

RL-675 (03/99)

United States Government

Department of Energy
Office of River Protection

memorandum

DATE: **NOV 14 2003**
REPLY TO
ATTN OF: ESQ:SV 03-ESQ-079

SUBJECT: ASSESSMENT TO VERIFY THE CLOSURE AND EFFECTIVENESS OF
CORRECTIVE ACTIONS BY CH2M HILL HANFORD GROUP, INC. IDENTIFIED
IN THE RESPONSE TO THE PRELIMINARY NOTICE OF VIOLATION (PNOV)

TO: Stephen M. Sohinki, Director
Office of Price-Anderson Enforcement
EH-10, HQ

Reference: CH2M HILL letter from E. S. Aromi to S. M. Sohinki, EH-10, "Reply to Preliminary Notice of Violation and Proposed Imposition of Civil Penalty \$82,500 Dated August 29, 2003," CH2M-0303687, dated September 24, 2003.

In the Reference, CH2M HILL Hanford Group, Inc. (CH2M HILL) responded to the Office of Price-Anderson Enforcement's PNOV with the identification of corrective actions implemented to address the following issues:

- Inadvertent Isolation of the Safety Class Leak Detection System;
- Repeated Dilution Tank Overflows;
- Inadequacies in Dome Loading Controls; and
- Weaknesses in Management and Independent Assessments.

In October 2003, the U.S. Department of Energy, Office of River Protection (ORP) verified the completion and effectiveness of all the corrective actions identified in the CH2M HILL response. The assessors interviewed CH2M HILL personnel and management responsible for implementing the corrective actions, and reviewed CH2M HILL procedures, drawings, specifications, evaluations, analyses, logbooks, and records to verify processes had been established and effectively implemented to resolve the problems and to prevent recurrence.

The ORP assessors concluded the Contractor had established and effectively implemented the corrective actions as outlined in their response to the Office of Price-Anderson Enforcement. Based on the assessment results, ORP will close the following five NTS reports:

- NTS-RP-CHG-TANKFARM-2002-0005
- NTS-RP-CHG-TANKFARM-2002-0006
- NTS-RP-CHG-TANKFARM-2002-0008
- NTS-RP-CHG-TANKFARM-2002-0009
- NTS-RP-CHG-TANKFARM-2002-0014

Mr. Steven M. Sohinki
03-ESQ-079

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Attached is a copy of the report documenting the corrective action verification. If you have any questions, please contact me, or your staff may contact Robert C. Barr, Office of Environmental Safety and Quality, (509) 376-7851.


Roy J. Schepens
Manager

Attachment

A-03-ESQ-TANKFARM-008

U.S. DEPARTMENT OF ENERGY
Office of River Protection
Environmental Safety and Quality

ASSESSMENT: VERIFICATION OF CLOSURE AND EFFECTIVENESS OF
CORRECTIVE ACTIONS ASSOCIATED WITH THE CH2M HILL
HANFORD GROUP, INC. RESPONSE TO THE PRELIMINARY
NOTICE OF VIOLATION

REPORT: A-03-ESQ-TANKFARM-008

FACILITY: CH2M HILL Hanford Group, Inc.

LOCATION: P.O. Box 1500, H6-63
Richland, Washington 99352

DATES: October 6 through 21, 2003

ASSESSORS: S. Vega, Lead Assessor
P. Hernandez, Assessor

APPROVED BY: P. Carrier, Team Lead
Verification and Confirmation Official

EXECUTIVE SUMMARY

INTRODUCTION

On August 29, 2003, the Office of Price-Anderson Enforcement issued a Preliminary Notice of Violation stating the U.S. Department of Energy (DOE) determined that violations of the nuclear safety rule had occurred. In the response,¹ CH2M HILL Hanford Group, Inc. (CH2M HILL) identified the corrective actions implemented to address the issues in the DOE letter. During the period of October 6 through 22, 2003, the DOE Office of River Protection (ORP) verified the completion and effectiveness of those corrective actions committed to by CH2M HILL. This assessment covered the following specific areas:

- Inadvertent Isolation of the Safety Class Leak Detection System
- Repeated Dilution Tank Overflows
- Inadequacies in Dome Loading Controls
- Weakness in Management and Independent Assessments.

The assessors concluded that CH2M HILL had established and effectively implemented all the corrective actions committed in their response to the DOE.

SIGNIFICANT OBSERVATIONS AND CONCLUSIONS

Inadvertent Isolation of the Safety Class Leak Detection System

The assessors verified the completion and effectiveness of the seven corrective actions associated with Noncompliance Report NTS-RP-CHG-TANKFARM-2002-0008 titled, "Loss of AN-101 and AN-104 Primary Tank Leak Detection System," reported on October 24, 2002. Two Occurrence Reports (RP-CHG-TANKFARM-2002-0094 and RP-CHG-TANKFARM-2002-0091), and a Problem Evaluation Report (PER-2002-4545) addressed an event in which some safety class leak detectors were inadvertently isolated during a lockout/tagout for unrelated work. This was caused by weakness in the training and qualification of individuals preparing work isolations. The assessors verified closure and effectiveness of 32 additional corrective actions identified in these reports.

To verify corrective action completion, the assessors reviewed CH2M HILL procedures, electrical drawings, specifications, evaluation and assessment reports, training plans, and records to verify processes had been established and effectively implemented to prevent recurrence. The assessors interviewed several key CH2M HILL management and staff members who were instrumental in the resolution of the leak detection inadequacies.

Corrective Action 2 of NTS-RP-CHG-TANKFARM-2002-0008 required the development of an engineering task plan to identify, categorize, and prioritize 120/240 volt electrical panel boards within Tank Farm facilities with TSR equipment that require electrical load identification. The

¹ Letter from E. S. Aromi, CH2M HILL to S. M. Sohinki, Office of Price Anderson Enforcement, "Reply to Preliminary Notice of Violation and Proposed Imposition of Civil Penalty \$82,500 Dated August 29, 2003," CH2M-0303687 dated September 24, 2003.

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task plan was to include an estimate of the resources necessary to revise panel board schedules as required to ensure all electrical loads. This corrective action was changed due to the cost of completing the action. The revised corrective action was focused on providing sufficient training to allow the use of existing panel board drawings by teaching the Lockout/Tag out personnel to compensate for drawing errors. This change to the corrective action was not reflected in the NTS report, but it was documented within the CH2M HILL corrective action records. The corrective action verification performed by the assessors was based on the changes documentation in CH2M HILL corrective action records.

The assessors concluded that all corrective actions have been completed, and CH2M HILL had established processes to effectively address the lockout/tag-out problems.

Repeated Dilution Tank Overflows

The assessors verified completion and the effectiveness of the 8 corrective actions associated with Noncompliance Report NTS-RP-CHG-TANKFARM-2002-0006 titled, "Overfill of Dilution Tanks," reported on September 5, 2002, and with Noncompliance Report NTS-RP-CHG-TANKFARM-2002-0009, titled, "Reporting of Dilution Tank Overfills," reported October 24, 2002. Corrective actions addressed the failure of Tank Farm contractor operators to control and report the release of water from the dilution tanks. The assessors verified closure and effectiveness of an additional 31 corrective actions identified in the related Occurrence Reports and Performance Evaluation Reports.

To verify corrective action completion, the assessors reviewed CH2M HILL procedures, drawing changes, evaluation and assessment reports, training plans, and other records to verify processes had been established and effectively implemented to prevent recurrence. The assessors interviewed several key CH2M HILL management and staff members who were instrumental in the resolution of the dilution tank overflow problem.

Corrective Action 5 of NTS-RP-CHG-TANKFARM-2002-0006 required the use of the temporary round sheets to be used and the process incorporated into the operating procedures. The use of round sheets was initiated via shift instructions, and round sheets were used as directed during the interim until design changes to the dilution tanks were implemented. The procedures were never revised because implementation of dilution tank design changes was timely and in place before procedures could be revised. The NTS report did not reflect this change in the corrective action, but the assessors verified there was no impact the final resolution of the issue.

The assessors concluded all corrective actions were completed, and CH2M HILL had effectively addressed the problems with the overfilling of dilution tanks.

Inadequacies in Dome Loading Controls

The assessors verified completion of the 12 corrective actions associated with Noncompliance Report NTS-RP-CHG-TANKFARM-2002-0005 titled, "Inadequacy in Dome Loading Controls," reported on May 6, 2002. The assessors also evaluated the effectiveness of CH2M HILL's responses and completed actions. During calendar year 2002, there were a series of occurrences in which Tank Farm contractor personnel failed to control the weight loading on some tanks. These

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controls were specified in technical safety requirements. Numerous PERs and Occurrence reports were written reporting non-compliances and repetitive problems. These events resulted in additional corrective actions totaling 57 as of September 2003. The assessors verified closure and effectiveness of the completed corrective actions associated with these PERs and Occurrence reports.

To verify corrective action completion, the assessors reviewed CH2M HILL procedures, analyses/evaluation reports, specifications, assessments, logbooks, and records to verify processes had been established and effectively implemented to correct the problems and prevent recurrence. The assessors interviewed several key CH2M HILL management and staff members who were instrumental in the resolution of dome loading issues.

The assessors concluded all corrective actions have been completed, and CH2M HILL had established processes to effectively address dome loading issues at the Tank Farms. The Contractor had allocated resources (personnel, time, and funds) to adequately implement a new Dome Loading Controls Program.

Two remaining corrective actions, which were identified as incomplete in the response letter include:

- 1 "Extend barriers and posting at all miscellaneous tanks out to the respective exclusion zone boundaries," due December 31, 2003.
- 2 "End Point Assessment Description: Query the PER database for instances of new exclusion zone excursion events. Determine if any events identified are the direct result of inadequate corrective actions as implemented by this root cause analysis corrective action plan. Document adverse findings in a new PER," due January 28, 2004.

Once notified by the Contractor that actions are completed, ORP will perform verification of corrective action completion and effectiveness.

Weaknesses in Management and Independent Assessments

The assessors verified completion of the 15 corrective actions associated with Noncompliance Report NTS-RP-CHG-TANKFARM-2000-0014 titled, "Management and Independent Assessments" reported on July 21, 2000. The assessors also evaluated the effectiveness of CH2M HILL's responses and completed actions. On January 12, 2002 CH2M HILL issued PER-2002-0964 to address additional weaknesses with assessment activities. Program weaknesses included inadequate scope, inadequate corrective actions, and a lack in defined program expectations. This resulted in an additional 12 corrective actions to further strengthen the management and independent assessment processes. The assessors verified the completion and effectiveness of these additional 12 corrective actions.

To verify corrective action completion, the assessors reviewed CH2M HILL procedures, evaluation reports, specifications, assessments, training course outlines, and records to verify completion of and required training and to verify processes have been established and effectively implemented to correct the problems and prevent recurrence. The assessors interviewed several

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key CH2M HILL management and staff members who were instrumental in correcting the problems and establishing the CH2M HILL integrated management and independent assessment program.

Corrective actions for NTS-RP-CHG-TANKFARM-2000-0014 were implemented as required, but continuing improvement activities have further evolved the process for management and independent assessments. These evolutions have impacted the NTS corrective actions by changing what was implemented for corrective actions number 3 and 6. The changes were not reflected in the NTS report, but the assessors verified the changes made met the intent of the original corrective actions.

The assessors concluded all corrective actions have been completed, and the processes CH2M HILL had implemented to correct the management and independent assessment problems were effective.

Attachment:

Verification matrix

Attachment – Verification Matrix

Leak Detection inoperability Issue			
Reviewed Document: NTS No. 2002-0008 – Loss of AN-101 and AN-104 Primary Tank Leak Detection System			
Summary: Corrective actions and compensatory measures verified were effectively implemented.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Compensatory measure 1 (Tab item 1)	Initiate engineering review of lockout/tag-out or caution tag authorization that would change facility configuration for impact to AB/OSD equipment and systems for communication to the CCC.	<ul style="list-style-type: none"> Standing Order TWO-02-13 Standing Order WFO-02-13 Occurrence Report RP-CHG-TANKFARM-2002-0091 	Standing orders put this review in place for all required activities. The occurrence report documents this was initiated in Standing Order TWO-02-13 and continued in Standing Order WFO-02-13 which supersedes the previous standing order. Effectiveness of this temporary activity is based on the successful resolution of the Leak detection inoperability and the associated LO/TO problem.
Compensatory measure 2 (Tab item 2)	Notify affected facility management of the event and compensatory measures that would effect their organizations.	<ul style="list-style-type: none"> RP-CHG-TNKFARM-2002-091-2002-091 Interviewed Deputy Director, Construction 	Verbal notification only, and discussed with CAB. The occurrence report also indicated this was done. Effectiveness of this temporary activity is based on the successful resolution of the Leak detection inoperability and the associated LO/TO problem.
Compensatory measure 3 (Tab item 3)	Initiate qualification suspension pending completion of the investigation and follow on actions	<ul style="list-style-type: none"> Interviewed Deputy Director, Construction 	Interview indicated this activity was completed. No documentation was available. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Compensatory measure 4 (Tab item 4)	Initiate temporary removal of affected personnel from bargaining unit overtime list due to suspension of qualifications.	<ul style="list-style-type: none"> Interviewed Deputy Director, Construction 	Interview indicated this activity was completed. No documentation was available. Effectiveness of this temporary activity is based on the successful resolution of the Leak detection inoperability and the associated LO/TO problem.

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Compensatory measure 5 (Tab item 5)	Notify Industrial relations of qualification suspension actions being taken and path forward.	<ul style="list-style-type: none"> Interviewed Deputy Director, Construction 	Interview indicated this activity was completed. No documentation was available. Effectiveness of this temporary activity is based on the successful resolution of the Leak detection inoperability and the associated LO/TO problem.
Compensatory measure 6 (Tab item 6)	Review effects on planned work activities for Monday 8/26/02	<ul style="list-style-type: none"> This NTS report documents there was no impact Event Investigation Team (EIT) report #2002-040, 271-AN <i>Lock-N-Tag and Missed Surveillance Event</i> 	The NTS and EIT report both document that the results of this review which was to collect information. There was no other formal documentation. Effectiveness of this temporary activity is based on the successful resolution of the Leak detection inoperability and the associated LO/TO problem.
Compensatory measure 7 (Tab item 7)	Complete Identification of other active lock/tag-out authorization reviews performed by Operations Engineers involved in the event	<ul style="list-style-type: none"> Event Investigation Team (EIT) report #2002-040, 271-AN <i>Lock-N-Tag and Missed Surveillance Event</i> Interviewed Director of Engineering Services Interviewed one Shift Director 	From interviews it was determined this activity was performed. EIT report indicates this activity was in progress. Effectiveness of this temporary activity is based on the successful resolution of the Leak detection inoperability and the associated LO/TO problem.
Corrective Action No. 1 (Tab item 8)	Perform root cause analysis and develop corrective action plan to prevent recurrence.	<ul style="list-style-type: none"> Reviewed the root cause analysis and corrective action plan. Reviewed the Problem Evaluation Requests (PERs) associated with the corrective action plan. Interviewed the PAAA evaluator responsible for this NTS report Interviewed personnel responsible for the root cause analysis Interviewed Engineering Manager (2/20/02, and 10/16/03, and 4/17/03) Per 2002-4545 	<ul style="list-style-type: none"> Root cause was identified and corrective actions specified Effectiveness of this activity is based on the eventual successful resolution of the Leak detection inoperability and the associated LO/TO problem.

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>Corrective Action No. 2 (Tab item 9)</p>	<p>Prepare an engineering task plan to identify, categorize, and prioritize 120/240 volt electrical panelboards within Tank Farm facilities with TSR equipment that require electrical load identification. The task plan will include cost estimates and identify the resources necessary to revise panelboard schedules to ensure all electrical loads are identified. This plan will be provided to CHG senior management for funding decisions.</p>	<ul style="list-style-type: none"> • Interview with cognizant engineering manager • Interview with PAAA Director • Reviewed task plan • Reviewed Corrective Action • Review Board minutes addressing this issue (2/20/02, and 10/16/03, and 4/17/03) • Reviewed Per 2002-4545 	<ul style="list-style-type: none"> • Cost was found to be prohibitive. CH2M HILL decided instead to rely on training of LO/TO personnel. • This is not reflected in the NTS report, which presently implies that drawing errors will be systematically corrected. On 7/17/03, CH2M Hill updated the corrective action database to reflect their focus on training personnel to use the existing drawings, rather than correcting all of the drawings. • CH2M Hill has trained personnel to compensate for drawing errors during LO/TO review process. • Effectiveness of this activity is based on the eventual successful resolution of the Leak detection inoperability and the associated LO/TO problem.
<p>Corrective Action No. 3 (Tab item 10)</p>	<p>Revise drawing H-14-030001, Sheet 7, Rev. 6 for the AN271-EDS-DP-101 panelboard schedule to correct the load description for Breaker #11. Also provide a roadmap drawing to the elementary diagrams associated with the loads fed from the AN271-EDS-DP-101, 120/240 volt distribution panelboard.</p>	<p>Reviewed completed drawings and wiring diagrams (revised)</p>	<p>Design documents were properly changed as described. Corrective action was effective.</p>
<p>Corrective Action No. 4</p>	<p>Revise procedure TFC-OPS-OPER-C-05 to include identification of AB/OSD equipment impacts during</p>	<p>Reviewed procedure change</p>	<p>The procedure was changed appropriately. Effective implementation is accomplished by the training addressed in following corrective actions.</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
(Tab item 11)	preparation of the Lockout/Tagout Authorization Form.		
Corrective Action No. 5 (Tab item 12)	Revise Lock and Tag Technical Reviewer Qualification Card and Guide (3505830) to include a demonstration of familiarity with the Hanford Document Control System (HDCS) and include an objective performance demonstration that will verify proficiency in the use of Tank Farm Drawings and HDCS.	<ul style="list-style-type: none"> • Reviewed revised qualification card • Interviewed managers responsible for qualification card changes 	Qualification card changes were made. Effectiveness is based on no additional events
Corrective Action No. 6 (Tab item 13)	Require currently qualified Lock and Tag Technical Reviewers to successfully complete the performance demonstration within 90 days, after which time qualification for those not successfully completing this performance demonstration will be suspended. The System Engineer required lockout/tagout review will not be required after this performance demonstration is complete.	<ul style="list-style-type: none"> • Interviewed individuals responsible for accomplishing the training • Interviewed PAAA evaluator responsible for this item • Reviewed revised qualification cards • Reviewed list provided by training of the population required to be trained – population was 61. All were trained 	Qualification cards were revised and all retraining was completed. Activity was found to be effective.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action No. 7 (Tab item 14)	Issue the CARB approved significant PER-2002-4545 and corrective action plan as electronic required reading to all LO/TO administrators and Technical reviewers	<ul style="list-style-type: none"> • Reviewed required reading report maintained by training indicating the PER was assigned as required reading and all required to read completed the task • Per database indicated the PER was issued 	Activity was completed and effective in elevating awareness of the LO/TO problem
Corrective Action No. 8 (Tab item 15)	Include the root cause analysis for this event in the Initial Lockout/Tag-out training	<ul style="list-style-type: none"> • Reviewed lesson plan for <i>CHG Controlling Organization "CO" Lockout/Tagout Initial training</i> (Course 350415) 	Required changes were made. Activity effective in conjunction with all other training provided.

Attachment – Verification Matrix

Leak Detection inoperability Issue			
Reviewed Document: Occurrence Report RP-CHG-TANKFARM-2002-0091 – Loss of AN-101 and AN-104 Primary Tank Leak Detection System (USQ)			
Summary: One corrective action was verified. The corrective action was never performed but was replaced by alternative corrective actions identified in PER 2002-4545			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action CATPR-01-03 (Tab item 16)	Engineering/Operations will develop a load list for TSR related equipment upon completion of the revised Documented Safety Analysis (DSA)	<ul style="list-style-type: none"> • Corrective Action Plan Alternative Evaluation PER 2002-4545, April 17, 2003 • CARB meeting Minutes (CARB Meeting #2003-07, April 17, 03) 	This was never implemented. Instead alternative corrective actions were developed via Per 2002-4545 which were to replace the original commitment.

Attachment – Verification Matrix

Leak Detection inoperability Issue	
<p>Reviewed Document: Occurrence Report RP-CHG-TANKFARM-2002-0094 – De-energized Leak Detectors Were Not identified Due to Incorrect Conduct of Operations (USQ)</p>	
<p>Summary: One expectation in the Facility Manager was verified and found to be effective</p>	

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
(Tab item 17)	The expectation to maintain a questioning attitude and to perform self-checks has been communicated to all levels of the organization.	<ul style="list-style-type: none"> • Review copy of the memo distributed (Dave Amerine to all CH2M HILL Organizations, April 8, 2003) • Interviewed QA and PAAA staff 	Several memos like the one reviewed were distributed as a result of the Notice of Violation. Those interviewed remember reading them. The activity was effective in increasing awareness.

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Leak Detection inoperability Issue			
Reviewed Document: PER 2002-1243			
Summary: Two commitments made by CH2M HILL in the PER were Verified and found to be effective in meeting their intent			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
(Tab item 18)	Evaluation of red line entries revealed no TSR or Safety applicability issues which affect operability of the equipment.	<ul style="list-style-type: none"> Interviewed two individuals from Systems Engineering 	Interviews and the attachment to the PER indicated the review performed. This was an information gathering activity. Effective in that it provided management with information to determine the extent of corrective actions
(Tab item 19)	All Construction Field Work Supervisors have confirmed they have read and understood the current revision of pages 18-21 of the TFC-OPS-MAINT-C-01, <i>Tank Farm Contractor Work Control</i> procedure and the requirements for work package change methods and process requirements.	<ul style="list-style-type: none"> Interviewed the Deputy Director, Construction Reviewed TFC-OPS-MAINT-C-01 	Interview indicated that all Construction Field Work Supervisors were requested to review the procedure and all responded when completed. Also, subsequent revisions to the procedure have been reviewed in the same manner. This has been effective in assuring all Construction Field Work Supervisors understand the process.

Attachment – Verification Matrix

Leak Detection inoperability Issue			
Reviewed Document: Excerpts from the CH2M Hill response to the PNOV letter			
Summary: Corrective actions referred in the CH2M HILL response to the PNOV were Verified and found to be effective in meeting their intent			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
(Tab item 20)	All employees were required to view the videotape	<ul style="list-style-type: none"> • Video tape, <i>Core Values: Honesty, Integrity & Trust</i> • Reviewed course completion forms • Interviewed QA and PAAA staff • Interviewed Deputy VP Closure Projects Manager 	Effective - individuals who viewed the video still remember it and the “Time Out” activities and the message conveyed.
(Tab item 21)	The company initiated the Quality Event Free Clock	<ul style="list-style-type: none"> • Reviewed TFC-OPS-OPER-CD-21.1, Rev A, <i>Quality Event Free Clock</i>, • Reviewed e-mails from CH2M HILL Senior Management implementing the process • Interviewed Deputy Director, Construction 	Process was implemented and status is discussed daily by management every morning in the Decision Makers Meeting. Effective in providing a measurable indicator of real time progress.
(Tab item 22)	Performance appraisals forms were revised to include quality of work as an attribute	<ul style="list-style-type: none"> • Reviewed the Jet Form Employee <i>Performance Appraisal CH2M HILL Hanford Group, Inc.</i> (site form A-6003-475) 	Forms are in place and quality of work is now part of the evaluation.

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
(Tab item 23)	Quality Expectations “Time Out” was held in May 2003 to emphasize the importance of “doing things right the first time.”	<ul style="list-style-type: none"> • Reviewed several of the briefings provided at the various organizations (Engineering, QA, Process Knowledge, ESH&Q, Mission Control) 	Effective - individuals who participated still remember the “Time Out” activities and the message conveyed
(Tab item 24)	The TSR Applicability is no longer used	<ul style="list-style-type: none"> • Reviewed Letter No. CH2M-0302371 dated June 27, 2003 	Effective - Letter notifies DOE the use of the activity was canceled.

Attachment – Verification Matrix

Leak Detection inoperability Issue			
Reviewed Document: PER-2002-4545			
Summary: The PER was not mentioned in the response to the PNOV but was important in resolving the problem it was verified to be complete. Corrective actions were found to be effective.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
DC-01-01	Revise drawing H-14-0300001, Sheet 7, Revision 6 for the AN271-EDS-DP-101 panel board schedule to provide a roadmap to the elementary diagrams associated with the loads fed from the AN271-EDS-DP-101, 120/240 Volt distribution panel boards	<ul style="list-style-type: none"> Reviewed Engineering Drawing transmittal (EDT) # 634698, dated December 5, 2002 Reviewed drawing H-14-105731, <i>Electrical Distribution Panel Board 271AN-EDS-DP-101 Drawing Roadmap</i>, Rev 0 	The required changes were made. Activity was effective in conjunction with the other training provided.
DC-01-02	Issue the CARB approved significant PER-2002-4545 and corrective action plan as an electronic required reading to all LO/TO administrators and technical reviewers.	<ul style="list-style-type: none"> Reviewed required reading report maintained by training indicating the PER was assigned as required reading and all required to read completed the task. Corrective action plan is in the text of the PER. Per database indicated the PER was issued 	The activity was completed and effective in evaluating the awareness of the LO/TO problem. Same as NTS corrective Action #7
DC-01-03	Include the root cause analysis for this event in the initial Lockout/tag out “Operating Experience”	<ul style="list-style-type: none"> Reviewed lesson plan for <i>CHG Controlling Organization “CO” Lockout/Tag out Initial training</i> (Course 350415) 	Required changes were made. Activity effective in conjunction with all other training provided. Same as NTS Corrective Action #8

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
CATPR-01-01	<p>Prepare an engineering task plan to identify, categorize, and prioritize 120/240 volt electrical panel boards within the tank farm facilities with the TSR equipment that require electrical load identification.</p>	<ul style="list-style-type: none"> • Reviewed Task Plan RPP-14525, <i>Identification and Configuration Discrepancy resolution of Electrical Isolation Devices Associated With TSR/SAR Component/System</i> • Reviewed EDT # 614878 • Endpoint Assessment PER for #2002-4545, "Unplanned Loc 3.2.6 Entry Created by Lock & Tag AN Farm, dated October 9, 2003 	<p>Task plan is satisfactory. It was provided to CH2M HILL Senior Management and the CAARB for review. Effectiveness of this activity is based on the eventual successful resolution of the Leak detection inoperability and the associated LO/TO problem.</p>
CATPR-01-02	<p>Perform endpoint assessment. Review PER database to verify that there have been no other instances in which TSR related equipment has been inadvertently disabled as a result of LO/TO where the drawing did not identify TSR related equipment load information.</p>	<p>Assessment resulted in the determination that all corrective actions were completed and effective.</p>	
CATPR-01-03	<p>Revise procedure TFC-OPS-OPER-C-05 to include identification of AB/OSD equipment impacts during preparation of the Lockout/Tagout Authorization Form.</p>	<ul style="list-style-type: none"> • Reviewed procedure changes to TFC-OPS-OPER-C-05 	<p>The procedure was changed appropriately. Effective implementation is accomplished by the training addressed in other NTS corrective actions. Same as NTS corrective action #4</p>
CATPR-01-04	<p>Revise Lock and Tag Technical Reviewer Qualification Card and Guide (3505830) to include a demonstration of familiarity with the Hanford Document Control System (HDCS) and include an objective performance demonstration that</p>	<ul style="list-style-type: none"> • Reviewed revised qualification card • Interviewed managers responsible for qualification card changes 	<p>Qualification card changes were made. Effectiveness is based on no additional events and documented instances in the PER system where potential incenses were caught by process checks before work was initiated (See Per-2003-4075) Same as NTS corrective action #5</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
CATPR-01-05	<p>will verify proficiency in the use of Tank Farm Drawings and HDCS.</p> <p>Require currently qualified Lock and Tag technical Reviewers to successfully complete the performance demonstration within 90 days, after which time the qualification for those not successfully completing this performance demonstration will be suspended. The system engineer required LO/TO review will not be required after this performance demonstration is complete.</p>	<ul style="list-style-type: none"> • Reviewed all new qualification cards for Lock and Tag technical Reviewers • Interviewed individuals responsible for accomplishing the training • Interviewed PAAA evaluator responsible for this item • Reviewed revised qualification cards • Reviewed list provided by training of the population required to be trained – population was 61. All were trained 	<p>Qualification cards were revised and all retraining was completed. Activity was found to be effective. In that no additional incidents have occurred</p>

Attachment – Verification Matrix

Dilution Tank Overflow Issue			
Reviewed Document: NTS No. 2002-0006/0009 – Overfill of Dilution Tanks / Reporting of Dilution Tank Overflows			
Summary: Corrective actions for these two NTS reports are coherent and adequately documented. Overall effectiveness demonstrated by significantly improved performance reflected in “Event-Free Clock.” “Significant Emotional Event” appears to have had a positive overall effect on performance in many areas of the company.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
No. 1 (Tab item 1)	Perform root cause analysis and develop corrective action plan.	<ul style="list-style-type: none"> • Reviewed PERs, EIT report, root cause analysis • Interview with senior responsible manager 	<ul style="list-style-type: none"> • Causes were effectively identified and resolved.
No. 2 (Tab item 2)	Redesign the auto-fill feature. Design Media will be released for each tank independently and in series per the 12-week rolling schedule.	<ul style="list-style-type: none"> • Interviewed cognizant engineering manager. • Reviewed certification of completed design work. • Reviewed Inter Office Memo 76500-03-TMH.002, <i>Corrective Action CATPR-01 Of Problem Evaluation Request 2002-3906</i>(stated action was completed) • Reviewed a sample of corresponding Engineering Change Notices ECN-672358, ECN-674287, ECN-638559, ECN-638554, ECN-672432, ECN-672853, ECN-671555, ECN-672431, ECN-674292 	<p>This corrective action was effective. Once installed, the new automatic filling design prevented the tanks from overflowing – there were no more events after the new overflow prevention features were installed.</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>No. 3 (Tab item 3)</p>	<p>Implement new design on all active saltwell dilution tanks. Installations will be done in series per 12 week rolling schedule.</p>	<ul style="list-style-type: none"> • Interviewed cognizant engineering manager. • Reviewed work package closure documentation for the completed physical work. 	<p>This action was to perform the work identified in item No. 2 above. Since completed, there have been no more overflow events.</p>
<p>No. 4 (Tab item 4)</p>	<p>Issue IS lessons learned.</p>	<ul style="list-style-type: none"> • Interviewed lessons learned coordinator. • Reviewed lessons learned procedure. • Reviewed training rosters of the staff who was briefed. • Reviewed Lessons Learned material provided to staff during briefing 	<p>The lessons learned were issued. Weaknesses in content are overcome by the training corrective actions from items 7 and 8 below. The lessons learned was effective in raising general awareness.</p>
<p>No. 5 (Tab item 5)</p>	<p>Incorporate temporary round sheet into operating procedures. A Temporary Round Sheet was implemented and will be incorporated into the following procedures and any new procedures developed at a later date: TO-210-200 TO-200-026 TO-305-105 TO-305-106 TO-410-101 TO-420-100 TO-410-107 TO-420-111 TO-410-112 TO-420-101 TO-420-102 TO-420-103 TO-505-107 TO-505-108 TO-505-111 TO-270-102 TO-430-102 TO-305-400</p>	<ul style="list-style-type: none"> • Reviewed temporary round sheet and examples of its actual use. • Interviewed Pump Operations Manager • Interviewed NTS verifier 	<p>Round sheet was adequate and was used. The procedures were never revised. The use of round sheets was initiated via shift instructions. Permanent fix (Corrective action #3) was very timely and in place before procedures could be revised.</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>No. 6 (Tab item 6)</p>	<p>Present to Disciplinary Review Board (DRB) for recommended actions for operators who took shortcuts (PER-2002-3282 & 3906)</p>	<ul style="list-style-type: none"> • Reviewed signed statement from Labor Relations • Interview with cognizant manager • Video “Core Values” 	<p>Corrective action was effective.</p> <p>Personnel who failed to report occurrence participated in preparing the video, “Core Values: Honesty, Integrity & Trust.” In the video, the employees admitted their roles in the errors and the reporting failures. This was worked through the union. This video had a positive effect on the safety culture. Additionally, operators involved in reporting failures received termination letters for their files. The letters stipulated that participation in the video mitigated the action; however they each received 30 days of unpaid leave.</p>
<p>No. 7 (Tab item 7)</p>	<p>Perform Needs Analysis to determine if training is needed to address a mindset that human errors are acceptable for IS personnel and if so recommend training to effect change toward error free performance. Areas of suggested inquiry:</p> <ul style="list-style-type: none"> • The personal consequences of a human error that resets the event free clock • How disciplinary process works, what behaviors warrant different levels of discipline, and how disciplinary process dovetails with coaching. • The attitude toward error 	<ul style="list-style-type: none"> • Reviewed completed Needs Analysis. • Interviewed personnel who conducted needs analysis • Interviewed senior training manager 	<p>Needs analysis was comprehensive and very well executed.</p>

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>No. 8 (Tab item 8)</p>	<p>free performance as the rule not the exception</p> <ul style="list-style-type: none"> • What can each person do to eliminate errors. <p>Provide training to IS personnel on preventing human errors.</p> <p>Training to include:</p> <ul style="list-style-type: none"> • What resets the event free clock. • The accountability project and what it means. • What was the impact in cost and lost productivity for the last 6 human errors made by IS personnel. • Examples of individuals who did not proceed in the face of uncertainty or take extra time to do it right & how it paid off. • “Human Error” concept training is currently optional in continuing training. Make it mandatory for IS personnel: <ul style="list-style-type: none"> - Shift Operators - Field Crew Operators - Maintenance - Engineering 	<ul style="list-style-type: none"> • Interviewed personnel who developed and conducted training. • Interviewed senior manager responsible for training • Reviewed training material 	<ul style="list-style-type: none"> • Training was well developed and well executed. • Extended to all organizations within Interim Stabilization (IS), as well as some organizations outside of IS. • Evidence of effectiveness is the remarkable improvement of “Event Free Clock.”

Attachment – Verification Matrix

Dilution Tank Overflow Issue			
Reviewed Document: PER-2002-5502			
Summary: This PER was not listed in CH2M Hill letter, but the root cause used by the NTS was in this PER. Two corrective actions in addition to those in the NTS report were identified. Verified these two corrective actions to be complete.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
CA-01	Generate and publish lessons learned to address tunnel vision demonstrated by management and the root cause team	<ul style="list-style-type: none"> Reviewed RPP Lessons Learned bulletin+ (#IB-03-09), <i>Substituting Administrative Controls for Engineering Barriers</i> Verified Bulletin was in the CHG Lessons learned Database indicating it was issued. 	Discussion of tunnel vision problem was brief. This is one of several distributions to CH2M HILL staff attempting to address this type of tunnel vision problems. Combined, these briefings were effective.
CA-02	Complete Endpoint Assessment	Reviewed assessment titled: <i>End Point Assessment Per-2002-3906, 5502, 5528, Interim Stabilization Dilution Tank Overfills</i>	Results of assessment indicate effective corrective actions. The proof is there were no more events.

Attachment – Verification Matrix

Dilution Tank Overflow Issue			
Reviewed Document: Occurrence Report RP-CHG-TANKFARM-2002-0066 – Inadvertent Dilution Water Spills in 241-AX Tank Farm			
Summary: Immediate actions were verified only. Corrective actions are same as the NTS report. Corrective actions for the occurrence report are coherent and adequately documented. Overall effectiveness demonstrated by significantly improved performance reflected in “Event-Free Clock.” “Significant Emotional Event” appears to have had a positive overall effect on performance in many areas of the company.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Immediate Action 1 (Tab item 9)	An operator closed and secured the 241-AX-101 Dilution Tank Manual Fill Valve	<ul style="list-style-type: none"> Interviewed Deputy VP Closure projects (responsible manager at the time) Reviewed occurrence report (OR) 	The activity was performed and documented on the occurrence report in a section called “ <i>Results of immediate actions.</i> ” This was reported by management who knew this activity was completed. Completion of this action was verified by interview. Physical verification of this temporary action was not possible and no documentation exists other than the statements in the OR.
Immediate Action 2 (Tab item 10)	Interim Stabilization Operations Supervisor (SOS) investigated spill to determine approximate amount of dilution water spilled.	<ul style="list-style-type: none"> Reviewed occurrence report Interviewed Deputy VP Closure projects (responsible manager at the time) <p>(This was an informal review with results documented in the occurrence report only)</p>	The activity was performed and documented on the occurrence report in a section called “ <i>Results of immediate actions.</i> ” This was reported by management who knew this activity was completed. Completion of this action was verified by interviewing responsible management. Physical verification of this temporary action was not possible and no documentation was located other than the statements in the OR. Effectiveness cannot be assessed since activity was temporary and no longer in place

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Immediate Action 3 (Tab item 11)	Central Command and Control were notified	<ul style="list-style-type: none"> • Reviewed occurrence report • Interviewed Deputy VP Closure projects (responsible manager at the time) 	The activity was performed and documented on the occurrence report in a section called “ <i>Results of immediate actions.</i> ” This was reported by management who knew this activity was completed. Since this was a temporary action, physical verification was not possible and no documentation was located other than the statements in the OR. Effectiveness cannot be assessed since activity was temporary and no longer in place
Immediate Action 4 (Tab item 12)	CHG Environmental was notified	<ul style="list-style-type: none"> • Reviewed occurrence report • Interviewed Deputy VP Closure projects (responsible manager at the time) 	The activity was performed and documented on the occurrence report in a section called “ <i>Results of immediate actions.</i> ” This was reported by management who knew this activity was completed. Since this was a temporary action, physical verification was not possible and no documentation was located other than the statements in the OR. Effectiveness cannot be assessed since activity was temporary and no longer in place

Attachment – Verification Matrix

Dilution Tank Overflow Issue			
Reviewed Document: Occurrence Report RP-CHG-TANKFARM-2002-0111 – Non-Reporting of Saltwell Dilution Tank Overflow			
Summary: Immediate actions and one corrective action were verified. The remainder of the corrective actions are the same as the NTS report. Corrective actions for this occurrence report are coherent and adequately documented. Overall effectiveness demonstrated by significantly improved performance and the elimination of tank overfills.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Immediate Action 1 (Tab item 13)	Operators verified the raw water fill valve for the dilution tank was closed	<ul style="list-style-type: none"> Reviewed occurrence report Interviewed Deputy VP Closure projects (responsible manager at the time) 	The activity was performed and documented on the occurrence report. This was reported by management who knew this activity was completed. Since this was a temporary action, physical verification was not possible and no documentation exists other than the statements in the OR. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Immediate Action 2 (Tab item 14)	Health Physics technicians verified that the spill did not involve tank waste	<ul style="list-style-type: none"> EIT Report (EIT-2002-049 R1) <i>Suspected S-102 Dilution Tank Overflow</i> Interviewed Deputy VP Closure projects (responsible manager at the time) Reviewed occurrence report 	The activity was performed and documented on the occurrence report and in the EIT report. Other formal documentation of the activity was not located. This was included in the reports by management and EIT investigators who verified this activity was completed. Effectiveness is based on the successful resolution of the dilution tank overflow problem.
Immediate Action 3 (Tab item 15)	IS Supervisor and operators evaluated the piping for a potential leak	<ul style="list-style-type: none"> EIT Report (EIT-2002-049 R1) <i>Suspected S-102 Dilution Tank Overflow</i> Reviewed occurrence report 	The activity was performed and documented on the occurrence report and in the EIT report. Both reports indicate that no potential leaks were identified. This was included in the reports by management and EIT investigators who verified this

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>Immediate Action 4 (Tab item 16)</p>	<p>IS Supervisor collected pictures of the spill, and a personnel statement from the discovering individual. Shift Director activated EIT to determine the cause of raw water spill.</p>	<p>EIT Report (EIT-2002-049 R1) <i>Suspected S-102 Dilution Tank Overflow</i></p>	<p>activity was completed. Effectiveness is based on the successful resolution of the dilution tank overflow problem.</p>
<p>Corrective Action (Tab item 17)</p>	<p>Ensure 98 percent of all operations personnel view a video, produced by bargaining unit and management personnel, with respect to the dilution tank overflow incidents.</p>	<ul style="list-style-type: none"> • Task Detail Report showing the corrective action was completed • Organization chart of impacted organization • Course roster • Delinquency list for <i>Interim Stabilization Dilution Tank Lessons Learned Video</i> (indication all required viewed video) 	<p>The EIT report documents the results of these activities. Results were used during the EIT investigation. Effectiveness is based on the successful resolution of the dilution tank overflow problem.</p> <p>All CH2M HILL personnel viewed video during a “quality time out” session held for all personnel. The activity was effective in increasing safety culture awareness. Effectiveness is based on the successful resolution of the dilution tank overflow problem and no more occurrences.</p>

Attachment – Verification Matrix

Dilution Tank Overflow Issue			
Reviewed Document: PER-2002-5502			
Summary: Compensatory measures and remedial actions were verified. The corrective actions are rolled up into the NTS report. Actions were determined to be effective because the end result of all these temporary action, many of which are no longer in place, eventually resulted in no additional occurrences			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Compensatory measure 1 (Tab item 18)	A two-person rule was put into effect for filling dilution water tanks until administrative locks could be applied to manual fill valves.	<ul style="list-style-type: none"> Reviewed Standing Order TWO-02-012, <i>Filling of Saltwell Pumping Dilution Tanks</i> 	Two-person rule initiated in revision 4 and canceled after revision 6 on June 4, 2003. Effectiveness is based on the successful resolution of the dilution tank overflow problem and no more occurrences.
Compensatory measure 2 (Tab item 19)	Administrative locks were added to all manual valves on all dilution water tanks as a temporary remedial measure and will be removed following completion of auto-fill feature installation	<ul style="list-style-type: none"> Reviewed Standing Order TWO-02-012, <i>Filling of Saltwell Pumping Dilution Tanks</i> Reviewed a sample of the Tank Operation Procedure such as TO-410-101 B.3, <i>Perform241-S-101 Saltwell Pumping</i>, and TO-410-107 B.1, <i>Perform241-S-107 Saltwell Pumping</i> 	The standing order discusses the use of administrative locks how to proceed if they are not in place. Tank operating procedures, when applicable, include process called <i>Administrative Lock Program</i> . Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Compensatory measure 3 (Tab item 20)	Procedures were revised to reflect the action of administrative locks on all manual fill valves or dilution water tanks	<ul style="list-style-type: none"> Reviewed Standing Order TWO-02-012, <i>Filling of Saltwell Pumping Dilution Tanks</i> Reviewed a sample of the Tank Operation Procedure such as TO-410-101 B.3, <i>Perform241-S-101 Saltwell Pumping</i>, and TO-410- 	Tank operating procedures were revised to include, when applicable, a section called <i>Administrative Lock Program</i> . Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Compensatory measure 4 (Tab item 21)	Operations management representative and DOE representative to observe and oversee dilution tank fillings.	<p>107 B.1, <i>Perform241-S-107 Saltwell Pumping</i></p> <ul style="list-style-type: none"> Reviewed Standing Order TWO-02-012, <i>Filling of Saltwell Pumping Dilution Tanks</i> 	Standing order required this to happen. Initiated in Revision 4 of the standing order (November 9, 2002) and continued through revision 6 until the order was canceled in February 4, 2003. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Compensatory measure 5 (Tab item 22)	Provide secondary containment at the bottom of the overflow tube to contain small volumes of overflow water. Cattle trough tanks have placed under the overflow lines.	<ul style="list-style-type: none"> Reviewed digital pictures provided showing the cattle troughs installed for S-101 and 102 dilution tanks Phone interview with Pump Operations Manager 	Pictures clearly showed the troughs were in place. Effectiveness of this activity is based on the successful resolution of the dilution tank overflow problem.
Compensatory measure 6 (Tab item 23)	Revised all saltwell operating procedures to more clearly define which valves to operate during flush operations	<ul style="list-style-type: none"> Reviewed a sample of the Tank Operation Procedure such as TO-410-101 B.3, <i>Perform241-S-101 Saltwell Pumping</i>, and TO-410-107 B.1, <i>Perform241-S-107 Saltwell Pumping</i> 	Tank operating procedures all have tables indicating valve positions during covered operations. Effectiveness of this activity is based on the successful resolution of the dilution tank overflow problem.
Compensatory measure 7 (Tab item 24)	Procedures were enhanced to detail what constitutes a “full” tank	<ul style="list-style-type: none"> Reviewed a sample of the Tank Operation Procedure such as TO-410-101 B.3, <i>Perform241-S-101 Saltwell Pumping</i>, and TO-410-107 B.1, <i>Perform241-S-107 Saltwell Pumping</i> Phone interview with Pump Operations Manager 	Tank operating procedures clearly indicate what constitutes a full tank. Effectiveness of this activity is based on the successful resolution of the dilution tank overflow problem.

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Compensatory measure 8 (Tab item 25)	Management observations of OTJ for operators were initiated and all operators were qualified on dilution tank fills.	<ul style="list-style-type: none"> • Phone interview with Pump Operations Manager • Reviewed e-mail indicating management observations were done. • Reviewed updated qualification cards for all impacted operators-Saltwell OJT Card/Guide 350080, Revision 2 • Training records for course #350080, <i>Saltwell System Operations</i> 	All operators required to re-qualify completed the required training. Effectiveness of this activity is based on the successful resolution of the dilution tank overflow problem.
Remedial corrective actions 1 (Tab item 26)	Conveyed information in shift turnovers for consistent understanding of what constitutes a full tank	<ul style="list-style-type: none"> • Phone interview with Pump Operations Manager • Reviewed e-mail received by Pump operations manager from OPS management on a briefing to be given to staff on the subject. 	Based on phone interview, all required staff was briefed. Effectiveness of this activity is based on the successful resolution of the dilution tank overflow problem.
Remedial corrective actions 2 (Tab item 27)	Marked a line on the sight tube sufficiently low enough to preclude overfilling if the tank is filled to that mark and revised operating procedures to reflect definition of Full and the demarcation line on the fill tube. Added a sight tube level indicator float to the sight tubes to better detect water level.	<ul style="list-style-type: none"> • Phone interview with Pump Operations Manager • Viewed pictures of S-102 dilution tank 	Pictures indicate S-102 was marked. Interview verified all others tanks were marked but the marks are no longer used or maintained. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Remedial corrective actions 3 (Tab item 28)		<ul style="list-style-type: none"> • Phone interview with Pump Operations Manager • Viewed pictures of S-102 dilution tank 	Interview indicated this was done but did not verify further because effectiveness is not an issue since no longer in use.

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Dilution Tank Overflow Issue			
Reviewed Document: PER-2002-5538			
Summary: Only verified remedial/compensatory actions. The corrective actions are rolled up into the NTS. Actions were determined to be effective because the end result of all these temporary action, many of which are no longer in place, eventually resulted in no additional occurrences			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Remedial/compensatory action 1 (Tab item 29)	Secure Filling dilution Tank until issuance of temporary round sheet.	Interviewed Deputy VP. Of Closure Projects (responsible manager)	Action was performed but not formally documented. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Remedial/compensatory action 2 (Tab item 30)	On July 22, 2002, a message from the IS Operations Manager was sent to the IS shift operations supervisors to clarify and re-enforce management expectations for manually filling saltwell dilution tanks.	<ul style="list-style-type: none"> Reviewed the e-mail memo distributed by the Pump Operations Manager to staff. This was forwarding the IS operations management memo 	Action was performed but not formally documented. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.
Remedial/compensatory action 3 (Tab item 31)	A temporary round sheet was implemented		Round sheet was adequate and was used. Effectiveness of this temporary activity is based on the successful resolution of the dilution tank overflow problem.

Attachment – Verification Matrix

Dome Loading Issue			
Reviewed Document: NTS No. 2002-0005 – Inadequacy In Dome Loading Controls			
Summary:			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action -01 (Tab item 1)	Develop Root Cause Analysis and Corrective Action Plan to prevent recurrence.	<ul style="list-style-type: none"> PER 2002-0763, discovered 2/5/02, and root cause analysis therein. PERS 2002-1011, 097, 1208,0047, 0019, 1875, and 2188 	Root cause determined; dome loading controls program not implemented/lack of commitment. Acceptable
Corrective Action -02 (Tab item 2)	Develop a new Operations Procedure or revise and rename existing vehicle control procedure	TFC-OPS-OPER-C-10, rev A, "Vehicle and Dome Load Controls in Tankfarm Facilities", effective 9/15/02.	Procedure revised. Acceptable
Corrective Action -03 (Tab item 3)	Develop a new Engineering Procedure, TFC-ENG-FACS-P-010, <i>Control of Dome Loading</i> .	TFC-ENG-FACSUP-C-10, Rev. A, "Control of Dome Loading", effective 9/15/02.	There were additional PERS issued requiring additional procedure changes. This corrective action was not effective in itself, but once the procedures were cleaned up as a result of the subsequent PERS, procedure related problems stopped. Acceptable.
Corrective Action -04 (Tab item 4)	Assemble three formal Analyses of Record (Controlled records under the Design Authority) that will incorporate existing documentation. The Analysis of Record will be grouped into	<ul style="list-style-type: none"> Reviewed the analyses of record to verify they were properly issued and controlled RPP-11801, Rev. 0, "Analysis of Record Summary for Double-Shell Tanks," dated July, 2002, 	Analyses describe the basis for the then-existing dome load limits. The analyses recommend further evaluations be performed. These include effects of concentrated loads versus uniform loads, nonsymmetrical concentrated loading, effects of openings in tank dome structures, and

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>Corrective Action -05 (Tab item 5)</p>	<p>three reports covering the following:</p> <ul style="list-style-type: none"> • Double Shell Tanks • Single Shell Tanks • Miscellaneous Tanks 	<ul style="list-style-type: none"> • released July 31, 2002. • RPP-11802, Rev. 0, "Analysis of Record Summary for Single-Shell Tanks," dated July 31, 2002. • RPP-11803, Rev 0, "Analysis of Record Summary for DCRTs, Catch Tanks, and IMUSTs", dated July 31, 2002. • HNF-IP-0842, "Administrative Procedures", section 4.38, Rev. 0a, dated 7/2/02 • TFC-ENG-FACSUP-C-10, Rev. A, "Control of Dome Loading", effective 9/15/02. • TFC-OPS-OPER-D-02, Rev. A, "Electronic Dome Loading Logs", effective 9/15/02. 	<p>considerations for empty tanks. Recommends analysis of concentrated loads and exclusion zones.</p> <p>These records provided data used in corrective action # 12, the structural evaluation of the three types of tanks.</p> <p>Acceptable.</p> <ul style="list-style-type: none"> • Non-design basis dome load records were effectively put into a retrievable, controlled format. • Records were collected from various sources and compiled into three documents (single shell, double shell, and miscellaneous. These documents exist and are retrievable. • Documentation was used to reevaluate dome loads. The corrective action was judged to be effective based on the fact that documentation provided the required information to recalculate dome loads.
<p>Corrective Action – 06 (Tab item 6)</p>	<p>Update as required Operating Specifications Document (OSD), OSD-151-013 to reflect changes in monitoring and control of Dome Load Survey records.</p>	<p>Reviewed updated OSD</p> <ul style="list-style-type: none"> • Operating Specifications Document Number OSD-151-013, Rev. D-22, "Operating Specifications for Single-Shell Waste Storage Tanks", dated August 15, 2002. 	<p>Acceptable</p> <p>The OSD was changed as specified.</p> <p>Requires that survey results be transmitted to SST Engineering who then adds information to the Dome Load Record as applicable. References new procedure for recovery actions.</p> <p>Acceptable.</p>

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action – 07 (Tab item 7)	Update the "Tank Farms Operations Administrative Controls" HNF-IP-1266, Section 5.16b.	<ul style="list-style-type: none"> Reviewed the updated procedure HNF-IP-1266, Rev. 1, section 5.16 B, "Tank Farms Administrative Controls", dated September 11, 2002. 	<p>The procedure was changed as specified in the corrective action plan and change history. References were made to new procedures.</p> <p>Acceptable.</p>
Corrective Action - 08 (Tab item 8)	Train Operations, Planners, and Engineers to new procedures and IP-1266 changes	<ul style="list-style-type: none"> Reviewed required reading rosters and organization charts, and spot checked to verify required individuals completed required reading Required Reading List report, dated 9/26/02. Statement from responsible manager stating completion dated 10/7/02. Engineering and Operations Organization Charts 	<ul style="list-style-type: none"> Initial actions were not effective, but subsequent corrective actions (resulting from PERs generated after this corrective action was in place) finally resolved this problem. Two PERs were issued after September 2002 indicating that there were still problems with personnel not understanding the process. The Dome Load Response Team took on the job of making sure everyone responsible was aware of responsibilities associated with dome loading procedures. The procedure was also revised for clarity. <p>Acceptable.</p> <p><i>The end-point effectiveness assessment was completed satisfactorily.</i></p> <p>Acceptable.</p>
Corrective Action – 09 (Tab item 9)	Post-effectiveness assessment of the plan. Note that this is being incorporated in the planned review of Administrative Controls. PER-2002-0763	<p>End Point Assessment, "PER-2002-0763 Allowable Load Margins in 241-S Incorrect, and PER-2002-0992 Dome Loading Issue in S-Farm", dated 7/19/03.</p> <ul style="list-style-type: none"> June 27, 2002 email of kickoff meeting for Dome Load Response team. July 1, 2002 tailgate meeting presentation. Plan to resolve PER-2002 0763, Rev. 1, dated 7/26/03. 	<p>Response team became key in resolving the recurrence of dome loading issues by providing a focused management team to address the problems.</p> <p>Acceptable</p>
Corrective Action – 010 (Tab item 10)	Implement a Dome Load Response team to address both short term and long term corrective actions relative to Dome Load Issues at CHG.		

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Action Number	Description	What Was Evaluated	Assessment of Effectiveness
<p>Corrective Action – 11 (Tab item 11)</p>	<p>Implement an electronic Dome Load Log.</p>	<ul style="list-style-type: none"> • 8/01/02 email – dome load log test procedure; • examples of several dome load logs. • Procedure TFC-OPS-OPER-D-02, Rev. A, “Electronic Dome Loading Logs”, dated August 1, 2002. 	<p>The electronic log provides an easily accessible, customized, and controlled real-time log of loads for each tank dome. This makes it much easier to manage the dome loading at each tank.</p> <p>Acceptable.</p>
<p>Corrective Action – 12 (Tab item 12)</p>	<p>Complete a structural evaluation of the same three classes of structures identified in Corrective action No. 4 to determine the allowable dome loads based on their ultimate load-carrying capacity.</p>	<ul style="list-style-type: none"> • RPP-16363, Rev. 0, “Tank-Specific Allowable Dome Load for Hanford-Site 100 Series Single-Shell Tanks”, dated June 2003, released July 7, 2003. • RPP-16748, Rev. 0, “Miscellaneous Tank Load Evaluation”, dated July 14, 2003. • RPP-16675, Rev. 0, “302 Series Miscellaneous Catch Tanks Dome Load Evaluation”, dated July 2003, released July 14, 2003. • RPP-16903, Rev. 0, “Dome Load Capacity for 301 Catch Tanks 241-301-B, C, T and U”, dated July 14, 2003. • RPP-16660, Rev. 0, “200 Series Single-Shell Tank Dome Load Capacity (200, B, C, T and U)”, dated July 14, 2003. 	<p>The results of the structural evaluation showed that the existing calculations were extremely conservative. This justifies the removal of all exclusion zones within each tank farm. New procedures were issued to establish reasonable controls at the gate to each tank farm.</p> <p>Acceptable.</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 13	Controls were placed on dome loading; created a new engineering procedure.	<ul style="list-style-type: none"> RPP-16364, Rev. 0, "Tank-Specific Allowable Dome Load for Hanford-Site Double-Shell Tanks", dated July 8, 2003. Interviewed responsible manager 	Acceptable
Tab item 14	Performed a 100% check on the calculations to verify other references were correct.	<ul style="list-style-type: none"> Occurrence report RP-CHG-TANKFARM-2002-0019, dated 11/18/02. TFC-OPS-OPER-C-10, rev A., "Vehicle and Dome Load Controls in Tank Farm Facilities", effective 9/15/02. Database for allowable load margins (ALM) on tank domes.	None exceeded ALM. Acceptable.
Tab item 15	Raise awareness of dome loading to individuals.	<ul style="list-style-type: none"> Tailgate meeting presentation given on 7/1/02. Interview CH2M HILL QA and PAAA staff. 	Based on interviews, the presentation was effective in raising awareness. Acceptable.
Tab item 16	Initiate process to perform dome load walkdown/dome load log verification	<ul style="list-style-type: none"> CH2M Hill West Area Routine titled, "Dome Load Inspection, misc.", Ticker numbers 441 and 442, dated September 15, 2003. End Point Assessment, "PER-2002-0763 Allowable Load Margins in 241-S Incorrect, and PER-2002-0992 Dome Loading Issue in S-Farm", dated 7/19/03. 	<ul style="list-style-type: none"> Examples show facility managers have performed monthly inspections of dome loads. Acceptable for closure. Field walk downs performed 6/26 – 30, 2003. All loads present on tank domes and exclusion areas were accurately reflected on the logs. Acceptable

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 17	Perform a mid-point assessment on the implementation plan.	Interoffice memo, 7T900-02-CEH-026, titled "February 2002 Dome Load Assessment Corrective Actions", dated November 14, 2002.	Assessment indicates an effective program. Acceptable.
Tab item 18	Perform an end-point assessment of the implementation plan.	End Point Assessment, "PER-2002-0763 Allowable Load Margins in 241-S Incorrect, and PER-2002-0992 Dome Loading Issue in S-Farm", dated 7/19/03.	Assessment was performed and activity was found effective. Acceptable.
Tab item 19	Performed an investigation into crane on S-110 and S-111 exclusion zone on 2/14/02.	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/03. • PER-2002-0992 	SSW interviewed Crane and Rigging, Field Work Supervisor, System Engineering staff the afternoon of the event. Results were briefly discussed in the PER and occurrence report. Acceptable.
Tab item 20	Logged all applicable loads into the dome logs for S-110 and S-111 prior to removing equipment from S-107.	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/03. • Dome load logs S-110/111. • PER-2002-0992 	Electronic dome load logs for S-110 and S-111 extend back to August 2002. Prior to that hard copies were used and archived. Dome loading logs checked. Acceptable.
Tab item 21	Checked dome load logs for S-110 and S-111 for ALM prior to removing equipment from S-107.	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02. • Dome load logs S-110/111. • PER-2002-0992 	Electronic dome load logs for S-110 and S-111 extend back to August 2002. Prior to that hard copies were used and archived. Allowable ALM verified per PER. Acceptable.
Tab item 22	Senior Supervisory Watch (SSW) to critique the 2/14/03 event to evaluate routing in S tankfarm.	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02. • PER-2002-0992 	Routing was evaluated prior to moving equipment. Results of the critique were documented in the PER and occurrence report. Acceptable.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 23	Provide briefing to affected employees.	Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02.	Tailgate meeting presentation given on 7/1/02. Acceptable.
Tab item 24	Include language into revised dome loading procedure.	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02. • TFC-ENG-FACSUP-C-10, Rev. A, "Control of Dome Loading", effective 9/15/02. 	Procedure was revised as indicated. Acceptable.
Tab item 25	Evaluate options for tankfarm field markings.	Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/03.	Done but no longer applicable due to revised structural evaluations. Acceptable.
Tab item 26	Develop plan to mark domes of SSTs.	Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02.	Done but no longer applicable due to revised structural evaluations. Acceptable.
Tab item 27	Implement plan to mark domes of SSTs.	Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/03.	Done but no longer applicable due to revised structural evaluations. Acceptable.
Tab item 28	Develop plan to mark domes of DSTs.	Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02.	Done but no longer applicable due to revised structural evaluations. Acceptable.
Tab item 29	Implement plan to mark domes on DSTs.	Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02.	Done but no longer applicable due to revised structural evaluations. Acceptable.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 30	Issue Standing Order TWO-2002-003, Rev. 1 on February 22, 2002.	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0024, dated 9/23/02. • WFO/CP Cancelled Standing Order Index, no date. 	TWO-2002-003 was superseded by WFO-03-002, which requires use of a Work Release Checklist. Section 5.16B of checklist requires “Dome Loading Controls” be verified. Acceptable.
Tab item 31	A Shift instruction and revision to Dome Load standing order (TWO-2002-003) initiated	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/02 • TFC-OPS-OPER-C-10, rev A., “Vehicle and Dome Load Controls in Tank Farm Facilities” • TFC-ENG-FACSUP-C-10, Rev. A, “Control of Dome Loading” • TFC-OPS-OPER-D-02, Rev. A, “Electronic Dome Loading Logs” 	TWO-2002-003 was superseded by: <ul style="list-style-type: none"> • TFC-OPS-OPER-C-10, rev A. • TFC-ENG-FACSUP-C-10, Rev. A • TFC-OPS-OPER-D-02, Rev. A, Acceptable.
Tab item 32	Dome Load Task Team has revised corrective actions identified in PER-2002-0763	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/02 • Problem Evaluation Report 2002-0763 	Corrective actions revised on 7/15/03. Acceptable.
Tab item 33	CHG procedures will be revised to improve the process	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/03 • TFC-OPS-OPER-C-10, rev A., “Vehicle and Dome Load Controls in Tank Farm Facilities”, effective 9/15/02. • TFC-ENG-FACSUP-C-10, Rev. A, “Control of Dome Loading”, effective 9/15/02. 	Procedures Revised. Acceptable.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 34	Revise HNF-IP-0842, Volume 11, section 1.7, "Problem Evaluation Request"	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/02 • HNF-IP-0842, "Administrative Procedures" • TFC-ESHQ-Q_C-C-01, Rev. B-2, "Problem Evaluation Request", effective date 9/24/03. 	The PER Screening Team reviewed each PER with the immediate actions and compensatory measures implemented to date. Acceptable.
Tab item 35	Revise HNF-IP-0842, Volume 2, section 4.6.4, "Event Investigation and Critique Process"	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/02 • HNF-IP-0842, "Administrative Procedures" • TFC-OPS-OPER-C-14, Rev. A-1, "Event Investigation Process", dated 6/24/03. 	Procedure was revised to require that if compensatory measures have been identified, their effectiveness is to be evaluated using the "SMART" criteria. Acceptable.
Tab item 36	Revise HNF-IP-0842, Volume 11, section 2.6, "Causal Analysis and Corrective Action Planning"	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/02 • HNF-IP-0842, "Administrative Procedures" • TFC-ESHQ-Q_ADM-C-11, Rev. A-2, "Causal Analysis and Corrective Action Planning", dated September 25, 2003. 	TFC-ESHQ-Q_ADM-C-11, Rev. A-2, requires verification efforts to assure compensatory measures were completed or implemented, and that the corrective actions really solved the problem. Acceptable.
Tab item 37	Revise RPP-CHARTER-016	<ul style="list-style-type: none"> • Occurrence Report RP-CHG-TANKFARM-2002-0080, dated 9/20/02 • TFC-ESHQ-Q_C-C-01, Rev. B-2, "Problem Evaluation Request", effective date 9/24/03 	Charter requirements have been rolled into the procedure TFC-ESHQ-Q_C-C-01, Rev. B-2, "Problem Evaluation Request". The new Joint Test Working Group performs these activities as of 10/1/03. Acceptable.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 38	A review of all SST dome load records was conducted.	<ul style="list-style-type: none"> • Problem Evaluation Report 2002-0763 • Database for allowable load margins (ALM) on tank domes. 	Reviews were performed as required. Acceptable.
Tab item 39	Field walk downs of DSTs and SSTs was performed.	<ul style="list-style-type: none"> • CH2M Hill West Area Routine titled, "Dome Load Inspection, misc.", Tickler numbers 441 and 442, dated September 15, 2003. • Problem Evaluation Report 2002-0763 	Examples show facility managers have performed monthly inspections of dome loads, as required. Acceptable.
Tab item 40	Perform a review of PERS associated with dome loading program issues.	<ul style="list-style-type: none"> • End Point Assessment, "PER-2002-0763 Allowable Load Margins in 241-S Incorrect, and PER-2002-0992 Dome Loading Issue in S-Farm", dated 7/19/03. • Problem Evaluation Report 2002-0763 	The end-point effectiveness assessment was completed satisfactorily. Dome load related PER database evaluation was part of the assessment. Acceptable.
Tab item 41	An analysis was performed on the dome load control program	<ul style="list-style-type: none"> • Problem Evaluation Report 2002-0763 	A causal analysis was performed; root and common causes were identified. Acceptable
Tab item 42	A red arrow entry was made restricting additional loads in 241-S Tank Farm	<ul style="list-style-type: none"> • Problem Evaluation Report 2002-0763 • Interview with responsible manager. 	Demarcations in log book to put a restriction in place. According to the responsible manager, when issues were resolved red arrow entries were removed. Acceptable.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 43	Shift logs and Dome Load Logs were reviewed to determine if ALMs were exceeded.	<ul style="list-style-type: none"> Problem Evaluation Report 2002-0763 Interview with responsible manager. 	According to the responsible manager, the review was completed. Acceptable.
Tab item 44	Performed 100% check of calculations to verify correctness.	<ul style="list-style-type: none"> Problem Evaluation Report 2002-0763 Interview with responsible manager. 	According to the responsible manager, the calculation check was completed. Acceptable.
Tab item 45	Perform spot check on tank farms to verify field conditions match dome load	<ul style="list-style-type: none"> Problem Evaluation Report 2002-0763 Interview with responsible manager. 	Field walk downs performed 6/26 – 30, 2003. All loads present on tank domes and exclusion areas were accurately reflected on the logs. Acceptable.
Tab item 46	Performed a 100% review of dome load logs against field walk downs.	<ul style="list-style-type: none"> Problem Evaluation Report 2002-0763 Interview with responsible manager. 	Field walk downs performed 6/26 – 30, 2002. All loads present on tank domes and exclusion areas were accurately reflected on the logs. Acceptable.
Tab item 47	Review and update all SST dome load records to reflect weights of Interim Stabilization Flammable Gas Monitors.	<ul style="list-style-type: none"> PER-2002-1919 discovered 4/8/02, "FGMs not accurately loaded in Dome Load Log" Interview Rick Heath 	For concrete pads subtract weight of displaced soil (150 – 115) lbs. per cubic foot. Acceptable.
Tab item 48	All work was stopped at AN Farm.	<ul style="list-style-type: none"> PER-2002-3966 discovered 7/23/02. "Exclusion Zone Controls Violated at 241-AN." 	Immediate corrective action suspended all work involving vehicle movements at 11 am on 7/24/02. Acceptable.
Tab item 49	An extent of condition review was completed for other tank farms.	<ul style="list-style-type: none"> PER-2002-3966 discovered 7/23/02. "Exclusion Zone Controls Violated at 241-AN." Root Cause Analysis-PER-2002-3966 	On page 4 of Root Cause Analysis-PER-2002-3966, it states that 60 other documented issues and concerns were identified as a result of the extent of condition review. The review was informal and not documented other than in the PER that it was

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 50	All work packages were reviewed for dome load compliance	<ul style="list-style-type: none"> • PER-2002-3966 discovered 7/23/02. "Exclusion Zone Controls Violated at 241-AN." • RPP JCS Work Record No. 2E-01-00851/M, titled, "241-AN: Install W-314 MPS Node equipment at AN-271. • Interview with responsible manager. 	<p>completed. Acceptable.</p> <p>According to the responsible manager, the review was completed. Acceptable.</p>
Tab item 51	Subsequent work released after review by engineer, shift director, construction manager, and facility manager completed.	<ul style="list-style-type: none"> • PER-2002-3966 discovered 7/23/02. "Exclusion Zone Controls Violated at 241-AN." • RPP JCS Work Record No. 2E-01-00851/M, titled, "241-AN: Install W-314 MPS Node equipment at AN-271. • Interview with responsible manager. 	<p>According to the responsible manager, the review was completed prior to work being released. Acceptable.</p>
Tab item 52	Appropriately coach/counsel responsible supervisor	<ul style="list-style-type: none"> • Problem Evaluation Report 2002-6051, discovered 11/14/02, "AC 5.16 Non-compliance with Water Truck on A-417 Exclusion Zone". • H2M Hill Interoffice Memo No. 7TB00-KDC-03-003, "Corrective Action for PER: Appropriately coach/counsel responsible 	<p>Individual lessons learned discussions took place on 2/21 and 2/22/03. Acceptable.</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Tab item 53	Issue lessons learned from A-417 exclusion zone non-compliance.	supervisor.”, dated February 24, 2003.	
Tab item 54	Tank Farm Orientation course includes pictures of feathers used to mark tank domes.	Lessons Learned Bulletin No. IB-03-13, “Exclusion Zones Exist Relative to all Tank Farm Underground Waste Tanks”, dated February 20, 2003.	Adequately explained the use of yellow and green “feathers”. Acceptable.
Tab item 55	In September 2002 Operations Management surveyed employees to determine if the markings were understood and were helpful.	CH2M Hill course no. 350761 course on web-based training page.	Adequately explained the use of yellow and green “feathers”. Acceptable.
		Samples of email responses to survey of employees regarding markings (feathers) to mark tank domes.	Responses were favorable and stated that markings were helpful and understood. Acceptable.

Attachment – Verification Matrix

Management and Independent Assessments Issue			
Reviewed Document: NTS-RP-CHG-TANKFARM-2000-0014			
Summary: Corrective actions for this NTS reports are coherent and adequately documented. Overall effectiveness is demonstrated by significantly improved performance in the management assessment process. This was accomplished in conjunction PER-2002-0964 which reopened the NTS and added corrective actions to address additional weaknesses in the management assessment process.			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action 1 (Tab item 1)	Conduct root cause analysis and prepare corrective action plan	<ul style="list-style-type: none"> • Reviewed Management and Independent Assessment Corrective Action Plan • Reviewed Root Cause Analysis for NTS-RP-CHG-2000-0014, <i>Management and Independent Assessments</i> 	Initial root cause analysis corrective actions were not effective. Subsequently PER-2002-0964 was issued to further address the problem. Combined, the results were effective in producing an effective management assessment program.
Corrective Action 2 (Tab item 2)	Establish and implement FY01 independent assessment schedule. Include in the schedule, assessments of subcontractors	<ul style="list-style-type: none"> • Reviewed December 20, 2000 Quality Assurance Independent Assessment Schedule • Reviewed procedure TFC-ESHQ-Q-INSP-C-06, R A-1, <i>Supply Chain Process</i> • Reviewed Procedure HNF-IP 0842, <i>Supplier Quality Assurance Program Evaluation</i> 	Initial corrective action was marginal, but the process has evolved. Improvements to the process are effective. The development of oversight plans is required for all subcontractors. an oversight schedules is required to be a part of these plans.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action 3 (Tab item 3)	Modify management assessment schedule to include review of implementation plans for completion of internal commitments	Reviewed schedule that was developed to indicate the review of implementation plans.	This activity was completed and in place in 2000, but it is not currently maintained because it has been overcome by events due to the revamping of the management assessment program. Current activities, though effective, do not reflect this commitment.
Corrective Action 4 (Tab item 4)	Issue lessons learned that provides for the following key elements: reflection of W-19 issues; overview of independent and management assessment; Utilization of available resources (QA, Safety) for performing assessments; expectations for management assessments	<ul style="list-style-type: none"> • Reviewed Internal memo stating that the lessons learned was issued on November 21, 2002 to all CH2M HILL staff • Reviewed Lessons Learned IB-00-26, <i>River Protection Project QA</i> 	Effective in communicating expectations for performing management assessments.
Corrective Action 5 (Tab item 5)	Perform an assessment of the management assessment program against 10 CFR 830.120 and DOE Order 414.1A assessment criteria	Reviewed, <i>CHG Management Assessment Report, September 2000</i>	Effective in evaluating program and identifying areas for improvement
Corrective Action 6 (Tab item 6)	The CHG assessment program will be rewritten to: Identify focus of the assessment program, establish links between the various organizational assessment programs, and to identify a process to coordinate the scheduling, performance, and trending of assessments.	<ul style="list-style-type: none"> • Reviewed inter office memo 7R900-01-012, April 2, 2002 titled: <i>Assignment 6, Rewrite the CHG Assessment Program</i> • Reviewed procedure HNF-0842, Volume 1, Section 2.10, Rev. 4, <i>Assessment Program</i> 	This procedure was later rewritten and the entire management assessment process was again revised. The evolution of the process is effective in consolidating the required activities

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action 7 (Tab item 7)	Perform QA assessment of corrective actions.	Reviewed interoffice memo # 7B400-HME-0022, May 31, 2001, NTS-RP-CHG-TANKFARM-2000-0014, AR #29006806, <i>Verification of Corrective Actions and Closure of Assignment 7</i>	Activity was completed and effective in determining corrective actions were completed.
Corrective Action 8 (Tab item 8)	Issue Problem Evaluation Request (PER) to ensure comprehensive evaluation of continuing issues associated with assessment program documentation and implementation, and complete initial PER screening team evaluation	<ul style="list-style-type: none"> • Reviewed PER-2002-0964 • Identified the PER in Electronic format in the PER database. 	The PER was issued. Effectiveness is based on the fact that the corrective actions resolved the problems and eliminated recurrence.
Corrective Action 9 (Tab item 9)	Develop root cause analysis and corrective action plan to resolve PER-2002-0964	Reviewed: <i>Root Cause Analysis and Corrective Action Plan PER-2002-0964-Reopening of NTS-RP-CHG-TANKFARM-2000-0014</i> , April 17, 2002	The report has been issued and corrective actions implemented. Effectiveness would be based on the successful establishment of a company wide integrated management assessment program
Corrective Action 10 (See tab item 10)			Same as PER-2002-0965 Corrective action CATPR-02. (Tab item 10)
Corrective Action 11 (See tab item 11)			Same as PER-2002-0965 Corrective action CATPR-06. (Tab items 11-21)
Corrective Action 12 (See Tab item 4)			Same as PER-2002-0965 Corrective action CATPR-07. (Tab items 22)

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
Corrective Action 13 (See tab item 23)			Same as PER-2002-0965 Corrective action CATPR-08. (Tab items 23)
Corrective Action 14 (no tab item assigned)	Revise Management Assessment schedule to reflect changes brought about by the corporate realignment process.	<ul style="list-style-type: none"> • Reviewed Organization chart for CHi@M HILL dated March 31, 2003 • Reviewed assessment schedule dated August 28, 2003 	Comparing schedule with organization chart indicates all organizations have scheduled management assessments. The schedule is organized by organization and is very easy to determine each organization's commitment to perform management assessments
Corrective Action 15 (no tab item assigned)	Commitment from senior management not to postpone nor cancel management assessments unless expressly authorized by the Deputy General Manager.	<ul style="list-style-type: none"> • Reviewed interoffice memo 7000-DBA-03-004, March 6, 03 from D.B. Amerine stating this expectation • Reviewed procedure TFC-ESHQ-AP-C-01, Rev 2A 	Both the procedure and the memo state that management assessments cannot be changes without this approval. Effective

Attachment – Verification Matrix

Management and Independent Assessments Issue			
Reviewed Document: PER-2002-0964			
Summary: This PER-2002-0964 reopened the NTS –RP-CHG-TANKFARM-2000-0014 and added corrective actions to address additional weaknesses with the management assessment process. Combined with the corrective actions of the NTS, the results were an improved and more effective management assessment process			
Action Number	Description	What Was Evaluated	Assessment of Effectiveness
CATPR-02 (Tab item 10)	Management-customer acceptance of Plan	<ul style="list-style-type: none"> • Reviewed interoffice memo #7BB00-CEA-02-006, May 16, 2002 • Reviewed Assessment Improvement Plan, Rev. 0 April 2, 2002 • Reviewed ESTAR closure record indicating the action was completed and closed 	<p>Memo indicates after presenting the plan to management, direction was given to implement. Effectiveness is based on an improved management assessment program in place after all corrective actions were completed.</p>
CA-03 (Tab item 11)	Revise/Issue Policy, Plan, and Procedure	<ul style="list-style-type: none"> • Reviewed policy TFC-ESHQ-POL, <i>Management and Independent Assessment</i> dated June 20, 2002 • Reviewed procedure TFC-ESHQ-AP-C-02, Rev. 0, <i>Independent Assessment Program</i> dated June 20, 2002 • Reviewed individual ESTAR actions (the Plan) to implement the above 	<p>All ESTAR actions were completed and verified by CH2M HILL. Effectiveness is based on the establishment of a functioning management assessment program based on the policy and procedure.</p>

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
CA-04 (Tab item 12)	Development of Revised training module	<ul style="list-style-type: none"> Reviewed the training overheads titled: <i>Just-in-time training for Assessment Team Members</i>, dated July 2000 Reviewed course description report for course 350318 	The just in time training was provided as a remedial item and to get people familiar with the new process. A permanent course was also developed and is maintained by the training organization. Effective
CA-05 (Tab item 13)	Pilot testing of revised processes	<ul style="list-style-type: none"> Memorandum to file dated September 30, 2003 Reviewed document titled: <i>CH2M HILL Hanford Group, Inc. Results of pilot testing of Management assessment Program procedure</i> 	Reported results were positive and the program was implemented. Effective
CATPR-06 (Tab item 14 through 21)	Implement HNF-IP-042 Vol. 1 Section 2.10 Assessment Program	Reviewed e-mails or interoffice memos from each CH2M Hill organization indicating implementation of the program (six in total, one from each director level organization)	The referenced procedure was changed to TFC-ESHQ-AP-C-02, Rev. 0, <i>Independent Assessment Program</i> dated June 20, 2002. A management assessment program was effectively implemented
CATPR-07 (Tab item 22)	Midpoint assessment	<ul style="list-style-type: none"> Reviewed document titled: <i>CH2M HILL Hanford Group, Inc. Assessment Report for Mid-point Assessment of PER-2002-0964 Actions</i>, dated September 20, 2002 	Mid point assessment was completed. Effective
CATPR-08 (Tab item 23)	End point Assessment	<ul style="list-style-type: none"> Reviewed document titled <i>CH2M Hill Hanford Group, Inc. End Point Assessment of Problem Evaluation Request 2002-0964 actions</i>, dated January 27, 2003 Interoffice memo 7BB00-CEA-03-04, January 28, 2003 	Results were positive. Effective implementation of integrated management assessment program

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
EPA Action-01 (Tab item 24)	A team ... will analyze the current MA schedule for the purpose of re-scheduling and analyzing the MA subject to fit the re-alignment process	<ul style="list-style-type: none"> Reviewed procedure TFC-ESHQ-Q-ADM-C-11, Rev. A-2, Attachment J, <i>Endpoint Assessment</i> Reviewed ESTAR Task Detail Report indicating the task was accomplished and verified by CH2M HILL Copy of the finalized 2003 CH2M HILL Management Assessment Schedule 	Schedule does contain management assessment commitments from the organizations as it existed after the re-alignment. Effectiveness is based on an improved management assessment program in place after all corrective actions were completed.
EPA Action-02 (Tab item 25)	Get agreement from each affected VP that there will be no management assessment that is cancelled and/or rescheduled without D. Amerine's permission. Draft an Internal Memorandum for D. Amerine's signature to re-state this point.	<ul style="list-style-type: none"> Reviewed Interoffice memorandum # 70000-DBA-03-004 Reviewed procedure TFC-ESHQ-AP-C-01, Rev 2A 	Both the procedure and the memo state that management assessments cannot be changes without this approval. Effective. From participation in CARB meetings, the presentations on the improvement plan, and the overall awareness of this issue and the changes being implemented, management at the VP level were aware and committed to this effort. Effectiveness is based on an improved management assessment program in place after all corrective actions were completed.
EPA Action-03 (Tab item 26)	Revise TFC-ESHQ-AP-C-01, Revision 2A to include a statement... "There will be no management assessment that is canceled and/or rescheduled without permission from CH2M HILL Executive Vice President and Deputy General Manager	<ul style="list-style-type: none"> Reviewed Interoffice memorandum # 70000-DBA-03-004 Reviewed procedure TFC-ESHQ-AP-C-01, Rev 2A --with the change Reviewed the Administrative document change authorization for the intended change 	Change was made. Effectiveness is based on an improved management assessment program in place after all corrective actions were completed.

Attachment – Verification Matrix

Action Number	Description	What Was Evaluated	Assessment of Effectiveness
EPA Action-04 (Tab item 27)	Complete another End Point Assessment in 6 months to evaluate the status of the Management and Independent Assessment Program	Reviewed the End Point Assessment for PER-2002-0964, <i>Weakness in Assessment Activities and Corrective Action Effectiveness</i>	Assessment determined the corrective actions were effective.

E-STARS™ Report
Task Detail Report
11/14/2003 0927

TASK INFORMATION			
Task#	ORP-ESQ-2003-0074		
Subject	CONCUR 03-ESQ-079 HQ Memo - Assessment to Verify CH2M Corrective Actions PNOV		
Parent Task#		Status	CLOSED
Reference		Due	
Originator	Hopkins, Dianne	Priority	None
Originator Phone	(509) 376-4132	Category	None
Origination Date	10/31/2003 0817	Generic1	
Remote Task#		Generic2	
Deliverable	None	Generic3	
Class	None	View Permissions	Normal
Instructions	bcc: MGR RDG FILE Judy O'Connor, OPA J. Swalles, AMTF S. Vega, ESQ P. Carier, ESQ		
ROUTING LISTS			
1	Swalles List		Inactive
	<ul style="list-style-type: none"> ● Barr, Robert C - Review - Concur - 11/13/2003 0825 ● Swalles, John H - Review - Concur with comments - 11/14/2003 0732 ● Schepens, Roy J - Approve - Approved - 11/14/2003 0919 		
ATTACHMENTS			
Attachments	1. 03-ESQ-079 Sohinki EH-10 Memo attach.doc 2. 03-ESQ-079 Sohinki EH-10 Memo.doc		
COMMENTS			
Poster	Swalles, John H (Struthers, Deborah J) - 11/14/2003 0711		
	Concur		
	John concurred 11/13/03		
TASK DUE DATE HISTORY			
<i>No Due Date History</i>			
SUB TASK HISTORY			
<i>No Subtasks</i>			

-- end of report --

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NOV 14 2003

DOE-ORP/ORPCC

E-STARS™ Report
Task Detail Report
10/31/2003 0822

TASK INFORMATION

Task#	ORP-ESQ-2003-0074		
Subject	CONCUR 03-ESQ-079 HQ Memo - Assessment to Verify CH2M Corrective Actions PNOV		
Parent Task#		Status	Open
Reference		Due	
Originator	Hopkins, Dianne	Priority	None
Originator Phone	(509) 376-4132	Category	None
Origination Date	10/31/2003 0817	Generic1	
Remote Task#		Generic2	
Deliverable	None	Generic3	
Class	None	View Permissions	Normal
Instructions	bcc: MGR RDG FILE Judy O'Connor, OPA J. Swailes, AMTF S. Vega, ESQ P. Carier, ESQ		

ROUTING LISTS

1	Swailles List	Active
	<ul style="list-style-type: none"> ● Barr, Robert C - Review - Awaiting Response <i>SV ROB 11/13/03</i> ● Swailes, John H - Review - Awaiting Response <i>JH 11/13/03</i> ● Schepens, Roy J - Approve - Awaiting Response 	

ATTACHMENTS

- Attachments
- 03-ESQ-079 Sohinki EH-10 Memo attach.doc
 - 03-ESQ-079 Sohinki EH-10 Memo.doc

COMMENTS

No Comments

TASK DUE DATE HISTORY

No Due Date History

SUB TASK HISTORY

No Subtasks

-- end of report --

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NOV 14 2003

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