



PBS-SR-0040 Nuclear Facility Deactivation and Decommissioning

Risk Management Plan

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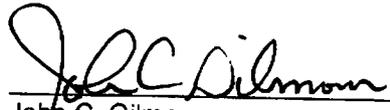


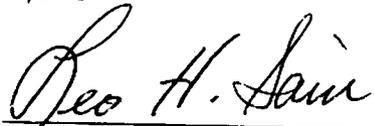
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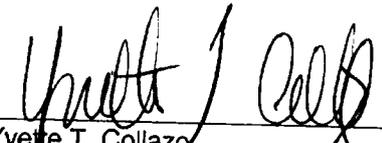
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REVISION SUMMARY

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0	November 30, 2005	Full Document	Initial issue
1	June 30, 2006	Full document	Document title change; deleted Risk #5 and added Opportunity #10; revised text to reflect FY06 D&D progress and changes due to deleted and added risks and opportunities.

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ACRONYMS

B	Benefit
C	Consequence
D&D	Deactivation and Decommissioning
DOE	Department of Energy
EM	Environmental Management
FOAK	First-of-a-Kind
ISD	In-situ Disposal
L	Likelihood
OHS	Opportunity Handling Strategy
PBS	Project Baseline Summary
PEP	Program Execution Plan
PSO	Program Secretarial Office
R&O	Risk & Opportunity
RHS	Risk Handling Strategy
RMP	Risk Management Plan
ROM	Rough Order of Magnitude
SGCP	Soil and Groundwater Closure Project

1.0 EXECUTIVE SUMMARY

The Project Baseline Summary (PBS) Federal Risk Management Plan for PBS-SR-0040, Nuclear Facility Deactivation and Decommissioning, documents the results of the risk and opportunity assessment conducted by Department of Energy (DOE) Savannah River Operations Office (SR) and Washington Savannah River Company (WSRC), communicates the risk handling strategies developed for identified risks, and provides a plan for monitoring risks throughout the life of the project. It establishes the basis of the amount to be used as a contingency estimate for this PBS. Project and programmatic risks for the entire project (both near-term—FY 2007 through FY 2012—and the balance of the lifecycle baseline—FY 2013 through FY 2031) are considered and contingency estimated. The contingency estimate for this PBS, other Savannah River Site (SRS) PBS, and crosscutting project and programmatic risks are documented in *SRS Risk Summary and Integrated Contingency Estimate* (Document No. Y-RAR-B-00003, Revision 0). The integrated contingency data establishes the SRS portion of the DOE unfunded contingency amount used to determine the EM liability that must be added to the EM performance baseline.

The purpose of utilizing the Risk and Opportunity management process is to increase the overall effectiveness of the Department of Energy (DOE) Environmental Management (EM) work associated with the deactivation and decommissioning effort such that risks are managed to acceptable levels and opportunities are taken to enhance Project Baseline Summary (PBS) scope completion. This Federal Risk and Opportunity Plan documents the risk assessment conducted by DOE-SR and WSRC personnel on PBS-SR-0040, Nuclear Facility Deactivation and Decommissioning. The scope of this PBS includes decommissioning 1,013 existing facilities/buildings plus four new facilities (and supporting ancillary facilities) to be constructed that will be dispositioned as part of the Department of Energy (DOE) Office of Environmental Management (EM) cleanup project when their missions are complete.

1.1 Risk Identification and Assessment

A risk and opportunity management process is used to identify the risks and opportunities associated with the Deactivation and Decommissioning. The risks and opportunities are analyzed and handling strategies developed to ensure risks are managed to acceptable levels and opportunities are availed to improve the probability of successful completion of the EM work scope.

A team of DOE and WSRC subject matter experts and management conducted the risk and opportunity assessment. Risks and opportunities were identified by considering risks and opportunities identified in previous documentation, including the SRS Environmental Management Program Execution Plan (PEP), DOE SR and WSRC management briefings, and summaries submitted to DOE Headquarters (HQ). The methodology employed for the risk and opportunity assessment followed the guidance provided in the *SR Project Management Manual* and the *Systems Engineering Methodology Guidance Manual* (References 3 and 4, Section 6.0). The risk assessment addresses the final 24 years of the planned remaining lifecycle for this PBS. There are several risks for which the major impacts will not be realized for 15 to 20 years. Although there remains sufficient time to address these risks through the regulatory process and further quantify the impacts, these risks have the potential to significantly impact the PBS cost and schedule. Therefore, for the purpose of this assessment, risks that will impact PBS 40 at a point greater than five years in the future were graded as a critical consequence. This PBS risk assessment does not reflect any schedule impacts caused by acquisition strategy changes over the PBS lifecycle. This PBS Risk Assessment is based on The 2006 Program Execution Plan (PEP) (Reference 6) and the Savannah River Site Environmental Management Integrated Deactivation and Decommissioning Plan (Reference 2).

A total of 6 Risks and 3 Opportunities were identified. Of those 6 risks, 4 were *High* and 2 were *Moderate*. Of the 3 opportunities, 2 were *Moderate* and 1 was *Low*. The 4 *High* risks are:

- Risk ID 001 – Funding Delays Impact D&D

- Risk ID 004 – Extended Facility Operating Schedule Impacts D&D
- Risk ID 006 – Future Use Uncertainty
- Risk ID 009 – Interpretation of “In-situ Decommissioning Endpoint”

Two of the 6 risks handling strategies were “Accept”. Three of the risks (affected risks ID 001, 003, and 006) are characterized as external, meaning the source of risk event is outside the direct control of the DOE-SR and WSRC, and this caused one of these risks (ID 001) to have the handling strategy of “Accept”. The other two external sources of risk will be mitigated by continuing efforts through the interagency core teams and existing stakeholder agreements. The handling strategy “Mitigate” was identified for 4 of the 6 risks; this reduced high risks to moderate or low risks. Only one high risk remains (001 – Funding Delays Impact D&D). A summary of the risks and their handling strategies is presented in Table 1.0-1.

Three opportunities were identified including the use of hardened facilities for disposal of D&D wastes (ID 007); new or improved technology for D&D (ID 008); and using the maintenance worker scenario in lieu of the industrial worker to establish cleanup criteria (ID 010). Opportunity 007 was judged as likely to occur with a significant benefit. Opportunity 008 was judged as unlikely to occur and Opportunity 010 was judged as very unlikely to occur. Both Opportunities 008 and 010 would result in a significant benefit if they were to occur. A summary of the opportunities and their handling strategies is presented in Table 1.0-2.

1.2 Risk Handling Strategies and Contingency Estimates

After identifying, assessing, and classifying risks and opportunities, handling strategies were developed. A summary of the risks and their handling strategies is presented in Table 1.0-1. Risks for which no mitigation strategy was identified were accepted and classified as residual risks. Due to the sheer volume of facilities, the team determined that it was not practical to develop contingency estimates for this plan. Order of magnitude estimates for all 1013 facilities is provided in Reference 2. Estimates for the 4 “yet-to-be-built” facilities have not been made to date.

1.3 Risk Monitoring

As risk management is an ongoing process, the risk assessment elements of identification, grading, handling, impact determination and integration (risk status and reporting to closure) will be conducted as warranted by the Federal Project Director but at least annually over the lifecycle of this PBS to assess the impact of changes to programs and assumptions on risk determinations and handling strategies.

In summary, the team identified 9 individual PBS risks and/or opportunities. Risk ID 005 has been deleted in this revision. Although there are limited risk reduction strategies that WSRC and DOE-SR identified in the assessment, this PBS Risk Assessment provided a

1. Continuing joint forum for WSRC and DOE-SR to identify and understand potential cost and schedule impacts to the PBS lifecycle,
2. Documented WSRC and DOE-SR understanding of the PBS level risks and opportunities, and
3. Documented PBS level risks and opportunities communication tool to provide decision makers with the bases to understand the PBS level impacts associated with deactivation and decommissioning.

Table 1.0-1 PBS-SR-0040 Risks

PBS Element	Risk Identifier and Risk Title	Source of Risk	PBS Impact Cost Schedule Performance	Likelihood	Consequence (\$M/months)	Risk Level	Risk Handling Strategy (RHS)	Risk Level after RHS
High Risks								
40	001- Funding Delays Impact D&D	External	Cost Schedule	Very Likely	Critical \$/12	H	Accept	H
40	004 – Extended Facility Operating Schedule Impacts D&D	Internal	Cost Schedule	Very Likely	Critical \$/24	H	Mitigate	M
40	006 – Future Use Uncertainty	External	Cost Schedule	Very Unlikely	Crisis \$/>24	H	Mitigate	L
40	009 – Interpretation of “In-situ Decommissioning Endpoint”	Internal	Cost Schedule	Likely	Critical \$30M/24	H	Mitigate	L
Moderate Risks								
40	002 – Additional and/or more extensive contamination within facilities	Internal	Cost Schedule	Very Likely	Marginal \$2M/3	M	Accept	M
40	003 – D&D Actual Duration Differs from Baseline Assumptions	External	Schedule	Likely	Significant \$0/6	M	Mitigate	M
Low Risk								
40	005 – DELETED							

Table 1.0-2 PBS-SR-0040 Opportunities

PBS Element	Risk Identifier and Risk Title	Source of Risk	PBS Impact Cost Schedule Performance	Likelihood	Consequence (\$M/months)	Risk Level	Risk Handling Strategy (RHS)
40	007 – Use of Hardened Facilities as Waste Consolidation Units for D&D and SGCP Waste	Internal External	Cost	Likely	Significant	M	Share
40	008 – New and Improved D&D Technology	Internal	Cost	Unlikely	Significant	M	Enhance
40	010 – Regulatory Agreement to Use Maintenance Worker Cleanup Criteria	External	Cost Schedule	Very Unlikely	Significant	M	Enhance

2.0 BACKGROUND

2.1 PBS-SR-0040 Nuclear Facility Deactivation and Decommissioning

After 40 years of producing nuclear materials for defense and non-defense uses, the Savannah River Site (SRS) shifted its strategic direction and resources from nuclear materials production to cleanup. An integral part of the cleanup mission is decommissioning of facilities constructed in support of nuclear materials production as well as those facilities constructed in support of cleanup. This includes 1,013 existing facilities/buildings plus three new facilities (and supporting ancillary facilities) to be constructed that will be dispositioned as part of the Department of Energy (DOE) Office of Environmental Management (EM) cleanup project when their missions are complete.

This PBS scope includes a disposition path for all major EM buildings/facilities, including planned new EM facilities such as Glass Waste Storage Buildings #2 and #3, Canister Shipping Facility, and Salt Waste Processing Facility. This project also includes surveillance and maintenance of the decommissioned facilities through FY 2031 or through Area Closure under the PBS-SR-0030 Soil and Groundwater Project.

The end state of a facility is the final status of the facility after decommissioning activities are complete. The selection of end states dictates the required extent of facility decommissioning and supports the ultimate area closure end state. This end state determination factors heavily into the cost, schedule, and work scope of the decommissioning project as well as a key factor in risk and opportunity management.

There are two possible decommissioning end state alternatives for SRS facilities: demolition and in-situ disposal (ISD). For each facility, the end state is determined by considering:

- Physical condition at the time of decommissioning
- Structural factors affecting difficulty of removal or effectiveness of containment
- Proximity to public access areas, or surface or groundwater sources
- Known or anticipated area closure end point
- Stakeholder expectations
- Extent of contamination and/or hazardous material and the degree to which they may pose a threat to the environment or the public.

Preliminary end states have been identified for all the major facilities (reference 2). The approach to the decommissioning process assures the appropriate stakeholders, Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (DHEC), are involved in decommissioning end state decisions.

Table 2.1-1 illustrates the breakout of the preliminary end states for all of the existing facilities and shows the completion status as of May 2006.

Table 2.1-1 SRS Facility Endstates

Units	Demoliton	In-Situ Disposal	Total	Decommissioned/Closed	To Go
Facilities	857	105	962	186	776
F&H Area Tanks*	0	51	51	2	49
New Facilities	4	0	4	0	4
Total		1017	1017	188	829

* These tanks are covered under PBS SR-014C

The EM cleanup project is scheduled for completion by FY 2031, at which time EM will have completed its mission at SRS and will not require the use of any facilities. All 1,017 major facilities including planned new EM facilities and their ancillary structures will be decommissioned. Assessments conducted under this plan must address risks and/or opportunities that potentially impact the successful completion of the EM Cleanup Project.

2.2 Risk/Opportunity Assessment Scope

The scope of PBS-SR-0040 assessable elements included the deactivation and decommissioning of all 1,013 EM facilities identified in reference 2 plus the four planned new EM facilities. This project also includes surveillance and maintenance of the decommissioned facilities through FY 2031 or through Area Closure under the PBS SR-0030 Soil and Groundwater Project.

The basis for the PBS Assessment Scope was that funding would be available to support the PBS milestones and that the acquisition strategy (i.e. contracts) would not impact PBS milestones.

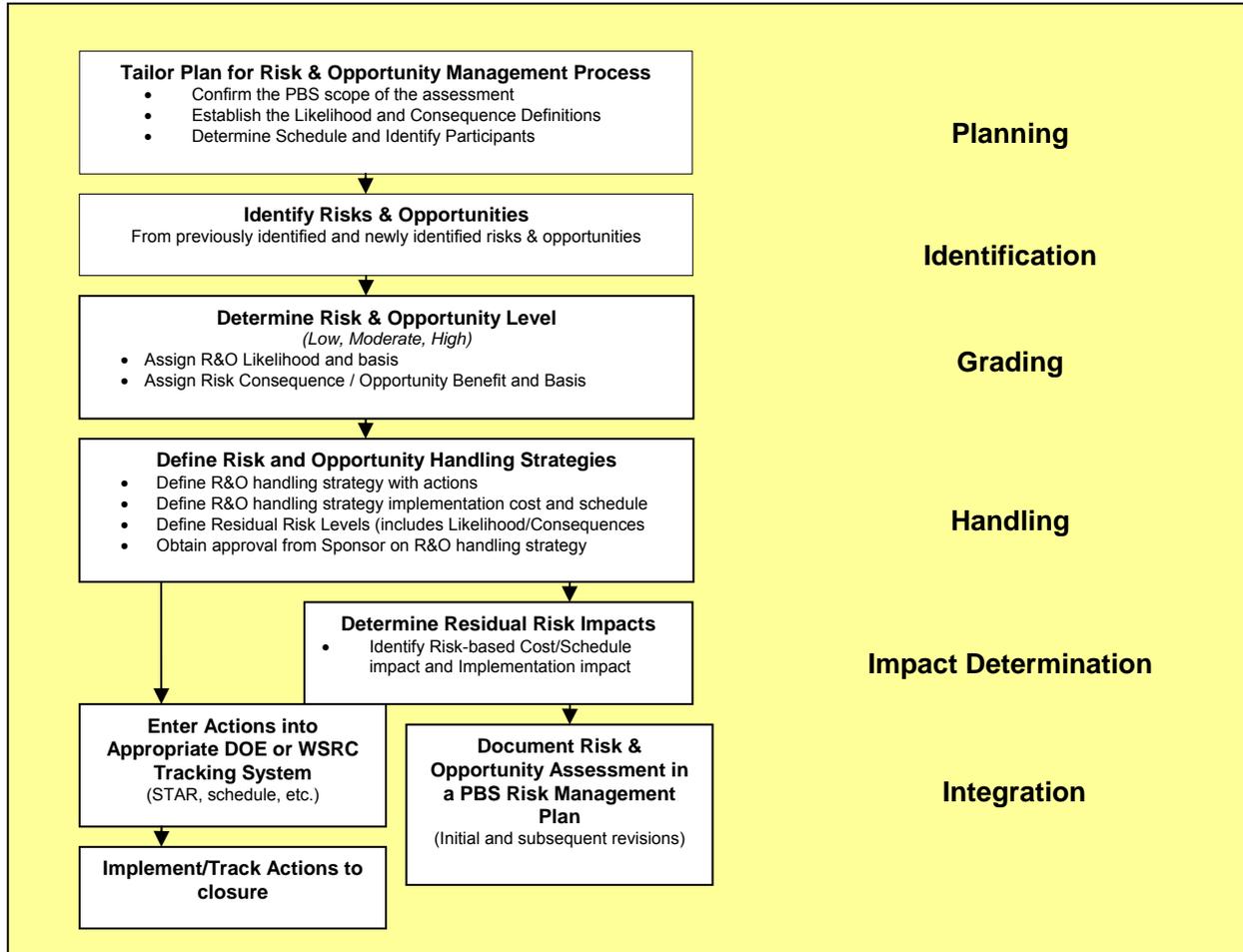
2.3 Risk/Opportunity Assessment Goals

The primary goal of this assessment was to identify risks to the successful completions of the mission defined in PBS-SR-0040 within the planned cost budgets and schedule. A secondary goal of the assessment was to capture opportunities that may be exploited to reduce cost and schedules and/or provide cost effective performance improvements. To support these goals, the focus of this assessment was limited to the identification of risks and opportunities that had potential impacts at the PBS level rather than lower risk levels, such as individual facilities.

2.4 Risk/Opportunity Management Team Roles and Responsibilities

A team of WSRC and DOE-SR personnel served as the Risk and Opportunity Assessment Team. A WSRC, Systems Engineer facilitated the assessment process. The team assembled for one meeting to identify and draft the Risk/Opportunity Forms. Offline discussions were held with team members to finalize the Risk/Opportunity Forms i.e. reviews, and comment incorporation. In addition, several team members were instrumental in the preparation of Revision 1. The team is composed of DOE-SR and WSRC contractor personnel that are responsible for the PBS scopes of work. The DOE-SR Assistant Manager for Closure Project has overall responsibility for the implementation of this plan. The team is responsible for performing the R&O activities shown in Table 2.4-2 and Table 2.4-3. The completed Risk/Opportunity Forms provide the basis for this Risk Management Plan and are attached in Appendix B.

Table 2.4-2 R&O Management Team Responsibilities



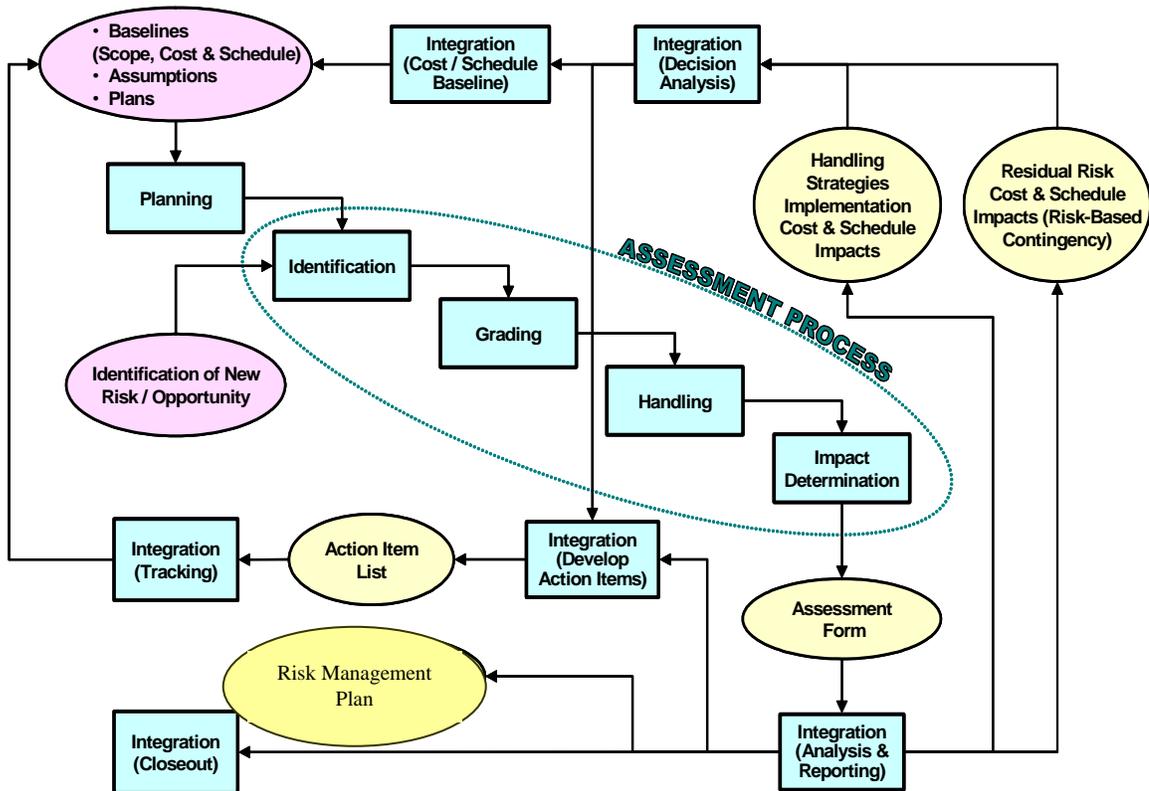
<u>DOE-SR Federal Project Director for the PBS</u>	
Identifies and assigns DOE participants	Approves the Risk Management Plan (RMP) and its revisions
Identifies SMEs and obtains commitment for participation	Approves the transfer of risk from facility, project, or modification activities to the PBS Attains Office of the Assistant Manager approval of the RMP
Approves Core Team members	Provides oversight of the R&O management process to ensure implementation and integration between DOE and contractors
<u>WSRC Manager for PBSs</u>	
Chairs formal R&O meetings	Actively engages in monitoring and addressing project R&Os; ensures R&Os are identified and managed
Ensures R&O process steps specified in this plan are implemented	Proposes the assessment likelihood and consequences/benefit criteria and any changes to those criteria
Identifies budget and resources to support R&O process	Ensures R&O status is reviewed and updated on an annual basis or more frequently as warranted by PBS
Approves the RMP	
Defines scope/schedule of risk assessments	Ensures R&O handling strategies are implemented and tracked to closure
Nominates/Determines WSRC Team members	Ensures configuration control is maintained for PBS R&O database
Assigns R&O handling strategies	
<u>WSRC R&O Lead</u>	
Prepares and maintains RMP	Prepares status/tracking/closure reports as requested
Provides training and guidance to R&O Team on applying R&O management process	Ensures R&O and their handling strategy responsibilities transferred to the PBS from facilities, projects and modifications are approved, documented and reflected in subsequent R&O analyses
Facilitates assessment meetings as required	
Performs R&O analysis and prepares R&O forms	Maintains configuration control of initial PBS database

Table 2.4-3 Individual Responsibilities

3.0 RISK AND OPPORTUNITY ASSESSMENT PROCESS

The methodology employed for the risk and opportunity assessment followed the guidance provided in Reference 4. For reference, a functional flow diagram of the entire risk and opportunity management process is shown below in Figure 3.0-1. Process steps performed during this assessment were limited to the elements of *Identification*, *Grading*, *Handling* and *Impact Determination*. Information captured during the assessments was recorded on Risk and Opportunity Assessment forms found in Appendix B.

FIGURE 3.0-1 R&O Management Process Functional Flow Diagram



4.0 RESULTS OF THE ANALYSIS

4.1 Assessment Results

The team identified risks and opportunities using the PBS-SR-0040 assessable elements. As PBS-SR-0040 level risks were identified, Risk/Opportunity Assessment Forms were generated.

A total of 6 risks are identified and documented in Risk/Opportunity Forms found in Appendix B. Using the *Likelihood* and *Consequence/Benefit* criteria defined in Appendix A, four of the risks were graded as *High* and two as *Moderate*. The statements of event for each of the four *High* risks are provided below:

1. Risk ID 001 - Funding Delays Impact D&D The latest approved Federal Facility Agreement provides milestone completion dates. There is a risk that funding to support this schedule may be reduced or delayed due to current government commitments for other federal programs including disaster relief and military operations abroad. A delay or reduction in funding may impact the ability to complete D&D of facilities thus impacting regulatory commitments.
2. Risk ID 004 – Extended Facility Operating Schedule Impacts D&D The current Program Execution Plan (PEP) defines the expected operating life of facilities which are closely linked to the schedule for D&D. Extended operation of facilities poses a risk that D&D will exceed the baseline plan. This event results in possible extension of the project past the planned completion date.
3. Risk ID 006 – Future Use Uncertainty The current future use for SRS assumes industrial use and exposure. There is a risk the scenario could change to residential due to no planned mission for SRS. This event could change the cleanup standards and requirements for D&D.
4. Risk ID 009 – Interpretation of “In-situ Decommissioning Endpoint An unfavorable interpretation of “in Situ decommissioning endpoint” will exceed current baseline cost and schedule.

Three opportunities were identified including the use of hardened facilities for disposal of D&D wastes (ID 007); new or improved technology for D&D (ID 008); and using the maintenance worker scenario in lieu of the industrial worker to establish cleanup criteria (ID 010). Opportunity 007 was judged as likely to occur with a significant benefit. Opportunity 008 was judged as unlikely to occur and Opportunity 010 was judged as very unlikely to occur. Both Opportunities 008 and 010 would result in a significant benefit if they were to occur.

4.2 Analysis of Handling Strategy Effectiveness

The Team recommended the handling strategy of “Accept” for 2 of the 6 risks. Four of the risks had handling strategies of “Mitigate”. The mitigation handling strategy reduced the risk level for 3 of these risks; the other risk remained the same. One risk mitigation did not change the risk level because the likelihood of occurrence was reduced but the consequence was not sufficiently reduced to affect the risk level. Three of the four *High* risks were reduced.

4.3 Analysis of Cost and Schedule Impact

All of the identified risks and opportunities have cost and schedule impacts at the PBS level. The team realized the difficulty in determining cost and schedule impacts for 1,017 facilities in the PBS primarily due to the method previously established in estimating costs. Reference 2 estimated costs and schedules for 1,013 facilities to be decommissioned using “rough-order-of-magnitude” (ROM) methods. D&D cost estimates for the four “yet-to-be-built” facilities have not been made. Using the existing ROM

cost estimates along with the criteria for consequences could indicate a crisis in total consequence for the majority of the risks identified. Thus the team did not apply this criterion due to the sheer volume of facilities.

4.4 Documentation and Risk Monitoring

The Risk Management Plan documents the results of the risk and opportunity assessment, communicates the risk handling strategies developed for identified risks, and provides a plan for monitoring risks. The DOE Federal Project Director is responsible for directing risk and opportunity assessments, developing risk handling strategies, preparing the Risk Management Plan, and implementing risk management throughout the life of the project.

5.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, the team identified 6 individual PBS level risks and 3 opportunities. Although there are no new additional risk reduction strategies that WSRC and DOE-SR identified in this revision, this PBS Risk Assessment provides a

1. Continuing joint forum for WSRC and DOE-SR to identify and understand potential cost and schedule impacts to the PBS lifecycle,
2. Documented WSRC and DOE-SR understanding of the PBS level risks and opportunities, and
3. Documented PBS level risks and opportunities communication tool to provide decision makers with the bases to understand the PBS level impacts associated with deactivation and decommissioning

As Risk Management is an ongoing process, the risk assessment elements of *Identification, Grading, Handling, Impact Determination* and *Integration (risk status and reporting to closure)* should be conducted over the lifecycle of this PBS to: understand changes to PBS level risks, determine if there are risk reduction strategies that can be implemented and continue to have risk assessment status results serve as a communication tool for decision makers to understand impacts by possible decisions.

6.0 REFERENCES

1. DOE Order 413-3, Project Management for the Acquisition of Capital Assets
2. Savannah River Site Environmental Management Integrated Deactivation and Decommissioning Plan, WSRC-RP-2003-00233, Revision 1 dated September 2003.
3. SRM 410.1.1D, SR Project Management Manual
4. Systems Engineering Methodology Guidance Manual, WSRC Manual WSRC-1M-98-00033, Revision 12, SRS, Aiken, SC 29808.
5. DOE Manual 413-3.1, Project Management for the Acquisition of Capital Assets
6. 2006 SRS Environmental Management Program Project Execution Plan

7.0 APPENDICES

Appendix A Risk and Opportunity Grading Guidelines

Appendix B Risk and Opportunity Assessment Forms

APPENDIX A Risk and Opportunity Grading Guidelines

This appendix documents the risk and opportunity grading guidelines used by the Team to determine risk and opportunity levels (i.e. *High, Moderate* or *Low*). Team members are identified in Table A-5.

Tables A-1 and A-2 shown below and on the following page were used by the Team to define the likelihood and consequence of each risk identified in the assessment. These definitions were used to evaluate both the initial and residual risk levels. Risk levels (*High, Moderate, or Low*) were determined using the matrix shown in Figure A-1. Handling strategies for each of the risks were selected from the four strategies shown in Figure A-2.

From the risk likelihood and consequence values, the risk levels (*High, Moderate* or *Low*) are determined using the matrix shown in Figure A-1. Handling strategies for the risks were selected from the four strategies shown in Figure A-2.

Table A-1 Risk Likelihood Criteria

Likelihood of Occurrence (L)	Criteria
Non-Credible*	Determined (through formal probability calculations) to have a probability of occurrence of $\leq 10^{-6}$ (or other non-credible probability defined for the activity)
Very Unlikely	<ul style="list-style-type: none"> • Will not likely occur anytime in the life cycle of the facilities/PBS ; or • Estimated recurrence frequency < 1 (i.e., event not expected to recur); or • $0 < \text{Likelihood of single event occurrence} < 0.15$.
Unlikely	<ul style="list-style-type: none"> • Will not likely occur in the life cycle of the facility/PBS; or • $1 \leq \text{Estimated recurrence frequency} < 2$ (i.e., event expected to recur but not more than once); or • $0.15 \leq \text{Likelihood of single event occurrence} < 0.45$.
Likely	<ul style="list-style-type: none"> • May occur sometime during the life cycle/PBS; or • $2 \leq \text{Estimated recurrence frequency} < 5$ (i.e., event expected to recur from 2 to 4 times); or • $0.45 \leq \text{Likelihood of single event occurrence} < 0.75$.
Very Likely	<ul style="list-style-type: none"> • Will likely occur sometime during the life cycle/PBS; or • Estimated recurrence frequency ≥ 5 (i.e., event expected to recur more than five times); or • $0.75 \leq \text{Likelihood of single event occurrence} < 1$.

*This category is normally reserved for the evaluation of residual risks associated with *Crisis* consequences

Table A-2 Risk Consequences Criteria for PBS 40

Consequence of Occurrence (C)	Criteria for PBS-SR-0040
Negligible	<ul style="list-style-type: none"> • Minimal consequences; unimportant. • Some potential transfer of money (\leq \$50K), but budget estimates not exceeded. • Negligible impact on program; slight potential for schedule change ($<$ 3 months of lifecycle schedule); compensated by available schedule float.
Marginal	<ul style="list-style-type: none"> • Small reduction in modification/work task technical performance. • Moderate threat to facility mission, environment, or people; may require minor facility redesign or repair, minor environmental remediation, or first aid/minor medical intervention. • Cost estimates marginally exceed budget ($>$ \$50K, but \leq \$.5M). • Minor slip in schedule (3-6 months of lifecycle schedule) with some potential adjustment to milestones required.
Significant	<ul style="list-style-type: none"> • Significant degradation in modification/project/contract technical performance. • Significant threat to facility mission, environment, or people; requires some facility redesign or repair, significant environmental remediation, or causes injury requiring medical treatment. • Cost estimates significantly exceed budget (5-10% of Annual PBS Budget). • Significant slip in schedule (6 months – 1 year of lifecycle schedule) with resulting milestones changes that may affect facility mission.
Critical	<ul style="list-style-type: none"> • Technical goals of work task cannot be achieved. • Serious threat to facility mission, environment, or people; possibly completing only portions of the mission or requiring major facility redesign or rebuilding; extensive environmental remediation, or intensive medical care for life-threatening injury. • Cost estimates seriously exceed budget (10%-20% of Annual PBS Budget) • Excessive schedule slip (1-2 years of lifecycle schedule) unacceptably affecting overall mission of facility/site/DOE objectives, etc.
Crisis	<ul style="list-style-type: none"> • Modification/Project cannot be completed • Cost estimates unacceptable exceed budget ($>$20% of Annual PBS Budget) • Catastrophic threat to facility mission, environment, or people; possibly causing loss of mission, long term environmental abandonment, and death. • Schedule slip $>$ 2 years of lifecycle schedule.

Note: First-of-a-Kind (FOAK) Risks will receive special attention because they are often associated with project failure. FOAK risks should receive a Critical or Crisis consequence estimate unless there is a compelling argument for lesser consequence.

Likelihood (L)	Very Likely	Low	Moderate	High	High	High
	Likely	Low	Moderate	Moderate	High	High
	Unlikely	Low	Low	Moderate	Moderate	High
	Very Unlikely	Low	Low	Low	Moderate	High
	*Non-Credible	Low				
		Negligible	Marginal	Significant	Critical	Crisis
		Consequence (C)				

* Normally limited to assessing residual risks with Crisis consequences

Figure A-1 Risk Level Matrix

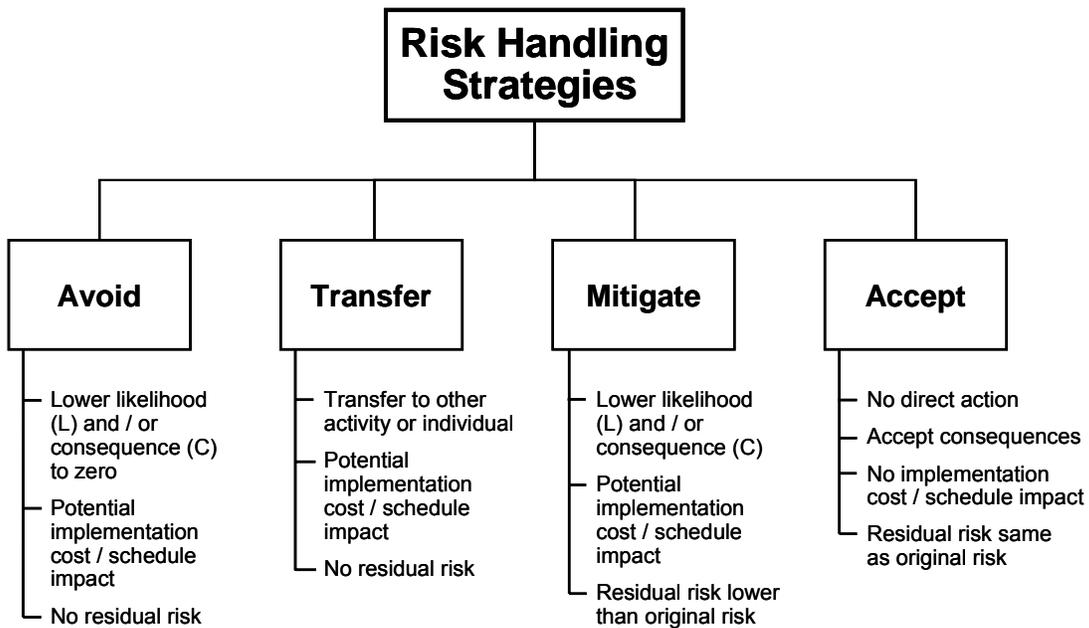


Figure A-2 Risk Handling Strategies

Tables A-3 and A-4 shown below were used by the Team to define the likelihood and benefit of each opportunity identified during the assessment. Opportunity levels (*High*, *Moderate* or *Low*) were identified using the matrix shown in Figure A-3. Handling strategies for the opportunities were selected from the four strategies shown in Figure A-4.

Table A-3 Opportunity Likelihood Criteria

Likelihood of Realization (L)	Criteria
Very Likely	• $0.75 \leq \text{Likelihood of benefit realization} < 1.$
Likely	• $0.45 \leq \text{Likelihood of benefit realization} < 0.75.$
Unlikely	• $0.15 \leq \text{Likelihood of benefit realization} < 0.45.$
Very Unlikely	• $0.15 > \text{Likelihood of benefit realization} > 0.$

Table A-4 Opportunity Benefits Criteria

Benefit of Implementation (B)	Criteria For PBS-SR-0040
Negligible	<ul style="list-style-type: none"> • Minimal benefit; unimportant. • Some potential transfer of money, but budget estimates not changed. • Negligible impact on program; slight potential for reduction in schedule.
Marginal	<ul style="list-style-type: none"> • Small improvement in technical performance. • Moderate improvement to the mission, environment, or people. • Cost estimates reduced by up to \$2.5M per year. • Minor reduction in schedule with some potential adjustment to level 1 milestones.
Significant	<ul style="list-style-type: none"> • Significant improvement in technical performance. • Significant improvement to the mission, environment, or people. • Cost estimates reduced between \$2.5M and \$5M. • Significant reduction in schedule with resulting level 1 milestone changes.
Exceptional	<ul style="list-style-type: none"> • Technical goals of the program improved. • Exceptional improvement to the mission, environment, or people. • Cost estimates reduced over \$5M. • Exceptional reduction in schedule with resulting level 1 milestone changes.

*Any one or more of the criteria in the four levels of benefits may apply to a single opportunity. The overall benefit level for the opportunity being evaluated must be based upon the highest level for which a criterion applies.

From the opportunity likelihood and consequence values, the opportunity level is determined as shown in Figure A-3 and Opportunity Handling Strategies are shown in Figure A-4.

Likelihood (L)	Very Likely	Low	Moderate	High	High
	Likely	Low	Moderate	Moderate	High
	Unlikely	Low	Low	Moderate	Moderate
	Very Unlikely	Low	Low	Low	Moderate
		Negligible	Marginal	Significant	Exceptional

Benefit (B)

Figure A-3 Opportunity Level Matrix

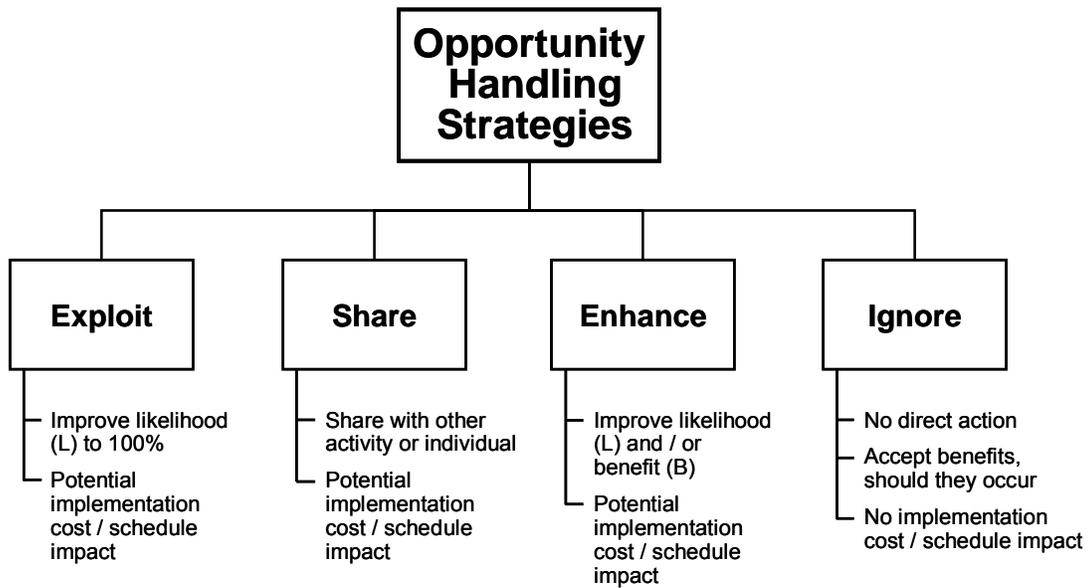


Figure A-4 Opportunity Handling Strategies

Table A-5 Risk/Opportunity Assessment Team

Name	Organization
Bill Austin	WSRC-SDD
Helen Belencan	DOE-D&D
Mary Flora	WSRC-SGP
Joe Krupa	WSRC-SE
Diana Hannah	DOE-SGP
Bill Erickson	DOE-D&D
Ray Hannah	DOE-D&D
John Reynolds	DOE-D&D
Debbie Kristosik	DOE-CFO
Mary Bennington	DOE-SGP
Philip Prater	DOE-SGP
Mike Griffith	WSRC-SGP
Angelia Adams	DOE-D&D

APPENDIX B Risk and Opportunity Assessment Forms

This Appendix provides a copy of all Risk/Opportunity Assessment Forms completed during the risk and opportunity assessment process.

Risk Assessment Form				
ID Number: 001		Revision: 0		Last Date Evaluated: 6/1/06
Status: Active				
Event Title: Funding Reductions and/or Delays Impact D&D				
Type: External			Category: Management	
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning		
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05
Statement of Event: The latest approved Federal Facility Agreement provides milestone completion dates. There is a risk that funding to support this schedule may be reduced or delayed due to current government commitments for other federal programs including disaster relief and military operations abroad. A delay or reduction in funding may impact the ability to complete D&D of facilities thus impacting regulatory commitments.				
Likelihood:	Very likely	Basis: Based on current proposals being considered by Congress a reduction in funding is very likely for FY07.		
Consequence / Benefit:	Critical	Basis: A delay in funding will impact the schedule for completion of D&D activities and may impact FFA milestones and/or funding for other site programs.		
Most Significant Cost Impact (\$k):			Most Significant Schedule Impact (Months): 12	
Level:	High	Event Trigger: Annual budget allotment is received.		
Handling Strategy:	Accept	Description: If a reduction or delay is realized, steps will be taken to mitigate the consequence.		
HS Implementation Cost (\$K):	N/A	Basis: N/A for accept handling strategy		
HS Implementation Schedule (Wks):	N/A	Basis: N/A for accept handling strategy		
Other Handling Strategies:				
Statement of Residual Risk:				
Residual Likelihood:	Very Likely	Basis: Same as initial evaluation for Accept handling strategy		
Residual Consequence:	Critical	Basis: Same as initial evaluation for Accept handling strategy		
Residual Risk Level:	High			Residual Impact Basis:
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>	<u>Worst Case</u>	
Residual Schedule Impact (Wks):				
Impacted Scope of Work: D&D and SGCP Program Scope				
Evaluation Comments:				
Event Comments:				

Risk Assessment Form					
ID Number: 002		Revision: 0	Last Date Evaluated: 6/1/06		
Status: Active					
Event Title: Additional and/or more extensive contamination within facilities					
Type: Internal		Category: Characterization			
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning			
Responsible Org: - D&D Project		Contact: H. Belencan	Date Identified: 11/30/05		
Statement of Event: The current ROM estimate is based on preliminary characterization information and does not include costs for additional or more extensive contamination. There is a risk that contamination (hazardous and radiological) could be more extensive than assumed in the ROM estimate requiring additional characterization and decontamination. This event will result in additional program cost and possible extension of the program past the planned completion date.					
Likelihood:	Very likely	Basis: Based on historical experience and the number of facilities to be D&D'd before the project completion and the very preliminary nature of characterization completed to date, this event is very likely to occur on 5% of the remaining 776 facilities.			
Consequence / Benefit:	Marginal	Basis: A delay due to additional characterization and decontamination will marginally exceed cost with minor impact to the overall schedule, assuming that incremental characterization costs will not exceed \$2M annually, based historical experience.			
Most Significant Cost Impact (\$k per year): 2,000		Most Significant Schedule Impact (Months): 3 months per facility			
Level:	Moderate	Event Trigger: Characterization identifies additional decontamination			
Handling Strategy:	Accept	Description: Based on the large number of facilities in the PBS, the likelihood of facilities being less extensively contaminated balances out the facilities that could be more contaminated, thus the impact is minimal.			
HS Implementation Cost (\$K):	N/A	Basis: N/A for accept handling strategy			
HS Implementation Schedule (Wks):	N/A	Basis: N/A for accept handling strategy			
Other Handling Strategies:					
Statement of Residual Risk:					
Residual Likelihood:	Very Likely	Basis: Same as initial evaluation for Accept handling strategy			
Residual Consequence:	Marginal	Basis: Same as initial evaluation for Accept handling strategy			
Residual Risk Level:	Moderate	Residual Impact Basis: 5% is most likely; 0% is best case; worst case is 10%			
Residual Cost Impact (\$K):	<u>Best Case</u>			<u>Most Likely</u>	<u>Worst Case</u>
Residual Schedule Impact					
Impacted Scope of Work: D&D and SGCP Program Scope					
Evaluation Comments:					

Risk Assessment Form			
ID Number: 002	Revision: 0	Last Date Evaluated: 6/1/06	Status: Active
Event Comments:			

Risk Assessment Form				
ID Number: 003		Revision: 0		Last Date Evaluated: 6/1/06
Status: Active				
Event Title: D&D Actual Duration Differs from Baseline Assumptions				
Type: External		Category: Schedule		
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning		
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05
Statement of Event: The current project baseline assumes specific D&D durations based on the type and size of facilities and current regulations and requirements. Due to the possibility of more conservative requirements (including additional characterization/sampling) being imposed on the D&D Project from outside agencies, there is a risk that the actual D&D duration will exceed the baseline duration. This event excludes the potential for enactment and promulgation of new and more conservative environmental laws and regulations. This event will result in additional project cost and possible extension of the project past the planned completion date.				
Likelihood:	Likely	Basis: Based on regulatory tendency toward conservatism, this event is likely to occur on various facilities before completion of the D&D project.		
Consequence / Benefit:	Significant	Basis: More conservative requirements can significantly impact durations for completion of the D&D project. Assume this will occur for 5% of the remaining 776 facilities.		
Most Significant Cost Impact (\$k per year): 0			Most Significant Schedule Impact (Months): 6 months per facility	
Level:	Moderate	Event Trigger: Additional regulatory requirements invoked		
Handling Strategy:	Mitigate	Description: Utilize Core Team process to negotiate compliance strategy, and elevate to senior management, as necessary.		
HS Implementation Cost (\$K):	N/A	Basis: N/A		
HS Implementation Schedule (Wks):	on-going	Basis: Address in regularly scheduled Core Team meetings		
Other Handling Strategies:				
Statement of Residual Risk:				
Residual Likelihood:	Unlikely	Basis:		
Residual Consequence:	Significant	Basis:		
Residual Risk Level:	Moderate			Residual Impact Basis: Most likely is 5%; Best is 0%; Worst Case is 10%
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>	<u>Worst Case</u>	
Residual Schedule Impact (Months):				
Impacted Scope of Work: D&D and SGCP Project Scope				
Evaluation Comments:				
Event Comments:				

Risk Assessment Form						
ID Number: 004		Revision: 0		Last Date Evaluated: 6/1/06		
Status: Active						
Event Title: Extended Facility Operating Schedule Impacts D&D						
Type: Internal			Category: Management			
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning				
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05		
Statement of Event: The current Program Execution Plan (PEP) defines the expected operating life of facilities which are closely linked to the schedule for D&D. Extended operation of facilities poses a risk that D&D will exceed the baseline plan. This event results in possible extension of the project past the planned completion date.						
Likelihood:	Very Likely	Basis: Mission durations, including the startup of new facilities and continued length of operations, have been extended and will result in project delays.				
Consequence / Benefit:	Critical	Basis: Extended operations of the facilities results in a day-to-day slip for initiating D&D				
Most Significant Cost Impact (\$k):			Most Significant Schedule Impact (Months): 24			
Level:	High	Event Trigger: Operations schedule is extended past the completion date				
Handling Strategy:	Mitigate	Description: Execute scope in parallel; re-sequence project scope				
HS Implementation Cost (\$K):	N/A	Basis: N/A				
HS Implementation Schedule (Wks):	N/A	Basis: N/A				
Other Handling Strategies:						
Statement of Residual Risk:						
Residual Likelihood:	Very Likely	Basis: Same as initial evaluation				
Residual Consequence:	Marginal	Basis: Working in parallel reduces schedule impacts to less than 6 months.				
Residual Risk Level:	Moderate	Residual Impact Basis: Working in parallel makes a delay of less than 6 months the most likely case.				
Residual Cost Impact (\$K):	<u>Best Case</u>				<u>Most Likely</u>	<u>Worst Case</u>
Residual Schedule Impact (Months):	0				< 6 months	> 6 months
Impacted Scope of Work: D&D and SGCP Program Scope						
Evaluation Comments:						

Risk Assessment Form			
ID Number: 004	Revision: 0	Last Date Evaluated: 6/1/06	Status: Active
Event Comments:			

Risk Assessment Form				
ID Number: 005	Revision: 1	Last Date Evaluated: 6/1/06	Status: Inactive	
Event Title: Deleted (Revision 1)				
Type:		Category:		
Assess. Element: PBS-40	Title: Nuclear Facility Deactivation & Decommissioning			
Responsible Org: - D&D Project		Contact: H. Belencan	Date Identified: 11/30/05	
Statement of Event: This risk has been deleted (Revision 1)				
Likelihood:		Basis:		
Consequence / Benefit:		Basis:		
Most Significant Cost Impact (\$k):		Most Significant Schedule Impact (Months):		
Level:		Event Trigger:		
Handling Strategy:		Description:		
HS Implementation Cost (\$K):		Basis:		
HS Implementation Schedule (Wks):		Basis:		
Other Handling Strategies:				
Statement of Residual Risk:				
Residual Likelihood:		Basis:		
Residual Consequence:		Basis:		
Residual Risk Level:			Residual Impact Basis:	
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>		<u>Worst Case</u>
Residual Schedule Impact (Months):				
Impacted Scope of Work:				
Evaluation Comments:				
Event Comments:				

Risk Assessment Form						
ID Number: 006		Revision: 0		Last Date Evaluated: 6/1/06		
Status: Active						
Event Title: Future Use Uncertainty						
Type: External			Category: Regulatory and Environmental			
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning				
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05		
Statement of Event: The current future use for SRS assumes industrial use and exposure. There is a risk the scenario could change to residential due to no planned mission for SRS. This event could change the cleanup standards and requirements for D&D.						
Likelihood:	Very Unlikely	Basis: The planned future use of SRS as industrial has been agreed to by multiple agencies and has been documented.				
Consequence / Benefit:	Crisis	Basis: This event could require additional cleanup and decontamination to facilities decommissioned in-situ as well as future decommissionings resulting in delays and additional costs.				
Most Significant Cost Impact (\$k):			Most Significant Schedule Impact (Months): >24			
Level:	High	Event Trigger: Change in Land Use				
Handling Strategy:	Mitigate	Description: Continue to support previous interagency agreements.				
HS Implementation Cost (\$K):	N/A	Basis:				
HS Implementation Schedule (Wks):	N/A	Basis:				
Other Handling Strategies:						
Statement of Residual Risk:						
Residual Likelihood:	Non-credible	Basis: Based on previous agreements and likely stakeholder rejection this event is not credible.				
Residual Consequence:	Critical	Basis:				
Residual Risk Level:	Low	Residual Impact Basis:				
Residual Cost Impact (\$K):	<u>Best Case</u>				<u>Most Likely</u>	<u>Worst Case</u>
Residual Schedule Impact (Months):						
Impacted Scope of Work: D&D and SGCP Program Scope						
Evaluation Comments:						
Event Comments:						

Opportunity Assessment Form				
ID Number: 007		Revision: 0	Last Date Evaluated: 6/1/06	Status: Active
Event Title: Use of Hardened Facilities as Waste Consolidation Units for D&D and SGCP Waste				
Type: Internal/External		Category: Management		
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning		
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05
Statement of Event: The reactor buildings are large facilities with concrete walls up to three feet thick. There is an opportunity for each of these facilities to be used for the consolidation of D&D waste generated during closure of the area.				
Likelihood:	Likely	Basis: Waste generated during area closure activities is evaluated for suitability for disposal in waste consolidation units. Hardened Facilities are a candidate for this alternative. To date, discussions with regulators have been favorable.		
Consequence / Benefit:	Significant	Basis: Reduced disposal costs and less cost to stabilize (volume reduction)		
Most Significant Cost Impact (\$k):			Most Significant Schedule Impact (Months): none	
Level:	Moderate	Event Trigger: An alternative analysis of the Facility End State is conducted suggesting reuse of the Reactor for this purpose.		
Handling Strategy:	Share	Description: Share this opportunity with Soil & Groundwater and Waste Disposition projects.		
HS Implementation Cost (\$K):		Basis:		
HS Implementation Schedule (Wks):		Basis:		
Other Handling Strategies:				
Statement of Residual Risk:				
Residual Likelihood:		Basis:		
Residual Consequence:		Basis:		
Residual Risk Level:				Residual Impact Basis:
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>	<u>Worst Case</u>	
Residual Schedule Impact (Months):				
Impacted Scope of Work:				
Evaluation Comments:				
Event Comments:				

Opportunity Assessment Form				
ID Number: 008		Revision: 0		Last Date Evaluated: 6/1/06
Status: Active				
Event Title: New and Improved D&D Technology				
Type: Internal			Category: Technology	
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning		
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05
Statement of Event: A new and/or improved D&D technology for handling radioactively contaminated equipment will lead to cost and schedule savings, as well as potential benefits in safety.				
Likelihood:	Unlikely	Basis: Funding and timing restraints will most likely limit any research activities towards improving the tools, techniques and equipment for D&D.		
Consequence / Benefit:	Significant	Basis: Small improvements in the D&D process have measurable benefits in safety, cost and schedule per facility. These savings multiplied by the number of facilities requiring D&D between now and 2025 result in considerable benefits.		
Most Significant Cost Impact (\$k): < \$1M			Most Significant Schedule Impact (Months): none	
Level:	Moderate	Event Trigger: Management initiates and funds a technology improvement program.		
Handling Strategy:	Enhance	Description: Initiate a facility specific technology needs program. Concentrate on difficult facilities (ex. FAMS, Reactor Facilities) and ensure the needs are specific to that facility. Provide adequate funding to obtain the improved tools, equipment and technology.		
HS Implementation Cost (\$K):	TBD	Basis:		
HS Implementation Schedule (Wks):		Basis:		
Other Handling Strategies: N/A				
Statement of Residual Risk:				
Residual Likelihood:		Basis:		
Residual Consequence:		Basis:		
Residual Risk Level:				Residual Impact Basis:
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>	<u>Worst Case</u>	
Residual Schedule Impact (Months):				
Impacted Scope of Work:				
Evaluation Comments:				

Opportunity Assessment Form			
ID Number: 008	Revision: 0	Last Date Evaluated: 6/1/06	Status: Active
Event Comments:			

Risk Assessment Form			
ID Number: 009	Revision: 0	Last Date Evaluated: 6/1/06	Status: Active
Event Title: Interpretation of "in Situ Decommissioning Endpoint"			
Type: Internal		Category: Management	
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning	
Responsible Org: - D&D Project		Contact: H. Belencan	Date Identified: 11/30/05
Statement of Event: An unfavorable interpretation of "in Situ decommissioning endpoint" will exceed current baseline cost and schedule.			
Likelihood:	Likely	Basis: Due to the broad range of interpretation and this work has never been undertaken at SRS (i.e., no precedent for decision-making) this event is likely.	
Consequence / Benefit:	Critical	Basis: Schedule slippage would be between 1 and 2 years; Cost increase would be between 10 and 20% of lifecycle budget (\$30,000K per Reactor).	
Most Significant Cost Impact (\$k): \$30,000 per reactor		Most Significant Schedule Impact (Months): ~ 24 months	
Level:	High	Event Trigger: Unsuccessful negotiation on end state of Reactor Facility; documented in CERCLA Feasibility Study.	
Handling Strategy:	Mitigate	Description: Negotiate through Core Team process.	
HS Implementation Cost (\$K):	N/A	Basis: Regular meetings already scheduled	
HS Implementation Schedule (Wks):	N/A	Basis: Negotiations conducted through regularly scheduled Core Team meetings.	
Other Handling Strategies: Active public involvement plan development and implementation.			
Statement of Residual Risk: in Situ interpretation is favorable			
Residual Likelihood:	Unlikely	Basis:	
Residual Consequence:	Marginal	Basis:	
Residual Risk Level:	Low		Residual Impact Basis: Best \$-15M for each Reactor
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>	<u>Worst Case</u> Most Likely \$0M for each Reactor

Risk Assessment Form				
ID Number: 009		Revision: 0		Last Date Evaluated: 6/1/06
Status: Active				
Residual Schedule Impact (Months):				Worst \$15M for each Reactor
Impacted Scope of Work: D&D and SGCP				
Evaluation Comments:				
Event Comments:				

Opportunity Assessment Form				
ID Number: 010		Revision: 1		Last Date Evaluated: 6/1/06
Status: Active				
Event Title: Regulatory Agreement to Use Maintenance Worker Cleanup Criteria				
Type: External		Category: Regulatory and Environmental		
Assess. Element: PBS-40		Title: Nuclear Facility Deactivation & Decommissioning		
Responsible Org: - D&D Project			Contact: H. Belencan	Date Identified: 11/30/05
Statement of Event: Obtain regulatory agreement to use the Maintenance Worker scenario in lieu of the Industrial Worker scenario to establish cleanup criteria for D&D.				
Likelihood:	Unlikely	Basis: Precedent has been set in agreements with the regulators to use the Industrial Worker scenario		
Consequence / Benefit:	Significant	Basis: Cost and schedule improvement can be obtained based on the Maintenance Worker cleanup criteria.		
Most Significant Cost Impact (\$k):			Most Significant Schedule Impact (Months):	
Level:	Moderate	Event Trigger: Renegotiate with the regulators the Maintenance Worker Cleanup Criteria		
Handling Strategy:	Enhance	Description: Improve the likelihood of this event by proving to the regulators that the Maintenance Worker Scenario is more realistic than the more conservative Industrial Worker Scenario.		
HS Implementation Cost (\$K):		Basis:		
HS Implementation Schedule (Wks):		Basis:		
Other Handling Strategies:				
Statement of Residual Risk:				
Residual Likelihood:		Basis:		
Residual Consequence:		Basis:		
Residual Risk Level:			Residual Impact Basis:	

Opportunity Assessment Form				
ID Number: 010		Revision: 1		Last Date Evaluated: 6/1/06
Residual Cost Impact (\$K):	<u>Best Case</u>	<u>Most Likely</u>	<u>Worst Case</u>	
Residual Schedule Impact (Months):				
Impacted Scope of Work:				
Evaluation Comments:				
Event Comments:				
