January 26, 2012
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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk (03-H8)
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2738

Subject: **Triennial Update to Decommissioning Funding Plan (DFP) for AREVA NP Inc's. (AREVA's) Richland Fuel Fabrication Facility (License No. SNM-1227; Docket No. 70-1257)**

Ref. 1. Letter, R.L. Rodriguez to R.E. Link, "Approval of AREVA's Updated Decommissioning Funding Plan for its Richland, Washington Facility (TAC No. L32821); August 4, 2009.

Ref. 2. Letter, R.E. Link to USNRC Document Control Desk, "Revised Decommissioning Funding Plan (DFP) for AREVA NP Inc., Richland Fuel Fabrication Facility (TAC L32821); July 9, 2009.

Ref. 3. Letter, RE Link to USNRC Document Control Desk, "Updated Decommissioning Funding Plan (DFP) for AREVA NP Inc.'s (AREVA's) Richland Fuel Fabrication Facility (License No. SNM-1227; Docket 70-1257); January 23, 2009.

The purpose of this correspondence is to convey an updated DFP for AREVA's Richland fuel fabrication facility. NRC regulations at 10 CFR 70.25(e) require that cost estimates be adjusted at intervals not exceeding three years. The NRC last approved Richland's DFP and cost estimate via Reference 1. That approval was of a revised DFP submitted by AREVA via Reference 2, which in turn had been submitted to answer an NRC Request for Additional Information (RAI) relative to AREVA's triennial update submitted via Reference 3. This current DFP and cost estimate update are conservatively being submitted to meet the three year requirement for AREVA's original January 2009 update. The cost estimate being conveyed at this time is current as of December 2011.

The total decommissioning cost estimate including contingency has increased approximately $3.4M over the corresponding figure conveyed via Reference 2. A number of key factors contributed to this increase, including most notably:

- Addition of labor for extended operation of the site's Volume Reduction Facility to facilitate the effective packaging of contaminated building equipment/components for disposal;
- Inclusion of costs for disposition of the site's entire fleet of Model 30-B UF_6 cylinders;
- Increased projected costs for surface decontamination (steam cleaning, sandblasting);

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- Inclusion of costs for two potential areas of sub-surface contamination (soil below historic liquid processing areas within the UO_2 Building and soil associated with historic and current underground piping); and

- Additional labor costs relative to equipment removal/dismantling, logistics/shipping support, and project administration.

The two largest offsetting cost reductions involve reduced insurance costs related to a more realistic assessment of needed coverage during decommissioning and a decrease in the costs for waste boxes related to a reassessment of the anticipated volume of packed waste for disposal. A full listing of noteworthy changes to the DFP is provided in the Nature of Changes section of the document.

In addition to exceeding the current cost estimate on file with the NRC, the revised cost estimate exceeds the value of AREVA's current Letter of Credit by approximately $850K. The DFP being submitted at this time includes a revised Certification of Financial Assurance, an increased Letter of Credit, and revised Schedules A and B to the Standby Trust Agreement to reflect the increased cost estimate. You will note that these have been submitted as unexecuted drafts for the NRC's review. AREVA's intention is to await the NRC's review and eventual approval of the revised DFP and cost estimate, at which time we will take the necessary actions to fully execute these items. Finalized financial assurance instruments will be incorporated into the finalized DFP for re-submittal to the NRC at that time.

If you have questions or require additional information, please feel free to contact me at 509-375-8409.

Very truly yours,

R. E. Link, Manager
Environmental, Health, Safety & Licensing

c: USNRC
Office of Nuclear Material Safety
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EHS&L Document

Decommissioning Funding Plan

Nature of Changes

Item	Paragraph	Description	Justification
1.	Entire Document	Minor editorial/technical revisions and updates	Triennial update
2.	Table 1	Revised cost figures	Make summary table consistent with sub-tier tables
3.	3.0, Assumption No. 6	Added to clarify that buildings will remain in place after decontamination	Clarification
4.	3.0, Assumption No. 7	Changed $5.33M to $5.359M	Increased U.S. Ecology rate structure
5.	5.1.1, No. 1	Added references to use of non-radiological disposal facilities	Clarification
6.	5.1.4, Nos. 12 and 14	Added information in 10 CFR 70.38(f) alternate decommissioning schedules	Clarification
7.	Table 2	Revised equipment volumes	Updated packed volume estimates
8.	Table 3	Increased engineer labor for Development of Work Plans	Revised estimate
		Revised staff training labor	Reflect current assumptions relative to demolition/ decontamination field crews.
9.	Table 4	Revised Equipment/Component Removal Labor	Revised estimate
		Increased sand blasting and steam cleaning rates	Inflation adjustment plus adjustment for work in radiological environment.
		Increased Health and Safety Technician labor	Re-assessment of radiological support needs

Item	Paragraph	Description	Justification
10.	Table 6	Added labor for Operation of Waste Volume Reduction Facility	Required service
		Revised labor totals	Consistency with sub-tier Tables 3, 4, and 5
11.	Table 7	Updated labor rates	Triennial update
12.	Table 8	Revised cost figures	Consistency with sub-tier Tables 6 and 7
13.	Table 9a	Revised building waste volume, container numbers, and container cost	Consistency with Table 2 volumes and updated container cost
		Added boron spider drum waste	Former omission
		Increased Contaminated Shipping Container Components	Revised estimate
14.	Table 9b	Added disposition costs for UF_6 cylinder fleet	Former omission
		Revised containerized waste burial costs	New U.S. Ecology rate
		Revised shipping costs	Updated rates
15.	Tables 10 and 11	Increased for inflation	Triennial update
16.	Table 12	Revised state/local fees	Triennial update
		Revised insurance costs	More realistic assessment of insurance needs
		Revised NRC costs	Revised estimate
		Added Logistics/Shipping support	Former omission
		Revised steam cleaning/sand blasting total	Consistency with Table 4
		Inflation adjustments	Triennial update

Item	Paragraph	Description	Justification
17.	Table 13	Revised cost totals	Consistency with sub-tier tables
18.	Table 15, footnote	Reference to U.S. Ecology closure plan	Clarification
19.	Table 20	Revised labor costs	Updated Table 7 labor rates
20.	Table 21	Removed container and disposal costs	Per added table footnote
21.	Table 25	Revised cost totals	Consistency with sub-tier tables
22.	Table 26	Revised cost totals	Updated SWUR rates and mixed waste disposal rates
		Removed incremental costs for disposal at LLRW disposal site	Per table footnote; consistency with Table 9b.
23.	5.3	Added reference to new Section 5.3.3	New Section 5.3.3
24.	5.3.1, para. 4	Updated discussion of groundwater status	Triennial update
25.	5.3.2, para. 2	Revised number of burial boxes	Consistency with Table 9a numbers
26.	5.3.3	New Section	More complete coverage of potential sub-surface contamination
27.	Table 29	Revised soil sampling costs	Transition from borehole drilling to backhoe excavation
28.	Table 30	Revised costs	Consistency with sub-tier tables
29.	Table 32	Revised costs	Reflect updated Table 7 labor rates
30.	Table 34	Updated costs	Consistency with sub-tier tables
31.	Table 35	New table	Recognition of potential soil contamination below UO_2 Building

Item	Paragraph	Description	Justification
32.	Table 36	New table	Address removal of underground pipes and remediation of potential soil contamination
33.	Certification of Financial Assurance	Revised financial assurance amount	Revised cost estimate total
34.	Financial assurance instruments (Letter of Credit and Trust Agreement Schedules A and B)	Updated	Reflect new cost estimate total and updated NRC approval date
35.	Approvals	Remove, Manager, Project & Reliability Eng., add Manager, Richland Site	Update
List Below any Documents, including Forms & Operator Aids which must be issued concurrently with this document revision:			

This Document contains a total of 67 pages excluding the signature page generated by Documentum, the document control application software.

DOCUMENT REVIEW/APPROVAL/DELETION CHECKLIST

All new and/or revised procedures shall be approved by the change author, cognizant manager(s) of areas affected by the changes, and by applicable manager(s) of any function that approved the previous revision of the document unless responsibility for such approval has been transferred to another organization. Also, the procedure shall be approved by manager(s) of functional organizations that provide technical reviews with the exception of the Training Department. Finally, Document Control shall verify that the required approvals have been properly obtained and that any documents that must be issued concurrently are ready to be issued.

Minor Changes: If the changes are limited to editorial and/or administrative, check the box at the right. Only Change Author is required. All applicable approvals must still be obtained.	☐

Document Reviews			**Document Approvals**	
Purpose/Function of Review	Specify Reviewer(s) (Optional except for change author)	(Check all that apply)	Title of Approver	(Check all that Apply)
Document Control (Automatic)		☒	Document Control (Automatic)	☒
Change Author	LJ Maas	☒	Author	☒
Independent Technical Review	WA Koglin	☒		
Operability Review(s)			Mgr, Richland Operations[1]	☐
Conversion		☐	Mgr, Uranium Conversion & Recovery Operations[1]	☐
Recovery		☐		
Ceramics		☐	Mgr, Ceramic Operations[1]	☐
Rods		☐	Mgr, Rods & Bundles[1]	☐
Bundles		☐		
Transportation		☐		
Components		☐	Mgr, Component Fabrication[1]	☐
Maintenance Review		☐	Mgr, Maintenance[1]	☐
Lab Review		☐	Mgr, Analytical Services[1]	☐
EHS&L Review(s)			Mgr, EHS&L[2]	☒
Criticality		☐	Mgr, Criticality Safety[2]	☐
Radiation Protection	RK Burklin	☒	Mgr, Safety, Security & Emergency Preparedness[2]	☐
Safety/Security		☐		
Emergency Preparedness		☐		
MC&A		☐	Mgr, Licensing & Compliance[2]	☐
Transportation		☐		
Environmental	LJ Maas	☒		
Mechanics Richland Review		☐	Mgr, Mechanics Richland	☐
Mechanics Lynchburg Review		☐		
Thermal Hydraulics Richland Review		☐	Mgr, Thermal Hydraulics Richland	☐
Project & Reliability Review		☐	Mgr, Project & Reliability Eng.	☒
Quality Review		☐	Mgr, Richland Site Quality	☐
Purchasing Review		☐	Mgr, Purchasing	☐
Others:		☐	Mgr, Richland Site/Other	☒
Document Control		☐	Richland Records Management	☐
Training & Employee Dev.:[3]		☐	Training & Employee Dev.	☐

[1] Note: If approvals include 2 or more product center managers, the Operations manager can be substituted for the applicable product center managers.

[2] Note: If approvals include 2 or more EHS&L functional managers, the EHS&L manager can be substituted for the applicable EHS&L functional managers.

[3] Note: Training department review is required for all procedures that require or affect a Learning Plan and if additional training materials or curriculum must be revised before issuing procedure.

EHS&L Change Impact Evaluation Form			
The scope / content of this document have been determined by EHS&L to not directly impact the safe handling of licensed materials (enriched uranium). Future revisions to this document do not require the 10CFR 70.72 change evaluation unless the scope of the document changes such that it directly impacts the handling of licensed materials.			☐
Document Version:	EHS&L Review:	Date:	
Document / ECN No*: E06-04-007		Change Evaluator:	LJ Maas
Does the change potentially impact Criticality Alarm System (CAS) coverage?	☐ Yes ☒ No	If yes, explain:	
NRC Pre-Approval Evaluation:			
Is NRC Pre-approval (License Amendment) Needed? (Based on "Yes" answer to any of five questions below). (Based on "No" answer to all five questions below).	☐ Yes ☒ No		
1. Does the change create new types of accident sequences that, unless mitigated or prevented, would exceed the performance requirements of 10 CFR 70.61 (create high or intermediate consequence events) and that have not previously been described in AREVA NP's ISA Summary?	☐ Yes ☒ No	If yes, explain:	
2. Does the change use new processes, technologies, or control systems for which AREVA NP has no prior experience?	☐ Yes ☒ No	If yes, explain:	
3. Does the change remove, without at least an equivalent replacement of the safety function, an item relied on for safety that is listed in the ISA Summary?	☐ Yes ☒ No	If yes, explain:	
4. Does the change alter any item relied on for safety, listed in the ISA Summary, that is the sole item preventing or mitigating an accident sequence of high or intermediate consequences?	☐ Yes ☒ No	If yes, explain:	
5. Does the change qualify as a change specifically prohibited by NRC regulation, order or license condition?	☐ Yes ☒ No	If yes, explain:	
Actions Required Prior to or Concurrent with Change Implementation Evaluation:			
Action		**Explanation**	
6. Modification / Addition to CAS system or system coverage documentation	☐ Yes ☒ No	If yes, explain:	
7. Acquire NRC pre-approval (license amendment)	☒ Yes ☐ No	If yes, explain: NRC approval required before DFP is finalized.	
8. Conduct/modify ISA	☐ Yes ☒ No	If yes, explain:	
9. ISA Database Modification	☐ Yes ☒ No	If yes, explain:	
10. Modification of other safety program information / underlying analyses (PHA, RHA, FHA, NCSA, etc.)	☐ Yes ☒ No	If yes, explain:	
Actions required subsequent to Change Implementation Evaluation:			
11. Update safety program information (PHA,RHA,FHA,NCSA, P&ID)	☐ Yes ☒ No	If yes, explain:	

* If this form exists as a part of a document, the document number is not required.

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List of Exhibits

1.0 Introduction and Summary

This Decommissioning Funding Plan (DFP) is submitted by AREVA NP Inc. (AREVA) in compliance with 10 CFR 70.25(c) (2) and contains the information required by 10 CFR 70.25(e). Furthermore it provides the required [10 CFR 70.25(e)] triennial adjustment of the decommissioning cost estimate, last conveyed to the NRC via Version 4.0 of this plan (July 2009). The DFP was developed using the guidance provided in NUREG-1757, Volume 3, "Consolidated NMSS Decommissioning Guidance".

The DFP establishes decommissioning criteria and key assumptions and outlines the major technical approaches in the decommissioning of all facilities on the AREVA Richland site with a potential for radioactive contamination. This includes the major production facilities, production support facilities, containerized waste storage areas, and contaminated environmental media (soil). Certain portions of the containerized waste storage areas manage wastes that are classified as mixed wastes, i.e., wastes that are radiologically contaminated and also contain chemical constituents that cause them to be designated as dangerous wastes under the State of Washington Dangerous Waste Regulations. The decommissioning/closure procedures and provision of financial assurance for these mixed waste areas are, therefore, intended to meet the pertinent requirements of both the NRC and the Washington State Department of Ecology (Ecology).

The DFP also provides associated decommissioning/closure cost estimates, a commitment for periodic (minimum triennial) cost estimate adjustments, and appropriate evidence of financial assurance via a Financial Assurance Instruments section. The total consolidated decommissioning/closure cost estimate addresses all required costs relative to NRC licensed materials for both the NRC and Ecology and is summarized in Table 1. The Table 1 costs are effective as of December 2011.

The major components of the cost estimate are described in Sections 5.1, Production and Production Support Facilities; 5.2, Containerized Waste Storage Pads, and 5.3, Environmental Remediation. Section 5.1 is further broken down into the major production facilities and production support (ancillary) facilities. Decommissioning the waste storage pads involves decommissioning the pad structures and disposing of the containerized mixed and low level radioactive wastes stored on the pads. Environmental remediation will entail any activities and associated costs to address any environmental contamination that will require remediation during decommissioning to meet the unrestricted use criteria of 10 CFR 20.1402.

Each of the major cost estimate components is presented via a set of tables, as similar as practicable to those in NUREG-1757, which support the estimates. In some cases, e.g., dispositioning of the containerized waste inventories, the NUREG-1757 tables are not easily applied; in those cases alternate or modified tables better suited to communicate the pertinent cost data have been used.

A certification that AREVA has obtained financial assurance in an amount sufficient to meet the decommissioning cost estimate is provided in Section 7.0. Evidence of that financial assurance utilizing the letter of credit/standby trust method is provided in Section 8.0.

Table 1 Decommissioning Cost Estimate Summary

Category	Cost Estimate, $
1. Production and Production Support Facilities (Table 13)	26,396,562
2. Containerized Waste Storage Pads and Inventories	
A. Storage Area (Pad) Structures (Table 25)	63,922
B. LLRW Inventory Disposal (Table 26)	2,577,663
C. Mixed Waste Inventory Disposal (Table 26)	561,239
3. Environmental Remediation	
A. Legacy Surface Impoundment Area (Table 30)	247,771
B. Historic Spills/Releases (Table 34)	11,230
C. Potential Soil Contamination Areas (Tables 35, 36)	740,065
Subtotal	30,598,452
25% Contingency	7,649,613
TOTAL	38,248,065

2.0 Decommissioning Criteria

This DFP and associated decommissioning cost estimate for AREVA's Richland Facility, located at 2101 Horn Rapids Road, Richland, Washington (License SNM-1227, Docket 70-1257) have been prepared per the requirements of 10 CFR 70.25 and guidance provided in NUREG-1757, "Consolidated NMSS Decommissioning Guidance, Volume 3", September 2003.

2.1 *Uncontaminated Facilities*

The disposition of uncontaminated equipment and facilities is not within the scope of this plan, provided that such facilities are verified to be uncontaminated in accordance with approved radiation survey procedures.

2.2 *Residual Radiation Levels*

In accordance with 10 CFR 20.1402, the residual radioactive contamination distinguishable from background radiation for the decontaminated Richland facility will result in dose levels of less than 25 mrem/yr to the average member of the critical group. Any equipment or facility which cannot be decontaminated to acceptable levels will be demolished, packaged, and disposed of at a licensed low-level radioactive waste (LLRW) or mixed waste disposal site, or alternatively, could be transferred to another licensed facility. Residual environmental contamination will be remediated to levels consistent with the 25 mrem/yr unrestricted use criterion.

2.3 *Records*

Records of the decommissioning procedures and results will be preserved for at least five years, or as required by then-current regulations.

2.4 *Financial Provisions*

Decommissioning of the AREVA Richland facility will be conducted at no cost to the public. AREVA's provisions for funding of the decommissioning activities are provided in Section 7.0 of this plan.

3.0 Key Assumptions

The following key assumptions were used in the preparation of the DFP and cost estimate for the decommissioning of the licensed facilities at AREVA's Richland Facility.

1. This DFP assumes the availability of LLRW and mixed waste disposal facilities at reasonable cost and the application of packaging and transportation requirements consistent with existing regulations.
2. Prior to the start of final site decommissioning, a detailed decommissioning plan consistent with NRC guidance, including a proposed closeout survey plan, will be submitted to the NRC for approval. The results of the closeout survey shall be approved by the NRC prior to release of equipment or grounds to unrestricted use.
3. All work will be performed in compliance with procedures written specifically for the decommissioning activity in conjunction with the detailed decommissioning plan.
4. All work inside contaminated areas will be performed using approved radiation work procedures.
5. The typical costs associated with decontamination of process equipment and ventilation ductwork for free release are expected to be greater than their salvage value, as well as in excess of the cost savings realized by disposal at a non-radioactive waste disposal site. In

general, therefore, no attempt at decontamination for this purpose will be made except in special cases when it may be warranted. Contaminated process equipment and ductwork along with other decommissioning-related wastes will typically be disposed of by burial in LLRW disposal sites, and only the facility will be decontaminated.

6. The facilities themselves, i.e., the buildings housing activities utilizing licensed materials, will be decontaminated via a combination of physical processes (steamcleaning, sandblasting, needle scaling, etc.) such that their demolition will not be required to meet the 25 mrem unrestricted use criteria.
7. All LLRW generated in the decontamination and/or dismantling of site facilities will be containerized and staged to allow shipment to the U.S. Ecology-operated Northwest Compact LLRW Disposal Site over a two calendar year period. The site operator is limited to a maximum allowable total revenue collection from all facility users over a one year period; this limit is currently at $5.359M as set by the Washington Utilities and Transportation Commission. The disposal cost estimate [(see Table 9b)] conservatively assumes application of the entire disposal site fee for the two year period to AREVA.
8. The cost estimate does not take credit for any salvage value that may be realized from the sale of potential assets (e.g., recovered materials or decontaminated equipment) during or after decommissioning.
9. For the sake of this DFP and associated cost estimate, the limit for free release of materials, e.g., soil, in which the radioactive contamination is distributed throughout the material matrix, is assumed to be 30 pCi/gram.
10. The DFP assumes that the site and associated facilities will be decommissioned via decontamination activities and materials removal/disposal in a manner that will not necessitate stabilization and long-term surveillance programs.

4.0 Facility Description Summary

This section provides a facility description as called for in the Facility Description section of Volume 3 of NUREG-1757. The information supplements the facility description on record (Docket 70-1257) as part of AREVA's NRC special nuclear materials license (SNM-1227) for the Richland site.

4.1 *NRC License*

The AREVA Richland nuclear fuel fabrication facility is operated in accordance with an NRC special materials license issued under 10 CFR Part 70. The license, SNM-1227, is docketed under NRC Docket No. 70-1257 for the Richland site.

4.2 *Authorized Radioactive Materials*

NRC License SNM-1227 authorizes AREVA to possess up to 75,000 kgs (75 metric tons) of U-235 present in uranium enriched up to 5 wt. % U-235; only 350 g U-235 may be possessed in uranium U-235 enrichments exceeding 5 wt. %.

4.3 *Usage of Licensed Materials*

The AREVA Richland nuclear fuel fabrication facility utilizes enriched uranium (≤5 wt. % U-235) for the production of enriched uranium nuclear fuel for use in commercial light water reactors, both domestically and internationally. Finished fuel assemblies (bundles) are supplied to nuclear utilities for direct usage as fuel in their nuclear power reactors; however intermediate

products such as enriched uranium powder or pellets are also produced on behalf of other nuclear fuel cycle facilities.

The typical feed material to the plant is uranium hexafluoride (UF_6) received in 30-inch diameter steel cylinders, each containing approximately 1500 kilograms of enriched uranium. The UF_6 is chemically converted to uranium dioxide (UO_2) powder, which is pressed into fuel pellets, which in turn are loaded into fuel rods. These loaded fuel rods, in conjunction with other supporting hardware (tie plates and grid spacers), are assembled into a variety of fuel bundle designs, depending on customer-specific requirements. The fuel products - powder, pellets, or fuel bundles (assemblies) - are loaded for shipment into specially designed shipping containers licensed by the NRC and/or the U.S. Department of Transportation.

4.4 *Description of Facilities Utilizing Special Nuclear Material*

The AREVA Richland nuclear fuel fabrication plant is located at 2101 Horn Rapids Road just within the northern limits of the City of Richland in Benton County, Washington. More specifically, the facility is located in the approximate center of the more easterly of two adjacent quarter sections (160 acres each) of land owned by AREVA. All facilities storing or processing special nuclear material are located within an approximately 53 acre fenced, secured area; the remainder of the surrounding AREVA property is either devoted to vehicle parking areas, is undeveloped, or is leased for agricultural usage.

The primary production activities involving special nuclear material are conducted in three major facilities - the Dry Conversion Facility; the Uranium Dioxide (UO_2) Building, which includes the Blended Low-Enriched Uranium (BLEU) addition; and the Specialty Fuels (SF) Building. The specific functions of these facilities, the general approach to their decommissioning, and the associated decommissioning cost tables are provided in Section 5.1, Production and Production Support Facilities, of this DFP.

The primary production facilities are supported by a number of ancillary support facilities that also entail the storage or handling of SNM or SNM-containing materials. These facilities are most typically involved with materials storage (feed materials, product intermediates, or finished product) or waste processing functions but also provide a number of other miscellaneous production support functions, e.g., purification of contaminated fuel scrap, laundering of contaminated clothing, and recertification of UF_6 shipping cylinders. A listing of these facilities and their functions, the general assumptions/approach pertinent to their decommissioning, and the associated decommissioning cost tables are also provided in Section 5.1 of this DFP.

The major containerized solid waste storage pads consist of two asphalted areas managing currently generated and legacy containerized (barreled or boxed) wastes. These facilities are distinguished by their large spatial size and the fact that they may manage mixed wastes, i.e., wastes that are both radiologically contaminated and chemically hazardous. These facilities are therefore simultaneously subject to the decommissioning requirements of the NRC and, for those portions managing chemically hazardous wastes, the closure requirements of the Washington State Department of Ecology. The inventory disposition and closure approach pertinent to the containerized waste pads are addressed in Section 5.2 of this DFP.

In addition to the facilities themselves as discussed above, operation of the site offers the potential for contamination of the land (soil) below and/or around those facilities. That contamination may have resulted from releases from the facilities or from releases/spills associated with the transfer of licensed materials between facilities, e.g., piping leaks, container spills, etc.

The most significant area of known soil contamination on the AREVA Richland site was the area associated with operation of the legacy surface impoundment system. Known liquid releases

from at least three of the six impoundments in the 1970s - early 1980s resulted in contamination of the soils underlying these units with uranium as well as certain chemicals (fluorides, nitrates, ammonia). The surface impoundment system has been removed and associated radiological and non-radiological soil contamination remediated to meet Washington Department of Ecology (Ecology) soil cleanup levels for uranium and regulated chemical constituents. Additional soil remediation to meet NRC radiological decommissioning criteria is not anticipated to be necessary.

Less significant instances of soil contamination with licensed materials have occurred from spills/releases over the course of the plant's operating history. These contamination incidents have typically been small and remediated at the time of occurrence but in some cases the potential for residual contamination (detected or undetected) remains. These areas are documented in decommissioning records maintained by AREVA in accordance with 10 CFR 70.25(g).

Decommissioning obligations and associated costs relative to environmental remediation are discussed in Section 5.3. These include residual decommissioning-related final survey costs associated with the remediated surface impoundment area and potential characterization/ remediation costs associated with certain other areas as documented in required decommissioning records.

4.5 *Pre-Shipment/Disposal Waste Accumulations*

With the elimination of the site's historic surface impoundment system, current liquid waste processing is very closely coupled to production, using relatively small volume tanks. Temporary accumulation of liquid SNM-containing wastes from production activities is very limited with respect to time and volume and an insignificant contributor to the overall plant decommissioning liability.

Current inventories of containerized solid wastes (low-level radioactive and mixed) and their associated disposition costs are provided in Table 26. Based on the site's continued progress in working down its legacy backlog of stored wastes, current inventories are no longer necessarily higher than possible maximum foreseeable inventories in the future. Therefore in addition to current inventories, Table 26 provides estimates of maximum anticipated volumes in each solid waste category. These higher inventory volumes have been conservatively utilized to estimate disposal cost liabilities.

5.0 Closure Procedures and Cost Estimates

This section outlines the major technical approaches involved in the decontamination and decommissioning of each major facility with a significant potential for radiological contamination. In the case of the containerized waste storage areas, the DFP also extends to the onsite waste inventory associated with these units. Minor ancillary facilities such as external docks, grounds, and warehouses, where contamination is not anticipated but may be found, will be decontaminated in a similar fashion as the known-contaminated facilities described herein.

Certain portions of the containerized waste storage areas may manage mixed wastes, i.e., wastes that are radiologically contaminated and also contain chemical constituents that cause them to be designated as dangerous wastes under the State of Washington Dangerous Waste Regulations. These wastes are dually regulated by the NRC and Ecology and the units are subject to the decommissioning requirements of the NRC (10 CFR 70.25) and the closure requirements of Ecology (WAC 173-303-610 and 650). Detailed decommissioning procedures written pursuant to this DFP and closure plans/procedures developed pursuant to Ecology's

regulations will jointly address the requirements of both regulatory agencies with respect to the mixed waste areas.

Environmental remediation costs apart from costs associated with the decommissioning of site structures are not anticipated to be significant by comparison. Environmental remediation-related approaches and costs are discussed in Section 5.3.

5.1 *Production and Production Support Facilities*

The production activities at the AREVA Richland facility encompass the full scale of nuclear fuel fabrication, i.e., chemical conversion of UF_6 to UO_2 powder, UO_2 pellet production, rod loading, and fuel bundle assembly. These activities occur in three major production facilities, namely the Dry Conversion Facility; the UO_2 Building, including the Blended Low Enriched Uranium (BLEU) addition; and the Specialty Fuels Building. The major production activities are supported by a number of production support, or ancillary, facilities. The general approach to decommissioning these facilities, along with the associated costs, is described below. The associated cost estimates are shown in Tables 2 through 13.

5.1.1 Dry Conversion Facility

The Dry Conversion Facility (DCF) houses the head-end processes for the Richland plant's nuclear fuel fabrication activities, namely the vaporization of UF_6 out of Model 30-B shipping cylinders using electrically-heated autoclaves, the conversion of the UF_6 vapor to dry UO_2 powder in fluidized bed reactors, final defluoridation of the powder in calciners, and the physical preparation (milling, compacting, etc.) of the powder for subsequent pellet pressing. Major aspects of the decommissioning of the DCF are as follows:

1. All process equipment in the various contaminated areas of the building will be surveyed to determine the degree of contamination. Equipment with contamination which is below acceptable release levels can be disposed of on a commercial basis at non-radiological disposal facilities. Equipment which is contaminated to levels above such release levels will be decontaminated if warranted, and packaged for shipment. Such equipment contaminated above free release levels will be shipped to an appropriate low-level radioactive waste disposal site or alternatively, could be transferred to another licensed facility.

   Liquid effluent systems exiting radiation zones will be treated in the same manner as process equipment in the contaminated areas.

   Sufficient radiation surveys of process equipment outside the contaminated areas will be made to assure that unacceptable levels of contamination have not spread outside the contaminated operating areas. Non-contaminated process equipment outside the contaminated areas can be disposed of on a commercial basis at non-radiological disposal facilities or can be left in place to support the mission of associated decontaminated facilities.

2. All contaminated exhaust ductwork will be treated in a manner similar to the contaminated process equipment as described in item 1 above. The final filter bank of the ventilation system will also be disposed of by burial.

3. After removal of all process equipment and exhaust ducting, the facility ceiling and walls will be cleaned as necessary. The cost estimate for this work is based on steam cleaning. The typical wall materials (painted concrete and painted cement block) and ceiling materials (metal panels) are amenable to decontamination via steam cleaning. Although some isolated areas may require more aggressive cleaning approaches, e.g., sand blasting, the increased resources required in these cases should be offset by larger areas that may

require minimal decontamination efforts. Porous, non-durable wall coverings such as gypsum wallboard are uncommon and are present in noteworthy quantities only within two production facilities (UO_2 and Specialty Fuels Buildings) and a single production support facility (ELO Building). The total packed disposal volume for the potentially radioactively contaminated portion of this material is relatively small (≈2,500 ft^3) and is included in the packed disposal volumes provided in Table 2.

4. The floors of the controlled areas will be stripped of all paint and appropriately cleaned. Solvents, if used, will be selected such that they will not cause materials to be designated as dangerous wastes under the State of Washington Dangerous Waste Regulations. The cost estimates for floor decontamination assume the application of sand blasting. Due to the fact that the floors are in most cases coated with some type of sealant, it is anticipated that significant areas will require less aggressive techniques than sand blasting, thereby offsetting the costs of technologies more aggressive than sand blasting that may be required in some areas (e.g. needle scaling).
5. A radiation survey described in the decommissioning plan will be completed to verify that areas are successfully decontaminated.
6. After NRC approval of the radiation survey results, the entire affected area may be resurfaced as appropriate.

5.1.2 UO_2 Building

The UO_2 Building houses the majority of AREVA's nuclear fuel fabrication process downstream of the Dry Conversion Facility, i.e., pellet pressing to final fuel bundle assembly. The building also houses the Richland plant's one remaining "wet" chemical conversion (ammonium diuranate) production line, now utilized strictly for uranium scrap recovery. The activities (excluding the ADU conversion-related activities) are broadly grouped into two categories as follows:

- Ceramics, including additive blending, pellet pressing, pellet sintering, pellet grinding and pellet inspection; and
- Rod Fabrication/Bundle Assembly, including rod loading; rod welding, leak checking, assaying, and x-raying; rod inspection; bundle assembly; and bundle inspection, cleaning, and packaging.

These ceramics and rod fabrication/bundle assembly activities include those performed in the traditional portions of the UO_2 Building as well as those more recently added (2004) to accommodate processing of BLEU material.

Other miscellaneous support facilities located within the UO_2 Building include the U_3O_8 Facility, Powder Storage Facility, UNH Facility, Scrap Recovery Facility, Miscellaneous Uranium Recovery (MURS) Facility, Powder Characterization Facility, UF_6 cylinder wash facility, Supercritical CO_2 Uranium Extraction Facility ($SCCO_2$), Quality Control Analytical/Testing Laboratories, and "hot" maintenance facilities.

Decontamination and decommissioning of the UO_2 Building will be accomplished via an approach consistent with that described for the Dry Conversion Facility.

5.1.3 Specialty Fuels Building

The Specialty Fuels (SF) Building houses fuel fabrication activities related to the production of fuel containing gadolinia (Gd_2O_3) as a neutron poison. The activities include the blending of UO_2 powder, produced in the Dry Conversion Facility or UO_2 Building, with purchased Gd_2O_3; powder preparation and additive blending; pellet pressing; pellet sintering; and pellet grinding. Loading

of gadolinia-containing pellets into rods occurs in the UO_2 Building. Also located in the SF Building is the Solid Waste Uranium Recovery (SWUR) Incinerator Facility.

Decontamination and decommissioning of the SF Building will be accomplished via an approach consistent with that described for the Dry Conversion Facility and UO_2 Building.

5.1.4 Production Support (Ancillary) Facilities

In addition to the Dry Conversion Facility and the UO_2 and SF Buildings, a number of other facilities are involved with enriched uranium handling and processing in varying degrees, and will, therefore, require decontamination/decommissioning efforts commensurate with those activities. The facilities, along with a brief summary of their associated enriched uranium/ radionuclide-handling activities, are as follows:

1. Engineering Laboratory Operations (ELO) Building - process development laboratories, Gadolinia Scrap Uranium Recovery (GSUR) Facility (fuel scrap dissolution and solvent extraction activities), decontamination area, and hot maintenance area.
2. Contaminated Clothing Laundry - laundering of contaminated protective clothing.
3. Fuels Storage Warehouse (Warehouse 4) - storage of packaged special nuclear material in various compounds and forms.
4. UNH Drum Storage Warehouse - storage of closed drums of uranyl nitrate liquid awaiting processing.
5. Uranium Storage Warehouse (Warehouse 6) – past storage of packaged special nuclear material in various compounds and forms; currently devoted to non-SNM processing/storage activities.
6. Operations Scrap Warehouse (Warehouse 7) - storage of closed containers of uranium-containing feed materials, product, or scrap awaiting processing.
7. Product Development Test Facility (PDTF) - LOCA heat transfer, seismic, and coolant flow testing of nuclear fuel assemblies.
8. UF_6 Receiving and Storage Facility - receipt and storage of UF_6 cylinders.
9. Lagoon Uranium Recovery (LUR) Facility - past recovery of uranium from liquid process wastes; no current SNM-related activities.
10. Solids Processing Facility (SPF) - an addition to LUR containing equipment for recovery of uranium from contaminated sludges.
11. Silicon Removal Process (SRP) - equipment housed at LUR/SPF to remove silicon from low-U liquid effluents before treatment in the Ammonia Recovery Facility.
12. Modular Extraction Recovery Facility (MERF) - recovery of uranium from certain solid phase low-level radioactive and mixed wastes. Currently in secured standby status under alternate schedule for decommissioning per 10 CFR 70.38(f).
13. Wastewater Treatment Facility - includes the traditional Ammonia Recovery Facility (ARF) for the recovery of ammonium hydroxide from high-ammonia-content liquid process wastes; the filtration and ion exchange (IX) systems for removal of trace levels of uranium from the plant's final sewered effluent, including equipment to flush and regenerate these systems; and wastewater tanks for interim management of the site's contaminated liquid effluents.
14. Fuel Services Facility (Building 9) - disassembly of contaminated fuel bundles; waste handling/packaging activities; miscellaneous production-support activities. Currently in secured standby status under alternate schedule for decommissioning per 10 CFR 70.38(f).

15. Cylinder Recertification Facility (CRF) - testing and recertification of UF_6 cylinders.
16. Warehouse 2 - storage/loading of packaged special nuclear material in various compounds and forms.

The same basic plan as outlined above for the major production facilities will be implemented, as necessary, in the decontamination and decommissioning of these ancillary facilities.

Assumptions specific to ancillary facilities are as follows:

1. The following facilities contain contaminated equipment to be disposed of and, based on the nature of their operations, will likely require decontamination of the facility and supporting structures prior to release.
   - ELO (process areas)
   - LUR/SPF/SRP
   - MERF
   - Fuel Services Building (Building 9)
   - WWTF (ARF process sump areas only)
   - Laundry
2. The following facilities contain contaminated equipment to be disposed of, but no significant contamination of the facilities themselves is anticipated because the radioactive material was well contained in equipment or in closed containers:
   - WWTF (exclusive of ARF process sump areas)
   - Cylinder Recertification Facility
3. The following facilities contain neither contaminated equipment requiring disposal nor significant levels of structural contamination because they contain, or previously contained, radioactive material exclusively in closed containers.
   - Operations Scrap Warehouse (Warehouse 7)
   - UNH Drum Storage Warehouse
   - Uranium Storage Warehouse (Warehouse 6)
   - PDTF
   - Fuels Storage Warehouse (Warehouse 4)
   - UF_6 Receiving and Storage Facility
   - Warehouse 2

Table 2 Total Dimensions of Facility Components - Production and Production Support Facilities

Level of Contamination: <1.7 Bq/cm^2

Production Facilities	Components	Total Dimensions
Dry Conversion Facility	• Floors • Walls • Ceilings • Equipment/Components/Wallboard (packaged for disposal)	17,818 ft^2 46,179 ft^2 20,611 ft^2 4,301 ft^3
UO_2 Building, including BLEU	• Floors • Walls • Ceilings • Equipment/Components/Wallboard (packaged for disposal)	116,269 ft^2 268,606 ft^2 135,355 ft^2 21,134 ft^3
Specialty Fuels Building	• Floors • Walls • Ceilings • Equipment/Components/Wallboard (packaged for disposal)	13,540 ft^2 52,804 ft^2 15,825 ft^2 6,929 ft^3
Production Support Facilities	**Components**	**Total Dimensions**
WWTF (ARF Sumps Only)	• Floors	527 ft^2
LUR/SPF/SRP Building	• Floors • Walls • Ceilings	6,165 ft^2 25,823 ft^2 6,673 ft^2
ELO Building	• Floors • Walls • Ceilings	8,772 ft^2 19,743 ft^2 8,770 ft^2
MERF	• Floors • Walls • Ceilings	2,045 ft^2 5,091 ft^2 2,045 ft^2
Fuel Services Building (Building 9)	• Floors • Walls • Ceilings	5,305 ft^2 10,361 ft^2 5,455 ft^2
Laundry	• Floors • Walls • Ceilings	299 ft^2 690 ft^2 299 ft^2
All Production Support Facilities	• Equipment/components/wallboard from all production support facilities (packaged for disposal)	8,556 ft^3

Table 3 Planning and Preparation - Production and Production Support Facilities (Work Days)

Estimate of the number of work days, by specific labor category, that will be required to complete planning and preparation activities.

Activity	Safety Engineer Work Days	Engineer Work Days	Health and Safety Technician Work Days	NRC Work Days	Crafts Work Days	Laborer - Work Days
Preparation of Documentation for Regulatory Agencies	181					
Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36(g)(1), 40.42(g)(1), or 70.38(g)(1)	27			25		
Development of Work Plans		44				
Procurement of Special Equipment		44				
Staff Training	10		20		40	40
Characterization of Radiological Condition of the Facility (including sampling, soil and tailings analysis, or groundwater analysis if applicable)			1,220			
TOTALS	218	88	1,240	25	40	40

Table 4 Decontamination or Dismantling of Radioactive Facility Components - Production and Production Support Facilities (Work Days)

Estimate of the number of workdays, by specified labor category that will be required to complete decontamination and/or dismantling activities for each facility component.

Name of room, laboratory, or area: Dry Conversion Facility
Level of Contamination: <1.7 Bq/cm^2

Component	Decon. Method	Engineer Work Days	Crafts Work Days	Laborer Work Days	Health and Safety Technician Work Days
Preparation/ Mobilization				56	
Equipment/ Component Removal			478	478	
Floors	Sand blast	Estimated @ $4.15/ft^2 (See Table 12) = $73,945			
Walls/ Ceilings	Steam Clean	Estimated @ $0.415/ft^2 (See Table 12) = $27,718			
Remedial Radiation Surveys					208
QA/QC		25			
TOTALS		25	478	534	208

Table 4 Decontamination or Dismantling of Radioactive Facility Components - Production and Production Support Facilities (Work Days) (cont.)

Estimate of the number of workdays, by specified labor category that will be required to complete decontamination and/or dismantling activities for each facility component.

Name of room, laboratory, or area: UO_2 Building, including BLEU
Level of Contamination: <1.7 Bq/cm^2

Component	Decon. Method	Engineer Work Days	Crafts Work Days	Laborer Work Days	Health and Safety Technician Work Days
Preparation/ Mobilization				276	
Equipment/ Component Removal			1,906	1,906	
Floors	Sand blast	Estimated @ $4.15/ft^2 (See Table 12) = $482,516			
Walls/ Ceilings	Steam Clean	Estimated @ $0.415/ft^2 (See Table 12) = $167,644			
Remedial Radiation Surveys					1,098
QA/QC		129			
TOTALS		129	1,906	2,182	1,098

Table 4 Decontamination or Dismantling of Radioactive Facility Components - Production and Production Support Facilities (Work Days) (cont.)

Estimate of the number of workdays, by specified labor category that will be required to complete decontamination and/or dismantling activities for each facility component.

Name of room, laboratory, or area: Specialty Fuels Building
Level of Contamination: <1.7 Bq/cm^2

Component	Decon. Method	Engineer Work Days	Crafts Work Days	Laborer Work Days	Health and Safety Technician Work Days
Preparation/ Mobilization				103	
Equipment/ Component Removal			873	873	
Floors	Sand blast	Estimated @ $4.15/ft^2 (See Table 12) = $56,191			
Walls/ Ceilings	Steam Clean	Estimated @ $0.415/ft^2 (See Table 12) = $28,481			
Remedial Radiation Surveys					510
QA/QC		30			
TOTALS		30	873	976	510

Table 4 Decontamination or Dismantling of Radioactive Facility Components - Production and Production Support Facilities (Work Days) (cont.)

Estimate of the number of workdays, by specified labor category that will be required to complete decontamination and/or dismantling activities for each facility component.

Name of room, laboratory, or area: Production Support (Ancillary) Facilities
Level of Contamination: <1.7 Bq/cm^2

Component	Decon. Method	Engineer Work Days	Crafts Work Days	Laborer Work Days	Health and Safety Technician Work Days
Preparation/ Mobilization				157	
Equipment/ Component Removal			757	757	
Floors	Sand blast	Estimated @ $4.15/ft^2 (See Table 12) = $95,919			
Walls/ Ceilings	Steam Clean	Estimated @ $0.415/ft^2 (See Table 12) = $35,254			
Remedial Radiation Surveys					276
QA/QC		43			
TOTALS		43	757	914	276

Table 5 Final Radiation Survey - Production and Production Support Facilities (Work Days)

Estimate of the number of work days, by specific labor category that will be required to conduct a final radiation survey.

Activity	Health and Safety Technician Work Days
Final Survey	1,220
TOTAL	1,220

Table 6 Total Work Days by Labor Category - Production and Production Support Facilities

Total work days estimated for each specific labor category from the applicable tables above (i.e., from Tables 3 through 5).

Activity	Project Manager	Safety Engineer Work Days	Senior Engineer Work Days	Engineer Work Days	Health and Safety Technician Work Days	Clerical Work Days	Crafts Work Days	Laborer Work Days	NRC Work Days
Planning and Preparation (TOTALS from Table 3)		218		88	1,240		40	40	25
Decontamination and/or Dismantling of Radioactive Facility Components (Sum of TOTALS from Table 4)				227	2,092		4,014	4,606	
Operation of Waste Volume Reduction Facility								4,680	
Final Radiation Survey (TOTAL from Table 5)					1,220				
Project Administration	780	780	780	780		780			

Table 7 Worker Unit Cost Schedule

Fully burdened billing rates from State of Washington-based third party contractors (with exception of NRC).

Labor Category	Labor Rate, $/hr.	Labor rate, $/day*
Project Manager	105.59	845
Senior Engineer	106.08	849
Engineer	67.93	543
Health and Safety Technician (HST)	42.56	340
Safety Engineer	69.31	554
Crafts	64.94	520
Equipment Operator	49.38	395
Laborer	43.50	348
Clerical	34.74	278
NRC	273.00	2,184

* Eight hour day; rounded to the nearest dollar.

Table 8 Total Labor Costs by Major Decommissioning Task - Production and Production Support Facilities

Estimated work days for each specific labor category (from Table 6) multiplied by the total cost per work day for the corresponding labor category (from Table 7).

Task	Project Manager Cost, $	Safety Engineer Cost, $	Senior Engineer Cost, $	Engineer Cost, $	Health and Safety Tech. Cost, $	Clerical Cost, $	Crafts (Avg.) Cost, $	Laborer (Semi-Skilled) Cost, $	NRC Cost, $	Total Labor Cost, $
Planning and Preparation		120,772		47,784	421,600		20,800	13,920	54,600	679,476
Decontamination or Dismantling of Radioactive Facility Components				123,261	711,280		2,087,280	1,602,888		4,524,709
Operation of Waste Volume Reduction Facility								1,628,640		1,628,640
Final Radiation Survey					414,800					414,800
Project Administration	659,100	432,120	662,220	423,540		216,840				2,393,820

Table 9 Packaging, Shipping, and Disposal of Radioactive Wastes - Production and Production Support Facilities (Excluding Labor Costs)

(a) Packing Material Costs

Estimate of the types and volumes of waste expected to be generated, along with the number and types of containers required for packing the waste.

Waste Type	Volume (ft^3)	Number of Containers	Type of Container	Unit Cost of Container, $	Total Packaging Costs, $
Bldg. Waste	40,920	440	93 ft^3 Box	1,447	636,680
Boron spider drums	1,418 (compacted)	16			23,152
Contaminated shipping container components	400 (compacted)	5			7,235
TOTAL	42,738	461			667,067

(b) Shipping and Disposition Costs

Estimate of the volume of waste to be disposed and the packing, shipping, and disposal costs.

Waste Type	Disposition Volume or Weight (as indicated)	Disposition Costs, $	Shipping Cost, $
Containerized Waste for Burial	42,738 ft^3	10,718,496*	154,000
30-B Cylinders (melt, reuse)	471,800 lbs.	1,236,116	120,000
TOTAL		11,954,612	274,000

* Assumes all wastes accumulated/staged for disposal over two calendar year period at maximum allowed waste site revenue collection of $5,359,248/yr. (see Section 3.0, Key Assumptions)

Table 10 Equipment/Supply Costs - Production and Production Support Facilities
(Excluding Containers)

Estimate of the quantity of equipment and supplies required for decommissioning.

Equipment/Supplies	Total Equipment/Supply Cost, $
Miscellaneous Cleaning Equipment/Consumable Supplies	381,000
TOTAL	381,000

Table 11 Laboratory Costs - Production and Production Support Facilities

Estimate of costs for analyses to be performed by an independent third-party laboratory.

Activity	Total Cost, $
Sampling and analysis	10,500
TOTAL	10,500

Table 12 Miscellaneous Costs - Production and Production Support Facilities

Estimate of any other applicable costs.

Cost Item	Total Cost, $
State/Local Permit and Inspection Fees	50,000/yr x 3 yr. = 150,000
Insurance	521,000/yr x 3 yr. = 1,563,000
Taxes	50,000/yr. x 3 yr. 150,000
NRC Inspections	70,000/yr x 3 yr. = 210,000
Steam Cleaning Walls/Ceilings	259,097
Sand Blasting Floors	708,571
Certification Survey	94,500
Consultant Support (Health Physics, Decommissioning)	121,000
Logistics/Shipping Support	211,770
TOTAL	3,467,938

Table 13 Total Decommissioning Costs - Production and Production Support Facilities

Total of the reported costs in Tables 8, 9, 10, 11 and 12.

Task/Component	Cost, $
Planning and Preparation (From Table 8)	679,476
Decontamination and/or Dismantling of Radioactive Facility Components (From Table 8)	4,524,709
Operation of Waste Volume Reduction Facility (Total from Table 8)	1,628,640
Final Radiation Survey (From Table 8)	414,800
Packing Material Costs (TOTAL from Table 9)	667,067
Shipping and Disposal Costs (TOTAL from Table 9)	12,228,612
Project Administration Costs (TOTAL from Table 8)	2,393,820
Equipment/Supply Costs (TOTAL from Table 10)	381,000
Laboratory Costs (TOTAL from Table 11)	10,500
Miscellaneous Costs (TOTAL from Table 12)	3,467,938
TOTAL - Production and Production Support Facilities	26,396,562

5.2 *Containerized Waste Storage Pads and Inventories*

Containerized (barreled or boxed) operational wastes are managed on an ongoing basis at two significant container storage areas at the Richland facility - an uncovered asphalt pad located in the central portion of the site, often referred to as the "old" or "historic" dangerous waste storage pad; and a newer, partially covered asphalt pad, located in the southeast corner of the site, and referred to as the Dangerous Waste Storage Facility (DWSF). Both pads manage containerized low-level radioactive waste (LLRW) and also manage, or have managed, LLRW that also designates as chemically dangerous per Ecology's Dangerous Waste Regulations (WAC 173-303), i.e., mixed wastes. As such, these waste management units, all or in part, are subject to both the NRC's decommissioning requirements and Ecology's closure requirements, as well as the financial assurance requirements of both agencies.

The decommissioning/closure of the containerized waste storage pads will involve disposition of the containerized inventories followed by decommissioning/closure of the physical structures. Current plans call for utilization of both pads for the management of LLRW until time of plant closure, meaning that NRC decommissioning will not occur before then. With respect to mixed waste management, nearly all of the historic dangerous waste pad has been closed per Ecology regulations now that AREVA's Modular Extraction Recovery Facility (MERF) has completed its uranium recovery processing of the large volume of legacy containerized mixed wastes once stored on the historic pad. In the event that MERF is operated in the future, any mixed waste storage in the MERF staging area will be conducted in accordance with Ecology regulations on a less-than-90-day basis. Management of LLRW and mixed wastes on the newer DWSF will continue until time of plant closure, at which time AREVA will pursue Ecology closure of the DWSF plus the small unclosed portion of the historic pad housing the MERF operational area. At that time, decommissioning of both pads will also be pursued per NRC requirements. Decommissioning of the MERF facility itself is addressed as one of the ancillary facilities in Section 5.1.4 of this plan.

5.2.1 Container Storage Pad Structures

Physical structures associated with the container storage pads (historic pad and DWSF) consist of the blacktop pads at both locations, a limited number of double containment storage pallets, and the roofed three-sided storage building at the DWSF. Contamination levels (radiological or chemical) are expected to be minimal at both locations based on the fact that the pads manage for the most part solid phase wastes in securely closed strong-tight containers. Outside surfaces of the containers have undergone appropriate radiological release surveys. Furthermore, the containers are subject to routine operational inspections. The need for remediation of surrounding or underlying soil to any significant extent is also not anticipated but soil status will be verified via appropriate screening/sampling protocols. Prior (September 2004) closure of a significant portion of the historic waste pad under Ecology regulations confirmed the lack of surface and soil contamination associated with this longstanding operation.

Major aspects of the decommissioning/closure of the container storage pads and associated equipment/facilities are as follows:

- radiological surface screening measurements at a detection sensitivity sufficient to detect past releases from containers to the blacktop or surrounding peripheral soils;
- removal of any asphalt with evidence of radiological contamination to allow similar screening of underlying soil;
- chemical constituent sampling of underlying or peripheral soils found to be radiologically contaminated;

- removal/disposal of contaminated blacktop and/or soils in accordance with NRC/Ecology cleanup criteria;
- surveying/decontamination/release of double containment pallets, and;
- replacement of removed asphalt with non-contaminated material.

Final release of the pad structures will be subject to the final release survey requirements of both the NRC and Ecology. Costs associated with closure/decommissioning of the waste storage pad structures are summarized in Tables 14-25.

Table 14 Number and Dimensions of Facility Components - Storage Areas

Name of room, laboratory, or area: Outdoor Containerized Waste Storage Areas

Component	Number of Components	Dimensions of Components	Total Dimensions, ft^2
Asphalt Pad - Old	1	72' x 133 ' + 45' x 169'	17,181
Asphalt Pad - DWSF	1	120' x 170'	20,400
Double Containment Pallets	20	4' x 4'	320

Table 15 Planning and Preparation - Storage Areas (Work Days)

Estimate of the number of work days, by specific labor category, that will be required to complete planning and preparation activities.

Activity	Safety Engineer Work Days	Engineer Work Days	Health and Safety Technician Work Days	Laborer (Semi-Skilled) Work Days
Preparation and Submittal of Documentation for Regulatory Agencies	*			
Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36(g)(1), 40.42(g)(1), or 70.38(g)(1)	*			
Development of Work Plans/Safety Plans	2			
Procurement of Special Equipment		2		
Staff Training	1		1	1
Characterization of Radiological Condition of the Facility (including sampling, soil and tailings analysis, or groundwater analysis if applicable)		4	10	4
Other (specify)				
TOTALS	3	6	11	5

* Labor costs relative to NRC licensed materials included in Decommissioning Plan for Production and Production Support Facilities (Table 3). Closure plan for Ecology-regulated areas already on file with Ecology.

Table 16 Decontamination or Dismantling of Radioactive Facility Components - Storage Areas (Work Days)

Estimate of the number of workdays, by specified labor category that will be required to complete decontamination and/or dismantling activities for each facility component.

Name of room, laboratory, or area: Waste Storage Areas

Component	Health and Safety Technician Work Days	Laborer (Semi-Skilled) Work Days
Asphalt Pads	1	2
Double Containment Pallets	5	
TOTALS	6	2

Table 17 Restoration of Contaminated Areas on Facility Grounds - Storage Areas (Work Days)

Estimate of the number of work days, by specific labor category that will be required to restore contaminated areas on facility grounds.

Activity	Laborer (Semi-Skilled) Work Days
Waste Storage Areas	3
TOTAL	3

Table 18 Final Radiation Survey - Storage Areas (Work Days)

Estimate of the number of work days, by specific labor category that will be required to conduct a final radiation survey.

Activity	Engineer Work Days	Health and Safety Technician Work Days	Laborer (Semi-Skilled) Work Days
Survey		30	
Sampling Labor	2		2
TOTALS	2	30	2

Table 19 Total Work Days by Labor Category - Storage Areas

Total work days estimated for each specific labor category from the applicable tables above (i.e., from Tables 15 through 18).

Activity	Safety Engineer Work Days	Engineer Work Days	Health and Safety Technician Work Days	Laborer (Semi-Skilled) Work Days
Planning and Preparation (TOTALS from Table 15)	3	6	11	5
Decontamination and/or Dismantling of Radioactive Facility Components (Sum of TOTALS from Table 16)			6	2
Restoration of Contaminated Areas on Facility Grounds (TOTAL from Table 17)				3
Final Radiation Survey (TOTALS from Table 18)		2	30	2

Table 20 Total Labor Costs by Major Decommissioning Task - Storage Areas

Estimated work days for each specific labor category (from Table 19) multiplied by the total cost per work day for the corresponding labor category (from Table 7).

Task	Safety Engineer Cost, $	Engineer Cost, $	Health and Safety Technician Cost, $	Laborer (Semi-Skilled) Cost, $	Total Labor Cost, $
Planning and Preparation	1,662	3,258	3,740	1,740	10,400
Decontamination or Dismantling of Radioactive Facility Components			2,040	696	2,736
Restoration of Contaminated Areas on Facility Grounds				1,044	1,044
Final Radiation Survey		1,086	10,200	696	11,982

Table 21 Packaging, Shipping, and Disposal of Radioactive Wastes - Storage Areas (Excluding Labor Costs)

(a) Packing Material Costs

Estimate of the types and volumes of waste expected to be generated, along with the number and types of containers required for packing the waste.

Waste Type	Volume (ft^3)	Number of Containers	Type of Container	Unit Cost of Container, $	Total Packaging Costs, $
Asphalt/Soil	40	*	93 ft^3 box	*	*

(b) Processing, Packing, Shipping, Disposal Cost

Estimate of the volume of waste to be disposed and the packing, shipping, and disposal costs.

Waste Type	Disposal Volume (ft^3)	Unit Cost ($/$ft^3$)	Total Disposal Costs, $
Asphalt/Soil	40	*	*

* No incremental costs for containers or disposal for this small waste volume. Can be accommodated in void spaces of equipment disposal boxes (see Table 9).

Table 22 Equipment/Supply Costs - Storage Areas (Excluding Containers)

Estimate of the quantity of equipment and supplies required for decommissioning.

Equipment/Supplies	Total Equipment/Supply Cost, $
Radiation Screening Instruments	12,000
TOTAL	12,000

Table 23 Laboratory Costs - Storage Areas

Estimate of costs for analyses to be performed by an independent third-party laboratory.

Activity	Total Cost, $
Testing and analysis - 48 samples @ $120 ea.	5,760
TOTAL	5,760

Table 24 Miscellaneous Costs - Storage Areas

Estimate of any other applicable costs.

Cost Item	Total Cost, $
Certification Survey (ORISE)	20,000
TOTAL	20,000

Table 25 Total Decommissioning Costs - Storage Areas

Total of the reported costs in Tables 20, 21, 22, 23 and 24.

Task/Component	Cost, $
Planning and Preparation (From Table 20)	10,400
Decontamination and/or Dismantling of Radioactive Facility Components (From Table 20)	2,736
Restoration of Contaminated Areas on Facility Grounds (From Table 20)	1,044
Final Radiation Survey (From Table 20)	11,982
Packing Material Costs (TOTAL from Table 21)	-
Processing, Packing, Shipping, Disposal Costs (TOTAL from Table 21)	-
Equipment/Supply Costs (TOTAL from Table 22)	12,000
Laboratory Costs (TOTAL from Table 23)	5,760
Miscellaneous Costs (TOTAL from Table 24)	20,000
TOTAL - Storage Areas	63,922

5.2.2 Containerized LLRW Inventory

The LLRW inventory consists of barreled or boxed waste materials that are radioactively contaminated but that do not designate as chemically dangerous per Ecology regulations. They are essentially all solid-phase materials; all of the relatively few drums containing liquids, e.g., radioactively contaminated oils, are stored on double containment pallets or in drums within drums. Treatment and/or disposal options are available for each of the major containerized LLRW categories; disposition pathways vary primarily based on combustible versus non-combustible classification of the waste. Primary disposition pathways include:

- for combustible wastes, incineration in AREVA's SWUR facility, followed by uranium recovery processing of the resultant ash; and
- for non-combustible LLRW, disposal at the U.S. Ecology-operated Hanford LLRW disposal site.

Table 26 summarizes the volumes and associated disposition costs for the containerized LLRW inventory. As noted in the table, current inventories are now somewhat lower than reasonably assumed maximum inventories, due in large part to the site's significant progress in working off its historic backlog of stored wastes. The maximum expected volumes have been conservatively utilized to estimate disposal cost liabilities.

5.2.3 Containerized Mixed Waste Inventory

The containerized mixed waste inventory consists of wastes that are both radioactively contaminated and chemically dangerous (per Ecology criteria). Like the LLRW inventory, they are essentially all solid-phase; the few remaining liquid-containing drums are stored on containment pallets. Treatment and/or disposal options are available and being utilized for all of the major currently generated containerized mixed waste categories. Options for the final disposition of a relatively small volume of legacy mixed wastes and very small volume of currently generated mixed wastes have not been identified but continue to be pursued in the commercial sector.

Disposition pathways for the containerized mixed wastes depend primarily on the specific acceptance criteria of the contracted mixed waste disposal site. Primary disposition pathways, depending on the specific waste stream, include:

- direct shipment to the contracted mixed waste disposal site with or without pre-compaction; and
- offsite treatment via a permitted commercial mixed waste treatment facility followed by disposal of the treated residues at the contracted mixed waste disposal facility.

Table 26 also summarizes the volumes and associated disposition costs for the containerized mixed waste inventory. As in the case of the non-mixed LLRW, the current inventory of containerized mixed wastes is smaller than reasonably assumed maximum inventories. As such, the maximum expected inventories have been utilized to estimate disposal cost liabilities.

Table 26 Containerized Waste Inventory Costs

	Disposal Rate $/ft^3	Current Volume ft^3	Max Expected Volume ft^3	Max Total Cost, $[1]
LLRW[2] - Incinerate in SWUR	$236.70	4,522	10,890	$2,577,663
LLRW - Direct disposal at LLRW burial site	*	1,860	2,500	*
LLRW - On hold for further processing	*	1,522	1,600	*
LLRW - Total		**7,904**	**14,990**	**$2,577,663**
MW[3] - Disposal at contracted mixed waste disposal site	$286.59	963	1,200	$343,908
MW - No disposal option	$666.66	266	326	$217,331
MW - Total		**1,229**	**1,526**	**$561,239**
Logistics/Shipping Support				N/A**
Shipping Costs				N/A***

* No incremental disposal costs above $10.718M already allocated to US Ecology (see Table 9 b.)

** Logistics/shipping support included in Table 12.

*** Disposal rates include shipping costs, as applicable.

[1] Because this waste is containerized, the cost of containers is not included.

[2] Low-level radioactive waste

[3] Mixed waste

5.3 *Environmental Remediation*

Decommissioning financial liability can be associated with environmental contamination with licensed materials to the extent that the contamination requires remediation during decommissioning to meet the unrestricted use criteria of 10 CFR 20.1402. At the Richland facility the most significant area of known soil contamination was the area associated with the legacy surface impoundment system. This historically contaminated area and its residual decommissioning liability are discussed below in Section 5.3.1. Similar discussion relative to other historic site spills/releases of licensed materials to the environment is provided in Section 5.3.2. Lastly, Section 5.3.3 addresses potential investigation/remediation costs associated with two potential soil contamination areas, namely soil underlying certain areas of the UO_2 Building and soil potentially impacted by underground piping.

5.3.1 Legacy Surface Impoundment System

The Richland site maintained and operated a surface impoundment system over the time period of 1971-2004 for the management of the plant's radioactively-contaminated (low-level uranium) liquid effluents. Certain of those impoundments initially installed with single liner systems developed leaks, resulting in contamination of the underlying soil. The leaks also resulted in uranium contamination within the shallow confined groundwater aquifer underlying the site. From 1983 until their last usage in 2004, all of the impoundments were operated with multi-linered containment systems with inter-liner leak detection/leachate collection; no additional leaks were documented over that period.

The surface impoundment system has been removed from service in accordance with a consent decree and formal closure plan under Washington State Department of Ecology (Ecology) Dangerous Waste Regulations. The work involved processing of the stored waste inventory, removal/disposal of lagoon structural components, characterization of contamination levels in underlying soil, and remediation (removal and offsite disposal) of contaminated soil to meet Ecology cleanup levels for uranium and regulated non-radiological chemicals. Certification of completion of the work in accordance with the approved closure plan and associated soil cleanup levels was submitted to Ecology in September 2006; Ecology concurrence was received on November 14, 2006.

AREVA believes that the surface impoundment area now conservatively meets NRC requirements for unrestricted release and that no additional remediation will be required at the time of final plant decommissioning. The Ecology-imposed uranium cleanup level of 12.1 mg/kg translates to an activity level of 29 pCi/g for uranium at a U-235 enrichment of 3.5%. In reality the residual soil uranium concentrations present upon completion of the Ecology-mandated closure work were generally well below the 29 pCi/g limit in that cleanup to a very conservative fluoride soil cleanup limit typically drove soil removal/disposal to an extent well beyond that required to meet the uranium cleanup limit. AREVA has calculated DCGLs of 63 pCi/g for U-234 and 66 pCi/g for U-235, U-236, and U-238 based on RESRAD 6.3 and ICRP 30 (using more up-to-date ICRP models would yield even higher DCGLs). While realizing the final NRC release of the former surface impoundment area will be based on NRC-approved DCGLs and final status and confirmatory surveys, it is not anticipated that such DCGLs will necessitate cleanup beyond that already conducted.

Groundwater levels of uranium are in the general range of, or below, the Ecology groundwater cleanup level for uranium of 30 ug/l (ppb), corresponding to the current federal (EPA) uranium drinking water limit. Groundwater levels of uranium have continued their decline over the last three years and are expected to continue to decline via natural attenuation in that the Ecology

uranium soil cleanup level was calculated to be protective of groundwater at the 30 ppb groundwater limit. Only two of the site's six groundwater wells downgradient of the legacy surface impoundment area still exceed 30 ppb, with neither exceeding 50 ppb. Furthermore, uranium has not been detected at levels exceeding the drinking water standard in any monitored offsite downgradient wells. Those wells are located on the immediately downgradient U.S. Department of Energy Hanford Site, where groundwater is not extracted for any practical usage (consumption, irrigation, etc.).

Residual decommissioning cost liabilities related to the legacy surface impoundment area are limited to the costs associated with the planning for, and the conduct of, a technically compliant final survey, including anticipated NRC regulatory oversight and the conduct of an NRC-required third party certification survey. These residual costs are provided in Tables 27-30. These costs will be incurred at the time of final plant decommissioning in that the NRC has granted AREVA an alternate schedule for official decommissioning of the remediated surface impoundment area in accordance with 10 CFR 70.38(f) (November 15, 2006; TAC L31973).

5.3.2 Historic Spills and Releases (Documented)

As required by 10 CFR 70.25(g)(3), AREVA maintains records of information important to the decommissioning of the Richland site, which includes areas of known or suspect environmental contamination that will require additional characterization and, if needs be, remediation at the time of plant decommissioning. These potential environmental remediation areas are a subset of the areas listed per 10 CFR 70.25(g)(3)(ii), i.e., records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. Information in this regard has been derived from two major sources, namely (1) a major site-wide remedial investigation/feasibility study (RI/FS) conducted in the early 1990s which included a formal hazardous substance source review (the RI/FS was in response to surface impoundment-related issues and included both radiological and non-radiological constituents), and (2) the site's ongoing hazardous spill/release reporting procedure and associated spill reports/log.

Records of these past spills/releases typically reveal residual contamination levels below 30 pCi/g uranium-based activity; furthermore most of the areas are highly localized and typically were remediated at the time of occurrence. Extensive environmental remediation efforts are not anticipated for these areas to meet decommissioning radiological release criteria. Costs will primarily be related to characterization (investigation, sampling, analysis) with the potential for limited soil removal costs. Any limited soil removal required will not result in incremental disposal costs in that the soil can be easily accommodated within the void spaces in the approximately 450 93 ft^3 burial boxes that will be utilized to contain removed facility equipment (see Table 9). Estimated decommissioning costs related to environmental remediation of documented historic spills/releases (unrelated to the surface impoundments) are provided in Tables 31-34.

5.3.3 Potential Soil Contamination Areas

Beyond the legacy surface impoundment area and the pertinent historic spill/release sites discussed in Sections 5.3.1 and 5.3.2, respectively, two other environmental areas of potential soil contamination will need to be accessed and evaluated at the time of plant decommissioning. The first area is the soil underlying the historic and current wet chemical processing areas [primarily ammonium diuranate (ADU) chemical conversion] within the Uranium Dioxide (UO_2) Building. The long-term processing of uranium-bearing solutions in conjunction with concrete flooring challenged by the harsh chemical environment have created the possibility for the release of uranium to the soil column below those areas. Access to this soil for characterization

and possible removal will necessitate concrete removal, soil characterization, soil excavation, and possible offsite soil disposal.

Table 35 provides the costs associated with removal of ADU conversion area concrete flooring judged as most vulnerable to having underlying soil contamination, analyzing the underlying soil for uranium and pertinent chemical constituents (nitrate, fluoride), and excavating soil contaminated above cleanup limits for offsite disposal. The assumptions underlying Table 35 are conservative in that the implicated floor areas (500 ft^2 total) will be over-cut (removal of 1400 ft^2) to allow backhoe access, and removal of all soil to a depth of ten feet is assumed over a total surface area of 1000 ft^2 (twice the implicated floor area).

The second area of potential soil contamination is the soil underlying underground piping, historically or currently conveying uranium-bearing solutions. It is estimated that approximately 3,000 feet of trenching will be required to gain access for removal of the approximately 6,000 lineal feet of underground piping that has conveyed uranium-bearing solutions, past or present. Table 36 provides estimated costs for excavation (backhoe and hand), piping removal/disposal, and soil analysis, along with a conservative estimate of soil removal/disposal costs that assumes the need to address soil contamination below ten percent of the 3,000 feet of trenching.

Table 27 Residual Labor Requirements for Final Release of Former Surface Impoundment Area (Work Days)

Estimated number of work days by specific labor category that will be required to complete the planning and preparation for, and the conduct of, a final release survey for the former surface impoundment area.

Activity	Senior Engineer Work Days	Engineer Work Days	NRC Work Days	Health and Safety Technicians
Planning and Preparation				
Preparation of Documentation for Regulatory Agencies	10			
Submittal of Decommissioning Plan to NRC when Required by 70.38(g)(1)	5		15	
Development of Work Plans		5		
Procurement of Special Equipment		4		
Staff Training		4		2
Conduct of Survey				
Final Radiation Survey (gridding, sampling, sample preparation)		12		12
TOTALS	15	25	15	14

Table 28 Total Labor Costs for Final Release of Former Surface Impoundment Area

Estimated work days for each specific labor category (from Table 27) multiplied by the total cost per work day for the corresponding labor category (from Table 7).

Task	Senior Engineer Cost, $	Engineer Cost, $	Health and Safety Technician Cost, $	NRC Cost, $	Total Labor Cost, $
Planning and Preparation	12,735	7,059	680	32,760	53,234
Conduct of Final Radiation Survey		6,516	4,080		10,596

Table 29 Laboratory and Miscellaneous Costs - Final Release of Former Surface Impoundment Area

Estimate of costs for analyses to be performed by an independent third-party laboratory as well as other third party support costs.

Activity/Item	Total Cost, $
Testing and analysis: 480 samples @ $120 ea.	57,600
40 sampling excavations (backhoe)	16,591
NRC Inspections	31,000
Certification Survey	78,750
TOTAL	183,941

Table 30 Total Decommissioning Costs - Final Release of Former Surface Impoundment Area

Total of the reported costs in Tables 28 and 29.

Task/Component	Cost, $
Planning and Preparation (From Table 28)	53,234
Conduct of Final Radiation Survey (From Table 28)	10,596
Laboratory and Miscellaneous Costs (TOTAL from Table 29)	183,941
TOTAL – Former Surface Impoundment Area	247,771

Table 31 Labor Requirements – Historic Spills/Releases (Work Days)

Estimated number of work days by specific labor category that will be required to investigate, characterize and remediate pertinent environmental releases/spills recorded in accordance with 10 CFR 70.25(g)(3)

Activity	Engineer Work days	Equipment Operator Work Days	Laborer Work Days
Work plans/procedures	3		
Pre-characterization dismantlement and/or excavation		2	2
Soil sample collection (characterization and confirmation)	2		
Soil removal/packaging (if required)		3	3

Table 32 Total Labor Costs for Historic Spills/Releases

Estimated number of work days for each specific labor category (from Table 31) multiplied by the total cost per work day for the corresponding labor category (from Table 7)

Activity	Engineer Cost, $	Equipment Operator Cost, $	Laborer Cost, $	Total Labor Cost, $
Work plans/procedures	1,629			1,629
Pre-characterization dismantlement and/or excavation		790	696	1,486
Soil sample collection (characterization and confirmation)	1,086			1,086
Soil removal/packaging (if required)		1,185	1,044	2,229

Table 33 Laboratory and Miscellaneous Costs – Historic Spills/Releases

Estimate of costs for analyses to be performed by an independent third-party laboratory.

Activity/Item*	Total Cost, $
Testing and analysis: 40 samples @ $120 ea.	4,800
NRC Inspections, certification survey	Covered in Table 12 and 29 costs

* No incremental soil disposal costs. Anticipated soil volumes accommodated in void spaces of equipment disposal boxes (see discussion in Section 5.3.2).

Table 34 Total Costs - Environmental Remediation for Historic Spills/Releases

Total of reported costs in Tables 32 and 33.

Task/Component	Cost, $
Work plans/procedures (from Table 32)	1,629
Pre-characterization dismantlement and/or excavation (from Table 32)	1,486
Soil sample collection (from Table 32)	1,086
Soil removal/packaging (from Table 32)	2,229
Laboratory testing and analysis (from Table 33)	4,800
TOTAL - Environmental Remediation	11,230

Table 35 Estimated Remediation Costs for Soil Underlying UO_2 Building Wet Chemical Processing Areas

Estimated labor, material, equipment and analytical costs to address potential soil contamination below UO_2 Building ADU Conversion Area

Activity/Component	Cost, $
Concrete removal/soil excavation	
Labor	21,447
Materials	2,525
Equipment	8,973
Analytical	
Uranium in soil (114 @ $120 ea.)	13,680
Nitrate, fluoride in soil (57 @ $30 ea.)	1,710
Containers (118 waste boxes @ $1,447 ea. to accommodate 10,000 ft^3 soil and 700 ft^3 concrete)	170,746
Soil Disposal	*
Container Transport (20 transports @ $2,000 ea.)	40,000
Logistics/Shipping Support	**
TOTAL	259,081

* No incremental disposal costs above $10.718M already allocated to US Ecology (see Table 9b).
** Logistics/shipping support included in Table 12.

Table 36 Estimated Costs for Removal of Underground Piping and Conduct of Associated Soil Remediation

Estimated labor, material, equipment, and analytical costs to address the removal of, and potential soil contamination below, underground piping.

Activity/Component	Cost, $
Excavation/pipe removal/soil removal	
Labor	216,693
Equipment	51,250
Containers (103 boxes @ $1,447 ea.)	149,041
Analytical (250 samples @ $120 ea.)	30,000
Container transport (17 transports @ $2,000 ea.)	34,000
Soil disposal	*
Logistics/shipping support	**
TOTAL	480,984

* No incremental disposal costs above $10.718M already allocated to US Ecology (see Table 9b).
** Logistics/shipping support included in Table 12.

6.0 Adjustment of Cost Estimates and Funding Level

As required in 10 CFR 70.25(e), AREVA will adjust these cost estimates at intervals not to exceed three years. Associated funding levels will be adjusted as needed. Consistent with guidance in NUREG-1757, the review will consider changes in costs of goods and services, including inflation; changes in facility conditions or operations; and changes in expected decommissioning procedures.

Certification of Financial Assurance

Principal: AREVA NP Inc., 2101 Horn Rapids Road, Richland, WA 99354

NRC License Number SNM-1227 for AREVA NP Inc. (same address)

Issued to: U.S. Nuclear Regulatory Commission

I certify that AREVA NP Inc. is licensed to possess the following types of unsealed special nuclear material licensed under 10 CFR Part 70 in the following amounts:

Type of Material	Amount of Material
Uranium compounds in any chemical/physical form enriched up to 5.00 wt. % U-235 (uranium compounds)	75,000 kg U-235
Uranium enriched in U-235 (any enrichment or chemical/physical form)	350 g U-235

I also certify that financial assurance in the amount of $38,248,065M has been obtained for the purpose of decommissioning as prescribed by 10 CFR Part 70.

_____ _____

Date

7.0 Financial Assurance Instruments

This section provides copies of financial assurance instruments (Exhibits 1 and 2) to demonstrate financial assurance for all of the estimated decommissioning costs. The mechanism utilized by AREVA is the letter of credit/standby trust agreement provided for in 10 CFR 70.25 (f)(2).

Exhibit 1 - Irrevocable Standby Letter of Credit

DRAFT DTD 01/12/12

IRREVOCABLE STANDBY LETTER OF CREDIT NO. _____

Date:
Our Ref.:
Amount: US$38,248,065.00
Expiry:

U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir or Madam:

We, Credit Industriel et Commercial, 520 Madison Avenue, New York, NY 10022 ("Bank"), hereby establish our Irrevocable Standby Letter of Credit No. _____ in your favor, at the request and for the account of Areva NP Inc., 3315 Old Forest Road, P.O. 10935, Lynchburg, VA 24506-0935 up to the aggregate amount of US$38,248,065.00 (United States Dollars Thirty Eight Million Two Hundred Forty Eight Thousand Sixty Five and 00/100), available upon presentation of:

1) Your sight draft, bearing reference to this Letter of Credit No. _____ and

2) Your statement purportedly signed by yourselves reading as follows:

> "I certify that the amount of the draft is payable pursuant to regulations issued under authority of U.S. Nuclear Regulatory Commission."

This Letter of Credit is issued in accordance with the regulations issued under the authority of the U.S. Nuclear Regulatory Commission (NRC), an agency of the U.S. Government, pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974. The NRC has promulgated regulations in Title 10, Chapter I of the Code of Federal Regulations, Part 70, which require that a holder of, or an applicant for, a license issued under 10 CFR Part 70 provide assurance that funds will be available when needed for decommissioning.

This Letter of Credit shall expire on _____, but such expiration date shall be automatically extended for a period of one year on _____ and on each successive expiration date, unless, at least 90 days before the current expiration date, we notify both you and Areva NP Inc., by certified mail, as shown on the signed return receipts. If Areva NP Inc. is unable to secure alternative financial assurance to replace this Letter of Credit within 30 days of our notification of cancellation, the NRC may draw upon the full value of this Letter of Credit prior to cancellation. The bank shall give immediate notice to Areva NP Inc. and NRC of any notice received or action filed alleging (1) the insolvency or bankruptcy of the Bank or (2) any violation of regulatory requirements that could result in suspension or revocation of the Bank's charter or license to do business. The Bank also shall give immediate notice if the Bank for any reason, becomes unable to fulfill its obligation under this Letter of Credit.

Continued on page 2, which forms an integral part of this Standby Letter of Credit

Whenever this Letter of Credit is drawn on under and in compliance with the terms of this Letter of Credit, we shall duly honor such draft upon its presentation to us within 30 days, and we shall deposit the amount of the draft directly into the standby trust fund of Areva NP Inc. in accordance with your instructions.

Each draft must bear on its face the clause: "Drawn under Letter of Credit No. _____, dated _____ and the total of this draft and all other drafts previously drawn under this Letter of Credit does not exceed US$38,248,065."

This Letter of Credit is subject to the Uniform Customs and Practice for Documentary Credits, 2007 Revision, published by the International Chamber of Commerce, Publication No. 600.

This Letter of Credit is issued inoperative as is and shall become operative and enforceable upon receipt by us of your written confirmation stating that the original Letter of Credit No. SB22.802 has been returned, by overnight courier, to Credit Industriel et Commercial, 520 Madison Avenue, New York, NY 10022, Attn: Standby Letter of Credit Department for cancellation. Fax confirmation is acceptable to Fax No. (212) 715-4477. The date of receipt by us of such confirmation will be effective date of this Letter of Credit No. SB _____ and we shall notify you in writing accordingly.

Please address all correspondence regarding this Letter of Credit to the attention of the Standby Letter of Credit Department located at 520 Madison Avenue, New York, NY 10022, referring to our Standby Letter of Credit No. _____. For telephone assistance, please contact the Standby Letter of Credit Department at (212) 715-4690 and have this Letter of Credit number available.

Exhibit 2 - Standby Trust Agreement

AMENDED AND RESTATED STANDBY TRUST AGREEMENT

AGREEMENT made April 28, 2008 as amended and restated as of the 1st day of November, 2008, by and between AREVA NP Inc., a Delaware corporation, the "Grantor," and State Street Bank and Trust Company, 125 Sunnynoll Ct., Suite 200, Winston-Salem, NC 27106, the "Trustee."

WHEREAS, the U. S Nuclear Regulatory Commission (NRC), an agency of the U.S. Government, pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974 has promulgated regulations in Title 10, Chapter I of the Code of Federal Regulations, Part 70. These regulations, applicable to the Grantor, require that a holder of, or an applicant for, a materials license issued pursuant to 10 CFR Part 70 provide assurance that funds will be available when needed for required decommissioning activities.

WHEREAS, the Grantor has elected to use a letter of credit to provide all of such financial assurance for the facilities identified herein; and

WHEREAS, when payment is made under the letter of credit, this standby trust shall be used for the receipt of such payment; and

WHEREAS, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this Agreement, and the Trustee is willing to act as trustee.

NOW, THEREFORE, the Grantor and the Trustee agree as follows:

Section 1. Definitions. As used in this Agreement:

(a) The term "Grantor" means the NRC Licensee who enters into this Agreement and any successors or assigns of the Grantor.

(b) The term "Trustee" means the Trustee who enters into this Agreement and any successor Trustee.

Section 2. Costs of Decommissioning. This Agreement pertains to the costs of decommissioning the materials and activities identified in License Number SNM 1227 issued pursuant to 10 CFR part 70 as shown in Schedule A.

Section 3. Establishment of Fund. The Grantor and the Trustee hereby establish a standby trust fund, (the Fund), for the benefit of the NRC. The Grantor and the Trustee intend that no third party have access to the Fund except as provided herein

Section 4. Payments Constituting the Fund. Payments made to the Trustee for the Fund shall consist of cash, securities, or other liquid assets acceptable to the Trustee. The Fund is established initially as consisting of the property, which is acceptable to the

Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee are referred to as the "Fund", together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as hereinafter provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount of, or adequacy of the Fund, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by the NRC.

Section 5. Payments for Required Activities Specified in the Plan. The Trustee shall make payments from the Fund to the Grantor upon representation to the Trustee of the following:

a. A certificate duly executed by the Secretary of the Grantor attesting to the occurrence of the events, and in the form set forth in the attached Certificate of Events, and

b. A certificate attesting to the following conditions:

(1) that decommissioning is proceeding pursuant to an NRC-approved plan:

(2) that the funds withdrawn will be expended for the activities undertaken pursuant to that plan; and

(3) that the NRC has been given 30 days prior notice of AREVA NP Inc.'s intent to withdraw funds from the trust fund.

No withdrawal from the Fund for a particular license can exceed 10 percent of the remaining funds available for that license unless NRC written approval is attached.

In addition, the Trustee shall make payments from the Fund as the NRC shall direct, in writing, to provide for the payment of the costs of required activities covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by the NRC from the Fund for expenditures for required activities in such amounts as the NRC shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as the NRC specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

Section 6. Trust Management. The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge his duties with respect to the Fund solely in the interest of the beneficiary and with the care, skill,

prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims; except that:

(i) Securities or other obligations of the Grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2.(a), shall not be acquired or held, unless they are securities or other obligations of the Federal or a State government.

(ii) The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal or State government and in obligations of the Federal government such as GNMA, FNMA and FHLM bonds and certificates or State and Municipal bonds rated BBB or higher by Standard & Poor's or Baa or higher by Moody's Investment Services; and

(iii) For a reasonable time, not to exceed 60 days, the Trustee is authorized to hold uninvested cash awaiting investment or distribution without liability for the payment of interest thereon.

Section 7. Commingling and Investment. The Trustee is expressly authorized in its discretion:

(a) To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and

(b) To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80(a)-1, et seq., including one which may be created, managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

Section 8. Express Powers of Trustee. Without in any way limiting the powers and discretions conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

(a) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale, as necessary to allow duly authorized withdrawals at the joint request of the Grantor and NRC or to reinvest in securities at the direction of the Grantor;

(b) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

(c) To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, to reinvest interest payments and funds from matured and redeemed instruments, to file proper forms concerning securities held in the Fund in a timely fashion with appropriate government agencies, or to deposit or arrange for the deposit of such securities in a qualified central depositary even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee or such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve bank, but the books and records of the Trustee shall at all times show that all such securities are part of the Fund;

(d) To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal or State government; and

(e) To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses. All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation . After payment has been made into this standby trust fund, the Trustee shall annually, at least 30 days before the anniversary date of receipt of payment into the standby trust fund, furnish to the Grantor and to the NRC a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days before the anniversary date of the establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and the NRC shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to the matters disclosed in the statement.

Section 11. Advice of Counsel. The Trustee may from time to time consult with counsel, who may be counsel to the Grantor, with respect to any question arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

Section 12. Trustee Compensation. The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing with the Grantor. (See Schedule C)

Section 13. Successor Trustee. Upon 90 days notice to the Grantor, the Trustee may resign; upon 90 days notice to the NRC and the Trustee, the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor Trustee, the successor accepts the appointment, the successor is ready to assume its duties as trustee, and the NRC has agreed, in writing, that the successor is an appropriate State or Federal government agency or an entity that has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or State agency. The successor Trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. When the resignation or replacement is effective, the Trustee shall assign, transfer, and pay over to the successor Trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor Trustee or for instructions. The successor Trustee shall specify the date on which it assumes administration of the trust in a writing sent to the Grantor, the NRC, and the present Trustee by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this section shall be paid as provided in Section 9.

Section 14. Instructions to the Trustee. All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are signatories to this Agreement or such other designees as the Grantor may designate in writing. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests and instructions. If NRC issues orders, requests or instructions to the Trustee these shall be in writing, signed by the NRC or its designees, and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or NRC hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or NRC, except as provided for herein.

Section 15. Amendment of Agreement. This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and the NRC, or by the Trustee and the NRC if the Grantor ceases to exist. All amendments shall meet the relevant regulatory requirements of the NRC.

Section 16. Irrevocability and Termination. Subject to the right of the parties to amend this Agreement as provided in Section 15, this trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the NRC, or by the Trustee and the NRC, if the Grantor ceases to exist. Upon termination of

the trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor or its successor.

Section 17. Immunity and Indemnification. The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this trust, or in carrying out any directions by the Grantor or the NRC issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the trust fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 18. Choice of Law. This Agreement shall be administered, construed, and enforced according to the laws of The Commonwealth of Massachusetts.

Section 19. Interpretation and Severability. As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement. If any part of this Agreement is invalid, it shall not affect the remaining provisions which will remain valid and enforceable.

In Witness Whereof the parties have caused this Agreement to be executed by their respective officers duly authorized and their corporate seals to be hereunto affixed and attested as of the date first written above.

AREVA NP Inc.

By: _____
Title: VP + CFO

Attest:

By: _____

STATE STREET BANK AND TRUST COMPANY

By: _____
Title: VICE PRESIDENT

Attest: _____

Schedule A

This Agreement demonstrates financial assurance for the following cost estimates or certification numbers for the following licensed activities:

U.S Nuclear Regulatory Commission License Numbers

SNM-1227

Name and Address of Licensee

AREVA NP Inc.
2101 Horn Rapids Road
Richland, WA 99354

Address of Licensed activity
2101 Horn Rapids Road
Richland, WA 99354

The cost estimates listed here were last adjusted and approved by the NRC on _____.

Schedule B

Dollar Amount $38,248,065

As Evidenced by Letter of Credit _____.

Schedule C

State Street Bank and Trust Company
125 Sunnynolle Ct. Suite 200
Winston-Salem, NC 27106
Phone: 336-747-7638

Trustee's fees shall be $1,000 per year.

Certificate of Events

State Street Bank and Trust Company
125 Sunnynoll Ct. Suite 200
Winston-Salem, NC 27106

Attention Trust Division

Gentlemen:

In accordance with the terms of the Agreement with you dated April 28, 2008, I _____ Secretary of AREVA NP Inc., hereby certify that the following events have occurred:

1. AREVA NP Inc. is required to commence the decommissioning of its facility located at Richland, Washington (hereinafter called the decommissioning).

2. The plans and procedures for the commencement and conduct of the decommissioning have been approved by the United States Nuclear Regulatory Commission, or its successor, on _____ (copy of approval attached).
3. The Board of Directors of AREVA NP Inc. has adopted the attached resolution authorizing the commencement of the decommissioning.

_____
Secretary of AREVA NP Inc.

_____
Date

Certificate of Resolution

I, _____, do hereby certify that I am the Secretary of AREVA NP Inc., a Delaware corporation, and that the resolution listed below was duly adopted at a meeting of this Corporation's Board of Directors on _____, 20__.

IN WITNESS WHEREOF, I have hereunto signed my name and affixed the seal of this Corporation this _____ day of _____, 20__.

_____
Secretary

Resolved, that this Board of Directors hereby authorizes the President, or such other employee of the Company as he may designate, to commence decommissioning activities at AREVA NP Inc.'s Richland, Washington facility in accordance with the terms and conditions described to the Board of Directors at this meeting and with such other terms and conditions as the President shall approve with and upon the advice of Counsel.

Letter of Acknowledgement

State of North Carolina

~~To Wit:~~ _____

County ~~City~~ of Forsyth

On this 13th day of November, 2008, before me, a notary public in and for the city and State aforesaid, personally appeared Ryan Peterson, and she/he did depose and say that she/he is the Vice President of State Street Bank & Trust, Trustee, which executed the above instrument; that she/he knows the seal of said association; that the seal affixed to such instrument is such corporate seal; that it was so affixed by order of the association; and that she/he signed her/his name thereto by like order.

JILL E. WHEELER
NOTARY PUBLIC
FORSYTH COUNTY, NC

Jill E Wheeler
Signature of the Notary Public

My Commission Expires: October 12, 2013