



Surplus Plutonium Disposition

- Dilute and Dispose Approach LCCE Risk Assessment Process

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— PERMANENT THREAT REDUCTION —

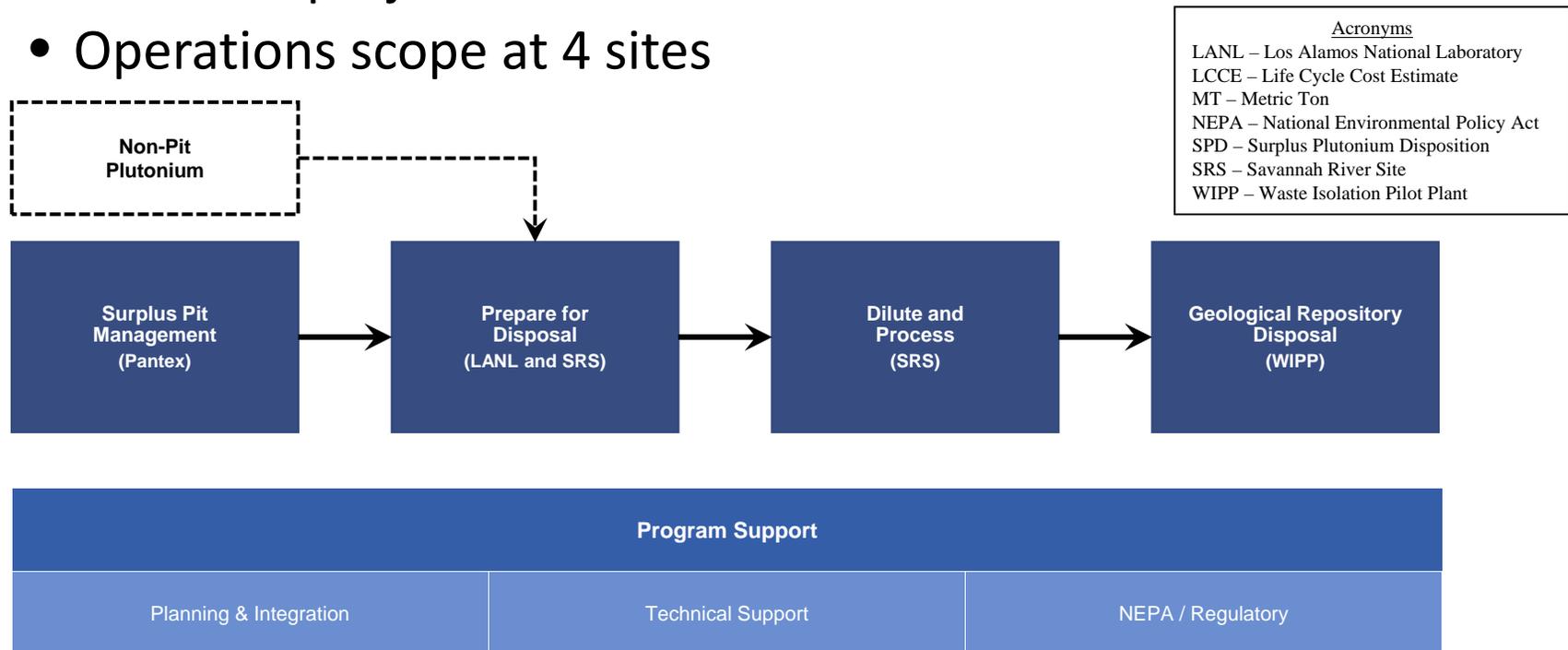


**MATERIAL MANAGEMENT
AND MINIMIZATION**

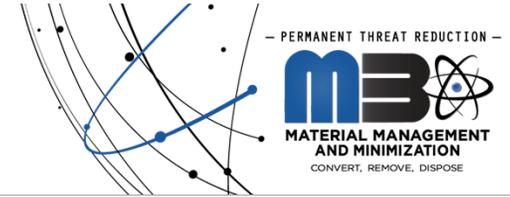
CONVERT, REMOVE, DISPOSE

Scope of Work for SPD LCCE

- Disposition 34 MT of surplus weapon-grade plutonium
 - 26.2 MT pit plutonium
 - 7.8 MT non-pit plutonium
- Scope includes
 - Line item projects at SRS and LANL
 - Operations scope at 4 sites



SPD LCCE Overview

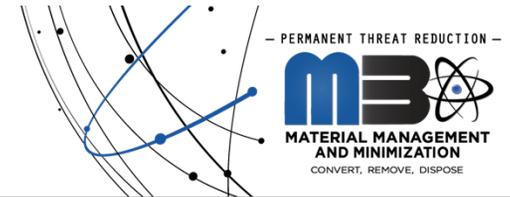


- LCCE performed in accordance with *GAO Cost Estimating and Assessment Guide (GAO-09-03SP)*
 - 12 steps of high-quality estimating process
 - validated by USACOE including risk related attributes
- Program Managers/SMEs/estimators at each site developed detailed estimates/schedules/risk assessments for their scopes of work
- SRNS integrated all information into comprehensive estimate/schedule/risk analysis
- Total cost: \$18.0B
- Processing complete date: February 2049
 - Additional activities for deactivation following Feb 2049
 - Schedule contingency following Feb 2049

Acronyms

GAO – General Accounting Office
LCCE – Life Cycle Cost Estimate
SME – Subject Matter Expert
SPD – Surplus Plutonium Disposition
SRNS – Savannah River Nuclear Solutions
USACOE – United States Army Corps of Engineers

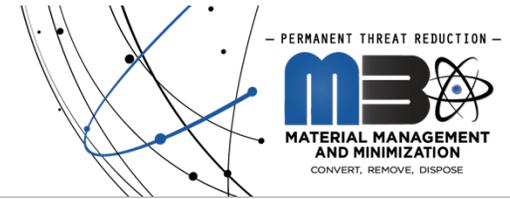
Risk Management Requirements Flowdown



- A rigorous risk management process has been in place for LCCE since outset of development
- NNSA Surplus Plutonium Disposition (SPD) Program Requirements Document (PRD) directed that a formal risk management program be implemented for LCCE
- SRNS developed SPD Risk and Opportunities Management Plan (ROMP) which defines the scope, process, roles and responsibilities, implementation strategy, and documentation requirements for the management of risks and opportunities

Acronyms

LCCE – Life Cycle Cost Estimate
NNSA - National Nuclear Security Agency
PRD – Program Requirements Document
ROMP – Risk and Opportunities Management Plan
SPD – Surplus Plutonium Disposition
SRNS – Savannah River Nuclear Solutions

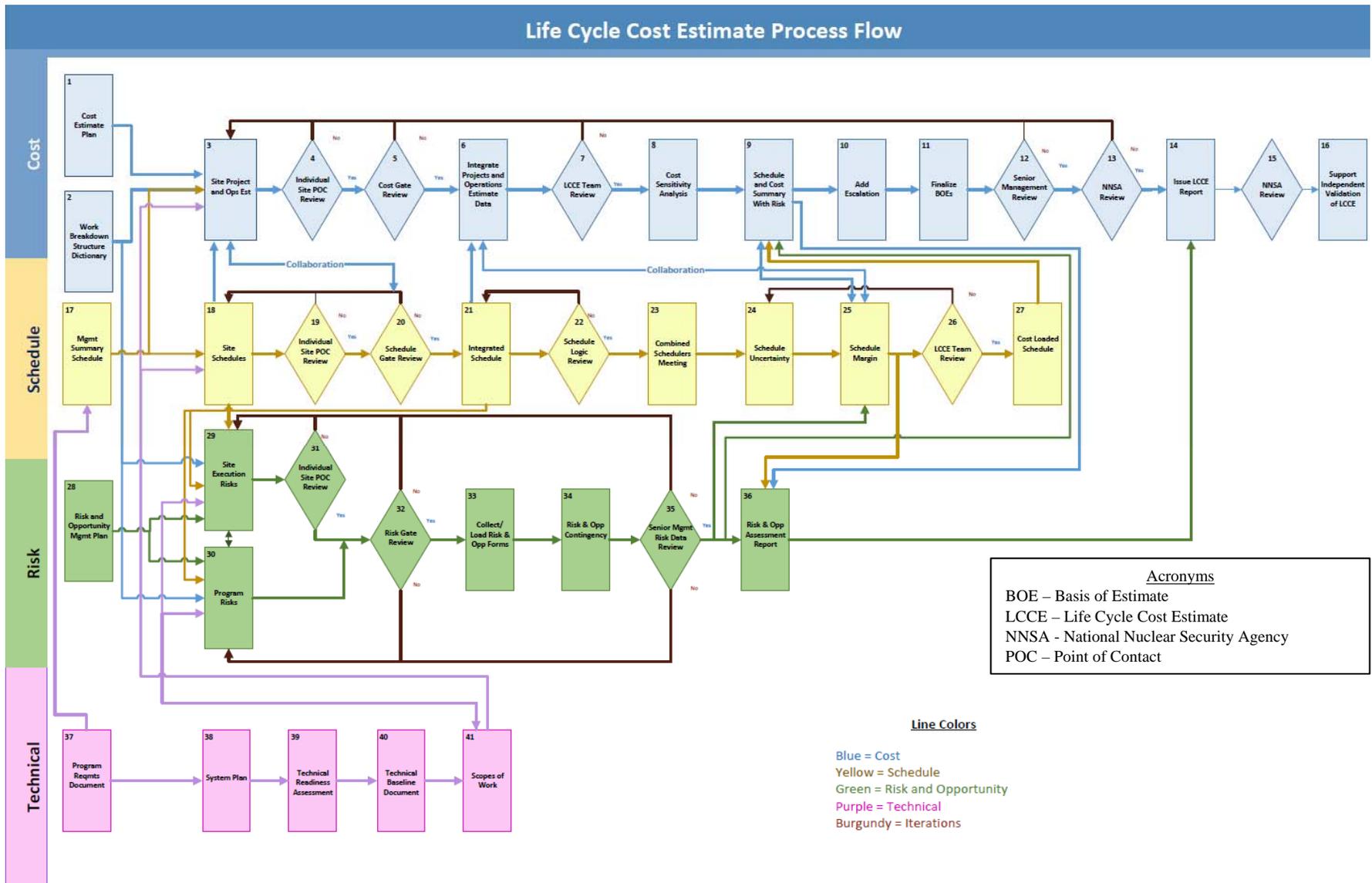
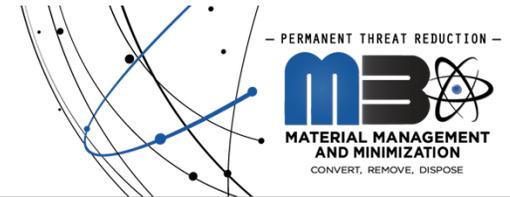


- SPD LCCE ROMP and ROAR are based on:
 - DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*
 - DOE Guide 413.3-7A, *Risk Management Guide*
- Risk program evaluated vs. Government Accountability Office (GAO) Cost Estimating and Assessment Guide, GAO-09-3SP.
- SRNS Manuals and Risk Management Plans
- Industry recognized software utilized including Active Risk Manager (ARM) and Primavera Risk Analysis (PRA)

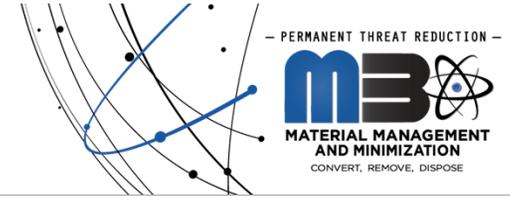
Acronyms

ARM – Active Risk Manager
GAO – General Accounting Office
LCCE – Life Cycle Cost Estimate
PRA – Primavera Risk Analysis
ROAR – Risk and Opportunities Assessment Report
ROMP – Risk and Opportunities Management Plan
SPD – Surplus Plutonium Disposition
SRNS – Savannah River Nuclear Solutions

Integration of Risk Management



Risk and Opportunity Management Plan - (ROMP)



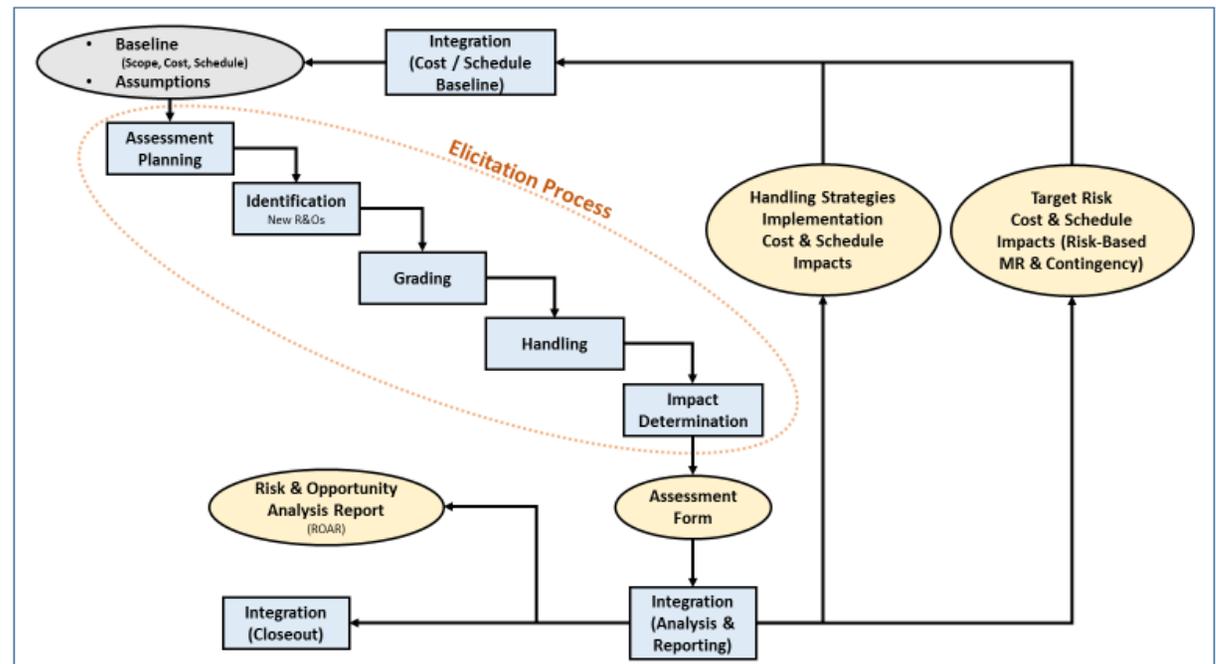
- High-level plan for risk assessment process
 - Program managers at each site concurred
 - Document completed prior to start of risk assessment process
- Identifies
 - Scope of assessment
 - Risk management process
 - Risk types
 - Program – impacts more than one site
 - Execution – impacts one site only
 - Handling strategies
 - Grading criteria
 - Standard risk assessment form for use in Active Risk Manager database
 - Roles/responsibilities of team members
 - Implementation strategy
 - Documentation requirements

ROMP – Structured Approach

- **Planning** – Developed ROMP
- **Identification** – Each Site identified Program, Execution, and Technical Risks
- **Grading** – Graded Current & Target R&Os using criteria in ROMP
- **Handling** – Developed handling strategies for R&Os
- **Impact Determination** – Calculated T&PRA, Contingency, and MR

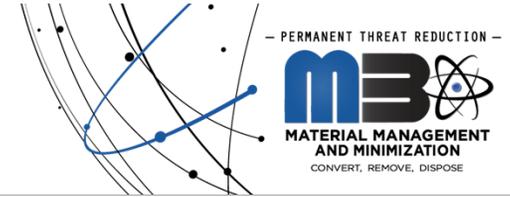
Also:

- **Integrated** risk mitigation actions into LCCE baseline
- **Documented** results in ROAR



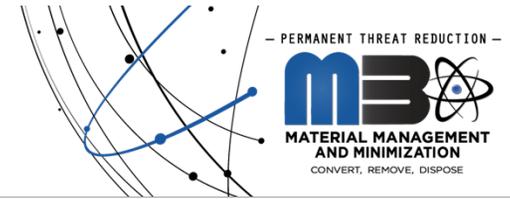
Acronyms	
LCCE	– Life Cycle Cost Estimate
MR	– Management Reserve
R&O	– Risk and Opportunity
ROAR	– Risk and Opportunities Assessment Report
ROMP	– Risk and Opportunities Management Plan
T&PRA	– Technical and Programmatic Risk Analysis

Risk and Opportunities Analysis Results

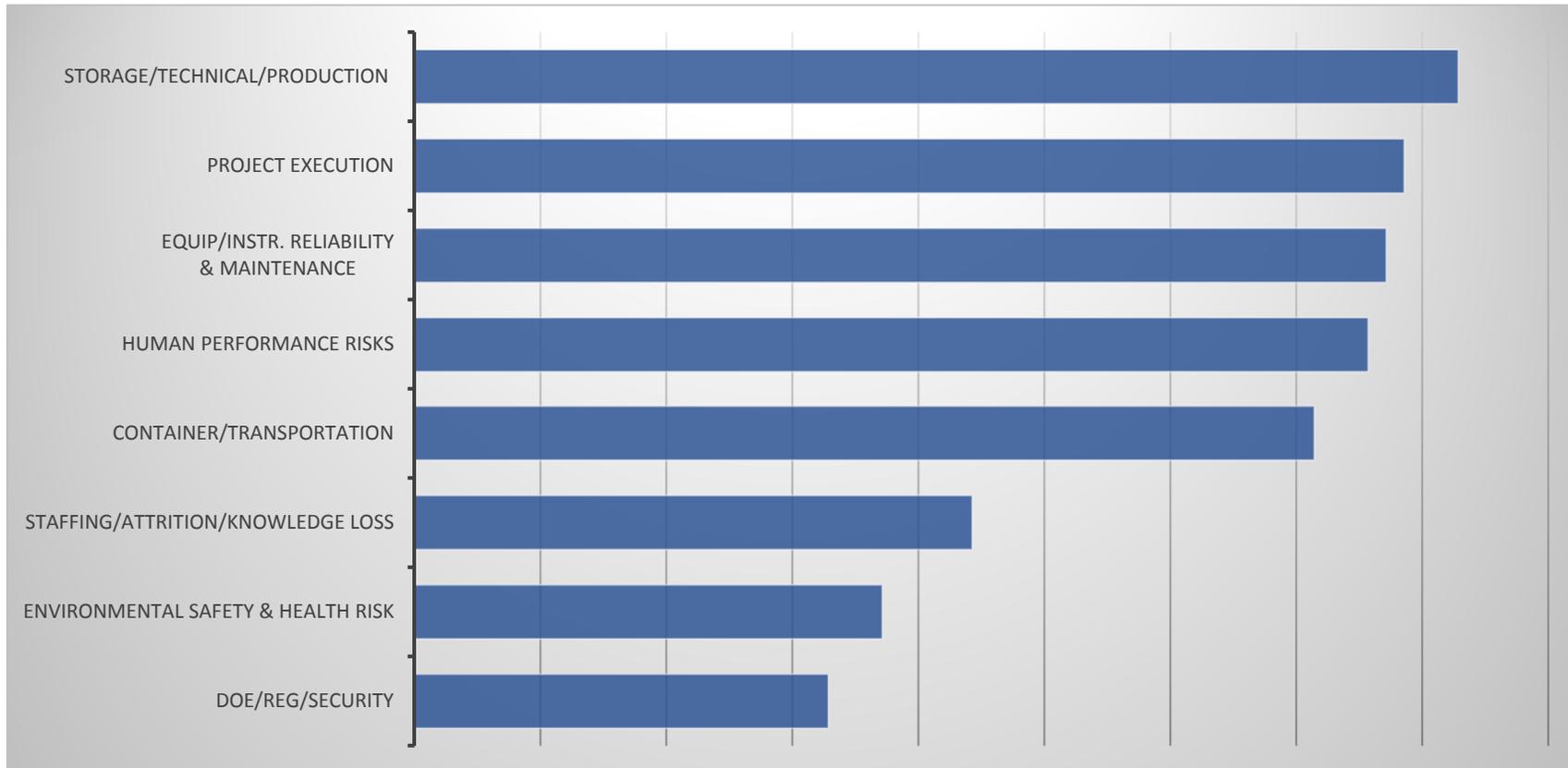


- 124 events identified during elicitation process
- 76 events closed due to redundancy, improbability, etc.
- 40 active risks are included in LCCE cost and schedule including 1 risk avoided
- 8 opportunities were identified but were conservatively not included in the LCCE cost or schedule estimates

Active Risk Exposure by Subject Area

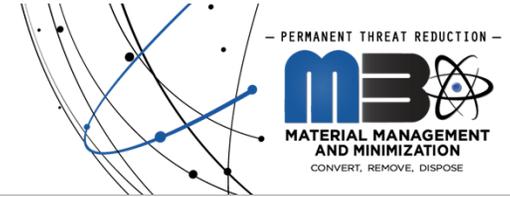


Subject Area



Increasing Impact

Active Risk Results



Current = Before Mitigation

Target = After Mitigation

Category	CURRENT							TARGET							
	Risks (40 total)			Opportunities (0 total)				Total	Risks (39 total)			Opportunities (8 total)			Total
	High	Mod.	Low	High	Mod.	Low	High		Mod.	Low	High	Mod.	Low		
Program	4	4	3	N/A	N/A	N/A	11	2	6	3	1	2	2	16	
Execution	3	17	9	N/A	N/A	N/A	29	1	8	19	2	1	0	31	
Total	7	21	12	N/A	N/A	N/A	40	3	14	22	3	3	2	47	

8 Opportunities

39 Risks

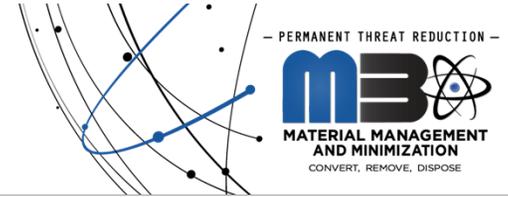
Exceptional	Significant	Moderate	Marginal	Negligible	Likelihood	Negligible	Marginal	Significant	Critical	Crisis
				1	Almost Certain > 90%					
2					Very Likely > 70% and ≤ 90%		3			1
1			1		Likely > 30% and ≤ 70%	2	1	2	1	2
					Unlikely > 10% and ≤ 30%	1	8	3	2	
2			1		Very Unlikely ≥ 0% and ≤ 10%	5	5	1	1	1

Note: 1 Risk was avoided

Technical & Programmatic Risk Analysis Results

- Open risks (40 total)
 - Risk levels after mitigation
 - High – 3
 - Moderate – 14
 - Low - 22
 - Cost to mitigate risks – (\$42M)
- High risks (after mitigation)
 - Anomalous events at LANL cause delays that impact program
 - LANL equipment installation schedule delays impact ops ramp-up
 - SRNS line item not completed on schedule causing delays in dilution operations
- Risk calculations do not include opportunities (for conservatism)
- Risk impacts are primarily schedule impacts
 - 52 months schedule contingency (70% confidence level)
- Risk handling strategies included in cost estimate/ schedule

Contingency Components (T&PRA)



- Risk Cost Contingency
 - SRNS performed integrated Monte Carlo analysis of all program and execution risks
 - \$140M Cost impact at 70% confidence level
- Schedule Margin (Risk Schedule Contingency)
 - SRNS performed integrated Primavera Risk Analysis (PRA) of integrated schedule
 - PRA run included schedule uncertainty analysis and risk schedule analysis
 - Total number of months of schedule contingency multiplied by monthly hotel load cost at steady-state operations
 - Schedule contingency begins February 2049 (last shipment to WIPP)
 - 52 months (completes December 2055)
 - \$1.2B (unescalated)
 - Additional schedule uncertainty (30 months) (\$0.682B) (unescalated)

- GAO Guide requires performance of risk and uncertainty analysis
- Formal risk assessment process performed throughout development of LCCE to identify required contingency at 70% confidence level; estimate includes:
 - \$ 3.7B total contingency (unescalated)
 - Includes estimate uncertainty, schedule uncertainty/margin, and T&PRA contingency
 - Base cost unescalated is \$8.5B
 - Contingency is 44% of base cost
 - 82 months total schedule contingency
 - Feb 2049 – December 2055

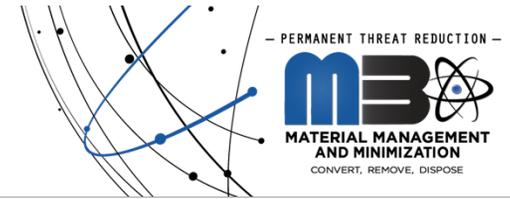
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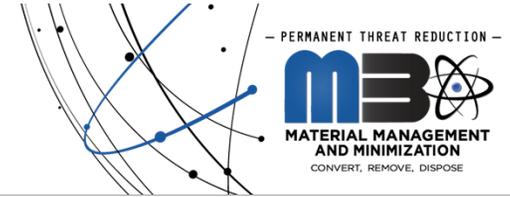
LCCE – Life Cycle Cost Estimate

T&PRA – Technical and Programmatic Risk Analysis

Contingency Breakdown



<u>Contingency Component</u>	Unescalated Value (\$B)		
	<u>26.2MT</u>	<u>7.8 MT</u>	<u>Total</u>
Estimate Uncertainty	1.327	0.104	1.431
Schedule Uncertainty/Margin	1.863	0.222	2.085
Cost (T&PRA)	<u>0.140</u>	<u>0.010</u>	<u>0.150</u>
Total	3.330	0.336	3.666



- Final product documenting results
- Summary of risk assessment process and results
 - Developed by SRNS at completion of risk assessment process
 - Program Managers from each site concurred
- Includes
 - Results of risk assessment
 - Current/target levels of all open risks
 - Risk cost contingency
 - Schedule contingency/schedule margin
 - Risk assessment sheets for all open risks
 - List of closed risks
 - Methodology for risks with multiple potential occurrences