

**Y-RAR-H-00057**

**Revision 2**

**CLOSURE BUSINESS UNIT  
LIQUID WASTE DISPOSITION PROJECTS**

**SALT PROCESSING PROJECTS**

**Tank 48 Disposition Project  
Risk Analysis Report**



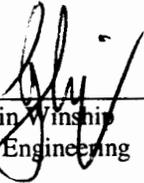
**Washington Savannah River Company  
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Aiken, SC 29808**

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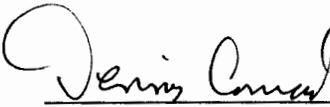
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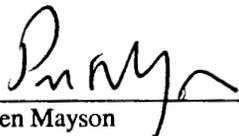
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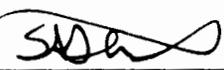
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### SUMMARY OF REVISIONS

<b>Issue Date</b>	<b>Revision</b>	<b>Description</b>
5/11/05	0	Initial Issue
9/14/05	1	General revision to include division of project scope (Phase I / Phase II) and update to risk data and T&PRA contingency analysis. No Revision bars.
3/13/06	2	General revision to update risk baseline and T&PRA to support 30% design estimate. No Revision bars.

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## EXECUTIVE SUMMARY

The Salt Processing Program (SPP) is tasked with the removal and disposition of Salt currently stored within High Level Waste (HLW) tanks at SRS. To accomplish this task the SPP has been divided into several projects. A Program Risk Assessment (Reference 1) was prepared to address the overall SPP risks.

This risk assessment addresses risks associated with one of the SPP projects, namely the Tank 48 Project. This risk assessment presents the risks and levels of risk associated with this Project, the risk handling strategies (RHSs) to be employed, the residual risk remaining and provides a basis for a Technical and Programmatic Risk Assessment (T&PRA) contingency estimate. The primary driver for this update was the decision to split the Tank 48 Project into two Phases:

Phase I: Design and installation of modifications necessary to perform the removal of Tank 48 contents.

Phase II: Removal of Tank 48 contents, achieving intermediate end state, and Tank 48 return to service.

The Team reviewed, updated and added to the existing risk data and allocated risks to either Phase I or Phase II. This risk analysis focused on Phase I, however the Project Team may implement risk handling strategies designed to manage Phase II risks during the execution of Phase I where a significant advantage can be gained for the overall project.

A total of 1 risk was close, and 1 new risk identified. Of the remaining 57 open risks, 30 were Phase I risks and 27 were Phase II risks. The Phase I risks comprised of 11 high risks, 14 moderate risks, and 5 low risks. The Phase II risks comprised of 18 high risks, 8 moderate risks, and 1 low risk. Risk handling strategies were developed for all risks.

After application of the RHSs, 26 Phase I risks will be reduced or mitigated and 4 risks will be accepted. The resulting handled risks that would remain open with the potential to impact the project, based on the most likely impact assessed by the Team comprised of 5 high risks, 10 moderate risks and 15 low risks.

The Phase I residual risk levels were analyzed using Crystal Ball<sup>®</sup> software to perform a Monte Carlo analysis. Based upon the results of this analysis it was concluded that an 80% probability of project success would require a T&PRA contingency of approximately 1.23 million dollars.

After application of the RHSs, 24 Phase II risks will be reduced or mitigated and 3 risks will be accepted. The resulting handled risks that would remain open with the potential to impact the project, based on the most likely impact assessed by the Team comprised of 5 high risks, 7 moderate risks and 15 low risks. This report will be updated to include additional analysis of the Phase II risks, prior to the commencement of Phase II.

## **ABBREVIATIONS and ACRONYMS**

AB – Authorization Basis

BCP –Baseline Change Proposal

CAB – Citizens Advisory Board

DOE – Department of Energy

DOE – HQ – Department of Energy Headquarters

DNSFB – Defense Nuclear Facilities Safety Board

DSA - Documented Safety Analysis

DWPF – Defense Waste Processing Facility

HLW – High Level Waste

HTF – H-Area Tank Farm

ITP – In-Tank Precipitation

NCSE – Nuclear Criticality Safety Evaluation

PA – Performance Assessment

RHS – Risk Handling Strategy

SCDHEC – South Carolina Department of Health and Environmental Control

SPP – Salt Processing Program

SRS – Savannah River Site

SRNL – Savannah River National Laboratories

SSF – Saltstone Facility

T&PRA – Technical and Programmatic Risk Assessment

TPB –Tetraphenylborate

TSR – Technical Safety Requirement

TF – Tank Farm

WAC – Waste Acceptance Criteria

WIR – Waste Incidental to Reprocessing

WSMS – Washington Safety Management Solutions

WSRC – Washington Savannah River Company

## 1.0 OVERVIEW

The SPP is tasked with the removal and disposition of salt currently stored within HLW tanks at SRS. Successful disposal of salt waste will support a significant reduction in lifecycle cost while allowing accelerated waste tank closure and providing space gain in the Tank Farms to support operational flexibility. A program risk assessment (Reference 1) addresses the overall SPP risks, while risks specific to the Tank 48 Project will be addressed within this risk analysis report.

This risk analysis identifies risks and handling strategies (RHSs) that will be used to tailor an integrated risk handling strategy for the Tank 48 Project. The RHSs align with the current LWDP risk management strategy outlined in Reference 6.

### 1.1 Project Description

Tank 48H currently contains approximately 250,000 gallons of salt solution containing 19,000 kilograms of potassium and cesium tetraphenylborate (TPB) salts generated during the 1983 In-Tank Precipitation (ITP) Process demonstration and the subsequent operation of the ITP facility in 1995/1996. The organic nature of TPB salts makes the Tank 48H waste incompatible with the existing HLW Treatment and Disposition facilities. In order to meet organic requirements in the current Documented Safety Analysis (DSA), which limit the amount of TPB that can remain in the tank when returned to service and due to the need for additional HLW storage, successful disposition of the material in Tank 48H is essential.

Evaluation of alternative methods for disposition of the TPB in consideration with the salt strategy resulted in the selection of an aggregation process, using available recycle material within the tank farms to aggregate the contents of Tank 48 for disposition through the Saltstone Facility. A detailed description of the conceptual scope of the Tank 48 Project is contained within Reference 2.

The Tank 48 Project has been divided into two Phases:

- Phase I: Design and installation of modifications necessary to perform the removal of Tank 48 contents.
- Phase II: Removal of Tank 48 contents, achieving intermediate end state, and Tank 48 return to service.

## 2.0 RISK MANAGEMENT PROCESS

### 2.1 Background

A program risk assessment is maintained for the SPP. The Program risk assessment was conducted at a higher level and addressed the risks within the SPP program in terms of their consequences to the implementation of the current HLW System Plan (Reference 4) and the Interim Salt Processing Strategy Planning Baseline (Reference 6). This risk assessment is documented in Reference 1.

The SPP conducts risk assessments on each of the SPP projects. This risk report provides the results of the Tank 48 Project assessment and will be periodically updated to incorporate updated information. The Project Team may add additional risks to the matrix prior to any re-issuance of a report. This will allow timely evaluation of the risk and ensure risk handling strategies are developed as needed.

## 2.2 Team Members

As a minimum the Tank 48 Team consists of the following personnel:

Renee Spires	Project Owner
Pen Mayson	Project Manager
Gavin Winship	SPP Engineering
Larry Romanowski	PIT Team
Bill Wilmarth	SRNL
Dennis Conrad	Design Authority
Delane Maxwell	PIT
Chris Cope	WSMS
Gerald Eide	LWD Engineering
Lee Carey	DS

During the course of the risk assessment representatives from other contributing organizations were requested to provide input for a specific set of risks or requested to sit on the team during the assessment meeting.

## 2.3 Risk Assessment Process and Methodology

The risk assessments are conducted by formal meetings using a structured format to implement the risk assessment methodologies outlined in Reference 5. The major steps of the process are assessment, analysis and tracking which are shown in steps 1 through 7.

### Assessment

#### 1. Identification of risks

The risk identification process is performed in a brainstorming session with the team or by developing functions of the process and identifying the risks associated with each function. To assist risk identification a Risk Topics sheet (Appendix 6.1) that identifies risk typical types by area can be used. Each identified risk is documented on a Risk Assessment Form (Appendix 6.5). Each has a documented basis, event and risk description to allow a full understanding of the risk.

#### 2. Assignment of Probability, Consequences and Determination of the Risk Level

The probability of risk occurrence is selected from the Risk Probabilities Table (Appendix 6.2) and a basis for the probability documented on the Risk Assessment Form. The consequences (schedule impact and cost impact) of the risk occurring is then determined by the Team and the corresponding consequence identifier assigned from the Risk Consequences Table (Appendix 6.3) and a basis for the consequences documented on the Risk Assessment Form. The probability and consequences are used in conjunction with Risk Level Matrix (Appendix 6.4) to determine the risk level.

#### 3. Identification of risk handling strategy

A risk handling strategy (RHS) will normally be developed for all moderate and high level risks, and may be developed for other risks at the discretion of the Project Team. The risk handling strategy will be documented on the Risk Assessment Form along with the person responsible for execution of the RHS and where required by the Project Owner, the cost and schedule to implement the RHS. The following RHSs types may be employed:

Avoid – This strategy focuses on totally eliminating the specific risk-driving event. Once the RHS is implemented the risk will be reduced to zero, no residual risk remains with this strategy

Reduce – This strategy identifies specific steps or actions to reduce the probability of the occurrence of the risk. There will be residual risk after the implementation of this RHS.

Mitigate – This strategy identifies specific steps or actions to reduce the consequence of the risk. There will be residual risk after the implementation of this RHS.

Reduce/Mitigate – A combination of Reduce and Mitigate. There will be residual risk after the implementation of this RHS.

Accept – Accepting a risk is essentially a “no action” strategy. Selection of this strategy is based upon the decision that it is more cost effective to continue the activity as planned with no resources specifically dedicated to addressing the risk. The residual risk is equal to the initial risk with this RHS.

#### 4. Determination of residual risk

If a reduce, mitigate or reduce/mitigate RHS is employed, there will be residual risk remaining after the RHS is complete. This residual risk is estimated and entered on the Risk Assessment Form as quantified cost and/or schedule impact with an associated probability of occurrence. This residual risk can be used to calculate the total risk abated by a particular RHS.

### Analysis

#### 5. Developing risk handling priorities

Based on individual Project needs, RHS priorities may be required to allow selection of RHSs for implementation. This may occur when or constrained by resources. RHSs may be prioritized based on cost or risk abated. The total cost of all RHSs is used as a baseline to normalize each RHS cost. Similarly the total risk abated (the sum of initial risk minus the residual risk for all RHSs) is used as a baseline to normalize each RHS risk abated.

The risk abated per unit cost can be calculated from the normalized risk abated and cost data. Risk adverse and cost adverse models and RHS cost and risk adverse priority lists may also be created. At the Project Owner’s discretion, risk may also be assigned a “type” and the risk type weighted and used to create a weighted RHS priority list. Prioritized RHSs listings and model tools may be used by the Project Owner to assist in the scheduling and reporting of RHS implementation and the alignment of risk trigger points for schedule activities. (Risk trigger points define points at which RHS must begin to allow successful risk mitigation or points at which risk may no longer be realized.)

#### 6. Developing T&PRA contingency estimate

Based on the residual risk impacts identified by the Team, a cost probability distribution is developed for each risk using Crystal Ball<sup>®</sup> software. The software can then be used to statistically combine the distributions through a Monte Carlo process (random sampling methodology) to produce the (T&PRA) cost contingency estimate. The intent of the T&PRA cost contingency estimate is to identify the amount of contingency funding for the Project to ensure that, at an 80% confidence level, the Project is adequately funded and can survive the consequences of realized residual risk. Appendix 6.6 shows the probability distribution models for each of the risks, the frequency-probability profile for the combination of models and the percentiles within the output as they relate to the estimated contingency dollars (the percentile of interest being 80%).

### Tracking

#### 7. Risk Tracking

Risk tracking will be performed using risk trigger points and scheduled RHSs. Risk trigger points define the earliest point in the project life that the risk could be realized and the latest point at which the risk no longer can be realized. Risk triggers may be entered into the project schedule at the Project Owners discretion. As a minimum they will be used to update project risk status. Project risk status is depicted on a “risk-o-meter,” (Appendix 6.7). The Project status of each risk is expressed as a “level of concern” which reflects a

combination of the Project Team's confidence of handling and perceived severity level of the risk at the time of the "risk-o-meter" update. As new risks are identified and existing risks change, the Risk Assessment Forms and analysis

(from items 5 and 6 above) will be updated prior to reporting project risk trends. Periodically the updated Risk Assessment Forms will be issued in a revision to this report.

Additional guidance for performance of Risk Assessments is found in Reference 3, WSRC Manual E11, Conduct of Project Management and Controls, Procedure 2.62, "Project Risk and Opportunity Analysis," and Reference 5, "Systems Engineering Methodology Guidance Manual."

## 2.4 Assumptions and Issues

Assumptions for the Tank 48 Project are listed and discussed in detail within Sections 5 and 6 of Reference 2. These assumptions were reviewed as part of this risk assessment and any risks associated with those assumptions identified and included in the risk data for the Tank 48 Project. The following assumption was identified in addition to those discussed above:

1. SPF operational costs of processing Tank 48 aggregated material will be funded by others and not be funded as part of the Tank 48 Project.

No issues were identified during this risk assessment.

## 3.0 RESULTS

The risk assessment Team updated the risk population for the project with the following results:

### Risks Closed (1)

T48-61 Recycle Not Available

### New Risks (1)

T48-65 Processing Window Unavailable

### Previously Identified Risks Remaining (56)

T48-01 Funding Availability  
T48-02 Interfaces with Other Facilities and Projects  
T48-03 Lost or Spilled Sample in SRNL  
T48-04 Laboratory Capability - Tank Farm  
T48-05 Accessibility to Perform Work  
T48-06 Field materials are not available  
T48-08 Requirements for Construction Change  
T48-09 Availability of Construction Equipment  
T48-10 Readiness Assessment More Than a WSRC RA  
T48-11 Readiness Assessment Findings  
T48-12 Support Services Availability  
T48-13 Tank 48 Equipment Failure  
T48-14 Loss of Utilities  
T48-15 Unsafe Conditions Discovered at Turnover  
T48-16 Equipment Failure (Recycle Transfers)  
T48-17 Tie-ins to Existing Facility  
T48-18 Cooling Coils Fail Test  
T48-19 Existing equipment cannot meet seismic qualification requirements  
T48-20 Tank 48 Transfer Pump Fails Tests During Startup Testing

- T48-21 Modifications are determined to be required for the Transfer line/LPDT and Tank 48 to 50.
- T48-22 Stakeholder Participation
- T48-23 Regulatory Concerns (3116 implementation)
- T48-24 Regulatory Concerns (Class C permit not granted)
- T48-25 Equipment Fails Surveillance
- T48-26 Safety Basis Impacts Design -Tank Farm
- T48-27 Safety Basis Strategy not Accepted By DOE
- T48-28 Insufficient recycle available for aggregation
- T48-29 Chemical Spills (Caustic)
- T48-31 Decomposition Products Generated By Additions to Tank
- T48-32 Analytical Detection Limit
- T48-34 Inadequate Suspension of Material
- T48-35 Increased Sampling and Analysis
- T48-36 Benzene Generation Rate - Tank Farm (Safety Basis)
- T48-37 Inability to Meet End State
- T48-40 Tank Film Cannot be Removed
- T48-41 Equipment Failure (Tank 50)
- T48-42 Transfer Pump Suction or Discharge Line Plugs
- T48-43 Permitting Delay - Saltstone
- T48-44 Inadequate Tank Space
- T48-45 Tank 50 Cooling (Saltstone Transfer) Inadequate
- T48-46 Saltstone 0.2 Ci/gal Cs Modifications Not Ready in Time to Support Strategy
- T48-47 Tank 50 residual TPB level
- T48-48 Saltstone Na limit (1M) cannot be met
- T48-49 Effect of Raw Material Impurities - Saltstone
- T48-50 TPB Decomposition Temperature – Saltstone (Safety Basis)
- T48-51 Benzene Released in Saltstone (Safety Basis)
- T48-54 Volume of Grout is Unacceptable
- T48-55 Greater Than Assumed Number of Analyzed Samples Required - Saltstone
- T48-56 Saltstone Facility Benzene Generation Requires Equipment Modification
- T48-57 Process Material Fails TCLP - Saltstone
- T48-58 Inadequate scale up from R&D - Saltstone
- T48-59 Saltstone Facility production rate less than 83K gals/week
- T48-60 Laboratory Capability - Saltstone
- T48-62 ARP Equip. Instal. Interferes with Installation of Above Ground Transfer Line
- T48-63 Fast-Track Schedule Requires Rework
- T48-64 Tank 50 Equipment Installation Impacted by Ongoing Transfers

The 57 open risks were allocated to Phase I and Phase II as follows:

Phase I Risks (30):

- T48-01 Funding Availability
- T48-02 Interfaces with Other Facilities and Projects
- T48-03 Lost or Spilled Sample in SRNL
- T48-04 Laboratory Capability - Tank Farm
- T48-05 Accessibility to Perform Work
- T48-06 Field materials are not available
- T48-08 Requirements for Construction Change
- T48-09 Availability of Construction Equipment

- T48-10 Readiness Assessment More Than a WSRC RA
- T48-11 Readiness Assessment Findings
- T48-12 Support Services Availability
- T48-14 Loss of Utilities
- T48-15 Unsafe Conditions Discovered at Turnover
- T48-16 Equipment Failure (Recycle Transfers)
- T48-17 Tie-ins to Existing Facility
- T48-18 Cooling Coils Fail Test
- T48-19 Existing equipment cannot meet seismic qualification requirements
- T48-21 Modifications are determined to be required for the Transfer line/LPDT and Tank 48 to 50.
- T48-22 Stakeholder Participation
- T48-23 Regulatory Concerns (3116 implementation)
- T48-24 Regulatory Concerns (Class C permit not granted)
- T48-25 Equipment Fails Surveillance
- T48-26 Safety Basis Impacts Design -Tank Farm
- T48-27 Safety Basis Strategy not Accepted By DOE
- T48-36 Benzene Generation Rate - Tank Farm (Safety Basis)
- T48-50 TPB Decomposition Temperature – Saltstone (Safety Basis)
- T48-51 Benzene Released in Saltstone (Safety Basis)
- T48-62 ARP Equip. Instal. Interferes With Installation of Above Ground Transfer Line
- T48-63 Fast-Track Schedule Requires Rework
- T48-64 Tank 50 Equipment Installation Impacted by Ongoing Transfers

Phase II Risks (27):

- T48-13 Tank 48 Equipment Failure
- T48-20 Tank 48 Transfer Pump Fails Tests During Startup Testing
- T48-28 Insufficient recycle available for aggregation
- T48-29 Chemical Spills (Caustic)
- T48-31 Decomposition Products Generated By Additions to Tank
- T48-32 Analytical Detection Limit
- T48-34 Inadequate Suspension of Material
- T48-35 Increased Sampling and Analysis
- T48-37 Inability to Meet End State
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- T48-42 Transfer Pump Suction or Discharge Line Plugs
- T48-43 Permitting Delay - Saltstone
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- T48-45 Tank 50 Cooling (Saltstone Transfer) Inadequate
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- T48-57 Process Material Fails TCLP - Saltstone
- T48-58 Inadequate scale up from R&D - Saltstone
- T48-59 Saltstone Facility production rate less than 83K gals/week
- T48-60 Laboratory Capability - Saltstone
- T48-65 Processing Window Unavailable

The 30 Phase I risks comprised of 11 high risks, 14 moderate risks and 5 low risks. Risk handling strategies were developed for the new risks and existing RHSs updated or modified as appropriate:

Risks Reduced or Mitigated (26)  
Risks Accepted (4)

The resulting handled risks that would remain open with the potential to impact the Phase I of the project, based on the most likely impact assessed by the Team comprised of 5 high risks, 10 moderate risks and 15 low risks. Three of these high risks are programmatic and external to the project. If these risks were realized a BCP would be initiated, therefore, they were omitted from the T&PRA contingency calculation. See Table in Appendix 6.5 for a summary of results.

The residual risk levels were analyzed using Crystal Ball<sup>®</sup> software to perform a Monte Carlo analysis. Based upon the results of this analysis it was concluded that an 80% probability of project success would require a T&PRA contingency of approximately 1.23 million dollars. Appendix 6.6 documents the results of the T&PRA contingency analysis.

The 27 Phase II risks comprised of 18 high risks, 8 moderate risks and 1 low risk. Risk handling strategies were developed for the new risks and existing RHSs updated or modified as appropriate:

Risks Reduced or Mitigated (24)  
Risks Accepted (3)

The resulting handled risks that would remain open with the potential to impact Phase II of the project, based on the most likely impact assessed by the Team comprised of 5 high risks, 7 moderate risks and 15 low risks. See Table in Appendix 6.5 for a summary of results. The Phase II risks will be updated and analyzed further prior to the commencement of Phase II

## 4.0 CONCLUSIONS

As part of the ongoing project activities, risk statusing and tracking will be performed on the Tank 48 Project. RHSs will be included in the Project schedule and within the Project action item database. As new risks are identified by the Project Team they will be assessed and RHSs developed and implemented. Periodically these risks and updates to existing risks will be issued in a revision to this report. This process will continue for the life of the Project.

The Phase I risks that remain open after the application of handling strategies are comprised of 5 high risks 10 moderate risks and 15 low risks and the Phase II risks that remain open after the application of handling strategies are comprised of 5 high risks 7 moderate risks and 15 low risks.

## 5.0 REFERENCES

1. Y-RAR-G-00015, Salt Processing Program Risk, Revision 2, February 2005.
2. CBU-PIT-2004-00034, Planning Baseline for Tank 48 Aggregation to Saltstone @ 0.2 Ci/gal Cesium, Revision 0, January 12, 2005.
3. WSRC Manual E11, Conduct of Project Management and Controls, Procedure 2.62, Revision 8, February 18, 2004, Project Risk and Opportunity Analysis.

4. HLW-2002-00025, "Savannah River Site High Level Waste System Plan," Revision 13, March 2002.
5. Systems Engineering Methodology Guidance Manual, WSRC-IM-98-00033, Appendix B Risk Management, Revision 6, September 29, 2005.
6. CBU-SPT-2004-00291, CBU, LWDP, Development of a Risk Management Strategy for LWDP, Revision 0, December 2004.
7. CBU-PIT-2005-00130, Interim Processing Plan, Revision 0, June 17, 2005.

## **6.0 APPENDICES**

- 6.1 – Risk Topics
- 6.2 – Risk Probabilities
- 6.3 – Risk Consequences
- 6.4 – Risk Level Matrix
- 6.5 – Risk Summary and Assessment Forms
- 6.6 – Crystal Ball Report
- 6.7 – Risk-o-Meter

## 6.1: Risk Topics

### Design

- Undefined, Incomplete, Unclear Functions or Reqs
- Complex Design Features
- Numerous or Unclear Assumptions or Bases
- Reliability
- Inspectability
- Maintainability
- Safety Class
- Availability
- Errors and Omissions in Design

### Regulatory & Environmental

- Environmental Impact Statement Req'd. (EIS)
- Additional Releases
- Undefined Disposal Methods
- Permitting
- State Inspections
- Order Compliance
- Regulatory Oversight

### Safeguards & Security

Category I nuclear materials

- Classified process / information

### Technology

- New Technology
- Existing Technology Modified
- New Application of Existing Technology
- Unknown or Unclear Technology

### Procurement

- Procurement Strategy
- First-use Subcontractor/Vendor
- Vendor Support

### Construction Strategy

- Turnover/Start-up Strategy
- Direct Hire/Subcontract
- Construction/Maintenance Testing
- Design Change Package Issues

### Testing

- Construction
- Maintenance
- Operability
- Facility Startup
- System Startup (Subcontractor or PE&CD)

### Resource/Conditions

- Material/Equipment Availability
- Specialty Resources Required
- Existing Utilities Above and Underground
- Support Services Availability
- Geological Conditions
- Temporary Resources (Power, Lights, Water, etc.)
- Resources Not Available
- Construction Complexities
  - Transportation
  - Critical Lifts
  - Population Density
- Escorts
- Personnel Training & Qualifications
- Tools, Equipment Controls & Availability
- Experience with system/component (design, operations, maintenance)
- Work Force Logistics
  - Operations Support
  - Health Physics
  - Facility Support
  - Facility Maintenance Centralized Maintenance
  - Construction Support Post Modifications
- Training
- Research and Development Support
- Multiple Project/Facility Interface
- Facility Work Control Priorities
- Lockout Support

### Safety

- Criticality Potential
- Fire Watch
- Exposure Contamination Potential
- Authorization Basis Impact
- Hazardous Material Involved
- Emergency Preparedness
- Safeguards & Security
- Confinement Strategies

### Management

- Funding uncertainties
- Stakeholders Program Strategy Changes
- Errors and Omissions in Estimates
- Fast track/critical need
- Infrastructure influence

**Safety/ISMS**

- Established operating practices
- Established, proven operating procedures
- Requires changes to AB documents or new USQ
- Unique operating logistics required
- Additional operations personnel required
- New TSR) limits or surveillance's
- Limited access/egress
- Complex emergency/off-normal operational steps
- Equipment reliability

**Security**

- New security systems required
- New security practices required
- Additional security personnel required
- Revised MC&A requirements

**Mission**

- Affect other facility/site missions
- Interfacing with off-site organizations required
- Shipment to off-site locations required
- Operation susceptibility to external intervention

**Integration**

- Work included in division/area/facility master schedule
- Design/construction schedule conflicts
- Other site division involvement

**Waste Management**

- New waste streams generated
- New waste management practices being implemented
- Additional quantities of waste being generated

**Interfaces**

- Multiple Agencies, Contractors
- Special Work Control/Work Auth. Procedures
- Operating SSCs Including Testing
- Multiple Customers
- Co-Occupancy
- Outage Requirements
- Multiple systems
- Radiological Conditions (Current and Future)
  - Contamination
  - Radiation
- Multiple Projects
- Proximity to Safety Class Systems

**Operation**

- Non-routine and/or complex operation
- Routine operational stoppages required
- Analytical sampling required during operations

**Engineering/R&D**

- Newly deployed technology
- Transient technology, replacement component differ

**Infrastructure**

- Equipment operating beyond intended/useful life
- Support facility reliability (steam, waste, etc.)
- Spare parts availability

**Facility Capability**

- Additional capital funded/project requirements
- Modification to existing project scope

## 6.2: Risk Probabilities

<b>Probability of Occurrence</b>	<b>Criteria</b>
0.1 or less Very Unlikely	Chance of occurrence is less than or equal to 10%
0.2, 0.3, 0.4 Unlikely	Chance of occurrence is between 10% and 40%
0.5, 0.6, 0.7 Likely	Chance of occurrence is between 40% and 80%
0.8, 0.9, >0.9 Very Likely	Chance of occurrence is 80% or greater

### 6.3: Risk Consequences

Consequence of Occurrence	Criteria
0.1  (Negligible)	<p>Minimal or no consequences, unimportant.</p> <p>Some potential transfer of money, but budget estimates not exceeded, less than \$10K.</p> <p>Negligible impact on project, slight potential development schedule change (&lt; 1 week), compensated by available schedule slack.</p>
0.2, 0.3, 0.4  (Marginal)	<p>Small, acceptable, reduction in modification technical performance.</p> <p>Moderate threat to project mission, environment or people; possibly requires minor facility operations or maintenance changes, very minor rework or redesign; routine cleanup.</p> <p>Cost estimates exceed budget \$10K- less than \$50K.</p> <p>Minor slip in schedule (&lt; 1 week).</p>
0.5, 0.6, 0.7  (Significant)	<p>Significant degradation in modification/project technical performance.</p> <p>Significant threat to project mission: requires some redesign or repair, significant environmental remediation.</p> <p>Cost estimates exceed budget by \$50K - less than \$150K.</p> <p>Significant slip in schedule (1 week – 4 weeks).</p>
0.8, 0.9  (Critical)	<p>Technical goals of modification/process cannot be achieved.</p> <p>Serious threat to project; possible threat to program or requiring major facility redesign or repair, extensive environmental remediation.</p> <p>Cost estimates exceed budget by \$150K- less than \$500K.</p> <p>Excessive schedule slip (1 month – less than 3 months) possibly affecting overall program mission.</p>
> 0.9  (Crisis)	<p>Processing cannot be completed.</p> <p>Cost estimates unacceptably exceed budget, \$500K or more.</p> <p>Catastrophic threat to program (<math>\geq</math> 3 months); possibly causing loss of mission.</p>

### 6.4: Risk Level Matrix

		RISK LEVEL				
		Low	Moderate	High	High	High
P R O B A B I L I T Y	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	Low	Low	Low	Low
		Negligible	Marginal	Significant	Critical	Crisis
<b>CONSEQUENCES</b>						

### 6.5: Risk Summary and Assessment Forms

#### Phase I Project Risks

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-02	Interfaces with Other Facilities and Projects	Moderate	Likely	Significant	Reduce	<p>Keep H-Tank Farm Facility and Saltstone/ Project Owners &amp; Managers informed about project needs/progress. (T48-RHS-16)</p> <p>Prepare a plan showing NaOH additions and transfers of recycle from Type IV tanks and receive concurrence from Facility and Transfer Planning Group. (T48-RHS-17)</p>	Moderate

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-03	Lost or Spilled Sample in SRNL	Moderate	Unlikely	Significant	Reduce	<p>Develop Sample &amp; Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans. (T48-RHS-44)</p> <p>SRNL to implement corrective action to improve sample storage and management. (T48-RHS-31) - COMPLETE</p>	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-04	Laboratory Capability - Tank Farm	Moderate	Likely	Significant	Mitigate	Develop Sample & Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans. (T48-RHS-44)	Moderate

Risk Number	Risk Title	Risk			Risk Handling Strategy		Project Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-05	Accessibility to Perform Work	Moderate	Likely	Significant	Reduce	<p>Coordinate work with operations and other projects through participation in facility Work Window Lock-ins, 8 Week Lookaheads (T8s), and Plan of the Days (PODs). (T48-RHS-01)</p> <p>Add development of lift plan and crane placement plan to schedule, which would include determining and obtaining the proper size crane. When activities are locked in, ensure critical resources (i.e. rigging, radcon, IH, etc.) are onboard and ready to support. (T48-RHS-02)</p>	Low
T48-06	Field materials are not available	Low	V. Unlikely	Marginal	Reduce	<p>Quantify / track material. Expedite procurements when feasible. (T48-RHS-03)</p>	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-09	Availability of Construction Equipment	Low	V. Unlikely	Significant	Accept	N/A	Low
T48-10	Readiness Assessment More Than a WSRC RA	Moderate	V. Unlikely	Critical	Reduce	Early development and input to the Startup Notification Report (SNR). Obtain appropriate buy-in from DOE prior to submittal. (T48-RHS-32)	Low
T48-11	Readiness Assessment Findings	Low	V. Unlikely	Marginal	Mitigate	Project Team develop and perform detailed management checklist prior to beginning RA. (T48-RHS-33)	Low
T48-12	Support Services Availability	Moderate	Likely	Significant	Reduce	Forecast resources and stick to plan. (T48-RHS-14)  Integrate project activities into facility schedule. (T48-RHS-15)	Moderate
T48-14	Loss of Utilities	Moderate	Unlikely	Significant	Accept	N/A	Moderate
T48-15	Unsafe Conditions Discovered at Turnover	Moderate	Likely	Significant	Mitigate/Reduce	Ensure Safety/IH Engineer included in design reviews. (T48-RHS-40)	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-16	Equipment Failure (Recycle Transfers)	Moderate	Unlikely	Significant	Accept	N/A	Low
T48-17	Tie-ins to Existing Facility	Moderate	Unlikely	Significant	Mitigate/Reduce	Design Services will perform early walk downs and validate existing conditions/equipment. (T48-RHS-11)	Low
T48-18	Cooling Coils Fail Test	Low	V. Unlikely	Significant	Mitigate	Perform heat balance to determine requirements. (T48-RHS-62)	Low
T48-19	Existing equipment cannot meet seismic qualification requirements	Moderate	Likely	Significant	Reduce/Mitigate	Design Services will perform early walk downs and validate existing conditions/equipment. (T48-RHS-11)	Low
T48-21	Modifications are determined to be required for the Transfer line/LPDT and Tank 48 to 50.	Low	V. Unlikely	Significant	Mitigate	Complete Safety Basis development and SIRC approval as early as possible. (T48-RHS-09)	Low
T48-25	Equipment Fails Surveillance	Moderate	Unlikely	Significant	Reduce	Identify attributes in AB requiring testing before design is complete. (T48-RHS-37)	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-26	Safety Basis Impacts Design -Tank Farm	High	Unlikely	Crisis	Reduce/ Mitigate	<p>Complete Safety Basis development and SIRC approval as early as possible. (T48-RHS-09)</p> <p>Develop R&amp;D Plan to ensure sufficient supporting data has been developed to support safety approach. (T48-RHS-10)</p> <p>Resolve SIL Impact (T48-RHS-60)</p>	High
T48-27	Safety Basis Strategy not Accepted By DOE	Moderate	Likely	Significant	Reduce	<p>Ensure formal/informal DOE involvement during SBS development and prior to WSRC request for approval to avoid final minute surprises. DOE is also represented in SIRC approval. (T48-RHS-30)</p>	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Project Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-36	Benzene Generation Rate - Tank Farm (Safety Basis)	High	V. Unlikely	Crisis	Mitigate	<p>PIT to define a chemical qualification program to be put into place to ensure minimal benzene generation. (T48-RHS-22)</p> <p>Perform chemical testing program that includes early testing of materials that will potentially cause an increase in benzene generation - DWPF recycle, HEU, ETP. (T48-RHS-23)</p>	Moderate
T48-50	TPB Decomposition Temperature – Saltstone (Safety Basis)	High	Likely	Crisis	Reduce	<p>Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28)</p> <p>Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63)</p>	High

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-51	Benzene Released in Saltstone (Safety Basis)	High	Likely	Crisis	Mitigate	Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28)  Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63)	High
T48-62	ARP Equip. Instal. Interferes With Installation of Above Ground Transfer Line	Moderate	Likely	Significant	Reduce	Monitor ARP schedule implementation and schedule Tank 48 activities to minimize any impact. (T48-RHS-61)	Moderate
T48-63	Fast-Track Schedule Requires Rework	High	Likely	Critical	Accept	N/A	Moderate
T48-64	Tank 50 Equipment Installation Impacted by Ongoing Transfers	High	Likely	Critical	Mitigate	Monitor other project schedule implementation and schedule Tank 48 activities to minimize any impact. (T48-RHS-64)	Moderate

**Phase II Project Risks**

Risk Number	Risk Title	Risk			Risk Handling Strategy		Project Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-20	Tank 48 Transfer Pump Fails Tests During Startup Testing	High	Likely	Critical	Reduce/Mitigate	Develop a plan for functional check of 48 to 50 transfer pump early in the project. (T48-RHS-38)  Develop a strategy to identify pump on site that is comparable and not in use. (T48-RHS-39)	Moderate
T48-28	Insufficient recycle available for aggregation	Moderate	Unlikely	Significant	Accept	N/A	Low
T48-29	Chemical Spills (Caustic)	Low	Likely	Marginal	Accept	N/A	Low
T48-31	Decomposition Products Generated By Additions to Tank	High	V. Unlikely	Crisis	Mitigate	PIT to define a chemical qualification program to be put into place to ensure minimal benzene generation. (T48-RHS-22)	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projecte d Residual Risk Level
		Risk Level	Probabilit y	Consequenc e	Approac h	Description	
T48-32	Analytical Detection Limit	High	Likely	Critical	Mitigate	<p>Develop TPB Residual Strategy (TPB measurement / material balance) and obtain SIRC approval. (T48-RHS-34)</p> <p>Develop Sample &amp; Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans. (T48-RHS-44)</p>	Moderate
T48-34	Inadequate Suspension of Material	High	Unlikely	Crisis	Mitigate	<p>PIT to perform a Mixing Study on Tank 50H. (T48-RHS-20)</p>	Moderate

Risk Number	Risk Title	Risk			Risk Handling Strategy		Project Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-35	Increased Sampling and Analysis	Moderate	Unlikely	Critical	Mitigate	Develop definitive sample plan in support of disposition. (T48-RHS-21)	Moderate
T48-37	Inability to Meet End State	High	V. Unlikely	Crisis	Mitigate	Develop TPB Residual Strategy (TPB measurement / material balance) and obtain SIRC approval. (T48-RHS-34)  Develop new end state criteria that allows some solids to remain behind (residual limit). (T48-RHS-07)	Low
T48-40	Tank Film Cannot be Removed	High	Unlikely	Crisis	Mitigate	Develop new end state criteria that allows some solids to remain behind (residual limit). (T48-RHS-07)  Evaluate rinsing effectiveness early. (T48-RHS-08)	Moderate

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-42	Transfer Pump Suction or Discharge Line Plugs	Moderate	Unlikely	Significant	Reduce/Mitigate	Test and verify that existing flushing capabilities for transfer pump and transfer line are operational. (T48-RHS-56)	Low
T48-44	Inadequate Tank Space	Moderate	V. Unlikely	Critical	Reduce/Mitigate	Perform calculations before transfer to ensure below the Saltstone limits on all constituents. (T48-RHS-27)	Low
T48-47	Tank 50 residual TPB level	High	Likely	Crisis	Mitigate	Develop TPB Residual Strategy (TPB measurement / material balance) and obtain SIRC approval. (T48-RHS-34)  Develop end state criteria that allows some solids to remain behind. (T48-RHS-07)	Low
T48-48	Saltstone Na limit (1M) cannot be met	Moderate	V. Unlikely	Critical	Mitigate	Perform grout studies using one molar sodium. (T48-RHS-36)	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projecte d Residual Risk Level
		Risk Level	Probabilit y	Consequenc e	Approac h	Description	
T48-49	Effect of Raw Material Impurities - Saltstone	Moderat e	Unlikely	Critical	Reduce/ Mitigate	Conduct testing to examine interaction of Tank 48H with impurities in Saltstone premix. (T48-RHS-42) - COMPLETE	Low
T48-55	Greater Than Assumed Number of Analyzed Samples Required - Saltstone	Moderat e	Likely	Significant	Reduce/ Mitigate	Develop definitive sample plan in support of disposition. (T48-RHS-21)	Moderate
T48-56	Saltstone Facility Benzene Generation Requires Equipment Modification at Saltstone	High	V. Likely	Crisis	Mitigate	If evaluations show increased benzene generation, implement modifications. (T48-RHS-54)  Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28)  Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63)	High

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projecte d Residual Risk Level
		Risk Level	Probabilit y	Consequenc e	Approac h	Description	
T48-57	Process Material Fails TCLP - Saltstone	High	V. Unlikely	Crisis	Mitigate	Perform a test similar to TCLP early in project. (T48-RHS-48) - COMPLETE  Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28)	High
T48-58	Inadequate scale up from R&D - Saltstone	High	V. Unlikely	Crisis	Mitigate	Compare effect of grout test sample geometry on benzene release rates during TPB tests. (T48-RHS-47)	High
T48-59	Saltstone Facility production rate less than 83K gals/week	High	V. Unlikely	Crisis	Mitigate	Evaluate production rate and investigate the option of using different vaults (T48-RHS-59)  Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63)	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-60	Laboratory Capability - Saltstone	Moderate	V. Likely	Marginal	Reduce/Mitigate	<p>Develop definitive sample plan in support of disposition. (T48-RHS-21)</p> <p>Perform testing with grout at various TPB concentrations and curing temperatures. (T48-RHS-28)</p> <p>Develop Sample &amp; Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including ID of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans. (T48-RHS-44)</p>	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projecte d Residual Risk Level
		Risk Level	Probabilit y	Consequenc e	Approac h	Description	
T48-65	Processing Window Unavailable - NEW RISK	High	V. Likely	Crisis	Mitigate	Identify and develop methods of operating MCU and Tank 48 concurrently with Tank 50 as a shared receipt tank. (T48-RHS-65)  Identify alternative methods to disposition Tank 48. (T48-RHS-66)	High

**Risks External to T&PRA Contingency Analysis**

Risk Number	Risk Title	Risk			Risk Handling Strategy		Project Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-01	Funding Availability	High	Likely	Crisis	Reduce/Mitigate	Keep Senior Management informed about project needs/progress. (T48-RHS-12)  Ensure required funding is approved and if funding becomes unavailable, effect a baseline change proposal to project. (T48-RHS-13)	Moderate
T48-08	Requirements for Construction Change	High	V. Unlikely	Crisis	Mitigate	Ensure estimate is conservative. Have estimating perform contingency analysis and SE to perform T&PRA analysis to ensure contingency is quantified to provide at least an 80% confidence of project under run. (T48-RHS-05)	Low

Risk Number	Risk Title	Risk			Risk Handling Strategy		Project Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-13	Tank 48 Equipment Failure	High	Likely	Critical	Mitigate/Reduce	Maintain critical spares. Design Authority will specify spare parts and Project Manager will determine plan. (T48-RHS-25)	Low
T48-22	Stakeholder Participation	High	Likely	Crisis	Reduce/Mitigate	Develop communication plan for involving stakeholders. (T48-RHS-18)  Keep Stakeholders/Senior Management informed of R&D results. (T48-RHS-19)	Moderate
T48-23	Regulatory Concerns (3116 implementation)	High	V. Unlikely	Crisis	Reduce	PIT Team to pursue 3116 WD process, actively engaging DOE, NRC and stakeholders. (T48-RHS-49)	High
T48-24	Regulatory Concerns (Class C permit not granted)	High	V. Unlikely	Crisis	Reduce	PIT Team to pursue NRC Class C permit, actively engaging NRC and stakeholders. (T48-RHS-50)	High

Risk Number	Risk Title	Risk			Risk Handling Strategy		Projected Residual Risk Level
		Risk Level	Probability	Consequence	Approach	Description	
T48-41	Equipment Failure (Tank 50)	High	Likely	Critical	Reduce/Mitigate	Maintain critical spares. Design Authority will specify spare parts and Project Manager will determine plan. (T48-RHS-25)	Low
T48-43	Permitting Delay - Saltstone	High	Likely	Crisis	Mitigate	Perform R&D and NESHAPS evaluation early before execution of the project. (T48-RHS-45)	Low
T48-45	Tank 50 Cooling (Saltstone Transfer) Inadequate	High	V. Unlikely	Crisis	Accept	N/A	Low
T48-46	Saltstone 0.2 Ci/gal Cs Modifications Not Ready in Time to Support Strategy	High	V. Unlikely	Crisis	Mitigate	Proceed with an integrated schedule upon decision to implement aggregation project. (T48-RHS-51)	Moderate
T48-54	Volume of Grout is Unacceptable	High	Unlikely	Crisis	Reduce	Determine the grout volume based on aggregation to meet the governing limit. (T48-RHS-52)	High

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.0 Project Execution  
 00-T48-01 **Title:** Funding Availability

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: Project must be adequately funded.  
 Event: Funding falls short of need.  
 Risk: Project is delayed

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Funding short falls occur with regularity.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_  
 Schedule delay.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 6 Mo(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce /Mitigate	Keep Senior Management informed about project needs/progress. (T48-RHS-12) (Responsible for execution: Owner - Renee Spires)	U	C	M	0	0	
	Ensure required funding is approved and if funding becomes unavailable, effect a baseline change proposal to project. (T48-RHS-13) (Responsible for execution: PM - Pen Mayson)				0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 1 Mo(s) 6 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Residual risk is the additional time required to complete the project and will not be included in T&PRA contingency calculation, as if realized the project will have to be re-baselined through the change control process.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.0 Project Execution  
 00-T48-02 **Title:** Interfaces with Other Facilities and Projects

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: This project will interact with other facilities and projects  
 Event: Priorities conflict  
 Risk: Project is delayed

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Projects and facilities that interact with this project are subject to conflicting priorities  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_  
 Cost increases and schedule delays  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Keep H-Tank Farm Facility and Saltstone/Project Owners & Managers informed about project needs/progress (T48-RHS-16) (Responsible for execution: Owner - Renee Spires)	U	S	M	0	0	
	Prepare a plan showing NaOH additions and transfers of recycle from Type IV tanks and receive concurrence from Facility and Transfer Planning Group (T48-RHS-17) (Responsible for execution: Owner - Renee Spires)				\$3K	1 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$50,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

The aggregation plan requires the addition of about 100 Kgal of NaOH and 3.4 Mgal of recycle added to Tanks 48 and 50 in a very congested East Hill.

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**Risk & Opportunity Assessment Form**

Identification No.: Assessed Element: 1.0 Project Execution  
00-T48-03 Title: Lost or Spilled Sample in SRNL

KASE#: \_\_\_\_\_ Category (Optional): \_\_\_\_\_  
 Risk/Opportunity Type: \_\_\_\_\_ BDER Level: \_\_\_\_\_

Date: \_\_\_\_\_ Responsibility: \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: R&D efforts require sample material  
 Event: SRNL spills or loses sample  
 Risk: R&D process takes more time.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Sample spills are a rare event, with a typical frequency of less than one event per year.

Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 More tank samples would need to be pulled.

Worst Case Cost Impact: \$125K Worst Case Schedule Impact: 4 Wk(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Develop Sample & Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans (T48-RHS-44) (Responsible for execution: SRNL - Bill Wilmarth)  SRNL to implement corrective action to improve sample storage and management. (T48-RHS-31) (Responsible for execution: Mike Swain) - COMPLETE	VU	S	L	\$10K	2 Wk	
					0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$10,000 \$125,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/16/05 - T48-RHS-44 and 31 have been completed, revised title to "Lost or spilled sample in SRNL."

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**Risk & Opportunity Assessment Form**

Identification No.: Assessed Element: 1.0 Project Execution  
00-T48-04 Title: Laboratory Capability - Tank Farm

KASE#: \_\_\_\_\_ Category (Optional): \_\_\_\_\_  
 Risk/Opportunity Type: \_\_\_\_\_ BDER Level: \_\_\_\_\_

Date: \_\_\_\_\_ Responsibility: \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Process samples must be analyzed.  
 Event: Rate of return of analytical results is slow ed.  
 Risk: Timing and progress of sample results is delayed.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Parallel site (and LVWD) projects may place competing demands on SRNL Analytical Staff. Key equipment is unique and seldom used. Potential for equipment failure or competing resource needs high.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Process is disrupted and delays in sample results occur.

Worst Case Cost Impact: \$125K Worst Case Schedule Impact: 4 Wk(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Develop Sample & Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans (T48-RHS-44) (Responsible for execution: SRNL - Bill Wilmarth)	L	S	M	\$10K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$70,000 \$125,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Expect some delays during entire schedule with number of samples needed.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.01 Design/Install New Equipment  
 00-T48-05 **Title:** Accessibility to Perform Work

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Construction work is required at or around Tank 48.  
 Event: Congestion / Collocation of work impacts accessibility to area on or around Tank 48 and/or Operations planned activities.  
 Risk: Scheduled construction activities impacted.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Tank 48 has one of the most congested tank tops at SRS. If not closely coordinated construction and operations activities will interfere with each other.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay due to inability to perform work on Tank 48 area.  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Coordinate work with operations and other projects through participation in facility Work Window Lock-ins, 8 Week Lookaheads (T8s), and Plan of the Days (PODs). (T48-RHS-01) (Responsible for execution: Owner - Renee Spires)	VU	S	L	0	0	
					\$6K	2wk	

F. Residual Risk Impact: Cost Consequence:  $\frac{\$0}{0}$   $\frac{\$0}{2 \text{ Wk(s)}}$   $\frac{\$100,000}{4 \text{ Wk(s)}}$  Distribution Selection: Best Most Likely Worst

G. Description of Residual Risk: Minor schedule conflicts

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 1/20/06 - Deleted T48-RHS-02

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.01 Design/Install New Equipment  
00-T48-06 **Title:** Field materials are not available

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Materials are required for Tank 48 Project construction activities.  
 Event: Materials are not available when required.  
 Risk: Work unable to proceed.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 The materials required for Tank 48 construction are not unique at SRS or within the commercial world.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay due to unavailability of material.  
 Worst Case Cost Impact: \$25K Worst Case Schedule Impact: 1 Wk(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Quantify / track material. Expedite procurements when feasible. (T48-RHS-03) (Responsible for execution: PM - Pen Mayson)	VU	N	L	0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 0 1 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Minor delays

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.01 Design/Install New Equipment  
 00-T48-08 **Title:** Requirements for Construction Change

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Conceptual design begins with a given set of requirements.  
 Event: Requirements change.  
 Risk: Scope increases.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Typically Codes and Standards are relatively stable, however they can change.

Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Scope growth (extra stiffeners, missile shields, etc.) increases cost and delays schedule for redesign.

Worst Case Cost Impact: \$400K Worst Case Schedule Impact: 12 Wk(s)

Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Ensure estimate is conservative. Have estimating perform contingency analysis and SE to perform T&PRA analysis to ensure contingency is quantified to provide at least an 80% confidence of project under run. (T48-RHS-05) (Responsible for execution: PM - Troy Donahue) - COMPLETE	VU	N	L	\$9600	10 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$200,000 Distribution Selection:  
 Schedule Consequence: 0 0 6 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - T48-RHS-05 has been completed.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.01 Design/Install New Equipment  
 00-T48-09 **Title:** Availability of Construction Equipment

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Construction equipment (e.g. cranes, JLGs, Breathing Air Compressors) is needed to complete work.  
 Event: Equipment is not available when needed.  
 Risk: Construction activities are slowed or stopped.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 This project is a high profile, accelerated project, which should increase priority for access to equipment.  
 Noncredible ( $P < 0.15$ )  Very Unlikely (VU) ( $.15 \leq P < 0.45$ )  Unlikely (U) ( $.45 \leq P < 0.75$ )  Likely (L) ( $.75 \leq P < 0.9$ )  Very Likely (VL) ( $P \geq .75$ )

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay and loss of productivity due to availability of equipment.  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible(N) ( $C < 0.15$ )  Marginal(M) ( $.15 \leq C < 0.45$ )  Significant(S) ( $.45 \leq C < 0.75$ )  Critical(C) ( $.75 \leq C \leq 0.9$ )  Crisis(Cr) ( $C > 0.9$ )

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Accept		VU	S	L	\$6K	2 wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 1/20/06 - Deleted T48-RHS-02

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.01 Design/Install New Equipment  
 00-T48-10 **Title:** Readiness Assessment More Than a WSRC RA

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: (State Event and Risk/Opportunity) \_\_\_\_\_  
 Basis: Process has to be proven ready to operate  
 Event: ORR is required in addition to Management Checklist/Readiness Assessment  
 Risk: Start up is delayed.

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Readiness requirements have been investigated.

- Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_  
 Additional assessment time will be needed, schedule and cost impact

Worst Case Cost Impact: \$200K Worst Case Schedule Impact: 2 Mo(s)

- Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Early development and input to the Startup Notification Report (SNR). Obtain appropriate buy-in from DOE prior to submittal. (T48-RHS-32) (Responsible for execution: Owner - Renee Spires)	VU	S	L	0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$200,000 Distribution Selection:  
 Schedule Consequence: 0 3 Wk(s) 2 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Most likely is DOE oversight of WSRC RA.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.01 Design/Install New Equipment  
 00-T48-11 **Title:** Readiness Assessment Findings

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Process has to be proved ready to operate  
 Event: Process is found to be not ready by Readiness Assessment  
 Risk: Project is delayed while concerns are resolved.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Readiness requirements have been investigated.

- Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Additional time to resolve findings will be needed, schedule and cost impact

Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)

- Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Project Team develop and perform detailed management checklist prior to beginning RA. (T48-RHS-33) (Responsible for execution: Owner - Renee Spires)	VU	N	L	\$6K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$50,000 Distribution Selection:  
 Schedule Consequence: 0 0 2 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-12 **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
**Title:** Support Services Availability

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Project requires support from other organizations  
 Event: Support is not available in a timely way.  
 Risk: Project is delayed

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Organizations that support this project are subject to conflicting priorities  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Cost increases and schedule delays  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible(N) (C < 0.15)  Marginal(M) (0.15 ≤ C < 0.45)  Significant(S) (0.45 ≤ C < 0.75)  Critical(C) (0.75 ≤ C ≤ 0.9)  Crisis(Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

**E. Handling:**

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Forecast resources and stick to plan. (T48-RHS-14) (Responsible for execution: PM - Pen Mayson)	U	S	M	0	0	
	Integrate project activities into facility schedule (T48-RHS-15) (Responsible for execution: Owner - Renee Spires)				0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$50,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-13 **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
**Title:** Tank 48 Equipment Failure

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Process employs a variety of equipment  
 Event: Equipment fails in normal service.  
 Risk: Process stops while equipment is repaired

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Equipment failure in normal service must be expected.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Process is halted  
 Schedule delay  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 1 Mo(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C < 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Reduce/Mitigate	Maintain critical spares. Design Authority will specify spare parts and Project Manager will determine plan. (T48-RHS-25) (Responsible for execution: PM - Pen Mayson)	U	N	L	\$3K	1 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 0 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Failures will occur, but spare parts and forward planning will mitigate the impact

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/17/05 - Removed cost impact as H-Area Tank Farm will fund any equipment repair during operations. Impact to project is limited to schedule only.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
 00-T48-14 **Title:** Loss of Utilities

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Process requires utilities (e.g. power, CRW)  
 Event: Utilities fail  
 Risk: Process stops until utilities can be restored

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Tank farm has a history of failure of utilities. This project plans to work with H-Tank Farm Facility to return systems to service.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay and cost impact  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Accept		U	S	M			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 1 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Worse case would be to provide temporary power to pumps, fans and instruments. Do not believe this would ever be necessary.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 Risk reduced from in-situ processing since steam is not required.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
 00-T48-15 **Title:** **Unsafe Conditions Discovered at Turnover**

KASE#: **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Process requires a safety (SMI 51) walk down before start up.  
 Event: Unsafe conditions are discovered during walk down.  
 Risk: Delay while remedial action is taken.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Safety walk downs typically turn up conditions that must be corrected.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Additional cost, schedule impact to perform minor modifications, rework and procedure changes  
 Worst Case Cost Impact: \$50K Worst Case Schedule Impact: 2 Wk(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate/Reduce	Ensure Safety/IH Engineer included in design reviews (T48-RHS-40) (Responsible for execution: DS - Lee Carey)	U	M	L	0	0	

F. Residual Risk Impact: Cost Consequence:  $\frac{0}{\text{Best}}$   $\frac{0}{\text{Most Likely}}$   $\frac{\$25,000}{\text{Worst}}$  Distribution Selection:  $\frac{1 \text{ Wk(s)}}{\text{Worst}}$   
 Schedule Consequence: \_\_\_\_\_

G. Description of Residual Risk:  
 H. Triggers:  
 I. Affected Work Scope:  
 J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
 00-T48-16 **Title:** Equipment Failure (Recycle Transfers)

KASE#: **Category (Optional):**

**Risk/Opportunity Type:** **BDER Level:**

Date: **Responsibility:**

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Equipment operability (Pumps, VFDs, Seals etc.) is necessary for process  
 Event: Transfer pump, pump seals or other critical components fail  
 Risk: Processing not possible until repair or replacement

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Based on historical transfer pump performance.  
 Noncredible (P < 0.15)  Very Unlikely (VU)  Unlikely (U) (.15 ≤ P < 0.45)  Likely (L) (.45 ≤ P < 0.75)  Very Likely (VL) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Worst case will be a prime mover fails in the Recycle Feed Tank  
 Worst Case Cost Impact: \$50K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (.15 ≤ C < 0.45)  Significant (S) (.45 ≤ C < 0.75)  Critical (C) (.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Accept		U	N	L			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$50,000 Distribution Selection:  
 Schedule Consequence: 0 0 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 A transfer pump failure is not considered as likely and this risk will be accepted

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.02 Ensure Operability of Existing Equipment  
00-T48-17 **Title:** Tie-ins to Existing Facility

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Modifications tie into existing systems and components  
 Event: Existing components are faulty (e.g. corroded, do not operate as expected).  
 Risk: Existing facility has to be modified/repared to permit tie-ins.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Existing facility is aging and has recently suffered from less than adequate maintenance funding  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Scope Growth (Upgrades to existing pumps, piping, equipment, etc.)  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate/Reduce	Design Services will perform early walk downs and validate existing conditions/equipment. (T48-RHS-11) (Responsible for execution: DS - Pierre Gauthier)	VU	S	L	\$6K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: \_\_\_\_\_

H. Triggers: \_\_\_\_\_

I. Affected Work Scope: \_\_\_\_\_

J. Additional Comments (optional): \_\_\_\_\_

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-18 **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
**Title:** Cooling Coils Fail Test

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Maintain tank contents below DSA temp. limit to minimize benzene generation from aggregation process  
 Event: Existing cooling coils in both T48 and T50 are used for heat removal to maintain contents below DSA temp.  
 Risk: Cooling coils fail the performance test, heat removal is impacted.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
Cooling coils have been in service for many years however, design uses many loops allowing isolation of failed loops and continued use of operable loops. Corrosion control and in-service testing will be performed as part of the current program.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
Likely to very likely that a single loop may fail, but that loop can be valved out with minimal impact.  
 Worst Case Cost Impact: \$50K Worst Case Schedule Impact: 2 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C < 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Perform heat balance study to determine requirements. (T48-RHS-62) (Responsible for Execution: DA - Dennis Conrad) - Complete	VU	N	L			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$50,000 Distribution Selection:  
 Schedule Consequence: 0 0 2 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
UPDATED 1/20/06 - T48-RHS-62 Complete

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.02 Ensure Operability of Existing Equipment  
 00-T48-19 **Title:** Existing equipment cannot meet seismic qualification requirements

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: Equipment must be seismically qualified.  
 Event: Existing equipment cannot meet seismic qualification requirements  
 Risk: Equipment must be upgraded or replaced.

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Existing calculations indicate some equipment is not seismically qualified.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_  
 Schedule delay and cost increases for replacement of existing equipment (Worst case scenario)  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C < 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate/Reduce	Design Services will perform early walk downs and validate existing conditions/equipment. (T48-RHS-11) (Responsible for execution: DS - Pierre Gauthier)	VU	S	L	\$6K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 0 Wk(s) 3 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Some rework and redesign will be required

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-20 **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
**Title:** Tank 48 Transfer Pump Fails Tests During Startup Testing

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Equipment is tested before start up.  
 Event: Equipment fails tests.  
 Risk: Delay; equipment must be repaired or modified, or additional equipment must be designed, procured, installed and tested.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Worst case assumes failure of existing T48 to T50 transfer pump. Installed for many years without use.

Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay and cost impact

Worst Case Cost Impact: \$400K Worst Case Schedule Impact: 12 Wk(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

**E. Handling:**

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate/Reduce	Develop a plan for functional check of 48 to 50 transfer pump early in the project. (T48-RHS-38) (Responsible for execution: DA - Dennis Conrad) - COMPLETE	VU	C	M	\$6K	2 Wk	
	Develop a strategy to identify pump on site that is comparable and not in use. (T48-RHS-39) (Responsible for execution: DA - Dennis Conrad)				\$3K	1 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$250,000 \$400,000 Distribution Selection:  
 Schedule Consequence: 0 6 Wk(s) 12 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Identifying spare pump and being ready to change out will significantly reduce risk.

H. Triggers: \_\_\_\_\_

I. Affected Work Scope: \_\_\_\_\_

J. Additional Comments (optional):  
 UPDATED 6/29/05 - Risk Re-opened - Pump testing was not considered "startup testing."  
 UPDATED 6/2/05 - Risk Closed - Testing successfully completed.  
 UPDATED 5/20/05 - T48-RHS-38 completed.

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-21 **Assessed Element:** 1.02 Ensure Operability of Existing Equipment  
**Title:** Modifications are determined to be required for the Transfer line/LPDT and T48 to 50.

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: T50 to Saltstone transfer lines are required for processing aggregated batch to Saltstone  
 Event: Analysis finds lines not adequate to handle safety concerns from high organic TFB conc. in batches  
 Risk: Requires modifications to transfer lines to mitigate safety concerns

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Transfer lines are not evaluated to handle batches with high (ca. 3,000 mg/L) organic TFB. Modifications for Tank 50 to saltstone are being handled as Min Gate activities.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_  
 Scope growth

Worst Case Cost Impact: \$100 K Worst Case Schedule Impact: 4 Wk(s)

Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Complete Safety Basis development and SIRC approval as early as possible. (T48-RHS-09) (Responsible for execution: DA - Dennis Conrad)	VU	S	L	\$12K	4 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 0 0  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.03 Meet Regulatory Requirements  
 00-T48-22 **Title:** Stakeholder Participation

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Project will fall under the scrutiny of various stakeholders  
 Event: Stakeholders (DNFSB, DOE, Regulatory, etc.) do not accept R&D results  
 Risk: Project will be delayed while resolving stakeholder concerns.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Stakeholders are eager to offer their input.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Delay in authorization to proceed, schedule impact while Stakeholder concerns are being resolved.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 6 Mo(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce/Mitigate	Develop communication plan for involving stakeholders (T48-RHS-18) (Responsible for execution: Project Owner - Renee Spires)	U	C	M	\$6K	2 Wk	
	Keep Stakeholders/Senior Management informed of R&D results. (T48-RHS-19) (Responsible for execution: Project Owner - Renee Spires)				0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 2 Mo(s) 6 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

UPDATED 8/17/05 - Limited consequences to schedule impacts only.  
 Saltstone, DOE, DNFSB, CAB, SCDHEC and H Disposition and Saltstone are likely to provide input or require information that could impact the schedule and divert resources.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.03 Meet Regulatory Requirements  
 00-T48-23 **Title:** Regulatory Concerns (3116 implementation)

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: A waste determination is required to allow the disposal of Tank 48H contents in Saltstone  
 Event: waste determination is not received in time frame or is never received at all  
 Risk: Project abandoned

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Based upon the PIT Team activities and feedback to date, rejection of the 3116WD for salt processing is considered very unlikely.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely(VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Worst case, the determination is not approved and processing strategy cannot be implemented as planned. This would require that the Salt Strategy be reworked to develop a different path forward.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 1 Yr(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk		Implementation		Tracking# (Optional)
		Prob	Cons	Cost	Schedule	
Reduce	PIT Team to pursue 3116 WD process, actively engaging DOE, NRC and stakeholders (T48-RHS-49) (Responsible for execution: PIT - Steve Thomas)	VU	Cr	H	0	0

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 6 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk: See J below

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 If the worst case impact of this risk is realized the tank 48 Project (as currently scoped) could not be implemented and the Salt Strategy would be reworked to develop a different strategy as a path forward. The most likely case would be a serious delay to the project occurring during the final stages of 3116 approval. The best case would be that the PIT strategy of working closely with DOE, NRC and stakeholders results in no delay to the project. The Tank 48 Project will track this risk and monitor the risk handling strategy execution (identified above) as the 3116 WD is developed and reviewed. The resolution of risks associated with regulatory activities was also identified and assigned to the PIT Team in the SPP Program Risk Assessment (Y-RAR-G-00015, Revision 2).

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**Risk & Opportunity Assessment Form**

Identification No.: Assessed Element: 1.03 Meet Regulatory Requirements

00-T48-24

Title: Regulatory Concerns (Class C permit not granted)

KASE #: Category (Optional):

Risk/Opportunity Type: BDER Level:

Date: Responsibility:

A. Statement of Event: *(State Event and Risk/Opportunity)*

Basis: An NRC Class C permit will be required for the disposal of blended Tank 48 contents in Saltstone  
 Event: A Class C permit cannot be obtained  
 Risk: Project is abandoned

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_

Based upon the PIT Team activities and feedback to date, rejection of the 3116WD for salt processing is considered very unlikely.

Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_

Worst case, the determination is not approved and processing strategy cannot be implemented as planned. This would require that the Salt Strategy be reworked to develop a different path forward.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 1 Yr(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk		Implementation		Tracking# (Optional)
		Prob	Cons. Risk	Cost	Schedule	
Reduce	PIT Team to pursue NRC Class C permit, actively engaging NRC and stakeholders (T48-RHS-50) (Responsible for execution: PIT - Steve Thomas/ Ross Fanning)	VU	Cr H	0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 6 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk: See J below

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

If the worst case impact of this risk is realized the tank 48 Project (as currently scoped) could not be implemented and the Salt Strategy would be reworked to develop a different strategy as a path forward. The most likely case would be a serious delay to the project occurring during the final stages of 3116 approval. The best case would be that the PIT strategy of working closely with NRC and stakeholders results in no delay to the project. The Tank 48 Project will track this risk and monitor the risk handling strategy execution as identified above. The resolution of risks associated with regulatory activities was also identified and assigned to the PIT Team in the SPP Program Risk Assessment (Y-RAR-G-00015, Revision 2).

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-25 **Assessed Element:** 1.04 Meet Safety Requirements  
**Title:** Equipment Fails Surveillance

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Equipment must demonstrate ability to pass required surveillances to satisfy Authorization Basis  
 Event: Equipment fails surveillance (incapable of passing surveillance as written)  
 Risk: Equipment unable to operate as required by Authorization Basis

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 This event is intended to capture the risk that equipment can not perform as credited in the Authorization Basis (i.e., AB says that a component is capable of performing some function, and surveillance testing can not demonstrate this function) Simple equipment failure is addressed in other risk statements.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Either new equipment must be installed which can perform as required (redesign), or the AB must be revised to match the capability of the installed equipment.  
 Worst Case Cost Impact: \$140K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Reduce	Identify attributes in AB requiring testing before design is complete. (T48-RHS-37) (Responsible for execution: DA - Dennis Conrad)	VU	N	L	0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$140,000 Distribution Selection:  
 Schedule Consequence: 0 0 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.04 Meet Safety Requirements  
 00-T48-26 **Title:** Safety Basis Impacts Design -Tank Farm

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: Design must conform to the Safety Basis  
 Event: In order to comply with the Safety Basis, design has to be modified  
 Risk: Design will have to be redone.

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Safety Basis changes between conceptual design and Title II can impact scope.

Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_

Delay and cost of redesign, potential the worst case would be to install a nitrogen system on Tank 50 and associated safety instrumentation and controls and use of nitrogen on Tank 48.

Worst Case Cost Impact: \$1M Worst Case Schedule Impact: 9 Mo(s)

Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate/Reduce	Complete Safety Basis development and SIRC approval as early as possible. (T48-RHS-09) (Responsible for execution: DA - Dennis Conrad)	VU	Cr	H	\$12K	4 Wk	
	Develop R&D Plan to ensure sufficient supporting data has been developed to support safety approach. (T48-RHS-10) (Responsible for execution: PIT - Larry Romanowski) - COMPLETE				\$12K	4 Wk	
	Resolve SIL Impact (T48-RHS-60) (Responsible for execution: DA - Dennis Conrad)						

F. Residual Risk Impact: Cost Consequence: \$0 \$750,000 \$1,000,000 Distribution Selection:  
 Schedule Consequence: 0 6 Mo(s) 9 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - T48-RHS-10 has been completed.  
 UPDATED 8/17/05 - Revised cost impacts.  
 UPDATED 8/2/05 - Added T48-RHS-60.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.04 Meet Safety Requirements  
00-T48-27 **Title:** Safety Basis Strategy not Accepted By DOE

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Tank 48 Dis position Safety Basis is required to be approved by DOE for implementation  
 Event: DOE does not accept the Safety Basis  
 Risk: The Safety Basis will have to be modified or redone to DOE's acceptance requirements

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 DOE may find that Safety Basis as written will not support appropriate development of required safety documents and related analysis for safe disposition of organic inventory in tank 48  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay  
 Worst Case Cost Impact: \$100 K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

**E. Handling:**

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Ensure formal/informal DOE involvement during SBS development and prior to WSRC request for approval to avoid final minute surprises. DOE is also represented in SIRC approval. (T48-RHS-30) (Responsible for execution: WSMS - Schwenker)	VU	S	L	0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-28 **Assessed Element:** 1.1 Transfer Recycle from T21, T23 to T48  
**Title:** Insufficient recycle available for aggregation

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: DWPF recycle is assumed to be the aggregate for the Tank 48H material  
 Event: DWPF recycle not available  
 Risk: Inhibited water would need to be used.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 An extended DWPF shutdown or extremely good evaporator operation could limit recycle availability.  
 Noncredible (P < 0.15)     Very Unlikely (VU) (0.15 ≤ P < 0.45)     Unlikely (U) (0.45 ≤ P < 0.75)     Likely (L) (0.75 ≤ P < 0.9)     Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Use inhibited water for aggregation.

Worst Case Cost Impact: \$50K Worst Case Schedule Impact: 2 Wk(s)  
 Negligible (N) (C < 0.15)     Marginal (M) (0.15 ≤ C < 0.45)     Significant (S) (0.45 ≤ C < 0.75)     Critical (C) (0.75 ≤ C ≤ 0.9)     Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)     Moderate (M)     High (H)    Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Accept		U	M	L			

F. Residual Risk Impact: Cost Consequence: \$0    \$25,000    \$50,000    Distribution Selection:  
 Schedule Consequence: 0    1 Wk(s)    2 Wk(s)  
 Best    Most Likely    Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.2 Add Cold Chemicals  
 00-T48-29 **Title:** **Chemical Spills (Caustic)**

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Aggregation process requires 50w t% caustic for chemistry control (free OH control) (approx. 100 Kgals)  
 Event: Caustic leaks and spills occur.  
 Risk: Release to environment is above RQ value (1,000 lb.), stopping further operation until issue is addressed

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 The amount of caustic to be used is greater than normally handled in the Tank Farm.

Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay and cost impact

Worst Case Cost Impact: \$10K Worst Case Schedule Impact: 1 Wk(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Accept		U	N	L	\$6K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$10,000 Distribution Selection:  
 Schedule Consequence: 0 0 1 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - RHS changed to Accept.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.3 Mx T48 Contents  
 00-T48-31 **Title:** Decomposition Products Generated By Additions to Tank

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Existing waste contents and residue on internal structure will be mixed with new waste streams.  
 Event: Added streams to Tank 48H or Tank 50H results in partial decomposition forming byproducts (e.g., tarry substances).  
 Risk: Return to normal service is delayed.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Testing to date show negligible reaction of Tank 48H with DWPF Recycle. Temperature and contact time minimized by proposed plan thereby reducing risk of reaction. Project already includes plans to test each stream for chemical interactions.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (.45 ≤ P < 0.75)  Likely (L) (.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Additional R&D costs, schedule delay and development of new strategy  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 12 Mo(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (.15 ≤ C < 0.45)  Significant (S) (.45 ≤ C < 0.75)  Critical (C) (.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	PIT to define a chemical qualification program to be put into place to ensure minimal benzene generation. (T48-RHS-22) (Responsible for execution: PIT - Larry Romanowski)	VU	N	L	\$60K	15 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 0 12 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Residual risk is cost of limited R&D, delays and modifications to strategy

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.3 Mx T48 Contents  
 00-T48-32 **Title:** Analytical Detection Limit

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Progress of Aggregation will be determined through analysis of samples  
 Event: Analytical method for TPB analysis may not be good enough to qualify end state  
 Risk: Return to normal service is delayed.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 The quantity of heel and the end state (currently 378 grams or less) is unknown. As measurements approach the detection limit, the scatter frequently increases.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Additional R&D costs, schedule delay and development of new strategy  
 Worst Case Cost Impact: \$200K Worst Case Schedule Impact: 6 Wk(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Develop TPB Residual Strategy (TPB measurement / material balance) and obtain SIRC approval. (T48-RHS-34) (Responsible for execution: DA - Sam Shah)	L	S	M	\$36K	8 Wk	
	Develop Sample & Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans (T48-RHS-44) (Responsible for execution: SRNL - Bill Wilmarth)				\$10K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$75,000 \$150,000 Distribution Selection:  
 Schedule Consequence: 0 3 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.3 Mx T48 Contents  
 00-T48-34 **Title:** Inadequate Suspension of Material

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: The basis for the planning document for Aggregation is that the TPB is suspended in a slurry.  
 Event: Characteristics of the material make suspension with the proposed equipment inadequate.  
 Risk: Decreased progress of TPB removal. Potential areas of higher density material must be taken care of.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Existing tank equipment and material rheology have been extensively investigated and researched.  
 MST solid content is not an issue. However, samples taken over the past two years are very low on solids.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Inadequate suspension causes inadequate TPB removal.  
 Schedule delay and cost impact (additional equipment needed to suspend solids).

Worst Case Cost Impact: \$3M Worst Case Schedule Impact: 3 Mo(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	PIT to perform a Mixing Study on Tank 50H (T48-RHS-20) (Responsible for execution: PIT - Sterling Robertson) - COMPLETE	U	C	M	\$12K	4 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 1 Mo(s) 3 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - T48-RHS-20 Completed.

Document Name: \_\_\_\_\_ Document No.: \_\_\_\_\_  
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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.3 Mix T48 Contents  
 00-T48-35 **Title:** Increased Sampling and Analysis

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Progress of TPB removal will be determined through sampling and analysis.  
 Event: Single samples are determined to have the potential to be inconsistent with actual tank contents  
 Risk: More numerous samples and analyses are required.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Past sampling has shown that consistent results are achieved over time. However, the sampling was during a period of no deliberate changes in the tank. When undergoing a process to remove TPB, it is important to pull multiple samples to insure that changes in TPB can be attributed to removal and not sample variations. As measurements approach the detection limit, the scatter frequently increases.  
 Noncredible (P < 0.15)  Very Unlikely (VU)  Unlikely (U) (.15 ≤ P < 0.45)  Likely (L) (.45 ≤ P < 0.75)  Very Likely (VL) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Increase sample frequency or analysis scope  
 Schedule delay and cost impact  
 Worst Case Cost Impact: \$360K Worst Case Schedule Impact: 8 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (.15 ≤ C < 0.45)  Significant (S) (.45 ≤ C < 0.75)  Critical (C) (.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Develop definitive sample plan in support of disposition. (T48-RHS-21) (Responsible for execution: PIT - Pete Hill)	U	S	M	\$12K	4 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$75,000 \$150,000 Distribution Selection:  
 Schedule Consequence: 0 3 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Some resampling could still be necessary if inconsistent results were detected (increasing levels of constituents versus decreasing).

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.04 Meet Safety Requirements  
 00-T48-36 **Title:** Benzene Generation Rate - Tank Farm (Safety Basis)

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: TPB benzene generation is assumed to be sufficiently low to allow processing with existing equipment  
 Event: Benzene generation rate exceeds current assumptions due to the presence of active catalysts in the material.  
 Risk: Process cannot be modified to accommodate the higher generated benzene rate

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Benzene generation rate has been researched. Scale-up is a concern for all chemical processes going from bench to field scale.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely(VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Design is halted until testing is performed to re-baseline safety basis.  
 Schedule delay and cost impact.  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 2 Yr(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk		Implementation		Tracking# (Optional)
		Prob.	Cons.	Cost	Schedule	
Mitigate	PIT to define a chemical qualification program to be put into place to ensure minimal benzene generation. (T48-RHS-22) (Responsible for execution: PIT - Lary Romanowski)	VU	C	\$60K	15 Wk	
	Perform chemical testing program that includes early testing of materials that will potentially cause an increase in benzene generation - DWPF recycle, HEU, ETP. (T48-RHS-23) (Responsible for execution: SRNL - Jeff Griffin)			\$200K	8 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$200,000 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 2 Mo(s) 2 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Worse case cost impact is for implementation of an alternative disposition path which is not within project scope, therefore this residual is not included in T&PRA calculation.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - T48-RHS-24 Deleted as not in project scope.  
 UPDATED 8/2/05 - Added "(Safety Basis)" to title.  
 UPDATED 8/31/05 - Changed assessable element to 1.04.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.3 Mix T48 Contents  
 00-T48-37 **Title:** Inability to Meet End State

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Tank 48 contents are to be processed to meet an end state condition acceptable to allow return to service.  
 Event: Required end state is not met (excludes event that film cannot be removed) .  
 Risk: Tank is delayed in returning to service.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Sampling after mixing indicates that some solids are not readily suspended.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Implementation of residual strategy prior to reuse of tank, cost and schedule impact

Worst Case Cost Impact: \$500K Worst Case Schedule Impact: <6 Mo(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Develop TPB Residual Strategy (TPB measurement / material balance) and obtain SIRC approval. (T48-RHS-34) (Responsible for execution: DA - Sam Shah)	VU	N	L	\$36K	8 Wk	
	Develop new end state criteria that allows some solids to remain behind (residual limit). (T48-RHS-07) (Responsible for execution: DA - Dennis Conrad)				\$36K	8 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 0 6 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: Assessed Element: 1.3.1 Handle Tank Film  
00-T48-40 Title: Tank Film Cannot be Removed

KASE#: \_\_\_\_\_ Category (Optional): \_\_\_\_\_  
 Risk/Opportunity Type: \_\_\_\_\_ BDER Level: \_\_\_\_\_

Date: \_\_\_\_\_ Responsibility: \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Tank 48 has a film of material on the tank walls that must be removed  
 Event: The selected method of rinsing with agitation is not effective  
 Risk: Film cannot be completely removed (cannot meet end state).

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Tank 49 film was removed by washing.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Delay and cost of development and deployment of additional technology to remove film.  
 Worst Case Cost Impact: \$250K Worst Case Schedule Impact: 3 Mo(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Develop new end state criteria that allows some solids to remain behind (residual limit) (T48-RHS-07) (Responsible for execution: DA - Dennis Conrad)	U	C	M	36K	8 Wk	
	Evaluate rinsing effectiveness early. (T48-RHS-08) (Responsible for execution: Owner - Renee Spires)				\$100K	8 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$150,000 \$250,000 Distribution Selection:  
 Schedule Consequence: 0 2 Mo(s) 3 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 If rinsing is determined not to be effective, develop alternative plans for film removal from internal surfaces.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.4 Transfer T48 to T50  
 00-T48-41 **Title:** **Equipment Failure (Tank 50)**

KASE#: **Category (Optional):**

**Risk/Opportunity Type:** **BDER Level:**

Date: **Responsibility:**

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Equipment operability (Pumps, VFDs, Seals etc.) is necessary for process  
 Event: Slurry pump, VFD, pump seals or other critical components fail  
 Risk: Processing not possible until repair or replacement

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 With the number of components that must operate for an extended period, failures are likely during the aggregation program.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Worst case will be a VFD failure as it is assumed that Tank 50 mixing is adequate with one failed slurry pump. The concurrent failure of two slurry pumps is beyond very unlikely, otherwise slurry pump failure would be the worst case.

Worst Case Cost Impact: 0 Worst Case Schedule Impact: 1 Mo(s)

Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce/Mitigate	Maintain critical spares. Design Authority will specify spare parts and Project Manager will determine plan. (T48-RHS-25) (Responsible for execution: PM - Pen Mayson)	U	N	L	3K	1 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 0 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/17/05 - Removed cost impact as H-Area Tank Farm will fund any equipment repair during operations. Impact to project is limited to schedule only.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.4 Transfer T48 to T50  
 00-T48-42 **Title:** Transfer Pump Suction or Discharge Line Plugs

KASE#: **Category (Optional):**

**Risk/Opportunity Type:** **BDER Level:**

Date: **Responsibility:**

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: T48 existing transfer pump in riser B5 will be used for transfer with new rerouted transfer line installed to T50  
 Event: Transfer pump and/or transfer line plugs  
 Risk: Transfer from T48 to T50 not possible

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Existing T48 transfer pump was designed for handling 10 wt% solids, however there is concern that MST/TPB solids in T48 may plug the pump / transfer line during transfer to T50.

- Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (0.75 ≤ P < 0.9) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Worst case the pump or transfer line would have to be removed and cleaned or replaced

Worst Case Cost Impact: \$50K Worst Case Schedule Impact: 2 Wk(s)

- Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C < 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Reduce/Mitigate	Test and verify that existing flushing capabilities for transfer pump and transfer line are operational. (T48-RHS-56) (Responsible for execution: DA - Dennis Conrad)	VU	N	L	\$10K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$50,000 Distribution Selection:  
 Schedule Consequence: 0 0 2 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/16/05 - Design activities include this verification.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.5 Transfer from T50 to Saltstone Facility  
 00-T48-43 **Title:** Permitting Delay - Saltstone

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: Process requires numerous permits.  
 Event: Obtaining permits is complex and laborious.  
 Risk: Permits are not obtained in a timely way.

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Unique constituents in Tank 48 waste require approval of 2 permits (disposal and air permits)  
 Noncredible  Very Unlikely(VU)  Unlikely(U)  Likely(L)  Very Likely(VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. C= \_\_\_\_\_  
 For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)  
 Worst case assumes processing cannot proceed at SFF until permit is approved. Schedule is delayed while waiting to permit approval.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 1 Yr(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Perform R&D and NESHAPS evaluation early before execution of the project. (T48-RHS-45) (Responsible for execution: Owner - Renee Spires)	L	Cr	H	\$24K	8 Wk	
					\$500K	1 Yr	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 6 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk:  
 H. Triggers:  
 I. Affected Work Scope:  
 J. Additional Comments (optional):  
 UPDATED 9/7/05 - Deleted T48-RHS-24 as not in project scope.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.5 Transfer from T50 to Saltstone Facility  
 00-T48-44 **Title:** Inadequate Tank Space

KASE#: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Large volumes of liquid must be added to Tank 48H and Tank 50H during the process to aggregate to the Saltstone limits.  
 Event: Required additions(to meet Saltstone limits) exceed tank volume.  
 Risk: Material must be transferred and adjusted before aggregation to Saltstone can occur.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Tank volume needs have been extensively investigated and researched.  
 Noncredible  Very Unlikely (VU)  Unlikely(U)  Likely(L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay and cost impact. Equipment and procedures must be put in place for Tank 50H to be transferred back to Tank 48H.

Worst Case Cost Impact: \$250K Worst Case Schedule Impact: 2 Mo(s)  
 Negligible(N)  Marginal(M)  Significant(S)  Critical(C)  Crisis(Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)  Moderate(M)  High(H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Reduce/Mitigate	Perform calculations before transfer to ensure below the Saltstone limits on all constituents. (T48-RHS-27) (Responsible for execution: DA - Dennis Conrad)	VU	N	L	\$6K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$250,000 Distribution Selection:  
 Schedule Consequence: 0 0 2 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Transfer errors could still occur making Tank 50 batch not suitable for transfer to Saltstone.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/16/05 - Saltstone flow sheet should handle these variances.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.5 Transfer from T50 to Saltstone Facility  
 00-T48-45 **Title:** Tank 50 Cooling (Saltstone Transfer) Inadequate

KASE#: **Category (Optional):**

**Risk/Opportunity Type:** **BDER Level:**

Date: **Responsibility:**

A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: Continuous feed and continuous mixing will be required to feed Saltstone from Tank 50  
 Event: This process could challenge the cooling capacity of Tank 50  
 Risk: Process has to be modified to avoid excessive heat generation (e.g., batch operations)

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 During the recent campaign to remove T50 solids tank temperature only reached 65 deg F without cooling. Cooling requirements are modest.  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity) C= \_\_\_\_\_  
 Use a batch process. Schedule delay  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 3 Mo(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Accept		VU	N	L			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 0 3 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk: With sufficient temperature margin up to the levels allowed for Saltstone processing, tank cooling should not be a significant issue.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.5 Transfer from T50 to Saltstone Facility  
 00-T48-46 **Title:** Saltstone 0.2 Ci/gal Cs Modifications Not Ready in Time to Support Strategy

KASE#: **Category (Optional):**

**Risk/Opportunity Type:** **BDER Level:**

Date: **Responsibility:**

A. Statement of Event: (State Event and Risk/Opportunity)  
 Basis: Modifications to the Saltstone Facility to allow the processing of up to 0.2 Ci/gal Cs feed must be completed before processing can begin  
 Event: Modifications are not complete when processing of Tank 48 contents is scheduled to begin  
 Risk: Processing cannot begin

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 The focus and priority assigned to this project makes the realization of this event very unlikely.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS) C= \_\_\_\_\_  
 For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity  
 The worst case delay was arrived at by team consensus.

Worst Case Cost Impact: 0 Worst Case Schedule Impact: 9 Mo(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Proceed with an integrated schedule upon decision to implement aggregation project (T48-RHS-51) (Responsible for execution: Owner - Renee Spires)	VU	C	M	0	0	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 2 Mo(s) 6 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** 00-T48-47 **Assessed Element:** 1.5 Transfer from T50 to Saltstone Facility  
**Title:** Tank 50 residual TPB level

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Tank 50 contents are to be processed to allow return to normal service after the Tank 48 Project has been completed.  
 Event: Residual TPB prevents acceptable end state from being met  
 Risk: Tank is delayed in returning to service

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Sampling after mixing indicates that some solids are not readily suspended.  
 Noncredible (P < 0.15)     Very Unlikely (VU) (0.15 ≤ P < 0.45)     Unlikely (U) (0.45 ≤ P < 0.75)     Likely (L) (0.75 ≤ P < 0.9)     Very Likely (VL) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Implementation of residual strategy prior to reuse of tank, cost and schedule impact.  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 6 Mo(s)  
 Negligible(N) (C < 0.15)     Marginal(M) (0.15 ≤ C < 0.45)     Significant(S) (0.45 ≤ C < 0.75)     Critical(C) (0.75 ≤ C ≤ 0.9)     Crisis(Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low(L)     Moderate(M)     High(H)    Probability x Consequence = RF/OF (optional): \_\_\_\_\_

**E. Handling:**

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Develop TPB Residual Strategy (TPB measurement / material balance) and obtain SIRC approval. (T48-RHS-34) (Responsible for execution: DA - Sam Shah)	L	N	L	\$36K	8 Wk	
	Develop end state criteria that allows some solids to remain behind (T48-RHS-07) (Responsible for execution: Dennis Conrad)				\$36K	8 Wk	

F. Residual Risk Impact: Cost Consequence: \$0    \$0    \$500,000 Distribution Selection:  
 Schedule Consequence: 0    0    6 Mo(s)  
 Best    Most Likely    Worst

G. Description of Residual Risk:  
 H. Triggers:  
 I. Affected Work Scope:  
 J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.5 Transfer from T50 to Saltstone Facility  
 00-T48-48 **Title:** Saltstone Na limit (1M) cannot be met

KASE#: **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Saltstone grout is assumed to be able to be generated at sodium concentrations down to one molar.  
 Event: Grout cannot be made at one molar sodium  
 Risk: Process will have to accommodate the higher sodium limit

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Saltstone has produced grout at lower Na molarities  
 Noncredible (P < 0.15)  Very Unlikely (VU) (0.15 ≤ P < 0.45)  Unlikely (U) (0.45 ≤ P < 0.75)  Likely (L) (0.75 ≤ P < 0.9)  Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay - More sodium hydroxide would need to be added - increase amount of grout formed  
 Worst Case Cost Impact: \$250K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N) (C < 0.15)  Marginal (M) (0.15 ≤ C < 0.45)  Significant (S) (0.45 ≤ C < 0.75)  Critical (C) (0.75 ≤ C ≤ 0.9)  Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Perform grout studies using one molar sodium. (T48-RHS-36) (Responsible for execution: David Crowley) - COMPLETE	VU	N	L	\$100K	4 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$250,000 Distribution Selection:  
 Schedule Consequence: 0 0 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/16/05 - T48-RHS-36 complete. Grout studies show no impact

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.6 Process material at Saltstone Facility  
 00-T48-49 **Title:** **Effect of Raw Material Impurities - Saltstone**

KASE#: **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Chemicals added in SPF contain impurities.  
 Event: Impurities increase rate of decomposition and reaction.  
 Risk: Decomposition rate varies unpredictably; unknown intermediates form.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Acceptable reaction rates for Saltstone significantly lower than for Tank Farm. Multiple feed streams exist and interaction with Tank 48H waste unknown.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (.75 ≤ P < 0.9) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Delay while process variation is researched and remedial action implemented.

Worst Case Cost Impact: \$200K Worst Case Schedule Impact: 2 Mo(s)

Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Reduce/Mitigate	Conduct testing to examine interaction of Tank 48H with impurities in Saltstone premix. (T48-RHS-42) (Responsible for execution: John Occhipinti)	VU	N	L	\$150K	16 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$200,000 Distribution Selection:  
 Schedule Consequence: 0 0 2 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

If impurities are the cause of reaction, Saltstone should pay for development and implementation of specification changes.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.04 Meet Safety Requirements  
 00-T48-50 **Title:** TPB Decomposition Temperature - Saltstone (Safety Basis)

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Curing of grout takes place at an elevated temperature.  
 Event: R&D determines that TPB decomposition in the grout is within the proposed curing temperature.  
 Risk: Significant modifications are necessary to Saltstone before aggregation can continue.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Existing testing does not cover this range. Previous testing has indicated that benzene is released from grout.  
 Noncredible (P < 0.15)     Very Unlikely (VU) (0.15 ≤ P < 0.45)     Unlikely (U) (0.45 ≤ P < 0.75)     Likely (L) (0.75 ≤ P < 0.9)     Very Likely (VL) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Change strategy - decrease the concentration of TPB to be sent, decrease the rate that the solution is sent to Saltstone (this would decrease the amount of benzene released and would slow down processing of Tank 48 material). Schedule and cost impact (additional grout).  
 Worst Case Cost Impact: \$10M Worst Case Schedule Impact: 2 Yr(s)  
 Negligible (N) (C < 0.15)     Marginal (M) (0.15 ≤ C < 0.45)     Significant (S) (0.45 ≤ C < 0.75)     Critical (C) (0.75 ≤ C < 0.9)     Crisis (Cr) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)     Moderate (M)     High (H)    Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28) (Responsible for execution: John Occhipinti)	U	Cr	H	\$500K	1 Yr	
	Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63) (Responsible for execution: PIT - Larry Romanowski)				\$150K	16 Wk	

F. Residual Risk Impact: Cost Consequence: \$0    \$250,000    \$500,000    Distribution Selection:  
 Schedule Consequence: 0    3 Mo(s)    6 Mo(s)  
 Best                                      Most Likely                                      Worst

G. Description of Residual Risk: Cost is limited to additional grout volume and will not be included in T&PRA for this Project as it is an SPF operational cost. Residual risk of schedule delay will directly impact Tank 48 Project.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

UPDATED 9/7/05 - Deleted T48-RHS-24 as not in project scope.  
 UPDATED 8/31/05 - Changed assessable element to 1.04.  
 UPDATED 8/16/05 - Added T48-RHS-63  
 UPDATED 8/2/05 - Added "(Safety Basis)" to title.  
 If testing shows aggregation will cause grout to not pass TCLP, then aggregation option would not be pursued. This risk only covers impacts from the rate of benzene released to the vault vapor space. See risk T48-069 for TCLP.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.04 Meet Safety Requirements  
 00-T48-51 **Title:** Benzene Released in Saltstone (Safety Basis)

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Benzene is not anticipated to be generated by the process.  
 Event: Benzene is released during the grout curing process in Saltstone.  
 Risk: Release exceed safety and/or environmental limits.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 During grout curing it is expected that temperatures will exceed levels that will be used to help control releases in the Tank Farm.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 TPB concentration would be reduced or rate reduced to control temperature. Alternative disposition strategy may be required.  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 2 Yr(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28) (Responsible for execution: John Occhipinti)	L	C	H	\$150K	16 Wk	
	Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63) (Responsible for execution: PIT Team - Larry Romanowski)				\$500K	1 Yr	

F. Residual Risk Impact: Cost Consequence: \$0 \$200,000 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 2 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Cost is limited to additional grout volume and will not be included in T&PRA for this Project as it is an SPF operational cost. Residual risk of schedule delay will directly impact Tank 48 Project.

H. Triggers: \_\_\_\_\_

I. Affected Work Scope: \_\_\_\_\_

J. Additional Comments (optional):  
 UPDATED 9/7/05 - Deleted T48-RHS-24 as not in project scope.  
 UPDATED 8/31/05 - Changed assessable element to 1.04.  
 UPDATED 8/16/05 - Added T48-RHS-63  
 UPDATED 8/2/05 - Added "(Safety Basis)" to title.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.6 Process material at Saltstone Facility  
 00-T48-54 **Title:** Volume of Grout is Unacceptable

**KASE #:** **Category (Optional):**  
**Risk/Opportunity Type:** **BDER Level:**

**Date:** **Responsibility:**  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Several Stakeholders (DOE, CAB and DNFSB) will monitor activities on Tank 48.  
 Event: Stakeholders reject path forward on Tank 48 based on the amount of grout produced being too great.  
 Risk: Project abandoned.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 One example of stakeholder concern would be cost of additional Saltstone Vaults due to additional quantities of waste being processed as a result of aggregation.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 The worst case would require that the Salt Strategy be reworked to develop a different path forward.  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 1 Yr(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Reduce	Determine the grout volume based on aggregation to meet the governing limit (T48-RHS-52) (Responsible for execution: PIT - Sterling Robertson)	VU	Cr	H	\$150K	16 Wk	
					\$500K	1 Yr	

F. Residual Risk Impact: Cost Consequence: \$0 \$150,000 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 4 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - Deleted T48-RHS-24 as not in project scope.  
 If the worst case impact of this risk is realized the tank 48 Project (as currently scoped) could not be implemented and the Salt Strategy would be reworked to develop a different path forward. The most likely case would be a serious delay to the project during which stakeholders concerns are resolved. The best case would be that the PIT strategy of working closely with stakeholders results in no delay to the project. The Tank 48 Project will track this risk and implement and monitor the progress of risk handling strategies (identified above).

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.6 Process material at Saltstone Facility  
 00-T48-55 **Title:** Greater Than Assumed Number of Analyzed Samples Required - Saltstone

KASE #: **Category (Optional):**  
**Risk/Opportunity Type:** **BDER Level:**

Date: **Responsibility:**  
 (State Event and Risk/Opportunity)

A. Statement of Event: Basis: The Tank 48 Project sampling strategy assumes a number and frequency of samples.  
 Event: Additional sampling is required to support required testing efforts.  
 Risk: Process strategy must be modified.

B. Probability: (State the probability and basis that the risk/opportunity will come true without credit for HS) P= \_\_\_\_\_  
 Additional samples could be required from Tanks 48, 50 and from DWWF recycle tanks.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: (State the consequences and quantify basis if that risk comes true without credit for RHS) C= \_\_\_\_\_  
 For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity.  
 Obtain more samples. Cost and schedule impact.  
 Worst Case Cost Impact: \$100K Worst Case Schedule Impact: 4 Wk(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce/Mitigate	Develop definitive sample plan in support of disposition. (T48-RHS-2.1) (Responsible for execution: PIT - Pete Hill)	U	S	M	\$12K	4 Wk	
					\$10K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 4 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:  
 H. Triggers:  
 I. Affected Work Scope:  
 J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.6 Process material at Saltstone Facility  
 00-T48-56 **Title:** Saltstone Facility Benzene Generation Requires Equipment Modification at Saltstone

**KASE #:** **Category (Optional):**  
**Risk/Opportunity Type:** **BDER Level:**

**Date:** **Responsibility:**

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: TPB benzene generation is assumed to be sufficiently low to allow processing with existing equipment.  
 Event: Benzene generation rate exceeds current assumptions.  
 Risk: Process will have to accommodate the higher level of generated benzene.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Evaluations are currently being performed to identify the potential for benzene generation through the addition of recycle.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Saltstone Facility will require a tank ventilation system as a process control (possibly including an inerting/blanketing capability).  
 Worst Case Cost Impact: \$3M Worst Case Schedule Impact: 12 Mo(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

**E. Handling:**

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk		Implementation		Tracking# (Optional)
		Prob.	Cons.	Cost	Schedule	
Mitigate	If evaluations show increased benzene generation, implement modifications (T48-RHS-54) (Responsible for execution: Dennis Thompson)	VL	Cr	\$3K	1 Yr	
	Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28) (Responsible for execution: John Occhipinti)			\$150K	16 Wk	
	Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63) (Responsible for execution: PIT Team - Larry Romanowski)			\$500K	1 Yr	

F. Residual Risk Impact: Cost Consequence: \$0 \$150,000 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 4 Mo(s) 12 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - Deleted T48-RHS-24 as not in project scope.  
 UPDATED 8/16/05 - Added T48-RHS-63  
 Updated 8/2/05 - Added "at Saltstone," to title.  
 Updated 4/12/05 - Risk is being realized. To reduce the risk of proceeding without data to understand the potential scope of modifications required, the project will not proceed until data is available from grout testing.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.6 Process material at Saltstone Facility  
 00-T48-57 **Title:** Process Material Fails TCLP - Saltstone

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: TCLP (pre-qual) has to be acceptable as a nonhazardous material.  
 Event: TCLP (pre-qual) results show material to be hazardous.  
 Risk: Process cannot continue.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Based on existing test results.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Worst case, the TCLP cannot be qualified and processing strategy cannot be implemented as planned. This would require that the Salt Strategy be reworked to develop a different path forward.  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 1 Yr(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Perform a test similar to TCLP early in project - (T48-RHS-48) - COMPLETE  Complete testing on grout at various TPB concentrations and curing temperatures. (T48-RHS-28) (Responsible for execution: John Occhipinti)	VU	Cr	H	\$150K	16 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$150,000 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 4 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Best case, testing demonstrates no concerns; most likely case requires process adjustment at saltstone; worst case requires an alternate strategy to be developed.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.6 Process material at Saltstone Facility  
 00-T48-58 **Title:** Inadequate scale up from R&D - Saltstone

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: R&D studies must be scaled-up to plant scale.  
 Event: Scaled-up process does not meet performance requirements.  
 Risk: Process halted.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Scale-up is a concern for all chemical processes going from bench to field scale (surface area to benzene generation, for example).  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for HS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Project will be forced to use an alternate strategy.  
 Worst Case Cost Impact: \$500K Worst Case Schedule Impact: 1 Yr(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons	Risk	Cost	Schedule	
Mitigate	Compare effect of grout test sample geometry on benzene release rates during TPB tests (T48-RHS-47) (John Occhipinti)	VU	Cr	H	\$10K	3 Wk	
					\$500K	1 Yr	

F. Residual Risk Impact: Cost Consequence: \$0 \$200,000 \$500,000 Distribution Selection:  
 Schedule Consequence: 0 4 Mo(s) 1 Yr(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Most likely consequence is more testing required.

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 9/7/05 - Deleted T48-RHS-24 as not in project scope.

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.6 Process material at Saltstone Facility  
 00-T48-59 **Title:** Saltstone Facility production rate less than 83Kgals/week

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: A throughput at the Saltstone Facility of 83K gals/w k is assumed.  
 Event: Saltstone cannot process at 83k gals/w k.  
 Risk: Process will have to take longer.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Saltstone has never been challenged to achieve this production rate.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
(P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Longer processing time. Schedule impact.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: 6 Mo(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
(C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk		Implementation		Tracking# (Optional)
		Prob.	Cons.	Cost	Schedule	
Mitigate	Evaluate production rate and investigate the option of using different vaults. (T48-RHS-59) (Responsible for execution: Waste Solidification - Dennis Thompson)  Investigate required rates for windows of opportunity for processing in the Salt Strategy. (T48-RHS-63) (Responsible for execution: PIT Team - Larry Romanowski)	VU	N	L		

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 0 6 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 8/16/05 - Added T48-RHS-63  
 UPDATED 8/2/05 - Modified T48-RHS-59  
 UPDATED 6/28/05 - Added T48-RHS-59

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.6 Process material at Saltstone Facility  
 00-T48-60 **Title:** Laboratory Capability - Saltstone

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Process samples must be analyzed.  
 Event: Analysis exceeds current laboratory capabilities due to samples being too hot.  
 Risk: large delay in analytical results.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Higher rad content invalidates past practice of pulling processing and TCLP samples and conducting tests in hood at Saltstone. Transporting samples and conducting tests in Cells most likely required.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Delays in analytical results, especially if forced off-site. However, it is likely SRNL will perform required analyses. This is the basis of the consequences listed.  
 Worst Case Cost Impact: \$70K Worst Case Schedule Impact: 3 Wk(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob	Cons.	Risk	Cost	Schedule	
Reduce/Mitigate	Develop definitive sample plan in support of disposition. (T48-RHS-21) (Responsible for execution: PIT - Pete Hill)	VU	S	L	\$12K	4 Wk	
	Perform testing with grout at various TPB concentrations and curing temperatures. (T48-RHS-28) (Responsible for execution: John Occhipinti)				\$150K	16 wk	
	Develop Sample & Analytical Plans well in advance of actual operations including critical spare parts for analytical instruments, what if analysis (including identification of potential conflicts), splitting samples into multiple aliquots upon arrival, replicate analyses (especially as the concentration decreases or the target response time shortens), and contingency plans (T48-RHS-44) (Responsible for execution: SRNL - Bill Wilmarth)				\$10K	2 Wk	

F. Residual Risk Impact: Cost Consequence: \$0 \$35,000 \$70,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 3 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.1 Transfer Recycle from T21, T23 to T48  
 00-T48-61 **Title:** Recycle Not Available - RISK CLOSED

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: It is assumed that infrastructure to allow recycle transfer to Tank 48 will be installed by the Tank 41 (Min Gate) Project  
 Event: Tank 41 Project does not install the necessary infrastructure  
 Risk: Recycle cannot be transferred to Tank 48

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Currently it is planned to provide the infrastructure, however, as execution of the Tank 41 Min Gate progresses, that project may sacrifice accommodating the Tank 48 infrastructure if it would achieve schedule gain or avoid an impediment to meeting the Min Gate milestone.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Tank 48 Project would have additional scope to design and install infrastructure and will be delayed until a window is available during Min Gate operations to perform field modifications.  
 Worst Case Cost Impact: 100K Worst Case Schedule Impact: 2 Mo(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Monitor Min Gate activities for completion of recycle infrastructure scope, and if not performed under that project, initiate BCP early to add this scope to the Tank 48 Project such that the design may be completed and ready for implementation in the field once a Min Gate window is available. (T48-RHS-57) (Responsible for execution: Owner - Renee Spires)	L	S	M			

F. Residual Risk Impact: Cost Consequence: \$0 \$100,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 2 Wk(s) 1 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):  
 UPDATED 10/31/05 - RISK CLOSED - Min Gate activities completed, infrastructure completed, this risk cannot be realized.

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**Risk & Opportunity Assessment Form**

Identification No.: **Assessed Element:** 1.01 Design/Instal New Equipment  
 00-T48-62 **Title:** ARP Equip. Instal. Interferes With Installation of Above Ground Transfer Line

KASE #: \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

Date: \_\_\_\_\_ **Responsibility:** \_\_\_\_\_  
 A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: An above ground transfer line will be used to transfer from Tank 48 to Tank 50  
 Event: ARP installation activity (equipment, cell covers etc.) prevent the use of the above ground transfer line.  
 Risk: Transfers are not possible until ARP Project completes installation.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Based on review of existing schedules  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (.15 ≤ P < 0.45) (.45 ≤ P < 0.75) (P ≥ .75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delays  
 Worst Case Cost Impact: 0 \_\_\_\_\_ Worst Case Schedule Impact: 2 Wk(s) \_\_\_\_\_  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (.15 ≤ C < 0.45) (.45 ≤ C < 0.75) (.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Reduce	Monitor ARP schedule implementation and schedule Tank 48 activities to minimize any impact. (T48-RHS-61) (Responsible for execution: T CP Operations - Jim Hosmer)	U	S	M			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 1 Wk(s) 2 Wk(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.7 General  
 00-T48-63 **Title:** Fast-Track Schedule Requires Rework

**KASE #:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: The Tank 48 Project will be executed as a fast-track project.  
 Event: The fast-track process results in re-design and field rework  
 Risk: Project cannot proceed until re-design or rework is complete

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Parallel design/fabrication paths and unconfirmed assumptions in design contribute to the probability of this risk being realized.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (0.75 ≤ P < 0.9) (P ≥ 0.9)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule and cost impact for re-design and rework.  
 Worst Case Cost Impact: 100K Worst Case Schedule Impact: 2 Mo(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Accept		L	S	M			

F. Residual Risk Impact: Cost Consequence: \$0 \$50,000 \$100,000 Distribution Selection:  
 Schedule Consequence: 0 4 Wk(s) 2 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.01 Design/Instal New Equipment  
 00-T48-64 **Title:** Tank 50 Equipment Installation Impacted by Ongoing Transfers

**KASE #:** **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: Tank 50 will be used by other Projects as an aggregation tank and to feed Saltstone.  
 Event: Other projects use Tank 50 and prevent modifications being performed that are required for Tank 48 Project.  
 Risk: Equipment cannot be installed while Tank 50 is in operation.

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Based on currently scheduled work.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delays  
 Worst Case Cost Impact: 0 \_\_\_\_\_ Worst Case Schedule Impact: 2 Mo(s) \_\_\_\_\_  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Monitor other project schedule implementation and schedule Tank 48 activities to minimize any impact. (T48-RHS-64) (Responsible for execution: T CP Operations - Jim Hosmer)	L	S	M			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 4 Wk(s) 2 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk:

H. Triggers:

I. Affected Work Scope:

J. Additional Comments (optional):

Document Name: \_\_\_\_\_ Document No.: \_\_\_\_\_  
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**Risk & Opportunity Assessment Form**

**Identification No.:** Assessed Element: 1.4 Transfer T48 to T50  
 00-T48-65 **Title:** Processing Window Unavailable - NEW RISK

**KASE#:** \_\_\_\_\_ **Category (Optional):** \_\_\_\_\_  
**Risk/Opportunity Type:** \_\_\_\_\_ **BDER Level:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Responsibility:** \_\_\_\_\_

A. Statement of Event: *(State Event and Risk/Opportunity)*  
 Basis: This project will require Tank 50 space to be available to receive Tank 48 material when required.  
 Event: MCU project is utilizing Tank 50 when it is needed by the Tank 48 Project and both projects cannot simultaneously utilize Tank 50  
 Risk: Tank 48 Project cannot move waste from Tank 48 until Tank 50 space is available

B. Probability: *(State the probability and basis that the risk/opportunity will come true without credit for HS)* P= \_\_\_\_\_  
 Currently both projects are competing for overlapping windows of Tank 50 use.  
 Noncredible  Very Unlikely (VU)  Unlikely (U)  Likely (L)  Very Likely (VL)  
 (P < 0.15) (0.15 ≤ P < 0.45) (0.45 ≤ P < 0.75) (P ≥ 0.75)

C. Consequence: *(State the consequences and quantify basis if that risk comes true without credit for RHS. For opportunities, document the benefit/cost ratio comparison between the original scope and proposed opportunity)* C= \_\_\_\_\_  
 Schedule delay to Project.  
 Worst Case Cost Impact: 0 Worst Case Schedule Impact: > 3 Mo(s)  
 Negligible (N)  Marginal (M)  Significant (S)  Critical (C)  Crisis (Cr)  
 (C < 0.15) (0.15 ≤ C < 0.45) (0.45 ≤ C < 0.75) (0.75 ≤ C ≤ 0.9) (C > 0.9)

D. Risk/Opportunity Level:  Low (L)  Moderate (M)  High (H) Probability x Consequence = RF/OF (optional): \_\_\_\_\_

E. Handling:

Handling Strategy	Handling Strategy (HS) Description and Bases	Reduced Risk			Implementation		Tracking# (Optional)
		Prob.	Cons.	Risk	Cost	Schedule	
Mitigate	Identify and develop methods of operating MCU and Tank 48 concurrently with Tank 50 as a shared receipt tank (T48-RHS-65) (Responsible for execution: LWD Engineering - John Schwenker)  Identify alternative methods to disposition Tank 48. (T48-RHS-66) (Responsible for execution: Neil Davis)	VL	S	H			

F. Residual Risk Impact: Cost Consequence: \$0 \$0 \$0 Distribution Selection:  
 Schedule Consequence: 0 4 Wk(s) 3 Mo(s)  
 Best Most Likely Worst

G. Description of Residual Risk: Best case is no impact. Most likely is being able to work around the windows with some parallel receipts in Tank 50 and minor impact. Worst case is concurrent operation not possible..

H. Triggers: \_\_\_\_\_

I. Affected Work Scope: \_\_\_\_\_

J. Additional Comments (optional):  
 UPDATED 1/20/06-Title changed to "Processing window unavailable"

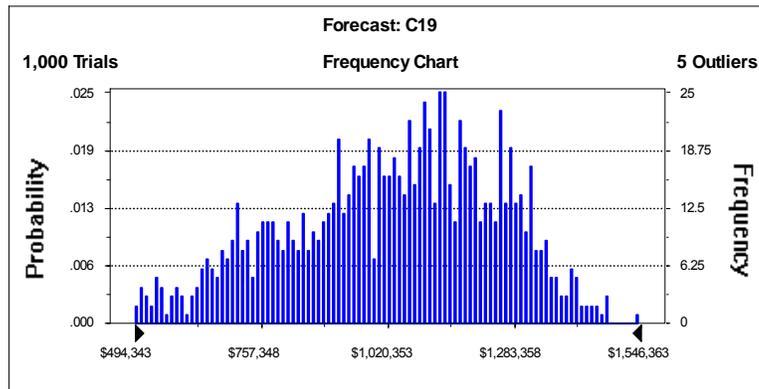
## 6.6: Crystal Ball Report

### Summary:

Display Range is from \$494,343 to \$1,546,363  
 Entire Range is from \$367,320 to \$1,546,363  
 After 1,000 Trials, the Std. Error of the Mean is \$6,956

### Statistics:

	<u>Value</u>
Trials	1000
Mean	\$1,027,768
Median	\$1,052,820
Mode	---
Standard Deviation	\$219,961
Variance	\$48,382,628,034
Skewness	-0.37
Kurtosis	2.49
Coeff. of Variability	0.21
Range Minimum	\$367,320
Range Maximum	\$1,546,363
Range Width	\$1,179,043
Mean Std. Error	\$6,955.76



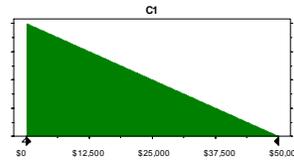
Percentiles:

<u>Percentile</u>	<u>Value</u>
0%	\$367,320
10%	\$712,180
20%	\$822,410
30%	\$921,999
40%	\$986,181
50%	\$1,052,820
60%	\$1,107,780
70%	\$1,165,827
80%	\$1,228,855
90%	\$1,299,329
100%	\$1,546,363

**Risk: T48-02**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$0
Maximum	\$50,000

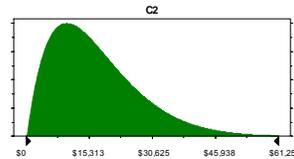


Selected range is from \$0 to \$50,000

**Risk: T48-03**

Beta distribution with parameters:

Alpha	\$2
Beta	\$13
Scale	\$125,000

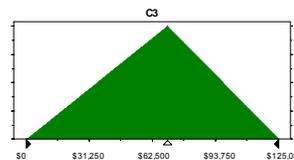


Selected range is from \$0 to +Infinity

**Risk: T48-04**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$70,000
Maximum	\$125,000

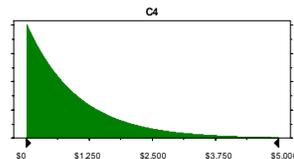


Selected range is from \$0 to \$125,000

**Risk: T48-05**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$100,000

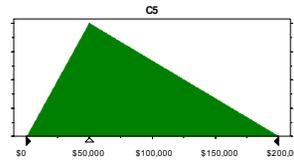


Selected range is from \$0 to +Infinity

**Risk: T48-10**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$50,000
Maximum	\$200,000

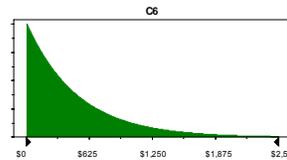


Selected range is from \$0 to \$200,000

**Risk: T48-11**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$50,000

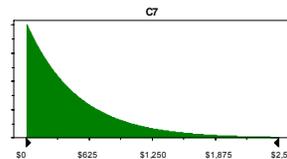


Selected range is from \$0 to +Infinity

**Risk: T48-12**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$50,000

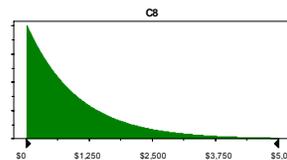


Selected range is from \$0 to +Infinity

**Risk: T48-14**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$100,000

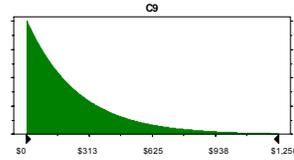


Selected range is from \$0 to +Infinity

**Risk: T48-15**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$25,000

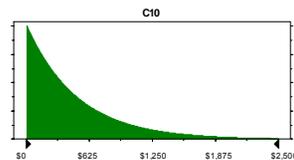


Selected range is from \$0 to +Infinity

**Risk: T48-16**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$50,000

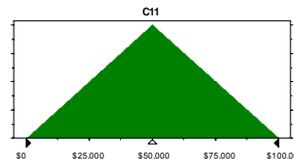


Selected range is from \$0 to +Infinity

**Risk: T48-17**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$50,000
Maximum	\$100,000

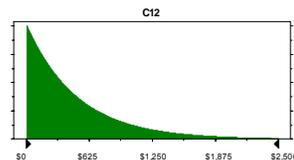


Selected range is from \$0 to \$100,000

**Risk: T48-18**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$50,000

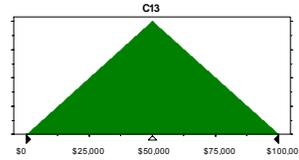


Selected range is from \$0 to +Infinity

**Risk: T48-19**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$50,000
Maximum	\$100,000

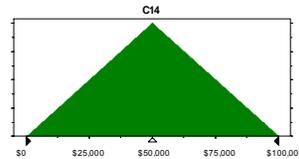


Selected range is from \$0 to \$100,000

**Risk: T48-21**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$50,000
Maximum	\$100,000

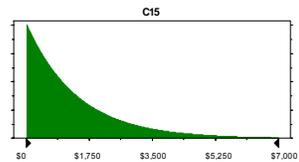


Selected range is from \$0 to \$100,000

**Risk: T48-25**

Beta distribution with parameters:

Alpha	\$1
Beta	\$100
Scale	\$140,000

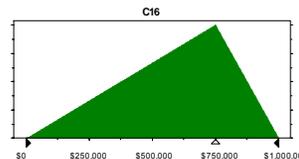


Selected range is from \$0 to +Infinity

**Risk: T48-26**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$750,000
Maximum	\$1,000,000



Selected range is from \$0 to \$1,000,000

**Risk: T48-27**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$50,000
Maximum	\$100,000

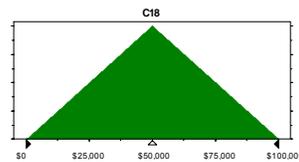


Selected range is from \$0 to \$100,000

**Risk: T48-63**

Triangular distribution with parameters:

Minimum	\$0
Likeliest	\$50,000
Maximum	\$100,000



Selected range is from \$0 to \$100,000

### 6.7: Risk-O-Meter

Risk Number	Risk Title	Risk Level	Closed	Not a Problem	Minor Concern	Major Concern	Remarks
	<b>PHASE I Project Risks</b>						
T48-02	Interfaces with Other Facilities and Projects	M			●		Keep H-Tank Farm Facility and Saltstone/ Project Owners & Managers informed. Plan NaOH additions and transfers of recycle from Type IV tanks and receive concurrence
T48-03	Lost or Spilled Sample in SRNL	M		●			Develop Sample & Analytical Plans. SRNL has improved sample storage and management.
T48-04	Laboratory Capability - Tank Farm	M			●		Develop Sample & Analytical Plans.
T48-05	Accessibility to Perform Work	M			●		Coordinate work with operations and other projects.
T48-06	Field materials are not available	L		●			Quantify / track material. Expedite procurements.
T48-09	Availability of Construction Equipment	L		●			N/A
T48-10	Readiness Assessment More Than a WSRC RA	M			●		SNR is developed and awaiting approval.
T48-11	Readiness Assessment Findings	L		●			Detailed management checklist prior to beginning RA.
T48-12	Support Services Availability	M			●		Forecast resources and stick to plan. Integrate project activities into facility schedule.
T48-14	Loss of Utilities	M		●			N/A
T48-15	Unsafe Conditions Discovered at Turnover	M		●			Safety/IH Engineer included in design reviews.
T48-16	Equipment Failure (Recycle Transfers)	M		●			N/A
T48-17	Tie-ins to Existing Facility	M		●			Perform early walk downs and validate existing conditions/equipment.
T48-18	Cooling Coils Fail Test	L		●			Heat balance study completed.
T48-19	Existing equipment cannot meet seismic qualification requirements	M		●	←		Perform early walk downs and validate existing conditions/equipment.
T48-21	Modifications are determined to be required for the Transfer line/LPDT and Tank 48 to 50.	L		●			Complete Safety Basis development and SIRC approval as early as possible.

Risk Number	Risk Title	Risk Level	Closed	Not a Problem	Minor Concern	Major Concern	Remarks
T48-25	Equipment Fails Surveillance	M		●			Identify attributes in AB requiring testing before design is complete.
T48-26	Safety Basis Impacts Design -Tank Farm	H				●	Complete Safety Basis development and SIRC approval as early as possible. R&D Plan to ensure sufficient supporting data and resolve SIL impact.
T48-27	Safety Basis Strategy not Accepted By DOE	M			●		Formal/ informal DOE involvement during SBS development.
T48-36	Benzene Generation Rate - Tank Farm (Safety Basis)	H				●	Define and execute a chemical qualification program.
T48-50	TPB Decomposition Temperature – Saltstone (Safety Basis)	H				●	Develop backup process. Testing on grout at various TPB concentrations and curing temperatures. Investigate processing rates/windows within Salt Strategy.
T48-51	Benzene Released in Saltstone (Safety Basis)	H				●	Develop backup process. Testing on grout at various TPB concentrations and curing temperatures. Investigate processing rates/windows within Salt Strategy.
T48-62	ARP Equipment Installation Interferes With Above Ground Transfer Line	M		●	←		Monitor ARP schedule implementation
T48-63	Fast-Track Schedule Requires Rework	H			●	←	N/A
T48-64	Tank 50 Equipment Installation Impacted by Ongoing Transfers	H			●	←	Monitor other project schedule implementation.
	Overall Project Phase I Risk				●		
	<b>PHASE II Project Risks</b>						
T48-20	Tank 48 Transfer Pump Fails Tests During Startup Testing	H		●			Functional check of 48 to 50 transfer pump successfully performed.
T48-28	Insufficient recycle available for aggregation	M		●			N/A
T48-29	Chemical Spills (Caustic)	L		●			N/A
T48-31	Decomposition Products Generated By Additions to Tank	H			●		PIT to define a chemical qualification program to be put into place to ensure minimal benzene generation.
T48-32	Analytical Detection Limit	H				●	TPB Residual Strategy (TPB measurement / material balance) is approved. Develop Sample & Analytical Plans
T48-34	Inadequate Suspension of Material	H		●			Perform a Mixing Study on Tank 50H.

Risk Number	Risk Title	Risk Level	Closed	Not a Problem	Minor Concern	Major Concern	Remarks
T48-35	Increased Sampling and Analysis	M		●			Develop definitive sample plan.
T48-37	Inability to Meet End State	H			●	←	TPB Residual Strategy approved. End state criteria to be developed.
T48-40	Tank Film Cannot be Removed	H				●	Develop new end state criteria. Evaluate rinsing effectiveness early. Testing has started. Update versus new results.
T48-42	Transfer Pump Suction or Discharge Line Plugs	M		●			Test and verify the existing flushing capabilities.
T48-44	Inadequate Tank Space	M		●			Perform calculations before transfer to ensure below the Saltstone limits on all constituents. Saltstone flowsheet should handle.
T48-47	Tank 50 residual TPB level	H			●	←	TPB Residual Strategy approved. End state criteria to be developed.
T48-48	Saltstone Na limit (1M) cannot be met	M		●			Grout studies show no impact.
T48-49	Effect of Raw Material Impurities - Saltstone	M			●		Examine interaction of Tank 48H with known additives and impurities to Saltstone Matrix.
T48-55	Greater Than Assumed Number of Analyzed Samples Required - Saltstone	M			●		Develop definitive sample plan. Develop sampling plan for grout.
T48-56	Saltstone Facility Benzene Generation Requires Equipment Modification at saltstone	H				●	If evaluations show increased benzene generation, implement modifications. Complete testing on grout. Develop backup process. Investigate processing rates/windows within Salt Strategy.
T48-57	Process Material Fails TCLP - Saltstone	H			●		Performed a test similar to TCLP with favorable results. Complete testing on grout at various TPB concentrations and curing temperatures.
T48-58	Inadequate scale up from R&D - Saltstone	H				●	Evaluate existing R&D effort to address potential scale-up issues. Develop backup process.
T48-59	Saltstone Facility production rate less than 83K gals/week	H				●	Evaluate production rate / investigate using different vaults. Investigate processing rates/windows within Salt Strategy.
T48-60	Laboratory Capability - Saltstone	M		●			Develop definitive sample plan. Perform testing with grout at various TPB concentrations and curing temperatures. Develop Sample & Analytical Plans.
T48-65	Processing Window Unavailable	H				●	ID and Develop a method of operating Tank 48 and MCU concurrently. ID Alternative methods of Tank 48 disposition.

Risk Number	Risk Title	Risk Level	Closed	Not a Problem	Minor Concern	Major Concern	Remarks
	Overall Project Phase II Risk					●	
T48-01	Funding Availability	H				●	Keep Senior Management informed, ensure required funding is approved, if unavailable, effect a baseline change proposal.
T48-08	Requirements for Construction Change	H		●	←	←	Ensure estimate is conservative perform contingency analysis and T&PRA analysis.
T48-13	Tank 48 Equipment Failure	H				●	Maintain critical spares.
T48-22	Stakeholder Participation	H				●	Develop communication plan for Stakeholders/ Senior Management.
T48-23	Regulatory Concerns (3116 implementation)	H				●	PIT Team to pursue 3116 WD process.
T48-24	Regulatory Concerns (Class C permit not granted)	H				●	PIT Team to pursue NRC Class C permit.
T48-41	Equipment Failure (Tank 50)	H				●	Maintain critical spares.
T48-43	Permitting Delay - Saltstone	H				●	Perform R&D and NESHAPS evaluation early. Develop backup process.
T48-45	Tank 50 Cooling (Saltstone Transfer) Inadequate	H		●	←	←	N/A
T48-46	Saltstone 0.2 Ci/gal Cs Modifications Not Ready in Time to Support Strategy	H		●	←	←	Proceed with an integrated schedule upon decision to implement aggregation project.
T48-54	Volume of Grout is Unacceptable	H				●	Determine the grout volume based on aggregation to meet the governing limit. Develop backup process.
	Overall Project					●	

LEGEND

- Risk has been closed
- Not a problem, no issues at this time
- Minor concern
- Major concern