Savannah River Remediation

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Liquid Waste
Top Ten Program Risks

Date: August 24, 2010

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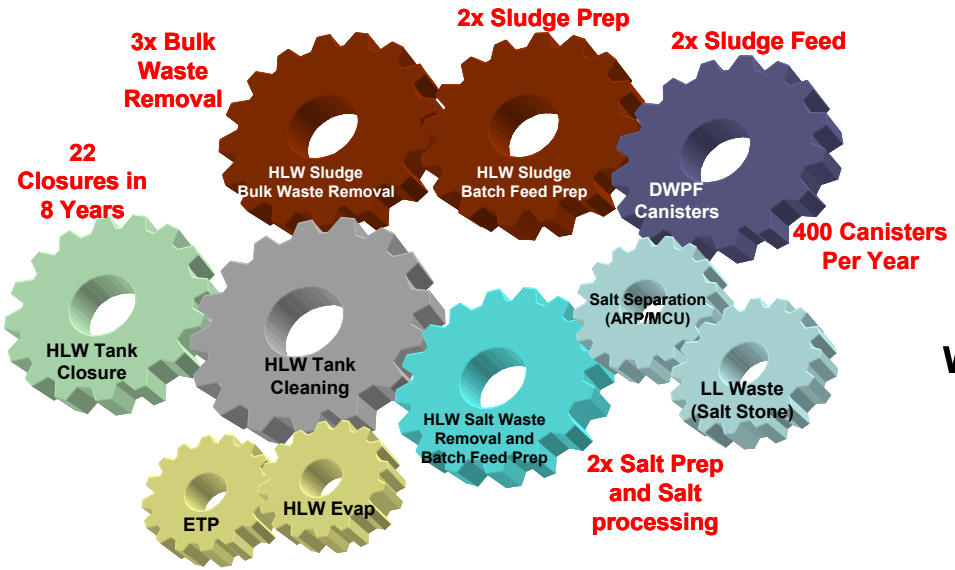
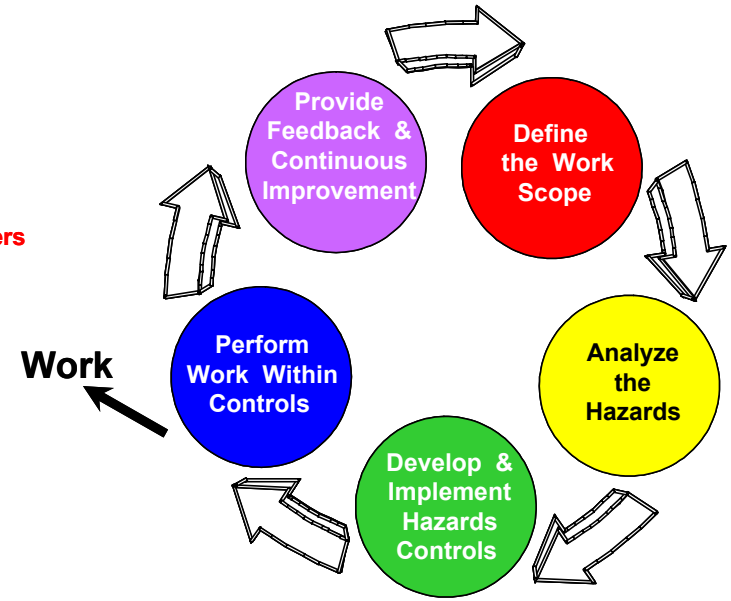
Event:
Citizen's Advisory Board

Waste Management Committee Meeting

SRR-LWP-2010-00050

Program Risks not Hazard Management





Program Risks relate to increase in overall cost or schedule of Liquid Waste Project

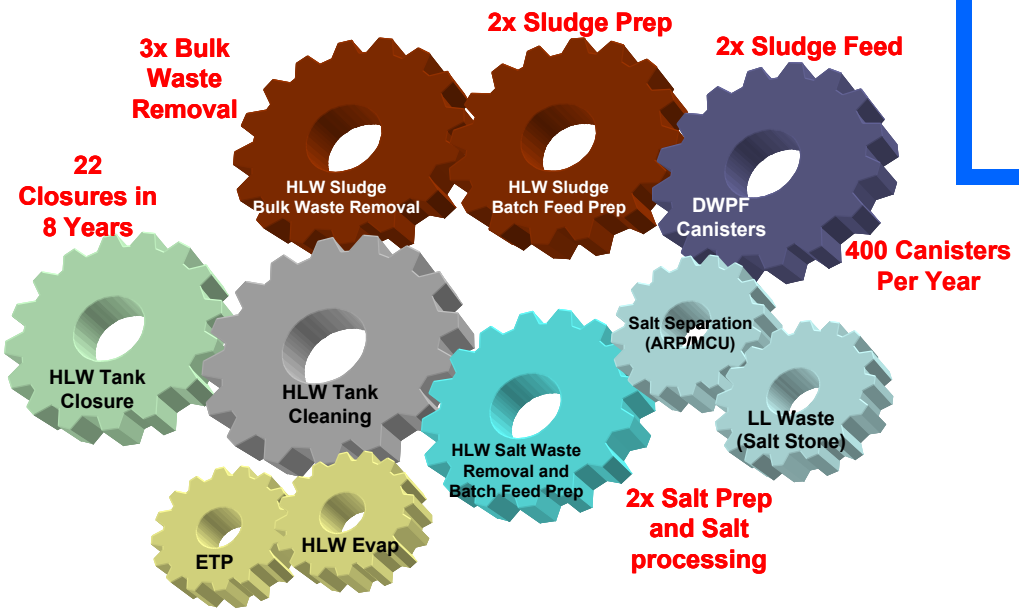
Integrated Safety Management System

Manages Hazards

Liquid Waste Project Risk Management Approach

- Consistent with typical Project Management Process
- Covers entire Liquid Waste lifecycle
- Multiple categories: Business, Technical, Programmatic, etc.
- Risks change over life of project
- Real-time evaluation of risks and monthly review
- Annual formal Top-to-Bottom update of risks
  - Original Technical and Programmatic Risk Assessment Report issued in 2006
  - Revision 5 supports System Plan Revision 15

Current Top Ten



Area of Concern	Strategy to Address
1. Equipment Reliability	System Health Monitoring, Maintenance Program and Spare Parts
2. Major System Failure (for example, Melter or Evaporator)	System Health Monitoring, Spares, Development of Repair Techniques
3. Tank Space Availability when Needed	Integrated System Planning
4. Tank Leak Sites Reduce Useable Space	Structural Integrity Program
5. Characterization of Waste	Early sampling and analysis, Development of robust processes to accommodate varying composition
6. Technology Readiness	Testing, mock-up, lessons learned from DOE complex
7. Salt Waste Processing Facility Start-Up Delayed or Processing Rate Limited	Interim Salt Disposition Project, Supplemental Salt Treatment Processes
8. Meeting Tank Cleanliness Requirements for Closure	Use of new technologies included Enhanced Chemical Cleaning
9. Availability of Closure Documentation	Integrated Planning and Development with Stakeholders
10. Integration/Coupling of Execution Activities	Integrated System Planning, Integrated Operations and Projects Planning and Scheduling

System Health Process

Formal reporting via two formats

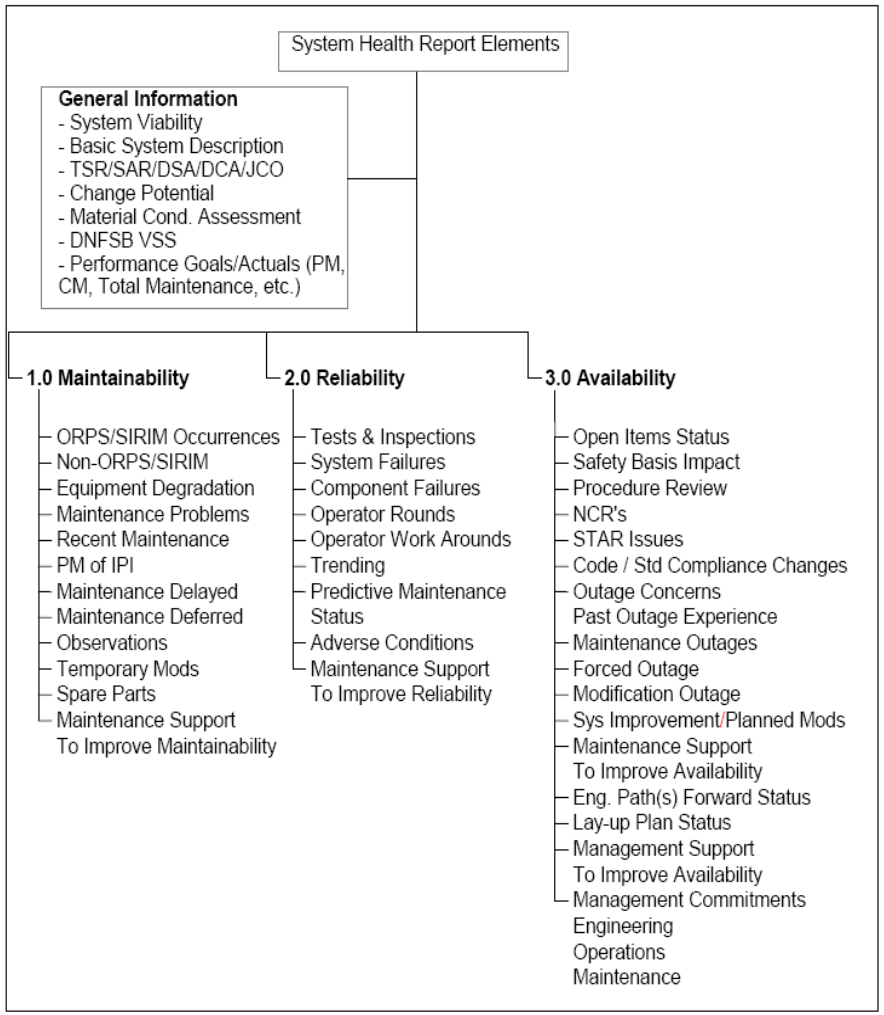
- Performance Monitoring Report (short form-monthly/quarterly frequency)
- System Health Report (Formal Report-annual or biannual)

Performance Monitoring Report Topics:

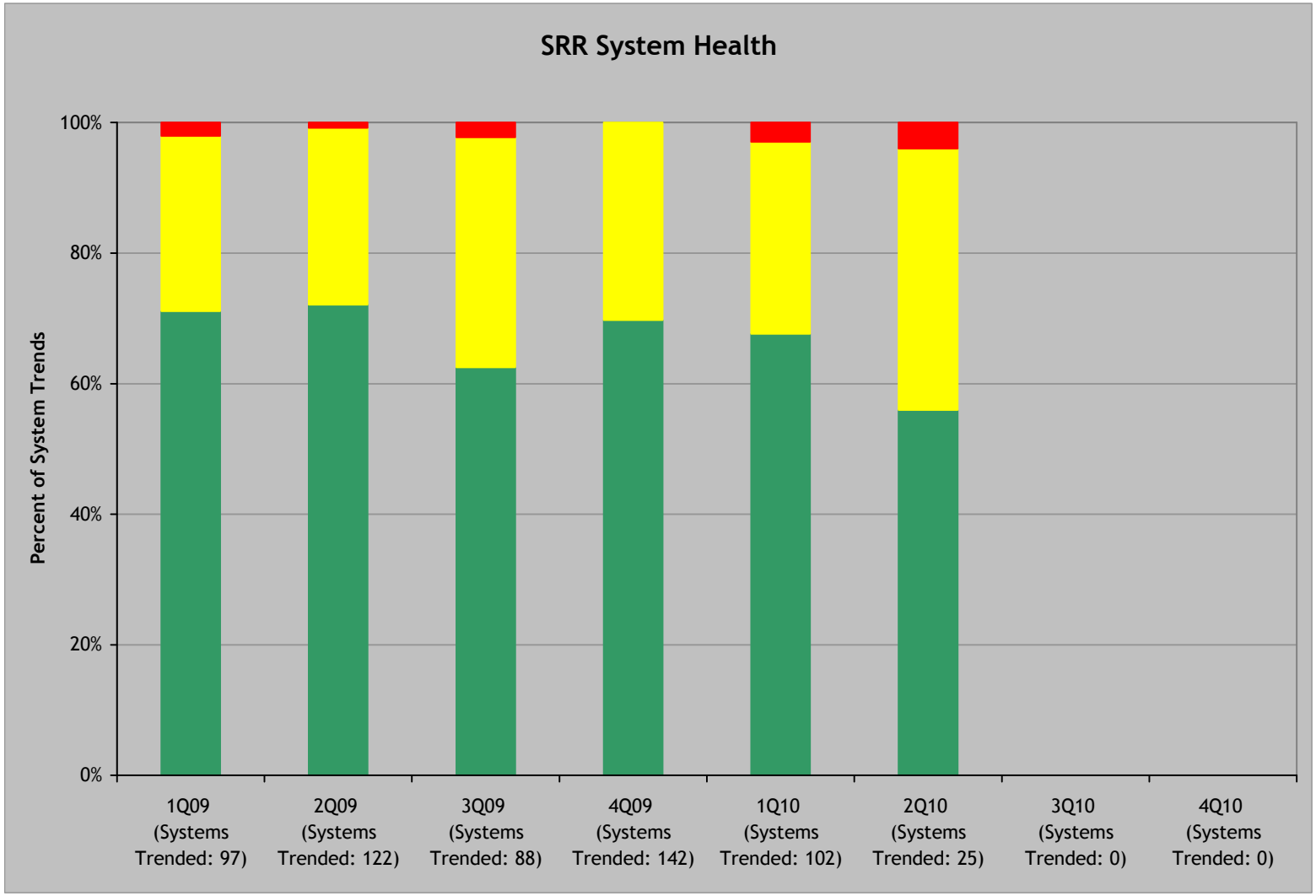
- Overall summary including System Status Grading
  - Green-Available with no degradation, minor corrective issues, no adverse trends
  - Yellow-Available, but in a degraded condition requiring compensatory actions. Has persistent issues requiring maintenance. Degradation trend noted, but no an immediate issue.
  - Red-System is unavailable. System has high equipment vulnerability such as end of life with no spares, near term failure likely
- Trend analysis-summary of key performance trends
- Maintenance Impacts-notification of significant material condition or performance issues and maintenance history
- System Walkdown Observations
- Actions-identify new actions based on current review

Purpose is to ensure systems are performing as required and define actions to keep it that way for the mission life (viability)

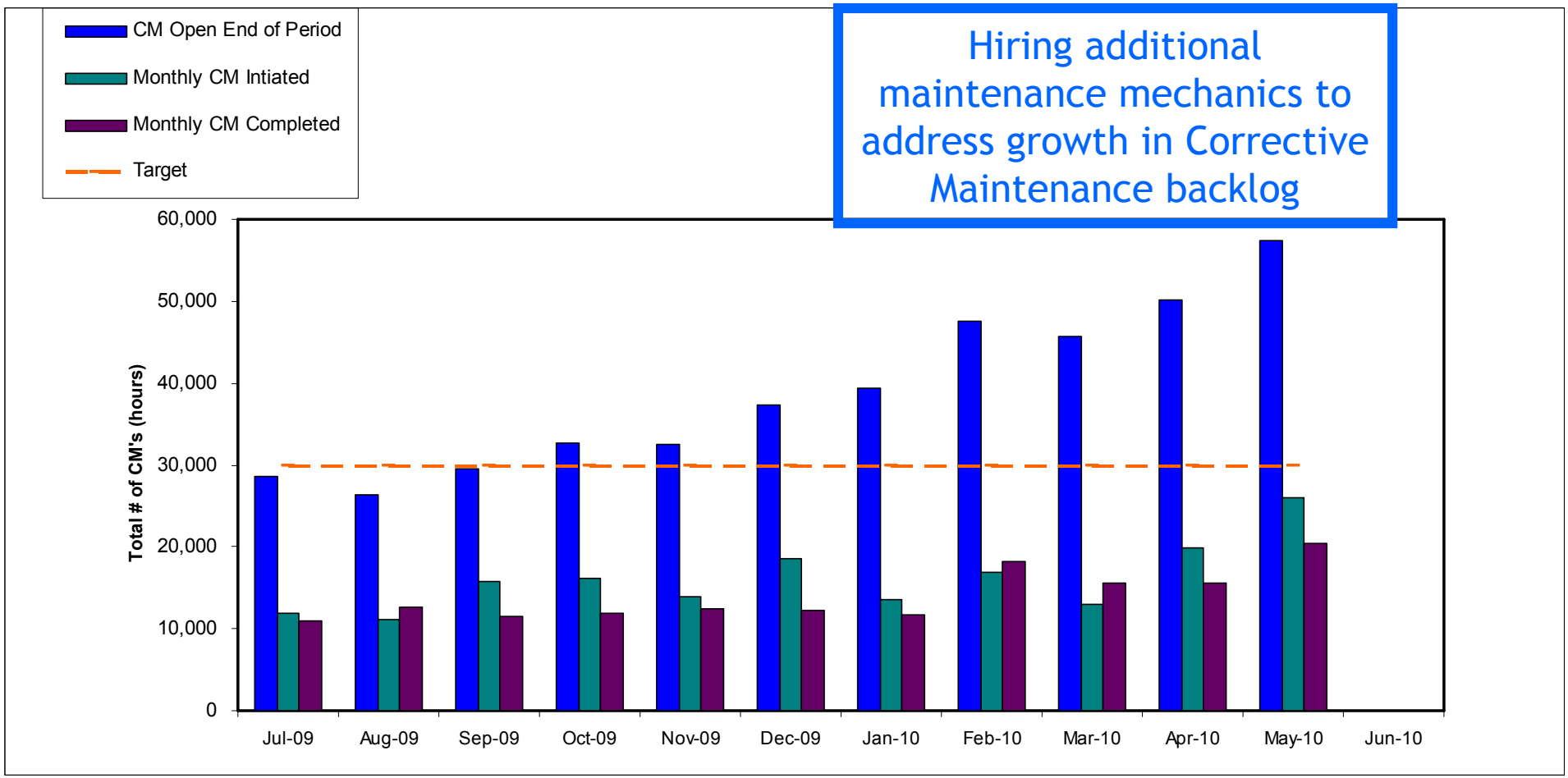
Considerations for System Health Reports



System Health Performance

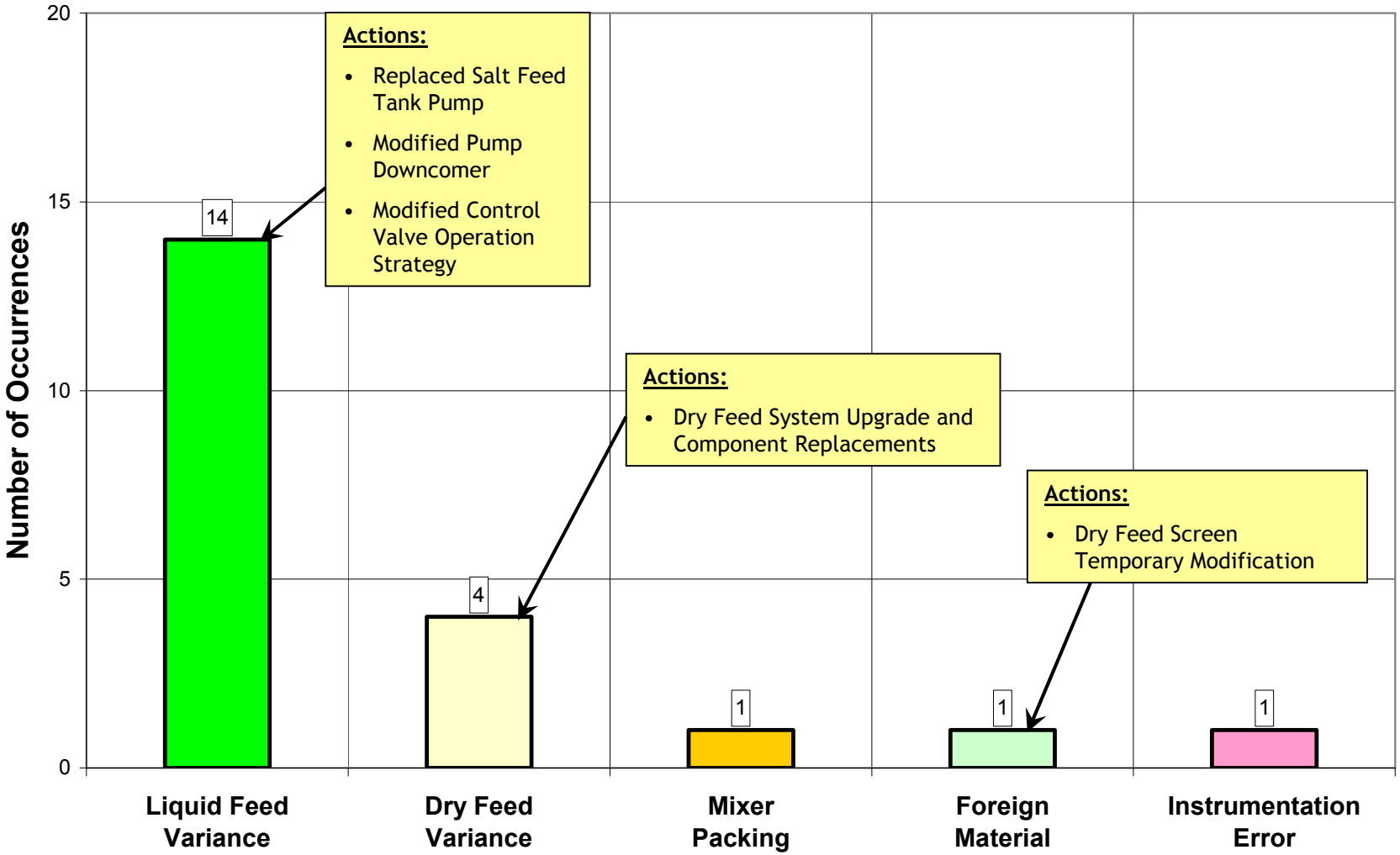


Corrective Maintenance Indicator



Hiring additional maintenance mechanics to address growth in Corrective Maintenance backlog

Process Performance Analysis



Unplanned Process Shutdowns
December 2009 through July 2010

Equipment Reliability Risk Examples

Risk #12

DWPF Equipment Failure (Excluding Melter)

Risk

- Equipment failure and lack of adequate equipment spares results in degraded facility performance and decreased canister production rates.

Handling

- Replenish assembled unit spares – **In Progress**
- Revalidate spare equipment list - **Complete**
- Verify spares are maintained on hand – **In Progress**
- Procure additional spares as needed – **In Progress**
- Projectize procurement of spares – **In Progress**
- Investigate system life extension - **Complete**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Very Likely - 1 Year	Likely - 6 Months

Risk #11

Tank Farm Equipment Failure (Excluding Transfer Lines or 3H Evaporator Pot)

Risk

- Equipment failure and lack of adequate equipment spares or unavailability of utilities results in unplanned facility outages.

Handling

- Initiate HTF Utility Services Upgrade project – **In Progress**
- Revalidate spare equipment list - **Complete**
- Projectize procurement of spares – **In Progress**
- Investigate system life extension - **Complete**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Very Likely - 3 Months	Likely - 2 Months

Risk #295

Tank Farm Transfer Line Failure

Risk

- Tank Farm transfer line outer jacket degrades and as a result the transfer line cannot be used as required.

Handling

- Develop and deploy transfer line repair technologies – **In Progress**
- Perform modifications to install additional protection – **In Progress**
  Identify an alternate 2H evaporator concentrate receipt tank and be staged to perform conversion in the event of a Tank 38 Gravity Drain Line outer jacket failure – **In Progress**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Likely - 1 Year	Unlikely - 4 Months

Risk #289

DWPF Infrastructure Failure Forces DWPF Outage

Risk

- DWPF infrastructure (steam, HVAC, rail, power, etc.) degrades significantly and fails resulting in a DWPF production outage.

Handling

- Implement recommendations of system health evaluations – **In Progress**
- Perform life extension study on DWPF ventilation systems and implement identified upgrades – **In Progress**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Very Likely - 6 Months	Avoided

Major System/Component Failure Risk Examples

Risk #13

Tank 49 Feed Pump Failure

Risk

- Transfers from Tank 49 to SWPF will be required every 21 hours. Failure of the Tank 49 to SWPF transfer/feed pump will result in a reduction in the SWPF throughput.

Handling

- Procure and install a redundant transfer/feed pump in Tank 49– **In Progress**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Very Likely - 1 Year	Avoided

Risk #344

3H Evaporator Pot Failure

Risk

- Failure of the 3H Evaporator pot impacts DWPF sludge batch preparation

Handling

- Prepare procurement specification for spare 3H evaporator pot– **In Progress**
- Procure a spare 3H Evaporator pot – **After RHS above**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Very Unlikely - 18 Months	Very Unlikely - 3 Months

Risk #18

Saltstone Processing Facility major equipment failure

Risk

- Failure of an essential component impacts processing at Saltstone

Handling

- Identify and implement actions to optimize throughput to support ARP/MCU operations – Complete
- Identify and implement actions to optimize throughput to support SWPF operations – In Progress
- Evaluate alternatives to SPF to enhance capacity and reliability – In Progress
- Projectize procurement of spares – In Progress
- Investigate system life extension - Complete

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Very Likely - 6 Months	Likely - 6 Months

Risk #21

Replacement Melter Failure

Risk

- Following a melter replacement, the replacement melter prematurely fails (less than 6 years of operation).

Handling

- Utilize system health data to identify improvements for future melters – **In Progress**

Unmitigated Lifecycle Risk	Most Likely Residual Lifecycle Impact
Likely - 2 Years	Likely - 3 Months

Summary

- Risk changes over life of program
  - Real-time evaluation of risks and monthly review
  - Annual formal Top-to-Bottom update of risks
  - Risk profile is improving
- Equipment Reliability and Major Equipment failures are top areas of concern
- Specific risks are analyzed by subject matter experts who identify executable Risk Handling Strategies
- Risk Handling Strategies are included on an Integrated Priority List
- No risks prevent program completion

Questions?

Grading of Programmatic Risks

Example Likelihood Criteria

Very Likely	≤ 10 years
Likely	10-25 years
Unlikely	25-50 years
Very Unlikely	> 50 years

Example Consequence Criteria

Negligible	< 3 month delay
Marginal	3-12 months delay
Significant	1-2 years delay
Severe	>2 years delay

Figure 3 – Risk Level Matrix

Likelihood (L)	Negligible	Marginal	Significant	Severe (Critical)	Very Severe (Crisis)
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				

Consequence (C)

* Normally limited to assessing residual risks with Very Severe (Crisis) consequences

Example Risk Status Report

ID	Title	Risk Level	Review Date	Status: Transferred	Closed	Acceptable Risk	Minor Concern	Major Concern	Remarks
034	DWPF Impacted by Chemistry/Rheology of Sludge Waste Feed	Low	4/21/2010				●		Melter performance improvements being investigated. Research has been performed and implementation of melter bubbler mixing is underway to be installed by September 2010.
036	Sampling and Analysis of Salt Feed to ISDP Shows SPF WAC Cannot be Met After Processing	Low	5/5/2010			●			Batches are being sampled and to date they meet the WAC.
037	DWPF Impacted by Chemistry of Salt Waste Feed	High	4/21/2010				●		The need for additional characterization is being evaluated. Characterization data and operating lessons learned during ARP/MCU operations will be used in optimizing sludge batch compatibility with the SWPF waste stream for processing at DWPF.
040	Salt Dissolution Results in the Precipitation of Gibbsite	Moderate	5/5/2010			●			Investigating methods to avoid gibbsite formation.
041	Formation of Sodium Aluminosilicate in a Salt Tank	Moderate	5/5/2010				●		Developing flowsheets and mathmatical models for salt removal that avoid criticality.
042	Salt Waste Heel or Tank Annuli Waste Cannot be Processed Through SWPF	High	5/5/2010				●		Developing a flowsheet with additional feed treatment or processing modifications.
045	Higher Curie Sludge Impacts DWPF Canister Production	Low	5/6/2010			●			Sludge batch sampling, blending strategy development and qualification are being performed.
048	Sludge Physical Properties Cause Delays in Meeting Sludge Feed Objectives	Low	4/19/2010				●		Physical characteristics of waste are being determined and used in development of removal technologies that can tolerate variability in waste characteristics.
069	Higher Than Expected Cs Levels in Salt Solution Impact Processing	Low	5/5/2010			●			Batches are being sampled and no concerns have been identified to date.
070	Rogue Constituents in SWPF Feed	Moderate	5/5/2010				●		Evaluating the need for additional sampling and testing and developing tank sequencing / blending strategies.
071	Unknown Physical Properties in Heel Material During Mechanical Heel Removal	Low	4/20/2010				●		ECC is being deployed to handle this risk.
074	MCU Feed Requirements not met by ARP Processing Strategy (Filter Breakthrough)	Low	5/5/2010			●			Robust filter design provides protection and a basis to accept this risk.

Content changed from last update

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

Example Risk Assessment Form

PBS SR-0014 **Risk Assessment Form**

ID Number: 012 **Revision:** 03 **Last Date Evaluated:** 8/12/2009 **Status:** Active

Statement of Residual Risk: Premature failure of installed spare equipment leads to canister production downtime while a new replacement is procured.

Residual Likelihood:	Likely	**Basis:** Based upon the 20+ years of remaining operation of the DWPF, the potential for a premature failure of an installed spare is likely.
Residual Consequence:	Significant	**Basis:** Premature failure of an installed spare is estimated to cause a canister production outage period judged to be up to 1 year in duration. Out-year residual impact of 1 year schedule delay, near-term residual impact of $10M to procure a new major equipment spare.
Residual Risk Level:	**Moderate**	

NEAR TERM Residual Impact			
	Best Case	Most Likely	Worst Case
Residual Cost Impact ($K):	10,000	10,000	10,000
Residual Schedule Impact :	0	0	0

Basis of NEAR TERM Cost and Schedule Impacts:
Basis - Near-term residual risk for all cases is the cost to procure a new major equipment spare. ($10M)

OUT YEAR Residual Impact			
	Best Case	Most Likely	Worst Case
Residual Cost Impact :	0	225,000	450,000
Residual Schedule Impact (Mos):	0	6 Mths	12 Mths

Basis of OUT YEAR Cost and Schedule Impacts:
Basis - Worst Case: Immediate premature failure of installed spare. Assume 1 year to procure and install replacement.
Most Likely Case: Spare equipment operates for 6 months before failure. Procurement of a replacement begins upon installation of spare. Assume 6 additional months to complete procurement and install replacement.
Best Case: Spare equipment operates for 12 months and does not fail until a suitable replacement is available. No significant canister production downtime is experienced.

LIFE CYCLE Residual Impacts (total of Near Term and Out Year)			
	Best Case	Most Likely	Worst Case
Residual Cost Impact :	10,000	235,000	460,000
Residual Schedule Impact (Mos):	0	6 Mths	12 Mths

Basis of LIFE CYCLE Cost and Schedule Impacts:
Residual impact based on total life cycle

Risk Assumptions : 13. DWPF will produce canisters at maximum throughput for the duration of the program (based on achievable melt rate, planned outages, and waste loading for sludge being processed). DWPF near-term canister production is based on revised sludge mass values. Production of salt-only cans is acceptable to DOE.

Event Comments: The risk of a premature DWPF melter failure is addressed under Risk 021. The failure to provide a spare DWPF melter is addressed under Risk 022.