the container components
	and the	assembled	UFC.							
Deliverable	- R	Reports on d	levelopmer	nt and demo	onstration o	f fabricatin	g, inspecting	and sealing	the copper a	and steel UFC conceptual designs.
	:	•	•				•	l sealing met		
	•	•			-	-				sembled UFCs.
	1	•			•		•	otual designs		
	E				ealing and ii					
	- 11	nput to WB:	5 560.20.50	1.10.60 for t	he developr	nent UFPP	conceptual	designs.		
	ļ									
Assumptions	Duration o	f work: Y01	to Y09							
	Contractor	/consultant	s to develo	p technolog	gies and pre	pare prelim	inary techn	ical specificat	tions for fabi	rication, inspection and sealing of
	the copper	and steel L	JFCs: \$2,000	Ok for 5a (Y	05 to Y09).					
	Assumes th	ne availabili	ty of resour	ces and eq	uipment tha	t can be ad	apted for fa	bricating, sea	aling and ins	pecting copper vessels.
Schedule	Start Year			1	2010			Finish Year	9	2018
	ļ									
Туре	Fixed									
	ļ									
Calculations										
and Notes:	<u> </u>		al Casta	011	Cast-	6.1		Allanin	350/	Tabel Cost
Labour (	Losts	Materi S	al Costs		r Costs		total	Allowance		Total Cost
\$	-	Þ		\$	10,000,000	\$	10,000,000	\$	2,500,000	\$ 12,500,000

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#### **Work Element Definition Sheet**

WBS (New)	560 20 50 10 50 Prepared By: K. Birch
WBS (Old)	552 20 15 20
[	
WBS Title	SITE DEPENDENT REPOSITORY DESIGNS
Description	
	Y1 - Y3: The objective of the Site Dependent Repository Designs work program is to; (i) conduct sensitivity analyses on the 2010 APM design and cost updates, in order to reflect the variable conditions that may be expected at the potential candidate sites. These variables may include; rock strength, in-situ stresses, stratigraphy, area restrictions at surfaces, used fuel container design, etc. This sensitivity analysis would be conducted in support of selecting up to 2 candidate sites in 2013 for further assessment, and in support of a pre-licensing review of the reference designs. The effect of varying features such as depth, rock strength/type, UFC design on the overall cost of the project would be assessed;  Review and assess whether alternative approaches (such as horizontal borehole, drill and blast methods for hard sedimentary rock, supercontainer with heavy ground support) provide an economic, technical or safety improvement over the current two reference conceptual concepts: the In-Floor Borehole (IFB) method for crystalline rock, and the Horizontal Tunnel Placement (HTP) method for sedimentary rock. This component of the assessment would be carried out a part of the sensitivity study.  Post Y4 - Y9:
	From Years 4 to 9, the objective of this work package is to; (i) cunduct supplemantal conceptual designs for the two candidate sites selected for detailed site characterization; (ii) Acquire/modify/recommend specialized equipment for the conceptual underground design of the APM DGR in support of constructing and testing prototype equipment for further assessment in conducting the repository development studies (WBS 560.20.50.20.40); and (iii) Review alternative methodologies in optioneering studies for the DGR with respect to site specific conditions, such as stratigraphy, at the two candidate sites. These methods could include; (iii) Review alternative methodologies in optioneering studies for the DGR with respect to site specific conditions, such as stratigraphy, at the two candidate sites. These alternative methods could include:  - i.e. shaft vs. ramp multi-level repository; and - placement methods (horizontal vs. vertical) excavation methods (drill and blast vs. mechanical) and related issues (i.e. resulting size openings).
ļ	
L	
Deliverable	
	<ul> <li>Optioneering reports on alternative methods to preferred methods identified in 2010 APM Conceptual Design</li> </ul>
	Cost Updates.
	- Sensitivity studies carried out on the variables which would be reflective of the potential sites.
	Reports describing the conceptual design alternatives (Horizontal borehole - supercontainer concept; drill and
	blast methods for hard sedimentary rock; etc.); advantages and disadvantages; and associated costs, and provide
	recommendations for further evaluation or termination of review, and to address, if necessary, identified gaps in
	technology.
	- Recommendations for equipment development or equipment acquisition.
	Recommendations on timing of procurement activities required to meet in service dates.
	Neconimendations on thining of procurement activities required to meet in service dates.
<b></b>	
Accumptions	The work that will be carried out under this WIS will be an expectful design for the 2 cardidate sites based on the
Assumptions	The work that will be carried out under this WBS will be on conceptual designs for the 2 candidate sites based on the
	feasibility studies of the 10 potential sites in Y01 to Y03.
	All Labour found in the Repository Engineering WEDs: Year Staff cnslt
	(fte) (\$M) 1 0.5 NWMO-03
1	1 0.5 NWMO-03 2 0.5 NWMO-03
1	2 0.5 NWMO-03 3 0.5 NWMO-03
	5 0.5 INVINIO-05
	Year Staff cnsit
	(fte) (\$M)
	4 0.50 \$ 0.35
	5 0.50 \$ 0.35
1	6 0.50 \$ 0.35
	7 0.50 \$ 0.25
	8 0.50 \$ 0.25
	9 0.50 \$ 0.25
	Assumed tenual calated casts less than 10k parties - 12 time
1	Assumed travel related costs less than 10k per year (2 trips per year) - in general some potential minor equipment
ļ	purchases for laboratory studies.
<b></b>	
Schedule	Start Year 1 2010 Finish Year 9 2018
<u> </u>	
Туре	Fixed
ļ	
Calculations	
and Notes:	- Note: Design/cost update to take place 2014/2015 and costs for site specific conceptual design are embedded
	in Repository Engineering System Development.
<u> </u>	
Labour	
\$	- \$ - \$ 2,360,000 \$ 2,360,000 \$ 590,000 \$ 2,950,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	10	60					Prepared By:	P. Maak
WBS (Old)	552	20	20	10						\f	
WBS Title	UFPP CON	CEPTUAL DE	SIGN, SITIN	1G							
Description	•	dated UFPP	•	•		•					
	:									, exploring elimir	nation of wet bay
	storage wi	th dry storag	ge to avoid	re-wetting	fuel as an e	xample: if a	nalysis indic	cates it's advar	ntagous.		
	- Cont	tinue enhand	ing the rel	lationship v	with SKB Inte	ernational to	enhance to	echnology trar	nsfer.		
	- Iden	tify opportu	nities to si	mplify the <sub>ا</sub>	plant design						
	•	ctop studies/	•	•	•	•	, logistics so	creening.			
	±	bundle mod									
	•			process st	eps and dev	elop techno	logy risk mit	tigation strate	gies.		
	•	oort the Safe	-								
	•	_	_			-		s and update	the generic	UFPP design con	cepts for copper
	and steel L	JFC designs o	concepts a	s described	l in WBS 560	0.20.50.10.2	0.				
	- Deve	elop & maint	tain prelim	inary techr	nical specific	ations for U	FPP equipm	ents and proc	esses.		
	:	ate plant dra	-	-			- 1- 1-				
							••••••••••				
Deliverable	- Preli	minary optir	mized UFPI	P conceptu	al design by	2013 (Y04).					
	- Preli	minary tech	nical speci	fications fo	r the UFPP o	components	for the vari	ous UFPP desi	gn concept	s.	
	- Fina	l optimized l	JFPP conce	eptual desig	gn by 2018 (	Y09).					
Assumptions	Duration o	f work: Y01 t	to Y09.								
	Staff requi	rement acco	unting for	Repository	Engineerin	g Managem	ent: 0.25 N\	NMO-03 fte fo	or Y01, 1.0	NWMO-3 fte for	Y02, 2.0 NWMO-
	03 fte for \	'03 to Y09.									
	Contractor	/consultants	s, see belov	w:							
	Year	, consultants	cnslt	••							
			(\$M)								
	1		\$ -								
	2		\$ 0.20								
	3		\$ 0.40								
	4		\$ 0.40								
	5 TO 6		\$ 0.25								
	7 TO 9		\$ 0.75								
Schedule	Start Year				1 2010	)		Finish Year	9	2018	
Туре	Fixed										
Calculations	•	ū		•	chanical en	gineer with	automation	/ fabrication	experience	in high volume m	nanufacturing for
and Notes:	bundle tra	nsfer techno	logy devel	opment							
	Technolog	v for the fue	el transfer	operation	s will be bo	ounded by t	he fuel mo	dule, fuel trai	nsfer statio	n and the receiv	ring basket (core
		cy to be deve		•							
	i '	•		,							
	Y2 - Wet B				J						
	=	ransfer Tech		iceptual At	ivancement						
	1	Optimization	-	malification	2)						
	:	andling Cell ayout Revie	-	•	-	auinmont					
		•									
	17 - 19 - FL	iel Bundle Tr	ansier Pro	totype Mo	uule to BaSK	EL					
Labour (	Costs	Materia	l Costs	Otho	er Costs	C.,L	total	Allowance	25%	Total	l Cost
\$		\$	ii CU3L3	\$	3,750,000	\$	3,750,000	\$	937,500	\$	4,687,500
7		7		Y	3,730,000	۲ .	3,730,000	<del>'</del>	331,300	7	4,007,300

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	10	70				Prepared By:	G. Kwong
WBS (Old)	552	20	30							
WBS Title	PLACEMEN	T SYSTEMS	ENGINEERII	NG, SPECS 8	k PSAR INPU	IT				
	_ , , ,									
Description		abreast wi	ith potentia ntary DGR s		ement meth	ods / techn	ologies and the	latest seali	ng system des	ign details in both
Deliverable	TM to iden	tify the reco	ommended	placement (	method bas	ed on techno	ology watch resul	ts.		
Assumptions		ur included	in Reposito		ing Manage abreast wit		olacement metho	ds.		
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed	•••••								
Calculations and Notes:										
Labour (	Costs	Materi	al Costs	Other	r Costs	Subtotal	Allowance	25%	Tot	tal Cost
\$	-	\$	-	\$	-	\$ -	\$	-	\$	-

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	10	80					Prepared By	: G. Kwong
WBS (Old)	552	20	35								
WBS Title	RETRIEVAL	SYSTEMS E	NGINEERIN	G, SPECS &	PSAR INPU	Γ					
Description	programs.  (i) Y01: technologi retrievabili  (ii) Y02: reports on a DVD to g	NWMO-3 tes and stratity by Q4, Y0 issue a sum the technic raphically ill	to participal tegies being 01.  nmary reposal details olustrate the	te in nuclea g considere ort on the p f retrieving retrieval or	or waste mand in other referencesses and UFC for references full the transfer of the transfer	nagement F national nuc nd step asso erence repo a DGR by Q4	(&R working clear waste in the principle of the site o	group meeting management retrieving UF ns in crystallin	ngs and sta programs. C from a E e rock and	y abreast wit Issue a NWN OGR in Q1, YO in sedimenta	waste managemer  h the latest retrieva  nO backgrounder o  2. Issue 2 technica  ry rock; and develo  support retrieval o
Deliverable	(iv) <u>Y04</u> : methods o	f used fuel.	preliminary	le retrieval	y design op	and docume	nt research		summary	report by inc	corporating retrieva
Assumptions	Note: Labo Task # 1:	our included Y01-Y09, 0.2	in Reposito 2 fte/a, 9 y	years. NWI	-	rticipate in		_			o meetings and sta ment programs.
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs		r Costs		total	Allowance	25%		otal Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$	-

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	20	10					Prepared By:	A. Murchison
WBS (Old)	552	20	2								
WBS Title	REPOSITO	RY SYSTEM I	DEVELOPM	ENT MANAC	SEMENT, CO	ONSTRUCTIO	N LICENSE	PHASE			
Description	Provide ov	erall manag	gement of t	he repositor	y system de	evelopment	during repo	ository con	struction licen	se application.	Tasks include:
	- Maiı	ntain manas	gement tea	m responsik	ole for conta	ainer and re	oository sys	tem optim	ization and lic	ensing submiss	ion
	•	-	-	-				-	sitory systems	_	
	- Con	duct integra	ited transp	ortation, pa	ckaging plar	nt and repos	itory facility	, studies; a	ind		
	- Plan	and manag	e characte	rization dev	elopment a	nd demonst	ration activ	ities			
	- Supp	ort licensin	g and envi	ronmental a	ssessment	processes as	required				
Deliverable	- Man	agement of	f:								
20	•	•		ory system	developmer	nt plans refl	ective of CN	ISC comme	ents.		
	•			ory system d							
	•	ed containe	-		·						
	•				on and insp	ection spec	ifications ar	nd procedu	ires. (site spec	ific)	
	o Demon	strated con	tainer emp	lacement m	ethods and	retrieval m	ethods, equ	ipment an	d procedures	(site specific).	
	o Demon	strated sea	ling materi	als fabrication	on (ie., puck	s, rings, blo	cks, pedesta	al as requir	ed)		
	o Optimi	sed used-fu	el packagin	g plant and	repository f	facility desig	ns and spec	cifications.			
	o Identifi	cation of te	echnical risl	ks that could	d impact lic	ensing, sche	dule or cos	ts as they	may arise and	l provide recon	nmendations to th
	executive of	of options a	vailable								
	o Long-te	rm demons	stration and	d monitoring	g tests: plan	s in progres	S.				
	o Surface	based and	undergrou	nd characte	risation req	uirements/i	nformation	for engine	ering defined	and gathered	
Assumptions	Duration o										
	- Staff	requireme	nts are 4 ft	e/a for 5a b	ased on:						
	1		-	0-Y15) 1 fte							
	•			opment Ma							
	•			Manager, N		fte.					
		-		lining Engine	eer 1fte						
	•	el and expe	· ·	-							
	•	_					-	-			formed post CNS
	•			. (Y10-Y12)	\$4M per	annum (Co	sts based (	on recent	experience w	vith the DGR	project preliminar
	engineerin	g contracts	).								
	- Preli	minary eng	ineering co	sts carried i	n the capita	l cost portio	n of the est	timate (Pre	pared by SNC	).	
	- NWI	MO-03 for p	reparation	for constru	ction contra	acts to provi	de owners o	oversight, i	review detaile	d design packa	ges, etc.
	- NWI	MO-03 Y10	to Y12 16 F	T, Y13 to Y1	4 19 FTE, Y1	L5 21 FTE.					
Cabadula	Ctout Voor			10	2010			Finish Van	1	2024	
Schedule	Start Year			10	2019			Finish Yea	r 15	2024	
Туре	Fixed										
.,,,,	. incu										
Calculations	•										
and Notes:											
Labour	Costs	Materi	al Costs	Othe	Costs	Sub	otal	Allowan	ce 25%	To	tal Cost
\$	28,654,310	ć		\$ :	12,300,000	\$ 4	0,954,310	\$	10,238,578	\$	51,192,888

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	20	20					Prepared By:	P. Maak
WBS (Old)	552	20	10	30							
WBS Title	FABRICATI	ON, INSPEC	TION & SEA	LING DEMC	NSTRATION						
	inspecting license app risk.	the referen plication of t	ce used-fue	l container	(UFC) desig	n, which ha	s been sele	cted for the p	reparation o	of PSAR, EA and	ng, sealing and I construction ogy and licensing
Description	UFC de - Co	velop and d sign.	technical sp				_				ed on the reference
Deliverable	•	orts describ seal welding		_			ration trials	on fabrication	on of UFC co	mponents. Rep	orts describing the
	design (red 560.20.50. - Prot	quired for th 20.50). otype UFCs	ne preparati	on of the Pi	SAR, EA and	l construction	on license a		put to WBS 5		the reference UFC O and input to WBS
Assumptions	Duration o	f work: Y10	) to Y15.								
	technical s Assumes tl	pecification he availabili	s for these	methods:	\$5,000k/a four	or 6 a (Y10 t at can be ac	o Y15). apted for f		ealing and in		Cs, and b) prepare
	Assumes tl Staff requi	he developn	ment of fabr	ication and Repository	inspection Engineering	technologie 3 Manageme	s for inner ent: 3 fte/a,	oad-bearing	components	s of UFCs in No o Y15) to mana	rth America. Ige various projects
	Travel: 30k		ear werding				and assem	bled prototy	pe orcs.		
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	1	alculations a costs for the		•	med to be b	pased on the	assumptio	n that the co	pper UFC is t	to be selected a	ss the reference
Labour	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost
\$	-	\$	-	\$ 3	30,180,000	\$ 3	0,180,000	\$	7,545,000	\$	37,725,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	20	30					Prepared By: G. Kwong
WBS (Old)	552	20	10	40						
WBS Title	REFERENC	E CONTAINE	R DESIGN 8	& ENGINEER	RING					
Description	Tasks inclu 1.	ide:	Per	form detaile	ed engineer	ing analyses	as required	d to support F	PSAR, EA and	licensing of the selected site.
	1	n, inspection f the referer	and sealin	•			•	•		f the selected site and the late analyses to confirm the structur
	3. specification	ons, fabricat		-	_			_	_	s, detailed technical and welding up the UFC and its components.
	4. UCF and U	FC placeme		_	eering analy	yses as requ	ired to supp	port FSAR bas	sed on speci	fic site information obtained fro
	5. inspection	procedures			•	document	s, engineer	ring drawing	s, technical	specifications, fabrication ar
Deliverable	1	o support FS ailed design		ations for a	II componer	nts of the re	ference UFC	C design.		
Assumptions	Note: Labo Task # 1: `	of work: Y10 our included Y10 – Y12. nalyses to su	in Reposito 0.5 fte/a N	IWMO-3 to	design eng	gineering an			manage con	tracts. Contractor/consultants
	Task # 3: Y		).5 fte/a NW	/MO-3 to m	nanage cont					o perform task: \$ 100K/a, 4 a. led design documents; fabricatio
		wance: Y10								
Schedule	Start Year			10	2019			Finish Year	15	2024
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	4,460,000	\$	4,460,000	\$	1,115,000	\$ 5,575,00

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## **Work Element Definition Sheet**

WBS Title CON Description	552 NDUCT R	20 EPOSITORY	15	60	20						
Description	NDUCT R	EPOSITORY									
l :			DEVELOP	MENT STU	DIES						
	objectiv	e of the Co	nduct Rep	ository De	velopment s	tudies work p	rogram is	to;			
and	design	analysis issi	ues relate	d to site sp	ecific repos		NBS 560.2			0,0.	onstructability issues 10); and, based upon
I		sting equip		uding IFB (	drilling equip	oment and UF	C placeme	ent systems, a	as needed a	nd based on	the full-scale surface
- Re	ports ac	U	ne satisfac	tory resolu		erpretations o					ues identified in the
l	-	commendi				e preliminary	design for	the reposito	ory facility,	with emphas	sis on the placement
Note		•		) FTEs for e	each of years	s 13 to 15) are	located ir	Repository I	Managemen	t Engineerinį	g WEDs
Y	Year	Staff (fte)	cnslt (\$M)	Equip (\$M)	Other (M)						
	12	1.0									
	13	5.0	\$ 1.0								
l §	14 15	5.0 5.0		-	) \$ -						
<b>Schedule</b> Star	rt Year			1	2 2021			Finish Year	15	2024	
<b>Type</b> Fixe	ed										
Calculations											
and Notes:	simulate	d DGR cond	ditions.			ration of equip		0.	·	on shielding,	etc., under
Labour Costs		Materia	l Costs	Oth	er Costs	Subto	tal	Allowance	25%	-	Fotal Cost
\$			2,000,000	_	3,000,000		,000,000	Ś	3,750,000	\$	18,750,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	20	50					Prepared By: P. Maak	
WBS (Old)	552	20	20	20							
WBS Title	UFPP PREL	IMINARY DE	SIGN FOR I	PSAR, EA Al	ND CONSTRU	JCTION LIC	ENSE APPLI	CATION			
•	design at the contraction of this refusion component construction cons	his preferre erence UFC ts of this pr on license ap	d repositor design. The eliminary U pplication o	y site(input ne prelimin JFPP design f the DGR a	from WBS 5 ary UFPP de will be dev and UFPP. The odules from	sign docun eloped to t he key com	0.30). In the nents, technology, technology, the details to ponents of a contaction case.	is WBS, a pre nical specifica hat are neces a preliminary	liminary UFI tions and cossary for the	cted that is suitable for the PP design will be developed onstruction drawings of the preparation of the PSAR, if include:	d based e UFPP
			_		the module rom the mod	_		les into the us	sed-fuel bas	kets in the fuel handling cel	II.
	- E - E - E - S - S	equipment for equipment for equipment for etorage pool	or replacing or sealing a or machinir or loading, I for module ity for empt	gair with in nd inspection of the weld handling ar es; ty UFC com	ert gas insid on of UFC se	eal weld (in cutting off f UFCs in th	put from W the defecti <sup>,</sup> e UFPP.	BS 560.20.50 ve copper-ves		WBS 560.20.50.20.30).	
Deliverable		reliminary l A and const	ū		•	ninary techi	nical specific	cations of the	UFPP comp	onents for the preparation	of the
,		f work: Y10 /consultant		e prelimina	ry design, d	ocuments a	nd specifica	ations for use	d-fuel packa	iging plant: \$1,000k/a for 6	a (Y10
Schedule	Start Year			10	) 2019			Finish Year	15	2024	
Туре	Fixed										
		irement acc	•	•	ry Engineeri	ng Manage	ement: Staf	f requiremen	t: 2 fte/a,	NMWO-3, 6 years for ma	inaging
Labour C	osts	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost	
\$		Ś		Ś	6,000,000	\$	6,000,000	Ś	1,500,000		00,000

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#### **Work Element Definition Sheet**

WBS (New)	560	20	50	20	60					Prepared By: K. Birch
WBS (Old)	552	20	25							
WBS Title	SEALING N	MATERIALS E	ENGINEERIN	IG – FINALIZE SITE	SPECIFIC DEVELOPM	ENT				
Description	- '	finalize the o develop per	design of the formance re	e buffer disk, buff equirements for th	work program is to; er ring and backfill blo ne manufacturing equ ne plant for the produ	ipment, and	•		d pellets.	
Deliverable	- Demo	nstration of	f: (i) quality	of supply of bent		ca due to poter				montmorillonite content) which and clay from local sources.
Assumptions	Year	Staff (FTE)		Sealing Materials Demonstration (Backfill)	Sealing Materials Demonstration (Blocks,rings)					
	:	s (1.0 for Y1	0 to Y12) ar		agement Repository (	WBS 560.20.50	.20.10).			
	10			\$0.5k	\$2.0k					
	11 12			\$0.5k \$0.5k	\$2.0k \$2.0k					
Schedule	Start Year			10	2019		ļſ	inish Year	12	2021
Туре	Fixed									
Calculations	Note: Staf	f costed in F	Repository S	ystem Developme	ent Management Con	struction Licens	se Phase	(WBS 560.20	).50.20.10).	
Labour (	Costs	Materi	al Costs	Oth	er Costs	Subtota	ı	Allowance	25%	Total Cost
\$	-	\$	-	\$	7,500,000	\$ 7,5	00,000	\$	1,875,000	\$ 9,375,000

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#### **Work Element Definition Sheet**

WBS (New)	560	20	50	20	70					Prepared B	y: K. Birch
WBS (Old)	552	20	25								
WBS Title	SEALING N	1ATERIALS I	NGINEERIN	NG PROTOTYPE	AQUISITION						
Description	- Aqı	uire the pro	totype com	e Sealing Mate npaction equip he bentonite b	ment for the p	edestals in c		n with intern	ational par	tners, and	
Deliverable	disks, ring: systems we Manuf Modify Resear and light b Prepar and light b	s as define ork program acture and y prototype rch and devackfill pelle ration of coackfill pelle isation exer	d in the (i) n (WBS 560 test prototice system to a velopment parts. onceptual d ts. crise to dete	preliminary do not be preliminary do not be	esign (WBS 56 s and blocks pr deficiencies id ablish optimum nufacturing sys st suitable ring	oduced. entified. m processes stems for the	to manufa e productio	e (ii) site spe acture bentor on of bentoni	cific develo	opment of t	n geometry of blocks, he repository sealing fill blocks, and gap fill till blocks, and gap fill
Assumptions	Year  Note: FTEs 560.20.50.  13 14 15	•	or Y13 to Y1	Consultants  1.5) are included  \$1.5M  \$1.5M  \$1.5M	Equipment d in Repository \$7.5M \$1.5M \$1.5M	/ System Dev	elopment I	Management	Constructi	on License P	hase (WBS
Schedule	Start Year			13	2022			Finish Year	15	2024	
Туре	Fixed										
Calculations											
Labour	Costs	Materi	al Costs	Other	Costs	Subto	otal	Allowance	25%	,	Total Cost
\$	-	\$ 2	10,500,000	\$	4,500,000	\$ 15	5,000,000	\$	3,750,000	\$	18,750,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	20	80					Prepared By:	G. Kwong
WBS (Old)	552	20	30								
	DI 4 051 451			NO CDECC	0.0040.1410						
WBS Title	PLACEMEN	NT SYSTEMS	ENGINEERI	NG, SPECS	& PSAR INP	UI					
Description	<ol> <li>Dev</li> <li>componen</li> <li>Perf</li> </ol>	duct researd elop prelim ets. form engine	inary desig ering analys	n documen	ts including	engineerir	g drawings,	technical sp	ecifications ents of the p	Cs in the select of the placen placement systen nent system.	nent system and its
Deliverable	TM to sum A prototyp Detailed	, imarize anal oe placemen	ysis results It system. Iments incl	to support	PSAR, EA ar gn requirer	nd licensing	requiremen description	, engineerin	J	technical spe	ecifications; system
Assumptions	Note: Labo Tasks #2 – activities t with the us Task #5: Y	o evaluate v se of laborat 714-Y15, 0.7 r to demons	in Reposito 13, 0.4 fte/a various poto tory or wor 7 fte/a, NW trate the co	a, NWMO-3 ential place kshop facilit /MO-3 to constructabil	to manage ment meth ties for testi coordinate to lity and cap	e project, Co ods as desc ing the plac the constru ability of th	ribed: \$1.25 ement syste ction of a perfection	iM/a, Y10 to im. prototype pla iment system	Y13. Estima acement sys n. \$3.25M/a	ted costs inclu	lication engineering ide costs associated ualified contractor. mated cost includes ment system.
Schedule		/Developme	ent contrac	ts: \$500k/a	2019			Finish Year		2024	
Juleuule	Start Year			10	2019			i illisii teaf	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	To	otal Cost
\$	-	\$	-		14,500,000		14,500,000	\$	3,625,000	\$	18,125,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	20	90					Prepared By: G. Kwong
WBS (Old)	552	20	35	A						
WBS Title	RETRIEVAL	SYSTEMS E	NGINEERIN	G, SPECS &	PSAR INPUT	<u>[</u>				
	<u> </u>									
Description	both satur 3. Dev componen 4. Perf	duct researd ated and un relop prelim ats.	saturated basinary desig	entonite ar n documer es as requir	ound the er its including red to suppo	mplaced UFg engineer	C). ing drawing A and licensi	s, technical s	specification ents of the r	ced UFC (including the removal of sof the retrieval system and interieval system.
Deliverable		J			·		a reference	DGR design (	(both crystal	ine and sedimentary scenarios)
	Preliminar		cuments inc	luding desig	gn requirem	nents and e	ngineering o	•		
Assumptions	Note: Labo Tasks #2 – Estimated Task #5: \ Contractor	costs includ 714-Y15, 0.5 to demons	in Reposito 3, 0.5 fte/a, le costs asso 5 fte/a, NV trate the co	NWMO-3 to onstructabili	o manage p the use of coordinate ity and capa	oroject, Cor laboratory the constr ability of th	or workshop ruction of a e retrieval s	p facilities for	r testing the retrieval sys	s as described: \$2.25M/a, 4 year retrieval system. tem with a qualified contracto s. Estimated cost includes capita
Schedule	Start Year			10	2019			Finish Year	15	2024
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost
\$		Ś		\$ 1	5,500,000					

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## **Work Element Definition Sheet**

WBS (New)	560 552	20 20	50 2	30	10					Prepared By	: A. Murchison
WBS (Old)	332	20	<u></u>	.i	<b>.</b>	<u> </u>	Ĭ				
WBS Title	REPOSITO	RY CONSTRI	JCTION MA	NAGEMEN	T, CONSTRU	JCTION UD	& OBTAIN	FSR			
Description	•			ement of th implement					ks include: ring and the i	mplementati	on process.
	•		_	m responsil				-	mentation;		
	3			ign requirer nitoring as r		ontainer an	d repository	y systems;			
	3			t as require	•						
	:	ort constru		-							
Deliverable	- Und	ates/finaliza	ation of the	repository	system pla	ns.					
	•	-		sitory syste							
	- Site	specific fina	al container	design.							
	- Fina	l container	fabrication	and inspect	ion specific	ations and	procedures				
	:		•					nt and proce	edures (Site s	pecific).	
	1	-		gn, UFPP an		-	S.				
	1	•	•	neering tech	•	_					
	•			or design, p						and provide w	o commondations to
	3	ive of optio			ouid impact	licensing,	cnedule or	costs as the	ey may arise a	and provide r	ecommendations to
	•				ring tosts in	nrogross					
	- LON	g-term dem	onstration	and monito	ring tests in	i progress.					
Assumptions	Duration o	f work: Y16	to Y25.								
	- Staf	f requireme	nts are 4 ft	e/a NWMO	-01 for 10a	based on:					
	:		•	.6-Y25) 1 fte							
	E		-	oment Man	-	-					
				oment Man		urface Syst	ems (Y16-Y2	25) 1 fte.			
	8			lining Engin	eer 1fte						
	1	ime EPC coi			dovolonmo	at convent	ional minin	a ctructuros	curface facil	itios	
	E	_	_	-	-			_	, surface facil oration of any		inges to the design.
	:		-	to Y18 16 f	-	-	-		fte. ured by SNC's	capital octim	uato.
	i	•		•	-		_		•	•	
		assumed t	hat constru	uction/licen	sing suppor	rt will be r	equired and	1 \$2M per y	ear has beer	n budgetted i	for external support
	contracts.										
	-Program	Vlanageme	nt Year 15	to Year 25 I	ncludes the	augmente	d staff requ	lire for EPC	M contract o	versight.	
								······			
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations											
and Notes:											
	- A \$	250k yearl	v engineer	ing fee has	been incl	uded for '	16-Y25 to	resolve en	gineering dis	coveries tha	t will arise through
	implement	•	, ,	ū							
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	e <b>25</b> %	Т	otal Cost
\$	39,316,561	\$ 1	10,000,000	\$	2,500,000	\$	51,816,561	\$	12,954,140	\$	64,770,702

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	30	20					Prepared By: P. Maak
WBS (Old)										
WBS Title	DEVELOPN	MENT AND D	EMONSTRA	ATION OF SI	ERIAL PROD	UCTION OF	UFC COMP	ONENTS AND	UFCS	
Description	carried ou the FSAR, Tasks inclu	t in Canada ( EA and oper	or North Ar ating licens	nerica. The e applicatio	findings wo	ould be app	lied for esta			erence UFC design are to be C design for the preparation of
	- Co	evelop and domplete the ing the UFC	quality con	trol plan an	d technical	specificatio	•		ments and pr	rocedures) for manufacturing and
	1	tablish prod tion of the l	•	•	• .		he process	equipment, p	rocedures a	nd technical personnel for serial
Deliverable	- Fina assembled - List	al technical UFCs.	specification	ons (materions)	al and equi	pment) and	I qualified purposed of the control	and assemb procedures for	or serial pro	duction of UFC components and
		ut to suppo licence appl		design of	the referen	ce UFC des	ign in WBS	560.20.50.30	0.20 for the	preparation of the FSAR, EA and
Assumptions	control do	cuments and	d technical	specificatio	ns for these	methods:	\$2,000k/a	ng, sealing an for 10a (Y16 t ability has be	to Y25).	prototype UFCs. Prepare quality
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
Calculations and Notes:	Staff requi	rement acco	ounting for	Repository	Engineering	Managem	ent: Staff re	quirement: 2	fte/a, NWM	O-3, 10 years ((Y16 to Y25)
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	20,000,000	\$ 2	20,000,000	\$	5,000,000	\$ 25,000,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	30	30				Prepared By: G. Kwong
WBS (Old)	552	20	10	40		<u> </u>			
WBS Title	REFERENC	E CONTAINE	R DESIGN	& ENGINEE	RING				
Description	Tasks inclu	ıde:							
	1.		Val	idation of o	container des	sign in underground fac	ility.		
	2.		R	efine deta	iled design	documents, engineer	ring drawings	, technical	I specifications, fabrication and
	inspection	procedures	for all UFC	componer	nts.				
Deliverable	TM or TR t	o support FS	SAR.						
	Revise det	ailed design	document	ations for a	all componer	nts of the reference UFC	C design.		
Assumptions	Note: Labo Task # 1: \ for 2 a.	/22-Y23. 0.5 /23. Consult	in Reposito 5 fte /a NV	VMO-3 Val		ntainer design in unde		,	tor to conduct analyses: \$ 700k/a ection, test plans and procedures:
Schedule	Start Year			2	2 2031		Finish Year	23	2032
Туре	Fixed								
Calculations and Notes:									
Labour	Costs	Materia	al Costs	Othe	er Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,900,000	\$ 1,900,000	\$	475,000	\$ 2,375,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	30	40				Prepared By: J. Villagran
WBS (Old)	552	20	15	60	70				
WBS Title	TECH SPEC	S FOR REPO	SITORY & L	JFPP					
Description	facility at the p - F significa	Prepare the based on feoreferred site or site or and and issues rate or and issues rate o	eedback from te. lated design aised during	m the environs ns for the us	onmental as ed-fuel pac d CNSC licer	ssessment (EA) review	process and a	dditional un	t (UFPP) and the repository derground characterisation data eferred site that address all of the ge.
Deliverables	- Revi	sed prelimir hnical input	nary design	for the use	d-fuel packa		oository facility	that satisfy	the technical specifications.
Assumptions	NWMC - S Purcha: - C	Specialist Co sed Services	rements to onsultant to s \$200k/a fo consultants	manage the provide tec or 2a, (Y16 t to prepare	chnical inpu o Y17). revised pre	liminary Engineering o	cifications and	preliminary	st) plus the following: Engineering design for the UFPP epository facility design-build
Schedule	Start Year			16	2025	j	Finish Year	20	2029
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
					COSES	Jubiotal	Allowalice	23/0	Total Cost

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	30	50					Prepared By: P. Maak
WBS (Old)	552	20	20	30						
				Å	. <del>.</del>		.ā			
WBS Title	UFPP Cons	truction/Te	chnology D	emonstratio	on					
Description	and tested production 40 10 30 Laboratory The key production - E - E (New e - E - E - E - E - E - E - E - E - E - E	The findir a equipment (Package), or at vendo ocess equip equipment for equipment equipmen	ngs will be at will be instant 560 40 or locations when the remotor handling for removing to commer for drying the for sealing a for machinity or loading, quipment I for module monitoring harea.	pplied to dicalled, tested of 40 10 40 .  Le UFPP including the mandules in groundles from the mandles of grain with in and inspection of the weld handling an es (if require facility for	evelop and ordered and common (dispatch).  Indes: I	qualify the nissioned ir The work the transpe handling of dules and pe the UFCs (input from cutting off of UFCs in the transpectation)	final product the UFPP use activities of cortation cases. I lacing bundles with the UFPP use activities of cortation cases. I was seen as the use of cortation with the use of cortation cases. I was seen as the use of cortation cases are used to be used	tion process of the second of	equipment a 60 40 40 10 this WBS ca sed-fuel bash	e designed, procured, constructe and procedures for the UFPP. The 20 (receipt and transfer), . 560 4 and be performed in a Contained at the fuel handling cell 20.50.20.30).
Deliverable	equipm	ent in a use	ed-fuel pack	aging plant	·.	•	for procure		nstruction of	the production process
Assumptions	process eq Production Some of th	/consultant uipment for equipment	ts to i) prep r the used-f t for manuf: f equipmen	uel packagi acturing and	ng plant: \$3	,000k/a for	s a (Y17 to	Y21). available and	are adapted	urement of the container-relate to the used-fuel packaging plan le at laboratories such as the SK
Cala adada	Chart Value			······································				ir:-:-b-V		2020:
Schedule	Start Year			16	2025			Finish Year	21	2030
Туре	Fixed									
Calculations and Notes:	Staff requi	rement acco	ounting for	Repository	Engineering	; Managem	ent: Staff re	quirements a	re 3 fte/a, N	MWO-3, 6 years.
Labour (	Costs	Materi	al Costs	Othe	r Costs	Suh	total	Allowance	25%	Total Cost
\$	_	Ś			15,000,000		15,000,000	Ś	3,750,000	\$ 18,750,000
· -		<del>'</del>		٠,	13,000,000	7	10,000,000	<u>۲</u>	3,730,000	7 10,730,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	30	60				Prepared By:	K. Birch
WBS (Old)	552	20	25	<u> </u>						
WBS Title	SEALING M	IATERIALS E	NGINEERIN	G						
Description	- f	urther deve levelop spec	lop the des cifications f	ign of the boor the manu	uffer disk, b ıfacturing e	program is to; uffer ring and bac quipment, the pro lisks, buffer block	cedures, and			
Deliverable	- Con implement	•	ization stu	dies on equ	uipment an	d processes, and	refine as required	prior to	production pro	ocess at operation
Assumptions	Year  16 17 18 19 20 All costs as 560.20.50.		th this WBS	are covere	d under Rep	pository Construct	ion Management, Co	onstructio	n UDF & Obtair	n FSR (WBS
Schedule	Start Year			16	2025		Finish Year	20	2029	
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	-	\$	- \$	-	\$	-

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	30	70					Prepared By:	G. Kwong
WBS (Old)	552	20	30	Ĭ							
WBS Title	PLACEMEN	NT SYSTEMS	ENGINEERI	NG, SPECS 8	& FSAR INPL	JT					
Description	7. De	orm engine	iled design	documen	ts, enginee		ngs, techni	ical specificat	ions, syste	em commissio	ning /operating /
Deliverable	TM to con	e placemen clude the ca imarize desi	pability of t				tem evalua	tion results.			
Assumptions	Tasks #6 -	f work: Y14 7: Y16-Y18, our included	0.3 fte/a, N				ıltant to car	ry out tasks as	s described	: \$1M/a, 3 yeaı	rs.
Schedule	Start Year			16	2025			Finish Year	18	2027	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi	al Costs	Other	r Costs	Sub	otal	Allowance	25%	То	tal Cost
\$		\$		\$	3,000,000	\$	3,000,000	\$	750,000	\$	3,750,000

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## **Work Element Definition Sheet**

## Construction

WBS (New)	560	20	50	30	80					Prepared By:	G. Kwong
WBS (Old)	552	20	35								
WBS Title		. SYSTEMS E	NGINEERIN	G, SPECS &	FSAR INPUT	Γ					
Description	7. Dev system. 8. Carr	orm engined	ed design d	ocuments, of the prot	engineering	drawings,	·				of the UFC retrieval
Deliverable	TM to sum Detailed	a prototype nmarize engi design doc ons; and ret	ineering and uments in	alysis results cluding des	sign requir	ements ar	•	ions, engine	ering draw	ings for cons	truction, technical
Assumptions	Note: Labo	of work: Y14 Our included 8: Y16-Y19,	in Reposito				ultant to ca	rry out tasks	as described	: \$2M/a, 4 yeal	rs.
Schedule	Start Year			16	2025			Finish Year	19	2028	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs		al Costs		Costs		total	Allowance	25%		tal Cost
\$	-	\$	-	\$	8,000,000	\$	8,000,000	\$	2,000,000	\$	10,000,000

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	40	10					Prepared	A. Murchison
WBS (Old)											
	<u> </u>										
WBS Title	Repository	Engineering	g Program 8	ዪ Project Co	osts - Opera	tion					
Description	NWMO sta			•		osts for :					
	=	ontinuing U			•						
	Ē	_	-	-	GR Operatio						
	•					tests at the	UDF and or	ngoing data c	ollection of	DGR perfor	mance monitoring
	activities to	ensure DG	R evolution	is as predic	cted.						
Deliverable	Donorts on	d cummaria	s of system	norforman							
Deliverable	Reports an	a summarie	s or system	i periorman	ice.						
Assumptions	Continuing	UDF Demo	nstrations:	2 FTF/a NW	/MO-03 Y26	- Y30 & 1 FT	F/a NWMC	D-03 Y31 - Y55			
, tosumptions	Continuing	ODI Dellio		2112,414	1110 03 120	150 @ 111	<i>L</i> , <i>a</i> 11111110	00 101 100	•		
	Monitoring	Systems &	Programs:	1 FTE/a NW	/MO-03 Y26	- Y55.					
		, 0,000		, a	05 . 20						
***************************************	Ŏ										
Schedule	Start Year			26	2035			Finish Year	85	2094	
				f							
Туре	Step-Fixed										
Calculations											
and Notes:											
Labour (	Costs	Materia	al Costs	Other	r Costs	Subt	otal	Allowance	25%	T	otal Cost
\$	8,461,908	\$	-	\$	-	\$ 8	8,461,908	\$	2,115,477	\$	10,577,385

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## **Work Element Definition Sheet**

WBS (New)	560	20	50	50	10					Prepared A. Murchison
WBS (Old)										
WBS Title	Repository	Engineering	g Program 8	& Project Co	sts - Extend	led Operation	on/Monitori	ing		
Description	NWMO sta	ff costs not	covered un	ider operati	ons. Staff o	osts for:				
	- C	ontinued op	perations &	maintenan	ce of reposi	tory monito	oring system	and monitor	ring system	data collection to ensure DGF
	evolutio	on is as pred	licted.							
	0									
Deliverable	Reports sui	mmerizing t	he results o	of ongoing r	nonitoring.					
	·	_			_					
	0									
Assumptions	1 NWMO-0	3 FTE/a fro	m Y56 - Y12	25	••••••					
Schedule	Start Year			56	2065			Finish Year	125	2134
Туре	Fixed									
Calculations										
and Notes:										
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	total	Allowance	25%	Total Cost
\$	9,112,824	\$	-	\$	-	\$	9,112,824	\$	2,278,206	\$ 11,391,030

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#### **Work Element Definition Sheet**

WBS (New)	560	25	20	10	10					Prepared By:	A. Vorauer
WBS (Old)		<u> </u>			<u> </u>		<u> </u>				
WBS Title	TECHNICA	L SUPPORT I	NIBING CAL	NDIDATE CI	TE DUACE						
WB3 THE	TECHNICA	L SUPPORT I	JURING CAI	NDIDATE SI	IE PHASE						
Description	processes candidate Report, an	that may inf sites. Much d the Final S	luence repo of the know afety Repo	ository safe vledge gain rt for the pi	ty (APM Ted ed will also referred site	chnical Prog pertain to a e.	ram Objec inalysis sup	tive 5). A speci pport for the Er	fic focus is nvironmen	ncing scientific under placed on supporting tal Assessment, the F ganizations interested	g the selection of Preliminary Safety
Deliverable	1	es are specil			jectives def	ined in APM	l Technical	Program Obje	ctive 5 and	I will consist of repor	ts and technical
	- 5a: Advaı	nce the und	erstanding o	of factors af	fecting geo	sphere stab	ility and its	s long-term sta	bility for b	oth crystalline and se	edimentary settings.
	- 5b: Adva	nce the und	erstanding o	of the evolu	ition of gro	undwater flo	ow and the	impact of glad	ciation on a	a deep geological rep	ository.
	1	op methods ry settings.	for conduc	ting detaile	d geoscien	tific site inve	estigations	and evaluatior	ns at candi	date sites in both cry	stalline and
Assumptions	NWMO Ge	eoscience sta	affing requi	rements for	managing	activities in	this WEDS	are 3 FTE in ea	nch of Y4 to	o Y9.	
	Funding fo	r contractor	support fo	r Objective	5 is \$2.095	M for Y4, \$1	275M for	Y5 and \$.7M fo	or Y6 to Y9	(1)	
Schedule	Start Year			4	2013	3		Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	1 Contract	or funding c	osts extract	ted from "T	echnical RD	) Program 20	011-2015_	R4a". Y6 fundii	ng extrapo	lated to Y9.	
Labour	Costs	Materi	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	Total	Cost
\$	2,343,298	\$	-	\$	6,170,000	\$ 8	3,513,298	\$ 2	2,128,324	\$	10,641,622

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## **Work Element Definition Sheet**

WBS (New)	560	25	20	20	10					Prepared By:	A. Vorauer
WBS (Old)											
WBS Title	TECHNICAL	_ SUPPORT I	DURING EA	AND PSR PI	HASE						
Description	understand on the pre and the Fir	ding of geolo ferred site a nal Safety Re	ogic process and knowled eport in the	ses that mandge required long-term.	y influence d to support	repository s developme	afety (APM ent of the E	Technical Pro nvironmental	gram Objed Assessmen	t, the Prelimina	entific ific focus is placed ary Safety Report, ested in similar
Deliverable	technical n - 5a: Ac settings	nemoranda. Ivance the us.	. These sub understandi	-objectives ng of factor	include: s affecting ខ្	geosphere s	tability and	its long-term	stability for		eports and  e and sedimentary  gical repository.
								ent include:		WED (Complete	
Assumptions	Monitoring	g at Preferre	ed Site durir	to manage ng Regulator r Objective	ry Process).		s WED are a	accounted for	in another	WED (Geosphe	ere Support and
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	• '	-			•					ort for participa delling method	ation in ologies and tools.
Labour	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost
\$	-	Ś	-	Ś	3,000,000	Ś	3,000,000	Ś	750,000	\$	3,750,000

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#### **Work Element Definition Sheet**

WBS (New)	560	25	30	10	10				Prep	ared By:	N. Hunt
WBS (Old)						Ĭ					
WBS Title	TECHNICAL	SUPPORT	FOR APM TE	CHNICAL P	ROGRAM O	BIFCTIV	F #3 DURIN	IG SCREENING	PHASE		
Description	part of the subsequen the Prelimi	Confidence t tasks pert nary Safety	e Building ar	nd Process Use selection of	Jnderstand of candidat	ing secti e sites, a	on. Much o analysis sup	of the knowled	ge gained l	here will al	gram. Objective 3 is so be applied in ent, creation of
	- Furth	er increase	confidence	in the deep	geological	reposito	ory safety ca	ase			
Deliverable	Deliverable objectives		fic to individ	lual sub-obj	ectives and	will cor	sist of repo	orts and technic	cal memor	anda. The	principal sub-
	Objective #	#3: Further	increase cor	nfidence in	the deep ge	ological	repository	safety case:			
	3b) Suppor 3c) Improv 3d) Provide	t system m e lifetime p e technical :	redictions a support and	ion through nd modellir modelling	integrated ng of coppe expertise to	r and sto Canadi	eel used fue an participa	onal joint proje el containers in ation in interna nentation by 2	a deep ged tional join	t repositor	y technology
Assumptions	Assessmen	t Studies fo	r Hypotheti	cal Sites).				ded in WBS 56			itive Safety
	See the cal	culation se	ction below	for a more	detailed br	eakdow	n.				
Schedule	Start Year			1	2010	Ĭ		Finish Year	3	2012	
Туре	Fixed										
Calculations and Notes:			······································								
		<u>Y01</u>	<u>Y02</u>	<u>Y03</u>							
	(a) (b) (c) (d) (e)	\$ 21 \$ 115 \$ 1,100 \$ 50	\$ 21 \$ 100 \$ 1,000 \$ 200	\$ 150 \$ 100 \$ 1,000 \$ 200							
	Sun Iorai	э 1,315	\$ 2,099	э 2,33U							
Labour	Costs		al Costs		Costs		ıbtotal	Allowance	25%		Total Cost
\$	-	\$	-	\$	6,364,000	\$	6,364,000	\$	1,591,000	\$	7,955,000

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#### **Work Element Definition Sheet**

WBS (New)	560	25	30	10	40				Prepared By:	N. Hunt, P.
WBS (Old)										Gierszewski, B.
						! ! 				Belfadhel, G.
M/DC Title	TECHNICAL CURRORT FOR ARM	TECHNICA	LDDOCDAN	4 OD IECTIVI	C #3 DUDIN	C CANDIDA	TE CITE D	LLACE	<u> </u>	
WBS Title	TECHNICAL SUPPORT FOR APM	TECHNICA	LPROGRAM	TOBJECTIVI	E #3 DUKIN	G CANDIDA	IE SIIE P	TASE		
Description	This task captures all activities	under Obje	ctive 3 of th	ie Jan 2011	revision (V	ersion 4) of	the APM	Technical Program and i	s a continuation of e	fforts outlined in
	WBS 560 15 30 10 10 (Technica	l Support f	or APM Tec	hnical Prog	ram Objecti	ive #3 Durir	g Screen	ing Phase). Much of the	knowledge gained he	ere will also be
	applied in subsequent tasks pe	rtaining to	analysis sup	port for the	e Environmo	ental Asses	ment, cr	eation of the Preliminary	Safety Report, and c	reation of the
	Final Safety Report.									
	APM Technical Program Object - Further increase confiden		en geologi	al renosito	rv safety ca	SP.				
	r artirer moreuse communi		ch Pcc.op.	заптерозно	., 50.00, 60					
Deliverable	Deliverables are specific to ind	vidual sub-	objectives a	ind will con	sist of repo	rts and tech	inical me	moranda. The principal	sub-objectives are:	
	Objective #3: Further increase	confidence	in the deen	geological	repository	safety case				
	objective not railties marease		נוופ מככף	BeeroBicai	. eposito. y	sarcty case				
	3a) Maintain and improve prod		_							
	3b) Support system model valid									
	<ul><li>3c) Improve lifetime prediction</li><li>3d) Provide technical support a</li></ul>			•					oav	
	3e) Demonstrate components								уву	
	, , , , , , , , , , , , , , , , , , , ,				0		,			
Assumations										
Assumptions	NWMO Repository Engineering	staff requi	rement is 1	.75 FTE in e	ach of Y4 to	y9.				
	NWMO Safety Assessment staf						essment f	for Candidate Sites).		
	Funding for contractor support	for is \$2.85	50M for Y4,	\$3.300M fo	or Y5, \$3.30	OM for Y6,	\$3.700M	for Y7, \$3.400M for Y8 a	nd \$3.35M for Y9.	
	See the calculation section belo	ow for a mo	re detailed	breakdowr	١.					
Cabadula	Ctart Vaar			4	2012			Finish Year 9	2018	
Schedule	Start Year			4	2013			Finish Year 9	2018	
Туре	Fixed									
Calculations										
and Notes:		<u>Y04</u>	Y05	<u>Y06</u>	<u>Y07</u>	Y08	Y09			
	Repository Engineering	104	103	100	107	100	105			
	Sci/Eng, NWMO-03	1.75	1.75	1.75	1.75	1.75	1.75	_		
	Repository Engineering FTE	1.75	1.75	1.75	1.75	1.75	1.75			
	, 6		(ėL)							
	,	Y04	(\$k) Y05	Y06	Y07	Y08	Y09			
	, ,	<u>Y04</u>	(\$k) <u>Y05</u>	<u>Y06</u>	<u>Y07</u>	<u>Y08</u>	<u>Y09</u>			
	(a)	\$ 900	<b>Y05</b> \$ 900	\$ 900	\$ 1,150	\$ 1,150	\$1,100			
	(a) (b)	\$ 900 \$ 300	<b>Y05</b> \$ 900 \$ 500	\$ 900 \$ 500	\$ 1,150 \$ 350	\$ 1,150 \$ 350	\$1,100 \$ 350			
	(a) (b) (c)	\$ 900 \$ 300 \$ 250	\$ 900 \$ 500 \$ 500	\$ 900 \$ 500 \$ 500	\$ 1,150 \$ 350 \$ 500	\$ 1,150 \$ 350 \$ 200	\$1,100 \$ 350 \$ 200			
	(a) (b) (c) (d)	\$ 900 \$ 300 \$ 250 \$ 1,200	\$ 900 \$ 500 \$ 500 \$ 1,200	\$ 900 \$ 500 \$ 500 \$ 1,200	\$ 1,150 \$ 350 \$ 500 \$ 500	\$ 1,150 \$ 350 \$ 200 \$ 500	\$1,100 \$ 350 \$ 200 \$ 500			
	(a) (b) (c)	\$ 900 \$ 300 \$ 250 \$ 1,200	\$ 900 \$ 500 \$ 500	\$ 900 \$ 500 \$ 500 \$ 1,200	\$ 1,150 \$ 350 \$ 500 \$ 500	\$ 1,150 \$ 350 \$ 200	\$1,100 \$ 350 \$ 200 \$ 500			
	(a) (b) (c) (d) (e)	\$ 900 \$ 300 \$ 250 \$ 1,200 \$ 200	\$ 900 \$ 500 \$ 500 \$ 1,200	\$ 900 \$ 500 \$ 500 \$ 1,200 \$ 200	\$ 1,150 \$ 350 \$ 500 \$ 500 \$ 1,200	\$ 1,150 \$ 350 \$ 200 \$ 500 \$ 1,200	\$1,100 \$ 350 \$ 200 \$ 500	-		
	(a) (b) (c) (d) (e) Sub Total	\$ 900 \$ 300 \$ 250 \$ 1,200 \$ 200	\$ 900 \$ 500 \$ 500 \$ 1,200 \$ 200 \$ 3,300	\$ 900 \$ 500 \$ 500 \$ 1,200 \$ 200 \$ 3,300	\$ 1,150 \$ 350 \$ 500 \$ 500 \$ 1,200 \$ 3,700	\$ 1,150 \$ 350 \$ 200 \$ 500 \$ 1,200 \$ 3,400	\$1,100 \$ 350 \$ 200 \$ 500 \$1,200 \$3,350			G-14
\$	(a) (b) (c) (d) (e)	\$ 900 \$ 300 \$ 250 \$ 1,200 \$ 200 \$ 2,850	\$ 900 \$ 500 \$ 500 \$ 1,200 \$ 200	\$ 900 \$ 500 \$ 500 \$ 1,200 \$ 200 \$ 3,300	\$ 1,150 \$ 350 \$ 500 \$ 500 \$ 1,200	\$ 1,150 \$ 350 \$ 200 \$ 500 \$ 1,200 \$ 3,400	\$1,100 \$ 350 \$ 200 \$ 500 \$1,200 \$3,350	Allowance 25% \$ 5,316,731	Total \$	Cost 26,583,655

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## **Work Element Definition Sheet**

WBS (New)	560	25	30	20	10					Prepared By:	N. Hunt, P. Gierszewski
WBS (Old)											
WBS Title	TECHNICA	L SUPPORT I	DURING EA	AND PSR PI	HASE						
Description	Objective i	#3 During Ca nmental Ass	andidate Sit sessment ar	e Phase), w	ith specific ary Safety Re	focus on th eport. The	e selected s work may a	ite and the in Iso be longer	formation n -term to sup	eeded to suppo port the Final S	chnical Program ort production of Safety Report. ested in similar
Deliverable	Deliverable	es are specif	ic to individ	dual items d	efined in th	e work pro	gram and w	ill consist of r	eports and t	technical memo	pranda.
	using site s		erials and c	onditions to	the extent	practicable	-			f key assessmei nents that could	•
Assumptions	the wa	ste; Biosphere in	formation i	s provided i	n WBS 560.	30.30.20.30	) (Biosphere	· Characteriza	ation for EA		zation that created and PSR).
	Safety Ass	r contractor essment: \$1 g: \$1.0M/a		0, \$1.4M in	Y11, \$1.3M	in Y12, \$1.0	0M in Y13-Y	15.			
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materi	al Costs	Othe	Costs	Sub	total	Allowance	25%	To	tal Cost
\$	-	\$	-	\$ 1	13,350,000	\$	13,350,000	\$	3,337,500	\$	16,687,500

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	25	30	30	10					Prepared By:	N. Hunt, P. Gierszewski
WBS Title	TECHNICAL	L SUPPORT I	FOR OPERA	TING LICEN	CE APPLICA	TION					
Description	of the sele	cted site. T	his work wi	ll extend the	e studies in	WBS 560.25	.30.20.10 (	Technical Sup	pport During	EA and PSR Ph	specific conditions ase).  The work will
	focus on:	je carrieu ot	at at the ser	ecteu site e	ittiei uliuei	ground in th	e obi oi a	boveground	iii tiie biospii	ere at tills site	. The work will
	- II Most work experimen	n-situ integr will be carr ts will invol	rated experi ried to conc ve the insta	iments that lusion durin llation of te	can be used g the const st coupons	d to validate ruction perio or assemblio	or calibrated to supposes for long-		ting Licence re tests (e.g.	application; ho up to 100 year	owever, some s). Even though
	:	-				y (over mult ient period v			atures, driest	materials, and	d most oxygen.
	- E	insure that t	there is com	npetent tecl	nnical staff o	on-hand to c	eal with to	ppical questio	ns that may	arise or, if nece	essary, retrieval.
Deliverable	Experimen	tal result re	ports, inclu	ding analysi	s and recon	nmendation	for mode	ls and for mo	del parameto	ers.	
Assumptions	- C and loc	Costs for ger ated in Rep Costs associa	nstructing the neral operatository Engi nated with te	ne UDF, inclicion support neering. chnical staf	uding excav t of the UDF f dedicated	rating the ex (e.g. utilitie	s, monitori		on, supplies) a	are included in	UDF Operation
	Costs are e These cost detailed sit		\$3 M/a for d appropriat neasuremen	10 years (Y te because, nts are mad	16 to Y25). while the g					this period is w that must be i	when the most resolved before an
	Although a experimen		oport progr	am at the U	DF is not de	efined here,	this rate of	expenditure	would be co	nsistent with t	ests and
	glove b - P - 1 - E CHEML	ox and vent Projects aim major in-si Evaluation o AB-type tes	ilation), and ed at impro tu test of th f material p ts, SKB TR-C	d acquisition ving unders he scale of the roperties on 11-10, Äspö	n of specialistanding of s the Buffer Co r behaviour Annual Rep	sed instrume site-specific ontainer Exp under site-s ort 2000, p.	ents (\$1M) processes ( eriment (\$ pecific con 57) (\$10M	or topical issu 5 - \$10M). ditions, espec for 5 in-situ t	ies (5 x \$0.2N cially near-fie ests);	л). eld transport p	astrumentation, arameters (e.g.
	•		0		,	•		•		of 20-120 years reding the repos	to provide data on sitory closure
	tracers	(\$5M).									with radioactive
	Assessmen		ents for inc	orporation	or test resu	its into the s	arety asses			ed WBS 560.30	.30.30.10 (Safety
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi \$	al Costs		Costs 30,000,000	Subt \$ 3	otal 0,000,000	Allowance \$	<b>25%</b> 7,500,000	<b>To</b>	37,500,000
4	-	l 4		ت با	,0,000,000	5 ب	0,000,000	ا ۲	7,300,000	ب	37,300,000

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#### **Work Element Definition Sheet**

WBS (New)	560	25	50	10	10					Prepared By: K. Birch
WBS (Old)	552	20	15	30	1					
WBS Title	GENERIC R	EPOSITORY SEAL	ING SYSTEI	MS						
Description	The object	ives of this work	program is	to develop	repository-s	ealing syste	ms for gene	eric repository sea	lling sys	tem development as follows:
	(star	port of; the moderting in 2013). The	elling of the ne suite of	e potential s material pro	ites, and of toperties have	the detailed e been deve	modelling loped from	of the conceptual standard geotech	design Inical la	se properties are required in of the two candidate sites boratory methods such as I thermal conductivity
	:	rence shaft seal	material, (t	he in-situ co	mpacted 70	/ 30 bento	nite/ sand r		ystems	and mixtures such as the include clay-based and cement-fts).
	-	Support on "Ir	ternationa	l Obligation	s" such as th	ie SKB ASPC	HRL & Mo	nt Terri for collect	ive "de	monstration" technology.
	8	erial properties o	letermined	for both sa	turated and	unsaturate	d condition	s. Examples of on-	going N	. The modelling would use the IWMO sponsored modelling er systems (EBS-TF).
	- seal	ing systems (plac	ement of p	oellets adjac	ent to UFC,	and in-situ o	ompaction	of shaft seal mate	erials.	conceptual design related to
	-	identification	or technoic	gy developr	nent & dem	onstration (	i.e. aspnait	shaft seals) for Ca	ınadlan	concepts.
Deliverable	Generic Re - - -	Material prope Assessment of Validated num	erty databa constructa	ases for varia	ious concep	ts	design (WB	3S 560.20.50.10.10	))	
Assumptions	Note: Labo Year 1 2 3 Costs capti	f work: Y01 to Y0 our is located in R Staff (NWMO-3 (fte) 1.0 1.0 1.0 ured in 560.25.30	epository I ) cnslt (\$M) \$ 0.8 \$ 0.8 \$ 0.8	3 3 3			n general s	ome potential mi	nor equ	nipment purchases for laboratory
Schedule	Start Year				1 2010			Finish Year	3	2012
Туре	Fixed									
Calculations	- - -	Linked to repo Links to instru Note: Costs inc	mentation	and monito	ring		ative Safety	y Assessment Stuc	lies".	
Labour (	Costs	Material	Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$ -

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	10	20			ic.	Prepared By: K. Bir	rch
WBS (Old)	552	20	15	30	20				riepaieu by. K. Bii	CII
WB3 (Olu)	332		11.	. 30	.i	li				
WBS Title	CANDIDAT	E SITES REPO	CITODV CE	ALINIC CVCT	ENAC CITINIC					
WD3 TILLE	CANDIDA	E SITES REPU	JOITURT SEF	ALING STSTE	LIVIS, SITTING					
Description	The chies	ives of this w		m is to dove	lon ronosit	on, cooling cycto	ms for the condidate	sites as fall		
Description	rne object	ives of this w	ork prograi	m is to deve	elop repositi	ory-sealing syste	ems for the candidate	sites as roll	ows:	
		Theeul		مامئن مصمما اماني	. : :		*la a musefamus d s:4 a fus		والعاملين ومعنو وعوادناه	. f
		-	_	-	-		the preferred site fro			e tocus on
	site	specific mate	eriais testin	g for compa	atibility of se	ealing materials	with rock and ground	water from	i two sites.	
	-		ign improve	ements fror	m years 1 to	3 (WED 560.25.	50.10.10), including s	tatistical va	riability of test result	s on
	ben	tonite.								
	-	Identify se	aling techn	ology refine	ement oppo	rtunities specific	to candidate sites.			
	-	Commence	e long term	testing pro	grams on th	ie two sites (buf	fer, backfill and concr	ete).		
	-			-	and specific					
	-	Reflect on	Internation	nal compliar	nce proficier	ncies such as the	SKB ASPO HRL & Mo	nt Terri for	collective "demonstr	ation"
	tecl	nnology.								
	_	Continue w	ith aspects	of WBS 560	0.25.50.10.1	.0, (i) long term	testing programs on b	ouffer and h	ackfill, (ii) reflection	on
	Inte						Mont Terri for collec			
	=						fic to the preferred si			,, ( )
Deliverable		···		c !: c			0)			
	Candidate	•				oment (years 4 t	•			
	ļ	Site specifi	ic reports o	n anticipate	ed EBS perfo	rmance for two	candidate sites with	recommend	lations.	
Assumptions	1	of work: Y04 t								
	•		-	ory Manage	ment Engine	eering WEDs:				
	Year	(NWMO-3)	cnslt							
		(fte)	(\$M)							
	4	1.0	\$ 1.0							
	5	1.0	\$ 1.0							
	6	1.0	\$ 1.0							
	7	1.0	\$ 1.0							
	8	1.0	\$ 1.0							
	9	1.0	\$ 1.0							
	•	ured in 560.2								
	Assumed	travel related	d costs less	s than 10k	per year. (2	2 trips per year	) – in general some	potential n	ninor equipment pu	rchases for
	laboratory	studies.								
Schedule	Start Year			4	2013		Finish Year	9	2018	
	3.c 1.ca1			.t						
Туре	Fixed									
.190	i iACU									
Calculations	<u> </u>									
Calculations		Linkad to	onocitor:	locian MPC	560 20 E0 1	0.10				
	_			•	560.20.50.1	0.10.				
	-	Links to ins	strumentati	ion and mo	nitoring.					
	1				16	C			1	
	-			1			ative Safety Assessmo			
Labour (	- Costs	Note: Cost  Materia		1	al Support for r Costs	or Siting & Illustr Subtotal		25%	'. Total Cost	:

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	10	30				Prepared By: J. Villagran
WBS (Old)									
WBS Title	DEVELOPN	MENT OF REI	POSITORY N	/ONITORIN	G STRATEGI	IES AND TECHNOLO	OGIES		
Description	no significa parameter geochemis	ant effects on the contract of	on public sa acterize repo logical syste	fety or the ository perf	environmen	t. It includes the d nd can be used to a	evelopment of a str	ategy to m	nance and ensuring that there are nonitor a set of selected ility on the hydrogeology,
	: ·	ojectives und Developmen			ring strategy	and identificatior	of an approach suit	able to m	eet APM strategic objectives.
	- F techno		g in collectiv	e internatio	onal initiativ	res and projects fo	r development of re	pository n	nonitoring methods and
	- (		work as req	uired on dv	_		ng the required mor of technologies ider	_	inctions. suitable to monitor the evolution
Deliverables	- Part - Mor - Asse - Prel	nitoring Requessment of a iminary mor	in advanced uirements of available tec nitoring syst	internation document. chnologies. tem design		ing project. emonstration moni	toring systems.		
Assumptions	Costs capt NWMO sta - S Purcha - C	Specialist Co sed Services	.25.30.10.10 nents to man onsultant to s \$200 k/a f consultants	nage/execu conduct wo or 4a (YO2 t to prepare	ork in specif to Y05). Technical Sp	ic monitoring tech	nologies, plus suppo	ort to inte	alist) plus the following: rnational monitoring programs: ns for specific monitoring systems:
Schedule	Start Year			1	2010		Finish Year	9	2018
Туре	Fixed								
Calculations and Notes:									
Labour	Costs		al Costs		r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$	- \$	-	\$ -

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	20	10					Prepared By: K. B	irch
WBS (Old)	552	20	15	30							
	<u> </u>										
WBS Title	PREFERRE	SITE REPOSITORY	SEALING S	YSTEMS, LIC	ENSE PHAS	E					
Description	The object	ive of the preferre	d Site Repo	sitory Sealin	ig Systems i	work progra	m is to;				
	-		asibility of o	concept in si	upport of E	A submissior	(year 12) -	<ul> <li>including lor</li> </ul>	ıg term dei	monstrations (consol	idation,
	swe	lling pressure)									
	-	Final design requ	uirements a	and specifica	ations for th	e applicatio	n of sealing	g materials at 1	he reposit	ory level, and within	the shafts.
	•										
Deliverable	1							•••••••			
	Preferred S	Site-specific Reposi	tory Sealing	g System De	velopment	(Years 10 to	12) for inc	lusion into fin	al design s	pecifications (WBS	
	560.20.50.										
		•									
	·										
Assumptions	••••••••••••••••••••••••••••••••••••••					•••••			***************************************		
	Note: Labo	ur is located in Rep	oository Ma	anagement l	Engineering	WEDs:					
	Year	Staff (NWMO-3)	cnslt								
		(fte)	(\$M)								
	10	1.0	\$ 0.75								
	11	1.0	\$ 0.50								
	12	1.0	\$ -								
Schedule	Start Year			10	2019			Finish Year	12	2021	
Туре	Fixed										
Calculations											
	-	Linked to reposi	tory design	WBS 560.20	0.50.20.10						
	-	Links to instrum									
	<u> </u>										
Labour (	Costs	Material C	osts	Other	Costs	Subt	otal	Allowance	25%	Total Cos	st
\$	-	\$	-	\$	1,250,000	\$ :	L,250,000	\$	312,500	\$	1,562,500

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	20	20					Prepared By: J. Villagran
WBS (Old)		<u> </u>	<b></b>	<u> </u>	<u></u>	<u> </u>	<u> </u>			
WBS Title	REPOSITO	RY MONITO	RING AND T	ECHNOLOG	SY DEVELOP	MENT				
Description	evolution of system suited a constant of the system suited and suited a constant of the system of th	late and ex of the site g table to asse	groundwate ess the repo of paramete	r hydraulic ository long ers selected	network (e. term perfoi l as indicato	.g. groundv rmance. rs of reposi	vater pressu tory safety i		ure and che	order to monitor the long-term emistry). Implement a monitoring seline.
Deliverables	- L and per - F	rformance re Procurement	nitoring sys elated para t, installatio	items for gr meters. on and com	oundwater	flow and ge	eosphere even		s	arameters, and repository safety ository site.
Assumptions	NWMO sta staff) to op - S - C Monito (Y10 to	perate system specialist Co Contractor/coring system Y12).	ents to mai ms and con nsultant to consultant t s and to ass	duct data a conduct we o prepare t sist with sys	cquisition fork in specif echnical specif stem installa	or use by NN ic monitoring crifications and convironments	NMO scienting technologiand provide mmissionin	ists (Y10 to Y gies: Purchase input to the g at the repo	15); plus the ed services \$ procuremer sitory site: P	alist) and 1 fte for 6a (Technical e following: \$200k/a for 6a (Y10 to Y15). In process for Environmental Turchased services \$300k/a for 3 a The site and surrounding area, with
Schedule	Start Year			10	2019			Finish Year	15	2024
Туре	Step-Fixed									
Calculations and Notes:	The equip	ment costs (	do not inclu	ide the pur	chase of a co	omputer fo	r the centra	database, w	hich is inclu	ded in the geosciences WEDS.
Labour (	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	3,000,000	\$	1,200,000	\$	4,200,000	\$	1,050,000	\$ 5,250,000

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	30	40					Prepared By: K. B	irch
WBS (Old)	552	20	15	60	30						
WBS Title	PLAN UDF	DEMONSTR	ATIONS an	d UDF SPE	CIFICATIONS						
Description	The object	ive of the "F	Plan Under	ground Der	nonstration	Facility (UDF)	AND UDF	Technical spe	cifications"	work program is to;	finalize plans
	and prepar	e technical	specification	ons for:							
	:		_		on, design co 5 560.20.50.2		nd commi	ssioning tests	for the repo	ository facility system	ns for
	- long-1	term demor	nstration ar	nd monitor	ing tests to b	oe located in t	the UDF a	nd other parts	of the repo	ository	
	•				include: cor	ntainer placer	nent; con	tainer retrieva	l; borehole	sealing; placement r	room sealing;
	:	t sealing; an		•							
	•	long-term of of the reposi				d on monitori	ing the pe	rformance of	the enginee	ered barrier system a	ınd near-field
	<u> </u>	•					•			vould include the us	
	1	, and used-1 icense is gra		ners conta	ining used fi	uel bundles (	The Instal	lation of these	e live UFCs	would occur in Year	26 once the
Deliverable	•	pecification				6					
	1	m undergr ation in the		acterisatio	n, design c	onfirmation	and com	missioning te	sts for the	e repository facility	systems for
	- long-term	n demonstra	ition and m	ionitoring t	tests to be lo	cated in the l	JDF and o	ther parts of t	he reposito	ory.	
	- Issue	e drawings a	and technic	al specifica	tions for co	nstruction of	the UDF.				
Assumptions	Duration o	f work: Y18	to Y20.								
	1			torv Mana	gement Engi	neering WED:	s:				
	Year	Staff	cnslt	Equip	Other						
		(fte)	(\$M)	(\$M)	(M)						
	18	2.0	\$ 0.5	\$ -	\$ -						
	19	2.0	\$ 1.0	\$ -	\$ -						
	20	2.0	\$ 1.0	\$ -	\$ -						
				· · · · · · · · · · · · · · · · · · ·				Y			
Schedule	Start Year			1	8 2027			Finish Year	20	2029	
Туре	Fixed										
Calculations											_
and Notes:	1	tefinement 1 50.20.40).	to equipme	ent / desigr	n based on re	esults of surfa	ce study p	program Repo	sitory devel	opment studies (WBS	S
Labour (	i		al Costs	Othe	er Costs	Subto	ntal	Allowance	25%	Total Co	st .
Ś	-	\$		\$	2,500,000		2,500,000	\$	625,000		3,125,000
7		۲	<u>-</u>	٧	2,300,000	2 ب	.,500,000	7	023,000	7	3,123,000

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## **Work Element Definition Sheet**

WBS (New)	560	25	50		30	50					Prepared By: K. Birch
WBS (Old)	552	20	15	-Λ	60	40					A
		ī					· <del>Ē</del>	.A	***************************************		
WBS Title	CONDUCT	UDF DEM	ONSTRATION	NS - IN	IITIATE						
	•										
Description	The object	ive of the	"Conduct Un	ndergr	round I	Demonstrat	ion Facility	(UDF)" wor	k program is	to;	
-	•			_			-				rations, including; placement an
	=										cement room sealing through th
	•										naft sealing. These demonstration
	•		erformance o							· ·	<u> </u>
	- Initi	ate, cond	uct, analyse	and	report	on commis	ssioning te	sts conduct	ed in the UD	OF for the sp	pecially developed equipment for
	placement	and retrie	eval (WBS 56	0.20.5	50.20.8	30 and WBS	560.20.50	20.90).			
	- Initia	ate, monit	tor and perio	dicall	ly repo	rt on long-t	erm demo	nstrations a	nd monitorin	g tests in th	e UDF (Note: additional tests ma
	•		-			_				-	ered barrier system and near-fiel
	<u> </u>		ository enviro								
Deliverable	1		•	nd eq	Juipme	nt, method	s and proc	edures for	excavation, d	rilling, repos	sitory construction and repositor
	sealing sys										
	- Conf	irmed rep	ository desig	gn for	the pr	eferred site	<b>!.</b>				
	- Shor	rt-term un	iderground c	harac	terisat	ion data an	d analyses	as input to	Geoscience s	upport (WBS	5 560.30.20.30.30) and final safet
	assessmen	t report (V	WBS 560.20.5	50.30.	.10).						
Assumptions	Duration o	f work: Y1	6 to Y20								
-	1			of vear	rs 21 to	25) is loca	ted in Rend	sitory Man	agement Engi	ineering WFI	Ds:
	Year	Staff	cnslt	-	quip	23) 13 10ca	tea iii nepe	Sitory iviain	agement Engi	incernig WE	53.
	icui	(fte)	(\$M)		фир \$М)						
	21	(itc)	\$ 2.0		رانار						
	22			\$	5.0						
	23			\$							
	24		\$ 2.0		5.0						
	25		\$ 2.0		5.0						
	25		\$ 2.0	Ş	5.0						
	It chould b	o notod t	hat casts ra	latad	+0 +b0	drifts over	overtion of	the chafts	narimatar ac	cocc routos	and the excavation of the room
	1		overed unde				avation or	tile silaits,	perimeter ac	cess routes,	and the excavation of the room
	within the	ODF are C	overeu unue	i ope	Tations						
	Contractor	c/concults	ants to proci	uro o	auinma	ant inctall	conduct a	nalycec and	report on d	ocian confir	mation and repository equipmer
	1	•	and the reso					iaiyses aiiu	report on a	esign comm	nation and repository equipmen
	COMMISSIO	illig tests	and the rest	Julioi	ii Oi aii	y issues ide	mineu.				
Schedule	Start Year			······	21	2030			Finish Year	25	2034
Scriedule	Start rear					2030			i iiiisii ieai		2034
Typo	Eivad										
Туре	Fixed										
Calculations	<b></b>										
Calculations											
and Notes:	Nata Fami				ملم ماداد		CNCl:		E		L
	ivote: Equi	pment is a	issumed to b	e out	siae th	e scope of :	SINC'S capit	ai estimate.	Equipment \	would be ted	hnology demonstration specific.
Labour (	Costs	Mate	rial Costs		Other	Costs	Suk	total	Allowance	25%	Total Cost
\$	-	\$	20,000,000	\$	1	10,000,000	\$	30,000,000	\$	7,500,000	\$ 37,500,000

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## **Work Element Definition Sheet**

	560	25	50	30	60				Prepared By:	J. Villagran
WBS (Old)										
WBS Title	MONITORI	NG SYSTEM	IS DEVELOP	MENT AND	DEMONSTR	ATION				
Description	- C - L review	Maintain/up ontinue the legal tech process.	e monitorin <sub>i</sub> nical specifi	g of site bas cations and		onmental paramete esign for UDF monit		sed on feed	lback from the	· licensing and EA
Deliverables	surrour	iding area.				Environmental Mor		within the re	epository site	and the
<u> </u>										
Assumptions	:	ff requirem	ents to mar	•		e tasks are 0.5 fte fo	•	•	•	for 5a (Technical plus the following:
Assumptions	NWMO sta staff) to op - S Purchas - C	ff requirem erate moni pecialist Co sed services ontractor/o	ents to man toring syste nsultant to \$200k/a fo	ms, conduct working to conduct working to conduct working to conduct with the conduct of the con	t data acqui ork in specifi o Y20). technical sp		he database for	use by NWN	MO scientists;	plus the following: oring programs:
Assumptions  Schedule	NWMO sta staff) to op - S Purchas - C	ff requirem erate moni pecialist Co sed services ontractor/o	nents to man toring syste insultant to \$200k/a fo consultants	ms, conduct working to conduct working to conduct working to conduct with the conduct of the con	t data acqui ork in specifi ( Y20). technical sp 1a (Y20).	isition and manage	he database for	use by NWN	MO scientists; national monit ement of UDF	plus the following: oring programs:
	NWMO sta staff) to op - S Purchas - C systems	ff requirem erate moni pecialist Co sed services ontractor/o	nents to man toring syste insultant to \$200k/a fo consultants	ms, conduct wo r 5a (Y16 to prepare 400k/a for	t data acqui ork in specifi 1720). technical sp 1a (Y20).	isition and manage	he database for plogies and supply vide input to sys	ort to intern	MO scientists; national monit ement of UDF	plus the following: oring programs:
Schedule	NWMO sta staff) to op - S Purchas - C systems Start Year Fixed Construction	ff requirem erate moni  pecialist Co sed services contractor/c s: Purchasec  on of the UI f experimer of the Environ	nents to mai toring syste insultant to \$200k/a for consultants d Services \$ DF will take ints and systionmental N	ms, conduct wo r 5a (Y16 to prepare 400k/a for 16 place over 1 em demons lonitoring s	t data acqui ork in specifi (1720). technical sp (1a (Y20). 2025	isition and manage	he database for plogies and supplyide input to systimate in the system of the system o	tem procure  20  ccoming avang tasks dur	MO scientists; national monit ement of UDF  2029 allable in Y21. ring this perioc	plus the following: oring programs: monitoring Therefore, the I will be limited to
Schedule Type Calculations	NWMO sta staff) to op - S Purchas - C system: Start Year Fixed Construction initiation of operation of and commi	ff requirem erate moni  pecialist Co sed services ontractor/c s: Purchasec on of the UI f experimer of the Environsissioning in	nents to mai toring syste insultant to \$200k/a for consultants d Services \$ DF will take ints and systionmental N	ms, conduct we r 5a (Y16 to to prepare 400k/a for 3 16 16 16 16 16 16 16 16 16 16 16 16 16	t data acqui ork in specifi (1720). technical sp (1a (Y20). 2025	isition and manage in the control of	he database for plogies and supplyide input to systimate in the system of the system o	tem procure  20  ccoming avang tasks dur	MO scientists; national monit ement of UDF  2029  Bilable in Y21. ring this perioc	plus the following: oring programs: monitoring Therefore, the I will be limited to

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	30	70					Prepared By	: J. Villagran
WBS (Old)											
WBS Title	MONITORI	ING SYSTEM	S AND PRO	GRAM – DO	R CONSTRU	JCTION PHA	SE				
Description	Tasks inclu	ıqe.									
Description	1		stall and co	mmission U	DF Monitor	ing systems	with an est	timated total v	alue of \$1.0	000k.	
I	•	Demonstrate									
I	- L	Jpdate desig	gns for repo	sitory mon	itoring syste	ems as requ	ired, based	on experience	from UDF	operation and	d up to date
I	technol										
	•	Procure and			· .	or the DGR.					
I	•	Continue the Update repo									
İ	-	Jpuate repo	SILOTY IIIOIII	toring data	uase.						
Deliverables	:							OGR monitorin	ig systems.		
1	•	nstalled and Demonstration									
I	Ē	Continued of			-		1.				
1	1	Updated dat									
Assumptions	Duration o	of work: Y21	to Y25.								
	staff) to op - S Y25).	oerate syster Specialist Co	ms, conduc	t data acqu conduct wo	isition and r	nanage the ic monitorir	database fo	or use by NWN gies 1 fte for 5	10 scientist: a: Purchase	s; plus the fo	for 5a (Technical billowing:  200k/a for 5a (Y21 to
	with co	ommission of	f repository	monitoring	g systems: P	urchased se	ervices \$400	)k/a for 2a (Y2	1 to Y22)		ckages and assist
	- P	Jurchace/un	data of ma	nitoring eq	uipment for	installation	and comm				
	:	•	ipment is fo		ration at the			_			total value of nclude detectors and
	sensors - d - a	k. This equi	ipment is fo ing: t, stress, ssion,		ration at the			_			
	sensors - d - a - s	k. This equi s for measur displacemen acoustic emi	ipment is fo ing: t, stress, ssion, on,	or demonsti	ration at the			_			
	sensors - d - a - s - v - t	k. This equi s for measur displacement acoustic emis seismic motion water flow a temperature	ipment is for ing: t, stress, ssion, on, nd water pr	er demonsti	ration at the			_			
	sensors - d - a - s - v - t	k. This equi s for measur displacemen acoustic emis seismic motio water flow a	ipment is for ing: t, stress, ssion, on, nd water pr	er demonsti	ration at the			_			
Schedule	sensors - d - a - s - v - t	k. This equi s for measur displacement acoustic emis seismic motion water flow a temperature	ipment is for ing: t, stress, ssion, on, nd water pr	er demonsti				_			
Schedule	sensors - d - a - s - v - t	k. This equi s for measur displacement acoustic emis seismic motion water flow a temperature	ipment is for ing: t, stress, ssion, on, nd water pr	ressure,				nents for the I	monitoring (	of RLTP and i	
	sensors - d - a - s - v - t an	k. This equi s for measur displacement acoustic emis seismic motion water flow a temperature	ipment is for ing: t, stress, ssion, on, nd water pr	ressure,				nents for the I	monitoring (	of RLTP and i	
Type Calculations	sensors - d - a - s - v - t an Start Year Fixed	k. This equi s for measur displacemen acoustic emi seismic moti water flow a temperature and for the de	ipment is for ing: t, stress, ssion, on, nd water pr	ressure, racers.		UDF of sys		nents for the I	monitoring (	of RLTP and i	

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## **Work Element Definition Sheet**

WBS (New)	560	25	50	40	10					Prepared By:	K. Birch
WBS (Old)	552	20	15	60	40						
WBS Title	CONTINUII	NG UDF DEN	/ONSTRATI	ONS - OPE	RATIONS						
Description	- Init	iate, conduced f	ct, analyse rom the us	and perio	odically repo ckaging plan	ort on long t placed in a	term unde an reposito	ry setting, for	monstration r long term	_	he initial used fuel the performance of S.
Deliverable	- Com	iplete demo	nstrations t	to either cc	onfirm final c	designs or re	vise design	during opera	ntions of the	DGR	
Assumptions	•		•		tion to year s Y31 to Y55		n Repositoi	ry Manageme	nt Engineeri	ing WEDs:	
	26 27 28 29 30 Years 31	( )	\$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 0.5	\$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0	) )						
					nent, install, ny issues ide		alyses and	report on de	esign confirr	mation and re	pository equipment
Schedule	Start Year			26	6 2035			Finish Year	55	2064	
Туре	Fixed										
Calculations and Notes:	Note: Cont WEDs.	tainer empla	acement/re	trieval UDF	trials are ac	ccounted for	r in Reposit	ory Engineeri	ng Managen	nent & Emplac	ement/Retrieval
Labour	Costs	Materia	al Costs	Othe	er Costs	Sub	total	Allowance	25%	To	otal Cost
\$	-		5,000,000		17,500,000		22,500,000	\$	5,625,000	\$	28,125,000
			•								

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## **Work Element Definition Sheet**

WBS (New)	560	30	20	20	10					Prepared By: B. Belf	adhel
WBS (Old)	552	15	20	40							
WBS Title	DATABASE	AND INFOR	RMATION SY	'STEMS							
Description	design into monitoring further se toward co Databases	ended for s g data. Info rve to archi nfirmation o would be a	patial and to prmation Systive site specified of the preference of	temporal and stem would cific geosphored site and years	nalysis, inte I be applied nere/biosph d UCF const	erpretation, in d and, as requ dere data and ruction/opera	tegration ired, up- <sub>{</sub> create tr tion.	and commul graded throug aceable data	nication of ghout the re sets that v	ion management syster site specific characterice pository siting process would evolve as siting which would likely evolv	sation and It would proceeded
	seismicity, resources.	geology, b Results of	orehole dat geosphere i	ta, municip model deve	al/ regional lopment ar	boundaries,	aborigina numerica	al lands, surfa al simulations	nce hydrolo will also be	note imaging, airborne g gy, topography and gro e archived in a suitable te.	oundwater
Deliverable				•		ure to apply in and Safety A			siting, Envi	ronmental Assessment,	
Assumptions	- Ar		ing fees and	, 0		Y10-Y15;	eoscience	and monitor	ing support	beyond Y25.	
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materi	al Costs	Other	Costs	Subto	tal	Allowance	25%	Total Cost	
\$	-	\$	600,000	\$	-	\$	600,000	\$	150,000	\$	750,000

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	APM Cost Estimate
	Work Element Definition Sheet
WBS (New) WBS (Old)	560         30         20         20         20         iPrepared By:         iB. Belfadhel
WBS Title	GEOSPHERE SUPPORT AND MONITORING AT PREFERRED SITE DURING REGULATORY PROCESS
Description	During this period, geoscience staff will provide support to the regulatory process by addressing regulatory comments, preparation of licensing documentation and participating in other licensing activities.
	Geosphere monitoring will continue at the preferred site during the regulatory process and prior to UDF construction. The objective of the continued monitoring is similar to that in WBS 560 15 40 40: continue monitoring the baseline or undisturbed conditions of the site to support performance assessment, engineering design and licensing. During this period it is assumed that no additional monitoring installations will be added, although some routine maintenance may be required. Certain monitoring installations may need to be completely refurbished or replaced during this pre-construction period to ensure on-going integrity of the monitoring program.
	Maintenance of the Descriptive Geoscientific Site Model (DGSM) and associated flow system model will be supported throughout the regulatory process time period.
	During this phase, geosphere monitoring installations will consist primarily of shallow groundwater monitoring wells (~ 100 m), multiple-level groundwater monitoring systems in deep boreholes (~ 1000 m), borehole seismographs and GPS stations. Groundwater monitoring will consist of periodic (ex: quarterly) measurements of hydraulic pressures and periodic (semi-annual) collection of groundwater samples for hydrogeochemical analyses for the purpose of establishing background conditions and variability. Seismograph and GPS stations will include automatic data acquisition systems accessed remotely.
Deliverable	- Annual reports on baseline monitoring conditions, and evaluation of trends.
	- Provision of QA'd monitoring data to the electronic information management system
	Maintenance and updating of DGSM and associated numerical geosphere models.     Supporting licensing activities, address regulatory comments, licensing documentation
	- Support planning for UDF and DGR construction.
Assumptions	- One preferred site enters the regulatory process and licensing
	<ul> <li>All monitoring installations are operational as part of detailed characterization activities.</li> <li>No new field or laboratory activities during the licensing phase.</li> </ul>
	- Monitoring installations (wells and seismographs) at the second site not selected will be gradually decommissioned during this period.
	- An electronic information management system is operational Local climate monitoring, such rainfall and snow accumulation, as well as surface water monitoring is assumed to be undertaken under biosphere
	monitoring.  - Formal monitoring program begins in the year following the end of detailed site characterization.
	Information collected by the groundwater monitoring system would include, though not be limited to:
	Major ions, trace elements, tritium and gross beta radiation, drilling water tracers within groundwater samples.  Selected isotopes, known to be potential contaminants associated with the repository  Suite of metals  Basic organic analysis
	Hydraulic pressure measurements in the multi-level wells will be collected quarterly if possible and may be extended to semi-annually later in the period. Water samples will be collected from specific intervals in the multi-level wells on a semi-annual basis. The information collected will be added to the baseline data collected during the Siting Phase to assess any long-term trends or changes in background conditions.
	- The surface-based groundwater monitoring system would be maintained and refurbished as required as it will be needed throughout the construction and operation phases of the DGR.
	NWMO Staff:
	Senior management at 1 NWMO-1/a (Y10-Y15)  NWMO Specialists: 11 NWMO-3/a (Y10-Y15) required in geosynthesis (1), hard rock or sedimentary rock geology (2), hydrogeology (1) geosphere modelling(2), hydrogeochemistry(2), rock mechanics (1), geophysics (1) and data management (1).
	Travel/Expenses: \$22k/a (Y10 to 15), assuming one trip per staff per year.  Purchased Services:
	- Hydraulic pressure profiling: 20 multi-level wells [1xPS-4 at 400 hrs per quarter], travel, accomodation and reporting [PS-3 at 16 hrs per quarter] = \$200k/a. Groundwater sample collection: 10 multi-level wells [1xPS-4 at 350 hrs semi-annual], travel, accomodation and reporting (PS-3 at 16 hrs semi-annual) = \$100k/a.
	· Analytical costs: \$60k/a from Y10 to Y15; assuming 120 samples at \$500/sample
	<ul> <li>Monitor and maintain seismograph and GPS stations: \$100k/a from Y10 toY15.</li> <li>Abandoning/grouting instrumented boreholes including development of decommissioning plan for second site (assuming 20 instrumented boreholes at \$200k per borehole = \$4M). For planning purposes assume abandonment of 5 boreholes per year in the last 4 years of the period (Y12</li> </ul>
	to Y15) at \$1M/a.  Address regulatory comments and update hydrogeological model at two intervals during the period accounting for monitoring results: \$300k in Y13 and \$200k in Y14 for a total offers of \$600k.
	Y12 and \$300k in Y14 for a total effort of \$600k  Address regulatory comments and update Geomechanical models to support design (one time): \$250k in Y14  Address regulatory comments and maintain and update DGSM during period: \$500k averaged over Y11 to Y15.
	Equipment Replacement Provision:  One seismograph replacement during period: \$150k (assume Y12)  One Westbay system replacement in a deep borehole, including removal and installation: \$500k (assume Y15)
Schedule	Start Year 10 2019 Finish Year 15 2024
Туре	Fixed
Calculations and Notes:	Based on the DGR experience, for deep boreholes instrumented with a Westbay system it may take on average 20 hours per borehole to complete hydraulic pressure profiling measurements. It should be noted that the DGR-series boreholes include betrween 20 and 40 monitoring intervals each. This may be required in a sedimentary rock setting. By comparison, the groundwater monitoring wells at Forsmark, Sweden are instrumented with a maximum of 8 intervals that tend to target higher conductivity, fractured horizons, similar to the URL network in Pinawa. Based on the DGR experience, it may atke on

intervals that tend to target higher conductivity, fractured horizons, similar to the URL network in Pinawa. Based on the DGR experience, it may atke on average 35 hours per borehole to purge and collected groundwater samples, primarily from the shallower, US-series Westbay systems. The recent DGR experience has formed the basis for this cost estimate, including the seismic monitoring activity.

	Labour Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	9,920,207	\$ 650,000	\$ 8,242,000	\$ 18,812,207	\$	4,703,052	\$ 23,515,259

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## **Work Element Definition Sheet**

WBS Title  Description  Develop the infrastructure for an integrated electronic geographic and geologic database and information management system. Sy design intended for spatial and temporal analysis, interpretation, integration and communication of site specific characterisation monitoring data. Information System would be applied and, as required, up-graded throughout the repository siting process. It is further serve to archive site specific geosphere/biosphere data and create traceable data sets that would evolve as siting procest toward confirmation of the preferred site and UCF construction/operation.  Databases would be accessible by a suite of analyses and visualization applications (GIS, Gocad,), which would likely evolve ove timeframe of the project. Interoperability is essential.  Databases would be structured to include data information on transportation, natural environment, remote imaging, airborne geoph seismicity, geology, borehole data, municipal/ regional boundaries, aboriginal lands, surface hydrology, topography and groundy resources. Results of geosphere model development and associated numerical simulations will also be archived in a suitable data Database would facilitate internet access by project team members and other stakeholders, if appropriate.  Deliverable  Integrated Electronic Information system and infrastructure to apply in support of repository siting, Environmental Assessment, conceptual geosphere model development, Performance and Safety Assessment.  Cost:  - Annual Licensing fees and upgrades: \$100k/a for Y16-Y25;  Database/Information management system maintained through Geoscience and monitoring support beyond Y25.	<b>New)</b> 56
Develop the infrastructure for an integrated electronic geographic and geologic database and information management system. Sy design intended for spatial and temporal analysis, interpretation, integration and communication of site specific characterisation monitoring data. Information System would be applied and, as required, up-graded throughout the repository siting process. It is further serve to archive site specific geosphere/biosphere data and create traceable data sets that would evolve as siting process toward confirmation of the preferred site and UCF construction/operation.  Databases would be accessible by a suite of analyses and visualization applications (GIS, Gocad,), which would likely evolve ove timeframe of the project. Interoperability is essential.  Databases would be structured to include data information on transportation, natural environment, remote imaging, airborne geoph seismicity, geology, borehole data, municipal/ regional boundaries, aboriginal lands, surface hydrology, topography and grounds resources. Results of geosphere model development and associated numerical simulations will also be archived in a suitable data Database would facilitate internet access by project team members and other stakeholders, if appropriate.  Deliverable  Integrated Electronic Information system and infrastructure to apply in support of repository siting, Environmental Assessment, conceptual geosphere model development, Performance and Safety Assessment.  Cost:  - Annual Licensing fees and upgrades: \$100k/a for Y16-Y25;	<b>)ld)</b> 55
Develop the infrastructure for an integrated electronic geographic and geologic database and information management system. Sy design intended for spatial and temporal analysis, interpretation, integration and communication of site specific characterisation monitoring data. Information System would be applied and, as required, up-graded throughout the repository siting process. It is further serve to archive site specific geosphere/biosphere data and create traceable data sets that would evolve as siting process toward confirmation of the preferred site and UCF construction/operation.  Databases would be accessible by a suite of analyses and visualization applications (GIS, Gocad,), which would likely evolve ove timeframe of the project. Interoperability is essential.  Databases would be structured to include data information on transportation, natural environment, remote imaging, airborne geoph seismicity, geology, borehole data, municipal/ regional boundaries, aboriginal lands, surface hydrology, topography and grounds resources. Results of geosphere model development and associated numerical simulations will also be archived in a suitable data Database would facilitate internet access by project team members and other stakeholders, if appropriate.  Deliverable  Integrated Electronic Information system and infrastructure to apply in support of repository siting, Environmental Assessment, conceptual geosphere model development, Performance and Safety Assessment.  Cost:  - Annual Licensing fees and upgrades: \$100k/a for Y16-Y25;	
design intended for spatial and temporal analysis, interpretation, integration and communication of site specific characterisation monitoring data. Information System would be applied and, as required, up-graded throughout the repository siting process. It we further serve to archive site specific geosphere/biosphere data and create traceable data sets that would evolve as siting process toward confirmation of the preferred site and UCF construction/operation.  Databases would be accessible by a suite of analyses and visualization applications (GIS, Gocad,), which would likely evolve ove timeframe of the project. Interoperability is essential.  Databases would be structured to include data information on transportation, natural environment, remote imaging, airborne geoph seismicity, geology, borehole data, municipal/ regional boundaries, aboriginal lands, surface hydrology, topography and grounds resources. Results of geosphere model development and associated numerical simulations will also be archived in a suitable data Database would facilitate internet access by project team members and other stakeholders, if appropriate.  Deliverable  Integrated Electronic Information system and infrastructure to apply in support of repository siting, Environmental Assessment, conceptual geosphere model development, Performance and Safety Assessment.  Assumptions  Cost:  - Annual Licensing fees and upgrades: \$100k/a for Y16-Y25;	tle DATAI
conceptual geosphere model development, Performance and Safety Assessment.  Assumptions  Cost:  - Annual Licensing fees and upgrades: \$100k/a for Y16-Y25;	desigr monit furthe towar Datab timefr Datab seismi resoui
- Annual Licensing fees and upgrades: \$100k/a for Y16-Y25;	: "
	-
Schedule Start Year 16 2025 Finish Year 25 2034	ı <b>le</b> Start \
Type Fixed	Fixed
hearth	
Calculations and Notes:	
: Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	
\$ - \$ 1,000,000 \$ - \$ 1,000,000 \$ 250,000 \$ 1,250	Labour Costs

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#### Work Element Definition Sheet

WBS (New) WBS (Old)	560 552	30 25	20 80	30	20					Prepared I	By: B	3. Belfadhel
WBS Title	GEOSCIEN	CE SUPPOF	RT AND MON	NITORING E	OURING UDF	CONSTRU	CTION					
Description	the DGR's	main shaft	t, service sh	aft and exl	naust ventila	tion shaft	analysis during t , associated stat cility (UDF). Tes	tions and ser	vices will be	constructe	d inclu	iding the access
ĺ	Work activ	vities suppo	ort DGSM re	finement a	nd confirma	tion, Repo	sitory Engineeri	ng and Safety	/ Assessment	t functions.	The ma	ain tasks are:
	- geol drifts (1&2	logic mapp !) and UDF	ing, hydrogo drifts and te	eological, g esting room	geochemical is;	and geom	enance of the assectantical chara	cterization a	ctivities duri	ing constru	ction o	
	- plan	ining, mana g; installati	agement and	d reporting	of studies f	or the cha	rogeologic and g racterization of ph and microse	the shafts,	access drifts	and testing		
Deliverable	- Ann - Prov - Upd - Geo	ual monito vision of QA ate DGSM	ring reports A'd monitori and referen- oorts describ	on far-field ng data to ce hydroge	d and near-fi the electron ological and	ield condit ic informa geomech	ort multi-year U ions, including e tion managemei anical numerical gic descriptive a	evaluation of nt system. I models.	trends.		Reposit	ory Engineering
Assumptions	- Shaf	fts/vent sin	king and sta	tion constr		oleted bety	hree will be exca ween Y16 and Y1 ncurrently.			Irifts compl	eted by	y Y20.
	· NWI hydrogeol	aff: or manage MO Specia ogy (1), geo	ment at 1 N lists: 11 NW	/MO-3/a fo delling (2),	hydrogeoch	Y16-Y20) ı	equired in geos , rock mechanic					
	o Qı per W	field Monit uarterly hy	draulic press				oundwater samp re profiling @ \$2					
							ons: \$100k/a fro					
	shafts o	concurrent	ly: \$10M (Y	17)			tion <sup>1</sup> , to include drifts 1 or 2, and					
	- L	Jpdate hyd Jpdate Geo	rogeologica mechanical	l model du models to	ring the peri support des	od accoun ign (one ti	aph to support a ting for monitor me): \$250k in Y2 ne period (\$80k/	ing: \$300k in 19.	Y18.	0k (Y19)		
							during period:			assume Y20	D).	
Schedule	Start Year			16	5 2025			Finish Year	20	2029	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
Туре	Fixed											
Calculations and Notes:	<sup>1</sup> Similar to permeabili monitoring <sup>2</sup> Similar to geophysica	ity testing, g, geochem o the OPG E al surveys,	lateral corin ical testing. OGR plan, ac rock core an	g and loggi cess drift a	ing at selecte nd UDF char npling, seep	ed location acterization	s include: wall in is, seepage colle on activities inclu monitoring, bor eomechanics tes	ection, in-situ ude: Wall ima ehole hydrau	stress meas aging and ma ulic conductiv	urement, do	eforma and ro and ins	ock mass strumentation,
	J											
\$	8,266,839	\$	650,000		r Costs 19,660,000	\$	ubtotal 28,576,839	\$	7,144,210	\$	Total	35,721,049
<u> </u>		ı		1		l		1		<u> </u>		

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#### **Work Element Definition Sheet**

WBS (New)	560	30	20	30	30					Prepared By: B. Belfadhel
WBS (Old)	552	25	80	İ			<u> </u>			
WBS Title	GEOSCIENO	CE SUPPOR	RT AND MON	ITORING I	DURING UDF	OPERATIO	N			
Description	The Under	ground De	monstration	Facility (L	JDF) will be o	operational	during the concurr	ent phase of DG	R constru	uction.
·	Provide ca	pability fo	r geoscience	far-field	and near-fie	· eld monitor	ing, numerical ana	lysis and geosci	ence-bas	ed confirmation tests during UDF ons. The main tasks are:
	- Geos - Plan	science ver ning, exect	rification acti ution and ana	ivities and alyses of g	l reporting d geoscience-b	uring constr pased confir		UDF and selecte	ed locatio	ts; ns within the DGR access ways. odels during the period;
Deliverable	- Plan - Annu - Prov - Upda	s, status ar ual monito rision of QA ate DGSM science re	nd final analy ring reports A'd monitorir and referenc	vsis report on far-fiel ng data to ce hydroge	ts of geoscier Id and near-f the electror eological and	nce-based c field condition fic informat d geomecha	lti-year DGR constr onfirmation tests. ons, including evalu ion management sy nical numerical mo ptive and numerica	uation of trends. ystem. dels.		Repository Engineering and Safety
Assumptions	DCB	ovcavatio	ns will includ	o norimot	tor drifts 1 9.	2 and norin	neter cross-cuts A &	2. D /7 km		
	NWM modelling( Trave  Purchase S  - F  - A  - N  - G  effort a  - L  - N	or manage MO Speciali 1), hydroge el/Expense: Gervices: Gerfield  Analytical c Monitor and Geoscience is per previ Geoscience Update hyd Update Geo Maintain ar Et One repla  To Special C  To Special	eochemistry s: \$16k/a for vdraulic press osts: \$30k/a d maintain fa verification ious WED 560 -based confii lrogeological omechanical ind update Do acement seis	O-3/a for !  (1), rock r  Y21 to Y2  sure meas  for Y21 to  ar field sei activities² 0.30.20.30  rmation te model du models to SSM durin smograph	5 years (Y21 mechanics (125.  Surements and 1275.  Sismograph and	-Y25) requir l), geophysic and groundw and GPS stati perimeter of ss drifts, UE over the er iod account -going const 00k/a for Y2 ad: \$150k (a	ater sample collect ons: \$100k/a for YZ Irift and cross-cut e IF galleries and shar tire 5-year period t ing for monitoring truction: \$250k in YZ	d data managen dion where possi 21 to Y25. excavations (assu ft stations excav to confirm paran results: \$300k in '24.	nent (1).  ble and re ume scale rations): \$ neters. n Y23.	y (2), hydrogeology (1), geosphere eporting: \$150k/a for Y21 to Y25. ed, by excavation length, level of 64M in Y21 and \$2M in Y22.
Schedule	Start Year			2	21 203	0		Finish Year	25	2034
Туре	Fixed									
	Wall ima mineralogy access way <sup>3</sup> Geoscient support ge transport p	ents from s aging and n y, borehole rs (away fro ce-based co omechanic parameter	napping, EDZ groundwate om emplacer onfirmation ( cal modelling measuremer	and rock er water sa ment roon tests may g, large sca nts in prox	mass geoph ampling, hyd ns), in-situ st include one ale stability t kimal fractur	nysical surve draulic cond tress measu or more of est, rock ma	ed under the overa ys, rock core and b uctivity testing and rements, geomech the following durin ass creep, EDZ evol	Il DGR monitorin lock sampling, so instrumentation anics . ug the period: In- ution and testing	eepage won at selections.	UDF/DGR operations as near field y.  vater monitoring, fracture infilling ted locations along the perimeter as evolution during excavation to ale thermal properties, tracer nole-based long term diffusion and
			to support p	1						
Labour C	6,314,091	Mater \$	650,000		13,530,000		Subtotal 20,494,091	Allowance 5,	<b>25%</b> 123,523	Total Cost \$ 25,617,614
7	0,514,031	۲ ا	030,000	7	10,00,000	,   ,	20,434,031	رد بر	123,323	25,017,014

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## **Work Element Definition Sheet**

WBS (New)	560	30	20	40	10					Prepared By:	B. Belfadhel
WBS (Old)	552	25	80		<u></u>						
WBS Title	GEOSCIEN	CE SUPPOR	T AND MON	ITORING DI	JRING DGR	OPERATION	 				
Description	panels. Pla verificatior	ncement of n studies wi	containers a	and sealing eted to sup	of emplace plement the	ment room descriptive	s will be ongo	ng in one pa	nel as anotl	her is being ex	built successively in cavated. Geoscience d. Geoscience-based
Deliverable	- Annı - Prov - Revi	ual reports vision of QA	on far-field 'd monitorir date DGSM	monitoring	conditions, he electroni	and evalua c informatio	truction activit tion of trends. on managemen d geomechani	t system.	l models in	support of Re	pository Engineering
Assumptions	=			-			-			_	pproximately a 24/7 years to complete.
	•		toring activi eoscience-ba			-	O. completed pric	or to the ope	rational pha	se of the DGR.	
	· NW hydrogeoc	or managen MO Specia hemistry (1		WMO-3/a nanics (1), g	(Y26-Y55) eophysics/s	-	hard rock į ) and data mar			ogy (1), geos	phere modelling(1),
	Purchase S - F Y55.		Iraulic press	ure measur	ements and	groundwat	er sample colle	ection where	possible and	d reporting: \$1	50k/a for Y26 to
	- N	Monitor and Geoscience Jpdate hyd	verification	eismograph activities <sup>1</sup> d	and GPS sta luring DGR e	mplaceme	Ok/a for Y26 to nt room excava riod accountin	tion: \$470k/		\$300k in Y30, \	Y35, Y40, Y45, Y50
	- ι	Jpdate Geo				-	ruction: \$250k ement room ve				
	Y55. - One	· Westbay s	system repla	cement in	a deep bor	ehole, inclu	ding removal a	and installation	on if needed	d: \$500k every	5, Y40, Y45, Y50 and 10 years starting in ion will be allowed.
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Step-Fixed										
Calculations and Notes:	<sup>1</sup> Wall ima	aging and m								irveys, rock coi nel over 4 year	
Labour (	Costs	Mater	ial Costs	Othe	r Costs	Su	btotal	Allowance	25%	Т	otal Cost
	33,979,050	\$	2,400,000		27,720,000	\$	64,099,050		16,024,763	\$	80,123,813

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## **Work Element Definition Sheet**

WBS (New)	560	30	20	50	10					Prepared By:	B. Belfadhel
WBS (Old)	552	25	80								
WBS Title  Description			DURING EXTEND			) Y125. Durii	ng this peri	od of extend	ded monitor	ring, the facilit	y will remain open
·	and access	•					· .			<u> </u>	
Deliverable	- Annı	ual reports	on far-field monito	oring condi	tions, and e	valuation of	trends.				
Assumptions	•	_	activities are cap measurement an			ED (ex: micr	o-seismic,	deformation	of access	and perimeter	tunnels, thermal,
	- Geo: - Geo: - Geo:	science mar science spe science tech	nents are 3 NWM( nagement (1 fte) cialist (1 fte) nnologist (1 fte). roughout the peri		0 years base	ed on:					
	reporting: - Anal	field (surfac \$150k/a. ytical costs	e-collared multi-lo \$30k/a for the pe iintain seismograp	eriod.				and ground	water samp	ole collection v	vhere possible and
	- One - Not	Westbay sy all instrum	ring equipment Restem replacemen sents will be able es and approache	t in a deep to be re	borehole, in placed or r	ncluding remepaired and	noval and in I thus som	nstallation if e attrition i	needed: \$50 s to be exp	00k every 10 ye	ears improvements in
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Mat	erial Costs	Othe	r Costs	Subt	otal	Allowance	25%	То	tal Cost
\$	27,338,472	\$	5,600,000	\$ 2	20,020,000	\$ 53	2,958,472	\$	13,239,618	\$	66,198,090

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## **Work Element Definition Sheet**

WBS (New)	560	30	20	60	10					Prepared By	: B. Belfadhel
WBS (Old)	552	25	80	<u></u>		<u> </u>					
WBS Title	GEOSCIEN	CE SUPPOF	RT AND MON	IITORING I	DURING DGF	R DECO	MMISSIONING				
	this period geoscience - Man - Far- various ded - Revi- decommis: - Plan models bas	d, main ace Performa agement a field moni commission ew and up sioning lice ning and nosed on possessment of	ccess ways nce Assessm and evaluation toring of ge ning stages of date of the I	and shafts nent and pr non of the k oscience i on geosph  Descriptive  of studies al response es as may b	s will progresost-closure Song-term monstrumentatere response e Geosphere	essively Safety <i>F</i> ponitorination (ex es and the Site M	be backfilled Assessment fund by system programs of the control of	and surface ctions. The mam. monitoring operational kated hydroge	facilities re ain tasks are wells, seism paseline con- cologic and g	emoved. Wor e: nographs) to o ditions prior t geomechanica	Y126-Y150). During k activities support establish impacts of o abandonment.
Deliverable	- Ann - Revi license.	ual monito ew and up	ring reports odate DGSM	on post-o and refer	ence hydrog	eosphe geologic	re conditions, a cal and geomec	hanical num	erical mode	ls in support	of decommissioning
	obtain lice - Elect NWMO Sta - Geo: - Geo: - Trav Purchased - Far possible ar - A - N - L - R	nse), but we tronic information informatio	rmation mar rments are 5 inagement ( ecialists (2 ft chnologists ( face-collared g: \$130k/a. osts: \$30k/a d maintain s rogeologica omechanical update DGS	natically clanagement:  NWMO-3, 1 fte) e) 2 fte).  d multi-lev for the peeismograp I model du model during	osed during system is op /a for 25 year wells) heriod. Sh and GPS string first year first year deciring fi	most o eration ars base ydrauli tations ar deco r decor commis	f the period.  al.  c pressure me  : \$100k/a for pe mmissioning pe mmissioning period:	asurements riod. riod: \$300k ir riod: \$250k ir \$300k.	and ground n Y126. n Y126.	dwater samp	riod (first 5 years to
	assumed tl	hat mal-fu	nctioning mo	onitoring ir	nstruments v	will not	be replaced du	ring the deco	mmissionin	g phase.	
Schedule	Start Year			120	6 2135			Finish Year	150	2159	
Туре	Fixed										
Calculations and Notes:											
Labour (			ial Costs		er Costs		Subtotal	Allowance		1	otal Cost
\$ 1	16,272,900	\$	-	\$	7,600,000	\$	23,872,900	\$	5,968,225	\$	29,841,125

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## **Work Element Definition Sheet**

WBS (New)	560	30	20	70	10				Prepared By:	A. Vorauer
WBS (Old)										
WBS Title	GEOSCIEN	CE SUPPORT	AND MON	ITORING DI	JRING DGR	ABANDONMENT				
Description	However,		n cost is as	ssociated w		phase following cor ED to accommodate				
Deliverable										
Assumptions	- Abaı	ndonment a	ctivity cost	s estimated	at \$50M.					
Schedule	Start Year			151	2160		Finish Year	151	2160	
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%		tal Cost
\$	-	\$	-	\$ 5	50,000,000	\$ 50,000,00	0 \$	12,500,000	\$	62,500,000

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#### **Work Element Definition Sheet**

WBS (New)	560	30	30	20	10				Prepared By: N. Hunt, P.
WBS (Old)					<u></u>				Gierszewski
WBS Title	SAFETY ASSESSMENT FOR EA	AND PSR							
Description	This task is to provide preclos Report (PSR). The EA and PSR								t (EA) and the Preliminary Safety d for a Licence to Construct.
	The preclosure assessment wi monitoring phases.	ill address o	conventiona	l and radiol	ogical safet	y for norma	l, upset and	l accident conditions as	sociated with the operating and
	The postclosure assessment radiological and non-radiolog					an and noi	n-human bi	iota following decomm	nissioning and abandonment. B
Deliverable	- Preclosure Safety As	ssessment r	eport.						
	- Postclosure Safety A								
	- Preliminary ALARA								
	- Conventional Safety								
	<ul> <li>Radiological Safety /</li> <li>Preclosure and post</li> </ul>			o the EA an	d the DSD				
	- Updated computer				u tile r sit.				
	<ul> <li>Updated datasets.</li> </ul>								
	- Key supporting repo	orts, for exa	mple: Refe	rence Data;	Features, E	vents and P	rocesses; N	ormal Evolution scenar	io; Disruptive Scenario.
Assumptions	- Assessment builds o	n report(s)	produced a	t end of Y9	for the sele	cted prefer	ed site.		
	<ul> <li>Work is carried out</li> </ul>								
		ixed and av	ailable one	year ahead	of when fin	al safety as	sessment re	eports are due. That is,	by end Y11 if reports are to be
	completed by end Y12.								
	- Geosynthesis and D	escriptive G	Geosphere S	ite Model r	eports avail	able one ye	ar ahead of	when final safety asses	ssment reports are due.
	Duell'en le con Al ADA		t t	to take Landson				iifit ALADAti	tootooktoo =============================
	•	issessment	is primarily	initial estin	nate of dose	es, and does	not provide	e significant ALARA opt	imization. This will be addressed
	Operating Licence stage Conventional Safety	Assessmer	nt detail is n	nore consist	ent with dr	y storage fa	cility Conve	ntional Safety Assessm	ent rather than a uranium mine.
	- The staffing model i - Transportation safe					-		riented). n Safety Assessment).	
	NWMO Safety Assessment sta for more information and staf (Technical Support During EA	f categoriza	ation). This						ee the Calculation Section below tivity in WBS 560.25.30.20.10
	Funding for contractor support	rt with prec	closure and	postclosure	assessmen	ts (including	review and	d comment) is \$2.8M fo	or Y10, \$2.8M for Y11, \$3.5M for
	NWMO expenses are \$40 K/a	(~5 K\$/a/F	TE). This wi	ll cover soft	ware licenc	es, travel (s	ites, confer	ences) and other costs	(e.g. high speed computing).
Schedule	Start Voor			10	2010			Finish Voor 1	2021
Julicaule	Start Year			10	2019			Finish Year 1 1	12 2021
Туре	Fixed								
Calculations	Biosphere and transportation	staffing red	quirements	are not incl	uded here.				
		<u>Y10</u>	<u>Y11</u>	<u>Y12</u>					
	Dir (NWMO-01)	1	1	1					
	Mgr UF NWM (NWMO-01)	1	1	1					
	Sr Scientist (NWMO-03) Sci/Eng (NWMO-03)	1 5	1 5	1 5					
	Total FTE				-				
	Labour Costs		al Costs		Costs	Sub	otal	Allowance 25%	Total Cost
\$	3,671,413	\$	-	\$	9,220,000	\$ 1	2,891,413	\$ 3,222,85	3 \$ 16,114,2

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	20	20					Prepared By:	N. Hunt, P.
WBS (Old)			ļ								Gierszewski
WBS Title	SUPPORT F	OR REVIEW	/ AND HEAF	RINGS FOR C	ONSTRUCT	ION LICENC	<u> </u>				
Description	and Prelim	inary Safety	Report (PS	SR) submissi	on. It is also	o anticipate	d that Safet	y Assessmer	nt staff will a		Assessment (EA) of sessions with .
Deliverable	1	on material	for public a	stions. and regulato A and PSR r	•						
Assumptions	support th	is activity in	WBS 560.2	e 2 NWMO-( 25.30.20.10 uring the EA	(Technical S	Support Dur	ing EA and	PSR Phase).	the effort fo	r management	of contracts that
Schedule	Start Year			13	2022			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	for two yea where mos	ars. A simila st work was Darlington N	ar value is a by contrac	issumed for tors. A Panel expe	APM, altho	ugh more w	ork will like	ely be carried	out by NW	MO staff than w	earings is \$360 K/a as case with DGR ublic review, and
Labour	Costs	Materi	al Costs	Othe	Costs	Sub	total	Allowance	25%	To	tal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	20	30					Prepared By:	N. Hunt, P.
WBS (Old)						<u></u>					Gierszewski
WBS Title	BIOSPHERE	CHARACTE	RIZATION I	OR EA AND	PSR						
Description	1				•	aracterization the select		tion created i	n WBS 560.1	.5.30.10.40 (Bio	osphere
Deliverable	Maintenan	ce and upda	ate of biosp	ohere Chara ohere datab er commun	ase.		here chara	acterization ar	nd impact ar	nalysis.	
Assumptions	the info	rmation ne	cessary to	define the b	iosphere. F	lowever, it is	anticipate	ed that there v	will be some	additional Env	s) provides most of ironmental hich is covered
		·		/MO-03 FTE \$200 K in ea	•	of Y10 to Y1	2.				
Schedule	Start Year			10	2019			Finish Year	12	2021	
Туре	Fixed										
Calculations and Notes:											
Labour			al Costs	Other	r Costs	Subt	otal	Allowance	25%	Tot	tal Cost
\$	390,550	\$	-	\$	600,000	\$	990,550	\$	247,637	\$	1,238,187

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	30	10					Prepared By:	N. Hunt, P.
WBS (Old)											Gierszewski
WBS Title	SAFETY AS	SESSMENT I	FOR FSR								
Description	=	to provide will be subr	-			-			he Final Safet	ty Report (FSR).	The FSR
	the operat Assessmer	ing and mo	nitoring ph	ases. It will	include a p	reliminary	ALARA asse	ssment, a Co	onventional S	afety Assessme	associated with ent, and a Radon ommissioning and
	•	ent. Both r			-						
Deliverable	Contribution	ons to the F	SR include:								
	- P - A - C - R - N	Preclosure S Postclosure S ALARA Asses Conventiona Radiological Natural Anal Updated cor	Safety Assessment. Il Safety Assessafety Assessessessessessessessessessessessesse	ssment reposessment.	ort.	ents.					
	1	Jpdated dat Jpdated Fea		nts and Proc	esses docu	ment.					
Assumptions	WBS 56 Demon - S License - F - T	50.30.30.20. stration Fac lite specific Application Final design The regulato	10 (Safety a lility (UDF) information of the lility (UDF) info	Assessment and the final from UDF available 2 and approva	for EA and Il decision w testing is av years ahea I period tak	PSR); howwill be used vailable as a d of when sees 2 years im version,	ever, in this required fro the FSR is du which implie	case additio m WBS 560. ue. es the final v	nal informati 25.30.30.10 ( rersion is to b	on from the Ur (Technical Supp	oort for Operating
	- Т	he staffing	model is co	nsistent wit	th the curre	nt status q	uo (i.e., moi	,	make oriente This include	,	ment of contracts
		support w	•		·	• •	·	J	Application).		to Y23 (similar to
	NWMO ex speed com		\$40 K/a (~\$	5 K/a/FTE).	This will co	over softwa	re licences,	travel (sites	, conferences	s) and other cos	sts (e.g. high
Schedule	Start Year			16	2025			Finish Year	23	2032	
Туре	Fixed										
Calculations and Notes:											
Labour			al Costs		Costs		total	Allowance			al Cost
\$	9,790,435	\$	-	\$ 1	.5,320,000	\$ 2	25,110,435	\$	6,277,609	\$	31,388,044

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	30	20			Prepared By: N. Hunt, P.						
WBS (Old)	•							Gierszewski						
<u> </u>	ļ													
WBS Title	BIOSPHER	E MONITORI	ING											
Description	This task is	for the dev	elopment a	and operati	on of a bios	ohere monitoring progr	am.							
	Environme	ental Effects	Monitoring	g is a proce	ss which wil	l establish the baseline	conditions of the biosp	here and then monitor for changes						
	to the bas	eline from th	he activitie	s occurring	at the facilit		construction, normal op	erations, emergency procedures or						
	The monit	oring progra	ım includes	s:										
	Ē		-		_		Management System Pla the likely cause and det	an. ermining mitigation / actions.						
	Ē	npliance Mor f-site air acti	_		cted to ensu	re that all Provincial re	gulatory requirements a	re met for effluent discharges, and						
	A variety of measurements from off-site locations will also be collected on a regular basis for use with public health and monitoring assessments, including:  Air — continual radioactivity monitoring at 10 locations with sampling each quarter.													
	<ul> <li>Air – continual radioactivity monitoring at 10 locations with sampling each quarter</li> <li>Water – rain, drinking water, lakes, streams, rivers – 10 samples per event</li> <li>Soil – 20 soil samples per quarter</li> <li>Wildlife and Plants – 10 flora and fauna samples from various locations each quarter</li> <li>Produce (e.g.; milk) – 5 samples from various local produce per quarter (on rotation)</li> </ul>													
Deliverable	The main (	deliverables	are:											
	- Peri - Prov	odic reports vision of env	on complia	ance with to I data and a	argets set ou analysis for p	ublic information.	Management System P	lan. e Ministry of the Environment as						
Assumptions	1	Baseline bios Excludes gro	•			S 560.30.30.20.30 (Bio:	sphere Characterization	for EA and PSR).						
	NWMO sta	aff requirem	ent is 1 NW	VMO-03 FT	E/a as long a	s the program is runnir	ng.							
	•					OK/a as long as the pro , and report preparation		ncludes contractor staff costs, costs						
Schedule	Start Year			16	5 2025		Finish Year 2	5 2034						
Туре	Fixed													
Calculations														
and Notes:														
Labour (		Materia	al Costs	+	r Costs	Subtotal	Allowance 25%	Total Cost						
\$	1,301,832	\$	-	\$	2,000,000	\$ 3,301,832	\$ 825,458	\$ \$ 4,127,290						

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	30	30					Prepared By:	N. Hunt, P.
WBS (Old)	<u></u>										Gierszewski
WBS Title	HUMAN HI	EALTH MON	IITORING								
Description	A regular a	ssessment (	of public he	alth will be	conducted	and may inv	olve the fo	llowing activiti	es:		
	- Iden	tification of	community	/ health con	icerns						
	- Publ	ic health im	plications								
	- Site	specific hea	Ith outcom	es							
	The focus i	s on assessi	ng the pote	ntial impac	ts of facility	operations	on the hea	Ith of the peop	ole living in	the area of the	facility.
Deliverable	The main c	leliverables	for the Hur	nan Health	monitoring	are:					
	•	uation of pu orts to regul					cluding ger	neration of pul	blic health a	assessment rep	oorts.
Assumptions	₹	itoring of w				g basis.					
	A study is o	conducted e	very 5 year	s at a cost o	of \$500 K/st	udy.					
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,000,000	\$	1,000,000	\$	250,000	\$	1,250,000

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	30	90				Prepared By:	N. Hunt, P.
WBS (Old)										Gierszewski
WBS Title	SUPPORT FOR REVIEW AND HEARINGS FOR OPERATING LICENCE									
Description	This task is to support the public hearings and respond to review panel and regulatory questions on the Final Safety Report (FSR) submission. It is also anticipated that Safety Assessment staff will attend a variety of sessions with the public, elected representatives an aboriginal groups to provide information on the technical aspects of the project.									
Deliverable	Prepare responses to review questions. Presentation material for public and regulatory review. Participation in public review of FSR materials.									
Assumptions	NWMO staffing requirements are 2 NWMO-01 and 6 NWMO-03 FTE/a. This includes the management of contracts that support this activity in WBS 560.25.30.30.10 (Technical Support for Operating Licence Application).									
	Funding for contractor support during the Operating Licence review process is estimated at \$400 K/a for 2 years.									
Schedule	Start Year			24	2033		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	Assumed s	imilar level	of effort as	in supporti	ng the Cons	truction Licence applica	ation.			
Labour Costs		Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
\$ 2,447,609		Ś								

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	40	10	•				Prepared By:	N. Hunt, P.
WBS (Old)										.A	Gierszewski
				A			Α				
WBS Title	OPERATIO	NS SAFETY A	SSESSMEN	Т							
Description	This task is	to provide s	safety asse	ssment sup	port during	the facility	operating p	eriod. Specif	ic items incl	ude:	
		\	. <b>.</b>					- 4: <b></b> 41	: 0	-1:	
	1	•	•	-	-			ation of the s	•	g Licence. g Licence appro	oval
	:		-			_		-	•		nce databases and
	:	inder a suita			the safety a	nu periorii	ance assess	ment compu	ter codes, ii	iciduliig refere	nice databases and
			•		numarical m	مرما مرما	anad in M/D	C E C O O O O O	00 10 (Cafatı	, Assassment fo	or FCD)
	•									Assessment for Assess	
	•	nent models	•				the develop	pilielit allu ve	anuation or s	salety and pen	Offilatice
	1			•			sunnort th	a monitoring	and eventi	ial closure of th	ne facility
	'	railling or qu	uaiiiieu sta	ii to eiisure	continueu	capability to	support ti	ie momitornię	g and event	iai ciosure or ti	ie raciity.
	- I	nterpretatio	n and appl	ication of ex	xperiments	conducted i	n the Unde	rground Dem	onstration I	Facility (UDF).	
Deliverable	•	Jp-to-date re			•				1 6.1 1.		
	•									Operating Lice	
	- <i>F</i>	Annual repor	t describin	g ongoing r	esults to fur	ther validat	e or improv	e the referei	nce sarety as	ssessment mod	lei.
Assumptions		ho monitori	ng of gools	raic conditio	anc around t	tho cito and	l maintanar	sco of the city	hydrogool	agical reference	e numerical model
Assumptions	•	ddressed he		igic conunci	Jiis ai Guilu i	ine site, and	ı ınannenai	ice of the site	e nyurogeon	ogical reference	e numericai modei
	•	Costs do not		snhere mo	nitoring						
	Ē	Costs do not		-	_	as needed to	n sunnart a	nerations			
	=								al program i	n support of op	erations.
	<u> </u>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		, po		.o.i.a. i icaici	., • • • • • • • • • • • • • • • • • • •		p. 08. a		
	:						iere (i.e., ur	niversities, inf	ternational o	collaboration) is	s described in WBS
	560.25	.50.40.10 (Cd	onduct UDI	F Demonstr	ations – Ope	erations).					
	NWMO sta	aff requireme	ents are 5 I	FTE/a based	l on:						
	:	afety assess			-						
	•	echnical spe			sment (2 NV	VMO-03)					
	- a	nalyst/engir	neers (2 NV	VMO-03)							
	F		d == ¢400 k	//a ha muanii	ما ممسمد الم		<b>f</b>		مندرا مسمارية		\
	=							and worksho		and peer revie	w), and costs for
	traver to a	iteria public	ineetings a	ind to partit	cipate iii iiit	erriational t	.Office effices	and worksin	ρμs.		
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Step-Fixed										
Calculations											
Calculations	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	тс	otal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	40	20				Prepared By: N. Hunt, P.
WBS (Old)									Gierszewski
WBS Title	BIOSPHER	E MONITORI	NG						
Description	This task is	for the deve	elopment a	and operati	on of a bios	ohere monitoring progr	am.		
	to the bas	eline from th	ne activitie	s occurring	at the facilit		construction, norr		ere and then monitor for changes rations, emergency procedures or
	The monit	oring progra	m includes	::					
	1		-		_	hin the Environmental of			n. rmining mitigation / actions.
	•	npliance Mor f-site air acti	_		cted to ensu	re that all Provincial re	gulatory requirem	nents ar	e met for effluent discharges, and
	•	of measuren		n off-site lo	ocations will	also be collected on a	a regular basis fo	r use w	ith public health and monitoring
	- Wat - Soil - Wild	er – rain, dri – 20 soil sam Ilife and Plar	nking wate nples per q nts – 10 flo	er, lakes, sto uarter ra and faur	reams, rivers	cions with sampling eac 5 – 10 samples per ever rom various locations e produce per quarter (d	ach quarter		
Deliverable	The main o	deliverables	are:						
	- Peri - Prov	odic reports vision of envi	on complia	ance with to I data and a	argets set ou analysis for p	ssments of the likely rea ut in the Environmental public information. nd regulations and pro	Management Sys	tem Pla	n. Ministry of the Environment as
Assumptions	•	Biosphere da				0.30.30.20 (Biosphere N	Monitoring).	•••••	
						s the program is runnir			
	•					costs, and report prep		ing. Th	is includes contractor staff costs,
Schedule	Start Year			26	5 2035		Finish Year	55	2064
Туре	Step-Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Othe	er Costs	Subtotal	Allowance	25%	Total Cost
\$	3,905,496	\$	-	\$	6,000,000	\$ 9,905,496		76,374	\$ 12,381,870
	, , 0	1 '		. '	.,,	. 2,222,130		-,	

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	40	30					Prepared By:	N. Hunt, P.
WBS (Old)	ļ			<u></u>							Gierszewski
WBS Title	HUMAN HI	EALTH MON	IITORING								
Description	A regular a	ssessment (	of public he	alth will be	conducted	and may inv	olve the fo	llowing activiti	ies:		
	- Publ - Site	ic health im specific hea	plications Ith outcom			operations	on the hea	lth of the peop	ple living in	the area of the	facility.
Deliverable	- Evalı	uation of pu	ıblic health	man Health through and	alysis of coll	ated data ir	cluding ger	neration of pu	blic health :	assessment rep	orts.
Assumptions	- Publ	ic health ev	aluation is I	th is not incl reviewed or	n an ongoing						
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Fixed										
Calculations	İ										
Labour (	Costs	Materi	al Costs	Other	Costs	Subt	otal	Allowance	25%	Tot	tal Cost
Ś		Ś									

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#### **Work Element Definition Sheet**

WBS (New)	560	30	30	50	10	l				Prepared By	: N. Hunt, P.
WBS (Old)											Gierszewski
	5.4754.050										
WBS Title	EXTENDED	MONITORII	NG								
Description	This task is	to provide	safety asses	ssment act	ivities during	the Extend	led Monitor	ing period (Y	′56-Y125). S	pecific items i	nclude:
•		•	,					01 (	,	•	
	<b>.</b>	-	-	-	-				ite Operatin	_	
	•		=	sitory perfo	ormance aga	inst model	predictions,	and continu	al improvem	nent in the ref	erence repository
	•	issessment i									
	- N QA syst		e of safety a	and perforr	nance assess	sment com	outer codes,	including re	ference data	ibases and too	ols, under a suitable
			( 1) (				I ' - 14/D/	5 5 6 0 2 0 2 0	10.10.10	C- (-1 A	
	- IV	/laintenance	e of the refe	erence site	numericai m	ioaei aevei	opea in wis:	5 560.30.30.4	10.10 (Opera	tions Safety A	ssessment).
	:	_	_						-	· · · · · · ·	nce assessment
	models	and codes,	and in part	icular on th	ne implicatio	ns of contir	ued monito	oring on the I	ong-term sa	fety.	
	- Т	raining of q	ualified sta	ff to ensure	continued (	capability to	support th	e monitoring	g and eventu	al closure of t	he facility.
Deliverable	- U	Jp-to-date r	eference re	pository sa	ifety assessn	nent model					
	:	•			•			site Operatii	ng Licence.		
	1	•					•		•	essment mode	el, and specifically its
***************************************	conclus	ions with re	spect to th	e implication	ons for conti	nued monit	oring and to	or repository	closure.	***************************************	
Assumptions	The follow	ing is not inc	cluded here	<u>;</u> :							
		`I		-f +h - 11	la d D		Fa ailite . /I	IDE)			
		ienerai opei iroundwate			lerground D	emonstratio	on Facility (C	JDF).			
	Ē				with enviro	nmental tar	gets).				
	NWMO sta	ıff requirem	ents are 2 F	TF/a base	d on:						
				. 2, a 2000							
	<b>5</b>	-		-	ment (1 NW	'MO-03)					
	:	nalyst/softv		•	•	dveie eunno	rt ongoing	neer review :	and for trave	el to public me	etings and
	1				estimated at		it, ongoing	peer review	and for trave	ir to public me	etings and
	•	-	_	-					-	-	s are undertaken, but
	:									ery and analys	entually recovered fo is campaign.
	In particula	ar, it is expe	cted that at	t least one	long-term co	ontainer tes	t will have b	een emplace	ed and		
		•			_			=		us on analysis	of long-term exposed
	•	· ·						•		•	possible for making
											fluence of the
	extended r repository.		tself on the	repository	(e.g. resatu	ration) and	or on conce	epts for remo	ote monitori	ng of a closed	and sealed
	repository.										
Schedule	Start Year			5(	5 2065			Finish Year	125	2134	
Туре	Fixed										
Calculations	<b></b>										
and Notes:											
Labour C		Materia	al Costs		r Costs		total	Allowance		1	otal Cost
\$ 1	18,225,648	\$	-	\$	28,000,000	\$ 4	16,225,648	\$	11,556,412	\$	57,782,060

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	50	20					Prepared By:	N. Hunt, P.
WBS (Old)	0						Ö				Gierszewski
WBS Title	BIOSPHERI	E MONITORI	ING								
Description	This task is	for the dev	elopment a	nd operation	on of a biosp	ohere monit	oring progr	am.			
	Environme	ntal Effects	Monitoring	is a proces	ss which wil	l establish t	he baseline	conditions	of the biosph	ere and then r	monitor for changes
	:	eline from tl sioning. Any		_		-			•	rations, emerg	gency procedures or
	The monito	oring progra	ım includes:	:							
	•		-		_			_	t System Plar use and deter		tion / actions.
	•	npliance Mo f-site air act	_		cted to ensu	re that all P	rovincial re	gulatory req	uirements ar	e met for efflu	ient discharges, and
	•	of measurer ts, including		off-site lo	cations will	also be co	llected on a	a regular ba	sis for use w	ith public hea	alth and monitoring
	- Wat - Soil - Wild	- continual r er – rain, dr – 20 soil san llife and Plai duce (e.g.; m	inking wate nples per qu nts – 10 flor	r, lakes, str uarter a and faun	eams, rivers a samples fr	om various	es per even	t ach quarter			
Deliverable	The main o	deliverables	are:								
	- Perio	vision of env	on complia	nce with ta	nrgets set ou nalysis for p	it in the Env ublic inforn	rironmental nation.	Manageme	nt System Pla		:he Environment as
Assumptions	1	Biosphere da Excludes gro				.30.40.20 (E	iosphere M	onitoring).			
	NWMO sta	aff requirem	ent is 1 NW	'MO-03 FTE	/a as long a	s the progra	am is runnir	ıg.			
	•	costs for dand				-	•	•	ning. This inc	ludes contrac	tor staff costs, costs
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations and Notes:											
Labour (			al Costs		r Costs		total	Allowance			otal Cost
\$	9,112,824	\$	-	\$	14,000,000	\$ 2	23,112,824	\$	5,778,206	\$	28,891,030

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## **Work Element Definition Sheet**

WBS (Old)	560	30	30	50	40		_	Prepared By:	N. Hunt, P. Gierszewski
WBS Title	HUMAN HI	EALTH MON	IITORING						
Description	A regular a	ssessment (	of public he	ealth will be	conducted ar	nd may involve the fol	lowing activities:		
		tification of ic health im		y health cor	ncerns				
		specific hea s on assessi			ts of facility o	perations on the heal	th of the people living	in the area of the	facility.
Deliverable	The main c	leliverables	for the Hu	man Health	monitoring a	re:			
	1	-		_	alysis of colla- terested parti		neration of public heal	th assessment rep	orts.
Assumptions	<b>.</b>	itoring of wichealth is		th is not incl n an ongoin					
Assumptions	- Publ	ic health is	reviewed o	n an ongoin		dy.			
	- Publ	ic health is	reviewed o	n an ongoin	g basis. of \$500 K/stud		Finish Year 1	55 2164	
Schedule	- Publ A study is c	ic health is	reviewed o	rs at a cost o	g basis. of \$500 K/stud		Finish Year 1 1	55 2164	
Assumptions Schedule Type Calculations	- Publ A study is c	ic health is	reviewed o	rs at a cost o	g basis. of \$500 K/stud		Finish Year 1 1	55 2164	
Schedule	- Publ A study is of Start Year Fixed	conducted e	reviewed o	n an ongoin	g basis. of \$500 K/stud		Finish Year 1 1		al Cost

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	60	10					Prepared By: N. Hunt, P.
WBS (Old)										Gierszewski
WBS Title	BIOSPHER	E MONITOR	ING							
	ļ									
Description	This task is	for the dev	velopment a	and operation	on of a bios	ohere moni	toring progr	ram.		
					1 . 1			10.0		
	1		-						-	ere and then monitor for change
	•			_		•			-	rations, emergency procedures of
	uecommis	Sioning. An	ly changes t	o the basen	ne wiii be ii	ivestigateu	to determin	ne the cause.		
	<u>.</u>	_								
	The monit	oring progra	am includes	<b>;</b> :						
	Don	anstration	of complian	aca with tar	ants sot wit	hin tha Favi	ronmontal	Managemen	t Custom Dlar	
	=				-			_	•	rmining mitigation / actions.
	- Lvai	uation of ai	iy i eleases	iiito tile eliv	in offittellt if	iciuuiiig ass	essilient of	the likely cat	use and dete	inining mitigation / actions.
	Con	nnliance Mc	nitoring wi	ll he condu	rtad to ansu	ro that all [	Provincial re	gulatory red	uiramants ar	e met for effluent discharges, an
	:	f-site air act	_		ited to ensu	ire triat air i	TOVITICIALTE	guiatory req	un ements ar	e met for emdent discharges, an
	on and or	i site un uct	ilom levels u	i e iiiet.						
	A variety	of measure	ments from	n off-site lo	cations will	also be co	llected on	a regular ba	sis for use w	vith public health and monitorin
	•	nts, including								
		,	U							
	- Air-	- continual ı	radioactivity	y monitorin	g at 10 locat	tions with s	ampling eac	h quarter		
	- Wat	er – rain, dr	rinking wate	er, lakes, str	eams, rivers	s – 10 samp	les per ever	nt		
	- Soil	– 20 soil sar	mples per q	uarter						
	- Wild	dlife and Pla	nts – 10 flo	ra and faun	a samples fi	om various	locations e	ach quarter		
	- Prod	duce (e.g.; n	nilk) – 5 san	nples from v	arious loca	l produce p	er quarter (	on rotation)		
Deliverable	The main (	deliverables	are:							
	Pon	orting of ha	calina cand	ition change	oc and accor	cments of t	ho likoly ro	asons for the	changes	
	•	_		_			-	Managemer	_	ın
	•	-	-		nalysis for p			ividilageillei	it System i it	
								ovision of re	ports to the	Ministry of the Environment a
	required.				8.0.0.0				p	
						***************************************				
Assumptions	- [	Biosphere d	ata are avai	lable from \	WBS 560.30	.30.50.20 (E	Biosphere N	lonitoring).		
	- 6	Excludes gro	oundwater r	monitoring	wells.					
	NWMO sta	aff requirem	nent is 1 NV	VMO-03 FTE	/a as long a	s the progr	am is runnir	ng.		
	•							_	ning. This inc	cludes contractor staff costs, cost
	to install a	nd maintair	n equipmen	t, sample ar	nalysis costs	, and repor	t preparatio	n.		
Schedule	Start Year			126	2135			Finish Year	150	2159
Туре	Fixed									
ļ										
Calculations										
and Notes:	<u> </u>	1						T 411		
Labour			ial Costs	+	r Costs	1	total	Allowance		Total Cost
\$	3,254,580	\$	-	\$	5,000,000	\$	8,254,580	\$	2,063,645	\$ 10,318,225

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	60	20				Prepared By:	N. Hunt, P.
WBS (Old)				A						Gierszewski
WBS Title	DECOMMI	SSIONING								
Description	This task is Assessmer	•	Assessment	support fo	r the applica	tion for Decommission	ing Licence an	d possible a	associated Envii	onmental
Deliverable				•	A) as require					
Assumptions	applica - F - T - T of reservith ur Decom  NWMO satiapplication during the  WEDS 560. Specialist,	tion. Preparation The EA/Licer The EA addre Technical sularch that ha hiversities or missioning prefety assessm are 2 NWN Decommiss  .30.40.50.40	for the EA/lace applicatesses all issupport activitive taken pland contractor operiod.  The contractor operiod for contractor operiod.  The contractor operiod for contractor operiod.  The contractor operiod for contractor operiod.	Licence app cion takes 3 ues related ties are larg ace prior to rs or interna equirement a for 5 year, se, and to e	vears to pre to obtaining gely over (i.e. the decision ational collab s for the fina s, Y126 to Y1 nsure that the	ins at the start of the Depare and thereafter the the Decommissioning and the department of the Decommissioning and the department of the Decommissioning and the department of the Decommission in order to add and the Decommission in order to add and the Decommission in order to add the FSR remains consistence of the PSR remains consistence of the Decommission in order to add the Decommission i	ecommissioning e hearing procuries and the issues have been the facility). In dress issues the essment activity effort is 1 NW ent with the assert will require perform techn	ng and Clos eess takes 2 ne Licence t een sufficiel However \$2 at may arise ities and De MO-03 FTE s-decommis	ure stage. year to comple to Abandon. Intly addressed if 200 K/a funding the 25- the during the 25- the commissioning a to maintain the the sioned facility.  Manager and fu	te.  n the >100 years is maintained year  Licence the facility licence
Schedule	Start Year			126	2135		Finish Year	150	2159	
Туре	Fixed									
Calculations and Notes:										
	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	al Cost

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## **Work Element Definition Sheet**

WBS (New)	560	30	30	70	10					Prepared By:	N. Hunt, P.
WBS (Old)				<u> </u>			·				Gierszewski
WBS Title	ABANDON	MENT									
Description	This task is	for Safety A	Assessment	support fo	r an applicat	tion for abar	ndonment o	of the facility.			
Deliverable	Preparatio	n of update	d safety ass	sessment Fi	nal Safety R	eport (FSR)					
Assumptions	issues r  - T  the act  - F  NWMO sta	elated to obline existing The Updated ual seal instance reparation The application	otaining the FSR will be I FSR will in allation cha for the Lice ion takes 3 ents are 2 I	e Decommis updated wi clude informateristics nce applica years to con	, sioning Lice ith current of mation obta , and the action begins mplete and	ince and the data, but is o ined during tual as-deco 5 years prio thereafter t	the Decomommissioned report to the end	Abandon.  ufficient to su  missioning ph	apport the ab mase, includi mmissioning	pandonment li ng if necessary phase.	e) addresses all EA cence application. y information on
Schedule	Start Year			151	. 2160			Finish Year	154	2163	
Туре	Fixed										
Calculations and Notes:							,				
Labour	Costs	Materi	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	To	otal Cost
\$	1,041,466	¢	_	Ś	1,600,000	Ś	2,641,466	Ś	660,366	Ś	3,301,832

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	10	10				Prepared By:	A. Khan
WBS (Old)	552	30	60	10						
WBS Title	OTHER GO	VERNMENT	APPROVAL	S - REQUIRE	MENTS					
Description	Canadian N	luclear Safe	ety Commis	sion and ap	proval unde	•	site, construct or			cies (other than the termine the actions
Deliverable	Listing of th	ne necessar	y licenses, į	permits appi	rovals, and	plans needed as we	ll as the actions re	quired to	obtain them.	
Assumptions	<b>.</b>		e at a minii	num regula	tory review	s from such agenci	es as Transport C	anada. Na	tural Resource	os Canada, Eisheries
	2. The	costs assoc	iated with		ources nee	; and	liaison with the	applicable	federal, provi	ncial and municipal
Schedule	2. The	costs assoc	iated with	and the res	ources nee	; and ded to manage the	liaison with the	applicable	federal, provi	·
Schedule Type	2. The	costs assoc	iated with	and the res	ources nee	; and ded to manage the	liaison with the	applicable .40.10.10).	federal, provi	·
	2. The agencies has start Year	costs assoc	iated with	and the res	ources nee	; and ded to manage the	liaison with the	applicable .40.10.10).	federal, provi	·
Type Calculations	2. The agencies has start Year Fixed	costs assoc	iated with ptured in tl	and the res	ources nee signed to li	; and ded to manage the	liaison with the	applicable .40.10.10).	federal, provi	·

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	10	20			Prepared	By: A. Khan
WBS (Old)	•			·				······································	
						1			
WBS Title	PREPARATIO	N FOR ENV	IRONMENT	AL ASSESSN	∕IENT				
ļ									
Description				-	-	formally sharing the ropart of the Siting Pro			
Deliverable	Informally su	ıbmit the re	sults of the	e site charad	terization a	ctivities to the CNSC			
Assumptions	<ol> <li>The waste character</li> <li>The remains the rema</li></ol>	t of the sition ork associal rization sturms sults will be ork will support to the cork will support to the cork will support will support to the cork will support to the	ted with the dies will contact the document port the in	he investiga over such th ted in techn teractions v	tions is cap ings as meto ical reports vith the CNS	estigations will be conducted as part of the sign corology, flora, fauna, but that will be shared with as technical reports.	ting process (WBS nydrology, geology h the CNSC. are submitted and	, hydrogeology, e	etc. SC staff.
	6. The ea	arly site cha osts associa	racterization ted with a	on activities nd the reso	are expecte urces neede	is dependent on the nued to expedite the EA pend to support the early	rocess.		ctions with the CNSC
		Y07	Y08	Y09					
•									
	CNSC Licensing Fees (\$k) NWMO-1 NWMO-3 Travel (\$k)	405 0.5 0.5 2	405 0.5 0.5 2	405 0.5 0.5 2					
Schedule	Licensing Fees (\$k) NWMO-1 NWMO-3	0.5 0.5	0.5 0.5	0.5 0.5	2016		Finish Year	9 201	8
	Licensing Fees (\$k) NWMO-1 NWMO-3 Travel (\$k)	0.5 0.5	0.5 0.5	0.5 0.5 2	2016		Finish Year	9 201	8
Schedule	Licensing Fees (\$k) NWMO-1 NWMO-3 Travel (\$k)	0.5 0.5	0.5 0.5	0.5 0.5 2	2016		Finish Year	9 201	8
Туре	Licensing Fees (\$k) NWMO-1 NWMO-3 Travel (\$k)  Start Year  Fixed  CNSC licensing thousands or NWMO-1 va NWMO-1 va NWMO-3 va	0.5 0.5 2 2 ng fees are f dollars; lues represelues represe	0.5 0.5 2 calculated ent the FTE	0.5 0.5 2 7 assuming the effort require effort requirements	at 1 FTE eq ired by NW ired by NW	uals 1800 hours and is  MO management;  MO technical staff; and p to Ottawa costs \$100	charged at an hou	rly rate of \$250.	This total is reported
Type Calculations	Licensing Fees (\$k) NWMO-1 NWMO-3 Travel (\$k)  Start Year  Fixed  CNSC licensii thousands or NWMO-1 va NWMO-3 va Travel expen	0.5 0.5 2 2 ng fees are f dollars; lues represelues represe	0.5 0.5 2 calculated ent the FTE ent the FTE culated assistant	assuming the	at 1 FTE eq ired by NW ired by NW	MO management; MO technical staff; and	charged at an hour	rly rate of \$250.	This total is reported

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560 552	30 30	40 50	20	10					Prepared By	/: A. Khan
WBS Title	SITE PREP. AND CO	ONSTR. LICEN	NCE (CNSC)	APPLICATION	ON						
Description	Control Act and its	10.10.10). Th nd submittin	nis includes ng a licence regulations	s: application s; and	and suppo	rting docun	ents that ir	nclude all of th			ing the licensing p
Deliverable	Class I Nuclear Fac	ility Site Pre	paration &	Construction	on Licence A	Application a	ınd Support	ting Document	ts		
	<ol> <li>A separate I</li> <li>The Commis</li> <li>The licence</li> <li>An Environr</li> <li>A licence a includes such item</li> <li>A Prelimina details (see WBS 5</li> <li>Consideratic</li> <li>Consideratic</li> <li>Consideratic</li> <li>Consideratic</li> <li>Consideratic</li> <li>Consideratic</li> <li>Consideratic</li> <li>A Constription</li> <li>A Complianc</li> <li>A Quality As</li> <li>A Construct</li> <li>A Preliminar</li> <li>The licensin</li> </ol>	ntent will be ricence to prosision will issue will be valid mental Asses pplication pass as:  ry Safety Repi60.20.50.20.  cons for Radiations for Human for Securions for Securions for Safeg poins to Opera of the Convece Matrix; ssurance Projion Program, ry Decomming process (frulan will be prosessociated will sessociated will sessociated will issue will sessociated will sessociate will sessociated will sessociated will sessocia	epare the super a licence for the ention of the entire of	ite will not a which will ire construct the required contain at that include ction and Albustness; intain the Fallanagemen fety Program WBS 560.90 an and Decche project of support the resources.	be required require CN: ction period before the a minimum is prelimina LARA;  acility; t Structure; m;  0.70.20.10); ommissionir description e licencing responses to the control of the c	I. SC approval I; licence rei CNSC can i: n the listing ry safety as ng Cost Estir and notice of review and I	s at identifications and lice presented presented sessments (	or Financial Gu ough to issue vities (WBS 56 g process and	ork. d. 5 560.30.40 ng procedu 30.30.20.10 arantee. of licence) 0.30.40.20 to prepar	.20.30).  Ire, NWMO-F  and releva  is expected to  .20);  e the applica	PROC-RG-0002 wh nt preliminary des o require 5 years; ation and support
Schedule Type	Start Year Fixed			10	2019			Finish Year	12	2021	
Calculations and Notes:	CNSC licensing fee thousands of dolla NWMO-1 values ri NWMO-3 values ri Travel expenses ai	epresent the epresent the	e FTE effort e FTE effort I assuming	required by required by that 1 perso	, NWMO m NWMO te	anagement chnical staf	; and \$1000. Thi	·		thousands o	·
\$	1,647,577	\$	-	\$	2,730,000	\$	4,377,577		1,094,394	\$	5,471,9

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	20	20				Prepared By: A. Khan
WBS (Old)									
		ii		i	ř				
WBS Title	LICENSING REVIEW	INCLUDING	PUBLIC HE	ARING					
Deliverable Assumptions	(Y13 – Y15). This w 1. Answering CI 2. Providing sup 3. Preparing inf 4. Attending ar CNSC (e.g.: beginni  Class I Nuclear Faci  It is assumed that: 1. A separate lic 2. The Commiss 3. The licence v 4. Environment	vill include: NSC staff que pplementary formation ne nd participat ng of comm lity Site Prep cence to pre sion will issu vill be valid to	estions (as y information deeded for the issioning).  Departed the sign of the entire the entire the entirent submiss	required); on as per a s ne Public He hearing prio  Constructio  te will not b which will r re constructions have b	echedule and earing; and or to initial or to	d/or as required; licence and possibly p	ntified stages of not be required.	ce modific	n support of obtaining the licence
	Hearing. 7. The costs as	ssociated w	ith and the	resources	needed to		review of the a	•	uestions and to attend the Public
	CNSC Licensing								
	Fees (\$k)	2025	1000	1000					
	NWMO-1 (FTE)	2025	1980	1980					
		0.75	0.85	0.85					
	NWMO-3 (FTE)	2.25	2.75	2.75					
	Travel (\$k)	5	5	5					
	Purchased Services (\$k)	854	854	854					
Schedule	Start Year			12	2022		Finish Year	15	2024
Juleuule	:J(a) (   E a)			13	2022		11111311 1 [	15	2024
Туре	Fixed								
Calculations and Notes:	CNSC licensing fees thousands of dollar		ted assumir	ng that 1 FT	E equals 180	00 hours and is charge	d at an hourly ra	te of \$250	O. This total is reported in
		present the e calculated	FTE effort i assuming t	required by hat 1 perso	NWMO tec n-trip to Ott	hnical staff; awa costs \$1000. Thi	•		housands of dollars; and
1						ted assuming that 1 F			Tatal Ct
	our Costs	Materia	ai Costs		Costs	Subtotal	Allowance	25%	Total Cost
\$	1,551,234	Ş	-	\$	8,562,000	\$ 10,113,234	\$ 2	,528,308	\$ 12,641,542

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#### Work Element Definition Sheet

WBS (New)	560	30	40	2	0	30	ļ				Prepared By:	A. Khan
VBS (Old)	552	55	20	i			i					
WBS Title	ENVIRONMENTAL	ASSESSMENT										
Description	Prepare and subm will be prepared by							oort Document	ts required	to support th	e Environment	al Assessment th
	:	the Responsi										
	•	a public involv any field work			ed:							
	<ul> <li>Collecting ar</li> </ul>	nd analysing t	he data; and	d .								
	<ul> <li>Preparing th</li> </ul>	e Environmer	ital Impact S	Statemen	t and	the Techni	cal Supp	ort Documents	S.			
Deliverable	Environmental Importance Important I						for the	Environmental	Assessme	nt (the Enviro	nmental Asses	sment itself will
Assumptions	It is assumed that:											
•	<b>.</b>							ne project desc			itted.	
	=							o-economic Im			ntal Assessmen	t to a Joint Revi
	Panel early in the E	EA Process.								ic Environme	rear 7 is sessimen	t to a some nevi
		Panel will con							tudies and	I the preparat	ion of the Env	vironmental Imp
	Statement and the						autu coi	icedion, neid 3	tudics and	the prepara	ion of the Em	monnentai impi
	•	will be submit			tal acc	occmont u	ill bo av	ailable, such as				
												ha arrisahilisar af s
	site, all costs assoc											he suitability of t 30);
	- The biosphe been included und						the suita	ability of the si	te, all costs	s associated w	ith performing	these studies ha
	- The dose as 560.30.30.20.10); a		workers, n	nembers	of the	public and	l non-hu	ıman biota pre	pared for t	the Preliminar	y Safety Assess	ment Report (W
	= ·	unding will be						evelopment (W to that organi			no additional	intervener fund
			he public in	volvemer	nt prod	cess are inc	luded u	nder Public Aff	airs – Publ	ic Review and	EA Approval (V	VBS XXX XX XX).
	10. No revision However there wil											acterization facil
	11. Preparation use the relevant i expected to take 3 include the followi	nformation gas years to com	athered in	the EA p	repara	ation phase	e (see V	VBS 560.30.40	.10.20). Th	ne review of	the EIS and th	e Public Hearing
	- Preparation	of an EA Scop	ing Docume	ent (EA G	uidelir	nes);						
		nake decisions										
	•	of Environme of the Environ										
	- Submission	of Environme	ntal Impact	Statemer	nt; and	I						
		nvironmental										1.1.0
	<ol><li>It is assumed licensing process (</li></ol>				ng doc	uments as	well as	the Panel Pub	olic Hearing	g will likely co	ver the EA pro	cess and the CN
	13. The costs ass				eded	to support	the env	ironmental ass	essment a	re as follows:		
		Y10	Y11	Y1	2	]						
	CNSC Licensing			١.								
	Fees (\$k) NWMO-1 (FTE)	\$ 99	\$ 9	9 \$	99							
	NWMO-3 (FTE)	1.5	1.5	1								
	Travel (\$k)	2	2	2	2							
	Purchased Services (\$k)	\$ 4,454	\$ 4,45	4 \$ 4	1,454							
	SCI VICES (SK)	3 4,434	ÿ 4,43	4 7 .	+,434	J						
Schedule	Start Year				10	2019			Finish Yea	er 12	2021	
Гуре	Fixed											
Calculations and Notes:	CNSC licensing fees of dollars; NWMO-1 values re		_					l is charged at a	an hourly r	ate of \$250. 1	his total is repo	orted in thousan
	NWMO-3 values re Travel expenses ar	epresent the F re calculated a	TE effort re ssuming tha	quired by at 1 perso	/ NWN on-trip	10 technicato to Ottawa	al staff; costs \$				sands of dollar	s; and
	Purchased services	for the envir	onmental as	ssessmen	t are o	calculated a	ssumin	g that 1 FTE eq	uals 1856 l	hours.		
1-6	our Costs		ial Costs		Other	Costs		Subtotal	Allowan	ce 25%		tal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	20	40			Prepared By: A. Khan
WBS (Old)	552	30	60	30				ii.
WBS Title	OTHER GOVERMENT A	APPROVALS	- FEDERAL					
Description	Obtain the federal new	ita aautifi		manuala /fua		other then the Coned	ion Nuclear Cafatu Cama	nission and approval under CEAA)
Description	3				_			nission and approval under CEAA) acility, these may include:
	Permits from Fig.	charias & O	coanc Cana	da to allow				
	the discharge of				•			
	<ul> <li>the removal of f</li> </ul>			.5 (5 1.51.)				
	- the construction	n of roadwa	ys near wat	ter bodies.				
	•	itural Resou	irces Canad	da to Store	Explosives (	during construction); a	llong with any other per	mits and approvals required for a
	given site.							
	<ol><li>Approval from T</li></ol>	ransport Ca	anada follo	wing an ass	essment of	impact on navigation,	emergency response, etc	2.
	4. Authorization fr	om Canadia	ın Transpor	t Agency.				
Deliverable	Dormits Cortificatos a	nd Annrous	le required	from fodor	al regulator	v agancies other than t	he Canadian Nuclear Saf	intu Commission
Deliverable	Permits, Certificates a	nu Approva	is required	irom leder	ai regulator	y agencies other than t	ne Canadian Nuclear Sai	ety Commission
Assumptions	The number and natur	re of the pe	rmits that r	nay be requ	uired may d	epend on the location	selected.	
	It is assumed that:							
	•	chnical info	rmation tha	at will be r	eauired to	obtain federal permits	. certificates or approva	als (from agencies other than the
	•				-	•		e applications. It is also assumed
	that this information v	vill be availa	able around	the same	time as the	application for the Site	Preparation and Constru	uction Licence.
	The environmer	ntal assessm	ent must h	e complete	ed before ar	ny federal permits, cert	ificates or approvals can	he issued.
	1			-			* *	or to the beginning of operations.
	1 Como pormito o	ortificator (	or approval	s may nood	to be rene	wad an a yearly basis		
	•			-		wed on a yearly basis.  - and submit application	ns and liaise with regula	tory agencies
	· ·			-			_	
	•	-			_	-	_	ast two years in which the EA and cted a larger effort will be needed
	•			_				f maintaining the Site Preparation
	and Construction Licer						aro io captar ca ao part o	aag ce e.ce : .epa.ac.e
		_					annlicable federal agenc	ties are as follows (note that CNSC
	staff will also interface				eu to mana	ge the haison with the	applicable rederal agenc	iles are as follows (flote that cluse
		Y14	Y15	Y16	]			
	Licensing Fees (\$k)	45	45	45				
	NWMO-1 (FTE)	0.1	0.1	0.1	4			
	NWMO-3 (FTE)	0.7	0.7	0.7	4			
	Travel (\$k)	1	1	1	<u>]</u>			
Schedule	Start Year			14	2023		Finish Year 15	2024
T	Fixed							
Туре	Fixed							
Calculations	Licensing fees are calc	ulated assu	ming that 1	FTE equals	1800 hour	s and is charged at an h	ourly rate of \$250. This	total is reported in thousands of
and Notes:	dollars;		J / -	- 4- 2		<b>5</b>	, , , ,	,
	NWMO-1 values repre	sent the FT	E effort red	uired by N	WMO mana	gement:		
	NWMO-3 values repre					-		
	:					•	otal is also reported in the	ousands of dollars.
		1				Γ	1	1
	bour Costs		al Costs		r Costs	Subtotal	Allowance 25%	Total Cost
\$	226,527	\$	-	\$	92,000	\$ 318,527	\$ 79,632	\$ 398,159

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	20	50				Prepared By:	A. Khan
WBS (Old)	552	30	60	40						
WBS Title	OTHER GO	VERNMENT	APPROVAL	S - PROVIN	ICIAL					
	Obtain the likely to in 1. Regi 2. Obt water wor Environme 3. Com 4. Regi Other perri	e provincial clude: istering the aining Certi ks (domest ent; aplying with istering as a mits (e.g.: p	permits, cer constructio ficates of A tic water, fi the MISA R Hazardous ermit to cut	n project w pproval for ire water) degulations Waste Ger t timber on	rapprovals to with the Mini ratmospher and waste of for liquid water areator with crown land.	the Ministry of the English patent for water lots	nal & construct aste, constructi vironment. , permission to	ion), liquid on waste dump fill v	effluents (sewa & soil) from th	age, waste water), ne Ministry of the
	to excavat	e or alter ar	n archaeolo	gical or hist	oric site, etc	c.) may be required on	a site specific b	asis.		
Deliverable	Permits, C	ertificates a	nd Approva	ls required	from provir	ncial regulatory agencie	es.			
·	It is assum (Ontario).  It is assum  1. Perr  2. The effluents a  3. The approvals  4. The	ned that the Provincial and that: mits, certificate Technical Sound wastes, environment for the constants.	ere will be authorities grates or app upport Doc no addition ental assess struction/op ciated with	no need to generally according to the generally according to the general must be retained the retained to the retained the retail ment must be retained to the retail ment must be retailed to the retail ment must be retailed to the retail ment must be retailed to the retail ment and the retail ment must be retailed to the retail ment and the ret	the Environmection or mo	ired may depend on the aseparate environme uclear facilities fall und from provincial agenci mental Assessment will odelling will be necessated before provincial eded to manage the lital agencies (WBS 560.	er the jurisdiction of the provide all of the provi	t under th on of the fo construction he require ncies will	ederal process.  on and operatio  d information o  issue any perm	n of the facility; n gaseous & liquid lits, certificates or
Schedule	Start Year			14	 4 2023		Finish Year	15	2024	
Juleuule	Stait iedi				+ 2023		i iiisii teal	13	2024	
Туре	Fixed									
Calculations and Notes:		••••••	•••••	•••••••••••••••••••••••••••••••••••••••	•••••••••••					
Labour (	Costs	Materi	ial Costs	Othe	er Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	-	\$ -	\$	-	\$	-

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	20	60				Prepared By: A. Khan
WBS (Old)	552	30	60	50					
WBS Title	•				IPAL/REGIOI				
Description	required w 1. Offic 2. Build along with	vill depend o cial Plan/Zor ding Permit; any other n	on the locati ning Variand ; nunicipal pe	ermits, app	d but are like	ely to include:	,	·	spermits or approvals that will be
Deliverable	Obtain the	permits and	d approvals	required fr	om municip	al authorities			
·	It is assum  1. Perr  2. The the inform	ed that: nits, certifica Technical Station requir	ates or appi upport Doci red to suppo	rovals will b ument for t ort applicat	ne required f the Environr tions for peri	rom municipality for b nental Assessment, the mits from the municipa	oth the constru PSAR and the lity.	ction and	which the facility will be located.  operation of the facility.  sign documents will provide all of issue any permits, certificates or
	4. Mur 5. The	costs assoc	ns will not b	e challenge and the re	ed before a p sources nee	provincial oversight booded to manage the lia al agencies (WBS 560.3	ison with the		icipal Board). provincial agencies have already
Schedule	Start Year			14	2023		Finish Year	15	2024
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$ -	\$		\$ -

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	30	10					Prepared By: A. Khan
WBS (Old)	552	30	60	30						
WBS Title	OTHER GOVERMEI	NT APPROV	ALS - FEDER	RAL						
Description										Commission and approval under lected for the facility, these may
	Permits from     the discharg									
	- the removal									
	<ul> <li>the construct</li> <li>License from</li> </ul>		-			s (during d	onstruction	): along with any	other pe	ermits and approvals required for
	a given site.				,	. ( 0		,, ,		and the same of the same
	3. Approval fro	om Transpor	rt Canada fo	ollowing an	assessment	of impact	on navigation	on, emergency re	sponse,	etc.
	4. Authorizatio	n from Can	adian Trans	sport Agenc	у.					
 Deliverable	Downsite Contificat	as and Anna	avala ragui	and from fo				an the Consider		Safat, Cammingian
Deliverable	Permits, Certificat	es and Appr	ovais requi	rea from le		tory agent	ies other th	an the Canadian i	vuciear .	Safety Commission
Assumptions	The number and n	ature of the	permits th	at may be r	equired ma	y depend (	on the locati	on selected.		
	It is assumed that:  1. Most of the		nformation	that will be	required to	obtain fe	deral permi	ts. certificates or	approva	als (from agencies other than the
	:						-			C license applications. It is also
	assumed that this	information	will be ava	ilable aroui	nd the same	time as th	e applicatio	n for the Site Pre	paration	and Construction Licence.
	2 The environ	tal acco			المعمط الممام	. anu fada	ol november	autificatos au anu		an ha issued
	I			-		•	•	certificates or app		ian be issued. ion or prior to the beginning of
	operations.	tu reuerar p	Jerrints, ce	itilicates of	approvais	will be or	itallieu as i	ieeded during co	nisti ucti	ion of phot to the beginning of
	4. Some permi			-						
		•		•				ations and liaise v	_	
	and licence applica	ation's supp first year o	orting doci	uments are ion licence	being revie (Y16). The e	wed (Y148 effort need	(Y15) (WBS ed in the su	560.30.40.20.40). bsequent years is	It is als	he last two years in which the EA o expected a larger effort will be ed as part of maintaining the Site
	7. The costs as CNSC staff will also					nanage the	liaison with	n the applicable f	ederal a	gencies are as follows (note that
		Y14	Y15	Y16	]					
	Licensing Fees									
	(\$k) NWMO-1 (FTE)	45 0.1	45 0.1	45 0.1	-					
	NWMO-3 (FTE)	0.7	0.7	0.7	1					
	Travel (\$k)	1	1	1						
Schedule	Start Year			16	2025			Finish Year	25	2034
Scriedule	Start rear			10	2023			FIIIISII TEGI	23	2034:
Туре	Fixed									
Calculations and Notes:	Licensing fees are of dollars;	calculated a	ssuming th	at 1 FTE eq	uals 1800 ho	ours and is	charged at	an hourly rate of	\$250. T	his total is reported in thousands
	NWMO-1 values re NWMO-3 values re Travel expenses ar	epresent the	e FTE effort	required by	y NWMO te	chnical sta	ff; and	is total is also rep	orted in	thousands of dollars.
	<u> </u>	1				1				
\$	our Costs 113,264	+	al Costs	Othe:	r Costs 46,000	\$ul	159,264		<b>25%</b> 39,816	<b>Total Cost</b> \$ 199,079
٧	113,204	۱۶	-	۱ ۶	40,000	Ą	133,204	1 4	22,010	£10,8ec

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	30	20				Prepared By: A. Khan
WBS (Old)	552	30	60	40					
WBS Title	OTHER GO	VERNMENT	APPROVAL	S - PROVIN	CIAL				
	likely to in:  1. Regi 2. Obt water wor Environme 3. Com 4. Regi Other perr	clude:  istering the claiming Certificks (domestient;  inplying with stering as a mits (e.g.: pe	construction ficates of Al tic water, fi the MISA R Hazardous ermit to cut	n project w pproval for re water) a egulations of Waste Gen timber on	ith the Mini atmospheri and waste of for liquid wa erator with crown land,	stry of Labour; ic emissions (operatic disposal (domestic w astes; and the Ministry of the Er	onal & construction aste, construction with the construction of the construction with the construction to construct the construction to construct the construction to construct the construction to construct the construction to construct the construction to construct the construction to construct the construction and the construction as the const	ion), liquid on waste dump fill v	e the facility (Y14 – Y25). These is I effluents (sewage, waste water), & soil) from the Ministry of the within a conservation area, permit
Deliverable	·					icial regulatory agenci			
	It is assun (Ontario). It is assum 1. Perr 2. The	ned that the Provincial a ed that: nits, certifica Technical Su	ere will be authorities grates or appi	no need to generally ac rovals will b ument for t	o conduct a cept that nu be required the	iclear facilities fall und	ental assessment der the jurisdiction ies for both the co	t under thon of the fo	ne Environmental Assessment Act ederal process.  on and operation of the facility;  d information on gaseous & liquid
	approvals <sup>-</sup> 4. The	for the cons	struction/op ciated with	eration of t and the re	the facility. sources nee	·	iaison with the a		issue any permits, certificates or provincial agencies have already
Schedule	Start Year			16	2025		Finish Year	25	2034
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materi	ial Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$		Ś							

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	30	30				Prepared By: A. Khan
WBS (Old)	552	30	60	50					
WBS Title	OTHER GO	VERNMENT	APPROVAL	S – MUNIC	IPAL/REGIOI	NAL			
Description	required w	vill depend o	on the locati	on selected	•	onstruct or operate thely to include:	e facility (Y14 –	Y25). The	e permits or approvals that will be
	2. Build along with	-	nunicipal pe	ermits, app		pections related to hig	rhways, roads, s	idewalks,	sewers, potable water, electricity,
Deliverable	Obtain the	permits and	d approvals	required fr	om municip	al authorities			
Assumptions	The numb	er and natur	e of the pe	rmits that r	nay be requ	ired will vary dependir	g on the munici	pality in v	which the facility will be located.
	It is assum 1. Perr		ates or appı	rovals will b	oe required t	from municipality for b	ooth the constru	ction and	operation of the facility.
	E					mental Assessment, th mits from the municipa		facility de	sign documents will provide all of
	•	environme for the cons			•	ted before provincial	regulatory ager	ncies will	issue any permits, certificates or
	5. The	costs assoc	ciated with	and the re	sources nee	provincial oversight bo eded to manage the li al agencies (WBS 560	aison with the		icipal Board). provincial agencies have already
Schedule	Start Year			16	2025		Finish Year	25	2034
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$ -	\$	-	\$ -

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	30	40	30	40				I	Prepared By: A. Khan
WBS Title	MAINTAIN CONS	TRUCTION I	ICENCE DU	JRING THE S	SITE PREPAR	ATION AND	CONSTRU	CTION OF THE UND	ERGRO	DUND DEMONSTRATION
	FACILITY (UDF)									
Description	the Underground  1. Preparing	d Demonstra	ation Facilit ing reports	ty (UDF). The to the CNS	nis includes: C according	to the sched	dule specif	ied in the licence;	(Y16 –	Y20) during the construction of
	3. Seeking ap	provals as r	equired by	the Licence	e; and	ed, in accord		the licence; supporting CNSC co	mpliar	nce inspections).
Deliverable	:		•	•				by the CNSC by sub age of the project.	omittin	g reports and seeking approvals
Assumptions	the licence).		ssue licenc	e which wil	l require CN	NSC approval	s before i	dentified stages of	work (	such as hold points identified in
	· ·				•	-		III not be required. nder the licence) of	the UD	PF will require 5 years.
	5. The licensi 6. The costs a	ng plan that associated v	t will be exe vith and th	ecuted for t e resources	he operatin needed to	g licence app support com	olication w opliance w	,	includ	g this time. ing technical support to address g plan are as follows:
		Y16	Y17	Y18	Y19	Y20				
	CNSC Licensing Fees (\$k)	990	405	405	405	990				
	NWMO-1 (FTE)	0.85	0.75	0.75	0.95	0.95				
	NWMO-3 (FTE)	2.75	2.25	2.25	3.45	3.45				
	Travel (\$k)	2	2	2	2	2				
Cob o dodo	Charle Value			1.0	2025			F:-:-b V		2020
Schedule	Start Year			16	2025			Finish Year	20	2029
Туре	Fixed									
Calculations and Notes:	thousands of dol	lars;		_	·			ged at an hourly ra	te of \$	250. This total is reported in
	NWMO-1 values NWMO-3 values Travel expenses a	represent t	he FTE effo	rt required	by NWMO	technical staf	ff; and	his total is also rep	orted i	n thousands of dollars.
Labo	ur Costs	Materi	al Costs	Other	Costs	Subto	otal		5%	Total Cost
\$	2,782,841	\$	-	\$	3,205,000	\$ 5	,987,841	\$ 1,496	5,960	\$ 7,484,801

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	30	50					Prepare	d By: A	. Khan
WBS (Old)		·	1		¢		J			4i		
			1			·····	ā					
WBS Title	MAINTAIN THE C	ONSTRUCTI	ON LICENC	E DURING T	HE CONSTR	UCTION OF	THE DEEP G	EOLOGICAL	REPOSITOR	Y (DGR) (	COMPONI	ENTS
Description	Maintain the Site	Preparation	n & Constru	ıction Licen	ce from the	Canadian N	Nuclear Safet	y Commissi	on (Y21 – Y	25) durin	g the cons	struction of th
•	Deep Geological I							•	•	,	5	
	Preparing a	nd cubmitti	na roports	to the CNS	according t	to the scho	dule specifie	d in the lice	200			
	: -				_		dance with th		ice,			
	•	provals as re	_	-	-	u, iii accord	adiice with ti	ie licerice,				
				-		licence (also	o includes su	nnorting CN	ISC complia	nce insne	ections)	
	т. заррогинд	CIVOC Starr		aring the co	4136 01 1116 1	incerice (ais		pporting or		nee mape		
Deliverable	Maintain the Clas		•	•				•	by submitti	ng report	ts and see	eking approva
	as required. Prep	aration of t	he Final Sat	lety Analysi	s Report will	l also occur	during this s	tage.				
	It is seen and the											
Assumptions	It is assumed that		saua liaa	النبر وامتطييره	roquiro CNI	CC 22225:	la bafara :-l	natified sta-	os of weet	lauch ca	ساءم امامط	to identifical
	:	ISSION WIII IS	ssue ilcence	e wnich will	require CN	sc approva	ais before ide	entinea stag	es of work	(such as	noia poir	nts identified
	the licence).  2. The licence	will he valid	d for the en	ntire constri	iction nerio	d· licence re	enewals will	not he requi	ired			
	•									that all t	he requir	ed information
	has been provide				•		•	•				
	the UDF activities		JC. IL IS dIS	o iikely tildi	. a round of	CINSC CUIIII	menta Will He	ive to be du	uresseu iei	ateu to ti	ne resuits	obtained if O
	<ol><li>The assessi</li></ol>	ments need	ed for the I	FSAR and to	sunnort the	e onerating	· licanca ann	lication will	alco ha con	h hotolar	uring this	time (coe M/E
			ca for the i	JAN and to	Support till	c operating	licence app	ilcation will	aiso be con	ipieteu u	uring tins	tille (see wi
	560.30.30.30.10).		cu for the f	JAN and to	зарроге	c operating	g licerice app	ilcation will	aiso de con	ipieteu u	aring tins	time (see wi
												oort to addres
		ıssociated w	vith and the	e resources	needed to s	support cor	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a	ıssociated w	vith and the	e resources	needed to s	support cor	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to	ıssociated w	vith and the	e resources	needed to s	support cor	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to	ssociated w designs, pla	vith and the	e resources ocedures), s	needed to s	support cor C approvals	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to are as follows:	essociated w designs, pla	vith and the	e resources ocedures), s	needed to seeking CNSC	support cor C approvals Y25	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)	essociated widesigns, pla	rith and the ins and pro	e resources ocedures), s Y23	needed to seeking CNSC	support cor C approvals Y25	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)	y21 990 0.85	vith and the ins and pro	Y23 405 0.75	needed to seeking CNSC  Y24  405  0.95	support cor C approvals Y25 990 0.95	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)	y21 990 0.85 2.75	405 0.75 2.25	Y23 405 0.75 2.25	reeded to seeking CNSC  Y24  405  0.95  3.45	y25  990 0.95 3.45	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)	y21 990 0.85	vith and the ins and pro	Y23 405 0.75	needed to seeking CNSC  Y24  405  0.95	support cor C approvals Y25 990 0.95	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  Travel (\$k)	y21 990 0.85 2.75	405 0.75 2.25	e resources preduces, s  Y23  405  0.75  2.25  2	needed to seeking CNSC  Y24  405  0.95  3.45  2	y25  990 0.95 3.45	mpliance wit	h the licences to comme	e (not inclu	ding tech	nical supp	port to addres
Schedule	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)	y21 990 0.85 2.75	405 0.75 2.25	Y23 405 0.75 2.25	needed to seeking CNSC  Y24  405  0.95  3.45  2	y25  990 0.95 3.45	mpliance wit	h the licenc	e (not inclu	ding tech	nical sup	port to addres
Schedule	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  Travel (\$k)	y21 990 0.85 2.75	405 0.75 2.25	e resources preduces, s  Y23  405  0.75  2.25  2	needed to seeking CNSC  Y24  405  0.95  3.45  2	y25  990 0.95 3.45	mpliance wit	h the licences to comme	e (not inclu	ding tech	nical supp	port to addres
Туре	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year	990 0.85 2.75	405 0.75 2.25 2	e resources ocedures), s  Y23  405  0.75  2.25  2	needed to seeking CNSC  Y24  405  0.95  3.45  2	y25  990 0.95 3.45 2	mpliance wit	h the licence to comme	e (not inclu nts, and ob	ding tech taining a	nical supp ssessmen	oort to addrests for the FSA
Type Calculations	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing fees	y21 990 0.85 2.75 2	405 0.75 2.25 2	e resources ocedures), s  Y23  405  0.75  2.25  2	needed to seeking CNSC  Y24  405  0.95  3.45  2	y25  990 0.95 3.45 2	mpliance wit	h the licence to comme	e (not inclu nts, and ob	ding tech taining a	nical supp ssessmen	port to addres
Туре	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing feethousands of doll	y21 990 0.85 2.75 2 es are calculars;	405 0.75 2.25 2	405 0.75 2.25 2	needed to seeking CNSC  Y24  405  0.95  3.45  2  2030  TEE equals 1	y25  990 0.95 3.45 2	mpliance wit	h the licence to comme	e (not inclu nts, and ob	ding tech taining a	nical supp ssessmen	oort to addrests for the FSA
Type Calculations	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing fees	y21 990 0.85 2.75 2 es are calculars;	405 0.75 2.25 2	405 0.75 2.25 2	needed to seeking CNSC  Y24  405  0.95  3.45  2  2030  TEE equals 1	y25  990 0.95 3.45 2	mpliance wit	h the licence to comme	e (not inclu nts, and ob	ding tech taining a	nical supp ssessmen	oort to addrests for the FSA
Type Calculations	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing feethousands of doll	y21 990 0.85 2.75 2  es are calculars; represent th	405 0.75 2.25 2 ated assun	Y23 405 0.75 2.25 2  ining that 1 littrequired littrequired littre	reeded to seeking CNSC  Y24  405  0.95  3.45  2  2030  TEE equals 1	y25  990 0.95 3.45 2  800 hours a	mpliance wit s, responding	h the licence to comme	e (not inclu nts, and ob	ding tech taining a	nical supp ssessmen	oort to addrests for the FSA
Type Calculations	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing feethousands of doll NWMO-1 values in NWMO-3 values in Travel expenses a	y21 990 0.85 2.75 2  ses are calculars; represent the represent the recalculate.	405 0.75 2.25 2 ated assuming FTE efford assuming	405 0.75 2.25 2  trequired by trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by the trequired	reeded to seeking CNSC  Y24  405  0.95  3.45  2  2030  TEE equals 1  Toy NWMO may NWMO to son-trip to Co	y25  990 0.95 3.45 2  800 hours a	mpliance wit s, responding	h the licence to comme Finish Year d at an hou	e (not incluints, and ob	ding tech taining a: 20 250. This	nical supposessessmen  34  s total is r	eported in
Type Calculations	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing feethousands of doll NWMO-1 values in NWMO-3 values in Travel expenses a	y21 990 0.85 2.75 2  ses are calculars; represent the represent the recalculate.	405 0.75 2.25 2 ated assuming FTE efford assuming	405 0.75 2.25 2  trequired by trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by that 1 persons a constraint and the trequired by the trequired	reeded to seeking CNSC  Y24  405  0.95  3.45  2  2030  TEE equals 1  Toy NWMO may NWMO to son-trip to Co	y25  990 0.95 3.45 2  800 hours a	mpliance wit s, responding	h the licence to comme Finish Year d at an hou	e (not incluints, and ob	ding tech taining a: 20 250. This	nical supposessessmen  34  s total is r	eported in
Type Calculations and Notes:	5. The costs a issues related to are as follows:  CNSC Licensing Fees (\$k)  NWMO-1 (FTE)  NWMO-3 (FTE)  Travel (\$k)  Start Year  Fixed  CNSC licensing feethousands of doll NWMO-1 values in NWMO-3 values in Travel expenses a	y21  990 0.85 2.75 2  es are calculars; represent the represent the recalculate	405 0.75 2.25 2 ated assuming FTE efford assuming	405 0.75 2.25 2 ining that 1 litrequired l	reeded to seeking CNSC  Y24  405  0.95  3.45  2  2030  TEE equals 1  Toy NWMO may NWMO to son-trip to Co	support cor C approvals  Y25  990  0.95  3.45  2  800 hours a	mpliance wit s, responding	h the licence to comme Finish Year d at an hou	e (not incluints, and ob	ding tech taining a: 20 250. This	nical supposessessmen  34  s total is r	eported in

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#### **Work Element Definition Sheet**

WBS (New)	560	30	40	30	60					Prepared By: A. Khan
WBS (Old)	552	30	65							
14/DC T'11	DEDATING LICE	NOT (CNICO)	A DDI 10 A TI							
WBS Title O	PERATING LICE	NCE (CNSC)	APPLICATION	ON						
· · · · · · · · · · · · · · · · · · ·	pply for an Op	•		the Canadi	an Nuclear	Safety Com	mission (Y	/21 – Y23) by	implement	ing the licensing plan (see WBS
1	•			nce applicat	ion that inc	cludes all of	the inforn	nation require	d under th	e Nuclear Safety and Control Act
	nd its associated		_	ос арриса				nacion regaire	a anaci in	e madical barety and bent erries
2	. Confirming	g that safety	y criteria us	ed in the de	esign and sa	fety assessn	nents have	e been met.		
<b>Deliverable</b> C	lass I Nuclear Fa	icility Opera	ating Licenc	е Аррисати	on Package	and Support	ing Docun	nents		
Assumptions It	is assumed tha	t:								
1	. No amer	ndments o	r additions	s to the E	Environmen	tal Assessm	ent subn	nitted in con	junction w	vith the application for a Site
	reparation/Con			•						
2					-			identified stag		re, NWMO-PROC-RG-0002 which
<u> </u>	ncludes such ite		-	ii contain a	t a minimu	ii tile listilig	presented	i iii tile litelisii	ng procedu	re, NWWWO-PROC-RG-0002 WINCH
-				FSAR) that	includes fir	nal safety as	sessments	s (see WBS 56	0.30.30.30	.10) and represents the detailed
d	esign (see WBS									
-		Policies and	-		A					
_		tions for Ka tions for Hu		tection and	ALAKA;					
_				•	and Installa	ation;				
-				Robustness;		,				
-	Considerat	tions for Sat	feguards;							
-		-		laintain the	-					
-		_	-	_	ent Structur	·e;				
				Safety Prog	ram; of all pre-red	nuisites:				
-			_	-	90.70.30.10	-				
-	A Commiss	sioning Prog	gram; and							
-	-		_			_		for Financial G		
4										e the application and supporting
u	ocuments (not i	including til	ne required	a by engine	ering/techn	icai staii ioi	their inpu	it into the subi	ilissioris) ai	e as follows:
		Y21	Y22	Y23						
	NSC Licensing ees (\$k)	405	405	405						
N	IWMO-1 (FTE)	0.7	0.5	0.5						
N	IWMO-3 (FTE)	2	1.75	1.75						
T	ravel (\$k)	5	5	5	]					
					=					
<b>Schedule</b> S	tart Year			21	2030			Finish Year	23	2032
Jeneuale 3	tait ieai				2030			i iiiisii i eai	23	2032;
<b>Type</b> Fi	ixed									
<b>1</b>	•		ulated assu	ming that 1	FTE equals	1800 hours	and is cha	rged at an hou	irly rate of	\$250. This total is reported in
	nousands of dol IWMO-1 values		ho ETE offo	rt roquirod	by NIM/NAO	managaman	+.			
•	IWMO-3 values	•		•	•	_				
<u> </u>		•		•	•			This total is als	o reported	in thousands of dollars.
					F					
				1		Ī		1		
Labour			al Costs		Costs	Subt		Allowance	25%	Total Cost
\$	1,092,307	\$	-	\$	1,230,000	\$ 2	2,322,307	\$	580,577	\$ 2,902,884

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## **Work Element Definition Sheet**

WBS (Old)				30	70		i			Prepared By: A. Khan
WBS Title L	ICENSING	REVIEW INC	CLUDING PI	UBLIC HEAR	ING					
		quired supp	ort during	the applica	ation reviev	v process a	nd attend I	Hearings need	led to obta	ain the licence (Y24 – Y25). This
ir	ncludes:									
1	L. Ansv	vering CNSC	questions	(as required	d);					
2	2. Prov	iding supple	ementary ir	nformation a	as per a sch	edule and/c	r as require	d;		
3	3. Prep	aring inforn	nation need	ded for the I	Public Heari	ng; and				
4	l. Atte	nding and p	articipating	g in Public H	earings bef	ore the CNS	C prior to ir	itial licence a	nd possibly	prior to any licence modifications
o	or stages id	lentified by	the CNSC (	e.g.: beginn	ing of active	e commissio	ning).			
<b>Deliverable</b> C	Class I Nucl	ear Facility	Operating	Licence issu	ed by the C	NSC				
Assumptions It	t is assume	ed that:								
1	L. The	Commission	on will iss	sue a licen	ce which	may requir	e CNSC ap	provals befo	re identifi	ed stages of work (e.g., active
С	commissio	ning).								
2	2. Subn	nissions in s	support of t	he licence a	pplication h	nave been n	nade (see W	BS 560.30.40.	30.60).	
3	3. The	Environme	ntal Assess	ment comp	oleted for t	he Site Pre	paration ar	d Construction	n Licence	also covers the operation of the
fa	acility.									
4	I. The	costs associ	iated with a	and the reso	ources need	led to supp	ort CNSC sta	aff's review of	the applic	ation (not including time required
b								earing are as f		( ) , ) , , , , , , , , , , , , , , , ,
<u> </u>	, 0	<i>-</i>	· ·	1	•			Ü		
		Y24	Y25							
C	CNSC	990	990							
Ν	NWMO-1	0.7	0.7							
N	WMO-3	2	2	1						
T	ravel	5	5	1						
	'			_						
<b>Schedule</b> S	Start Year			24	2033			Finish Year	25	2034
<b>Type</b> F	ixed									
<b>Calculations</b> C	CNSC licens	sing fees are	e calculated	d assuming t	hat 1 FTE e	quals 1800	nours and is	charged at ar	n hourly rat	e of \$250. This total is reported
and Notes: ir	n thousand	ds of dollars	5;							
٨	NWMO-1 v	alues repre	sent the FT	E effort req	uired by NV	VMO manag	gement;			
٨	NWMO-3 v	alues repre	sent the FT	E effort req	uired by NV	VMO techni	cal staff; an	d		
Т	ravel expe	enses are ca	Iculated as	suming that	1 person-ti	rip to Ottaw	a costs \$10	00. This total	is also repo	orted in thousands of dollars.
	•			-	•				•	
Labour Co	sts	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost
Ś	830,626	\$	-	\$	1,990,000	Ś	2,820,626	Ś	705,157	

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#### **Work Element Definition Sheet**

				Wo	rk Element	Definition S	heet			
WBS (New)	560	30	40	40	10	<u> </u>				Prepared By: A. Khan
WBS (Old)	552	30	70	10						N
WBS Title	MAINTAIN OPS LICE	NCE DURIN	IG ODERATIO	NIS/ADDI V	TO BENEW	LICENCE				
wbs fille	WAINTAIN OF 3 LICE	INCE DOKIN	IG OF ERATIO	JN3/AFFLT	TO KEINEW	LICENCE				
-	Preparing and     Preparing and     Preparing and	d submitting d submitting d submitting	g reports ac g unschedul g an applica	cording to t ed reports, tion for ren	the schedule if required, ewal of the	prescribed in accordan	by the Ope	erating Licence	≘;	– Y55). This includes: ation required under the Nuclear
i	Safety and Control A. Supporting C			-		increations	during the	course of the	liconco	
	4. Supporting C	INCO Stail CO	inpliance at	LIVILIES AS V	VEII d3 IALA	mspections	during the	course or the	mence.	
Deliverable	Maintain Class I Fac	ility Operat	ing Licence	issued by th	ne CNSC dur	ing operation	n and subn	nit licence ren	ewal applic	ations
Assumptions	It is assumed that: 1. The Operatir year 26 (Y26 – Y55)		vill be issue	d for 5-yea	r terms con	tinuing unti	the end of	f the Operation	ons phase (3	0 years of operation beginning in
									te active co	mmissioning of the facility.
	The terms of     No amendm Licence will be requ	ents or add	ditions to t	he Environi	mental Asse	essment sul	mitted in	conjunction \	with the ini	tial application for the Operating
		t the applic	cation for re	enewal of t	he Operati	ng Licence,				for the Operating License will be d under WBS 560.30.30.40.10) in
	6. A midterm r Y48, and Y53.	eport will b	e made to t	the Commis	ssion at abo	ut the mid-	point to ev	ery licence te	rm starting	with Y28 and then Y33, Y38, Y43,
	7. A licence rer will be compiled in			-			-			14, and Y49. The application that
	8. Licence rene 0002. The main sub				minimum	the informa	tion identii	fied in the N\	WMO licens	ing procedure, NWMO-PROC-RG-
	<ul> <li>Updated proj</li> <li>Final Safety R</li> <li>Operating Po</li> </ul>	Report; and								
		nts for tran	sportation							ser certificate renewals as well as re captured in the transportation
	:	ents (not inc	cluding time	e required	by enginee	ring/technic				ations for licence renewals with missions and/or for resolving any
		Y26		Repeat ev	very 5 years	starting wi Y51	th Y27 and	ending with		
	CNSC Licensing Fees (\$k)	900		450	450	900	450	450		
	NWMO-1 (FTE)	0.95		0.75	0.75	0.75	0.25	0.75		
	NWMO-3 (FTE) Travel (\$k)	3.5 2		2.5	2.5	2.5	2.5	2.5	-	
	11. The costs as	ssociated wents (not inc	cluding time	e resources e required	needed to	manage tring/technic	ne licensin	g and to pre		ations for licence renewals with missions and/or for resolving any
Í	·	Y52	Y53	Y54	Y55	ī				
	CNSC Licensing		1.33			t				
	Fees (\$k)	450	450	900	450	1				
	NWMO-1 (FTE)	0.75	0.75	0.75	0.25	Į				
	NWMO-3 (FTE) Travel (\$k)	2.5	2.5	2.5	2.5	ł				
	Traver (\$K)	2	2	2	2	1				
Schedule	Start Vaar			26	2025			Einich Voor		2064:
Jenedule	Start Year			26	2035			Finish Year	55	2064
Туре	Fixed									
Calculations and Notes:	CNSC licensing fees thousands of dollar		ted assumin	g that 1 FTE	equals 180	00 hours and	is charged	at an hourly	rate of \$250	. This total is reported in
	NWMO-1 values re NWMO-3 values re Travel expenses are	present the present the	FTE effort r	equired by	NWMO tecl	nnical staff;		total is also re	ported in th	ousands of dollars.
			5	•						
Lab	our Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
		1 -						1 2		

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16,710,000 \$

30,964,569 \$

7,741,142 \$

38,705,712

14,254,569 \$

## **Work Element Definition Sheet**

WBS (New)	560	30	40	40	20					Prepared By: A. Khan
WBS (Old)				<u> </u>						
	LIGENCING DEVIENT			DING						
WBS Title	LICENSING REVIEW II	NCLUDING I	OBLIC HEA	RING						
Description	Provide required sup	port during	the applica	tion review	process an	d attend Hearin	igs need	ed to obtain th	e licence (	Y30 – Y55). This includes:
		,					.00		(	
	1. Answering CNS	SC question:	s (as require	ed);						
	2. Providing supp	lementary i	nformation	as per a sch	nedule and,	or as required;				
	<ol><li>Preparing info</li></ol>	rmation nee	eded for Pul	blic Hearing;	; and					
	<ol><li>Attending and</li></ol>	participatin	ng in Public	Hearings be	fore the CN	NSC prior to init	ial licend	ce and possibly	prior to a	ny licence modifications or stages
	identified by the CNS	C (e.g.: beg	inning of co	mmissionin	g).					
Deliverable	Class I Nuclear Facilit	y Operating	Licence iss	ued by the (	CNSC.					
A	It is assumed that									
Assumptions	It is assumed that:  1. The licence ter	m will he E	vears and +	hat the licer	nce will noo	d to be renewo	d in 5-va	ar intervals h	oginning o	n Y30 and then Y35, Y40, Y45, and
	Y50. The licence ren		•				•	-		
			•	•	•				_	, stage.
	3					been made (see				Danielatani Affaina
	3. All activities w	ili be identif	ied and exe	ecuted as de	scribed in a	supporting nea	aring pia	n that is prepa	rea by the	Regulatory Affairs group.
	4. The costs ass	ociated wit	h and the	resources n	eeded to	sunnort CNSC s	staff's re	view of the a	nnlication	(not including time required by
										five-year cycle as follows:
	engineering/ teerinie	ii staii, as w	cii as to pi	cpare for an	a attena tn	e i abile i learini	6 WIII OC	cai over timee	ycurs on a	Tive year cycle as follows.
					_					
		Y29	Y30	Y31						
		Y34	Y35	Y36						
		Y39	Y40	Y41						
		Y44	Y45	Y46						
		Y49	Y50	Y51						
		Y54	Y55							
	CNSC Licensing Fees									
	(\$k)	900	900	450						
	NWMO-1 (FTE)	0.2	0.7	0.2						
	NWMO-3 (FTE)	1	1	1						
	Travel (\$k)	4	4	2	<b>.</b>					
Schedule	Start Year			29	2038			Finish Year	55	2064
				.k			ē			
Туре	Fixed									
Calculations	:		d assuming	that 1 FTE	equals 1800	) hours and is cl	harged a	t an hourly rat	e of \$250.	This total is reported in
and Notes:	thousands of dollars;									
	NWMO-1 values repr	resent the F	TF effort re	auired by N	WMO man	agement.				
	NWMO-3 values repr					•				
	Travel expenses are			-			. This to	tal is also repo	rted in the	ousands of dollars.
	have Casts	Na-+- *	al Cast-	041-	Casts	Clu.		Alle	350/	Tatal Cost
	bour Costs		al Costs	1	Costs	Subtota		Allowance	25%	Total Cost
\$	3,629,771	\$		\$ 1	3,108,000	/,16 د	37,771	\$ 4	,184,443	\$ 20,922,214

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	50	10				Prepared By: A. Khan
WBS (Old)	552	30	70	20		) : : :			
WBS Title	MAINTAIN/RENEW	OPS LICEN	CE DURING	EXTENDED	MONITORII	NG			
Description	Renew and mainta	in the Class	I Facility O	perating Lice	ense issued	by the Can	adian Nucle	ar Safety Commission (Y5	6 – Y125). This includes:
	•			_		-		erating Licence;	
	<ol> <li>Preparing ar</li> <li>Preparing a</li> </ol>		-		-				information required under the
	Nuclear Safety and					-	ting Licence	that includes all of the	illioillation required under the
				_			ns) during th	ne course of the licence.	
							,		
Deliverable	Maintain Class I Fa	cility Opera	ting Licence	e issued by t	he CNSC dι	iring extend	ed monitor	ing and submit licence re	newal applications
Assumptions	It is assumed that:								
Assumptions	1. During the ε	extended mo ued. Regula	tory Affairs	activities ar	e assumed	to be simila			s may be required or an extended t form the licensing basis will have
	2. The applicatimeframe (see W			e renewal to	operate d	uring the ex	tended mo	nitoring stage is expected	d to be submitted around the Y54
	1					-		e-year intervals, either to xpected to be in Y55 (see	report to the Commission or to WBS 560.30.40.40.20).
	<u> </u>	nents or ad		•			•	ts, as required by the CN: conjunction with the ini	SC. tial application for the Operating
	6. No amendn					-		* *	perating Licence will be required,
	•	o these doc							rocedure, NWMO-PROC-RG-0002. t need to be renewed. The main
	<ul><li>Updated pro</li><li>Final Safety</li></ul>	Report; and							
	- Operating P		-						
	:					•	•		documents throughout the course
	issues that may ar		_	-		_		•	missions and/or for resolving any
		Repeat e	every 5 yea	rs starting v	vith Y56 an	d ending			
				with Y124		r			
	CNSC Licensing Fees (\$k)	250	250	250	250	450			
	NWMO-1 (FTE)	250 1	250 1	250 1	250 1	450 1			
	NWMO-3 (FTE)	1	1	1	1	1			
	Travel (\$k)	_	_	_	=	2			
Schedule	Start Year			56	2065			Finish Year 125	2134
Туре	Fixed								
Calculations and Notes:	CNSC licensing fee thousands of dolla		ted assum	ing that 1 FT	E equals 18	00 hours ar	nd is charge	d at an hourly rate of \$25	0. This total is reported in
	NWMO-1 values re	•				•			
	NWMO-3 values re	•					-		uhannan da af dalla o
					-	•		total is also reported in t	
	our Costs		al Costs		Costs		total	Allowance 25%	Total Cost
\$	24,607,506	Ş	-	\$ 2	20,328,000	\$ 4	14,935,506	\$ 11,233,877	\$ 56,169,383

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	50	20					Prepared By: A. Khan
WBS (Old)	552	30	75	č	<u> </u>					ii
WBS Title	DECOMMISSIONIN	3 LICENCE (	CNSC) APPL	ICATION						
Description		preparing	and submit	ting a licen	ce application					g and implementing the licensing f the information required under
Deliverable	Class I Nuclear Faci	ity Decomn	nissioning Li	cence Appl	ication and	Supporting	Documents			
Assumptions	The Commiss     An Environm process, from notic period. It is also e review and the hea	nental Assest te of intent expected that ring in Y124	sment will to issue of l at the bulk -Y125 (see	be required licence, will of the licer WBS 560.30	d before the require 5 years nce application. 1.40.50.30).	CNSC carears and to	ne work will es will occur	begin 5 years during the ye	prior to the ears of Y12	40.50.40). It is expected that this e end of the Extended Monitoring 12-Y123 followed by the licensing tapplies to decommissioning.
	3. The topics exwill include such ite	-	e covered a	as part of t	ne licence a <sub>l</sub>	plication,	many of whi	ich will be cap	tured in de	tailed decommissioning planning,
	- Consideratio - Consideratio - Consideratio - Consideratio - Description o - Description o - A Complianc - A Quality Ass 4. The licensing	ns for Humans for Fire Pons for Secur of the Organ of the Conve of Matrix; an urance Prog	in Factors; rotection; ity and Safe izational M ntional Safe d gram (see W om filling th	guards; anagement ety Progran /BS 560.90. e project de	Structure; n; 70.50.10). escription ar					expected to require 5 years;
	5. The costs a documents (not inc						_	•		
	:						_	•		
	CNSC Licensing Fees (\$k) NWMO-1 (FTE)	122 450 0.5	123 450 0.5				_	•		
Schedule	CNSC Licensing Fees (\$k) NWMO-1 (FTE)	122 450 0.5	123 450 0.5		ng/technical		neir input int	•		e the application and supporting follows:  2132
Schedule	CNSC Licensing Fees (\$k) NWMO-1 (FTE) NWMO-3 (FTE) Travel (\$k)	122 450 0.5	123 450 0.5	, engineerir	ng/technical		neir input int	o the submissi	ons) are as	follows:
	CNSC Licensing Fees (\$k) NWMO-1 (FTE) Travel (\$k)  Start Year  Fixed  CNSC licensing fees thousands of dollar NWMO-1 values re NWMO-3 values re	450 0.5 1 5 are calculates; present the present the	450 0.5 1 5 ted assumin	122 g that 1 FT equired by equired by	2131 E equals 180 NWMO mai	o hours a	neir input into	o the submissi Finish Year at an hourly r	123 ate of \$250	2132
Type Calculations and Notes:	CNSC Licensing Fees (\$k) NWMO-1 (FTE) Travel (\$k)  Start Year  Fixed  CNSC licensing fees thousands of dollar NWMO-1 values re	450 0.5 1 5 are calculates;	450 0.5 1 5 ted assumin	g that 1 FT equired by equired by at 1 perso	2131 E equals 180 NWMO mai	0 hours an agement inical staff	neir input into	o the submissi Finish Year at an hourly r	123 ate of \$250	2132

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	50	30				Prepared By:	A. Khan
WBS (Old)										
WBS Title	LICENSING REVIEW IN	ICLUDING P	UBLIC HEA	RING						
Description	Provide required supp	port during	the applica	tion review	process an	d attend Hearings need	ded to obtain t	the licence	(Y124 – Y125).	This includes:
	Answering CNS	C questions	(as require	ed);						
	2. Providing suppl	lementary ii	nformation	as per a scl	nedule and,	or as required;				
	<ol><li>Preparing infor</li></ol>				•					
	4. Attending and p	participatin	g in Public	Hearings be	fore the CN	SC prior to initial licen	ce.			
Deliverable	Class I Nuclear Facility	y Decommis	sioning Lic	ence issued	by the CNS	С				
Assumptions	<ol> <li>The Environme</li> <li>All activities wil</li> <li>The costs asso</li> </ol>	ntal Assessr II be identifi ociated with	ment for the	e Decommi ecuted as de resources n	ssioning of scribed in a	made (see WBS 560.30 the facility has been co supporting hearing pl upport CNSC staff's re e Public Hearing are as	empleted (see an that is prep	pared by the	Regulatory A	
		Y124	Y125	1						
	CNSC Licensing Fees									
	(\$k)	900	900							
	NWMO-1 (FTE)	0.5	0.5							
	NWMO-3 (FTE) Travel (\$k)	10	2							
	rraver (\$K)	10	2	<u></u>						
Schedule	Start Year			124	2133		Finish Year	125	2134	
Туре	Fixed									
Calculations and Notes:	CNSC licensing fees ar thousands of dollars;				•		at an hourly ra	ate of \$250.	This total is r	eported in
	NWMO-1 values repr					•				
	NWMO-3 values repr					·	otal is also ror	ortod in th	ousands of do	llars
	iravei expenses are c	aiculated as	suming th	at i person-	trip to Otta	wa costs \$1000. This t	otai is also rep	oortea in th	ousands of do	lidi S.
La	bour Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	To	tal Cost
Ś	481,719	\$	-	\$	1,812,000	\$ 2,293,719	\$	573,430	\$	2,867,149

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#### **Work Element Definition Sheet**

	,	•		,	,					<u>,                                      </u>
WBS (New)	560 553	30 FF	40	50	40	ļ				Prepared By: A. Khan
WBS (Old)	552	55	30		İ	<u> </u>				
WBS Title	EA FOR CNSC DECOMMISS	IONING LICI	ENCE							
							. 5			
Description	prepare and submit the prepared by the Responsib Liaising with the Res Conducting a public Performing any field Collecting and analy Preparing the Enviro	ole Authority  ponsible Au  involvemen  I work that r  zing the dat	y. This inclust thorities; it process; might be re a; and	udes: equired;				nts required t	o support	t the Environmental Assessment
Deliverable	Environmental Impact Stat prepared by the Responsib			cal Support	Document	s for the En	vironmenta	al Assessment (	the Enviro	nmental Assessment itself will be
Assumptions	It is assumed that:  1. Provincial authoritie  2. The Responsible Aut									ment to a Review Panel.
	3. The scope of the EA 4. The Regulatory Aut Documents to the propone	hority will I				-	_		the prep	aration of the Technical Support
	<ol><li>Preparations will be require 2 years to complet</li></ol>	-					_			assessment hearing process will 80).
	the project will be availabl under other work element	le, suitable a s (WBS 560 ats for work	and sufficie 30.20 serie ers, membe	ent for the E es of WEDs)	invironmen	tal Assessm	ent; all cos	sts associated v	vith collec	data collected over the lifetime of ting this data have been included sessment Report will be available
	•	ed to suppo	rt an Appli	ication for a	Licence to	Abandon.	However t	here would be		no revision of the Environmental reports to EA that would provide
		A Scoping Do cisions relationmental Ir nvironment onmental Imental Impac assessment ontract con ng the data	ocument (E ed to the E npact State al Impact S npact State t Statemen process wil sultants to , and prepa	A Guideline ement Guide statement; and at which included in require a superform the aring the Te	s; elines; udes public support Ma e technical echnical Su	nager and f studies and	ull-time Ted prepare th	e Technical Su	port Doc	uments. vill be performed by a team of a
	Project Manager & 4 Senio					5				A LUL CNICCU
	process (covered by WBS 5	60.30.40.50	0.30).							A process and the CNSC licensing
	<ol><li>The costs associated</li></ol>						ental asse	ssment are as f	ollows:	
		Y121	Y122	Y123	Y124	Y125				
	CNSC Licensing Fees (\$k)	450	450	450	900	900				
	NWMO-1 (FTE)	0.5	0.5	0.5	0.5	0.5				
	NWMO-3 (FTE)	1	1	1	1	1				
	Travel (\$k) Purchased Services (\$k)	2 1782	2 1782	2 1782	2 1782	2 1782				
		1,02	1,02	1/02	1/02	1/02	l			
Schedule	Start Year			121	2130			Finish Year	125	2134
-	Fixed									
туре										
Type Calculations and Notes:		culated assi	uming that	1 FTE equal	s 1800 hou	rs and is ch	arged at an	hourly rate of	\$250. Thi	s total is reported in thousands of
Calculations	CNSC licensing fees are cal dollars; NWMO-1 values represent NWMO-3 values represent	the FTE eff	ort require ort require	d by NWM0	O managem O technical	ent; staff; and		·		·
Calculations and Notes:	CNSC licensing fees are cal dollars; NWMO-1 values represent	the FTE eff the FTE eff ated assumi	ort require ort require	d by NWM0 d by NWM0 erson-trip t	O managem O technical	ent; staff; and osts \$1000.		·		·

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	60	10				Prepared By: A. Khan
WBS (Old)	552	30	80						
WBS Title	LICENCE TO ABAN	NDON (CNS	C) APPLICAT	ΓΙΟΝ					
Description	Apply for a Dec	ommissionii	ng Licence	from the	Canadian N	uclear Safe	ty Commis	ssion (Y148 –Y149) by 1	preparing and implementing the
Description	1		_				•	. , , ,	at include all of the information
	required under N				_		ion and s	apporting accuments th	at melade an or the information
	required under it								
Deliverable	Class I Facility Lic	ence to Aba	ındon Appli	cation and	Supporting	Documents			
				·····					
Assumptions	'Abandonment' r	efers to the	cessation	of all license	ed activities	on the site i	ather thar	the termination of own	ership or control of the site.
	It is assumed that	t:							ļ
	1. The Enviro	nmental Ass	sessment p	repared pri	or to decom	missioning	will satisfa	ctorily address all issues	related to abandonment.
								,	
	<ol><li>The Regulation</li><li>many of which w</li></ol>							pics that need to be add	ressed in the licence application,
	- The results	of the deco	nmmissioni	ng. and					
	8	of the envi		•	nrograms				
	•			_		hy the Regu	latory Affa	airs group as outlined in t	he licensing plan during Y149.
	5. Freparation	ii oi tile lice	псе аррпса	ition will be	completed	by the Nego	iatory Arra	ins group as outililed in t	The licensing plan during 1143.
	•						_	abandonment.	
	1		-	-					trol, safeguards, and transfer of
	information/reco	rds) but it v	vill not invo	lve active r	egulatory ov	versight or c	ontinuing I	liaison with regulators.	
								g process and to prepar into the submissions) ar	e the application and supporting e as follows:
		Y148	Y149	]					
	CNSC Licensing			1					
	Fees (\$k)	450	450						
	NWMO-1 (FTE)	1	1						
	NWMO-3 (FTE)	1	1						
	Travel (\$k)	4	4						
				•					
Schedule	Start Year	***************************************		148	2157			Finish Year 149	2158
		***************************************		A	•••••••••••			·	
Туре	Fixed								
		••••••••••							
Calculations	CNSC licensing fe	es are calcu	ılated assur	ning that 1	FTE equals :	1800 hours a	nd is char	ged at an hourly rate of S	250. This total is reported in
and Notes:	thousands of doll	ars;							
	NIMMO 1 values	roprocent +	ho ETE offor	rt roquirod	hv NI\A/N40 =	nanagomen	٠.		
	NWMO-1 values	•		•	•	_	•		
	NWMO-3 values	•		•	•			his kakal is alsa man su su su	in the constant of dellars
	<u> </u>	1			son-trip to (	Jitawa cost:	5 \$1000. T	his total is also reported	in thousands of dollars.
Lahr									
\$	703,072		al Costs	Other \$	908,000	Subt	otal 1,611,072	Allowance 25% \$ 402,768	Total Cost \$ 2,013,840

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#### **Work Element Definition Sheet**

WBS (New)	560	30	40	60	20				Prepared By: A. Khan
WBS (Old)		<u> </u>							
WBS Title	LICENSING REVIEW IN	CLUDING PI	UBLIC HEAR	RING					
Description	Answering CNS	C questions	(as require	d);		l attend Hearings need	ed to obtain th	e licence (	Y180). This includes:
	2. Providing supple	•		•	-	or as required;			
	3. Preparing inform				•	Contour to initial linear	_		
	4. Attending and p	participating	In Public H	learings be	fore the CN	SC prior to initial licence	2.		
Deliverable	Class I Nuclear Facility	Licence to	Abandon is	sued by the	e CNSC				
Assumptions	2. The Environmer	ntal Assessn	nent for the	Decommi	ssioning of t	made (see WBS 560.30. he facility has been cor supporting hearing pla	npleted (see V		0.40.50.50). Regulatory Affairs group.
						upport CNSC staff's re Public Hearing are as		pplication	(not including time required by
	CNSC Licensing Fees	130	1						
	(\$k)	450							
	NWMO-1 (FTE)	1	1						
	NWMO-3 (FTE)	1	1						
	Travel (\$k)	4							
Schedule	Start Year			150	) 2159		Finish Year	150	2159
Туре	Fixed								
Calculations and Notes:	CNSC licensing fees ar thousands of dollars;	e calculated	d assuming	that 1 FTE	equals 1800	hours and is charged a	t an hourly rat	e of \$250.	This total is reported in
	NWMO-1 values repre NWMO-3 values repre Travel expenses are ca	esent the FT	E effort red	uired by N	WMO techn	•	tal is also repo	orted in the	ousands of dollars.
				•		<del>,</del>	<u> </u>		
	bour Costs		al Costs		r Costs	Subtotal	Allowance	25%	Total Cost
\$	351,536	Ş	-	\$	454,000	\$ 805,536	\$	201,384	\$ 1,006,920

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## **Work Element Definition Sheet**

WBS (New)	560	30	40	60	30					Prepared By: A. Khan
WBS (Old)	552	30	75							······
WBS Title	MAINTAIN DECOM	MISSIONING	LICENCE (	CNSC)						
Description	Maintain a Class I F	acility Deco	mmissionir	ng Licence fr	om the Can	adian Nucle	ar Safety Co	ommission (Y1	26 - Y150).	This includes:
	Preparing an	ıd submittin	g reports a	ccording to	the schedul	e prescribed	by the Dec	ommissioning	Licence;	
	Preparing an			_		-	-	-	·	
	<ol><li>Preparing ar Nuclear Safety and</li></ol>						sioning Lice	nce that inclu	des all of th	ne information required under the
	4. Supporting C	CNSC staff co	mpliance a	ctivities (as	well as IAE	A inspection	s) during th	e course of th	e licence.	
Deliverable	Class I Facility Deco	ommissionin	g Licence is	sued by CN	SC					
Assumptions	It is assumed that:									
							-	-		o expected that mid-term reports ce is expected to cycle on 5-year
	2. The applicat	ion for the fi	rst licence	renewal dui	ring this sta	ge is expect	ed to be sub	mitted aroun	d the Y134	timeframe followed by Y144.
	3. It is assumed the licence. The fire					-	-		-	ort to the Commission or to renew
	<u> </u>		_	_						, will continue to be available to ntinue to support the licence.
	1	ments or a	additions 1	to the Env			-	orts to the CNS ed in conjund		the initial application for the
	7. The costs a documents (not inc						_	-		e the application and supporting follows:
		Repeat ev	ery 5 year	s starting v	vith Y126 a	and ending				
	CNSC Licensing									
	Fees (\$k)	250	250	250	250	450				
	NWMO-1 (FTE) NWMO-3 (FTE)	1	1	1	1	1				
	Travel (\$k)	1	1	1	1	2				
	Traver (\$K)	1	-	1						
Schedule	Start Year			126	2135			Finish Year	150	2159
Туре	Fixed									
Calculations and Notes:	CNSC licensing feet thousands of dollar		ted assumi	ng that 1 FT	E equals 18	00 hours an	d is charged	at an hourly r	ate of \$25	0. This total is reported in
	NWMO-1 values re NWMO-3 values re	present the	FTE effort	required by	NWMO tec	hnical staff;				
		1							•	housands of dollars.
	our Costs	Materia	ai Costs	1	Costs	Subt		Allowance	<b>25%</b>	Total Cost
\$	8,788,395	<b>\$</b>	-	\$	7,280,000	\$ 1	6,068,395	\$	4,017,099	\$ 20,085,494

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#### **Work Element Definition Sheet**

WBS (New)	560	30	40	70	30					Prepared By: A. Khan
WBS (Old)	552	30	75							
WBS Title	LICENCE TO ABA	NDON (CNS	C)							
	Preparing     Maintainir     Preparing     Supporting	and submiting records do transfer of CNSC staff	ting reports luring the to records to r activities (	according erm of the I national arc as well as IA	to the schedicence; hives at the	dule prescr	ibed by the	Licence to Aba	andon;	55). This includes:
Deliverable	Class I Facility Lic	ence to Aba	andon issue	d by CNSC						
Assumptions	2. During the 3. Records no 4. Plans to tr. 5. No amen Decommissioning 6. The costs a  CNSC Licensing Fees (\$k)	o abandon course of t eeded to mo ansfer these dments or g License w	he licence t eet Canadia e records to additions ill be requir	erm, the lider on regulation the appropertion to the Energian	ns and/or a priate Cana Ivironmenta	submit scho greements dian autho Il Assessm	will be mair rity will be n	nade. ted in conjun		n the initial application for the
	NWMO-1 (FTE)	1	1	1	1	1				
	Travel (\$k)					2				
Schedule	Start Year			151	2160			Finish Year	155	2164
Туре	Fixed									
Calculations and Notes:	thousands of dol NWMO-1 values NWMO-3 values	lars; represent t represent t	he FTE effo he FTE effo	rt required rt required	by NWMO	manageme technical s	ent; taff; and		•	\$250. This total is reported in in thousands of dollars.
Labo	ur Costs	Materi	al Costs	Othe	r Costs		total	Allowance	25%	Total Cost
\$	1,106,763	\$	-	\$	502,000	\$	1,608,763	\$	402,191	\$ 2,010,954

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## **Work Element Definition Sheet**

WBS (New)	560	30	50	20	10					Prepared By:	J. Villagran
WBS (Old)	552	20	15	60	50						
WBS Title	PROVIDE E	NGINEERIN	G INPUT TO	<b>P</b> SAR							
Description	: '		•	specification	ns to suppo	ort the PS	SAR and the Env	/ironmental A	ssessment ı	report for the re	epository facility
Deliverable		ic system de ation of pro									
Assumptions	NWMO sta	of work three	ents are 1ft		Senior Tecl	nnical Sp	pecialist) to man	nage/direct the	e tasks spec	ified below plu	s consultant
	document	s in support	of the PSAF	R and EA rep	oort. These	prelimi	, ,	cuments, syste	•	•	l prepare technical and prototype test
Schedule	Start Year			10	2019	)		Finish Year	12	2021	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materia	al Costs	Other	Costs		Subtotal	Allowance	25%	To	tal Cost
\$											tai cost

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## **Work Element Definition Sheet**

WBS Title  ENGINEERING SUPPORT DURING LICENSING REVIEW AND EA HEARINGS  Tasks include:  Prepare technical documents and descriptive material on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  Technical documents describing the repository technology and the preferred site-specific repository design.  Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  Travel & expenses of \$70k/a for 3a (Y13 to Y15), and  document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Calculations  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance  25%  Total Cost	WBS (New)	560	30	50	20	20				Prepared By:	J. Villagran
Description  Tasks include:  Prepare technical documents and descriptive material on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA proces and the CNSC licensing process.  Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  Technical documents describing the repository technology and the preferred site-specific repository design.  Less-technical documents describing the repository technology and the preferred site-specific repository design.  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  travel & expenses of \$70k/a for 3a (Y13 to Y15), and document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  staff. Consultants or external staff will be required to prepare supporting technical documents.	WBS (Old)	552	20	15	60	60					
Description  Tasks include:  Prepare technical documents and descriptive material on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA proces and the CNSC licensing process.  Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  Technical documents describing the repository technology and the preferred site-specific repository design.  Less-technical documents describing the repository technology and the preferred site-specific repository design.  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  travel & expenses of \$70k/a for 3a (Y13 to Y15), and document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  staff. Consultants or external staff will be required to prepare supporting technical documents.											
- Prepare technical documents and descriptive material on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  - Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA proces and the CNSC licensing process.  - Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  - Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  - Schedule  - Start Year  - Start Year  - Staff. Consultants and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  - Staff. Consultants or external staff will be required to prepare supporting technical documents.	WBS Title	ENGINEER	ING SUPPOR	RT DURING	LICENSING	REVIEW AN	D EA HEARINGS				
- Prepare technical documents and descriptive material on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  - Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA proces and the CNSC licensing process.  - Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  - Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  - Schedule  - Start Year  - Start Year  - Staff. Consultants and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  - Staff. Consultants or external staff will be required to prepare supporting technical documents.		ļ									
for the EA process and the CNSC licensing process.  Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA proces and the CNSC licensing process.  Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  Technical documents describing the repository technology and the preferred site-specific repository design.  Less-technical documents describing the repository technology and the preferred site-specific repository design.  Less-technical documents describing the repository technology and the preferred site-specific repository design.  Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  Travel & expenses of \$70k/a for 3a (Y13 to Y15), and  document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:	Description										
- Prepare "less technical" documents on repository technology and the preferred site-specific repository design for the EA proces and the CNSC licensing process.  - Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:							naterial on repository t	echnology and	d the prefe	rred site-specifi	c repository design
and the CNSC licensing process.  - Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  Staff. Consultants or external staff will be required to prepare supporting technical documents.		for the	EA process	and the CN	SC licensing	g process.					
and the CNSC licensing process.  - Deliver presentations and respond to review questions on repository technology and the preferred site-specific repository design for the EA process and the CNSC licensing process.  Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  Staff. Consultants or external staff will be required to prepare supporting technical documents.		- F	Prepare "less	s technical"	document	s on reposit	ory technology and the	preferred site	e-specific re	pository design	for the EA process
the EA process and the CNSC licensing process.  Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:		•	•				. ,			, , , , , ,	,
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Deliverables  - Technical documents describing the repository technology and the preferred site-specific repository design.  - Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following: - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15), - travel & expenses of \$70k/a for 3a (Y13 to Y15), and - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Calculations and Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM staff. Consultants or external staff will be required to prepare supporting technical documents.		:	•		•	•	ons on repository techi	nology and the	e preferred	site-specific rep	oository design for
- Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Calculations  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  staff. Consultants or external staff will be required to prepare supporting technical documents.		the EA	process and	the CNSC I	icensing pr	ocess.					
- Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Calculations  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  staff. Consultants or external staff will be required to prepare supporting technical documents.											
- Less-technical documents describing the repository technology and the preferred site-specific repository design.  Assumptions  Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule  Start Year  13 2022  Finish Year  15 2024  Type  Fixed  Calculations  Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes:  staff. Consultants or external staff will be required to prepare supporting technical documents.	Deliverables								:£:		
Assumptions Duration of work: Y13 to Y15.  NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule Start Year  13 2022 Finish Year  15 2024  Type Fixed  Calculations Adking presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.	Deliverables	•			•			•		, ,	~n
NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule Start Year 13 2022 Finish Year 15 2024  Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.			.ess-tecimica	ai documen	its describil	ig the repos	atory technology and ti	ie preierreu s	ite-specific	repository desig	g11.
NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule Start Year 13 2022 Finish Year 15 2024  Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.											
NWMO staff requirements are 1 fte/a for 3a (Manager/Senior Technical Specialist) plus the following:  - Senior Consultant writing, staff training: Purchased services: \$200k/a for 3a(Y13 to Y15),  - travel & expenses of \$70k/a for 3a (Y13 to Y15), and  - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule Start Year 13 2022 Finish Year 15 2024  Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.	Assumptions	Duration o	f work: Y13	to Y15.							
- travel & expenses of \$70k/a for 3a (Y13 to Y15), and - document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule Start Year 13 2022 Finish Year 15 2024  Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.	·	NWMO sta	aff requirem	ents are 1 f	fte/a for 3a	(Manager/S	Senior Technical Specia	list) plus the fo	ollowing:		
- document production & distribution \$100k/a for 3a (Y13 to Y15).  Schedule Start Year 13 2022 Finish Year 15 2024  Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.		- Senior	Consultant	writing, sta	off training:	Purchased	services: \$200k/a for 3	a(Y13 to Y15),	_		
Schedule Start Year 13 2022 Finish Year 15 2024  Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.		- travel	& expenses	of \$70k/a	for 3a (Y13	to Y15), and	İ				
Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM staff. Consultants or external staff will be required to prepare supporting technical documents.		- docun	nent produc	tion & dist	ribution \$10	00k/a for 3a	(Y13 to Y15).				
Type Fixed  Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM staff. Consultants or external staff will be required to prepare supporting technical documents.											
Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.	Schedule	Start Year			13	3 2022		Finish Year	15	2024	
Calculations Making presentations and defending the DGR system design and safety in front of regulatory bodies will remain the role of senior NWM and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.											
and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.	Туре	Fixed									
and Notes: staff. Consultants or external staff will be required to prepare supporting technical documents.											
					•	•	•			remain the role	e of senior NWMO
Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	and Notes:	staff. Cons	sultants or e	external stat	ff will be re	quired to pr	epare supporting techr	nical documen	ts.		
	Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
\$ - \$ 810,000 \$ 810,000 \$ 202,500 \$ 1,012,50	\$	-	\$		\$	810,000	\$ 810,000	\$	202,500	\$	1,012,500

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### **Work Element Definition Sheet**

WBS (New)	560	30	50	30	10					Prepared By:	J. Villagran
WBS (Old)			<u></u>								
WBS Title	PROVIDE E	NGINEERING	G INPUT TC	) FSAR							
Description			•	•	ecifications	to support	the FSAR ar	nd the Enviro	onmental Ass	essment repor	t for the repository
Deliverables	•	ic system fin ation of pro	•	•	•	•	ns				
Assumptions	NWMO stand Consultant Specialist of support of	consultants t	ments are : to prepare	site-specifio	c preliminary	y designs, co	onduct the ments, syst	required data	a analysis an	nd prepare tech	ied above and the nnical documents in ype test results will
Schedule	Start Year			21	. 2030			Finish Year	23	2032	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	To	tal Cost
\$		Ś		\$	750,000	\$	750,000	\$	187,500	\$	937,500

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### **Work Element Definition Sheet**

WBS (New)	560	30	50	30	20				Prepared By:	J. Villagran
WBS (Old)	552	20	40	20						
WBS Title	SAFEGUAR	DS INTERFA	CE IMPLEN	1ENTATION						
Description	specification Cons Resc	pare designs ons complet struct and fi	ed under Weld test pro iciencies in	VBS 550 20 o totypes of a the perforn	40 10 (precu all non-stand nance and re	dard interface systems obustness of the syste	and equipme	nt.	plant and repos	sitory to satisfy the
Deliverable				· ·		e systems for nuclear rafeguards interface sy	· ·	uards meas	sures and equip	ment.
Assumptions	noted. Consultant safeguards \$500k/a fo	aff requirent/contractors interfaces,	nents are Conservations are Co	complete p	orototype de and to doc	gement and supervisi esign, to acquire proto ument the final metho es at the DGR facility v	type equipmends, designs an	nt, to condu d technical	uct demonstrati specifications:	ion tests of nuclear Purchased Services
Schedule	Start Year			23	2032		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	System des	sign and pro	ocurement o	can be comp	oleted in tw	o years and system de	monstration ca	an be condu	ucted in the last	t year of the
Labour	Costs	Materi	al Costs	Other	Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,500,000	\$ 1,500,000	\$	375,000	\$	1,875,000

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### **Work Element Definition Sheet**

WBS (New)	560	30	50	30	30				Prepared By: A. Murchison
WBS (Old)				Ĭ					
WBS Title	PRODUCE	SPECS AND	NPUT TO F	SAR (FINAL	SAFETY ASSE	SSMENT REPORT	Г)		
Description	Prepare the facility con	-	ns, specific	cations and o	demonstratio	n test results to	support the final	safety asses	ssment report (FSAR) for repository
Deliverable	Descriptio	ns, specifica	tions and d	lemonstrati	on results to	support to FSAR	and the EA report	for constru	ction approval.
Assumptions	2 NWMO- Specialist	of work: Y16 03 fte/a for ' consultant to ccounted for	Y16-Y20 o prepare t	•		EA on the repos	itory facility and u	sed-fuel pa	ckaging plant: 2 fte/a for 5 a.
Schedule	Start Year			16	2025		Finish Year	2(	0 2029
Туре	Fixed								
Calculations and Notes:									
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
Ś				Ś	-	Ś			Ś -

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### **Work Element Definition Sheet**

WBS (New)	560	30	50	40	10					Prepared By:	J. Villagran
WBS (Old)	<u> </u>										
WBS Title	MONITORI	NG SYSTEM	S AND PRO	GRAM – D	GR OPERATI	ON PHASE					
Description	=				nance of mon	itoring syste	n.				
Deliverables	Ē	Jpdated rep Jpdated dat	•	· .	stem. monitoring p	arameters.					
Assumptions	Duration o	f work: Y26	to Y55.								
	acquisition - ( with th - F	and the mocontractor/c e maintenar	onitoring da onsultants nce and exp	tabase; p to prepare pansion of oning of m	lus the follow e technical sp repository m	ving: pecifications a ponitoring sys uipment as r	and providetems: Purd	e input to eq chased Servic	uipment pro es \$150k/a f	·	•
Schedule	Start Year			2	6 2035			Finish Year	55	2064	
Туре	Step-Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs	Oth	er Costs	Subt	otal	Allowance	25%	То	tal Cost
\$	-	\$ 3	0,000,000	\$	4,500,000	\$ 34	1,500,000	\$	8,625,000	\$	43,125,000

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### **Work Element Definition Sheet**

WBS (New)	560	30	50	50	10					Prepared By: J. Villagran	
WBS (Old)	0										
WBS Title	EXTENDED	MONITORII	NG PERIOD								
Description	period.		•		·	sitory moni	toring syste	ms, as requir	ed following	the 30-year DGR operating	
Deliverables	:	Operation ar Accessible ar		•	•	· .	ems at the i	repository site	e and surrou	nding area.	
Assumptions	NWMO sta data acquis - C reposite - P	sition and the Contractor/cory monitor	ents to mar ne monitorio consultant to ing systems d commissio	ng database o provide in c. Purchase oning of mo	e, plus the finput to equid services: Services	following: pment prod \$100k/a for uipment as	urement pr 100a (Y56 t	rocess and ass to Y155).	sist with the	o operate systems and manag maintenance and upgrading o ing of the repository monitori	of
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations and Notes:	ð										
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost	
\$	-	\$ 1	7,500,000	\$	7,000,000	\$ 2	24,500,000	\$	6,125,000	\$ 30,625,	000

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### **Work Element Definition Sheet**

WBS (New)	560	30	50	60	10					Prepared By:	J. Villagran
WBS (Old)											
WBS Title	DECOMMIS	SSIONING PI	ERIOD								
Description	- P	ontinued op	decommissi	oning and r	emoval of s	•	υ.		00-year perio	od of pre-closure	monitoring.
Deliverables	- N - A	Operation ar Managemen Accessible ar Monitoring s	t of decomr nd continuo	nissioning outling of the contraction of the contra	operations ed database	·.	ems at the r	epository sit	e and surrou	nding area.	
Assumptions	repository Environme - C \$100k/a - C \$400k/a	ff requirem monitoring ntal Monito contractor/c a for 25 a (Y contractor/c a for 10 a (Y	ents to mar systems and oring system consultant to 126 to Y150 consultant to 126 to Y135 e and updat	d 1 fte for 2 i; plus the for o assist with i)). o implement o). ing of equip	25 a (Techni ollowing: h equipmen nt the proce	cal Specialis t maintenar ss of decom	t) to manag	e data acqui Environment the reposito	sition as wel al Monitorin	nage the decomi I as the database g systems. Purch g systems. Purch oring system and	e for the nased services: nased services:
Schedule	Start Year			126	2135			Finish Year	150	2159	
Туре	Fixed										
Calculations and Notes:	:	ve years for									repository and a ling of repository
Labour (	Costs	Materia	al Costs	Othe	r Costs	Sub	otal	Allowance	25%	Tota	l Cost
\$	-	\$	3,750,000	\$	6,500,000	\$ 1	0,250,000	\$	2,562,500	\$	12,812,500

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### **Work Element Definition Sheet**

WBS (New)	560	90	50	10	10	<u> </u>				Prepared By: C. Vardy
WBS (Old)	552	90					0			
WBS Title	Common S	ervices (Y01	L-Y09), Sitin	g Phase						
Description	· The undert: · Pre · Qu: · Saf · Fin: buyer a · Hui · Ove staff ex	e program m aken by NW sident's Off ality Programety Programence and Bu and IT suppo man Resour erheads mis penses.	nanagemen MO staff. N ice: Project m Mgmt wi n Managem isiness Serv ort. ces: Recruit cellaneous	t and admir Managemen implement II be covere ent: Manag ices: Accou tment, staff expenses, I'	t functions ation mana d under a u ement of h int manage manageme T costs, trai	covered and gement, sit nique set of ealth and sa ment, repor ent, purchas ning, holida	d their scope ng and publi work elem- fety progra- ting, invoici e of payroll ys, pension	e include: lic affairs. ent definitions ms ng, contract services, ge contributio	t payments, st	aff payments,  ommodation and
Deliverable	· An	- F devel - F	President's ( inance and lopment an	Office: Prog Business Se d maintena ources: Pers	ram estima ervices: Pro nce, docum	tes, schedu gram finan entation, fi ces to all ar	es, resource ce, business ling, work po eas of the po	e plans and planning/b	ollowing: management udgeting, syst	rems
Assumptions	elsewh · Bro · The Assessr	adly, overal ese numbers nent, QA, Li	Operations  Il staffing le  s do not inc censing & A	Phase (Y30- vels are ass lude NWM0 Approvals ar	Y59), etc., umed to be O staff listed nd Public Af	for 35 NWI I under Sitir fairs. This v	MO-01 and ! ng, Reposito vork elemer	5 NWMO-03 ory System E nt includes a	a (admin staff Development, a cost allowan D1-Y09 see be	) for Y01-Y09. Safety ce for the
Schedule	Start Year			1	2010			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:	througl · Bas · NW	n Y09 based is of cost es	on an anay timate was	rsis of HC ar NWMO Bu	nd changes i siness Plan	n activities common se	in the organ	nization	These were e	
Labour (	Costs	Materia	al Costs	Other	r Costs	Sub	total	Allowanc	e <b>25</b> %	Total Cost
\$	32,031,947	\$	-	\$ 3	32,374,851	\$ 6	64,406,798	\$	16,101,700	\$ 80,508,498

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560 552	90 90	50	20	10					Prepared I	By: C. Vardy
WBS Title	Common S	ervices (Y10	0-Y15), Con	struction Li	cense Phase	9					
Description	NWMO  Pre Geoscie definiti Qui Safi definiti Hui Arc and ma schedu Leg	sident's Offichinical Deve ence, Repos on sheets. allity Program on sheets ance and But. man Resour hitect Engir inagement of	emented before the control will	y Architect timplement rogram Mgr m Developr fill be covere ment: Manag vices: Accord timent, staff ased service and build cord be covered	Engineering tation mana mt. – Engin nent & Safe ed under a u gement of h unt manage f manageme es engineer ntractors. Pr d under a ur	gement, si eering offic ty Assessm unique set c ealth and s ment, repo ent, purcha s responsib rovides pro-	ing and pul e, integration ent Mgrs with of work elent afety progra rting, invoice se of payrolate the for development and work element	ent functions blic affairs. on of siting, o ill be covered ams will be c cing, contrac ll services, ge opment of or and project m ent definition	development d under a uni on sheets. overed unde t payments, s eneral suppor utline design anagement s n sheets.	and designed and designed and designed and designed are a unique staff payment.  The preparation of the prep	
Deliverable	· An	-	President Finance a stenance,do Human R Offsite ov	's Office: Pr nd Business ocumentation esources: Prerheads ap	ogram estir Services: I	mates, sche Program fin ork process rvices to all NWMO staf	dules, resou ance, busin ing and stra areas of the	ess planning itegic plannir	nd managem /budgeting,		s. evelopment and
Assumptions	· Bro NWMO · The & Appr	eadly, overa 2 and 15 N' ese number: ovals and P	ll staffing le WMO3) s do not inc ublic Affair	evels are ass clude NWM s. This worl	sumed rang O staff liste	e from 27 t d under Siti ncludes a co	o 33 for Y10 ng, Reposit ost allowand	) -Y15 as out ory System E ce for the ove	lined to the r	ight (appro	(Y30-Y59), etc.,  ox 9 NWMO1, 6  sessment, Licensing these staff.
Schedule	Start Year			10	2019			Finish Year	15	2024	
Calculations and Notes:	an anay	sis of HC ar	nd changes	in activities	in the orga	inization		•			through Y09 based on
Labour (		Materia	al Costs		Costs		total	Allowance			Total Cost
\$ 2	27,437,036	\$	-	\$ 2	28,595,504	\$ 5	6,032,540	\$	14,008,135	\$	70,040,675

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560 552	90 50 90	30 10			ſ	Prepared By: C. Vardy
WBS Title	Common S		ruction Phase				
Description	NWMO		t and administration or Architect Engineering	personnel. Managem	ent functions cov		ork will be undertaken by their scope include:
	· Tec	hnical Development Pr	ogram Mgmt. – Engin	eering office, integrati	on of siting, devel		and design, Directs Geoscience, ork element definition sheets.
	· Saf	ality Program Mgmt wil ety Program Managem on sheets					a unique set of work element
	· Fina support		ices: Account manage	ment, reporting, invoi	cing, contract pay	ments, s	taff payments, buyer and IT
	· Arc and ma		ased services engineers d build contractors. Pr	responsible for devel ovides procurement a	opment of outline nd project manag	e design, gement se	t. preparation of specifications ervices to the NWMO including
	_	al and Insurance – Inte ons phase.	rnal and external legal	counsel as well as con	ventional insuran	ice cover	age for work during the pre-
Deliverable	· An	overall business, admir	nistrative and manager	nent function that will	deliver the follow	ving:	
		- Finance ar	s Office: Program estir nd Business Services: F cumentation, filing, wo	Program finance, busin	ess planning/bud	_	nt reports. ystems development and
		- Offsite ove	ssources: Personnel sei erheads applicable to f – Insurance against co	NWMO staff	e program		
Assumptions	. The	nrogram managemen	t and administration of	f the DGR are costed a	Isawhere for the	Operatio	ns Phase (Y30-Y59), etc.,
Assumptions							ght (approx 9 NWMO1, 6
		2 and 15 NWMO3) ese numbers do not inc	lude NWMO staff liste	d under Siting, Reposit	ory System Devel	opment,	Safety Assessment, Licensing &
	Approv	als and Public Affairs. <sup>-</sup>	This work element incl	udes a cost allowance	for the overhead	associate	ed with these staff.
	· Insi	urance premiums as pe	r CTECK estimate over	years 10-15 - see belo	w-right		
Schedule	Start Year		16 2025		Finish Year	25	2034
Туре	Fixed						
Calculations and Notes:		ailed bottom up budger rsis of HC and changes	•		by function. Thes	se were e	extended through Y09 based on
	· NW growth		ge from 27 to 33 based	l on current common s	services HC and pi	rojected <sup>·</sup>	through Y15 based on project
Labour C	osts	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$ 3	2,812,159	\$ -	\$ 37,158,496	\$ 69,970,655	\$ 17,4	92,664	\$ 87,463,318

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### **Work Element Definition Sheet**

WBS (New)	560	90	70	10	10					Prepared By: P. Hader
WBS (Old)	552	15	20	50						
WBS Title	QUALITY A	SSURANCE	PROGRAM	SITING						
Description	Establish a	Quality Ass	urance (QA	) program	consistent w	ith ISO 900	1 and 14001	l requirement	s. Work Pr	ogram would include:
	1	-			training and	_				
	•		-	-				staff/contract		
	1	•			=	•				gram activities.
	=				ı maintain Qi QA program.		oi on site cri	aracterisation	data/inter	pretation.
	•		-		and contract					
	1		QA progran	•		ors.				
	:				ports. Jal) and Man	agament P	oviow			
	<b>=</b>	_	-	-	•	-		o ensure that	work prog	ram expectations are conveyed t
	=									nd/or analyses not satisfying Q
	•	nts/expecta		11113 13 110	cessary to	avoia progi	ani uciays	iii re-quaiiiyi	ing data ai	id/or analyses not satisfying Q
	requiremen	піз/ехреста								
Deliverable	- Mair	atenance of	20 150 000	1/1/001 h	ased QA pro	gram				
Deliverable	•		n implement	•		grain.				
	Ē		ram status i		(A program.					
				-	and manuals					
	=	•	٠.		on data/inte					
	1				te/Mode Sel	•	ios/Evaluati	ons		
	•	•	nce Design –		te/ Wiode Ser	ection staa	ies/ Evaluati	5113		
	•	•	Design - Prel	•						
			,							
Assumptions	- Purc	hase Inform	nation Tech	nology Ma	nagement Sy	stem for us	se by QA pro	ogram (\$75 K,	Y2).	
	- ISO 9	9001/14001	accreditati	on is progi	ram standard	d.				
	- QA p	orogram will	I be subsum	ned by Lice	nce and PSA	R activities	in year 10.			
	3	_			'MO-01 fte/a	-				
	•	•			•	•	. ,	1 NWMO-01 f	•	ears (Y5 to 9)
	:			-	, ,	, ,	ility Studies	in potential s	ites).	
	1			-	or 6 years (Y4	•				
	1				ars (Y2 to 3);	\$100k/a fo	r 2 yrs (Y4-5	)		
	- Cont	tracts: \$250	k/a for 4 ye	ars (Y6 to s	9)					
Schedule	Start Year				1 2010			Finish Year	9	2018
				Ā						
Туре	Fixed									
							751/4/2			
Calculations	Assuming p	ourchase of	NWMO I.T.	Managem	nent System	tor QA @ \$	/5K (1/2 of S	515UK), shared	between l	L&ILW DGR and APM DGR.
and Notes:										
	Assuming s	site characte	erization of	up to two	sites betwe	en 2013 and	d 2018.			
	Contracts a	are for prog	ram audits,	assessmer	nts and evalu	uations whic	ch escalate i	n number fror	n one in ye	ar one to twenty a year starting i
	year six.	. •							•	
Labour (	Costs	Materia	al Costs	Othe	er Costs	Sub	total	Allowance	25%	Total Cost
\$	2,274,814	\$	75,000	\$	1,315,000	\$	3,664,814	\$	916,204	\$ 4,581,018

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### **Work Element Definition Sheet**

WBS (New)	560	90	70	20	10				Prepared By:	P. Hader
WBS (Old)	552	15	20	50					A	
(0.0)	332	į	.i	i		i				
WBS Title	ΟΠΑΠΤΑ Α	SSURANCE	DROGRAM	LICENCE AD	DI ICATION					
WD3 TILLE	QUALITIA	SSUNAINCE	FILOGRAM	LICLINGE AF	FLICATION					
Doccrintion	Maintain a	Quality Acc	curanca (OA	) program (	concictont u	ith ISO 0001 and 1	IOO1 roquiromon	ts Mark Dr	ogram would i	ncludo:
Description	ividiiildiii d	Quality Ass	surance (QA	i) program i	consistent w	ith ISO 9001 and 14	ioor requiremen	is. Work Pr	ograffi would i	nciude.
						_				
	3				nce docume					
	:		•	•		A program with proj	-			
	•	•				ments specific to lic	ensing PSAR, EA	& construct	ion license stag	ge.
	- Cond	duct technic	cal audits to	verify and	maintain Qu	uality Control.				
	- Mair	ntain/imple	ment/audit	software O	A program.					
	- Cond	duct QA trai	ining for pro	oject staff a	nd contracto	ors.				
	- Prep	are annual	QA progran	n status rep	orts.					
	3					agement Review				
	·	-	•	•	•	•	nt to ensure that	work nrog	ram expectatio	ons are conveyed to
	=									not satisfying QA
	1	nts/expecta		11113 13 1100	ccssury to t	avoia program aci	ays in it quality	ing data di	ia, or analyses	not satisfying QA
	requireme	піз/ехресіа	1110115.							
	<u> </u>									
Deliverable	- Mair	ntenance of	an ISO 900	1/14001 ba	sed QA pro	gram.				
	- Audi	it reports or	n implemen	tation of Q	A program.					
	- Annı	ual QA prog	ram status	reports.						
	1			•	nd manuals.					
	•	-	_		on data/inte					
	•				-	kage Design – Detai	l including Analyt	ic Δnalvsis :	and Evaluation	
	•					and Evaluation.	inicidaning Analyt	ic Analysis (	and Evaluation	
 	- QAC	n rackage r	Tototype –	iviaiiuiaciu	ie, resting a	ilu Evaluation.				
A	lofo.					. 0 4				
Assumptions						QA program.				
	•				am standard					
	•			•		•	aligning the acro	onym to UD	F for undergro	ound demonstration
	facility) & (	Obtain Cons	struction Lic	ense startir	ng in year 15	5.				
	- OAN	Managemen	nt Support (	a 1 fte/a fo	r 6 years (Y1	10 to 15).				
	•	_				ensing & PSAR Stud	es Support)			
	•	Specialist @				chonig & 1 5/ iii 5taa	es supporty.			
						1 yrs (Y11) \$250k/a	for 1 yrs (V12-1	:1		
 	i- com	liacis. Jiji	JK/ a IUI I y	ears (110), ,	2 200K/a 101	1 yıs (111) \$250k/	1101 4 913 (112-1	) ] .		
Schodulo	Ctart Vac-			10	2010		Einich Voor	1 1 1	2024	
Schedule	Start Year			10	2019		Finish Year	15	2024	
	ļ									
Туре	Fixed									
	<u> </u>									
Calculations										
and Notes:										
	Contracts a	are for prog	ram audits,	assessmen	ts and evalu	ations which escal	te in number fro	m twelve in	year one to tw	venty a year
	starting in	year two. A	Assume sub	surface inve	estigations a	re completed in ye	ar nine and qualit	y assurance	activities are	somewhat
		-			mental asses					
Labour (	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	То	otal Cost
\$	2,369,581	\$	-	\$	1,350,000	\$ 3,719,5	81 \$	929,895	\$	4,649,477
		•			•		*			

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### **Work Element Definition Sheet**

WBS (New)	560	90	70	30	10					Prepared By: P. H	ader
WBS (Old)	552	15	20	50							
	ļ					***************************************		***************************************			
WBS Title	QUALITY A	SSURANCE	PROGRAM I	JDF and DG	R CONSTRU	JCTION					
	ļ										
Description	Maintain a	Quality Ass	surance (QA	) program c	onsistent w	ith ISO 900	1 and 14001	l requiremen	its. Work Pro	ogram would include:	
	- Mair	ntenance of	QA training	and guidar	nce docume	nts.					
	- Cond	duct QA auc	lits to verify	implement	tation of QA	program w	ith project s	staff/contrac	tors.		
	- Cond	duct periodi	ic reviews a	nd revision	of QA docu	ments speci	fic to consti	ruction of UD	F & SFAR sta	ige	
	- Mair	ntain/imple	ment/audit	software Q	A program.						
	- Cond	duct QA trai	ning for pro	ject staff ar	nd contracto	ors.					
	• .	are annual		•							
	- QA N	Managemen	nt System Au	udits (annua	al) and Man	agement Re	eview				
	ļ										
Deliverable	:	ntenance of		-		gram.					
	=	it reports or									
	1	rterly and A	-	_	-						
	:	lity Assuran	٠.	ū							
	=	nical audits									
	- QAF	Package Pro	totype ivian	uracture, re	esting and c	Valuation.					
Assumptions	- Info	rmation Ma	nagement S	vstem exist	s for use by	QA progra	m.				
	:	9001/14001	•	•	•						
							ing and Lice	nsing in year	25.		
	1	Managemer		-			-				
	- QAS	Specialists N	WMO-03 @	2 fte/a fo	r 4 years (Yí	L6 to 19); 3	fte/a for 6 y	ears (Y20 to	Y25).		
	- Cont	tracts: \$250	)k/a for 10 y	ears (Y16 to	o 25).						
				,				,	.,		
Schedule	Start Year			16	2025			Finish Year	25	2034	
<u></u>											
Туре	Fixed										
Coloniation											
Calculations	G t :									Overliev Assessed	TC:-
	•			-			ion, oversigi	nt monitoring	g and audits.	Quality Assurance F	I E IS
	•	n year 20 to							/		
Labour (			al Costs		Costs		total	Allowance	25%	Total Cos	
\$	5,598,289	\$	-	\$	2,500,000	\$	8,098,289	\$	2,024,572	\$	10,122,862

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### **Work Element Definition Sheet**

WBS (New)	560	90	70	40	10				Prepared By: P. Hader	
WBS (Old)	552	15	20	50						
	ļ									
WBS Title	QUALITY A	SSURANC	E PROGRAM,	, DGR OPER	ATIONS					
Description	Maintain	Ouglity A	scurance (O	1) program	consistent w	ith ISO 0001 and 1400	1 roquironon	to Mork Dr	ogram would include	
Description	iviaintain a	Quality A	ssurance (QA	A) program	consistent w	rith ISO 9001 and 14003	requiremen	its. Work Pr	ogram would include:	
	- Maiı	ntenance (	of OA trainin	g and guida	ance docume	nts.				
	•					program with operation	ons staff/con	tractors.		
	•					ments specific to opera				
	- Maiı	ntain/impl	ement/audit	t and action	n tracking sof	tware QA program.				
	- Con	duct QA tr	aining for op	erations st	aff and contr	actors.				
						m status reports.				
	=		ective action							
	- QA 1	Manageme	ent System A	udits (annu	ual) and Man	agement Review.				
Deliverable	- Mai	ntenance	of an ISO 000	01/1/001 b	ased QA pro					
Deliverable	E		on implemen	-		grain.				
	E		Annual QA p							
	•	•	•	ū	and manuals.					
	E					nterpretation.				
	- QA F	Package M	anufacture.							
	- QA 1	Transporta	ition Services	S.						
	ļ									
Assumptions	1		•			for use by QA program	n.			
	•				ram standard					
		•		•	•	ons in year 26.				
	•	_				30 years (Y26 to 55). 6 to 31); 2 fte/a for 24	voars (V22 to	V55)		
	=					o to 31), 2 fte/a for 24 a for 24 years (Y32 to \		133).		
			301,410107	Ca13 (120 tt	31), 720017	0.101 2.1 years (132 to 1				
Schedule	Start Year			2(	6 2035		Finish Year	55	2064	
Туре	Fixed									
	0									
Calculations	Assume a ı	new Inforr	nation Mana	gement Sy	stem is insta	lled during commission	ing.			
and Notes:	Assume ad	lditional co	ontracted ass	sistance in f	first years of	operation (assume son	ne extended	commissioni	ing activities).	
	=					ent calibration, oversig	ht monitoring	g and audits	for package manufacturin	ıg,
	contracted	l services a	and transpor	tation servi	ices.					
Labour (	Costs	Mate	rial Costs	Othe	er Costs	Subtotal	Allowance	25%	Total Cost	
\$	15,232,669	\$	-	\$	6,300,000	\$ 21,532,669	\$	5,383,167	\$ 26,9	915,837

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### **Work Element Definition Sheet**

WBS (New)	560	90	70	50	10					Prepared B	<b>y:</b> P. Hader
WBS (Old)	552	15	20	50							
WBS Title	QUALITY A	SSURANCE I	PROGRAM,	EXTENDED	OPERATION	IS					
Description	Maintain a	Quality Ass	surance (QA	) program o	consistent w	ith ISO 900	1 and 1400:	1 requiremer	nts. Work Pr	ogram woul	d include:
	- Mair	ntenance of	QA training	g and guidar	nce docume	ents.					
	- Cond	duct QA aud	dits to verify	implement	tation of QA	program w	ith monitor	ring staff.			
	- Cond	duct periodi	ic reviews a	nd revision	of QA docu	ments speci	fic to exten	ded operatio	ns.		
	- Cond	duct QA trai	ining for ext	ended oper	rations staff	•					
	: '		QA progran	•							
	•		tive action t								
	- QA N	<b>M</b> anagemen	nt System Ai	udits (annua	al) and Man	agement Re	eview.				
Deliverable	- Mair	ntenance of	an ISO 900	1/14001 ba	sed OA pro	gram.					
20	1		n implemen	•		5					
	•	•	ram status								
	•		ce training	•	nd manuals	for extende	d operation	ns.			
	•	•	on extende	•			•				
Assumptions	- Infor	mation Ma	nagement S	System impl	ementation	for use hy	ΩA nrogran	า			
	•		accreditati			•	<b>∞</b> . p. σ <sub>B</sub> . α				
	:	-	ogram will b				Operations	in year 56.			
	- QAS	pecialists @	0 1 NWMO-	03 fte/a for	70 years (Y	56 to 125).	•	•			
	- Cont	racts: \$75k	c/a for 5 yea	rs (Y56 to 6	60), \$25k/a	for 65 years	(Y61 to Y12	25).			
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations											
and Notes:	:	duced staff	levels and r	educed trai	ning and ov	ersight. Te	chnical audi	its on a reduc	ced frequenc	cy (one/18 -2	24 months) after first
	five years.										
	-							ht monitorin	_		
Labour			al Costs		Costs		total	Allowance			Total Cost
\$	9,112,824	\$	-	\$	2,000,000	\$ 1	1,112,824	\$	2,778,206	\$	13,891,030

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### **Work Element Definition Sheet**

WBS (New)	560	90	70	60	10					Prepared By:	P. Hader
WBS (Old)	552	15	20	50							
WBS Title	QUALITY A	SSURANCE	PROGRAM,	DECOMMI	SSIONING &	CLOSURE					
Description	- Prep - Mair - Cond - Cond - Impl - Cond	paration of contenance of duct QA aud duct period ement and duct QA trainare monthl	detailed QA  f QA training dits to verify ic reviews a maintain au ining for dec ly, quarterly	plan for de gand guida implemen nd revision udit and act commissior and annua	commission nce docume tation of QA	ing activitie ents. A program w ments spec s software C d contracto m status re	s (Phase 1).  with decommific to decomment  A program.  rs.  poorts.	nissioning sta	aff and contra	ogram would actors.	include:
Deliverable	- Audi - Qua - Qua - Tech - QA s	it reports or rterly and a lity Assuran inical audits shaft sealing	n implemen nnual QA pr ce training p s on shaft se g materials a	tation of Q rogram stat programs a raling testin acceptance		for decomr erpretation , and verific	cation testin				
Assumptions	- ISO 9 - QA p - QA S - QA S	9001/14001 program wil Managemer Specialists @ tracts: \$250	Laccreditati Il be created nt Support @	on is progra by Decom 1 NWMO 03 fte/a for years (Y126	am standard missioning a p-01 fte/a for r 12 years (Y s to 137), \$20	d. and Closure r 25 years (\ 126 to 137)	Staff in yea '126 to 150' ; 1 NWMO-	). 03 fte/a for 1	l3 years (Y13	38 to Y150). (Y141-Y150).	
Schedule	Start Year			126	2135			Finish Year	150	2159	
Туре	Fixed										
Calculations and Notes:	Contracts v			ctions, test	ing, oversigh	nt monitorii	ng, audits, a	nd supplier a	udits. Expec	t decreased a	activity after the
Labour (	Costs	Materi	ial Costs	Othe	r Costs	Sub	total	Allowance	25%	T	otal Cost
\$ 1	11,912,792	\$	100,000	\$	5,100,000	\$ :	17,112,792	\$	4,278,198	\$	21,390,990

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### **Work Element Definition Sheet**

WBS (New)	560	05	10	10	10					Prepared By: CV/KS
WBS (Old)										
		ř	· <del>Ť</del>	Ā	Ī	Ē				
WBS Title	TITLE: APN	1 Social – Sta	affing – Buil	lding Relatio	onships					
Description	- C - I NWMO - I provinc - E support working science - C respect - II - R improv  Tasks S - E the mu - C	I Tasks: Critical to the Canadian pure lecisions through content of the Canadian pure lecisions through content of the Canadian pure less to support of the Canadian pure less to support of the Canadian pure lecision of the Canadian pure lecision of the Canadian pure level of the Canadian pu	ablic, includice rough open, numunication gement of und maintain report their involvement in the distribution of the communications and coll in the design of the communication and coll in the design of the communication and coll in the design of the colling	ing Aborigin, transparer ins and earn used nuclear relationship olvement in elationships the implement of Ab Natural Resco consult. It ions and letectiveness oves.	al people, a ant and inclused media, but and inclused media, but fuel and All swith the fethe implementation of A. Seek advictoriginal peopurces Canal arning oppositive website, each with municementation in ships on a little and included in the control of the c	t all stages of sive engager uild awaren PM ederal governentation of anal, provinci APM. Contine of Elders of ples.  da to implesortunities to engagement cipal association of APM.	of implement ment processess among rament and APM and sell and regionate to work on interweatinform you and committees to additions to additions to additions to additional process.	the Canadian with province upport for N' conal Aborigin con projects aving of Abori cess to meet ung people of unication vel vance unders	n key  n public, including all and local WMO as implicated as the second and the second are second as the second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second are second as the second as the second as the second as the second as the second are second as the second are second as	nts in nuclear provinces to on Niigani (NWMO Aboriginal onal Knowledge and western statutory obligations with
Deliverables										
Assumptions										
Schedule	Start Year			1	2010			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:										
Labour (	nsts	Materi	al Casta	Other						
Labour		IVIALEIT	al Costs	Othei	r Costs	Sub	otal	Allowance	25%	Total Cost

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#### **Work Element Definition Sheet**

WBS (Old)	560	05	10	20	10			Prepared By: CV/KS
vv DJ (Jiu)								
<b></b>								
WBS Title	TITLE: APN	1 Social – St	affing – Bu	lding Relati	onships			
·····								
Description	Tasks ir							
İ		<u>l Tasks</u> :						
İ	1			-		nagement (APM) is the		
	•	•	•			at all stages of implem	•	
	1		О.	•		sive engagement prod		
İ	1	Ü			-		g the Canadian public, in	cluding Aboriginal people
	about t	he NWMO,	the manag	ement of u	sed nuclear	fuel and APM		
I	-	Develop and	d maintain	relationship	s with the f	ederal government a	nd with provincial and loc	al governments in nuclear
I	2	•		•		•	support for NWMO as ir	•
I								
I	1	•		•			gional Aboriginal governn	nents in nuclear provinces to
İ	suppor	t their invol	vement in	the impleme	entation of	APM.		
İ	- (	Continue to	work with	Natural Res	ources Cana	ada to implement a pr	ocess to meet the NWM	O's statutory obligations with
	respect	to the Cro	wn's duty to	consult.				
	•	•				•	oung people of NWMO's	
	- F	Regularly as	sess the eff	ectiveness (	of website,	engagement and com	munication vehicles to id	entify opportunities for
İ	improv	ement in fu	ture initiati	ves.				
İ								
İ								
Deliverables								
Deliverables								
Deliverables Assumptions								
Assumptions								
	Start Year			10	2019		Finish Year 15	2024
Assumptions	Start Year			10	2019		Finish Year 15	2024
Assumptions	Start Year Fixed			10	2019		Finish Year 15	2024
Assumptions Schedule				10	2019		Finish Year 15	2024
Assumptions Schedule				10	2019		Finish Year 15	2024
Assumptions Schedule Type				10	2019		Finish Year 15	2024
Assumptions Schedule Type Calculations	Fixed	Materi	al Costs		2019 Costs	Subtotal	Finish Year 15	2024 Total Cost

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### **Work Element Definition Sheet**

WBS (New)	560	05	10	30	10				Prepared By: CV/KS
WBS (Old)									
		.T	Ī	Ā	f	īĀ			
WBS Title	TITLE: APN	1 Social – Sta	affing – Buil	lding Relatio	onships				
Description	- ( includii engage - 1 Aborigi - to supp - [ involve science - ( respect	Il Tasks: Critical to the process of	ing the transses. Inmunication about the Name in a maintain resolvement in the language work with Name's duty to communicates sess the effects.	ns and earned WMO, the relationships the imple elationships that in of AP ment of AB value and the consult. The consult is the consult and leave the consu	ed media, be management s with the famentation of with, poten M. Seek adoriginal peopurces Cana	uild awareness and of used nuclear ederal governmen of APM and suppositially affected provice of Elders on inples.  da to implement a provice of control of the control of	and in key decision on the potential fuel and APM. It and with potential for NWMO as it vincial and region of All process to meet a young people of	ons through of ally affected (tially affected mplementer. and Aboriginal boriginal Tracet the NWMO's well as	governments to support their ditional Knowledge and western s statutory obligations with
Deliverables									
Assumptions									
Schedule	Start Year			16	2025		Finish Year	25	2034
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost
	36,925,812	1 .	-	\$	-	\$ 36,925		9,231,453	\$ 46,157,265
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1 7		1 7		, 30,323	т	-,,.00	,207,203

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### **Work Element Definition Sheet**

WBS (New)	560	05	10	40	10					Prepared By: CV/KS
WBS (Old)				<u> </u>						
WBS Title	IIILE: APN	1 Social – Sta	affing – Buil	lding Relatio	onships					
Description	- ( includir inclusiv - T Aborigi to supp - C involve - C respect - II	Il Tasks: Critical to the ng those along those along the engagement of the company of the company of their involved pand the continue to the crows applement of the company	ng the tran ent process imunication bout the N I maintain re volvement i maintain re implement work with N vn's duty to communicate ess the effe	sportation res.  Institute of the service of the se	ed media, b managemer s with the for mentation of s with,poten M. Seek ad purces Cana	stages of th uild awaren nt of used no ederal gover of APM and utially affect vice of Elder da to imples	ess among uclear fuel a roment and support for ed provincials on interwinent a procession form your inform your	the potentiand APM.  with poter NWMO as al and region reaving of A ress to mee	in key decision cally affected of catally affected implementer. canal Aboriginal aboriginal Trace of NWMO's wo	governments to support their litional Knowledge and western s statutory obligations with
Deliverables										
Assumptions										
Schedule	Start Year			26	2035			Finish Year	. 55	2064
Туре	Fixed									
Calculations										
and Notes:						ı				
Labour (		Materia	al Costs		r Costs		otal	Allowand		Total Cost
\$	61,893,586	\$	-	\$	-	\$ 6	1,893,586	\$	15,473,396	\$ 77,366,982

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### **Work Element Definition Sheet**

WBS (New)	560	05	10	50	10				Prepared By: CV/KS
WBS (Old)	0			• • • • • • • • • • • • • • • • • • •					
	<u> </u>								
WBS Title	TITLE: APN	1 Social – St	affing – Buil	lding Relati	onships				
Description	Tasks ii								
		ı <u>l Tasks</u> :		f A .l	N NA	/ A DI	4) :- +l :		
	1			•		•	•	nvolvement of those who	ns through open, transparent and
	•	re engagem	_	-	ioute, at all	stages of the	iiiipieiiiei	itation and in key decision	is through open, transparent and
		0 0	•						
	•	-					_		Canadian public, including
	Aborigi	nal people a	about the N	WMO, the	managemer	nt of used nuc	lear fuel a	and APM.	
	1	-		-		_			provincial and local governments
	to supp	ort their in	volvement i	n the imple	mentation o	of APM and su	ipport for	NWMO as implementer.	
		Davalan and	l maintain r	alationchin	with noton	tially affected	l provinci	al and regional Aboriginal	governments to support their
	:	-		-		-	-	-	litional Knowledge and western
					original peo		OII IIICI W	reaving of Aboriginal Trac	intolial knowledge and western
	:				ources Cana	da to implem	ent a pro	cess to meet the NWMO's	s statutory obligations with
	respect	t to the Crov	wn's duty to	consult.					
	- 1	mplement o	communicat	tions and le	arning oppo	rtunities to ir	form you	ng people of NWMO's wo	ork.
		•			0		•	unication vehicles to ider	
	•	ement in fu			oi website, e	engagement a	na comm	iunication venicles to idei	itily opportunities for
	iiiipiov	ement in iu	ture initiati	ves.					
	ļ								
Deliverables	ļ								
Deliverables	ļ								
Assumptions	ļ								
Assumptions									
	<u> </u>								
Schedule	Start Year			56	2065			Finish Year 125	2134
	 !			A					
Туре	Fixed								
Calculations	•		•••••		••••••				
and Notes:	<u> </u>								
Labour (	Costs	Materi	al Costs	Othe	r Costs	Subto	tal	Allowance 25%	Total Cost
\$ 8	37,387,208	\$	-	\$	-	\$ 87	387,208	\$ 21,846,802	\$ 109,234,010

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### **Work Element Definition Sheet**

WBS (New)	560	05	10	60	10				Prepared By: CV/KS
WBS (Old)									A
WBS Title	TITLE: APM	1 Social – St	affing – Bui	lding Relation	onships				
Description	Tasks ir								
	. —	<u>l Tasks</u> :							
	1			•		• ,			are potentially affected,
	•	•	•	•	oute, at all	stages of the implei	nentation and	in key decisio	ns through open, transparent and
	inclusiv	e engagem	ent process	es.					
	- T	hrough con	nmunicatio	ns and earn	ed media, b	uild awareness amo	ng the potenti	ally affected (	Canadian public, including
	Aborigi	nal people a	about the N	IWMO, the	managemer	nt of used nuclear fu	el and APM.		
		Dovolon and	d maintain i	rolationshin	c with the f	ederal government	and with noten	tially affected	I provincial and local governments
	•	•				of APM and support	•	•	
	το σαρμ	ort their in	voiveillent	in the imple	mentation	or Ai ivi aria support	ioi ivvivio as	implementer.	
	<b>.</b>	-		-			_	_	governments to support their
	•		-				erweaving of A	boriginal Trac	ditional Knowledge and western
	science	and respec	tful engage	ement of Ab	original peo	ples.			
	- (	Continue to	work with I	Natural Res	ources Cana	da to implement a p	rocess to mee	t the NWMO'	s statutory obligations with
	respect	to the Crov	wn's duty to	consult.					
	- I	mplement o	communicat	tions and le	arning oppo	ortunities to inform	oung people o	f NWMO's wo	ork.
		•							
	•				of website, e	engagement and co	nmunication ve	ehicles to ider	ntify opportunities for
	Improv	ement in fu	ture initiati	ves.					
Deliverables									
Assumptions									
				· · · · · · · · · · · · · · · · · · ·					
Schedule	Start Year			126	2135		Finish Year	150	2159
Туре	Fixed								
Calculations									
and Notes:	<u> </u>			1		1			
Labour		1	al Costs		r Costs	Subtotal	Allowance		Total Cost
\$	18,283,456	\$	-	\$	-	\$ 18,283,4	56 \$	4,570,864	\$ 22,854,320

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### **Work Element Definition Sheet**

WBS (New)	560	10	10	10	40					Prepared By: CV/KS
WBS (Old)				0						·
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange					
Description	Tasks ir	nclude:								
ı	,	`amplata an	d publich r	ovious of us	ad fual ran	rococcing and	l altornatio	vo wasto man	agament to	chnologies
	•	-	•		-	ries and proje		ve waste mana	agement te	chhologies.
	•		•					nplementatio	n	
				-		_		-		build nuclear reactors on APM in
								be managed.		
	- A	Advance NW	'MO's unde	rstanding o	f insight fro	m Aboriginal	Traditiona	al Knowledge t	that may gu	ide implementation of APM.
	•			sted acaden	nics in Cana	da and intern	ationally t	to access the b	est knowle	dge and practices in social and
	commu	ınity-based ı	processes.							
	- F	articipate ir	n internatio	nal projects	and collab	oration for sh	aring info	rmation and b	est practice	2S.
Deliverables										
A										
Assumptions										
Calaadiila	Chart Va-				2040			Finiah Vaa	^	2010
Schedule	Start Year			1	2010			Finish Year	9	2018
Туре	Fixed									
. , pc	. IACU									
Calculations										
and Notes:										
Labour	Costs	Materia	al Costs	Other	Costs	Subto	otal	Allowance	25%	Total Cost
\$	3,440,250	\$	-	\$	-	\$ 3	,440,250	\$	860,062	\$ 4,300,312

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### **Work Element Definition Sheet**

WBS (New)	560	10	10	20	30			Prepared By: CV/KS
WBS (Old)								
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange			
Description	- A - C terms c - A - C	Complete an Annually upon Continue to a Continue to a for volume and Advance NW Collaborate Annity-based passed pa	date and puresearch cital assess devend potentia (MO's underwith interesprocesses.	blish used to blish used to be be be be be be be be be be be be be	fuel inventories and concorn environme stics of differ insight from the concorn in Canada.	rent used fuel types to m Aboriginal Traditiona da and internationally t	nplementation. s and the impact of be managed. If Knowledge that m o access the best kn	new build nuclear reactors on APM in ay guide implementation of APM. nowledge and practices in social and
Deliverables	- r	articipate ii	i internatio			oration for sharing info	mation and best pro-	actices.
Assumptions								
Schedule	Start Year			10	2019		Finish Year	15 2024
Туре	Fixed							
Calculations and Notes:								
Labour (			al Costs		r Costs	Subtotal	Allowance 25	
\$	2,241,427	\$	-	\$	-	\$ 2,241,427	\$ 560,	.357 \$ 2,801,783

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#### **Work Element Definition Sheet**

WBS (New)	560	10	10	30	10					Prepared By: CV/KS
WBS (Old)										
WBS Title	TITLE: APM	1 Social – St	affing – Ada	apting to Ch	nange					
Description	Tasks ir	nclude:								
	- (	Complete ar	nd publish r	eviews of u	sed fuel rep	rocessing a	nd alternat	ive waste mar	nagement t	echnologies.
	- A	Annually up	date and pu	ublish used	fuel invento	ries and pro	ojections.			
	=							implementati	on.	
	- (	Continue to	assess deve	elopments i	n environm	ental and e	nergy polic	ies and the im	pact of nev	v build nuclear reactors on
	APM in	terms of vo	olume and p	potential ch	aracteristic	s of differer	nt used fuel	types to be m	nanaged.	
	l .							1.00		
	- A	Advance NW	VMO's unde	erstanding (	of insight fro	om Aborigin	al Tradition	ial Knowledge	that may g	uide implementation of APM.
					mics in Cana	ida and inte	rnationally	to access the	best knowl	edge and practices in social
	and cor	mmunity-ba	sed proces	ses.						
	- F	Participate i	n internatio	onal project	s and collab	oration for	sharing info	ormation and	best praction	ces.
	<u></u>									
Deliverables										
Assumptions										
				y				y		
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
Calculations	<u> </u>		•••••			•••••••				
and Notes:										
Labour	Costs	Materi	al Costs	Other	r Costs	Suht	otal	Allowance	25%	Total Cost
\$	1,289,166	\$	-	\$	-		1,289,166	\$	322,292	\$ 1,611,458
Υ	1,203,100	٧ .		7	_	٧ .	1,200,100	l 7	322,232	7 1,011,430

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#### **Work Element Definition Sheet**

WBS (New)	560	10	10	40	10				Prepared CV/KS
WBS (Old)									
WBS Title	TITLE: APM	l Social – St	affing – Ada	pting to Ch	iange				
Description	- A - C - C APM in - A	complete and annually upon continue to continue to terms of volume to determs of volume to determs of volume NW.	date and puresearch cit assess deve olume and pure and pu	iblish used in the cizen prioritical prioritical contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding contential charstanding charstand charstand charstand charstand charstand charstand charstand charstand charstan	fuel invento ies and con n environm aracteristic of insight fro	s of different used for a second to the seco	M implementat licies and the in iel types to be r onal Knowledg	ion. npact of nev managed. e that may g	v build nuclear reactors on guide implementation of APM.
Deliverables	- P	articipate ii	n internatio	nal project	s and collab	oration for sharing i	nformation and	l best practi	ces.
Assumptions									
Schedule	Start Year			26	2035		Finish Year	55	2064
Туре	Fixed								
Calculations and Notes:									
Labour			al Costs		Costs	Subtotal	Allowance	25%	Total Cost
\$	2,361,820	\$	-	\$	-	\$ 2,361,82	0 \$	590,455	\$ 2,952,275

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### **Work Element Definition Sheet**

WBS (New)	560	10	10	50	10					Prepared	CV/KS
WBS (Old)										·····	
WBS Title	TITLE: APM	Social – Sta	affing – Ada	pting to Ch	ange						
Description	Tasks in	clude:									
	- A - C in term: - A - C commu	nnually upo ontinue to ontinue to s of volume dvance NW ollaborate nity-based	date and puresearch cit assess deve and potent 'MO's unde with interes processes.	blish used fizen prioriti lopments ir tial characte rstanding o	uel invento les and con n environme eristics of di f insight fro nics in Cana	ries and p cerns relatental and of fferent us m Aborigi	rojections.  ing to APM ing to APM ing to APM ingenergy policions and Traditions  and Traditions  are the area of	to be manag al Knowledge	on. pact of new ed. that may gu best knowle	build nuclea ide implem dge and pra	ar reactors on APM entation of APM. actices in social and
Deliverables											
Assumptions											
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations											
Labour			al Costs		Costs		btotal	Allowance			otal Cost
\$	5,510,912	\$	-	\$	-	\$	5,510,912	\$	1,377,728	\$	6,888,641

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#### **Work Element Definition Sheet**

WBS (New)	560	10	10	60	10					Prepared	CV/KS
WBS (Old)										·····	
WBS Title	TITLE: APM	1 Social – St	affing – Ada	pting to Ch	ange						
Description	Tasks in	ıclude:									
	- A - C in term: - A - C commu	continue to continue to so f volume davance NW collaborate volumes.	and puresearch cit assess deve and potent 'MO's unde with interes processes.	blish used fizen prioriti lopments ir cial characte rstanding o	uel invento es and cond environme eristics of di f insight fro nics in Canad	ries and cerns re ental and fferent in m Abori da and i	used fuel types	mplementation es and the impa to be managed al Knowledge to so access the b	n. act of new d. d. hat may gu est knowle	build nucle ide implen dge and pr	ear reactors on APM nentation of APM. ractices in social and
Deliverables											
Assumptions											
Schedule	Start Year			126	2135			Finish Year	150	2159	
Туре	Fixed										
Calculations											
Labour	Costs	Materi	al Costs	Othe	Costs		Subtotal	Allowance	25%		Total Cost
\$	1,968,183	\$	-	\$	-	\$	1,968,183	\$	492,046	\$	2,460,229

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	10	10	20					Prepared	By: CV/KS
WBS Title	TITLE: APM	1 Social – St	affing – Sit	ing Process							
Description	meet th	<u>l:</u> IWMO will i ne expectati	ions of Can	adians and	address the	ir key issue	s, such a		on of huma	ns and the	ection process must environment, operations.
	- R request - C - S	:. Conduct scree elect the 1-	community eenings and 2 willing co	requests for reque	asibility stud	dies and fiel rward to de	d upon r tailed sit	ering "Learn Mequest of come characterized in moving to	nmunities.		livering briefings on
	- A	s required,	provide de	edicated reg	gional NWM	O staff/sup	port in co	ommunities p	rogressing t	through sit	ing process.
	nrincinl - F	es and fram or the com	neworks munities se	elected for o	detailed site	characteriz	ation, in	itiate the esta	blishment o	of centres of	Board-approved of expertise as hubs unity well-being.
	local ne	eds to supp	ort comm	unity-based	discussions	of APM pro	oject and		advice of m	unicipal as	nat are responsive to sociations and
	both cr	ystalline an	d sediment	tary setting	s by 2012.						t candidate sites in
	- P	rovide engi	neering de	sign and pr	eliminary sa	fety assessi	ments to	support eval	uation of ca	ndidate sit	es.
Deliverables					O and comm			mal hosting ag	greement		
Assumptions											
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations											
and Notes: Labour C	osts.	Materi	al Costs	Otho	r Costs	Subto	ntal	Allowance	25%		Total Cost
	7,668,572	\$	-	\$	-		568,572	\$	9,417,143	\$	47,085,715

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#### **Work Element Definition Sheet**

WBS (New)	560	15	10	20	20	ļ				Prepared	l CV/K	S
WBS (Old)	<u> </u>	<u> </u>		<u> </u>	<u>i</u>	<u> </u>	. <u>.l</u>					
WBS Title	TITLE: APN	1 Social – St	affing – Siti	ng Process								
Description	Tasks ir	oclude:										
Description	Genera											
					-			ent. The exe				
								the protection ence in the N\				ent, fairness
				,						-,		
	Tacks S	pecific to Si	ting Drocos	c Dhaca:								
					or capacity-	building b	/ administer	ring "Learn M	ore" progran	n and deli	vering br	iefings on
	reques	t.										
	- (	Conduct scre	eenings and	l initiate fe	asibility stu	dies and fi	eld upon red	quest of comr	nunities.			
	•		-					characterizat				
	•	-						in moving to on munities pro				5.
						,		·			01	
				benefits fo	r communi	ties in adva	inced stages	s of siting pro	cess consiste	ent with B	oard-app	roved
	: '	es and fram or the comi		lected for	detailed site	e character	ization. initi	iate the estab	lishment of a	centres of	expertise	as hubs of
	•						,	he site and d				
	,	`antinua ast	tivitias ta b	معمسم اماني	acconfithe	ADA4 siting	250000 D	مانطوم مواويد	ovbibite on	d tools the	** *** ***	nansiya ta
	1					-	•	evelop mobile siting. Seek a				
	Aborigi	nal organiza	ations on de	esign of inf	ormation a	nd tool kits	to support	community-c	riven siting p	orocess.		
		Develop tool ystalline and			_	tailed geo	scientific sit	e investigatio	ns and evalu	ations at	candidate	sites in
	•			ary securig	S Dy 2012.							
				cian and n	oliminarys	afoty accor	cmonts to s	unnort ovalu	tion of cand	idata cita	_	
		rovide erigi	neering de	sign and pi	eliminary s	afety asses	sments to s	upport evalua	ation of cand	lidate site	S.	
Deliverables										idate site	s.	
Deliverables	- S	election of	preferred s	ite. NWM	O and comr	nunity ent		al hosting agr		lidate site	S.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	s.	
Deliverables  Assumptions	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		idate site	s.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	s. 	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	s.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		idate site	S	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		idate site	s.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		idate site		
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	s.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	s.	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	s.	
Assumptions	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		lidate site	S	
	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr		2024	S	
Assumptions	- S	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr	eement		S	
Assumptions  Schedule  Type	- S - C	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr	eement		S	
Assumptions	- S - C	election of	preferred s	ite. NWM	O and comr	nunity ent	er into form	al hosting agr	eement		S	
Assumptions  Schedule  Type  Calculations and Notes: Labour (	- S - C	election of Continued s	preferred s	ite. NWM ost commi	O and comr	nunity ent	er into form	al hosting agr	eement 15		Total Co	st 23,282,264

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### **Work Element Definition Sheet**

WBS (New)	560	05	10	10	100	Prepared J. Facella
WBS (Old)						
WBS Title	PROVINCI <i>A</i>	AL STAKEHO	LDER ENGA	GEMENT		
Description	Ongoing ir plan.	volvement	of provincia	al opinion l	eaders thro	ough briefings and periodic dialogue sessions focused on the implementation
Deliverable	Ensure und	derstanding	of project a	ctivities an	d forum for	r identification of issues that need to be addressed that may effect licensing.
Assumptions						
Schedule	Start Year			2	2011	1 Finish Year 6 2015
Туре	Fixed					
Calculations and Notes:						

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#### **Work Element Definition Sheet** NWMO Cost Code: 0170020-19 WBS (New) Prepared By: P. Simmons 560 05 10 10 WBS (Old) **BUILDING RELATIONS** - Regional Engagement -**WBS Title** COMMUNITY, SERVICE and ADVOCACY BRIEFINGS Description Category currently includes speaking engagements and briefings on request to community groups and their committees in the 4 nuclear cycle provinces and includes local, regional, and provincial organizations. Community groups include the Canadian Association of Nuclear Host Communities (CANHC), Durham Nuclear Health Committee (DNHC), Pickering Community Advisory Committee (PCAC), Point Lepreau Community Liaison Committee (PLCLC), Community Consultation Advisory Group (CCAG – Bruce County); provincial groups include Chambers of Commerce; and regional groups include service clubs, smaller chambers of commerce and boards of trade, educational institutions among others. Costs include travel-related expenses for staff participating in speaking engagements/briefings, special events and award ceremonies (tickets and registration fees), on or off-site meetings/briefing related costs (catering, meeting room, A/V), sponsorships, and membership fees. Deliverable This category's primary deliverable is fostering and building relationships with community leaders and members, and increasing awareness of the NWMO and APM. The secondary deliverable is maintaining the brand, and relationships with groups already aware of the NWMO and providing updates and progress reports to those bodies. These costs and activities, as outlined, assist in the distribution of information, support brand recognition, and provide networking opportunities. Currently the NWMO participates, on average, in 12 community organization meetings/briefings per year. As the siting process Assumptions progresses and specific communities express interest in the project, it is expected that requests for briefings from community organizations will increase significantly in the potentially interested host communities and surrounding regions, and among communities along potential, or assumed, transportation routes, and in existing nuclear host communities and their respective regions. Beyond the potentially interested host communities, it is reasonable to expect interest may also be expressed after the site selection process is initiated from transportation communities, first responder/emergency services groups, planning advisory groups and boards, and newly formed community groups responding to opportunity and local interest. In some cases these will be affiliated with the municipality expressing interest, in others it may be adjacent communities, or larger regional areas. Membership in national, provincial, and local chambers of commerce (potentially several) is also assumed as being prudent and reasonable as are public-policy events, and related AGM's and special events. This requirement is expected to reduce by 50% once a site Despite potentially being at Step 5 of the site selection process by 2018, the involvement and interaction with community groups large and small is not expected to diminish, in fact the opposite is more likely, and will continue through to the construction commencement of the APM DGR in 2035 Schedule 2010 Finish Year 2018 Start Year Type Fixed Calculations Estimated minimum 12 meetings per year in Ontario assumes: CANHC (2-1 in Ottawa, 1 in GTA), DNHC (4), PCAC (1), and Notes: CCAG (2), Provincial Chamber of Commerce briefing (1), and 2 potential community organization briefings (e.g. educational institutions, planning boards). Comparable groups in other nuclear provinces, but at 50% = 6 meetings (fewer orgs.) Memberships with Chambers of commerce – National, provincial and select local. Cost per meeting: varies depending on location and duration. An estimated \$2500 per meeting is reasonable for this purpose (each meeting requires 3 NWMO staff). In the assumptions the increase/frequency of meetings is expected to increase around 2018, and will continue to 2024 and reduce by 50% to 2035. With unknown changes to meeting frequency, as well as locations, or other resource requirements the annual estimates should reflect an a modest increase versus decrease until 2035. Approved Y01 (2010) budget \$50,000 Preliminary Estimates Y02 - Y09 (2011 - 2018) - 8 x \$200,000 = \$ 1,600,000 Y10 - Y15 (2019 – 2024) - 6 x \$200,000 = \$1,200,000 Y16 - Y25 (2025 - 2034) - 10 x \$200,000 = \$2,000,000 **Material Costs** Allowance **Total Cost Labour Costs** Other Costs Subtotal 25% 1.650.000 1.650.000 412,500 2.062.500

**APM Cost Estimate** 

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#### **APM Cost Estimate Work Element Definition Sheet** NWMO Cost Code: 0170020-19 WBS (New) 560 05 10 20 100 Prepared By: P. Simmons WBS (Old) BUILDING RELATIONS Community Engagement (50k) · Regional Engagement -**WBS Title** COMMUNITY, SERVICE and ADVOCACY BRIEFINGS Description Category currently includes speaking engagements and briefings on request to community groups and their committees in the 4 nuclear cycle provinces and includes local, regional, and provincial organizations. Community groups include the Canadian Association of Nuclear Host Communities (CANHC), Durham Nuclear Health Committee (DNHC), Pickering Community Advisory Committee (PCAC), Point Lepreau Community Liaison Committee (PLCLC), Community Consultation Advisory Group (CCAG – Bruce County); provincial groups include Chambers of Commerce; and regional groups include service clubs, smaller chambers of commerce and boards of trade, educational institutions among others. Costs include travel-related expenses for staff participating in speaking engagements/briefings, special events and award ceremonies (tickets and registration fees), on or off-site meetings/briefing related costs (catering, meeting room, A/V), sponsorships, and membership fees. Deliverable This category's primary deliverable is fostering and building relationships with community leaders and members, and increasing awareness of the NWMO and APM. The secondary deliverable is maintaining the brand, and relationships with groups already aware of the NWMO and providing updates and progress reports to those bodies. These costs and activities, as outlined, assist in the distribution of information, support brand recognition, and provide networking opportunities. Assumptions Currently the NWMO participates, on average, in 12 community organization meetings/briefings per year. As the siting process progresses and specific communities express interest in the project, it is expected that requests for briefings from community organizations will increase significantly in the potentially interested host communities and surrounding regions, and among communities along potential, or assumed, transportation routes, and in existing nuclear host communities and their respective regions. Beyond the potentially interested host communities, it is reasonable to expect interest may also be expressed after the site selection process is initiated from transportation communities, first responder/emergency services groups, planning advisory groups and boards, and newly formed community groups responding to opportunity and local interest. In some cases these will be affiliated with the municipality expressing interest, in others it may be adjacent communities, or larger regional areas. Membership in national, provincial, and local chambers of commerce (potentially several) is also assumed as being prudent and reasonable as are public-policy events, and related AGM's and special events. This requirement is expected to reduce by 50% once a site is selected. Despite potentially being at Step 5 of the site selection process by 2018, the involvement and interaction with community groups large and small is not expected to diminish, in fact the opposite is more likely, and will continue through to the construction commencement of the APM DGR in 2035. Schedule Start Year 10 2019 Finish Year 2024 Type Fixed Estimated minimum 12 meetings per year in Ontario assumes: CANHC (2 – 1 in Ottawa, 1 in GTA), DNHC (4), PCAC (1), Calculations and Notes: CCAG (2), Provincial Chamber of Commerce briefing (1), and 2 potential community organization briefings (e.g. educational Comparable groups in other nuclear provinces, but at 50% = 6 meetings (fewer orgs.) Memberships with Chambers of commerce – National, provincial and select local. Cost per meeting: varies depending on location and duration. An estimated \$2500 per meeting is reasonable for this purpose (each meeting requires 3 NWMO staff). In the assumptions the increase/frequency of meetings is expected to increase around 2018, and will continue to 2024 and reduce by 50% to 2035. With unknown changes to meeting frequency, as well as locations, or other resource requirements the annual estimates should reflect an a modest increase versus decrease until 2035. Approved Y01 (2010) budget \$50,000 **Preliminary Estimates** $Y02 - Y09 (2011 - 2018) - 8 \times $200,000 = $1,600,000$ Y10 - Y15 (2019 - 2024) - 6 x \$200,000 = \$1,200,000 Y16 - Y25 (2025 - 2034) - 10 x \$200,000 = \$2,000,000 **Labour Costs Material Costs** Other Costs Subtotal Allowance 25% **Total Cost** 1.200.000 \$ 1.200.000 \$ 300.000 \$ 1.500.000

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#### **APM Cost Estimate Work Element Definition Sheet** NWMO Cost Code: 0170020-19 WBS (New) 560 05 Prepared By: P. Simmons 10 30 WBS (Old) BUILDING RELATIONS – Regional Engagement -Community Engagement (50k) **WBS Title** COMMUNITY, SERVICE and ADVOCACY BRIEFINGS Description Category currently includes speaking engagements and briefings on request to community groups and their committees in the 4 nuclear cycle provinces and includes local, regional, and provincial organizations. Community groups include the Canadian Association of Nuclear Host Communities (CANHC), Durham Nuclear Health Committee (DNHC), Pickering Community Advisory Committee (PCAC), Point Lepreau Community Liaison Committee (PLCLC), Community Consultation Advisory Group (CCAG – Bruce County); provincial groups include Chambers of Commerce; and regional groups include service clubs, smaller chambers of commerce and boards of trade, educational institutions among others. Costs include travel-related expenses for staff participating in speaking engagements/briefings, special events and award ceremonies (tickets and registration fees), on or off-site meetings/briefing related costs (catering, meeting room, A/V), sponsorships, and membership fees. Deliverable This category's primary deliverable is fostering and building relationships with community leaders and members, and increasing awareness of the NWMO and APM. The secondary deliverable is maintaining the brand, and relationships with groups already aware of the NWMO and providing updates and progress reports to those bodies. These costs and activities, as outlined, assist in the distribution of information, support brand recognition, and provide networking opportunities. Currently the NWMO participates, on average, in 12 community organization meetings/briefings per year. As the siting process Assumptions progresses and specific communities express interest in the project, it is expected that requests for briefings from community organizations will increase significantly in the potentially interested host communities and surrounding regions, and among communities along potential, or assumed, transportation routes, and in existing nuclear host communities and their respective regions. Beyond the potentially interested host communities, it is reasonable to expect interest may also be expressed after the site selection process is initiated from transportation communities, first responder/emergency services groups, planning advisory groups and boards. and newly formed community groups responding to opportunity and local interest. In some cases these will be affiliated with the municipality expressing interest, in others it may be adjacent communities, or larger regional areas. Membership in national, provincial, and local chambers of commerce (potentially several) is also assumed as being prudent and reasonable as are public-policy events, and related AGM's and special events. This requirement is expected to reduce by 50% once a site is selected. Despite potentially being at Step 5 of the site selection process by 2018, the involvement and interaction with community groups large and small is not expected to diminish, in fact the opposite is more likely, and will continue through to the construction commencement of the APM DGR in 2035. Schedule Start Year 2025 Finish Year 2034 16 Type Fixed Calculations Estimated minimum 12 meetings per year in Ontario assumes: CANHC (2 - 1 in Ottawa, 1 in GTA), DNHC (4), PCAC (1), and Notes CCAG (2), Provincial Chamber of Commerce briefing (1), and 2 potential community organization briefings (e.g. educational institutions, planning boards). Comparable groups in other nuclear provinces, but at 50% = 6 meetings (fewer orgs.) Memberships with Chambers of commerce – National, provincial and select local, Cost per meeting: varies depending on location and duration. An estimated \$2500 per meeting is reasonable for this purpose (each meeting requires 3 NWMO staff). In the assumptions the increase/frequency of meetings is expected to increase around 2018, and will continue to 2024 With unknown changes to meeting frequency, as well as locations, or other resource requirements the annual estimates should reflect an a modest increase versus decrease until 2035. Approved Y01 (2010) budget \$50,000 **Preliminary Estimates** Y02 - Y09 (2011 - 2018) - 8 x \$200,000 = \$ 1,600,000 Y10 - Y15 (2019 – 2024) - 6 x \$200,000 = \$1,200,000 Y16 - Y25 (2025 - 2034) - 10 x \$200,000 = \$2,000,000

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Other Costs

2.000.000

Subtotal

2.000.000

Allowance

25%

500.000

**Total Cost** 

2.500.000

**Labour Costs** 

**Material Costs** 

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					Work Elem	ent Defini	tion Sheet			NWMO Cost Code: 0170030 31
WBS (New)	560	05	10	10	120		;			NWMO Cost Code: 0170020-21 Prepared By: P. Simmons
WBS (Old)		<u> </u>					1			
MOC THE		RELATIONS		ngagement	– MUNCIPA	AL FORUM	MEETINGS (	150)		
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	The Forum	consists of	15 individua	al organizati	ions whom	are invited	to participa	e at the mee	tings typical	ly held up to 4 times per year.
		ipal Forum o				(avg. 3). T	o date the m	eetings have	been held ir	Toronto (at the NWMO offices),
Deliverable	with a seco	ondary deliv	erable of pr	oviding insi	ght, comme	nt and ad	ice on existi		ing local gov	cipally related areas of interest, vernment policy areas potentially
	NWMO lia		unicipal asso	ociations, ar	nd provide g					nembers, facilitate effective ssist municipalities in considering
	techniques	s and best po storage facil	ractices, and	the recipro	ocal educati	ng of the I	orum memb	ers on APM a	nd the NWI	sight on effective communication MO including coordinated tours e is well-received and assists in
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	potential h set of issue potential t	nost (Step 5) es that prom ransportatio	, the Forum opt municipa on communi	will likely b alities to tur ities. Futur	e disbande n to their A e meetings	d or signifi ssociation of Forum	cantly change s for guidanc and their sco	ed in scope to e/interaction	reflect, a. b with the NV own and ma	iate with the NWMO to be a eing at Step 5, and/or b. a new VMO such as those affecting the y include an evolved Forum
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Schedule	Start Year			1	2010			Finish Year	9	2018
Туре	Fixed									
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Calculations and Notes:	- ca - -	1-2 edu tering costs Potentia Potentia	cational exc ). al travel to d al expenses/	ursions = \$3 other provin per diems	3k (includes ces for mee for guest sp	lengthene etings (e.g. eakers	SK, NB)	accommodati		group (bus) transportation, and
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\$	-	\$	-	\$	1,100,000	\$	1,100,000	Ş	275,000	\$ 1,375,000

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Work Elevan								stimate				
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BULDING BLATIONS - Regional Engineering - MANICANE (DIDUM MATTINGS (130))		560	05	10	20	110					Prepared By:	P. Simmons
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potential host (Step 5), the Forum will likely be disbanded or significantly changed in scope to reflect, a. being at Step 5, and/or b. a ne set of issues that prompt municipalities to turn to their Associations for guidance/interaction with the NWMO such as those affecting to potential transportation communities. Future meetings of Forum and their scope not known and may include an evolved Forum dealing with newer and emerging municipal issues concerning communities on the transportation routes.  Schedule  Start Year  10  2019  Finish Year  15  2024  Type  Fixed  Calculations  - 4 meetings per year @ \$20k per meeting = \$80k for total meeting costs.  - 1-2 educational excursions = \$3k (includes lengthened/extended accommodations, meals, group (bus) transportation, at catering costs).  - Potential travel to other provinces for meetings (e.g. SK, NB)  - Potential expenses/per diems for guest speakers  - Potential expenses for Forum Members to attend future, and other NWMO events such as an international Frum/expo in 2011.  - Current commitment for Forum to 2011  - Current budget Y01 (2010) budget - \$150,000  Y02 (2011) - Y04 (2013) 3 x \$150,000 = \$450,000  Y05 (2014) - Y09 (2018) 5 x \$100,000 = \$500,000  Y06 (2014) - Y09 (2018) 5 x \$100,000 = \$1,600,000  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost		as well as i also includ educationa members a	related expe le the necess al excursions additional ex	enses for of sary on and s is expecte xpertise in t	ff-site ed d off-site ed to be I the form	ucational excu meeting expe neld per year. of guest spea	rsions fo nses (ca Finally, a kers at f	or Forum Mei tering, meeti and dependin Forum meetir	mbers (e.g. tour ng room, A/V), a g on the issues	of Darlingto and it is cont being discus	on Dry Storage Fa emplated that o sed and raised b	acility). Costs can ne or more y Forum
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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	140					Prepared By:	J. Robinson
WBS (Old)				A							
WBS Title	GOVERNM	ENT RELATI	ONS MEETI	NGS							
Description	· Bi	o Quar o Annu o Minir NWMO f o Minir o One- o One-	terly in-pei lal in-person mum of one file mum of one on-one brie on-one brie	rson briefing we annual in-person briefing we annual croundings as requirings as req	gs with Natu ith the Mini person brief ss-departm uired with I uired with i	ural Resourd ster of Natu ing with rep ental briefin Ministers of ndividual M	es Canada, iral Resourc iresentative ig in each p relevant po Ps, MPPs, N	ces Canada, or es from the les rovince and a portfolios at fec	r as required ad provincia t the federa deral and pr if there is co	d al department/i I level ovincial levels	ministry for the est within their
Deliverable	• В	uild relation uild underst acilitate dec	anding of a			ect and pro	cess.				
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registratio	n.				
Schedule	Start Year			6	2015			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	E	011 – 2015, 016 – 2064,			g, \$200K/yea	ar then \$100	0k/year 206	55 - 2100.			
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,350,000	\$	1,350,000	\$	337,500	\$	1,687,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	130					Prepared B	<b>y:</b> J. Robins	son
WBS (Old)		<u></u>		<u></u>		<b></b>						
WBS Title	GOVERNM	ENT RELATI	ONS MEETI	NGS								
Description	• В	o Quar o Annu o Minir NWMO f o Minir o One- o One-	terly in-pei ial in-person mum of one file mum of one on-one brie on-one brie	rson briefing w n briefing w e annual in- e annual cro efings as req efings as req	gs with Natu ith the Mini person brief iss-departm juired with I juired with I	ural Resource ster of Natu ing with rep ental briefin Ministers of ndividual Mi	es Canada, ral Resourc resentative g in each pi relevant po Ps, MPPs, N	ces Canada, or es from the lea rovince and a portfolios at fec	as required ad provincia t the federa deral and pr f there is co	d al departmen al level ovincial leve	nt/ministry fo els terest within	
Deliverable	• в	uild relation uild underst acilitate dec	anding of a		. ,	ect and proc	ess.					
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registration	า.					
Schedule	Start Year			10	2019			Finish Year	15	2024		
Туре	Fixed											
Calculations and Notes:	· 2	016 – 2064,	same level	of spending	g, \$200K/ye	ar then \$100	k/year 206	55 - 2100.				
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%		Total Cost	
\$	-	\$	-	\$	1,200,000	\$	1,200,000	\$	300,000	\$	1,!	500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	110				Prepared By:	J. Robinson
WBS (Old)	ļ									
WBS Title	GOVERNM	IENT RELATI	ONS MEETI	NGS						
Description	. В	o Quar o Annu o Minir o Minir o One-	terly in-per al in-persor mum of one mum of one on-one brie on-one brie	rson briefing on briefing w e annual in-p e annual cro fings as req fings as req	gs with Natu ith the Mini person brief ss-departm uired with I uired with i	tatives from the nuclea ural Resources Canada, ster of Natural Resource ing with representative ental briefing in each po Ministers of relevant po ndividual MPs, MPPs, Nelegations at the OECD	every year ces Canada, or es from the le province and a portfolios at feo MLAs, MNAs,	r as required ad provinciant t the federa deral and profit there is co	d al department/i al level rovincial levels	·
Deliverable	• в	uild relation uild underst acilitate dec	anding of a		. ,	ect and process.				
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registration.				
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	· 2	016 – 2064,	same level	of spending	, \$200K/yea	ar then \$100k/year 206	55 - 2100.			
Labour	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	2,000,000	\$ 2,000,000	\$	500,000	\$	2,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	60				Prepared By	: J. Robinson
WBS (Old)		<u></u>	<u></u>	<u> </u>						
WBS Title	GOVERNM	IENT RELATI	ONS MEETI	NGS						
Description	. В	o Quar o Annu o Minii NWMO i o Minii o One- o One- riding	rterly in-person ual in-person mum of one file mum of one on-one brie on-one brie	rson briefing we annual in- e annual in- e annual cro efings as rec	gs with Natu vith the Mini person bried oss-departm quired with I quired with I	tatives from the nucle ural Resources Canada ster of Natural Resour ing with representativ ental briefing in each Winisters of relevant p ndividual MPs, MPPs, elegations at the OECI	, every year rees Canada, o res from the le province and a ortfolios at fe MLAs, MNAs,	r as required and provincial at the federal deral and pr if there is co	d al department al level rovincial level:	s
Deliverable	• в	uild relatior uild underst acilitate dec	tanding of a			ect and process.				
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registration.				
Schedule	Start Year			26	2035		Finish Year	55	2064	
Туре	Fixed									
Calculations and Notes:	· 2	016 – 2064,	same level	of spendin	g, \$200K/ye	ar then \$100k/year 20	65 - 2100.			
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Т	otal Cost
\$	-	\$	-	\$	6,000,000	\$ 6,000,000	\$	1,500,000	\$	7,500,000

560.05.10.40.60 152 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	50	30					Prepared By:	J. Robinson
WBS (Old)				<u></u>							
WBS Title	GOVERNM	ENT RELATI	ONS MEETI	NGS							
Description	· Bi	o Quar o Annu o Minii NWMO 1 o Minii o One- o One- riding	terly in-person mum of one file mum of one on-one brie on-one brie	rson briefing n briefing w e annual in- e annual cro efings as req efings as req	gs with Natu ith the Mini person brief ass-departm juired with I juired with i	ural Resourc ister of Natu fing with rep ental briefin Ministers of individual M	es Canada, ral Resourc resentative g in each pi relevant po Ps, MPPs, N	es Canada, ones from the le rovince and a portfolios at feo	r as required ad provincia t the federa deral and pr if there is co	d al department/ al level ovincial levels	ministry for the est within their
Deliverable	• В		anding of a	ind supporting where re		ect and prod	ess.				
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registratio	า.				
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations and Notes:	· 20	016 – 2064,	same level	of spending	g, \$200K/ye	ar then \$100	k/year 206	5 - 2100.			
Labour (	Costs	Materi	al Costs	Other	Costs	Subt	otal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	3,600,000	\$	3,600,000	\$	900,000	\$	4,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	150				Prepared By:	J. Robinson
WBS (Old)		<u> </u>		<u> </u>						
WBS Title	EDUCATIO	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS					
Description	Youth Rou technical a	ndtable, dev nd social dis Targeted Targeted ojects; Establish Opportu	velop an NV sciplines. The d outreach d outreach nment of sc unities to sp	VMO educa nis would in to relevant to key profe cholarships a consor yout!	ntion, outrea clude consider university considers essors to expland grants a h participati	O Youth Roundtable and capacity buildideration of Youth Roundles to provide inform plore opportunities to across relevant discipling on at relevant national estment in science fair	ng strategy fondtable recome ation sessions integrate the nes; I and internat	r young Can mendations ;; initiative in o ional confer	adians that inc s in such areas classroom dialo	orporates both as:
Deliverable										
Assumptions										
Schedule	Start Year			2	2011		Finish Year	9	2018	
Туре	Fixed									
Calculations	•	2 – Y55, \$20 66 - Y150 \$50	• •							
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	otal Cost
\$	-	\$	-	\$	1,600,000	\$ 1,600,000	\$	400,000	\$	2,000,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	140				Prepared By:	J. Robinson
WBS (Old)			<u> </u>	<u> </u>						
WBS Title	EDUCATIO	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS					
Description	Youth Rou technical a	ndtable, dev nd social dis Targeted	velop an NV sciplines. Th d outreach	VMO educanis would in	tion, outrea clude consid university c	O Youth Roundtable and capacity build deration of Youth Roulds to provide informations to opportunities to	ing strategy fo Indtable recom	r young Can nmendations	adians that inc s in such areas	orporates both as:
		Opportu	unities to sp	onsor yout	h participati	cross relevant discip on at relevant nation estment in science fa	al and internat		ences;	
Deliverable										
Assumptions										
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations		2 – Y55, \$20 66 - Y150 \$5								
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,200,000	\$ 1,200,00	\$	300,000	\$	1,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	120				Prepared By:	J. Robinson
WBS (Old)	ļ			<u></u>						
WBS Title	EDUCATIO	N SUPPORT,	/CURRICUL	UM/SCHOLA	ARSHIPS					
Description	Youth Rountechnical a	ndtable, dev nd social dis Targeted Targeted ojects; Establish Opportu	velop an NV sciplines. The doutreach doutreach nment of sc unities to sp	VMO educa nis would in to relevant to key profe cholarships a consor youth	tion, outreaclude considurity considers to expand grants and participati	ach and capacity deration of Yout lubs to provide plore opportuni across relevant o on at relevant r	ational and intern	for young Can mmendations ns; e initiative in a ational confer	adians that inco	orporates both as:
Deliverable		Promoti	on of scien	ce learning	through inv	estment in scier	nce fairs, camps, cl	ubs.		
Assumptions										
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations	Ē		. ,							
Labour (	Costs	Materia	al Costs	Other	Costs	Subtota	I Allowanc	e 25%	То	tal Cost
\$		\$	-	\$	2,000,000	\$ 2,00	00,000 \$	500,000	\$	2,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	70					Prepared B	<b>y:</b> J. Rob	inson
WBS (Old)												
WBS Title	EDUCATIO	N SUPPORT,	/CURRICUL	UM/SCHOLA	ARSHIPS							
								d the NWM0				
	=	-	•			•	•	ng strategy fo	, ,		•	es both
	technicai a	na social dis	sciplines. If	nis would in	ciude consid	deration of '	outh Roun	dtable recon	nmendations	in such area	as as:	
		Targeted	d outreach	to relevant i	university cl	ubs to prov	ide informa	ation session	s;			
		Targeted	d outreach	to key profe	ssors to exp	olore oppor	tunities to i	ntegrate the	initiative in	classroom di	alogues/sti	udent
	pr	ojects;										
		اماداما معامات		ممنطمسمامط			منامنه منام هم					
				holarships a	•		•	es; and internat	tional confor	oncoc:		
			-	-				and internal		ences;		
	•	FIUITION	on or scient	ce learning t	.iii ougii iiivi	estillellt ill s	cience rans	s, camps, ciu	<b>03.</b>			
l												
Deliverable												
Assumptions												
Schedule	Start Year			26	2035			Finish Year	55	2064		
				••••••								
Туре	Fixed											
Calculations												
		2 – Y55, \$20										
	· Y5	6 - Y150 \$50	0K/yr									
					<u> </u>				250/		<b>-</b>	
Labour (	osts		al Costs		Costs	Subt		Allowance			Total Cost	7.500.000
\$	-	\$	-	\$	6,000,000	\$	6,000,000	\$	1,500,000	\$		7,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	50	40			Prepared By: J. Robinson
WBS (Old)			<u></u>	<u> </u>				
WBS Title	EDUCATIO	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS			
Description	Youth Rou	ndtable, dev	velop an NV	VMO educa	tion, outrea	ch and capacity buildir	•	ntation Plan in response to the nadians that incorporates both ns in such areas as:
	pr	•			•	lubs to provide informa plore opportunities to i	•	ı classroom dialogues/student
		Opportu	unities to sp	onsor yout	n participati	cross relevant disciplin on at relevant national estment in science fairs	and international confe	erences;
Deliverable								
Assumptions								
Schedule	Start Year			56	2065		Finish Year 12	5 2134
Туре	Fixed							
Calculations	=	2 – Y55, \$20 66 - Y150 \$50						
Labour (	Costs	Materia	al Costs	Othe	Costs	Subtotal	Allowance 25%	Total Cost
\$		\$	-	\$	3,500,000	\$ 3,500,000	\$ 875,000	\$ 4,375,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	60	30			Prepared By: J. Robinson
WBS (Old)								
WBS Title	EDUCATIO	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS			
Description	Youth Roul technical a	ndtable, dev ind social dis Targeted Targeted ojects; Establish Opportu	velop an NV sciplines. Th d outreach d outreach hment of sc unities to sp	WMO education would in the relevant to key profescholarships ponsor yout	ation, outrea nclude considude university c essors to ex and grants a th participati	ach and capacity buildir deration of Youth Roun lubs to provide informa plore opportunities to i	ng strategy for young Car dtable recommendation ation sessions; ntegrate the initiative in es; and international confe	classroom dialogues/student
Deliverable Assumptions								
Schedule	Start Year			120	2135		Finish Year 150	) 2159
Туре	Fixed							
Calculations	•	2 – Y55, \$20 66 - Y150 \$50						
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance 25%	Total Cost
\$	-	\$	-	\$	1,250,000	\$ 1,250,000	\$ 312,500	\$ 1,562,500

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						Cost Estin					
						ent Definit	ion Sheet				ode: 0170020- <b>20</b>
WBS (New) WBS (Old)	560	05	10	10	130	ļ	ļ <u>-</u>		Pr	epared By:	P. Simmons
WBS Title	BUILDING	RELATIONS L ASSOCIAT	– Regional I	ngagemer	t - MUNIC	IPAL ASSOC	IATIONS (5	0)			
Description	relationshi	p building a	ind mainten	ance with i	municipal a	ind municip	ally-related	ssociations onli d associations inizations and	and organizati	ons in the 4 r	
								aff travel, acco			, booth/exhibit
			request to r s, Boards of			, their affilia	ates, or mu	inicipally-relate	ed organizatio	ns and group	s (e.g. Executive
	provinces.	Conferenc	e costs inclu	de staff re	gistration f	ees as deleg	gates or pai	ciation confere rticipants, exhi ved sponsorshi	ibitor participa		
			ipation at s gs (e.g. AM					unicipal-profe only	ssional and qu	asi-professio	nal) such as
Deliverable	new, relati	onships wit		ipal associ	ations and	their affiliat	ted organiz	sts in maintain ations, and the			ing, and building ssional
	gathering i	ntelligence		nunities an	d regions,			ase awareness s, providing su			of information, ognition, and
Assumptions											
•	temporary recommen negotiation	10% declin ded and pr Step 5 wit es or trade s	e in confere udent; the v h one or mo	ences can b various asso ore commu	e expected ociations te nities, and	. Maintainii nd to provi who may n	ng relations de support ot be mem		ed organizatio er. The decline liated associat	ns interested is the result ions. Presenc	is of being at the e at association
								the NWMO it he years to co		to assume a r	marginal
		elationship es in 2009/1		the followi	ng municip	al association	ons (althou	gh not all have	e requested/in	vited NWMC	presence at
	ONTARIO - QUEBEC - NEW BRUN	- 9 (AMO, N 4 (FMQ, UN SWICK - 4 IATIONAL –	SUMA, SARI IOMA & NW MQ, ADMQ, (UMNB, CNI 3 (FCM, CA 1FOA.	ORC, FONG APDEQ) BA, AFMNB	OM, ROMA , AMANB)		CO, OMAA	, AMCTO)			
			show locati tratford = c					al cost of partio	cipation (e.g. 2	2009 OSUM ir	n Cornwall =
	vary from : necessarily	10% to 25% commute er and the	. Consequer into the nex number of s	ntly, no ave t year as b	rage confe	rence fee/c cs will vary	ost is appli (new large	r exhibit, mod	e estimates. Co ules, and trans	ost of entry o sport), sponso	ne year does not
	administra that relatio	tors associa inships with	ations may r n all municip	ot be nece al associat	ssary in pro ions up to 2	ovinces that 2018 with p	t do not inc otential fo	nay become m lude a commu r minor expans net zero chango	inity in Step 5) sion of profess	. Nonetheles sional associa	s it is expected
								of NWMO sta		expenses, aut	o rental, mid-
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed			·····		······					
Calculations	Conference	es and Trad	es shows								
and Notes:				APO 00-							
	the transp	p, staff atte	endance, an ew exhibit a	nd display	in various o	configuratio	ns. Similar	ncrease in ann to other budg ons conference	et areas, an in		
	Y06 (2015)	- Y9 (2018	4) 4 x \$100 ) 4 x \$125,0 4) 16 x \$12	000 = \$ 5							
Labour (	Costs	Materi	al Costs	Other		Sub	total	Allowance	25%	Tota	al Cost
\$		\$	-	\$	950,000	\$	950,000	\$	237,500 \$		1,187,500

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				Cost Estimate ent Definition Sheet			
				ent pennition sneet			ost Code: 0170020- <b>20</b>
WBS (New) WBS (Old)	560	05 10	20 120			Prepared	By: P. Simmons
		RELATIONS – Regional E	ngagement - MUNICIP	AL ASSOCIATIONS (50)			
WBS Title	MUNICIPA	L ASSOCIATIONS					
Description	relationship	specific to local (munic o building and maintena and includes both nation	nce with municipal an	d municipally-related a	ssociations and o	organizations in the	
		ssociated with this cate and related expenses in					ons, booth/exhibit
	specific cor	rovided on request to m nmittees, Boards of Dire	ectors),			-	
	provinces.	elated fees to participal Conference costs includitics costs), exhibitor boo	le staff registration fee	es as delegates or partic	ipants, exhibitor		
		e and participation at sp etings (e.g. AMCTO) up			icipal-profession	al and quasi-profe	ssional) such as sector
Deliverable	The nrimar	y deliverable associated	with the activities as	outlined above assists	in maintaining ar	nd strengthening e	victing and huilding
	new, relation	onships with the munici ns and their leadership,	pal associations and th	eir affiliated organizati			
	gathering i	lary, but no less importa ntelligence about comm d cultivating networking	unities and regions, ar				
A							
Assumptions	temporary and pruder with one or	ted and assumed that the total	nces can be expected. I ons tend to provide su d who may not be me	Maintaining relations wo oport to one another. T mbers of all affiliated as	ith interested or he decline is the ssociations. Prese	ganizations interes result of being at t ence at association	ted is recommended the negotiation Step 5 conferences or trade
		current inventory of kn ofessional associations a				isonable to assume	e a marginal expansion
		elationships exist with t s in 2009/10)	he following municipal	associations (although	not all have requ	uested/invited NW	MO presence at
	ONTARIO – QUEBEC – 4 NEW BRUN CANADA/N	EWAN – 5 (SUMA, SARN 9 (AMO, NOMA & NWO 4 (FMQ, UMQ, ADMQ, A ISWICK - 4 (UMNB, CNB ATIONAL – 3 (FCM, CAN IEA, PEO, MFOA.	DRC, FONOM, ROMA, ( LPDEQ) A, AFMNB, AMANB)		мсто)		
		and trade show location of in Stratford = car; 200			ost of participation	on (e.g. 2009 OSUI	M in Cornwall = train,
	from 10% t necessarily	e fees and registration a o 25%. Consequently, n commute into the next er and the number of st ferences.	o average conference year as booth logistics	fee/cost is applicable fo will vary (new larger e	or these estimate xhibit, modules, a	s. Cost of entry on and transport), spo	e year does not onsorship may be
	administrat relationship	of 25 conferences per stors associations may no os with all municipal assicion, planners, etc.) afte	ot be necessary in provociations up to 2018 w	rinces that do not includ with potential for minor	de a community i expansion of pro	in Step 5). Nonethe ofessional associati	eless it is expected that
		nat 80% of conferences p, and associated costs		al registration of NWM		, travel, expenses,	auto rental, mid-range
Schedule	Start Year		10 2019		Finish Year	15 202	4
			10 2019				
Туре	Fixed						
Calculations	Conference	es and Trades shows					
and Notes:		'01 (2010) Budget	\$50,000				
	transport o	p, staff attendance, and f the new exhibit and d lized after 2018 to acco	splay in various config	urations. Similar to oth	er budget areas,		
	Y06 (2015)	- Y05 (2014) 4 x \$100 - Y9 (2018) 4 x \$125,00 - Y36 (2034) 16 x \$125	00 = \$ 500,000				
Labour (	Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	÷	\$ -	\$ 750,000	\$ 750,000		187,500 \$	937,500

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						Cost Estim									
						ent Definiti	on sneet				Code: 0170020- <b>20</b>				
WBS (New) WBS (Old)	560	05	10	30	100					Prepared By	: P. Simmons				
WBS Title	BUILDING MUNICIPA	RELATIONS L ASSOCIAT	– Regional E IONS	ngagemer	nt - MUNIC	IPAL ASSOCI	ATIONS (	50)							
Description	<u> </u>			evon (leni:	rnment rela	tionshins a	d their A	secciations or	dy and inclu	les for all act	vities related to				
Description	relationsh	ip building a	nd mainten	ance with	municipal a	nd municipa	lly-relate		and organiz	ations in the	4 nuclear-cycle				
								aff travel, acc			ns, booth/exhibit				
		rovided on committees				, their affilia	tes, or mu	inicipally-rela	ted organiza	tions and gro	ups (e.g. Executive				
	provinces.	Conference	costs inclu	de staff re	gistration fe	ees as deleg	ites or pa	ciation confe rticipants, exi ved sponsorsi	nibitor partic		s in all nuclear de shows				
						nicipal assoo nd request t			essional and	quasi-profes	sional) such as				
Deliverable	new, relat	ionships wit	h the munic	ipal associ	ations and	their affiliate	d organiz	sts in maintai ations, and th			isting, and building fessional				
	gathering														
Assumptions	temporary recommer negotiatio conferenc														
	Based on a current inventory of known associations presently in contact with the NWMO it is reasonable to assume a marginal expansion into the professional associations and their municipal affiliates in the years to come.  Currently relationships exist with the following municipal associations (although not all have requested/invited NWMO presence at conferences in 2009/10)														
	ONTARIO QUEBEC – NEW BRUI CANADA/I	EWAN – 5 (: - 9 (AMO, N 4 (FMQ, UN NSWICK - 4 ( NATIONAL – MEA, PEO, N	OMA & NW IQ, ADMQ, UMNB, CNE 3 (FCM, CA	ORC, FON APDEQ) BA, AFMNE	OM, ROMA s, AMANB)	AS) , OSUM, EDO	CO, OMAA	s, AMCTO)							
						and will affe 2010 FCM i			icipation (e.	g. 2009 OSUN	1 in Cornwall =				
	vary from necessaril lower/higl	10% to 25% commute i	. Consequer nto the nex number of s	ntly, no ave t year as b	erage confe ooth logisti	rence fee/co cs will vary (	st is appl new large	r exhibit, mo	se estimates dules, and tr	. Cost of entransport), spo	nt. Increases can y one year does not nsorship may be the larger exhibit				
	administra that relati	itors associa	tions may n all municip	ot be nece al associat	ssary in pro ions up to 2	ovinces that 2018 with po	do not ind tential fo	nay become r clude a comm r minor expai net zero chan	unity in Step nsion of prof	5). Nonethe essional asso	ess it is expected				
	•							aff, accommo of NWMO st		el, expenses, a	auto rental, mid-				
Schedule	Start Year			16	2025			Finish Year	25	2034					
Туре	Fixed														
Calculations	<b></b>	es and Trad	es shows												
and Notes:		Y01 (2010) I		\$50,000											
	the transp	ort of the ne	ew exhibit a	nd display	in various o	onfiguration	s. Similar	ncrease in an to other bud ons conference	get areas, ar		res and includes equests to				
	Y06 (2015	) – Y05 (201 ) - Y9 (2018 ) – Y36 (203	4 x \$125,0	100 = \$ 5											
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	Т	otal Cost				
\$	-	\$	-	\$	1,250,000		1,250,000	\$	312,500	\$	1,562,500				

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	260					Prepared By:	J. Facella		
WBS (Old)													
		ř	i	·····	i	žā.							
WBS Title	TRIENNIAL	REPORT											
	ļ												
Description	1 ' '		. •	uired by th	e Nuclear F	uel Waste A	ct every thi	rd year after tl	ne Govern	ment Decision	on the		
	manageme	ent approacl	n.										
Deliverable	Triennial R	eports for th	ne following	g years:									
			2013 delive										
			2016 delive										
			2019 delive										
			2022 delive on indefinite		:n 2023								
		Allu SU C	JII III UEIIIII II	e i y									
Assumptions	The Trienn	ial Report w	ill meet the	requireme	nts set out	in the NFWA	and repea	ted below:					
	•	•		•			•	ir fuel waste di	uring the				
	•					cant socio-ec			ū				
	•					cial, cultural							
	aspirations	;											
	i	-	•		•	•		pproach that t	he				
	Governor in Council selects under section 15 or approves under subsection 20(5);												
	(c) [+bc NI)A	/N4O'cl bud	ant forecast	for the nev	t five ficeal	voors to imn	lomont the	stratagic plan					
	(c) [tile NW	vivio sį buuį	geriorecasi	ior the nex	it live listai	years to mip	iement me	strategic plan	,				
	(d) the resu	ults of Ithe N	NWMO'sl n	ublic consul	tations held	d during the	ast three f	iscal years with	respect				
	1	ters set out				2 aage		ioodi youro irre	copect				
				, , ,	,,								
	(e) the com	nments of th	ne Advisory	Council on	the matters	referred to	in paragrap	ohs (a) to (d).					
			-			-		-			ucted in the fall of		
	:					onsultations	related to	issues beyond	review of	the 5-year stra	tegic plan will be		
	captured u	nder individ	lual prograr	n elements	•								
	Completion	n of (a) will i	not require	resources r	ew or addi	tional to tho:	se required	as part of the	siting prod	cess.			
		- (-)							01				
	Completion	n of (e) will i	require hirii	ng of extern	al writer to	support the	Advisory C	Council, estima	ted at \$25	K per report.			
	Costs relate	ed to transla	ation, mailir	ng, printing	will be capt	ured under	he respect	ive Communic	ation prog	ram elements.			
Schedule	Start Year			4	2013			Finish Year	9	2018			
Type	Fixed												
Туре	i-ixeu												
Calculations	Public revi	ew of the 5-	vear strates	gic plan. in t	he form of	directed disc	ussion gro	ups is estimate	ed to be \$1	.00K per vear (2	2013, 2016, 2019,		
and Notes:	2022, etc.)		,	, , , , , , , , , , , , , , , , , , , ,	2 . 2			. ,			, <del>-</del> , <b>-</b> ,		
			st Advisorv	Council in c	ompiling co	mments, \$2	5K per rend	ort.					
Labour	•		al Costs		Costs	Subt		Allowance	25%	То	tal Cost		
\$	-	\$	-	\$	225,000	\$	225,000	\$	56,250		281,250		
					, ,						,		

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	250					Prepared By:		J. Facella	а			
WBS (Old)	o						<u> </u>									
WBS Title	TRIENNIAL	REPORT														
Description	To prepare	Trionnial Pa	aport as rec	wired by th	o Nucloar E	ual Wasta	Act every th	ird year after th	o Govern	nent Decision	on t	he				
Description		nt approach	-	quired by til	e Nuclear i	uei waste i	act every til	iiu yeai aitei ti	ie Governi	Helit Decision	Ont	ic				
	manageme												*************			
Deliverable	Triennial Re	eports for th	ne following	vears:									*************			
		•	-	red in Marc	h 2014											
		2014 to	2016 delive	red in Marc	h 2017											
		2017 to	2019 delive	red in Marc	h 2020											
	٠			red in Marc	ch 2023											
	•	And so o	n indefinite	ely												
Assumptions	The Trienni	ial Report w	ill most the	requireme	ntc cat aut	in the NEW	A and renor	atad halow:				<b></b>	•••••			
-	•	•		•			•	ar fuel waste di	iring the							
		iscal years, i														
	•	ities on a co														
	aspirations	;														
				_												
		) [the NWMO's] strategic plan for the next five fiscal years to implement the approach that the														
	Governor in Council selects under section 15 or approves under subsection 20(5);  (c) [the NWMO's] budget forecast for the next five fiscal years to implement the strategic plan;															
	(d) the resu	ults of [the N	NWMO's] p	ublic consul	tations held	d during the	last three f	fiscal years with	respect							
	to the matt	ters set out	in paragrap	hs (a) and (	b); and											
	, , .															
	(e) the com	iments of th	ie Advisory	Council on	the matters	referred to	o in paragra	phs (a) to (d).								
	The nublic	consultation	ns required	to meet (d)	ahove sne	cifically the	review of t	he five-year str	ategic nlan	will he cond	lucte	d in the fa	all of			
	i '		-			-		issues beyond								
	<u> </u>	nder individ								, , , , , , , , , , , , , , , , , , , ,						
	Completion	n of (a) will r	not require	resources n	ew or addi	tional to the	nse required	d as part of the	siting nroc	ess						
	Completion	101 (a) <b>11</b> 1111	iot require	resources	iew or dadi	tional to th	ose required	a as part or the	orring proc	<b>C33.</b>						
	Completion	n of (e) will r	equire hiri	ng of extern	al writer to	support th	e Advisory (	Council, estimat	ed at \$25k:	C per report.						
	Costs relate	ed to transla	ation, maili	ng, printing	will be capt	ured under	the respec	tive Communic	ation progr	ram elements						
Cabadul-	C+==+ V			40	2040			Finish V	4-	2024						
Schedule	Start Year			10	2019			Finish Year	15	2024						
Туре	Fixed															
/ F =																
Calculations	Public revie	ew of the 5-	year strate	gic plan, in t	he form of	directed di	scussion gro	ups is estimate	d to be \$1	00K per year	(2013	, 2016, 20	019,			
and Notes:	2022, etc.).															
	Contract w	riter to assis	st Advisory	Council in c	ompiling co	mments, \$	25K per rep	ort.								
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Т	otal (	Cost				
\$	-	\$	-	\$	250,000	\$	250,000	\$	62,500	\$		312	2,500			

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	230					Prepared By:	J. Facella			
WBS (Old)														
WBS Title	TRIENNIAL	DEDODT												
WD3 THE	IINILININIAL	INLFONT												
Description	To prepare	Triennial R	eport as red	quired by th	ne Nuclear F	uel Waste	Act every th	ird year after	the Govern	ment Decisior	on the			
	manageme	ent approac	h.											
	<b></b>													
Deliverable	Triennial R	eports for t	he following	g years:										
			2013 delive											
	·		2016 delive											
			2019 delive											
			on indefinite		CII 2025									
				ī/					•••••••					
Assumptions	:	ial Report w		•			•							
	<u> </u>							ar fuel waste	during the					
	Ē	fiscal years,	_	-										
	aspirations	vities on a co	ommunity s	way or life	or on its soc	liai, cuitura	i or econom	IIC						
	aspirations	,,												
	(b) [the NWMO's] strategic plan for the next five fiscal years to implement the approach that the													
	Governor i	Governor in Council selects under section 15 or approves under subsection 20(5);												
	( ) (.)	(c) [the NWMO's] budget forecast for the next five fiscal years to implement the strategic plan;												
	(c) [the NV	VMO's] bud	get forecast	for the nex	kt five fiscal	years to im	iplement th	e strategic pla	in;					
	(d) the resi	ults of [the I	NWMO'sl p	ublic consu	Itations held	d during the	e last three	fiscal years wi	th respect					
	=	ters set out						, , , , , , , , , , , , , , , , , , , ,						
	(e) the con	nments of tl	he Advisory	Council on	the matters	referred to	o in paragra	phs (a) to (d).						
	The public	consultatio	ns required	to meet (d)	) ahove spe	cifically the	roviow of t	ho fivo-voar s	tratogic pla	n will be cond	lucted in the fall o			
	E		-			-		-			ategic plan will be			
	=	ınder individ						,						
	Completio	n of (a) will	not require	resources r	new or addi	tional to th	ose require	d as part of th	e siting prod	cess.				
	i i	. ,	·				•		0.					
	Completio	n of (e) will	require hiri	ng of exterr	nal writer to	support th	e Advisory	Council, estim	ated at \$25	K per report.				
	Costs relat	ed to transi	ation, mailii	ng, printing	will be capt	ured under	r the respec	tive Commun	ication prog	ram elements				
Schedule	Start Year			16	2025			Finish Year	25	2034				
				A										
Туре	Fixed													
Calculations	1		year strate	gic plan, in t	the form of	directed di	scussion gro	ups is estima	ted to be \$1	.00K per year	(2013, 2016, 2019			
and Notes:	2022, etc.)			C !! !			2514							
Labour (	•	riter to assi	st Advisory al Costs		compiling co r Costs		25K per rep Itotal	ort. Allowance	25%	-	otal Cost			
\$		\$	-	\$	500,000		500,000	\$	125,000	_	625,00			

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## **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	05	10	40	180					Prepa	red By:	J. Facella
vvb3 (Ola)			.i		.;							
WBS Title	TRIENNIAL	. REPORT										
Description	To prepare	e Triennial R	Report as red	uired by th	ne Nuclear F	uel Waste A	ct every thi	rd year after t	he Governi	ment D	ecision on	the
•	1	ent approac					•	•				
Deliverable	Triennial R	•	he following		1 2044							
			2013 delive 2016 delive									
			2010 delive									
			2022 delive									
		And so	on indefinite	ely								
Assumptions	The Trienn	ial Report v	vill meet the	requireme	ents set out	in the NFW	A and repea	ted below:				
7.000p.0.0	•	-		-			-	r fuel waste d	luring the			
	last three f	fiscal years,	including an	analysis o	f any signific	cant socio-e	conomic eff	ects of				
	=		ommunity's	way of life	or on its soc	cial, cultural	or economi	ic				
	aspirations	s;										
	(b) [the NV	NMO's] stra	ntegic plan fo	or the next	five fiscal ye	ears to imple	ement the a	pproach that	the			
	Governor i	in Council se	elects under	section 15	or approves	s under subs	section 20(5	5);				
	(c) [the NV	VMO's] bud	get forecast	for the ne	xt five fiscal	years to imp	olement the	strategic plan	n;			
	(d) the res	ults of [the	NWMO's] pı	ublic consu	Itations held	d during the	last three f	iscal years wit	h respect			
	to the mat	ters set out	in paragrap	hs (a) and	(b); and							
	(e) the con	nments of t	he Advisory	Council on	the matters	s referred to	in paragrap	ohs (a) to (d).				
	The public	consultatio	ns required	to meet (d	) above, spe	cifically the	review of th	ne five-year st	rategic plar	n, will l	oe conduct	ed in the fall of
						onsultations	related to	issues beyond	review of	the 5-y	ear strateg	gic plan will be
	captured u	ınder indivi	dual progran	n elements	<b>i.</b>							
	Completio	n of (a) will	not require	resources	new or addit	tional to tho	se required	as part of the	e siting proc	ess.		
	Completio	n of (e) will	require hirir	ng of exteri	nal writer to	support the	Advisory C	ouncil, estima	ated at \$25I	K per r	eport.	
	Costs relat	ed to transl	ation mailir	na printina	will be capt	tured under	the respect	ive Communio	cation prog	ram ol	omonts	
	Costs relat	eu to transi	ation, main	ig, printing	will be capt	ureu unuei	tile respect	ive communic	cation prog	i ai i i e i	ements.	
Schedule	Start Year			26	2035			Finish Year	55		2064	
T	Fined											
Туре	Fixed											
Calculations	Public revi	ew of the 5	-year strates	gic plan, in	the form of	directed dis	cussion gro	ups is estimat	ed to be \$1	00K pe	er year (201	13, 2016, 2019,
and Notes:	2022, etc.)		,	, - ,- ,							7 ( -	, , , , , , ,
	Contract w	riter to ass	ist Advisory	Council in o	compiling co	mments, \$2	.5K per repo	ort.				
Labour	•		ial Costs		r Costs	Subt	<u> </u>	Allowance	25%		Total	Cost
\$	-	\$	-	\$	1,250,000	\$	1,250,000	\$	312,500	\$		1,562,500

560.05.10.40.180 166 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	50	150					Prepared	<b>By:</b> J.	Facella
WBS (Old)												
WBS Title	TRIENNIAL	REPORT										
Description	To prepare	Triennial R	Renort as rec	nuired by th	ne Nuclear F	uel Waste	Act every th	ird year after t	he Governr	nent Decis	ion on the	
Description.		ent approac		quired by ti	ic itacicai i	uei wuste i	ter every til	ira year arter t	are <b>Gov</b> erni	Tierre Decis	non on the	
	ļ											
Deliverable	Triennial R	eports for t	he following	vears:								
201170101010			2013 delive		ch 2014							
		2014 to	2016 delive	red in Mar	ch 2017							
		2017 to	2019 delive	red in Mar	ch 2020							
			2022 delive		ch 2023							
		And so	on indefinite	ely								
Assumptions	The Trienn	ial Renort v	vill meet the	requireme	nts set out	in the NFW	Δ and renea	ted helow:				
7.05umperons	1	•		•			-	ar fuel waste d	luring the			
	•		including ar						. 0			
	those activ	vities on a co	ommunity's	way of life	or on its so	cial, cultura	l or econom	ic				
	aspirations	s;										
	/I= ) [#I= = NI)	A/B 40/-1 -+			£: £:				41			
	•	_	itegic pian fo elects under		-	-		approach that	tne			
	Governori	iii Councii se	elects under	360001113	от арргоче	s under sub	3600001 20(.	7),				
	(c) [the NV	VMO's] bud	get forecast	for the ne	xt five fiscal	years to im	plement the	e strategic plar	n;			
	1	•	J			•	•	0 1	•			
	(d) the res	ults of [the	NWMO's] p	ublic consu	Itations held	d during the	last three f	iscal years wit	h respect			
	to the mat	ters set out	in paragrap	hs (a) and	(b); and							
	(a) the a com		ر سمونا باد م	Caunailan	*		. :	nh				
	(e) the con	nments of t	ne Advisory	Council on	the matters	s referred to	o in paragra	phs (a) to (d).				
	The public	consultatio	ns required	to meet (d	) above, spe	ecifically the	review of t	he five-year st	rategic plan	, will be co	onducted in	the fall of
	: ·		-	-		-		issues beyond				
	captured u	ınder individ	dual progran	n elements								
	Completio	n of (a) will	not require	resources i	new or addi	tional to th	ose required	d as part of the	siting proc	ess.		
	Completio	n of (e) will	require hirir	ng of exterr	nal writer to	support th	e Advisory (	Council, estima	ited at \$25k	per repor	rt.	
	6							···· C				
	Costs relat	ed to transi	lation, mailir	ng, printing	will be capt	turea unaei	tne respec	tive Communio	cation progi	am eleme	nts.	
Schedule	Start Year			56	2065			Finish Year	125	2134	1	
				S				A				
Туре	Fixed											
Calculations			-year strateg	gic plan, in	the form of	directed di	scussion gro	ups is estimat	ed to be \$10	OOK per ye	ar (2013, 20	016, 2019,
and Notes:	2022, etc.)											
laha	•		ist Advisory						350/		Total Cart	
Labour (	COSTS		ial Costs		2 975 000		2 975 000	Allowance	<b>25%</b>	ċ	Total Cost	
\$	-	\$	-	\$	2,875,000	\$	2,875,000	\$	718,750	\$		3,593,750

560.05.10.50.150 167 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	60	70					Prepa	red By:	J. Facella		
WBS (Old)	•									A				
WBS Title	TRIENNIAL	. REPORT												
Description	To prepare	e Triennial R	eport as red	uired by th	ne Nuclear F	uel Waste Act e	very thir	d year after t	he Governi	ment [	Decision on	the		
	manageme	ent approac	h.											
Deliverable	Triennial R	eports for t	he following	years:						•••••••				
		2011 to	2013 delive	red in Mar	ch 2014									
		2014 to	2016 delive	red in Mar	ch 2017									
		2017 to	2019 delive	red in Mar	ch 2020									
		2020 to	2022 delive	red in Mar	ch 2023									
		And so	on indefinite	ely										
Assumptions	•	· ·		•		in the NFWA and	•							
	1 · ·		_			management of			luring the					
	•		_	-		cant socio-econo								
	1		ommunity's	way of life	or on its so	cial, cultural or e	conomic							
	aspirations	5;												
	(b) [the NWMO's] strategic plan for the next five fiscal years to implement the approach that the Governor in Council selects under section 15 or approves under subsection 20(5);													
	Governor i	in Council se	elects under	section 15	or approve	s under subsecti	on 20(5)	;						
	(c) [the NV	VMO's] bud	get forecast	for the ne	xt five fiscal	years to implem	ent the	strategic plai	n;					
	, n	l. 65.1												
	1 · ·	_				d during the last	three fis	ical years wit	h respect					
	to the mat	ters set out	in paragrap	hs (a) and	(b); and									
	/a\ #b a aa m		بسمواريام ۸ ما	Caunailan	*h			h o /o\ +o /d\						
	(e) the con	nments or t	ne Advisory	Council on	the matters	s referred to in p	aragrapi	ns (a) to (d).						
	The public	concultatio	nc roquired	to most (d	) abovo coo	cifically the revi	ow of th	o fivo voor st	ratogic pla	النبد	ho conduct	ad in the fall of		
	•		•	-		onsultations rela		-						
	•		dual progran			onsultations rele	iteu to is	sacs beyond	i review or	tile 5-	year strateg	gic plan will be		
	captureu	inder marvi	adai prograi	ii eleinent										
	Completio	n of (a) will	not require	resources	new or addi	tional to those re	equired	as part of the	siting prod	cess.				
	Completio	n of (e) will	require hirir	ng of exteri	nal writer to	support the Adv	isory Co	ouncil, estima	ited at \$25	K per r	eport.			
	Costs relat	ed to transl	ation, mailir	ng, printing	will be capt	tured under the	respectiv	ve Communio	cation prog	ram el	lements.			
				4.2.0	2425				450		2450			
Schedule	Start Year			126	2135			inish Year	150		2159			
Tuno	Eivod													
Туре	Fixed													
Calculations	Dublic rovi	ow of the E	voar stratos	tic plan in	the form of	directed discuss	ion grou	nc ic actimat	ad to ba ¢1	UUK M	or voor 1201	13 2016 2010		
and Notes:	2022, etc.)		year strates	sic piaii, ili	uie ioiiii oi	un ecteu uiscuss	ion grou	ps is estillidi	eu io be \$1	.συκ μι	er year (201	13, 2010, 2019,		
			a	Caa =!  !:										
	-					mments, \$25K p			350/		T-4-1	l Cast		
Labour (	LUSTS		al Costs		r Costs	Subtotal		Allowance	25%	ć	Iotal	1 250 000		
\$	-	\$	-	\$	1,000,000	\$ 1,00	0,000	\$	250,000	\$		1,250,000		

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	70	10					Prepared By	ν <b>:</b> J. F	acella		
WBS (Old)														
WBS Title	TRIENNIAL	REPORT												
Description	To proparo	Trionnial Pa	anort as rec	uired by th	o Nucloar E	ual Wasta A	rt every thi	rd year after th	ae Governi	nent Decision	n on the			
Description		ent approach	•	fulled by th	ie ivucieai r	uei wasie Ai	Li every tili	iu year arter ti	ie Governi	Herit Decision	ii oii tile			
	manageme													
Deliverable	Triennial R	eports for th	ne following	years:										
		-	2013 delive		ch 2014									
		2014 to	2016 delive	red in Mar	ch 2017									
		2017 to	2019 delive	red in Mar	ch 2020									
			2022 delive		ch 2023									
	•	And so o	n indefinite	ely										
Accument:	The Tries	ial Danart	- المعمد الن		nto cot act	in the NITMA	and rance	tod holow						
	•	•		•		in the NFWA	•	ted below: Ir fuel waste di	ıring the					
	Ī					cant socio-ec			uring the					
	=	-	_	-		cial, cultural o								
	aspirations			,		,								
	·													
	(b) [the NV	VMO's] strat	tegic plan fo	or the next	five fiscal ye	ears to imple	ment the a	pproach that t	:he					
	(b) [the NWMO's] strategic plan for the next five fiscal years to implement the approach that the Governor in Council selects under section 15 or approves under subsection 20(5);													
	(c) [the NWMO's] budget forecast for the next five fiscal years to implement the strategic plan;													
	(c) [the NW	/MO's] budg	get forecast	for the nex	ct five fiscal	years to imp	lement the	e strategic plan	;					
	(d) the resi	ılts of Ithe N	JWMO'sl n	uhlic consu	Itations held	during the l	last three f	iscal years with	n resnect					
	• •	ters set out				a during the i	idst till ce il	iscai years with	Пезресс					
			101	. (-, (	, .									
	(e) the com	nments of th	ne Advisory	Council on	the matters	referred to	in paragrap	ohs (a) to (d).						
	•		•			-		ne five-year str						
	:					onsultations	related to	issues beyond	review of	the 5-year str	rategic plar	n will be		
	captured u	nder individ	uai prograr	n elements	•									
	Completion	n of (a) will r	not require	resources r	new or addi	tional to thos	se required	as part of the	siting prod	ess.				
	Completier	o of (o) will m	roquiro biris	a of outors	al writer to	support the	A duison, C	ouncil actima	tod at ¢351	/ nor ronort				
	Completion	i oi (e) wiii i	equire min	ig or exteri	iai writer to	support the	Advisory C	ouncil, estima	teu at \$251	c per report.				
	Costs relate	ed to transla	ation, mailir	ng. printing	will be capt	ured under t	he respect	ive Communic	ation prog	ram element	s.			
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Schedule	Start Year			151	2160			Finish Year	151	2160				
	<u> </u>													
Туре	Fixed													
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	•		year strate	gic plan, in t	the form of	directed disc	cussion gro	ups is estimate	ed to be \$1	00K per year	(2013, 201	16, 2019,		
	2022, etc.).													
	<b>-</b>					mments, \$2								
Labour (	Costs	Materia	al Costs		Costs	Subto		Allowance	25%		Total Cost			
\$	-	\$	-	\$	125,000	\$	125,000	\$	31,250	\$		156,250		

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### Work Element Definition Sheet

WBS TRILE  EXHIBITS AND EDUCATION TOOLS  Description  Develop mobile exhibits and tools to facilitate community understanding of Adaptive Phased Management and the reportory project biblists will support engagement and capacity building initiatives in interested potential host communities.  Replicate existing modules to allow concurrent use in up to two communities (events.)  Develop new modules to address issues such as transportation, community well-being, regulatory processes, Aboriginal Traditional Knowledge.  Regular review and update of existing modules as reporting designs evolve. Update virtual DGR.  Maintenance of modules, e.g., regars, upgrades, replace interactive components, etc.  Develop two community-specific fixed modules for use in communities to support feasibility studies.  Develop training module, education materials to support staff in the use of the exhibits.  Develop training module, education materials to support staff in the use of the exhibits.  Develop training module, education materials to support staff in the use of the exhibits.  Develop training module, education materials to support staff in the use of the exhibits.  Develop training module, education materials to support staff in the use of the exhibits.  Develop training module, education materials to support staff in the use of the exhibits.  YOZ (2011) develop two new modules (Transportation, to be determined).  YOZ (2011) develop two new modules (Transportation, to be determined).  YOZ two YOZ two YOZ two behaviors to the exhibits.  YOZ Behaviors for viotors to the exhibits.  YOZ Behaviors for viotors to the exhibits.  YOZ Behaviors for viotors to the exhibits.  YOZ develop two new modules, SIOUC  YOZ, develop two new modules, SIOUC  YOZ, develop two new modules, SIOUC  YOZ, develop two new modules, SIOUC  YOZ develop two new modules, SIOUC  Charles to video components of virtual DoS are as follows:  Add new Adaptive paced: information, Design work for maximum style exhibits begins in 2011 (YOZ).  EAch new module (transporta	WBS (New)	560	05	10	10	20					Prepared By: J. Robinson			
Obescription  Conscription  Constitution  Co	WBS (Old)		j	 						······				
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Y02, develop two new modules, \$100K  Y03 to Y09 surface/subsurface investigations in two candidate sites, 2 fixed exhibits in community storefront office, with one module containing community-specific information. Design work for fixed exhibits begins in 2011 (Y02).  Y13 (2022) Exhibit in place in Centre of expertise.  Modules in mobile exhibits test concepts to be developed for museum-style exhibits.  Design work for museum-style exhibit begins in Y10.  Each new module (transportation, community specific information, etc.) costs approximately \$42 to 47K based on Welcome Tower configuration and including content development, design, fabrication, computer interactive software and hardware, crating and initial installation in Toronto.  Changes to video components of virtual DGR are as follows:  Add new chapter to video \$10 to 12K (\$ 4 to 6K programming plus content development)  Add new video or illustration to system, programming cost \$1 to 2K  Revise DGR illustration/representation \$1 to 5K programming cost \$1 to 2K  Revise DGR illustration/representation \$1 to 5K programming cost  Cost for each new set of 7 mobile exhibit modules: \$115-140K  Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule  Start Year 1 2010 Finish Year 9 2018  Type  Fixed  Calculations  and Notes:  2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K  2011 (Y02) Develop two new modules \$100K  2011 (Y02) Develop two new modules \$100K  2011 (Y02) Develop two new modules \$100K  2011 (Y02) Total \$680K  2012 (Y03) Fixed Exhibit development completed \$80K  2013 (Y03) Exhibit maintenance and update, \$75K  2014 (Y05) Exhibit maintenance and update, \$50K  2015 (Y06) Exhibit maintenance and update, \$50K														
Y03 to Y09 surface/subsurface investigations in two candidate sites, 2 fixed exhibits in community storefront office, with one module containing community-specific information. Design work for fixed exhibits begins in 2011 (Y02).  Y13 (2022) Exhibit in place in Centre of expertise.  Modules in mobile exhibits test concepts to be developed for museum-style exhibits.  Design work for museum-style exhibit begins in Y10.  Each new module (transportation, community specific information, etc.) costs approximately \$42 to 47K based on Welcome Tower configuration and including content development, design, fabrication, computer interactive software and hardware, crating and initi installation in Toronto.  Changes to video components of virtual DGR are as follows:  Add new video or illustration to system, programming cost 51 to 2K Revise DGR illustration/representation \$1 to 5K programming cost  Cost for each new set of 7 mobile exhibit modules: \$115-140K Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule Start Year 1 2010   Frinish Year   9 2018   Type   Fixed    Calculations and Notes:  2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K 2011 (Y02) Begin design and development of fixed exhibit for two communities, \$400K 2011 (Y02) Total \$680K 2012 (Y03) Fixed Exhibit development completed \$80K 2013 (Y04) Exhibit maintenance and update, \$55K 2014 (Y05) Exhibit maintenance and update, \$55K 2015 (Y06) Exhibit maintenance and update, \$55K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K	Assumptions	Y01 to Y03	: 2 mobile 6	exhibits to s	support initi	al screening	of 15 com	munities an	d feasibility stud	dies in 10	potential sites			
containing community-specific information. Design work for fixed exhibits begins in 2011 (Y02).  Y13 (2022) Exhibit in place in Centre of expertise.  Modules in mobile exhibits test concepts to be developed for museum-style exhibits.  Design work for museum-style exhibit begins in Y10.  Each new module (transportation, community specific information, etc.) costs approximately \$42 to 47K based on Welcome Tower configuration and including content development, design, fabrication, computer interactive software and hardware, crating and initi installation in Toronto.  Changes to video components of virtual DGR are as follows:  Add new chapter to video \$10 to 12K (\$ 4 to 6K programming plus content development)  Add new deapter to video \$10 to 12K (\$ 4 to 6K programming cost \$1 to 2K  Revise DGR illustration/representation \$1 to 5K programming cost \$1 to 2K  Revise DGR illustration/representation \$1 to 5K programming cost \$1 to 2K  Cost for each new set of 7 mobile exhibit modules: \$115-140K  Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule  Start Year   1 2010   Finish Year   9 2018   Type   Fixed  Calculations   Finish Year   9 2018   Type   Fixed  2011 (Y02) Develop two new modules \$100K   2011(Y02) Begin design and development of fixed exhibit for two communities, \$400K   2011(Y02) Begin design and development of fixed exhibit for two communities, \$400K   2011(Y02) Exhibit maintenance and update, \$75K   2014 (Y05) Exhibit maintenance and update, \$75K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhib		Y02, devel	op two new	modules, S	\$100K									
Modules in mobile exhibits test concepts to be developed for museum-style exhibits.  Design work for museum-style exhibit begins in Y10.  Each new module (transportation, community specific information, etc.) costs approximately \$42 to 47K based on Welcome Tower configuration and including content development, design, fabrication, computer interactive software and hardware, crating and initi installation in Toronto.  Changes to video components of virtual DGR are as follows:  Add new chapter to video \$10 to 12K (\$ 4 to 6K programming plus content development)  Add new video or illustration to system, programming cost \$1 to 2K  Revise DGR illustration/representation \$1 to 5K programming cost  Cost for each new set of 7 mobile exhibit modules: \$115-140K  Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule  Start Year   1 2010   Finish Year   9 2018   Type   Fixed  Calculations   2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K   2011 (Y02) Develop two new modules \$100K   2011 (Y02) Total \$680K   2012 (Y03) Fixed Exhibit development completed \$80K   2013 (Y04) Exhibit maintenance and update, \$75K   2014 (Y05) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit maintenance and update, \$50K   2015 (Y06) Exhibit											front office, with one module			
configuration and including content development, design, fabrication, computer interactive software and hardware, crating and initial installation in Toronto.  Changes to video components of virtual DGR are as follows:  Add new chapter to video \$10 to 12K (\$ 4 to 6K programming plus content development)  Add new video or illustration to system, programming cost \$1 to 2K  Revise DGR illustration/representation \$ 1 to 5K programming cost  Cost for each new set of 7 mobile exhibit modules: \$115-140K  Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule  Start Year  1 2010  Finish Year  9 2018  Type  Fixed  Calculations  2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K  2011 (Y02) Develop two new modules \$100K  2011 (Y02) Total \$680K  2012 (Y03) Fixed Exhibit development of fixed exhibit for two communities, \$400K  2011 (Y02) Total \$680K  2012 (Y03) Fixed Exhibit development completed \$80K  2013 (Y04) Exhibit maintenance and update, \$75K  2014 (Y05) Exhibit maintenance and update, \$50K  2015 (Y06) Exhibit maintenance and update, \$50K  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance  25%  Total Cost		Modules in	n mobile ex	hibits test c	oncepts to	be develope	ed for muse	um-style ex	khibits.					
Add new chapter to video \$10 to 12K (\$ 4 to 6K programming plus content development)  Add new video or illustration to system, programming cost \$1 to 2K  Revise DGR illustration/representation \$1 to 5K programming cost  Cost for each new set of 7 mobile exhibit modules: \$115-140K  Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule  Start Year  1 2010  Finish Year  9 2018  Type  Fixed  Calculations  2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K  2011 (Y02) Develop two new modules \$100K  2011 (Y02) Begin design and development of fixed exhibit for two communities, \$400K  2011 (Y02) Total \$680K  2012 (Y03) Fixed Exhibit development completed \$80K  2013 (Y04) Exhibit maintenance and update, \$550K  2015 (Y06) Exhibit maintenance and update, \$50K  2015 (Y06) Exhibit maintenance and update, \$50K  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost	İ	configurati	on and incl	uding conte										
Additional elements to create a more immersive environment for the virtual DGR display, \$30K.  Cost of fixed exhibit in community, \$200K each.  Schedule  Start Year  1 2010  Finish Year  9 2018  Type  Fixed  Calculations and Notes: 2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K 2011 (Y02) Develop two new modules \$100K 2011 (Y02) Begin design and development of fixed exhibit for two communities, \$400K 2011 (Y02) Total \$680K 2012 (Y03) Fixed Exhibit development completed \$80K 2013 (Y04) Exhibit maintenance and update, \$55K 2014 (Y05) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2016 (Y06) Exhibit maintenance and update, \$50K 2017 (Y06) Exhibit maintenance and update, \$50K 2018  Allowance 25% Total Cost		· Ad	dd new cha dd new vide	pter to vide eo or illustra	eo \$10 to 12 ation to sys	K (\$ 4 to 6K tem, progra	programm mming cost	t \$1 to 2K	ntent developm	ent)				
Schedule Start Year 1 2010 Finish Year 9 2018  Type Fixed  Calculations and Notes: 2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K 2011 (Y02) Develop two new modules \$100K 2011 (Y02) Begin design and development of fixed exhibit for two communities, \$400K 2011 (Y02) Total \$680K 2012 (Y03) Fixed Exhibit development completed \$80K 2013 (Y04) Exhibit maintenance and update, \$75K 2014 (Y05) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2015 (Y07) 20								he virtual D	GR display, \$30I	К.				
Type  Calculations 2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K  2011 (Y02) Develop two new modules \$100K  2011(Y02) Begin design and development of fixed exhibit for two communities, \$400K  2011 (Y02) Total \$680K  2012 (Y03) Fixed Exhibit development completed \$80K  2013 (Y04) Exhibit maintenance and update, \$75K  2014 (Y05) Exhibit maintenance and update, \$50K  2015 (Y06) Exhibit maintenance and update, \$50K  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost		Cost of fixe	ed exhibit ir	communit	y, \$200K ea	ch.								
Type   Fixed		Start Year			1	2010			Finish Year	9	2018			
and Notes: 2011 (Y02) Develop two new modules \$100K 2011(Y02) Begin design and development of fixed exhibit for two communities, \$400K 2011 (Y02) Total 5680K 2012 (Y03) Fixed Exhibit development completed \$80K 2013 (Y04) Exhibit maintenance and update, \$75K 2014 (Y05) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K 2016 (Y06) Exhibit maintenance Total Costs    Allowance   25%   Total Cost   Tot		Fixed												
2014 (Y05) Exhibit maintenance and update, \$50K 2015 (Y06) Exhibit maintenance and update, \$50K  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		2011 (Y02) Replicate exhibit, update existing exhibit elements and develop supporting education materials \$180K 2011 (Y02) Develop two new modules \$100K 2011(Y02) Begin design and development of fixed exhibit for two communities, \$400K 2011 (Y02) Total \$680K												
Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost														
		2015 (Y06)	Exhibit ma	aintenance	and update	, \$50K	Suhi	total	Allowance	25%	Total Cost			
1. IT IT CONTROL OF SERVICE   Y SERVICE	\$		\$	-	\$	917,745		917,745		229,436	\$ 1,147,181			

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	160					Prepared By:	J. Robinso	on			
WBS (Old)		ļ		<u></u>											
WBS Title	CONTRACT	ED WRITING	G												
Description	ar	To raise nong interes To build ting process	e the profile sted parties d awareness	and enhan i. s and under	ce the imag	ictivities that see e and reputation the important v	of the work tha		Ü	J	•	,			
Deliverable	Profession	al Writing/C	Copy-Editing	g, as require	d										
Assumptions	Work invol	Work involves contracting external consultants to provide writing/copy-editing service to the NWMO:  Support required is consistent year to year (i.e. copy editing of Annual Report/Implementation Plan etc.)													
Schedule	Start Year			1	2010		Į.	Finish Year	9	2018					
Туре	Fixed														
Calculations and Notes:	ns														
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal		Allowance	25%	To	tal Cost				
\$	-	\$	-	\$	1,445,000	\$ 1,44	5,000	\$	361,250	\$	1,80	06,250			

560.05.10.10.160 171 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	150				Prepared By: J. Ro	binson					
WBS (Old)															
WBS Title	CONTRACT	ED WRITING	G												
Description	- an	To raise nong interes To build ing process	e the profile sted parties d awareness	and enhar i. s and under	rstanding for	e and reputation of the the important work the impo									
Deliverable	Profession	Professional Writing/Copy-Editing, as required													
Assumptions	Work invol	Work involves contracting external consultants to provide writing/copy-editing service to the NWMO:  Support required is consistent year to year (i.e. copy editing of Annual Report/Implementation Plan etc.)													
Schedule	Start Year			10	) 2019		Finish Year	15	2024						
Туре	Fixed														
Calculations and Notes:	<ul> <li>Board approved budget 2010 \$165K; 2011 \$125k; 2012 - 2014 \$165/a.</li> <li>2015-2064, same level of spending, 165k/year</li> </ul>														
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost						
\$	-	\$	-	\$	990,000	\$ 990,000	\$	247,500	\$	1,237,500					

560.05.10.20.150 172 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	130					Prepared By: J. Robi	nson
WBS (Old)	•••••••••••••••••••••••••••••••										
	ļ										
WBS Title	CONTRACT	ED WRITIN	<u>G</u>								
Description	- an	To raise nong intere To build ing process	e the profile sted parties d awareness	and enhar s. s and unde	rstanding for	•	ation of the		J	ment Organization (NWN y the NWMO, in particul	·
Deliverable	Profession	al Writing/C	Copy-Editing	g, as require	ed						
Assumptions	Work invol		U		•	O,	., .			ation Plan etc.)	
Schedule	Start Year			16	5 2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	1	• • •	ed budget 2 ame level of	•		k; 2012 - 201	14 \$165/a.				
Labour (	Costs	Materi	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	1,650,000	\$	1,650,000	\$	412,500	\$ 2	,062,500

560.05.10.30.130 173 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	80					Prepared By:	J. Robinson
WBS (Old)				<u></u>							
WBS Title	CONTRACT	ED WRITING	G								
Description	an	To raise nong interes To build ing process	the profile sted parties d awarenes	and enhands. s and under	ce the imag	•	ation of the		J	nent Organizat	ion (NWMO) n particular the
Deliverable	Profession	al Writing/C	opy-Editing	g, as require	d						
Assumptions	Work invol		•		•	O.	. ,			ition Plan etc.)	
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Fixed										
Calculations and Notes:	•	• •	•	2010 \$165K; spending, 1		k; 2012 - 20	14 \$165/a.				
Labour (	•	Materia			Costs	Subt	otal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	4,950,000	\$	4,950,000	\$	1,237,500	\$	6,187,500

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## **Work Element Definition Sheet**

										l
Calculations and Notes:	:		Ū	2010 \$65K/\ f spending, 6		50k/year; 2012 & 2014	1 \$65k/year			
Туре	Fixed									
Schedule	Start Year			1	2010		Finish Year	9	2018	
Assumptions	Media mor		vities will ir	ncrease as th	ne NWMO g	generates more media a	attention on a	local level	through the implementation	of
Deliverable	Engage me	dia monitor	ing service	s to provide	copies of n	nedia references of the	NWMO in pri	nt or electr	onic formats.	
Description	Support th	e NWMO's	communica	ation and en	gagement k	by tracking media on a	consistent and	d on-going b	oasis.	
WBS Title	MEDIA MO									
WBS (Old)				<u> </u>						
WBS (New)	560	05	10	10	170				Prepared By: J. Robinson	

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## Work Element Definition Sheet

Type  Calculations and Notes:	· 20	pard approve 15-2064, sa Materia	me level of	spending,		50k/year; 2012 & 2014 Subtotal	\$65k/year	25%	тс	otal Cost
Calculations	:		•			50k/year; 2012 & 2014	\$65k/year			
Туре	•									
	Fixed									
Schedule	Start Year			10	2019		Finish Year	15	2024	
Assumptions	Media mor	•	vities will ir	ncrease as t	he NWMO g	generates more media a	attention on a	local level t	through the im	nplementation of
Deliverable	Engage me	dia monitor	ing service	s to provide	e copies of m	nedia references of the	NWMO in prir	nt or electro	onic formats.	
Description	Support th	e NWMO's	communica	tion and er	ngagement b	by tracking media on a	consistent and	on-going b	oasis.	
WBS Title	MEDIA MC	NITORING								
		T								
VBS (Old)	560	05	10	20	160				Prepared By:	J. Robinson

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## **Work Element Definition Sheet**

Calculations and Notes:	•		J	2010 \$65K/y spending, 6		50k/year; 2012 & 201	4 \$65k/year			
	·		•••••							
Туре	Fixed									
Schedule	Start Year			16	2025		Finish Year	25	2034	
Assumptions	Media moi the siting p		vities will ir	ncrease as th	ne NWMO g	enerates more media	attention on a	local level t	through the im	plementation of
Deliverable	Engage me	dia monitor	ing service	s to provide	copies of m	nedia references of the	NWMO in pri	nt or electro	onic formats.	
Description	Support th	e NWMO's	communica	ition and en	gagement b	y tracking media on a	consistent and	d on-going b	oasis.	
WBS Title	MEDIA MC									
WBS (Old)				A						
14/06/61/1	560	05	10	30	140				Prepared By:	J. Robinson

560.05.10.30.140 177 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	90					Prepared By:	J. Robinson
WBS (Old)											
WBS Title	MEDIA MC	NITORING									
Description	Support th	e NWMO's	communica	ntion and en	gagement b	by tracking m	edia on a d	consistent and	d on-going b	oasis.	
Deliverable	Engage me	dia monitor	ing service	s to provide	copies of n	nedia referer	ces of the	NWMO in pri	nt or electro	onic formats.	
Assumptions	Media mor		vities will ir	ncrease as th	ne NWMO g	generates mo	re media a	attention on a	local level t	through the im	plementation of
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Fixed										
Calculations and Notes:	•		J	2010 \$65K/y f spending, 6		50k/year; 20	12 & 2014	\$65k/year			
Labour	Costs	Materi	al Costs	Other	Costs	Subto	tal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,950,000	\$ 1	,950,000	\$	487,500	\$	2,437,500

560.05.10.40.90 178 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	180				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	WEBSITE N	IAINTENAN	CE							
Description	Maintenan	ce, hosting	and refinen	nents to nw	mo.ca on a	n on-going basis.				
Deliverable	Hosting ag necessary.	reement es	tablished an	nd maintain	ed with a w	eb-hosting company or	n an annual ba:	sis. Review	and update t	he website as
	••••••••••									
Assumptions	:	0 0		•		Every 3 years, the NWN the site incorporates la				
Assumptions Schedule	conduct a	0 0		•						
	conduct a dimpactful.	0 0		•	ensure that		atest technolog		tinues to be in	
Schedule	Start Year Fixed  BC BC BC BC BC BC BC BC BC BC BC BC BC	omplete ov	ed budget 2 ed budget 2 ed budget 2	1 010 \$25K 011 \$25K 012-2014 \$	2010		Einish Year		tinues to be in	
Schedule Type Calculations	Start Year Fixed  BC  BC  BC  C  BC  C  BC  C  C  C  C	pard approvoard approvoard approv	ed budget 2 ed budget 2 ed budget 2	1 010 \$25K 2011 \$25K 2012-2014 \$ 359ending, \$	2010	the site incorporates la	Einish Year		2018	

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	170				Prepared By: J. Robinson
WBS (Old)			<u></u>	<u> </u>					
WBS Title	WEBSITE N	MAINTENAN	ICE						
Description	Maintenar	ice, hosting	and refiner	ments to nv	vmo.ca on a	n on-going basis.			
Deliverable	Hosting ag necessary.	reement es	tablished ar	nd maintair	ned with a w	eb-hosting company or	n an annual ba	asis. Reviev	v and update the website as
Assumptions	•								a web development company to tinues to be interesting and
Schedule	Start Year			10	) 2019		Finish Year	15	2024
Туре	Fixed								
Calculations and Notes:	· Вс	pard approv pard approv	red budget 2 red budget 2 red budget 2 ame level of	2011 \$25K 2012-2014 \$		nd 100K every third ye	ar		
Labour	-	l .	al Costs	1	r Costs	Subtotal	Allowance	25%	Total Cost
\$		\$		Ś	360,000	\$ 360,000	\$	90,000	\$ 450,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	150				Prepared By: J. Robinson	
WBS (Old)				A						
WBS Title	WEBSITE N	1AINTENAN	CE							
Description	Maintenan	ce, hosting	and refinen	nents to nw	mo.ca on a	n on-going basis.				
Deliverable	Hosting ag necessary.	reement est	ablished ar	nd maintain	ed with a w	eb-hosting company or	n an annual bas	sis. Review	and update the website as	
Assumptions	•	0 0		ū					a web development comparing and	ny to
	impactful.	·								,
Schedule	impactful. Start Year			16	2025		Finish Year	25	2034	
Schedule Type				16	2025			25	2034	
	Start Year Fixed  BC BC BC BC BC BC BC BC	pard approvi pard approvi pard approvi	ed budget 2 ed budget 2 ed budget 2	2010 \$25K 2011 \$25K 2012-2014 \$	640K/year		Finish Year	25	2034	
Type Calculations	Start Year Fixed  BC BC BC BC C BC C C C C C C C C C C	pard approve pard approve	ed budget 2 ed budget 2 ed budget 2 me level of	2010 \$25K 2011 \$25K 2012-2014 \$ spending, \$	640K/year		Finish Year	25	2034 Total Cost	

560.05.10.30.150 181 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	100				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	WEBSITE N	1AINTENAN	CE							
Description	Maintenan	ce, hosting	and refinen	nents to nw	mo.ca on a	n on-going basis.				
Deliverable	Hosting ag necessary.	reement est	tablished ar	nd maintain	ed with a w	eb-hosting company	on an annual ba	asis. Review	and update th	e website as
Assumptions	•					Every 3 years, the NV the site incorporate				
Schedule	Start Year			26	2035		Finish Year	55	2064	
Туре	Fixed									
Calculations and Notes:	· Вс	pard approve pard approve pard approve 115-2064, sa	ed budget 2 ed budget 2	011 \$25K 012-2014 \$		nd 100K every third	year			
	· Bo	pard approvented a	ed budget 2 ed budget 2	011 \$25K 012-2014 \$ spending, \$		nd 100K every third Subtotal	year Allowance	25%	To	tal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	190					Prepared By:	J. Robinson
WBS (Old)											
			***************************************					***************************************			
WBS Title	DIRECTED	COMMUNIC	CATIONS								
Description	C	- NIVA/NAO'-		<b></b>					f		iostica colletaval
Description	including:	e NWWO S	communica	ition and en	igagement a	activities thr	ougn the d	evelopment o	i various co	rporate comm	nunication collateral
	including.										
		Backgro									
	·	Fact She									
		Newslet	now Booths								
		Etc.	.1013								
		Ltc.									
Deliverable											
	=										ritten, digital and
	multimedia	a communio	ations solu	tions that a	re aligned w	ith and con	tribute to t	he overall NW	/MO commu	unications stra	ategy.
,											
	Th - NI) 4/8 4/	O			<b>.</b>					I -I:CC	
Assumptions	=							same level as			it types of the siting process.
	IIIIOIIIIatio	ii wiii iieeu	to be made	available a	S LITE INVVIVI	o begins to v	WOIK WILLI	.ommunices (	on a local ba	sis as pait or	the siting process.
<u>                                     </u>	·										
Schedule	Start Year			1	2010			Finish Year	9	2018	
Joineaule	Start rear			i				11111311 1001	i		
Туре	Fixed										
Calculations											
	· 20	10 560K									
	· 20	11 360K									
	•	12 360K									
	1	13 360K									
	1	14 360K									
		15-2064, sa			360K/year						
	•	)65-2134 - Y		yr							
Jaha	•	.35-2159 \$2		O.b.	Costs	داري	estal	Allowers	350/	-	atal Cast
Labour \$	COSTS	\$	al Costs	\$	2 420 000	Subt		Allowance \$	<b>25%</b>	\$	otal Cost
Þ	-	٦	-	<b>&gt;</b>	3,430,000	٦	3,430,000	γ	857,500	Ş	4,287,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	180					Prepared By:	J. Robinson
WBS (Old)											
WBS Title	DIRECTED	COMMUNIC	ATIONS								
Description	Support th including:	Backgrou Fact She	unders ets now Booths		gagement a	activities throu	igh the de	evelopment o	f various co	rporate comm	unication collateral
Deliverable										a to provide wi unications stra	ritten, digital and tegy.
	E									e and different sis as part of t	t types of he siting process.
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations	· 20 · 20 · 20 · 20 · 20 · 20	010 560K 011 360K 012 360K 013 360K 014 360K 015-2064, sa 065-2134 - Y	155 \$100K/		360K/year						
Labour (		Materia		Other	Costs	Subto	tal	Allowance	25%	To	otal Cost
\$	-	\$	-	\$	2,160,000		160,000	\$	540,000		2,700,000
7		7		7	2,100,000	۷ ک	100,000	7	340,000	7	2,700,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	160					Prepared B	By: J. Robinson
WBS (Old)				<u></u>							
WBS Title	DIRECTED	COMMUNIC	CATIONS								
Description	Support th including:	ie NWMO's (	communica	tion and en	gagement a	activities thr	ough the d	evelopment o	f various co	rporate con	nmunication collateral
		Backgro	unders								
		Fact She									
			now Booths								
		Newslet	ters								
		Etc.									
Deliverable											
	:			• .	-			he overall NW		•	written, digital and trategy.
Assumptions	<b>∃</b>							same level as communities c			ent types of of the siting process.
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations	· 20 · 20 · 20 · 20 · 20 · 20	010 560K 011 360K 012 360K 013 360K 014 360K 015-2064, sa 065-2134 - Y	155 \$100K/		360K/year						
Labour (	-	Materia		Other	Costs	Sub	total	Allowance	25%		Total Cost
\$	-	\$		\$	3,600,000	\$	3,600,000	\$	900,000	\$	4,500,000

560.05.10.30.160 185 of 275

## **Work Element Definition Sheet**

	O COMMUNIC	ATIONS							
	O COMMUNIC	ATIONS							
	O COMMUNIC	ATIONS							
<b>Description</b> Support									
Description Support	1 1111111111								
including	: Backgrou Fact She	unders		gagement	ictivities tilrough ti	e development	or various co	rporate comm	unication collateral
	Newslett Etc.	ters							
:					elopment, graphic c vith and contribute				
					ication material at t D begins to work w				
Schedule Start Yea	<u>r</u>		26	2035		Finish Year	55	2064	
<b>Type</b> Fixed									
	2010 560K 2011 360K 2012 360K 2013 360K 2014 360K 2015-2064, sai 2065-2134 - Y2	155 \$100K/		360K/year					
Labour Costs	2135-2159 \$20 Materia		Othor	r Costs	Subtotal	Allowance	e 25%	To	otal Cost
\$ -	\$	-		10,800,000	\$ 10,800,0		2,700,000	\$	13,500,000

560.05.10.40.110 186 of 275

## **Work Element Definition Sheet**

	560	05	10	50	80					Prepa	red By:	J. Robi	inson
WBS (Old)													
,													
WBS Title	DIRECTED (	COMMUNIC	CATIONS										
Description	Support the including:	e NWMO's	communica	tion and en	gagement a	activities throu	igh the de	evelopment	of various	corporat	e commı	unication	n collateral
į		Backgro	unders										
i		Fact She											
		Trade Sh	now Booths										
i		Newslet	ters										
İ		Etc.											
Deliverable													
Assumptions	<b>:</b>					ication materia							
Assumptions	<b>:</b>					ication materia O begins to wo							
Assumptions Schedule	<b>:</b>				s the NWM		ork with c		s on a local	basis as p			
	informatio			available a	s the NWM		ork with c	ommunities	s on a local	basis as p	oart of th		
Schedule	Start Year Fixed - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 20	10 560K 11 360K 12 360K 13 360K 14 360K 14 360K 15-2064, sa 165-2134 - Y	ime level of	spending, s	2065		ork with c	ommunities	s on a local	basis as p	oart of th		
Schedule Type	Start Year  Fixed  - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2	n will need to the state of the	ime level of	spending, 3	2065		ork with c	ommunities	s on a local	basis as p	2134		

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## **Work Element Definition Sheet**

	560	05	10	60	40					Prepared F	By: J. Robinson
WBS (Old)											
ļ	<u> </u>							***************************************			
WBS Title	DIRECTED	COMMUNIC	CATIONS								
Description	Support th including:	e NWMO's	communica	tion and en	gagement a	ctivities thr	ough the d	evelopment (	of various co	rporate cor	mmunication collateral
		Backgro	unders								
1		Fact She									
1		Trade Sh	now Booths								
I		Newslet	ters								
		Etc.									
Deliverable											
Assumptions	The NWM(	will contin			te commun						
ı		J WIII COITCII	ide to deve	op corpora	te commun	cation mate	erial at the	same level as	s it has. Mor	e and differ	rent types of
	informatio										rent types of of the siting process.
Schedule	informatio Start Year				s the NWM0					sis as part (	of the siting process.
Schedule Type				available as	s the NWM0			communities	on a local ba	sis as part (	of the siting process.
	Fixed  - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2	10 560K 11 360K 12 360K 13 360K 14 360K 14 360K 15-2064, sa 65-2134 - Y	me level of	available as	2135			communities	on a local ba	sis as part (	of the siting process.
Туре	Fixed  - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2	10 560K 11 360K 12 360K 13 360K 14 360K 15-2064, sa 65-2134 - Y 35-2159 \$2	me level of	spending, 3	2135	D begins to		communities	on a local ba	sis as part (	of the siting process.

560.05.10.60.40 188 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	200				Prepared By:	J. Robinson
WBS (Old)				<u> </u>						
WBS Title	TRANSLATI	ION								
Description	Translation	n of all NWN	10 commur	nication ma	terial.					
Deliverable	Translate a	ill NWMO co	ommunicati	ion materia	l into Frencl	h. (i.e. print/audio/visu	al/website) in	to French.		
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm	on an annual basis. The nunities that the NWMC translation.				ŭ
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations	· 20	010, 220K 011, \$50k; 20 065 - 2159 \$	-	.20K/year						
Labour	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,110,000	\$ 1,110,000	\$	277,500	\$	1,387,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	190				Prepared By:	J. Robinson
WBS (Old)					<u></u>					
WBS Title	TRANSLAT	ION								
Description	Translation	n of all NWM	10 commur	ication ma	terial.					
Deliverable	Translate a	all NWMO co	ommunicati	on materia	l into French	n. (i.e. print/audio/visua	al/website) in	to French.		
	full-time is		efficient. D	epending o	n the comm	on an annual basis. The unities that the NWMC translation.				•
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations	· 20	010, 220K 011, \$50k; 20 065 - 2159 \$	-	20K/year						
Labour (	Costs	Materia	al Costs		r Costs	Subtotal	Allowance	25%		tal Cost
\$	-	\$	-	\$	720,000	\$ 720,000	\$	180,000	\$	900,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	170				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	TRANSLAT	ION								
Description	Translatio	n of all NWN	ЛО commui	nication ma	terial.					
Deliverable	Translate a	all NWMO co	ommunicat	ion materia	l into Frencl	h. (i.e. print/audio/visu	al/website) in	ito French.		
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm	on an annual basis. The nunities that the NWMC translation.				•
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations	· 20	 010, 220K 011, \$50k; 2 065 - 2159 \$	-							
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	1,200,000	\$ 1,200,000	\$	300,000	\$	1,500,000

560.05.10.30.170 191 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	120				Prepared By:	J. Robinson
WBS (Old)				<u> </u>						
WBS Title	TRANSLATI	ION								
Description	Translation	n of all NWN	10 commur	nication mat	terial.					
Deliverable	Translate a	ill NWMO co	ommunicati	ion materia	l into Frencl	n. (i.e. print/audio/visu	al/website) in	to French.		
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm	on an annual basis. The unities that the NWMC translation.				ŭ
Schedule	Start Year			26	2035		Finish Year	55	2064	
Туре	Fixed									
Calculations	· 20	010, 220K 011, \$50k; 20 065 - 2159 \$	-	.20K/year						
Labour	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	3,600,000	\$ 3,600,000	\$	900,000	\$	4,500,000

560.05.10.40.120 192 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	50	90				Prepared By: J. Robinson	
WBS (Old)		<u></u>								
WBS Title	TRANSLAT	ION								
Description	Translation	n of all NWM	10 commur	nication ma	terial.					
Deliverable	Translate a	all NWMO co	ommunicati	on materia	l into Frencl	n. (i.e. print/audio/visu	al/website) in	to French.		
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm				r whether hiring a translator o sis, translation into other	n
Schedule	Start Year			56	2065		Finish Year	125	2134	
Туре	Fixed									
Calculations	· 20	010, 220K 011, \$50k; 20 065 - 2159 \$	-	20K/year						
Labour	Costs		al Costs		Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	2,800,000	\$ 2,800,000	\$	700,000	\$ 3,500,0	)00

560.05.10.50.90 193 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	60	50			P	Prepared By: J. Robinson
WBS (Old)									
WBS Title	TRANSLAT	ION							
Description	Translation	n of all NWN	10 commur	nication ma	terial.				
Deliverable	Translate a	all NWMO co	ommunicat	ion materia	ıl into Frenci	h. (i.e. print/audio/visu	al/website) into	French.	
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm				whether hiring a translator on is, translation into other
Schedule	Start Year			126	2135		Finish Year	150	2159
Туре	Fixed								
Calculations	· 20	010, 220K 011, \$50k; 20	-	.20K/year					
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,000,000	\$ 1,000,000	\$	250,000	\$ 1,250,00

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	210				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA REL	ATIONS								
Description	Media rela	tions activit	ies to supp	ort the NW	MO's comm	unication and engagem	nent activities.			
Deliverable	Developme	ent and exec	cution of m	edia relatio	ons activities	on a corporate and loc	al basis.			
	1									
Assumptions	Assumes th		WMO work	s more clo	sely with cor	mmunities and regions,	more detailed	d media rela	ations plans w	ill be developed
	1		WMO work	s more clo	sely with cor		more detailed	d media rela	ations plans w 2018	ill be developed
Assumptions Schedule Type	and execut		WMO work	s more clos				d media rela		ill be developed
Schedule Type Calculations	and execut  Start Year  Fixed  Bo	ed.	ed budget 2	1 	2010 2011 \$126K			d media rela		ill be developed
Schedule	Start Year Fixed - Bo - 20	ed.	ed budget 2 me level of	2010 \$50K;	2010 2011 \$126K			d media rela	2018	ill be developed

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	200				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA REI	LATIONS								
Description	Media rela	ations activit	ies to supp	ort the NW	MO's comm	unication and engagen	nent activities.			
Deliverable	Developm	ent and exe	cution of m	edia relatio	ns activities	on a corporate and loc	cal basis.			
Assumptions	Assumes the		WMO work	ks more clos	sely with cor	mmunities and regions,	more detailed	l media rela	ations plans wil	be developed
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:	1	oard approv 015-2064, sa	•		-	; 2012 - 2014 \$50K.				
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	al Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	180				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA REL	ATIONS								
Description	Media rela	tions activit	ies to suppo	ort the NWI	MO's comm	unication and engager	ment activities			
Deliverable	Developme	ent and exe	cution of m	edia relatio	ns activities	on a corporate and loc	cal basis.			
Assumptions	Assumes tl		WMO work	s more clos	ely with cor	mmunities and regions	, more detaile	d media rela	ations plans wi	ll be developed
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:			ad budgat 3	2010 \$50K;	2011 \$126K	; 2012 - 2014 \$50K.				
and Notes.	•	)15-2064, sa			50K/year					
Labour	· 20	)15-2064, sa		spending,	50K/year	Subtotal	Allowance	25%	To	otal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	130				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA REL	ATIONS								
Description	Media rela	tions activit	ies to supp	ort the NWI	MO's comm	unication and engagen	nent activities			
Deliverable	Developme	ent and exe	cution of m	edia relatio	ns activities	on a corporate and loc	cal basis.			
Assumptions	Assumes tl		WMO work	s more clos	ely with cor	mmunities and regions,	more detailed	d media rela	ations plans wi	ll be developed
Schedule	Start Year			26	2035		Finish Year	55	2064	
Туре	Fixed									
Type  Calculations  and Notes:	· Bo	pard approve 115-2064, sa	•		-	; 2012 - 2014 \$50K.				
Calculations	· Bc		me level of	spending,	-	; 2012 - 2014 \$50K. Subtotal	Allowance	25%	To	tal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	220					Prepared By:	J. Robinson
WBS (Old)											
WBS Title	CORPORAT	TE CITIZENSI	HIP								
Description	•	ar Waste Ma on's brand a	-	Organizatio	n (NWMO)	has deve	eloped and imp	lemented a C	orporate Ci	tizenship Progr	am to enhance the
Deliverable	Develop th	ne focus for	the Corpora	ite Citizensh	nip Program	on an a	nnual basis inc	luding themes	s for suppor	t.	
Assumptions	The NWM	O's organiza	tional mand	date straddl	es both nat	ional and	d local parame	ters			
		The APN	∕l project is	framed as a	national in	frastruct	ture project bu	t its impact is	felt at the l	ocal level	
	•	for NWMO' eputation lo	-	•			chored around	identifying in	itiatives tha	t build our bra	nd nationally, and
		2008-20	10: focused	l on 4 provi	nces; going	forward,	, recognition th	at the scope o	of geograph	ical focus may	shift
,		Fluid fra	mework to	allow for re	egional expa	nsion wh	here we are ac	tive			
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	•	oard approv 015-2064, sa	_								
Labour (	Costs	Materi	al Costs	Other	Costs	S	ubtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,800,000	\$	1,800,000	\$	450,000	\$	2,250,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	210					Prepared By:	J. Robinso	n
WBS (Old)	ļ											
WBS Title	CORPORAT	E CITIZENSI	HIP									
Description	E	ar Waste Ma on's brand a	•	Organizatio	n (NWMO)	has develo <sub>l</sub>	oed and imp	olemented a C	Corporate Ci	tizenship Prog	gram to enhar	nce the
Deliverable	Develop th	e focus for	the Corpora	nte Citizensl	nip Program	n on an annı	ual basis inc	luding theme	s for suppor	t.		
Assumptions	The NWM	D's organiza	tional man	date stradd	les both nat	tional and lo	ocal parame	ters				
		The APN	∕l project is	framed as a	national in	frastructur	e project bu	t its impact is	felt at the lo	ocal level		
	•	for NWMO' eputation lo	•	•			ored around	identifying in	itiatives tha	t build our bra	and nationally	y, and
		2008-20	10: focused	l on 4 provi	nces; going	forward, re	cognition th	nat the scope	of geograph	ical focus may	y shift	
		Fluid fra	mework to	allow for re	egional expa	ansion wher	e we are ac	tive				
Schedule	Start Year			10	2019			Finish Year	15	2024		
Туре	Fixed											
Calculations and Notes:	1	pard approve 115-2064, sa	•		• •							
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	To	otal Cost	
\$	-	\$	-	\$	1,200,000	\$	1,200,000	\$	300,000	\$	1,50	00,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	190					Prepared By:	J. Robinson
WBS (Old)							<u> </u>				
WBS Title	CORPORAT	E CITIZENSI	HP.								
Description											
· •	-	r Waste Ma on's brand a		Organizatio	n (NWMO)	has develo	oed and imp	olemented a C	orporate Ci	tizenship Prog	ram to enhance the
Deliverable	Develop th	e focus for t	the Corpora	ite Citizensl	nip Program	on an ann	ual basis inc	luding theme	s for suppor	t.	
Assumptions	The NWM0	O's organiza	tional mand	date stradd	les both nat	ional and lo	cal parame	ters	***************************************		
		The APM	1 project is	framed as a	national in	frastructur	e project bu	t its impact is	felt at the lo	ocal level	
		for NWMO's putation lo	•	•			ored around	identifying in	itiatives tha	t build our bra	and nationally, and
		2008-20	10: focused	l on 4 provi	nces; going	forward, re	cognition th	nat the scope	of geograph	ical focus may	shift
		Fluid fra	mework to	allow for re	egional expa	nsion whe	e we are ac	tive			
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations	_			.040 204 : 5	2001/						
and Notes:		ard approve 15-2064, sa	•		• •						
Labour (	`osts	Materia	al Costs	Other	Costs	Suh	total	Allowance	25%	T/	otal Cost
Ś	-	Ś	-	Ś	2,000,000		2,000,000	Ś	500,000	Ś	2,500,000
Ş	-	Ş		Ş	2,000,000	Þ	2,000,000	Ş	500,000	P P	2,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	140					Prepared By: J. Robinson
WBS (Old)							<u></u>			
WBS Title	CORPORAT	E CITIZENSI	НР							
Description	The Nuclea organizatio			Organizatio	n (NWMO)	has develo	ped and imp	olemented a (	Corporate Ci	tizenship Program to enhance the
Deliverable	Develop th	e focus for t	the Corpora	te Citizensl	nip Program	on an ann	ual basis inc	luding theme	es for suppor	t.
·	The NWMC  The scope if earn our re	The APN for NWMO's putation loo	I project is s corporate cally throug 10: focused	framed as a citizenship h a series c on 4 provi	national in investment of investmer nces; going	frastructur s are ancho nts forward, re	e project bu	t its impact is identifying in the scope	nitiatives tha	ocal level It build our brand nationally, and iical focus may shift
Schedule	Start Year			26	2035			Finish Year	55	2064
Туре	Fixed									
Calculations and Notes:		ard approve 15-2064, sa	_		• •					
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	6,000,000	\$	6,000,000	\$	1,500,000	\$ 7,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	230					Prepared By:	J. Robinson
WBS (Old)				<u></u>							
WBS Title	MAILING										
Description	Cost of pos	tage for NV	VMO mailin	igs.							
Deliverable	The NWM0	O has a suite	of corpora	ate commur	ication mat	terial that is	mailed to t	those individ	uals on the N	IWMO mailing I	list.
Assumptions	Ī	_	•	t, 4 newslet			lan (2) etc.	Costs are ex	pected to ris	e with the cost	of postage rising
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations	· 20	. ,	me level of	012 - 2014 S							
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	440,000	\$	440,000	\$	110,000	\$	550,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	220				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of pos	tage for NV	VMO mailin	gs.						
Deliverable	The NWM0	) has a suite	of corpora	te commun	ication mat	erial that is mailed to t	hose individua	ls on the N	WMO mailing li	st.
	Assumes m as well as t	-	-			nentation Plan (2) etc. ist.	Costs are exp	ected to ris	e with the cost	of postage rising
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations	· 20	10 \$50K; 20 15-2064, sa 6 - Y150 \$10	me level of							
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	300,000	\$ 300,000	\$	75,000	\$	375,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	200				Prepared By:	J. Robinson
WBS (Old)				Ĭ						
WBS Title	MAILING									
Description	Cost of pos	tage for NV	VMO mailin	ıgs.						
Deliverable	The NWM0	) has a suite	of corpora	ate commur	nication mat	erial that is mailed to t	those individu	als on the N	IWMO mailing li	st.
	Assumes m as well as t	•	•	-		mentation Plan (2) etc. st.	Costs are exp	pected to ris	e with the cost	of postage rising
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations	· 20	10 \$50K; 20 15-2064, sa 6 - Y150 \$10	me level of		,					
Labour (	Costs	Materia	al Costs	Other	r Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	500,000	\$ 500,000	\$	125,000	\$	625,000

560.05.10.30.200 205 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	150				Prepared By:	J. Robinson
WBS (Old)		<u> </u>		<u></u>						
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailir	ngs.						
Deliverable	The NWM	O has a suite	e of corpora	ate commun	nication ma	erial that is mailed	to those individ	uals on the N	IWMO mailing	list.
Assumptions	Ē	_	-	t, 4 newslet		mentation Plan (2) o	etc. Costs are ex	pected to ris	se with the cost	of postage rising
Schedule	Start Year			26	2035		Finish Year	55	2064	
Туре	Fixed									
Calculations	· 20		ime level of	012 - 2014 S						
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,500,000	\$ 1,500,0	00 \$	375,000	\$	1,875,000

560.05.10.40.150 206 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	50	120				Prepared By: J. Rob	oinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailir	ngs.						
Deliverable	The NWM	O has a suite	e of corpora	ate commur	ication ma	terial that is mailed	to those individ	uals on the N	IWMO mailing list.	
Assumptions	•	_	-	t, 4 newslet			etc. Costs are ex	spected to ris	e with the cost of post	age rising
Schedule	Start Year			56	2065		Finish Year	125	2134	
Туре	Fixed									
Calculations	· 20		ame level o	012 - 2014 S						
Labour	Costs	Materi	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	700,000	\$ 700,0	00 \$	175,000	\$	875,000

560.05.10.50.120 207 of 275

## **Work Element Definition Sheet**

WBS (New)	560	05	10	60	60				Prepared By:	J. Robinson
WBS (Old)				<u> </u>						
WBS Title	MAILING									
Description	Cost of pos	tage for NV	VMO mailin	ıgs.						
Deliverable	The NWM(	O has a suite	e of corpora	ate commur	nication mat	erial that is mailed to	those individua	ls on the N	WMO mailing lis	it.
Assumptions	Ē	nailing of An				mentation Plan (2) etc. ist.	Costs are exp	ected to ris	e with the cost c	of postage rising
Schedule	Start Year			126	2135		Finish Year	150	2159	
Туре	Fixed									
Calculations	· 20	10 \$50K; 20 15-2064, sa 6 - Y150 \$10	ime level of							
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Tota	al Cost
\$	-	\$	-	\$	250,000	\$ 250,000	\$	62,500	\$	312,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	240				Prepared By:	. Robinson
WBS (Old)										
WBS Title	PREMIUM	PROGRAM								
Description		ogram of sm ations and e			omotional pi	roducts at conferences,	, trade shows	etc. Intend	ed to support the	organization's
Deliverable	Develop a	comprehens	sive premiu	m program	with a suite	e of giveaways (pens, cl	othing etc.)			
Assumptions	Assumes th				constant but	that more products ma	ay be required	d due to inc	reased level of ac	tivities at the
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	· Bo	ard approve	ed budget 2			2012 - 2014 \$75K/year				
	Ē.	15-2064, sa	me level of	spending,	75K/year					
Labour	· 20				75K/year r Costs	Subtotal	Allowance	25%	Total	Cost

560.05.10.10.240 209 of 275

## Work Element Definition Sheet

WBS (New)	560	05	10	20	230				Prepared By:	J. Rob	inson
WBS (Old)											
WBS Title	PREMIUM	PROGRAM									
Description		ogram of sm ations and e		, ,	omotional p	roducts at conferences	, trade shows	etc. Intend	ed to support	the orga	nization's
Deliverable	Develop a	comprehens	sive premiu	m program	ı with a suite	e of giveaways (pens, cl	othing etc.)				
Assumptions	•	hat the pren			constant but	that more products m	ay be required	I due to inc	reased level of	activitie	s at the
Assumptions Schedule	•	•					ay be required	l due to inc	reased level of	activitie	s at the
	local comn	•		iting.						activitie	s at the
Schedule Type Calculations	Start Year Fixed • Bo	nunity level	as part of si	10 10 2010 \$75K;	2019 2011 \$50K;					activitie	s at the
Schedule	Start Year Fixed  BC - BC - 20	pard approvi	as part of si	10 10 2010 \$75K; spending,	2019 2011 \$50K;				2024	activitie	s at the

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	210				Prepared By: J. Rob	inson
WBS (Old)										
WBS Title	PREMIUM	PROGRAM								
Description	=	ogram of sm ations and e			omotional p	roducts at conferences	, trade shows	etc. Intend	ed to support the orga	nization's
Deliverable	Develop a	comprehen	sive premiu	ım program	with a suite	e of giveaways (pens, cl	othing etc.)			
Assumptions	=	hat the pren			constant but	that more products m	ay be required	d due to inc	reased level of activitie	s at the
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	:	oard approv 015-2064, sa	•			2012 - 2014 \$75K/year				
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	Ś	_	\$	750,000	\$ 750,000	\$	187,500	\$	937,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	160				Prepared By: J. Robinson
WBS (Old)				A					
WBS Title	PREMIUM	PROGRAM							
Description		ogram of sm ations and e		, .	omotional p	roducts at conferences	, trade shows	etc. Intend	led to support the organization's
Deliverable	Develop a	comprehens	sive premiu	m program	with a suite	e of giveaways (pens, cl	othing etc.)		
Assumptions	1	hat the pren nunity level			constant but	that more products m	ay be required	d due to inc	reased level of activities at the
Schedule	Start Year			26	2035		Finish Year	55	2064
Туре	Fixed								
Calculations and Notes:	:	oard approve 015-2064, sa	U	. ,		2012 - 2014 \$75K/year			
Labour	Costs	Materia	al Costs	Otha	r Costs	6	Allowance	25%	T. 10 .
Labour	COSES	iviateria	ai Costs	Otne.	r Costs	Subtotal	Allowance	25%	Total Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	250					Prepared By	: J Robir	nson
WBS (Old)												
WBS Title	ҮОИТН СО	MMUNICAT	IONS									
Description	±		•				work of the NWI nent of used nuc		ong-term m	anagement of	f used nucl	ear fuel
Deliverable	Annual You	uth Engagen	nent Progra	m								
Assumptions	•	nat as the N' and executo		s more clos	ely with co	mmuni	ties and regions,	a more detai	led local yo	uth engageme	ent progra	m will be
Schedule	Start Year			1	2010	)		Finish Year	9	2018		
Туре	Fixed											
Calculations and Notes:	2010, 160k 2011-2015											
Labour	•	Materia	al Costs	Other	Costs		Subtotal	Allowance	25%	Т	otal Cost	
\$	-	\$	-	\$	660,000	\$	660,000	\$	165,000	\$		825,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	90					Prepared By:	J. Robinson, P. Patton
WBS (Old)										i	
WBS Title	ABORIGINA	AL COMMUI	NICATIONS ·	– MATERIA	L PRODUCT	ION					
											<b>6</b>
Description		,	•			that will be used ong-term mana		_			fected through the
	•	e involved a					gement	or used flucie	ai iuei, to	ensure that and	ected Aboriginal
	peoples al										
B - 15 1-1 -					. f					ADA/A 40/	DVD by above
Deliverable	- "	ndividual co	mmunicatio	on products	for genera	use that explain	n the va	rious compor	ients of the	NWIVIO'S WORK	. – DVD, brochures.
		ranclation o	of appropria	to material	c into Abori	ginal languages	commo	n to the note	ntial host c	ommunity rogic	nn.
	1							•			
	E					eas of potential I		mmunities inv	olved in Fe	asibility Study t	o ensure that
	commu	inication ma	iteriai is cui	turally appr	opriate; de	velopment of ma	ateriais				
	- Y	'4 onwards:	communica	ation mater	ials develop	ment specific to	Aborig	inal communi	ities in area	s undergoing D	etailed Analysis
	<u> </u>	ranslators t	ravelling wi	th NWMO	when engag	ing community	membe	rs			
Assumptions		`oncultant/c	ontractors	with expert	ico to accict	ing in designing	cultura	lly appropriat	e material		
Assumptions	1	ranslators i		•		ing in designing	cuitura	пу арргорітат	e material		
	1					en, visual, web-l	based a	nd interactive	communic	ation products	
	•	•		•		nities to assist c				•	priate material
	- Т	ranslation s	ervices will	continue ir	construction	on and operation	n to ass	ist NWMO in	communica	ting with local	communities
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations	Y1-Y15: \$1	25 000 nerv	vear								
Calculations	Y16-Y55: \$		ycui								
	•	125 \$10K/yr									
	1	/150 \$25K/\									
		1		<b>r</b>		T				1	
Labour	Costs		al Costs		r Costs	Subtotal		Allowance	25%		tal Cost
\$	-	\$	-	\$	1,125,000	\$ 1,12	25,000	\$	281,250	\$	1,406,250

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	90					Prepared By:	J. Robinson, P.
WBS (Old)											
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIAI	L PRODUCT	ON					
Description	site selecti		in understa	nding the N	WMO, the l	ong-term m				communities affe ensure that affec	ected through the ted Aboriginal
Deliverable	- lı	ndividual co	mmunicatio	on products	for genera	use that ex	plain the va	arious compon	ents of the	NWMO's work -	- DVD, brochures
	- Y commu	2-3: Engage inication ma	with Abori eterial is cul	ginal people turally appr	es in the are opriate; de	eas of poter velopment o	tial host co of materials	mmunities inv	olved in Fe	ommunity region asibility Study to s undergoing De	ensure that
	- T	ranslators t	ravelling wi	th NWMO v	when engag	ing commu	nity membe	ers			
Assumptions	- T - C	ranslators i Developmen	n appropria t, printing a	te language and product	es ion of writt	en, visual, v	veb-based a		communic	ation products reloping appropr	riate material
	- Т	ranslation s	ervices will	continue in	construction	on and oper	ation to ass	ist NWMO in (	communica	ting with local co	ommunities
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
and Notes:	=	, ,									
Labour (	nsts.	Materi	al Costs	Other	· Costs	Sub	total	Allowance	25%	Tota	l Cost
Ś	-	\$	-	\$	750,000	\$	750,000	\$	187,500	\$	937,500
Y		7		7	750,000	7	750,000	7	107,300	Y	331,300

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	70					Prepared By:	J. Robinson, P.
WBS (Old)	<u> </u>										
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCT	ION					
Description	site selecti	,	in understa	nding the N	WMO, the	ong-term m		•			ffected through the fected Aboriginal
Deliverable	- lı	ndividual co	mmunicati	on products	for genera	use that ex	xplain the va	arious compor	ents of the	NWMO's wor	k – DVD, brochures.
	- Y commu	'2-3: Engage Inication ma	with Abori aterial is cul	iginal peoplo turally appr	es in the are opriate; de	eas of poter velopment	itial host co of materials	mmunities inv	olved in Fe		to ensure that  Detailed Analysis
	- Т	ranslators t	ravelling w	ith NWMO	when engag	ing commu	nity membe	ers			
Assumptions	- T	ranslators i Developmen	n appropria t, printing a	ite language and product	es ion of writt	en, visual, v	veb-based a		communic	ation product	s opriate material
	- Т	ranslation s	ervices will	continue in	construction	on and oper	ation to ass	ist NWMO in	communica	ting with loca	communities
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
and Notes:	Y16-Y55: \$ Y56 - Y	25,000 per v 100,000 125 \$10K/yr Y150 \$25K/v									
Labour (			al Costs	Othor	Costs	Suh	total	Allowance	25%	т,	otal Cost
Ś	-	\$	-	\$	1,000,000	\$	1,000,000	\$	250,000		1,250,000
Y		7		7	_,000,000	7	_,000,000	7	_55,000	7	1,230,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	40	20					Prepared By:	J. Robinson, P.
WBS (Old)											
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIAI	L PRODUCT	ION					
Description	site selecti		in understa	nding the N	WMO, the l	ong-term m		•			ffected through the ected Aboriginal
Deliverable	- T - Y	ranslation o	of appropria	ite material ginal people	s into Abori es in the are	ginal langua	ages commo	on to the pote mmunities inv	ntial host co	ommunity regi	k – DVD, brochures. on to ensure that
		4 onwards:							ities in area	s undergoing [	Detailed Analysis
Assumptions	- T - C	ranslators i Developmen ndependent	n appropria it, printing a contractor	te language and product s to Aborigi	es ion of writt nal commu	en, visual, v nities to ass	veb-based a	nities in review	communic	ation products veloping appro	opriate material
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Fixed										
Calculations and Notes:	Y16-Y55: \$ Y56 - Y	25,000 per 100,000 125 \$10K/yr /150 \$25K/y									
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	To	otal Cost
\$	-	\$	-	\$	3,000,000	\$	3,000,000	\$	750,000	\$	3,750,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	50	20					Prepared By: J. Robinson, P.
WBS (Old)				A			A			
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCT	ION				
Description	site selecti		in understa	nding the N	WMO, the l	ong-term m		_		ommunities affected through the ensure that affected Aboriginal
Deliverable	- I	ndividual co	mmunicatio	on products	for genera	use that ex	cplain the va	arious compoi	nents of the	NWMO's work – DVD, brochures.
	- Y commu	'2-3: Engage Inication ma	with Abori aterial is cul	ginal peoplo turally appr	es in the are opriate; de	eas of poter velopment	ntial host co of materials	mmunities inv	olved in Fe	ommunity region asibility Study to ensure that
		'4 onwards: Translators t			·	·	·		ities in area	s undergoing Detailed Analysis
Assumptions	- T	ranslators i Developmen	n appropria it, printing a	te language and product	es ion of writt	en, visual, v	veb-based a		e communic	ation products veloping appropriate material
	- 1	ranslation s	services will	continue in	construction	on and oper	ation to ass	sist NWMO in	communica	ting with local communities
Schedule	Start Year			56	2065			Finish Year	125	2134
Туре	Fixed									
Calculations and Notes:	Y16-Y55: \$ Y56 - Y	25,000 per 100,000 125 \$10K/yr Y150 \$25K/y	-							
Labour (	Costs	Materi	al Costs	Other	Costs	Suh	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	700,000	\$	700,000	\$	175,000	\$ 875,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	60	20					Prepared By: J. Robii	nson, P.
WBS (Old)											
	ļ		***************************************			***************************************					
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCTI	ON					
Description	site selecti	on process i	in understa	nding the N		ong-term m				communities affected the	-
Deliverable	- II	ndividual co	mmunicatio	on products	for general	use that ex	plain the va	arious compon	ents of the	NWMO's work – DVD, I	orochures.
	- Y commu	'2-3: Engage Inication ma	with Abori aterial is cul	ginal peopl turally appr	es in the are opriate; dev	eas of poter velopment o	itial host co of materials	mmunities inv	olved in Fea	ommunity region asibility Study to ensure s undergoing Detailed A	
	- Т	ranslators t	ravelling wi	th NWMO	when engag	ing commu	nity membe	ers			
Assumptions	- T	ranslators in Developmen	n appropria it, printing a	te language and product	es tion of writt	en, visual, v	veb-based a		communic	ation products veloping appropriate ma	aterial
	- Т	ranslation s	services will	continue ir	n construction	on and oper	ation to ass	ist NWMO in o	communica	ting with local commun	ities
Schedule	Start Year			126	2135			Finish Year	150	2159	
Туре	Fixed										
and Notes:		25,000 per y	year								
	i	100,000 125 \$10K/yr Y150 \$25K/y									
Labour (	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost	
\$	-	\$	-	\$	625,000	\$	625,000	\$	156,250	\$	781,250

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	40					Prepared B	y: P. Patton
WBS (Old)											
	ļ										
WBS Title	NATIONAL	ABORIGINA	L ORGANIZ	ATIONS							
Description	with the N' involved w	WMO on ar ith the NWI	ongoing ba	asis to provi al Aborigina	de insight o al organizat	n all phases ions will wa	of the proj nt to ensure	ect and to su	pport their i VMO and Cro	member org	s work, to engage anizations in being e duty to consult and
			ooriginal org		will require	consistent (	contact/liais	on with the	NWMO and	internal capa	acity regarding the
Deliverable	- Д	nnual brief	ings and tra	ining of nat	ional Abori	ginal organi	zation core	staff.			
	- C	onsistent li	aison mech	anism with	organizatio	าร					
	- C	)rganization	input to N	WMO docu	ments and p	rojects as r	equested o	ver time			
	ļ										
Assumptions	- N	lational Abo	original orga	ınizations h	ave limited	capacity to	sustain invo	lvement on	this subject of	over the very	long term
	- F consiste adminis - N consult - F	unds will be ent liaison v strative expo lational org and accom unds will be	e required to vith the NW enses. anizations v modate e required th	o ensure the MO; this would request the hough at le	ill normally funds to co	Aboriginal on the second of th	rganization: ted as the n endent rese e project Y1	s are able to eed for parti earch and/or	al funding of observation	to ensure fu	d to maintain a rson and associated ulfillment of duty to nded period at least
Cabadula	Chart Vaar			1	2010			Finish Vana		2010	
Schedule	Start Year			1	2010			Finish Year	. 9	2018	
Туре	Fixed										
Calculations and Notes:	sessions w Y1-Y2 (201 Y3-5 (2012 Y 6-Y9 (201	ith NWMO: 0-2011): \$5 -2014): \$46 .5-2018): \$5	20K – Years 0K - Years o 330K per yea	of capacity f capacity b ar – Negotia	building, supuilding, supuilding, supuilding, supuilding, supuilding, supuilding, supuilding supuil	ipport and i port and meements and	monitoring lonitoring N	NWMO commiss will be scru	mitments & action of the contract of the contr	action ction ly	vation, training
	•	-		_	toring and o						
Labour (	Costs		al Costs	Other	Costs	Sub	total	Allowance	25%		Total Cost
\$	-	\$	-	\$	4,540,000	\$	4,540,000	\$	1,135,000	\$	5,675,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	40					Prepared By:	P. Patton
WBS (Old)	o						<u></u>				
WBS Title	NATIONAL	ABORIGINA	L ORGANIZ	ATIONS							
Description	with the N' involved w	WMO on ar ith the NWI	n ongoing ba MO. Nation	asis to provi nal Aborigina	de insight o al organizat	n all phases ions will wa	s of the proj int to ensure	ect and to sup	port their r MO and Cro	member organ own fulfill the o	vork, to engage izations in being duty to consult and
	• • • • • • • • • • • • • • • • • • • •		ooriginal org		will require	consistent (	contact/liais	son with the N	WMO and i	internal capaci	ity regarding the
Deliverable	- C	onsistent li	aison mech	anism with	organizatio	ns	zation core				
Assumptions	- N - F consiste adminis - N consult - F	IWMO will unds will be ent liaison vitrative explational organd accomunds will be	need to male required to with the NW enses. anizations verdate erequired to	ke considera o ensure tha /MO; this wi will request	able effort t at national a ill normally funds to co	o ensure co Aboriginal o be interpre nduct indep	onsistent liai organization: ted as the n pendent reso ne project Y1	s are able to dueed for partial	evote the e I funding of observation	effort needed t a liaison perso to ensure fulf	Š
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	sessions w Y1-Y2 (201 Y3-5 (2012 Y 6-Y9 (201	ith NWMO: 0-2011): \$5 -2014): \$46 .5-2018): \$5	20K – Years 0K - Years o 530K per yea	of capacity of capacity b ar – Negotia	building, supuilding, sup	upport and opport and meements and	monitoring lonitoring No	NWMO commits s will be scruti	nitments & a ments & ac inized close	action tion ly	ition, training
	· `	•		year - Negot year – Monit	Ū		•	ess will be scru	unizeu cios	эсіу	
Labour (	•		al Costs		Costs		total	Allowance	25%	To	otal Cost
											itai Cust

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	20				Prepared By: P. Pattor	n
WBS (Old)	0									
				***************************************	***************************************					
WBS Title	NATIONAL	ABORIGINA	AL ORGANIZ	ATIONS						
Description	with the Ni involved w	WMO on ar	n ongoing bands MO. Nation	asis to prov nal Aborigin	ide insight o al organizat	n all phases of the p	roject and to su ure that the NV	pport their i VMO and Cro	the NWMO's work, to eng member organizations in low own fulfill the duty to con ed.	being
	: ' '		boriginal org	-	•	consistent contact/I	iaison with the I	NWMO and	internal capacity regardin	ng the
Deliverable	- <i>P</i>	Annual brief	fings and tra	nining of nat	tional Abori	ginal organization co	re staff.			
	E		_	_	organizatio	-				
	- (	Organization	n input to N	WMO docu	ments and p	projects as requeste	d over time			
Assumptions	- N	National Ab	original orga	anizations h	nave limited	capacity to sustain i	nvolvement on t	this subject o	over the very long term	
	- F consiste adminis - N consult - F	eunds will be ent liaison vestrative expended National orgen and accom	e required t with the NW penses. ganizations v nmodate e required t	o ensure th /MO; this w will request hrough at le	eat national Avill normally funds to co	be interpreted as th	ons are able to e need for parti esearch and/or	al funding of observation	effort needed to maintain a liaison person and asso to ensure fulfillment of d over an extended period a	ociated
Schedule	Start Voor			16	2025		Finish Year	25	2024	
Jeneuale	Start Year			10	, 2025		: IIIISII TEdi	25	2034	
Туре	Fixed									
	Ē	· ·	Ū	or part of on	r FTE along v	vith travel, overhead	l expenses, rese	arch/indepe	ndent observation, traini	ng
and Notes:	•	ith NWMO:								
	• •					upport and monitori	•			
	• `				٠.	port and monitoring	•			
	:r b-r9 (20)	12-2018): \$	SKIIK DOLVO	ar – Negotii	ation of agre	eements and EA pro	ess wiii be scru	unized close	IV	
	E	-		_	tiation of an	roomants and FA ar		utinized clas	•	
	Y10-Y15 (2	019-2024):	\$340K per y	year - Nego	_	reements and EA pr		utinized clos	•	
Labour (	Y10-Y15 (2 Y16-Y25 (2	019-2024): 025-2034):	\$340K per y	year - Nego year – Moni	tiation of ag itoring and or r Costs	-		utinized clos	•	

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## **Work Element Definition Sheet**

WBS TRIE  Description  Maintain relationships with provincial Aboriginal Organizations to ensure internal capacity to understand the NWMO's work, to with the NWMO and on an ongoing basis to provide insight on all phases of the project and to support their member organizations involved with the NWMO. Provincial Aboriginal organizations will with the owner that the NWMO and committed in an appropriate and respectful manner and that Aboriginal and treaty rights are protected.  Support to provincial Aboriginal organizations will require consistent contact/liaison with the NWMO and internal capacity regar long-term management of used nuclear fuel.  Deliverable  - Annual briefings and training of provincial Aboriginal organization core staff Input to NWMO documents and projects as requested over time - Annual update of provincial membership to apprise of NWMO work  Assumptions  - Provincial Aboriginal organizations have limited capacity to sustain involvement on this subject over the very long term provincial membership to apprise of NWMO work  - NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses.  - Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34)  - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate  - Initially funds will be needed in all four provinces Y1-V4; in V4 funds will be needed for the provinces in which the pote communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provide	/BS (New)	560	05	10	10	50					Prepared By	r: P. Patton	1
Description  Maintain relationships with provincial Aboriginal Organizations to ensure internal capacity to understand the NWMO's work, to with the NWMO on an ongoing basis to provide insight on all phases of the project and to support their member organizations in involved with the NWMO. Provincial Aboriginal organizations will want to ensure that the NWMO and Crown fulfill the duty to c and accommodate in an appropriate and respectful manner and that Aboriginal and treaty rights are protected.  Support to provincial Aboriginal organizations will require consistent contact/liaison with the NWMO and internal capacity regar long-term management of used nuclear fuel.  Deliverable  - Annual briefings and training of provincial Aboriginal organization core staff input to NWMO documents and projects as requested over time - Annual update of provincial membership to apprise of NWMO work.  Assumptions  - Provincial Aboriginal organizations have limited capacity to sustain involvement on this subject over the very long term - NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses.  - Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34)  - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate  - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the pote communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive invol	/BS (Old)			ļ									
Description  Maintain relationships with provincial Aboriginal Organizations to ensure internal capacity to understand the NWMO's work, to with the NWMO on an ongoing basis to provide insight on all phases of the project and to support their member organizations in involved with the NWMO. Provincial Aboriginal organizations will want to ensure that the NWMO and Crown fulfill the duty to c and accommodate in an appropriate and respectful manner and that Aboriginal and treaty rights are protected.  Support to provincial Aboriginal organizations will require consistent contact/liaison with the NWMO and internal capacity regar long-term management of used nuclear fuel.  Deliverable  - Annual briefings and training of provincial Aboriginal organization core staff input to NWMO documents and projects as requested over time - Annual update of provincial membership to apprise of NWMO work.  Assumptions  - Provincial Aboriginal organizations have limited capacity to sustain involvement on this subject over the very long term - NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses.  - Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34)  - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate  - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the pote communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive invol	IDC Title	A DODLONIA	A L DDO\/IAI/	CAL ODC AND	IZATIONIC								
with the NWMO on an ongoing basis to provide insight on all phases of the project and to support their member organizations in involved with the NWMO. Provincial Aboriginal organizations will want to ensure that the NWMO and Crown fulfill the duty to c and accommodate in an appropriate and respectful manner and that Aboriginal and treaty rights are protected.  Support to provincial Aboriginal organizations will require consistent contact/liaison with the NWMO and internal capacity regar long-term management of used nuclear fuel.  Deliverable  - Annual briefings and training of provincial Aboriginal organization core staff Input to NWMO documents and projects as requested over time - Annual update of provincial membership to apprise of NWMO work  Assumptions  - Provincial Aboriginal organizations have limited capacity to sustain involvement on this subject over the very long term - NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses Funds will be required through at least the beginning of the project and may be required over an extended period at lea completion of the Environmental Assessment and license (Y34) - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure full of duty to consult and accommodate - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the potencommunities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces Note: This has not provided for substantive involvement beyond the four provinces for the purposes o	/BS Little	ABORIGINA	AL PROVINIC	LAL ORGAN	IZATIONS								
Deliverable  - Annual briefings and training of provincial Aboriginal organization core staff Input to NWMO documents and projects as requested over time - Annual update of provincial membership to apprise of NWMO work  - Provincial Aboriginal organizations have limited capacity to sustain involvement on this subject over the very long term - NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34) - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the pote communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces  Schedule  Start Year   1 2010   Finish Year   9 2018   Type   Fixed  Calculations   Individual organization funding for part of on FTE along with travel, overhead expenses, research/independent observation, train sessions with NWMO:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action; Negotiatic agreements and EA process will be scrutinized closely		with the N <sup>1</sup> involved w and accom	WMO on ar ith the NWI modate in a	n ongoing ba MO. Provin an appropri	asis to provi cial Aborigi ate and resp	de insight c nal organiza pectful man	n all phases itions will wa ner and tha	of the proj ant to ensu t Aboriginal	ect and to su re that the N I and treaty r	pport their r WMO and C ghts are pro	member orga rown fulfill th tected.	nizations in k	peing nsult
- Input to NWMO documents and projects as requested over time - Annual update of provincial membership to apprise of NWMO work  - Provincial Aboriginal organizations have limited capacity to sustain involvement on this subject over the very long term - NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34) - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the pote communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces  Schedule  Start Year  1 2010 Finish Year 9 2018  Type Fixed  Calculations and Notes:  V1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action; Negotiatic agreements and EA process will be scrutinized closely		long-term	managemei	nt of used n	uclear fuel.								
- NWMO will need to make considerable effort to ensure consistent liaison - Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses.  - Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34)  - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate  - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the potern communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces  Schedule  Start Year  1 2010  Finish Year  9 2018  Type  Fixed  Calculations and Notes:  Individual organization funding for part of on FTE along with travel, overhead expenses, research/independent observation, train sessions with NWMO:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action  Y3-9 (2012-2018): \$652K per year; Years of capacity building, support and monitoring NWMO commitments & action; Negotiatic agreements and EA process will be scrutinized closely	eliverable	- II	nput to NW	MO docum	ents and pro	ojects as red	quested ove	r time	e staff.				
- Funds will be required to ensure that provincial Aboriginal organizations are able to devote the effort needed to maint consistent liaison with the NWMO; this will normally be interpreted as the partial funding of a liaison person and associated administrative expenses.  - Funds will be required through at least the beginning of the project and may be required over an extended period at le completion of the Environmental Assessment and license (Y34)  - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate  - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the poter communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces  Schedule  Start Year  1 2010  Finish Year  9 2018  Type  Fixed  Calculations and Notes:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action: Negotiatic agreements and EA process will be scrutinized closely	ssumptions	- P	Provincial Ab	ooriginal org	ganizations	have limited	d capacity to	sustain inv	volvement or	this subject	over the ver	y long term	
completion of the Environmental Assessment and license (Y34)  - Provincial/regional organizations will request funds to conduct independent research and/or observation to ensure ful of duty to consult and accommodate  - Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the poter communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces  Schedule  Start Year  1 2010  Finish Year  9 2018  Type  Fixed  Calculations and Notes:  Individual organization funding for part of on FTE along with travel, overhead expenses, research/independent observation, train sessions with NWMO:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action; Negotiatic agreements and EA process will be scrutinized closely		- F consiste	unds will be ent liaison v	e required t vith the NW	o ensure th	at provincia	l Aboriginal	organizatio	ons are able t				n a
- Initially funds will be needed in all four provinces Y1-Y4; in Y4 funds will be needed for the provinces in which the poter communities are located and at a minimum the 3 nuclear energy production provinces for the purposes of the transportation assume minimum 3 provinces  Note: This has not provided for substantive involvement beyond the four nuclear provinces  Schedule Start Year		comple - P	tion of the Provincial/re	Environmer egional orga	ntal Assessm nizations w	nent and lice	ense (Y34)		·				
Schedule Start Year 1 2010 Finish Year 9 2018  Type Fixed  Calculations and Notes: Individual organization funding for part of on FTE along with travel, overhead expenses, research/independent observation, train sessions with NWMO:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action  Y3-9 (2012-2018): \$652K per year; Years of capacity building, support and monitoring NWMO commitments & action; Negotiation agreements and EA process will be scrutinized closely		commu	inities are lo	ocated and		•				-		-	
Type  Fixed  Calculations and Notes:  Individual organization funding for part of on FTE along with travel, overhead expenses, research/independent observation, train sessions with NWMO:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action  Y3-9 (2012-2018): \$652K per year; Years of capacity building, support and monitoring NWMO commitments & action; Negotiation agreements and EA process will be scrutinized closely	Į	Note: This	has not pro	vided for su	ıbstantive ir	nvolvement	beyond the	four nuclea	ar provinces				
Calculations and Notes:  Individual organization funding for part of on FTE along with travel, overhead expenses, research/independent observation, train sessions with NWMO:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action  Y3-9 (2012-2018): \$652K per year; Years of capacity building, support and monitoring NWMO commitments & action; Negotiation agreements and EA process will be scrutinized closely	chedule	Start Year			1	2010			Finish Year	9	2018		
and Notes:  Y1 (2010) \$590K; Y2 (2011) \$882K; Years of capacity building, support and monitoring NWMO commitments & action  Y3-9 (2012-2018): \$652K per year; Years of capacity building, support and monitoring NWMO commitments & action; Negotiatic agreements and EA process will be scrutinized closely	уре	Fixed											
agreements and EA process will be scrutinized closely	nd Notes:	sessions w	ith NWMO:	J		J	ŕ		, ,			,	 ng
		-	-				ding, suppor	t and moni	toring NWM0	O commitme	ents & action	; Negotiation	of
Y10-Y15 (2019- 2024): \$492K per year; Negotiation of agreements and EA process will be scrutinized closely		·		·	-			nd EA proce	ess will be scr	utinized clos	ely		
Y16-25 (2025-2034): \$417K per year; Monitoring and observation  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	-	•						otal	Allowance	25%	-	Total Cost	
		-		ai CUSIS -									545,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	50					Prepared E	By: P. Patton
WBS (Old)											
WBS Title	ABORIGINA	AL PROVINIC	CAL ORGAN	IZATIONS							
·	with the N' involved w	WMO on an	ongoing ba	asis to provi cial Aborigii	de insight o nal organiza	on all phases ations will w	s of the proj ant to ensu	ect and to sup	port their r VMO and C	member org rown fulfill	O's work, to engage ganizations in being the duty to consult
		provincial A managemer	_	_	s will requir	e consisten	t contact/lia	aison with the	NWMO and	d internal ca	apacity regarding the
Deliverable	- li	Annual briefi nput to NWI Annual upda	MO docume	ents and pro	ojects as red	quested ove	er time	e staff.			
Assumptions	- P	Provincial Ab	original org	ganizations	have limited	d capacity to	o sustain inv	olvement on	this subject	over the ve	ery long term
	- F consiste adminis	ent liaison w strative expe	e required to vith the NW enses.	o ensure the	at provincia ill normally	l Aboriginal be interpre	organization	ons are able to partial funding	of a liaison	person and	
	comple	tion of the I	Environmen	tal Assessm	nent and lice	ense (Y34)					d period at least to to ensure fulfillment
	- lı commu assume	inities are lo minimum 3	s will be neo cated and a B provinces	eded in all f at a minimu	m the 3 nuc	clear energy	productior	n provinces foi			iich the potential site ransportation network
	Note: This	nas not pro	vided for su	bstantive ir	ivolvement	beyond the	four nucle	ar provinces			
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
and Notes:		ith NWMO:	n funding fo 011) \$882K	r part of on	FTE along v		overhead ex	openses, resea	arch/indepe		rvation, training
	•	-2018): \$65 s and EA pro		•		ding, suppo	rt and moni	toring NWMO	commitme	ents & action	n; Negotiation of
	•	019- 2024): 25-2034): \$	•	, , ,			nd EA proce	ess will be scru	itinized clos	ely	
Labour C			al Costs		· Costs		total	Allowance	25%		Total Cost
\$	-	\$	-		2,952,000		2,952,000	\$	738,000	\$	3,690,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	30			Prepared By: P. Patton
WBS (Old)	<u> </u>							
WBS Title	ABORIGINA	AL PROVINIC	CAL ORGAN	IZATIONS				
Description	with the N involved w and accom Support to	WMO on an vith the NWI amodate in a	n ongoing ba MO. Provin an appropri Aboriginal o	asis to prov cial Aborigi ate and res organization	ide insight o inal organiza pectful man ns will requir	n all phases of the pr itions will want to ens ner and that Aborigin	oject and to support their ure that the NWMO and ( al and treaty rights are pro	d the NWMO's work, to engage member organizations in being crown fulfill the duty to consult otected.  d internal capacity regarding the
Deliverable	•		•	• .		riginal organization co	ore staff.	
	•					quested over time prise of NWMO work		
Assumptions	- F	Provincial Ab	ooriginal or	ganizations	have limited	d capacity to sustain i	nvolvement on this subjec	t over the very long term
	- F consiste adminis	Funds will be ent liaison v strative expo	e required t vith the NW enses.	o ensure th /MO; this w	at provincia vill normally	be interpreted as the	ions are able to devote the partial funding of a liaisor	e effort needed to maintain a person and associated an extended period at least to
	comple - F	tion of the I	Environmer egional orga	ntal Assessn inizations w	nent and lice	ense (Y34)		bservation to ensure fulfillment
	- I	nitially fund	s will be ne ocated and	eded in all t at a minimu				vinces in which the potential site ses of the transportation network;
	Note: This	has not pro	vided for su	ıbstantive i	nvolvement	beyond the four nucl	ear provinces	
Schedule	Start Year			16	5 2025		Finish Year 25	2034
Туре	Fixed							
Calculations and Notes:	sessions w	ith NWMO:		·	J	•	expenses, research/indepointoring NWMO commitm	endent observation, training nents & action
	•	-2018): \$65 ts and EA pr				ding, support and mo	nitoring NWMO commitm	ents & action; Negotiation of
			·		tiation of ag	·	cess will be scrutinized clo	sely
Labour (	•	1	al Costs		r Costs	Subtotal	Allowance 25%	Total Cost
\$	-	\$	-	\$	4,170,000	\$ 4,170,000		<del> </del>
		•		•		· · · · · · · · · · · · · · · · · · ·		•

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	60				Prepared By: P. Patton	
WBS (Old)										
,										
WBS Title	ABORIGINA	AL YOUTH IN	NITIATIVES							
Description	program co surroundir	onducted wing Aborigina	ith the yout I communit	h of the Eldi	lers Forum. Original yout	As the NWMO work	s closely with po ties will become	otential hos involved th	gement beginning with a learni t communities and the rrough the Elders Forum youth n involvement with the Elders	
		of involvem			h in vicinity	of communities in s	te selection will	be importa	nt for the long term sustainabil	lity
	Aboriginal				٠				youth in potentially affected be involved in the guidance an	nd
	An annual	Aboriginal y	outh schola	arship progr	am to be in	cluded in the progra	m development			
Deliverable	- A informa		s Forum trains for comn	nsitions to b nunity yout	oe represen	D Elders Forum tative of the Aborigi	nal communities	in the vicin	ity of potential host communit	ties,
Assumptions	youth o	The Elders For of the affect of outh involve	ed Aborigin	al commun	ities		nent of the yout	h members	to provide for a transition to th	he
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	Y3-5: (2012	2-2014): \$17 15-2034): \$1	75K per yea	r:: Summe	r Program v	ucted through initia vith youth of Elders m/group with affec	orum assisting	youth in aff		rs
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	1,411,000	\$ 1,411,00	0 \$	352,750	\$ 1,763,7	750

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	60					Prepared By:	P. Patton
WBS (Old)	ļ										
MADE THE	ADODICINI										
WBS Title	ABORIGINA	AL YOUTH IN	NIIIAIIVES								
Description	program co surroundin	, onducted wi g Aborigina	ith the yout I communit	h of the Eld ies, the Abo	ers Forum. original yout	As the NWI h in these c	MO works o	closely with pot s will become i	tential hos nvolved th	t communities	rs Forum youth
		of involvem erational tr			n in vicinity	of commun	ities in site	selection will b	e importa	nt for the long	term sustainability
	Aboriginal				0.		•		•	youth in poten be involved in	tially affected the guidance and
	An annual	Aboriginal y	outh schola	rship progr	am to be in	cluded in th	e program	development.			
Deliverable	- A informa	nitial learnin s the Elders ation session annual schol	Forum trains for comm	nsitions to b nunity youth	e represent			communities i	n the vicin	ity of potential	host communities,
Assumptions	youth c	he Elders For of the affect outh involv	ed Aborigin	al communi	ities	J	levelopmer	nt of the youth	members	to provide for a	a transition to the
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	Y3-5: (2012	2-2014): \$17 15-2034): \$1	75K per yea	r:: Summe	r Program w	ith youth o	f Elders For	es of youth of E rum assisting yo I Aboriginal cor	outh in affe	ected areas	vement of Elders
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	То	tal Cost
\$	-	\$		\$	1,050,000	\$	1,050,000	\$	262,500	\$	1,312,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	40					Prepared By:	P. Patton
WBS (Old)											
	<u> </u>										
WBS Title	ABORIGINA	AL YOUTH IN	NITIATIVES								
	<u></u>										
Description	program co surroundin	onducted wing Aborigina	ith the yout I communit	h of the Eld ies, the Abo	ers Forum. original yout	As the NW th in these o	MO works of communities	closely with por s will become i	tential hos	t communities rough the Elde	ing with a learning and the rs Forum youth with the Elders
		of involvem erational tr			n in vicinity	of commun	ities in site	selection will b	e importa	nt for the long	term sustainability
	Aboriginal									youth in poten be involved in	tially affected the guidance and
	An annual	Aboriginal y	outh schola	rship progr	am to be in	cluded in th	e program	development.			
Deliverable	- A informa	nitial learnin as the Elders ation session annual schol	Forum tran	nsitions to b nunity youth	e represen			communities i	in the vicin	ity of potential	host communities,
Assumptions	youth c	the Elders For the affector outh involve	ed Aborigin	al communi	ties	J	developmer	nt of the youth	members	to provide for	a transition to the
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	Y3-5: (2012	2-2014): \$17 L5-2034): \$1	75K per year	r:: Summe	r Program v	vith youth c	f Elders For	es of youth of E um assisting yo Aboriginal cor	outh in affe	ected areas	vement of Elders
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,750,000	\$	1,750,000	\$	437,500	\$	2,187,500

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## **Work Element Definition Sheet**

	560	05	10	10	70				Prepared By:	P. Patton
WBS (Old)				<u> </u>						
WBS Title	ABORIGINA	AL AWAREN	ESS BUILDII	NG						
Description	people in t	he province vareness bu	s where sit	e selection	takes place	ion briefings and gene and in general through ought through annual a	national Abo	riginal orgai	nizations. Opport	unities to
	Speaking e	ngagement	s and briefi	ngs on requ	iest will also	be conducted.				
Deliverable					ssembly of p	provincial and national	Aboriginal org	ganizations i	in affected provin	ces
Assumptions	- R	Requests wil	I increase o	nce commi	unities enter	est attendance of NWN  Feasibility Study step st in regional areas for	in siting	,	·	formed on APM
Į.	•									
Schedule	Start Year			1	. 2010		Finish Year	9	2018	
Schedule Type	Start Year Fixed			1	2010		Finish Year	9	2018	
Туре		ear		1	2010		Finish Year	9	2018	
Type Calculations	Fixed \$50K per y 4 national	organization			2010		Finish Year	9	2018	
Type Calculations	Fixed \$50K per y 4 national 10 provinc	organizatior ial organizat	tions	1	2010		Finish Year	9	2018	
Type Calculations	\$50K per y 4 national 10 provinc	organizatior ial organizat nal requests	tions per year	1 1			Finish Year	9	2018	
Type Calculations	\$50K per y 4 national 10 provinc 10 addition	organizatior ial organizat nal requests v registration	tions per year	1		Subtotal	Finish Year	25%	2018	Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	70				Prepared By:	P. Patton
WBS (Old)										
WBS Title	ABORIGINA	AL AWAREN	ESS BUILDI	NG						
Description	people in t conduct av organizatio	he province vareness bu ons.	s where sit	e selection ities will ge	takes place nerally be so	tion briefings and gene and in general through ought through annual a be conducted.	national Abori	ginal organ	nizations. Oppo	ortunities to
Deliverable					ssembly of pat regional a	provincial and national assemblies	Aboriginal orga	inizations i	n affected prov	vinces
Assumptions	- R	equests wil	l increase c	once comm	unities ente	est attendance of NWN r Feasibility Study step st in regional areas for	in siting	,	·	s informed on APM
Assumptions Schedule	- R	equests wil	l increase c	once comm	unities ente	r Feasibility Study step st in regional areas for	in siting	,	deshows	s informed on APM
	- R - A	equests wil	l increase c	once comm	unities enter	r Feasibility Study step st in regional areas for	in siting NWMO attend	ance at tra	deshows	s informed on APM
Schedule	- R - A Start Year Fixed \$50K per y	equests wil attendance a	l increase c	once comm	unities enter	r Feasibility Study step st in regional areas for	in siting NWMO attend	ance at tra	deshows	s informed on APM
Schedule Type Calculations	- R - A Start Year Fixed \$50K per y	equests wil attendance a ear organization ial organizat nal requests	l increase cat tradesho	once comm ws will gen	unities enter erate intere ) 2019	r Feasibility Study step st in regional areas for	in siting NWMO attend	ance at tra	deshows	s informed on APM
Schedule Type Calculations	Start Year  Fixed  \$50K per your 10 provinci 10 addition Tradeshow	equests wil attendance a ear organization ial organizat nal requests	l increase c at tradesho	once comm ws will gen	unities enter erate intere ) 2019	r Feasibility Study step st in regional areas for	in siting NWMO attend	ance at tra	deshows 2024	tal Cost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	50			Prepared By: P. Patton
WBS (Old)		ļ						
WBS Title	ABORIGIN	AL AWAREN	ESS BUILDII	NG				
Description	people in t conduct av organization	he province wareness bu ons.	s where sit	e selection ities will ge	takes place nerally be so	and in general through	•	ss programs among Aboriginal nizations. Opportunities to ovincial and regional
Deliverable	i .				ssembly of p at regional a		Aboriginal organizations	in affected provinces
Assumptions	- F	Requests wil	l increase o	nce comm	unities enter	r Feasibility Study step i	•	keep members informed on APM
Schedule	Start Year			16	2025		Finish Year 25	2034
Туре	Fixed							
Calculations and Notes:	10 provinc 10 additio	organization ial organizat nal requests registration	tions per year	staff travel	expenses			
	4 national 10 provinc 10 addition Tradeshow	organizatior ial organizat nal requests v registration	tions per year		expenses r Costs	Subtotal	Allowance 25%	Total Cost

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#### Work Element Definition Sheet

WBS (New)	560	05	10	10	30			Prepared By: P. Patton
WBS (Old)				İ	İ	<u> </u>		
WBS Title	ABORIGINA	AL ENGAGE	MENT – ELI	DERS FORU	M, NIIGANI			
·	culture, pro including, b	O Elders For otocols, pra but not limi	actices and ited to, Abo	Traditional riginal Trad	Knowledge itional Know	. The members of t wledge, political aff	he Elders Forum represent airs, community developm	nd in understanding Aboriginal a broad range of interests ent, health and welfare, Aborigina rical relationships and youth
	Brunsw	rick. The N	WMO may a	also choose	, from time	-to-time, to accept		van, Ontario, Quebec and New mber from one of Canada's other Elders Forum.
						ccompany him/her s to learn from Elde		vide support and, in keeping with
	· M	lembers are	e invited to	participate	in the Elder	rs Forum to bring ar	Aboriginal perspective to	the work of the NWMO.
	=	-	bership is o				erson and a Secretary/Fac	ilitator and is chosen by the Elder
		ne NWMO i					tional members to Niigani	from among the members of the
	Site Selecti of a potent Forum will again trans	ion process tial willing h transition t sition to be	evolves the nost commu to include E representa	e membersl unity, estim Iders repre tive of the	nip of the El ated to take sentative of communitie	ders Forum will gra place in 2011-201 the siting commun s in this step. Throu	dually change to reflect th 2. In the Feasibility Study : ities and in the Detailed A	e acknowledging that as the APM e Aboriginal groups in the vicinity step of site selection, the Elders nalysis step the Elders Forum will e Elders Forum will maintain a
	Once a site to the proj		selected, th	e negotiatio	on with loca	ıl Aboriginal commu	nities will determine the r	ature of an Elders advisory group
			years of siting in areas of				ally provide assistance to N	IWMO in introductions to
	involve	d in these s	teps who w	vill assist NV	VMO in uno		ditional Knowledge and cu	ll include Elders from communitie lture/protocols/practices of their
Deliverable	- A	nnual mee	ting of the I	Flders Foru	m: Y1-15			
	- 3 - N	l-5 Niigani r Iiigani mem	meetings an	inually: Y1-: ssist NWMC	15 ) in establis	hing meetings with	local, provincial, regional g	groups and will attend events,
Assumptions	- E	lders Forur	n and Niiga	ni member	s will assist	in program for Abo	iginal youth involvement	and Traditional Knowledge project
	- E	lders Forur	n will meet	a minimum	of 1X per y	ear with the possib	ility of meeting 2X meetin	gs per year if necessary
	=						the NWMO Board and Adv ed along with coverage of	
							sessment and License (Y15	
Schedule	Start Year			1	2010		Finish Year	9 2018
Туре	Fixed							
Calculations	Y1 (2010):							
and Notes:			Y5 (2012 - 2 \$632K per y		K/year;			
	Description Elders Foru							
	Y1 (2010):	\$170K;	IROK.					
	Y2-Y9 (201 Y10-15 (20 Aboriginal	19-2024): \$		ear (assum	es need for	community Elders t	o be involved and provide	insight on project to interested
	Y2 (2011):	per year (Ir \$460K (Inclu	ncludes: Nii	ni Communi	-	rement Project); nent Project):		
	Staff travel	l: Y1: \$40K;	Y2-5: \$42K	; Y6-15: \$50	)k			
Labour (			al Costs		Costs	Subtotal	Allowance 25%	Total Cost
\$	-	\$	-	\$	5,616,000	\$ 5,616,0		

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	05	10	20	30				Prepared By: P. Patton
		!	!! 						
WBS Title	ABORIGINA	AL ENGAGEI	MENT – ELDI	ERS FORUN	Л, NIIGANI				
Description	culture, pro but not lim	D Elders For otocols, pra ited to, Abo	ctices and Ti original Tradi	raditional I itional Kno	Knowledge. wledge, pol	The members of the Elitical affairs, communit	lders Forum rep y development	present a b , health an	n understanding Aboriginal road range of interests including, d welfare, Aboriginal relationships and youth interests.
	Brunsw	ick. The NV	VMO may al	so choose,	from time-t		mmendations o	of a membe	Ontario, Quebec and New er from one of Canada's other rs Forum.
						company him/her to Fo to learn from Elders.	orum meetings	to provide	support and, in keeping with
	· м	embers are	invited to p	articipate i	in the Elders	Forum to bring an Abo	original perspec	ctive to the	work of the NWMO.
			pership is co om among t				n and a Secreta	ary/Facilita	tor and is chosen by the Elders
	· Th Elders F		nay, from tir	ne-to-time	at its discre	etion, appoint additiona	al members to I	Niigani fror	n among the members of the
	Selection p potential w transition t to be repre	rocess evol villing host on to include E esentative o	ves the men community, ders represe f the commu	nbership of estimated entative of unities in th	f the Elders to take plac the siting co his step. Thr	Forum will gradually che in 2011-2012. In the ommunities and in the	ange to reflect Feasibility Stud Detailed Analys ons the Elders F	the Aborig ly step of s sis step the	knowledging that as the APM Site inal groups in the vicinity of a ite selection, the Elders Forum will Elders Forum will again transition maintain a select number of
	Once a site the project		elected, the	negotiatio	n with local	Aboriginal communities	es will determin	ne the natu	re of an Elders advisory group to
	peoples - D	in areas of uring Feasi	potential ho bility Study a	ost commu and Detaile	nities. ed Study yea	rs of siting (2012-2024)	), Niigani memb	oers will inc	10 in introductions to Aboriginal clude Elders from communities
	:		-			with their communities.	_		
Deliverable	- 3 - N	-5 Niigani n Iiigani mem	ing of the El neetings ann bers will ass ngs along wi	ually: Y1-1 ist NWMO	.5	ing meetings with local	, provincial, re	gional grou	ps and will attend events,
Assumptions	- E	lders Forun	n and Niigani	i members	will assist ir	n program for Aborigina	al youth involve	ement and	Traditional Knowledge projects
	- N - N	liigani will n Iiigani mem	neet 3-5X pe bers will rec	r year incli eive an ho	uding an ani norarium fo	ear with the possibility nual meeting with the N r meetings attended al Environmental Assessr	NWMO Board a	ind Advisor age of trav	y Council
Schedule	Start Year			10	) 2019		Finish Year	15	2024
Туре	Fixed								
Calculations and Notes:		\$627K; Y3-Y	75 (2012 - 20 6632K per ye		<th></th> <th></th> <th></th> <th></th>				
	Descriptior Elders Foru Y1 (2010):\$ Y2-Y9 (201 Y10-15 (20 Aboriginal	ım: 3170K; 1-2018): \$1 19-2024): \$		ar (assume	es need for c	rommunity Elders to be	involved and p	orovide insi	ght on project to interested
	Y2 (2011):\$ Y3-15 (201	per year (Ir 6460K (Inclu 2-2024): \$3	cludes: Niiga des: Niigani 82 K per yea	Communit	ty Involveme	ement Project); ent Project):			
		: Y1: \$40K;	Y2-5: \$42K; \	Y6-15: \$50	k				
\$	Costs -	Materi \$	al Costs -	Othe \$	r Costs 3,672,000	<b>Subtotal</b> \$ 3,672,000	Allowance \$	<b>25%</b> 918,000	Total Cost \$ 4,590,000
		_					•		

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	80					Prepared By:	P. Patton
WBS (Old)	ļ										
WBS Title	STAFF TRA	VEL COSTS -	- ABORIGIN	AL							
Description	confidence		involve nat		•	•	O	•	•	election proces	ss to build nce in the NWMO
	Costs inclu		lated exper	nses for staf	f participati	ng in speak	ng engager	nents/briefing		gements on re	
Deliverable	- S	upport to N Naintenance	IWMO bran e and buildi	d in buildin ng of relatio	g confidenc onships betv	e in APM ween Aborig	inal organi	se to requests zations, poter and confiden	itial host coi	mmunities and	surrounding
Assumptions	- R and AP	_	tings/briefi	ngs with Ab	original org	anizations,	groups, con	nmunities and	individuals	will build confi	idence in NWMO
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	Provincial of Regional of Travel to lo	rganizations organization organizations ocal commu oriefings on	ns meetings meetings/ nities	/briefings							
	Y1 (2010): Y2 (2011): Y4-25 (201	187K; Y3 (20	•								
Labour (	Costs		al Costs	Other	Costs	Sub	total	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,328,000	\$	1,328,000	\$	332,000	\$	1,660,000

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	80				Prepared By: P.	Patton
WBS (Old)	<u></u>			<u></u>						
\										
WBS Title	STAFF TRA	VEL COSTS -	- ABORIGIN	AL						
Description	confidence		involve nat		-	g with Aboriginal comm nal and local Aboriginal	_	•	•	
	Travel will	also include	meetings v	with Aborigi	nal groups,	organizations and indi	viduals and spe	eaking enga	gements on reques	st.
	•					ng in speaking engagei ccommodations if neec		s, off-site m	neetings, and relate	d costs
Deliverable	- S	upport to N Naintenance	WMO bran and buildi	id in buildin ng of relatio	g confidenc onships betv	tion process in response in APM ween Aboriginal organi if site selection process	zations, poten	tial host cor	mmunities and surr	ounding
Assumptions	- R and AP	_	tings/briefi	ngs with Ab	original org	anizations, groups, cor	nmunities and	individuals	will build confiden	ce in NWMO
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calaulatiana										
	Provincial of Regional of Travel to lo Meetings/l Y1 (2010): Y2 (2011):	187K; Y3 (20	ns meetings s meetings/ nities request 012): \$191k	/briefings briefings						
and Notes:	Provincial of Regional of Travel to lo Meetings/l Y1 (2010): Y2 (2011): Y4-25 (201	organization rganizations ocal commu oriefings on 200K 187K; Y3 (20 3-2034): 12	ns meetings s meetings/ nities request 012): \$191k	/briefings briefings	· Costs	Subtotal	Allowance	25%	Total C	ost

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	30	60					Prepared By:	P. Patton
WBS (Old)	ļ			<u></u>							
WBS Title	STAFF TRA	VEL COSTS -	- ABORIGIN	AL							
Description	confidence and APM o	in APM, to on an ongoir	involve nat	ional, provi	ncial, regior	nal and loca	l Aboriginal	groups to bu	ild awarene	election proce ss and confider gements on re	nce in the NWMO
	:	de travel-re meeting roo	•			•			gs, off-site n	neetings, and r	elated costs
Deliverable	- S	upport to N Naintenance	IWMO bran e and buildi	d in buildin ng of relatio	g confidenc onships betv	e in APM ween Aborig	inal organi	se to request: zations, pote and confide	ntial host co	mmunities and	surrounding
Assumptions	- R and AP		tings/briefi	ngs with Ab	original org	anizations,	groups, con	nmunities an	d individuals	will build conf	idence in NWMO
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	Provincial of Regional of Travel to lo	rganizations organizatior rganizations ocal commu oriefings on	ns meetings meetings/ nities	/briefings							
	Y1 (2010): Y2 (2011): Y4-25 (201	187K; Y3 (2	, .								
Labour (	Costs		al Costs	Other	Costs		total	Allowance		То	tal Cost
\$	-	\$	-	\$	1,250,000	\$	1,250,000	\$	312,500	\$	1,562,500

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	10	270				Prepared By: J. Facella
WBS (Old)									Aidaiminin damadan damadan damadan damadan damadan damadan damadan damadan damadan damadan damadan damada
WBS Title	TRACKING	PUBLIC OPI	NION						
	ļ								
Description	. ac	tivities in a identify Canadians identify Identify	changes in timely way opportuniti opportuniti emerging is	citizen valu es to re-ali es to refine sues/challe	es and cond gn policies, p e NWMO bra enges	plans and activities to b	etter reflect ti	he evolving	e) for NWMO's policies, plans or values, preferences and concern
		Benchm			_	cceptability among com untries and be similar p		•	ders in Canada with that
	purchase o	f and/or pa	rticipation i	n syndicate	d studies; u	•	- ·	_	groups on targeted issues; levant publicly available researc
	The progra	m anticipat	es expendit	ure of \$200	),000 each y	vear until Environmenta	l Assessment	successfully	/ completed.
Deliverable	1) ac	Yearly s tivities	urvey of the	attitudes (	of Canadian	s on key topics of impo	rtance to susta	aining and l	ouilding acceptance for NWMO
	2) bu	isiness plan			ings from th	e broad range of input	s outlined abo	ve timed to	support internal NWMO
	3)	Commu	ilication tes	tilig				***************************************	
Assumptions	general po	licy environ	ment in wh	ich NWMO	operates, to	•	ey. If activity is	s less inten	IWMO siting process or in the se than anticipated, the survey would be conducted
Schedule	Start Year			1	2010		Finish Year	9	2018
Туре	Fixed								
Calculations and Notes:	Notes Consider th - - -	Bi-Annı	ual worksho ual worksho	p of a cross p of provin	section of ocial opinion	citizens to input to NW leaders to input to NW quired to support these	'MO policies a	•	
Labour	Costs		al Costs		r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,800,000	\$ 1,800,000	\$	450,000	
		, r		r	,5,000		L *	,	

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## **Work Element Definition Sheet**

WBS (New)	560	05	10	20	260					Prepared By	: J. Facella
WBS (Old)											
WBS Title	TRACKING	PUBLIC OPI	NION								
					40 :						
Description	Inis work	program is d	U			orne which	may affact	support Inacc	ivo or activo	\ for \\\\\\	s policies, plans or
		tivities in a	Ŭ	Citizeii vaiu	es and conc	erns willen	illay allect :	support (pass	ive or active	) TOT INVVIVIO	s policies, plans or
	ac.			ios to ro alia	an nolicios	alanc and a	ctivities to h	attor roflect t	the evolving	values profe	erences and concerns
	of	Canadians	оррогини	ies to re-ali	gii policies,	Jiaiis aliu a	Luvilles to L	etter renect i	lile evolvilig	values, preie	rences and concerns
			opportunit	ies to refine	NWMO bra	and					
		•	• •	sues/challe							
		Demons	trate ongoi	ng support	of Canadiar	s for NWM	O policies a	nd plans to Fe	ederal and P	rovincial gove	ernment policy
	m	akers									
		Benchm	ark NWMO	progress in	building ac	ceptability	among com	munities and	opinion lead	ders in Canad	a with that
	ex				_		_	rojects within	•		
	On a vearl	v hasis, this	work may i	involve: na	tionally repi	esentative	telenhone s	urvey; condu	ct of focus g	roups on tare	eted issues:
	: '	•					•	• •	_		ly available research
	•	within Cana						. ,	Ü	•	•
	The progra	ım anticipat	es expendit	ure of \$200	),000 each v	ear until En	vironmenta	ıl Assessment	successfully	completed.	
	•										
Deliverable	1)	Yearly s	urvey of the	e attitudes o	of Canadian	s on key top	ics of impo	rtance to sust	aining and b	ouilding accep	otance for NWMO
	ac	tivities									
	2)	Yearly s	ummarv rei	port of findi	ngs from th	e broad rar	ge of input	s outlined abo	ove timed to	support inte	rnal NWMO
	: '	usiness plani			0		0				
	3)	Commu	nication tes	sting							
	3)	Commu	meation tes	7.1116							
Assumptions	It is assum	ed that ther	e will be su	fficient acti	vity over th	e course of	the year, eit	ther with resp	ect to the N	IWMO siting	process or in the
-	general po	licy environ	ment in wh	ich NWMO	operates, to	warrant a	yearly surve	ey. If activity	is less inten	se than antici	pated, the survey
	might be c	onducted ev	very 18 moi	nths rather	than every	12 months a	and in its ste	ead qualitativ	e research w	ould be cond	ducted
Schedule	Start Year			10	2019			Finish Year	13	2022	
				Λ				f			
Туре	Fixed										
	ļ										
Calculations	Notes		1.10.1	.1							
and Notes:	Consider th	he following				.iki		MO mal!-!			
	_			•			•	MO policies a	•		
	-				•		nput to NW pport these	MO policies a	ina pians		
Labour	•		al Costs		r Costs	i	total	Allowance	25%	т	otal Cost
\$	-	\$	-	\$	800,000		800,000	\$	200,000	\$	1,000,000
		, <del>r</del>		, <del>,</del>	,	, T	,000	<u> </u>		· · · · · · · · · · · · · · · · · · ·	2,000,000

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#### **Work Element Definition Sheet**

WBS (New)	560	10	10	10	30					Prepared By: J. Facella	
WBS (Old)				<u> </u>	<u> </u>	<u> </u>					
WBS Title	TRACKING	BEST PRACT	ICES AND I	EXTERNAL A	DVICE						
Diti	Th:										
Description	- k - p Nuclear the Foru - F and Inte	o Appro o Aware o Appro vision a co o Appro o Appro o Appro o Appro o Appro articipate in Energy Age um. acilitate limi ernational Ir t any given o inforr o suppo interest a o Inforn and cultur o Assist	best practical best p	ices and ever community e ing, design of evelopment has for itself ssessment of and issues as: angaging Aboct anal informat m on Stakelf pation in initing Public Partiting pation in with public Partiting pation of NWMO able authorically to assess an of NWMO (community)	olving exper ngagement of information of tools and of environments sociated with related issu- priginal peop tion and expended confi- ditiatives which cipation date with re- or activities a dities in pote of and demonstrations of the san	and dialoguen material design and cental, social the thics and its such as light explored to explore the explored the explored the explored plans; intially internstrate willicommunity assessment	e and best sand commod implement, economic ditheir applinosting agregition of dimated at \$ chese issues olving socie ested commongness and region t and analy	and cultural e ication to NW eements, com Aboriginal Tra levelopment c i10,000 per yes and discuss e etal expectation nunities in the based researchsis	nning ainability pa effects MO work munity eng iditional Kno f internatio ear) Include experience a on in this are e engagemen	ans which capture the long-term agement, communications, and owledge nal best practice, as part of the s review of materials published by and best practices such as C2D2 as in order to: at of their own citizens to explore to support the social, economic	
	The progra	m anticipate \$200,000 \$200,000 \$150,000 \$150,000 \$125,000	0 in 2011 0 in 2012 0 in 2013 0 in 2014								
Deliverable	- C	onsulting ac	dvice								
	plannin	g and engag	gement plai	n design (int	ternal)					port internal NWMO business	
	- P	reparation (	of case stud	dies of proje	cts of partic	cular interes	t with a foo	cus on the eng	gagement ap	oproaches used (internal)	
		evelopmen (internal, ir					ommunities	s in engaging t	their resider	nts for publishing on the NWMO	
		early works 00 per year)	hop of prac	ctitioners to	review and	explore be	st practice a	and input to N	IWMO's pla	ns going forward (Estimated at	
	- A	d hoc exper	t advice in	cluding com	missioning	of papers de	esigned to e	explore key to	pics of inter	est (Estimated at \$60,000)	
	- S	ponsorship	of a confer	ence such a	s C2D2 or o	ther, or a di	scussion se	ssion at a con	ference (Es	timated at \$30,000 per year)	
Assumptions	Using appropriate processes, and encouraging communities to use appropriate processes will help build and sustain public acceptance of NWMO's policies, plans and activities  It will be important to the documentation required to support the EA and licencing process to be able to demonstrate that appropriate processes were used in these areas and that these processes meaningfully influenced proposals and decisions made.										
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations											
and Notes:				r		T		1			
Labour (	Costs	Materia	al Costs	1	1 200 000		total	Allowance	25%	Total Cost	
\$	-	\$	-	\$	1,200,000	\$	1,200,000	\$	300,000	\$ 1,500,000	

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#### **Work Element Definition Sheet**

WBS (New)	560	10	10	20	20				Prep	ared By: ၂.	Facella
WBS (Old)		<b>[</b>				<b></b>					
WBS Title	TRACKING	BEST PRACT	ICES AND E	XTERNAL A	DVICE						
Description	- p Nuclear by the F - F and Inte	o Appro o Awar o Appro vision a c o Appro o Appro o Appro o Appro o Appro r Energy Age Forum. acilitate lim ernational Ir	best pract paches to deness build paches to denement of the paches to a paches to a paches to endement of the paches to endement of the paches to endement of the paches to endement of the paches to endement of the paches to endement of the paches to endement of the paches to endement of the paches to endement of the paches the p	ices and evo community e ing, design of evelopment has for itsel ssessment c nd issues as arious siting ngaging Abo nal informat m on Stakeh pation in ini Public Parti	olving exper ngagement of informati of tools and f of environm sociated wi related issoriginal peo tion and ex older Confi tiatives whi cipation date with re	and dialogion material didesign and ental, social the ethics and uses such as ples and apperience shindence. (Estich explores	umber of key succe ue and best practice is and communication d implementation of l, economic and cult d their application thosting agreements plication of Aboriginaring, and developed imated at \$10,000 purchased at \$10,	e design on planning of sustainabili tural effects to NWMO wo s, community nal Traditiona ment of interr per year) Inc	ork r engagem al Knowled national be ludes revidence and be	ent, communinge est practice, a ew of materions est practices	nications, and as part of the als published
		o suppo interest a o Inforr and cultu o Assist	ort account and ultimat m the desig ural impact	able author ely to assess n of NWMC (community building of	ities in pote s and demo sponsored well-being	entially internstrate will community assessmen	rested communities ingness v and region based r nt and analysis nanagers, and other	research desi	gned to su	upport the so	cial, economic
	The progra	\$200,000 \$150,000 \$150,000	es expendit 0 in 2011 0 in 2012 0 in 2013 0 in 2014 0 in 2015	ure of:							
Deliverable	- Y plannin - P - D website - Y \$100,00	g and engag reparation of Development e (internal, in Gearly works 00 per year) d hoc exper	ary report of gement plan of case student of information collaboration of practical advice incomparts.	n design (int lies of proje ation sheets tion with Co titioners to	ernal) cts of partic and tools t mmunicatic review and	cular interes to support cons staff) explore be of papers d	f inputs outlined about the st with a focus on the communities in engagest practice and inpure segment to explore keeps at the community of th	ne engagemen aging their res at to NWMO's key topics of i	nt approad sidents for s plans goi interest (E	ches used (in r publishing c ng forward (I stimated at \$	on the NWMO Estimated at
Assumptions	accepta - It	nce of NWN	MO's policie ortant to th	es, plans and ne documen	l activities tation requ	ired to sup	es to use appropriat port the EA and lice rocesses meaningfu	ncing process	to be abl	e to demons	trate that
Schedule	Start Year			10	2019		Finish Y	'ear	11	2020	
				••••••							
Type Calculations and Notes:	Fixed										

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## **Work Element Definition Sheet**

WBS (New)	560	10	10	10	20					Prepared By: J. F	acella
WBS (Old)											
	ļ										
WBS Title	ETHICAL FF	RAMEWORK	FOR APM I	MPLEMENT	TATION						
	ļ										
Description	This work p	orogram is d	•		6 .1.						
	-			•				s decision m	naking throug	gh a yearly reflection	n of past
	pe	rformance					•	la collaboración al			a malatina tina dala a
	-				_			· ·		ugh continued partn gh participation in A	•
	:	eeting (\$5,0			•	, ,	-		r) and throug	gii participation iii A	illiuai Gellerai
	[ "					-			nugh desktor	research (internal)	
	_	•		•	J					, ,	lation of
	- -	Ad noc vironmenta	•	•	ed at \$40,00	oo per year	beginning ii	n 2010 throu	gn to the end	d of the successful co	ompletion of
	E11	ivironinenta	ii Assessiiie	IIL							
	<u>_</u> .			. d=0							
	The progra	m anticipat	es expendit	ure of \$70,0	000 per yea	r for the du	ration of th	e program.			
Deliverable	<u> </u>	Darticia	ation in an	d cupport fo	r Canadian	Pucinoss Et	hice Pocoar	ch Network			
Deliverable		•							evolve ethica	Il framework as wor	k nroceeds
	an	id new issue		cction on ci	inical perior	imanec ana	assessifier	t of fieed to t	Evolve etilled	ii ii ainework as wor	K proceeds
	u				a la alla accidi	- 1114/1140	distantantant				
	-	Inira pa	arty input a	nd review t	o neip guide	e NWMO po	olicies, plans	s and activitie	es.		
Assumptions		leing proces	soc which c	ncourage e	vnlicit cons	ideration of	ethical con	cidorations t	hroughout N	WMO's work, and a	gainst which
Assumptions	•	0.		•	•				•	s policies, plans and	•
	1,,,,,,,,,,	can pablici	y report, wi	iii ricip banc	a ana sastan	ii pablic alic	governine	in acceptanc	COLIVINO	5 policies, plans and	detivities
	1	•			•			-		pe able to demonstr	ate that
	•		•				_	oughout the s			
	1		, 0	-	•		•			stain public and gov	
	•		-	es, plans and	d activities a	and provide	NWMO for	ewarning of	issues and m	naximum flexibility to	o address
	them in	the early s	tages.								
Schedule	Start Year			1	2010			Finish Year	9	2018	
	ļ										
Туре	Fixed										
	ļ										
Calculations											
and Notes	CBERN - \$2	25,000 per y	ear sponso	rship.							
	•	5,000 per ye	•	•	ual general	meeting.					
	<b>.</b>	0,000 experi			<b>5</b>	J					
	•	e per year t		end of Envir	onmental A	ssessment	process.				
			-			•					
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Co	ost
\$	-	\$	-	\$	630,000	\$	630,000	\$	157,500	\$	787,500

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## **Work Element Definition Sheet**

WBS (New)	560	10	10	20	10					Prepared By:	J. Facella	
WBS (Old)		ļ										
WBS Title	ETHICAL FF	RAMEWORK	FOR APM I	MPLEMENT	ATION							
Description	This work	program is o	lesigned to									
Description	- TIIIS WOLK		•		of ethical co	onsideration	s in NWMC	o's decision m	aking throu	gh a vearly ref	lection of past	t
	ре	erformance		•						5,,		
							•	la collaboración Ala			La santa sandata ta	
	- C-				_			_		_	l partnership i	
	1	eeting (\$5,0			-				) and throug	gri participatio	n in Annual G	enerai
	"	בבנוווא (אָט,ט	ooj and gei	ierai projec	t support it	i the period	2010 (0 2)	020.				
	-	Track p	ractices use	d by other	waste orgar	nizations to	use as a be	nchmark thro	ugh desktop	research (int	ernal)	
	-	Ad hoc	expert advi	ce (Estimate	ed at \$40,00	00 per year	beginning i	n 2010 throug	gh to the end	d of the succes	ssful completion	on of
	Er	nvironmenta	ıl Assessme	nt								
	The progra	ım anticipat	es expendit	ure of \$70.0	000 per vea	r for the du	ration of th	e program.				
					p ,			- 10				
Deliverable	-	Particip	ation in an	d support fo	r Canadian	Business Et	hics Resear	ch Network				
	-	Interna	l yearly refl	ection on et	hical perfo	rmance and	assessmen	t of need to e	volve ethica	l framework a	s work procee	eds
	ar	nd new issue	es arise									
	-	Third pa	arty input a	nd review t	o help guide	e NWMO po	licies, plans	s and activitie	·S.			
Assumptions	- L	Jsing proces	ses which e	encourage e	xplicit cons	ideration of	ethical con	siderations th	roughout N	WMO's work,	and against w	which
	NWMC	can publicl	y report, wi	ill help build	l and sustai	n public and	l governme	nt acceptance	e of NWMO'	s policies, plar	ns and activitie	es
	- 1	t will he imr	ortant to th	ne documer	ntation requ	ired to suni	ort the FA	and licencing	nrocess to l	ne able to den	nonstrate that	t
	:				-			oughout the s	-		ionstrate that	
		00110100101	51.5 Were ap	, р. ора.с.,	4441 25524	400.0.0		Jugilout the s	В р. оссо			
	- E	arly third pa	arty guidan	ce, which ca	n begin to	be documer	nted publica	ally, will help l	build and su	stain public ar	nd governmen	ıt
	accepta	ance of NWI	MO's policie	es, plans and	d activities a	and provide	NWMO for	rewarning of i	ssues and m	aximum flexik	oility to addres	SS
	them ir	n the early s	tages.									
									.,,			
Schedule	Start Year			10	2019			Finish Year	11	2020		
Туре	Fixed											
Calculations												
Calculations												
	CBERN - \$2	25,000 per y	ear sponso	rship.								
	CBERN - \$5	5,000 per ye	ar participa	tion in annu	ual general	meeting.						
	Other - \$40	0,000 exper	t advice.									
	Expenditur	re per year t	hrough to e	end of Envir	onmental A	ssessment <sub>l</sub>	orocess.					
	<u> </u>							1				
Labour	Costs		al Costs		Costs		total	Allowance	25%		otal Cost	
\$	-	\$	-	\$	140,000	\$	140,000	\$	35,000	\$	17.	'5,000

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#### Work Element Definition Sheet

WBS (New)	560	10	10	10	10			ı	Prepared By	y: P. Patton
WBS (Old)		<u> </u>								
WBS Title	ABORIGINA	AL TRADITIC	DNAL KNOW	/LEDGE						
Description	It also inclu and betwe Traditional assisting in	udes knowle en commur Knowledge the develo	edge about nities. e provides re pment of te	developing ules for pro echnologies	and mainta tecting the to meet the	owledge about the lan ining effective and me land while using it; cla e subsistence, health, of all of these in the co	eaningful relations rifying and enhan trade and ritual n	ships beto	ween gener tionships ar ocal people;	rations and within mongst users; ; and helping to
	· sp · th · th · th	oiritual and place relationships aborigina te aborigina te health, trace pects of trace	physical asp nips betwee I sense of re ade and spi aditional cor	pects of the en various a esponsibilit ritual need mmunity life	land, peopl spects of th y and stewa s of people; e such as cu		ing humans; es, the wide rang			
	desktop re Knowledge	search and or experts	related pre in this field	paratory wo to assist in	ork. This wo	erstanding and interwe ork program is designe on of Traditional Know lated) assessment. Ac	d to engage those ledge in assessme	e involve ent of pot	d as holders tential host	s of Traditional sites for social,
	a. hu	Desktop nting, cerer			al uses of la	nd in territories of sitir	ng communities ir	n order to	o identify im	nportant fishing,
	b. inc					anizations, as appropi national resource ma				desktop research,
	c.	Monitor	r impact bei	nefit agreer	nents withi	n Canada and in North	America			
	d. me				tioners to p 013, 2016, 2	rovide advice and cou 018	nsel to NWMO wi	th respec	ct to its futu	ure activities –
	- in this		pacity build	ling of NWN	MO relations	ship managers, and ot	her NWMO staff,	to engag	e with and	support communities
	- siting	Cultural ser areas.	nsitivity trai	ining of NW	/MO staff to	understand tradition	al practices, proto	cols and	cultures of	Aboriginal peoples in
	Estimate o	f expenditui	res begins ii	n 2010 and	concludes a	t end of detailed site c	haracterization (2	2018)		
Deliverable	- P	esktop rese roject with Vorkshop of	Niigani Elde	ers 2011 (W	orkshop)	nd counsel to NWMO v	with respect to its	future a	ctivities –20	012, 2013, 2016, 2018
						ng of NWMO staff and of Aboriginal peoples		sociated	with APM t	o understand cultura
Assumptions	- Ir	nformation	is publicly a	vailable for	the nurnos	es of desktop research	or can be gather	red with i	involvemen	t of local Aboriginal
	people.					insight to their local Tr	_			
				Analysis ste		will be conducted sep original communities a			g steps and	will take place in the
Schedule	Start Year	•••••		1	2010		Finish Year	9	2018	
Туре	Fixed								-310	
: 15~	. meu									
	\$125K (pro \$45K Staff \$10K Cultu \$30 Staff tı	ral training	iigani) NWMO sta	ff						
	\$125K per \$45K Staff	year (Work training	shop, Resea							
	\$10K Cultu \$30 Staff ti	ral sensitivi	ty training I	NWMO staf	Ť					
Labour (		Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	1	Total Cost
\$	-	\$	-	\$	1,890,000	\$ 1,890,000			\$	2,362,500
		·				, ,				,

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#### **Work Element Definition Sheet**

WBS (New)	560	10	10	20	40				1	Prepared B	y: P. Patton
WBS (Old)		<u> </u>	)		<u> </u>	( !					······
WBS Title	ABORIGINA	AL TRADITIO	NAL KNOW	LEDGE							
Description	also includ		ge about de								itact with the land. It ons and within and
	in the deve	elopment of	technologie	es to meet t	he subsiste	nce, health,	trade and r		local people	; and helpi	ongst users; assisting ng to create a world making.
	· sp · th · th · th · as		physical asp nips betwee I sense of re ade and spi iditional cor	ects of the n various as esponsibility ritual needs nmunity life	land, people spects of the y and stewar s of people; e such as cul	e, wildlife a e environm rdship; Itural orient	nd their hab ent, includin	g humans;			es, recreational uture.
	desktop re Knowledge	search and or experts	related prep in this field	paratory wo	ork. This wo the inclusion	rk program n of Traditio	is designed onal Knowle	to engage tho dge in assessn	se involved nent of pote	as holders ntial host s	th a workshop, of Traditional ites for social, ogram include:
	b.	ınting, cerei Track e	monial and volving prac	burial sites ctices used I	by other org	ganizations,	as appropri		a benchmar	k through d	portant fishing, lesktop research,
	c. d.	Monito	r impact bei ie a worksho	nefit agreer op of practi	ments withir tioners to p	n Canada ar rovide advid	ıd in North A				re activities –
	-	s area.									upport communities  Aboriginal peoples in
	Estimate o	f expenditur	es begins in	2010 and a	concludes at	t end of det	ailed site ch	aracterization	(2018)		
Deliverable	- P	Desktop rese Project with Workshop of	Niigani Elde	ers 2011 (W	orkshop)	d counsel to	o NWMO wi	ith respect to i	its future ac	ivities –20	12, 2013, 2016, 2018
								oroject teams a n siting areas	associated v	vith APM to	understand cultural
Assumptions	people.							or can be gath			of local Aboriginal
	- V	Vork on a de	etailed Trad	itional Land	Use Study	will be cond	lucted sepa		of the siting		vill take place in the
Schedule	Start Year			10	2019			Finish Year	15	2024	
Tyne										••••••••	
	Fixed										
and Notes:	\$125K (pro \$45K Staff	ral training	igani)	f							
	\$125K per \$45K Staff	ral sensitivi	shop, Resea								
Labour C	•	Materi	al Costs		r Costs	Sub	total	Allowance	25%		Total Cost
\$	-	\$	-	\$	1,260,000	\$	1,260,000	\$	315,000	\$	1,575,000

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				Cost Estimate									
			Work Elem	ent Definition Sheet		NWMO Cost Code: 0170020-21							
WBS (New)	560	15 10	10 110			Prepared By: P. Simmons							
WBS (Old)	SITE SELEC	TION PROCESS	l	!									
WBS Title		ONT NWMO OFFICES											
Description	Category is	ncludes all those exnen	ises (non-staffing relat	ed) associated with the	oneration of 'store from	nt' offices and regional office in							
Description						y, and operation of the DGR.							
					f								
		ed public relations acti				vide information, displays, and							
Deliverable	This catego	ory's primary deliverab	le is the provision of a	store front operation/	liaison in communities.								
	A complen	nentary deliverable is t	he ongoing relationshi	p building/maintenand	e, NWMO brand suppor	t, and community presence.							
	ļ												
Assumptions	The Feasib	ility stage (Step 3 a. or	b.) triggers a store fro	nt operation. Only tho	se communities moving	from Step 2 into Step 3 will be							
		for a store front/comr		. ,	· ·								
	2010 – scr	eenings begin (no store	efronts).										
	2011 – scr	eenings continue.											
	Store front	ts are only initiated at f											
						r b) in 2011. Other screened t. It is also assumed that the							
						ility communities (4) will receive							
	store front	operation in 2011.											
					6 9 9 9 1								
						y be initiated. Assumed that 4 wever, is that the all store fronts i							
					(total store fronts requi								
		ity stage store fronts ar in by the community or			12 – early closure of a st	ore front may come from self-							
				•									
	In 2013 2	In 2013, 2 candidate sites are assumed to emerge from all completed feasibility studies. Any remaining feasibility communities (lower											
	ranked) will see the removal/closure of store front operations.												
	Store front	ts in 2013 = 2 per candi	date site = 4.										
						st community, the other in the discation of the Centre of							
		C of E) assumed to com			cy, and also the propose	a rocation or the centre of							
						018. Once the preferred site is e full Centre of Expertise c/w							
						of Expertise/lab morphs into the							
	2 <sup>nd</sup> store fr	ont/information centre	e - n <b>o Centre of Exper</b>	tise costs are included	in these estimates.								
	Store front	(s) will be staffed (staf	fing FTF's hudgeted ele	sewhere) and resource	ed with sunnlies materia	al, and displays. Storefront							
	assumed t	o be min. 1500 ft2. Lea	sed, utilities, taxes, ov	erhead, travel - \$ 60,00	00 per store front (staff i	not included). Assumed that							
	marginally	frequent travel of staff	f between NWMO offi	ce (Toronto) and candi	date site communities w	vill be required.							
	<b>†</b>												
Schedule	Start Year		1 2010		Finish Year 9	2018							
Tyne	Fixed												
Туре	Fixed												
Calculations and Notes:	Current ap	proved budget Y02 (20	010) = \$0										
and Notes:	Y02 (2011)	2 x \$60,000 for full ye	ear (\$120,000)		\$120,000								
		•	•										
	Y03 (2012)	4 x \$60,000 for full ye	ear = \$ 240.000										
	, , , , , , , , , , , , , , , , , , , ,		from 2011) = \$240,00	0	\$ 480,000								
	Y04 (2012)	2 x \$60,000 x in ea. ca	andidate site (2)) (C of	F initiated in each com	munity) \$ 240 000								
		1 x \$60,000 x in ea. cand			\$ 240,000								
		1 x \$60,000 x ea. cano	didate site (2), C of E m	orphs into '2 <sup>nd</sup> store fr									
	Y07 (2016) Y08 (2017)				\$ 120,000 \$ 120,000								
	Y09 (2018)				\$ 120,000								
	V10 (2019)	to Y15 (2024) Preferre	nd site selected = 1 loc	al storefront 1 at Cont	re of Expertise								
	110 (2019)		.000 = \$ 60,000 x 6 ye		= \$360,000								
	L												
	Y16 (2025)	- Y21 (2030) Preferre	ed site – 1 local store f	ront, 1 at Centre of Exp 1 x \$ 60,000 x 6yrs	pertise/UG lab. = \$ 360,000								
	Y22 (2031)	- Y26 (2034) 1 local st	ore front, Centre of ex	pertise/UG lab remain 1 x \$60,000 x 4yrs	s until operations begin = \$ 240,000	in 2035 (5 years).							
<u> </u>				1 A 900,000 X 491S	- \$ 24U,UUU								
Labour	Costs	Material Costs	Other Costs	Subtotal	Allowance 25%	Total Cost							
Ş		\$ -	\$ 1,560,000	\$ 1,560,000	\$ 390,000	\$ 1,950,000							

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							stimate				
					Work Elem	ent De	finition Sheet			NWMO Cost C	ode: 0170020- <b>21</b>
WBS (New)	560	15	10	20	40		-			Prepared By:	P. Simmons
WBS (Old)	<u> </u>	]				<u></u>					
WBS Title		TION PROCI									
WD3 TILLE	310KL FKC	JIVI IVVIVIO	OFFICES								
Description									n of 'store front' o ost community, a		
							s a liaison office nment relations		NWMO to provid	e information, o	displays, and other
Deliverable	ľ		•	·			ont operation/lia		ommunities. brand support, a	nd community	proconco
	A complem	ientary den	verable is th	e ongoing	, relationship		g/maintenance,		uranu support, a	na community	presence.
Assumptions			itep 3 a. or l			t opera	tion. Only those	commu	nities moving from	m Step 2 into St	ep 3 will be
			in (no store		on onice.						
	2044										
	2011 – scre		tinue. nitiated at fe	acihility c	tago						
	The screer communiti	nings initiate es should th ibility studie	ed in late 20 ney enter du es will be 50	10, and 20 Iring this p	011, are assu period are ass	sumed 1	to begin opting o	ut, or be	ies (stages a or b) e screened out. It e feasibility comm	is also assume	d that the timing
	store front	s will be red	quired in 201	L2 in addit	ion to the 4 i	nitiated	in 2011. Dissim	ilar to 20	ity studies may be 011, however, is its required in 20	that the all stor	imed that 4 more e fronts in 2012
					I to remain in ation of subc			– early (	closure of a store	front may com	e from self-
					merge from a e front opera		leted feasibility	studies.	Any remaining fe	asibility commi	unities (lower
	Store front	s in 2013 =	2 per candio	date site =	4.						
	The candidate sites selected from the feasibility studies will host 2 store front operations – 1 in the host community, the other in the 'region.' The 'region' is the proposed site location in each candidate community, and also the proposed location of the Centre of Exper (C of E) assumed to commence operation in 2014.										
	selected, 2 undergrou	of the 4 sto nd Lab. The	ore fronts wi local store	ill close. Ti front (in co	he remaining ommunity) w	2 will o	ontinue through	to cons until 203		II Centre of Exp	
	to be min.	1500 ft2. Le	ased, utiliti	es, taxes, o	overhead, tra	ivel - \$	50,000 per store	front (s	oplies, material, a taff not included) s will be required	. Assumed that	orefront assumed marginally
				······							
Schedule	Start Year			1	0 2019			rinish Y	ear 15	2024	
Туре	Fixed										
	ļ										
Calculations and Notes:	Current ap Y02 (2011)		get YO2 (20: 0 for full yea		000)				\$120,000		
	Y03 (2012)		0 for full yea								
	Y04 (2013)				) = \$240,000 te (2)) (C of E		d in each comm		\$ 480,000 \$ 240,000		
	Y05 (2014)	1 x \$60,00	0 x ea. cand	idate (2) C	of E under o	levelop	ment		\$ 240,000		
			0 x ea. cand	idate site	(2), C of E mo	orphs in	to '2 <sup>nd</sup> store from		\$ 120,000		
	Y07 (2016) Y08 (2017)								\$ 120,000 \$ 120,000		
	Y09 (2018)								\$ 120,000		
	Y10 (2019) to Y15 (2024) Preferred site selected = 1 local storefront, 1 at Centre of Expertise  1 x \$60,000 = \$60,000 x 6 years = \$360,000										
	Y16 (2025) – Y21 (2030) Preferred site – 1 local store front, 1 at Centre of Expertise/UG lab.  1 x \$ 60,000 x 6yrs = \$ 360,000										
	Y22 (2031)	– Y26 (203	<b>4)</b> 1 local sto	ore front,	Centre of exp	ertise/		until ope	rations begin in 2 5 240,000	2035 (5 years).	
1-1	Costs		al Cc-+	C	or Co -+-		Cubert-1	Δ11-	350	-	tal Cost
Labour (	-	\$ s	al Costs	\$	2,160,000	\$	2,160,000	Allowa \$	nce <b>25%</b> 540,000	Ś	2,700,000
					_,0,000		_,_00,000	7	3.0,000		_,, 00,000

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	APM Cost Estimate
······	Work Element Definition Sheet
WBS (New)	NWMO Cost Code: 0170020-21   560   15   10   30   20     Prepared By: P. Simmons
WBS (Old)	
M/DC Title	SITE SELECTION PROCESS  STORE FRONT NWMO OFFICES
WBS Title	STORE FROM I NUMBO OFFICES
Description	Category includes all those expenses (non-staffing related) associated with the operation of 'store front' offices and regional office in communities involved in the site selection process from Step 3 through to selection of host community, and operation of the DGR.
	Store front operation is both 'in community' and 'regional' and is a liaison office for the NWMO to provide information, displays, and other related public relations activities including municipal/local government relations.
Deliverable	:This category's primary deliverable is the provision of a store front operation/liaison in communities.
	A complementary deliverable is the ongoing relationship building/maintenance, NWMO brand support, and community presence.
ļ	
Assumptions	
	The Feasibility stage (Step 3 a. or b.) triggers a store front operation. Only those communities moving from Step 2 into Step 3 will be candidates for a store front/community liaison office.
	2010 – screenings begin (no storefronts).
	2011 – screenings continue.
	Store fronts are only initiated at feasibility stage.  The screenings initiated in late 2010, and 2011, are assumed to lead to 4 feasibility studies (stages a or b) in 2011. Other screened
	communities should they enter during this period are assumed to begin opting out, or be screened out. It is also assumed that the timing of the feasibility studies will be 50% early in the year, 50% latter part of year. Each of the feasibility communities (4) will receive a store front operation in 2011.
	2012 – Assumed that more communities may enter screening stage, and 4 more feasibility studies may be initiated. Assumed that 4 more store fronts will be required in 2012 in addition to the 4 initiated in 2011. Dissimilar to 2011, however, is that the all store fronts in 2012 will be required at the beginning of the year for the duration of the year (total store fronts required in 2012 = 8).
	All feasibility stage store fronts are assumed to remain in operation during 2012 – early closure of a store front may come from self- elimination by the community or clear revelation of suboptimal conditions.
	in 2013, 2 candidate sites are assumed to emerge from all completed feasibility studies. Any remaining feasibility communities (lower ranked) will see the removal/closure of store front operations.
	Store fronts in 2013 = 2 per candidate site = 4.
	The candidate sites selected from the feasibility studies will host 2 store front operations – 1 in the host community, the other in the 'region.' The 'region' is the proposed site location in each candidate community, and also the proposed location of the Centre of Expertise (C of E) assumed to commence operation in 2014.
	It is assumed that each of the 2 candidate sites will require 2 store fronts (total of 4) between 2013- 2018. Once the preferred site is selected, 2 of the 4 store fronts will close. The remaining 2 will continue through to construction of the full Centre of Expertise c/w underground Lab. The local store front (in community) will remain in operation until 2035. The Centre of Expertise/lab morphs into the 2 <sup>nd</sup> store front/information centre - no Centre of Expertise costs are included in these estimates.
	Store front(s) will be staffed (staffing FTE's budgeted elsewhere), and resourced with supplies, material, and displays. Storefront assumed to be min. 1500 ft2. Leased, utilities, taxes, overhead, travel - \$ 60,000 per store front (staff not included). Assumed that marginally frequent travel of staff between NWMO office (Toronto) and candidate site communities will be required.
·····	
Schedule	Start Year 16 2025 Finish Year 25 2034
	PaJ
Туре	Fixed
Calculations	Current approved budget Y02 (2010) = \$0
and Notes:	Y02 (2011) 2 x \$60,000 for full year (\$120,000) \$120,000
	Y03 (2012) 4 x \$60,000 for full year = \$ 240,000 4 x \$60,000 (full year from 2011) = \$240,000 \$ 480,000
	Y04 (2013) 2 x \$60,000 x in ea. candidate site (2)) (C of E initiated in each community) \$ 240,000
	Y05 (2014) 1 x \$60,000 x ea. candidate (2) C of E under development \$ 240,000
	Y06 (2015) 1 x \$60,000 x ea. candidate site (2), C of E morphs into '2 <sup>nd</sup> store front' \$ 120,000
	Y07 (2016) « « \$120,000
	Y08 (2017) «
	Y10 (2019) to Y15 (2024) Preferred site selected = 1 local storefront, 1 at Centre of Expertise  1 x \$60,000 = \$60,000 x 6 years = \$360,000
	Y16 (2025) – Y21 (2030) Preferred site – 1 local store front, 1 at Centre of Expertise/UG lab.
	1 x \$ 60,000 x 6yrs = \$ 360,000 Y22 (2031) – Y26 (2034) 1 local store front, Centre of expertise/UG lab remains until operations begin in 2035 (5 years).
	1 x \$60,000 x 4yrs = \$ 240,000
Labour (	
\$	- \$ - \$ 3,120,000 \$ 3,120,000 \$ 780,000 \$ 3,900,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	10				Prepared B	Зу:	K. Shaver,A. Mur	chison
WBS (Old)	552	40	10									
WBS Title	SITE ACQU	ISITION AN	ID IMPROVE	MENTS								
Description	Option to	purchase s	ites and eve	entual purcha	se of land	I to house th	ne DGR.					
Deliverable	Purchase la Preparatio Preparatio Provision c Site impro	and and mi n of the sit n of the sit of initial site vements in	ineral rights e, including e access rou e security fa cluding land		access rou rough gra final gradi	ute and tow ading. ing/drainag	e.					
Assumptions	Land cost ( (NOTE: Pei Land regist Site is a fla Access roa Rail access	55000 per hand P. recent and P. recent and the green are down the site to the site	hectare, inclent experien legal fees, 5 ea situated in O m wide and is not requi	luding minerance for crown 50% of land content the Canadiand 25 km in le	al rights co land purc ost. an Shield, ngth	osts. chase was \$ within 25 ki	print, 25 km x 20 m 1,000 per hectare) m of an existing hig r @ 6 km2		and 5 km x	5 km f	or the township.	
Schedule	Start Year			1	2010	)		Finish Year	9	2018	3	
Type Calculations	Step-Fixed											
and Notes:												
Labour	Costs	Mater	ial Costs	Other (	Costs		Subtotal	Allowance	25%		Total Cost	
							Jubiciai	/ liio tt allice	-5/0		. ota. cost	

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	20	10					Prepared By:	A. Murchison		
WBS (Old)	552	40	10	<u> </u>									
WBS Title	SITE ACQU	ISITION ANI	) IMPROVE	MENTS									
Description	Option to	purchase si	tes and eve	ntual purch	ase of land	to house th	e DGR.						
Deliverable	Preparatio Preparatio Preparatio Provision c Site impro	the facilities and and mir n of the site n of the site of initial site vements inc of on-site ro	neral rights e, including e access rou security fac luding land	for the site, clearing and te. cilities. scaping and	access rout I rough grad	ding. ng/drainage							
Assumptions	Land cost Site is a fla Access roa Rail access	Land requirements will be 3150 hectares, 3 km x 2km for DGR footprint, 25 km x 20 m access route and 5 km x 5 km for the township.  Land cost \$5000 per hectare, including mineral rights costs.  (NOTE: Per lan P. recent experience for crown land purchase was \$1,000 per hectare)  Land registration and legal fees, 50% of land cost.  Site is a flat green area situated in the Canadian Shield, within 25 km of an existing highway.  Access road will be 10 m wide and 25 km in length  Rail access to the site is not required.  Surface preparation is calculated for surface facilities footprint only @ 6 km2											
Schedule	Start Year			10	2019			Finish Year	15	2024			
	- E												
Туре	Step-Fixed												
Type  Calculations and Notes:	Step-Fixed												
Calculations			al Costs	Other	Costs	Sub	total	Allowance	25%	To	tal Cost		

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	170					Prepared By:	J. Robi	nson
WBS (Old)												
WBS Title	PRODUCTI	ON, TRANSL	ATION OF S	SITING PRO	CESS DOC							
Description	Siting Docu	ıment										
Deliverable	Design, pro	oduction and	d translatio	n of the Siti	ng Docume	nt						
Assumptions	50 pages ir	n length, des	sign comple	ted interna	lly, product	ion (printi	ng) and trans	slation done e	externally			
Schedule	Start Year			1	2010			Finish Year	9	2018		
Туре	Fixed											
Calculations												
and Notes:	2010 100K	(will be less	because de	esign is beir	ng done inte	ernally)						
Labour	Costs	Materia	al Costs	Othe	r Costs	Su	btotal	Allowance	25%	To	otal Cost	·
\$	-	\$	-	\$	100,000	\$	100,000	\$	25,000	\$		125,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	140					Prepared By:	K. Shav	ver
WBS (Old)												
WBS Title	DVDs FOR	SITING										
Description	NWMO Co	re Video										
Deliverable	Update the	e NWMO co	re video to	reflect initia	ation of the	site selection p	rocess.					
Assumptions	The core vi	deo needs t	o be updat	ed. Not an	entire re-w	rite.						
Schedule	Start Year			1	2010			Finish Year	4	2013		
Туре	Fixed											
Calculations and Notes:	2010 - 201	5: \$40K/yea	r									
Labour	Costs	Materia	l Costs		Costs	Subtota		Allowance	25%		tal Cost	
\$	-	\$	-	\$	240,000	\$ 2	40,000	\$	60,000	\$		300,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	70					Prepared By:	J. Facella
WBS (Old)											
WBS Title	THIRD PAR	TY REVIEWS	) 								
		issociated w selection pro			v of NWMO	's site assessm	ent work	by a Third P	arty Review	group of exp	erts, as documented
Deliverable											
Assumptions	•										
Schedule	Start Year			2	2011			Finish Year	13	2022	
Туре	Fixed										
Calculations and Notes:	these steps Review is c	s will be det optional), co	ermined by mpletion o	the commu f preliminar	unity. Triggo y assessmei	er points in the	process udy) in S	are: complet tep 3, and co	ion of initial	screening in	of moving through Step 2 (Third Party characterization in
Labour (	Costs	Materia	al Costs	Other	Costs	Subtota	al	Allowance	25%	T	otal Cost
\$	-	\$	-	\$	650,000	\$ 6	50,000	\$	162,500	\$	812,500

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560 15 10 10 30 <b>Prepared By:</b> J. Facella
WBS Title	COMMUNITY CAPACITY BUILDING – Community support for participation in Step 1 and Step 2 of the Siting process (information and initial screening)
Description	The work package is designed to capture funding which will need to be provided to communities (regions, band councils etc. as outlined in siting document) to support their participation in the early steps of the siting process (Step 1 and Step 2)
	Communities     a. Travel costs associated for a small group of community representatives to travel to an NWMO briefing in a nearby regional hub or NWMO offices: Estimate \$10,000 per community
	<ul> <li>Proposals to hire a third party expert to review material published to date, in order to answer questions the community representatives may have about the safety of the project and the basis for confidence at this early stage: Estimate \$15,000 per community</li> </ul>
	<ul> <li>Travel expenses associated with trip to visit an interim waste storage site by a small representative delegation: Estimate maximum \$20,000 per community</li> </ul>
	d. Hire a third party expert to review NWMO's evaluation of the suitability of the community based on readily available information and a short list of initial screening criteria (Step 2): Estimate \$15,000 per community
	<ul> <li>Should initial screening suggest community has potential to be suitable for the project the community, as represented by accountable authorities, may request and receive resources (funding and information, if desired) to develop and/or augment an existing sustainability plan which captures the long-term vision the community has for itself: Estimate \$40,000 per community</li> </ul>
	f. Should initial screening suggest community has potential to be suitable for the project, the community as represented by accountable authorities, may request and receive resources (funding and information, if desired) to engage citizens and begin to explore interest in hosting the project: Estimate \$20,000 per community
	Total of above per community: Potentially \$120,000.
	Note, uncertainties include: number of activities a community will choose to participate in; length of time a community will wish to take to complete all the tasks; number of communities who will enter the process and request funding and drop out before initial screening. Assumption for cost estimating purposes is that all tasks are completed in the calendar year noted.
	NOT INCLUDED IN COST ESTIMATE: Other support which communities may request:  g. Funding to support a community based advisory or liaison group to work with NWMO to conduct the initial screening: Estimate \$25,000 for each community
	h. Funding to support an FTE or partial FTE municipal staff: Estimate \$40,000 - \$80,000 per community i. Honorarium/reimbursement for attending meetings for public and elected politicians and out of pocket expenses
	COVERED IN A SEPARATE WED: Funding national and provincial Aboriginal organizations:     J. National organizations: Activities similar to a-h although completed at a non-site specific level and also develop information and communication material about the project to inform Aboriginal peoples.
	k. Provincial organizations: Activities similar to a-h although completed at a non-site specific level.
	Funding regional level:     No Funding planned at the regional level at this point in the process
	Non-profit organizations and academics: See separate WED sheet     NWMO staff travel costs associated with trips to community in order to plan for, deliver and support (participate) community in
	capacity building activity and other relationship building. Note that each trip may involve a stay of one week or more:
	a. Estimate \$5,000 associated with each community b. Estimate \$5,000 associated with each community c. Estimate \$5,000 associated with each community d. Estimate \$5,000 associated with each community e. Estimate \$10,000 (2 or 3 trips) associated with each community f. Estimate \$10,000 (2 or 3 trips) associated with each community g. Estimate \$10,000 (2 or 3 trips) associated with each community h. Estimate \$10,000 (2 or 3 trips) associated with each community i. j. Estimate \$40,000 associated with each community i. j. Estimate \$18,000 (6 trips) associated with each of 5 national organizations k. Estimate \$18,000 (6 trips) associated with each of 7 provincial organizations in 2010 l. \$0
	Total of above per community: Potentially \$255,000.
Deliverable	Support to communities to engage in various activities associated with Step 1 and Step 2 in the siting process
	Assumes a 50% take-up rate on published capacity building program; assumes interested communities complete Steps 1 and 2 by end of 2011.
Schedule	Start Year 1 2010 Finish Year 3 2012
Туре	Fixed
	Costs reflect commitments made in Learn More Program - Early Steps published on the website.
and Notes: Labour (	Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost
\$	- \$ - \$ 867,000 \$ 867,000 \$ 216,750 \$ 1,083,750

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	APM Cost Estimate									
	Work Element Definition Sheet									
WBS (New) WBS (Old)	560         15         10         10         60         Prepared By: IJ. Facelia									
WBS Title	COMMUNITY CAPACITY BUILDING – Community support for participation in Step 3 of the Siting process (feasibility study)									
Description	The work package is designed to capture funding which will need to be provided to communities to support their participation in Step of the siting process. The nature of funding provided to be outlined in a memorandum of understanding between the community(ies) involved at this stage and the NWMO. Use of funds is subject to third party audit.									
	Communities     a. Travel expenses associated with trip to Sweden (or Carlsbad) to visit research facilities and to meet with community leaders involving a small representative delegation from the community: Estimate maximum \$40,000 per community									
	<ul> <li>b. Hire a third party expert or establish a peer review group to support community's participation in feasibility study (Step 3), community based advisory group and part or full FTE to work with NWMO to conduct the feasibility study, develop information and communication material about the project to inform citizens and foster dialogue, conduct activities to inform residents and assess interest in surrounding areas, including First Nations, Métis and Inuit as appropriate: Estimate \$150,000 per year</li> <li>c. Establish a community office for the project: See budget for store front offices described elsewhere</li> </ul>									
	Total of above per community: 2011: \$200,000									
	2012: \$624,000  Note, assumptions and uncertainties include: Only 4 of 8 communities which begin this step will remain through to the end of the step, meaning that more resources will be devoted to these communities during this step than to the communities which drop out									
	<ol> <li>Funding available to accountable authorities in potentially affected surrounding areas, including First Nations, Métis and Inuit as appropriate, to support their participation.</li> </ol>									
	d. Travel costs associated for a small group of community representatives to travel to an NWMO briefing in a nearby regional hub or NWMO offices: Estimate \$10,000 per community									
	e. Proposals to hire a third party expert to review material published to date, in order to answer questions the community representatives may have about the safety of the project and the basis for confidence at this early stage: Estimate \$15,000 per community									
	f. Travel expenses associated with trip to visit an interim waste storage site by a small representative delegation: Estimat maximum \$20,000 per community									
	<ul> <li>g. Hire a third party expert</li> <li>h. Develop information and communication material about the project to inform Aboriginal peoples and support their exploration of interest in hosting the project</li> </ul>									
	<ul> <li>Funding to support a partial FTE municipal staff and honorarium/reimbursement for attending meetings for public and elected politicians.</li> </ul>									
	2011: \$204,000 2012: \$624,000									
	Funding to region     j. Included in above.									
	4. COSTS FOR THIS ITEM OUTLINED IN A SEPARATE WED. Funding national and provincial Aboriginal organizations:  k. National organizations: Activities similar to a-b although completed at a non-site specific level.  l. Provincial organizations: Activities similar to a-b although completed at a non-site specific level.									
	<ol> <li>NWMO travel costs associated with trips to community in order to plan for, deliver and support (participate) community in capacity building activity and other relationship building:</li> </ol>									
	<ul> <li>Communities: Assume 6 trips to each at \$7,000 each.</li> <li>Surrounding communities: Assume 4 trips to each</li> <li>INCLUDED IN OTHER WED: Estimate \$18,000 (6 trips) associated with each of: 5 national organizations in 2012 (\$90,00</li> </ul>									
	<ul> <li>INCLUDED IN OTHER WED: Estimate \$18,000 (6 trips) associated with each of: 6 provincial organizations in 2012 (\$108,000)</li> </ul>									
	Total of above: 2011: \$100,000 2012: \$100,000									
	2010, 910,900									

Deliverable Support to communities to engage in various activities associated with Step 3 in the siting process

Assumptions
Schedule Start Year 2 2011 Finish Year 3 2012

Type Fixed

Calculations and Notes:

Labour Costs		Material Costs		Other Costs		Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$ 1,900,000	\$	1,900,000	\$	475,000	\$ 2,375,000

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## **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	10	10	150	<u> </u>				Prepared By	: J. Facella		
WBS Title	COMMUN	ITY CAPACIT	TY BUILDING	G – Commur	nity support	for particip	ation in Ste	p 4/5/6 of th	e Siting prod	ess (detailed	site		
	characteri												
Description	the siting	orocess. Th	e nature of	•	vided to be	outlined in	a memorar	dum of unde		•	icipation in Step 4 of ommunity(ies)		
	a. For character	Funding to e terization: E Funding for pation in fea aracterization es to inform h of 2 comm	stimate: \$8 two communications; two asibility stuctors, conductors in a residents in	unities to pa 5,000 in 201 unities to hir dy (Step 3), c activities to n surroundil each of 2013	erticipate in 13 re a third pa community inform resi ng areas, in 3 - 2018	process to arty expert of based advision and a cluding Firs	or establishy ory group a assess and d t Nations, N	'maintain a po nd part or ful emonstrate v létis and Inuit	nich will be t eer review g I FTE to wor villingness in as appropr	k with NWM0 n the commun	ort community's O during the detailed nity, conduct e \$250,000 per year		
	1	_			•					nities surrour ovincial orgar	nding each of the nizations)		
	represe	entatives) aı	nd to pay fo	r their norm	nal operatio	ns, logistica	ıl support, d	evelopment	of communi	cation materi	al and province als and working of two communities		
	f. COSTS NOT INCLUDED: Up front regional development payments to allow an exploration of capacity to capture benefits and initiate programs to increase this capacity and local sourcing. This may include strategic investment in commercial/industry sectors, educational and training programs for local workers, infrastructure and business development studies, etc. Focus on local community, surrounding communities, region and affected Aboriginal peoples. Estimate: \$250,000 per year for each of the two regions during the period 2013 - 2018												
	each co	ommunity (4	1 meetings	for each per	year), pote	entially affe	ted Aborigi	nal peoples (	4 meetings p	per year with	udy organization for each of 4 Aboriginal of for the period 2013		
	Total of th	e above: 2013: \$ 2014: \$ 2015: \$	1.516M										
	Note some	e allowance	for commu	nities beginr	ning this ste	p in the siti	ng process r	nid way throu	igh the year	in 2013 has b	peen made		
Deliverable Assumptions	Support to	communiti	es to engag	ge in various	activities a	ssociated w	ith Step 4/5	/6 in the sitir	g process				
Schedule	Start Year			4	2013			Finish Year	9	2018			
Туре	Fixed												
Calculations and Notes:		1 -											
\$	Costs -	Materi \$	al Costs	\$	3,888,000	\$ub	3,888,000	Allowance \$	<b>25%</b> 972,000	\$ *	4,860,000		

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	50		<u> </u>			Prepared By:	J. Facella
WBS (Old)				<u> </u>			<u> </u>				
WBS Title	CAPACITY BUILDING OF OTHERS – Non profit organizations/ academics										
-	Includes funding to non-profit organizations and academics to enable them to participate in the site selection process leading up to the regulatory review stage and to follow and evaluate issues concerning the disposal of radioactive waste and its effect on the environment and people's health.   • \$200,000 per year, beginning in 2012  • Includes travel costs and out of pocket expenses associated with individuals attending an NWMO briefing, information session or topical workshop										
Deliverable											
Assumptions											
Schedule	Start Year		3 2012			Finish Year		9	9 2018		
Туре	Fixed										
Calculations and Notes:											
Labour Costs		Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	To	tal Cost
\$	\$	-	\$	1,400,000	\$	1,400,000	\$	350,000	\$	1,750,000	

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	10	10	130					Prepared By: J. Facella
WBS Title	MANAGIN	G COMMUN	NITY IMPAC	TS (Commu	nity Benefit	s)				
Description		Host cor Surroun Region Transpo Losing p	otential hos	unities munities as st communi					gin with	granting of construction licence.
	· TI project · TI · TI · TI inclusic	he means by the need for the need for the mechani the approach the approach	, and nature , and nature sm to be us h for ensurin	NWMO an e of, provisi e of, any de ed for dispung the long- ng the impa	d the comm on of resour cision-makir ute resolutio term sustain	ces and fun ng and/or ac on nability and	ding for ted dvisory bod well-being	chnical and other lies to support the	assistan e process	
	· U · Ei · Ei relatior · A · Ei suppor · R · M monito · Fi · A or othe · Fi · Co · Lo	pgrades to mergency renvironment in to environ greements in to environment it communit ecords cent leeting and ring at university and wanced mater; centre for unding for summunity cocal procure	and oversight mental issu with affecte cal monitoring based mo cre as part of conference versity as pail andependent anufacturing or hazardous school equip donations prement program	and infrastrinsportation and monities described and monities described and resentation and monities described and resentation and and and and and and and and and an	nucture n monitoring oring agreer al organizati arch centre Expertise al training a of Expertise ation trainin	ons as part of C nd business	ng oversight entre of Ex centre, res	pertise (separate search center for	mediation	raining on, and emergency response in aseline health studies; fund to dent environmental impact
	· Ti · Ei · In · Pi Estimated item to be · wi	raining – en conomic ass itergenerati roperty valu total value negotiated It is expo Ilingness an	sistance grai ional fund ue protectio of hosting a with the co ected that a nd being sele	sponse and nt to offset n greement ( mmunity. Milestone ected as pre	payment wi	ransportati beyond ecor II be made munity in st	on nomic bene upon the co	rfits which natural	a comp	rom the project) is a contingent elling demonstration of t community, losing community
Deliverable										
Assumptions										
Schedule	Start Year			3	3 2012			Finish Year	9	2018
Туре	Fixed									
. 14-	. IACU									
Calculations and Notes:										
Labour (	Costs	Materi	ial Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$ -

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	10	20	50					Prepared By:	J. Facella
WBS Title	MANAGIN	G COMMUN	IITY IMPAC	TS (Commur	nity Benefits	5)					
Description		Region Transpor Losing po	nmunity ding common rtation com otential hos	unities munities as st communit	Ey .				egin with	granting of cor	nstruction licence.
	· TI project · TI · TI · TI inclusic · TI  As negotia · U · Er relatior · A · Er suppor · R	the need for, the need for, the mechanis he approach the approach ted with the pgrades to I mergency renvironments to environments to community ecords centi	which the and nature and nature and nature of the use o	e of, provisice of, any deceded for dispung the long-famp the impany, it may also and infrastrumsportation and monitoes deceded Aborigina and reseanitoring of Centre of E	on of resour ision-makin te resolutio term sustain cts associat o include: ucture i monitoring oring agreer I organization arch centre	ces and fung and/or acon mability and ion with the g, accident Innent includions	ding for tec dvisory bodi well-being e project iability and ing oversigh	er to seek regulat chnical and other ies to support the of the communit transportation c at, monitoring, re	assistance process ty throug  orridor tremediation  WED); ba	ce; h the project, or raining on, and emerge	ency response in studies; fund to
	monito Fi A or othe C C B T I F I P Estimated	unding for indvanced mader; centre for sunding for sommunity docal procure raining — emconomic assistergeneration perty valuated anegotiated	ersity as paindependent inufacturing rhazardous chool equip lonations properly registance graonal fund are protection fhosting a with the countries and part of the countries of	rt of Centre coversight g and innova waste man ment and co orgam ram rojects sponse and nt to offset i  m greement (a mmunity.	of Expertise ation trainin agement ex urricula radioprotec impacts of t	g centre; En cellence ction and re ransportati	nvironment lated equip on nomic bene	al/ hazardous ma	aterials e	ducation and to	raining programs  t) is a contingent
	=		d being sele	ected as pre	ferred com	munity in st			-	-	osing community
Deliverable											
Assumptions											
Schedule	Start Year			10	2019			Finish Year	15	2024	
Type Calculations	Fixed										
and Notes: Labour (	Costs		al Costs		Costs		total	Allowance	25%		tal Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$	-

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	560	15	10	30	30					Prepared By: J. Facella
WBS Title	MANAGIN	G COMMUN	IITY IMPAC	TS (Commu	nity Benefit	s)				
Description		Region Transpor Losing po	nmunity ding common rtation com otential hos	unities munities as st communit	ty				gin with	granting of construction licence.
	· Tl project · Tl · Tl · Tl inclusio	ne need for, ne need for, ne mechanis ne approach	which the and nature and nature om to be us n for ensuri	NWMO and e of, provision of, any dec ed for dispung the long-	I the comm on of resour cision-makir te resolutio term sustaii	ces and fun ng and/or ad n nability and	ding for ted dvisory bod well-being	chnical and other ies to support the	assistande process	
	· U · Er · Er relatior · A	nvironmenta n to environi greements v	ocal roads a esponse, tra al oversight mental issu with affecte al monitorii	and infrastro insportation and monito es d Aborigina ng and resea	ucture I monitoring oring agreer I organizati	nent includ	ing oversigh		mediatio	aining on, and emergency response in aseline health studies; fund to
	N monito     Fu     An or othe     Cu     Bu     Tu     Eu     In	ring at unive unding for ir	conference ersity as pain dependent inufacturing r hazardous chool equip ionations pi ment progre elopment p dergency re- istance gra onal fund	centre, locart of Centre t of Centre t oversight g and innova waste man ment and c rogram ram rojects sponse and nt to offset	al training a of Expertise ation training agement ex urricula radioprotec	g centre; Ei cellence	nvironment lated equip	al/ hazardous ma		dent environmental impact ducation and training programs
	item to be wi	negotiated It is expe	with the co ected that a d being sele	mmunity.  Milestone   ected as pre	payment wi ferred com	II be made munity in st	upon the co	ommunity making	g a comp	rom the project) is a contingent elling demonstration of community, losing community
Deliverable										
Assumptions Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
	i iACU									
Calculations and Notes:										
Labour (	Costs	Materi	al Costs	Other \$	Costs	Sub \$	total -	Allowance \$	25%	Total Cost
<u> </u>		, ,		l 7		٧.		1 4		<del>-</del>

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#### **Work Element Definition Sheet**

						;				F
WBS (New)	560	15	10	40	30	ļ				Prepared By: J. Facella
WBS (Old)		<b>!</b>	<u> </u>	İ		<u> </u>				
WBS Title	MANAGINO	G COMMUN	IITY IMPAC	TS (Commu	nity Benefit	s)				
WD5 TILLE	100000000000000000000000000000000000000	o communi		13 (0011111101	ncy benefic	3)				
Description	Benefits to  Benefits to  Hosting ag  Th  project  Th	be defined Host con Surround Region Transpor Losing po begin with reement con me means by	for each of nmunity ding community relation commotential hose triggering for mponents rown which the and nature and nature	munities as at communities are to communities are t	a large gro y atory revie	up with a sh w process n unity will w rces and fur ng and/or ac	nilestone. F ork togethe	Full benefits to b	atory appr er assistan	
	· Th inclusio		n for ensurir	ng the long-	term sustai	nability and		of the commun	nity throug	h the project, outlining specific
	· U <sub>l</sub> · Er · Er relation · A <sub>t</sub> · Er support · Re	nvironmenta n to environi greements v nvironmenta t community ecords centr	ocal roads a esponse, tra al oversight mental issu- with affecte al monitorir y based mo re as part of	and infrastrinsportation and monito es d Aboriginang and reseanitoring	ucture I monitoring Iring agree I organizati Irch centre	ment includ ons as part of C	ing oversigl	pertise (separat	remediatio	on, and emergency response in a seline health studies; fund to
	monitor  Fu Ador other  Fu Co Bu Tr In In	ring at unive	ersity as par independent inufacturing r hazardous chool equip lonations pre- ment progre elopment progre elopment progressistance grai onal fund	rt of Centre coversight g and innova waste man ment and cogram ram rojects sponse and nt to offset	of Expertison training agement expertise training agement expertise training and the control of	e ng centre; E ccellence ction and re	nvironment	tal/ hazardous n		dent environmental impact ducation and training programs
	item to be wil	negotiated It is expe	with the co ected that a d being sele	mmunity. Milestone   ected as pre	payment wi	II be made munity in st	upon the co	ommunity makir	ng a comp	rom the project) is a contingent elling demonstration of t community, losing community
Deliverable										
Deliverable										
Assumptions										
Schedule	Start Year			26	2035			Finish Year	26	2035
······································	e									
Туре	Fixed									
Calculations										
and Notes:	Coats		al Carto	0.1	Cost-		tata!	Allerna	350/	Takal Carr
Labour (	LUSIS		al Costs	\$	Costs	\$	total	Allowance \$	25%	Total Cost
\$	-	\$	-	Į	-	٦	-	۱۶	-	٠ -

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	160					Prepared By: J. Facella
WBS (Old)										
WBS Title	CENTRE OF	EXPERTISE	: (NFW)							
WD5 Title	CLIVINE OI	LAI LIVIIJI	(14244)							
Description	(As out initially which i demon enviror of the continual implem	lined in the to support s an import stration pro mental and community h public vie nentation of	siting docui the multi-yi ant compor ogram involvi d socio-econ to learn mo wing gallerie f a deep geo	ment, centrear testing a nent of the s ving research nomic and core about the es and inter logical repo	e of experti and assessm siting proces hers and ot ultural impa e project, to active displa sitory and t	se will be estonent of the standard of the sta	stablished a site on tech the home to in a wide va ent. The cec cientific and d as a small riety of relat	t the site, or n nical safety an for an active to ariety of discip ntre of expert I engineering v science centrited activities,	earby as de d commun echnical and lines incluc ise will also work involv e focused o it will be de	detailed site characterization. etermined with the community, ity well-being related dimensions d social research and technology ling rock science, engineering, be a focus for engaging members ed in site assessment in progress n the design, construction and signed not only as a meeting region and beyond.)
	outline will be demon over se	d in the siti expanded t strate the s veral decac	ng documer o include ar afety of the	nt, should the nd support to facilities be neen the ca	ne site be ul the construct fore they a se for deep	timately sel tion and op re construct geological r	ected to ho eration of a ed and ultine epositories	st the deep ge in undergrour mately to supp	eological report and demonst port the ope	6 of the siting process. (As pository, the centre of expertise ration facility designed to eration of the deep repository ucted in other countries, it will
	. А	s negotiate	d with the c	ommunity,	it may also	include:				
		o Mee o local o rese o Adva o Envir	ce	d business of for indepen facturing ar hazardous r	centre dent enviro nd innovatio materials ed	on training c lucation and	entre; I training pr			for hazardous waste management re
	. К	o 2018	I - Begin cor I - Expand fa	cility at pre	ferred site t	to meet con	nmunity cor	e in site select nmitments (p and DGR con:	referred sit	e selected).
		o 2035	- Right size	facility for	operation p	hase of wor	k and comr	nitments to co	ommunity.	
Deliverable										
Assumptions										
Schedule	Start Year			4	2013			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:										
Labour C	Costs		ial Costs		Costs		total	Allowance	25%	Total Cost
\$	-	\$	-	\$ 1	10,000,000	\$ 1	0,000,000	\$	2,500,000	\$ 12,500,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	20	60					Prepared By: J. Facella	
WBS (Old)		r		A							
WBS Title	CENTRE OF	EXPERTISE	(NEW)								
Description	(As out initially which i demon enviror of the continual implem	lined in the to support s an imports stration promental and community to public view lentation of	siting docui the multi-yo ant compon gram involv socio-econ to learn mo ving gallerio a deep geo	ment, centrear testing a nent of the s ving research nomic and core about the es and inter logical repo	e of experti and assessm siting proces hers and ot ultural impa e project, to active displa sitory and t	se will be esteement of the state of the sta	stablished a lite on tech the home f in a wide va ent. The cen cientific and d as a small iety of relat	t the site, or nical safety a for an active ariety of discintre of exper I engineering science cented activities,	nearby as de nd communi technical and plines includ tise will also work involv re focused o , it will be de	detailed site characterization etermined with the communitity well-being related dimensid social research and technologing rock science, engineering be a focus for engaging memed in site assessment in prograthe design, construction and signed not only as a meeting region and beyond.)	ty, ions ogy s, nbers ress
	outline will be demon over se	d in the sitir expanded to strate the sa veral decad	ng documer o include an afety of the es. As has l	nt, should the nd support to facilities be been the ca	ne site be ul he construc fore they a se for deep	timately selection and op re construct	ected to ho eration of a ed and ultin epositories	st the deep g in undergrou mately to sup	eological rep nd demonst port the ope	6 of the siting process. (As pository, the centre of expertination facility designed to eration of the deep repository ucted in other countries, it wi	У
		o Meet o local o resea o Adva o Envir excellenc o Ongo ey Milestone o 2014 o 2018 o 2025	rds centre ring and cor training and irch center nced manur onmental/ ce ing researc es: - Begin con - Expand fa - Expand fa	onference ced d business of for indepen facturing ar hazardous n h on Tradition instruction of acility at pre-	ntre, centre dent enviro nd innovatio materials ed onal Knowle onal Knowle onal Knowle onal Knowle onal Knowle	onmental im on training co lucation and edge of area per commit to meet com nd other coi	entre; I training pr a and develonments made annunity cor mmitments		eritage Centr ction process preferred site astruction in	(Step 4). e selected).	ment
Dolivorable											
Deliverable Assumptions											
Schedule	Start Year			10	2019			Finish Year	15	2024	
Type Calculations	Fixed										
and Notes:	Costs	Matari	al Costs	Otho	Costs	Subt	otal	Allowanca	25%	Total Cost	
Labour (	LOSTS -	\$	al Costs	\$	6,000,000		6,000,000	\$	1,500,000	<b>Total Cost</b> \$ 7,500,	.000
٧		۱ ۲		٧ _	0,000,000	۱ ۲	0,000,000	7	1,500,000	7,300,	,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	30	40					Prepared By: J. Facella
WBS (Old)				0						
WBS Title	CENITRE OF	EXPERTISE	/NIE\A/\							
vvb3 Title	CENTRE OF	EXPENSI	(INEVV)							
Description	(As out initially which i demon enviror of the ougling implem	lined in the to support s an imports stration pro amental and community to public view lentation of	siting docui the multi-yo ant compon gram involv socio-econ to learn mo ving gallerio a deep geo	ment, centrear testing a nent of the s ving research nomic and core about the es and inter- logical repo	e of experti and assessm siting proces hers and ot ultural impa e project, to active displa sitory and t	se will be estonent of the state of the stat	tablished a ite on tech the home t in a wide va ent. The ce cientific and d as a small iety of relat	It the site, or inical safety and for an active the ariety of discipance of experting science centrated activities,	nearby as de nd commun technical and plines includ tise will also work involv re focused o it will be de	detailed site characterization. etermined with the community, ity well-being related dimension d social research and technology ding rock science, engineering, be a focus for engaging membered in site assessment in progress on the design, construction and esigned not only as a meeting region and beyond.)
	outline will be demon over se	d in the sitir expanded to strate the sa	ng documer o include an afety of the es. As has l	nt, should the nd support to facilities be neen the ca	ne site be ul he construc fore they a se for deep	timately sel tion and op re construct geological r	ected to ho eration of a ed and ultion epositories	st the deep go an undergrou mately to sup	eological rep nd demonst port the ope	6 of the siting process. (As cository, the centre of expertise ration facility designed to eration of the deep repository ucted in other countries, it will
	. А	s negotiated	d with the c	ommunity,	it may also	include:				
		o Meet o local o resea o Adva o Envir	training and arch center nced manu onmental/ ce	facturing ar hazardous r	centre ident enviro nd innovatio materials ed	on training c lucation and	entre; I training pr			for hazardous waste manageme re
	. К	o 2018 o 2025	<ul><li>Begin con</li><li>Expand fa</li><li>Expand fa</li></ul>	ncility at pre	ferred site to port UDF a	to meet con	nmunity cor nmitments	e in site selec mmitments (p and DGR con nitments to c	oreferred sit	e selected).
Deliverable	<u> </u>									
Assumptions										
Cabadul-	Chart V				2025			Finish V	·	2024
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
Calculations										
Labour C	Costs	Materi	al Costs	Other	Costs	Sub	otal	Allowance	25%	Total Cost
Ś		Ś		\$ 1	12,000,000	\$ 1	2,000,000	Ś	3,000,000	\$ 15,000,00

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	40	40					Prepared By:	J. Facella
WBS (Old)	0										
WBS Title	CENTRE OF	EXPERTISE	(NEW)								
Description	(As out initially which is demons environ of the c through implem	lined in the to support s an imports stration pro mental and community in public view lentation of	siting docur the multi-yeant compor gram involved socio-econ to learn mo wing gallerie a deep geo	ment, centr ear testing a nent of the s ving researc nomic and co ore about the es and inter ological repo	e of experti and assessn siting proces hers and ot ultural impa e project, to active displa sitory and t	se will be estonent of the state of the stat	stablished a site on tech the home f in a wide va ent. The cer cientific and d as a small riety of relat	t the site, or nical safety a for an active ariety of discintre of exper I engineering science cented activities,	nearby as de nd communi technical and plines includ tise will also work involve re focused of it will be de	etermined with ity well-being in d social resear- ling rock scient be a focus for ed in site asses in the design, c	characterization. In the community, Irelated dimensions Ich and technology Ice, engineering, Ich engaging members Ich sament in progress Ich sament in progress Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in grogness Ich sament in ground in grown in grow
	outline will be demon over se	d in the sitir expanded to strate the sa veral decad	ng documer o include ar afety of the es. As has l	nt, should th nd support t facilities be	ne site be ul he construc fore they a se for deep	timately sel tion and op re construct geological r	ected to ho eration of a ed and ultin epositories	st the deep g in undergrou mately to sup	eological rep nd demonstr port the ope	ration facility or eration of the o	entre of expertise
	· A	o Reco o Meet o local o resea o Adva o Envir	rds centre ting and cor training and arch center nced manu conmental/ ce		ntre, centre dent enviro nd innovatio materials ed	onmental im on training c lucation and	entre; I training pr				waste managemen
	· Kı	o 2018 o 2025	- Begin cor - Expand fa - Expand fa	acility at pre acility to sup	ferred site i	to meet con	nmunity cor mmitments	e in site selec nmitments (p and DGR cor nitments to c	oreferred site	e selected).	
Deliverable	<b></b>										
	İ										
Assumptions											
Schedule	Start Year			26	2035			Finish Year	55	2064	
Туре	Fixed										
Calculations											
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	Тс	otal Cost
							เบเสเ	Allowalice	23/0	10	olai Cust

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	50	10					Prepared By: J. Facella	
WBS (Old)	• • • • • • • • • • • • • • • • • • •										
	OFNITOE OF		/A.E.A.()								
WBS Title	CENTRE OF	EXPERTISE	(NEW)								
Description	(As out initially which is demons environ of the c through implem	lined in the s to support it is an importa stration prop imental and community to in public view entation of	siting docuithe multi-ying ant comporing gram involving socio-econgo learn moving galleria deep geo	ment, centrear testing a nent of the s ving research nomic and core about the es and inter- logical repo	e of experti and assessm siting proces hers and otl ultural impa e project, to active displa sitory and t	se will be estonent of the state of the stat	stablished a lite on tech the home f in a wide va ent. The cen cientific and d as a small iety of relat	t the site, or nical safety a for an active ariety of disc ntre of exper I engineering science cented activities	nearby as d and commur technical an iplines inclu- tise will also work involver re focused of it will be de	detailed site characterization etermined with the communit ity well-being related dimensi d social research and technoloding rock science, engineering be a focus for engaging memored in site assessment in progron the design, construction and esigned not only as a meeting eregion and beyond.)	ty, ions ogy s, nbers ress
	outline will be demon over se	d in the sitin expanded to strate the sa	ng documer o include ar afety of the es. As has l	nt, should the nd support to facilities be been the ca	ne site be ult the construct fore they ar se for deep	timately selection and oper re constructing geological r	ected to ho eration of a ed and ultin epositories	st the deep g in undergrou mately to sup	geological re and demonst aport the op	o 6 of the siting process. (As pository, the centre of experti tration facility designed to eration of the deep repository ucted in other countries, it will	У
l	· A:	s negotiated		ommunity,	it may also i	include:					
		o Meet o local o resea o Advai o Enviro excellenc	training and irch center inced manu onmental/	facturing ar hazardous r	centre Ident enviro Id innovatio Inaterials ed	on training c lucation and	entre; I training pr	_		for hazardous waste manager re	ment
	· Kı	o 2018 o 2025	- Begin cor - Expand fa - Expand fa	acility at pre	ferred site to port UDF a	to meet con nd other co	nmunity cor mmitments	e in site selec nmitments ( and DGR con nitments to c	preferred sit	e selected).	
Deliner III											
Deliverable	<u> </u>										
Assumptions	<u> </u>										
	<u> </u>			·						2424	
Schedule	Start Year			56	2065			Finish Year	125	2134	
Туре	Fixed										
Calculations											
Labour C	Costs	NA-t	.1.0		_						
	-0313	iviateria	al Costs	Other	r Costs	Sub	otal	Allowance	25%	Total Cost	

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	40					Prepared By:	J. Facella
WBS (Old)											
WBS Title	MUNICIPA	L FORUM A	ND TOOL DI	EVELOPMEN	NT						
Description	<b>:</b>	uct of resea in hosting t		ns and deve	lopment of	tools and comm	unicati	on materials o	designed to	support comm	unities which are
Deliverable	Tools and (	communicat	tion materia	als targeted	to commur	nities and design	ed to su	upport their e	xploration (	of interest in th	e APM project.
	Note that t meetings.	the specific	work to be	completed	will be iden	tified and shaped	d throu	gh dialogue w	ith the Mui	nicipal Forum a	t its regular
	process an	d, through o	dialogue an	d collaborat	-	process become e NWMO, will fo					entered the siting dual needs and
	requireme		st of costs a 0 in 2011 0 in 2012,	re:							
		\$100,00 \$50,000	0 in 2013 in 2014								
Assumptions	1		•			meet at least unt ormed around th		nunities have	been ident	ified for detaile	d site
Schedule	Start Year			2	2011			Finish Year	5	2014	
Туре	Fixed										
Calculations and Notes:	ō										
Labour (	Costs		al Costs		Costs	Subtotal		Allowance	25%		tal Cost
\$	-	\$	-	\$	450,000	\$ 45	0,000	\$	112,500	\$	562,500

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	180				Prepared By:	J. Facella
WBS (Old)	0									
WBS Title	EXPERT AD	VICE, WOR	(SHOPS							
Description						onduct topic specific wo	•		•	•
	Forecast co		0 in 2010							
Deliverable										
Assumptions										
Schedule	Start Year			1	2010		Finish Year	1	2010	
Туре	Fixed									
Calculations and Notes:										
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%		al Cost
\$	-	\$	-	\$	200,000	\$ 200,000	\$	50,000	\$	250,000

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#### **Work Element Definition Sheet**

WBS (New)	560	15 10	10 120	ı		Prepared By: J. Facella
WBS (Old)						
WBS Title	ASSESSMEI	NTS OF SITE SUITABILIT	TY (SOCIAL ASPECTS)			
Description		of this work program is t on an interested comi				, economic and cultural effects o
	ref	Development of a re cument Consultant develops ference framework pos	s desk-top profile of co	mmunity, describing this	ne community on as man	ramework described in the siting  ny of the dimensions of the al use in obtaining an early sense le will also be used to help build
	the \$50	e capacity of the NWM 0,000 per community	O to engage in early di	scussions and relations	hip building with the cor	mmunity: Estimate of cost is
	Estimated (	cost: \$357,000 in 2011				
	Step 3 Est	timate of incremental o	cost \$20,000 - \$25,000	per community. Total	\$125,000 in each of 201	
	the				program – NO COST INC	to supplement the work lead by CLUDED IN THIS WED
		ch of 2011 and 2012	ment of high level prof		_	munities. Estimate: \$200,000 in st communities. Estimate:
	20:		ement among transpor		stimate: \$100,00 in 201 begin identification of so	1 and \$250,000 in 2012 ocial issues. Estimate: \$50,000 in
		Field Studies (interv	riews). Estimate: \$100 Estimate \$100,000 in		2012	
	Estimated (	cost: \$775,000 in 2011 \$1.13M in 2012				
	Step 4 ead	Field studies in com ch year until completio		100,000 in 2013; \$200,	000 in 2014; \$100,000 ir	n 2015; expenditure at 2015 leve
	at :	Field studies in surn 2015 level each year u		Estimate: \$100,000 in	1 2013; \$200,000 in 2014	; \$100,000 in 2015; expenditure
	yea	ar until completion of E	EIS			expenditure at 2015 level each
	ead	ch year until completio	on of EIS			015; expenditure at 2015 level n 2013; \$2.294M in 2014;
	\$10	00,000 in 2015; expend	diture at 2015 level ead	h year until completion	n of EIS	xpenditure at 2015 level each ye
		til completion of EIS				re at 2015 level each year until
	Estimated (	\$525,000 in 2013 \$1.1M in 2014 \$900,000 in 2015 Note some level of	spending is expected to			
	Stepwise a interest).	ssessment of suitability	y of site, surrounding c	ommunities, region, tr	ansportation communition	es (as a large group with a shared
Assumptions		Assumes these stud mmunities, regions, tra ntinue at some level th \$357K in step 2 (202	lies are a foundation for ansportation communiturough until the comple	or relationship building ties. For this reason, it tion of the EIS. (2011-2012); \$5.655M	is assumed that expendi in Step 4 (2011-2015).	ginal communities with community, surrounding tures in this area will need to
Schedule	Start Year		2 2011		Finish Year 9	2018
	Fixed					
Calculations						
and Notes:			out. •	0.11.1		
\$	.osts -	Material Costs \$ -	\$ 7,973,000	\$ 7,973,000	<b>Allowance 25%</b> \$ 1,993,250	*** Total Cost \$ 9,966,250

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						ent Definition Sheet				-
					vvork Elem	ent Definition Shee			NWMO Cost (	Code: 0170022- <b>11</b>
WBS (New)	560	15	10	10	100				Prepared By:	P. Simmons
WBS (Old)	SITING SFI	ECTION PRO	CESS	<u></u>	.i	<i>i</i>				
WBS Title	·····		– NON ABO	RIGINAL						
Description	council cor interested	nmittees (e in learning	.g. economi more about	c developn NWMO, A	nent) comm PM site sele	e/deliver speaking e unity groups and oth ection process on an e authority (e.g. mu	er accountable ongoing basis.	authorities i	n the 4 nuclea	r provinces
	: -					elated expenses for s meeting room, A/V,				-
Deliverable			-	_	-	nd inquiring bodies th ore program highligh		-		
						d as it relates to con ne siting process.	inued awarene	ss of the siti	ng process, and	d the dispensation
	•				_	itionships between n es for long-term sust				
Assumptions	:		e NWMO wi elsewhere).	II inform ar	nd respond	to several non-abori <sub>ę</sub>	inal community	/ meetings/b	riefings per ye	ar until 2025
	NWMO's "	Learn More	" program f	rom which	funding ma	nation briefings from ny be provided to mu d with the Learn Mor	nicipalities for in	ndependent	studies aimed	to inform their
	awareness		d the siting			st in building relatior information distribut				
	to drop aft	er candidat	e sites are s	elected. Th	e locations	tuate and cannot rea of the meetings, and per meeting should	pace at which g	groups move	through the p	•
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations	ļ									
and Notes:	Current bu	dget Y01 (2	010)		= \$ 2	00,000				
	Y02 (2011) Y04 (2013)	- Y03 (201 - Y16 (202	010) 2) – \$180,00 5) – \$125,00 4) - \$75,000	00 x 13 yea	ers = \$ 360 ers = \$ 1,6	),000 25,000				
		1		I .		T	1			
\$	Costs	Materi \$	al Costs	Othe \$	r Costs 1,310,000	\$ 1,310,00	Allowance 0 \$	<b>25%</b> 327,500	\$	1,637,500
7		7		۲	1,310,000	1,310,00	ν <sub> </sub> γ	327,300	ب	1,037,300

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			Work Elem	ent Definition Sheet			
							NWMO Cost Code: 0170022- <b>11</b>
WBS (New)	560	15 10	20 30				Prepared By: P. Simmons
WBS (Old)							
	ļ	ECTION PROCESS					
WBS Title	STAFF TRA	VEL COSTS – NON ABC	RIGINAL				
D	C-+		ft. attack and and an extra	la /alatione and a latina and		-l l! - <b>-</b> !	
Description			·		-	_	on request to municipal
	!	nterested in learning n	·				uthorities in the 4 nuclear
	provinces i	interested in learning in	iore about invivio, Ar	ivi site selection proces	ss on an ongo	ilig basis.	
	These requ	ests must be initiated	by the local accountab	le authority (e.g. muni	cipal council),	which do n	ot include aboriginal councils
	and organi	zations (separate categ	gory). Costs include tra	vel-related expenses for	or staff partici	pating in sp	eaking engagements/briefings,
	and on off-	site meetings (briefing	s), and related costs (c	atering, meeting room	, A/V, travel fo	or delegate	s and accommodations if
	needed).						
	 !						
Deliverable	Primary de	liverable is primarily in	forming delegations ar	nd inquiring bodies thr	ough response	e and reque	ests for information. Related to
					-	-	cussed at these speaking
	engagemei	nts.					
	Socondor	dolivorable is the access	ort of the NIVA/NAO be	nd as it relates to socition	nund awarer -	sc of the c	ting process and the
	•	deliverable is the supp on of information and t				iss or the si	ting process, and the
	uisperisatio	חווטווווסוווומנוטוו מווע נ	oois and products asse	ociated with the siting	process.		
	Third delive	erable is the maintena	nce and building of rela	ationships between mu	ınicipal goverr	nments, ass	sociations, community groups,
	:		•				process and confidence in the
	NWMO.				, , , , , , , , , , , , , , , , , , , ,		,
Assumptions	It is estima	ted that the NWMO w	Il inform and respond	to several non-aborigir	nal community	/ meetings	/briefings per year until 2025
	:	budgeted elsewhere).				,	,
	, ,						
	It is assum	ed that a number of the	ese requests for inforn	nation briefings from c	ommunity org	anizations	may lead to participation in the
	:		•	_			nt studies aimed to inform their
	considerati	on of interest in the pr	oject. Costs associate	d with the Learn More	program are o	categorized	l and budgeted separately.
	The costs a	nd activities as outline	od in this catogony ass	ict in huilding rolations	hins with som	munity loa	ders and members, increase
	:			_			nd may encourage participation
	•	n More Program.	process, and anow for	mormation distribution	on in local com	illiaillices a	na may encourage participation
	The averag	ge number of inquiring	communities may fluc	tuate and cannot reas	onably be assu	umed to inc	crease or decrease, but is
	assumed to	drop after candidate	sites are selected. The	locations of the meeti	ngs, and pace	at which gi	roups move through the process
	cannot rea	sonably be assumed. C	onsequently, the avera	age cost per meeting sl	hould be kept	conservati	vely high versus low.
Schedule	Start Year		10 2019		Finish Year	15	2024
<b></b>	Eine 1						
Туре	Fixed						
Calculations							
and Notes:							
unu 140163.	Current hu	dget Y01 (2010)	= \$ 2	00,000			
	, , c. , c , bu	(=0.10)	Ÿ 2	/			
	Y02 (2011)	- Y03 (2012) - \$180,00	00 x 2 years = \$ 360	0,000			
		- Y16 (2025) - \$125,00	•				
		- Y26 (2034) - \$75,000	•				
	ĺ		•				
	<u> </u>				I		
Labour (	Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$ -	\$ 750,000	\$ 750,000	\$	187,500	\$ 937,500

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			Work Elem	ent Definition Sheet			
							NWMO Cost Code: 0170022- <b>11</b>
WBS (New)	560	15 10	30 10				Prepared By: P. Simmons
WBS (Old)							
	·	ECTION PROCESS	NICIALA I				
WBS Title	STAFF TRA	VEL COSTS – NON ABO	DRIGINAL				
Description	Catagoryin	soludos for NIVIAO stat	ff to attand and provide	la/dalivar caasking and		l briofings	on request to municipal
Description					-	_	on request to municipal uthorities in the 4 nuclear
	•			'M site selection proce			utilorities III tile 4 fluciear
	provinces	interested in learning in	nore about NVIVIO, AI	W site selection proces	33 On an ongoi	116 00313.	
	Th		horaba da saba sa sa sa sa ba	la authorite da a como	-:	ledele ele e	and to all order or be extent or all and or all a
			•				not include aboriginal councils
	: -						s and accommodations if
	needed).	site meetings (briefing	s), and related costs (c	atering, meeting room	, Ay v, ti avei it	n delegate	s and accommodations in
	necacaj.						
Deliverable	Primary de	liverable is primarily in	forming delegations a	nd inquiring bodies thr	ough response	and reque	ests for information. Related to
	this deliver	able (budgeted elsewh	nere) is the NWMO lea	rn more program highl	ighted, review	ed and dis	cussed at these speaking
	engagemei	nts.					
	Secondary	deliverable is the supp	ort of the NWMO bran	nd as it relates to conti	nued awarene	ss of the si	ting process, and the
	dispensatio	on of information and t	tools and products asso	ociated with the siting	process.		
	Third delive	erable is the maintena	nce and building of rela	ationships between mu	ınicipal goverr	ments, ass	sociations, community groups,
	•		•			-	process and confidence in the
	NWMO.		•		•		•
	 !						
Assumptions	It is estima	ted that the NWMO w	ill inform and respond	to several non-aborigir	nal community	meetings,	/briefings per year until 2025
	(Aboriginal	budgeted elsewhere).					
	It is assumi	ed that a number of th	ese requests for inform	nation briefings from co	ommunity org	anizations	may lead to participation in the
	:		•	-			nt studies aimed to inform their
	:		_		-	-	and budgeted separately.
		,	.,		p g		and analysis are a second
	The seets o	ومناهرين من منطنينهم اومر	. d : this sate same	:at :a b: diaa aalatiaaa			dana and manuals are insuesses
	•			-	-	-	ders and members, increase nd may encourage participation
	:	n More Program.	process, and allow for	וווטוווומנוטוו עוצנווטענוכ	on in local com	illullities a	nu may encourage participation
	iii tiic Ecai	ir word i rogiam.					
	The averag	ge number of inquiring	communities may fluc	tuate and cannot reas	onably be assu	ımed to ind	crease or decrease, but is
	•	•			• .		roups move through the process
	cannot rea	sonably be assumed. C	Consequently, the average	age cost per meeting sl	hould be kept	conservati	vely high versus low.
Schedule	Start Year		16 2025		Finish Year	25	2034
	ļ						
Туре	Fixed						
	ļ						
Calculations							
and Notes:	Current bu	dast V01 (2010)	= \$ 2	200,000			
	Current bu	dget Y01 (2010)	- \$ 2	.00,000			
	V02 (2011)	- Y03 (2012) - \$180,0	00 v 2 vears = \$360	0.000			
	:	- Y16 (2025) - \$125,0	•				
		- Y26 (2034) - \$75,00	•				
	(=020)	. ,, 4,3,00	- , 40,0,0				
Labour (	Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$ -	\$ 750,000	\$ 750,000	\$	187,500	\$ 937,500

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	80					Prepared By:	J. Robinsor	า
WBS (Old)												
WBS Title	STAKEHOLI	DER MAPPIN	NG FOR SITI	NG REGION	IS							
		y undividua s, needs and							ction proce	ss and build a	n understand	ding of
Deliverable	Strategic o	verview rep	ort for eacl	h of the invo	olved region	ns, prepared	d by a contr	actor, and upo	dated perio	dically in the p	eriod leading	g up to
	licensing.											
Assumptions												
Schedule	Start Year			2	2011			Finish Year	9	2018		
Туре	Fixed											
Calculations and Notes:												
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost	
\$	-	\$	-	\$	800,000	\$	800,000	\$	200,000	\$	1,00	0,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	20	70					Prepared By:	J. Robir	nson
WBS (Old)												
WBS Title	STAKEHOLI	DER MAPPIN	NG FOR SIT	ING REGION	IS							
Description	E				ks which m t these migl				ction proce	ss and build a	n underst	tanding of
Deliverable	Strategic o licensing.	verview rep	oort for eac	h of the inv	olved region	ns, prepared	d by a contr	actor, and upo	dated perio	dically in the p	eriod lead	ding up to
Assumptions												
Schedule	Start Year			10	2019			Finish Year	15	2024		
Туре	Fixed											
Calculations and Notes:												
Labour (	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	То	tal Cost	
\$	-	\$	-	\$	600,000	\$	600,000	\$	150,000	\$		750,000

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## **Work Element Definition Sheet**

WBS (New)	560	15	10	10	90					Prepared By:	J. Face Robins	
WBS (Old)												
WD3 (Ola)						i						
WBS Title	ΝΔΤΙΟΝΔΙ	WORKSHOP	S ON SOCIA	AL CONSIDE	RATIONS O	F SITING						
WD5 Here	INATIONAL	WORKSHOI	3 011 3001	AL CONSIDE	104110113 0	. 3111110						
Description				-		•				on on APM proj being of great I		
Deliverable	present	full-day par ations from	Swedish co	ouncilors fro	m host con	nmunity.		deration of Ca		nicipalities, incl	uding	
Assumptions	That we wi	ll cover cost	s of confere	ence registr	ations, trav	el costs, me	eeting room	s and facilitati	on costs.			
Schedule	Start Year			2	2011			Finish Year	6	2015		
Туре	Fixed											
Calculations	Assume tra -15 commu - 4 Swedish Assume ad	nities bring officials.	ing 5 memb	ers each.	ies, meetin	g rooms, m	eals and fac	ilitation.				
Labour (		Materia			Costs		total	Allowance	25%	To	tal Cost	
\$	-	\$	-	\$	250,000		250,000	\$	62,500	\$		312,500
					,-30		,		,- 30			

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## **Work Element Definition Sheet**

WBS (New)	560	15	60	40	10					Prepared By:	J. Facella	
WBS (Old)							<u> </u>					
WBS Title	SUSTAININ	G RELATION	NSHIPS/ CO	LLABORATI	ON DURING	OPERATIO	NS					
Description	the commi	unity at a gr	ass roots le	evel in decisi	ion-making	through op	erations and		in ongoing	he facility by co	J	0 0
	associated operations	with ongoir . These cos	ng involven sts may incl	nent of com	munity resi	dents in mo	nitoring of	potential effec	cts and othe	ons material pr er key decision a ty meetings, hir	areas throu	_
Deliverable	Support fo	r ongoing co	ommunity 6	engagemen	t and outrea	ech						
Assumptions	Cost of pul	olic commur	nication cov	vered elsew	here							
Schedule	Start Year			26	2035			Finish Year	55	2064		
Туре	Fixed											
Calculations and Notes:	\$100,000/	year throug	gh the perio	od of operat	ions (2035 -	- 2064)						••••••
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	To	tal Cost	
\$	-	\$	-	\$	3,000,000	\$	3,000,000	\$	750,000	\$	3,7	50,000

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**B.2** Alternate Case 7.2 Million Bundle Work Element Definition Sheets

## **Work Element Definition Sheet**

WBS (New)	561	10	50	10	10			Prepared By:	A. Murchison
WBS (Old)	552	20	2	<u> </u>	<u></u>				
WBS Title	REPOSITO	RY SYSTEM [	DEVELOPM	ENT MANAC	GEMENT, AF	PM SITING PHASE TECH	NOLOGY WATCH		
Description	- Tech	nology wat	ch on alterr	native used	fuel manag	evelopment during repo ement approaches. ecommendations to the	, 0	nclude:	
Deliverable	- Tecl	nagement of hnology wat the fuel manag	tch through			on such topics as Re-p	processing & transm	nutation, very deep b	orehole disposal,
Assumptions	Duration o	f work: Y01	to Y09.						
	Staff requi	rements fou	ınd in REPO	SITORY SYS	TEM DEVEL	OPMENT MANAGEMEN	NT, APM SITING PHA	SE DESIGN & COST UF	PDATE
	Description Year Watching I	2	1 Y02 010 20 52k \$75	11 2012	04 Y05 2013 2 \$75k \$7	Y06 Y07 Y08 014 2015 2016 75k \$75k \$75k	Y09 2017 2018 \$75k \$75k		
	Budget bas	sed on histo	rical costs t	o place tecl	nnology wat	ch contracts.			
Schedule	Start Year			1	2010		Finish Year	9 2018	
Туре	Fixed								
Calculations and Notes:									
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance 25	% Tota	al Cost
\$	-	\$	-	\$	652,000	\$ 652,000	\$ 163,	,000 \$	815,000

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## **Work Element Definition Sheet**

WBS (New)	561	15	20	10	10					Prepared By:	B. Belfadhe	el
WBS (Old)	552	15	20	40								
WBS Title	DATABASE	AND INFOR	RMATION S	YSTEMS								
Description	design into monitoring further set toward con Databases	ended for s g data. Info rve to archi nfirmation o	patial and irmation Sy ve site spe of the prefe	temporal a stem would cific geospl rred site and	nalysis, inte I be applied nere/biosph d UCF const	rpretation, I and, as re- ere data ar ruction/ope	integration quired, up- nd create tration.	and commu graded throu <sub>l</sub> raceable data	nication of ghout the re sets that v	ion manageme site specific ch epository siting would evolve a hich would like	naracterisation g process. It was s siting process	on and would eeded
	seismicity, resources.	geology, b Results of	orehole da geosphere	ta, municip model deve	al/ regional lopment ar	boundarie nd associate	s, aborigina d numerica	al lands, surfa	ace hydrolo will also be	note imaging, a gy, topography e archived in a te.	and ground	lwater
Deliverable	: "	Electronic I I geosphere		•					siting, Envi	ronmental Asse	essment,	
Assumptions	- An	3S Equipmer Inual Licensi	ing fees and	d upgrades:	\$100k/a for	Y03-Y09;	·	d monitoring	support bey	ond Y25.		
Schedule	Start Year			1	2010			Finish Year	9	2018		
Туре	Fixed											
Calculations and Notes:												
Labour	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	То	tal Cost	
\$	-	\$	800,000	\$	-	\$	800,000	\$	200,000	\$	1,000	0,000

561.15.20.10.10 2 of 278

## **Work Element Definition Sheet**

WBS (New)	561	15	20	10	20				Prepared By: B. Belfadhel
WBS (Old)	552	15	10	<u> </u>					
WBS Title	GEOSCIENI	CE TECUNII	CAL SITING N	AANACENA	ENT AND CIT	PPORT TO ENGAGEN	AENT		
WD3 THE	GEOSCIEIN	CE LECTIVI	CAL SITING IV	ANAGEIVII	ENT AND 30	PPORT TO ENGAGE	/ICIN I		
Description	Requires tl	he plannin	g and co-ord	lination of	field, labora		studies, as well	as, electron	ss for a Deep Geologic Repository. ic information systems to support
	- Prov - Tech - The	viding supp nnical supp administra	ort for comn ort for repos ation and for	nunity enga sitory desig mation of t	agement act n/engineerii echnical adv	ng, repository safety isory and peer revie	and environme w panels.	ental assessm	·
	and siting (								
Deliverable			sation and N	0.		hout the siting proc	255.		
Assumptions	NWMO Sta	affing:							
	Y02: 1 x N\ Y03: 1 x N\ Y04: 1 x N\	WMO-1 an WMO-1 an WMO-1 an	d 4.6 x NWN d 10.8 x NWI d 12.5 x NWI d 20.7 x NWI IO-1 and 25.2	MO-3; Trav MO-3; Trav MO-3; Trav	rel of \$30k rel of \$35k vel of \$55k	660k/a			
Schedule	Start Year			1	l 2010		Finish Year	9	2018
Туре	Fixed								
Calculations and Notes:	data mana	gement, 1	geology, 1 g	_		characterization phagy, 1 rock mechanic	, ,	•	ra siting and monitoring efforts: 1
	Staffing sco Travel is as		sumed. ne trip per ye	ar per staff	F				
Labour	-	1	rial Costs		r Costs	Subtotal	Allowance	25%	Total Cost
\$	24,722,160	\$	-	\$	435,000	\$ 25,157,1	50 \$	6,289,290	\$ 31,446,450

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## **Work Element Definition Sheet**

WBS (New)	561	15	20	10	30					Prepared By: B. Belfadhe	el
WBS (Old)							·				
WBS Title	INITIAL SC	REENING									
Description	screening space, an a intrusion, is to allow eliminating on the am	is a desktop absence of s and avoiding sites or area g those sites ount of site	study base ignificant ng known ge as that cleas or areas thinformation	ed on readily natural envir coscientific c orly have the nat are clear n that will b	vavailable in onment and onditions the potential to ly unsuitable e available.	nformation. If heritage for the heritage	The five Ini eatures, mir ompromise d nuclear fo of detail at ailed assess	tial Screening nimal possibili repository satuel repository which these ment will be o	Criteria relaty of future fety. The overto be move various aspectonducted a	valuation process. The initial ate to a site having sufficient disruption due to human erall objective of initial screed forward in the process, where so will be assessed will deput the feasibility stage providing in the site selection process.	t ening hile pend ded
Deliverable	- All o	data sets use for future re	ed in the so eference an	creening asso d traceabilit	essment wil	ll be stored	in the NWN		agement sys	reasibility Study. tem accompanied with nec	essary
Assumptions	- Info - Scre screening	rmation Ma eening asses and relevant	nagement s sment met t geoscient	ific data are	structure is in place, o available.	operationa one or more	l. external se	ervice provide		liar with the NWMO approa	ach to
	- Initi - Y1: ! - Y2: !	al screening \$317k (4 cor \$500k (10 co	costs avera mmunities) ommunitie	age \$50k/ cc s)	ommunity		Ū			4 communities (2010-2011)	):
Schedule	Start Year			1	2010			Finish Year	2	2011	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost	
\$	-	\$	-	\$	817,000	\$	817,000	\$	204,250	\$ 1,022	1,250

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## **Work Element Definition Sheet**

WBS (New)	561	15	20	10	40			Prepared By:	B. Belfadhel
WBS (Old)	552	15	50	20					
WBS Title	DESKTOP F	EASIBILITY S	STUDIES						
Description	the detaile using publ having sele multiple si	ed safety-rel lished availa ected a spec tes from wit	ated criteri able inform cific site. In thin that are	a based on lation. Som n such case ea that have	geoscientifi ne interested es, the feasib e the potent	c factors identified in the communities are expositive study will initially in the meet the detailed	o assess whether a propo NWMO site selection pro- pected to propose larger r examine these larger ar d safety-related criteria.	cess. The study areas for con eas and identif	will be conducted sideration without y a specific site or
						y, the site is moved fo characterization stage	rward for further conside	eration and co	mpared with other
Deliverable	- All		ed in the f	easibility s	tudies will b	3 sites in 2011-2012 be stored in the NWM	O data management sys	tem accompan	ied with necessary
	- Tech	nnical comm	unication/	oresentatio	n of feasibili	ty study findings to cor	mmunity representatives.		
Assumptions	plans and of the plans and of the plans and of the plans are the plans a	undertake th ktop Feasibil rmation Ma	ne studies i lity Studies nagement S external co	n an efficient would be constructions.	nt manner. onducted at astructure is NWMO Staf	8 Candidate sites. operational.	external consultants are		
	•	•	•	•		tes (\$500K per site): \$2 dditional sites (\$500K p			
Schedule	Start Year				2011		Finish Year 3	2012	
Туре	Fixed								
Calculations and Notes:									
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance 25%	Tot	tal Cost
\$	-	\$	-	\$	4,000,000	\$ 4,000,000	\$ 1,000,000	\$	5,000,000

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## **Work Element Definition Sheet**

WBS (New)	561	15	20	10	50					Prepared By	: B. Belfadhel			
WBS (Old)	552	15	50	30										
WBS Title	PRELIMINA	ARY FIELD ST	TUDIES IN SI	UPPORT OF	FEASIBILITY	' ASSESSME	NTS							
	this is an interpretation that the first series of the features of the features of the features of the features of the features of the fire and the	mportant fi tep in the operation increase constants sary approades, in order naissance le	nal data ga decision ma onfidence in ch. These fic to assess pa vel geologi ) Landsat/R	thering steaking proce the suitaled studies articular co c/structura adarsat da	ep, before the ess is to associate of the sociate o	e decision in east the extended to feel the extended to feel iminary field with a contract to feel in the extended to feel in	s made to ent, nature minary field ocus on add eld studies i based ge	proceed to de e and cost of d study plan v dressing site-s may include: i ophysical sur	etailed char the prelimi vould be pre specific safe ) airborne g veys; v) to	acterization a inary field st epared outlin ty-related cri eophysical; ii pographic su	ite. Where required, at one or more sites. udies that would be ing the requirements teria by investigating ) aerial photography; urveys; vi) structural ality assessments and			
Deliverables	<ul> <li>Site-specific Preliminary Field Study plans</li> <li>Preliminary Field Investigation Report and updated Feasibility study report</li> <li>All data sets developed during field studies will be stored in the NWMO data management system accompanied with necessary metadata for future reference and traceability.</li> <li>Technical communication/presentation of preliminary field study findings to community representatives.</li> </ul>													
									.,					
	Desktop Feasibility Study identifies knowledge gaps and summarizes the benefits of undertaking preliminary field studies.  Information Management System infrastructure is operational.  Up to 4 preliminary field studies are completed between 2011 to 2013.  Work is done by external contractors. NWMO Staffing is included in WED 560.15.20.10.20  Community and Offsets & Benefits assumed to provide compensation to communities to permit early borehole activity.  Field studies per site will include: Site field study plan (\$150K); Remote Imaging/Landsat/Radarsat (\$50K); DEM/Lidar (\$50K); Airborne Geophysics(500K); field geology and lineament mapping (\$100K); 3 percussion boreholes including analysis (\$1,500); Transportation/Access/Field Expenses/equipment: \$500K; project coordination and data synthesis and update of feasibility study report (\$500K); external advice and review (\$150K). \$ 3, 500K per site  Cost:  Y02: Begin preliminary field investigations at one site: \$400K Y03: Complete preliminary field investigations at one site and begin investigations at 2 additional sites: \$5,725K Y04: Complete preliminary field investigations at three sites: \$7,875K													
Schedule	Start Year				2 2011			Finish Year	4	2013				
			••••	A				A	i					
Туре	Fixed													
Calculations and Notes:														
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	1	Total Cost			
\$		\$												

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## **Work Element Definition Sheet**

WBS (New)	561	15	20	10	60					Prepared By:	B. Belfadh	nel
WBS (Old)			<b></b>									
WBS Title	CHARACTE	RISATION A	ND MONIT	ORING PLAN	IS FOR 2 SIT	ES						
								//				
	surface bas Geoscienti (UCF) engin As part of t revise the l designed to the 5-year	sed and bord fic Site Mod neering fund the plan ged basis for the o establish s period to ac	ehole geospiel. The plactions, thro clogic, geomegeoscientisite specific	ohere chara n would be ugh support nechanical, l fic models a baseline mo	cterization a designed to ting geoscie hydrogeoch at the prefer ponitoring pr pwledge and	activities to support Sa nce numeri emical, hyd rred sites, w ograms. Th d remaining	confirm sit fety Assessical modelling rogeologic rould be co- e site chara needs. Dev	e suitability and ment activities ng tasks. and associated ordinated. Sit- acterisation pla	d provide i and Under I numerical e character ins would be the plan and	will focus on the nput to the devergeround Character in modelling activities are reviewed and tits subsequents.	velopment or exterisation Fa vities to con es would be d revised du	of a acility ofirm or tring
Deliverable	- Phas	se I Detailed se II Detailed se III Detaile	d Site Chara	cterisation	and Monito	ring Plans f	or two sites					
Assumptions	- Wor - Site	sites both in k is done by Characterisa includes pe	external co ation activit	ontractors. I lies proceed	NWMO Staf I according t	_		15.20.10.20				
	Cost:											
	- Y05: - Y06:	Develop de Revise deta	tailed site on the characteristic sites of the characteristic sites and the characteristic sites of the characteri	characteriza aracterizatio	tion and mo	onitoring plan	ans for secons for both s	site: \$900K and site: \$900K sites : \$975K sites : \$975K				
Schedule	Start Year			4	2013			Finish Year	8	2017		
Туре	Fixed											
	Additional throughou		fort require	d for larger	characteriz	ation (x 2) f	ootprint at	both sites. Ass	suming x 1.	5 factor for pla	ns developm	nent
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	To	tal Cost	
\$	_	\$	-	\$	3,750,000	\$	3,750,000	\$	937,500	\$	1 69	87,500

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						Cost Estimate						
					Work Elem	ent Definition Sheet						
WBS (New)	561	15	20	10	70			F	Prepared By:	B. Belfadhel		
WBS (Old)	552	15	70	30								
M/DC Title	DETAILED	CITE CHADA	CTEDICATIO	AN /CDVCTA	LLINE CITE)							
WBS Title	DETAILED :	SITE CHARA	CTERISATIO	N (CRYSTA	ALLINE SITE)							
Description	characteris Engineerin to establis informatio Undergrou and licensi	sation activi g functions h baseline on m would se and Charactong.	ities would including th conditions v erve to defi erization Fa	involve lad the design of will be est tine impact ticility, if ap	boratory and of an Underg tablished and ts resulting f oproved. The	racterisation of a cryst field investigations to round Characterisation managed under WBS from on-going site cha monitoring informatio gic mapping with a foo	o support Geoscie Facility (UCF). Sit 5 560 15 40 40 ar aracterization acti n will also support	ence, Saf e specifi nd WBS vities ar t the Env	fety Assessm c monitoring 560 15 40 5 nd eventual vironmental	ent and Repository programs designed io. This monitoring development of an Assessment process		
	particular seismicity purpose of and Virtua the Site gro field obser	the acquisit in the region foreating a sell I Reality Tecoundwater for tration and	tion of fraction around to 3-dimension the chologies for flow system boundary controls.	ture netwonthe sites.  The sites of the site	ork statistics Field and la tive Site Geos tion and inter conducted an at time scale	A network of boreho boratory activities wo sphere Model DGSM. I pretation of multi-disci nd documented. The si s relevant to repositor irmation of potentially	ole seismographs vuld be described i Database support a iplinary data sets. imulations would e y construction and	would be in a serie activities Three-di explore fl d long-te	e established es of suppor would includ imensional nu low system u erm safety. N	I to monitor micro- ting reports for the de application of GIS umerical analyses of ncertainty based on Model results would		
	the Feasib	ility Studies		ased invest	tigations will	) will be undertaken if i include a coordinated	•					
	The drilling and analysis of boreholes is the most expensive component during detailed site characterization. The number of boreholes that will be required is site specific. However, based on the Swedish experience and the OPG-DGR project, it would be reasonable to assum that a full detailed site characterization would cost \$173M per site. Site characterization activities at each site would likely involve Geophysics 2D and Field geological mapping; drilling, testing and analysis of 35 cored boreholes; the drilling and testing of 35 percussio boreholes; external independent advice and review; and development and regular update of site descriptive model.											
	Geophysics peer review These activ	s = \$11M; 3! ws = \$3M. vities and co	5 cored BH :	x \$3.0M=\$ nsistent wit	5105M; 35 pe th the Swedis	n at a site with an aver rcussion BH x \$1.0M = sh experience where 2	\$35M; geosynthes	is, Descr	iptive site mo			
Deliverable	- Supp	oorting geos	-	acterisatio	n documenta	idwater flow system m	odelling.					
Assumptions	- Sites - Chai - Elec - Assu <b>Co</b>	s are investi racterizatior tronic datab	gated in par n activities a pase and Info cost is \$173N	rallel. are conduc formation s	systems are o	nal contractors. NWMO	Ü	ed in 561	.15.20.10.20.			
	•	\$80M (\$40N o Y08 : \$86N	. ,	\$43M per	site) and YO	9: \$70M (\$35M per site	)					
Schedule	Start Year			<u> </u>	5 2014		Finish Year	9	2018			
Туре	Fixed											
	Number of					stigation increases by 2 ort increases by 2.	; Geophysics effor	t increas	ses by 1.5; De	scriptive Site model		
		т										
Labour (	Losts	Materi	ial Costs	Othe	er Costs	Subtotal	Allowance 2	25%	To	otal Cost		

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#### **Work Element Definition Sheet**

WBS (New)	561	15	20	10	80					Prepared By:	B. Belfadhel
WBS (Old)											
WBS Title	GEOSPHER	E MONITO	RING DURIN	IG DETAILEI	SITE CHAR	ACTERIZATI	ON AT 2 SIT	ES			
Description	directed in the purpos detailed sit undisturbe as potentia wise fashio	part to ob se of furthe te characte ed condition al changes on through	tain primary er addressing erization plar ns of the site associated w	data on the their suital also requil and for mo vith continu iled site cha	e geologic, holity and to res establishonitoring the ed borehole aracterization	nydrogeolog support the ning perman e natural tin e characteriz	ic, hydroge developm ent installa ne-varying t ation activi	ochemical an ent of the De tions for the I rends in spec ties. Monitor	d geomecha scriptive Ge purpose of c lific geosphe ing installati	nnical character oscientific Site I developing the I ere properties a ions may be est	ese activities are istics of the sites for Model (DGSM). The paseline, or and responses as well ablished in a step- pport to acquire,
	wells (~ 10 Groundwa samples fo	0 m), mult ter monito r hydroged smograph a	iple-level gro ring will con ochemical an	oundwater i sist of peric alyses. Only	monitoring sodic (ex: qua	systems in d irterly) mea: aintenance (	eep boreho surements of of the moni	oles (~ 1000 n of hydraulic p toring well ne	n), borehole ressures and etwork and e	seismographs a d periodic collec	ndwater monitoring and GPS stations. ction of groundwater ticipated during this e routine
Deliverable	•		orts on basel QA'd monit		_			rends. gement syste	em		
Assumptions	- A - G - A - L under E	all monitori Groundwat An electron Ocal climat Biosphere ( Ormal mor	er pressure ic information e monitorin Characterizat	ons are made monitoring on manager g, such as ra tion for can	de operation will take planent system ainfall and soldidate sites.	nal as part o ace quarterl n is operatio now accum	y and samp nal. ulation, as v	naracterizatic ling will take well as surfacc etailed site ch	place semi-a	annually nitoring is assun	ned to be undertaken
	site); Y(	)8 \$580k (\$	essure meas S290k per sit d maintain s	:e); Y09 \$84	0k (\$420k p	er site).			6 \$74k (\$37	k/site); Y07 \$31	5k (\$157.5k per
	^	malutical c	osts for both	sites: VN6	\$11 7b. V07	\$631. AU8 \$	115 5k and	V00 \$168k			
		ary acar C	0303 101 0001	. 3103. 100	7±7.7K, 1U/	703K, 100 7	LIJ.JK GIIU	100 Y100K.			
Schedule	Start Year			6	2015			Finish Year	9	2018	
Туре	Fixed										
Calculations	Groundwa		ng and analy			•	,	•	•		vill be available for
and Notes:	entire insta characteria allocations over the 4	alled netwo zation stag in WED 56 year perio	ork will only e will gradua 51.15.20.10.	commence ally escalate 70. The mor %, 30%, 55%	in the first y throughout nitoring cost 6, 80%. Geo	year of the let the period its as a percensisher more	censing phass more bo	ase (Y10) in V reholes are d r site, full cos	VED 560.15 rilled and in st reflected i	20.10.70. Moni strumented as n WED 561.30.	ring activities on the toring during the per the budget 20.20.20 escalate oles (x 1.75) only.
	entire insta characteriz allocations over the 4 No additio	alled netwo zation stag in WED 56 year perion	ork will only e will gradua 51.15.20.10.3 d from: as 79	commence ally escalate 70. The mor %, 30%, 55% seismic/GPS	in the first y throughout nitoring cost 6, 80%. Geo	year of the l t the period ts as a perce psphere mon g.	censing phass more bo	ase (Y10) in V reholes are d r site, full cos	VED 560.15 rilled and in st reflected i	20.10.70. Moni strumented as n WED 561.30. n of more boreh	toring during the per the budget 20.20.20 escalate

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## **Work Element Definition Sheet**

WBS (New)	561	15	30	10	10			Prepared	N. Hunt, P.
WBS (Old)									Gierszewski
WBS Title	SAFETY ASS	ESSMENT F	OR SCREEN	IING					
D	Th:- 41::-		f - t		t f t l		f: h : ! :		
Description	inis task is	to provide :	sarety asses	ssment sup	port for the	initial screening and	reasibility assessme	nts for prospective si	tes.
	The overall	annroach i	s to annly i	nformation	learned froi	m the generic safety	accessments for hyn	othetical sites to the	notential cites
	The Overall	арргоастт	s to apply ii	Hormation	icarrica iroi	in the generic salety	assessments for hyp	othetical sites to the	potential sites.
	The assess	ment will f	ocus on id	entifying a	ny key asne	acts of the site that	would be of note:	ntial benefit or cond	ern with respect to
							•	ed in the NWMO sitin	·
		,	, , ,			,			
Deliverable	- Scree	ning and F	easibility As	ssessments	for the pros	pective sites as requ	ired.		
	- Parti	cipation in i	information	n and engag	ement activ	ities as required.			
	- The	screening a	and feasibil	ity assessm	ents will be	based primarily on	information genera	ited in WBS 560.20.	30.10.10 (Illustrative
	Safety Asse	ssment Stu	udies for H	ypothetical	Sites) and	on information gen	erated in WBS 560.	25.30.10.10 (Technic	al Support for APM
Assumptions	Technical P	rogram Obj	jective #3 D	uring Scree	ning Phase)				
	- Initia	l screening	is for 15 co	mmunities	and feasibil	ity assessments are f	or 8 communities.		
	<u> </u>	_		ons are for		,			
	- The s	taffing mod	del is consis	stent with th	ne current s	tatus quo (i.e., more	buy than make orie	nted).	
						are 0 FTE for Y1, 1	.9 FTE for Y2 and 2.	9 FTE for Y3 (see the	Calculation Section
	below for n	nore inform	nation and j	ob categori	zation).				
					2. Allowan	ce is for analysis or	data collection as ne	eded to evaluate an	y site-specific issues
	identified d	uring scree	ning phase						
	1			\$0K for Y1,	, \$50K for Y	2 and \$30K for Y3 (4	person-trips x 10 si	tes x 2k\$/trip). This	will cover travel and
	special pres	entation m	iaterial.						
				·			Y		
Schedule	Start Year			2	2011		Finish Year	3 2012	
T	Cive al								
Туре	Fixed								
Calculations	Riosnhere a	and transno	rtation Safe	ety Assessm	ent staffing	requirements are n	nt included here		
and Notes:	biospilere t	ina transpo	ntation san	cty Assessii	iciic stairiile	, requirements are in	ot included here.		
			Y1	Y2	Y3				
	Dir, NWMC	-01	<u>Y1</u> 0.25	<u>Y2</u> 0.50	<u>Y3</u> 0.50				
	Dir, NWMC Mgr UF SA,			0.50	0.50				
	i '		0.25	0.50	0.50				
	Mgr UF SA,	NWMO-	0.25	0.50 1.00	0.50 1.00				
	Mgr UF SA, 01	NWMO-	0.25 1.00	0.50 1.00	0.50 1.00				
	Mgr UF SA, 01 Sr Scientist, 03	NWMO-	0.25 1.00 0.75	0.50 1.00 0.75	0.50 1.00 0.75				
	Mgr UF SA, 01 Sr Scientist, 03 Sci/Eng, NV	NWMO-	0.25 1.00 0.75 3.00	0.50 1.00 0.75 4.00	0.50 1.00 0.75 5.00				
	Mgr UF SA, 01 Sr Scientist, 03 Sci/Eng, NV Total FTE	NWMO- NWMO- VMO-03	0.25 1.00 0.75 3.00	0.50 1.00 0.75 4.00 6.25	0.50 1.00 0.75 5.00 7.25				
	Mgr UF SA, 01 Sr Scientist, 03 Sci/Eng, NV Total FTE Utilizatio	NWMO- NWMO- VMO-03	0.25 1.00 0.75 3.00 11.25 0.00	0.50 1.00 0.75 4.00 6.25 0.30	0.50 1.00 0.75 5.00 7.25 0.40				
	Mgr UF SA, 01 Sr Scientist, 03 Sci/Eng, NV Total FTE	NWMO- NWMO- VMO-03	0.25 1.00 0.75 3.00	0.50 1.00 0.75 4.00 6.25 0.30	0.50 1.00 0.75 5.00 7.25 0.40				
I a bayy	Mgr UF SA, 01 Sr Scientist, 03 Sci/Eng, NV Total FTE Utilizatio	NWMO- NWMO- VMO-03 n Factor WEDS	0.25 1.00 0.75 3.00 11.25 0.00 <b>0.00</b>	0.50 1.00 0.75 4.00 6.25 0.30	0.50 1.00 0.75 5.00 7.25 0.40 2.90		Allowance	DE0/ T	otal Cost
Labour \$	Mgr UF SA, 01 Sr Scientist, 03 Sci/Eng, NV Total FTE Utilizatio FTE for this	NWMO- NWMO- VMO-03 n Factor WEDS	0.25 1.00 0.75 3.00 11.25 0.00	0.50 1.00 0.75 4.00 6.25 0.30	0.50 1.00 0.75 5.00 7.25 0.40			25% T	otal Cost 1,059,191

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## **Work Element Definition Sheet**

WBS (New)	561	15	30	10	20			Prepared By:	N. Hunt, P.
WBS (Old)		<u></u>							Gierszewski.
WBS Title	BIOSPHERI	CHARACTE	ERIZATION F	OR SCREEN	ING				
	<u> </u>								
Doscription	This tack is	to provide	high lovel k	iosphoro sh	aractorizati	on data in cupport of t	ho initial cerooning and f	asibility accord	monts
Description	This task is	to provide	nign ievei b	nosphere cr	iaracterizati	on data in support of i	he initial screening and f	easibility assess	ments.
	Th f					- d F		/	
	•		•			•	ents whose distribution eration of a repository at	, ,	
		•				•	a focus of the Environme		
	•						ability to the effects of a		
	·					•	t is important that select	-	· ·
	•	-	-			may be caused by the	•		
				J		,	•		
	Readily ava	ailable biosp	phere data v	will be colle	cted with re	spect to:			
		· me	eterology						
		· sur	rface hydrol	logy					
		· lan	nd use						
			ra/fauna						
			vironmenta						
		· Ab	original Tra	ditional Kno	wledge (AT	K)			
Deliverable	- Cont	ribution to	the screeni	ng and foas	ihility acces	sments as required			
Deliverable	Com	TIDUCION CO	the screen	ing and reas	ibility asses.	sinents as required			
Assumptions	- Initia	al screening	is for 15 cc	mmunities	and feasibil	ity assessments are fo	· 8 communities.		
	- Preli	minary field	d investigati	ions are for	4 sites.				
	- Wo	rk would b	e primarily	via deskto	p review, o	onsultation with prov	rincial or regional autho	rities (e.g. Con	servation councils
	Ministry of	Natural Re	sources) an	d limited lo	cal field wo	rk. Local field work lik	ely limited to verifying ke	y features rathe	r than surveys.
	- Initi	al contacts v	would be m	ade with Fi	rst Nations	in the area. Intent wo	uld be to learn about env	vironmental or s	piritual features o
	the region	Haurarar	it is recogn	ized that sh	aring of tra	ditional knowledge w			
l	the region	. nowever	it is recogn				ould likely require time t	o establish rela	-
			_		_	<del>-</del>	ould likely require time t ny readily available infor		-
			_		_	<del>-</del>	• •		-
			_		_	<del>-</del>	• •		•
	during this	period the	work would	d be primari	ly to initiate	this task and gather a	ny readily available infor	mation.	tionships, and tha
	during this	period the	work would	d be primari	ly to initiate	this task and gather a	• •	mation.	tionships, and tha
	during this	period the	work would	d be primari	ly to initiate	this task and gather a	ny readily available infor	mation.	tionships, and tha
	during this	period the	work would	d be primari	ly to initiate	this task and gather a	ny readily available infor	mation.	tionships, and tha
	during this NWMO Sa Y2 and 1 N	period the fety Assessn WMO-03 F1	work would ment staffin TE for Y3.	d be primari	ly to initiate	e this task and gather a	ny readily available infor	mation. )3 FTE for Y1, 1 I	tionships, and tha
	during this  NWMO Sa  Y2 and 1 N  Funding fo	period the fety Assessn WMO-03 FT r contractor	work would ment staffin TE for Y3. r support is	d be primar g for biospl \$0 for Y1, \$	ly to initiate nere charact 160K for Y2	e this task and gather a	ny readily available infor	mation. )3 FTE for Y1, 1 I	tionships, and tha
	during this  NWMO Sa  Y2 and 1 N  Funding fo	period the fety Assessn WMO-03 FT r contractor	work would ment staffin TE for Y3. r support is	d be primar g for biospl \$0 for Y1, \$	ly to initiate nere charact 160K for Y2	e this task and gather a erization and related a and \$240K for Y3. As:	ny readily available infor	mation. )3 FTE for Y1, 1 I	tionships, and tha
Schedule	during this  NWMO Sa  Y2 and 1 N  Funding fo	period the fety Assessn WMO-03 FT r contractor	work would ment staffin TE for Y3. r support is	d be primar g for biospl \$0 for Y1, \$	ly to initiate nere charact 160K for Y2 cal First Nat	e this task and gather a erization and related a and \$240K for Y3. As:	ny readily available infor	mation.  3 FTE for Y1, 1 l	tionships, and tha
Schedule	NWMO Sa Y2 and 1 N Funding fo up to \$100	period the fety Assessn WMO-03 FT r contractor	work would ment staffin TE for Y3. r support is	g for biospl \$0 for Y1, \$ sions with lo	ly to initiate nere charact 160K for Y2 cal First Nat	e this task and gather a erization and related a and \$240K for Y3. As:	ny readily available infor activities is 0.25 NWMO-C sumes approx. \$300k for	mation.  3 FTE for Y1, 1 l	tionships, and tha
Schedule	NWMO Sa Y2 and 1 N Funding fo up to \$100	period the fety Assessn WMO-03 FT r contractor	work would ment staffin TE for Y3. r support is	g for biospl \$0 for Y1, \$ sions with lo	ly to initiate nere charact 160K for Y2 cal First Nat	e this task and gather a erization and related a and \$240K for Y3. As:	ny readily available infor activities is 0.25 NWMO-C sumes approx. \$300k for	mation.  3 FTE for Y1, 1 l	tionships, and tha
	NWMO Sa Y2 and 1 N Funding fo up to \$100 Start Year	period the fety Assessn WMO-03 FT r contractor	work would ment staffin TE for Y3. r support is	g for biospl \$0 for Y1, \$ sions with lo	ly to initiate nere charact 160K for Y2 cal First Nat	e this task and gather a erization and related a and \$240K for Y3. As:	ny readily available infor activities is 0.25 NWMO-C sumes approx. \$300k for	mation.  3 FTE for Y1, 1 l	tionships, and tha
Type Calculations	NWMO Sa' Y2 and 1 N Funding fo up to \$100 Start Year Fixed	period the  fety Assessn WMO-03 F1  r contractor k for initial	ment staffin TE for Y3. r support is ATK discuss	\$0 for Y1, \$ sions with lo	160K for Y2 cal First Nat	e this task and gather a erization and related a and \$240K for Y3. Ass tions communities.	ny readily available infor activities is 0.25 NWMO-C sumes approx. \$300k for	mation.  93 FTE for Y1, 1 I  site biosphere d  2012	NWMO-03 FTE for
Type  Calculations and Notes:	NWMO Sar Y2 and 1 N Funding fo up to \$100 Start Year Fixed	fety Assessn WMO-03 F1 r contractor k for initial	ment staffin TE for Y3. r support is ATK discuss	\$0 for Y1, \$ sions with lo	160K for Y2 cal First Nat 2010 ith a contra	e this task and gather a erization and related a and \$240K for Y3. Ass tions communities.	ny readily available infor activities is 0.25 NWMO-0 sumes approx. \$300k for a single finish Year and summary of available information.	mation.  3 FTE for Y1, 1 l  site biosphere d  2012	NWMO-03 FTE for lata collection, and
Type Calculations	NWMO Sar Y2 and 1 N Funding fo up to \$100 Start Year Fixed	period the  fety Assessn  WMO-03 F1  r contractor  k for initial  on assumir	ment staffin TE for Y3. r support is ATK discuss	\$0 for Y1, \$ sions with lo	160K for Y2 cal First Nat	e this task and gather a erization and related a and \$240K for Y3. Ass tions communities.	ny readily available infor	mation.  3 FTE for Y1, 1 I  site biosphere d  2012	NWMO-03 FTE for

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#### **Work Element Definition Sheet**

M/DC /Nam)	FC1	15 3	0 10	20					Duamanad Dua	N. Humb D			
WBS (New)	561	15 3	0 10	30					Prepared By:	•			
WBS (Old)	ļ	j	I	<u>.</u>	ii.			i		Gierszewski.			
W/DC Title	CAEETV AC	CECCMENT EOD C	ANDIDATE CITE	с									
WBS Title	SAFELLAS	SESSMENT FOR CA	ANDIDATE SITE	3									
	<u>.</u>												
Description	This tack is	to provide procle	sure and nest	locuro cafoty	accoccmonto	in cupport	of candidate of	itos					
Description	This task is to provide preclosure and postclosure safety assessments in support of candidate sites.												
	The approach will be to use the generic safety assessments for hypothetical sites from WBS 560.20.30.10.10 (Illustrative Safety												
	Assessment Studies for Hypothetical Sites) as the basis for assessing and documenting the safety aspects of the candidate sites.												
	Assessmen	it Studies for Hypo	otneticai Sites)	as the basis to	or assessing a	na aocum	enting the safe	ety aspects	of the candida	te sites.			
	The precio	sure assessments	will address co	nventional ar	nd radiologica	l safety fo	r normal unse	t and accid	ent conditions	Anticinated			
	: '	the natural enviro			-	•			ent conditions	. Alterpated			
		and matarar critic	annene danng	3100 0011001 000	on and open								
	The postclo	osure assessment	will address th	e anticipated	effects on hu	man and	non-human bio	ta followin	g decommission	ning and			
	abandonm	ent. Both radiolo	gical and non-r	adiological co	ntaminants v	vill be con	sidered.						
Deliverable	Safety /	Assessment for Ca	ndidate Site ^										
_ :		Assessment for Ca											
	Juicty F		aidaic Jile D										
Assumptions	_ Two	candidate sites ir	crystalline roo	k									
		iled geoscience ir			is not availab	le initially	hut reculte fro	m at least	one deen boro	hole would be			
	1	•		LITE LAND SILES	is not availab	ic iiiilaliy,	par results 110	iii at ieast	one aceh note	noie would be			
	provided by Y5.  The generic safety assessment deliverables produced as part of WBS 560.20.30.10.10 (Illustrative Safety Assessment Studies for												
	•			-	-				afety Assessm	ent Studies for			
	Hypothetic	al Sites) provide a	a basis for prod	ucing safety a	ssessments f	or the two	candidate site	S.					
	•												
	Tho	cafoty accorrmo	at staffing mod	dal is consists	nt with the	current ct	stus quo (i o	more huy	than make				
	1	safety assessmer	it starring mot	iei is consiste	iit with the	Luireiit Ste	itus quo (i.e.,	more buy	tilali illake				
	oriented).												
	NWMO Sal	fety Assessment s	taff requireme	nts are 7.75 ir	n Y4, 7.5 in e	ich of Y5 a	nd Y6, 6.75 in	Y7, 7.0 in Y	'8 and 7.75				
	in Y9.												
	This include	es the effort for n	nanagement of	contracts tha	t sunnort thi	s activity i	WBS 560 25 3	30 10 40 (T	echnical Sunno	ort for APM			
	:	Program Objective	-			-							
	categorizat		. #3 During Car	ididate Site i i	iasej. See tiik	Calculation	on section belo	w ioi illoit	. iniormation d	iid job			
	Categorizat	lion.											
	Funding fo	r contractor supp	ort is \$0.8M fo	r Y4, \$1.5M fc	r Y5, \$2.1M t	or Y6, \$2.	35M for Y7, \$2.	.7M for Y8	and \$2.7M				
	for Y9. The	ese are based on e	experience with	n APM Case St	udies and ex	perience v	vith OPG's DGR	analysis.					
			·					•					
	Costs for tr	ansportation safe	ety assessment	s are in WBS 6	60.20.30.10.	10 (Transp	ortation Safety	y Assessme	ent).				
	<u> </u>												
	Overhead	allowances (Othe	r) have been (	estimated at	\$60k/a. This	will cove	r travel (techn	ical meetir	igs, CNSC),				
	software li	cences, graphics,	and miscellane	ous expenses									
Schedule	Start Year			4 2013			Finish Year	9	2018				
	†		ii				l.						
Туре	Fixed												
.44	<u> </u>												
Calculations	Biosphere	and transportatio	n staffing requ	irements are	not included	here.							
and Notes:													
			<u>Y4</u>	<u>Y5</u>	<u>Y6</u>	<u>Y7</u>	<u>Y8</u>	<u>Y9</u>					
	Safety Asse	essment	17	<u></u>	<u></u>	<u></u>	10	<u></u>					
	Dir		0.7	5 0.75	0.75	0.50	0.50	0.75					
	Mgr UF		1.0		1.00	1.00	1.00	1.00					
		- NIWWO 03											
	:	: , NWMO-03	1.0		1.00	0.75	0.75	1.00					
	Sci/Eng, N\		5.0		4.75	4.50	4.75	5.00					
1 - 1		essment FTE	7.7		7.50	6.75	7.00	7.75	<b>-</b>	tal Cost			
Labour (	6,672,301	Material Cos	- \$	13,010,000	\$ 19	,682,301	\$ Allowance	<b>25%</b> 1,920,575	\$	tal Cost 24,602,87			
\$							_ /						

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	15	30	10	40			Prepared	N. Hunt, P. Gierszewski		
WBS Title	BIOSPHERE	CHARACT	ERIZATION F	OR CANDII	DATE SITES						
	domain info construction Construction Reconnaiss meteorologe environmen community communica	ormation, on/operation on Licence sance level gical data; ntal signification. A contact	to aid charac on. The info process. field activitie flora and fau cance would tion gathered onceptual Bio	terisation rmation so es would p na; soils; s be defined d would be sphere mo	of terrestrial collected with covide the based on piesenteed into	conditions and ident ill be included in the asis for classification clogy; and surface/sul ublic domain and fiel to a biosphere GIS base e developed that wor	nately 300 to 1000 km2 in ify potential receptors/in Environmental Assessmen of land use; forest, wildlife o-surface hydrologic intered data, as well as by consulation system for all serve as a basis for prematerials prepared to all	pacts resulting interpretation performed as eand fishery restacts. Areas of ultation with potanalysis, interpretation impact	from a DGR part of the  ources; natural and/or ential host etation and assessments.		
	This is inter	nded to pr	ovide a signif	icant amo	unt of site bi	al Tribal Knowledge. osphere characteriza uld not require this l	tion to support the site se evel of field effort.	election. Further	work at the		
Deliverable	- Biosp - Supp - Surve	ohere Electoring repose orting repose ey of Abor	tronic (GIS) d orts documer iginal Tribal k	atabases f nting recor (nowledge	or two Candi nnaissance fie (english and	date Sites. eld investigation and local First Nations la	odel, for two Candidate S identification of natural/e nguage versions). re characterization and pr	environmental a	-		
Assumptions	2 separate Candidate Sites (300-1000 km2).     Sites are "green-field" (i.e., no significant existing site characterization available).     Field work undertaken over 3 years/2 field seasons.     Most meteorological information can be compiled from local stations.     Electronic Information databases are operational.     Protocals can be prepared to allow sharing of Aboriginal Tribal Knowledge.										
	<ul> <li>Protocals can be prepared to allow sharing of Aboriginal Tribal Knowledge.</li> <li>Projected Costs are:         <ul> <li>NWMO Safety Assessment staff requirement is 1 NWMO-03 FTE/a</li> </ul> </li> <li>Contractors to undertake Biosphere Characterisation Studies, preparation of reports and biosphere databases:         <ul> <li>Project manager plus 4 FTE/a for 3 years per candidate site.</li> <li>Sample analyses: \$75k/a for 3 years per candidate site.</li> <li>Equipment: \$200k per candidate site.</li> <li>Transportation/Access/Expenses: \$330k per candidate site. This includes modest allowance for air transportation animal population surveys.</li> <li>The resulting expenses are approximately \$6M total per site, or about \$2M/a for 3 years per site.</li> </ul> </li> </ul>										
	once the assume for plan	e Candidat d for scheoning and Yother costs \$1 \$2 \$2 \$2 \$3 \$3	te Sites are so duling purpose '9 for the fina will include: .00k in Y4 for 100k in Y9 for	elected giv ses that the al preferred planning a assessme	en that the re effort occud site selection and literature and summ	equirement is to havins at the first site from	ng two field seasons. Thie the information is availand the secon Y5 to Y7, and the secon s/surveys/translations.	ble for use in th	e EA activities. It is		
Schedule	Start Year			2	4 2013		Finish Year	9 2018			
	Fixed										
Calculations and Notes: Labour C	Costs 781,099	Mater \$	ial Costs		er Costs 12,600,000	<b>Subtotal</b> \$ 13,381,099	Allowance 25%  \$ \$ 3,345,275		tal Cost 16,726,374		

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## **Work Element Definition Sheet**

WBS (New)	561	20	20	10	10				Prepared E	By:	A. Vorauer
WBS (Old)				<u></u>							
	ļ										
WBS Title	TECHNICAL	_SUPPORT F	FOR SITING	AND ILLUST	RATIVE SAF	ETY ASSESS	MENT STU	DIES			
Description	This alones				V1 V2 -:			-+:£:		-l:	
Description	influence r selection o the Final S	epository sa if candidate afety Report	afety (APM sites, analy t.	Technical Pi	rogram Objo for the Envi	ective 5). Kr ironmental	owledge ga Assessment	ained will be a	applied in su the Prelimin	ary Safety Re	es that may ks pertaining to the port, and creation of erested in similar
Deliverable	1	es are specif nemoranda.		-		ned in APM	Technical F	Program Obje	ective 5 and v	will consist of	reports and
	setting: - 5b: Ac - 5c: De	s. Ivance the u	understandi ods for con	ing of the ev	volution of g	groundwate	r flow and t	the impact of	glaciation o	n a deep geol	ine and sedimentary ogical repository.
Assumptions	("Geoscien Sites").	ice Technica	ll Siting Ma	nagement a	nd Support	to Engagen	nent" and "l	_	fety Assessn		others WEDs for Hypothetical
Schedule	Start Year			1	2010			Finish Year	3	2012	
Туре	Fixed										
Calculations and Notes:	1 Contract	or funding c	osts extrac	ted from "To	echnical RD	Program 20	)11 - 2015_	R4a"			
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Т	otal Cost

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#### Work Element Definition Sheet

WBS (New) WBS (Old)	561	20	30	10	10					Prepared By:	N. Hunt			
WBS Title	ILLUSTRATIVE SAFETY AS	SSESSMENT	STUDIES F	OR HYPOTH	IETICAL SITI	S								
Description	This captures all activitic items (i.e., 1a and 1g). T improvements to existin information produced w support site selection.	he capture g codes and	d tasks sup I improvem	port a CNSO ents to the	C pre-licens long-term	ng reviev safety ca	v of the metho se through cor	odology, acqu ntainer corros	isition and t sion and geo	testing of new o osphere glaciati	omputer codes, on studies. The			
Deliverable	Deliverables are specific to individual sub-objectives and will consist of reports and technical memoranda. The principal sub-objectives are:  Objective #1: Prepare updated generic reference designs, cost estimates and safety cases for a deep geological repository in crystalline rock and in sedimentary rock.													
Assumptions														
	Engineering will p     Geoscience will pi     The staffing mode The NWMO Geoscience	rovide the re	eference ge nt with the	eosphere ch current sta	naracteristic atus quo (i.e	s. e., more b	ouy than make	oriented).						
	The NWMO Geoscience staff requirements are 6.4 FTE for Y1 and 5.0 for Y2 to Y3.  The NWMO Safety Assessment staff requirements are 5.0 FTE for Y1, 4.4 FTE for Y2 and 4.4 FTE for Y3.  The NWMO Repository Engineering staff requirement is 1.75 FTE for each of Y1 to Y3.													
	These safety assessment staff estimates include the effort for management of technical support contracts in WBS 560 25 30 10 10 (Technical Support for APM Technical Program Objective #3 During Screening Phase). Note that the reason the staff estimates are for Y1 to Y3 while the contractor funding estimates are for Y1 to Y6 is due to changes to this WEDS implemented to match the Jan 2011 (Rev 4) version of the APM Technical Program document. These changes extended the funding into Y4 to Y6. Since the staff needed for Y4 to Y6 are accounted for in other WEDS it was decided not to update the staffing changes to minimize the cascading effect. The total staffing count remains unchanged.													
	Contractor costs are \$2. Overhead allowances (C										aphics, and			
	miscellaneous expenses													
Schedule	Start Year			1	2010			Finish Year	6	2015				
Туре	Fixed													
Calculations and Notes:	Biosphere and transport	ation staffii	ng requiren	nents are n	ot included	here.								
	Geoscience	<u>Y1</u>	<u>Y2</u>	<u>Y3</u>										
	Sci/Eng, NWMO-3 Geoscience FTE	6.40 <b>6.40</b>	5.00 <b>5.00</b>		-	1b 1c	<u>Y1</u> \$777 \$82	<u>Y2</u> \$1,140 \$110	<u>Y3</u> \$1,100 \$100	\$0	\$0 \$0 \$0 \$0			
	Safety Assessment Dir, NWMO-01 Mgr UF SA, NWMO-01	0.25 1.00	0.50 1.00			1d 1e 1f	\$196 \$91 \$871	\$89 \$150 \$1,000	\$200 \$150 \$1,000	\$200 \$3 \$150 \$700 \$4	\$0 \$0			
	Sr Scientist, NWMO-3 Sci/Eng, NWMO-3	0.75 3.00	0.75 4.00			total	\$2,017	\$2,489	\$2,550	\$1,750 \$7	50 \$650			
	FTE	5.00	6.25		_									
	Utilization Factor Safety Assessment FTE	1.00 5.00	0.70 <b>4.38</b>											
	Repository Engineering													
	Sci/Eng, NWMO-3 Repository	1.75 <b>1.75</b>	1.75 <b>1.75</b>											
	Engineering FTE													
La \$	abour Costs 4,896,973	Materia	l Costs		r Costs 10,326,000		15,222,973	Allowance \$	<b>25%</b> 3,805,743	To	19,028,716			
· -	4,050,373	Ą		. ب	10,320,000	ب	13,222,313	7	3,003,743	7	13,020,710			

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#### Work Element Definition Sheet

WBS (New) WBS (Old)	561 552	20 30	40 30	10	10					Prepared	By: A. Khan
WBS Title	LIAISON WITH CNSC	•••••									
Description	Liaise with CNSC and o	ther regula	tory agenci	es prior to	filing the No	tice of Inte	ent to apply	for a Site Pre	paration/Co	nstruction	License (Y01 - Y09)
Deliverable	To maintain good relat to design. This transla development of safety with CNSC staff on can prepared in Y09 and w	tes into a de criteria. Th didate site	eliverable t ne deliveral investigatio	hat include ble also incl ons, consult	s identifying ludes agreed ation with (	applicable d processes CNSC staff o	regulatory s, consultation on process f	documents, on with CNSC or choice of p	regulatory re Staff on fea	equirement sibility stud	s and criteria, and the ly plans, consultation
Assumptions	It is assumed that:										
	safety assessments for Security and safe Geoscientific site Human factors; Emergency man Fire protection; Mining; and Other governme NWMO Regulate NWMO Regulate NWMO Regulate NWMO Regulate NWMO Regulate NWMO Regulate NWMO Regulate NWMO Regulate A NWMO Regulate NWMO Regulate To NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO Regulate A NWMO B Regulate A NWMO B Regulate A NWMO	eguards (see e characteria agement; ent requiren ory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vory Affairs vor ensing prentractors, and the vory Affairs vor ensing prentractors, and the vory Affairs vor ensing prentractors, and the vory Affairs vor ensing prentractors, and the vory an	s as: e WBS 560. ization plan inents such vill arrange vill coordin. vill support Yearly upo vill communit it comm	as Transpo the Annual ate feedbac the Safety the Geosci dates on the nicate NWh he Service / tiles may als a a Licensing he scope of g risks.	rt Canada (standard);  It canada (standard);	ee WBS 56 Program Up SC on the c group in c in presenti expected ir to the CN: t between sits to the 8/Y09 time ng tasks, a l wrt the CNS ison (this v 20). The ac asing review view (see v ding comm ceptual de: s expected.	0.30.40.10. ddates to be developmen leveloping a ng the site of 1 YOS/YOS. SC in suppor CNSC and N CNSC office frame (as re licensing sch tivities are w (see WBS WBS 560.20. unity visits sign(s) wher Also, the N ISC, prelimin	10). provided to t of regulator cceptable sal characterizati et of APM eng IWMO, effect (up to 10 visi equired by the ledule, a tabu ies across YO C pre-licensin expected to c 560.20.40.10 40.10.20) an to the CNSC of e a further u IWMO anticip	the CNSC.  ry document fety criteria. on plans to gagement active April 1, its per year). e licensing p allation of re- 1 to Y09 since g review (W occur in the i- 20) and inc- d the Service ffices; nderstandin, pates preser	ts.  CNSC staff.  ctivities with 2008 and in  procedure, I source requ te the majo BS 560.20.4  following tir ludes the la  e Arrangem g of design ting site ch	NWMO-PROC-RG-02) irrements from other r activities during this 10.10.20) and me frames: unch of the siting ent noted above that inputs, to meet
	support of preparing for							iai y site ciiai	acterization	results iroi	ii site iiivestigations iii
	9. The costs associa				1		1		1	1	1
	CNSC Licensing Fees (\$k)	Y01 125	<b>Y02</b> 450	<b>Y03</b> 450	<b>Y04</b> 495	<b>Y05</b> 480	<b>Y06</b> 480	<b>Y07</b> 340	<b>Y08</b> 340	<b>Y09</b> 340	
	NWMO-1 (FTE)	0.12	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.95	
	NWMO-3 (FTE) Travel (\$k)	0.25 8	0.25 8	1.2 8	1.2 8	2	2.25 8	1.75 8	1.75 8	2.95 8	
	Travei (\$K)	0	0								L
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations	CNSC licensing fees are	e calculated	assuming t	that 1 FTE e	equals 1800	hours and	is charged a	t an hourly ra	ate of \$250.	This total is	<u> </u>
and Notes:	reported in thousands NWMO-1 values repre NWMO-3 values repre Travel expenses are ca dollars.	of dollars; sent the FT sent the FT	E effort req E effort req	uired by N\ uired by N\	WMO mana WMO techn	gement; ical staff; a	nd				
	<ul> <li>For information</li> <li>560.20.40.10.20, and V</li> </ul>					for the thre	ee separate	activities (thi	s WEDs, WB	SS	
	550.20.40.10.20, and V	VBS 560.30	Y02	Y03	ws: Y04	Y05	Y06	Y07	Y08	Y09	
<u></u>	CNSC Licensing Fees (\$	370	1050	1050	755	480	480	745	745	745	
	bour Costs		al Costs		r Costs		total	Allowance	25%	ċ	Total Cost
\$	2,649,261	\$	-	\$	3,572,000	\$	6,221,261	\$	1,555,315	\$	7,776,577

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## **Work Element Definition Sheet**

WBS (New)	561	20	40	10	20		ļ			Prepared B	<b>y:</b> A. Khan
WBS (Old)							<u> </u>				
WBS Title	CNSC Pre-li	icensing Rev	view								
	ļ										
Description	Conduct a	CNSC pre-lic	censing revi	ew as agree	ed to by the	NWMO an	d the CNSC	(Y01 – Y05)			
 						40   .		.1			
Deliverable	•										ry concerns with the ective April 1, 2008).
Assumptions	•	MO Regulat	•	•					•		n April 2013 for their
	•	-		_		•	-	eptual Design a			
	:	•			•		April 2013	submission wil	ll be for Sec	dimentary Ro	ock.
	•	t for these s		will be obt	ained from:						
		neering Divi									
	1	sciences Div	•								
		ty Assessme									
	<u> </u>	•	•			NSC reviev	<i>i</i> as outline	ed in the AP	M Design	Review Pro	cess documented in
	•	dence to the	•		•						
								ile the subm CNSC reviews	-		g time required by
				Y01	Y02	Y03	Y04	Y05			
		sing Fees (\$	\$k)	260	500	200	760				
	NWMO-1 (			0.13	0.2	0.2	0.2				
	NWMO-3 (			0.5	0.5	1.3	1.3	0.5			
	Travel (\$k)	<u> </u>		5	5	5	5				
Schedule	Start Year			1	2010			Finish Year	5	2014	
	1			i				A			
Туре	Fixed										
Calculations	CNSC licen	sing fees are	e calculated	assuming t	hat 1 FTE e	quals 1800	hours and is	charged at an	hourly rat	e of \$250. T	his total is reported
and Notes:		ds of dollars		J				-	•	•	•
	•	alues repre	•	F effort rea	uired by NV	VMO mana	gement.				
	•	alues repre		•	•			d			
	•	•		•	•		-		ic alco reno	rtad in thou	sands of dollars.
	πανει εχρι	Liises ale Ca	iicuiateu dss	Janning Lindl	. <u> </u>	ip to Ottav	,a costs \$10	oo. This total	13 a130 1 Epu	rteu iii tiidu	Junus of Wollars.
Labour	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%		Total Cost
\$	695,339		-	\$	1,740,000		2,435,339	\$	608,835		3,044,173
т	000,000	т		т	_,, .0,000	т	_, .00,000	7	200,000	т	5,5,175

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## **Work Element Definition Sheet**

WBS (New)	561	20	40	10	30				Prepared By:	A. Khan	
WBS (Old)											
WBS Title	SECURITY A	AND SAFEGU	JARDS INPL	JT TO DESIG	iN						
Description	E	CNSC spec				rity and Safeguards to Y09)	ensure that re	egulatory r	requirements a	re well understood	
Deliverable	Security an	ıd Safeguard	ds Design In	puts							
	met. This facilitating 2. The staff (not i	MO Regulat will be achion the IAEA's a costs associ	eved by conditional particular pa	nfirming that rotocol. and the reso by enginee	at the facilit	to confirm that CNSC of the confirm that CNSC of the confirm that CNSC of the confirmation that the confirmati	ty Regulations	as well as interface v	international a	greements such as	
Schedule	Start Year			1	2010		Finish Year	9	2018		
Туре	Fixed										
and Notes:	CNSC licensing fees are calculated assuming that 1 FTE equals 1800 hours and is charged at an hourly rate of \$250. This total is reported in thousands of dollars;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO technical staff; and  Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.										
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost	
\$	-	\$	-	\$	-	\$ -	\$	-	\$	-	

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	10	10				Prepared By:	A. Murchison
WBS (Old)	552	20	2							
	ļ									
WBS Title	REPOSITO	RY SYSTEM	1 DEVELOPM	ENT MANA	AGEMENT, AF	PM SITING PHASE DESIG	GN & COST U	PDATE		
Description	Provide ov	erall mana	agement of t	he reposit	ory system de	evelopment during rep	ository siting.	Tasks includ	le:	
	- Asse	emble and	maintain ma	nagement	t team respor	nsible for container and	l repository s	ystem optim	ization;	
	- Dev	elop/appr	ove conceptu	ıal & prelii	minary desigr	requirements for conf	tainer and rep	ository syst	ems;	
	- Con	duct integ	rated transpo	ortation, p	ackaging plar	nt and repository facilit	y studies			
	- Ove	rsight of d	emonstration	n of fabrica	ability of key	DGR components				
	- Prep	paration of	f APM refere	nce design	updates and	cost update as require	ed for funding	;		
	- Iden	itify and p	rovide techni	cal risk ma	anagement re	ecommendations to the	e executive			
Daliverahla	Mar		_f.							
Deliverable	:	nagement		امنيمام مسما						
	1				opment plans					
	<b>=</b>	-	•		developmen	τ.				
	1		eliminary con		igns.					
	•		ze UFC conta							
	1				•	pecifications and proce			. ,	
	o Surveil	lance of de	emonstrated	container	placement m	nethods and retrieval m	nethods, equi	pment and p	rocedures (ger	neric URL).
	o Optimi	sed used f	iuel containe	r and used	l-fuel nackagi	ng plant and repository	, facility desig	ns and speci	ifications	
	E					uirements/information				
	:		•		•	ensing, schedule or co	•	0.0		mendations to the
	executive				ara mipace ne	ensg, senedane e. ee.	, , , , , , , , , , , , , , , , , , ,	a, a.i.c aiia	provide recon	c.iaations to the
	1	•		stimata in	2010/2011 =	and next updated APM	design & cost	- actimata in	2014/2015	
			ū			endering, contract assig	•			
						for construction license		iiiieiit stai tii	ig 2014).	
	o integra	iteu repos	itory concept	uai uesigi	i as required	ior construction needs	3001111331011.			
Assumptions	Duration o	of work: Y0	1 to Y09.							
	(work cont	tinues und	ler REPOSITO	RY SYSTEN	M DEVELOPM	ENT MANAGEMENT, LI	CENSING PSA	IR, EA & CON	ISTRUCTION LI	CENSE)
	Staff roqui	romonts	ro 2 25 fto N	W/MAO 01 /	(VO1) 2 25 ft/	e NWMO-01 (Y02-Y04)	and 4 fta NIM	MO 01 (VOE	V00)	
	E		evelopment		(101), 3.23 116	E INVVIVIO-01 (102-104)	and 4 ne nvv	1010-01 (103	-109)	
			tory design la		ι <b>α</b> )					
	Ondergrou	ти герозі	tory design is	iyout (iiiii	ic)					
	Descriptio	n	Y01 Y0	2 Y03	3 Y04	Y05 Y06 Y07	7 Y08 Y0	9		
	Year			011 20			2016 2017	2018		
	APM Cost	Update	\$2,250k \$60	00k \$400	0k \$400k	\$2,000k \$4,000k \$	\$600k \$0k	\$0k		
	NWMO03	FTE Y01 3,	, Y02 5, Y03 t	o Y09 6						
	Contract o	osts hasen	l on recent ex	knerience :	for technolog	y advancement contra	cts.			
						,,				
Schedule	Start Year			<u> </u>	1 2010		Finish Year	9	2018	
Туре	Fixed									
6.1.1										
Calculations										
and Notes: Labour	Costs	Mata	rial Costs	Oth	er Costs	Subtotal	Allowance	25%	To	tal Cost
<b>.</b>	13,556,674	+	-	\$	10,250,000	\$ 23,806,674	\$	5,951,668	\$	29,758,342
7		Į Ÿ		ļ <sup>*</sup>		23,000,074	, <del>r</del>	3,331,000	7	25,750,572

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	10	20					Prepared By: G. Kwong
WBS (Old)	552	20	10	10						
M/DC Title	DDEL CON	TAINED DECI	ICNI ENICINI	TEDING						
WBS Title	PREL CON	TAINER DESI	IGN ENGIN	EEKING						
Description	Tasks inclu	ıde:								
·		its, deposit uring the cop	ion constr	aints, ther	•	•	•	_		in relation to the DGR size, UFPP rial capabilities / practices for
	3		l UFC comp	oonents. (U	JFC compon	ents includ	e (i) the cop	oper tube and	l lid; steel t	for fabrication demonstrations of cube and lid; and steel basket(s).) arate work task.
	3.		If	required,	validate de	sign basis	through lim	ited fabricati	on trials (1	fabrication effort per fabrication
	technolog 4. physical te	y demonstra			dy to evalua	ate the cree	ep behaviou	r of the coppe	er vessel (st	udy includes creep modelling and
	5.	,-	Car	ry out struc	tural analys	es of the co	nceptual ste	eel UFC design	١.	
	6.			•	-		-	_		ing to be retained as a fabrication
	alternative	e). Revise pr	eliminary d	esigns for b	oth copper	and steel U	FCs incorpo	rating all obta	ined results	i.
	7.		•	•	•	•		•	•	ct to specifications.
	8.		Pro	vide indepe	endent revie	w and advi	ce on reposi	tory designs a	nd develop	ment ideas.
Deliverable	-		Tec	hnical mem	noranda or t	echnical rep	oorts for tas	ks # 1, 3, 4, 5,	6, and 7.	
	-		Pr	eliminary e	ngineering	design pack	age include	conceptual le	evel technic	cal specifications and engineering
	drawings.		Fin	al ontimized	d design of a	LUEC by 20:	1 & (VAQ)			
				ai optiiiiizet	uesigii oi a	1 01 C by 20.	18 (109).			
Assumptions	Duration o	of work: Y01	to Y09.							
	1	our included	•			ement:				
	1 .	0-03 fte Y01		for Y02 to	Y09					
	Y01-\$0.25	l Services Ca 9M	sniiow:							
	Y02- Y04 \$									
	Y05-Y09-\$	0.2M								
Schedule	Start Year				L 2010			Finish Year	9	2018
				.i	2010				i	2010:
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	2,139,000	\$	2,139,000	\$	534,750	\$ 2,673,750

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	10	30					Prepared By: P	. Maak
WBS (Old)	552	20	10	20							
	<u></u>										
WBS Title	CONTAINE	R FABRICAT	ION, INSPE	CTION & S	SEALING TECH	l DEV					
Description	designs as  -  -  and ste	defined in V Identify qua Perform en eel UFC desig	WBS 560.20 alified supp gineering a gns. eferred copp	.50.10.20, ly base ssessmen	, Preliminary	Container E	Design Engin	eering. Tasks	s include: bricating, ins	l container (UFC) or specting and sealing of the container of	g the copper
Deliverable	- F - <i>J</i> - I - Do	Preliminary t A preliminary nput to WBS emonstratio	technical sp y list of pot S 560.20.50 on of UFC fa	ecification ential sup 0.10.20 for obrication,	ns for the fab	rication, ins per and ste ment of the nspection b	spection and el UFCs fror UFC conce y 2018 (Y09	I sealing meth in the raw ma otual designs.	nods. terials to ass	and steel UFC conc	eptual designs.
Assumptions	Contractor the copper	and steel U	s to develo JFCs: \$2,000	0k for 5a (	Y05 to Y09).		·	·		rication, inspection	_
Schedule	Start Year			<u> </u>	1 2010			Finish Year	9	2018	
Туре	Fixed										
i ype	TIXEU										
Calculations											
and Notes:	Costs	Matari	al Costs	Oth.	or Costs	CL	total	Allowance	25%	Total	Cost
Labour (	LUSTS		al Costs	+	er Costs			Allowance \$		Total	
\$	-	\$	-	\$	10,000,000	\$	10,000,000	>	2,500,000	\$	12,500,000

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#### Work Element Definition Sheet

				••			iitioii sileet				
WBS (New) WBS (Old)	561 552	20 20	50 15	10 20	50					Prepared By:	K. Birch
WBS Title	ļ		OSITORY D								
Description	cost updat include; ro would be o review of t project wo Review an supercont conceptua	tes, in order teck strength conducted i the referen- ould be assed d assess whainer with hainer with hainer with hainer some I concepts:	r to reflect to the control of the c	the variable co esses, stratigra of selecting up The effect of v native approach d support) pro	aphy, area to 2 cand rarying fe ches (such byide an e B) method	that may a restricti didate site atures su h as horiz economic d for crys	be expected fons at surfaces in 2013 for ch as depth, contal boreho c, technical or talline rock, a	at the poten es, used fuel further asse rock strength le, drill and b safety imprond the Horiz	tial candidat container de essment, and n/type, UFC of blast method ovement over contal Tunnel	yses on the 2010 A e sites. These var esign, etc. This ser in support of a pr design on the over ls for hard sedime or the current two I Placement (HTP)	iables may nsitivity analysis e-licensing rall cost of the ntary rock, reference
	selected for design of to developmon respect to methodologi	s 4 to 9, th or detailed the APM DO ent studies site specific ogies in opt e alternativ	site character site character support (WBS 560 c conditions cioneering size methods)	cterization; (ii) rt of construct .20.50.20.40); s, such as strat	Acquiring and to and (iii) and (iii) and (iii) and (iii) and and (iii) and and and and and and and and and and	re/modificesting pr Review at the two th respect	y/recommend ototype equipalternative in o candidate s t to site spec	I specialized oment for fu nethodologie ites. These r ific condition	equipment rther assessr es in optione methods coul ns, such as s	esigns for the two for the conceptu ment in conductin eering studies fo ld include; (iii) Re tratigraphy, at the chanical) and	al underground g the repositor r the DGR with view alternative
	1	elated issu	es (i.e. resu	lting size open	ings).						
Deliverable	Cost Upda - Sen: - Rep blast meth recommer technolog	tes. sitivity stud orts describ ods for har ndations for y.	ies carried o ping the con d sediment further eva ons for equ	out on the variceptual designary rock; etc.); aluation or ter	iables wh n alternat ; advanta mination opment o	ich would ives (Hor ges and o of reviev r equipm	d be reflective izontal boreh disadvantages v, and to adde ent acquisitio	of the pote ole - superco ; and associa ess, if neces	ntial sites. ontainer cond ated costs, and sary, identifi	cept; drill and nd provide	
Assumptions	feasibility All Labour Year 1 2 3  Year 4 5 6 7 8 9	studies of ti found in th Staff (fte) 0.5 0.5 0.5 Staff (fte) 0.50 0.50 0.50 0.50	he 10 poter re Repositor crisit (\$\( \) \\ \) NWMO-03 NWMO-03 (\$\frac{\( \) \\ \) \\ \ \ \ \ \ \ \ \ \ \ \ \ \	ntial sites in Y0 ry Engineering 3 3 3	1 to Y03.					based on the	
Schedule	:		ory studies.								
Туре	Fixed										
Calculations and Notes:				ate to take plac tem Developm		2015 and	costs for site	specific cond	ceptual desig	gn are embedded	
Labour (	Costs		ial Costs	Other C			ubtotal	Allowance		Total	
\$	-	\$	-	\$ 2,	360,000	\$	2,360,000	\$	590,000	\$	2,950,000

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	10	60					Prepared By: P. Maak
WBS (Old)	552	20	20	10						
WBS Title	UFPP CON	CEPTUAL DE	SIGN, SITIN	G						
Description	Provide un	dated UFPP	concentua	l decigns fo	r colocted II	EC Specifi	tacke inclu	do:		
Description	•		•	•		•			v review ie	, exploring elimination of wet bay
	=							ates it's adva		, exploring elimination of wet bay
	, and the second			· ·		·	•		J	
	<b>:</b>		-	-			enhance te	echnology tra	nsfer.	
	•	tify opportu			_					
	Ē	ctop studies	-	-		-	, logistics so	reening.		
	<u> </u>	bundle mod					lamı rick mit	igation strate	aioc	
	•	ort the Safe		process ste	ps and deve	eiop tecimo	logy risk min	tigation strate	gies.	
			-	mont and	aroliminary	docian ctur	ios to assos	s and undate	the generic	UFPP design concepts for copper
	=	JFC designs	-	-	-	_		s and update	the generic	or r design concepts for copper
	Ē	•	•	-	-	ations for U	FPP equipm	ents and proc	esses.	
 	- Upa	ate plant dr	awings as d	esign evoiv	es					
Deliverable	- Preli	minary opti	mized LIEPI	oncentua	l design hy	2013 (۷04)				
Deliverable	€	, ,		•	ο,	. ,		ous UFPP des	ign concent	s
	=	optimized					ior the van	043 0111 463	.Б. сопсерс	
				praar acois	,	. 037.				
Assumptions	Duration o	f work: Y01	to Y09.							
-	Staff requi	rement acco	ounting for	Repository	Engineering	Managem	ent: 0.25 NV	VMO-03 fte f	or Y01, 1.0 I	NWMO-3 fte for Y02, 2.0 NWMO-
	03 fte for Y	'03 to Y09.	· ·	. ,		, ,			•	·
	Ē	/consultant		v:						
	Year		cnslt							
			(\$M)							
	1		\$ -							
	2		\$ 0.20							
	3		\$ 0.40							
	4 5 TO 6		\$ 0.40							
	5 TO 6 7 TO 9		\$ 0.25 \$ 0.75							
	7109		\$ 0.75							
Schedule	Start Year			1	2010			Finish Year	9	2018
				i					I	
Туре	Fixed									
Calculations	New staff t	to augment	the current	team (med	chanical eng	ineer with	automation	/ fabrication	experience	in high volume manufacturing for
and Notes:	bundle trai	nsfer techno	ology devel	opment						
	L									
	•			-	will be bo	unaed by t	ne tuel mo	dule, fuel tra	nster statio	n and the receiving basket (core
	competend	cy to be dev	eiopea in C	anada)						
	Y2 - Wet Ba	ay Study								
	=	ransfer Tech	nology Cor	ceptual Ad	vancement					
	Ē	Optimization	٠,	•						
	Ē	andling Cell	•	nplification	)					
	Ē	.ayout Revie	-	•	-	quipment				
	Y7 - Y9 - Fu	iel Bundle T	ransfer Pro	totype Mod	lule to Bask	et				
		1		1		1				
Labour C	Costs		al Costs		Costs		total	Allowance	25%	Total Cost
\$	-	\$	-	\$	3,750,000	\$	3,750,000	\$	937,500	\$ 4,687,500

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## **Work Element Definition Sheet**

Siting

WBS (New)	561	20	50	10	70					Prepared By:	G. Kwong
WBS (Old)	552	20	30								
WBS Title	PLACEMEN	NT SYSTEMS	ENGINEER	NG, SPECS 8	द्र PSAR INPL	JT					
Description	Tasks inclu  1. Stav		ith notontia	LUEC place	mont moth	ods / tochno	logios and	the latest seali	na system	docian dotail	s in both crystalline
	±	entary DGR		i orc place	ment meth	ous / tecinic	nogies and	tile latest seali	iig systeii	i designi detaii:	s iii botii ciystaiiile
	ana scann	citally bolk	sectionos.								
Dolivership											
Deliverable	TM to ider	ntify the rec	ommended	nlacement	method has	sed on techr	nology watc	h results			
	TWI to idei	itily the rec	ommended	piacement	method bas	sea on teem	lology watc	ii resuits.			
Assumptions	Duration o	of work: Y01	toY18.								
	=	our included		ory Enginee	ring Manage	ement					
						th potential	placement	methods.			
Schedule	Start Year			1	2010			Finish Year	9	2018	
				å		.i					
Туре	Fixed										
Calculations											
and Notes:		Т		1		1	,			T	
Labour (	Costs		ial Costs		Costs	Subt	otal	Allowance	25%		otal Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$	-

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## **Work Element Definition Sheet**

Siting

WBS (New)	561	20	50	10	80					Prepared By: G. Kwong
WBS (Old)	552	20	35	<u></u>						
WBS Title	RETRIEVAL	SYSTEMS E	NGINEERIN	G, SPECS &	PSAR INPU	Γ				
Description	Tasks inclu	de.								
Description	<b>.</b>		vith feasibl	e retrieval	methods /	technologi	es being c	onsidered in c	other natio	onal nuclear waste managemen
	technologi		tegies being			_	-		_	y abreast with the latest retrieva Issue a NWMO backgrounder or
	reports on		al details o	f retrieving	UFC for refe	erence repo	sitory desig			OGR in Q1, Y02. Issue 2 technica in sedimentary rock; and develop
	· · · —	review retri he reposito		ptions and i	revise the s	ummary rep	ort by inco	orporating mon	itoring red	quirements to support retrieval o
	i	complete   f used fuel.	preliminary	repository	design op	timization	tudies and	l update the s	summary	report by incorporating retrieva
Deliverable	1	marize the v			•			results.		
Assumptions	Note: Labo Task # 1:		in Reposito 2 fte/a, 9 y	years. NWI	MO-3 to pa	rticipate in		_		working group meetings and stay vaste management programs.
Schedule	Start Year				2010			Finish Year	9	2018
				ā						ā
Туре	Fixed									
	<u> </u>									
Calculations and Notes:										
Labour	Costs	Materia	al Costs	Other	r Costs	Sub	otal	Allowance	25%	Total Cost
\$	_	Ś	-	\$	-	\$	. <del></del>	Ś	-	Ś -
7	_	ļ <del>7</del>	_	٧	_	7		7	_	· ·

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## **Work Element Definition Sheet**

WBS (New)	561	2	20	50	20	10					Prepared By:	A. Murchison
WBS (Old)	552		20	2								
WBS Title	REPOSITOR	RY SYS	TEM D	EVELOPM	IENT MAN	AGEMENT, CO	ONSTRUCTIO	N LICENSE	PHASE			
	ļ											
Description	Provide ov	erall r	nanage	ement of t	the reposit	tory system de	evelopment	during rep	ository constr	uction licens	se application.	Tasks include:
	- Maiı	ntain r	manage	ement tea	am respon	sible for conta	niner and re	oository sys	stem ontimiza	ition and lice	ensing submiss	ion
	1		_		-	nal design req			•			
	:			-	-	packaging plar			•			
	1		•	•		evelopment a	•	•	•			
	1					l assessment						
Deliverable	- Man	nagem	ent of:									
	· -			-		m developmei	-	ective of CN	ISC comment	S.		
	•			-		n developmen	t.					
	•				te specific	-						
	1					ation and insp	-		-		-	
	:					methods and					site specific).	
	1			_		ition (ie., puck			-	)		
	•					nd repository f		-		ay arico and	provide recen	mandations to the
	executive (				KS that co	uiu iiiipact iic	ensing, scrie	dule of cos	sis as they me	ay arise ariu	provide recon	nmendations to the
	executive (	οι ορι	ions av	allable								
						ing tests: plan						
	o Surface	e base	d and u	ındergrou	ınd charac	terisation req	uirements/i	nformation	for engineer	ing defined a	and gathered	
	<u></u>											
Assumptions	Duration o											
	1					based on:						
	•			•	l0-Y15) 1 f							
	±				-	Nanager, NWN						
	:			_		NWMO-01 1	fte.					
	1		-		ining Engi	ineer 1fte						
	•		-	ses are \$!		anginaaring a	lasian ta nu	oliminon, ,	anaineerina c	+200 2 100	duration nor	formed nest CNSC
	: -		-					-			•	formed post CNSC project preliminary
	engineerin			ubillissioi	1. (110-11	2) 34IVI pei	aminim (Co	sis baseu	on recent ex	perience wi	itii tile bak p	oroject premimary
	_	_	-			d to the contra			ti t - /D			
	±			_		d in the capita	-				I design packag	ros etc
	- 111001	IVIO-03	o iui pi	ерагация	i ioi const	ruction contra	icts to provi	ue owners	oversigni, rev	iew detailed	i desigii packag	ges, etc.
	- NWI	MO-03	3 Y10 to	Y12 16 F	T, Y13 to	Y14 19 FTE, Y1	L5 21 FTE.					
											2024	
Schedule	Start Year					10 2019			Finish Year	15	2024	
Туре	Fixed											
1,460	TIACU											
<b></b>												
Calculations	<u></u>											
and Notes:												
Labour (	Costs	N	/lateria	l Costs	Oth	ner Costs	Sub	otal	Allowance	25%	То	tal Cost
\$ 2	28,654,310	\$			\$	12,300,000	\$ 4	0,954,310	\$	10,238,578	\$	51,192,888
							•					

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	20	20			Prepared By: P. Maak
WBS (Old)	552	20	10	30				
WBS Title	FARRICATI	ON. INSPEC	TION & SEA	JING DEM	MONSTRATIOI			
		011, 11131 E01	11011 (4 32)					
	inspecting	the referen	ce used-fue	el containe	er (UFC) desig	gn, which has been sele	cted for the preparation	ods for fabricating, sealing and of PSAR, EA and construction itigate technology and licensing
Description	UFC de - Co	velop and d sign.	technical s					otype UFCs based on the reference sealing and inspecting the UFC
Deliverable	- Rep	orts describ	ing the eng	ineering a	ssessment ar	nd demonstration trials	on fabrication of UFC co	omponents. Reports describing the
	- Tec	hnical speci quired for th	fications fo	or the ma		oment and procedures		and inspecting the reference UFC 560.20.50.20.30 and input to WBS
	•	otype UFCs t of potentia		-	•	rom raw material to an	assembled UFC.	
Assumptions	Duration o	f work: Y10	) to Y15.					
	•		-	-		methods for fabricatir or 6 a (Y10 to Y15).	ng, sealing and inspectin	g prototype UFCs, and b) prepare
	•		-			at can be adapted for f gn for the PSAR, EA and		nspection of copper vessels. (i.e., if
	Assumes t	he developn	nent of fab	rication ar	nd inspection	technologies for inner	load-bearing component	s of UFCs in North America.
	=					g Management: 3 fte/a, components and assem		to Y15) to manage various projects
	Travel: 30k	⟨/a.						
Schedule	Start Year			1	10 2019	)	Finish Year 15	5 2024
Туре	Fixed							
Calculations and Notes:	1	alculations a costs for the		,		pased on the assumptio	n that the copper UFC is	to be selected as the reference
Labour	Costs	Materia	al Costs	Oth	er Costs	Subtotal	Allowance 25%	Total Cost
_uoou.				- C		Subtotal	Allowalice 23/0	TOTAL COST

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## **Work Element Definition Sheet**

WBS Title  REFERENCE CONTAINER DESIGN & ENGINEERING  Description  Tasks include:  1. Perform detailed engineering analyses as required to support PSAR, EA and licensing of the selected fabrication, inspection and sealing developments into the preliminary UFC design. Carry out structural analyses to confirm the sintegrity of the reference UFC.  3. Prepare detailed design documentation including construction drawings, detailed technical and specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component UFC and UFC placement demonstration.  5. Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR.  Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15.  Note: Labour included in Repository Engineering Management:  Task # 1: Y10 – Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consuconduct analyses to support PSAR, EA and licensing of the selected site: \$1,000k/a for 3 a.  Task # 3: Y14 – Y15. 0.5 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$100K/a,  Task # 3: Y14 – Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$500K/a for 2 a.  Travel allowance: Y10 – Y15, \$10K/a.  Schedule  Start Year 10 2019 Finish Year 15 2024  Type Fixed  Calculations and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	WBS (New)	561	20	50	20	30					Prepared By	: G. Kw	ong .
Description   Tasks include:   1.   Perform detailed engineering analyses as required to support PSAR, EA and licensing of the selected   2.   Develop a reference UFC design by incorporating specific information of the selected site and the fabrication, inspection and sealing developments into the preliminary UFC design. Carry out structural analyses to confirm the sintegrity of the reference UFC.   3.   Prepare detailed design documentation including construction drawings, detailed technical and specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component   4.   Perform engineering analyses as required to support FSAR based on specific site information obtain UCF and UFC placement demonstration.   5.   Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.    Deliverable   TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.    Assumptions   Duration of work: Y10 toY15.   Note: Labour included in Repository Engineering Management:   Task # 1: Y10 - Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$1,000K/a for 3 a.   Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$100K/a,   Task # 3: Y14 - Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$500K/a for 2 a.   Travel allowance: Y10 - Y15, \$10K/a.   10 2019   Finish Year   15 2024     Type   Fixed   Type   Fixed   Type   Fixed   Type	WBS (Old)	552	20	10	40								
Description   Tasks include:   1.   Perform detailed engineering analyses as required to support PSAR, EA and licensing of the selected   2.   Develop a reference UFC design by incorporating specific information of the selected site and the fabrication, inspection and sealing developments into the preliminary UFC design. Carry out structural analyses to confirm the sintegrity of the reference UFC.   3.   Prepare detailed design documentation including construction drawings, detailed technical and specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component   4.   Perform engineering analyses as required to support FSAR based on specific site information obtain UCF and UFC placement demonstration.   5.   Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.    Deliverable   TM or TR to support FSAR, Revise detailed design documentations for all components of the reference UFC design.    Assumptions   Duration of work: Y10 toY15.   Note: Labour included in Repository Engineering Management:   Task #1: Y10 - Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$1,000K/a for 3 a.   Task #2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$100K/a,   Task #3: Y14 - Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$500K/a for 2 a.   Travel allowance: Y10 - Y15, \$10K/a.   10.   2019   Finish Year   15.   2024     Type   Fixed     Type   Fixed     Type   Fixed     Type   Typ													
1. Perform detailed engineering analyses as required to support PSAR, EA and licensing of the selected  2. Develop a reference UFC design by incorporating specific information of the selected site and it fabrication, inspection and sealing developments into the preliminary UFC design. Carry out structural analyses to confirm the sintegrity of the reference UFC.  3. Prepare detailed design documentation including construction drawings, detailed technical and specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component UCF and UFC placement demonstration.  5. Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15. Note: Labour included in Repository Engineering Management: Task # 1: Y10 - Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$ 1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$ 100k/a,  Task # 3: Y14 - Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$ 500k/a for 2 a.  Travel allowance: Y10 - Y15, \$ 10k/a.  Schedule  Start Year  10 2019  Finish Year  15 2024  Type  Fixed  Calculations and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost	NBS Title	REFERENC	E CONTAINE	R DESIGN 8	& ENGIN	EERING							
1. Perform detailed engineering analyses as required to support PSAR, EA and licensing of the selected  2. Develop a reference UFC design by incorporating specific information of the selected site and it fabrication, inspection and sealing developments into the preliminary UFC design. Carry out structural analyses to confirm the sintegrity of the reference UFC.  3. Prepare detailed design documentation including construction drawings, detailed technical and specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component UCF and UFC placement demonstration.  5. Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15. Note: Labour included in Repository Engineering Management: Task # 1: Y10 - Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$ 1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$ 100k/a,  Task # 3: Y14 - Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$ 500k/a for 2 a.  Travel allowance: Y10 - Y15, \$ 10k/a.  Schedule  Start Year  10 2019  Finish Year  15 2024  Type  Fixed  Calculations and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost													
fabrication, inspection and sealing developments into the preliminary UFC design. Carry out structural analyses to confirm the sintegrity of the reference UFC.  3. Prepare detailed design documentation including construction drawings, detailed technical and specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component UCF and UFC placement demonstration.  5. Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15.  Note: Labour included in Repository Engineering Management: Task # 1: Y10 — Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$1,000k/a for 3 a.  Task # 2: Y10 – Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$100k/a,  Task # 3: Y14 — Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$500k/a for 2 a.  Travel allowance: Y10 – Y15, \$10k/a.  Schedule  Start Year 10 2019   Finish Year 15 2024   Type  Fixed  Type  Fixed  Calculations and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost			de:	Perf	form det	ailed engineeri	ing analyses	s as required	d to support F	SAR, EA and	d licensing of	the select	ed site.
specifications, fabrication, handling, and transport procedures, and inspection test plans for the reference UFC and its component  4. Perform engineering analyses as required to support FSAR based on specific site information obtain UCF and UFC placement demonstration.  5. Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15.  Note: Labour included in Repository Engineering Management: Task # 1: Y10 – Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$ 1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$ 100k/a,  Task # 3: Y14 – Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$ 500k/a for 2 a.  Travel allowance: Y10 – Y15, \$ 10k/a.  Schedule  Start Year  10 2019  Finish Year  15 2024  Type  Fixed  Calculations and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost		fabrication	•	and sealing	•		υ,	•	<b>.</b>				
UCF and UFC placement demonstration.  5. Refine detailed design documents, engineering drawings, technical specifications, fabricat inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15.  Note: Labour included in Repository Engineering Management: Task # 1: Y10 – Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$ 1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$ 100K/a,  Task # 3: Y14 – Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$ 500K/a for 2 a.  Travel allowance: Y10 – Y15, \$ 10K/a.  Schedule  Start Year  10 2019  Finish Year  15 2024  Type  Fixed  Calculations and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance 25%  Total Cost		•	ons, fabricat		•	_			_	_			_
inspection procedures for all UFC components.  Deliverable  TM or TR to support FSAR. Revise detailed design documentations for all components of the reference UFC design.  Duration of work: Y10 toY15. Note: Labour included in Repository Engineering Management: Task # 1: Y10 – Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$100K/a,  Task # 3: Y14 – Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$500K/a for 2 a.  Travel allowance: Y10 – Y15, \$10K/a.  Schedule  Start Year  10 2019  Finish Year  15 2024  Type  Fixed  Calculations and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance  25%  Total Cost			FC placemer			gineering analy	yses as requ	ired to sup	oort FSAR bas	sed on speci	fic site inform	nation obt	tained from
Revise detailed design documentations for all components of the reference UFC design.  Assumptions  Duration of work: Y10 toY15.  Note: Labour included in Repository Engineering Management:  Task # 1: Y10 – Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consuconduct analyses to support PSAR, EA and licensing of the selected site: \$1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$100K/a,  Task # 3: Y14 – Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fall and inspection plans and procedures: \$500K/a for 2 a.  Travel allowance: Y10 – Y15, \$10K/a.  Schedule  Start Year  10 2019  Finish Year  15 2024  Type  Fixed  Calculations and Notes:  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance  25%  Total Cost			procedures			<del>-</del>	document	s, engineei	ing drawing	s, technical	specificatio	ns, fabri	cation and
Note: Labour included in Repository Engineering Management:  Task # 1: Y10 - Y12. 0.5 fte/a NWMO-3 to design engineering analyses required and to manage contracts. Contractor/consu conduct analyses to support PSAR, EA and licensing of the selected site: \$ 1,000k/a for 3 a.  Task # 2: Y10 - Y13. 0.7 fte/a NWMO-3 to develop reference UFC design manage contract. Consultant to perform task: \$ 100K/a,  Task # 3: Y14 - Y15. 0.5 fte/a NWMO-3 to manage contract(s). Contractor/consultants to develop detailed design documents; fal and inspection plans and procedures: \$ 500K/a for 2 a.  Travel allowance: Y10 - Y15, \$ 10K/a.  Schedule Start Year 10 2019 Finish Year 15 2024  Type Fixed  Calculations and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost					ations fo	r all componen	nts of the re	ference UFC	design.				
Type Fixed  Calculations and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	•	Note: Labo Task # 1: \ conduct ar Task # 2: Y Task # 3: Y and inspec	our included Y10 — Y12. nalyses to su 10 - Y13. 0.14 — Y15. 0.14 — Y15. 0.14 — Y15. 0.15 on plans al	in Reposito 0.5 fte/a N ipport PSAR 7 fte/a NWi .5 fte/a NW ind procedu	IWMO-3 R, EA and MO-3 to /MO-3 to res: \$ 50	to design eng licensing of th develop refere o manage conti	gineering ar de selected de ence UFC de	site: \$ 1,000	k/a for 3 a. e contract. C	onsultant to	perform tasi	k: \$ 100K/	/a, 4 a.
Type Fixed  Calculations and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Schedule	Start Year			······	10 2019			Finish Year	15	2024		
Calculations and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		Jean Crear			A				i i cui	i	2027		
and Notes:  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Гуре	Fixed											
Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Calculations												
	and Notes:												
	Labour C	osts	Materia	al Costs	Ot	her Costs	Sub	total	Allowance	25%	Т	otal Cost	
\$ -   \$ -   \$ 4,460,000   \$ 4,460,000   \$ 1,115,000   \$ 5,5		-	\$	_	\$		\$				\$		5,575,000

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	20	40			Prepared By: K. Birch
WBS (Old)	552	20	15	60	20			
WBS Title	CONDUCT	REPOSITOR	Y DEVELOPI	MENT STUD	IES			
Description	The object	ive of the Co	onduct Rep	ository Dev	elopment s	tudies work program is	to;	
	and design	analysis iss	ues related	d to site spe	ecific repos			ology gaps, constructability issues 60.20.50.20.10); and, based upon
		xisting equip tion progran	-	uding IFB dı	rilling equip	ment and UFC placem	ent systems, as needed a	nd based on the full-scale surface
Deliverable	- Reports a preliminar - Reports r	nddressing t y design (WI	he satisfac BS 560.20.5	tory resolut 50.10.10). s to the pre	tion of tech	nnology gaps, construc		ations.  n analysis issues identified in the with emphasis on the placement
Assumptions	•	•		) FTEs for ea	ach of years	13 to 15) are located in	n Repository Managemen	nt Engineering WEDs
	Year	Staff (fte)	cnslt (\$M)	Equip (\$M)	Other (M)			
	12	1.0						
	13		\$ 1.0		\$ -			
	14 15	5.0 5.0	\$ 1.0 \$ 1.0	•	\$ - \$ -			
Schedule	Start Year			12	2021		Finish Year 15	2024
Туре	Fixed							
Calculations and Notes:	simulat	ed DGR con	ditions.	•		monstration of equipm		radiation shielding, etc., under
Labour	Costs	Materia	al Costs	0.1.		Cultara	All 250/	
		iviaterit	ai Costs	Otnei	r Costs	Subtotal	Allowance 25%	Total Cost

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	20	50					Prepared By: P. Maak	
WBS (Old)	552	20	20	20							
WBS Title	UFPP PREL	IMINARY DE	SIGN FOR I	PSAR, EA AN	ND CONSTRU	JCTION LIC	ENSE APPLI	CATION			
Description	design at to on this ref componen construction	his preferre erence UFC ts of this pr on license ap quipment fo	d repositor design. The eliminary Upplication o	y site(input ne prelimina JFPP design of the DGR a	from WBS 5 ary UFPP de will be dev	sign docum eloped to t he key com the transpo	0.30). In thing the details the details the conents of a cortation cas	is WBS, a pre nical specifica hat are neces a preliminary	eliminary UFF ations and co ssary for the	cted that is suitable for the developed on the developed on the preparation of the PSAR, it include:	d based ne UFPP
	Ī	•	ū			•		es into the us	sed-fuel basl	kets in the fuel handling ce	ell.
Deliverable Assumptions	- E - E - S - S - E - P PSAR, E	quipment for quipment for quipment for quipment for torage pool torage facili lectrical and reliminary U A and const	or replacing a or sealing a or machinir or loading, I for module ity for empl d ventilation.  UFPP design truction lice	ind inspection the weld handling an es; ty UFC comparts of the facility.	ert gas insid on of UFC se surface and id transfer o ponents and ss and prelimition.	al weld (in cutting off f UFCs in th I filled UFCs	the defective UFPP.	cations of the	UFPP comp	NBS 560.20.50.20.30).  onents for the preparation ging plant: \$1,000k/a for 6	
	to Y15).										
Schedule	Start Year			10				Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	•	rement acc	_	•	y Engineeri	ng Manage	ment: Staff	f requiremer	nt: 2 fte/a,	NMWO-3, 6 years for ma	anaging
Labour (	Costs	Materia	al Costs	Other	r Costs	Sub	total	Allowance	25%	Total Cost	
<b></b>				·							

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#### **Work Element Definition Sheet**

WBS (New)	561	20	50	20	60					Prepared By: K. Birch
WBS (Old)	552	20	25							
WBS Title	SEALING I	MATERIALS	ENGINEERIN	IG – FINALIZE SITE S	PECIFIC DEVELOPIV	1ENT				
	<u> </u>									
Description			-	erials Engineering w						
	:		-	e buffer disk, buffer equirements for the	•			e,		
	:			equirements for the				uffer block an	d nellets	
		ucvelop pei	TOTTIGHTEC IV	equirements for the	plant for the produ	uction 01 111	153, 01313, 0	unci biock an	u penets.	
Deliverable	†·····									
	- Spec	ifications fo	r the bento	nite products and m	anufacturing equip	ment,				
	- Demo	onstration o	f: (i) quality	of supply of bentor	nite in North Ameri	ica due to p	otential va	riability in pro	perties (i.e	. montmorillonite content) which
	have an e	ffect on hyd	draulic condi	uctivity and swelling	pressure; and (ii) o	quantity of I	oentonite, a	ıs well as aggı	egate, sand	d and clay from local sources.
Assumptions	Year	Staff (FTE)	)	Sealing Materials	Sealing Materials					
•		` '	•	Demonstration	Demonstration					
				(Backfill)	(Blocks,rings)					
	Note: FTF	s (1.0 for Y1	0 to Y12) ar	e included in Manag	rement Repository	(WBS 560.2	0.50.20.10	١.		
	10	- (=.0 .0 =		\$0.5k	\$2.0k	(		<i>-</i>		
	11			\$0.5k	\$2.0k					
	12			\$0.5k	\$2.0k					
Schedule	Start Year	·		10	2019			Finish Year	12	2021
	ļ									
Туре	Fixed									
Calculations	. <del> </del>									
calculations	Note: Staf	ff costed in	Repository S	System Developmen	t Management Cor	nstruction Li	icense Phas	e (WBS 560.2	0.50.20.10)	
		1		1		1				
Labour	Costs		ial Costs	Other			total	Allowance	25%	Total Cost
\$	-	\$	-	\$	7,500,000	\$	7,500,000	\$	1,875,000	\$ 9,375,000

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#### **Work Element Definition Sheet**

WBS (New)	561	20	50	20	70					Prepared By:	K. Birch
WBS (Old)	552	20	25		Ĭ						
WBS Title	SEALING N	1ATERIALS E	NGINEERIN	IG PROTOTYPE	AQUISITION						
Description	- Aqı	uire the pro	totype com	paction equip	•	ngs, dis	k program is to; sks and blocks in	collaboration	with inter	national partne	ers, and
Deliverable	disks, ring: systems water Manuf Modify Reseater and light b Prepar light backfi Optim	s as defined ork program facture and y prototype right and deviackfill pelle ration of contill pellets. isation exer	d in the (i)  n (WBS 560)  test prototy system to a relopment p  ts.  nceptual de	preliminary d .20.50.20.60). ype disks, rings accommodate program to est signs for manu	esign (WBS 56 s and blocks pro deficiencies ide tablish optimur ufacturing syste	oduced entified m prod ems for	0.10.10) and the d. cesses to manufa	e (ii) site spe acture bentor of bentonite ufacturing sy	cific develo	opment of the	eometry of blocks, repository sealing blocks, and gap fill ks, and gap fill and
Assumptions	Year Note: FTEs 560.20.50. 13 14 15	•	or Y13 to Y1	Consultants .5) are included \$1.5M \$1.5M \$1.5M	Equipment d in Repository \$7.5M \$1.5M \$1.5M	Syster	n Development I	Management	Construction	on License Pha	se (WBS
Schedule Type	Start Year Fixed			13	2022			Finish Year	15	2024	
	0										
Calculations		I				ı				ı	
Labour	Costs		al Costs		r Costs	_	Subtotal	Allowance	25%		otal Cost
\$	-	\$ 1	.0,500,000	\$	4,500,000	\$	15,000,000	\$	3,750,000	\$	18,750,000

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## **Work Element Definition Sheet**

Licensing

WBS (New)	561	20	50	20	80				Prepared By: G. Kwong
WBS (Old)	552	20	30						, , , , , , , , , , , , , , , , , , , ,
					···				
WBS Title	PLACEMEN	NT SYSTEMS	ENGINEERI	ING, SPECS	& PSAR INP	UT			
	ļ								
•	Tasks inclu								
	2. Con	duct researd	ch and deve	elopment, a	s required, t	to identify an optimal n	nethod for en	nplacing UFC	is in the selected site.
	3. Dev	elop prelim	ninary desig	n documer	nts including	engineering drawings	, technical sp	pecifications	of the placement system and its
	componen							. 6.1	
	:	_		-		ort PSAR, EA and licens nd demonstration of th		-	-
	J. COII	struct a pro	totype syste	eni ioi the t	evaluation a	nd demonstration of the	ie preiiiriiiiary	y of c placell	ient system.
Deliverable									
	•			٠.	•	ign requirements and e		rawings.	
	•			to support	PSAR, EA ar	nd licensing requiremen	nts.		
		e placemen	•	ludina doci	an roquiror	ments and description	onginoerin	a drawings	technical specifications; system
						the UFC placement sys		g urawings,	technical specifications, system
				·					
Assumptions	Duration o	f work: Y10	toY15.						
	Note: Labo	our included	l in Reposito	ory Enginee	ring Manag	ement			
	activities t	o evaluate	various pot	ential place	ment meth		5M/a, Y10 to	•	carry out application engineering ted costs include costs associated
	Contractor	to demons	strate the co	onstructabi	lity and cap	ability of the UFC place	ement system	n. \$3.25M/a,	tem with a qualified contractor. 2 years. Estimated cost includes the UFC placement system.
	Placement	/Developm	ent contrac	ts: \$500k/a					
Schodulo	Start Voor			10	2010	<u> </u>	Finish Voor	10	2024
Schedule	Start Year			110	2019	<u> </u>	Finish Year	15	2024
Туре	Fixed								
	å								
Calculations and Notes:									
Labour (	Costs	Materi	ial Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	14,500,000	\$ 14,500,000	\$	3,625,000	\$ 18,125,000

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## **Work Element Definition Sheet**

Licensing

WBS (New)	561	20	50	20	90				Prepared By: G. Kwong
WBS (Old)	552	20	35						
				Α					
WBS Title	RETRIEVAL	. SYSTEMS E	NGINEERIN	IG, SPECS 8	& PSAR INPU	Т			
Description	both satur 3. Dev componer 4. Perf	duct resear ated and ur relop prelin its. form engine	nsaturated beninary designers.	oentonite a gn docume ses as requ	around the elents includin	mplaced UFC).	gs, technical s	pecification ents of the r	•
Deliverable	DVD to gra	aphically illu y design do	istrate the r	etrieval of	UFCs from a		drawings	both crystal	line and sedimentary scenarios)
Assumptions	Tasks #2 – Estimated Task #5: ` Contractor	our included 4: Y10 – Y1 costs includ Y14-Y15, 0.	d in Reposito 3, 0.5 fte/a, de costs asso 5 fte/a, NV strate the co	, NWMO-3 ociated with WMO-3 to onstructab	th the use of coordinate	oroject, Contractor / c laboratory or worksho the construction of	op facilities for a prototype r system. \$3.25	testing the etrieval sys M/a, 2 year	s as described: \$2.25M/a, 4 years. retrieval system. tem with a qualified contractor. s. Estimated cost includes capital
Schedule				i 1	0 2019		Trining Manager	······································	
Jeneaule	Start Year			<u>.i</u>	.0 2019		Finish Year	15	2024
Туре	Start Year Fixed			<u> </u>	.0 2019		Finish Year	15	2024[
					2019		Finish Year		2024[
Type Calculations	Fixed	Mater	ial Costs		er Costs	Subtotal	Allowance	25%	Z0Z4 <u>i</u>

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## **Work Element Definition Sheet**

WBS (New) WBS (Old)	561 552	20 20	50 2	30	10				į	Prepared By:	A. Murchison
WBS Title	REPOSITOF	RY CONSTRU	ICTION MA	NAGEMENT	, CONSTRU	CTION UDF	& OBTAIN F	SR			
Description	- Asse - Mair - Deve - Cont - Supp	emble and m ntain manag elop/approv tinue site ba port Final Sa	ement tear e final desi seline mon fety Report	m responsib gn requirem itoring as re	tion team t le for conta ents for co quired	o oversee e	ngineering	ction. Tasks incl EPC tendering a tem implementa systems;	nd the imp	olementation	process.
	- Supt	oort constru	ction as rec	luirea							
	- Statu - Site - Final - Final - Final - Over - Impl - Iden executive c - Long Duration o - Staff - Direc - Repc - Conv - Assu - NWM - NWM	I site specific rsight of det ementation of of options as a term demonstrate of work: Y16 for requirement of APM Teopsitory System optional System of the property of the prop	n the repose I container abrication a emplaceme con DGR designailed enging contract for technical rivallable enstration a expensive second and the constration are to Y25. The sare 4 fte exchnical (Y16 em Developestems & Mittract mode ering of unconstruction 15 fte, Y17 tition contrains	itory system design. and inspecti nt methods from the thods from the thods from the thod from the the thod from the the thod from the the thod from the thod from the the thod from the the the the the the the the the the	on specifica and retrieve direlated DC nical package ocurement ild impact li ing tests in  Of for 10a b ger, Surface ger, Sub-Su er 1fte evelopmen versight, re e, Y19 to Y2 reliminary 8	progress.  Systems (Yrface System)  converted to the convention of	and commismedule or commismedule or commismedule or commismed (Y16-Y25) 1 fms (Y16-Y25) and mining dichanges are 110 fte, Y2 ngineering	te structures, surfa nd incorporation 22 to Y25 7fte. costs captured b	arise and	provide recon	nmendations to the es to the design. e. or external support
	-Program I	Managemen	nt Year 15 t	o Year 25 in	cludes the	augmented	staff requi	re for EPCM con	tract over	sight.	
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	- A \$	•	y engineer	ing fee has	; been incl	uded for Y	/16-Y25 to	resolve engine	ering disc	coveries that	will arise through
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost
\$ 3	9,316,561	\$ 1	0,000,000	\$	2,500,000	\$ 5	1,816,561	\$ 12,	954,140	\$	64,770,702

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	30	20					Prepared By: P. Maak
WBS (Old)										
WBS Title	DEVELOPN	1ENT AND D	EMONSTRA	ATION OF SI	ERIAL PROD	UCTION OF	UFC COMP	ONENTS AND	UFCS	
	carried out		or North Ar	nerica. The	findings wo	•				ference UFC design are to be C design for the preparation of
Description	- De - Co inspect - Esi	velop and d velop and d mplete the ing the UFC tablish prod	lemonstrati quality con componen uction capa	e assemblin trol plan an ts and asse abilities, inc	mbled UFCs	om the UFC specification fication of the	componen ns (i.e., mat	erials, equipr	·	rocedures) for manufacturing and nd technical personnel for serial
Deliverable	- Fina assembled - List ( - Com - Inpu	I technical UFCs. of selected solutions	specifications suppliers for the final	ons (materions or UFC comp finished UF	al and equi	pment) and assembled onstration p	qualified publications of the qualified publication of the qualified publi	final supply r	or serial pro	duction of UFC components and preparation of the FSAR, EA and
Assumptions	control do	cuments and	d technical	specificatio	ns for these	methods:	\$2,000k/a	ng, sealing an for 10a (Y16 t ability has be	o Y25).	; prototype UFCs. Prepare quality
Schedule	Start Year			16	5 2025			Finish Year	25	2034
Туре	Fixed									
Calculations and Notes:	Staff requi	rement acco	ounting for	Repository	Engineering	Manageme	ent: Staff re	quirement: 2	fte/a, NWM	IO-3, 10 years ((Y16 to Y25)
Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	otal	Allowance	25%	Total Cost
\$	-	\$	-	\$ :	20,000,000	\$ 2	0,000,000	\$	5,000,000	\$ 25,000,000

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	30	30				Prepared By: G. Kwong	
WBS (Old)	552	20	10	40						
WBS Title	REFERENC	E CONTAINE	R DESIGN 8	& ENGINEE	RING					
Description	Tasks inclu	ıdo:								
Description	1.	ue.	Vali	idation of c	ontainer des	sign in underground fac	cility.			
	2						•	s technical	I specifications, fabrication	and
	inspection	procedures				documents, enginee	ing arawing	s, teeminea	specifications, radification	una
Deliverable	TM or TR t	o support FS	SAR.							
	=			ations for a	II componen	its of the reference UF	C design.			
·	Task # 1: \ for 2 a.	′23. Consult	5 fte /a NW	VMO-3 Valid	dation of co	ntainer design in unde			tor to conduct analyses: \$ 70 ection, test plans and proced	
Schedule	Start Year			22	2 2031		Finish Year	23	2032	
Туре	Fixed									
Calculations and Notes:										
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost	
\$		\$								1

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	30	40					Prepared By: J. Villagran
WBS (Old)	552	20	15	60	70		A			
WBS Title	TECH SPEC	S FOR REPO	SITORY & U	JFPP						
Description	facility at the p - F significa	Prepare the based on fe preferred site or and the prepare upd ant issues rate.	edback from te. ated designalsed during	m the environs for the us	onmental as sed-fuel pac d CNSC licer	ssessment (l kaging plant nsing proces	EA) review particles and the resease.	process and ac	dditional un	t (UFPP) and the repository derground characterisation data eferred site that address all of th
Deliverables	- Revi	sed prelimir	nary design	for the use	d-fuel packa	aging plant a	and the rep		that satisfy	the technical specifications. ent package for the design/bu
Assumptions	NWMC - S Purcha: - C	Specialist Co sed Services	rements to ensultant to s \$200k/a fo consultants	manage the provide tec or 2a, (Y16 t to prepare	chnical inpu to Y17). revised pre	ts to the ted	hnical spec	ifications and	preliminary	st) plus the following: Engineering design for the UFP epository facility design-build
Schedule	Start Year			16	5 2025	5		Finish Year	20	2029
Туре	Fixed									
Calculations and Notes:										
Labour (	Costs		al Costs		r Costs		total	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,900,000	\$	1,900,000	\$	475,000	\$ 2,375,00

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	30	50			Prepared By: P. Maak
WBS (Old)	552	20	20	30				
WBS Title	UFPP Cons	truction/Ted	hnology D	emonstra	tion			
Description	and tested production 40 10 30 Laboratory	. The finding equipment	gs will be a will be insi and 560 40 or locations	applied to talled, tes 0 40 10 4	develop and ted and comr 10 (dispatch)	qualify the final produc missioned in the UFPP u	tion process equipment ander WBSs 560 40 40 10	pe designed, procured, constructed and procedures for the UFPP. The 20 (receipt and transfer), . 560 40 an be performed in a Container
	- E	quipment fo	or handling or removing	modules g bundles	in the modul from the mo	n the transportation cas e handling cell. dules and placing bundl		kets in the fuel handling cell
	- E - E - E - E - I - S	equipment for equipment for equipment for equipment for equipment for storage pool	or replacing a per sealing a per machinir loading, quipment for module monitoring area.	g air with ind inspecting the well handling attempts (if requises (if requises facility for each of the second sec	inert gas insic tion of UFCs d surface and and transfer c ired);			20.50.20.30).
Deliverable	equipm	nent in a use	d-fuel pack	kaging plai	nt.	nents ready for procure a used-fuel packaging p		f the production process
Assumptions	Contractor process eq Production Some of th	uipment for n equipment	to i) prep the used-f for manuf equipmen	uel packa	ging plant: \$3	3,000k/a for 5 a (Y17 to	Y21). available and are adapted	curement of the container-related during the container of
Schedule	Start Year			1	16 2025	j	Finish Year 21	2030
Туре	Fixed							
Calculations and Notes:	Staff requi	rement acco	unting for	Repositor	y Engineering	g Management: Staff re	quirements are 3 fte/a, N	IMWO-3, 6 years.
Labour	Costs	Materia	l Costs	Oth	er Costs	Subtotal	Allowance 25%	Total Cost
\$		\$		\$	15,000,000	\$ 15,000,000	\$ 3,750,000	\$ 18,750,000
		•				•	<del>'</del>	

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	30	60	<u> </u>				Prepared By: K. Birch
WBS (Old)	552	20	25			<u> </u>				
	<u> </u>									
WBS Title	SEALING N	1ATERIALS E	NGINEERIN	G						
Description			•	_	•	program is to	•			
	=		•	•	-	ouffer ring an		•		
					_	quipment, th				
	- (	revelop trie	piant for th	e productio	n or rings, o	lisks, buffer	оюск апо р	ellets.		
Deliverable										
Deliverable	- Con	nduct optim	ization stud	dies on ear	inment an	d processes	and refin	ne as required	prior to	production process at operation
	implement	•	ization stat	ares on equ	iipinene un	a processes	, and rem	ic as required	prior to	production process at operation
	ipice									
Assumptions	Year	Staff								
		(fte)								
	16	2.0								
	17	2.0								
	18	2.0								
	19	1.0								
	20	1.0								
	All costs as	ssociated wi	th this WBS	are covered	d under Rep	oository Con	struction N	lanagement, Co	nstructio	n UDF & Obtain FSR (WBS
	560.20.50.	30.10).								
										<u>.</u>
Schedule	Start Year			16	2025			Finish Year	20	2029
	<u> </u>									
Туре	Fixed									
Calculations										
and Notes:										
Labour	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	Total Cost
\$	-	Ś		\$		\$		¢	23/0	Ś -
ې	-	٧		٧		٧	-	ې		

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	30	70					Prepared By:	G. Kwong
WBS (Old)	552	20	30	<u> </u>	<u></u>	<u></u>	<u> </u>				
	DI 4.051.451			NO CDECC	0.5045.110						
WBS Title	PLACEMEN	NI SYSTEMS	ENGINEERI	NG, SPECS	& FSAR INPL	J I					
Description	Tasks inclu	ıde:									
	Ē			•	ired to suppo						
						ring draw	ngs, techni	ical specificat	tions, syste	em commissio	ning /operating /
	maintenar	nce procedui	res of the U	FC placem	ent system.						
Deliverable											
Denverable	A prototyp	e placemen	t system.								
	•	-	-	he placem	ent system b	oased on sy	stem evalua	tion results.			
	TM to sum	marize desi	gn analysis	results to s	support FSAF	₹.					
Assumptions	Duration o	of work: Y14	toY18.								
·											
	Tasks #6 -	7: Y16-Y18,	0.3 fte/a, N	WMO-3 to	manage cor	ntract, cons	ultant to car	rry out tasks a	s described	: \$1M/a, 3 yea	rs.
	Noto: Labo	our included	in Poposito	ny Enginoc	ring Manag	omont					
	Note. Labo	our included	iii keposito	ory Enginee	ering Manage	ement					
Schedule	Ctart Vaar			1.	2025	······		Einich Voor	18	2027	
Scriedule	Start Year			10	5 2025	İ		Finish Year	10	2027	
Туре	Fixed										
Calculations											
and Notes:		T _						I			
Labour (	Costs		al Costs		r Costs		total	Allowance	25%		tal Cost
\$	-	\$	-	\$	3,000,000	\$	3,000,000	\$	750,000	\$	3,750,000

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## **Work Element Definition Sheet**

					Construction	on				
WBS (New)	561	20	50	30	80				Prepared By: G. l	〈wong
WBS (Old)	552	20	35							
WBS Title	RETRIEVAL	SYSTEMS E	NGINEERIN	NG, SPECS	& FSAR INPUT					
Description	7. Dev system. 8. Carr	orm engine elop detaile	ed design o	of the pro		ort FSAR drawings, technical sp m at the Undergroun				
Deliverable	TM to sum Detailed o	design doc	ineering an uments in	ialysis resu icluding d	Its to support esign requir he UFC retrie	ements and descript	ions, enginee	ering drawi	ings for constructi	on, technica
Assumptions		ur included	l in Reposit		ering Manage					
		,	0.4 rte/a, r	WWW 5 to	J Illaliage Col	ntract, consultant to ca	rry out tasks a	s described	: \$2M/a, 4 years.	
Schedule	Start Year		0.4 rte/a, r	······································		itract, consultant to ca	rry out tasks a	s described		
Schedule Type	Start Year Fixed		0.4 rte/a, r	······································		itract, consultant to cal	······			
			0.410,1	······································		itract, consultant to cal	······			
Type Calculations	Fixed		al Costs	1		Subtotal	······			st

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	40	10				Prepared By: A. Murc	hison
WBS (Old)										
WBS Title	Repository	r Engineering	g Program	& Project Co	osts - Opera	tion				
Description	- ( - N Work scop	aff costs not Continuing U Monitoring S De includes o O ensure DG	JDF Demon Systems & I ongoing Io	strations - ( Program - D ng term de	Operations GR Operations monstration	on Phase	l ongoing dat	a collection	of DGR performance m	onitoring
Deliverable	Reports an	nd summarie	es of systen	n performar	nce.					
Assumptions		g UDF Demo		•		- Y30 & 1 FTE/a NWM	O-03 Y31 - Y5	5.		
Schedule	Start Year			26	5 2035		Finish Year	85	2094	
	Step-Fixed									
Туре										
Calculations and Notes:										
Calculations	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost	

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## **Work Element Definition Sheet**

WBS (New)	561	20	50	50	10					Prepared By:	A. Murchison
WBS (Old)	ļ				<u></u>		<u> </u>				
WBS Title	Repository	Engineering	g Program 8	& Project Co	osts - Extenc	ded Operati	on/Monitor	ing			
Description	- C	off costs not Continued op on is as prec	perations &	•			oring systen	n and monito	ring system	data collection	to ensure DGR
Deliverable	Reports su	mmerizing t	he results c	of ongoing I	monitoring.						
Assumptions	1 NWMO-0	03 FTE/a fro	m Y56 - Y12	25							
Schedule	Start Year			86	2095			Finish Year	155	2164	
Туре	Fixed										
Calculations and Notes:											
Labour (			al Costs		r Costs		total	Allowance	25%		tal Cost
\$	9,112,824	\$	-	\$	-	\$	9,112,824	\$	2,278,206	\$	11,391,030

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## **Work Element Definition Sheet**

WBS (New)	561	25	20	10	10					Prepared By:	A. Vorauer
WBS (Old)							Ž			0	
	ļ										
WBS Title	TECHNICAL	SUPPORT I	DURING CA	NDIDATE SI	TE PHASE						
Description	geologic pr selection o Preliminary	ocesses tha f candidate y Safety Rep	it may influe sites. Much port, and the	ence reposit n of the kno e Final Safet	tory safety ( wledge gair ty Report fo	APM Techr ned will also r the prefer	nical Program pertain to a rred site.	m Objective ! analysis supp	5). A specific ort for the E	•	
Deliverable	technical n	nemoranda.	These sub	-objectives	include:			,		will consist of re	
	- 5c: Devel				_					deep geological ate sites in both	
Assumptions								are 3 FTE in e			
Schedule	Start Year			4	2013			Finish Year	9	2018	
Туре	Fixed								••••••		
	1 Contracto	or funding c	osts extract	ted from "To	echnical RD	Program 20	011-2015_R	4a". Y6 fund	ing extrapola	ited to Y9.	
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Tota	al Cost
\$	2,343,298	\$	_	Ś	6,170,000	Ś	8,513,298	\$	2,128,324	\$	10,641,622

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## **Work Element Definition Sheet**

WBS (New)	561	25	20	20	10					Prepared By:	A. Vorauer
WBS (Old)											
WBS Title	TECHNICAL	_ SUPPORT I	DURING EA	AND PSR PI	HASE						
	<u> </u>										
Description	understand on the pref and the Fir	ding of geolo ferred site a nal Safety Re	ogic process and knowled eport in the	ses that man Ige required Iong-term.	y influence d to support	repository s	afety (APM ent of the E	Technical Proposition	gram Objec Assessment	t, the Prelimina	entific ific focus is placed ary Safety Report, rested in similar
Deliverable	•	es are specif nemoranda.		-		ned in APM	Technical F	Program Objec	tive 5 and v	will consist of r	eports and
	- 5a: Ad settings		ınderstandi	ng of factor	s affecting g	geosphere s	tability and	its long-term	stability for	both crystallir	ne and sedimentary
	- 5b: Ac	dvance the ι	ınderstandi	ng of the ev	olution of g	groundwate	r flow and t	he impact of g	laciation o	n a deep geolo	gical repository.
	Within the	sub-objecti	ves above,	the specific	items addre	essed in this	work elem	ent include:			
Assumptions	•	oscience sta g at Preferre					s WED are a	accounted for	in another	WED (Geosphe	ere Support and
	Funding fo	r contractor	support fo	r Objective	5: \$500k/a(	1).					
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	1 '				•				0	ort for particip	ation in dologies and tools.
labe	<u> </u>	D4-4	al Casta	OH	Costs	Cl	tatal	Allannanca	350/		tal Cast
Labour	LOSTS		al Costs		Costs		total	Allowance	25%		otal Cost
<b>&gt;</b>	-	\$	-	\$	3,000,000	\$	3,000,000	\$	750,000	\$	3,750,000

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## **Work Element Definition Sheet**

WBS (New)	561	25	30	10	10				Pre	oared By:	N. Hunt
WBS (Old)				Ĭ							
WBS Title	TECHNICAL	. SUPPORT I	FOR APM TE	ECHNICAL P	ROGRAM O	BJECTIVE #	3 DURING S	CREENING PH	HASE		
Description	the Confide pertaining	ence Buildin to the selec I creation of	ng and Proce tion of cand f the Final S	ess Underst didate sites, afety Repor	anding sect , analysis su	ion. Much	of the know	ledge gained	l here will als	o be applied	Objective 3 is part of in subsequent tasks minary Safety
	- Furth	er increase	confidence	in the deep	geological	repository	safety case				
Deliverable	Deliverable are:	es are specif	ic to indivic	dual sub-obj	ectives and	will consis	t of reports	and technica	l memoranda	a. The princip	oal sub-objectives
	Objective #	3: Further i	ncrease cor	nfidence in	the deep ge	ological re	pository safe	ety case:			
	3b) Suppor 3c) Improv 3d) Provide and demor	t system mo e lifetime po e technical s estration pro estrate comp	odel validat redictions a support and ojects.	nd modellir I modelling	n integrated ng of coppe expertise to	r and steel Canadian	used fuel co participation	n in internatio	deep geolog onal joint rep	ical repositor pository techr rt internation	nology
Assumptions	Studies for Funding fo	Hypothetic r contractor	al Sites).	r Objective	3 is \$1,9152	2M for Y1,		in WBS 560 2		Illustrative Sa	fety Assessment
	See the cal	culation sec	ction below	for a more	detailed bro	eakdown.					
Schedule	Start Year			1	2010			Finish Year	3	2012	
Туре	Fixed										
Calculations and Notes:		(k <u>Y01</u>	\$) <u>Y02</u>	<u>Y03</u>							
	(a) (b) (c) (d) (e)	\$ 21 \$ 115 \$ 1,100	\$ 100 \$ 1,000 \$ 200	\$ 900 \$ 150 \$ 100 \$ 1,000 \$ 200							
Labour	Costs	Materi	al Costs	Other	Costs	Suk	total	Allowance	25%	Т	otal Cost
\$	-	\$	-	\$	6,364,000	\$	6,364,000	\$	1,591,000	\$	7,955,000

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# **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	25	30	10	40						Prepared By: N. Hunt, P. Gierszewski, B.
WBS Title	TECHNICAL	. SUPPORT F	OR APM TE	CHNICAL	PROGRAM	⁄I ОВЈ	ECTIVE #3	3 DURING	CANDIDATE S	SITE PHASE	
Description	continuation Phase). Mu Environme APM Techr	on of efforts uch of the k	s outlined in nowledge g ment, creati m Objective	n WBS 560 gained her ion of the e #3 is:	0 15 30 10 e will also Prelimina	10 (T be ap ry Saf	echnical oplied in s ety Repo	Support fo subsequen rt, and cre	or APM Techn It tasks pertai ation of the I	iical Progran ining to anal	ical Program and is a n Objective #3 During Screening ysis support for the Report.
Deliverable	Deliverable are:	es are specif	ic to individ	lual sub-o	bjectives a	and w	ill consist	of reports	s and technic	al memoran	da. The principal sub-objectives
	3a) Mainta 3b) Suppor 3c) Improv 3d) Provide and demor	e lifetime prosection	ove process odel validat redictions a support and ojects.	s understa ion throu nd model modellin	anding. gh integra lling of cop g expertis	ted te oper a e to C	ests and in nd steel o anadian p	nternation used fuel c participation	al joint proje containers in on in internat	a deep geolo cional joint r	ogical repository. epository technology port international
Assumptions	NWMO Re			-							
											didate Sites). \$3.400M for Y8 and \$3.35M for
	See the cal	culation sec	tion below	for a mor	e detailed	breal	kdown.				
Schedule	Start Year				4 20	13			Finish Year	9	2018
Туре	Fixed										
Calculations and Notes:				<u>Y04</u>	<u>Y05</u>	•••••	<u>Y06</u>	<u>Y07</u>	<u>Y08</u>	<u>Y09</u>	
	Sci/Eng, NV			1.75	5 1.7	'5	1.75	1.75	1.75	1.75	
	Repository	Engineerin	g FTE	1.75	1.7	5	1.75	1.75	1.75	1.75	
				<u>Y04</u>	<u>Y05</u>		(\$ <u>Y06</u>	SK) <u>Y07</u>	<u>Y08</u>	<u>Y09</u>	
			(a) (b)			00 \$ 00 \$					
			(c)	\$ 250 \$ 1,200		00 \$ 00 \$				\$ 200 \$ 500	
			(e)			00 \$				\$ 1,200	
			Sub Total	\$ 2,850	) \$ 3,30	00 \$	3,300	\$ 3,700	\$ 3,400	\$ 3,350	•
Labour (		Materia			er Costs		Subt		Allowance		Total Cost
\$	1,366,924	\$	-	\$	19,900,00	00   \$	2:	1,266,924	\$	5,316,731	\$ 26,583,655

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## **Work Element Definition Sheet**

WBS (New)	561	25	30	20	10					Prepared By:	N. Hunt, P. Gierszewski
WBS (Old)				ō							
WBS Title	TECHNICAL	SUPPORT [	DURING EA	AND PSR PI	HASE						
Description	Objective # the Enviror	‡3 During Ca nmental Ass	andidate Sit essment ar	e Phase), w nd Prelimina	ith specific ary Safety Re	focus on the	e selected s work may a	ite and the in	formation n term to sup		
Deliverable	Deliverable	es are specif	ic to indivic	lual items d	efined in th	e work prog	gram and w	ill consist of r	eports and t	echnical memo	randa.
	using site s		erials and co	onditions to	the extent	practicable	-			f key assessmer nents that could	-
Assumptions	the was	ste;		·				ANDU bundle	·	, 0	zation that created
	NWMO sta	iff for mana	ging Safety	Assessmen	t activities a	re included	in WBS 560	).30.30.20.10	(Safety Asse	essment for EA	and PSR).
	Safety Asse	r contractor essment: \$1 g: \$1.0M/a		), \$1.4M in	Y11, \$1.3M	in Y12, \$1.0	0M in Y13-Y	15.			
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs		al Costs		Costs		total	Allowance	25%		tal Cost
\$	-	\$	-	\$ 1	13,350,000	\$ 1	3,350,000	\$	3,337,500	\$	16,687,500

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#### **Work Element Definition Sheet**

WBS (New)	561	25	30	30	10					Prepared By:	N. Hunt, P.
WBS (Old)											Gierszewski
WBS Title	TECHNICAI	L SUPPORT	FOR OPERA	TING LICEN	ICE APPLICA	TION					
Description	•									epository at the pport During E	e specific A and PSR Phase).
	Tests will be focus on:	e carried o	ut at the se	lected site	either unde	rground in	the UDF or	abovegroun	d in the biosរ	ohere at this sit	te. The work will
	- I Most work experimen	n-situ integi will be carr ts will invol	rated exper ried to cond ve the insta	riments tha clusion duri allation of to	t can be use ng the cons est coupons	ed to valida truction pe or assemb	te or calibra riod to supp lies for long		r models. rating Licenc sure tests (e.		however, some ars). Even though
	- (	Check for an	y problems	during the		sient period	I with the h	ottest tempe			nd most oxygen.
	- E retrieva		there is cor	mpetent ted	chnical staff	on-hand to	deal with t	topical quest	ions that ma	y arise or, if ne	ecessary,
Deliverable	Experimen	tal result re	ports, inclu	iding analys	sis and reco	mmendatio	ns for mod	els and for n	nodel parame	eters.	
Assumptions	- C and loc and loc instrum Costs are e These cost detailed sit an Operati Although a experimen - C glove b - F - 1 - E CHEML - II data or closure - C radioac	Costs for corcosts for corcosts for corcosts for generated in Rep Costs associated in Rep Costs associated in Rep Costs associated in Rep Costs as are judged te-specific or ang Licence of a specific suptraction of an active tracers in the behavior (\$3M).	nstructing the real operal operal operal ository Englated with the osts specific is \$3 M/a for appropriate assurement of special tilation), and the dat impropriate the store of the first, SKB TR-flong-term in the store of the	the UDF, incition supportions supportions. The control of the cont	ort of the UD  Iff dedicated experiment  Y16 to Y25)  While the gale. Also, th  UDF is not decided  If the Buffer Cort behavious  Annual Recontainer-tenthe longes  In the longes  In the longes  In the simila	vating the F (e.g. utility of the support of the su	es should be ion Licence es, this rate consumers (\$1M icences) especific cop. (\$100 icences) (\$1	ring, ventilar  the UDF are e addressed may have ic of expenditur  dioactive may ). s or topical is \$5 - \$10M). nditions, esp 4 for 5 in-situ eft in place fo in support o actured Rock	by this point lentified issure would be daterials (trace sues (5 x \$0. becially nearutests); or time scales future decis	s) are included s are installations, this period is es that must be consistent with er) laboratory (2M). field transport s of 20-120 years	when the most e resolved before tests and (instrumentation, parameters (e.g. ars to provide the repository me with
Schedule	Start Year	sessment fo	r rsk).	16	2025			Finish Year	25	2034	
Janeadie				16	2023				23	2037	
Туре	Fixed										
Calculations and Notes:								I			
Labour (	Costs	Materia \$	al Costs		r Costs		total	Allowance		To:	27 500 000
\$	-	ا ع	-	] <del>)</del> 3	30,000,000	ع ا	30,000,000	ا غ	7,500,000	۲	37,500,000

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## **Work Element Definition Sheet**

WBS Title  GENERIC REPOSITORY SEALING SYSTEMS  Description  The objectives of this work program is to develop repository-sealing systems for generic repository sealing system development as follow  - Development of suite of material properties for both saturated and unsaturated conditions. These properties are required if support of; the modelling of the potential sites, and of the detailed modelling of the conceptual design of the two candidate sites (starting in 2013). The suite of material properties have been developed from standard georetichical alboratory methods such as consolidation and triavial testing, and from additional test methods such as the 2-component tests, and thermal conductivity assessments  - The reference buffer and backfill materials will be analyzed along with potential new behoritor/sand mixin.  - The reference shift seal material, (the in-situ compacted 70 / 30 bentonite/sand mixin.) The sealing systems include clay-based and cert based sealing systems (e.g., buffer, backfills, grouts for buildheads, boreholes, access cross-cuts and sharts).  - Support on "International Obligations" such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology.  - Development of numerical modelling codes and procedures, including validation and verification. The modelling would use to material properties determined for both saturated and unsaturated conditions. Examples of on going NVMO sponsored modelling development include; the joint development of CODE_BRIGHT, and the task force on engineered burner systems (EBS TF).  - Assessment of the constructability of Conceptual Designs - Continued assessment of developed conceptual design related to sealing systems (placement of pellets adjacent to UfC, and in-stru compaction of shaft seal materials.  - Identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  - Validated numerical model for variable site conditions  - Assessment of constructability of various concepts  - Validated numerica	WBS (New)	561	25	50	10	10					Prepared By: K. Birch
The objectives of this work program is to develop repository-sealing systems for generic repository sealing system development as follow  - Development of suite of material properties for both saturated and unsaturated conditions. These properties are required in support of, the modelling of the potential sites, and of the detailed modelling of the conceptual design of the two candidates sites (strating in 2013). The suite of material properties have been developed from standard geotechnical aboratory methods such as consolidation and triaxial testing, and from additional test methods such as the 2-component tests, and thermal conductivity assessments:  - The reference buffer and backfill materials will be analyzed along with potential new bentonite/sand mixtures such as the reference shaft seal material, (the in-situ compacted 70 / 30 bentonite/sand mixture sealing systems include clay-based and cerr based sealing systems (e.g., buffer, backfilis, grouts for bulkheads, boreholes, access cross-custs and shafts).  - Support on "International Obligations" such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology.  - Development of numerical modelling codes and procedures, including validation and verification. The modelling would use the material properties determined for both saturated and unsaturated conditions. Examples of on-going NWMO sponsored modelling development include; the joint development of CODE_BRIGHT, and the task force on engineered barrier systems (EBS-TF).  - Assessment of the constructability of Conceptual Designs - Continued assessment of developed conceptual design related to sealing systems (placement of pellets adjacent to UFC, and in-situ compaction of shaft seals) for Canadian concepts.  - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  - Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  - Assumed travel related costs less than 10k p		ļ	ç	•}	ġ	٥ ا					
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- Development of suite of material properties for both saturated and unsaturated conditions. These properties are required in support of; the modelling of the potential sites, and of the detailed modelling of the conceptual design of the two candidates sites (starting in 2013). The suite of material properties have been developed from standard goetchnical laboratory methods such as consolidation and triaxial testing, and from additional test methods such as the 2-component tests, and thermal conductivity assessments:  - The reference buffer and backfill materials will be analyzed along with potential new bentonite/sand mixtures such as the reference shaft seal material, (the in-situ compacted 70 / 30 bentonite/ sand mix). The sealing systems include day-based and cerb based sealing systems (e.g., buffer, backfills, grouts for bulkheads, boreholes, access ross-custs and shaft).  - Support on "International Obligations" such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology.  - Development of numerical modelling codes and procedures, including validation and verification. The modelling would use to material properties determined for both saturated and unsaturated conditions. Examples of on-going NWMO sponsored modelling development include; the joint development of CODE_BRIGHT, and the task force on engineered barrier systems (EBS-TT).  - Assessment of the constructability of Conceptual Designs. Continued assessment of developed conceptual design related to sealing systems (placement of peliets adjacent to UFC, and in-situ compaction of shaft seal materials.  - Identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  - Material property databases for variable site conditions  - Assessment of constructability of various concepts  - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  - Assumptions  - Duration of work: V01 to V03.  - Note: Cabor is located in Repository Management Engineering WEDs:  - Ve											
support of, the modelling of the potential sites, and of the detailed modelling of the conceptual design of the two candidate sites (starting in 2013). The suite of material properties have been developed from standard geotechnical laboratory methods such as consolidation and triaxial testing, and from additional test methods such as the 2-component tests, and thermal conductivity assessments  The reference buffer and backfill materials will be analyzed along with potential new bentonite/sand mixtures such as the reference shaft seal material, (the in-situ compacted 70 / 30 bentonite/ sand mix). The sealing systems include clay-based and cerb based sealing systems (e.g., buffer, backfills, grouts for bulkheads, boreholes, access cross-cuts and shafts).  Support on "international Obligations" such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology.  Development of numerical modelling codes and procedures, including validation and verification. The modelling would use to material properties determined for both saturated and unsaturated conditions. Examples of one going NWMO sponsored modelling development include; the joint development of CODE, BRIGHT, and the task force ne engineered barrier systems (EBS-TF).  Assessment of the constructability of Conceptual Designs - Continued assessment of developed conceptual design related to sealing systems (placement of pellets adjacent to UFC, and in-situ compaction of shaft seal materials.  I identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  Deliverable  Generic Repository Sealing System Development  Material property databases for variable site conditions  Assessment of constructability of various concepts  Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Our attion of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO 3) cnst.  (fig.) (5M)  1 1.0 \$ 0.8  2 1.0 \$ 0.8  2 1.0 \$ 0.8  3 1.0 \$ 0.	Description	The object	ives of this work	k program is	to develop	repository-	sealing syst	ems for gene	ric repository	sealing sy	stem development as follows:
reference shaft seal material, (the in-situ compacted 70 / 30 bentonite/ sand mix). The sealing systems include clay-based and cem based sealing systems (e.g., buffer, backfills, grouts for bulkheads, boreholes, access cross-cuts and shafts).  - Support on "International Obligations" such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology.  - Development of numerical modelling codes and procedures, including validation and verification. The modelling would use t material properties determined for both saturated and unsaturated conditions. Examples of on-going NWMO sponsored modelling development include; the joint development of CODE_BRIGHT, and the task force on engineered barrier systems (BS-TF).  - Assessment of the constructability of Conceptual Designs - Continued assessment of developed conceptual design related to sealing systems (placement of pellets adjacent to UFC, and in-situ compaction of shaft seal materials.  - Identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  - Material property databases for variable site conditions  - Assessment of constructability of various concepts  - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  - Assumptions  Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cost (fite) (SM)  1 1.0 \$ 0.8  2 1.0 \$ 0.8  3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  - Linked to repository design WBS 560.20.50.10.10  - Links to instrumentation and monitoring  - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		(stai cons	port of; the mod rting in 2013). T solidation and to	delling of the The suite of	e potential : material pr	sites, and of operties have	the detailed The been dev	d modelling o	of the concept standard geot	ual desigr echnical l	of the two candidate sites aboratory methods such as
- Development of numerical modelling codes and procedures, including validation and verification. The modelling would use to material properties determined for both saturated and unsaturated conditions. Examples of on-going NWMO sponsored modelling development include; the joint development of CODE_BRIGHT, and the task force on engineered barrier systems (EBS-TF).  - Assessment of the constructability of Conceptual Designs - Continued assessment of developed conceptual design related to sealing systems (placement of pellets adjacent to UFC, and in-situ compaction of shaft seal materials Identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  Deliverable  Generic Repository Sealing System Development  - Material property databases for variable site conditions - Assessment of constructability of various concepts  - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnsit  (fre) (SM)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8 3 1.0 \$ 0.8 3 1.0 \$ 0.8 Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule  Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10  - Links to instrumentation and monitoring - Note: Costs included in *Technical Support for Siting & Illustrative Safety Assessment Studies".			rence shaft seal	material, (t	he in-situ c	ompacted 7	0 / 30 bento	onite/ sand n	nix). The sealir	ng systems	include clay-based and cement-
material properties determined for both saturated and unsaturated conditions. Examples of on-going NWMO sponsored modelling development include; the joint development of CODE_BRIGHT, and the task force on engineered barrier systems (EBS-TF).  - Assessment of the constructability of Conceptual Designs - Continued assessment of developed conceptual design related to sealing systems (placement of pellets adjacent to UFC, and in-situ compaction of shaft seal materials Identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  Deliverable  Generic Repository Sealing System Development  - Material property databases for variable site conditions - Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour Is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnslt (fite) (SM)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8 3 1.0 \$ 0.8 Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule  Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-	Support on "I	nternationa	l Obligation	ns" such as t	he SKB ASP	O HRL & Mor	nt Terri for col	ective "de	emonstration" technology.
sealing systems (placement of pellets adjacent to UFC, and in-situ compaction of shaft seal materials.  Identification of technology development & demonstration (i.e. asphalt shaft seals) for Canadian concepts.  Deliverable  Genetic Repository Sealing System Development  - Material property databases for variable site conditions - Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnsit (fite) (SM) 1 1.0 \$ 0.8 2 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule  Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-	erial properties	determined	for both sa	aturated an	d unsaturate	ed conditions	. Examples of	on-going	NWMO sponsored modelling
Deliverable Generic Repository Sealing System Development  - Material property databases for variable site conditions - Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnsit (fte) (SM)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8 Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		- seal			=	-	_				conceptual design related to
- Material property databases for variable site conditions - Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fte) (\$M)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule  Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-	Identification	of technolo	ogy develop	ment & der	nonstration	(i.e. asphalt	shaft seals) fo	r Canadiar	n concepts.
- Material property databases for variable site conditions - Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fte) (\$M)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule  Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	Deliverable	Generic Re	pository Sealing	Svstem De	velopment						
- Assessment of constructability of various concepts - Validated numerical codes for use in preliminary conceptual design (WBS 560.20.50.10.10)  Assumptions  Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fte) (SM)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8 Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) — in general some potential minor equipment purchases for labor studies.  Schedule  Start Year   1 2010   Finish Year   3 2012   Type   Fixed  Calculations   - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring   Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".			. , .	,	•						
Assumptions Duration of work: Y01 to Y03. Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fte) (\$M)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8 Costs captured in 561.25.30.10.10. Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-		-							
Assumptions Duration of work: Y01 to Y03.  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fte) (SM)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule  Start Year   1 2010   Finish Year   3 2012    Type   Fixed  Calculations   - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-			· ·						
Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnslt (fte) (\$M)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-	Validated nur	merical code	es for use in	preliminar	y conceptua	l design (WB:	\$ 560.20.50.10	).10)	
Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnslt (fte) (\$M)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	Assumptions	Duration o	fwork: V01 to V	'U3							
Year (NWMO-3) cnslt (fte) (\$M)  1 1.0 \$ 0.8 2 1.0 \$ 0.8 3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	•	•			Manageme	nt Engineer	ng WFDs:				
(fte) (\$M)  1 1.0 \$ 0.8  2 1.0 \$ 0.8  3 1.0 \$ 0.8  Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year		•		-	a.iaBeiiie	ב					
2 1.0 \$ 0.8 3 1.0 \$ 0.8 Costs captured in 561.25.30.10.10. Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".			,								
Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		1	1.0	\$ 0.8							
Costs captured in 561.25.30.10.10.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10  - Links to instrumentation and monitoring  - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		2	1.0	\$ 0.8							
Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		3	1.0	\$ 0.8							
Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchases for labor studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".											
studies.  Schedule Start Year 1 2010 Finish Year 3 2012  Type Fixed  Calculations - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		Costs capti	ured in 561.25.3	30.10.10.							
Type Fixed  Calculations  - Linked to repository design WBS 560.20.50.10.10  - Links to instrumentation and monitoring  - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".			ravel related co	sts less tha	n 10k per y	ear. (2 trips	per year) –	in general so	ome potential	minor eq	uipment purchases for laboratory
Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	Schedule	Start Year			1	2010		F	inish Year	3	2012
Calculations  - Linked to repository design WBS 560.20.50.10.10 - Links to instrumentation and monitoring - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	Type	Fixed									
<ul> <li>Linked to repository design WBS 560.20.50.10.10</li> <li>Links to instrumentation and monitoring</li> <li>Note: Costs included in "Technical Support for Siting &amp; Illustrative Safety Assessment Studies".</li> </ul>											
<ul> <li>Links to instrumentation and monitoring</li> <li>Note: Costs included in "Technical Support for Siting &amp; Illustrative Safety Assessment Studies".</li> </ul>	Calculations		11-1 12		14/06 - 5	. 20 50 : 2					
- Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		-		•	_		U				
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Total Cost	Lahour C	osts -						1			Total Cost
\$ - \$ - \$ - \$				-		-					

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## **Work Element Definition Sheet**

WBS TRILE  CANDIDATE SITES REPOSITIORY SEALING SYSTEMS, SITING  The objectives of this work program would provide input into the selection of the preferred site from the 2 candidate sites, with the foci site specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  The work program would provide input into the selection of the preferred site from the 2 candidate sites, with the foci site specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  Assess design improvements from years 1 to 3 (WED 561.25.50.10.10), including statistical variability of test results on bentonite.  Identify sealing technology refinement opportunities specific to candidate sites.  Commence long term testing programs on the two sites (buffer, backfill and concrete).  Preliminary design requirements and specifications  Reflect on International compiliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration technology."  Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compiliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  Poliverable  Candidate Site-specific Repository Sealing System Development (years 4 to 9)  Site specific reports on anticipated EBS performance for two candidate sites with recommendations.  Assumptions  Duration of work: YO4 to YO9.  Note: Labour is located in Repository Management Engineering WEDs:  Year (NNMO-3) cnott  (fite) (SM)  4 1.0 S 1.0  S 1.0  Costs captured in 561.25 30.10.40.  Assumed travel related costs less than 10k per year, (2 trips per year) — in general some potential minor equipment purchal laboratory studies.  Schedule  Linked to repository design WBS 561.20.50.10.10.  Linked to repository design WBS 561.20.50.10.10.  Linked to reposito	WBS (New)	561	25	50	10	20					Prepared By: K. Birch
W85 Trile  CANDIDATE SITES REPOSITORY SEALING SYSTEMS, SITING  Description  The objectives of this work program would provide input into the selection of the preferred site from the 2 candidate sites, with the focisite specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  - The work program would provide input into the selection of the preferred site from the 2 candidate sites, with the focisite specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  - Assess design improvements from years 1 to 3 (WED 561.25.50.10.10), including statistical variability of test results on bentonite.  - Identify sealing technology refinement opportunities specific to candidate sites.  - Commence long term testing programs on the two sites (buffer, backfill and concrete).  - Preliminary design requirements and specifications  - Reflect on International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration technology.  - Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  Deliverable  Candidate Site-specific Repository Sealing System Development (years 4 to 9)  - Site specific reports on anticipated IBS performance for two candidate sites with recommendations.  Assumptions  Duration of work: V04 to V99.  Assumptions  Duration of work: V04 to V99.  Assumption of work: V04 to V99.  Const captured in 561.25.30.10.40.  Assumed travel related tosts is than 10k per year. (2 trips per year) – in general some potential minor equipment purchal laboratory studies.  Construction of Sealing technology is the sealing support for Siting & Illustrative Safety Assessment Studies*.  - Linked to repository design WBS 561.2		· · · · · · · · · · · · · · · · · · ·	·····	. <b>.</b>				å			
Description  The objectives of this work program is to develop repository-sealing systems for the candidate sites as follows:  The work program would provide input into the selection of the preferred site from the 2 candidate sites, with the focisite specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  Assess design improvements from years 1 to 3 (WED 561.25.50.10.10), including statistical variability of test results on bentonite.  Identify sealing technology refinement opportunities specific to candidate sites.  Commence long term testing programs on the two sites (buffer, backfill and concrete).  Preliminary design requirements and specifications  Reflect on international compliance proficiencies such as the SRB ASPO HRL & Mont Terri for collective "demonstration" technology.  Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SRB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  Deliverable  Candidate Site-specific Repository Sealing System Development (years 4 to 9)  Site specific reports on anticipated EBS performance for two candidate sites with recommendations.  Assumptions  Note: Labour is located in Repository Management Engineering WEDs:  Year (NMMO-3) cnst (fite) (SM)  4 1.0 \$ 1.0  5 1.0 \$ 1.0  6 1.0 \$ 1.0  7 1.0 \$ 1.0  8 1.0 \$ 1.0  9 1.0 \$ 1.0  Costs captured in 561.25.30.10.40.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchal aboratory studies.  Schedule  Start Year			k	.å			.ă	Ā			
The work program would provide input into the selection of the preferred site from the 2 candidate sites, with the focisite specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  Assess design improvements from years 1 to 3 (WED 561.25.50.10.10), including statistical variability of test results on bentonite.  Identify sealing technology refinement opportunities specific to candidate sites.  Commence long term testing programs on the two sites (buffer, backfill and concrete).  Preliminary design requirements and specifications  Reflect on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology.  Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  Deliverable  Candidate Site-specific Repository Sealing System Development (years 4 to 9)  Site specific reports on anticipated EBS performance for two candidates sites with recommendations.  Assumptions  Oursation of work: YO4 to YO9.  Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnst (f(te) (SM) 4 1.0 \$ 1	WBS Title	CANDIDAT	E SITES REPO	SITORY SE	ALING SYS	TEMS, SITING					
site specific materials testing for compatibility of sealing materials with rock and ground water from two sites.  - Assess design improvements from years 1 to 3 (WED 561.25.50.10.10), including statistical variability of test results on bentonite.  - Identify sealing technology refinement opportunities specific to candidate sites Commence long term testing programs on the two sites (buffer, backfill and concrete) Preliminary design requirements and specifications - Reflect on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  Deliverable  Candidate Site-specific Repository Sealing System Development (years 4 to 9) - Site specific Repository Sealing System Development (years 4 to 9) - Site specific reports on anticipated EBS performance for two candidate sites with recommendations.  Assumptions  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fite) (SM) 4 1.0 \$ 1.0 5 1.0 \$ 1.0 6 1.0 \$ 1.0 7 1.0 \$ 1.0 8 1.0 \$ 1.0 9 1.0 \$ 1.0 4 2.013   Finish Year   9 2018   Costs captured in 561.25.30.10.40. Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purcha laboratory studies.  Schedule  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs  - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	Description	The objecti	ives of this w	ork progra	ım is to de	velop reposito	ory-sealing s	systems for	the candidate	sites as fo	lows:
- Assess design improvements from years 1 to 3 (WED 561.25.50.10.10), including statistical variability of test results on bentonite.  - Identify sealing technology refinement opportunities specific to candidate sites.  - Commence long term testing programs on the two sites (buffer, backfill and concrete).  - Preliminary design requirements and specifications  - Reflect on International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration technology."  - Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  - Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  - Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on international compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology reflected sites with experiment of the preferred site.  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system Development (years 4 to 9)  - Site specific repository sealing system		-		_	-	-		-			
bentonite.  - Identify sealing technology refinement opportunities specific to candidate sites Commence long term testing programs on the two sites (buffer, backfill and concrete) Preliminary design requirements and specifications - Reflect on International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration technology Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.  Deliverable  Candidate Site-specific Repository Sealing System Development (years 4 to 9) - Site specific reports on anticipated EBS performance for two candidate sites with recommendations.  Assumptions  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnsit (ite) (SM) 4 1.0 \$ 1.0 5 1.0 \$ 1.0 6 1.0 \$ 1.0 7 1.0 \$ 1.0 8 1.0 \$ 1.0 9 1.0 \$ 1.0 Assumed travel related costs less than 10k per year. (2 trips per year) — in general some potential minor equipment purcha laboratory studies.  Schedule Start Year 4 2013 [Finish Year 9 2018]  Type Fixed  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		site	specific mate	eriais testir	ig for com	patibility of se	aling mater	iais with ro	ick and ground	water from	n two sites.
Commence long term testing programs on the two sites (buffer, backfill and concrete).		- bent		ign improv	ements fr	om years 1 to	3 (WED 56:	1.25.50.10.2	10), including s	tatistical v	ariability of test results on
- Reflect on International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration technology.  - Continue with aspects of WBS 561.25.50.10.10, (i) long term testing programs on buffer and backfill, (ii) reflection on International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.    Deliverable		- -	Commence	e long tern	n testing p	rograms on th	e two sites			ete).	
International compliance proficiencies such as the SKB ASPO HRL & Mont Terri for collective "demonstration" technology, an identification of sealing technology refinement opportunities specific to the preferred site.    Candidate Site-specific Repository Sealing System Development (years 4 to 9)		- - tech	Reflect on					s the SKB A	SPO HRL & Mo	nt Terri foi	collective "demonstration"
Candidate Site-specific Repository Sealing System Development (years 4 to 9)  Site specific reports on anticipated EBS performance for two candidate sites with recommendations.  Assumptions  Duration of work: Y04 to Y09.  Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) cnslt  (fite) (SM)  4 1.0 \$ 1.0  5 1.0 \$ 1.0  6 1.0 \$ 1.0  7 1.0 \$ 1.0  8 1.0 \$ 1.0  9 1.0 \$ 1.0  Costs captured in 561.25.30.10.40.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purcha laboratory studies.  Schedule  Start Year   4 2013   Finish Year   9 2018   Type   Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10.  - Links to instrumentation and monitoring.  - Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		•	rnational con	npliance p	roficiencie	s such as the S	SKB ASPO H	RL & Mont	Terri for collec	tive "demo	
Candidate Site-specific Repository Sealing System Development (years 4 to 9)  - Site specific reports on anticipated EBS performance for two candidate sites with recommendations.  Assumptions  Duration of work: Y04 to Y09.  Note: Labour is located in Repository Management Engineering WEDs: Year (NWMO-3) cnslt (fite) (SM)  4 1.0 \$ 1.0  5 1.0 \$ 1.0  6 1.0 \$ 1.0  7 1.0 \$ 1.0  8 1.0 \$ 1.0  9 1.0 \$ 1.0  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purcha laboratory studies.  Schedule  Start Year   4 2013   Finish Year   9 2018   Type   Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".	Deliverable										
Note: Labour is located in Repository Management Engineering WEDs:  Year (NWMO-3) crist  (fte) (\$M)  4 1.0 \$ 1.0  5 1.0 \$ 1.0  6 1.0 \$ 1.0  7 1.0 \$ 1.0  8 1.0 \$ 1.0  9 1.0 \$ 1.0  Costs captured in 561.25.30.10.40.  Assumed travel related costs less than 10k per year. (2 trips per year) — in general some potential minor equipment purcha laboratory studies.  Schedule Start Year   4 2013   Finish Year   9 2018    Type   Fixed    Calculations   - Linked to repository design WBS 561.20.50.10.10.  Links to instrumentation and monitoring.  Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".		Candidate : -							late sites with	recommen	dations.
Year	Assumptions	Duration o	f work: Y04 t	o Y09.							
Costs captured in 561.25.30.10.40.		Note: Labo	ur is located	in Reposit	ory Manag	gement Engine	eering WED	s:			
4 1.0 \$ 1.0   5 1.0 \$ 1.0   6 1.0 \$ 1.0   7 1.0 \$ 1.0   8 1.0 \$ 1.0   9 1.0 \$ 1.0    Costs captured in 561.25.30.10.40. Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purcha laboratory studies.  Schedule Start Year 4 2013   Finish Year 9 2018    Type Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs   Material Costs   Other Costs   Subtotal   Allowance 25%   Total Cost		Year	(NWMO-3)	cnslt							
5 1.0 \$ 1.0   5 1.0   6 1.0   5 1.0   7 1.0   5 1.0   7 1.0   5 1.0   8 1.0   9 1.0   \$ 1.0   9 1.0   \$ 1.0			(fte)	(\$M)							
6 1.0 \$ 1.0   1.0   1.0   1.0   1.0   8   1.0   8   1.0   9   1.0   \$ 1.0   9   1.0   1.		4	1.0	\$ 1.0	)						
7 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 9 1.0 \$ 1.0 \$ 9 1.0 \$		5	1.0	\$ 1.0	)						
7 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 9 1.0 \$ 1.0 \$ 9 1.0 \$		6	1.0	\$ 1.0	)						
8 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ 1.0 \$ Costs captured in 561.25.30.10.40.  Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purcha laboratory studies.  Schedule Start Year		7									
Costs captured in 561.25.30.10.40. Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purcha laboratory studies.  Schedule Start Year 4 2013 Finish Year 9 2018  Type Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		•									
Assumed travel related costs less than 10k per year. (2 trips per year) – in general some potential minor equipment purchal laboratory studies.  Schedule Start Year 4 2013 Finish Year 9 2018  Type Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		•									
Schedule Start Year 4 2013 Finish Year 9 2018  Type Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		Costs captu	ured in 561.2	5.30.10.40	).						
Type Fixed  Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		•		d costs les	s than 10	k per year. (2	2 trips per	year) – in	general some	potential	minor equipment purchases for
Calculations  - Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Schedule	Start Year				4 2013			Finish Year	9	2018
- Linked to repository design WBS 561.20.50.10.10 Links to instrumentation and monitoring Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Туре	Fixed									
- Note: Costs included in "Technical Support for Siting & Illustrative Safety Assessment Studies".  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Calculations	-	Linked to r	epository	design WB	S 561.20.50.1	0.10.				
Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		-	Links to ins	strumenta	tion and m	nonitoring.		luctrotice C	ofoty Access		11
	laha	Costs							1 '		
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## **Work Element Definition Sheet**

WBS (New)	561	25	50	10	30					Prepared By:	J. Villagran
WBS (Old)											
		••••••									
WBS Title	DEVELOPN	IENT OF RE	POSITORY N	10NITORIN	G STRATEGI	ES AND TE	HNOLOGIE	S			
Description	no significa parameter geochemis	ant effects o	on public sat acterize repo ogical syste	fety or the obsitory performs at the re	environmen ormance an	t. It include d can be us	s the develo	opment of a s	trategy to n	mance and ensu nonitor a set of illity on the hyd	
										neet APM strate	
	techno		in collectiv	e internatio	onai initiativ	es and proj	ects for dev	elopment of l	repository r	nonitoring metl	nods and
	- (		work as req	uired on dv	Ū		•	ne required m	•		itor the evolution
Deliverables	- APN	1 Monitorin	g Strategy d	ocument.							
	•	nership in a			nal Monitori	ng project.					
	- Mor	nitoring Req	uirements o	locument.							
	- Asse	essment of a	ivailable ted	hnologies.							
	•	iminary mor		_							
	- Tecl	nnical specif	ications for	the procur	ement of de	monstratio	n monitorir	ng systems.			
Assumptions	Duration	of work: Y01	to V00								
Assumptions	•	ured in 561.		) and 561.2	5 20 10 40						
	•					e tasks are	0.5 fte for 9	a (Senior Tecl	nnical Speci	alist) plus the fo	ollowing:
								. (00		, p	
	_ 9	Specialist Co	nsultant to	conduct wo	ork in specifi	ic monitori	ng technolo	gies, plus sup	port to inte	rnational monit	oring programs:
	:	sed Services			-			8. e., h. e. e.h	,		
				•	,	a a sification	c and nealin	ninarı Engina	orina docian	os for sposifis m	anitaring systems
	<b>:</b>	sed Services			•	Decincation	s and preim	illiary Engine	ering desigi	is for specific in	onitoring systems:
	, urciiu		,								
Schedule	Start Year			1	2010	 !		Finish Year	g	2018	
Scriedule	Start rear			1	2010	İ		FIIIISII TEAI		2010	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$	_

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## **Work Element Definition Sheet**

WBS (New)	561	25	50	20	10				Prepared By: K. Birch
WBS (Old)	552	20	15	30					
WBS Title	PREFERRED	SITE REPOSI	TORY SEAL	ING SYSTEN	AS, LICENSE	PHASE			
Description	The object	ve of the pre	ferred Site	Repository	Sealing Syst	ems work program is t	:o;		
	- swe - shaf	lling pressure Final desig	e)						m demonstrations (consolidation, pository level, and within the
	Silai								
Deliverable	Preferred S 560.20.50.		epository S	ealing Syste	em Develop	ment (Years 10 to 12) i	for inclusion in	to final des	ign specifications (WBS
Assumptions	Note: Labo Year 10 11 12	ur is located (NWMO-3) (fte) 1.0 1.0	cnslt (\$M) \$ 0.75 \$ 0.50	ry Manager	ment Engine	eering WEDs:			
Schedule	Start Year			10	2019		Finish Year	12	2021
Туре	Fixed								
Calculations	- -			esign WBS on and moi	560.20.50.2 nitoring	0.10			
Labour (	Costs	Materia	l Costs	Other	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,250,000	\$ 1,250,000	\$	312,500	\$ 1,562,500

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## **Work Element Definition Sheet**

WBS (New)	561	25	50	20	20					Prepared By: J. Villagran
WBS (Old)										
WBS Title	REPOSITOR	RY MONITO	RING AND 1	rechnolog	Y DEVELOP	MENT				
Dossription	Tacks inclu	do:								
Description	Tasks inclu		nand as ro	auired the	horobola n	otwork oct	ablished for	r cita charac	torization in	order to monitor the long-terr
	•		•	•						mistry). Implement a monitorin
	•	_	-	ository long	· ·		ater pressu	re, temperar	tare and ene	mistry). Implement a momeorin
					-					
	•	ū	•			•		n order to es	tablish a bas	eline.
	- Estabi	isn a databa	ase that will	l include En	vironmenta	i parameter	S.			
Deliverables	- T	echnical sp	ecifications	and optimi	zed designs	for monito	ring systems	S.		
	1	•		•	•		0 ,		onmental pa	arameters, and repository safety
	and pe	rformance r	elated para	meters.						
	- F	rocuremen	t, installatio	on and comi	missioning o	of Environm	ental monit	oring system	s.	
	- E	stablished l	baseline for	surface, su	bsurface an	d environm	ental param	neters at the	selected rep	ository site.
Assumptions	Duration o	f work: Y10	to V15							
Assumptions	Daration o	i work. 110	10 115.							
	NWMO sta	off requirem	ents to ma	nage/execu	te the abov	e tasks are (	0.5 fte for 6:	a (Senior Tec	hnical Specia	alist) and 1 fte for 6a (Technical
	•	-						ists (Y10 to Y	•	
										22001 / 5 - 5 - ()40 - 145)
	- 5	pecialist Co	insultant to	conduct wo	ork in specif	ic monitorii	ig technolog	gies: Purchas	ea services \$	6200k/a for 6a (Y10 to Y15).
	•	-			•		•	•	•	t process for Environmental
	1	υ.	is and to ass	sist with sys	tem installa	ition and co	mmissionin	g at the repo	sitory site: P	urchased services \$300k/a for 3 a
	(Y10 to	Y12).								
	- F	urchase, in	stallation ar	nd commiss	ioning of En	vironmenta	al Monitorin	g systems in	the reposito	ry site and surrounding area, wit
	an estir	nated total	value of \$3	,000k (\$1,00	00k/a Y10 to	o Y12).			·	-
Schedule	Start Year			10	2019			Finish Year	15	2024
Scriedule	Start rear			<u></u>	2013	i		i iiiisii ieai	.i	2024
Туре	Step-Fixed									
1-71-										
Calculations	The equip	ment costs	do not inclι	ide the pur	chase of a co	omputer fo	the central	database, w	hich is inclu	ded in the geosciences WEDS.
and Notes:				•		·				<u> </u>
		1				1				
Labour	Costs		al Costs	1	Costs		total	Allowance		Total Cost
\$	-	\$	3,000,000	\$	1,200,000	\$	4,200,000	\$	1,050,000	\$ 5,250,000

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## **Work Element Definition Sheet**

WBS TRIE  PLAN UDF DEMONSTRATIONS and UDF SPECIFICATIONS  Description  The objective of the "Plan Underground Demonstration Facility (UDF) AND UDF Technical specifications" work program is to; finalize plan and prepare technical specifications for:  - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF links to WBS 560.20.50.20.40).  - long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository - The short-term confirmation studies include: container placement; container retrieval; borehole sealing; placement room sealing access drift sealing; and shafts sealing.  - The long-term demonstration studies are focused on monitoring the performance of the engineered barrier system and near-fiel evolution of the repository environment over time.  - The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once the operating license is granted).  Deliverable  Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository facility systems for implementation in the UDF.  Assumptions  Duration of work: Y18 to Y20.  Assumptions  Duration of work: Y18 to Y20.  So S S S S S S S S S S S S S S S S S S	WBS (New)	561	25	50	30	40		<u> </u>			Prepared By:	K. Birch
Description  The objective of the "Plan Underground Demonstration Facility (UDF) AND UDF Technical specifications" work program is to; finalize plan and prepare technical specifications for:  - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF (links to WBS 560.20.50.20.40).  - long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository The short-term confirmation studies include: container placement; container retrieval; borehole sealing; placement room sealing access drift sealing; and shaft sealing.  - The long-term demonstration studies are focused on monitoring the performance of the engineered barrier system and near-fiel evolution of the repository environment over time.  - The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once the operating license is granted).  - Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  - Note: Labour is located in Repository Management Engineering WEDs: - Year Staff cnsht Equip Other - (file) (SM) (SM) (M) - 18	WBS (Old)	552	20	15	60	30		•			^i	
Description  The objective of the "Plan Underground Demonstration Facility (UDF) AND UDF Technical specifications" work program is to; finalize plan and prepare technical specifications for:  - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF (links to WBS 560.20.50.20.40).  - long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository The short-term confirmation studies include: container placement; container retrieval; borehole sealing; placement room sealing access drift sealing; and shaft sealing.  - The long-term demonstration studies are focused on monitoring the performance of the engineered barrier system and near-fiel evolution of the repository environment over time.  - The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once the operating license is granted).  - Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  - Note: Labour is located in Repository Management Engineering WEDs: - Year Staff cnsht Equip Other - (file) (SM) (SM) (M) - 18								A				
and prepare technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF (links to WBS 560.20.50.20.40) Iong-term demonstration and monitoring tests to be located in the UDF and other parts of the repository - The short-term confirmation studies include: container placement; container retrieval; borehole sealing; placement room sealing access drift sealing; and shaft sealing The long-term demonstration studies are focused on monitoring the performance of the engineered barrier system and near-fiel evolution of the repository environment over time The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once the operating license is granted).  Deliverable - Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20. Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnslt Equip Other  (fte) (SM) (SM) (SM) (M)  18 2.0 \$ 0.5 \$ - \$ - 20 2.0 \$ 1.0 \$ - \$ - 20 2	WBS Title	PLAN UDF	DEMONSTR	ATIONS ar	nd UDF SPE	CIFICATIONS						
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- The short-term confirmation studies include: container placement; container retrieval; borehole sealing; placement room sealing access drift sealing; and shaft sealing.  - The long-term demonstration studies are focused on monitoring the performance of the engineered barrier system and near-fiel evolution of the repository environment over time.  - The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once th operating license is granted).  Deliverable  Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20. Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnsit Equip Other (fite) (SM) (SM) (SM) (M)  18 2.0 \$ 0.5 \$ . \$ . \$ .  19 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .		•		_		_		and commi	ssioning tests	for the repo	ository facility	systems for
- The short-term confirmation studies include: container placement; container retrieval; borehole sealing; placement room sealing access drift sealing; and shaft sealing.  - The long-term demonstration studies are focused on monitoring the performance of the engineered barrier system and near-fiel evolution of the repository environment over time.  - The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once th operating license is granted).  Deliverable  Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20. Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnsit Equip Other (fite) (SM) (SM) (SM) (M)  18 2.0 \$ 0.5 \$ . \$ . \$ .  19 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ .  20 2.0 \$ 1.0 \$ . \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .  20 2.0 \$ 1.0 \$ .		- long-	term demoi	nstration a	nd monitor	ing tests to b	oe located ir	n the UDF a	nd other parts	of the repo	sitory	
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evolution of the repository environment over time.  The long term studies will be conducted on full-scale container placement studies which would include the use of heate containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once th operating license is granted).  Deliverable  Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20.  Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnslt Equip Other (fte) (SM) (SM) (M)  18 2.0 \$ 0.5 \$ - \$ - \$ - 20 2.0 \$ 1.0 \$ - 20 2.0 \$ 1.0 \$ - 20 2.0 \$		access drif	t sealing; an	nd shaft sea	aling.		•					_
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containers, and used-fuel containers containing used fuel bundles (The installation of these live UFCs would occur in Year 26 once the operating license is granted).  Deliverable  Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20.  Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnslt Equip Other (fite) (SM) (SM) (M)  18 2.0 \$ 0.5 \$ - \$ - \$ -  19 2.0 \$ 1.0 \$ - \$ - \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -  2		•					a on monic	ing the pe	riormance or	the enginee	ereu barrier sy	sterri ariu riear-rieiu
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Deliverable  Technical specifications for: - short-term underground characterisation, design confirmation and commissioning tests for the repository facility systems for implementation in the UDF long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20.  Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnslt Equip Other (fite) (SM) (SM) (M)  18 2.0 \$ 0.5 \$ - \$ -  20 2.0 \$ 1.0 \$ -  20 2.0 \$ 1.0 \$ -		•	_					-				
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- long-term demonstration and monitoring tests to be located in the UDF and other parts of the repository.  Issue drawings and technical specifications for construction of the UDF.  Assumptions  Duration of work: Y18 to Y20.  Note: Labour is located in Repository Management Engineering WEDs: Year Staff cnslt Equip Other (fte) (\$M) (\$M) (M)  18 2.0 \$ 0.5 \$ - \$ - 19 2.0 \$ 1.0 \$ - \$ - 20 2.0 \$ 1.0 \$ - \$ - 20 2.0 \$ 1.0 \$ - \$ - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		•			racterisatio	n, design c	Ommation	and com	missioning te	SLS TOT LITE	repository i	acility systems for
Assumptions   Duration of work: Y18 to Y20.		1 '						. UDF l -		l		
Assumptions   Duration of work: Y18 to Y20.   Note: Labour is located in Repository Management Engineering WEDs:   Year   Staff   cnslt   Equip   Other   (fte)   (\$M)   (\$M)   (M)					_				tner parts of t	ne reposito	ry.	
Note: Labour is located in Repository Management Engineering WEDs:   Year		13301	e urawings o	and technin	Lai specifica	10113 101 101	isti uction o	i the ODI.				
Year   Staff   Cnslt   Equip   Other	Assumptions	Duration o	f work: Y18	to Y20.				•••••				
(fte) (\$M) (\$M) (M)	-	Note: Labo	our is locate	d in Repos	itory Manag	gement Engi	neering WE	Ds:				
18		Year	Staff	cnslt	Equip	Other						
19 2.0 \$ 1.0 \$ - \$ - \$ - 20 2.0 \$ 1.0 \$ - \$ - \$ - \$ - 20 2.0 \$ 1.0 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$			(fte)	(\$M)	(\$M)	(M)						
20 2.0 \$ 1.0 \$ - \$ -  Schedule Start Year 18 2027 Finish Year 20 2029  Type Fixed  Calculations and Notes: - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		18	2.0	\$ 0.5	\$ -	\$ -						
Schedule Start Year 18 2027 Finish Year 20 2029  Type Fixed  Calculations and Notes: - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		19	2.0	\$ 1.0	\$ -	\$ -						
Type Fixed  Calculations and Notes: - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		20	2.0	\$ 1.0	\$ -	\$ -						
Type Fixed  Calculations and Notes: - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost												
Calculations and Notes: - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Schedule	Start Year			1	3 2027	······································		Finish Year	20	2029	
and Notes:  - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Туре	Fixed										
and Notes:  - Refinement to equipment / design based on results of surface study program Repository development studies (WBS 560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Calaulatian	ļ										
560.20.50.20.40).  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost			) afi a a + .	<b>.</b>		. haaad a.:- ::-	کم مداریم	fa a a ak		ا - ، بمام بسمطاء		- AMDC
	and Notes:	•		to equipm	ent / desigr	based on re	esuits of sur	race study p	orogram Repos	sitory devei	opment studie	s (MR2
	Labour	Costs	Materi	al Costs	Othe	er Costs	Sub	total	Allowance	25%	To	otal Cost
ווור בין בין בין בין בין בין בין בין בין בין	\$		\$	-	\$	2,500,000	\$	2,500,000	\$	625,000	\$	3,125,000

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## **Work Element Definition Sheet**

WBS (New)	561	25	50		30	50					Prepared By: K. E	Birch
WBS (Old)	552	20	15		60	40						
	ļ											
WBS Title	CONDUCT	UDF DEMO	NSTRATION	IS - IN	ITAII	E						
								/				
Description	1 -			_				lity (UDF)" wor				
	•		-	-				•	-		rations, including; pl	
											cement room sealing	
	installation	of dense b	ackfill block	s, lig	ht bac	kfill pellets	and con	crete bulkhead:	s; borehole se	ealing and sh	aft sealing. These de	monstrations
	would con	firm the per	rformance c	of the	mate	rials during	the insta	allation process	es.			
	- Initi	ate. condu	ct. analyse	and	report	on comm	issioning	tests conduct	ed in the UC	)F for the sr	pecially developed e	auinment for
	1		al (WBS 560		•		_				secium, developed e	quipinent ioi
	- Initi:	ate, monito	r and perio	dicall	lv rend	ort on long-	term de	monstrations a	nd monitorin	g tests in the	e UDF (Note: additio	nal tests may
	Ē		-			_				-	ered barrier system a	
	:							ed heated conf		the enginee	irea barrier system e	ina near-neia
	evolution	n the repos	sitory enviro	,,,,,,	iii ove	i time using	5 Jiiiiulai	ed fieated com	tairiers.			
Deliverable	:		_	nd eq	quipme	ent, method	ds and p	rocedures for e	excavation, d	rilling, repos	sitory construction a	nd repository
	sealing sys	tems install	ation.									
	- Conf	irmed repo	sitory desig	n for	the p	referred sit	e.					
	- Shor	t-term und	erground ch	harac	cterisa	tion data ar	nd analys	ses as input to	Geoscience s	upport (WBS	5 560.30.20.30.30) ar	nd final safety
	assessmen	t report (W	BS 560.20.5	0.30	.10).							
Assumptions	Duration o	f work: V16	to V20									
Assumptions	1			f vea	rc 21 t	o 25) is loc:	ated in R	epository Mana	gement Engi	neering WFI	)c·	
	Year	Staff	cnslt		quip	0 23) 13 1000	ateu iii ii	epository iviant	igement Liigi	neering wer	<b>J</b> 3.	
	i Cai	(fte)	(\$M)		чир \$М)							
	21	(ILE)	\$ 2.0		(۱۷۱							
	22		\$ 2.0		5.0							
	23											
					5.0							
	24		\$ 2.0	-	5.0							
	25		\$ 2.0	\$	5.0							
	It should b	e noted th	at costs rel	ated	to the	e drifts, exc	cavation	of the shafts, <sub>I</sub>	perimeter ac	cess routes,	and the excavation	of the rooms
	within the	UDF are co	vered undei	r ope	ration	S.						
	Contractor	s/consultar	nts to procu	ire e	quipm	ent, install,	conduc	t analyses and	report on de	esign confirr	mation and reposito	ry equipment
	commissio	ning tests a	nd the reso	lutio	n of ar	ny issues ide	entified.					
Schedule	Start Year				21	L 2030	 )		Finish Year	25	2034	
				A					.a		k	
Туре	Fixed											
Calculations												
and Notes:												
	Note: Equi	pment is as	sumed to be	e out	tside th	ne scope of	SNC's ca	pital estimate.	Equipment v	vould be tec	hnology demonstrati	ion specific.
						•					<b>.</b>	•
l abarra	Costs	Mate::	al Costs		O+h -	r Costs		Cubtotal	Allowansa	250/	Total Ca	ve+
Labour (	LUSTS		al Costs	ċ		r Costs	-	Subtotal	Allowance	<b>25%</b> 7,500,000	Total Co	
\$	-	۶ 4	20,000,000	\$		10,000,000	٦	30,000,000	\$	7,300,000	٧	37,500,000

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## **Work Element Definition Sheet**

review process.  - Maintain and update repository performance of the continued operation of the surrounding area.  - Updated database of relevant environmental at the continued operation of the continued operation of the surrounding area.  - Updated database of relevant environmental at the continued operation of the continued operation operati	red. onmental parameters. design for UDF monitoring systems based on feedback from the licensing and EA database. f Environmental Monitoring systems within the repository site and the
Description  Tasks include:  - Maintain/upgrade monitoring system as requir - Continue the monitoring of site baseline enviro - Update technical specifications and optimize de review process Maintain and update repository performance d  Deliverables - Upgraded systems and continued operation of surrounding area Updated database of relevant environmental a  Assumptions Duration of work: Y16 to Y20.	red. onmental parameters. design for UDF monitoring systems based on feedback from the licensing and EA database. f Environmental Monitoring systems within the repository site and the
Description  Tasks include:  - Maintain/upgrade monitoring system as requir - Continue the monitoring of site baseline enviro - Update technical specifications and optimize de review process Maintain and update repository performance d  Deliverables - Upgraded systems and continued operation of surrounding area Updated database of relevant environmental a  Assumptions Duration of work: Y16 to Y20.	red. onmental parameters. design for UDF monitoring systems based on feedback from the licensing and EA database. f Environmental Monitoring systems within the repository site and the
- Maintain/upgrade monitoring system as requir - Continue the monitoring of site baseline enviro - Update technical specifications and optimize de review process Maintain and update repository performance de Deliverables - Upgraded systems and continued operation of surrounding area Updated database of relevant environmental a  Assumptions Duration of work: Y16 to Y20.	onmental parameters. design for UDF monitoring systems based on feedback from the licensing and EA database.  f Environmental Monitoring systems within the repository site and the
- Maintain/upgrade monitoring system as requir - Continue the monitoring of site baseline enviro - Update technical specifications and optimize de review process Maintain and update repository performance de Deliverables - Upgraded systems and continued operation of surrounding area Updated database of relevant environmental a  Assumptions Duration of work: Y16 to Y20.	onmental parameters. design for UDF monitoring systems based on feedback from the licensing and EA database.  f Environmental Monitoring systems within the repository site and the
surrounding area.  - Updated database of relevant environmental a  Assumptions Duration of work: Y16 to Y20.	
	ve tasks are 0.5 fte for 5a (Senior Technical Specialist) and 1 fte for 5a (Technical uisition and manage the database for use by NWMO scientists; plus the following:
Purchased services \$200k/a for 5a (Y16 to Y20).	fic monitoring technologies and support to international monitoring programs: pecifications and provide input to system procurement of UDF monitoring
Schedule Start Year 16 2025	Finish Year 20 2029
Type Fixed	
and Notes: initiation of experiments and system demonstrations will	ar period, with the UDF test rooms becoming available in Y21. Therefore, the ill not start before Y21. The Monitoring tasks during this period will be limited to and off-site) and to the updating of system designs for procurement, installation
Labour Costs Material Costs Other Costs	Subtotal Allowance 25% Total Cost
\$ - \$ - \$ 1,400,000	

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## **Work Element Definition Sheet**

WBS (New)	561	25	50	30	70					Prepared By	J. Villagran	
WBS (Old)		ļ		A								
WBS Title	MONITORI	NG SYSTEM	S AND PRO	GRAM – D	GR CONSTRU	JCTION PHA	SE					
Description	- [ - L techno - F - C	Purchase, ins Demonstrate Jpdate desig logies.	e function o gns for repo commission e monitoring	f monitorionsitory more monitorions g of site pa	ng system in nitoring syste ng systems for arameters.	the UDF. ems as requi		timated total on experience			d up to date	
Deliverables	- I - C	nstalled and Demonstration	commissio on of monit peration of	ned monit toring syste repository	gns and processoring system ems operation monitoring erformance p	ns in the UDI on in the UD systems.	F.	DGR monitori	ng systems.			
Assumptions	NWMO sta staff) to op - S Y25). - C with co - F \$1,000 sensors - C - a - s - v	aff requirements system of the	ents to mar ms, conduct nsultant to consultants f repository date of mor ipment is for ing: t, stress, ssion, on, nd water pr	t data acqui conduct w to prepare monitorin nitoring eq or demonst	uisition and r rork in specif system tech ng systems: P quipment for	nanage the ic monitorin nical specification in the interest of the installation in the	g technolog cations, pro rvices \$400 and comm	or use by NWN gies 1 fte for 5 ovide input to Dk/a for 2a (Y2 issioning in th	MO scientistons:  Sa: Purchase  system pro 21 to Y22)  e UDF with	ed services, \$2 curement pace	or 5a (Technical illowing: 200k/a for 5a (Y2 ckages and assist total value of nclude detectors	t
Schedule	Start Year			2:	1 2030			Finish Year	25	2034		
Туре												
Турс	Fixed											
Calculations and Notes:	Fixed											
Calculations		Materia \$	al Costs 1,000,000	Othe \$	er Costs 1,800,000	Subt	otal	Allowance \$	<b>25%</b> 700,000	T \$	otal Cost	

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## **Work Element Definition Sheet**

WBS (New)	561	25	50	40	10					Prepared By:	K. Birch
WBS (Old)	552	20	15	60	40						
WBS Title	CONTINUI	NG UDF DEN	ИONSTRATI	IONS - OPER	RATIONS						
Description	- Init	iate, conduced f	ct, analyse rom the us	and perio	dically repo	ort on long t placed in a	term unde an reposito	ry setting, fo	monstration r long term		e initial used fuel he performance of
Deliverable	- Com	nplete demo	nstrations t	to either co	nfirm final c	designs or re	evise design	during opera	ations of the	DGR	
Assumptions	Duration o	of work: Y26	to Y30, wit	h continuat	ion to year !	55.					
	:		-		•		n Repositor	y Manageme	ent Engineeri	ng WEDs:	
	Year	Staff (fte)	cnslt (\$M)	Equip (\$M)							
	26		\$ 1.0	\$ 1.0							
	27		\$ 1.0	-							
	28		\$ 1.0	-							
	29		\$ 1.0	-							
	30 Years 31		\$ 1.0 \$ 0.5	\$ 1.0 \$ -							
	16912 2T		\$ 0.5	-							
		rs/consultan					alyses and	report on do	esign confirr	nation and rep	ository equipment
Schedule	Start Year			26	2035			Finish Year	85	2094	
Туре	Fixed										
Calculations and Notes:	Note: Cont	tainer empla	acement/re	trieval UDF	trials are ac	ccounted for	r in Reposito	ory Engineeri	ing Managen	nent & Emplace	ement/Retrieval
Labour	Costs	Materia	al Costs	Othe	Costs	Sub	total	Allowance	25%	To	tal Cost
\$	-	\$	5,000,000	\$ 3	32,500,000	\$ 3	37,500,000	\$	9,375,000	\$	46,875,000
						1		1			

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## **Work Element Definition Sheet**

WBS (New)	561	30	20	20	10					Prepared By: B. Belfa	idhel
WBS (Old)	552	15	20	40							
WBS Title	DATABASE	AND INFOR	RMATION SY	'STEMS							
Description	design into monitoring further sen toward con Databases timeframe Databases seismicity, resources.	ended for s g data. Info rve to archi nfirmation c would be a of the proje would be si geology, b Results of g	patial and to primation Sysive site specific the prefer accessible by ect. Interope tructured to orehole dat geosphere r	temporal and stem would cific geosphored site and y a suite of erability is extended to the control of the cont	nalysis, inte l be applied nere/biosph d UCF const analyses an essential. ta informati al/ regional	erpretation, d and, as receivere data an erruction/ope nd visualizat ion on trans I boundaries nd associated	integration quired, up- quired, up- quired, up- quired, up- quired tion applica portation, r s, aborigina d numerica	n and commun graded throug raceable data ations (GIS, Go natural environ al lands, surfa	nication of ghout the re- sets that v ocad,), w nment, rem ice hydrolo will also be	ion management system site specific characterist epository siting process. would evolve as siting purhich would likely evolve note imaging, airborne gegy, topography and groe archived in a suitable te.	ation and It would proceeded e over the eophysics, undwater
Deliverable	: "			•		ure to apply e and Safety			siting, Envi	ronmental Assessment,	
Assumptions	- An		ing fees and	. 0		·	ough Geosc	cience and mo	nitoring sup	pport beyond Y25.	
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi	ial Costs	Other	Costs	Subt	otal	Allowance	25%	Total Cost	

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#### Work Element Definition Sheet

					Work Eler	nent Definiti	on Sheet					
WBS (New)	561	30	20	20	20		]			Prepared	I <b>By:</b> B. Be	elfadhel
WBS (Old)	ļl	l		ii		İ	j					
WBS Title	GEOSPHER	E SUPPORT	AND MON	ITORING AT	PREFERRED	SITE DURING	REGULATOR	Y PROCESS				
Danasiatias	Duning Abia			.ee:11								
Description	Geosphere continued of performand added, alth	monitoring monitoring ce assessme	on and part will conting is similar to ent, engine routine ma	ticipating in tue at the protection that in WB ering designation	other licensi referred site S 560 15 40 and licensir may be requ	during the re 40: continue ng. During thi ired. Certain	gulatory pro monitoring t s period it is monitoring i	cess and prior the baseline or assumed that restallations maintening progra	to UDF cons undisturbed no additiona y need to b	struction. d condition	The objecti ons of the si	ve of the te to support tions will be
		ce of the De process tim		ieoscientific	Site Model	(DGSM) and a	associated flo	ow system mod	lel will be su	upported	throughout	the
	groundwat consist of p hydrogeoch	er monitori periodic (ex hemical ana	ng systems quarterly) lyses for th	in deep boo measureme	reholes (~ 10 ents of hydra of establishin	000 m), boreh Julic pressure	ole seismogr s and period	ow groundwate raphs and GPS: ic (semi-annual and variability.	stations. Gr I) collection	oundwat of groun	er monitorii dwater sam	ng will ples for
Deliverable	- Pi - N - Si	rovision of Naintenance upporting li	QA'd monit and updat censing act	oring data ting of DGSN ivities, addr	to the electro A and associ		ion manager al geosphere	nent system				
Assumptions	- 0	ne preferre	d site ente	rs the regul	atory proces	s and licensir	g					
	- N - M period. - A - Lo under b	lo new field Monitoring in In electronic local climate liosphere m	or laborate nstallations information monitoring.	ory activities (wells and on managen g, such rain	s during the seismograph nent system fall and snov	licensing pha ns) at the seconis is operationa v accumulatio	se. ond site not s il. on, as well as	ation activities selected will be surface water	gradually o			
	- F	ormal moni	toring prog	ram begins	in the year f	ollowing the	end of detail	ed site charact	erization.			
	- Majo - Selec - Suite - Basio	or ions, trac ted isotope of metals corganic an	e elements s, known to alysis	, tritium and be potenti	d gross beta al contamina	radiation, dri ants associate	lling water tred with the re		oundwater	·		
	in the perio	od. Water sa ed to the ba	amples will aseline data	be collected a collected o	d from specif during the Sit	fic intervals ir ting Phase to	the mulit-le assess any lo	erly if possible and wells on a song-term trends	semi-annua s or change	l basis. Th s in back	ne informati ground cond	on collected litions.
	through	out the cor	nstruction a	ind operation	on phases of							
	· NWM geosphere	10 Specialis modelling(2	ts: 13 NWN 2), hydroge	ochemistry(	-Y15) requir 2), rock med		ophysics (1)	ird rock or sedi and data mana			gy (2), hydr	ogeology (2)
	Purchased	Cardena			-							
	hrs	Hydrauli per quarte	r] = \$350k	/a. Groundy	water sample		.8 multi-level	er quarter], tra wells [1xPS-4 :				g [PS-3 at 28
		Monitor Abandor trumented t 4 years of	and mainta ning/groution boreholes the period	ain seismog ng instrume at \$200k pe (Y12 to Y15	raph and GP nted boreho r borehole = ) at \$1.75M,	S stations: \$1 les including \$7M). For pl /a.	00k/a from \ developmen anning purpo	t of decommiss oses assume ab	andonmen	t of 9 bor	eholes per y	rear in the
	res	ults: \$450k Address	in Y12 and regulatory	\$450k in Y1	L4 for a total and update (	effort of \$90 Geomechanic	0k al models to	two intervals d support desigr g period: \$875l	n (one time)	: \$375k i	n Y14	monitoring
		ograph repl	acement du	iring period	: \$150k (assı borehole, ir		oval and insta	allation: \$1M (a	assume Y15	)		
Schedule	Start Year			10	2019			Finish Year	15	202	4	
Туре	Fixed											
Calculations and Notes:	complete h monitoring Sweden are network in samples, pi including th	ydraulic pro intervals e e instrumen Pinawa. Ba rimarily from ne seismic n f models (D Assumin	essure prof ach. This m ated with a sed on the m the shalld nonitoring GSM, hydr g more bo	iling measur ay be requir maximum of DGR experi- ower, US-se activity. ological and reholes at s	rements. It s red in a sedir of 8 intervals ence, it may ries Westbay	hould be not mentary rock that tend to atke on avera a systems. The ical) requires eed to be aba	ed that the D setting. By c target higher age 35 hours e recent DGF	ystem it may ta GR-series bore omparison, the conductivity, f per borehole t a experience ha fort. uires 1.75 more	choles inclui groundwar fractured ho to purge and as formed th	de betrwe ter monit orizons, s d collecte	een 20 and a oring wells milar to the d groundwa	40 at Forsmark, URL iter
Labour		One add	itional Wes	stbay systen	r Costs		total	Allowance	25%	_	Total Cos	
>	11,482,405	\$	1,150,000	\$	13,686,000	\$	26,318,405	\$	6,579,601	\$		32,898,007

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## **Work Element Definition Sheet**

WBS (New)	561	30	20	30	10					Prepared By: E	3. Belfadhel
WBS (Old)	552	15	20	40	<u></u>						
WBS Title	DATABASE	AND INFOR	RMATION SY	'STEMS							
Description	design into monitoring further se toward con Databases timeframe Database geophysics groundwa	ended for sign data. Informer to archinfirmation of would be a of the projects would be so, seismicity ter resource	patial and the properties of the preferences of the preference of	temporal and tempo	nalysis, inte d be applied nere/biosph d UCF const analyses are essential. de data inf ata, munici e model dev	rrpretation, I and, as receivere data an ruction/ope nd visualization formation of pal/ region recomment a	integration quired, up- quired	and commu graded through raceable data ations (GIS, G rtation, naturaties, aborigina	nication of ghout the rouse sets that wood,), woral environmal lands, su simulations	ion management site specific chara epository siting prowould evolve as swhich would likely ment, remote imprace hydrology, swill also be archivappropriate.	acterisation and rocess. It would iting proceeded evolve over the aging, airborne topography and
Deliverable		Electronic I I geosphere		•					siting, Envi	ronmental Assessi	ment,
Assumptions	- Ar	nnual Licensi		, 0		·	ough Geosc	ience and mo	nnitoring sur	oport beyond Y25.	
		atabase/ iiiic	711110111111	anagement	3,31011111111	intained till	Jugii Geosc	nence and me	intorning sur	port beyond 123.	
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	ō										
Labour (	Costs	Materia	al Costs	Other	r Costs	Subt	otal	Allowance	25%	Total	Cost
\$	-	\$	1,000,000	\$	-	\$	1,000,000	\$	250,000	\$	1,250,000

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#### Work Element Definition Sheet

WBS (New)	561	30	20	30	20				Prepared By: B. Belfadhe	el
WBS (Old)	552	25	80	<u> </u>						
WBS Title	GEOSCIEN	CE SUPPOR	T AND MON	IITORING	DURING UDF	CONSTRUCTION				
Description	DGR's mai	in shaft, ser	vice shaft ar	nd exhaus	t ventilation s	haft, associated	stations and	services will be constr	d (Y16-Y20). During this perioucted including the access drificals following this period.	
	Work activ	vities suppo	rt DGSM ref	finement	and confirmat	ion, Repository	Engineering :	and Safety Assessment	functions. The main tasks are	<b>:</b> :
	- geo (1&2) and	logic mappi UDF drifts a	ng, hydroge and testing i	ological, g rooms;	geochemical a	nd geomechani	cal characteri		ring network; construction of shafts, access athered during UDF construction	
	- plar monitorin	nning, mana	gement an	d reporti	ng of studies	for the characte	erization of the		models; is and testing rooms EDZs; se- tion deformation monitoring; i	
Deliverable	- Ann - Prov - Upd - Geo	ual monitor vision of QA late DGSM a oscience rep	ring reports 'd monitorion and reference orts describ	on far-fie ng data to ce hydrog	ld and near-fi the electroni eological and	eld conditions, i c information m geomechanical	ncluding eval anagement s numerical m	odels.	activities.	eering
	and Sarety	/ Assessmer	IT.							
Assumptions	- Sha	fts/vent sin	king and sta	tion cons	truction comp		/16 and Y18;	ted simultaneously. UDF and DGR access d	rifts completed by Y20.	
	NWMO St · Seni · NW	or managei MO Special	ment at 1 N' ists: 13 NV	VMO-3/a		(Y16-Y20) requi			. or sedimentary rock geolog ty (1), and data management (	
	· Trav	el/Expenses	:: \$26k/a for	r 5 years (	Y16 to Y20).					
	o Q WED \$105	field Monito uarterly hyo 561.30.20.2 k/a.	fraulic press 20.20): \$630	0k/a from	Y16 to Y20: P	_	g @ \$350k/a,	Groundwater samplin	ble and reporting over 5 years g @ \$175k/a and Analytical co	
	- (	Geoscience	characteriza	ation duri					es 24/7 during sinking of three	<u> </u>
			y: \$10M (Y1 characteriza		ng shaft statio	n, access drifts	1 or 2, and U	DF gallery excavations	: \$2M (averaged over Y18 to Y	(20)
	- l	Update hyd Update Geo	ogeological mechanical	l model di models to	uring the perions o support desi	od accounting fo gn (one time): \$	r monitoring 375k in Y19.		k (Y19).	
		•			•	٠.		50k (assume Y18). ation [1] if needed: \$1	M (assume Y20).	
Schedule	Start Year			1	16 202	5		Finish Year	20 2029	
Туре	Fixed									
Calculations and Notes:		ity testing, l							oping and geophysics, EDZ urement, deformation monito	ring,
	surveys, ro	ock core and	l block sam	pling, seep	page water m	onitoring, boreh	ole hydraulio		ng, EDZ and rock mass geophys nd instrumentation, micro seis m installation.	
	•					Iditional boreho				
Labour			aft and acc al Costs		for the larger her Costs	repository foot Subt		med to occur at a late Allowance 25%	r date.  Total Cost	
\$	9,568,671		1,150,000		21,655,000		32,373,671	\$ 8,093,41		7,089

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561 552	30 25	20 80	30	30				Prepared By:	B. Belfadhel
WBS Title	GEOSCIENO	CE SUPPOR	T AND MON	IITORING DU	JRING UDF C	PERATION				
	Provide ca operation (	pability for (Y21-Y25).	geoscience Work activi	far-field an	d near-field Geoscience	monitoring, n	umerical analy	ent phase of DGR constr ysis and geoscience-base Safety Assessment funct	ed confirmation	_
	- Plan	ning, execu	ution and an	alyses of ge	oscience-bas	sed confirmati	on tests in the	meter drifts and cross-cu UDF and selected location mechanical numerical m	ons within the I	
Deliverable	- Plan: - Annu - Prov - Upda	s, status ar ual monito ision of QA ate DGSM	nd final analy ring reports A'd monitori and referen	ysis reports on far-field ng data to th ce hydrogeo	of geoscienc and near-fie ne electronic logical and g	e-based confir ld conditions, information r geomechanical	mation tests. including evalunanagement so nanagement so numerical mo	odels.		
	- Geo: Assessmen		oorts updati	ng geologic/	/hydrogeolog	gic descriptive	and numerica	I models in support of R	epository Engi	neering and Safety
Assumptions	- DGR NWMO Sta		ns will includ	le perimeter	drifts 1 & 2	and perimete	r cross-cuts A 8	& B (7 km).		
	· Senio	r manage ∕⁄O Specia	lists: 10 NW	VMO-3/a fo		'21-Y25) requi		ock or sedimentary rocl nicity (1) and data manag		hydrogeology (2),
			s: \$20k/a for	r Y21 to Y25.						
	Purchase S - F		draulic pres	sure measu	rements and	groundwater	sample collect	tion where possible and i	reporting: \$225	5k/a for Y21 to Y25.
	- N - G	Monitor and leoscience	verification	ar field seisr activities <sup>2</sup> d	nograph and uring DGR p	erimeter drift		21 to Y25. excavations (assume scal ft stations excavations):		
	- U	pdate hyd	rogeological	l model duri	ng the perio	d accounting f		to confirm parameters. results: \$450k in Y23. /24.		
	Equipment	: One repla	acement seis	smograph d	uring period	0k/a for Y21 to : \$150k (assum cluding remov	ne Y23)	ion if needed: \$1Mk (as:	sume Y25)	
Schedule	Start Year			21	2030			Finish Year 25	2034	
Туре	Fixed									
Calculations and Notes:					-			be reduced by half during overall DGR monitoring a		erations as near
	mineralogy access way	, borehole s (away fro	groundwate om emplace	er water san ment rooms	npling, hydra ), in-situ stre	aulic conductivess measureme	ity testing and ents, geomech		cted locations a	along the perimete
	support ge transport p	omechanic arameter	cal modelling measureme	g, large scale nts in proxin	stability tes	t, rock mass c , microbial sar	reep, EDZ evol	ng the period: In-situ stre ution and testing, field so colled environment, bore	cale thermal pr	operties, tracer
Labour C			ial Costs		r Costs	1	total	Allowance 25%		tal Cost
\$	7,615,923	\$	1,150,000	\$	14,525,000	\$	23,290,923	\$ 5,822,731	\$	29,113,654

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561 552	30 25	20 80	40	10					Prepared By:	B. Belfadhel
WBS Title	GEOSCIENO	E SUPPORT	AND MON	ITORING DU	JRING DGR	OPERATION	<u> </u>				
Description	panels. Pla Geoscience	cement of	containers n studies w	and sealir	ng of empla eleted to su	acement ro pplement t	oms will b he descripti	e ongoing i ve geoscient	n one pane	l as another i	ouilt successively in s being excavated operations period
Deliverable	- Annı - Prov - Rev		on far-field d monitorir pdate DGS	monitoring ng data to th M and ref	conditions, ne electroni	and evaluat c information	tion of trend on manager	ds. nent system.		nodels in sup	port of Repository
Assumptions	period by complete Near	two separa	te mining of	crews. Each	panel will	require ap	proximately	/ 1900 m/a	of excavatio		proximately a 24/7 e about 4 years to
	NWMO Sta - Senio - NWI hydrogeocl	ff: r managem MO Speciali	ent at 1 NV ists: 8 NW , rock mech	VMO-1/a (Y VMO-3/a (Y nanics (1), g	26-Y85). '26-Y85) re eophysics/s	quired in I	hard rock		hydrogeolo		here modelling(1),
	Purchase S - F Y85. - A	ervices:	raulic press sts: \$52k/a	ure measur for Y26 to Y	ements and		•		ere possible	and reporting:	\$262k/a for Y26 to
	- U in Y30. - U	pdate hydro	ogeological mechanical	model ever	ry 5 years do upport on-g	uring the pe	eriod accour	5k every 5 ye	nitoring resul	ng in Y30.	y 5 years begining
								verification y 5 years du			Y35, Y40, Y45, Y50
	Y35. This a allowed. - Geos - Geos		t some bro acterization	oken or mal	functioning nt construct ess drift 3/4	systems w ion: \$3M (Y 4: \$1.5M av	rill not be r 45). eraged over	eplaced duri r Y46 - Y47.			10 years starting in me attrition will be
Schedule	Start Year			26	2035			Finish Year	85	2094	
Туре	Step-Fixed										
Calculations and Notes:	sampling, s Main impa	eepage wat	er monitor	onitoring of	ogical analy	rehole netw	tory geome	chanics testii dating variou	ng (760k per us models tha	panel over 4 y at cover larger	·
	(Y46 to Y47	') and perim	eter drift a	nd cross-cu	ts (Y48, Y49	).		T			
\$ 7	osts 5,769,092	\$ Materia	6,900,000		'Costs '8,900,000		total 51,569,092	\$	<b>25%</b> 40,392,273	\$	201,961,365

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## **Work Element Definition Sheet**

WBS (New)	561	30	20	50	10				Prepared By: B. Belfadhel
WBS (Old)	552	25	80						
WBS Title	GEOSCIEN	CE SUPPORT	T DURING E	XTENDED	MONITORING	<u> </u>			
Description	- This		extended m	nonitorin	g occurs from	Y86 to Y155. During	this period of e	extended n	nonitoring, the facility will remain
Deliverable	- Ann	ual reports o	on far-field	monitori	ng conditions,	and evaluation of tre	nds.		
Assumptions	•	monitoring ter pressure			•	r WED (ex: micro-seis	mic, deformatio	on of acces	s and perimeter tunnels, thermal,
	- Geo - Geo - Geo	aff: requiren science mar science spec science tech rel: \$8k/a th	nagement (1 cialist (1 fte hnologist (2	l fte) ) fte).	3/a for 70 yea	rs based on:			
	and report - Anal - Mor - Far-	field (surfacting: \$262k/a lytical costs: nitor and ma	'a. : \$52k/a for aintain seisr oring equipn	the perion	od. and GPS static lacement prov	ons: \$100k/a for perio vision: One replaceme	d. nt seismograph	: \$150k eve	sample collection where possible ery 5 years. ed: \$1M every 10 years
	•				•	or repaired and thus ed and applied to the			xpected. Future improvements in
Schedule	Start Year			<u> </u>	86 2095		Finish Year	155	2164
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Otl	her Costs	Cubtotal	A II	350/	7.10
			iai Costs	Oti	iei costs	Subtotal	Allowance	25%	Total Cost

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## **Work Element Definition Sheet**

WBS (New)	561	30	20	60	10					Prepared By:	B. Belfadhel
WBS (Old)	552	25	80								
<b> </b>											
WBS Title	GEOSCIEN	CE SUPPOR	T AND MON	NITORING D	URING DGR	DECOMMI	SSIONING				
	this perior geoscience - Mar - Far- various de - Revi decommis - Plan models ba	d, main acce e Performar nagement a field monit commission ew and upo sioning licer	cess ways nce Assessm nd evaluation oring of ge ning stages of date of the I nse; anagement coperation copical issue	and shafts nent and po on of the lo oscience ir on geosphe Descriptive of studies al response es as may b	will progresst-closure S ng-term mo istrumentat re response Geosphere for the impr	essively be diafety Assessivationing sys- cion (ex: groups and to account and to account and to account and to account and account account and account account and account account account and account account and account account account and account account account account and account acc	backfilled sment func item progra bundwater quire post- and associa	and surface tions. The m am. monitoring operational b	facilities real facilities rea	emoved. Work e: lographs) to e: ditions prior to	156-Y180). During activities support stablish impacts of abandonment.  models to support and geomechanical
} 	,,,,,,	1 033 1 0 6 01 01	.01 9 001111110								
Deliverable	- Ann - Revi license.	ual monitor ew and upo	ing reports	on post-op and refere	ence hydrog	eosphere co eological ar	nd geomec	nd evaluatior hanical numo ement systen	erical mode	ls in support o	f decommissioning
Assumptions	•	-				-	_	ne early stage	es of decom	missioning per	iod (first 5 years to
	obtain lice	nse), but w	iii be systen	natically cid	sea auring i	most of the	perioa.				
	- Elec	tronic infor	mation mar	nagement s	ystem is ope	erational.					
	- Geo - Geo - Geo	aff: requirer science man science spe science tecl rel: \$14k/a	nagement ( cialists (3 ft	1 fte) e)	a for 25 yea	irs based on	:				
	Purchased	Services:									
	possible ar - A - N - L	nd reporting Analytical co Monitor and Jpdate hydr Jpdate Geo	g: \$228k/a. osts: \$52k/a I maintain s rogeologica mechanical	for the per eismograph I model dur model dur	riod. n and GPS st ring first yea ing first yea	tations: \$10 or decommis	Ok/a for pe ssioning pe sioning per	riod. riod: \$450k iı iod: \$375k ir	n Y156.	dwater sample	collection where
	Equipmen	t Replacem	ent Provisio	on: It is an	ticipated th	nat many m	onitoring i			_	ut the period. It is
Schedule	Start Year			156	2165			Finish Year	180	2189	
Type	Fixed										
Type Calculations and Notes:	Fixed										
Labour (	Costs	Materi	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	То	tal Cost

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## **Work Element Definition Sheet**

WBS (New)	561	30	20	70	10					Prepared By:	A. Vorauer
WBS (Old)											
WBS Title	GEOSCIEN	CE SUPPORT	AND MON	ITORING DI	JRING DGR	ABANDONI	ЛENT				
Description	However,		n cost is as	ssociated w							e not well defined. a technical nature
Deliverable											
Assumptions	- Abaı	ndonment a	ctivity costs	s estimated	at \$50M.						
Schedule	Start Year			181	2190			Finish Year	181	2190	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs		al Costs		Costs		total	Allowance			tal Cost
\$	-	\$	-	\$ 5	50,000,000	\$ 5	0,000,000	\$	12,500,000	\$	62,500,000

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## **Work Element Definition Sheet**

Description Th Pr Sit Th th	nis task is reliminary te and for ne preclos ne operati	to provide  safety Rep  r a Licence  sure assessing and mo	preclosure port (PSR). to Construc ment will ac	and postclo The EA and t.			t contributi																
Sit Th th: ab	reliminary te and for ne preclos ne operati ne postclo	y Safety Repraise a Licence sure assessing and mo	oort (PSR). to Construc	The EA and t.			t contributi				SAFETY ASSESSMENT FOR EA AND PSR												
th Th ab	e operati	ing and mo	This task is to provide preclosure and postclosure safety assessment contributions to both the Environmental Assessment (EA) and the Preliminary Safety Report (PSR). The EA and PSR documents will be submitted in support of the applications for a Licence to Prepare Site and for a Licence to Construct.  The preclosure assessment will address conventional and radiological safety for normal, upset and accident conditions associated with the operating and monitoring phases.																				
	oandonm	e postclosure assessment will address the anticipated effects on human and non-human biota following decommissioning and andonment. Both radiological and non-radiological contaminants will be considered.  - Preclosure Safety Assessment report.  - Postclosure Safety Assessment report.																					
Deliverable		ent. Both r	adiological	and non-ra	diological co	ontaminant	s will be co	nsidered.															
Denverable	- P	ostclosure : reliminary /	Safety Asse ALARA Asse	ssment rep																			
	- R - P	adiological reclosure a	-	essment. Sure contrib		e EA and th	e PSR.																
	- U	pdated dat	asets.		e: Referenc		tures, Ever	nts and Proces	sses; Norma	al Evolution scenario; Dis	ruptive												
Assumptions	- W - P reports	Vork is carri reliminary o are to be c leosynthesi	ied out itera design fixed ompleted b	atively, with I and availa by end Y12.	interim ve ble one yea	rsion releas r ahead of v	ed in mid-Y vhen final s	safety assessn	nent reports	s are due. That is, by en													
	This will  - C than a u - T	I be address onventiona uranium mi he staffing	sed in Oper Il Safety Ass ne. model is co	rating Licend sessment de ensistent wit	ce stage. etail is more th the curre	consistent nt status qu	with dry st	orage facility	Convention	nificant ALARA optimizat nal Safety Assessment ra ed). ety Assessment).													
Ca	alculation	Section be	low for mo	re informat	ion and staf	f categoriza	ition). This			10, Y11, and Y12 (see the nanagement of contract:													
	_	r contracto .5M for Y12		ith preclosu	ire and post	closure ass	essments (	including revi	ew and com	nment) is \$2.8M for Y10,	\$2.8M												
	WMO expoeed com		\$40 K/a (~5	K\$/a/FTE).	This will co	ver softwar	e licences,	travel (sites, o	conferences	s) and other costs (e.g. h	igh												
Schedule Sta	art Year			10	2019			Finish Year	12	2021													
<b>Type</b> Fix	xed																						
Calculations Bio	osphere a	and transpo	ortation sta	ffing requir	ements are	not include	d here.																
M	-	/M (NWMC	•		<u>Y10</u> 1 1	<u>Y11</u> 1 1	<u>Y12</u> 1 1																
l :		(NWMO-0 NMO-03)	3)		1 5	1 5	1 5																
То	otal FTE				8	8	8																
\$ 3,6	671,413		al Costs	Other \$	<b>Costs</b> 9,220,000	\$ 11	otal 2,891,413	Allowance \$	<b>25%</b> 3,222,853	\$ Total Cost	,114,267												

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	20	20					Prepared By:	N. Hunt, P.	
WBS (Old)						<u></u>	***************************************				Gierszewski	
WBS Title	SUPPORT F	OR REVIEW	' AND HEAR	INGS FOR C	ONSTRUCT	ION LICENCE						
Description	and Prelim	inary Safety	Report (PS	R) submissi	on. It is also	o anticipated	that Safet	y Assessmen	t staff will a		Assessment (EA) of sessions with	
Deliverable	Prepare re Presentation Participation	•	for public a	nd regulato	•							
Assumptions	support thi	s activity in	WBS 560.2	5.30.20.10	(Technical S	d 6 NWMO-0 Support Durin	g EA and F	PSR Phase).	he effort fo	r management (	of contracts that	
Schedule	Start Year			13	2022			Finish Year	15	2024		
Туре	Fixed											
Calculations and Notes:												
Labour	Costs	Materi	al Costs	Other	Costs	Subto	tal	Allowance	25%	Tot	tal Cost	
Ś	3,671,413	\$	-	\$	1,200,000	\$ 4	,871,413	\$	1,217,853	\$	6,089,267	

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	20	30	<u> </u>				Prepared By:	N. Hunt, P.
WBS (Old)			ļ			<u> </u>					Gierszewski
WBS Title	BIOSPHERI	CHARACTE	RIZATION F	FOR EA AND	) PSR						
Description	<u> </u>				oiosphere ch ecific focus			tion created ir	n WBS 560.1	15.30.10.40 (Bio	osphere
Deliverable	Maintenan	ice and upd	ate of biosp	here datab			ohere chara	acterization an	ıd impact ar	nalysis.	
Assumptions	the info	ormation ne	cessary to	define the b	oiosphere. H	lowever, it i	s anticipate	ed that there v	vill be some	Candidate Sites additional Env are prepared, w	
		·			Z/a for each		.2.				
	Fulluling 10	i contractor	Support is	3200 K III E	acii di 110 t	0 112.					
Schedule	Start Year			10	2019			Finish Year	12	2021	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Tot	al Cost
\$	390,550	\$	-	\$	600,000	\$	990,550	\$	247,637	\$	1,238,187

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#### **Work Element Definition Sheet**

WBS (New)	561	30	30	30	10	ļ				Prepared By:	N. Hunt, P.
WBS (Old)		<u>.</u>		<u></u>		<u> </u>					Gierszewski
WBS Title	SAFETY AS	SESSMENT I	FOR FSR								
Description	1	•	•	•		,	sment contri cence to Ope		he Final Safe	ety Report (FSR)	
	•	ing and mo				_	-	-			s associated with ent, and a Radon
	•				•		s on humar		uman biota	a following dec	commissioning and
Deliverable	Contributi	ons to the F	SR include:	:							
	- F - C - F - N - L	Postclosure S ALARA Asses Conventiona Radiological Natural Anal Updated con Updated dat	Safety Assessment. Il Safety Assessety Assessety Assessety Assessety Assessets.	essment. les and supp	ort. ort docume						
	- L	Jpdated Fea	itures, Evei	nts and Proc	esses docu	ment.					
Assumptions	WBS 56 Demon	50.30.30.20. stration Fac	10 (Safety cility (UDF)	Assessment and the fina	for EA and I decision v	PSR); how vill be used	ever, in this d.	case additio	nal informa	tion from the U	Report (PSR) in nderground port for Operating
		Application			· ·		·				
	- F	inal design	is fixed and	d available 2	years ahea	d of when	the FSR is d	ue.			
	- Т	he regulato	ry review a	and approva	l period tak	es 2 years	which impli	es the final v	ersion is to	be completed b	y end Y23.
	•		-	complete for FSR work m				ner 2 years r	equired for	review and revi	sion to produce the
	- Т	he staffing	model is co	onsistent wit	th the curre	ent status o	quo (i.e., mo	re buy than	make orient	ed).	
	1	•		•			10-01 and 6 ort for Opera			•	ment of contracts
	Contractor		ith preclos	ure and pos	tclosure as	sessments	(including r	eview and o	comment) is	\$3 M/a for Y19	9 to Y23 (similar to
	NWMO ex speed com	•	\$40 K/a (~\$	\$5 K/a/FTE).	This will co	over softw	are licences,	travel (sites	, conference	es) and other co	sts (e.g. high
Schedule	Start Year			16	2025			Finish Year	23	3 2032	
Туре	Fixed										
Calculations and Notes:											
Labour			al Costs		Costs	-	btotal	Allowance			tal Cost
\$	9,790,435	\$	-	\$ 1	15,320,000	\$	25,110,435	\$	6,277,609	\$	31,388,044

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	30	20	<u> </u>	<u> </u>			Prepared By:	N. Hunt, P.
WBS (Old)	301	30	30	30	20					riepaieu by.	Gierszewski
WD3 (Ola)			i	<u></u>	<b></b>	<b>!</b>					GICI 32CW3KI
WBS Title	BIOSPHER	E MONITOR	ING								
WD5 TIEC	DIOSI IIEI	LIVIOIVIIOI									
Description	This task is	for the dev	elopment a	ind operation	on of a biosp	ohere moni	toring progr	am.			
	Environme	ental Effects	Monitoring	is a nroces	s which wil	l establish t	he haseline	conditions of	the hiosph	ere and then m	onitor for changes
	to the bas	eline from t	he activities	occurring	at the facilit	y site, whe	ther this is		•		ency procedures or
						_					
	The monit	oring progra	am includes	:							
	Ē		-		_			Management the likely caus	-	n. rmining mitigati	on / actions.
	•	npliance Mo f-site air act	_		ted to ensu	re that all F	rovincial re	gulatory requ	irements ar	e met for efflue	ent discharges, and
	1	of measure nts, including		off-site lo	cations will	also be co	llected on a	a regular basi	s for use w	rith public heal	th and monitoring
	- Wat - Soil - Wild	- continual r er – rain, dr – 20 soil sar dlife and Pla duce – for ex	rinking wate mples per qu nts – 10 floo	er, lakes, str uarter ra and faun	eams, rivers a samples fr	o – 10 samp	les per ever	t	tation)		
Deliverable	The main (	deliverables	are:								
	- Peri - Prov	odic reports vision of env	s on complia	ance with ta data and a	irgets set ou nalysis for p	it in the Envublic inform	vironmental nation.	asons for the o	System Pla		e Environment as
Assumptions	<u> </u>	Baseline bio: Excludes gro	•			S 560.30.30	).20.30 (Bio	sphere Charac	cterization f	or EA and PSR).	
	NWMO sta	aff requirem	nent is 1 NW	/MO-03 FTE	/a as long a	s the progr	am is runnir	ng.			
	•	r costs for d							ng. This inc	cludes contracto	or staff costs, costs
				······································							
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi	al Costs	Othor	r Costs	Çııh	total	Allowance	25%	Tot	al Cost
	1,301,832	1	ai CUSIS	\$	2,000,000	\$		\$	825,458		4,127,290
\$	1,501,652	۲ ا		١ ٢	2,000,000	۲	3,301,832	7	023,430	7	4,147,430

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	30	30					Prepared By:	N. Hunt, P.
WBS (Old)				<u> </u>							Gierszewski
WBS Title	HUMAN HI	EALTH MON	ITORING								
Description	A regular a	ssessment o	of public he	alth will be	conducted	and may inv	olve the fo	llowing activit	ies:		
	- Iden	tification of	communit	y health cor	icerns						
	- Publ	ic health im	plications								
	- Site	specific hea	Ith outcom	es							
	The focus i	s on assessi	ng the pote	ential impac	ts of facility	operations	on the hea	Ith of the peo	ole living in	the area of the	e facility.
Deliverable	The main o	leliverables	for the Hur	nan Health	monitoring	are:					
	E	•		through and	•		icluding gei	neration of pu	blic health a	assessment rep	oorts.
Assumptions	<b>:</b>	•		h is not incl		g basis.					
	A study is o	conducted e	very 5 year	s at a cost o	of \$500 K/st	udy.					
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%		tal Cost
\$	-	\$	-	\$	1,000,000	\$	1,000,000	\$	250,000	\$	1,250,000

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	30	90					Prepared By:	N. Hunt, P.
WBS (Old)											Gierszewski
WBS Title	SUPPORT F	OR REVIEW	' AND HEAR	INGS FOR C	PERATING	LICENCE					
Description	submission	ı. It is also a	nticipated	•	Assessment	staff will at	tend a vari	ety of session		Final Safety Re Jublic, elected	eport (FSR) representatives and
Deliverable	Presentation		for public a	stions. Ind regulato SR materials	•						
Assumptions	1	0 .		2 NWMO-0 Technical Su			•		nagement c	of contracts the	at support this
	Funding fo	r contractor	support du	uring the Op	erating Lice	ence review	process is e	estimated at	\$400 K/a for	2 years.	
Schedule	Start Year			24	2033			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	Assumed s	imilar level	of effort as	in supportir	ng the Cons	truction Lice	ence applica	ation.			
Labour	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	To	otal Cost
\$	2,447,609	\$	-	\$	800,000	\$	3,247,609	\$	811,902	\$	4,059,511

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	40	10				Prepared By: N. Hunt, P.
WBS (Old)								·	Gierszewski
WBS Title	OPERATIO	NS SAFETY A	ASSESSMEN	IT					
Description	This task is	to provide	safety asse	ssment sup	port during	the facility opera	iting peri	iod. Specific items inclu	de:
	- F	Preparation	of periodic	safety asse	ssment repo	orts to support c	ontinuati	on of the site Operating	Licence.
	- /	Assessment	of topical is	sues as ma	y be require	d, including any	follow-u <sub>l</sub>	p issues from Operating	Licence approval.
	:	Maintenance Inder a suita	-		the safety a	nd performance	assessm	ent computer codes, in	cluding reference databases and
	- 1	Maintenance	e of the ref	erence site	numerical n	nodel developed	in WBS 5	560.30.30.30.10 (Safety	Assessment for FSR).
	1	Planning and nent models	_				levelopm	nent and validation of sa	afety and performance
	•			•			port the	monitoring and eventua	al closure of the facility.
	- 1	nterpretatio	on and appl	ication of e	xperiments	conducted in the	Underg	round Demonstration F	acility (UDF).
Deliverable	<u> </u>	Jp-to-date r	eference re	epository sa	fety assessn	nent model.			
	•	•			•		r support	ting renewal of the site	Operating Licence.
	=							the reference safety as	
				0 0 0					
Assumptions	- 1	he monitor	ing of geolo	ogic condition	ons around	the site, and mai	ntenance	e of the site hydrogeolo	gical reference numerical model
	•	ddressed he						, ,	
	- (	Costs do not	include bio	osphere mo	nitoring.				
	Ē			-	_	as needed to sup	nort one	erations.	
	=							vironmental program in	support of operations
	<u> </u>	20313 00 1101	. Include res	эронзынгу	ioi convent	ionai ricaitii, sai	cty & Lin	vironinentai program in	support of operations.
	•	The cost for .50.40.10 (C					i.e., univ	ersities, international co	ollaboration) is described in WBS
	NWMO sta	aff requirem	ients are 5 I	FTE/a based	d on:				
		safety assess	mant man	ager (1 NIVA/	MO-01\				
	:	echnical spe			-	NMO-03)			
	1	nalyst/engi		-	SITICITE (Z IVV	V 1V10-03)			
	į '	andry sty engl	110013 (2 144	1.110 037					
	Expenses	are estimate	nd as \$400 k	(/a to provi	de consultai	nt sunnort (softy	are sunr	nort technical analysis s	and peer review), and costs for
	•					ernational confe			ma peer review, and costs for
	traver to a	tterra pabrie		and to parti	cipate iii iiit	cinational come	erices ai	na workshops.	
				·			······································		2004:
Schedule	Start Year			26	2035		Fi	inish Year 85	2094
 	: ·								
Туре	Step-Fixed								
Calculations									
and Notes:				1		T			
Labour (			al Costs	1	r Costs	Subtotal		Allowance 25%	Total Cost
\$ 4	44,525,124	\$	-	\$	24,000,000	\$ 68,52	5,124	\$ 17,131,281	\$ 85,656,405

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	40	20					Prepared By:	N. Hunt, P.
WBS (Old)											Gierszewski
WBS Title	BIOSPHER	E MONITORI	ING								
Description	This task is	for the dev	elopment a	ind operation	on of a biosp	ohere moni	toring progr	am.			
	to the bas	eline from tl	he activities	occurring a	at the facilit	ty site, whe	ther this is		-		onitor for changes ency procedures or
	The monit	oring progra	ım includes	:							
	:		-	-	_			Management the likely cau	-	n. rmining mitigati	ion / actions.
	<b>.</b>	npliance Mo f-site air act	_		ted to ensu	re that all I	Provincial re	gulatory requ	uirements ar	e met for efflue	ent discharges, and
	1	of measurer ts, including		off-site lo	cations will	also be co	ollected on a	a regular bas	is for use w	ith public heal	th and monitoring
	- Wat - Soil - Wild	er – rain, dr – 20 soil san Ilife and Plai	inking wate nples per q nts – 10 floo	er, lakes, stro uarter ra and fauna	eams, rivers a samples fr	o – 10 samp om various	ampling eac les per ever locations e er quarter (d	ach quarter			
Deliverable	The main o	deliverables	are:								
	- Peri - Prov	odic reports vision of env	on complia	ance with ta data and ar	irgets set ou nalysis for p	ut in the Env	vironmental nation.	asons for the Managemen	t System Pla		ne Environment as
Assumptions	•	Biosphere d Excludes gro				).30.30.20 (	Biosphere N	Monitoring).			
	NWMO sta	aff requirem	ent is 1 NW	/MO-03 FTE	/a as long a	s the progr	am is runnir	ng.			
	1						long as the report prep		running. Th	is includes con	tractor staff costs,
Schedule	Start Voor			26	2035			Finish Year	85	2094	
Jenedule	Start Year			<u>.</u>	2033			. 1111311 1Ed1	. 03	ZUJ4:	
Туре	Step-Fixed										
	Jeep i incu										
Calculations											
and Notes:	Costs	Matari	al Costs	Other	r Costs	CL	ntotal	Allowansa	250/	7-4	eal Cost
Labour (	7,810,992	1	al Costs		r <b>Costs</b> 12,000,000		total	Allowance	<b>25%</b> 4,952,748	\$	24.762.740
\$	7,010,992	۶	-	ر د	12,000,000	۶	19,810,992	\$	4,332,748	ب	24,763,740

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	40	30					Prepared By:	N. Hunt, P.
WBS (Old)	<u></u>										Gierszewski
WBS Title	HUMAN HI	EALTH MON	IITORING								
Description	A regular a	ssessment	of public he	alth will be	conducted	and may inv	olve the fo	llowing activi	ties:		
_ coop	, rregular a	33233	o. pao								
	Ē			/ health con	cerns						
	•	ic health im	•								
	- Site	specific hea	Ith outcom	es							
	The focus i	s on assessi	ng the pote	ntial impac	ts of facility	operations	on the hea	Ith of the pec	ple living in	the area of the	facility.
Deliverable	The main d	leliverables	for the Hur	nan Health	monitoring	are:					
	- Evalı	uation of pu	ıblic health	through and	alysis of coll	ated data ir	cluding ger	neration of p	ublic health a	assessment rep	orts.
	- Repo	orts to regul	ators and a	ny other int	erested par	ties					
	ļ										
Assumptions	•	•		h is not incl eviewed or		nacic					
	- Tubi	ic nearth ev	aidationisi	eviewed of	i an ongoni	5 00313.					
	A study is o	conducted e	very 5 year	s at a cost o	f \$500 K/st	udy.					
Schedule	Start Year			26	2035			Finish Year	85	2094	
Jenedale	Start rear			I20	2033			i iiiisii icai		2034	
Туре	Fixed										
Calculations											
Labour (	Costs	Materi	al Costs	Other	Costs	Subt	otal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	6,000,000	\$	6,000,000	\$	1,500,000	\$	7,500,000

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#### **Work Element Definition Sheet**

WBS (New)	561	30	30	50	10				Prepared By	r: N. Hunt, P.
WBS (Old)	1							A		Gierszewski
	ļ									
WBS Title	EXTENDED	MONITORI	NG							
Description	This task is	to provide	safety asse	ssment acti	vities during	the Extended Monito	oring period (Y86	5-Y155). Spe	ecific items i	nclude:
						,				
	- F	Preparation	of periodic	safety asse	ssment repo	orts to support continu	uation of the site	Operating	Licence.	
	1			sitory perfo	rmance aga	inst model prediction	s, and continual	improveme	ent in the re	ference repository
		assessment								
	•		e of safety a	and perforn	nance assess	ment computer code	s, including refer	rence datak	ases and to	ols, under a suitable
	QA sys									
	- r	Maintenance	e of the refe	erence site	numerical m	nodel developed in WI	3S 560.30.30.40.	10 (Operat	ions Safety A	Assessment).
	l ,	Na			-:			-ff-+		
	:	_	_			t related to the conting ns of continued monit		-	-	nce assessment
	1		•		· ·		_	_	•	ula a fa ailite .
	- '	raining or q	qualified Sta	ii to ensure	e continuea (	capability to support t	ne monitoring a	na eventua	i closure of	the facility.
Deliverable	•	•			fety assessm					
	•	-		-	-	porting renewal of th				al and an attended to
	:	-				ner validate or improv nued monitoring and		-	ssment mod	ei, and specifically its
	Cornera			- mpneacie			ioi repository en			
Assumptions	The follow	ing is not in	cluded here	e:						
	:	-	_		lerground De	emonstration Facility	(UDF).			
	:	Groundwate Biosphere m		-	with enviro	nmental targets).				
	1	orospiici e iii	, Simoning (c	compliance	With Civilor	inneritar targets).				
	NWMO sta	aff requirem	nents are 2 I	FTE/a based	d on:					
	<b>!</b> .				. /4 ****					
	•	echnical spe analyst/softv		-	ment (1 NW	MO-03)				
	:	-	-		-	llysis support, ongoing	peer review and	d for travel	to public me	eetings and
	=				estimated at				•	· ·
	Cost for ar	nalysis of the	e long-term	experimen	ts is estimat	ed at \$M 0.2/a. It is a	ssumed that no	major new	experiment	s are undertaken, bu
	•		_			continuously monitor	-	-	-	
	detailed a	nalysis. Thus	s the costs a	are likely to	be modest,	with periodic spikes f	or the duration o	of a recover	ry and analy:	sis campaign.
	la asatisul	:. :. :					h			
		-			_	ontainer test will have eriod. In addition, sm	-		s on analysis	of long-term expose
	•	-				on decade time-scale	•			
	a decision	with respec	t to continu	ued monito	ring or closu	re. Thirdly, the exper	iments may incre	easingly foo	cus on the in	fluence of the
	1	_	itself on the	repository	(e.g. resatu	ration) and/or on con	cepts for remote	monitorin	g of a closed	l and sealed
	repository									
Schedule	Start Year			86			Finish Year	155	2164	
T										
Туре	Fixed									
Calculations	<b></b>									
and Notes:										
Labour		1 .	ial Costs	1	r Costs	Subtotal	Allowance	25%		Total Cost
\$	18,225,648	\$	-	\$	28,000,000	\$ 46,225,648	\$ \$ 11	,556,412	\$	57,782,060

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	50	20		<u> </u>			Prepared By:	N. Hunt, P.
WBS (Old)							<u> </u>				Gierszewski
WBS Title	BIOSPHERI	E MONITOR	ING								
Description	This task is	for the dev	elopment a	ınd operatio	on of a biosp	here moni	toring progr	am.			
	to the base	eline from t	he activities	occurring	at the facilit	y site, whe	ther this is		, normal ope		nonitor for changes ency procedures or
	The monit	oring progra	am includes	:							
	1		-		_			_	t System Plar use and detei	n. rmining mitiga	tion / actions.
	1	npliance Mo f-site air act	_		cted to ensu	re that all F	Provincial re	gulatory requ	uirements ar	e met for efflu	ent discharges, and
	1	of measure ets, including		off-site lo	cations will	also be co	llected on a	a regular bas	sis for use w	rith public hea	lth and monitoring
	- Wat - Soil - Wild	- continual r er – rain, dr – 20 soil sar Ilife and Pla duce (e.g.; m	inking wate nples per q nts – 10 floi	er, lakes, str uarter ra and faun	eams, rivers a samples fr	o – 10 samp	les per ever	t ach quarter			
Deliverable	The main o	deliverables	are:								
	- Peri	odic reports vision of env	on complia	ance with ta data and a	nrgets set ou nalysis for p	it in the Envublic inform	vironmental nation.	_	nt System Pla		he Environment as
Assumptions		Biosphere da Excludes gro				.30.40.20 (E	Biosphere M	onitoring).			
	Contractor	aff requirem costs for dand	ata collectio	on and sam	pling is \$200	O K/a as lon	g as the pro	ogram is runr	ning. This inc	cludes contract	or staff costs, costs
Schedule	Start Year			86	2095			Finish Year	155	2164	
Julieuule	Jan Tedi			00	2033			י יייייייייייייייייייייייייייייייייייי	133	Z1U4	
Туре	Fixed										
Calculations											
and Notes:	Contr	BAct- 1	al Coata	C+1.	· Cost-	6.1	total	All	350/	_	stal Cost
\$	9,112,824	1	al Costs	<b>+</b> .	r Costs 14,000,000		total 23,112,824	Allowance \$	<b>25%</b> 5,778,206		28,891,030
7	J,112,024	١٧	-	٠ ٢	1-1,000,000	، با	-3,112,024	٧	3,110,200	٧ -	20,031,030

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	50	40				Prepared By	r: N. Hunt, P.
WBS (Old)			<u></u>	<u></u>	<u></u>					Gierszewski
WBS Title	HUMAN H	EALTH MON	IITORING							
Description	A regular a	issessment (	of public he	alth will be	conducted	and may involve	he following	activities:		
	- Publ	itification of lic health im specific hea	plications	•	ncerns					
	The focus i	is on assessi	ing the pote	ential impac	ts of facility	operations on th	e health of th	e people living ir	the area of t	he facility.
Deliverable	- Eval	deliverables uation of pu	ıblic health	through an	alysis of col	ated data includi	ng generatior	n of public health	assessment r	eports.
Assumptions		nitoring of w				ties				
		lic health is conducted e		J		udy.				
Schedule	Start Year			86	2095		Finish `	Year 155	5 2164	
Туре	Fixed									
Calculations										
Labour	Costs		al Costs		r Costs	Subtotal	Allow			Total Cost
\$	-	\$	-	\$	7,000,000	\$ 7,000	,000 \$	1,750,000	\$	8,750,000

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	60	10					Prepared By: N. Hunt, P.
WBS (Old)										Gierszewski
			f	A		.f				
WBS Title	BIOSPHER	E MONITORI	ING							
Description	This task is	for the dev	elopment a	ind operati	on of a bios	phere monito	ring progr	am.		
	Environmo	ntal Effocts	Monitoring	tic a proco	cc which wil	l octablich th	o hacolino	conditions	of the biosph	ere and then monitor for chan
	to the bas	eline from tl	he activities	occurring	at the facilit		ner this is o	construction	, normal ope	rations, emergency procedures
	The monit	oring progra	am includes	:						
	1		-		_			_	it System Plar use and detei	n. rmining mitigation / actions.
	•	npliance Mo f-site air act	•		cted to ensu	ire that all Pr	ovincial re	gulatory rec	juirements ar	e met for effluent discharges, a
	:	of measurer ts, including		off-site lo	ocations will	also be coll	ected on a	a regular ba	sis for use w	rith public health and monitor
	- Wat - Soil - Wild	er – rain, dr – 20 soil san Ilife and Plai	inking wate nples per q nts – 10 floi	er, lakes, sti uarter ra and faun	reams, rivers	tions with sai s – 10 sample rom various l I produce per	s per ever	t ach quarter		
Deliverable	The main o	deliverables	are:							
	- Peri - Prov	odic reports vision of env	on complia	ance with to data and a	argets set ou analysis for p	ublic informa	onmental ation.	Manageme	nt System Pla	n. Ministry of the Environment
Assumptions	•	Biosphere da Excludes gro				.30.50.20 (Bi	osphere M	onitoring).		
	NWMO sta	aff requirem	ent is 1 NW	/MO-03 FT	E/a as long a	s the progra	n is runnir	ıg.		
						0 K/a as long		U	ning. This inc	cludes contractor staff costs, co
Schedule	Start Year			156	 5 2165			Finish Year	180	2189
				å						
Туре	Fixed									
Calculations										
and Notes: Labour	Costs	Materi	al Costs	Otho	er Costs	Subto	ntal	Allowance	e <b>25</b> %	Total Cost
\$	3,254,580	\$	-	\$	5,000,000	1	3,254,580	\$	2,063,645	\$ 10,318,2
Υ	3,23 4,300	1 ~		1 7	3,000,000	1,	,,_3 ,,300	, ·	2,000,040	7 10,310,2

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	60	20				Prepared By: N. Hunt, P.
WBS (Old)									Gierszewski
WBS Title	DECOMMI	SSIONING							
Description	This task is Assessmer	•	Assessment	support fo	r the applica	ation for Decommission	ing Licence an	d possible	associated Environmental
Deliverable				•	A) as requir inal Safety R				
Assumptions	applica  - F  - T  of rese with ur Decom  NWMO sa application during the  WEDS 560 Specialist,	tion. Preparation The EA/Licer The EA addro Technical sularch that haniversities or missioning pression are 2 NWN Decommiss	for the EA/nce applicatesses all iss pport activity to taken pland contractor period.  nent staff real MO-03 FTE/sioning phase	Licence application takes 3 ues related ties are lar ace prior to a sor internequirement a for 5 years, and to e	polication beg years to pre to obtaining gely over (i.e. to the decision ational collal ats for the finates, Y156 to Yi ansure that t	ins at the start of the Depare and thereafter the general the Decommissioning and the start of the Decommissioning and the start of the Boration in order to add and wrap up of safety assession. Subsequently the he FSR remains consistence of the Start o	ecommissioning e hearing procuries have be at the facility). Idress issues the dessment activity effort is 1 NW ent with the asset will require perform technical effort technical effort activity and the second effort is 1 NW ent with the asset will require perform technical efforts.	ng and Clos eess takes 2 ne Licence 1 een sufficie However \$: at may aris ities and De MO-03 FTE s-decommis	year to complete. to Abandon. ntly addressed in the >100 years 200 K/a funding is maintained e during the 25-year ecommissioning Licence /a to maintain the facility licence
Schedule	Start Year			156	5 2165		Finish Year	180	2189
Туре	Fixed								
Calculations and Notes:				1					
Labour			al Costs		er Costs	Subtotal	Allowance	25%	Total Cost
\$	3,905,496	\$	-	\$	-	\$ 3,905,496	\$	976,374	\$ 4,881,870

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## **Work Element Definition Sheet**

WBS (New)	561	30	30	70	10					Prepared I	<b>By:</b> N. Hu	ınt, P.
WBS (Old)				<u></u>							Giers	zewski
WBS Title	ABANDON	MENT										
Description	This task is	for Safety A	Assessment	support for	r an applica	tion for abai	ndonment (	of the facility.				
Deliverable	Preparatio	n of update	d safety ass	sessment Fi	nal Safety R	eport (FSR)						
Assumptions	issues r - T the act - F - T	elated to ol the existing the Updated ual seal inst treparation the applicati	otaining the FSR will be I FSR will in allation cha for the Lice ion takes 3 ents are 2 I	e Decommis updated wi clude inforr tracteristics nce applica years to con	, sioning Lice th current c mation obta , and the ac tion begins mplete and	nce and the lata, but is c ined during tual as-decc 5 years prio thereafter t	the Decomemmissione	ufficient to su	pport the all nase, including mmissioning	pandonmer ng if necess phase.	rt licence ap	oplication.
Schedule	Start Year			181	2190			Finish Year	184	2193		
Туре	Fixed											
Calculations and Notes:												
Labour	Costs	Materi	al Costs	Othe	r Costs	Subt	otal	Allowance	25%		Total Cost	
\$	1,041,466	\$	-	\$	1,600,000	\$	2,641,466	\$	660,366	\$		3,301,832

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## **Work Element Definition Sheet**

WBS (New)	561	30	40	10	10				Prepared By: A. Khan
WBS (Old)	552	30	60	10					
WBS Title	OTHER GO	VERNMENT	APPROVAL	S - REQUIRE	MENTS				
Description	Canadian N	Nuclear Safe	ety Commis	sion and ap	proval unde	•	o site, construct o		municipal agencies (other than the che facility. Determine the actions
Deliverable	Listing of t	he necessar	y licenses, p	permits app	rovals, and	plans needed as w	ell as the actions r	equired to	obtain them.
Assumptions	and Ocean 2. The	will include s Canada, ai costs assoc	nd the Cana iated with	ndian Transp and the res	oort Agency sources nee	; and	e liaison with the	applicable	itural Resources Canada, Fisheries federal, provincial and municipal
Schedule	Start Year			1	2010		Finish Year	Ç	2018
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$	- \$	-	\$ -

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## **Work Element Definition Sheet**

WBS (New)	561	30	40	10	20					Prepared By: A. Khan
WBS (Old)										
WBS Title	PREPARAT	ON FOR EN	VIRONMEN	TAL ASSESS	MENT					
Description	=									erization activities with the CNSC n be initiated as soon as a site is
Deliverable	Informally	submit the	results of th	ne site chara	cterization	activities to	the CNSC			
Assumptions	<ol> <li>The site charac</li> <li>The 4. This</li> <li>The of the site</li> <li>The</li> </ol>	art of the si work assoc terization si results will I work will su studies are information early site ch costs assoc	iated with to tudies will come documer upport the inexpected to its expected arracterization arracterization with a second come arracterization arracterization arracterization arracterization arracterization arracterization with a second comparacterization arracterizati	the investignover such the intending techniques of the intended in techniques of the intended in the intended in the resconding activities and the resconding over the intending in the intending	ations is cap hings as me nical report with the CN at 5 years (N ver 3 years s are expect ources need	teorology, f s that will b ISC as techn ('07) prior to but is deper	rt of the sir ora, fauna, e shared wi ical reports the submindent on the lite the EA I	ting process (thydrology, geth the CNSC. are submitted sistent of the Elenumber of corocess.	ology, hydi d and revie nvironmen andidate si	5.20.10.70, 560.15.20.10.80). The rogeology, etc.  wed by CNSC staff. tal Impact Statement. The review tes.  ent interactions with the CNSC on
	CNSC Licensing Fees (\$k) NWMO-1 NWMO-3 Travel (\$k)	405 0.5 0.5 2	405 0.5 0.5 2	405 0.5 0.5 2						
Schedule	Start Year			7	2016			Finish Year	9	2018
Type  Calculations  and Notes:	in thousand NWMO-1 v NWMO-3 v	ds of dollars values repre values repre	s; esent the FT esent the FT	E effort req E effort req	uired by NV uired by NV	VMO manag VMO techni	ement; cal staff; an	d	·	e of \$250. This total is reported
Labour	Costs	Materi	al Costs	Other	Costs	Subt	otal	Allowance	25%	Total Cost
	527,304		• •							

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40 50	20	10			Prepared By: A. Khan					
	552	30		i	i	<u>                                     </u>							
WBS Title	SITE PREP.	AND CONS	TR. LICENCI	E (CNSC) AF	PLICATION								
Description					n Licence fr his includes		clear Safety Commission	(Y10 -Y12) by implementing the					
	Nuclear Sa	fety Contro	ol Act and its	s associated	regulation	s; and		the information required under					
	2. Con	firming that	safety crite	eria used in	design and	safety assessments h	ave been met.						
Deliverable	Class I Nuc	lear Facility	Site Prepa	ration & Co	nstruction L	icence Application an	d Supporting Documents						
Assumptions	It is assumed that:  1. A Letter of Intent will be submitted as soon as the site is selected. The project description will also be submitted.  2. A separate licence to prepare the site will not be required.  3. The Commission will issue a licence which will require CNSC approvals at identified stages of work.												
	4. The licence will be valid for the entire construction period; licence renewals will not be required.												
	5. An Environmental Assessment will be required before the CNSC can issue any licence (see WBS 560.30.40.20.30).												
	6. A licence application package will contain at a minimum the listing presented in the licensing procedure, NWMO-PROC-RG-0002												
	which includes such items as:												
	<ul> <li>A Preliminary Safety Report (PSR) that includes preliminary safety assessments (see WBS 560.30.30.20.10) and relevant preliminary design details (see WBS 560.20.50.20.10);</li> <li>Considerations for Radiation Protection and ALARA;</li> </ul>												
	•	siderations			n and ALAK	KA;							
	:	siderations											
	•	siderations			tness;								
		siderations siderations	-		in the Facil	itv:							
	Considerations to Operate and Maintain the Facility; - Description of the Organizational Management Structure;												
	<ul> <li>Description of the Conventional Safety Program;</li> <li>A Compliance Matrix;</li> <li>A Quality Assurance Program (see WBS 560.90.70.20.10);</li> <li>A Construction Program; and</li> </ul>												
	:		-		and Decomn	missioning Cost Estima	te plan for Financial Guar	rantee.					
		licensing pr	rocess (fron	n filling the	project des	cription and notice of	intent through to issue o	f licence) is expected to require 5					
	years; 8. A He	oring plan	معم ما النيب	lucad ta cuu	anaut tha lia	oneing review and He	aring activities (MIRS ECO	20.40.20.20).					
	9. The	costs asso	ciated with	h and the	resources r	needed to oversee th		to prepare the application and he submissions) are as follows:					
			T	T	T								
	CNSC	Y10	Y11	Y12	}								
	Licensing												
	Fees (\$k)	900	900	900									
	NWMO-1	0.05	0.05	0.75									
	(FTE) NWMO-3	0.95	0.95	0.75	1								
	(FTE)	2.95	2.95	2.25									
	Travel (\$k)	10	10	10									
	. ,												
Schedule	Start Year			10	2019		Finish Year 12	2021					
Туре	Fixed												
Calculations and Notes:	•	sing fees ar ds of dollar		d assuming	that 1 FTE e	equals 1800 hours and	is charged at an hourly r	ate of \$250. This total is reported					
	NWMO-3	values repre	esent the F1	ΓE effort re	quired by N	WMO management; WMO technical staff;		ported in thousands of dollars					
	i i avei exp	ciises die Ci	aicuiateu dS	sammig tilä	r 1 herson-i	inp to Ottawa COSES \$.	LOOO. TTIIS LOLAI IS AISO FE	ported in thousands of dollars.					
Labour (	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance 25%	Total Cost					
\$	1,647,577	\$	-	\$	2,730,000	\$ 4,377,577	\$ 1,094,394	\$ 5,471,972					

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	20	20					Prepared By: A. Khan				
WBS (Old)														
					•••••									
WBS Title	LICENSING	REVIEW IN	CLUDING PL	JBLIC HEAR	ING									
Description	licence (Y13	3 – Y15). Th	nis will inclu Staff quest	de: tions (as red	quired);				ng that will b	e held in support of obtaining the				
	2. Providing supplementary information as per a schedule and/or as required;													
	3. Preparing information needed for the Public Hearing; and													
	4. Attending and participating in the hearing prior to initial licence and possibly prior to any licence modifications or stages identified by the CNSC (e.g.: beginning of commissioning).													
	<u> </u>													
Deliverable	Class I Nucl	ear Facility	Site Prepar	ation & Cor	struction Li	cence issue	d by the CN	SC						
Assumptions	1. A sep 2. The 0	The Commission will issue a licence which will require CNSC approvals before identified stages of work.												
	-							0.40.20.30).	e requireu.					
	1							'BS 560.30.4	0.20.10)					
										staff questions and to attend the				
	=		useu to su	pport the E	nvironineni	ai Assessiii	ent will be a	ivaliable to a	iliswer Civsc	stair questions and to attend the				
	Public Hearing.  7. The costs associated with and the resources needed to support CNSC staff's review of the application (not including time required by engineering/technical staff) as well as to prepare for and attend the Public Hearing are as follows:													
	by enginee				repare for a	and attend	ne Public H	earing are as	s follows:					
	CNICO	Y13	Y14	Y15										
	CNSC													
	Licensing													
	Fees (\$k)	2025	1980	1980										
	NWMO-1	0.75	0.05	0.05										
	(FTE)	0.75	0.85	0.85										
	NWMO-3	2.25	2.75	2.75										
	(FTE)	2.25	2.75	2.75										
	Travel (\$k)	5	5	5										
	Purchased													
	Services													
	(\$k)	854	854	854	l									
Cabadul-	Charle V			40	2022			Finish V		2024				
Schedule	Start Year			13	2022			Finish Year	15	2024				
Type	Eivad													
Туре	Fixed													
Calculations and Notes:	CNSC licens in thousand NWMO-1 v	ds of dollars	;;					charged at	an hourly rat	e of \$250. This total is reported				
	1	enses are ca	lculated as	suming that	1 person-ti	rip to Ottaw	a costs \$10		al is also repo uals 1856 ho	orted in thousands of dollars; and ours.				
Labour	Costs	Materia	al Costs	Othor	Costs	Çııh	total	Allowance	25%	Total Cost				
H .			ai CUSIS											
\$	1,551,234	\$	-	\$	8,562,000	\$ :	10,113,234	\$	2,528,308	\$ 12,641,542				

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					Work Elem	ent Definition Sheet							
MIDC (No)	F.C4	20	40	20	20				D				
WBS (New) WBS (Old)	561 552	30 55	40 20	20	30				Prepared By: A. Khan				
WBS Title	ENVIRONN	IENTAL ASS	ESSMENT										
Description	Prepare ar	nd submit t	he Environ	mental Imp	act Statem	ent and Technical S	ipport Doci	uments require	ed to support the Environment				
	Assessmen	t that will b	e prepared	by the Resp	onsible Aut	hority (Y10 – Y12). Th	is includes:						
				e Authoritie ment proce									
				hat might b									
		cting and a aring the Er			atement an	d the Technical Suppo	rt Documer	nts.					
Deliverable	Environme	ntal Impact	Statement	and Techn	ical Suppor	t Documents for the	Environmer	ntal Assessmen	t (the Environmental Assessmer				
						e Review Panel).							
Assumptions	It is assume	ed that:											
issumptions.	1. The I	Letter of Int				ne site is selected. The							
	•					nvironmental & Socio							
	<ol> <li>The Responsible Authority will likely recommend that the Minister of the Environment refer the Environmental Assessment to a Joint Review Panel early in the EA Process.</li> <li>The Review Panel will conduct the Public Hooring (see WISS 560.20.40.20.20).</li> </ol>												
	<ol> <li>The Review Panel will conduct the Public Hearing (see WBS 560.30.40.20.20).</li> <li>The Review Panel will likely delegate the responsibility for data collection, field studies and the preparation of the Environment.</li> </ol>												
	<ol><li>The Review Panel will likely delegate the responsibility for data collection, field studies and the preparation of the Environment Impact Statement and the Technical Support Documents to the proponent.</li></ol>												
	Documents will be submitted by Proponent.     Other information needed for the environmental assessment will be available, such as:												
	•								etc.) performed to evaluate th				
	suitability of 560.15.20.1		all costs as	ssociated w	ith perform	ing these studies ha	e been inc	luded under G	eoscience (WBS 560.15.20.10.70				
	- The	biosphere o					bility of the	e site, all costs	associated with performing thes				
	:					BS 560.30.30.20.30); the public and non-h	ıman biota	prepared for t	he Preliminary Safety Assessmer				
	Report (WI	3S 560.30.3	0.20.10); an	ıd									
	Conceptual design for the facility prepared under Repository System Development (WBS 560.20.50.20.10).  B. Intervener funding will be provided by CEAA from the funds available to that organization (i.e.: there will be no addition.												
	intervener funding provided by the Proponent).												
	<ol> <li>All costs associated with the public involvement process are included under Public Affairs – Public Review and EA Approval (WBS XX XX XX).</li> <li>No revision of the Environmental Assessment will be required after completion of the work in the underground characterizatic facility. However there will be updated reports to the EA which provides new information about site conditions as observed in the UCF.</li> </ol>												
	EIS and wil Public Hea 560.30.40.2 - Prep - Hear - Prep - Prep	I use the re ring is expe 20.10). The aration of a ing to make aration of E aration of t	levant infor ected to ta EA process in EA Scopir decisions i invironment he Environr	mation gath ke 3 years will include ng Documen related to th tal Impact Si nental Impa	nered in the to complet the followint (EA Guide te EA Guide tatement G ct Stateme	e EA preparation phase. The Hearing Planing: lines); lines); lines; uidelines; nt;	e (see WBS	560.30.40.10.2	ars prior to the submission of th 20). The review of the EIS and th o start of construction (see WB				
	- Subn	nission of E	nvironment	al Impact St	atement; a	nd							
						includes public engag uments as well as the		c Hearing will I	ikely cover the EA process and th				
	1			y WBS 560.			anmantal a	coocmont are	os fallous.				
	15. THE C				irces neede	d to support the envi	Ollineillai a	ssessment are	as follows.				
	CNSC	Y10	Y11	Y12									
	Licensing Fees (\$k)	99	99	99									
	NWMO-1 (FTE)	1	1	1									
	NWMO-3												
	(FTE)	1.5	1.5	1									
	Travel (\$k)	2	2	2									
	Purchased Services												
	(\$k)	4454	4454	4454									
	<u> </u>												
Schedule	Start Year			10	2019		Finish Yea	ır 12	2021				
Гуре	Fixed												
. ype	IACU												
Calculations and Notes:	CNSC licens thousands		e calculated	assuming t	hat 1 FTE ed	quals 1800 hours and	s charged a	t an hourly rate	e of \$250. This total is reported in				
	NWMO-3 v	alues repre	sent the FT	E effort requ	uired by NW	/MO management; /MO technical staff; rip to Ottawa costs \$1	000. This to	tal is also repo	rted in thousands of dollars; and				
	Purchased	services for	the enviro	nmental ass	essment are	e calculated assuming	that 1 FTE e	equals 1856 ho	urs.				
Labour (			al Costs		Costs	Subtotal	Allowan		Total Cost				
\$	1,184,791	\$	-	\$ 1	3,665,000	\$ 14,849,791	. \$	3,712,448	\$ 18,562,238				

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561 552	30 30	40 60	20 30	40					Prepared By: A. Khan
WBS Title	OTHER GO	VERMENT A	APPROVALS	- FEDERAL						
Description	under CEA these may  1. Pern - the c - the c 2. Licel required fc 3. Appl	A) that are include: nits from Fis discharge of removal of footstruction use from Nor a given site.	required in sheries & O f substance fish habitat n of roadwa atural Reso te. Fransport C	ceans Cana s deleterion , or ays near wa burces Cana	onstruct or ida to allow us to fish, ter bodies. ida to Store wing an ass	operate th	e facility (Y	14 – Y25). De	pending or	Safety Commission and approvanthe site selected for the facility any other permits and approvanthesesponse, etc.
Deliverable	Permits, Co	ertificates a	nd Approva	ls required	from feder	al regulato	ry agencies	other than the	e Canadian	Nuclear Safety Commission
Assumptions	It is assum:  1. Mos than the applicatior and Constr  2. The 3. Any of operatic 4. Som 5. The 6. It is which the a larger eff as part of r	ed that: at of the tec Canadian Ins. It is also ruction Licer required fe ons. e permits, c effort requi expected t EA and licer fort will be in maintaining	chnical information Nuclear Salassumed to a sassumed to a sassumed to a sassumed to a sassumed the assessment of the Site Processived with sassuments of the Site Proc	rmation that fety Common hat this information must I hits, certification or approva limited to the regulatory tion's supporting the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and the results of the first eparation and t	at will be re- hission) will be complete ates or app Is may need hat require reviews fro orting docu t year of co nd Constru	equired to our lead of the availated before a control of the availated before a control of the availated by	obtain feder ble from o ble around ny federal p be obtained wed on a yo e and subm overnment being review licence (Y16 te during co	ral permits, ce either the er the same tim ermits, certifi I as needed d early basis. it applications agencies will ved (Y14&Y15 s). The effort nstruction (se	ertificates of avironment ertificates or apportuning constant is and liaise be conducted (i) (WBS 560 needed in the WBS 560 avironment)	r approvals (from agencies other all assessment or CNSC licens uplication for the Site Preparation provals can be issued.  Truction or prior to the beginning with regulatory agencies.  Ited during the last two years is 0.30.40.20.20). It is also expecte the subsequent years is capture .30.40.30.10).  The federal agencies are as follows.
	(FTE)	0.7	0.7	0.7	-					
Schedule	Start Year	<u> </u>	<u> </u>	14	2023			Finish Year	15	2024
				14	2023			i illisii Teal	13	2024
Туре	Fixed									
Calculations and Notes:	thousands NWMO-1 v NWMO-3 v	of dollars; values repre values repre	esent the F1 esent the F1	E effort red	quired by N quired by N	WMO mana WMO techi	agement; nical staff; a	nd	,	\$250. This total is reported in corted in thousands of dollars.
Labour			al Costs		r Costs	1	total	Allowance	25%	Total Cost
\$	226,527	\$	-	\$	92,000	\$	318,527	\$	79,632	\$ 398,159

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	20	50				Prepared By: A. Khan					
WBS (Old)	552	30	60	40					A					
***************************************				·A		A								
WBS Title	OTHER GO	VERNMENT	T APPROVAL	S - PROVIN	CIAL									
Description	likely to in	Obtain the provincial permits, certificates or approvals that are required in order to construct or operate the facility (Y14 – Y25). These is likely to include:  1. Registering the construction project with the Ministry of Labour;												
	:	•		. ,		•								
	1	_			-				I effluents (sewage, waste water),					
	1	•	tic water, f	ire water)	and waste	disposal (dome	stic waste, construct	ion waste	& soil) from the Ministry of the					
	Environme	ent;												
	2 Com	nlying with	the MICA D	logulations	for liquid w	actor: and								
	1	<ol> <li>Complying with the MISA Regulations for liquid wastes; and</li> <li>Registering as a Hazardous Waste Generator with the Ministry of the Environment.</li> </ol>												
		•				•		dumn fill s	within a concentration area, normit					
	•					•	• •	-	within a conservation area, permit					
	to excavat	e or aiter ai	i arciiaeoio;	gical of flist	oric site, etc	) may be requi	red on a site specific	Dasis.						
Deliverable	Permits, C	ertificates a	ind Approva	ils required	from provir	ncial regulatory	agencies.							
Assumptions	The numb	er and natu	re of the pe	rmits that r	may be requ	ired may deper	d on the location sele	ected.						
-	It is assun	It is assumed that there will be no need to conduct a separate environmental assessment under the Environmental Assessment Act												
	(Ontario). Provincial authorities generally accept that nuclear facilities fall under the jurisdiction of the federal process.													
	It is assum	ed that:												
	•		ates or app	rovals will l	ne required	from provincial	agencies for both the	constructi	on and operation of the facility;					
	1		acco o. app		oc.equeu		agenoies for both the		on and operation of the facility,					
	2 The	Taabaal C			ika Emiliaani		عمالم مامني مسمر النبي عسم		dinformation on account Olimid					
	Ē						•	the require	d information on gaseous & liquid					
	emuents a	na wastes,	no addition	ai data con	ection or mo	odelling will be	necessary;							
	3. The	environme	ental assess	ment must	be comple	eted before pro	vincial regulatory ag	encies will	issue any permits, certificates or					
	approvals	for the cons	struction/op	peration of	the facility.									
	4. The	costs asso	ciated with	and the re	sources nee	eded to manag	e the liaison with the	applicable	provincial agencies have already					
	been captı	ured in the	estimates fo	or liaison wi	th the feder	ral agencies (Wi	3S 560.30.40.20.40).							
Schedule	Start Year			14	1 2023		Finish Year	15	2024					
Туре	Fixed													
Calculations														
and Notes:		T.		1		_								
Labour	Costs	1	ial Costs		r Costs	Subtota		25%	Total Cost					
\$	-	\$	-	\$	-	\$	- \$	-	\$ -					

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	20	60				Prepared By: A. Khan	
WBS (Old)	552	30	60	50						
WBS Title	OTHER GO	VERNMENT	ΓAPPROVAL	S – MUNIC	IPAL/REGIOI	NAL				
Description	required w 1. Offic 2. Build along with	vill depend of cial Plan/Zooding Permit, any other r	on the locat ning Variand ; municipal pe	ermits, app	d but are like rovals or ins	ely to include:	,	·	e permits or approvals that will be sewers, potable water, electricity,	
Deliverable	Obtain the	permits an	d approvals	required fi	rom municip	oal authorities				
Assumptions	The numbe	er and natu	re of the pe	rmits that r	may be requ	ired will vary dependin	g on the munici	ipality in v	which the facility will be located.	
	It is assumed that: 1. Permits, certificates or approvals will be required from municipality for both the construction and operation of the facility.  2. The Technical Support Document for the Environmental Assessment, the PSAR and the facility design documents will provide a the information required to support applications for permits from the municipality.  3. The environmental assessment must be completed before provincial regulatory agencies will issue any permits, certificate approvals for the construction/operation of the facility.									
	5. The	costs asso	ciated with	and the re	sources nee	provincial oversight bookeded to manage the lia al agencies (WBS 560.3	ison with the		icipal Board).  provincial agencies have already	
Schedule	Start Year			14	2023		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:										
Labour (	Costs		ial Costs		r Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	-	\$ -	\$	-	\$ -	

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	30	10			Prepared By: A. Khan
WBS (Old)	552	30	60	30				
		·····						
WBS Title	OTHER GO	VERMENT A	PPROVALS	- FEDERAL				
Description	under CEA these may  1. Perm - the c - the c 2. Lice required fc 3. Appr	A) that are include: nits from Fis discharge of removal of from Struction as given sit	required in sheries & O substances ish habitat, n of roadwa latural Reso te.	ceans Cana s deleteriou or ys near wat ources Cana	da to allow: us to fish, ter bodies. ada to Store wing an asse	operate the facility (Y	14 – Y25). Depending or	Safety Commission and approval name the site selected for the facility, and other permits and approvals ponse, etc.
	ļ							
Deliverable	Permits, Co	ertificates ai	nd Approva	ls required	from federa	ıl regulatory agencies o	ther than the Canadian N	uclear Safety Commission
	<u> </u>							
Assumptions	The number	er and natur	e of the pe	rmits that n	nay be requi	ired may depend on th	e location selected.	
7.000		ana natai	c or the pe	······································	, De requ	nea may aepena on an	e rocation selectear	
	the Canadi also assum Licence.  2. The 3. Any operations 4. Som 5. The 6. It is the EA and	t of the tech an Nuclear ned that this environmer required fe e permits, c effort requi expected the	Safety Comes information tall assessmental permomentificates of the following services of the control of the co	nmission) won will be a nent must b its, certificator approval limited to the egulatory re upporting o	rill be availa available arcompleted attes or appropriate and required views from documents a	ble from either the en- bund the same time as d before any federal per ovals will be obtained at to be renewed on a yea to prepare and submit other government age are being reviewed (Y1-	wironmental assessment the application for the standard principle as needed during constructions and liaise will be conducted at 48Y15) (WBS 560.30.40.2)	iction or prior to the beginning of ith regulatory agencies.  during the last two years in which 20.40). It is also expected a larger
	:		_	-			(WBS 560.30.40.30.40 an	quent years is captured as part of d 560.30.40.30.50).
	7. The	costs associ	ated with a	and the reso	ources need	ed to manage the liaiso	on with the applicable fed	leral agencies are as follows (note
	that CNSC		o interface	with Transp	ort Canada	):		
		Y14	Y15	Y16	_			
	Licensing	45	45	45				
	Fees (\$k) NWMO-1	4-5	40	40	1			
	(FTE)	0.1	0.1	0.1				
	NWMO-3							
	(FTE)	0.7	0.7	0.7	4			
 	Travel (\$k)	1	1	1	<u> </u>			
Cohodulo	Ctort V			1.	2025		Finish Voor	2024
Schedule	Start Year			16	2025		Finish Year 25	2034
Туре	Fixed							
Calculations	Licensing f	ees are calc	ulated assu	ming that 1	FTE equals	1800 hours and is char	ged at an hourly rate of \$	250. This total is reported in
and Notes:	thousands	of dollars;						
	NWMO-1	alues repre	sent the FT	E effort req	uired by NV	VMO management;		
	•					VMO technical staff; an		
	Travel expe	enses are ca	lculated as	suming that	t 1 person-ti	rip to Ottawa costs \$10	00. This total is also repo	orted in thousands of dollars.
	<u> </u>						T	
Labour (		Materia \$	al Costs	Othe \$	r Costs	Subtotal	Allowance 25%	Total Cost \$ 199,079
\$	113,264	٦	-	۱۶	46,000	\$ 159,264	\$ 39,816	\$ 199,079

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	30	20				Prepared By: A. Khan	
WBS (Old)	552	30	60	40	<u> </u>	<u> </u>				
WBS Title	OTHER GO	VERNMENT	APPROVAL	S - PROVIN	CIAL					
Description	1. Regi 2. Obta water wor Environme 3. Com 4. Regi Other perr	stering the aining Certicks (domesterit; applying with stering as a mits (e.g.: pe	construction ficates of A ic water, fi the MISA R Hazardous ermit to cut	n project w pproval for re water) a egulations Waste Gen timber on	ith the Mini atmospheri and waste of for liquid wa erator with crown land,	stry of Labour; ic emissions (operation disposal (domestic wa astes; and the Ministry of the Env	nal & constructionste, constructionste, vironment.	on), liquid on waste dump fill v	e the facility (Y14 – Y25). These is  I effluents (sewage, waste water), & soil) from the Ministry of the  within a conservation area, permit	
Deliverable	Permits, Co	ertificates a	nd Approva	ls required	from provin	icial regulatory agencie	es.			
Assumptions	The number and nature of the permits that may be required may depend on the location selected.  It is assumed that there will be no need to conduct a separate environmental assessment under the Environmental Assessment (Ontario). Provincial authorities generally accept that nuclear facilities fall under the jurisdiction of the federal process.  It is assumed that:									
	2. The	Technical S	upport Doc	ument for t	he Environn		provide all of the		on and operation of the facility; d information on gaseous & liquid	
	approvals t	for the cons	struction/op ciated with	eration of t and the re	the facility.	•	aison with the		issue any permits, certificates or provincial agencies have already	
				······································						
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations										
and Notes:	<u> </u>	84-4-	al Cart	011	- Cook-	Cultana	Allanca	350/	Total Cont	
Labour	Losts		al Costs		r Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	-	\$ -	\$	-	\$ -	

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	30	30				Prepared By: A. Khan
WBS (Old)	552	30	60	50					
WBS Title	OTHER GO	VERNMENT	APPROVAL	S – MUNIC	IPAL/REGIOI	NAL			
Description	<u> </u>				•	onstruct or operate the ely to include:	e facility (Y14 –	Y25). The	permits or approvals that will be
	1	cial Plan/Zor ding Permit;	•	ce;					
	along with	any other n	nunicipal pe			pections related to hig	hways, roads, s	idewalks,	sewers, potable water, electricity,
Deliverable	Obtain the	permits and	d approvals	required fi	rom municip	al authorities			
Assumptions	The numb	er and natur	e of the pe	rmits that r	nay be requ	ired will vary dependin	g on the munici	pality in v	which the facility will be located.
		nits, certifica			•	. ,			operation of the facility.
	the inform	ation requir	ed to suppo	ort applicat	ions for per	mits from the municipa	lity.		
	•	environme for the cons			•	ted before provincial	regulatory ager	ncies will	issue any permits, certificates or
	5. The	costs assoc	ciated with	and the re	sources nee	provincial oversight booded to manage the lia al agencies (WBS 560.3	ison with the		icipal Board). provincial agencies have already
Schedule	Start Year			16	2025		Finish Year	25	2034
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	_	\$ -	\$	-	\$ -

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	30	40					Prepared By: A. Khan
WBS (Old)										
WBS Title	MAINTAIN	CONSTRUC	TION LICEN	CE DURING	THE SITE PI	REPARATIO	N AND CON	STRUCTION C	OF THE UNDI	ERGROUND DEMONSTRATION
Description	of the Unde 1. Prep 2. Prep 3. Seek	erground De aring and su aring and su ing approva	emonstration ubmitting roubmitting uals as requir	on Facility (I eports to th nscheduled red by the L	UDF). This i e CNSC acco reports, if i icence; and	includes: ording to th required, in	e schedule s accordance	specified in the with the lice	ne licence; ence;	16 – Y20) during the construction
Deliverable	1			•	•			e issued by t e) during this		y submitting reports and seeking e project.
Assumptions	<ol> <li>The I in the licen</li> <li>The I</li> <li>Final</li> <li>Seek</li> <li>The I</li> <li>The I</li> </ol>	Commission ce). icence will izing the sit ing CNSC apicensing placesses	be valid for e specific d oproval to c an that will ciated with	the entire of esign and construct the be executed and the re-	construction onstruction e initial com d for the op sources nee	n period; lic (i.e., the w nponents of erating lice eded to sup	ence renew ork perform the DGR wi nce applicat port compl	als will not be ed under the Il likely be re- ion will be als iance with th	e required. licence) of t quired. so prepared ne licence (r	ork (such as hold points identified the UDF will require 5 years.  during this time.  not including technical support to e operating licensing plan are as
	follows:		Г				П			
	CNSC Licensing Fees (\$k) NWMO-1 (FTE) NWMO-3	990 0.85	405 0.75	405 0.75	405 0.95	990 0.95				
	(FTE)	2.75	2.25	2.25	3.45	3.45				
	Travel (\$k)	2	2	2	2	2				
Schedule	Start Year			16	2025			Finish Year	20	2029
Туре	Fixed									
Calculations and Notes:	in thousand NWMO-1 v NWMO-3 v	ds of dollars alues repre alues repre	s; sent the FT sent the FT	E effort req	uired by NV uired by NV	VMO mana VMO techn	gement; ical staff; an	d	·	e of \$250. This total is reported orted in thousands of dollars.
Labour (	Costs	Materi	al Costs	Other	r Costs	Suh	total	Allowance	25%	Total Cost
_usoui v		iviatelli		Other		, 545		wance		

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#### **Work Element Definition Sheet**

Description N	MAINTAIN	THE CONST		<u></u>			:			
Description N	MAINTAIN	THE CONC			************************		<u>.</u>			
Description N	MAINTAIN									
1 :		THE CONST	TRUCTION I	ICENCE DU	RING THE C	ONSTRUCTI	ON OF THE	DEEP GEOLO	OGICAL REPO	SITORY (DGR) COMPONENTS
1 2 3	of the Deep 1. Prepa 2. Prepa	o Geological aring and su aring and su	l Repositor ubmitting ro ubmitting u	y (DGR) com eports to th	ponents. T e CNSC acco reports, if r	his includes	s: e schedule s	ear Safety Co specified in t with the lic	the licence;	21 – Y25) during the construction
4	4. Supp	orting CNS(	C staff activ	ities during	the course	of the licen	ce (also incl	udes suppor	ting CNSC co	mpliance inspections).
l :				•	•			e issued by occur during		submitting reports and seeking
. 1 ii 2 3 3 ii r 4 V 5 a f   C L F N ( N (	n the liceno 2. The li 3. CNSO nformation results obta 4. The a WBS 560.30 5. The	Commission ce). icence will I C approvals has been sined from the cassessment 0.30.30.10). costs associated.	be valid for s, if requir provided t the UDF ac s needed fo ciated with to designs	the entire of ed, will have the CNSC tivities.  or the FSAR and the res	construction we been so . It is also and to supp	n period; lice light but s likely that a port the ope	ence renewa ome effort a round of ( erating licen	als will not be is expected CNSC communications applications with the control of	pe required. If during Y21 Idents will have on will also be the licence (r	to ensure that all the required e to be addressed related to the ecompleted during this time (see ot including technical support to nents, and obtaining assessments
	(\$k)	2	2	2	2	2				
<b>Schedule</b> S	Start Year			21	2030			Finish Year	25	2034
<b>Type</b> F	ixed									
and Notes: in	n thousand NWMO-1 v NWMO-3 v	ds of dollars alues repre alues repre	sent the FT sent the FT	E effort req E effort req	uired by NV uired by NV	VMO mana VMO techni	gement; ical staff; an	d	,	e of \$250. This total is reported
I ahaur Ca	octo I	Mataria	al Costs	Other	Costs	CL	total	Allowan	350/	Total Cost
Labour Co	osts 2,782,841	Materia \$	ai COSTS	\$ Sther	3,205,000	\$ \$ub	total 5,987,841	Allowance \$	25% 1,496,960	<b>Total Cost</b> \$ 7,484,801

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#### **Work Element Definition Sheet**

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	30	70					Prepared By: A. Kha	n			
WBS (Old)														
WBS Title	LICENSING	REVIEW IN	CLUDING PL	JBLIC HEAR	ING									
Description	Provide re	quired supp	port during	the applica	ation reviev	v process a	nd attend I	Hearings need	led to obta	ain the licence (Y24 –	Y25). This			
	1. Ansv	wering CNSC	questions	(as required	d);									
	2. Prov	iding supple	ementary in	formation a	as per a sche	edule and/c	r as require	ed;						
	3. Prep	aring inforn	nation need	led for the	Public Heari	ng; and								
	4. Atte	nding and p	articipating	in Public H	learings befo	ore the CNS	C prior to ir	nitial licence ar	nd possibly	prior to any licence mo	difications			
	or stages ic	dentified by	the CNSC (	e.g.: beginn	ing of active	e commissio	ning).							
Deliverable	Class I Nuc	lear Facility	Operating I	Licence issu	ed by the Cl	NSC								
			***************************************			***************************************					***************************************			
Assumptions	It is assume													
	•		on will iss	ue a licen	ice which i	may requir	e CNSC ap	oprovals before	re identifi	ed stages of work (e	.g., active			
	commissio	ning).												
	2. Subr	nissions in s	support of t	he licence a	application h	nave been n	nade (see W	/BS 560.30.40.3	30.60).					
	3. The	Environme	ntal Assess	ment comp	oleted for t	he Site Pre	paration ar	nd Constructio	n Licence	also covers the operat	ion of the			
	facility.													
	4. The	costs assoc	iated with a	and the reso	ources need	led to supp	ort CNSC sta	aff's review of	the applic	ation (not including tim	e required			
	by enginee	by engineering/technical staff) as well as to prepare for and attend the Public Hearing are as follows:												
			1	1										
		Y24	Y25											
	CNSC	990	990											
	NWMO-1	0.7	0.7											
	NWMO-3	2	2											
	Travel (\$k)	5	5											
				•										
				·······				······						
Schedule	Start Year			24	2033			Finish Year	25	2034				
Tuno	Fixed													
Туре	rixeu													
Calculations	CNSC licen:	sing fees are	e calculated	l assuming t	that 1 FTE e	quals 1800	hours and is	charged at ar	n hourly rat	e of \$250. This total is	reported			
and Notes:	•	ds of dollars		8				J	,					
			•	F effort rea	uired by NV	VMO mana	ement.							
	•	•			uired by NV	•		ıd						
	•	•			•				is also reno	orted in thousands of do	ollars			
	i averexpt	inses are Ca	nculated ds:	Julining tildt	. I person-ti	ip to Ottaw	u costs \$10	oo. mis total	ιο αιου τεμι	nica in tilousarius of ut	mai 3.			
Labour	•													
	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost				

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#### Work Flement Definition Sheet

561	30	40	40	10	Prepared By: A. Khan
552	30	70	10		
MAINTAIN	OPS LICEN	E DURING	OPERATIO	NS/APPLY T	O RENEW LICENCE
Renew and	l maintain t	he Class I F	cility Oper	ating Licens	se issued by the Canadian Nuclear Safety Commission (Y26 – Y85). This includes:
<ol> <li>Prep</li> </ol>	aring and s	ubmitting r	eports acco	ording to the	e schedule prescribed by the Operating Licence;
2. Prep	aring and s	ubmitting u	nschedule	d reports, if	required, in accordance with the licence;
<ol><li>Prep</li></ol>	aring and s	ubmitting a	n applicati	on for rene	wal of the Operating Licence that includes all of the information required under
the Nuclea	r Safety and	Control A	t and its as	sociated re	gulations; and
4 Cup	orting CNC	C staff sam	nlianco act	ivitios as we	-
4. Supp	JOI LING CIVC	3 Stall Colli	pilatice act	ivities as we	en as naea inspections during the course of the licence.
Maintain C	lace I Encilit	Operating	Licopco ic	cuad by the	CNSC during appration and submit license renewal applications
iviaiiilaiii C	iass i Facilii	y Operating	s Licence is	sueu by the	Civac during operation and submit licence renewal applications
It is assum	ed that:				
1. The	Operating	icence will	he issued	for 5-year	terms continuing until the end of the Operations phase (60 years of operation
	MAINTAIN Renew and 1. Prep 2. Prep 3. Prep the Nuclea 4. Supp Maintain C	MAINTAIN OPS LICENCE Renew and maintain t  1. Preparing and s  2. Preparing and s  3. Preparing and s the Nuclear Safety and 4. Supporting CNC Maintain Class I Facilit  It is assumed that:	MAINTAIN OPS LICENCE DURING Renew and maintain the Class I Fa  1. Preparing and submitting r 2. Preparing and submitting r 3. Preparing and submitting a 4. Supporting CNCS staff com Maintain Class I Facility Operating	MAINTAIN OPS LICENCE DURING OPERATION  Menew and maintain the Class I Facility Oper  1. Preparing and submitting reports accc 2. Preparing and submitting unschedule 3. Preparing and submitting an application the Nuclear Safety and Control Act and its as 4. Supporting CNCS staff compliance act  Maintain Class I Facility Operating Licence is  It is assumed that:	MAINTAIN OPS LICENCE DURING OPERATIONS/APPLY T Renew and maintain the Class I Facility Operating Licen:  1. Preparing and submitting reports according to th 2. Preparing and submitting unscheduled reports, if 3. Preparing and submitting an application for rene the Nuclear Safety and Control Act and its associated re 4. Supporting CNCS staff compliance activities as we Maintain Class I Facility Operating Licence issued by the It is assumed that:

- beginning in year 26 (Y26 Y85)).
- The first year of the operating stage (Y26) will require additional resources and effort to complete active commissioning of the facility.
- The terms of the licence are expected to require the submission of Reports to the CNSC.
- No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Operating Licence will be required to support the application for renewal of the Operating Licence.
- 5. No significant amendments or additions to the FSAR submitted in conjunction with the initial application for the Operating License will be required to support the application for renewal of the Operating Licence, although periodic updates (prepared under WBS 560.30.30.40.10) in support of the renewal application will be submitted to the CNSC.
- A midterm report will be made to the Commission at about the mid-point to every licence term starting with Y28 and then Y33. Y38, Y43, Y48, Y53, 58, 63, 68, 73, 78, and 83.
- A licence renewal application will be compiled at 5-year intervals starting with Y29 and then Y34, Y39, Y44, Y49, etc. The application that will be compiled in Y84 is to support the application for an operating licence for the extended monitoring stage.
- Licence renewal applications will contain at a minimum the information identified in the NWMO licensing procedure, NWMO Licence renewal applications will contain at a mi PROC-RG-0002. The main substance of which includes:
- Updated project requirements;
- Final Safety Report; and
- Operating Policies and Principles.
- Regulatory Affairs will support the Transportation Group in interfacing with the CNSC for package and user certificate renewals as well as security requirements for transportation purposes. The effort and resources needed to prepare for renewals are captured in the transportation costs (see WBS 660.20.50.40.10).
- 10. The costs associated with and the resources needed to manage the licensing and to prepare applications for licence renewals with supporting documents (not including time required by engineering/technical staff for their input into the submissions and/or for resolving any issues that may arise during operations) are as follows for Y26 to Y81:

		Repeat every 5 years starting with Y27 and ending with								
	Y26			Y81						
CNSC										
Licensing										
Fees (\$k)	900	450	450	900	450	450				
NWMO-1										
(FTE)	0.95	0.75	0.75	0.75	0.25	0.75				
NWMO-3										
(FTE)	3.5	2.5	2.5	2.5	2.5	2.5				
Travel										
(\$k)	2	2	2	2	2	2				

11. The costs associated with and the resources needed to manage the licensing and to prepare applications for licence renewals with supporting documents (not including time required by engineering/technical staff for their input into the submissions and/or for resolving any issues that may arise during operations) are as follows for Y82 to Y85:

	Y82	Y83	Y84	Y85
CNSC				
Licensing				
Fees (\$k)	450	450	900	450
NWMO-1				
(FTE)	0.75	0.75	0.75	0.25
NWMO-3				
(FTE)	2.5	2.5	2.5	2.5
Travel				
(\$k)	2	2	2	2

L	. i						
Schedule	Start Year	2	6 2035	Finish Year	8	5 2094	
Туре	Fixed						
Calculations	CNSC licensing fees are calculate	d assumin	g that 1 FTE e	equals 1800 hours and is charged a	t an hourly	rate of \$250.	This total is reported

in thousands of dollars;

NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and

Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.

Labour Costs	Material Costs	Other Costs	Subtotal	Allowa	nce	25%	Total Cost
\$ 25,678,454	\$ -	\$ 32,970,000	\$ 58,648,454	\$	1	4,662,113	\$ 73,310,567

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#### **Work Element Definition Sheet**

Calculations and Notes: Labour	NWMO-1 v NWMO-3 v Travel expe	alues repre enses are ca	sent the FT	E effort req suming that	uired by NV	VMO techn rip to Ottaw	ical staff; an		is also repo		ands of dollars.
	NWMO-1 v NWMO-3 v	alues repre	sent the FT	E effort req	uired by NV	VMO techn	ical staff; an		is also repo	orted in thousa	ands of dollars.
	:	alues repre	sent the FT	E effort req	uired by NV	vivio mana	gement;				
	CNSC licone	ing fees are	e calculated	l assuming t		•		charged at a	n hourly rat	e of \$250. Thi	s total is reported
Туре	Fixed										
Schedule	Start Year			29	2038			Finish Year	85	2094	
	Travel (\$k)	4	4	2	J				 E -		
	Travel (¢la)	4	4	2							
	NWMO-3 (FTE)	1	1	1							
	(FTE)	0.2	0.7	0.2							
	Licensing Fees (\$k) NWMO-1	900	900	450							
	CNSC	Y84	Y85								
		Y79	Y80	Y81	]						
		Y74	Y75	Y76	1						
		Y69	Y70	Y71	†						
		Y59 Y64	Y60 Y65	Y61 Y66	1						
		Y54	Y55	56 V61	-						
		Y49	Y50	Y51	]						
		Y44	Y45	Y46	]						
		Y39	Y40	Y41	1						
		Y34	Y35	Y36	1						
		Y29	Y30	Y31	1						
	by enginee follows:	ring/techni	cal staff) as	well as to	prepare for	and attend	the Public	Hearing will o	occur over t	three years on	a five-year cycle a
	•									•	uding time require
	group.										
	3. All a										e Regulatory Affair
	2. Subn	nissions in s	support of t	he licence a	pplications	will have b	een made (s	ee WBS 560.3	0.40.40.10)	١.	
	Y40, Y45, a	nd Y50. The	e licence re	newal in Y5	5 is expecte	d to be in s	upport of th	e licence appl	lication for	the extended	monitoring stage.
Assumptions	1. The	licence tern		-							n Y30 and then Y35
Deliverable	Class I Nucl	ear Facility	Operating I	Licence issu	ed by the CI	NSC.					
	4. Atter				_		SC prior to i	nitial licence a	ind possibly	prior to any li	cence modification
					as per a scho ic Hearing; a		or as require	d;			
	1. Answ			(as required							
Description	Provide red	quired supp	oort during	the applica	ation reviev	w process a	ind attend	Hearings nee	ded to obta	ain the licence	e (Y30 – Y85). Thi
	LICLINGING	REVIEW INC	CLUDING PL	JBLIC HEAR	ING						
WBS Title	LICENSING	D = \ // = \ / / /									
WBS (Old) WBS Title	LICENSING			į	<u>j</u>	<u> </u>	İ				

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#### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561 552	30 30	40 70	50 20	10				Prepared By: A. Khan
WBS Title	MAINTAIN	/RENEW OP	S LICENCE	DURING EX	TENDED MO	ONITORING			
Description	•	d maintain	the Class	I Facility O	perating Lic	cense issue	d by the C	anadian Nuclear Safety	Commission (Y86 – Y155). This
	<ol> <li>Prep</li> <li>Prep</li> <li>the Nuclea</li> </ol>	paring and so paring and so r Safety and	ubmitting uubmitting a	inscheduled an application ct and its as	I reports, if on for rene sociated re	required, ir wal of the ( gulations; a	n accordanc Operating Li nd	by the Operating Licence e with the licence; icence that includes all c during the course of the	f the information required under
Deliverable	Maintain C	lass I Facilit	y Operating	g Licence iss	sued by the	CNSC durin	g extended	monitoring and submit	licence renewal applications
Assumptions	extended I licensing ba	ng the exter icence may asis will hav	be issued. e to be kep	Regulator ot up-to-dat	y Affairs ac e and subm	tivities are nitted to the	assumed to CNSC for e	be similar in either cas ither situation.	, renewals may be required or an e since documents that form the
	:	application neframe (se				erate durin	g the exten	ded monitoring stage is	expected to be submitted around
	•	w the lice							ther to report to the Commission pected to be in Y85 (see WBS
	5. No		ts or addit	ions to the				ne Reports, as required I nitted in conjunction w	by the CNSC. Ith the initial application for the
	:							th the initial application be submitted to the CN	for the Operating Licence will be SC.
	0002. Regi		s to these o	documents					sing procedure, NWMO-PROC-RG ce does not need to be renewed.
	- Final - Opei 8. The		ort; and es and Prin iated with	ciples. and the res			_		upporting documents throughout their input into the submissions
	and/or for	resolving ar	ny issues th	at may aris	e during the	e monitorin	g phase) are	e expected to be covered	l by a staffing plan of:
		Repeat eve	ery 5 years	starting wit Y154	h Y86 and e	ending with			
	CNSC Licensing Fees (\$k)	250	250	250	250	450			
	NWMO-1 (FTE)	1	1	1	1	1			
	NWMO-3 (FTE)	1	1	1	1	1			
	Travel (\$k)					2			
Schedule	Start Year			86	2095			Finish Year 155	2164
Туре	Fixed								
Calculations and Notes:	:	sing fees are		d assuming	that 1 FTE e	equals 1800	hours and	is charged at an hourly r	ate of \$250. This total is reported
	NWMO-3 v	values repre values repre enses are ca	sent the FT	E effort red	uired by N	WMO techr	ical staff; a		ported in thousands of dollars.
Labour (		Materia	al Costs		Costs		total	Allowance 25%	Total Cost
\$ 2	4,607,506	Ş	-	\$ 2	0,328,000	\$ 4	4,935,506	\$ 11,233,877	\$ 56,169,383

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	50	20				Prepared By: A. Khan
WBS (Old)	552	30	75						
WBS Title	DECOMMIS	SSIONING LI	CENCE (CN	ISC) APPLIC	ATION				
	licensing p	lan. This i	ncludes p	reparing a	nd submitti	•	ication and su		preparing and implementing the cuments that include all of the
Deliverable	Class I Nucl	ear Facility	Decommis	sioning Lice	ence Applica	tion and Supporti	g Documents		
	1. The 0 1. An Ei that this pr Extended N	Commission  nvironment  ocess, from  Monitoring	al Assessn n notice of period. It	nent will be intent to i is also expe	e required be ssue of licer ected that th	nce, will require 5 he bulk of the lice	years and the water application	vork will beg activities wi	S 561.30.40.50.40). It is expected in 5 years prior to the end of the Il occur during the years of Y152
	2. A lic decommiss	cence plan ioning.	will be p	repared to	capture th		censing proced	lure, NWM0	D-PROC-RG-0002 as it applies to ured in detailed decommissioning
	- Cons - Cons - Cons - Desc - Desc - A Cou	iderations f iderations f iderations f ription of th ription of th mpliance M ality Assura	or Human for Fire Pro for Security ne Organiza ne Convent latrix; and ince Progra	Factors; etection; and Safeg ational Mar tional Safet am (see WE	nagement St y Program; 3S 561.90.70	ructure; .50.10).	of intent throu	gh to issue c	of licence) is expected to require 5
	:						_	-	to prepare the application and he submissions) are as follows:
	CNSC Licensing Fees (\$k)	152 450	153 450						
	NWMO-1 (FTE) NWMO-3 (FTE)	0.5	0.5						
	Travel (\$k)	5	5						
Schedule	Start Year			152	2 2161		Finish Year	153	3 2162
Туре	Fixed								
Calculations and Notes:	in thousand NWMO-1 v NWMO-3 v	ds of dollars alues repre alues repre	sent the F <sup>-</sup> sent the F <sup>-</sup>	ΓΕ effort re ΓΕ effort re	quired by N\ quired by N\	 WMO managemer WMO technical sta	; ff; and	·	ate of \$250. This total is reported
Labour C	Costs	Materia	l Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	481,719		-	\$	910,000			347,930	

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	50	30					Prepared E	By: A. Khan
WBS (Old)				<u></u>							
WBS Title	LICENSING	REVIEW IN	CLUDING PI	JBLIC HEAR	ING						
Description	includes: 1. Answ 2. Provi 3. Prep	vering CNSC iding supple aring inforn	C questions ementary in nation need	(as require formation ded for the		edule and/o	r as require	d;	d to obtair	the licenc	e (Y154 – Y155). T
Deliverable	Class I Nucl	ear Facility	Decommis	sioning Lice	nce issued b	y the CNSC					
Assumptions	<ol> <li>Subn</li> <li>The B</li> <li>All a group.</li> </ol>	nissions in s Environmen ctivities wil costs associ	ital Assessn Il be identif	nent for the fied and ex	e Decommiss ecuted as d ources need	sioning of the escribed in led to support	ne facility hat a supporting		eted (see Win that is protected the application)	repared by	40.50.40). the Regulatory Affa ncluding time requi
		Y154	Y155								
	CNSC Licensing Fees (\$k)	900	900								
	NWMO-1 (FTE) NWMO-3	0.5	0.5	-							
	(FTE)	1	1	-							
	Travel (\$k)	10	2								
Schedule	Start Year			154	2163			Finish Year	155	2164	
Туре	Fixed										
Calculations and Notes:	in thousand	ds of dollars	s;		that 1 FTE equipments			charged at ar	hourly rat	e of \$250. <sup>-</sup>	This total is reported
	NWMO-3 v	alues repre	sent the FT	E effort req	uired by NV t 1 person-tr	VMO techni	cal staff; an		is also repo	orted in thou	usands of dollars.
Labour	NWMO-3 v Travel expe	alues repre enses are ca	sent the FT	E effort required suming that		VMO techni ip to Ottaw	cal staff; an		is also repo	orted in thou	usands of dollars.  Total Cost

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	50	40					Prepared By: A. Khan
WBS (Old)	552	55	30		<u> </u>	<u>[</u>				
WBS Title	EA FOR CN	SC DECOM	AISSIONING	LICENCE						
Description		nd submit t					chnical Sup	port Docum	nents require	ed to support the Environmenta
	- Cond	ing with the ducting a pu	blic involve	ment proce	ss;					
		orming any ecting and a			e requirea;					
	- Prep	aring the Er	vironment	al Impact St	atement an	d the Techn	ical Suppor	t Documents		
Deliverable	1	ntal Impac nt itself will b					ocuments	for the Env	vironmental	Assessment (the Environmenta
Assumptions	It is assum	ed that:								
									pact Assessn er the Enviro	nent. Inmental Assessment to a Reviev
	4. The		Authority w	vill likely de				ng technolog ollection, fiel		d the preparation of the Technica
			_						-	nvironmental assessment hearing g (see WBS 561.30.40.50.30).
	the lifetime		ject will be	available,	uitable and	sufficient f	or the Envi	ronmental A		and technical data collected ove ill costs associated with collecting
		dose assess					nd non-hun	nan biota pre	epared for th	e Final Safety Assessment Repor
	Environme	ntal Assessr	ment will be	required to	support ar	Application	n for a Licer	ice to Aband	on. Howeve	of the site and no revision of the r there would be updated reports nd closure activities.
	- Prep - Hear - Prep - Prep - Subr - Revi - The F 11. The F	Proponent v	n EA Scopin decisions in nvironment the Environment nvironment onmental In tal Assessm vill contract llyzing the contract	ng Document of the latest of t	t (EA Guide te EA Guide tatement G ct Statemen atement; a ment which will require to perform eparing the	lines; uidelines; nt; nd includes pui e a support I n the technic Technical S	Manager an cal studies a Support Doo	d full-time T and prepare t		cialist. Support Documents. ed out and will be performed by a
	1. The		he EIS and	other suppo	rting docur	ments as we		nel Public H	earing will lil	cely cover the EA process and the
	2. The	costs associ	ated with a	nd the reso	urces neede	d to suppor	t the enviro	onmental ass	essment are	as follows:
	CNSC	1131	1132	1133	1134	1133				
	Licensing Fees (\$k)	450	450	450	900	900				
	NWMO-1 (FTE)	0.5	0.5	0.5	0.5	0.5				
	NWMO-3 (FTE)	1	1	1	1	1				
	Travel (\$k)	2	2	2	2	2				
	Purchased	1782	1782	1782	1782	1782				
Schedule	Start Year			151	2160			Finish Year	155	2164
Туре	Fixed									
Calculations and Notes:		sing fees are		assuming t	hat 1 FTE ed	quals 1800 h	ours and is	charged at a	in hourly rate	e of \$250. This total is reported
	NWMO-3 v	values repre values repre enses are ca	sent the FT	E effort req	uired by NV	/MO technic	al staff; an		l is also repo	rted in thousands of dollars.
Labour (		Materi	al Costs		Costs	Subt	otal	Allowance		Total Cost
\$	1,204,298	\$	-	\$ 1	2,070,000	\$ 1	3,274,298	\$	3,318,574	\$ 16,592,872

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	60	10				Prepared By: A. Khan
WBS (Old)	552	30	80	<u> </u>					
M/DC Title	LICENCE TO	ADANDON	I (CNICC) AI	DUCATION					
WBS Title	LICENCE IO	ABANDON	V (CNSC) AF	PPLICATION					
Description	licensing pl	an. This in	cludes pre	paring and	submitting a	•	•		preparing and implementing the that include all of the information
Deliverable	Class I Facil	ity Licence	to Abando	n Applicatio	on and Suppo	orting Documents			
Assumptions	'Abandonm	ent' refers	to the cess	sation of all	licensed act	ivities on the site rath	er than the terr	mination of	ownership or control of the site.
	It is assume 1. The E		ntal Assessr	ment prepa	red prior to	decommissioning will	satisfactorily ac	ddress all is	sues related to abandonment.
	•				•	ensing plan that cov commissioning report,	•	that need	to be addressed in the licence
	- The r	esults of th	ne environn		itoring progr		atory Affairs gr	oup as out	tlined in the licensing plan during
	4. The li 5. The	Licence to	Abandon n	nay impose	ongoing red	n/control the site foll quirements on the lic tory oversight or cont	ensee (likely re	lated to co	ontrol, safeguards, and transfer of ors.
	•					ed to oversee the lice technical staff for the			are the application and supporting ns) are as follows:
		Y178	Y179	7					
	CNSC Licensing Fees (\$k)	450	450						
	NWMO-1 (FTE)	1	1						
	NWMO-3 (FTE)	1	1	_					
	Travel (\$k)	4	4	<u> </u>					
Schedule	Start Year			178	8 2187		Finish Year	179	2188
Туре	Fixed								
Calculations and Notes:	in thousand	ds of dollars	s;	J		•	is charged at ar	n hourly rat	e of \$250. This total is reported
	NWMO-3 v	alues repre	esent the F	ΓE effort red	quired by NV	VMO management; VMO technical staff; a rip to Ottawa costs \$1		is also repo	orted in thousands of dollars.
	<u> </u>								
Labour (	Costs	Materia	al Costs	Othe	er Costs	Subtotal	Allowance	25%	Total Cost

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	60	20					Prepared By: A. Khan
WBS (Old)										······································
		face a contract of the contrac	f	Λ						
WBS Title	LICENSING	REVIEW IN	CLUDING PI	JBLIC HEAR	ING					
	ļ									
Description	•		_		-	process and at	tend Hea	rings needed t	o obtain th	e licence (Y180). This includes:
	<ol> <li>Ansv</li> </ol>	vering CNSC	questions	(as required	d);					
	2. Prov	iding supple	ementary in	formation a	as per a sch	edule and/or a	as require	ed;		
	3. Prep	aring inforn	nation need	ded for the	Public Heari	ing; and				
	4. Atte	nding and p	articipating	in Public H	earings befo	ore the CNSC	prior to in	itial licence.		
Deliverable	Class I Nuc	lear Facility	Licence to	Abandon iss	sued by the	CNSC				
Assumptions	:									
	•						-	/BS 561.30.40.	-	
	2. The	Environmen	ntal Assessn	nent for the	Decommis	sioning of the	facility ha	as been comple	eted (see V	/BS 561.30.40.50.50).
	3. All a	ctivities wi	ll be identif	fied and ex	ecuted as d	lescribed in a	supportin	ng hearing pla	n that is pi	repared by the Regulatory Affair
	group.									
		costs associ	iatad with a	and the res	011K000 D000	dad ta sunnart	L CNCC ct	off's ravious of	the applie	ation (not including time require
	•									ation (not including time required
	by enginee	ring/technic	cai staff) as	well as to p	prepare for a	and attend the	e Public H	earing are as f	ollows:	
	<u> </u>	ı	1							
		180								
	CNSC									
	Licensing									
	Fees (\$k)	450								
	NWMO-1									
	(FTE)	1								
	NWMO-3	-								
		1								
	(FTE)	1								
	Travel (\$k)	4								
Schedule	Start Year			180	2189			Finish Year	180	2189
	Jean Creat			i	2103				100	21001
Tyne	Fixed									
Туре	INCU									
Calculations	CNSC licen	sing fees are	e calculated	l assuming t	that 1 FTE e	guals 1800 ho	urs and is	charged at an	hourly rat	e of \$250. This total is reported
and Notes:	:	ds of dollars				.,000 110			,	,
and Hotes.	tilousalli	as or donals	,							
	NWMO-1 v	alues repre	sent the FT	E effort rea	uired by NV	NMO managei	ment;			
	1	•				NMO technica	-	d		
	=	•							is also reno	rted in thousands of dollars.
	Traverexpo	inses are ea	nearacea as	Janning that	t i person ti	inp to Ottawa	CO313 710	oo. Tiiis totai i	13 0130 1 CPC	rted in thousands of donars.
1 -1	Conto	84-4- *	al Casta	Out.	- Ct-	eliz	·-I	Allancer	350/	Takel Cont
Labour			al Costs		r Costs	Subto		Allowance	25%	Total Cost
\$	351,536	\$	-	\$	454,000	\$	805,536	\$	201,384	\$ 1,006,920

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#### **Work Element Definition Sheet**

WBS (New)	561	30	40	60	30					Prepared By: A. Khan
WBS (Old)	552	30	75							
WBS Title	MAINTAIN	DECOMMI	SSIONING L	ICENCE (CN	ISC)					
Description  Description	1. Prep 2. Prep 3. Prep under the 4. Sup	paring and s paring and s paring and s Nuclear Saf porting CNS	ubmitting r ubmitting u ubmitting a ety and Cor	eports acco unscheduled an applicati ntrol Act an pliance act	ording to the d reports, if on for renevents dits associated	e schedule required, in wal of the I ted regula	orescribed by accordance of the commission of th	y the Decomr e with the lice	missioning ence; that includ	es all of the information required
Assumptions	It is assum	ed that:								
	1. Duri reports wi cycle on 5- 2. The Y174. 3. It is	ng the decoration in the decoration in the decoration application assumed the decoration in the decoration assumed the decoration in the decoration assumed the decoration in	nted to the als. for the first nat appeara	Commission to licence re	on. Therefonewal during the Comm	re, the effor g this stage dission will	ort required is expected be required	to maintain	the decom tted around ntervals, ei	It is also expected that mid-term missioning licence is expected to it the Y164 timeframe followed by ther to report to the Commission cted to be in Y130.
	available t support th 5. The 6. No Decommis 7. The	o support the licence. terms of the amendmen sioning Lice	he licence a e licence ar ts or addit ense will be ociated with	e expected ions to the required.	All other in to require to Environment	nformation he submiss ental Asses needed to	as specified ion of sched sment subn oversee the	I in the licensi duled reports nitted in conj	ing plan wi to the CNS junction wi	procedures, will continue to be II also be available to continue to C. Ith the initial application for the to prepare the application and the submissions) are as follows:
		Repeat ev with Y180	ery 5 years	s starting v	with Y156 a	ind ending				
	CNSC Licensing Fees (\$k) NWMO-1	250	250	250	250	450				
	(FTE)	1	1	1	1	1				
	NWMO-3 (FTE)	1	1	1	1	1				
	Travel (\$k)	1	1	1	1	2				
Schedule	Start Year			156	2165			Finish Year	180	2189
Туре	Fixed									
Calculations and Notes:	CNSC licen in thousan NWMO-1 v	ds of dollars values repre values repre	s; esent the FT esent the FT	TE effort red TE effort red	quired by N\	WMO mana WMO techi	ngement; nical staff; a	nd	·	ate of \$250. This total is reported
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	8,788,395	\$	-	\$	7,280,000	\$	16,068,395	\$	4,017,099	\$ 20,085,494

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#### **Work Element Definition Sheet**

Maintain a Class I Facility Decommissioning Licence from the Canadian Nuclear Safety Commission (Y181 - Y185). This includes:  1. Preparing and submitting reports according to the schedule prescribed by the Licence to Abandon; 2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon issued by CNSC  Assumptions  It is assumed that: 1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:  Y181 Y182 Y183 Y183 Y184 Y185  CNSC Licensing Fees (Sk) 100 100 100 100 100 100  NWMO-1 (FTE) 1 1 1 1 1 1  Travel (Sk) 100 100 100 100 100 Finish Year 185 2194  Schedule  Cisculations CNSC Licensing fees are calculated assuming that 1 FTE equals 1800 hours and is charged at an hourly rate of \$250. This total is reported in thousands of dollars;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-1 values represent the FTE effort requi	WBS (New)	561	30	40	70	30					Prepared E	By: A. Khan
Description   Maintain a Class   Facility Decommissioning Licence from the Canadian Nuclear Safety Commission (Y181 - Y185). This includes:  1. Preparing and submitting reports according to the schedule prescribed by the Licence to Abandon; 2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.    Deliverable   Class   Facility Licence to Abandon issued by CNSC	WBS (Old)	552	30	75								
Description   Maintain a Class   Facility Decommissioning Licence from the Canadian Nuclear Safety Commission (Y181 - Y185). This includes:  1. Preparing and submitting reports according to the schedule prescribed by the Licence to Abandon; 2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.    Deliverable   Class   Facility Licence to Abandon issued by CNSC												
1. Preparing and submitting reports according to the schedule prescribed by the Licence to Abandon; 2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon issued by CNSC  Assumptions  It is assumed that: 1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:  V181 V182 V183 V184 V185  CNSC Licensing Fees (Sk) 100 100 100 100 100 100  NWMO-1 (FTE) 1 1 1 1 1 1  Travel (Sk) 2  Schedule  Start Year 181 2190 Finish Year 185 2194  CNSC licensing fees are calculated assuming that 1 FTE equals 1800 hours and is charged at an hourly rate of \$250. This total is reported in thousands of dollars;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO exchaical staff; and	WBS Title	LICENCE TO	) ABANDON	I (CNSC)								
1. Preparing and submitting reports according to the schedule prescribed by the Licence to Abandon; 2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon issued by CNSC  Assumptions  It is assumed that: 1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:  V181 V182 V183 V184 V185  CNSC Licensing Fees (Sk) 100 100 100 100 100 100  NWMO-1 (FTE) 1 1 1 1 1 1  Travel (Sk) 2  Schedule  Start Year 181 2190 Finish Year 185 2194  CNSC licensing fees are calculated assuming that 1 FTE equals 1800 hours and is charged at an hourly rate of \$250. This total is reported in thousands of dollars;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO exchaical staff; and												
2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon Issued by CNSC  Assumptions  It is assumed that:  1. A licence to abandon will be issued with a licence term of 5 years.  2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC.  3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181	Description	Maintain a	Class I Facil	lity Decomr	nissioning L	icence from	the Canadi	an Nuclear	Safety Commis	ssion (Y181	- Y185). Th	nis includes:
2. Maintaining records during the term of the licence; 3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon Issued by CNSC  Assumptions  It is assumed that:  1. A licence to abandon will be issued with a licence term of 5 years.  2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC.  3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181												
3. Preparing to transfer records to national archives at the end of the licence term; and 4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon issued by CNSC  Assumptions  It is assumed that:  1. A licence to abandon will be issued with a licence term of 5 years.  2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC.  3. Records needed to meet Canadian requisitors and/or agreements will be maintained.  4. Plans to transfer these records to the appropriate Canadian authority will be made.  5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    V181			_	_	-	_	-	rescribed by	the Licence to	o Abandon	;	
4. Supporting CNSC staff activities (as well as IAEA inspections) during the course of the licence.  Deliverable  Class I Facility Licence to Abandon issued by CNSC  Assumptions  It is assumed that:  1. A licence to abandon will be issued with a licence term of 5 years.  2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC.  3. Records needed to meet Canadian regulations and/or agreements will be maintained.  4. Plans to transfer these records to the appropriate Canadian authority will be made.  5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181		1	_	_								
Deliverable  Class I Facility Licence to Abandon issued by CNSC  Assumptions  It is assumed that:  1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:    Y181			•						•			
Assumptions  1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:    V181		4. Supp	orting CNS	C staff activ	ities (as we	ll as IAEA in	spections) c	uring the co	ourse of the lic	ence.		
Assumptions  1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:    V181												
1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:    Y181	Deliverable	Class I Faci	lity Licence	to Abandor	issued by (	CNSC						
1. A licence to abandon will be issued with a licence term of 5 years. 2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC. 3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:    Y181	Assumptions	It is assume	ad that:									
2. During the course of the licence term, the licensee will submit scheduled reports to the CNSC.  3. Records needed to meet Canadian regulations and/or agreements will be maintained.  4. Plans to transfer these records to the appropriate Canadian authority will be made.  5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181	Assumptions	1		ndon will b	o iccuad wit	h a liconco	torm of E v	arc				
3. Records needed to meet Canadian regulations and/or agreements will be maintained. 4. Plans to transfer these records to the appropriate Canadian authority will be made. 5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for the Decommissioning License will be required. 6. The costs associated with and the resources needed to support the licence are as follows:    Y181							-		roports to the	CNISC		
4. Plans to transfer these records to the appropriate Canadian authority will be made.  5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181			· ·		-				•	CN3C.		
5. No amendments or additions to the Environmental Assessment submitted in conjunction with the initial application for th Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181		•			•							
Decommissioning License will be required.  6. The costs associated with and the resources needed to support the licence are as follows:    Y181								-			ale ale e testat	al analisation for the
6. The costs associated with and the resources needed to support the licence are as follows:    Y181		1				Environm	ental Asses	sment subn	nittea in conj	unction wi	in the initi	al application for the
V181   V182   V183   V184   V185		Decommis	sioning Lice	nse will be	requirea.							
CNSC Licensing Fees (\$k) 100 100 100 100 100 100    NWMO-1 (FTE) 1 1 1 1 1		6. The	costs associ	ated with a	nd the reso	urces neede	ed to suppo	rt the licenc	e are as follow	vs:		
Licensing Fees (\$k) 100 100 100 100 100 100 100 Finish Year 185 2194  Schedule Start Year 181 2190 Finish Year 185 2194  Fixed Start Year 181 2190 Finish Year 185 2194  Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost			Y181	Y182	Y183	Y184	Y185					
Fees (\$k) 100 100 100 100 100 100		CNSC										
NWMO-1 (FTE) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Licensing										
Company of the content of the cont		Fees (\$k)	100	100	100	100	100					
Travel (\$k) 2  Schedule Start Year 181 2190 Finish Year 185 2194  Type Fixed  Calculations and Notes: NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		NWMO-1										
Schedule Start Year 181 2190 Finish Year 185 2194  Type Fixed  Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		(FTE)	1	1	1	1	1					
Schedule Start Year 181 2190 Finish Year 185 2194  Type Fixed  Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost												
Fixed  Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		Travel (\$k)					2	<u> </u>				
Fixed  Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost					······							
Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Schedule	Start Year			181	2190			Finish Year	185	2194	
Calculations and Notes:  NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	T	Fived										
In thousands of dollars;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO technical staff; and  Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	ı ype	rixeu										
In thousands of dollars;  NWMO-1 values represent the FTE effort required by NWMO management;  NWMO-3 values represent the FTE effort required by NWMO technical staff; and  Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Calculations	CNSC licen	sing fees are	e calculated	l assuming t	that 1 FTF o	nuals 1800	hours and is	charged at an	hourly rat	e of \$250	This total is reported
NWMO-1 values represent the FTE effort required by NWMO management; NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost					a assulling	נוומנ ז דוב פ	quais 1000	iouis allu IS	ciiai geu at dii	i nounly rat	C UI 723U.	ims total is reported
NWMO-3 values represent the FTE effort required by NWMO technical staff; and Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	and Notes.	iii tiiUuSdlli	us or dolldis	,								
Travel expenses are calculated assuming that 1 person-trip to Ottawa costs \$1000. This total is also reported in thousands of dollars.  Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		NWMO-1 v	alues repre	sent the FT	E effort req	uired by NV	VMO mana	gement;				
Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost		NWMO-3 v	alues repre	sent the FT	E effort req	uired by NV	VMO techni	cal staff; an	d			
		Travel expe	enses are ca	lculated as	suming that	t 1 person-t	rip to Ottaw	a costs \$10	00. This total	is also repo	rted in tho	usands of dollars.
	Labour	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%		Total Cost
		1,106,763		-		502,000	\$	1,608,763		402,191	\$	2,010,954

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#### **Work Element Definition Sheet**

Ś		Ś		Ś	1,500,000	\$ 1,500,	000 \$	375,000	Ś	1,875,000
Calculations Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
Туре	Fixed									
Schedule	Start Year			10	2019		Finish Year	12	2021	
	services as 4fte/a for a documents	described back descri	oelow: list consult of the PSA	ant to prepared and the prepared in the prepar	are site-spec		signs, conduct th	e required d	ata analysis anc	s consultant  I prepare technical and prototype tes
Assumptions			•		/C : T	. 16	/!:			
Deliverable		•	ū		system spec ts where app					
	: '	on licence a	•	specificatio	ins to suppo		e Environmentar i	Assessment		epository racinty
Description	Tasks inclu		ntions and	sposificatio	ns to suppo	rt the PSAR and th	- Environmental	Assassment	rapart for the r	onositon, fosility
WBS Title	PROVIDE E	NGINEERIN	G INPUT TO	<b>P</b> SAR						
WBS (Old)	552	20	15	60	50					
WBS (New)	561	30	50	20	10				Prepared By:	J. Villagran

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	20	20					Prepared B	<b>y:</b> J. Villa	gran
WBS (Old)	552	20	15	60	60							
WBS Title	ENGINEERI	NG SUPPOF	RT DURING I	LICENSING	REVIEW ANI	D EA HEARIN	IGS					
Description	for the - P and the - Delive	Prepare tech EA process Prepare "less CNSC licen	and the CNS s technical" sing process ions and res	SC licensing documents s. spond to re	process. s on reposito	ory technolo	ogy and the	echnology and preferred site	e-specific re	pository des	sign for the	EA process
Deliverables	•			•		0,	•	eferred site-sp ne preferred si	•			
	- Senior - travel	off requirem Consultant & expenses	ents are 1 f writing, sta of \$70k/a f	ff training: or 3a (Y13		services: \$20 I	00k/a for 3	list) plus the fo	•			
Schedule	Start Year			13	2022			Finish Year	15	2024		
Туре	Fixed											
				•	•	ū	•	of regulatory		remain the	role of seni	or NWMO
Labour (	Costs	Materia	al Costs	Other	r Costs	Subt	otal	Allowance	25%		<b>Total Cost</b>	
\$	-	\$	-	\$	810,000	\$	810,000	\$	202,500	\$		1,012,500

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	30	10				Prepared By:	J. Villagran
WBS (Old)										
	ļ			***************************************				***************************************		
WBS Title	PROVIDE E	NGINEERIN	G INPUT TO	) FSAR						
D	Talaha bala	-l								
Description	Tasks inclu		m doccrint	ions and sn	ocifications	to support the FSAR ar	ad tha Enviror	montal Acc	accment rener	t for the repository
		rating licen	•	•	ecifications	to support the FSAN ai	iu tile Eliviioi	iiileiilai ASS	essilient repor	t for the repository
	racinty ope	rating neem	cc applicati	0111						
Deliverables	Site-specifi	ic system fin	nal design d	escriptions	and system	specifications				
	Document	ation of pro	totype test	s and result	s where app	olicable.				
Assumptions	Duration o			164a/a fau 1	on /Coming T	Fachwinel Cunniclist) to			- +!ifi	
	Consultant		nents are	inte/a for s	sa (Senior	Fechnical Specialist) to	manage/uir	ect both th	e tasks specifi	ed above and the
	Consultant	.3.								
	Specialist o	consultants	to prepare	site-specific	preliminar	y designs, conduct the	required data	analysis an	d prepare tech	nical documents in
	1 '			•	•	design documents, sys	•	•		
	be inputs t	o the PSAR	and EA rep	orts. Purcha	sed services	s: 250k\$/a for 3a.				
Schedule	Start Year			21	2030		Finish Year	23	2032	
Туре	Fixed									
Calculations										
and Notes:										
Labour	Costs	Materia	al Costs	Othe	Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	750,000	\$ 750,000	\$	187,500	\$	937,500
_ ·		<u> </u>		<u>.                                    </u>		.,	1 .		ļ .	,

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	30	20					Prepared By:	J. Villagran
WBS (Old)	552	20	40	20							
WBS Title	SAFEGUAR	DS INTERFA	CE IMPLEN	/ENTATION							
Description	specification - Cons	pare designs ons complet struct and fi olve any defi	ed under V eld test pro iciencies in	VBS 550 20 4	40 10 (precu all non-stand nance and re	ursor). dard interfac obustness of	e systems	measures for and equipments and equipn	nt.	plant and repos	sitory to satisfy the
Deliverable	1			U		e systems for afeguards int		Ü	uards meas	ures and equip	ment.
Assumptions	NWMO stanoted. Consultantsafeguards \$500k/a fo	/contractor interfaces, r 3 a.	nents are ( services to to resolve	o complete p deficiencies	orototype de and to doc	esign, to acquument the fi	uire protot nal method	ype equipmends, designs and	nt, to condu d technical	uct demonstrat	io.30.10, except as ion tests of nuclear Purchased Services
Schedule	Start Year			23	2032			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	System des period.	sign and pro	curement	can be comp	oleted in tw	o years and s	system den	nonstration ca	an be condu	ucted in the las	t year of the
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,500,000	\$ :	1,500,000	\$	375,000	\$	1,875,000

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	30	30					Prepared By:	A. Murchison
WBS (Old)											
WBS Title	PRODUCE	SPECS AND	INPUT TO F	SAR (FINAL	SAFETY ASS	SESSMENT R	PORT)				
				········							
Description	Prepare th facility con	-	ns, specifica	ations and o	demonstrati	ion test resu	ts to supp	ort the final sa	fety asses	sment report (I	FSAR) for repository
Deliverable	Description	ns, specifica	tions and d	emonstratio	on results to	support to	FSAR and t	the EA report fo	or constru	ction approval.	
Assumptions		3 fte/a for	Y16-Y20 o prepare tl			nd EA on the	repository	facility and use	ed-fuel pa	ckaging plant: 2	2 fte/a for 5 a.
Schedule	Start Year			16	2025			Finish Year	20	) 2029	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materia S	al Costs	Other	r Costs	Subt	otal	Allowance	25%		otal Cost
										Ś	

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	40	10					Prepared By:	J. Villagran
WBS (Old)											
	ļ										
WBS Title	MONITORI	NG SYSTEM	S AND PRO	GRAM – D	GR OPERATION	ON PHASE					
	ļ										
Description	Tasks inclu				•						
	•	•			ance of mon	itoring syste	m.				
	- L	Data collection	on and data	ibase man	agement.						
Deliverables		Jpdated rep	ository moi	nitoring sy	ctam						
Deliverables	•		•	Ο,	nonitoring p	arameters.					
	Ì	paatea aat	abase for re	pository i	mornico mig p	arameters.					
Assumptions	Duration o	f work: Y26	to Y55.								
	NWMO sta	off requirem	ents to mar	nage/exec	ute the abov	e tasks are 1	fte for 30a	(Technical s	staff) to oper	ate systems an	d manage data
	acquisition	and the mo	onitoring da	tabase; pl	lus the follov	ving:					
	- (	`ontractor/c	onsultants	to prepare	technical sr	ecifications	and provid	e input to ed	nuipment pro	ocurement prod	cess and to assist
	:	-					•	•		for 30a (Y26 to	
											,
	_ D	ourchasa and	d commission	nning of m	onitoring ea	uinment as	equired fo	r maintanan	ce and ungra	ding of both th	e DGR and
	•				estimated av				ce and upgra	unig or both th	e Dan and
	Терозіс	ory momen	6 3 / 3 (	· Wittin Girl	.stimated av	crube value	01 91,00019	· ·			
	ļ			·····				y			
Schedule	Start Year			2	6 2035			Finish Year	85	2094	
Туре	Step-Fixed										
Calculations	<u> </u>										
and Notes:											
Labour (	Costs	Materia	al Costs	Othe	er Costs	Subt	otal	Allowance	25%	To	tal Cost
\$	-		0,000,000	\$	9,000,000		9,000,000	Ś	17,250,000	\$	86,250,000
		,	-,,,-	<u> </u>	- ,,	<u>'</u>	-,,	<u> </u>	,===,===	ļ '	,,000

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	50	10				Prepared By:	J. Villagran
WBS (Old)										
	ļ									
WBS Title	EXTENDED	MONITORII	NG PERIOD							
	<u></u>									
Description	Tasks inclu				•					
	1	continued of	peration an	d maintena	ince of repo	sitory monitoring syste	ms, as require	ed following	the 30-year D	GR operating
	period.									
	- [	Data collection	on and data	ibase mana	gement.					
Deliverables	_ (	Ineration ar	nd mainten	nce of ren	ository mon	itoring systems at the r	enository site	and surrou	ınding area	
Deliverables	:	-		-	ed database		epository site	ana samoa	illullig area.	
	<u> </u>	iccessible al	ia continuo	usiy upuutt	La database	•				
Assumptions	Duration o	f work: Y56	to Y125.							
	NWMO sta	off requirem	ents to mar	nage/execu	te the above	e tasks are 1 fte for 100	)a (Technical 9	Snecialist) to	onerate syste	ms and manage
	•	•		•	e, plus the f		ou (recinicur	specialist, te	o operate syste	ins and manage
				Ū	•	pment procurement pr	ococc and acc	ict with the	maintananca	and ungrading of
	•			•		\$100k/a for 100a (Y56 t		sist with the	maintenance a	and upgrading of
	Терозіс	ory monitor	ing systems	. Turchase	u sei vices. ,	2100K/ a 101 100a (130 t	.0 1133).			
	- F	urchase and	d commissio	oning of mo	nitoring equ	uipment as required fo	r maintenanc	e and updat	ing of the repo	sitory monitoring
	system	with an est	timated ave	rage value	of \$250k/a f	for 100 a.				
Schedule	Chart Vacu			0.0	2005		Finish Von		2164	
Scriedule	Start Year			86	2095		Finish Year	155	2164	
Туре	Fixed									
Calculations										
and Notes:		1		Т		T	1		1	
Labour (	Costs		al Costs		r Costs	Subtotal	Allowance	25%	_	tal Cost
\$	-	\$ 1	17,500,000	\$	7,000,000	\$ 24,500,000	\$	6,125,000	\$	30,625,000

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#### **Work Element Definition Sheet**

WBS (New)	561	30	50	60	10					Prepared By: J. Villagran
WBS (Old)										
WBS Title	DECOMMI	SSIONING P	ERIOD							
Description	- P	Continued o	peration an decommissi ata collectio	oning and r	emoval of s	ystems as r			00-year perio	od of pre-closure monitoring.
Deliverables	- N - A	/lanagemen	nd maintena t of decomi nd continuo systems rem	missioning outling of the contraction of the contra	operations ed database		ems at the r	epository sit	e and surrou	nding area.
Assumptions	repository Environme - C \$100k/i - C \$400k/i	off requirem monitoring ntal Monito Contractor/ca for 25 a (Y) Contractor/ca for 10 a (Y) Maintenance	ents to mar systems an oring system consultant to 226 to Y150 consultant to 2126 to Y135	d 1 fte for 2; plus the for a ssist with the following of equipment of the following of equipment of the following of equipment of the following of equipment of the following of equipment of the following of equipment of the following of equipment of equipment of the following of equipment of equi	.5 a (Techni ollowing: n equipmen nt the proce oment as re	cal Specialis t maintena ss of decom	t) to manag	ge data acqui Environment the reposito	sition as wel al Monitorin ry monitorin	nage the decommissioning of I as the database for the g systems. Purchased services: g systems. Purchased services: pring system and database, witl
Schedule	Start Year			156	2165			Finish Year	180	2189
Туре	Fixed									
Calculations and Notes:	<b>5</b>	ive years for								surrounding the repository and ckfilling and sealing of reposito
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost
\$		\$	3,750,000	\$	6,500,000	\$ 1	0,250,000	\$	2,562,500	\$ 12,812,50

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#### **Work Element Definition Sheet**

WBS (New)	561	90	50	10	10	<u> </u>	<u> </u>	<u> </u>		Prepared By: C. Vardy
WBS (Old)	552	90								i
MDC Till-	6		1 1/00) C:+:	- Dl						
WBS Title	Common S	ervices (Y01	L-Y09), Sitin	g Phase						
Description	underta Pre Qua Safe Fina buyer a Hui Ove staff ex	aken by NW sident's Off ality Progran ety Program ance and Bu and IT suppo man Resour erheads mis penses.	MO staff. Mo staff. Mo staff. Mo staff. Mo mo mo mo mo mo mo mo mo mo mo mo mo mo	lanagemen implement I be covere ent: Manag ices: Accou ment, staff expenses, I	at functions attion mana d under a u gement of he int manager manageme T costs, train	covered an gement, sit nique set o ealth and sa ment, repor ent, purchas ning, holida	d their scop ing and pub f work elem afety progra ting, invoic e of payroll ys, pension	e include: lic affairs. ent definitions. ms. ing, contract services, ge contribution	t payments, s neral suppor	taff payments,
Deliverable	· An	- F deve - F	President's ( Finance and lopment and Human Resc	Office: Prog Business So d maintena ources: Pers	ram estima ervices: Pro	tes, schedu ogram finan nentation, fi ces to all ar	les, resourc ce, business ling, work p eas of the p	planning/b rocessing ar	ollowing: management udgeting, sys nd strategic p	tems
Assumptions	elsewh · Bro · The Assessr	ere for the ( adly, overal ese numbers ment, QA, Li	Operations I Il staffing le s do not incl censing & A	Phase (Y30- vels are ass ude NWM0 pprovals a	-Y59), etc., umed to be O staff listed nd Public Af	for 35 NW d under Siti fairs. This	MO-01 and ng, Reposito vork eleme	5 NWMO-03 ory System D nt includes a	a (admin staff evelopment, a cost allowar 01-Y09 see be	f) for Y01-Y09. Safety nce for the
Schedule	Start Year			1	2010			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:	through · Bas · NW	n Y09 based iis of cost es	on an anay stimate was	sis of HC ar NWMO Bu	nd changes i siness Plan	in activities common se	in the organ	nization.	These were of	
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	e <b>25</b> %	Total Cost
\$	32,031,947	\$	-	\$	32,374,851	\$	64,406,798	\$	16,101,700	\$ 80,508,49

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#### **Work Element Definition Sheet**

WBS (New)	561	90	50	20	10				Prepared By: C. Vardy				
WBS (Old)	552	90			Ĭ	]							
WBS Title	Common Services (Y10-Y15), Construction License Phase												
WD3 TICE	Commons	CIVICES (110	115), CONS	oti actioni Ei									
Description	<ul> <li>The program management and administration of the DGR facility during Siting (Y10-Y15). This work will be undertaken by NWMO staff supplemented by Architect Engineering personnel. Management functions covered and their scope include:         <ul> <li>President's Office: Project implementation management, siting and public affairs.</li> <li>Technical Development Program Mgmt. – Engineering office, integration of siting, development and design, Directs Geoscience, Repository System Development &amp; Safety Assessment Mgrs will be covered under a unique set of work element definition sheets.</li> <li>Quality Program Mgmt will be covered under a unique set of work element definition sheets.</li> <li>Safety Program Management: Management of health and safety programs will be covered under a unique set of work element definition sheets</li> <li>Finance and Business Services: Account management, reporting, invoicing, contract payments, staff payments, buyer and IT support.</li> <li>Human Resources: Recruitment, staff management, purchase of payroll services, general support.</li> <li>Architect Engineer: Purchased services engineers responsible for development of outline design, preparation of specifications and management of design and build contractors. Provides procurement and project management services to the NWMO including schedule and cost control will be covered under a unique set of work element definition sheets.</li> </ul> </li> </ul>												
	<ul> <li>Legal and Insurance – Internal and external legal counsel as well as conventional insurance coverage for work during the pre- operations phase.</li> </ul>												
Deliverable	<ul> <li>An overall business, administrative and management function that will deliver the following:         <ul> <li>President's Office: Program estimates, schedules, resource plans and management reports</li> <li>Finance and Business Services: Program finance, business planning/budgeting, systems development and maintenance, documentation, filing, work processing and strategic planning</li> <li>Human Resources: Personnel services to all areas of the program</li> <li>Offsite overheads applicable to NWMO staff</li> <li>Insurance – Insurance against conventional risks</li> </ul> </li> </ul>												
Assumptions	· The	program m	anagement	t and admir	nistration of	the DGR ar	e costed els	sewhere for the Operatio	ns Phase (Y30-Y59), etc.,				
	<ul> <li>The program management and administration of the DGR are costed elsewhere for the Operations Phase (Y30-Y59), etc.,</li> <li>Broadly, overall staffing levels are assumed range from 27 to 33 for Y10 -Y15 as outlined to the right (approx 9 NWMO1, 6 NWMO2 and 15 NWMO3)</li> <li>These numbers do not include NWMO staff listed under Siting, Repository System Development, Safety Assessment, Licensing &amp; Approvals and Public Affairs. This work element includes a cost allowance for the overhead associated with these staff.</li> <li>Insurance premiums as per CTECK estimate over years 10-15 - see below-right:</li> </ul>												
								······································					
Schedule	Start Year			10	2019			Finish Year 15	2024				
Туре	Fixed												
Calculations and Notes:	anaysis	of HC and c 'MO staff nu	hanges in a	ctivities in	the organiza	ation.		•	xtended through Y09 based on an through Y15 based on project				
Labour (	Costs	Materia	al Costs	Othe	r Costs	Sub	total	Allowance 25%	Total Cost				
\$ 2	27,437,036	\$	-	\$ 2	28,595,504	\$ !	56,032,540	\$ 14,008,135	\$ 70,040,675				

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#### **Work Element Definition Sheet**

WBS (New)	561	90	50	30	10	1				Prepared B	y: C. Vardy		
WBS (Old)	552	90					<u> </u>				tt		
WBS Title	Common S	ervices Y16-	-Y25, Const	ruction Pha	ise								
Description	The program management and administration of the DGR facility during Siting (Y10-Y15). This work will be undertaken by NV staff supplemented by Architect Engineering personnel. Management functions covered and their scope include:      President's Office: Project implementation management, siting and public affairs.												
	Technical Development Program Mgmt. – Engineering office, integration of siting, development and design, Directs Geoscience, Repository System Development & Safety Assessment Mgrs will be covered under a unique set of work element definition sheets.												
	Quality Program Mgmt will be covered under a unique set of work element definition sheets.  Safety Program Management: Management of health and safety programs will be covered under a unique set of work element.												
	<ul> <li>Safety Program Management: Management of health and safety programs will be covered under a unique set of work element definition sheets</li> <li>Finance and Business Services: Account management, reporting, invoicing, contract payments, staff payments, buyer and IT</li> </ul>												
	support.												
	· Arc manage	<ul> <li>Human Resources: Recruitment, staff management, purchase of payroll services, general support.</li> <li>Architect Engineer: Purchased services engineers responsible for development of outline design, preparation of specifications and management of design and build contractors. Provides procurement and project management services to the NWMO including schedule and cost control will be covered under a unique set of work element definition sheets.</li> </ul>											
		al and Insur ons phase.	ance – Inte	rnal and ex	ternal legal	counsel as	well as conv	entional ins	surance cover	age for work	during the pre-		
Deliverable	Λ	avagell has	:				+	d a li 4 b a .	fallaiaa.				
Deliverable	<ul> <li>An overall business, administrative and management function that will deliver the following:         <ul> <li>President's Office: Program estimates, schedules, resource plans and management reports</li> <li>Finance and Business Services: Program finance, business planning/budgeting, systems development and maintenance,documentation, filing, work processing and strategic planning</li> <li>Human Resources: Personnel services to all areas of the program</li> <li>Offsite overheads applicable to NWMO staff</li> <li>Insurance – Insurance against conventional risks</li> </ul> </li> </ul>												
Assumptions		-	-						the Operation				
	<ul> <li>Broadly, overall staffing levels are assumed range from 27 to 33 for Y10 -Y15 as outlined to the right (approx 9 NWMO1, 6 NWMO2 and 15 NWMO3)</li> <li>These numbers do not include NWMO staff listed under Siting Repository System Development, Safety Assessment, Licensing 8.</li> </ul>												
	<ul> <li>These numbers do not include NWMO staff listed under Siting, Repository System Development, Safety Assessment, Licensing &amp; Approvals and Public Affairs. This work element includes a cost allowance for the overhead associated with these staff.</li> </ul>												
	· Insi	urance prem	niums as pe	er CTECK est	imate over	years 10-15	i - see below	v-right:					
Schedule	Start Year			10	2019			Finish Year	15	2024			
Туре	Fixed												
Calculations	. Det	ailad hatta-	n un budes	te wore de	olonod for	the vers 20	10 2015	v function	Thoso were -	vtondod the	augh V00 based on an		
Calculations and Notes:	anaysis	of HC and o	changes in a	activities in	the organiza	ation.		•			bugh Y09 based on an		
1 - 1													
	Costs 32,812,159	Materia \$	al Costs	Othe \$	r Costs	Sub	total	Allowanc	e <b>25%</b> 17,492,664	\$	Total Cost		

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#### **Work Element Definition Sheet**

WBS (New)	561	90	70	10	10					Prepared By	P. Hader	
WBS (Old)	552	15	20	50			•			Ai		
				Α			Α					
WBS Title	QUALITY A	SSURANCE	PROGRAM	SITING								
Description	Establish a Quality Assurance (QA) program consistent with ISO 9001 and 14001 requirements. Work Program would include:											
	- Development and maintenance of QA training and guidance documents.											
	- Conduct QA audits to verify implementation of QA program with project staff/contractors.											
	- Conduct periodic reviews and revision of QA documents specific to site characterisation work program activities.											
	- Conduct technical audits to verify and maintain Quality Control on site characterisation data/interpretation.											
	- Maintain/implement/audit software QA program.											
	- Conduct QA training for project staff and contractors Prepare annual QA program status reports.											
	•			-		D						
	·	- QA Management System Audits (annual) and Management Review										
	- Establishing QA guidelines early in the siting program will be important to ensure that work program expectations are conveyed to											
	staff and external contractors. This is necessary to avoid program delays in re-qualifying data and/or analyses not satisfying QA											
	requirements/expectations.											
Deliverable	- Maintenance of an ISO 9001/14001 based QA program.											
	- Audit reports on implementation of QA program											
	- Annual QA program status reports.											
	- Quality Assurance training programs and manuals											
	- Technical audits on site characterisation data/interpretation											
	- QA of Route Options Studies and Route/Mode Selection Studies/Evaluations											
	- QA of Conveyance Design – Concept - QA of Package Design - Preliminary											
	- QAC	JI Package L	Jesigii - Pie	IIIIIIIII								
Assumptions	- Purc	hase Inform	nation Tech	nology Mai	nagement Sv	stem for u	se by QA pro	ogram (\$75 K. `	Y2).			
•	Purchase Information Technology Management System for use by QA program (\$75 K, Y2). ISO 9001/14001 accreditation is program standard.											
	- QA program will be subsumed by Licence and PSAR activities in year 10.											
	- QA Management Support @ 0.25 NWMO-01 fte/a for 2 years (Y1-2).											
	QA Management Support @ 0.33 NWMO-01 fte/a for 2 years (Y3-4) and 1 NWMO-01 fte/a for 5 years (Y5 to 9)											
	- QA Specialist @ 0.5 NWMO-03 fte/a for 2 years (Y2-3) (Feasibility Studies in potential sites).											
	- QA Specialists @ 1 NWMO-03 fte/a for 6 years (Y4 to 9).											
	- Contracts: \$15k (Y1), \$50k/a for 2 years (Y2 to 3); \$100k/a for 2 yrs (Y4-5)											
	- Contracts: \$250k/a for 4 years (Y6 to 9)											
Caba dula	Chart Vaar			1 .	2010			Finish Vasa		2010		
Schedule	Start Year			1	L 2010			Finish Year	9	2018		
Туре	Fixed											
Calculations	Assuming p	Assuming purchase of NWMO I.T. Management System for QA @ \$75K (1/2 of \$150K), shared between L&ILW DGR and APM DGR.										
and Notes:	5,											
	Assuming site characterization of up to two sites between 2013 and 2018.											
	Contracts are for program audits, assessments and evaluations which escalate in number from one in year one to twenty a year starting in											
	year six.	. •							,			
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Т	otal Cost	
\$	2,274,814	\$	75,000		1,315,000		3,664,814	\$	916,204	\$	4,581,018	
Υ	_,_, +,014	, Y	, 3,000	, Y	1,313,000	Υ	5,00 1,014	7	310,204	۲	7,501,01	

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#### **Work Element Definition Sheet**

WBS (New)	561	90	70	20	10					Prepared	<b>By:</b> P. Ha	der	
WBS (Old)	552	15	20	50			•			A			
				A			A						
WBS Title	QUALITY A	SSURANCE	PROGRAM I	LICENCE AP	PLICATION								
Description	Maintain a	Quality Ass	surance (QA	) program	consistent w	ith ISO 900	1 and 1400	l requirement	s. Work Pr	ogram wo	uld include:		
	- Maintenance of QA training and guidance documents.												
	- Conduct QA audits to verify implementation of QA program with project staff/contractors.												
	- Conduct periodic reviews and revision of QA documents specific to licensing PSAR, EA & construction license stage.												
	=	- Conduct technical audits to verify and maintain Quality Control.											
	•	- Maintain/implement/audit software QA program Conduct QA training for project staff and contractors.											
	1		•	•		ors.							
		are annual		-		D							
	- QA Management System Audits (annual) and Management Review												
	Note: Establishing QA guidelines early in the siting program will be important to ensure that work program expectations are conveyed to												
	staff and external contractors. This is necessary to avoid program delays in re-qualifying data and/or analyses not satisfying QA requirements/expectations.												
	requireme	піз/ехресіа	itions.										
Deliverable	- Maintenance of an ISO 9001/14001 based QA program.												
	- Audit reports on implementation of QA program.												
	- Annual QA program status reports.												
	- Quality Assurance training programs and manuals.												
	:	- Technical audits on site characterisation data/interpretation											
	<ul> <li>QA of Conveyance Design – Preliminary QA of Package Design – Detail including Analytic Analysis and Evaluation</li> <li>QA of Package Prototype – Manufacture, Testing and Evaluation.</li> </ul>												
	- QA (	of Package F	Prototype –	Manufactu	re, Testing a	and Evaluat	ion.						
Assumptions	1		_	-	ts for use by		m.						
	- ISO 9001/14001 accreditation is program standard.												
	- QA program will be subsumed by Construction UDF (we've been re-aligning the acronym to UDF for underground demonstration												
	facility) & Obtain Construction License starting in year 15.												
	- QA Management Support @ 1 fte/a for 6 years (Y10 to 15).												
	- QA Specialist @ 1 fte/a for 6 years (Y10 to 15) (Licensing & PSAR Studies Support).												
	- QA Specialist @ 1 fte/a for 2 years (Y14 to Y15)												
	- Contracts: \$150k/a for 1 years (Y10); \$ 200k/a for 1 yrs (Y11) \$250k/a for 4 yrs (Y12-15).												
Schedule	Start Year			10	) 2019			Finish Year	15	202	<b>4</b>		
Scriedule	July 1641			i	2013			i iiiisii i'cai	13	202	;		
Туре	Fixed												
- 150	. inca												
Calculations									••••••				
and Notes:													
'	Contracts are for program audits, assessments and evaluations which escalate in number from twelve in year one to twenty a year												
	starting in year two. Assume subsurface investigations are completed in year nine and quality assurance activities are somewhat												
	decreased but rampup again for the environmental assessment.												
Labour			al Costs		r Costs		total	Allowance	25%	I	Total Cost		
	2,369,581		ai Costs	\$		\$	3,719,581		929,895	\$	TOTAL COST		
\$	2,303,361	\$	-	ې	1,350,000	٦	2,/13,261	\$	343,035	٦		4,649,477	

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## **Work Element Definition Sheet**

WBS (New)	561	90	70	30	10					Prepared By:	P. Hader
WBS (Old)	552	15	20	50							
WBS Title	QUALITY A	SSURANCE	PROGRAM I	UDF and DO	R CONSTRU	JCTION					
Description	Maintain a	Quality Ass	urance (QA	) program o	consistent w	vith ISO 9001	and 14001	1 requiremer	nts. Work Pr	ogram would ii	nclude:
	N.4		OA tusinina								
	•	ntenance of	_	_		ants. A program wi	h project	ctaff/contrac	tors		
	:		-	-		ments specifi				age.	
	•	ntain/imple				•	c to consti	raction of OL	or & Si Air Sti	age.	
	Ē	duct QA trai									
	:	are annual	•	•							
	- QA N	√anagemen	it System Ai	udits (annua	al) and Man	agement Rev	riew				
Deliverable	•	ntenance of		•		gram.					
	•	t reports or	•								
	1	rterly and A		•	•						
	1	lity Assuran		_							
	•	inical audits Package Pro			-	•					
	- QAF	ackage PIO	totype ivian	uiacture, i	esting and t	-valuation.					
Assumptions	- Info	mation Ma	nagement S	system exist	s for use by	/ QA program					
,	•	9001/14001	•	•	•						
	- QA p	rogram will	l be subsum	ed by Cons	truct DGR, (	Commissionii	ng and Lice	ensing in year	r 25.		
	- Assur	me no chan	ge to the in	itial constru	ction perio	d activities (f	rst 10 year	rs).			
	- Assu	me constru	ction activit	ies (additio	nal rooms,	boreholes) d	uring the o	perations ph	ase (WED 56	51.90.70.40.10	).
	=	•	• •			or 10 years (Y					
	1					16 to 19); 3 ft	e/a for 6 y	ears (Y20 to	Y25).		
	- Cont	racts: \$250	)k/a for 10 y	ears (Y16 t	o 25).						
Schedule	Start Year			16	2025			Finish Year	25	2034	
Scriedule	Start rear			10	2023			riiiisii teai		2034	
Туре	Fixed										
- , , , ,	. 1/104						••••••				
Calculations											
and Notes:	Contracts v	will be for a	uality inspe	ctions, testi	ng equipm	ent calibratio	n. oversig	ht monitorin	g and audits	. Quality Assur	ance FTF is
and Notes.	•	n year 20 to					11, 0 (01316		6 ana adans	. Quality 7.55ai	arree i i E io
Laberra			• • •	ı				Allemen	350/		tal Cast
Labour			al Costs		Costs	Subto		Allowance			tal Cost
\$	5,598,289	\$	-	\$	2,500,000	\$ 8	,098,289	\$	2,024,572	\$	10,122,862

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## **Work Element Definition Sheet**

WBS (New)	561	90	70	40	10				Prepared By: P. Hader
WBS (Old)	552	15	20	50					A
WBS Title	QUALITY A	SSURANCE	PROGRAM,	DGR OPER	ATIONS				
Description	Maintain a	Ouality As	surance (OA	) program	consistent w	vith ISO 9001 and 1400	1 requirements	. Work Pr	ogram would include:
Description.	Widintain a	Quality 715	sarance (Q)	, program	consistent v	VIII 130 3001 and 1 100	requirements		ogram would melade.
	- Maiı	ntenance o	f QA training	g and guida	ince docume	ents.			
	- Cond	duct QA au	dits to verify	/ implemen	ntation of QA	A program with operation	ons staff/contra	actors.	
	- Cond	duct period	lic reviews a	nd revision	of QA docu	ments specific to opera	ntions		
	- Maiı	ntain/imple	ement/audit	and action	tracking so	ftware QA program.			
	•		ining for op						
						m status reports.			
	=		ctive action						
	•	-	-	-		nagement Review.			
	- Cons			and includ	din 3 years p	rior to closure.			
	•	Borehol							
	•		onstruction						
 	•	Access t	unneis						
Deliverable	- Maiı	ntenance o	f an ISO 900	1/14001 ba	ased OA pro	gram.			
2011014410	•			-	•	ncluding acceptence te	sting/inspectio	n.	
	=		n implemen			0 · · · · · · · · · · · · · · · · · · ·	<b>3,</b> 3, 1, 1, 1, 1		
	- Qua	rterly and A	Annual QA p	rogram sta	tus reports.				
	- Qua	lity Assuran	nce training	programs a	ind manuals				
	- Tech	nnical audit	s on operati	ons monito	oring data/ i	nterpretation.			
	- QA F	Package Ma	anufacture.						
	- QA1	Fransportat	ion Services						
Accumentions	Info	rmation Ma	anagamant (	Custom imp	Jomontation	n for use by QA progran			
Assumptions	1		1 accreditati				1.		
	:					ons in year 26.			
						60 years (Y26 to 85).			
	•					6 to 33); 3 fte/a for 52 y	ears (Y34 to Y8	35).	
	•					a for 52 years (Y34 to Y		,	
				y			v		
Schedule	Start Year			26	5 2035	,	Finish Year	85	2094
Туре	Fixed								
Calculations	1					lled during commission	ū		
	:		•		,	ded/replaced in Year 56		-	
	:					operation (assume son	ne extended co	mmissioni	ing activities).
	1		(2035) and		` '				
	•					ent calibration, oversig	ht monitoring	and audits	for package manufacturing,
			nd transport						
	Contracts i	include: cor	nstruction se	ervices, QA	monitoring	and audit (in addition t	o items listed ι	ınder 36 m	nillion bundles scenario).
Jaha	Costs	NA-4	ial Costs	Out-	w Cost-	Cubectal	Allowers	25%	Total Cost
\$	37,755,598	\$	150,000		15,400,000	<b>Subtotal</b> \$ 53,305,598	Allowance \$ 13	3,326,399	Total Cost \$ 66,631,997
ب	31,133,386	٧	130,000	٧	13,400,000	۵۵٫۵۵۵٫۵۵۵ ب	13 د ا	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	7 و ا

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## **Work Element Definition Sheet**

WBS (New)	561	90	70	50	10					Prepared By:	P. Hader
WBS (Old)	552	15	20	50							
WBS Title	QUALITY A	SSURANCE	PROGRAM,	EXTENDED	OPERATION	IS					
Description	Maintain a	Quality Ass	urance (QA	) program o	onsistent w	ith ISO 900	1 and 1400:	l requiremen	ts. Work Pr	ogram would i	nclude:
	- Mair	ntenance of	OΔ training	and guida	nce docume	ints					
	•	duct QA auc	-				ith monitor	ing staff.			
	•							ded operatio	ns.		
	- Cond	duct QA trai	ning for ext	ended oper	ations staff			·			
	- Prep	are annual	QA progran	n status rep	ort.						
	- Mair	ntain correc	tive action	tracking sys	tem.						
	- QA N	Managemer	it System A	udits (annua	al) and Man	agement Re	eview.				
Deliverable	- Mair	ntenance of	an ISO 900	1/14001 ha	sed QA pros	gram.					
	1	it reports or		•		<b>5</b> . <del>4</del>					
	:	ual QA prog									
	- Qua	lity Assuran	ce training	orograms ai	nd manuals	for extende	d operation	ns.			
	- Tech	nical audits	on extende	ed operatio	ns monitori	ng data/ int	erpretation				
Assumptions	Info	rmation Ma	nagament (	vetom impl	omontation	for uso by	OA program				
Assumptions	1	9001/14001	•			•	QA program	1.			
	•	ced QA prog					perations ir	vear 86.			
	:								oring and au	dit due to larg	er facility.
	- QA Sı	pecialists @	1.5 NWMC	-03 fte/a fo	r 70 years (	Y86 to 155)					
	- Contr	racts: \$100l	k/a for 5 ye	ars (Y86 to 9	90), \$50k/a	for 65 years	(Y91 to Y1	55).			
Schedule	Start Year			86	2095			Finish Year	155	2164	
Туре	Fixed										
	Ŏ										
Calculations											
and Notes:											
	Assume re	duced staff	levels and r	educed trai	ning and ov	ersight. Te	chnical audi	ts on a reduc	ed frequenc	cy (one/18 -24	months) after first
	five years.				-	-			•		
	Contracts v	will be for q	uality inspe	ctions, testi	ng, equipm	ent calibrat	ion, oversig	ht monitoring	g and audits.		
				· T		T		,		T	
Labour (			al Costs		Costs		total	Allowance	25%		otal Cost
\$ 1	13,669,236	\$	-	\$	3,750,000	\$ 1	7,419,236	\$	4,354,809	\$	21,774,045

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## **Work Element Definition Sheet**

WBS (New)	561	90	70	60	10					Prepared By:	P. Hader
WBS (Old)	552	15	20	50							
WBS Title	QUALITY A	SSURANCE	PROGRAM,	DECOMMIS	SSIONING &	CLOSURE					
	<u></u>										
Description	•		•	,				•	ts. Work Pr	ogram would i	nclude:
	:				commission		s (Phase 1).				
	•		-		nce docume						
	:		•	•				nissioning sta		actors.	
	•	•				•		nmissioning s	stage.		
					ion tracking						
	1		•		ing staff an						
	•				I QA progra						
	- QA N	Managemer	it System A	udits (annu	al) and Man	agement Re	eview				
	ļ										
Deliverable	- Mair	ntenance of	an ISO 900	1/14001 ha	sed QA pro	zram					
Deliverable	•	it reports or		•		51 0111.					
	1	rterly and a	•								
	:	•	•	J	nd manuals	for decom	niccionina a	ctivities			
		•	•		g/ data/ int		_	ctivities.			
	•				installation			ıσ			
	:				tallation an			8.			
	<u> </u>	Ji ilistralliei	itation acce	ptance, ms	tanation an		ii testing.				
Assumptions	- Infoi	rmation Ma	nagement S	System for o	decommission	oning work	installed for	use by QA p	rogram.		
,	1		•	•	am standard	•			- 6		
	•	-			missioning a		Staff in vea	r 156.			
	•	•		•	-01 fte/a foi		•				
	:	•			-			, 03 fte/a for 1	.3 years (Y16	58 to Y180).	
	•	•								rs (Y171-Y180)	
	÷	QA System					, ,	,, ,	•		
Schedule	Start Year			156	2165			Finish Year	180	2189	
Туре	Fixed						•••••				
Calculations										_	
and Notes:	:	-		ctions, testi	ing, oversigh	nt monitorii	ng, audits, a	nd supplier a	udits. Expe	ct decreased ac	ctivity after the
	undergrou	nd facility is	closed.								
Labour (	Costs	Materi	al Costs	Other	r Costs	Sub	total	Allowance	25%	To	otal Cost
	15,167,372	1	100,000	Ś	5,100,000		20,367,372	Ś	5,091,843		25,459,215
7	10,101,372	7	100,000	7	3,100,000	٠, ٠	-0,307,372	7	J,UJI,U43	7	23,433,213

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	10					Prepared By:	CV/KS
WBS (Old)		b		·····						M	
		f		Α	f	.f					
WBS Title	TITLE: APM	1 Social – St	affing – Buil	ding Relatio	onships						
Description	Tasks ir	nclude:					••••••				
	Genera	l Tasks:									
	•					agement (APN	-				
	•					it all stages of			n key		
	- Т	hrough con	nmunication	ns and earn	ed media, b				public, incli	uding Aborigin	nal people about the
		, the manag	-								
	•	•		•		ederal governi nentation of A		•		•	in nuclear
	suppor workin	t their invol	vement in t d NWMO El	he impleme ders Forum	entation of A . Seek advic	e of Elders on	e to work	on projects	with Elders o	on Niigani (NW	provinces to VMO Aboriginal ge and western
	1	Continue to			ources Cana	ıda to impleme	nt a prod	cess to meet	the NWMO'	s statutory ob	ligations with
	- F	-	sess the effe	ectiveness o		ortunities to in engagement a	-				ities for
	- C	nicipal level	tions and co in the design d maintain r	ollaboration gn and impl new relation	ementatior nships on a						ves and to involve s and develop
Deliverables											
Assumptions											
Assumptions											
Schodulo	Ctart Vac-			4	2010			Finish Voor		2010	
Schedule	Start Year			<u> </u>	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materi	al Costs	Other	Costs	Subtot	al	Allowance	25%	To	otal Cost
\$	19,709,348	\$	-	\$	-	\$ 19,	709,348	\$	4,927,337	\$	24,636,686

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	10					Prepared B	y: CV/KS
WBS (Old)										^	
WBS Title	TITLE: APM	1 Social – St	affing – Bui	lding Relation	onships						
Description	Tasks ir Genera - C - C - T NWMC - provinc - E suppor - C respect - I - F	nclude:  Il Tasks: Critical to the Canadian pure decisions the Through core In the mana Develop and the story and the involution of the Continue to the Cross mplement of Regularly as	ne success o ublic, includi rough open mmunicatio gement of u d maintain r ort their inv d maintain r lvement in t work with I wor's duty to	f Adaptive Fing Aborigin, transparer ns and earn used nuclea relationship olvement in elationships the impleme Natural Response occupilit.	Phased Man al people, a at and inclused media, b fuel and A s with the f the implen with natio entation of a purces Cana	PM ederal governn nentation of AF nal, provincial a	mplemer nt process s among nent and PM and so and regio nt a process	ntation and in sses the Canadian with provinc upport for No onal Aborigina cess to meet	n key  n public, including all and local  NMO as imples all governme  the NWMO's wo	governmen olementer. nts in nuclea s statutory c	ar provinces to
Deliverables											
Assumptions											
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs	Materi	ial Costs	Othe	Costs	Subtot	al	Allowance	25%		Total Cost
\$	23,978,052	\$	_	\$	-	\$ 23,9	78,052	Ś	5,994,513	\$	29,972,565

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	10					Prepared By:	CV/KS
WBS (Old)		<u></u>		<u> </u>							
WBS Title	TITI F: APN	1 Social – Sta	affing – Rui	Iding Relation	onshins				***************************************		
			uning Dun	iding relativ	3113111123						
Description	Tasks ir										
	Genera										
	•			•		•	•			are potential	•
	:	•			-		•	•	•	Canadian publi	
	•	•		•		U		•	•	•	d local governments
	•	•		-		-	-	_	_	s statutory ob	to support their
	1					•	•	ng people of		•	ilgations with
	1	-					-			ntify opportun	ities for
					,	0.0.				, , , , , , , , , , , , , , , , , , , ,	
	- [	•	tions and c	ollaboratior		•			•		ves and to involve s and develop
		zuitivate and		iew relation	1311p3 011 a	regional leve	as commi	unities begin	to engage ii	r sitting proces	s and develop
Deliverables											
Assumptions											
, toodin perono											
				······							
Schedule	Start Year			16	2025			Finish Year	25	2034	
Schedule	Start Year			16	2025			Finish Year	25	2034	
Schedule Type	Start Year Fixed			16	2025			Finish Year	25	2034	
				16	2025			Finish Year	25	2034	
Туре				16	2025			Finish Year	25	2034	
Type Calculations	Fixed	Materi	al Costs		2025	Subt		Finish Year	25 25%		otal Cost

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	10			Prepared By: CV/KS
WBS (Old)	•			••••••••••••••••••••••••••••••••••••••				\
	0	Fr		Δ		:		
WBS Title	TITLE: APM	1 Social – Sta	affing – Buil	ding Relatio	onships			
Description	includir inclusiv  - T Aborigi  to supp  - C involve science - C respect - II - R	Il Tasks: Critical to the ng those aloo we engagement through commal people and people and people and ment in the enand respective to the Crowmplement com	ong the trans ent processon munication about the N d maintain revolvement in I maintain re e implement ctful engage work with N wn's duty to communicat sess the effects	sportation in es.  Ins and earn WMO, the relationship in the imple elationships that in of AP ment of Ab Natural Rescondult.  It ions and lesectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the sectiveness of the section in t	route, at all seed media, be managements with the fermentation of the seek advoriginal peoporarring oppo	uild awareness among of of used nuclear fuel ederal government and of APM and support for tially affected provincitially affected provincities of Elders on interviples.  da to implement a provincination of the contract of	the potentially affected C and APM. I with potentially affected r NWMO as implementer. al and regional Aboriginal yeaving of Aboriginal Trad	canadian public, including provincial and local governments governments to support their litional Knowledge and western a statutory obligations with
Dolivorables								
Deliverables								
Assumptions								
Schedule	Start Year			26	2035		Finish Year 85	2094
Туре	Fixed				***************************************			
- 15			<i></i>					
Calculations								
and Notes:								
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance 25%	Total Cost
							/	Total Cost

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	50	10			Prepared By: CV/KS
WBS (Old)	•			······				^
	0		f	Λ				
WBS Title	TITLE: APM	1 Social – Sta	affing – Buil	ding Relation	onships			
Description	includir inclusiv - T Aborigi - C involve science - C respect - F	Il Tasks: Critical to the ng those aloo we engagement through commal people and people and people and ment in the enand respective to the Crowmplement com	ng the transent processed munication about the N d maintain revolvement in maintain revolvement in maintain revolvement ifful engage work with N wn's duty to communications as the effects	sportation of es.  as and earn WMO, the relationships the implestation of AP ment of Ab Natural Resolutions and le ectiveness of the section of the section	ed media, b managemer s with the fe mentation of s with,poten M. Seek addoriginal peo purces Cana arning oppo	uild awareness amount of used nuclear fue ederal government a of APM and support to tially affected proving vice of Elders on interples. da to implement a p	ng the potentially affected ( el and APM. nd with potentially affected or NWMO as implementer cial and regional Aborigina rweaving of Aboriginal Trad	Canadian public, including I provincial and local governments I governments to support their Iditional Knowledge and western Is statutory obligations with
Deliverables								
Assumptions								
Schedule	Start Year			86	2095		Finish Year 155	2164
Туре	Fixed							
Calculations								
and Notes:				•			1	
Labour (			al Costs		r Costs	Subtotal	Allowance 25%	Total Cost
\$ 8	87,387,208	\$	-	\$	-	\$ 87,387,20	8 \$ 21,846,802	\$ 109,234,010

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	60	10			Prepared By:	CV/KS
WBS (Old)									
WBS Title	TITLE: APN	1 Social – St	affing – Bui	lding Relation	onships				
Description	Tasks ir	nclude:							
•	Genera	l Tasks:							
			e success o	f Adaptive F	hased Man	agement (APM) is the	involvement of those	who are potentially a	ffected,
	includi	ng those ald	ng the tran	sportation i	oute, at all	stages of the impleme	entation and in key de	ecisions through open,	transparent and
	inclusiv	e engagem	ent process	es.					
		hrough cor	nmunicatio	ns and earn	ed media. h	ouild awareness among	the potentially affect	cted Canadian public, i	ncluding
	1	•			-	nt of used nuclear fuel		acca Camaaaan paasio, ii	.о.ииВ
	•	•		•		ederal government an of APM and support fo		ected provincial and lo enter.	cal governments
	involve	ment in the	implement	•	M. Seek ad	vice of Elders on inter	J	iginal governments to I Traditional Knowledg	• •
	•	Continue to			ources Cana	ida to implement a pro	ocess to meet the NW	/MO's statutory obliga	tions with
			•		arning onno	ortunities to inform you	ung people of NWMC	Ys work	
	•	-				•		o identify opportunities	s for
	Ē	ement in fu			or website, t	engagement and com	numeation verticles to	o identity opportunitie.	3 101
	p.ov	ciriciic iii iu	tare miliali	<b>v</b> c3.					
Deliverables									
Assumptions									
				·y					
Schedule	Start Year			156	2165		Finish Year	180 2189	
Туре	Fixed								
Calaulatiana									
Calculations									
and Notes: Labour	Costs	Materi	al Costs	Othor	r Costs	Subtotal	Allowance 25	% Total	Cost
	18,283,456		ai CUSIS	\$		\$ 18,283,456			22,854,320
ې	10,203,430	٧	-	د ا	-	10,203,430	4,570,	,ου <del>4</del>   3	22,034,320

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## **Work Element Definition Sheet**

WBS (New)	561	10	10	10	40				Prepared By: CV/KS
WBS (Old)	••••••••••••••••••••••••••••••••••••••								
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange				
Description	- A - C terms o - A - C commu	Complete an Annually upon Continue to a Continue to a Continue are a Continue are a Continue are a Collaborate vanity-based particular and continue and collaborate vanity-based particular and continue	date and puresearch cit assess deve and potentia 'MO's unde with interes processes.	blish used fizen priorit lopments in characteris rstanding o	uel inventories and concern environments of differ finsight from the concern from the conce	rent used fuel types to	mplementation es and the imp be managed. al Knowledge to co access the b	n. act of new hat may gu est knowle	build nuclear reactors on APM in in inde implementation of APM.
Deliverables									
Assumptions									
6 L L L	G			:	2010		:-····		2040:
Schedule	Start Year			1	2010		Finish Year	9	2018
Туре	Fixed								
Calculations and Notes:	ō								
Labour (	Costs	Materia	al Costs	Othe	Costs	Subtotal	Allowance	25%	Total Cost
\$	3,440,250	\$	-	\$	-	\$ 3,440,250	\$	860,062	\$ 4,300,312

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## **Work Element Definition Sheet**

WBS (New)	561	10	10	20	30				Prepared By: CV/KS
WBS (Old)									M
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange				
Description		Complete an				rocessing and alternati	ve waste mana	ngement te	chnologies.
	- C	Continue to a	research cit assess deve	tizen priorit Hopments i	ies and cond	cerns relating to APM in	es and the imp		build nuclear reactors on APM in
	- A	dvance NW	/MO's unde	erstanding o	f insight fro	m Aboriginal Tradition	al Knowledge t	hat may gu	ide implementation of APM.
	•	Collaborate v Inity-based p		sted acaden	nics in Cana	da and internationally 1	to access the b	est knowle	dge and practices in social and
	- P	articipate ir	n internatio	nal projects	and collabo	oration for sharing info	rmation and b	est practice	es.
Deliverables									
Assumptions									
Schedule	Start Year			10	2019		Finish Year	15	2024
Туре	Fixed								
Calculations and Notes:									
Labour (			al Costs		r Costs	Subtotal	Allowance	25%	Total Cost
\$	2,241,427	\$	-	\$	-	\$ 2,241,427	\$	560,357	\$ 2,801,783

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## **Work Element Definition Sheet**

WBS (New)	561	10	10	30	10				Prepared By: CV/KS
WBS (Old)									
				***************************************				***************************************	
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange				
Description	- A terms c - A commu	Complete an Annually upocontinue to a Continue to a for volume ar Advance NW Collaborate vanity-based p	date and puresearch citassess devend potentia  'MO's underwith interesprocesses.	iblish used f tizen prioriti elopments ir I characteris erstanding o sted acaden	uel invento ies and cond n environme stics of diffe f insight fro nics in Cana	erent used fuel types to	mplementation es and the imp be managed. al Knowledge t to access the b	n. act of new hat may gu	build nuclear reactors on APM in lide implementation of APM.
	- r	'articipate ii	imternatio	mai projects	and Conab	oration for snaring inic	ט מווט וו מווט ט	est practice	25.
Deliverables									
Assumptions									
Schedule	Start Year			16	2025		Finish Year	25	2034
Туре	Fixed								
Calculations and Notes:									
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost
\$	1,289,166	\$	-	\$	-	\$ 1,289,166	\$	322,292	\$ 1,611,458

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## **Work Element Definition Sheet**

WBS (New)	561	10	10	40	10				Prepared By: CV/KS
WBS (Old)									
	ļ			***************************************					
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange				
Description	- A terms c	Complete an Annually upo Continue to Continue to of volume ar Advance NW	date and puresearch cit assess devend potential 'MO's unde	blish used f izen priorit lopments ii characterii rstanding o	uel inventories and conditions and conditions and conditions are stics of differ finsight fro	rent used fuel types to m Aboriginal Tradition	mplementatio es and the imp be managed. al Knowledge	on. pact of new that may gu	chnologies. build nuclear reactors on APM in ide implementation of APM. dge and practices in social and
Deliverables	- P	Participate ir	n internation	nal projects	and collabo	oration for sharing info	rmation and b	pest practice	·····
Assumptions									
Schedule	Start Year			26	2035		Finish Year	85	2094
JUICUUIC	July 1541			20	2033		i iiiisii ICal		
Туре	Fixed								
Calculations and Notes:									
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	4,723,639	\$	-	\$	-	\$ 4,723,639	\$	1,180,910	\$ 5,904,549

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## **Work Element Definition Sheet**

WBS (New)	561	10	10	50	10				Prepared By: CV/KS
WBS (Old)	••••••••••••••••••••••••••••••••••••••								
WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange				
Description	- A - C terms o - A - C commu	Complete an Annually upon Continue to a Continue to a Continue and Advance NW Collaborate Vanity-based p	date and puresearch cit assess deve and potentia 'MO's unde with interes processes.	blish used fizen priorit lopments in characteris rstanding o	fuel inventories and concern environments stics of differ finsight from the concern from th	rent used fuel types to m Aboriginal Traditiona	mplementations and the implementation implementation in the implem	on. pact of new that may gu best knowle	build nuclear reactors on APM in ide implementation of APM.  dge and practices in social and
Deliverables	<u></u>								
Assumptions									
Schedule	Start Year			86	2095		Finish Year	155	2164
Type  Calculations  and Notes:	Fixed								
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	5,510,912	\$	-	\$	-	\$ 5,510,912	\$	1,377,728	\$ 6,888,641

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## **Work Element Definition Sheet**

WBS (New)	561	10	10	60	10				Prepared By: CV/KS
WBS (Old)									\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
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WBS Title	TITLE: APM	1 Social – Sta	affing – Ada	pting to Ch	ange				
Description	- A terms c	Complete an Annually upon Continue to Continue to Continue to Continue and Continue are Advance NW	date and pu research cit assess deve nd potential 'MO's unde with interes	blish used fizen priorit lopments i characteri	fuel inventor ies and cond n environme stics of diffe of insight fro	rent used fuel types to m Aboriginal Tradition	mplementatio es and the imp be managed. al Knowledge	n. Pact of new that may gu	chnologies. build nuclear reactors on APM in ide implementation of APM. dge and practices in social and
Deliverables	- P	articipate ir	n internatio	nal projects	s and collabo	oration for sharing info	rmation and b	est practice	25.
Assumptions									
Schedule	Start Year			156	2165		Finish Year	180	2189
	- Care rear		•••••	i				100	
Туре	Fixed								
Calculations and Notes:									
Labour	Costs		al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	1,968,183	\$	-	\$	-	\$ 1,968,183	\$	492,046	\$ 2,460,229

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## **Work Element Definition Sheet**

WBS (New)	561	15	10	10	20					Prepared By:	CV/KS
WBS (Old)		<u> </u>		<u> </u>							
WBS Title	TITLE: APN	1 Social – Sta	affing – Sitir	ng Process							
Description	the exp	<u>il:</u> NWMO will v pectations of	f Canadians	and addres	s their key i	issues, such	as the prot	ection of hur		environment,	rocess must meet , fairness and
	- F request - C - S - H - A - A - A - A - A - A - A - A - A	t.  Conduct scre Select the 1- nitiate Regio As required, Administer c meworks.  For the comi	eenings and 2 willing co onal Studies provide der ommunity l	initiate fea mmunities with one o dicated regi benefits for	sibility stud to move for r more com onal NWMO communition	ies and field ward to de nmunities in O staff/supp es in advan characteriz	I upon requialled site characteristed in commonded stages of the commonded sta	est of comm naracterization moving to de nunities progon of siting procon e the establi	unities.  on.  etailed site eversing throughts  ess consisten  shment of ce	ugh siting proc t with Board-a ntres of exper	ess. approved principles tise as hubs of
	- ( needs t organiz - [ crystall	Continue act to support c cations on de Develop tool ine and sedi	ivities to bu ommunity-l esign of info ls and meth imentary se	uild awarend based discu ormation an ods for con ettings by 20	ess of the A ssions of AP d tool kits t ducting det 012.	PM siting p PM project of o support c	rocess. Dev and siting. S ommunity-c	elop mobile ieek advice o driven siting nvestigation	exhibits and f f municipal a process.	ssociations an	responsive to local
Deliverables	:	Selection of Continued su	•			•		hosting agre	ement		
Assumptions											
Schodulo	Start Voar			1	2010			Finish Voor		2010	
Schedule Type	Start Year Fixed			1	2010			Finish Year	9.	2018	
Calculations and Notes:											
Labour (		Materia	al Costs		Costs		total	Allowance	25%		otal Cost
\$ 3	37,668,572	\$	-	\$	-	\$	37,668,572	\$	9,417,143	\$	47,085,715

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## **Work Element Definition Sheet**

WBS (New)	561	15	10	20	20					Prepared By: CV/KS
WBS (Old)										
WBS Title	TITLE: APN	1 Social – Sta	affing – Sitir	ng Process						
Description	the exp	<u>l:</u> IWMO will v ectations of	f Canadians	and addres	s their key i	ssues, such	as the prot		mans and the	ite selection process must meet e environment, fairness and ations.
	- R request - C - S - II - A - A and fra	conduct screelect the 1- nitiate Regions required, administer commeworks.	eenings and 2 willing co onal Studies provide der ommunity l	initiate fea mmunities i with one o dicated regi penefits for ected for de	sibility studi to move for r more com onal NWMC communition	ies and field ward to det munities in O staff/supp es in advand	upon requ ailed site ch terested in ort in comm ed stages o	est of comminaracterization moving to de nunities progens f siting procent ethe establic	unities.  on.  etailed site everessing thro  ess consisten  shment of ce	and delivering briefings on  valuations.  ugh siting process.  t with Board-approved principles  entres of expertise as hubs of
	- C needs t organiz - C crystall	Continue act o support co ations on de Develop tool ine and sedi	ivities to bu ommunity-l esign of info s and meth imentary se	uild awarend pased discu prmation an ods for con ttings by 20	ess of the Al ssions of AP d tool kits t ducting deta 112.	PM siting pr M project a o support co	ocess. Dev nd siting. S ommunity-c	elop mobile o eek advice o driven siting p	exhibits and f municipal a process. s and evalua	tools that are responsive to local associations and Aboriginal tions at candidate sites in both
Deliverables	:	election of <sub> </sub> Continued su						hosting agre	ement	
Assumptions										
Schedule	Start Year			10	2019			Finish Year	15	2024
Type Calculations and Notes:	Fixed									
Labour (			al Costs		Costs	Sub		Allowance	25%	Total Cost
\$ 1	18,625,811	\$	-	\$	-	\$ 1	8,625,811	\$	4,656,453	\$ 23,282,264
, \$ 1	18,625,811	<b>\$</b>	-	\$	-	\$ 1	8,625,811	\$	4,656,453	\$ 23,282,26

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	100					Prepared By:	J. Facella
WBS (Old)							<u> </u>				
WBS Title	PROVINCIA	L STAKEHO	LDER ENGA	GEMENT							
Description	Ongoing in	volvement o	of provincia	ıl opinion le	aders throu	gh briefing	s and period	lic dialogue se	essions focu	sed on the impl	lementation plan.
Deliverable											
	Ensure und	lerstanding	of project a	activities an	d forum for	identificati	on of issues	that need to	be addresse	ed that may effe	ect licensing.
Assumptions											
Schedule	Start Year			2	2011			Finish Year	6	2015	
Туре	Fixed										
Calculations and Notes:											
Labour C	osts	Materia	al Costs	Othe	r Costs	Sub	total	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	900,000	\$	900,000	\$	225,000	\$	1,125,000

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#### **Work Element Definition Sheet** NWMO Cost Code: 0170020-19 WBS (New) Prepared By: P. Simmons 561 05 10 10 110 WBS (Old) BUILDING RELATIONS Community Engagement (50k) Regional Engagement **WBS Title** COMMUNITY, SERVICE and ADVOCACY BRIEFINGS Description Category currently includes speaking engagements and briefings on request to community groups and their committees in the 4 nuclear cycle provinces and includes local, regional, and provincial organizations. Community groups include the Canadian Association of Nuclear Host Communities (CANHC), Durham Nuclear Health Committee (DNHC), Pickering Community Advisory Committee (PCAC), Point Lepreau Community Liaison Committee (PLCLC), Community Consultation Advisory Group (CCAG – Bruce County); provincial groups include Chambers of Commerce; and regional groups include service clubs, smaller chambers of commerce and boards of trade, educational institutions among others. Costs include travel-related expenses for staff participating in speaking engagements/briefings, special events and award ceremonies (tickets and registration fees), on or off-site meetings/briefing related costs (catering, meeting room, A/V), sponsorships, and membership fees. Deliverable This category's primary deliverable is fostering and building relationships with community leaders and members, and increasing awareness of the NWMO and APM. The secondary deliverable is maintaining the brand, and relationships with groups already aware of the NWMO and providing updates and progress reports to those bodies. These costs and activities, as outlined, assist in the distribution of information, support brand recognition, and provide networking opportunities. Assumptions Currently the NWMO participates, on average, in 12 community organization meetings/briefings per year. As the siting process progresses and specific communities express interest in the project, it is expected that requests for briefings from community organizations will increase significantly in the potentially interested host communities and surrounding regions, and among communities along potential, or assumed, transportation routes, and in existing nuclear host communities and their respective regions. Beyond the potentially interested host communities, it is reasonable to expect interest may also be expressed after the site selection process is initiated from transportation communities, first responder/emergency services groups, planning advisory groups and boards, and newly formed community groups responding to opportunity and local interest. In some cases these will be affiliated with the municipality expressing interest, in others it may be adjacent communities, or larger regional areas. Membership in national, provincial, and local chambers of commerce (potentially several) is also assumed as being prudent and reasonable as are public-policy events, and related AGM's and special events. This requirement is expected to reduce by 50% once a site is selected. Despite potentially being at Step 5 of the site selection process by 2018, the involvement and interaction with community groups large and small is not expected to diminish, in fact the opposite is more likely, and will continue through to the construction commencement of the APM DGR in 2035. Schedule Start Year 2010 Finish Year Type Fixed Calculations Estimated minimum 12 meetings per year in Ontario assumes: CANHC (2 - 1 in Ottawa, 1 in GTA), DNHC (4), PCAC (1), and Notes: CCAG (2), Provincial Chamber of Commerce briefing (1), and 2 potential community organization briefings (e.g. educational institutions, planning boards). Comparable groups in other nuclear provinces, but at 50% = 6 meetings (fewer orgs.) Memberships with Chambers of commerce - National, provincial and select local, Cost per meeting: varies depending on location and duration. An estimated \$2500 per meeting is reasonable for this purpose (each meeting requires 3 NWMO staff). In the assumptions the increase/frequency of meetings is expected to increase around 2018, and will continue to 2024 and reduce by 50% to 2035. With unknown changes to meeting frequency, as well as locations, or other resource requirements the annual estimates should reflect an a modest increase versus decrease until 2035. Approved Y01 (2010) budget \$50,000 **Preliminary Estimates** Y02 - Y09 (2011 - 2018) - 8 x \$200,000 = \$ 1,600,000 Y10 - Y15 (2019 - 2024) - 6 x \$200,000 = \$1,200,000 Y16 - Y25 (2025 - 2034) - 10 x \$200,000 = \$2,000,000 **Labour Costs Material Costs** Other Costs Subtotal Allowance 25% **Total Cost** 1.650.000 \$ 1.650.000 \$ 412.500 2.062.500

**APM Cost Estimate** 

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#### **Work Element Definition Sheet** NWMO Cost Code: 0170020-19 WBS (New) Prepared By: P. Simmons 561 05 10 20 100 WBS (Old) BUILDING RELATIONS Community Engagement (50k) Regional Engagement **WBS Title** COMMUNITY, SERVICE and ADVOCACY BRIEFINGS Description Category currently includes speaking engagements and briefings on request to community groups and their committees in the 4 nuclear cycle provinces and includes local, regional, and provincial organizations. Community groups include the Canadian Association of Nuclear Host Communities (CANHC), Durham Nuclear Health Committee (DNHC), Pickering Community Advisory Committee (PCAC), Point Lepreau Community Liaison Committee (PLCLC), Community Consultation Advisory Group (CCAG – Bruce County); provincial groups include Chambers of Commerce; and regional groups include service clubs, smaller chambers of commerce and boards of trade, educational institutions among others. Costs include travel-related expenses for staff participating in speaking engagements/briefings, special events and award ceremonies (tickets and registration fees), on or off-site meetings/briefing related costs (catering, meeting room, A/V), sponsorships, and membership fees. Deliverable This category's primary deliverable is fostering and building relationships with community leaders and members, and increasing awareness of the NWMO and APM. The secondary deliverable is maintaining the brand, and relationships with groups already aware of the NWMO and providing updates and progress reports to those bodies. These costs and activities, as outlined, assist in the distribution of information, support brand recognition, and provide networking opportunities. Assumptions Currently the NWMO participates, on average, in 12 community organization meetings/briefings per year. As the siting process progresses and specific communities express interest in the project, it is expected that requests for briefings from community organizations will increase significantly in the potentially interested host communities and surrounding regions, and among communities along potential, or assumed, transportation routes, and in existing nuclear host communities and their respective regions. Beyond the potentially interested host communities, it is reasonable to expect interest may also be expressed after the site selection process is initiated from transportation communities, first responder/emergency services groups, planning advisory groups and boards, and newly formed community groups responding to opportunity and local interest. In some cases these will be affiliated with the municipality expressing interest, in others it may be adjacent communities, or larger regional areas. Membership in national, provincial, and local chambers of commerce (potentially several) is also assumed as being prudent and reasonable as are public-policy events, and related AGM's and special events. This requirement is expected to reduce by 50% once a site is selected. Despite potentially being at Step 5 of the site selection process by 2018, the involvement and interaction with community groups large and small is not expected to diminish, in fact the opposite is more likely, and will continue through to the construction commencement of the APM DGR in 2035. Schedule Start Year 2019 Finish Year Type Fixed Calculations Estimated minimum 12 meetings per year in Ontario assumes: CANHC (2 - 1 in Ottawa, 1 in GTA), DNHC (4), PCAC (1), and Notes: CCAG (2), Provincial Chamber of Commerce briefing (1), and 2 potential community organization briefings (e.g. educational institutions, planning boards). Comparable groups in other nuclear provinces, but at 50% = 6 meetings (fewer orgs.) Memberships with Chambers of commerce - National, provincial and select local, Cost per meeting: varies depending on location and duration. An estimated \$2500 per meeting is reasonable for this purpose (each meeting requires 3 NWMO staff). In the assumptions the increase/frequency of meetings is expected to increase around 2018, and will continue to 2024 and reduce by 50% to 2035. With unknown changes to meeting frequency, as well as locations, or other resource requirements the annual estimates should reflect an a modest increase versus decrease until 2035. Approved Y01 (2010) budget \$50,000 **Preliminary Estimates** Y02 - Y09 (2011 - 2018) - 8 x \$200,000 = \$ 1,600,000 Y10 - Y15 (2019 - 2024) - 6 x \$200,000 = \$1,200,000 Y16 - Y25 (2025 - 2034) - 10 x \$200,000 = \$2,000,000 **Labour Costs Material Costs** Other Costs Subtotal Allowance 25% **Total Cost** 1.200.000 S 1.200.000 \$ 300.000 1.500.000

**APM Cost Estimate** 

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#### **Work Element Definition Sheet** NWMO Cost Code: 0170020-19 WBS (New) 561 Prepared By: P. Simmons 05 10 30 WBS (Old) BUILDING RELATIONS Regional Engagement Community Engagement (50k) **WBS Title** COMMUNITY, SERVICE and ADVOCACY BRIEFINGS Description Category currently includes speaking engagements and briefings on request to community groups and their committees in the 4 nuclear cycle provinces and includes local, regional, and provincial organizations. Community groups include the Canadian Association of Nuclear Host Communities (CANHC), Durham Nuclear Health Committee (DNHC), Pickering Community Advisory Committee (PCAC), Point Lepreau Community Liaison Committee (PLCLC), Community Consultation Advisory Group (CCAG – Bruce County); provincial groups include Chambers of Commerce; and regional groups include service clubs, smaller chambers of commerce and boards of trade, educational institutions among others. Costs include travel-related expenses for staff participating in speaking engagements/briefings, special events and award ceremonies (tickets and registration fees), on or off-site meetings/briefing related costs (catering, meeting room, A/V), sponsorships, and membership fees. Deliverable This category's primary deliverable is fostering and building relationships with community leaders and members, and increasing awareness of the NWMO and APM. The secondary deliverable is maintaining the brand, and relationships with groups already aware of the NWMO and providing updates and progress reports to those bodies. These costs and activities, as outlined, assist in the distribution of information, support brand recognition, and provide networking opportunities. Assumptions Currently the NWMO participates, on average, in 12 community organization meetings/briefings per year. As the siting process progresses and specific communities express interest in the project, it is expected that requests for briefings from community organizations will increase significantly in the potentially interested host communities and surrounding regions, and among communities along potential, or assumed, transportation routes, and in existing nuclear host communities and their respective regions. Beyond the potentially interested host communities, it is reasonable to expect interest may also be expressed after the site selection process is initiated from transportation communities, first responder/emergency services groups, planning advisory groups and boards, and newly formed community groups responding to opportunity and local interest. In some cases these will be affiliated with the municipality expressing interest, in others it may be adjacent communities, or larger regional areas. Membership in national, provincial, and local chambers of commerce (potentially several) is also assumed as being prudent and reasonable as are public-policy events, and related AGM's and special events. This requirement is expected to reduce by 50% once a site is selected. Despite potentially being at Step 5 of the site selection process by 2018, the involvement and interaction with community groups large and small is not expected to diminish, in fact the opposite is more likely, and will continue through to the construction commencement of the APM DGR in 2035. Schedule Start Year 2025 Finish Year Type Fixed Calculations Estimated minimum 12 meetings per year in Ontario assumes: CANHC (2 - 1 in Ottawa, 1 in GTA), DNHC (4), PCAC (1), and Notes: CCAG (2), Provincial Chamber of Commerce briefing (1), and 2 potential community organization briefings (e.g. educational institutions, planning boards). Comparable groups in other nuclear provinces, but at 50% = 6 meetings (fewer orgs.) Memberships with Chambers of commerce - National, provincial and select local, Cost per meeting: varies depending on location and duration. An estimated \$2500 per meeting is reasonable for this purpose (each meeting requires 3 NWMO staff). In the assumptions the increase/frequency of meetings is expected to increase around 2018, and will continue to 2024 and reduce by 50% to 2035. With unknown changes to meeting frequency, as well as locations, or other resource requirements the annual estimates should reflect an a modest increase versus decrease until 2035. Approved Y01 (2010) budget \$50,000 **Preliminary Estimates** Y02 - Y09 (2011 - 2018) - 8 x \$200,000 = \$ 1,600,000 Y10 - Y15 (2019 - 2024) - 6 x \$200,000 = \$1,200,000 Y16 - Y25 (2025 - 2034) - 10 x \$200,000 = \$2,000,000 **Labour Costs Material Costs** Other Costs Subtotal Allowance 25% **Total Cost** 2.000.000 \$ 2.000.000 \$ 500.000 2.500.000

**APM Cost Estimate** 

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				Wo		Cost Estimate	neet					
										NWMO Co	ost Code: 01	70020- <b>21</b>
WBS (New) WBS (Old)	561	05	10	10	120					Prepared	By: P. Sin	nmons
14103 (014)	BUILDING F	RELATIONS – Re	egional Eng	gagement – N	IUNCIPA	L FORUM MEET	INGS (1	50)				
WBS Title		FORUM MEE										
Description	late 2008 co association	omprised of se s, and who info	nior level n orm a resea	municipal exp arch agenda i	erts fron or a larg	with the meeting the four nucles and infrastrating with the	ar-cycle tructure	provinces p project, an	rimarily dra d who also	wn from th	ne municipal	
	The Forum	consists of 15 i	individual o	organizations	whom a	re invited to par	rticipate	at the mee	tings typica	lly held up t	to 4 times pe	er year.
	•	pal Forum conv eeting facility in			er year (	avg. 3). To date	the me	etings have	been held i	n Toronto (	at the NWM	O offices),
Deliverable	with a seco	ndary deliveral	ble of prov	iding insight,	commer	ance to a resear It and advice on ing at a provinci	existing	g and emerg	ing local go			
	NWMO liais		ipal associ	ations, and p	rovide gu	g existing relatio						
	techniques	and best pract torage facilities	ices, and th	he reciprocal	educatir	the Forum mem ng of the Forum ers in their host	membe	rs on APM a	nd the NW	MO includii	ng coordinat	ed tours
Assumptions	Current co-	nmitment from	n the Forum	n members b	as hoon	articulated and	commi	nicated thro	ugh to the	end of 2014	) with tacit	
-	commitmer municipal e	nt beyond, e.g. lection, decisio	into 2011. on not to se	. Election cyc eek re-electio	es can po n), and t	articulated and otentially affect he municipal ele vere membershi	membe ection c	rship on the ycles are dif	Forum (e.	g. failure to	be re-electe	
	trends and relations ar whom have for local go taxation. Re	patterns emer nd the effect ar e expressed into vernment in ar	ging both a nd progress erest will e eas within e change th	as a result of s of the resea volve once the their sphere the value of m	the siting rch direc ne siting   of influe aintainin	rum membershi g process, but als ted by the Foru process has bee nce and jurisdic g a relationship	so as a r m. For e n officia tion suc	esult of loca example, the lly been lau h as emerge	Il governme methods on nched. Sim	ent relation of communi ilarly, priori se, local tra	s, municipal- cating to mu ty issues will insportation,	provincial inicipalities emerge , and
	as well as re also include educationa members a	elated expense the necessary I excursions is	es for off-sit on and off expected to rtise in the	te education f-site meetin o be held per form of gues	al excursi g expens year. Fir t speake	expenses for al ions for Forum N es (catering, me hally, and depen rs at Forum mee commodation.	Member eting ro	s (e.g. tour o om, A/V), a the issues b	of Darlingtond it is contooling the contooling discussions of the	n Dry Stora emplated t sed and rai	nge Facility). hat one or m sed by Forun	Costs can nore n
	potential ho set of issue potential tr	ost (Step 5), the s that prompt i ansportation c	e Forum wi municipalit ommunitie	ill likely be di ties to turn to es. Future m	sbanded their As eetings o	ential host com or significantly sociations for gu of Forum and the ning communiti	changeo uidance, eir scop	f in scope to interaction are not kn	reflect, a. with the N own and m	being at Ste WMO such ay include a	p 5, and/or l as those affe	b. a new ecting the
Schedule	Start Year								ç	2018	В	
Tyne	Fived											
Туре	Fixed											
Calculations and Notes:	- cat - - - 201	1-2 educati ering costs). Potential tr Potential ex Potential ex 11. Current cor	onal excurs avel to oth spenses/pe spenses for mmitment	sions = \$3k (i er provinces er diems for	for meet guest spe abers to a	\$80k for total m engthened/exte ings (e.g. SK, NE eakers attend future, ai	eeting o	costs. ccommodati				
	Y02 Y05	rrent budget Y0 2 (2011) – Y04 ( 5 (2014) – Y09 ( 0 (2019) - Y25 (	(2013) 3 x (2018) 5 x	\$150,000 = \$100,000 =	\$ 450	,000						
	:											
Labour C	nete	Material C	nete	Other Co	te	Subtotal		Allowance	25%		Total Cost	

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				Wo		Cost Estimate nt Definition Sh	eet					_
									ĺ	NWMO Cost	Code: 0170020	-21
WBS (New)	561	05	10	20	110				1	repared By	r: P. Simmons	
WBS (Old)	BUILDING R	ELATIONS – R	egional Eng	gagement – N	IUNCIPA	L FORUM MEETI	NGS (150	)				
WBS Title		FORUM MEE										
Description	late 2008 co associations	omprised of se s, and who inf	enior level r orm a rese	municipal exp arch agenda i	erts fron or a larg	the four nuclea	ar-cycle pi tructure p	ovinces prim roject, and w	arily draw ho also p	n from the	a group formed i municipal e and comment i	
	The Forum	consists of 15	individual (	organizations	whom a	re invited to par	ticipate a	the meeting	s typically	held up to	4 times per year.	
	•	pal Forum con eting facility i			er year (	avg. 3). To date	the meet	ngs have bee	en held in	Toronto (at	the NWMO office	.es),
Deliverable	with a seco	ndary delivera	ble of prov	iding insight,	commer		existing a	nd emerging			d areas of interes licy areas potenti	
	NWMO liais		cipal associ	iations, and p	rovide gu	g existing relatio uidance on resea					litate effective valities in conside	ring
	techniques	and best prac torage facilitie	tices, and t	he reciprocal	educatir	g of the Forum i	members	on APM and	the NWM	- O including	ctive communicat coordinated tour eived and assists	irs
Assumptions	Current con	nmitment free	n the Form	m members b	as hoor	articulated and	ommuni	ated through	to the er	d of 2010 ·	vith tacit	
	commitmer municipal e	nt beyond, e.g lection, decisi	. into 2011 on not to s	. Election cyc eek re-electio	es can po n), and t	articulated and o otentially affect he municipal ele vere membershi	members ection cyc	hip on the Fo es are differe	rum (e.g.	failure to be		t on
	trends and relations an whom have for local go taxation. Re	patterns emen of the effect a expressed into vernment in a	rging both a nd progress terest will e reas within he change t	as a result of s of the resea evolve once to their sphere he value of m	the siting rch direc ne siting   of influe aintainin	process, but als ted by the Forur	o as a res m. For exa n officially ion such	ult of local go mple, the mo been launch as emergency	overnmen ethods of ed. Simila response	t relations, communica rly, priority , local trans		icial lities
	as well as re also include educational members a	elated expense the necessar l excursions is dditional expe	es for off-si y on and of expected t ertise in the	ite education ff-site meetin to be held per form of gues	al excursi g expens year. Fir t speake	ons for Forum Nes es (catering, mes ally, and depend	Members ( eting roor ding on th	e.g. tour of D n, A/V), and i e issues bein	arlington t is conter g discusse	Dry Storage nplated that d and raise		can
	potential ho set of issue: potential tr	ost (Step 5), th s that prompt ansportation o	ie Forum w municipalit communitie	rill likely be di ties to turn to es. Future m	sbanded their As eetings o		changed in idance/in eir scope a	n scope to rei teraction wit re not know	flect, a. be h the NW n and may	ing at Step MO such as	5, and/or b. a new those affecting t	
	ļ											
Schedule	Start Year											
······	ļ											
Туре	Fixed											
Calculations	-					\$80k for total me		ts.				
and Notes:	- - 201 - - - Cur Y02 Y05	ering costs).  Potential to Potential e Potential e 11.  Current co	ravel to oth xpenses/pe xpenses fo mmitment nitment for 01 (2010) b (2013) 3 x (2018) 5 x	ner provinces er diems for, r Forum Men for Forum is r Forum to 20 budget - \$150 x \$150,000 = x \$100,000 =	for meet guest spe abers to a to end of 11 0,000 \$ 450 \$ 500	ings (e.g. SK, NB akers uttend future, an 2010 ,000 ,000	)				ransportation, ar	
Labour C	acto.	Material (	Costs	Other Co	-to	Subtotal	1 -	lowance	25%		Total Cost	

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	APM Cost Estimate Work Element Definition Sheet
	NWMO Cost Code: 0170020-21
WBS (New)	561         05         10         30         90         Prepared By:         !P. Simmons
WBS (Old)	BUILDING RELATIONS – Regional Engagement – MUNCIPAL FORUM MEETINGS (150)
WBS Title	MUNICIPAL FORUM MEETINGS
Description	Municipal Forum category includes those costs associated with the meetings and assemblies of the Municipal Forum, a group formed in late 2008 comprised of senior level municipal experts from the four nuclear-cycle provinces primarily drawn from the municipal associations, and who inform a research agenda for a large national infrastructure project, and who also provide advice and comment to related municipal-specific issues, and effectively communicating with the local level of government.
	The Forum consists of 15 individual organizations whom are invited to participate at the meetings typically held up to 4 times per year.
	The Municipal Forum convenes up to four times per year (avg. 3). To date the meetings have been held in Toronto (at the NWMO offices) and at a meeting facility in downtown Ottawa.
Deliverable	The category's primary deliverable is the provision of guidance to a research agenda as it relates to municipally related areas of interest, with a secondary deliverable of providing insight, comment and advice on existing and emerging local government policy areas potentially affecting the siting process including those policies emerging at a provincial government level.
	The costs and activities, as outlined, assist in strengthening existing relationships with Municipal Forum members, facilitate effective NWMO liaison with municipal associations, and provide guidance on research aimed at yielding tools to assist municipalities in considerin large economic development projects, such as APM.
	A complementary deliverable to the inputs received from the Forum members on the siting process, is insight on effective communication techniques and best practices, and the reciprocal educating of the Forum members on APM and the NWMO including coordinated tours of the dry storage facilities. As primary contacts for members in their host provinces, first-hand experience is well-received and assists in awareness building.
Accumenti	Current commitment from the Corum members has been estimated and communicated the country to the country of 2000 and 1.2.2.
Assumptions	Current commitment from the Forum members has been articulated and communicated through to the end of 2010 with tacit commitment beyond, e.g. into 2011. Election cycles can potentially affect membership on the Forum (e.g. failure to be re-elected in a municipal election, decision not to seek re-election), and the municipal election cycles are different in each province. This has an effect of the historical knowledge of the core Forum membership were membership to change.
	As the siting process progresses, it is expected that the Forum membership and advisory direction will change and adapt to reflect the trends and patterns emerging both as a result of the siting process, but also as a result of local government relations, municipal-provincia relations and the effect and progress of the research directed by the Forum. For example, the methods of communicating to municipalitic whom have expressed interest will evolve once the siting process has been officially been launched. Similarly, priority issues will emerge for local government in areas within their sphere of influence and jurisdiction such as emergency response, local transportation, and taxation. Regardless of the change the value of maintaining a relationship with municipal experts and especially those connected to municipal associations in a collective setting is clear.
	Costs included in this category are primarily travel-related expenses for all Forum members and necessary and participating NWMO staff as well as related expenses for off-site educational excursions for Forum Members (e.g. tour of Darlington Dry Storage Facility). Costs car also include the necessary on and off-site meeting expenses (catering, meeting room, A/V), and it is contemplated that one or more educational excursions is expected to be held per year. Finally, and depending on the issues being discussed and raised by Forum members additional expertise in the form of guest speakers at Forum meetings may be required/requested and the estimates include for that possibility in the form of per diems and travel and accommodation.
	As the process gets closer to the time when 1 or more potential host communities are preparing to negotiate with the NWMO to be a potential host (Step 5), the Forum will likely be disbanded or significantly changed in scope to reflect, a. being at Step 5, and/or b. a new set of issues that prompt municipalities to turn to their Associations for guidance/interaction with NWMO such as those affecting the potential transportation communities. Future meetings of Forum and their scope are not known and may include an evolved Forum dealing with newer and emerging municipal issues concerning communities on the transportation routes.
Schedule	
Гуре	Fixed
	- 4 meetings per year @ \$20k per meeting = \$80k for total meeting costs.
Calculations and Notes:	- 1-2 educational excursions = \$3k (includes lengthened/extended accommodations, meals, group (bus) transportation, and catering costs).  - Potential travel to other provinces for meetings (e.g. SK, NB)  - Potential expenses/per diems for guest speakers  - Potential expenses for Forum Members to attend future, and other NWMO events such as an international Frum/expo in 2011.  - Current commitment for Forum is to end of 2010  - Tacit commitment for Forum to 2011  Current budget Y01 (2010) budget - \$150,000  Y02 (2011) - Y04 (2013) 3 x \$150,000 = \$450,000  Y05 (2014) - Y09 (2018) 5 x \$100,000 = \$1,600,000
	- 1-2 educational excursions = \$3k (includes lengthened/extended accommodations, meals, group (bus) transportation, and catering costs).  - Potential travel to other provinces for meetings (e.g. SK, NB)  - Potential expenses/per diems for guest speakers  - Potential expenses for Forum Members to attend future, and other NWMO events such as an international Frum/expo in 2011.  - Current commitment for Forum is to end of 2010  - Tacit commitment for Forum to 2011  Current budget Y01 (2010) budget - \$150,000  Y02 (2011) - Y04 (2013) 3 x \$150,000 = \$450,000  Y05 (2014) - Y09 (2018) 5 x \$100,000 = \$1,600,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	140				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	GOVERNM	IENT RELATI	ONS MEETI	NGS						
Description	. В	o Quar o Annu o Minir NWMO f o Minir o One- o One- riding	terly in-per al in-persor mum of one file mum of one on-one brie on-one brie	son briefing w h briefing w e annual in-p e annual cro fings as req fings as req	gs with Natu ith the Mini person bried ss-departm uired with I uired with I	tatives from the nuclea ural Resources Canada, ster of Natural Resource fing with representative ental briefing in each p Ministers of relevant po ndividual MPs, MPPs, N	every year every year eses Canada, or eses from the lear rovince and a ortfolios at feo MLAs, MNAs, i	as required ad provincia t the federa leral and pr f there is co	d al department, al level ovincial levels	·
Deliverable	• в	uild relation uild underst acilitate dec	anding of a			ect and process.				
Assumptions	· C	osts involve	travel, acco	mmodatio	n, meals and	d registration.				
Schedule	Start Year			6	2015		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	•	011 – 2015, 016 – 2064,			g, \$200K/ye	ar then \$100k/year 206	5 - 2100.			
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	To	otal Cost
\$	-	\$	-	\$	1,350,000	\$ 1,350,000	\$	337,500	\$	1,687,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	130					Prepared By:	J. Robinson
WBS (Old)											
WBS Title	GOVERNM	ENT RELATI	ONS MEETI	NGS							
Description	· Bi	o Quar o Annu o Minir NWMO f o Minir o One-o o One-riding	terly in-per al in-persor mum of one file mum of one on-one brie on-one brie	son briefing w h briefing w e annual in-p e annual cro fings as req fings as req	ys with Natu ith the Mini person brief ss-departm uired with I uired with I	ural Resource ister of Natura fing with repre ental briefing Ministers of re ndividual MP	s Canada, al Resourc esentative in each pr elevant po s, MPPs, M	es Canada, or es from the lead rovince and at ortfolios at fed	as required ad provincia the federa eral and pr f there is co	d al department/r I level ovincial levels	ministry for the
Deliverable	• Ві	uild relation uild underst acilitate dec	anding of a			ect and proce	ess.				
Assumptions	· C	osts involve	travel, acco	mmodation	n, meals and	d registration					
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	· 2(	016 – 2064,	same level	of spending	, \$200K/yea	ar then \$100k	c/year 206	5 - 2100.			
Labour (	Costs	Materia	al Costs	Other	Costs	Subto	tal	Allowance	25%	Tot	tal Cost
\$	-	\$	-	\$	1,200,000	\$ 1	,200,000	\$	300,000	\$	1,500,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	110					Prepared By	<b>/:</b> J. Robinson			
WBS (Old)														
WBS Title	GOVERNM	ENT RELATI	ONS MEETI	NGS										
Description	• В	<ul> <li>Brief government officials and elected representatives from the nuclear provinces and federal government</li> <li>Quarterly in-person briefings with Natural Resources Canada, every year</li> <li>Annual in-person briefing with the Minister of Natural Resources Canada, or as required</li> <li>Minimum of one annual in-person briefing with representatives from the lead provincial department/ministry for the NWMO file</li> <li>Minimum of one annual cross-departmental briefing in each province and at the federal level</li> <li>One-on-one briefings as required with Ministers of relevant portfolios at federal and provincial levels</li> <li>One-on-one briefings as required with individual MPs, MPPs, MLAs, MNAs, if there is community interest within their riding</li> <li>Contribute to Government of Canada delegations at the OECD Nuclear Energy Agency</li> </ul>												
Deliverable	• В	uild relation uild underst acilitate dec	anding of a	• • •	. ,	ect and pro	cess.							
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registratio	n.							
Schedule	Start Year			16	2025			Finish Year	25	2034				
Туре	Fixed													
Calculations and Notes:														
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%		Total Cost			
\$	-	\$	-	\$	2,000,000	\$	2,000,000	\$	500,000	\$	2,500,0	000		

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	60					Prepared By:	J. Robinson			
WBS (Old)				O										
WBS Title	GOVERNM	ENT RELATI	ONS MEETI	NGS										
Description	. в	Brief government officials and elected representatives from the nuclear provinces and federal government  Quarterly in-person briefings with Natural Resources Canada, every year  Annual in-person briefing with the Minister of Natural Resources Canada, or as required  Minimum of one annual in-person briefing with representatives from the lead provincial department/ministry for the NWMO file  Minimum of one annual cross-departmental briefing in each province and at the federal level  One-on-one briefings as required with Ministers of relevant portfolios at federal and provincial levels  One-on-one briefings as required with individual MPs, MPPs, MLAs, MNAs, if there is community interest within their riding  Contribute to Government of Canada delegations at the OECD Nuclear Energy Agency												
Deliverable	• В	uild relation uild underst acilitate dec	anding of a		. ,	ect and proce	ess.							
Assumptions	· C	osts involve	travel, acco	ommodation	n, meals and	dregistration								
Schedule	Start Year			26	2035			Finish Year	85	2094				
Туре	Fixed													
Calculations and Notes:														
Labour (	Costs	Materia	al Costs	Other	Costs	Subto	tal	Allowance	25%	Tot	tal Cost			
\$	-	\$	-	\$ 1	2,000,000	\$ 12	,000,000	\$	3,000,000	\$	15,000,000			

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	50	30				Prepared By:	J. Robinson				
WBS (Old)				<u></u>										
WBS Title	GOVERNM	ENT RELATI	IONS MEETI	NGS										
Description	. В	<ul> <li>Brief government officials and elected representatives from the nuclear provinces and federal government         o Quarterly in-person briefings with Natural Resources Canada, every year         o Annual in-person briefing with the Minister of Natural Resources Canada, or as required         o Minimum of one annual in-person briefing with representatives from the lead provincial department/ministry for the         NWMO file         o Minimum of one annual cross-departmental briefing in each province and at the federal level         o One-on-one briefings as required with Ministers of relevant portfolios at federal and provincial levels         o One-on-one briefings as required with individual MPs, MPPs, MLAs, MNAs, if there is community interest within their         riding         o Contribute to Government of Canada delegations at the OECD Nuclear Energy Agency</li> </ul>												
Deliverable	• В	uild relatior uild underst acilitate dec	tanding of a			ect and process.								
Assumptions	· C	osts involve	travel, acco	ommodatio	n, meals and	d registration.								
Schedule	Start Year			86	2095		Finish Year	155	2164					
Туре	Fixed													
Calculations and Notes:	· 2016 – 2094, same level of spending, \$200K/year then \$100k/year 2095 - 2100.													
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	То	tal Cost				
\$	-	\$	-	\$	3,600,000	\$ 3,600,	000 \$	900,000	\$	4,500,000				

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	150				Prepared By:	J. Robinson					
WBS (Old)															
WBS Title	EDUCATIOI	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS										
	Youth Rour	ndtable, dev	elop an NV	VMO educa	ition, outrea	ach and capacity	ble and the NWMC ouilding strategy fo Roundtable recom	r young Cana	adians that inc	orporates both					
	pre				•	•	formation sessions es to integrate the	-	classroom dialo	ogues/student					
		<ul> <li>Establishment of scholarships and grants across relevant disciplines;</li> <li>Opportunities to sponsor youth participation at relevant national and international conferences;</li> <li>Promotion of science learning through investment in science fairs, camps, clubs.</li> </ul>													
Deliverable															
Assumptions															
Schedule	Start Year			2	2011		Finish Year	9	2018						
Туре	Fixed														
Calculations and Notes:	Fixed  - Y2 – Y85, \$200K/year - Y86 - Y180 \$50K/yr														
Labour C	osts	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	То	tal Cost					
\$	-	\$	-	\$	1,600,000	\$ 1,60	0,000 \$	400,000	\$	2,000,000					

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	140					Prepared By:	J. Robinson			
WBS (Old)				<u></u>		<u> </u>								
WBS Title	EDUCATIOI	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS									
	Youth Rour	ndtable, dev	elop an NV	VMO educa	ition, outrea	ach and capac	ity buildin	g strategy for	young Cana		esponse to the orporates both as:			
	pr				•	•		ition sessions; ntegrate the ii		classroom dialo	ogues/student			
	<ul> <li>Establishment of scholarships and grants across relevant disciplines;</li> <li>Opportunities to sponsor youth participation at relevant national and international conferences;</li> <li>Promotion of science learning through investment in science fairs, camps, clubs.</li> </ul>													
Deliverable														
Assumptions														
Schedule	Start Year			10	2019			Finish Year	15	2024				
Туре	Fixed													
Calculations and Notes:	Fixed  · Y2 – Y85, \$200K/year · Y86 - Y180 \$50K/yr													
Labour C	osts	Materia	al Costs	Othe	r Costs	Subto	tal	Allowance	25%	То	tal Cost			
\$	-	\$	-	\$	1,200,000	\$ 1	,200,000	\$	300,000	\$	1,500,000			

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	120				Prepared By:	J. Robinson				
WBS (Old)					<u></u>									
WBS Title	EDUCATIOI	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS									
	Youth Rour	ndtable, dev	elop an NV	VMO educa	tion, outrea	ach and capacity b	le and the NWMC uilding strategy fo Roundtable recom	r young Cana	adians that inco	orporates both				
	pre	-			•	•	ormation sessions s to integrate the	-	classroom dialo	ogues/student				
	<ul> <li>Establishment of scholarships and grants across relevant disciplines;</li> <li>Opportunities to sponsor youth participation at relevant national and international conferences;</li> <li>Promotion of science learning through investment in science fairs, camps, clubs.</li> </ul>													
Deliverable														
Assumptions														
Schedule	Start Year			16	2025		Finish Year	25	2034					
Туре	Fixed													
Calculations and Notes:	Fixed  . Y2 – Y85, \$200K/year . Y86 - Y180 \$50K/yr													
Labour C	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	То	tal Cost				
\$	-	\$	-	\$	2,000,000	\$ 2,000	000 \$	500,000	\$	2,500,000				

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	70					Prepared By:	J. Robinson			
WBS (Old)														
WBS Title	EDUCATIOI	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS									
	Youth Rour	ndtable, dev	elop an NV	VMO educa	tion, outrea	ich and capa	city buildin	ng strategy fo	r young Cana		esponse to the orporates both as:			
	pr	-			•	•		ntion sessions ntegrate the	-	classroom dialo	ogues/student			
	<ul> <li>Establishment of scholarships and grants across relevant disciplines;</li> <li>Opportunities to sponsor youth participation at relevant national and international conferences;</li> <li>Promotion of science learning through investment in science fairs, camps, clubs.</li> </ul>													
Deliverable														
Assumptions														
Schedule	Start Year			26	2035			Finish Year	85	2094				
Туре	Fixed													
Calculations and Notes:	Fixed  - Y2 – Y85, \$200K/year - Y86 - Y180 \$50K/yr													
Labour C	osts	Materia	al Costs	Othe	Costs	Subt	otal	Allowance	25%	То	tal Cost			
\$	-	\$	-	\$ 1	2,000,000	\$ 1	2,000,000	\$	3,000,000	\$	15,000,000			

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	50	40	l				Prepared By:	J. Robinson				
WBS (Old)						<u> </u>									
WBS Title	EDUCATIOI	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS										
	Youth Rour	ndtable, dev	elop an NV	VMO educa	ition, outrea	ach and capa	city buildin	ng strategy for	young Cana		esponse to the orporates both as:				
	pre	•			•	•		ntion sessions; ntegrate the i		classroom dialo	ogues/student				
		<ul> <li>Establishment of scholarships and grants across relevant disciplines;</li> <li>Opportunities to sponsor youth participation at relevant national and international conferences;</li> <li>Promotion of science learning through investment in science fairs, camps, clubs.</li> </ul>													
Deliverable															
Assumptions															
Schedule	Start Year			86	2095			Finish Year	155	2164					
Туре	Fixed														
Calculations and Notes:	Fixed  - Y2 – Y85, \$200K/year - Y86 - Y180 \$50K/yr														
Labour C	osts	Materia	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	То	tal Cost				
\$	-	\$	-	\$	3,500,000	\$	3,500,000	\$	875,000	\$	4,375,000				

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	60	30					Prepared By:	J. Robinson			
WBS (Old)														
WBS Title	EDUCATIOI	N SUPPORT,	/CURRICUL	UM/SCHOL	ARSHIPS									
	Youth Rour	ndtable, dev	elop an NV	VMO educa	ition, outrea	ach and capa	city buildir		young Cana	dians that inc	esponse to the orporates both as:			
	pre	-			•	•		ntion sessions; ntegrate the i	nitiative in c	classroom dialo	ogues/student			
	<ul> <li>Establishment of scholarships and grants across relevant disciplines;</li> <li>Opportunities to sponsor youth participation at relevant national and international conferences;</li> <li>Promotion of science learning through investment in science fairs, camps, clubs.</li> </ul>													
Deliverable														
A														
Assumptions														
Schedule	Start Year			156	2165			Finish Year	180	2189				
Туре	Fixed													
Calculations and Notes:	Fixed  - Y2 – Y85, \$200K/year - Y86 - Y180 \$50K/yr													
l aha	`asts	Mataria	al Casta	Other	v Costs	C	etal	Allowance	25%	T-	tal Cast			
Labour C	.05(5	Materia \$	ai COSTS	\$	1 250 000	Subt \$		Allowance \$	312,500	\$	1 562 500			
\$	-	<b>&gt;</b>	-	<b>&gt;</b>	1,250,000	<b>&gt;</b>	1,250,000	<b>&gt;</b>	312,500	<b>&gt;</b>	1,562,500			

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				Cost Estimate			
			Work Elem	ent Definition Sheet			NWMO Cost Code: 0170020-20
WBS (New)	561	05 10	10 130	ļ			Prepared By: P. Simmons
WBS (Old)	BUILDING I	RELATIONS – Regional E	ngagement - MUNICIF	PAL ASSOCIATIONS (50)			
WBS Title		L ASSOCIATIONS					
Description	relationshi		ance with municipal an	d municipally-related a	ssociations and	organizat	s for all activities related to tions in the 4 nuclear-cycle s.
		ssociated with this cate and related expenses in					presentations, booth/exhibit ::
		rovided on request to m mmittees, Boards of Dir		their affiliates, or muni	cipally-related o	organizatio	ons and groups (e.g. Executive or
	provinces.		de staff registration fee	es as delegates or partic	cipants, exhibite		trade shows in all nuclear ation in trade shows (including
		e and participation at spetings (e.g. AMCTO) up			icipal-professio	onal and q	uasi-professional) such as sector
Deliverable	The as'	v dolivorable a'-'	d with the estimate	outlined about'	in maintel-1-	and st	athoning ovieting and builds
Deliverable	new, relati	onships with the munic ons and their leadership	ipal associations and th	neir affiliated organizati			gthening existing, and building -related professional
	gathering i		nunities and regions, a				e distribution of information, MO brand recognition, and
Assumptions	temporary and pruder with one o	10% decline in conferent; the various association more communities, ar	nces can be expected. ons tend to provide su nd who may not be me	Maintaining relations w pport to one another. T mbers of all affiliated a	rith interested on the decline is the ssociations. Pre	organizatio e result o sence at a	ge until 2018 after which a ons interested is recommended f being at the negotiation Step 5 sssociation conferences or trade ship is deemed appropriate.
		current inventory of kr ofessional associations				easonable	to assume a marginal expansion
		elationships exist with t es in 2009/10)	the following municipal	associations (although	not all have re	quested/i	nvited NWMO presence at
	ONTARIO - QUEBEC - NEW BRUN CANADA/N	EWAN – 5 (SUMA, SARN • 9 (AMO, NOMA & NW 4 (FMQ, UMQ, ADMQ, 4 ISWICK - 4 (UMNB, CNB IATIONAL – 3 (FCM, CAI IEA, PEO, MFOA.	ORC, FONOM, ROMA, APDEQ) BA, AFMNB, AMANB)		мсто)		
		e and trade show location of in Stratford = car; 200			ost of participa	ition (e.g.	2009 OSUM in Cornwall = train,
	from 10% t necessarily	commute into the next er and the number of s	no average conference t year as booth logistic	fee/cost is applicable fo s will vary (new larger e	or these estimate xhibit, modules	tes. Cost o s, and trar	of the event. Increases can vary of entry one year does not isport), sponsorship may be by to the to the larger exhibit at
	administra relationshi	of 25 conferences per tors associations may n ps with all municipal ass tion, planners, etc.) afte	ot be necessary in prov sociations up to 2018 v	vinces that do not included the potential for minor	de a community expansion of p	y in Step 5 rofession	<ul> <li>Nonetheless it is expected that al associations (e.g.</li> </ul>
		hat 80% of conferences p, and associated costs				on, travel,	expenses, auto rental, mid-range
Schedule	Start Year		1 2010		Finish Year	Ç	2018
			2010				1
Туре	Fixed						
Calculations	Conference	es and Trades shows					
and Notes:		/01 (2010) Budget	\$50,000	ar vaar sunaarts on income	roose in annual	astimatas	d avacaditures and includes the
	transport o		lisplay in various config	urations. Similar to oth	er budget areas		d expenditures and includes the lase in requests to participate
	Y06 (2015)	- Y05 (2014) 4 x \$100 - Y9 (2018) 4 x \$125,0 - Y36 (2034) 16 x \$125	00 = \$ 500,000				
Labour	Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$ -	\$ 950,000	\$ 950,000	\$	237,500	

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				Cost Estimate			
			Work Elem	ent Definition Sheet			NWMO Cost Code: 0170020-20
WBS (New)	561	05 10	20 120				Prepared By: P. Simmons
WBS (Old)	BUILDING F	RELATIONS – Regional E	ngagement - MUNICIF	AL ASSOCIATIONS (50)			
WBS Title		L ASSOCIATIONS					
Description	relationship		ance with municipal an	d municipally-related a	ssociations and	organizat	s for all activities related to cions in the 4 nuclear-cycle s.
		ssociated with this cate and related expenses in					presentations, booth/exhibit :
		rovided on request to m mmittees, Boards of Dir		their affiliates, or muni	cipally-related o	organizatio	ons and groups (e.g. Executive or
	provinces.		de staff registration fee	es as delegates or partic	cipants, exhibito		trade shows in all nuclear ation in trade shows (including
		e and participation at spetings (e.g. AMCTO) up			icipal-professio	nal and q	uasi-professional) such as sector
Deliverable	The prime	v dolivorable assesi-+-	d with the activities	outlined above, assists	in maintainir -	and stree-	athoning ovieting, and buildin-
Deliverable	new, relation	onships with the munic ons and their leadership	ipal associations and th	eir affiliated organizati			gthening existing, and building related professional
	gathering in		nunities and regions, a				· distribution of information, AO brand recognition, and
Assumptions	temporary and pruder with one or	10% decline in conferent; the various association more communities, ar	nces can be expected. ons tend to provide su nd who may not be me	Maintaining relations wo oport to one another. T mbers of all affiliated a	rith interested on the decline is the ssociations. Pres	organizatio e result of sence at a	e until 2018 after which a ons interested is recommended f being at the negotiation Step 5 ssociation conferences or trade ship is deemed appropriate.
		current inventory of kr ofessional associations				easonable	to assume a marginal expansion
		elationships exist with t es in 2009/10)	the following municipal	associations (although	not all have red	quested/i	nvited NWMO presence at
	ONTARIO – QUEBEC – 4 NEW BRUN CANADA/N	EWAN – 5 (SUMA, SARN • 9 (AMO, NOMA & NW 4 (FMQ, UMQ, ADMQ, 4 ISWICK - 4 (UMNB, CNB IATIONAL – 3 (FCM, CAI IEA, PEO, MFOA.	ORC, FONOM, ROMA, APDEQ) BA, AFMNB, AMANB)		мсто)		
		e and trade show location of in Stratford = car; 200			ost of participa	tion (e.g.	2009 OSUM in Cornwall = train,
	from 10% t necessarily	commute into the next er and the number of s	no average conference t year as booth logistic	fee/cost is applicable fo will vary (new larger e	or these estimat xhibit, modules	tes. Cost o	of the event. Increases can vary of entry one year does not sport), sponsorship may be y to the to the larger exhibit at
	administrat relationship	of 25 conferences per tors associations may n ps with all municipal ass tion, planners, etc.) afte	ot be necessary in prov sociations up to 2018 v	rinces that do not included the potential for minor	de a community expansion of p	in Step 5 rofession	). Nonetheless it is expected that al associations (e.g.
		hat 80% of conferences p, and associated costs				on, travel,	expenses, auto rental, mid-range
Schedule	Start Year		10 2019		Finish Year	15	2024
			2013				
Туре	Fixed						
Calculations	Conference	es and Trades shows					
and Notes:		/01 (2010) Budget	\$50,000	ur vons summerts en incert	ranca in annual	astimatos	d ourse ditures and includes the
	transport o		lisplay in various config	urations. Similar to oth	er budget areas		l expenditures and includes the ase in requests to participate
	Y06 (2015)	- Y05 (2014) 4 x \$100 - Y9 (2018) 4 x \$125,0 - Y36 (2034) 16 x \$125	00 = \$ 500,000				
Labour	Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$ -	\$ 750,000	\$ 750,000	\$	187,500	\$ 937,500

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				Cost Estimate			
			Work Elem	ent Definition Sheet			NWMO Cost Code: 0170020-2
WBS (New)	561	05 10	30 100	ļ			Prepared By: P. Simmons
WBS (Old)	BUILDING F	RELATIONS – Regional E	ngagement - MUNICIF	PAL ASSOCIATIONS (50)			
WBS Title		L ASSOCIATIONS					
Description	relationship		ance with municipal an	d municipally-related a	ssociations and	organizat	s for all activities related to ions in the 4 nuclear-cycle i.
		ssociated with this cate and related expenses in					presentations, booth/exhibit :
		rovided on request to n nmittees, Boards of Dir		their affiliates, or munic	cipally-related o	organizatio	ons and groups (e.g. Executive o
	provinces.		de staff registration fee	es as delegates or partic	cipants, exhibito		trade shows in all nuclear ation in trade shows (including
		e and participation at sp etings (e.g. AMCTO) up			icipal-professio	nal and q	uasi-professional) such as sector
Deliverable	The prime	v dolivorable a	d with the estimate	outlined shows!	in maintai-i-	and st	athoning ovieting, and builds
Deliverable	new, relation	y deliverable associated onships with the munic ins and their leadership	ipal associations and th	neir affiliated organizati			gthening existing, and building related professional
	gathering in		nunities and regions, a				distribution of information, 40 brand recognition, and
Assumptions	temporary and pruder with one or	10% decline in confere it; the various associati r more communities, ar	nces can be expected. ons tend to provide su nd who may not be me	Maintaining relations w pport to one another. T mbers of all affiliated as	rith interested on the decline is the ssociations. Pres	organization e result of sence at a	e until 2018 after which a ons interested is recommended being at the negotiation Step 5 ssociation conferences or trade ship is deemed appropriate.
		current inventory of kr ofessional associations				easonable	to assume a marginal expansion
		elationships exist with t s in 2009/10)	the following municipal	associations (although	not all have re	quested/ii	nvited NWMO presence at
	ONTARIO – QUEBEC – 4 NEW BRUN CANADA/N	EWAN – 5 (SUMA, SARN 9 (AMO, NOMA & NW 4 (FMQ, UMQ, ADMQ, I SWICK - 4 (UMNB, CNE ATIONAL – 3 (FCM, CAI JEA, PEO, MFOA.	ORC, FONOM, ROMA, APDEQ) BA, AFMNB, AMANB)		мсто)		
		and trade show location of in Stratford = car; 200			ost of participa	tion (e.g.	2009 OSUM in Cornwall = train,
	from 10% t necessarily	commute into the nex er and the number of s	no average conference t year as booth logistic	fee/cost is applicable fo s will vary (new larger e	or these estimat xhibit, modules	tes. Cost o	of the event. Increases can vary of entry one year does not sport), sponsorship may be y to the to the larger exhibit at
	administrat relationship	of 25 conferences per tors associations may n os with all municipal as tion, planners, etc.) afte	ot be necessary in prov sociations up to 2018 v	rinces that do not includ vith potential for minor	de a community expansion of p	in Step 5 rofessiona	<ol> <li>Nonetheless it is expected that al associations (e.g.</li> </ol>
		nat 80% of conferences p, and associated costs				on, travel,	expenses, auto rental, mid-rang
Schedule	Start Year		16 2025		Finish Year	25	2034
			10 2023				
Туре	Fixed						
Calculations	Conference	es and Trades shows					
and Notes:		'01 (2010) Budget	\$50,000		ranco in annual	astimatad	Louranditures and includes the
	transport o		lisplay in various config	urations. Similar to oth	er budget areas		expenditures and includes the ase in requests to participate
	Y06 (2015)	- Y05 (2014) 4 x \$100 - Y9 (2018) 4 x \$125,0 - Y36 (2034) 16 x \$125	00 = \$ 500,000				
Labour	Costs	Material Costs	Other Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$ -	\$ 1,250,000	\$ 1,250,000	\$	312,500	\$ 1,562,50

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	260		İ			Prepared By:	J. F	acella
WBS (Old)	0											
WBS Title	TRIENNIAL	REPORT										
Description	To prepare	Triennial R	eport as rec	uired by th	e Nuclear F	uel Waste A	Act every th	ird year after th	ne Governr	ment Decision	on the	
2 000 p 0.0	1	ent approach	-	, u c u u , c		ac. Waste?		a year areer er		2 00.0.0	011 0110	
Dolivershie	Trionnial D	onorte for th	ao following									
Deliverable	THEIIIIIAI K	eports for th 2011 to	2013 delive		h 2014							
			2016 delive									
		2017 to	2019 delive	red in Marc	ch 2020							
		2020 to	2022 delive	red in Marc	ch 2023							
	•	And so c	n indefinite	ely								
Assumptions	The Trienn	ial Report w	ill meet the	requireme	ents set out	in the NFW	A and renea	ited below:				
	•	•		•			•	ar fuel waste di	uring the			
	last three f	iscal years, i	including ar	n analysis of	f any signific	cant socio-e	conomic ef	fects of	-			
	:	ities on a co	mmunity's	way of life	or on its so	cial, cultura	l or econom	ic				
	aspirations	;										
	(h) [the NM	VMO'cl ctra	tegic nlan fo	or the nevt	five fiscal ve	aars to imnl	ament the s	approach that t	hο			
		n Council se	• .		•	•		• •	iic .			
								- //				
	(c) [the NW	/MO's] bud	get forecast	for the nex	kt five fiscal	years to im	plement the	e strategic plan	;			
	(d) the resu	ulta of Itha N	JVA/N4O/cl p	ublic concul	ltations hole	d during the	last throa f	isaal waars with	rosport			
		ters set out				a during the	i iast tillee i	iscal years with	rrespect			
	to the mat	ters set out	iii paragrap	ns (a) and (	<i>5</i> ), and							
	(e) the com	nments of th	ne Advisory	Council on	the matters	referred to	o in paragra	phs (a) to (d).				
	•		-			-		he five-year str				
	:	ng years: 20 nder individ				onsultation	s related to	issues beyond	review of t	ne 5-year stra	itegic piar	n will be
	captarca a	maci maivia	idai prograi	ii ciciiiciiis								
					1.10							
	Completion	n of (a) will i	not require	resources r	new or addit	tional to the	ose required	d as part of the	siting proc	ess.		
	Completion	n of (e) will i	reguire hirii	ng of extern	nal writer to	support th	e Advisorv (	Council, estimat	ted at \$25k	Cper report.		
	compice.c.	(0,	equile iiii.	.B or excern		зарроге сп	c / lavioo. y c	Journally Collinia	.ca at <b>7</b> 25.	· per reporti		
	Costs relate	ed to transla	ation, mailir	ng, printing	will be capt	ured under	the respec	tive Communic	ation progi	ram elements.		
Calcadad -	Chart V				2042			Finish V		2040		
Schedule	Start Year			4	2013			Finish Year	9	2018		
Туре	Fixed											
Calculations	•		year strate	gic plan, in t	the form of	directed dis	scussion gro	ups is estimate	d to be \$1	00K per year (	2013, 201	16, 2019,
and Notes:	2022, etc.).											
	•	riter to assi										
Labour	Costs	Materia	al Costs		Costs		total	Allowance	25%		tal Cost	204 252
\$	-	\$	-	\$	225,000	\$	225,000	\$	56,250	\$		281,250

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	250					Prepared By	<b>/</b> : J.	Facella
WBS (Old)												
WBS Title	TRIENNIAL	REPORT										
Description	1 ' '	Triennial Rent approacl	•	quired by th	ie Nuclear F	uel Waste	Act every th	ird year after t	he Governi	ment Decisio	n on the	
Deliverable	Triennial R	2014 to 2017 to 2020 to	2013 delive 2016 delive 2019 delive	ered in Marc ered in Marc ered in Marc ered in Marc	ch 2017 ch 2020							
Assumptions	last three f those activ aspirations (b) [the NV Governor i (c) [the NW (d) the resu to the mati (e) the com The public the followi captured u Completion	nary of [the liscal years, ities on a consister of the lis	NWMO's] a including an including an including an including an including and including	ctivities resonally and of life or the next section 15 for the next ublic consults (a) and (Council on to meet (d) 019 and 20 m elements resources resources reg of externing	pecting the fany signific or on its soon five fiscal year or approved the fiscal distance of the matters of the matter of the matters of the matter of t	management and socio-ectial, cultural ears to implies under subsycers to implies under subsycers to implies a referred to cifically the consultation subsycers to the support	ent of nucles conomic efforcement the assection 20(state of the last three efforcement the section are review of the section are review of the section are required to the last three efforcement the section are review of the section are required to the last three efforcement three efforcements are review of the section are required to the last three efforcements are requir	ar fuel waste d fects of iic approach that	the  n; h respect  rategic plar review of the siting processited at \$251	the 5-year st ess. C per report.	rategic pla	
Schedule	Start Year			10	2019			Finish Year	15	2024		
				i				A				
Туре	Fixed											
Calculations and Notes:	2022, etc.)		•	Council in c	ompiling co		J	oups is estimate	ed to be \$1	00K per yeaı	(2013, 20	16, 2019,
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%		Total Cost	
\$		\$	-	\$	250,000	\$	250,000	\$	62,500	\$		312,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	230					Prepared	By:	J. Facella
WBS (Old)												
WBS Title	TRIENNIAL	REPORT										
Description	1 1		-	uired by th	ie Nuclear F	uel Waste A	ct every th	ird year after t	the Govern	ment Deci	ision on	the
	manageme	nt approach	٦.									
Deliverable	Triennial Re	eports for th	ne following	vears:							••••••	
		•	2013 delive		ch 2014							
		2014 to	2016 delive	red in Mar	ch 2017							
		2017 to	2019 delive	red in Mar	ch 2020							
		2020 to	2022 delive	red in Mar	ch 2023							
		And so o	n indefinite	ely								
Assumptions	The Trienni	-		-			-		luring the			
	•					manageme cant socio-ed		ar fuel waste o	auring the			
	:					cial, cultural						
	aspirations		illillullity 5	way of file	01 011 113 300	Jiai, Cuiturai	or econom	IC .				
	aspirations	,										
	(b) [the NW	/MO'sl strat	tegic plan f	or the next	five fiscal ve	ears to imple	ment the a	approach that	the			
	• • • •	_			-	s under subs						
								,,,				
	(c) [the NW	/MO's] budg	get forecast	for the nex	kt five fiscal	years to imp	lement the	e strategic pla	n;			
		_				d during the	last three f	iscal years wit	th respect			
	to the matt	ters set out	in paragrap	hs (a) and (	b); and							
	( - ) + l			C	41		•	-1 (-) +- (-1)				
	(e) the com	iments of tr	ie Advisory	Council on	the matters	s referred to	ın paragra	phs (a) to (d).				
	The nublic	consultation	ns required	to meet (d)	ahove sne	cifically the	review of t	he five-vear st	trategic nla	n will he	conducte	ed in the fall of
			-			-		-				ic plan will be
	:	nder individ						,		, , , , , , , , , , , , , , , , , , , ,		
	'		, 0									
	Completion	n of (a) will r	not require	resources r	new or addi	tional to tho	se required	l as part of the	e siting pro	cess.		
	C	<b>- (</b> - <b>)</b> : !!! -	to a latest	<b>.</b>			A al. da a	Sa	-	v		
	Completion	i oi (e) wiii i	equire min	ig or exteri	iai writer to	support the	Auvisory	Council, estima	aleu al 325	k per repo	ort.	
	Costs relate	ed to transla	ation, maili	ng printing	will be capt	ured under	the respect	tive Communi	cation prog	ram elem	ents.	
	Costs relati			16) PI III I	Will be cap		circ respect		cation prog			
Schedule	Start Year			16	2025			Finish Year	25	203	34	
				·····				A				
Туре	Fixed											
Calculations	•		year strate	gic plan, in t	the form of	directed dis	cussion gro	ups is estimat	ed to be \$1	00K per y	ear (201	3, 2016, 2019,
and Notes:	2022, etc.).	•										
	Contract w	riter to assis	st Advisory			mments, \$2	5K per rep	ort.				
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%		Total	Cost
\$	-	\$	-	\$	500,000	\$	500,000	\$	125,000	\$		625,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	40	180					Prepared By:	J. Facella
WBS (Old)											
WBS Title	TRIENNIAL	REPORT									
Description	To prepare	Triennial R	eport as rec	uired by th	e Nuclear F	uel Waste A	Act every th	rd year after t	he Governr	ment Decision	on the
2 000 mp. 10 m		ent approacl	•	, u c u u , c		ac. Waste?	ioc every ciri	. a year areer e	• • • • • • • • • • • • • • • • •	2 00.0.0	0.1 0.10
Dolivershie	Trionnial D	onorte for th	ho following								
Deliverable	irieiiiiai k	eports for th 2011 to	2013 delive		h 2014						
			2016 delive								
		2017 to	2019 delive	red in Marc	ch 2020						
		2020 to	2022 delive	red in Marc	ch 2023						
	•	And so c	on indefinite	ely							
Assumptions	The Trienn	ial Report w	vill meet the	reguireme	nts set out	in the NFW	A and renea	ted below:			
	1	•		•			•	ar fuel waste d	luring the		
	last three f	iscal years,	including ar	n analysis of	any signific	cant socio-e	conomic ef	ects of	-		
		ities on a co	mmunity's	way of life	or on its soc	cial, cultura	or econom	ic			
	aspirations	;									
	(b) [the NM	VMO'cl ctra	togic plan fo	or the next	five fiscal ve	arc to impl	oment the s	pproach that	tho		
	1	n Council se			-	-			tile		
								- //			
	(c) [the NW	/MO's] bud	get forecast	for the nex	ct five fiscal	years to im	plement the	e strategic plar	n;		
	(d) the rec	ulta of [tho N	NIM/N4O'cl n	ublic concul	tations hale	during the	last throa f	iccal voarc wit	h rospost		
	1	ters set out				a during the	i last tillee i	iscal years wit	ii respect		
	to the mat	ters set out	iii paragrap	ins (a) and (	D), unu						
	(e) the com	nments of th	ne Advisory	Council on	the matters	referred to	in paragra	ohs (a) to (d).			
						.6. 11 .1					
	•		-			-		-			ucted in the fall of itegic plan will be
		nder individ				onsuitation	s relateu to	issues beyond	i review or i	ille 5-year stra	itegic pian wiii be
	Camanlatia	a af (a):II .							:*:		
	Completion	n or (a) will i	not require	resources r	iew or addii	tional to the	ose required	l as part of the	e siting proc	ess.	
	Completion	n of (e) will i	require hirir	ng of extern	al writer to	support th	e Advisory (	Council, estima	ited at \$251	C per report.	
	·		·			• •	•	•			
	Costs relate	ed to transla	ation, mailir	ng, printing	will be capt	ured under	the respect	ive Communic	cation prog	ram elements	
Schodulo	Start Voas			36	2025			Einich Voor	OF	2004	
Schedule	Start Year			26	2035			Finish Year	85	2094	
Туре	Fixed										
Calculations			year strateg	gic plan, in t	he form of	directed dis	cussion gro	ups is estimat	ed to be \$1	00K per year (	2013, 2016, 2019,
and Notes:	2022, etc.)										
	•	riter to assi									
Labour (	Costs		al Costs		Costs		total	Allowance	25%		otal Cost
\$	-	\$		\$	2,500,000	\$	2,500,000	\$	625,000	\$	3,125,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	50	150					Prepared E	By:	J. Facella
WBS (Old)												
WBS Title	TRIENNIAL	REPORT										
Description		Triennial Rent approacl	-	quired by th	ie Nuclear F	uel Waste /	Act every th	ird year after	the Governi	nent Decisi	on on t	the
Deliverable	Triennial R	2014 to 2017 to 2020 to	2013 delive 2016 delive 2019 delive	ered in Mare ered in Mare ered in Mare ered in Mare	ch 2017 ch 2020							
Assumptions	last three fithose active aspirations  (b) [the NV Governor in the public the following captured under	nary of [the liscal years, ities on a consister of the lis	NWMO's] a including an including an including an including an including and including	ctivities resonally and of life or the next section 15 for the next ublic consumbs (a) and (Council on to meet (d) 019 and 20 m elements resources resources reg of externing	pecting the fany signific or on its soon five fiscal year or approved the fiscal distance of the matters of the matter of the matters of the matter of t	management cant socio-ectial, cultural ears to imples under subsystems to imples a referred to ectifically the consultation tional to the support the	ent of nucleaconomic efforcement the assection 20(s) plement the alast three and a review of the solution of t	ar fuel waste of fects of oic approach that 5); e strategic pla fiscal years with phs (a) to (d).	the  n; th respect  trategic pland review of the siting procession at \$250.	the 5-year s ess. <per report<="" td=""><td>trategi</td><td>ed in the fall of ic plan will be</td></per>	trategi	ed in the fall of ic plan will be
Schedule	Start Year			86	2095			Finish Year	155	2164		
Туре	Fixed											
Calculations and Notes:	2022, etc.)		•				J		ed to be \$1	00K per yea	ar (201	3, 2016, 2019,
Labour	•		al Costs		Costs		total	Allowance	25%		Total	Cost
\$	-	\$	-	\$	2,875,000	\$	2,875,000	\$	718,750	\$		3,593,750

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	60	70		İ			Prepared By:	J. Facella
WBS (Old)											
WBS Title	TRIENNIAL	REPORT									
Description	To prepare	Triennial R	eport as rec	uired by th	e Nuclear F	uel Waste	Act every th	ird year after t	he Governr	ment Decision	on the
2 000 mp 000 m		ent approacl	•	, u c u u , c		ac. waste.	ioc every circ	year areer e	3010		
Deliverable	Trionnial D		ha fallanda								
Deliverable	irieiiiiai k	eports for th 2011 to	2013 delive		h 2014						
			2016 delive								
		2017 to	2019 delive	red in Marc	ch 2020						
		2020 to	2022 delive	red in Marc	ch 2023						
	•	And so c	on indefinite	ely							
Assumptions	The Trienn	ial Report w	vill meet the	reguireme	nts set out	in the NFW	A and renea	ited below:			
	1	•		•			•	ar fuel waste d	uring the		
	last three f	iscal years,	including ar	n analysis of	any signific	cant socio-e	conomic ef	fects of	-		
		ities on a co	mmunity's	way of life	or on its soc	ial, cultura	l or econom	ic			
	aspirations	;									
	(b) [the NM	VMO'cl ctra	togic plan fo	or the next	five fiscal ve	arc to impl	amont the s	approach that	the		
	•	n Council se			-	-			tile		
					1-1			. , ,			
	(c) [the NW	/MO's] bud	get forecast	for the nex	ct five fiscal	years to im	plement the	e strategic plar	n;		
	(d) the rec	ulta of [the N	NIM/N4O'cl n	ublic concul	tations hale	during the	last throa f	iccal voarc wit	h rocoost		
	1	ters set out				a during the	i last tillee i	iscal years wit	ii respect		
	to the mat	ters set out	пт рагавгар	ins (a) and (	D), unu						
	(e) the com	nments of th	ne Advisory	Council on	the matters	referred to	o in paragra	phs (a) to (d).			
						.6. 11 .1					
	•		-			-		-			lucted in the fall of ategic plan will be
		nder individ				onsultation	s relateu to	issues beyond	i review or i	ille 5-year sur	ategic pian will be
	Camanlatia	a af (a):II .							:.:		
	Completion	n or (a) will i	not require	resources r	iew or addii	tional to the	ose required	l as part of the	siting proc	ess.	
	Completion	n of (e) will i	require hirir	ng of extern	nal writer to	support th	e Advisory (	Council, estima	ited at \$25k	K per report.	
	·		·			• •	•	•			
	Costs relate	ed to transla	ation, mailir	ng, printing	will be capt	ured under	the respect	tive Communic	cation prog	ram elements	
Schodulo	Start Voas			156	2165			Einich Voor	100	2100	
Schedule	Start Year			156	2165			Finish Year	180	2189	
Туре	Fixed										
Calculations			year strateg	gic plan, in t	he form of	directed di	scussion gro	ups is estimat	ed to be \$1	00K per year	(2013, 2016, 2019,
and Notes:	2022, etc.)										
	•	riter to assi									
Labour (	Costs		al Costs		Costs		total	Allowance	<b>25</b> %		otal Cost
\$	-	\$		\$	1,000,000	\$	1,000,000	\$	250,000	\$	1,250,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	70	10					Prepared By:	J. F	acella
WBS (Old)												
WBS Title	TRIENNIAL	REPORT										
Description		Triennial Ro	•	quired by th	e Nuclear F	uel Waste A	Act every th	ird year after t	he Governi	ment Decision	on the	
Deliverable	Triennial R	2014 to 2017 to 2020 to	2013 delive 2016 delive 2019 delive	ered in Mare ered in Mare ered in Mare ered in Mare	ch 2017 ch 2020							
Assumptions	last three for those active aspirations  (b) [the NV Governor in the context of the math captured under the following captured under the completion completion completion captured under the completion completion completion captured under the completion completion completion captured under the completion completion completion completion completion captured under the completion completion completion completion completion captured under the captured	nary of [the liscal years, in ities on a consister of the list of	NWMO's] a including an including an including an including an including an including and including and including and including and including and including and including and including and including and including and including and including an including	ctivities resonally and of life or the next section 15 for the next ublic consumbs (a) and (Council on to meet (d) 019 and 20 m elements resources resources reg of externing	pecting the fany signification on its social five fiscal year or approved the fiscal distance of the matters of above, special properties of the matter of the matters of the matter o	management and socio-ectial, cultural ears to imples under sub years to imples during the consultation tional to the support the	ent of nucleiconomic efforcement the assection 20(s) plement the last three for in paragra a review of the solution of the solution of the solution of the last three for in paragra are review of the solution of the solutio	ar fuel waste d fects of iic approach that	the  n; h respect  rategic plan review of  siting processions	the 5-year stra	ategic plar	
Schedule	Start Year			181	2190			Finish Year	181	2190		
				i								
Туре	Fixed											
Calculations and Notes:	2022, etc.)		,	Council in c	ompiling co		· ·	oups is estimate	ed to be \$1	00K per year (	2013, 201	16, 2019,
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	To	otal Cost	
\$	-	\$	-	\$	125,000	\$	125,000	\$	31,250	\$		156,250

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#### Work Element Definition Sheet

WBS (New)	561	05	10	10	20				Prepared By: J. Robinson
WBS (Old)					<u> </u>				
WBS Title	EXHIBITS A	ND EDUCAT	TION TOOLS	3					
Description						ty understanding of A initiatives in intereste			nent and the repository project. ties.
	Replicate e	existing mod	lules to allo	w concurre	ent use in up	to two communities,	events.		
	Develop ne Knowledge		to address	issues sucl	n as transpo	rtation, community w	ell-being, regu	latory proc	esses, Aboriginal Traditional
	-	-		_		itory designs evolve. Use interactive compone	-	DGR.	
	Develop tw	vo commun	ity-specific	fixed modu	iles for use i	n communities to sup	port feasibility	studies.	
	Design and	develop fix	ed exhibit	in intereste	d potential	host community as pa	rt of Centre of	Expertise.	
	Develop tr	aining modu	ule, educati	on materia	ls to suppor	t staff in the use of th	e exhibits.		
	Develop ed	ducation kit	to support	visitor exp	erience to th	ne exhibit.			
Deliverable		Replicate ning regions/			or use at co	nferences and in com	munities poter	ntially inter	ested in hosting the project and
		•				o be determined).			
	:	Two fixed omic impac		-	two potent	ial host communities	that have sites	undergoin	g detailed site investigations and
	•	p communition kit for v							
	•				ntre of Expe -style exhib				
Assumptions	Y01 to Y03	: 2 mobile e	xhibits to s	upport init	al screening	of 15 communities a	nd feasibility st	tudies in 10	potential sites
	Y02, develo	op two new	modules, \$	5100K					
	:					didate sites, 2 fixed ex c for fixed exhibits beg			efront office, with one module
	Modules in	Exhibit in p mobile exh rk for muse	nibits test c	oncepts to	be develope	ed for museum-style e	xhibits.		
	configurati		uding conte						K based on Welcome Tower nd hardware, crating and initial
	· Ad	dd new cha <sub>l</sub> dd new vide	oter to vide o or illustra	o \$10 to 12 ation to sys	tem, progra	ows: Eprogramming plus comming cost \$1 to 2K K programming cost	ntent develop	ment)	
	Cost for ea	ch new set	of 7 mobile	exhibit mo	odules: \$11		OGR display \$3	BOK	
		ed exhibit in							
Schedule	Start Year			1	2010		Finish Year	9	2018
Туре	Fixed								
		Don!! '		ata color	ovels the text	mante ard do 1	onosti 1	ntion '	iala ¢100V
and Notes:	2011 (Y02) 2011(Y02)	Develop tw	o new mod n and deve	dules \$1001	(	ments and develop su		ation mater	NUST¢ cibi
	2012 (Y03) 2013 (Y04)	Fixed Exhib Exhibit mai Exhibit mai	it developr ntenance a	nd update,	\$75K				
	2015 (Y06)	Exhibit ma	intenance a	and update	, \$50K	Cubtatal	Allowers	350/	Total Cast
\$	-	Materia \$		\$	1,067,745	\$ 1,067,745	Allowance \$	<b>25%</b> 266,936	\$ 1,334,681
									<u> </u>

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#### Work Element Definition Sheet

\$	-	\$	-	\$	300,000	\$ 300,000	\$	75,000	\$	375,00
Labour (		Materia		Othe	r Costs	Subtotal	Allowance	25%	Total Co	
		Exhibit mair Exhibit mair								
	2013 (Y04)	Exhibit main	ntenance a	ind update	, \$75K					
		Total \$680K Fixed Exhibi		ment comp	leted \$80K					
	2011(Y02)	Begin design	and deve			it for two communities	, \$400K			
	:	Replicate ex Develop two				ments and develop sup	porting educati	on mater	ials \$180K	
Туре	Fixed									
							······			
Schedule	Start Year			10	2019		Finish Year	15	2024	
	Cost of fixe	ed exhibit in o	communit	y, \$200K e	ach.					
	:					nment for the virtual D	GR display, \$30H	Κ.		
	Cost for ea	ch new set o	of 7 mobile	exhibit m	odules: \$11	5-140K				
	:					mming cost \$1 to 2K K programming cost				
	· A	dd new chap	ter to vide	o \$10 to 1	2K (\$ 4 to 6k	programming plus cou	ntent developm	ent)		
	Changes to	video comp	onents of	virtual DGI	R are as follo	ows:				
	•	in Toronto.			, 30318	, ,				J
	:					nformation, etc.) costs in, fabrication, comput				
	Design wo	k for museu	m-style ex	hibit begin	s in Y10.					
	Modules in		ibits test c	oncepts to	be develope	ed for museum-style ex	hibits.			
	:					didate sites, 2 fixed exl k for fixed exhibits beg			front office, with o	ne module
1		op two new i								
					ıaı screening	g of 15 communities an	u reasibility stud	uies in 10	potentiai sites	
A a a		ion kit for vi					d foodbille	dias :- 42	notontial -*	
	•	ım-style exhi								
		op communit ion kit for vi								
	:	Two fixed ex omic impact			two poten	tial host communities t	hat have sites u	ndergoin	g detailed site inves	stigations an
	Y02 (2011)	develop two	new mod	dules (Tran	sportation, t	o be determined).				
Deliverable		Replicate m ng regions/c			for use at co	nferences and in comn	nunities potenti	ally inter	ested in hosting the	project and
	ļ ,	lucation kit t								
	Develop tra	aining modul	le, educati	on materia	ils to suppor	t staff in the use of the	exhibits.			
						host community as par		xpertise.		
						in communities to supp				
						e interactive compone				
	-			_		itory designs evolve. U		GR.		
	Knowledge									
	:		to address	issues suc	h as transpo	rtation, community we	ell-being, regulat	tory proc	esses, Aboriginal Tr	aditional
	Replicate e	xisting modu	ules to allo	w concurr	ent use in up	to two communities/	events.			
	EXIIIDIUS WI	ii support en	igagement	ани сарас	ity building	initiatives in interested	potential nost t	commun	ues.	
Description						ty understanding of Ac				ory project.
WBS Title	EXHIBITS A	ND EDUCATI	ION TOOL	S						
WBS (Old)										
WBS (New)	561	05	10	20	270				Prepared By: J. F	Robinson

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	160				Prepared By	: J. Rob	inson
WBS (Old)	ļ										
WBS Title	CONTRACT	ED WRITING	G								
Description	- an -	To raise nong interes To build ing process	e the profile sted parties d awareness	and enhan s and under	ce the imag	ectivities that seek to: e and reputation of the r the important work the					
Deliverable	Profession	al Writing/C	Copy-Editing	, as require	d						
Assumptions	Work invol		•		•	e writing/copy-editing (i.e. copy editing of A			tion Plan etc.	)	
Schedule	Start Year			1	2010		Finish Year	9	2018		
Туре	Fixed										
Calculations and Notes:	•	pard approv	•		-	k; 2012 - 2014 \$165/a.					
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Т	otal Cost	
\$	-	\$	-	\$	1,445,000	\$ 1,445,000	\$	361,250	\$	•	1,806,250

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	150				Prepared By:	: J. Robii	nson
WBS (Old)	ļ										
WBS Title	CONTRACT	ED WRITING	G								
Description	- an -	To raise nong interes To build ing process	e the profile sted parties d awareness	and enhan s and under	ce the imag	ectivities that seek to: e and reputation of the r the important work IO and its activities.					
Deliverable	Profession	al Writing/C	Copy-Editing	, as require	d						
Assumptions	Work invol		•		•	le writing/copy-editin r (i.e. copy editing of A	_		tion Plan etc.	)	
Schedule	Start Year			10	2019		Finish Year	15	2024		
Туре	Fixed										
Calculations and Notes:	•	oard approv	•			k; 2012 - 2014 \$165/a	i.				
Labour (	•		al Costs		Costs	Subtotal	Allowance	25%	T	otal Cost	
\$	-	\$	-	\$	990,000	\$ 990,000	\$	247,500	\$	1	,237,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	130				Prepared By: J. Robinson	1
WBS (Old)				A	<u> </u>					
WBS Title	CONTRACT	ED WRITING	3							
Description	- ar -	To raise nong interes To build ing process.	the profile sted parties d awareness	and enhan s and under	ce the imag	·		J	ment Organization (NWMO)  y the NWMO, in particular th	 1e
Deliverable	Profession	al Writing/C	opy-Editing	, as require	ed					
Assumptions	Work invol		•		•	e writing/copy-editing (i.e. copy editing of A	•		ition Plan etc.)	
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	:	pard approve	•			k; 2012 - 2014 \$165/a				
Labour	Costs	Materia	al Costs	Other	r Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	1,650,000	\$ 1,650,000	\$	412,500	\$ 2,062	2,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	40	80					Prepared By:	J. Robinson
WBS (Old)					<u></u>						
WBS Title	CONTRACT	ED WRITING	3								
Description	- ar -	To raise mong interes To build ting process	the profile sted parties d awareness	and enhan s and under	ce the imag	ctivities that se e and reputation the important O and its activit	n of the work th		J	J	,
Deliverable	Profession	al Writing/C	opy-Editing	, as require	ed						
Assumptions	Work invo		•		•	e writing/copy-	•			tion Plan etc.)	
Schedule	Start Year			26	2035			Finish Year	85	2094	
Туре	Fixed										
Calculations and Notes:	:	oard approve	_			k; 2012 - 2014 \$	3165/a.				
Labour	Costs	Materia	al Costs	Other	r Costs	Subtota	I	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	9,900,000	\$ 9,90	00,000	\$	2,475,000	\$	12,375,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	170				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA MC	NITORING								
Description	Support th	e NWMO's	communica	ation and en	gagement k	by tracking media on a	consistent and	d on-going b	oasis.	
Deliverable	Engage me	dia monitor	ring service	s to provide	copies of m	nedia references of the	NWMO in pri	nt or electr	onic formats.	
Assumptions	Media mor		vities will ir	ncrease as th	ne NWMO g	generates more media	attention on a	local level	through the im	plementation of
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	Ē			2010 \$65K/y f spending, 6		50k/year; 2012 & 2014	\$65k/year			
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%		tal Cost
\$	-	\$	-	\$	570,000	\$ 570,000	\$	142,500	\$	712,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	160				Prepared By:	J. Robinson
WBS (Old)		<u></u>		<u> </u>						
WBS Title	MEDIA MC	ONITORING								
Description	Support th	e NWMO's	communica	ntion and en	gagement k	by tracking media on a	consistent and	on-going b	asis.	
Deliverable	Engage me	edia monito	ring service	s to provide	copies of n	nedia references of the	NWMO in prir	nt or electro	onic formats.	
Assumptions	Media moi the siting ք	•	vities will ir	ncrease as tl	ne NWMO g	generates more media a	attention on a	local level t	through the im	plementation of
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:	<b>=</b>	pard approv 015-2094, sa	•			550k/year; 2012 & 2014	\$65k/year			
Labour (	Costs	Materi	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	390,000	\$ 390,000	\$	97,500	\$	487,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	140				Prepared By:	J. Robinson
WBS (Old)		<u></u>		<u></u>						
WBS Title	MEDIA MC	ONITORING								
Description	Support th	e NWMO's	communica	ation and er	ngagement b	by tracking media on a	consistent and	d on-going b	oasis.	
Deliverable	Engage me	edia monito	ring service	s to provide	e copies of n	nedia references of the	NWMO in pri	int or electro	onic formats.	
Assumptions	Media moi the siting ք	•	vities will ir	ncrease as t	he NWMO g	generates more media a	attention on a	ı local level t	through the in	nplementation of
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	<b>=</b>	pard approv 015-2094, sa	•			550k/year; 2012 & 2014	\$65k/year			
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	otal Cost
\$	-	\$	-	\$	650,000	\$ 650,000	\$	162,500	\$	812,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	40	90				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA MO	ONITORING								
Description	Support th	ne NWMO's	communica	ation and e	ngagement l	by tracking media on a	consistent and	d on-going b	oasis.	
Deliverable	Engage me	edia monito	ring service	s to provid	e copies of n	nedia references of the	NWMO in pri	int or electr	onic formats.	
Assumptions	Media mo		ivities will ir	ncrease as t	the NWMO g	generates more media a	attention on a	a local level	through the im	plementation of
Schedule	Start Year			20	6 2035		Finish Year	85	2094	
Туре	Fixed									
Calculations and Notes:	1	oard approv 015-2094, sa	•			\$50k/year; 2012 & 2014	\$65k/year			
Labour (	Costs	Materi	al Costs	Othe	er Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	3,900,000	\$ 3,900,000	\$	975,000	\$	4,875,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	180				Prepared By:	J. Robinson
WBS (Old)	ļ	<u> </u>	<u></u>	<u> </u>						
WBS Title	WEBSITE N	//AINTENAN	CE							
Description	Maintenar	ice, hosting	and refinen	nents to nw	/mo.ca on aı	n on-going basis.				
Deliverable	Hosting ag necessary.		tablished ar	nd maintain	ed with a w	eb-hosting company or	n an annual ba	asis. Review	v and update th	ne website as
Assumptions	•	0 0		•		Every 3 years, the NWN the site incorporates la			•	
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	· Вс	pard approvious and approvious approvious approvious approvious 2015-2094, sa	ed budget 2 ed budget 2	2011 \$25K 2012-2014 \$		nd 100K every third yea	ar			
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cast
			<u>u. costs</u>	0 (1.10		Jubiolai	7 tilo trailec	23/0	10	tal Cost

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	170				Prepared By	: J. Robinson
WBS (Old)		ļ	<u></u>							
WBS Title	WEBSITE N	/AINTENAN	CE							
Description	Maintenar	nce, hosting	and refiner	ments to nv	vmo.ca on a	n on-going basis.				
Deliverable	Hosting ag	reement es	tablished a	nd maintair	ned with a w	reb-hosting company (	on an annual b	pasis. Reviev	v and update	the website as
Assumptions	1	0 0		_		Every 3 years, the NW the site incorporates				
Schedule	Start Year			10	) 2019		Finish Year	15	2024	
Туре	Fixed									
I										
Calculations and Notes:	· Во	pard approvoard approvoard approvoard approvoard approvoard section (15-2094, sectio	ed budget 2 ed budget 2	2011 \$25K 2012-2014 :		and 100K every third y	ear			
	· Bo	pard approv pard approv 015-2094, sa	ed budget 2 ed budget 2	2011 \$25K 2012-2014 : f spending,		ind 100K every third y Subtotal	ear <b>Allowance</b>	25%	1	Total Cost

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	150					Prepared By:	J. Robinson
WBS (Old)		<u> </u>		<u> </u>							
WBS Title	WEBSITE N	/AINTENAN	CE								
Description	Maintenar	nce, hosting	and refiner	nents to nw	mo.ca on a	n on-going b	oasis.				
Deliverable	Hosting ag necessary.		tablished ar	nd maintain	ed with a w	eb-hosting (	company or	n an annual ba	asis. Review	v and update th	ne website as
Assumptions	=									a web develop tinues to be int	oment company to eresting and
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations	· Bo	oard approv	-	-							
and Notes:	· Bo	oard approve oard approve 015-2094, sa	ed budget 2	2012-2014 \$		nd 100K eve	ery third ye	ar			
Labour	· Bo	pard approv 015-2094, sa	ed budget 2	2012-2014 \$ spending, \$		nd 100K eve		ar Allowance	25%	То	tal Cost

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	40	100				Prepared By:	J. Robinson
WBS (Old)		ļ	<u></u>	<u></u>						
WBS Title	WEBSITE N	/AINTENAN	ICE							
Description	Maintenar	nce, hosting	and refinen	nents to nw	/mo.ca on a	n on-going basis.				
Deliverable	Hosting ag		tablished ar	nd maintain	ed with a w	eb-hosting company or	n an annual ba	asis. Review	v and update th	e website as
Assumptions	1	0 0		•		Every 3 years, the NWN the site incorporates la			•	
Schedule	Start Year			26	2035		Finish Year	85	2094	
Туре	Fixed									
Calculations and Notes:	· Во	pard approvoard approv	red budget 2 red budget 2 red budget 2 ame level of	2011 \$25K 2012-2014 \$	• •	nd 100K every third ye:	ar			
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
Ś		Ś		Ś	3,600,000	\$ 3,600,000	Ś	900,000	Ś	

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	190				Prepared By: J. Ro	binson
WBS (Old)										
	ļ									
WBS Title	DIRECTED	COMMUNIC	CATIONS							
•	Support the including:	Backgro Fact She	ounders eets how Booths		ngagement a	activities through th	e development o	f various co	rporate communicati	on collateral
Deliverable	•			Ο.	•	elopment, graphic d vith and contribute 1	•		a to provide written, o unications strategy.	ligital and
									e and different types sis as part of the sitin	
Schedule	Start Year				1 2010	)	Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	· 2 · 2 · 2 · 2	010 560K 011 360K 012 360K 013 360K 014 360K								
	· 2	)15-2094, sa )95-2164 - Y 165-2189 \$2	/155 \$100K/		360K/year					
Labour C	· 2	095-2164 - Y 165-2189 \$2	/155 \$100K/	/yr	360K/year	Subtotal	Allowance	25%	Total Cos	t

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### **Work Element Definition Sheet**

WBS (New)	561		05	10	20	180					Prepared By:	J. Robinson
WBS (Old)												
	<u> </u>											
WBS Title	DIRECTE	D C	OMMUNIC	CATIONS								
	ļ											
Description	Support		Backgro Fact She	unders eets now Booths		ngagement a	activities th	rough the d	evelopment o	of various co	rporate commu	unication collateral
Deliverable	multime	edia	communic	ations solu	tions that a	re aligned w	vith and co	ntribute to t	he overall NV	VMO commu	a to provide wri	
	:											ne siting process.
Schedule	Start Ye	ar			10	2019			Finish Year	15	2024	
Туре	Fixed											
Calculations and Notes:		201 201 201 201 201 201	95-2164 - Y	155 \$100K/	f spending,	360K/year						
Loherra	Costs	216	55-2189 \$2	ouk/yr al Costs	0+6-	r Costs	CL	total	Allowarss	25%	Total	tal Cost
Labour	Costs	{		ai CUSTS				total	Allowance			
\$	-		\$	-	\$	2,160,000	\$	2,160,000	\$	540,000	\$	2,700,000

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### **Work Element Definition Sheet**

WBS Title DIRECTED COMMUNICATIONS  Description Support the NWMO's communication and engagement activities through the development of various corporate communication including:  - Backgrounders - Fact Sheets - Trade Show Booths - Newsletters - Etc.  Deliverable	collateral
Description Support the NWMO's communication and engagement activities through the development of various corporate communication including:  Backgrounders Fact Sheets Trade Show Booths Newsletters Etc.  Deliverable	collateral
Description Support the NWMO's communication and engagement activities through the development of various corporate communication including:  Backgrounders Fact Sheets Trade Show Booths Newsletters Etc.  Deliverable	collateral
including:      Backgrounders     Fact Sheets     Trade Show Booths     Newsletters     Etc.  Deliverable	collateral
The communication collateral will bridge print, web development, graphic design, video and social media to provide written, dig multimedia communications solutions that are aligned with and contribute to the overall NWMO communications strategy.	ital and
Assumptions The NWMO will continue to develop corporate communication material at the same level as it has. More and different types of information will need to be made available as the NWMO begins to work with communities on a local basis as part of the siting process.	
Schedule Start Year 16 2025 Finish Year 25 2034	
Type Fixed	
Calculations and Notes:	
Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	
	4,500,000

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### **Work Element Definition Sheet**

	561	05	10		40	110					Prepai	ed By:	J. Robinso	n
WBS (Old)														
WBS Title	DIRECTE	COMMUN	IICATIONS											
Description	Support t including	Backg Fact S Trade	rounders		n and en	gagement	activities	through the d	evelopment	of various co	rporate	commi	unication co	llateral
Deliverable	•				• .	•	•	., graphic desi			•			and
Assumptions								naterial at the						cess.
Assumptions Schedule		on will nee				s the NWM	O begins				isis as p			cess.
	informati	on will nee			ilable a	s the NWM	O begins		communities	on a local ba	isis as p	art of th		cess.
Schedule	Start Yea Fixed  - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	010 560K 0010 360K 0011 360K 0012 360K 0013 360K 0014 360K 0015-2094,	same level	I of spe	26	2035	O begins		communities	on a local ba	isis as p	art of th		cess.
Schedule Type Calculations	Start Yea Fixed  - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	2010 560K 2011 360K 2012 360K 2013 360K 2014 360K 2014 360K 2015-2094, 2095-2164	same level	I of spe	26	2035	O begins		communities	on a local ba	isis as p	094		cess.

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	50	80					Prepared By	: J. Robinson
WBS (Old)				<u></u>							
,	<u> </u>										
WBS Title	DIRECTED	COMMUNIC	CATIONS								
Description	Support tl including:	Backgro Fact She	ounders eets how Booths		ngagement a	activities thro	ugh the de	evelopment (	of various co	rporate comi	munication collateral
Deliverable	•			<b>.</b>	-	elopment, gra				•	written, digital and ategy.
Assumptions						ication mater O begins to w					nt types of the siting process.
Schedule	Start Year			86	2095			Finish Year	155	2164	
Туре											
	Fixed										
Calculations and Notes:	· 2 · 2 · 2 · 2 · 2 · 2 · 2	010 560K 011 360K 012 360K 013 360K 014 360K 015-2094, sa 095-2164 - Y	/155 \$100K/		360K/year						
	· 2 · 2 · 2 · 2 · 2 · 2 · 2 · 2 · 2 · 2	011 360K 012 360K 013 360K 014 360K 015-2094, sa 095-2164 - Y 165-2189 \$2	/155 \$100K/	/yr	360K/year	Subto	otal	Allowance	25%		Fotal Cost

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	60	40					Prepared By: J. Robinson
WBS (Old)										
WBS Title	DIRECTE	COMMUNIC	CATIONS							
Description	Support t including	: Backgro Fact She	unders eets how Booths		gagement a	activities th	rough the do	evelopment c	of various co	rporate communication collateral
Deliverable	=									a to provide written, digital and unications strategy.
Assumptions	•									e and different types of sis as part of the siting process.
Schedule	Start Yea	r		156	2165			Finish Year	180	2189
Туре	Fixed									
Calculations and Notes:		2010 560K 2011 360K 2012 360K 2013 360K 2014 360K 2015-2094, sa 2095-2164 - Y 2165-2189 \$2	′155 \$100K/		360K/year					
Laberra	-		al Costs	Otha	r Costs	CL	total	Allowarss	250/	Total Cost
Labour							total	Allowance	25%	
\$	-	\$	-	\$	5,000,000	\$	5,000,000	\$	1,250,000	\$ 6,250,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	200				Prepared By: J. Robinson
WBS (Old)	ļ	<u></u>							
WBS Title	TRANSLAT	ION							
Description	Translation	n of all NWN	10 commur	ication ma	terial.				
Deliverable	Translate a	all NWMO co	ommunicati	on materia	l into Frencl	n. (i.e. print/audio/visu	al/website) in	to French.	
	full-time is	more cost-	efficient. De	epending o	n the comm				er whether hiring a translator o sis, translation into other
Schedule	Start Year			1	2010		Finish Year	9	2018
Туре	Fixed								
Calculations and Notes:	· 20	010, 220K 011, \$50k; 20 095 - 2189 \$	-	20K/year					
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,110,000	\$ 1,110,000	\$	277,500	\$ 1,387,50

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	190				Prepared By:	J. Robinson
WBS (Old)	0			<u></u>						
WBS Title	TRANSLATI	ION								
10000										
Description	Translation	of all NWM	ЛО commur	nication ma	terial.					
Deliverable	Translate a	ill NWMO co	ommunicat	ion materia	l into Frencl	n. (i.e. print/audio/visu	al/website) in	to French.		
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm	on an annual basis. The unities that the NWMC translation.				ŭ
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:	· 20	010, 220K 011, \$50k; 20	-							
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	tal Cost
\$	-	\$	-	\$	720,000	\$ 720,000	\$	180,000	\$	900,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	170				Prepared By: J. Robinson
WBS (Old)		ļ		<u></u>					
WBS Title	TRANSLAT	ION							
Description	Translation	n of all NWN	ЛО commur	nication ma	terial.				
Deliverable	Translate a	all NWMO co	ommunicati	ion materia	ll into French	n. (i.e. print/audio/visu	al/website) in	to French.	
Assumptions	full-time is	more cost-	efficient. D	epending o		unities that the NWMC			er whether hiring a translator on sis, translation into other
Schedule	Start Year			16	2025		Finish Year	25	2034
Туре	Fixed								
Calculations and Notes:	· 20	010, 220K 011, \$50k; 2 095 - 2189 \$	-	.20K/year					
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,200,000	\$ 1,200,000	\$	300,000	\$ 1,500,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	40	120				Prepared By: J. Robinson
WBS (Old)	<u></u>								
WBS Title	TRANSLATI	ON							
Description	Translation	of all NWM	10 commur	nication ma	terial.				
Deliverable	Translate a	ıll NWMO co	ommunicati	on materia	l into Frencl	n. (i.e. print/audio/visu	al/website) i	nto French.	
	full-time is	more cost-	efficient. De	epending o	n the comm				er whether hiring a translator on asis, translation into other
Schedule	Start Year			26	2035		Finish Year	85	2094
Туре	Fixed								
Calculations and Notes:	· 20	110, 220K 111, \$50k; 20	-	20K/year					
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	7,200,000	\$ 7,200,000	\$	1,800,000	\$ 9,000,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	50	90				Prepared By:	J. Robinson
WBS (Old)				<u> </u>						
WBS Title	TRANSLAT	ION								
Description	Translation	n of all NWN	ЛО commu	nication ma	terial.					
Deliverable	Translate a	all NWMO c	ommunicat	ion materia	l into Frenci	h. (i.e. print/audio/visu	al/website) in	ito French.		
Assumptions	full-time is	more cost-	efficient. D	Depending o	n the comm	on an annual basis. The nunities that the NWMO translation.				•
Schedule	Start Year			86	2095		Finish Year	155	2164	
Туре	Fixed									
Calculations and Notes:	· 20	010, 220K 011, \$50k; 2 095 - 2189 \$	-	120K/year						
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
			ui costs		. 00515	Jubiolai	Allowance	23/0		tai Cost

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	60	50				Prepared By:	J. Robinson
WBS (Old)			<u> </u>	<u></u>						
WBS Title	TRANSLAT	ION								
Description	Translation	of all NWM	ЛО commur	nication ma	terial.					
Deliverable	Translate a	ill NWMO co	ommunicat	ion materia	l into Frencl	h. (i.e. print/audio/visu	al/website) in	to French.		
Assumptions	full-time is	more cost-	efficient. D	epending o	n the comm	on an annual basis. The nunities that the NWMC translation.				•
Schedule	Start Year			156	2165		Finish Year	180	2189	
Туре	Fixed									
Calculations and Notes:	· 20	010, 220K 011, \$50k; 20 095 - 2189 \$	-	.20K/year						
Labour	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,000,000	\$ 1,000,000	\$	250,000	\$	1,250,000

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## **Work Element Definition Sheet**

	561	05	10	10	210	ļ			Prepared By:	J. Robinson
WBS (Old)				A	<u></u>	<u> </u>				
WBS Title	MEDIA REL	ATIONS								
Description	Media rela	tions activit	ies to supp	ort the NW	MO's comm	unication and engager	nent activities			
Deliverable	Developme	ent and exe	cution of m	edia relatio	ns activities	on a corporate and loc	cal basis.			
Assumptions										
·	Assumes th and execut		WMO work	s more clos	sely with cor	mmunities and regions	more detaile	d media rela	itions plans wi	ll be developed
Schedule	1		WMO work	s more clos	ely with cor	mmunities and regions	more detaile	d media rela	tions plans wi	ll be developed
Schedule Type	and execut		WMO work	s more clos		mmunities and regions,	······································	d media rela		ll be developed
Type Calculations	Start Year Fixed • Bo	ed.		1	2010 2011 2011 \$126K	mmunities and regions,	······································	d media rela		ll be developed
	Start Year Fixed  - Bo - 20	ard approvi	ed budget 2	1 2010 \$50K; spending,	2010 2011 2011 \$126K		······································	d media rela	2018	Il be developed

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## **Work Element Definition Sheet**

	561	05	10	20	200				Prepared By:	J. Robinson
WBS (Old)				<u> </u>						
WBS Title	MEDIA REL	ATIONS								
Description	Media rela	tions activit	ies to supp	ort the NW	MO's comm	unication and engager	nent activities.			
Deliverable	Developme	ent and exec	cution of m	edia relatio	ns activities	on a corporate and loc	cal basis.			
Assumptions										
	Assumes th and execut		WMO work	s more clos	ely with cor	mmunities and regions	, more detailed	l media rela	tions plans wi	ll be developed
Schedule			WMO work	s more clos	ely with cor	mmunities and regions	more detailed	l media rela	tions plans wi	ll be developed
Schedule Type	and execut		WMO work	s more clos		mmunities and regions	······································			ll be developed
Type Calculations	Start Year Fixed • Bo	ed.	ed budget 2	10 2010 \$50K;	2019 2011 2011 \$126K	; 2012 - 2014 \$50K.	······································			ll be developed
	Start Year Fixed  - Bo - 20	ard approvi	ed budget 2	10 2010 \$50K; 5 spending,	2019 2011 2011 \$126K		······································		2024	Il be developed

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	180				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MEDIA REL	ATIONS								
Description	Media rela	tions activit	ies to supp	ort the NWI	MO's comm	unication and engager	nent activities			
Deliverable	Developme	ent and exec	cution of m	edia relatio	ns activities	on a corporate and loc	cal basis.			
Assumptions	Assumes th		WMO work	s more clos	ely with cor	mmunities and regions,	, more detaile	d media rela	tions plans wi	ll be developed
	•									
Schedule	Start Year			16	2025		Finish Year	25	2034	
Schedule Type	Start Year Fixed			16	2025		Finish Year	25	2034	
	Fixed · Bo	oard approve 15-2094, sa	•	2010 \$50K;	2011 \$126K	; 2012 - 2014 \$50K.	Finish Year	25	2034	
Type Calculations	Fixed - Bc		me level of	2010 \$50K; i	2011 \$126K	; 2012 - 2014 \$50K. Subtotal	Finish Year  Allowance	25 25%		tal Cost

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	130				Prepared By:	J. Robinson
WBS (Old)		<u></u>		<u> </u>						
WBS Title	MEDIA REI	LATIONS								
Description	Media rela	itions activit	ies to supp	ort the NWI	MO's comm	unication and engagen	nent activities			
Deliverable	Developm	ent and exe	cution of m	edia relatio	ns activities	on a corporate and loc	al basis.			
Assumptions	Assumes t		WMO work	s more clos	ely with cor	mmunities and regions,	more detaile	d media rela	ations plans wil	l be developed
Schedule	Start Year			26	2035		Finish Year	85	2094	
Туре	Fixed									
Calculations and Notes:	Ē	oard approve 015-2094, sa	-		-	; 2012 - 2014 \$50K.				
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	3,000,000	\$ 3,000,000	\$	750,000	\$	3,750,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	220					Prepared By: J. Robinson
WBS (Old)										
WBS Title	CORPORAT	E CITIZENSI	НР							
		r Waste Ma n's brand a		Organizatio	n (NWMO)	has develo	ped and imp	olemented a C	orporate Ci	tizenship Program to enhance the
Deliverable	Develop th	e focus for t	the Corpora	te Citizensł	nip Program	on an ann	ual basis inc	luding themes	s for suppor	t.
·	The scope f	The APM for NWMO': putation loo 2008-20	I project is s corporate cally throug 10: focused	framed as a citizenship h a series o on 4 provi	i national in investment f investmer nces; going	frastructur ss are anch nts forward, re	ored around	t its impact is identifying in nat the scope o	itiatives tha	ocal level It build our brand nationally, and ical focus may shift
Schedule	Start Year			1	2010			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:		ard approve	_							
Labour C	osts	Materia	al Costs	Other	Costs	Sul	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,800,000	\$	1,800,000	\$	450,000	\$ 2,250,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	210					Prepared By: J. Robinson
WBS (Old)										
WBS Title	CORPORAT	E CITIZENSI	НР							
Description		r Waste Ma n's brand a		Organizatio	n (NWMO)	has develope	d and imp	elemented a C	orporate Ci	tizenship Program to enhance the
Deliverable	Develop th	e focus for t	the Corpora	te Citizensl	nip Program	on an annua	basis incl	luding themes	for suppor	t.
·		The APM for NWMO': putation loo 2008-20	I project is s corporate cally throug 10: focused	framed as a citizenship h a series c on 4 provi	n national in investment of investmer nces; going	s are anchore	roject bud d around	t its impact is identifying in lat the scope o	itiatives tha	ocal level t build our brand nationally, and ical focus may shift
Schedule	Start Year			10	2019			Finish Year	15	2024
Туре	Fixed									
Calculations and Notes:		ard approve	_		• •					
Labour C	Costs	Materia	al Costs	Othe	Costs	Subto	tal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,200,000	\$ 1	200,000	\$	300,000	\$ 1,500,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	190					Prepared By: J. Robinson
WBS (Old)										
WBS Title	CORPORAT	E CITIZENSI	НР							
Description	The Nuclea organizatio			Organizatio	n (NWMO)	has develo	oed and imp	olemented a C	orporate Ci	tizenship Program to enhance the
Deliverable	Develop th	e focus for t	the Corpora	te Citizensł	nip Program	on an ann	ual basis inc	luding themes	s for suppor	t.
·	The NWMC  The scope if earn our re	The APM for NWMO': putation loo 2008-20	I project is s corporate cally throug 10: focused	framed as a citizenship h a series o on 4 provi	national in investment f investmer	frastructur ss are ancho nts forward, re	e project bu red around cognition th	t its impact is identifying in nat the scope o	itiatives tha	ocal level It build our brand nationally, and iical focus may shift
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
Calculations and Notes:		ard approve	_							
Labour C	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$	2,000,000	\$	2,000,000	\$	500,000	\$ 2,500,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	140					Prepared By: J. Robinson
WBS (Old)							A			
WBS Title	CORPORAT	E CITIZENSI	НР							
Description	The Nuclea organizatio			Organizatio	n (NWMO)	has develo	oed and imp	olemented a	Corporate Ci	tizenship Program to enhance the
Deliverable	Develop th	e focus for t	the Corpora	te Citizensł	nip Program	on an ann	ual basis inc	luding theme	es for suppor	t.
·	The NWMC  The scope if earn our re	The APM for NWMO': putation loo 2008-20	I project is s corporate cally throug 10: focused	framed as a citizenship h a series o on 4 provi	national in investment f investmer	frastructur ss are ancho nts forward, re	e project bu red around cognition th	t its impact is identifying in	nitiatives tha	ocal level It build our brand nationally, and ical focus may shift
Schedule	Start Year			26	2035			Finish Year	85	2094
Туре	Fixed									
Calculations and Notes:		ard approve	_							
Labour C	costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$ 1	12,000,000	\$	12,000,000	\$	3,000,000	\$ 15,000,000

561.05.10.40.140 203 of 278

## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	230				Prepared By:	J. Robinson
WBS (Old)				<u></u>						
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailin	ıgs.						
Deliverable	The NWM	O has a suite	e of corpora	ite commui	nication mat	erial that is mailed to t	hose individu	uals on the N	WMO mailing l	ist.
Assumptions	<u> </u>				tters, Impler	nentation Plan (2) etc. ist.	Costs are ex	pected to ris	e with the cost	of postage rising
Schedule	Start Year			1	. 2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	· 20	010 \$50K; 20 015-2094, sa 06 - Y180 \$10	me level of							
Labour	Costs		al Costs		r Costs	Subtotal	Allowance	25%		tal Cost
\$	-	\$	-	\$	440,000	\$ 440,000	\$	110,000	\$	550,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	220				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailin	ıgs.						
Deliverable	The NWM	O has a suite	e of corpora	ite commur	nication mat	erial that is mailed to 1	those individu	uals on the N	WMO mailing l	ist.
Assumptions	•				tters, Impler	nentation Plan (2) etc. st.	Costs are ex	pected to ris	e with the cost	of postage rising
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:	· 20	010 \$50K; 20 015-2094, sa 86 - Y180 \$10	me level of							
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	tal Cost
\$	-	\$	-	\$	300,000	\$ 300,000	\$	75,000	\$	375,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	200				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailin	ngs.						
Deliverable	The NWM	O has a suite	e of corpora	ate commu	nication mat	erial that is mailed to t	hose individu	ials on the N	WMO mailing l	ist.
Assumptions	•	•	•	•	tters, Impler	nentation Plan (2) etc. st.	Costs are ex	pected to ris	e with the cost	of postage rising
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	· 20	010 \$50к; 20 015-2094, sa 86 - Y180 \$10	me level of							
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	tal Cost
\$	-	\$	-	\$	500,000	\$ 500,000	\$	125,000	\$	625,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	150				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailir	ıgs.						
Deliverable	The NWM	O has a suite	e of corpora	ite commu	nication mat	erial that is mailed to t	hose individu	uals on the N	WMO mailing l	list.
Assumptions	<u> </u>				tters, Impler MO mailing li	mentation Plan (2) etc. ist.	Costs are ex	pected to ris	e with the cost	of postage rising
Schedule	Start Year			26	5 2035		Finish Year	85	2094	
Туре	Fixed									
Calculations and Notes:	· 20	010 \$50K; 20 015-2094, sa 86 - Y180 \$10	me level of							
Labour	Costs		al Costs		r Costs	Subtotal	Allowance	25%		tal Cost
\$	-	\$	-	\$	3,000,000	\$ 3,000,000	\$	750,000	\$	3,750,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	50	120				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of po	stage for NW	VMO mailir	ngs.						
Deliverable	The NWM	O has a suite	of corpora	ate commu	nication mat	erial that is mailed to t	hose individu	ials on the N	WMO mailing l	list.
Assumptions	•	nailing of An the number	•	•		nentation Plan (2) etc. st.	Costs are ex	pected to ris	e with the cost	of postage rising
Schedule	Start Year			86	2095		Finish Year	155	2164	
Туре	Fixed									
Calculations and Notes:	· 20	010 \$50K; 20 015-2094, sa 36 - Y180 \$10	me level of							
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	700,000	\$ 700,000	\$	175,000	\$	875,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	60	60				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	MAILING									
Description	Cost of pos	stage for NV	VMO mailin	ıgs.						
Deliverable	The NWM	O has a suite	e of corpora	ite commur	nication mat	erial that is mailed to	those individ	uals on the N	WMO mailing l	ist.
Assumptions	·	•	•	•	tters, Impler	nentation Plan (2) et st.	c. Costs are ex	spected to ris	e with the cost	of postage rising
Schedule	Start Year			156	2165		Finish Year	180	2189	
Туре	Fixed									
Calculations and Notes:	· 20	010 \$50к; 20 015-2094, sa 86 - Y180 \$1	me level of							
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	250,000	\$ 250,00	0 \$	62,500	\$	312,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	240				Prepared By: J. Robin	son
WBS (Old)		ļ								
WBS Title	PREMIUM	PROGRAM								
Description	•	ogram of sm ations and e		, .	omotional pi	roducts at conferences	, trade shows	etc. Intend	ed to support the organi	zation's
Deliverable	Develop a	comprehen	sive premiu	m program	with a suite	e of giveaways (pens, cl	othing etc.)			
Assumptions	<u> </u>	hat the pren			onstant but	that more products m	ay be required	d due to inc	reased level of activities	at the
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	1	oard approv 015-2094, sa	•			2012 - 2014 \$75K/year				
Labour (	Costs	Materi	al Costs	Other	Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	650,000	\$ 650,000	\$	162,500	\$	812,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	230				Prepared By:	J. Robinson
WBS (Old)										
WBS Title	PREMIUM	PROGRAM								
Description	NWMO pro	•			omotional p	roducts at conferences,	, trade shows	etc. Intend	ed to support th	ne organization's
Deliverable	Develop a d	comprehens	sive premiu	m program	with a suite	e of giveaways (pens, cl	othing etc.)			
Assumptions	Assumes th	•			onstant but	that more products ma	ay be require	d due to inc	reased level of a	activities at the
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:	•	ard approve	•			2012 - 2014 \$75K/year				
Labour	Costs	Materia	al Costs	Othe	Costs	Subtotal	Allowance	25%	Tota	al Cost
\$	-	\$	-	\$	450,000	\$ 450,000	\$	112,500	\$	562,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	210				Prepared By: J. Rol	oinson
WBS (Old)		<u> </u>		<u> </u>						
WBS Title	PREMIUM	PROGRAM								
Description	1	ogram of sm ations and e			omotional p	roducts at conferences	, trade shows e	etc. Intend	ed to support the orga	anization's
Deliverable	Develop a	comprehens	sive premiu	m program	with a suite	e of giveaways (pens, cl	othing etc.)			
Assumptions	1	hat the pren			onstant but	that more products m	ay be required	due to inc	reased level of activition	es at the
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	•	oard approve 015-2094, sa	-			2012 - 2014 \$75K/year				
Labour	Costs	Materi	al Costs	Othe	Costs	Subtotal	Allowance	25%	Total Cost	
\$	-	\$	-	\$	750,000	\$ 750,000	\$	187,500	\$	937,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	160				Prepared By:	J. Robinson
WBS (Old)		<u></u>	<u> </u>		<u></u>					
WBS Title	PREMIUM	PROGRAM								
Description	•	ogram of sm ations and e			omotional p	roducts at conferences	, trade shows	etc. Intend	ed to support t	he organization's
Deliverable	Develop a	comprehen	sive premiu	m program	with a suite	e of giveaways (pens, cl	othing etc.)			
Assumptions	1	hat the pren			onstant but	that more products m	ay be required	due to inc	reased level of	activities at the
Schedule	Start Year			26	2035		Finish Year	85	2094	
Туре	Fixed									
Calculations and Notes:	•	oard approv 015-2094, sa	-			2012 - 2014 \$75K/year				
Labour	Costs	Materi	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	4,500,000	\$ 4,500,000	\$	1,125,000	\$	5,625,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	250				Prepared By:	J Robinson
WBS (Old)										
WBS Title	YOUTH CO	MMUNICAT	IONS							
Description						on the work of the NV anagement of used nu		ong-term ma	anagement of	used nuclear fuel
Deliverable	Annual You	uth Engagen	nent Progra	m						
	•									
Assumptions	•	nat as the N and execut		s more clos	sely with co	mmunities and regions	s, a more detai	ed local you	uth engageme	nt program will be
	•			s more clos	sely with co		, a more detai	ed local you	uth engageme	nt program will be
Assumptions Schedule Type	developed			s more clos						nt program will be
Schedule Type Calculations	developed  Start Year	and execut		s more clos						nt program will be
Schedule	Start Year Fixed 2010, 1600	and execut	ed.	1					2018	nt program will be

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	240					Prepared By:	J Robins	son
WBS (Old)						ļ						
WBS Title	ҮОИТН СО	MMUNICAT	IONS									
Description	•		•	•			work of the NW ment of used nuc		ong-term m	anagement of	used nucle	ear fuel
Deliverable	Annual You	uth Engagen	nent Progra	m								
Assumptions	1	nat as the N and execut		s more clos	ely with co	mmun	ities and regions,	a more detail	ed local yo	uth engageme	nt program	n will be
Schedule	Start Year			10	2019			Finish Year	15	2024		
Туре	Fixed											
Calculations and Notes:	2010, 160k 2011-2034											
Labour		Materia	al Costs	Othe	r Costs		Subtotal	Allowance	25%	To	tal Cost	
\$	-	\$	-	\$	600,000	\$	600,000	\$	150,000	\$		750,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	220					Prepared By:	J Robinson
WBS (Old)											
WBS Title	YOUTH CO	MMUNICAT	IONS								
Description	•		•	•			work of the NW ment of used nuc		ng-term ma	anagement of	used nuclear fuel
Deliverable	Annual You	uth Engagen	nent Progra	ım							
Assumptions	·	hat as the N' and execute		s more clos	sely with co	mmuni	ities and regions,	a more detail	ed local yo	uth engageme	nt program will be
Schedule	Start Year			16	2025	<u> </u>		Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	2010, 160k 2011-2034										
Labour	•	Materia	al Costs	Othe	r Costs		Subtotal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,000,000	\$	1,000,000	\$	250,000	\$	1,250,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	90				Prepared By:	J. Robinson, P. Patton
WBS (Old)										
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCT	ION				
Description	site selecti	,	in understa	nding the N	WMO, the	that will be used to ass ong-term managemen ns.	•			•
Deliverable	- T - Y commu - Y	ranslation of 2-3: Engage inication mar4 onwards:	of appropria with Abori aterial is cul communica	ginal peoplo turally appr ation mater	s into Abori es in the are opriate; de ials develop	I use that explain the very ginal languages commenters of potential host convelopment of materials of materials of the specific to Abori, ging community members.	on to the poter ommunities inv s ginal communi	ntial host co	ommunity regionsisticated in the second second in the second second in the second second in the seco	on o ensure that
Assumptions	- T - C	ranslators i Developmen ndependent	n appropria it, printing a t contractor	te language and product s to Aborigi	es ion of writt nal commu	en, visual, web-based a nities to assist commu on and operation to as	and interactive	e communice	eloping appro	priate material
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	Y1-Y15: \$1 Y16-Y85: \$ Y86 - Y155 Y156 - Y18	100,000 \$10K/yr	year							
Labour (	i Costs	Materi	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,125,000	\$ 1,125,000	\$	281,250	\$	1,406,250

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	90					Prepared By:	J. Robinson, P. Patton
WBS (Old)				Q							
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCT	ION					
Description	site selecti	,	n understa	nding the N	WMO, the	long-term m		•			fected through the ected Aboriginal
Deliverable	- T - Y commu - Y	ranslation of 2-3: Engage inication marks	of appropria with Abori aterial is cul communica	ginal peoplo turally appr ation mater	s into Abori es in the are opriate; de ials develop	iginal langua eas of poter velopment o	nges commo tial host co of materials fic to Aborig	on to the pote	ntial host co	ommunity region	
Assumptions	- T - D	ranslators i Developmen ndependent	n appropria t, printing a contractor	te language and product s to Aborigi	es ion of writt nal commu	en, visual, v	veb-based a	nities in reviev	e communic ving and dev	ation products veloping appro ting with local	priate material
Schedule	Start Year			10	2019	)		Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:	Y1-Y15: \$1 Y16-Y85: \$ Y86 - Y155 Y156 - Y18	100,000 \$10K/yr	year								
Labour (	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	600,000	\$	600,000	\$	150,000	\$	750,000

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## **Work Element Definition Sheet**

WBS (Old)	·		Ē								J. Robinson, P. Patton
	<u> </u>										
WBS Title	ABORIGINA	AL COMMU	NICATIONS	– MATERIA	L PRODUCTI	ION					
Description	site selecti	on process	in understa	nding the N		long-term mana		0 .	•		fected through the ected Aboriginal
Deliverable	- II	ndividual co	mmunicati	on products	for general	l use that explai	n the va	rious compon	ents of the	NWMO's work	c – DVD, brochures.
	- т	ranslation o	of appropria	ate material	s into Abori	ginal languages	commo	n to the pote	ntial host co	ommunity region	on
	:	0 0		•		eas of potential velopment of m		nmunities inv	olved in Fe	asibility Study 1	o ensure that
	- Y	'4 onwards:	communic	ation mater	ials develop	oment specific to	o Aborig	inal communi	ties in area	s undergoing D	etailed Analysis
	- Т	ranslators t	ravelling w	ith NWMO	when engag	ing community	membe	rs			
Assumptions	- T	ranslators i Developmer	n appropria it, printing a	ite language and product	es tion of writt	ing in designing en, visual, web- nities to assist c	based a	nd interactive	communic	•	
	- T	ranslation s	services will	continue ir	n constructio	on and operatio	n to ass	ist NWMO in (	communica	ting with local	communities
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	Y1-Y15: \$1	25,000 per	year								
	Y16-Y85: \$ Y86 - Y155 Y156 - Y18	\$10K/yr									
Labour C	Costs	Materi	al Costs	Othe	r Costs	Subtota	ı	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,000,000	\$ 1,00	00,000	\$	250,000	\$	1,250,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	40	20					Prepared By:	J. Robinson, P. Patton
WBS (Old)										å	
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCT	ION					
Description	site selecti	,	in understa	nding the N	WMO, the	long-term n		U			ffected through the ected Aboriginal
Deliverable	- lı	ndividual co	mmunicatio	on products	for genera	l use that e	xplain the va	arious compo	nents of the	e NWMO's wor	k – DVD, brochures
	- Т	ranslation o	of appropria	ate materia	ls into Abor	iginal langu	ages commo	on to the pot	ential host c	ommunity regi	on
	:	0 0		•		•	ntial host co of materials		volved in Fe	asibility Study	to ensure that
	- Y	4 onwards:	communica	ation mater	ials develop	oment speci	ific to Abori	ginal commui	nities in area	as undergoing [	Detailed Analysis
	- Т	ranslators t	ravelling w	ith NWMO	when engag	ging commu	ınity membe	ers			
Assumptions	- T	ranslators i Developmen	n appropria t, printing a	ite language and product	es tion of writt	en, visual, v	web-based a		e communic	cation products	priate material
	- T	ranslation s	ervices will	continue ir	n constructi	on and ope	ration to ass	sist NWMO in	n communica	ating with local	communities
Schedule	Start Year			26	2035			Finish Year	85	2094	
Туре	Fixed										
Calculations and Notes:	Y1-Y15: \$1	25,000 per	year								
	Y16-Y85: \$ Y86 - Y155 Y156 - Y18	\$10K/yr									
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	6,000,000	\$	6,000,000	\$	1,500,000	\$	7,500,000

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## **Work Element Definition Sheet**

<b>Description</b> D	Develop cu site selectio peoples are - Ir - T	llturally-app on process i e involved a ndividual co	ropriate co n understa nd able to i	mmunication nding the N make inforn	WMO, the I	that will be use			•			
<b>Description</b> D si	Develop cu site selectio peoples are - Ir - T	llturally-app on process i e involved a ndividual co	ropriate co n understa nd able to i	mmunication nding the N make inforn	on material WMO, the I ned decision	that will be use			•			
<b>Description</b> D	Develop cu site selectio peoples are - Ir - T	llturally-app on process i e involved a ndividual co	ropriate co n understa nd able to i	mmunication nding the N make inforn	on material WMO, the I ned decision	that will be use			•			•
si p	esite selectione see ples are les les les les les les les les les le	on process i e involved a individual co ranslation o	n understa nd able to i	nding the N make inforn	WMO, the I	long-term man			•			•
Deliverable	- T - Y	ranslation o		on products	for general							
	- Y				- 0	l use that expla	in the va	rious compon	ents of the	NWMO's work	c – DVD, bro	chures.
			of appropria	ite material	s into Abori	ginal language	s commo	n to the poter	ntial host co	ommunity regio	on	
ı	commu	0 0		•		eas of potentia velopment of n		nmunities inv	olved in Fea	asibility Study t	to ensure th	ıat
	- Y	4 onwards:	communica	ation mater	ials develop	oment specific t	to Aborig	inal communi	ties in area	s undergoing D	etailed Ana	ılysis
	- Т	ranslators t	ravelling wi	ith NWMO	when engag	ging community	, membe	rs				
Assumptions	- T - D	ranslators in evelopmen	n appropria t, printing a	te language and product	es ion of writte	ing in designin en, visual, web nities to assist	-based aı	nd interactive	communic	•		erial
	- T	ranslation s	ervices will	continue ir	construction	on and operation	on to assi	ist NWMO in o	communica	ting with local	communitie	es
<b>Schedule</b> S	Start Year			86	2095			Finish Year	155	2164		
<b>Type</b> F	ixed											
Calculations Y and Notes:	/1-Y15: \$1	25,000 per <sub>\</sub>	/ear									
Y	/16-Y85: \$: /86 - Y155 /156 - Y18(	\$10K/yr										
Labour Co	osts	Materia	al Costs	Other	Costs	Subtot	al	Allowance	25%	То	tal Cost	
\$		\$	-	\$	700,000	\$ 7	700,000	Ś	175,000	Ś	8	375,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	60	20				Prepared By:	J. Robinson, P. Patton
WBS (Old)										
WBS Title	ABORIGINA	AL COMMUI	NICATIONS	– MATERIA	L PRODUCT	ION				
Description	site selecti	on process i	n understa		WMO, the	that will be used to as long-term manageme ns.	•			•
Deliverable	- T - Y commu - Y	ranslation of 2-3: Engage inication mar4 onwards:	of appropria with Abori aterial is cul communica	ginal peoplo turally appr ation mater	s into Abori es in the are opriate; de ials develop	I use that explain the ginal languages comn eas of potential host of velopment of material ment specific to Aborting community memb	non to the pote ommunities inv Is iginal commun	ential host co	ommunity region	on so ensure that
Assumptions	- T - C	ranslators i Developmen ndependent	n appropria t, printing a contractor	te language and product s to Aborigi	es ion of writt nal commu	ing in designing cultu en, visual, web-based nities to assist commu on and operation to a	and interactive	e communications and dev	veloping appro	priate material
Schedule	Start Year			156	2165		Finish Year	180	2189	
Туре	Fixed									
Calculations and Notes:	Y1-Y15: \$1 Y16-Y85: \$ Y86 - Y155 Y156 - Y18	100,000 \$10K/yr	year							
Labour (	Costs	Materi	al Costs	Other	Costs	Subtotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	625,000	\$ 625,000	) \$	156,250	\$	781,250

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	40					Prepared By	P. Patton
WBS (Old)											
***************************************	<u> </u>										
WBS Title	NATIONAL	ABORIGINA	L ORGANIZ	ATIONS							
Description	with the N' involved w	WMO on ar ith the NWI	ongoing ba	asis to provi nal Aborigina	de insight o al organizat	n all phases ions will wa	of the proj nt to ensure	ject and to su	pport their i	member orga own fulfill the	work, to engage nizations in being duty to consult and
	: · ·	national Ab managemer		•	will require	consistent (	contact/liais	on with the I	NWMO and	internal capa	city regarding the
Deliverable	- A	nnual brief	ings and tra	ining of nat	ional Abori	ginal organi	zation core	staff.			
	•		_	_	organizatio	_					
	- C	Organization	input to N	WMO docu	ments and p	orojects as r	equested o	ver time			
Assumptions	- 1	lational Abo	original orga	anizations h	ave limited	capacity to	sustain invo	olvement on t	this subject o	over the very	long term
	- F consiste adminis - N consult - F	unds will be ent liaison v strative expo lational org and accom unds will be	e required to vith the NW enses. anizations v modate e required t	o ensure the MO; this will request through at le	ill normally funds to co	Aboriginal of the interpreed of the interpreed of the indepter of the inning of the indext inning of the inning of	rganization ted as the n endent reso e project Y2	s are able to need for partice earch and/or	al funding of observation	a liaison pers	to maintain a son and associated fillment of duty to ded period at least
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	sessions w Y1-Y2 (201 Y3-5 (2012 Y 6-Y9 (201 Y10-Y15 (2	ith NWMO: 0-2011): \$5 -2014): \$46 15-2018): \$5 019-2024):	20K – Years 0K - Years o 330K per ye \$340K per y	of capacity of capacity b ar – Negotia year - Negot	building, supuilding, sup	upport and opport and meements and reements and reements and reements a	monitoring onitoring N d EA proces	NWMO commi WMO commi s will be scru	mitments & actionized close	action tion ly	ation, training
Labour (			al Costs		Costs		total	Allowance	25%	Т	otal Cost
		\$		\$	4,540,000						

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	40					Prepared By:	P. Patton
WBS (Old)				<u></u>							
	ļ					***************************************					
WBS Title	NATIONAL	ABORIGINA	AL ORGANIZ	ATIONS							
Description	with the N' involved w	WMO on ar ith the NWI	n ongoing ba MO. Natior	asis to provi nal Aborigina	de insight o al organizat	n all phases ions will wa	of the pro nt to ensur	ject and to sup	port their i MO and Cr	member orgar own fulfill the	work, to engage nizations in being duty to consult and
	• ''			ganizations uclear fuel.	will require	consistent (	contact/liais	son with the N	IWMO and	internal capac	ity regarding the
Deliverable	- A	nnual brief	ings and tra	ining of nat	ional Abori	ginal organi	zation core	staff.			
	- 0	Consistent li	aison mech	anism with	organizatio	ns					
	- C	Organization	n input to N'	WMO docu	ments and p	orojects as r	equested o	ver time			
	ļ					***************************************	***************************************				
Assumptions	- N	lational Abo	original orga	anizations h	ave limited	capacity to	sustain invo	olvement on tl	nis subject (	over the very I	ong term
	- 1	IWMO will ı	need to ma	ke consider	able effort t	o ensure co	nsistent lia	ison			
	1		•			•	•	is are able to d			
	1			/MO; this w	ill normally	be interpre	ted as the r	need for partia	I funding of	f a liaison pers	on and associated
		strative exp									· · · · · · · · · · · · · · · · · · ·
	•	ational org and accom		will request	tunds to co	nduct indep	endent res	earch and/or o	observation	to ensure full	fillment of duty to
	:			hrough at le	ast the hea	inning of th	e project Y	1-6 and may h	e required (	over an extend	ded period at least
	•		•	nental Asses	_		. ,	1-0 and may b	e required (	over an extern	aca perioa at least
Schedule	Start Year			10	2019			Finish Year	15	2024	
	ļ										
Туре	Fixed										
Calculations	Individual	organization	n funding fo	r part of on	FTE along v	vith travel,	overhead e	xpenses, resea	rch/indepe	endent observ	ation, training
and Notes:	1	ith NWMO:	_	,	J	ŕ		•	•		
	Y1-Y2 (201	0-2011): \$5	20K – Years	of capacity	building. su	upport and	monitoring	NWMO comm	nitments &	action	
	•	•			٠.	• •	Ŭ	WMO commit			
					٠.	•	ū	s will be scrut			
	Y10-Y15 (2	019-2024):	\$340K per y	year - Negot	iation of ag	reements a	nd EA proce	ess will be scru	itinized clos	sely	
	Y16-Y25 (2			year – Moni	toring and o	bservation		1		1	
Labour	Costs		al Costs		Costs		total	Allowance	25%		otal Cost
\$	-	\$	-	\$	2,040,000	\$	2,040,000	\$	510,000	\$	2,550,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	20					Prepared By:	P. Patton
WBS (Old)											
WBS Title	NATIONAL	ABORIGINA	L ORGANIZ	ATIONS							
Description	with the N' involved w	WMO on an	ongoing ba	asis to provi Ial Aborigina	de insight o al organizat	n all phases ions will wa	of the proj nt to ensur	ject and to sup	port their r MO and Cro	member organiown fulfill the o	ork, to engage zations in being luty to consult and
	: · ·	national Ab managemer		•	will require	consistent (	contact/liai	son with the N	WMO and i	internal capaci	ty regarding the
Deliverable	- A	nnual brief	ings and tra	ining of nat	ional Abori	ginal organi	zation core	staff.			
	•	Consistent li	_	_	-	_					
	- C	Organization	input to N	WMO docui	ments and p	rojects as r	equested o	ver time			
Assumptions	- 1	lational Abo	original orga	nizations h	ave limited	capacity to	sustain invo	olvement on th	nis subject o	over the very lo	ong term
	- F consiste adminis - N consult - F	ent liaison w strative expo lational org and accom	e required to vith the NW enses. anizations v modate e required t	o ensure that YMO; this w will request hrough at le	at national national national nationally funds to contact the beg	Aboriginal of the interpreed of the interpreed of the indepter of the inning of the in	organization ted as the r pendent res e project Y:	is are able to dineed for partia	I funding of	to ensure fulfi	o maintain a on and associated Ilment of duty to ed period at least
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	sessions w Y1-Y2 (201 Y3-5 (2012 Y 6-Y9 (201 Y10-Y15 (2	ith NWMO: 0-2011): \$5 -2014): \$46 15-2018): \$5	20K – Years 0K - Years o 330K per ye \$340K per y	of capacity of capacity b ar – Negotia vear - Negot	building, su uilding, sup ation of agre iiation of ag	upport and opport and meements and reements and reements and reements a	monitoring onitoring N d EA proces	NWMO comm WMO commit s will be scrut less will be scru	nitments & a ments & ac inized close	tion ly	tion, training
Labour (			al Costs		Costs		total	Allowance	25%	То	tal Cost
\$		\$		\$	2,250,000	\$	2,250,000	Ś	562,500	\$	2,812,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	50					Prepared B	<b>y:</b> P. Patton
WBS (Old)											
WBS Title	ABORIGINA	AL PROVINIC	CAL ORGAN	IZATIONS							
Description	with the N' involved w	WMO on an	ongoing ba	asis to provi cial Aborigi	de insight o nal organiza	on all phase: ations will w	s of the proj ant to ensu	ect and to su	ipport their i IWMO and C	member org rown fulfill t	o's work, to engage anizations in being he duty to consult
	• ' '	-	Aboriginal ont of used n	_	s will requir	e consisten	t contact/lia	aison with the	e NWMO and	d internal ca	pacity regarding the
Deliverable	- II	nput to NW	ings and tra MO documente of proving	ents and pro	ojects as red	quested ove	er time	e staff.			
Assumptions	- P	rovincial Ab	ooriginal org	ganizations	have limited	d capacity t	o sustain inv	olvement or	this subject	over the ve	ry long term
	- F consiste adminis - F	unds will be ent liaison v strative expo unds will be	vith the NW enses.	o ensure the 'MO; this w	at provincia ill normally east the beg	I Aboriginal be interpre inning of th	organizatio ted as the p	ons are able t partial funding	g of a liaison	person and	ed to maintain a associated period at least to
	- P of duty - II commu	rovincial/re to consult a nitially fund	egional orga and accomn s will be neo ocated and a	nizations w nodate eded in all f	ill request f our provinc	unds to con	Y4 funds w	ill be needed	I for the prov	vinces in whi	o ensure fulfillment ch the potential site ansportation network
	Note: This	has not pro	vided for su	ıbstantive ir	nvolvement	beyond the	four nucle	ar provinces			
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	sessions wi	ith NWMO: \$590K; Y2 (2	2011) \$882K	; Years of c	apacity bui	lding, suppo	ort and mon	itoring NWM	10 commitm	ents & actio	vation, training n
	agreement	s and EA pr	ocess will b	e scrutinize	d closely	G		J			r; Negotiation of
	Ì	ŕ	\$492K per y	,	J		na EA proce	ess will be scr	rutinized clos	eiy	
Labour (	•		al Costs		Costs		total	Allowance	25%		Total Cost
\$	-	\$	-	\$	6,036,000		6,036,000	\$	1,509,000		7,545,000

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	50					Prepared By	r: P. Patton
WBS (Old)				<u></u>							
WBS Title	ADODICINI	AL DROVINI	CAL ODCAN	IZATIONS							
WD3 TILLE	ABURIGINA	AL PROVINIC	LAL ORGAIN	IZATIONS							
Description	with the Ni involved w	WMO on and the thick with the NWI	ongoing ba	asis to provi cial Aborigi	de insight o nal organiza	n all phases itions will w	s of the proj ant to ensu	ject and to sup	port their i VMO and C	member orga rown fulfill th	's work, to engage inizations in being ne duty to consult
	1	provincial A	_	_	s will requir	e consisten	t contact/lia	aison with the	NWMO and	d internal car	pacity regarding the
Deliverable	- A	Annual brief	ings and tra	ining of pro	vincial Abo	riginal organ	nization cor	e staff.			
	•		-	ents and pro		-					
	- A	Annual upda	te of provir	ncial membe	ership to ap	prise of NW	'MO work				
Assumptions	- F	Provincial At	ooriginal org	ganizations	have limited	d capacity to	sustain inv	volvement on	this subject	over the ver	y long term
	- F consisti adminis - F comple - F of duty - II commu assume	ent liaison v strative exp funds will be tion of the l Provincial/re to consult a nitially fund unities are lo	e required t vith the NW enses. e required t Environmer egional orga and accomn s will be ne ocated and a 3 provinces	hrough at le hral Assessm inizations w nodate eded in all f at a minimu	at provincia ill normally east the beg nent and lice ill request for our province m the 3 nuc	I Aboriginal be interpredinning of the ense (Y34) unds to condes Y1-Y4; in clear energy	organizatio ted as the p de project ar duct indepe Y4 funds w y production	ons are able to partial funding and may be requendent research	of a liaison uired over a ch and/or o for the prov	person and a an extended bservation to vinces in whice	ed to maintain a associated period at least to ensure fulfillment the potential site insportation network;
Schedule	Start Year			10	2019			Finish Year	15	2024	
	Jeane real			Ā	2013					2024	
Туре	Fixed										
Calculations and Notes:	sessions w Y1 (2010) \$	ith NWMO: \$590K; Y2 (2	2011) \$882k	(; Years of c	apacity bui	lding, suppo	ort and mon	nitoring NWMC	O commitm	ents & actior	vation, training
	agreement	ts and EA pr 019- 2024):	ocess will b	e scrutinize	d closely	reements a		ess will be scru			rregouation Of
Labour (	•		al Costs	l .	Costs		total	Allowance	25%	1	Total Cost
		\$		\$							

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	30					Prepared B	y: P. Patton
WBS (Old)											
WBS Title	ABORIGINA	AL PROVINIC	CAL ORGAN	IZATIONS							
Description	with the N' involved w	WMO on an	ongoing ba	asis to provi cial Aborigi	de insight o nal organiza	n all phases itions will w	s of the proj ant to ensu	ect and to su	ipport their r IWMO and C	member org rown fulfill t	O's work, to engage ganizations in being the duty to consult
	• ' '	provincial A	_	_	s will requir	e consisten	t contact/lia	aison with the	e NWMO and	d internal ca	pacity regarding the
Deliverable	- lı	Annual brief nput to NW Annual upda	MO docum	ents and pro	ojects as red	quested ove	er time	e staff.			
Assumptions	- P	rovincial Ab	ooriginal org	ganizations	have limited	d capacity to	o sustain in	olvement or	n this subject	over the ve	ery long term
	- F consiste adminis - F	ent liaison v strative exp	e required to vith the NW enses. e required t	o ensure the 'MO; this w	at provincia ill normally east the beg	I Aboriginal be interpre inning of th	organization ted as the p	ons are able t partial funding	g of a liaison	person and	ded to maintain a associated I period at least to
	of duty - lı commu	to consult a	and accomn s will be ne- ocated and a	nodate eded in all f	our provinc	es Y1-Y4; in	Y4 funds w	ill be needed	I for the prov	vinces in whi	to ensure fulfillment ich the potential site ansportation network
	Note: This	has not pro	vided for su	ıbstantive ir	nvolvement	beyond the	four nucle	ar provinces			
Schedule	Start Year			16	2025			Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:	sessions w Y1 (2010) \$ Y3-9 (2012	ith NWMO: 5590K; Y2 (2	2011) \$882k 2K per year	; Years of c	apacity bui	lding, suppo	ort and mor	itoring NWM	10 commitm	ents & actio	rvation, training on n; Negotiation of
	Ì	019- 2024): 25-2034): \$		,			nd EA proce	ess will be scr	rutinized clos	ely	
Labour (	•	1	al Costs		Costs		total	Allowance	25%		Total Cost
\$		\$	-	\$	4,170,000		4,170,000	\$	1,042,500	\$	5,212,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	10	60					Prepared By:	P. Patton
WBS (Old)											
	4000000										
WBS Title	ABORIGINA	AL YOUTH IN	MITIATIVES								
Description	program co surroundin	, onducted wi g Aborigina	ith the yout I communit	th of the Elo	lers Forum. original yout	As the NWMC	) works c nmunities	losely with po s will become	ntential host involved th	t communities rough the Elde	ing with a learning and the ers Forum youth with the Elders
	=	of involvem erational tr			h in vicinity	of communitie	es in site :	selection will	be importai	nt for the long	term sustainability
	Aboriginal		es understa			jects and sumn ent and the AP			-		tially affected the guidance and
	An annual	Aboriginal y	outh schola	arship progi	ram to be in	cluded in the p	rogram (	development.			
Deliverable	- A informa		Forum trains for comn	nsitions to I nunity yout	oe represen	D Elders Forum tative of the Al		communities	in the vicin	ity of potential	host communities,
Assumptions	youth c	he Elders For If the affector South involve	ed Aborigin	al commun	ities	J	elopmer	nt of the youth	n members	to provide for	a transition to the
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	Y3-5: (2012	2-2014): \$17 15-2034): \$1	75K per yea	r:: Summe	r Program v	ucted through vith youth of El am/group with	ders For	um assisting y	outh in affe	ected areas	vement of Elders
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subtot	al	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	1,411,000	\$ 1,4	11,000	\$	352,750	\$	1,763,750

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	20	60					Prepared By: P. Patton
WBS (Old)	ļ									
WBS Title	ABORIGINA	AL YOUTH IN	NITIATIVES							
Description	program co surroundin	, onducted wi g Aborigina	ith the yout I communit	h of the Eld ies, the Abo	lers Forum. Original yout	As the NWI th in these c	MO works o	closely with po s will become	tential hos involved th	gement beginning with a learning t communities and the rough the Elders Forum youth n involvement with the Elders
	•	of involvem			h in vicinity	of communi	ties in site	selection will b	oe importa	nt for the long term sustainability
	Aboriginal				0.	•			•	youth in potentially affected be involved in the guidance and
	An annual	Aboriginal y	outh schola	ırship progr	am to be in	cluded in th	e program	development.		
Deliverable	- A informa		Forum trains for comm	nsitions to be nunity youtl	e represent	D Elders Foru tative of the		communities	in the vicin	ity of potential host communities,
Assumptions	youth c	he Elders For If the affector Couth involve	ed Aborigin	al commun	ities		levelopmer	nt of the youth	members	to provide for a transition to the
Schedule	Start Year			10	2019			Finish Year	15	2024
Туре	Fixed									
Calculations and Notes:	Y3-5: (2012	2-2014): \$17 .5-2034): \$1	75K per yea	r:: Summe	r Program w	vith youth of	Elders For	es of youth of E um assisting yo Aboriginal cor	outh in affe	
Labour (	Costs	Materia	al Costs	Other	Costs	Subt	otal	Allowance	25%	Total Cost
\$	-	\$	-	\$	1,050,000	\$	1,050,000	\$	262,500	\$ 1,312,500

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## **Work Element Definition Sheet**

WBS (New)	561	05	10	30	40					Prepared By: P. Patton
WBS (Old)										
	ļ									
WBS Title	ABORIGINA	AL YOUTH IN	NITIATIVES							
Description	program co surroundir	onducted wi ng Aborigina	ith the yout I communit	h of the Eldies, the Abo	ders Forum. original yout	As the NWI th in these c	MO works of ommunities	closely with por s will become i	tential hos	gement beginning with a learning t communities and the rough the Elders Forum youth n involvement with the Elders
	•	of involvem			h in vicinity	of commun	ities in site	selection will b	oe importa	nt for the long term sustainability
	Aboriginal				٠.,		•		•	youth in potentially affected be involved in the guidance and
	An annual	Aboriginal y	outh schola	ırship progi	ram to be in	cluded in th	e program	development.		
Deliverable	- A informa		Forum tran	nsitions to l nunity yout	•			communities i	in the vicin	ity of potential host communities,
Assumptions	youth o	of the affect	ed Aborigin	al commun			developmer	nt of the youth	members	to provide for a transition to the
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
	Y3-5: (2012	2-2014): \$17 15-2034): \$1	75K per year	r:: Summe	r Program w	ith youth o	f Elders For	es of youth of E um assisting yo Aboriginal cor	outh in affe	
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	Total Cost
\$	-	Ś	_	Ś	1.750.000	Ś	1.750.000	Ś	437,500	\$ 2,187,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	70				Prepared By:	P. Patton
WBS (Old)	0		***************************************							
WBS Title	ABORIGINA	AL AWAREN	ESS BUILDIN	NG						
Description	The ADM o	roject will r	oguiro prov	iding ongoi	ag informat	ion briefings and gene	ral information	Vawaronos	c programs am	ang Aboriginal
Description	people in t	he province	s where site	e selection t	akes place	and in general through	national Abor	iginal organ	nizations. Oppo	ortunities to
	conduct aw organization		ilding activi	ties will ger	erally be so	ught through annual a	ssemblies of n	ational, pro	vincial and reg	ional
	Speaking e	ngagements	s and briefi	ngs on requ	est will also	be conducted.				
Deliverable	- T	radeshow a	ttendance a	at annual as	sembly of p	rovincial and national	Aboriginal org	anizations i	n affected prov	inces
	- Т	radeshow a	ttendance (	on request a	at regional a	ssemblies				
Assumptions	- N	lational and	provincial	organizatio	ns will reque	est attendance of NWI	ЛО at annual a	ssembly to	keep members	informed on APM
	•	-				Feasibility Study step at in regional areas for	_	lance at tra	deshows	
Schedule	Start Year			1	2010		Finish Year	9	2018	
Туре	Fixed									
Calculations and Notes:	\$50K per y	ear								
	4 national	organizatior	ıs							
	10 provinci	•								
	10 addition	•								
Labor	Tradeshow				•	Cultural	Allanna	250/		-1.04
Labour	Losts		al Costs		Costs	Subtotal	Allowance	25%		tal Cost
\$	-	\$	-	\$	450,000	\$ 450,000	\$	112,500	\$	562,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	70				Prepared By:	P. Patton
WBS (Old)	·····		***************************************							
WBS Title	ABORIGINA	AL AWAREN	ESS BUILDIN	VG						
Description	The ADM s	roioct will r	oguiro prou	iding ongoi	ag informat	ion briefings and gene	ral information	lawaranas	nrograms am	ana Abariainal
•	E					and in general through				
	conduct aw	vareness bu	ilding activi	ties will gen	erally be so	ught through annual a	ssemblies of na	itional, pro	vincial and regi	ional
	organizatio	ns.								
	Speaking e	ngagement	s and briefin	ngs on requ	est will also	be conducted.				
Deliverable	- T	radeshow a	ttendance a	at annual as	sembly of p	rovincial and national	Aboriginal orga	nizations ir	n affected prov	inces
	- Т	radeshow a	ttendance (	on request a	at regional a	ssemblies				
Assumptions	- N	lational and	provincial	organization	ns will reque	est attendance of NWN	лO at annual as	sembly to	keep members	informed on APM
	•	-				Feasibility Study step	-	ance at tra	deshows	
Schedule	Start Year			10	2019		Finish Year	15	2024	
Туре	Fixed									
	0									
Calculations and Notes:	\$50K per ye	ear								
	4 national o	organizatior	ıs							
	10 provinci	al organizat	ions							
	10 addition	al requests	per year							
	Tradeshow				•		1			
Labour (	Costs		al Costs		Costs	Subtotal	Allowance	25%		al Cost
\$	-	\$	-	\$	300,000	\$ 300,000	\$	75,000	\$	375,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	50				Prepared By:	P. Patton
WBS (Old)										
WBS Title	ABORIGINA	AL AWAREN	ESS BUILDII	NG						
Description	people in t conduct av organizatio	he province vareness bu ons.	s where sit	e selection t ities will ger	akes place erally be so	ion briefings and gene and in general through ought through annual a be conducted.	national Abor	iginal organ	nizations. Oppo	ortunities to
Deliverable	1	radeshow a				provincial and national assemblies	Aboriginal org	anizations i	n affected prov	vinces
Assumptions	- N	lational and	nrovincial	organizatio	ns will real	est attendance of NWI	10 at appual a			
	•	tequests wil	l increase o	nce commu	nities enter	Feasibility Study step st in regional areas for	in siting	,	·	s informed on APM
Schedule	•	tequests wil	l increase o	nce commu	nities enter	Feasibility Study step	in siting	,	·	s informed on APM
Schedule Type	- A	tequests wil	l increase o	nce commu ws will gene	nities enter	Feasibility Study step	in siting NWMO attend	lance at tra	deshows	s informed on APM
Туре	- A Start Year	dequests wil	l increase o	nce commu ws will gene	nities enter	Feasibility Study step	in siting NWMO attend	lance at tra	deshows	s informed on APM
Type Calculations	- A Start Year Fixed \$50K per y 4 national 10 provinc	dequests wil	I increase o	nce commu ws will gene	nities entererate intere	Feasibility Study step	in siting NWMO attend	lance at tra	deshows	s informed on APM
Type Calculations	- A Start Year Fixed \$50K per y 4 national 10 provinc 10 addition Tradeshow	dequests will attendance a mear ear organization ial organization	I increase of tradeshoods at tradeshoods at tradeshoods are tr	nce commu ws will gene 16	nities entererate intere	Feasibility Study step	in siting NWMO attend	lance at tra	deshows 2034	tal Cost

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### Work Element Definition Sheet

WBS (New)	561 05 10 10 30 Prepared By: P. Patton
WBS (Old)	
WBS Title	ABORIGINAL ENGAGEMENT – ELDERS FORUM, NIIGANI
	Elders Forum  The NWMO Elders Forum provides advice to the NWMO in its relationships with Aboriginal peoples and in understanding Aboriginal culture, protocols, practices and Traditional Knowledge. The members of the Elders Forum represent a broad range of interests including, but not limited to, Aboriginal Traditional Knowledge, political affairs, community development, health and welfare, Aborigina communications, cultural life of community and relationships, community protocols, treaty and historical relationships and youth interests.
	<ul> <li>Members of the Elders Forum are residents of each of the four nuclear provinces Saskatchewan, Ontario, Quebec and New Brunswick. The NWMO may also choose, from time-to-time, to accept recommendations of a member from one of Canada's other provinces or territories and the NWMO may, at its discretion, appoint additional members to the Elders Forum.</li> </ul>
	Each Elder is invited to ask a young person to accompany him/her to Forum meetings to provide support and, in keeping with Aboriginal cultural teachings, attend Forum meetings to learn from Elders.      Members are invited to participate in the Elders Forum to bring an Aboriginal perspective to the work of the NWMO.
	Nigani
	<ul> <li>Niigani membership is composed of 5 Elders and 5 youth, a Chairperson and a Secretary/Facilitator and is chosen by the Elders Forum members from among the Forum membership.</li> </ul>
	The NWMO may, from time-to-time at its discretion, appoint additional members to Niigani from among the members of the Elders Forum.
	The NWMO recognizes the importance of the continuity of the membership of the Elders Forum while acknowledging that as the APM Site Selection process evolves the membership of the Elders Forum will gradually change to reflect the Aboriginal groups in the vicinity a potential willing host community, estimated to take place in 2011-2012. In the Feasibility Study step of site selection, the Elders Foru will transition to include Elders representative of the siting communities and in the Detailed Analysis step the Elders Forum will again transition to be representative of the communities in this step. Throughout these transitions the Elders Forum will maintain a select number of representatives that bring a perspective of national and provincial Aboriginal issues.
	Once a site has been selected, the negotiation with local Aboriginal communities will determine the nature of an Elders advisory group the project.
	<ul> <li>In first two years of siting (2010-2011), Niigani members will initially provide assistance to NWMO in introductions to Aborigin peoples in areas of potential host communities.</li> </ul>
	<ul> <li>During Feasibility Study and Detailed Study years of siting (2012-2024), Niigani members will include Elders from communities involved in these steps who will assist NWMO in understanding the Traditional Knowledge and culture/protocols/practices of their communities and will assist in building relationships with their communities.</li> </ul>
Deliverable	<ul> <li>Annual meeting of the Elders Forum: Y1-15</li> <li>3-5 Niigani meetings annually: Y1-15</li> <li>Niigani members will assist NWMO in establishing meetings with local, provincial, regional groups and will attend events, tradeshows, meetings along with NWMO</li> </ul>
Assumptions	- Elders Forum and Nilgani members will assist in program for Aboriginal youth involvement and Traditional Knowledge project
	<ul> <li>Elders Forum will meet a minimum of 1X per year with the possibility of meeting 2X meetings per year if necessary</li> <li>Niigani will meet 3-5X per year including an annual meeting with the NWMO Board and Advisory Council</li> <li>Niigani members will receive an honorarium for meetings attended along with coverage of travel expenses</li> <li>Expense will continue at least to completion of Environmental Assessment and License (Y15)</li> </ul>
Schedule	Start Year 1 2010 Finish Year 9 2018
	Fixed
Calculations and Notes:	Y1 (2010): \$705K Y2 (2011): \$627K; Y3-Y5 (2012 - 2014): \$604K/year; Y 6-Y15 (2015-2024): \$632K per year
	Description: Elders Forum: Y1 (2010):\$170K; Y2-Y9 (2011-2018): \$180K; Y10-15 (2019-2024): \$200K per year (assumes need for community Elders to be involved and provide insight on project to interested Aboriginal people)
	Niigani meeting & assistance: Y 1: \$495K per year (Includes: Niigani Community Involvement Project); Y2 (2011):\$460K (Includes: Niigani Community Involvement Project): Y3-15 (2012-2024): \$382 K per year
	Staff travel: Y1: \$40K; Y2-5: \$42K; Y6-15: \$50k
Labour C	Costs         Material Costs         Other Costs         Subtotal         Allowance         25%         Total Cost           -         \$         -         \$         5,616,000         \$         1,404,000         \$         7,020,000
' S	

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### Work Element Definition Sheet

WBS (New)	561	05	10	20	30					Prepared	By: P. Patton
WBS (Old)	301				30	<u></u>				,pace	
WBS Title	ABORIGINA	AL ENGAGEI	MENT – ELI	DERS FORUM	л, NIIGANI						
•	culture, pro including, l communica interests. · M Brunsw	O Elders For otocols, pra but not limit ations, cultured the moders of the NV ick. The NV	ectices and ted to, Aboural life of cothers Fiders F	Traditional I original Tradi community a Forum are re also choose,	Knowledge. itional Know and relation esidents of from time-	The member vledge, politionships, comme each of the foot- to-time, to a	ers of the I cal affairs nunity prof our nuclea ccept reco	Elders Forum , community tocols, treaty ar provinces S	represent a development and historic askatchewa	a broad raint, health cal relation an, Ontarion ber from	rstanding Aboriginal nge of interests and welfare, Aboriginships and youth o, Quebec and New one of Canada's others.
						ccompany hi s to learn fro		Forum meetir	ngs to provi	de suppor	rt and, in keeping wil
		lembers are	invited to	participate	in the Elder	s Forum to b	ring an Ab	original pers	pective to t	he work o	f the NWMO.
	<b>Niigani</b> · Ni	iigani meml	pership is co	omposed of	5 Elders an	d 5 youth, a	Chairpers	on and a Secr	etary/Facili	tator and	is chosen by the Elde
		ne NWMO r		the Forum			nt addition	al members t	to Niigani fr	om amon	g the members of th
	Site Selecti a potential will transiti transition t	ion process willing hosi ion to include to be repres	evolves the t communi de Elders re sentative of	e membersh ty, estimate epresentativ f the commu	nip of the El d to take pl e of the siti unities in th	ders Forum vace in 2011- ing communi is step. Thro	vill gradua 2012. In t ties and ir ughout the	illy change to he Feasibility In the Detailed	reflect the Study step Analysis st s the Elders	Aborigina of site sel ep the Eld	dging that as the API Il groups in the vicini ection, the Elders Fo ders Forum will again ill maintain a select
	Once a site the project		elected, th	e negotiatio	n with loca	l Aboriginal o	communiti	es will deterr	nine the na	ture of an	Elders advisory grou
		-		ng (2010-20 nost commu		members w	ill initially	provide assist	tance to NV	VMO in in	troductions to Abori
	involve	d in these st	teps who w	ill assist NW	/MO in und		ne Traditio	onal Knowledg			ders from communit cols/practices of the
Deliverable	- 3 - N	-5 Niigani n Iiigani mem	neetings an bers will as	Elders Forur Inually: Y1-1 Ssist NWMO vith NWMO	5 in establish	ning meeting	s with loca	al, provincial,	regional gro	oups and v	will attend events,
Assumptions	- E	lders Forum	n and Niiga	ni members	will assist i	n program fo	or Aborigir	nal youth invo	lvement an	d Traditio	nal Knowledge proje
	- N	liigani will n Iiigani mem	neet 3-5X p bers will re	er year incl	uding an an norarium fo	nual meeting or meetings a	with the attended a	of meeting 2 NWMO Board long with covering and Lice	d and Advis verage of tra	ory Counc	cil
Schedule	Start Year			10	2019			Finish Year	15	202	24
Туре	Fixed										
and Notes:				2014): \$604H /ear	(/year;						
		ım: \$170K; 1-2018): \$1 19-2024): \$		ear (assume	es need for	community E	ilders to b	e involved an	d provide ir	nsight on p	project to interested
	Y 1: \$495K Y2 (2011):\$		ncludes: Nii ides: Niigar	ni Communi		ement Proje ent Project):					
	Staff trave	l: Y1: \$40K;	Y2-5: \$42K	; Y6-15: \$50	k						
Labour C	osts	Materia	al Costs	Other	Costs	Subto	ntal .	Allowance	25%	1	
							rtai	Allowance		<u> </u>	Total Cost

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	80					Prepared By:	P. Patton
WBS (Old)	ļ		<b></b>	<u> </u>							
WBS Title	STAFF TRA	VEL COSTS -	- ABORIGIN	AL							
Description	confidence		involve nat		-	•	_		•	selection proce	ss to build nce in the NWMO
	Costs inclu	de travel-re	lated exper	nses for staf	f participati	ng in speak	ng engager	nents/briefin		agements on re	
	(catering, r	neeting roo	m, A/V, tra	ver for deleg	gates and ac	commodat	ons ii need	iea.)			
Deliverable	- S - N	upport to N Naintenance	IWMO bran e and buildi	d in buildin ng of relatio	g confidenc onships betv	e in APM veen Aborig	inal organi	zations, pote	ntial host co	mmunities and	d surrounding
Assumptions	- R and API	· ·	tings/briefi	ngs with Ab	original org	anizations,	groups, con	nmunities and	d individuals	will build conf	idence in NWMO
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:	Provincial of Regional of Travel to lo Meetings/b	187K; Y3 (20	ns meetings s meetings/ nities request 012): \$191k	/briefings briefings							
Labour (			al Costs		Costs	Sub	otal	Allowance	25%	To	otal Cost
Ś	-	Ś	-	Ś	1,328,000	Ś	1.328.000	Ś	332,000	Ś	1,660,000
		<u> </u>		1 -	,==5,000		,==5,000	<u> </u>	,000		_,000,000

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	20	80				Prepared By: P.	Patton
WBS (Old)						<u></u>				
WBS Title	STAFF TRA	VEL COSTS -	– ABORIGIN	AL						
Description	confidence		involve nat			g with Aboriginal comm nal and local Aboriginal				
	Travel will	also include	e meetings v	with Aborig	inal groups,	organizations and indi	viduals and sp	oeaking enga	agements on reque	st.
	=					ing in speaking engager		gs, off-site n	neetings, and relate	ed costs
Deliverable	- S - N	Support to N Maintenance	IWMO bran e and buildi	d in buildin ng of relati	ng confidenc onships bet	ction process in respons e in APM ween Aboriginal organi of site selection process	zations, pote	ntial host co	mmunities and sur	rounding
Assumptions	- R and AP	•	tings/briefi	ngs with Ab	ooriginal org	anizations, groups, cor	nmunities and	d individuals	will build confiden	ce in NWMO
Schedule	Start Year			10	) 2019		Finish Year	15	2024	
Туре	Fixed									
Calculations and Notes:	Provincial of Regional of Travel to lo	rganizations organizatior rganizations ocal commu briefings on	ns meetings/ s meetings/ nities	/briefings						
	: ' '	200K 187K; Y3 (20 3-2034): 12								
Labour (	Costs		al Costs		r Costs	Subtotal	Allowance	25%	Total C	Cost
\$	-	\$	-	\$	750,000	\$ 750,000	\$	187,500	\$	937,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	30	60				Prepared By: P. Pa	atton
WBS (Old)										
WBS Title	STAFF TRA	VEL COSTS -	- ABORIGIN	AL						
Description	confidence		involve nat		-	g with Aboriginal comm nal and local Aboriginal		•	•	
	Travel will	also include	e meetings v	with Aborig	inal groups,	organizations and indiv	viduals and sp	eaking enga	agements on request.	
	1		•			ng in speaking engager		gs, off-site n	neetings, and related	costs
Deliverable	- S - N	upport to N Naintenance	IWMO bran e and buildi	id in buildin ng of relati	g confidence onships betw	tion process in respons e in APM ween Aboriginal organi if site selection process	zations, poter	ntial host co	mmunities and surro	unding
Assumptions	- R and API	· ·	tings/briefi	ngs with At	original org	anizations, groups, con	nmunities and	l individuals	will build confidence	in NWMO
Schedule	Start Year			16	2025		Finish Year	25	2034	
Туре	Fixed									
Calculations and Notes:	Provincial of Regional of Travel to lo Meetings/b	187K; Y3 (20	ns meetings s meetings/ nities request 012): \$191k	/briefings briefings						
Labour (	•		al Costs		r Costs	Subtotal	Allowance	25%	Total Cos	st
\$	-	\$	-	\$	1,250,000	\$ 1,250,000	\$	312,500	\$	1,562,500

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### **Work Element Definition Sheet**

WBS (New)	561	05	10	10	270				Prepared By: J. Facella
WBS (Old)				<u> </u>					Annoidean ann an Annoidean ann an Annoidean ann an Annoidean an Annoidean an Annoidean Annoidean Annoidean Ann
		n		A					
WBS Title	TRACKING	PUBLIC OPI	NION						
Description		identify tivities in a	timely way	citizen valu	es and conc				e) for NWMO's policies, plans or values, preferences and concern
	of	Canadians					etter remedi t	ic evolving	, values, preferences and concern.
		,	opportunit			and			
	m		emerging is strate ongoi			ns for NWMO policies a	nd plans to Fe	deral and P	rovincial government policy
	ex				_	ceptability among com untries and be similar p		•	ders in Canada with that
	purchase o	f and/or pa	rticipation i	in syndicate	d studies; u	•	-	_	groups on targeted issues; elevant publicly available research
	The progra	m anticipat	es expendit	ture of \$200	),000 each y	ear until Environmenta	l Assessment	successfully	y completed.
Deliverable	1) ac	Yearly s	urvey of the	e attitudes (	of Canadian	s on key topics of impo	rtance to susta	aining and l	building acceptance for NWMO
	2) bւ	Yearly s Isiness plan		port of find	ings from th	e broad range of inputs	s outlined abo	ve timed to	support internal NWMO
	3)	Commu	inication tes	sting					
Assumptions	general po	licy environ	ment in wh	ich NWMO	operates, to	•	ey. If activity is	s less inten	IWMO siting process or in the se than anticipated, the survey would be conducted.
Schedule	Start Year			1	2010		Finish Year	9	2018
Туре	Fixed								
Calculations and Notes:	Notes Consider th - - -	Bi-Annı Bi-Annı	ual worksho	op of a cross op of provin	section of cial opinion	citizens to input to NWI leaders to input to NW quired to support these	MO policies a	•	
Labour (	Costs		al Costs		r Costs	Subtotal	Allowance	25%	Total Cost

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### **Work Element Definition Sheet**

WBS Title  TRACKING PUBLIC OPINION  Description  This work program is designed to assist NWMO to:  - identify changes in citizen values and concerns which may affect support (passive or active) for NWMO's policies, plans or activities in a timely way  - identify opportunities to re-align policies, plans and activities to better reflect the evolving values, preferences and conce of Canadians  - identify opportunities to refine NWMO brand - identify opportunities to refine NWMO brand - identify emerging issues/challenges - Demonstrate ongoing support of Canadians for NWMO policies and plans to Federal and Provincial government policy makers  - Benchmark NWMO progress in building acceptability among communities and opinion leaders in Canada with that experienced by waste organizations in other countries and be similar projects within Canada.  On a yearly basis, this work may involve: nationally representative telephone survey; conduct of focus groups on targeted issues; purchase of and/or participation in syndicated studies, use of existing online or mail pane); tracking of relevant publicly available resear conducted within Canada or by waste organizations in other countries.  The program anticipates expenditure of \$200,000 each year until Environmental Assessment successfully completed.  Deliverable  1) Yearly survey of the attitudes of Canadians on key topics of importance to sustaining and building acceptance for NWMC activities 2) Yearly summary report of findings from the broad range of inputs outlined above timed to support internal NWMO business planning 3) Communication testing  Assumptions  It is assumed that there will be sufficient activity over the course of the year, either with respect to the NWMO siting process or in the general policy environment in which NWMO operates, to warrant a yearly survey. If activity is less intense than anticipated, the survey might be conducted every 18 months rather than every 12 months and in its stead qualitative research would be conducted.  Schedule  Start Year  1	WBS (New)	561	05	10	20	260				Prepared By:	J. Facella
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Identify emerging issues/challenges   Demonstrate ongoing support of Canadians for NWMO policies and plans to Federal and Provincial government policy makers		of	-	opportuniti	es to re-ali	gn policies, <sub>l</sub>	olans and activitie	s to better reflect	the evolving	g values, prefer	ences and concern
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purchase of and/or participation in syndicated studies; use of existing online or mail panel; tracking of relevant publicly available researconducted within Canada or by waste organizations in other countries.  The program anticipates expenditure of \$200,000 each year until Environmental Assessment successfully completed.  1) Yearly survey of the attitudes of Canadians on key topics of importance to sustaining and building acceptance for NWMC activities 2) Yearly summary report of findings from the broad range of inputs outlined above timed to support internal NWMO business planning 3) Communication testing  Assumptions It is assumed that there will be sufficient activity over the course of the year, either with respect to the NWMO siting process or in the general policy environment in which NWMO operates, to warrant a yearly survey. If activity is less intense than anticipated, the survey might be conducted every 18 months rather than every 12 months and in its stead qualitative research would be conducted.  Schedule  Start Year  10 2019  Finish Year  13 2022  Type  Fixed  Calculations and Notes:  Consider the following addition to the program:  - Bi-Annual workshop of a cross section of citizens to input to NWMO policies and plans  - Bi-Annual workshop of provincial opinion leaders to input to NWMO policies and plans  - Note that additional funding would be required to support these activities  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance  25%  Total Cost		ex				_		-	-	ders in Canada	with that
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activities  2) Yearly summary report of findings from the broad range of inputs outlined above timed to support internal NWMO business planning  3) Communication testing  Assumptions  It is assumed that there will be sufficient activity over the course of the year, either with respect to the NWMO siting process or in the general policy environment in which NWMO operates, to warrant a yearly survey. If activity is less intense than anticipated, the survey might be conducted every 18 months rather than every 12 months and in its stead qualitative research would be conducted.  Schedule  Start Year  10 2019  Finish Year  13 2022  Type  Fixed  Calculations  Notes  Consider the following addition to the program:  - Bi-Annual workshop of a cross section of citizens to input to NWMO policies and plans  - Bi-Annual workshop of provincial opinion leaders to input to NWMO policies and plans  - Note that additional funding would be required to support these activities  Labour Costs  Material Costs  Other Costs  Subtotal  Allowance  25%  Total Cost		The progra	m anticipat	es expendit	ure of \$200	),000 each y	ear until Environi	nental Assessmen	t successfull	y completed.	
business planning 3) Communication testing  Assumptions It is assumed that there will be sufficient activity over the course of the year, either with respect to the NWMO siting process or in the general policy environment in which NWMO operates, to warrant a yearly survey. If activity is less intense than anticipated, the survey might be conducted every 18 months rather than every 12 months and in its stead qualitative research would be conducted.  Schedule  Start Year   10   2019   Finish Year   13   2022   Type   Fixed  Calculations and Notes:  Consider the following addition to the program:  - Bi-Annual workshop of a cross section of citizens to input to NWMO policies and plans - Bi-Annual workshop of provincial opinion leaders to input to NWMO policies and plans - Note that additional funding would be required to support these activities  Labour Costs   Material Costs   Other Costs   Subtotal   Allowance   25%   Total Cost	Deliverable	· '		urvey of the	attitudes o	of Canadian	s on key topics of	importance to sus	staining and	building accept	ance for NWMO
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Labour Costs Material Costs Other Costs Subtotal Allowance 25% Total Cost	Calculations and Notes:		Bi-Annu Bi-Annu	ual worksho ual worksho	p of a cross p of provin	section of o	leaders to input t	o NWMO policies	•		
	Lahour G	i					i i		25%	To	tal Cost
1.5 - 1.5 (2000) (2000) (3 (200)) (3 (2000) (3 (2000) (3 (200))	\$	-	\$	-	\$						1,000,000

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### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	10	10	10	30				Prepared By: J. Facella
WBS Title	TRACKING	BEST PRACT	TICES AND E	XTERNAL A	DVICE				
WBS Title  Description	- p Nuclear the Fort - F and Inte	o Appro o Awar o Appro vision a c o Appro o Appro o Appro o Appro dispute r o Appro articipate ir Energy Age um. acilitate lime ernational Ir at any given o infor o suppo interest a o Inforr and cultu o Assist commun m anticipat \$200,000 \$150,000	lesigned to f best practionaches to december to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept to accept the accept to accept the accept to accept the accept to accept the accept to accept the accept	assist the Nices and evo mmunity eight ing, design evelopment has for itsel sessesment of not issues as arious siting magging Abo nal informa m on Stakel poation in ini Public Parti lee be up to or, of NWMC able author ely to asses of NWMC (community building of area.	IWMO: plying experence of information of information of information of information of experiments of environments of environments of environments of environments of environments of environments of environments of experiments of exp	ental, social, econor the ethics and their a uses such as hosting ples and application perience sharing, and dence. (Estimated a chexplore these issuespect to evolving so and plans; entially interested constrate willingness community and region assessment and are seen and are seen and are seen assessment and are seen assessment and are seen assessment and are seen assessment and are seen assessment and are seen assessment and are seen as seen as seen assessment and are seen assessment and are seen assessment and are seen as seen	est practice desimmunication planentation of sus mic and cultural pplication to NV agreements, cor of Aboriginal Trd development at \$10,000 per yours and discuss accietal expectation mmunities in the ion based reseaualysis	effects VMO work mmunity eng raditional Kno of internatio ear) Include experience a on in this are se engageme rch designed	anal best practice, as part of the s review of materials published by and best practices such as C2D2
Deliverable  Assumptions	- Y plannin - P - D website - Y \$100,00 - A - S	g and engag reparation of evelopmen e (internal, in early works 00 per year) d hoc expen ponsorship	ary report of gement plan of case student of case student of case student of the case	n design (inin design (inin design (inin design (inin design (inin design design design design design design design (inin design	ternal) ects of partic s and tools toommunication review and missioning of the second course	cular interest with a o support communions staff) explore best praction of papers designed ther, or a discussion communities to use	focus on the engaging ties in engaging te and input to Note to explore key to session at a corresponding to the engaging to th	gagement ap their resider NWMO's plan opics of inter ofference (Es	port internal NWMO business oproaches used (internal) ints for publishing on the NWMO ins going forward (Estimated at rest (Estimated at \$60,000) itimated at \$30,000 per year) inclined build and sustain public one able to demonstrate that
Schedule						hat these processes	_		2018
Туре	Fixed								
Calculations and Notes:									
Labour C	Costs -	Materia \$	al Costs	Other \$	1,200,000	\$ 1,200,0	Allowance 00 \$	<b>25%</b> 300,000	Total Cost \$ 1,500,000

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### **Work Element Definition Sheet**

WBS (New)	561	10	10	20	20					Prepared B	v: J. Facella	
WBS (Old)	301	10	10	20		ļ				riepaieu b	7. IJ. I acella	
						٠						
WBS Title	TRACKING	BEST PRACT	TICES AND E	XTERNAL	ADVICE							
 	-1.											
Description	:	-	designed to			ionco in	a number of k	ov succoss are	26.			
	· `	•			• .		logue and best	•				
							erials and comr					
										ans which ca	pture the long-teri	m
		vision a c	community I	has for itse	elf							
		o Appro	oaches to as	ssessment	of environm	ental, so	ocial, economic	and cultural e	effects			
							s and their app					
				arious sitin	ig related issu	ues such	n as hosting agr	eements, com	munity eng	agement, co	mmunications, an	d
		aispute r	esolution									
							l application of	-		-		
							-				ctice, as part of the	
	the For		ency's Forur	n on Stake	nolder Conti	aence.	(Estimated at \$	10,000 per ye	ar) include	s review of n	naterials published	עם נ
	•		ited particip nstitute for			ch explo	ore these issues	and discuss e	xperience a	nd best prac	ctices such as C2D2	2
	- A	t any given	point in tim	e be up to	date with re	spect to	evolving socie	tal expectatio	n in this are	a in order to	):	
			_		10 activities a							
					orities in pote ss and demo			nunities in the	engageme	nt of their ov	wn citizens to expl	ore
			_				inity and regior ment and analy		ch designed	to support	the social, econom	nic
		o Assist	t in capacity	building o	of NWMO rela	ationshi	p managers, ar	d other NWM	O staff, to	engage with	and support	
		commun	ities in this	area.								
			111									
	The progra		es expendit 0 in 2011	ure ot:								
			0 in 2011 0 in 2012									
			0 in 2013									
		\$150,00	0 in 2014									
	·	\$125,00	0 in 2015									
Dolivorable		onculting a	dvico									••••
Deliverable	:	onsulting a		of findings	from the bro	ad rang	e of innuts out	lined above ti	med to sun	nort interna	I NWMO business	
	1		gement plar	_		, uu . ue	c or imputs out		med to sup	port interna	Transfer Business	
	- P	reparation	of case stud	lies of proj	ects of partic	ular int	erest with a foo	cus on the eng	agement ap	proaches us	ed (internal)	
	- D	evelopmen	t of informa	ation shee	ts and tools t	o suppo	ort communities	s in engaging t	heir resider	nts for publis	hing on the NWM	0
	•				Communicatio			233				
	- Y	early works	hop of prac	titioners t	o review and	explore	best practice a	and input to N	WMO's pla	ns going forv	vard (Estimated at	:
	\$100,00	00 per year)										
	- Д	d hoc expe	rt advice inc	luding cor	nmissioning o	of pape	rs designed to e	explore key top	pics of inter	est (Estimate	ed at \$60,000)	
	- S	ponsorship	of a confere	ence such	as C2D2 or of	ther, or	a discussion se	ssion at a conf	ference (Es	timated at \$	30,000 per year)	
Assumptions	- L	Ising approp	oriate proce	sses, and	encouraging	commu	nities to use ap	propriate prod	cesses will h	elp build an	d sustain public	
	accepta	ince of NWI	MO's policie	s, plans ar	nd activities							
											monstrate that	
	approp	riate proces	ses were us	ed in thes	e areas and t	hat the	se processes m	eaningfully inf	luenced pro	posals and o	decisions made.	
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								······				
Schedule	Start Year			1	0 2019			Finish Year	11	2020		
Tyne	Fived											
Туре	Fixed											
Calculations	<b> </b>											
and Notes:	<u> </u>											
Labour C	Costs		al Costs		er Costs		Subtotal	Allowance	25%		Total Cost	_
\$	-	\$	-	\$	250,000	\$	250,000	\$	62,500	\$	312,5	00،

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### **Work Element Definition Sheet**

	561	10	10	10	20					Prepared By: J. Face	ella
WBS (Old)				Ĭ			<u></u>				
WBS Title	ETHICAL FR	RAMEWORK	FOR APM	IMPLEMEN <sup>*</sup>	TATION						
Description	- pe - Ca	Demon erformance Demon nadian Bus eeting (\$5,0	in this area strate NWN iness Ethics 000) and ge	mportance included as MO's comm Research Meral projec	s standard ir itment to ge letwork (CB it support fo	the Annua eneral socie ERN) (Estim or the perio	ll Report. tal capacity nated at \$25 d 2010 to 20	building in th ,000 per year )20.	is area thro ) and throuរុ	gh a yearly reflection or ugh continued partners gh participation in Annu	ship in the
	- - En	Ad hoc		ce (Estimat	_				-	o research (internal) d of the successful com	pletion of
	The progra	m anticipat	es expendit	ture of \$70,	000 per yea	r for the du	ration of the	e program.			
Deliverable	- - an -	Interna d new issue	l yearly refl es arise	ection on e	thical perfo	mance and				ıl framework as work p	roceeds
Assumptions	- It ethical - E accepta	can publicl will be imp consideration	oortant to the constant to the constant to the constant to the constant of the	ill help build he docume opropriately ce, which ca	d and sustain ntation requal addressed an begin to	n public and lired to sup in decision be docume	d government port the EA making thro nted publica	and licencing bughout the silly, will help b	of NWMO' process to I ting process puild and su	WMO's work, and agains of policies, plans and action be able to demonstrates.  Stain public and governotaximum flexibility to action	tivities that iment
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
	CBERN - \$5 Other - \$40	,000 per ye ),000 exper	t advice.	ition in ann	ual general		process.				
Labour C	nsts	Materi	al Costs	Otho	r Costs	Suh	total	Allowance	25%	Total Cost	
Labour C	<b>UJ</b> IJ	\$	u. CU313	Ś	630,000	Ś	630,000	Ś	157,500		787,500

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### **Work Element Definition Sheet**

WBS (New)	561	10	10	20	10					Prepared By: J. Face	ella
WBS (Old)				A							
WBS Title	ETHICAL FI	RAMEWORK	FOR APM	IMPLEMENT	TATION						
Danawinstian	This was also										
Description	- ре -	erformance Demon	strate the in in this area strate NWN	mportance included as MO's commi	standard ir	the Annua neral socie	l Report. tal capacity	building in th	is area thro	gh a yearly reflection of	hip in the
	•	eeting (\$5,0			•	, ,			) and throu	gh participation in Annu	iai Generai
	-	Track p	ractices use	ed by other	waste orgar	nizations to	use as a bei	nchmark thro	ugh desktor	research (internal)	
	- Er	Ad hoc nvironmenta	•	•	ed at \$40,00	00 per year	beginning ir	n 2010 throug	h to the en	d of the successful com	pletion of
	The progra	ım anticipat	es expendit	ture of \$70,	000 per yea	r for the du	ration of th	e program.			
Deliverable	- - ar	Interna nd new issue	l yearly refl es arise	ection on e	thical perfor	mance and	assessmen	ch Network t of need to e		ıl framework as work pr	oceeds
		111110 P	arty input a	ila icvicw t	o neip gaiat	. IVVVIVIO PC	meres, plans	and detivities			
Assumptions	NWMC - I ethical - E accepta	can publicl t will be imp consideration	y report, wo portant to the ons were apparty guidan MO's policie	ill help build he documer opropriately ce, which ca	ntation requal addressed	n public and ired to sup in decision pe documen	d government port the EA making thro nted publica	nt acceptance and licencing oughout the si	of NWMO'  process to ling proces  puild and su	WMO's work, and againg spolicies, plans and act be able to demonstrate s.  Stain public and govern laximum flexibility to act	ivities that ment
Schedule	Start Year			10	2019			Finish Year	11	2020	
Туре	Fixed										
Calculations and Notes:	CBERN - \$5	25,000 per y 5,000 per ye 0,000 exper	ar participa	•	ual general I	meeting.					
	Expenditu	re per year t	hrough to e	end of Envir	onmental A	ssessment	process.				
Labour	Costs	Materi	al Costs	Other	Costs	Sub	total	Allowance	25%	Total Cost	
ć		Ś		Ś	140.000	Ś	140.000	Ś	35,000	\$	175,000

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### **Work Element Definition Sheet**

WBS (Old)			10	10	10					Prepared	<b>Ву</b> : Р	. Patton
				" FD.0F	j							
WBS Title A	ABORIGINA	AL TRADITIC	ONAL KNOW	/LEDGE								
T. a C. n	t also incluind between traditional assisting in create a womaking.  Appropriation of the traditional assisting in create a womaking.  Appropriation of the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assisting in the traditional assistance in the traditional assis	ides knowle en commur Knowledge the develo porld view th te consider- piritual and te relations te aborigina te health, tr spects of tr es, housewo	edge about nities.  Provides ripment of te hat incorpor ation and re physical asphips between all sense of riade and spidditional coork and substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are substitutional coordinates and substitutional coordinates are subst	developing ules for pro echnologies ates and m espect mus bects of the en various a esponsibilit iritual need mmunity lis sistence act	and mainta etecting the to meet th akes sense t be given to land, peop aspects of th y and stewa s of people, ie such as c tivities; and	land while is e subsistence of all of the of factors sur le, wildlife a endyshop; it little in the impact the impact	using it; cla ce, health, is se in the co ch as: and their ha hent, includ	rifying and en trade and ritu intext of a lon abitat; ing humans; es, the wide r	ionships be hancing rel al needs of g-term, hol gaterm, sol gaterm, sol gaterm, sol gaterm, sol	ationships local peoplistic persp istic persp unteer act more in t	s amongs ole; and o pective ir civities, r the future	et users; helping to decision- ecreational
d K	desktop re: (nowledge	search and or experts	related pre in this field	paratory w to assist in	ork. This wo	ork progran on of Tradit	n is designe ional Know	eaving of Trad d to engage ti ledge in asses tivities condu	hose involv sment of p	ed as hold otential ho	lers of Tr	aditional for social,
	a. hu b.	inting, cere	monial and	burial sites	i			ng communiti			, ,	3,
	ind c. d.	cluding prep Monito Conver	paration of r impact be ne a worksh	case studie nefit agree op of pract	s concernin ments with	g national r in Canada a provide advi	esource ma	nagement ini	tiatives of i	nterest		. ,
	-	nunities in t	his area.	-				her NWMO st				ort iginal peoples
E	stimate o	f expenditu	res begins i	n 2010 and	concludes o	nt end of de	tailed site c	haracterizatio	on (2018)			
Deliverable	- P - V 2018 - P	roject with Vorkshop o	develop app	ers 2011 (Wers to provi	/orkshop) de advice a ultural traini	ing of NWM	IO staff and	with respect t project team peoples in sit	s associate			
Assumptions	people. - T - V	raditional p	peoples in si etailed Trac	iting areas v	will provide d Use Study	insight to the will be con	heir local Tr ducted sep	aditional Kno	wledge and	d land use.		ocal Aboriginal ake place in the
<b>Schedule</b> S	tart Year			1	2010			Finish Year	9	201	8	
	ixed									<b>-</b>		
Calculations Y and Notes: \$ \$ \$ \$ Y \$ \$	5125K (pro 545K Staff 510K Cultu 530 Staff tr 73- Y15 (20 5125K per 545K Staff	ral training ravel 012-2024): \$ year (Work training	iigani) NWMO sta	arch project	•							
\$ Labour Co	30 Staff tr		al Costs	Othe	Costs	Subt	total	Allowance	25%		Total	Cost
\$	-	\$	-	\$	1,890,000	\$	1,890,000	\$	472,500	\$		2,362,500

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### **Work Element Definition Sheet**

WBS (New)	561	10	10	20	40					Prepared I	By: P. Patton
WBS Title	ABORIGINA	AL TRADITIC	NAL KNOW	/LEDGE							
Description	It also inclu and betwe Traditional assisting in create a w making.	udes knowle en commur I Knowledge I the develo orld view th	edge about iities. provides r pment of te at incorpor	developing ules for pro echnologies ates and m	and mainta tecting the to meet th akes sense	lining effect land while e subsisten of all of the	ive and me using it; clar ce, health, t se in the co	aningful relati rifying and enl rade and ritu	ionships be hancing rela al needs of	tween gene ationships a local peopl	contact with the land. erations and within amongst users; e; and helping to ective in decision-
	· sp · th · th · th · as	ne aborigina ne health, tr spects of tra	physical asp nips betwee I sense of r ade and sp aditional co	pects of the en various a esponsibilit iritual need mmunity lif	land, peop spects of th y and stewa s of people; e such as cu	le, wildlife a ne environm ardship; : ultural orien	ind their ha ient, includ ted activiti	ing humans;			vities, recreational e future.
	desktop re Knowledge	search and or experts	related pre in this field	paratory we to assist in	ork. This wo	ork progran on of Tradit	is designe onal Knowl	d to engage the edge in assess	nose involve sment of po	ed as holde otential hos	ough a workshop, ors of Traditional st sites for social, or program include:
	a. hu b.	unting, cerei	monial and	burial sites							important fishing,
	=	cluding prep Monito	paration of rimpact be	case studie nefit agree	concerning	g national r n Canada a	esource ma	nagement ini America	tiatives of i	nterest	ture activities –
	-	nunities in t	pacity build	ding of NWI	MO relation	ship manag		her NWMO st			d support of Aboriginal peoples
		ng areas. f expenditui	res begins i	n 2010 and	concludes a	it end of de	tailed site c	haracterizatio	n (2018)		
Deliverable	- F - V 2018 - F	Program to o	Niigani Eldo f practitiono develop app	ers 2011 (Wers to provi	orkshop) de advice a ltural traini	ng of NWM	O staff and		s associate		2012, 2013, 2016, I to understand
Assumptions	people. - T	Traditional p	eoples in si	ting areas v	vill provide	insight to tl	neir local Tr	aditional Kno	wledge and	land use.	ent of local Aboriginal
	Ē							nd through th		ig steps un	
Schedule	Start Year			10	2019			Finish Year	15	2024	
Туре	Fixed										
and Notes:	\$125K (pro \$45K Staff	ıral training	iigani)	ff							
	\$125K per \$45K Staff	ıral sensitivi	shop, Resea								
Labour (	-	Materia \$	al Costs	Other \$	Costs 1,260,000	Subt	otal 1,260,000	Allowance \$	<b>25%</b> 315,000	\$	Total Cost 1,575,000

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								Estimate			
<u> </u>					Work E	lem	ent De	efinition Sheet			NWMO Cost Code: 0170020-21
WBS (New)	561	15	10	10	110	)					Prepared By: P. Simmons
WBS (Old) WBS Title	SITE SELEC		OCESS 10 OFFICES				l	L			
Description											offices and regional office in nd operation of the DGR.
								is a liaison offi ernment relatio		he NWMO to provid	e information, displays, and other
Deliverable	This catego	ory's prim	ary delivera	ble is the	provision o	f a s	tore fr	ont operation/	liaison	in communities.	
	A complen	nentary d	eliverable is	the ongo	ing relation	ship	buildi	ng/maintenand	e, NWI	MO brand support, a	nd community presence.
Assumptions					ers a store f aison office		t opera	ation. Only tho	se com	munities moving from	m Step 2 into Step 3 will be
		-	egin (no sto	refronts).							
	2011 – scre		ontinue. / initiated af	feasihilit	v stage						
	The screer communiti	nings initi es should ibility stu	ated in late I they enter dies will be	2010, and during th	l 2011, are a	e ass	umed	to begin optin	g out, c	or be screened out. It	) in 2011. Other screened is also assumed that the timing nunities (4) will receive a store
	store front	s will be r	equired in 2	2012 in ad	dition to th	e 4 i	nitiate	ed in 2011. Diss	imilar t		e initiated. Assumed that 4 more that the all store fronts in 2012 12 = 8).
								ation during 20 I conditions.	12 – ea	rly closure of a store	front may come from self-
					emerge fro			pleted feasibili	ty studi	ies. Any remaining fe	asibility communities (lower
	Store front	s in 2013	= 2 per can	didate site	e = 4.						
	'region.' Th	ne 'region		osed site	location in						community, the other in the ocation of the Centre of Expertise
	selected, 2 undergrou	of the 4 : nd Lab. Tl	store fronts he local stor	will close e front (ir	. The remain	ning y) w	2 will ill rem	continue throu	gh to c n until	onstruction of the fu 2035. The Centre of	o. Once the preferred site is all Centre of Expertise c/w Expertise/lab morphs into the 2 <sup>nc</sup>
	to be min.	1500 ft2.	Leased, util	ities, taxe	s, overhead	, tra	vel - \$	60,000 per sto	re fron		and displays. Storefront assumed I. Assumed that marginally I.
ł	ļ										
Schedule	Start Year			<u></u>	1 2	010			Finis	sh Year 9	2018
Туре	Fixed			•••••		•••••					
						·····					
Calculations and Notes:			udget Y02 (2							\$120,000	
	Y03 (2012)		000 for full yea		240,000 11) = \$240,	000				\$ 480,000	
	Y05 (2014)	1 x \$60,	000 x ea. ca	ndidate (2	) C of E und	ler d	levelop			\$ 240,000	
	Y06 (2015) Y07 (2016) Y08 (2017) Y09 (2018)	« «	лоо x ea. ca	ndidate si	te (2), C of E	: mc	orpns II	nto '2 <sup>na</sup> store f	ront	\$ 120,000 \$ 120,000 \$ 120,000 \$ 120,000	
					elected = 1 l 60,000 x 6			front, 1 at Cen	re of E	xpertise = \$360,000	
	Y16 (2025)	- Y21 (2	<b>030)</b> Prefer	red site –	1 local stor			at Centre of Ex 0,000 x 6yrs	oertise,	/UG lab. = \$ 360,000	
	Y22 (2031)	– Y26 (20	<b>034)</b> 1 local	store fror	it, Centre of			/UG lab remair 0,000 x 4yrs	ıs until	operations begin in 2 = \$ 240,000	2035 (5 years).
Labour (	Costs	Mate	erial Costs	0	ther Costs			Subtotal	Alle	owance 25%	Total Cost
\$	-	\$	-	\$	1,560,0	000	\$	1,560,00	-	390,000	\$ 1,950,000

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					APIV	Cost E	stimate				
					Work Elen	nent De	finition Sheet			NWMO Cost Code: 01700	120.21
WBS (New)	561	15	10	20	40	1	i .			Prepared By: P. Simmo	
WBS (Old)		TION PROC		<u>.]</u>							
WBS Title  Description				nses (non-	staffing relate	ness (he	ciated with the c	neration	of 'store front'	offices and regional office i	in
Jesen paren										nd operation of the DGR.	
<u></u>	•						is a liaison office rnment relations		IWMO to provide	e information, displays, an	d other
Deliverable	This catego	ory's prima	ry deliveral	ble is the p	rovision of a	store fr	ont operation/lia	ison in co	mmunities.		
	A complen	nentary del	iverable is	the ongoin	g relationship	buildir	ng/maintenance,	NWMO I	orand support, a	nd community presence.	
A											
Assumptions			Step 3 a. o			it opera	ation. Only those	commun	ities moving fror	n Step 2 into Step 3 will be	į
	2010 – scr	eenings be	gin (no stor	efronts).							
	2011 – scr										
	communit	nings initia ies should t ibility studi	ed in late 2 hey enter o es will be 5	2010, and 2 during this	2011, are assu period are as	sumed	to begin opting o	out, or be	screened out. It	in 2011. Other screened is also assumed that the t unities (4) will receive a st	
	store front	s will be re	quired in 2	012 in add	ition to the 4	initiate		ilar to 20	11, however, is t	e initiated. Assumed that 4 that the all store fronts in 2 12 = 8).	
					d to remain i			– early c	losure of a store	front may come from self-	-
					emerge from a		oleted feasibility	studies. A	Any remaining fe	asibility communities (low	er
	Store front	s in 2013 =	2 per cano	didate site	= 4.						
	'region.' Th	ne 'region'		osed site lo	ocation in eac					ommunity, the other in the cation of the Centre of Exp	
	selected, 2 undergrou	of the 4 st	ore fronts ore local store	will close. 1 e front (in d	The remaining	g 2 will vill rem	continue through	to const until 2035	ruction of the fu 5. The Centre of I	. Once the preferred site is Il Centre of Expertise c/w Expertise/lab morphs into	
	to be min.	1500 ft2. L	eased, utili	ties, taxes,	overhead, tr	avel - \$		front (st	aff not included)	nd displays. Storefront ass . Assumed that marginally	
<b>}</b>	<u> </u>										
Schedule	Start Year			.]	10 2019	)		Finish Ye	ar 15	2024	
Туре	Fixed										
Calculations	Current ap	nroved hu	lget VO2 (2	010) = \$0							
and Notes:	Y02 (2011)				.000)			Ş	5120,000		
	Y03 (2012)		00 for full y 00 (full year		10,000 1) = \$240,000	)		Ş	\$ 480,000		
	Y05 (2014)	1 x \$60,00	00 x ea. car	ndidate (2)	C of E under	develop	ed in each comm oment nto '2 <sup>nd</sup> store fro		\$ 240,000 \$ 240,000 \$ 120,000		
	Y07 (2016) Y08 (2017) Y09 (2018)	« «	oo x ea. cai	ididate site	: (2), C 01 E 111	oi piis ii	ito 2 store iroi	5	\$ 120,000 \$ 120,000 \$ 120,000		
					ected = 1 loca 60,000 x 6 yea		ront, 1 at Centre		tise \$360,000		
	Y16 (2025)	– Y21 (20	<b>30)</b> Prefer	red site – 1			at Centre of Expe 0,000 x 6yrs		lab. 360,000		
	Y22 (2031)	– Y26 (203	<b>34)</b> 1 local s	store front,			/UG lab remains i ,000 x 4yrs		rations begin in 2 240,000	2035 (5 years).	
Labour (	Costs	Mater	ial Costs	Oth	ner Costs		Subtotal	Allowa	nce 25%	Total Cost	
\$	-	\$	-	\$	2,160,000	\$	2,160,000	\$	540,000	\$ 2,7	00,000

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	APM Cost Estimate	
	Work Element Definition Sheet NWMO Cost Code: 017002	0- <b>21</b>
WBS (New) WBS (Old)	561         15         10         30         20         Prepared By: P. Simmon	
WB3 (Olu)	SITE SELECTION PROCESS	
WBS Title	STORE FRONT NWMO OFFICES	
Description	Category includes all those expenses (non-staffing related) associated with the operation of 'store front' offices and regional office in communities involved in the site selection process from Step 3 through to selection of host community, and operation of the DGR.	
	Store front operation is both 'in community' and 'regional' and is a liaison office for the NWMO to provide information, displays, and related public relations activities including municipal/local government relations.	other
Deliverable	This category's primary deliverable is the provision of a store front operation/liaison in communities.	
	A complementary deliverable is the ongoing relationship building/maintenance, NWMO brand support, and community presence.	
Assumptions		
Assumptions	The Feasibility stage (Step 3 a. or b.) triggers a store front operation. Only those communities moving from Step 2 into Step 3 will be candidates for a store front/community liaison office.	
	2010 – screenings begin (no storefronts).	
	2011 – screenings continue. Store fronts are only initiated at feasibility stage.	
	The screenings initiated in late 2010, and 2011, are assumed to lead to 4 feasibility studies (stages a or b) in 2011. Other screened communities should they enter during this period are assumed to begin opting out, or be screened out. It is also assumed that the tin of the feasibility studies will be 50% early in the year, 50% latter part of year. Each of the feasibility communities (4) will receive a sto front operation in 2011.	
	2012 – Assumed that more communities may enter screening stage, and 4 more feasibility studies may be initiated. Assumed that 4 r store fronts will be required in 2012 in addition to the 4 initiated in 2011. Dissimilar to 2011, however, is that the all store fronts in 20 will be required at the beginning of the year for the duration of the year (total store fronts required in 2012 = 8).	
	All feasibility stage store fronts are assumed to remain in operation during 2012 – early closure of a store front may come from self- elimination by the community or clear revelation of suboptimal conditions.	
	In 2013, 2 candidate sites are assumed to emerge from all completed feasibility studies. Any remaining feasibility communities (lower ranked) will see the removal/closure of store front operations.  Store fronts in 2013 = 2 per candidate site = 4.	-
	The candidate sites selected from the feasibility studies will host 2 store front operations – 1 in the host community, the other in the 'region' The 'region' is the proposed site location in each candidate community, and also the proposed location of the Centre of Expe (C of E) assumed to commence operation in 2014.	ertise
	It is assumed that each of the 2 candidate sites will require 2 store fronts (total of 4) between 2013-2018. Once the preferred site is selected, 2 of the 4 store fronts will close. The remaining 2 will continue through to construction of the full Centre of Expertise c/w underground Lab. The local store front (in community) will remain in operation until 2035. The Centre of Expertise/lab morphs into the store front/information centre - no Centre of Expertise costs are included in these estimates.	ne 2 <sup>nd</sup>
	Store front(s) will be staffed (staffing FTE's budgeted elsewhere), and resourced with supplies, material, and displays. Storefront assu to be min. 1500 ft2. Leased, utilities, taxes, overhead, travel - \$ 60,000 per store front (staff not included). Assumed that marginally frequent travel of staff between NWMO office (Toronto) and candidate site communities will be required.	med
<u> </u>		
Cob odu!-	Chart Voor 46 3035 Project Voor 27 2001	
Schedule	Start Year   16 2025   Finish Year   25 2034	
Туре	Fixed	
Calculations	Current approved budget YO2 (2010) = \$0	
and Notes:	Y02 (2011) 2 x \$60,000 for full year (\$120,000) \$120,000	
	Y03 (2012) 4 x \$60,000 for full year = \$ 240,000 4 x \$60,000 (full year from 2011) = \$240,000 \$ 480,000	
	Y04 (2013) 2 x \$60,000 x in ea. candidate site (2)) (C of E initiated in each community) \$ 240,000	
	Y05 (2014) 1 x \$60,000 x ea. candidate (2) C of E under development \$240,000 Y06 (2015) 1 x \$60,000 x ea. candidate site (2), C of E morphs into '2 <sup>nd</sup> store front' \$120,000	
	Y07 (2016) « « \$ 120,000	
	Y08 (2017) «	
	Y10 (2019) to Y15 (2024) Preferred site selected = 1 local storefront, 1 at Centre of Expertise  1 x \$60,000 = \$60,000 x 6 years = \$360,000	
	Y16 (2025) – Y21 (2030) Preferred site – 1 local store front, 1 at Centre of Expertise/UG lab.  1 x \$ 60,000 x 6yrs = \$ 360,000	
	<b>Y22 (2031) – Y26 (2034)</b> 1 local store front, Centre of expertise/UG lab remains until operations begin in 2035 (5 years).  1 x \$60,000 x 4yrs = \$240,000	
Labour (		
\$	- \$ - \$ 3,120,000 \$ 3,120,000 \$ 780,000 \$ 3,900	0,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	10				Prepared I	Зу:	K.			
WBS (Old)	552	40	10	<u> </u>										
WBS Title	SITE ACQU	ISITION AND	D IMPROVE	MENTS										
Description	Option to	purchase sit	tes and eve	ntual purch	ase of land	to house th	e DGR.							
Deliverable	Layout of the facilities and services on the selected site.  Purchase land and mineral rights for the site, access route and township.  Preparation of the site, including clearing and rough grading.  Preparation of the site access route.  Provision of initial site security facilities.  Site improvements including landscaping and final grading/drainage.  Provision of on-site road and rail transportation routes and parking.  Land requirements will be 3150 hectares, 3 km x 2km for DGR footprint, 25 km x 20 m access route and 5 km x 5 km for the township.													
Assumptions	Land cost ( (NOTE: Per Land regist Site is a fla Access roa Rail access	\$5000 per hor lan P. receitration and I	ectare, inclo nt experien legal fees, 5 a situated in m wide and is not requi	uding miner ce for crow 50% of land In the Canad Id 25 km in lo	ral rights co n land purc cost. ian Shield, v ength	sts. hase was \$1 within 25 kn	,000 per he			5 km x 5 l	km for the townsh	nip.		
Schedule	Start Year			1	2010	)		Finish Year	9	20	18			
Туре	Step-Fixed													
Calculations and Notes:														
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%		Total Cost			
Ś	1,054,607	\$	-	\$ 1	15,075,000	\$ :	16,129,607	\$	4,032,402	\$	20.1	62,009		

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	20	10					Prepared By:	A. Murchison
WBS (Old)	552	40	10								
WBS Title	SITE ACQU	IISITION AND	) IMPROVE	MENTS							
Description	Option to	purchase site	es and eve:	ntual purch	ase of land	to house th	e DGR.				
Deliverable	Purchase la Preparatio Preparatio Provision c Site impro	the facilities and and minion of the site, on of the site of initial site evenents included	eral rights, including access rou security fac	for the site, clearing and ite. cilities. Iscaping and	access rou I rough grad	ding. ng/drainage	·				
Assumptions	Land cost ( (NOTE: Per Land regist Site is a fla Access roa Rail access	\$5000 per he r Ian P. recen tration and le	ectare, inclo nt experien egal fees, 5 n situated in m wide and s not requi	uding miner ace for crown 50% of land on the Canadi d 25 km in le red.	ral rights co n land purc cost. ian Shield, v ength	sts. hase was \$1 within 25 kr	.,000 per he			5 km x 5 km foı	the township.
Schedule	Start Year			10	2019	)		Finish Year	15	2024	
Туре	Step-Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs	Other	Costs	Sub	total	Allowance	25%	То	tal Cost
Ś	1,406,143	ċ		<b>S</b> 1	18,000,000	\$		+	4,851,536		

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	170					Prepared By:	J. Robi	nson
WBS (Old)												
WBS Title	PRODUCTI	ON, TRANSL	ATION OF S	ITING PRO	CESS DOC							
Description	Siting Docu	ıment										
Deliverable	Design, pro	oduction and	d translatio	n of the Siti	ng Docume	nt						
Assumptions	50 pages ir	n length, des	ign comple	ted interna	illy, product	ion (printi	ng) and trans	slation done e	externally			
Schedule	Start Year			1	2010			Finish Year	9	2018		
Туре	Fixed											
Calculations	- <del> </del>											
and Notes:	2010 100K	(will be less	because de	esign is beir	ng done inte	ernally)						
Labour	Costs	Materia	al Costs	Othe	r Costs	Su	btotal	Allowance	25%	To	tal Cost	_
\$	-	\$	-	\$	100,000	\$	100,000	\$	25,000	\$		125,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	140					Prepared By:	K. Shav	/er
WBS (Old)												
WBS Title	DVDs FOR	SITING										
Description	NWMO Co	re Video										
Deliverable	Update the	e NWMO co	re video to	reflect init	iation of the	site sel	ection process.					
Assumptions	The core vi	deo needs t	o be updat	ed. Not an	entire re-w	rite.						
Schedule	Start Year				L 2010	)		Finish Year	4	2013		
Туре	Fixed											
Calculations and Notes:	2010 - 201	5: \$40K/yea	r									
Labour	Costs	Materia	al Costs	1	r Costs		Subtotal	Allowance	25%		tal Cost	
\$	-	\$	-	\$	240,000	\$	240,000	\$	60,000	\$		300,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	70				Prepared By:	J. Facella
WBS (Old)										
WBS Title	THIRD PAR	TY REVIEWS	5							
·	Expenses a				of NWMO	's site assessment worl	k by a Third Pa	rty Review	group of exper	ts, as documented
Deliverable										
Assumptions										
Schedule	Start Year			2	2011		Finish Year	13	2022	
Туре	Fixed									
and Notes:	these step: Review is c	s will be det optional), co	ermined by	the commu	unity. Trigge y assessmer	key steps in the site selver points in the process of (feasibility study) in someting in the process of the study in the s	are: completions Step 3, and cor	on of initia	l screening in St	ep 2 (Third Party
Labour (	Costs	Materia	al Costs	Other	Costs	Subtotal	Allowance	25%	Tot	al Cost
\$	-	\$	-	\$	650,000	\$ 650,000	\$	162,500	\$	812,500

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	APM Cost Estimate
	Work Element Definition Sheet
WBS (New) WBS (Old)	561 15 10 10 30 <b>Prepared By:</b> J. Facella
WBS Title	COMMUNITY CAPACITY BUILDING – Community support for participation in Step 1 and Step 2 of the Siting process (information and initial
Description	The work package is designed to capture funding which will need to be provided to communities (regions, band councils etc. as outlined in siting document) to support their participation in the early steps of the siting process (Step 1 and Step 2)
	Communities     a. Travel costs associated for a small group of community representatives to travel to an NWMO briefing in a nearby regional hub or NWMO offices: Estimate \$10,000 per community
	<ul> <li>Proposals to hire a third party expert to review material published to date, in order to answer questions the community representatives may have about the safety of the project and the basis for confidence at this early stage: Estimate \$15,000 per community</li> </ul>
	<ul> <li>Travel expenses associated with trip to visit an interim waste storage site by a small representative delegation: Estimate maximum \$20,000 per community</li> </ul>
	<ul> <li>d. Hire a third party expert to review NWMO's evaluation of the suitability of the community based on readily available information and a short list of initial screening criteria (Step 2): Estimate \$15,000 per community</li> </ul>
	<ul> <li>Should initial screening suggest community has potential to be suitable for the project the community, as represented by accountable authorities, may request and receive resources (funding and information, if desired) to develop and/or augment an existing sustainability plan which captures the long-term vision the community has for itself: Estimate \$40,000 per community</li> </ul>
	f. Should initial screening suggest community has potential to be suitable for the project, the community as represented by accountable authorities, may request and receive resources (funding and information, if desired) to engage citizens and begin to explore interest in hosting the project: Estimate \$20,000 per community
	Total of above per community: Potentially \$120,000.
	Note, uncertainties include: number of activities a community will choose to participate in; length of time a community will wish to take to complete all the tasks; number of communities who will enter the process and request funding and drop out before initial screening. Assumption for cost estimating purposes is that all tasks are completed in the calendar year noted.
	NOT INCLUDED IN COST ESTIMATE: Other support which communities may request: g. Funding to support a community based advisory or liaison group to work with NWMO to conduct the initial screening: Estimate \$25,000 for each community
	h. Funding to support an FTE or partial FTE municipal staff: Estimate \$40,000 - \$80,000 per community i. Honorarium/reimbursement for attending meetings for public and elected politicians and out of pocket expenses
	COVERED IN A SEPARATE WED: Funding national and provincial Aboriginal organizations:     j. National organizations: Activities similar to a-h although completed at a non-site specific level and also develop informatio and communication material about the project to inform Aboriginal peoples.  k. Provincial organizations: Activities similar to a-h although completed at a non-site specific level.
	<ul> <li>k. Provincial organizations: Activities similar to a-h although completed at a non-site specific level.</li> <li>3. Funding regional level:</li> <li>l. No Funding planned at the regional level at this point in the process</li> </ul>

- Non-profit organizations and academics: See separate WED sheet
- 5. NWMO staff travel costs associated with trips to community in order to plan for, deliver and support (participate) community in capacity building activity and other relationship building. Note that each trip may involve a stay of one week or more:

  - Estimate \$5,000 associated with each community
    Estimate \$5,000 associated with each community
    Estimate \$5,000 associated with each community
    Estimate \$5,000 associated with each community
    Estimate \$10,000 (2 or 3 trips) associated with each community
    Estimate \$10,000 (2 or 3 trips) associated with each community
    Estimate \$10,000 (2 or 3 trips) associated with each community
    Estimate \$40,000 associated with each community

  - Estimate \$18,000 (6 trips) associated with each of 5 national organizations
    Estimate \$18,000 (6 trips) associated with each of 7 provincial organizations in 2010

Total of above per community: Potentially \$255,000.

L	i											
Deliverable	Support to	communitie	es to engage	e in vario	us activities as	ssociated with Step	1 and St	tep 2 in th	ne siting pro	cess		
<u> </u>	<u> </u>											
Assumptions	Assumes a	50% take-u	p rate on pu	ıblished o	capacity buildi	ng program; assun	nes intere	ested con	nmunities co	mplete	e Steps 1 and 2 by 6	end of
	2011.											
	ļ											
ļ	<u> </u>											
Schedule	Start Year				1 2010		Fini	ish Year	3	2	2012	
Туре	Fixed											
Calculations	Costs reflec	ct commitm	ents made i	in Learn I	More Program	- Early Steps publi	shed on	the webs	ite.	•••••		
and Notes:						, , ,						
Labour (	Costs	Materia	al Costs	Oth	ner Costs	Subtotal	Al	lowance	25%		Total Cost	
\$	-	\$	-	\$	867,000	\$ 867,	000 \$		216,750	\$	1,0	083,750

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	Work Element Definition Sheet
WBS (New) WBS (Old)	561   15   10   10   60
WBS Title	COMMUNITY CAPACITY BUILDING – Community support for participation in Step 3 of the Siting process (feasibility study)
Description	The work package is designed to capture funding which will need to be provided to communities to support their participation in Step 3 of the siting process. The nature of funding provided to be outlined in a memorandum of understanding between the community(ies) involved at this stage and the NWMO. Use of funds is subject to third party audit.
	Communities     a. Travel expenses associated with trip to Sweden (or Carlsbad) to visit research facilities and to meet with community leaders involving a small representative delegation from the community: Estimate maximum \$40,000 per community
	<ul> <li>b. Hire a third party expert or establish a peer review group to support community's participation in feasibility study (Step 3), community based advisory group and part or full FTE to work with NWMO to conduct the feasibility study, develop information and communication material about the project to inform citizens and foster dialogue, conduct activities to inform residents and assess interest in surrounding areas, including First Nations, Métis and Inuit as appropriate: Estimate \$150,000 per year</li> </ul>
	c. Establish a community office for the project: See budget for store front offices described elsewhere
	Total of above per community: 2011: \$200,000 2012: \$624,000
	Note, assumptions and uncertainties include: Only 4 of 8 communities which begin this step will remain through to the end of the step, meaning that more resources will be devoted to these communities during this step than to the communities which drop out
	<ol> <li>Funding available to accountable authorities in potentially affected surrounding areas, including First Nations, Métis and Inuit, as appropriate, to support their participation.</li> </ol>
	d. Travel costs associated for a small group of community representatives to travel to an NWMO briefing in a nearby regional hub or NWMO offices: Estimate \$10,000 per community  e. Proposals to hire a third party expert to review material published to date, in order to answer questions the community
	representatives may have about the safety of the project and the basis for confidence at this early stage: Estimate \$15,000 per community
	f. Travel expenses associated with trip to visit an interim waste storage site by a small representative delegation: Estimate maximum \$20,000 per community
	<ul> <li>g. Hire a third party expert</li> <li>h. Develop information and communication material about the project to inform Aboriginal peoples and support their exploration of interest in hosting the project</li> </ul>
	i. Funding to support a partial FTE municipal staff and honorarium/reimbursement for attending meetings for public and elected politicians.
	2011: \$204,000 2012: \$624,000
	Funding to region     j. Included in above.
	4. COSTS FOR THIS ITEM OUTLINED IN A SEPARATE WED. Funding national and provincial Aboriginal organizations: k. National organizations: Activities similar to a-b although completed at a non-site specific level. l. Provincial organizations: Activities similar to a-b although completed at a non-site specific level.
	5. NWMO travel costs associated with trips to community in order to plan for, deliver and support (participate) community in capacity building activity and other relationship building:
	Communities: Assume 6 trips to each at \$7,000 each.     Surrounding communities: Assume 4 trips to each     INCLUDED IN OTHER WED: Estimate \$18,000 (6 trips) associated with each of: 5 national organizations in 2012 (\$90,000)
	· INCLUDED IN OTHER WED: Estimate \$18,000 (6 trips) associated with each of: 6 provincial organizations in 2012 (\$108,000)
	Total of above: 2011: \$100,000 2012: \$100,000
Deliverable	Support to communities to engage in various activities associated with Step 3 in the siting process
Assumptions	
Schedule	
	Start Year   2 2011   Finish Year   3 2012
Туре	Fixed

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Other Costs

Subtotal Allowance 1,900,000 \$

**25%** 475,000

**Total Cost** 

Calculations and Notes:

**Labour Costs** 

Material Costs

### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	150					Prepared By:	J. Facella
WBS (Old)		<u> </u>	İ	İ	<u></u>	İ	.i				
WBS Title	COMMUNI characteriz		TY BUILDING	6 – Commui	nity support	for partici	pation in Ste	p 4/5/6 of the	Siting proc	ess (detailed s	ite
Description	the siting p	rocess. Th	e nature of	funding pro	vided to be	outlined ir	•	dum of unde		ort their partic	cipation in Step 4 of mmunity(ies)
	a. F charact b. F	unding to e erization: E unding for	eight commu stimate: \$8 two commu	unities to pa 5,000 in 20 unities to hi	articipate in 13 re a third pa	process to	decide 2 cor	maintain a pe	er review g		rt community's
	site cha activitie for eacl	racterizations to inform the of 2 comm	on, conduct residents in nunities in e	activities to n surroundi each of 2013	inform resing areas, in 3 - 2018	dents and cluding Firs	assess and d it Nations, M	emonstrate v létis and Inuit	villingness ir as appropri	the communi ate: Estimate	\$250,000 per year
				-			_			cribed elsewhe	
	3	_			-					nities surround ovincial organi	ding each of the zations)
	represe	entatives) a	nd to pay fo	r their norn	nal operatio	ns, logistic	al support, d	evelopment o	of communic		and province Is and working of two communities
	initiate educati surrour	programs to	o increase t aining progi nunities, reg	his capacity	and local s al workers,	ourcing. TI infrastruct	nis may inclu ure and busi	de strategic i ness developi	nvestment i nent studies	n commercial/ s, etc. Focus o	ure benefits and industry sectors, n local community, o regions during the
	each co	mmunity (4	4 meetings f	for each pe	year), pote	ntially affe	cted Aborigi	nal peoples (4	meetings p	er year with e	dy organization for ach of 4 Aboriginal for the period 2013
	Total of the	2013: \$ 2014: \$	\$1.040M 1.732M \$1.767M								
	Note some	allowance	for commui	nities begini	ning this ste	p in the sit	ing process n	nid way throu	gh the year	in 2013 has be	een made.
Deliverable	Support to	communiti	es to engag	e in various	activities a	ssociated v	vith Step 4/5	/6 in the sitin	g process		
Assumptions	•										
Schedule	Start Year			4	2013			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs		ial Costs	1	r Costs	Sul	ototal	Allowance	25%		otal Cost
\$	-	\$	-	\$	3,888,000	\$	3,888,000	\$	972,000	\$	4,860,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	50					Prepared By:	J. Facella
WBS (Old)				<u></u>							
WBS Title	CAPACITY I	BUILDING O	F OTHERS -	- Non profit	organizatio	ns/ academ	ics				
Description	regulatory and people	review stag e's health. \$200,00	e and to fo  O per year, travel cost	llow and even	aluate issue n 2012	s concernin	g the dispos	sal of radioact	ive waste a	•	eading up to the the environment
Deliverable											
Assumptions											
Schedule	Start Year			3	2012			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour	Costs		al Costs		Costs	Subt		Allowance	25%		tal Cost
\$	-	\$	-	\$	1,400,000	\$	1,400,000	\$	350,000	\$	1,750,000

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### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	15	10	10	130					Prepared By: J. Facella
WBS Title	MANAGIN	G COMMUN	IITY IMPAC	rs (Commu	nity Benefits	5)				
Description		Region Transpor Losing p	nmunity ding commu rtation com otential hos	unities munities as t communit	,				gin with	granting of construction licence.
	· Th project · Th · Th · Th inclusio	ne need for, ne need for, ne mechanis ne approach	which the and nature and nature om to be use of for ensurir	NWMO and of, provision of, any dec ed for dispu	the comm on of resour ision-makin te resolutio term sustain	ces and fung and/or action	ding for tec dvisory bodi well-being	hnical and other es to support the	assistan e process	
	As negotia · U · Er · Er	ted with the pgrades to I mergency re	e communit ocal roads a esponse, tra al oversight	y, it may als and infrastronsportation and monito	so include: ucture ı monitoring	g, accident l	iability and	transportation co		aining on, and emergency response in
	· Er support · Re · M	t community ecords centi	al monitorir y based mo re as part of conference	ng and resea nitoring Centre of E centre, loca	erch centre Expertise al training a	as part of C				aseline health studies; fund to
	· An or othe control of the control	unding for indvanced mar; centre for unding for sommunity docal procure usiness deveraining — emonomic assistergeneration	nufacturing r hazardous chool equip ionations pr ment progre elopment pr iergency res istance grai onal fund	and innova waste man ment and c ogram am rojects sponse and at to offset	agement ex urricula radioprotec	cellence	lated equip		aterials e	ducation and training programs
	item to be wil	negotiated It is expe	with the co ected that a d being sele	mmunity. Milestone   ected as pre	payment wi ferred comi	ll be made munity in st	upon the co	mmunity making	g a comp	rom the project) is a contingent elling demonstration of t community, losing community
Deliverable										
Assumptions										
Schedule	Start Year			3	2012			Finish Year	9	2018
Type  Calculations and Notes:	Fixed									
Labour (	Costs -	Materi \$	al Costs	Other \$	Costs -	Sub \$	total -	Allowance \$	<b>25%</b> -	Total Cost

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### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	15	10	20	50					Prepared By: J. Facella
WBS Title	MANAGIN	G COMMUN	IITY IMPAC	TS (Commu	nity Benefi	ts)				
Description		Surroun Region Transpo Losing p	mmunity ding comm entation con ootential ho	nunities nmunities a ost commun					) begin wit	h granting of construction
	· Ti the pro · Ti · Ti · Ti specific	oject he need for, he need for, he mechani	y which the , and natur , and natur sm to be us n for ensuri	e NWMO and e of, provisi e of, any de sed for disp ng the long	d the comn on of resou cision-maki ute resoluti -term susta	rces and fu ng and/or a on inability an	nding for te dvisory boo	echnical and ot dies to support	her assista the proce	
	· U · E · In relat · A · E · suppor · R · M monito · F · A progra · F · C · L · B	nvironment ion to environment of the communit tecords cent deeting and oring at univending for it	local roads esponse, tra al oversigh onmental is with affected al monitority based more as part of conference ersity as pandependen anufacturing centre for chool equipolations perment progelopment pro	and infrastical sportation to an and infrastical success and Aborigin ng and reseonitoring of Centre of a centre, local to oversight g and innoving	ructure In monitorir In monitorir In monitorir In garee In organizat I	ions e as part of e and busines se ing centre; I agement ex	ding oversign oversign of Extended for the contrelation of Extended for the contrelation of the contrelati	xpertise (separ search center tal/ hazardous	, remediat ate WED); for indepe	training ion, and emergency response baseline health studies; fund to ndent environmental impact education and training
	· Ir · P Estimated contingent · w	t item to be It is exp	onal fund ue protection of hosting a negotiated ected that and being se	on agreement ( with the co a Milestone lected as pr	above and ommunity.  payment weferred con	beyond ecc vill be made nmunity in	nomic bene upon the c step 6. Will	community ma	king a com	from the project) is a spelling demonstration of cost community, losing
Deliverable										
Assumptions Schedule	Start Year			10	2019			Finish Year	15	2024
Type  Calculations and Notes:	Fixed									
Labour (	Costs	Materia \$	al Costs	Other \$	Costs	Sub	otal	Allowance \$	25%	Total Cost
\$	-	>	-	<b>\</b>	-	>	-	>	-	-

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### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	15	10	30	30					Prepared By: J. Facella
WBS Title	MANAGIN	G COMMUN	NITY IMPAC	TS (Commu	nity Benefi	:s)				
Description		Surroun Region Transpo Losing p	mmunity ding comm ortation cor ootential ho	nunities nmunities a ost commun					begin wit	h granting of construction
	· Ti the pro · Ti · Ti · Ti · Specific · Ti  As negotia · U · E · E in relat	pject  he need for, he need for, he mechani he approach c inclusions he approach ted with the pgrades to mergency re nvironment ion to envir	y which the , and natur , and natur sm to be us n for ensuri n to manag e communi local roads esponse, tr al oversigh onmental is	e of, provisi e of, any de sed for disp ng the long ing the imp ty, it may al and infrasti ansportatio t and monit	on of resou cision-maki ute resoluti -term susta acts associa so include: ructure n monitorir oring agree	rces and fung and/or a on inability an tion with the ag, accident ment include	nding for to dvisory bo d well-bein e project liability and	echnical and oth dies to support g of the commu d transportation	ner assista the proce nity throu	ss igh the project, outlining
	· Ei suppor · R · N monito · Fi · A prograi · Fi · C · Lu · B · Ti · Ei · Ir	t communit ecords cent Meeting and oring at univ unding for in	al monitori y based mo re as part o conference ersity as pa ndependen anufacturin ; centre for chool equi donations p ement prog elopment p nergency re sistance gra ional fund	ng and rese onitoring of Centre of e centre, loo int of Centre t oversight g and innov hazardous oment and program gram orojects esponse and ant to offset	Expertise cal training a of Expertise ration traini waste manacurricula	as part of and busines the ang centre; I agement ex	s centre, re nvironmer cellence	esearch center f	or indepe	baseline health studies; fund to ndent environmental impact education and training
	contingent w	item to be It is exp	negotiated ected that nd being se	with the co a Milestone lected as pr	ommunity.  payment weferred con	vill be made	upon the o	community mak	king a com	from the project) is a spelling demonstration of ost community, losing
Deliverable										
Assumptions										
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
Calculations and Notes: Labour (	Costs	Materia	al Costs	Other	Costs	Sub	otal	Allowance	25%	Total Cost
\$	-	\$	-	\$	-	\$	-	\$	-	\$ -

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### **Work Element Definition Sheet**

WBS (New) WBS (Old)	561	15	10	40	30					Prepared By: J. Facella
WBS Title	MANAGIN	G COMMUI	NITY IMPAC	TS (Commu	nity Benefit	:s)				
	Benefits to  Benefits to licence.  Hosting ag  Ti the pro  Ti  Ti specific	be defined Host co Surrour Region Transpo Losing p begin with reement co he means b bject he need for he mechani	I for each o mmunity ading commontation corpotential hotel triggering which the analysis and nature, and natures to be used for ensuring the analysis and the a	f: nunities nmunities a ost commun formal regu may include NWMO an e of, provisi e of, any de sed for dispi ng the long	s a large gro ity latory revie e: d the comm on of resou cision-maki ute resoluti -term susta	w process r nunity will w rces and fu ng and/or a on inability and	nilestone. vork togeth nding for tr dvisory bo d well-bein	Full benefits to be ther to seek regul- echnical and othe dies to support t	atory app er assista he proce	
	As negotia  U E I I I I I I I I I I I I I I I I I	ted with the pgrades to mergency renvironment ion to envir greements nvironment t communit ecords cent decting and uring at univunding for i	e communi local roads esponse, tr cal oversigh conmental i with affect cal monitori by based mo cre as part of conference ersity as pa ndependen anufacturin	ty, it may all and infrasticansportation that and monit is sues and reseonitoring of Centre of a centre, local in the coversight g and innoversight and innover	so include: ructure n monitorin oring agree al organizat earch centre Expertise cal training a e of Expertis	g, accident ment includions as part of d and busines ie	liability an ding oversig Centre of E s centre, re	esearch center fo	remediat te WED); or indepe	training ion, and emergency response baseline health studies; fund to ndent environmental impact education and training
	FI CONTROL BOTH BOTH BOTH BOTH BOTH BOTH BOTH BOTH	unding for sommunity of cocal procured usiness deveraining — enconomic assistergenerat roperty valuational value at item to be	cchool equip donations perment progetone transfer of elopment progetone transfer of esistance grational fund use protection of hosting and negotiated ected that and being se	oment and orogram ram projects esponse and ant to offset on egreement (  with the co a Milestone lected as pr	radioprote impacts of above and ommunity.	ction and ri transportal beyond ecc vill be made nmunity in :	elated equi ion nomic ben upon the step 6. Wil	nefits which natu	ng a com	from the project) is a pelling demonstration of ost community, losing
Deliverable										
Assumptions										
Schedule	Start Year			26	2035			Finish Year	26	2035
Туре	Fixed									
Calculations and Notes: Labour (	Costs -	Materi \$	al Costs	Other \$	Costs	Sub	total -	Allowance \$	<b>25%</b>	Total Cost

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	160					Prepared By: J. Facella
WBS (Old)	0									
			- (* )							
WBS Title	CENTRE OF	EXPERTISE	(NEW)							
Description	(As out initially which i demon enviror of the other timplem	lined in the to support s an import stration pro imental and community h public vie nentation o	siting docu the multi-y tant compor ogram involved d socio-ecor to learn mo wing gallerie f a deep geo	ment, centrear testing and to the solution of	e of experti and assessn siting proces hers and ot ultural impa e project, to active displa sitory and t	se will be enter of the second	stablished a site on tech the home in a wide vi ent. The ce cientific and d as a small riety of rela	t the site, or n nical safety an for an active to ariety of discip ntre of experti I engineering v science centre ted activities, i	earby as de d communi echnical and lines includ se will also work involv e focused o t will be de	detailed site characterization. termined with the community, ty well-being related dimensions disocial research and technology ing rock science, engineering, be a focus for engaging members ed in site assessment in progress in the design, construction and signed not only as a meeting region and beyond.)
	outline will be demon over se	d in the siti expanded t strate the s veral decad	ng documer to include ar safety of the	nt, should th nd support to facilities be been the ca	ne site be ul the construct fore they a se for deep	timately sel tion and op re construct geological r	ected to ho eration of a ted and ultine repositories	st the deep ge in undergroun mately to supp	ological rep d demonst oort the ope	6 of the siting process. (As pository, the centre of expertise ration facility designed to eration of the deep repository acted in other countries, it will
	· A	o Reco	d with the coords centre eting and cor	nference ce	ntre,	include:				
		o rese o Adva o Envi exceller	arch center anced manu ronmental/ nce	for indeper facturing ar hazardous i	ndent enviro nd innovatio materials ed	on training c lucation and	entre; d training pr			or hazardous waste managemeni e
	. к	o 2018 o 2025	4 - Begin cor 8 - Expand fa 5 - Expand fa	acility at pre acility to sup	eferred site in the side of th	to meet con nd other co	nmunity coi mmitments	e in site selecti nmitments (pr and DGR cons nitments to co	referred site struction in	e selected).
Deliverable										
Assumptions										
Schedule	Start Year			4	2013			Finish Year	9	2018
Туре	Fixed									
Calculations and Notes:										
Labour C	Costs	Mater	ial Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	-	\$	-	\$ :	10,000,000	\$ 1	10,000,000	\$	2,500,000	\$ 12,500,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	20	60	T I				Prepared By: J.	Facella
WBS (Old)	0										
	ļ										
WBS Title	CENTRE O	F EXPERTISE	(NEW)								
Description	(As out initially which i demon enviror of the of throug implem	clined in the to support of the supp	siting docu the multi-y ant compor ogram invol- d socio-ecor to learn mo wing galleri f a deep geo	ment, centivear testing nent of the ving research omic and core about the less and interpological reports.	re of experti and assessm siting proces chers and ot cultural impa ne project, to ractive displa ository and t	ise will be est ment of the si ss. It will be ther experts i act assessme o view the sc lays. Created the wide vari	tablished a ite on tech the home in a wide vont. The ce ientific and I as a small iety of rela	at the site, or n nnical safety an for an active to ariety of discip entre of experti d engineering v I science centro ited activities, i	nearby as de nd commun echnical an olines includ ise will also work involv e focused o it will be de	detailed site chara etermined with the lity well-being relati d social research ar ding rock science, e be a focus for enga- yed in site assessme on the design, const esigned not only as e region and beyond	community, ed dimensions and technology ngineering, aging members ant in progress ruction and a meeting
	outline will be demon over se	ed in the sitinexpanded to expanded to extrate the saveral decade	ng documen o include an afety of the les. As has	nt, should the support of the facilities be been the ca	he site be ul the construc efore they a ase for deep	Itimately selection and oper ore constructer	ected to ho eration of a ed and ulti epositories	ost the deep ge an undergroun imately to supp	eological re nd demonst port the op	o 6 of the siting prod pository, the centre cration facility desig eration of the deep ucted in other cour	of expertise ned to repository
		o Meet o local o resea o Adva o Envir excellenc o Ongo  (ey Milestone o 2014	ords centre ting and cor training an arch center inced manu ronmental/ ce bing researc es: - Begin cor	nference ce nd business for indeper ufacturing an hazardous ch on Tradit	entre, centre ndent enviro nd innovatio materials ec cional Knowle	onmental impon training ce ducation and ledge of area per commitn	entre; training pi and devel ments mad	_	ritage Cent	s (Step 4).	e managemen
		o 2025	- Expand fa	acility to su	pport UDF a	ind other con	nmitments	s and DGR cons	struction in	,	
Deliverable	<u> </u>										
	<u> </u>										
Assumptions											
Schodula	Ctart Vac-			10	) 2010			Einich Voor	45	2024	
Schedule	Start Year			10	2019	)		Finish Year	15	2024	
Туре	Fixed										
, r -	å										
Calculations	<u> </u>	***************************************					«·····				
and Notes:	<u> </u>										
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subt	otal	Allamanaa	25%	Total (	`oct
		4		0 0.10		Jubi	otai	Allowance	23/0	\$	.031

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	30	40					Prepared By: J. Facella
WBS (Old)				<u></u>	<u></u>	<u> </u>	<u></u>			
	0511705.01	- EVDED <b>T</b> ICE	(1.5.4.1)							
WBS Title	CENTRE OF	EXPERTISE	(NEW)							
Description	(As out initially which i demon enviror of the o throug implem	lined in the and to support of the san important of the stration properties of the same of	siting docui the multi-yo ant compon gram involv socio-econ to learn mo ving gallerio a deep geo	ment, centrear testing and to the size of	e of experti and assessn siting proces hers and ot ultural impa e project, to active displa sitory and t	ise will be enter of the second of the secon	stablished a site on tech the home in a wide vent. The ce cientific and d as a small riety of rela	It the site, or nical safety a for an active of ariety of disci ntre of exper d engineering science cent ted activities,	nearby as de nd commun technical and plines incluc tise will also work involv re focused o it will be de	detailed site characterization. etermined with the community, ity well-being related dimensions d social research and technology ling rock science, engineering, be a focus for engaging members ed in site assessment in progress n the design, construction and signed not only as a meeting region and beyond.)
	outline will be demon over se	d in the sitin expanded to strate the sa	ng documer o include an afety of the es. As has l	nt, should th nd support t facilities be been the ca	ne site be ul the construct fore they a se for deep	timately sel ction and op re construct geological r	ected to ho peration of a ted and ulti repositories	st the deep g an undergrou mately to sup	eological rep nd demonst port the ope	6 of the siting process. (As pository, the centre of expertise ration facility designed to eration of the deep repository ucted in other countries, it will
	. А	s negotiated	d with the c	ommunity,	it may also	include:				
		o Meet o local o resea o Adva o Enviro excellenc	training and arch center nced manu onmental/ ce	facturing ar hazardous i	centre ident enviro nd innovatio materials ed	on training c ducation and	entre; d training pi	_		for hazardous waste management e
	· K	o 2018 o 2025	<ul><li>Begin con</li><li>Expand fa</li><li>Expand fa</li></ul>	ncility at pre	eferred site to oport UDF a	to meet con nd other co	nmunity co mmitments	e in site selec mmitments (p and DGR cor nitments to c	oreferred sit estruction in	e selected).
Deliverable										
Assumptions	ļ									
Schedule	Start Year			16	2025			Finish Year	25	2034
Туре	Fixed									
Calculations										
and Notes: Labour (	: Costs	Materia	al Costs	Other	r Costs	Suh	total	Allowance	25%	Total Cost
\$	-	\$	-		12,000,000		12,000,000	\$	3,000,000	\$ 15,000,000
т		<u>  *</u>		, <del>,</del> ,	,000,000	<u> </u>	,000,000	T	3,000,000	13,000,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	40	40					Prepared By:	J. Facella
WBS (Old)	0										
WBS Title	CENTRE OF	EXPERTISE	(NEW)								
Description	(As out initially which i demon enviror of the ougling implem	lined in the to support s an imports stration pro mental and community in public viewentation of	siting docuithe multi-yi ant compor igram involvant socio-econ to learn mo wing galleria a deep geo	ment, centre ear testing tent of the string research tomic and comic and comic and comic and comic and comic and comic and comic and interest and in	re of experti and assessm siting proces thers and ot ultural impa e project, to ractive displa ository and t	se will be estiment of the size. It will be her experts act assessment oview the source of the wide variable.	tablished a tite on tech the home in a wide vent. The ce cientific and d as a small iety of rela	It the site, or I nical safety al for an active t ariety of disci ntre of expert dengineering science centre ted activities,	nearby as de nd communi echnical and olines includ ise will also work involve e focused o it will be de	termined with ty well-being r d social researd ing rock sciend be a focus for ed in site asses	
	outline will be demon over se	d in the sitir expanded to strate the sa veral decad	ng documer o include ar afety of the les. As has l	nt, should the nd support to facilities be been the ca	ne site be ul the construc efore they a	timately selection and op re construct geological r	ected to ho eration of a ed and ulti epositories	st the deep go an undergroui mately to sup	eological rep nd demonsti port the ope	ration facility deration of the c	entre of expertise
		o Reco o Meet o local o resea o Adva o Envir	rds centre ting and cor training and arch center inced manu conmental/ ce bing researce	nference ce d business of for indeper facturing an hazardous	centre ndent enviro nd innovatio materials ed	onmental im on training c lucation anc	entre; I training pı				waste management
	0	o 2018 o 2025	- Expand fa - Expand fa	ncility at pre ncility to sup	eferred site to oport UDF a	to meet con nd other co	nmunity co mmitments	e in site select mmitments (p and DGR con mitments to c	referred site struction in	e selected).	
Deliverable											
Assumptions	ō										
Schedule	Start Year			26	2035			Finish Year	85	2094	
Туре	Fixed										
Calculations	ļ										
and Notes:	<u> </u>										
Labour C	Costs	1	al Costs		r Costs		otal	Allowance	25%		tal Cost
\$	-	\$	-	\$	30,000,000	\$ 3	0,000,000	\$	7,500,000	\$	37,500,000

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### **Work Element Definition Sheet**

WBS (New) WBS (Old) WBS Title Description		15 EXPERTISE			10				A
		EXPERTISE							
		EXPERIISE							
Description	. Λι		(NEW)						
	(As outlinitially which is demonstered of the control of the contr	lined in the s to support is s an importa stration prop imental and community to public view entation of	siting docu the multi-y ant compor gram involv socio-ecor to learn mo ving galleri a deep gec	ment, centing the control of the con	re of experti and assessn siting proces chers and ot cultural impa ne project, to ractive displa ository and t	se will be establish nent of the site on ss. It will be the hoher experts in a winct assessment. The view the scientificays. Created as a sche wide variety of	ed at the site, or technical safety a me for an active de variety of disc e centre of exper and engineering mall science cent related activities	nearby as de and commun technical an iplines include tise will also g work involve tre focused of the it will be de	detailed site characterization. etermined with the community, ity well-being related dimension d social research and technology ding rock science, engineering, be a focus for engaging membered in site assessment in progress on the design, construction and esigned not only as a meeting eregion and beyond.)
	outlined will be d demons over se	d in the sitin expanded to strate the sa veral decado	ng documer o include ar afety of the es. As has	nt, should the nd support of facilities be been the ca	he site be ul the construc efore they a ase for deep	timately selected t tion and operation re constructed and	o host the deep a of an undergrou ultimately to su ories for nuclear	geological re and demonst apport the op-	of of the siting process. (As pository, the centre of expertise tration facility designed to eration of the deep repository ucted in other countries, it will
	· A:	o Recor o Meet o local o resea o Advar o Envirre	rds centre ting and con training an arch center nced manu onmental/ ce	nference ce d business for indeper facturing a hazardous	centre ndent enviro nd innovatio materials ec	onmental impact m on training centre; ducation and trainin	ng programs or o		for hazardous waste managemei
	• Ке	o 2014 o 2018 o 2025	es: - Begin cor - Expand fa - Expand fa	nstruction o acility at pre acility to su	on 2 sites as eferred site t pport UDF a	edge of area and d per commitments to meet communit nd other commitm hase of work and o	made in site sele y commitments ( ents and DGR co	ction process preferred sit nstruction in	s (Step 4). e selected).
Deliverable									
Assumptions									
Schedule S	Start Year			86	5 2095		Finish Year	155	2164
					30				
Type [	Fixed								
Calculations and Notes:									
Labour Co	osts	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Total Cost
\$	-	\$	-	\$	7,000,000	\$ 7,000,		1,750,000	\$ 8,750,00

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	40					Prepared By: J. Facella
WBS (Old)										
WBS Title	MUNICIPA	L FORUM A	ND TOOL DI	EVELOPME	NT					
Description	•	uct of resea in hosting t		ns and deve	elopment of	tools and c	ommunicat	ion materials (	designed to	support communities which are
Deliverable	Tools and o	communicat	tion materia	als targeted	l to commur	nities and d	esigned to s	upport their e	xploration	of interest in the APM project.
	Note that t meetings.	he specific	work to be	completed	will be iden	tified and sl	haped throu	igh dialogue w	vith the Mu	nicipal Forum at its regular
	process an	•	dialogue an	d collabora	_	-				es which have entered the siting to their individual needs and
		\$100,00 \$100,00	0 in 2011 0 in 2012, 0 in 2013 in 2014							
Assumptions	•		•		continue to r			munities have	been ident	ified for detailed site
Schedule	Start Year			2	2011			Finish Year	5	2014
Туре	Fixed									
Calculations and Notes:										
Labour (	Costs	Materi	al Costs	Othe	r Costs	Sub	total	Allowance	25%	Total Cost
\$	_	\$	_	\$	450,000	\$	450,000	\$	112,500	\$ 562,500

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	180					Prepared By:	J. Facella	
WBS (Old)												
WBS Title	EXPERT AD	VICE, WOR	KSHOPS									
Description	E									development of O's participation		of
	Forecast co		0 in 2010									
Deliverable												
Assumptions												
Schedule	Start Year			1	2010			Finish Year	1	2010		
Туре	Fixed											
Calculations and Notes:												
Labour	Costs	Materi	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	To	tal Cost	
\$	-	\$	-	\$	200,000	\$	200,000	\$	50,000	\$	250,0	000

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# APM Cost Estimate Work Element Definition Sheet

	Work Element Definition Sheet
WBS (New) WBS (Old)	561   15   10   10   120
WBS Title	ASSESSMENTS OF SITE SUITABILITY (SOCIAL ASPECTS)
Description	The focus of this work program is to assess, in a stepwise manner, the potential social, political, ethical, economic and cultural effects of the project on an interested community under the umbrella of "community well-being".
	Step 1 and 2  Development of a reference framework which elaborates on the community well-begin framework described in the siting document  Consultant develops desk-top profile of community, describing the community on as many of the dimensions of the reference framework possible using publicly available data. This is intended for NWMO internal use in obtaining an early sense of the resources which may be required to implement the project in the community. The profile will also be used to help build the capacity of the NWMO to engage in early discussions and relationship building with the community: Estimate of cost is \$50,000 per community  NWMO staff costs to travel to the community, to walk through the community with community representatives for an early 'ground-truthing' of the profile.
	Estimated cost: · \$357,000 in 2011
	Contractor cost to add to the desktop profile with information held by the community and obtained during this step:     Estimate of incremental cost \$20,000 - \$25,000 per community. Total \$125,000 in each of 2011 and 2012     NWMO may wish to conduct regional information sessions, or other broad engagement, to supplement the work lead by the community and funded as part of the community capacity building program – NO COST INCLUDED IN THIS WED      Contractor development of abbreviated desktop community profile for surrounding communities. Estimate: \$200,000 in
	each of 2011 and 2012  Contractor development of high level profile for each region associated with potential host communities. Estimate: \$200,000 in each of 2011 and 2012  Cost associated with launching of Traditional Land Use Studies. Estimate: \$100,00 in 2011 and \$250,000 in 2012
	NWMO lead engagement among transportation communities to begin identification of social issues. Estimate: \$50,000 in 2011 and \$150,000 in 2012
	Field Studies (interviews). Estimate: \$100,000 in 2012 NWMO staff travel. Estimate \$100,000 in 2011 and \$100,000 in 2012 Estimated cost:
	\$775,000 in 2011     \$1.13M in 2012  Step 4
	Field studies in communities. Estimate: \$100,000 in 2013; \$200,000 in 2014; \$100,000 in 2015; expenditure at 2015 level each year until completion of EIS     Field studies in surrounding communities. Estimate: \$100,000 in 2013; \$200,000 in 2014; \$100,000 in 2015; expenditure at
	2015 level each year until completion of EIS  Field studies in regions. Estimate: \$80,000 in 2013; \$100,000 in 2014; \$100,000 in 2015; expenditure at 2015 level each yea until completion of EIS  NWMO lead engagement. Estimate: \$100,000 in 2013; \$200,000 in 2014; \$200,000 in 2015; expenditure at 2015 level each year until completion of EIS  Regional Study Management. Estimate: \$284,000 in 2011; \$100,000 in 2012; \$388,000 in 2013; \$2.294M in 2014; \$100,000 in 2015; expenditure at 2015 level each year until completion of EIS
	<ul> <li>Traditional Land Use Studies (Phase 2). Estimate: \$100,000 in 2014; \$100,000 in 2015; expenditure at 2015 level each year until completion of EIS</li> <li>Staff travel. Estimate: \$100,000 in 2013; \$200,000 in 2014; \$200,000 in 2015; expenditure at 2015 level each year until completion of EIS.</li> </ul>
	Estimated cost:  S525,000 in 2013  S1.1M in 2014  S900,000 in 2015  Note some level of spending is expected to be required through until completion of EIS
Deliverable	Stepwise assessment of suitability of site, surrounding communities, region, transportation communities (as a large group with a shared interest).
Assumptions	Assumes 4 communities surround each potential willing host community, including Aboriginal communities     Assumes these studies are a foundation for relationship building and issue management with community, surrounding communities, regions, transportation communities. For this reason, it is assumed that expenditures in this area will need to continue at some level through until the completion of the EIS.     \$357K in step 2 (2011); \$1.961M in Step 3 (2011-2012); \$5.655M in Step 4 (2011-2015).
Schedule	Start Year 2 2011 Finish Year 9 2018
Type Calculations and Notes:	Fixed
Labour \$	Costs         Material Costs         Other Costs         Subtotal         Allowance         25%         Total Cost           - \$         \$ 7,973,000         \$ 7,973,000         \$ 1,993,250         \$ 9,966,250

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						Cost Estima					
y					Work Elem	ent Definition	n Sheet				
				,	,						Code: 0170022- <b>11</b>
WBS (New)	561	15	10	10	100	ļ <b>!</b>				Prepared By:	P. Simmons
WBS (Old)				<u> </u>	<u> </u>	<u> </u>					
	SITING SELI										
WBS Title	STAFF TRA	VEL COSTS -	- NON ABO	RIGINAL							
Description	council con interested These requ organizatio	nmittees (e. in learning r ests must b ns (separate	g. economi more about e initiated l e category)	c developm NWMO, All by the local . Costs inclu	nent) comm PM site sele accountabl ude travel-re	unity groups ection proces e authority ( elated expen	and other s on an ong e.g. munici ses for staf	accountable a going basis. ipal council), w ff participating	uthorities i which do no in speakin	n the 4 nuclea	ginal councils and s/briefings, and on
Deliverable	:		-	_	-				-		ion. Related to this king engagements.
	•					d as it relate ne siting prod		ued awarenes	s of the siti	ng process, an	d the dispensation
	•				•					-	nunity groups, fidence in the
Assumptions	:	ted that the		II inform ar	nd respond t	co several no	n-aborigina	al community	meetings/b	riefings per ye	ar until 2025
	NWMO's "I	earn More	" program f	rom which	funding ma	y be provide	d to munic	ipalities for in	dependent		ticipation in the to inform their separately.
	:	of APM and	I the siting			_			-	ers and membed may encoura	ers, increase ge participation in
	to drop aft	er candidate	e sites are s	elected. Th	e locations	of the meeti	ngs, and pa	•	roups move	through the p	se, but is assumed process cannot
ļ								,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Schedule	Start Year			1	2010			Finish Year	9	2018	
Туре	Fixed										
Calculations											
Calculations and Notes:	Current bu	dget Y01 (20	010)		= \$ 20	00,000					
	Y04 (2013)	– Y16 (2025	5) – \$125,00	00 x 13 yea	rs = \$ 360 rs = \$ 1,6 = \$675,0	25,000					
Labour (	Costs	Materia	al Costs	Othe	r Costs	Subt	otal	Allowance	25%	To	tal Cost
\$	-	\$	-	\$	1,310,000	\$	1,310,000	\$	327,500	\$	1,637,500

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					APM	Cost Estimate						
y					Work Elem	ent Definition S	heet					
MADE (No)	FC1	15	10	20	20						Code: 0170022-	11
WBS (New) WBS (Old)	561	15	10	20	30					Prepared By	P. Simmons	
WB3 (Olu)	SITING SEL	ECTION PRO	)CESS	i	.i	ll						
WBS Title	••••••	VEL COSTS		RIGINAL	***************************************							
Description	Category ir	ncludes for I	NWMO staf	f to attend		e/deliver speaki unity groups and			_	-	nunicipal councils	s,
	These requ	ests must b	e initiated l e category)	by the loca . Costs incl	l accountable ude travel-re		municip for staff	pal council), v	g in speakin	g engagemen	riginal councils ar ts/briefings, and s if needed).	
Deliverable				_	-			• .			ition. Related to	
						d as it relates to ne siting process		ed awarenes	s of the siti	ng process, ar	nd the dispensation	on
	:				-	tionships betwe es for long-term						
Assumptions	(Aboriginal			II inform ai	nd respond t	o several non-al	boriginal	I community	meetings/b	riefings per y	ear until 2025	
	NWMO's "	Learn More	" program f	rom which	funding ma	_	munici	palities for in	dependent	studies aimed	rticipation in the I to inform their separately.	
	:	of APM and	the siting			st in building rel nformation dist			•		pers, increase age participation	ı in
	to drop aft	er candidat	e sites are s	elected. Th	ne locations o	uate and canno of the meetings, per meeting sho	, and pad	ce at which g	roups move	through the	ase, but is assum process cannot	ed
Schedule	Start Year			10	2019		······································	Finish Year	15	2024		
Туре	Fixed				2019			misii redi	15	2024;		
Calculations and Notes:	Current bu	dget Y01 (2	010)		= \$ 20	00,000						
	Y04 (2013)	- Y16 (2025	5) – \$125,00	00 x 13 yea	ars = \$ 360 ars = \$ 1,62 s = \$675,00	25,000						
		Г		Т		T						
Labour	Costs		al Costs		er Costs	Subtotal	_	Allowance	25%		otal Cost	
\$	-	\$	-	\$	750,000	\$ 75	50,000	\$	187,500	\$	937,5	000

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						nent Definitio					
······································					ANOIN EIGH	.c.it Deillilli	JHEEL			NWMO Cost (	Code: 0170022- <b>11</b>
WBS (New)	561	15	10	30	10					Prepared By:	
WBS (Old)											
		ECTION PRO									
WBS Title	STAFF TRA	VEL COSTS	– NON ABO	RIGINAL							
Description	Cataaaaai		NIVA/NAO et ef	£ 4		- /-  -  -  -  -  -  -  -  -  -  -  -  -  -			huinfinna an		
Description	council cor interested	nmittees (e in learning	.g. economi more about	ic developn : NWMO, A	nent) comm PM site sele	unity groups a ection process	and other on an ong	accountable a	authorities i	n the 4 nuclea	unicipal councils, or provinces iginal councils and
	organizatio	ons (separat	e category)	. Costs incl	ude travel-r		es for staf	f participating	g in speaking	g engagement	s/briefings, and on
	ļ										
Deliverable				_	-			-	-		tion. Related to thi aking engagements
						nd as it relates he siting proce		ued awarenes	s of the sitir	ng process, an	d the dispensation
	•				-	-					munity groups,
	potential h	iost commu	nities and s	urrounding	communiti	es for long-te	rm sustain	ability of site	selection pr	ocess and cor	ifidence in the
Assumptions			e NWMO wi elsewhere).		nd respond	to several nor	ı-aborigina	al community	meetings/b	riefings per ye	ear until 2025
	NWMO's "	Learn More	e" program f	from which	funding ma	_	l to munic	ipalities for in	dependent	studies aimed	ticipation in the to inform their separately.
	awareness		d the siting			st in building information d		•	-		ers, increase age participation in
	to drop aft	er candidat	e sites are s	elected. Th	e locations		gs, and pa	ice at which g	roups move	through the p	ise, but is assumed process cannot
Schedule	Start Year			16	2025	 ;		Finish Year	25	2034	
Туре	Fixed										
Calculations and Notes:							-				
	Current bu	dget Y01 (2	010)		= \$ 2	00,000					
			2) – \$180,00								
			5) – \$125,00 4) -  \$75,000	-							
	04-		-10			T	4-1	Alleri	250/		
Labour (	LOSTS		al Costs	\$	750,000	\$ Subto	<b>tal</b> 750,000	Allowance	<b>25%</b>		otal Cost
\$	-	\$		۲	750,000	۶	730,000	\$	187,500	\$	937,500

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	80					Prepared By:	J. Robinson
WBS (Old)				<u></u>							
WBS Title	STAKEHOL	DER MAPPII	NG FOR SIT	ING REGIO	VS						
Description	=						e involved in		ction proce	ss and build a	n understanding of
Deliverable	Strategic o licensing.	verview rep	ort for eac	h of the inv	volved region	ns, prepar	ed by a contr	actor, and up	dated perio	dically in the p	eriod leading up to
Assumptions											
Schedule	Start Year				2 2011			Finish Year	9	2018	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materia	al Costs	Othe	r Costs	Su	btotal	Allowance	25%	То	tal Cost
\$	-	\$	_	\$	800,000	\$	800,000	\$	200,000	\$	1,000,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	20	70					Prepared By:	J. Robinson
WBS (Old)							ĺ				
WBS Title	STAKEHOL	DER MAPPII	NG FOR SIT	ING REGIO	VS						
Description	=						e involved ir esed prior to		ction proce	ss and build a	n understanding of
Deliverable	Strategic o licensing.	verview rep	port for eac	h of the inv	volved region	ns, prepare	ed by a contr	actor, and up	dated perio	dically in the p	eriod leading up to
Assumptions											
Schedule	Start Year			10	) 2019			Finish Year	15	2024	
Туре	Fixed										
Calculations and Notes:											
Labour (	Costs	Materi	al Costs	Othe	r Costs	Su	btotal	Allowance	25%	То	tal Cost
\$	-	\$	-	\$	600,000	\$	600,000	\$	150,000	\$	750,000

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### **Work Element Definition Sheet**

WBS (New)	561	15	10	10	90					Prepared By:	J. Face Robins	•
WBS (Old)						i						
WBS Title	NATIONAL	WORKSHOP	PS ON SOCI	AL CONSIDE	RATIONS O	F SITING						
Description	Workshops	to raise aw	areness of	APM siting	process, and	d provide co	mmunities	with access	to informati	on on APM pro	iect.	
2000										being of great		
	workshop:	s designed t	o be respoi	isive to top	ics identified	a by commu	ilities aliu i	numcipai ass	ociations as	being of great	mieresi.	
Deliverable	Two phase	s:										
	E						ence of Fe	deration of C	Canadian Mu	ınicipalities, inc	luding	
	present	tations from	Swedish co	ouncilors fro	om host con	nmunity.						
	- 0	Opportunitie	s for indivi	dual commu	unities to co	mmence wit	th represer	ntatives from	Sweden.			
Assumptions	That we wi	II cover cost	s of confer	anca ragisti	rations trav	al costs mai	eting room	s and facilita	tion costs			
Assumptions	That we wi	iii cover cosi	is of come	erice registi	iations, trav	er costs, me	eting room	3 and facilità	tion costs.			
	ļ			·				ç				
Schedule	Start Year			2	2011			Finish Year	6	2015		
Typo	Fixed											
Туре	rixeu											
Calculations	Assume tra	vel and reg	istration co	sts for:								
and Notes:		0										
	-15 commı	unities bring	ing 5 meml	bers each.								
	- 4 Swedish											
	-					g rooms, me				•		
Labour (	Costs		al Costs		r Costs	Subt		Allowance			tal Cost	
\$	-	\$	-	\$	250,000	\$	250,000	\$	62,500	\$		312,500

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### **Work Element Definition Sheet**

WBS (New)	561	15	60	40	10				Prepared By:	J. Facella
WBS (Old)					<u></u>					
WBS Title	SUSTAININ	G RELATION	NSHIPS/ CO	LLABORATIO	ON DURING	OPERATIONS				
Description	the commi	unity at a gr	ass roots le	evel in decisi	on-making	s with the community through operations ar ollaboration in its pub	ıd involvemen	t in ongoing		0 00
	associated operations	with ongoir . These cos	ng involven sts may incl	nent of com	munity resid	osts (not associated w dents in monitoring of nunity meetings, renta	potential effe	cts and othe	er key decision a	reas throughout
Deliverable	Support fo	r ongoing co	ommunity e	engagement	and outrea	nch				
Assumptions	Cost of pul	olic commur	nication co	vered elsew	here					
Schedule	Start Year			26	2035		Finish Year	85	2094	
Туре	Fixed									
Calculations and Notes:	\$100,000/	year throug	gh the perio	od of operat	ions (2035 -	- 2094)				
Labour	Costs	Materia	al Costs	Othe	r Costs	Subtotal	Allowance	25%	Tota	al Cost
\$	-	\$	-	\$	6,000,000	\$ 6,000,000	\$	1,500,000	\$	7,500,000

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