



**GEOSCIENCES AND ENGINEERING DIVISION
QUALITY ASSURANCE
SURVEILLANCE REPORT**

PROJECT NO.: 06002.01.332,
334, 342

REPORT No.: 2006-11

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SURVEILLANCE SCOPE: Mining, Geotechnical, and Facility Engineering (MGFE) Activities:
Preclosure Safety and Mechanical Disruption of Engineered Barriers
(No significant activities were being performed in the other MGFE tasks: ISA, LES, PFSF, MOX, or
USEC)

REFERENCE DOCUMENTS: Quality Requirements Application Matrices, Controlled Software Lists

START DATE: 5/25/2006

END DATE 6/6/2006

QA REPRESENTATIVE:
R. Brient, M. Simpson

PERSONS CONDUCTING ACTIVITY: A. Chowdhury, B. Dasgupta, F. Ferrante, A. Ghosh, S.
Hsiung, L. Ibarra, R. Kazban, G. Ofoegbu, T. Wilt, R. Nes, O. Povetko, S. Gonzalez, P. Shukla, K.
Chiang, P.A. Cox (18), J. Mathis (18)

SATISFACTORY FINDINGS:

General Observations:

Current MGFE activities include regulatory analysis and numerical analysis. No lab or field activities are being conducted internally. An approved supplier is performing mechanical testing.

Calculations are being appropriately documented and scientific notebooks contain the required initial and in-process entries. The entries appeared to be sufficiently detailed so that a technically qualified individual could reproduce the calculations. Several suggestions were offered to improve the clarity of notebook entries.

Unless noted otherwise, software used for calculations is under TOP-018 control and, in most cases, has been validated. See "Recommendations" for exceptions.

SwRI (Mathis, Hricisak) and outside consultants (Ankem) used by MGFE were verified as being up-to-date on annual qualification, training, and COI evaluations. Cox (SwRI Div 18) is currently due for annual reevaluation.

Preclosure Safety

Interim Staff Guidance: Staff are collaborating with NRC staff to develop potential interim staff guidance. Some example problems are being developed and the final versions will be documented in a scientific notebook.

Seismic Technical Exchange: Staff are preparing presentations for a June 2006 technical exchange. Some example problems (same as for the Interim Staff Guidance) are being prepared to include in the presentation materials.

Transportation, Aging, Disposal (TAD) Canister Technical Exchange: Staff are preparing for a July 2006 technical exchange, in which DOE will describe conceptual TAD designs. No calculations have been necessary for this preliminary stage of the TAD designs.

PCSA Exercise Problems - Probability and consequence calculations are being performed using PCSA Tool version 3.0.1C beta and SCALE5, respectively. Both are under TOP-018 control and

SCALE5 is validated, having been endorsed by NRC. Calculations are documented in scientific notebooks 658 and 663E, respectively. Analysis of a conceptual Fuel Handling Building was also performed using PCSA Tool version 3.0.1C beta and is documented in scientific notebook 763. A report is being prepared on a thermal analysis of the Hi-Star 100 cask, which was performed using FLUENT version 6.2.16 and FLOW3D version 9.0 and is documented in notebook 704E.

Reliability of Passive Structures, Systems, and Components - Calculations are being performed using ANSYS 10.0, which is in process of being placed under control. (Version 9.0 was placed under control in March 2006.) Documentation is provided in scientific notebook 759.

Soil/Structure Interactions: Analysis was performed using SASSI 2000 version one and is documented in scientific notebook 726.

Aircraft Crash Hazard: SwRI Division 18 consultants continue work on crash hazard analyses following a previous report from August 2005. Calculations performed using LS-Dyna 970 (not under TOP-018 control) are documented in scientific notebook 702. Other calculations performed using Excel is documented in notebook 776. Several suggestions were provided to enhance the notebook entries.

Mechanical Disruption of Engineered Barriers

Drift Degradation Workshop Report: Several staff members are compiling a report on the Drift Degradation Workshop. No calculations or notebooks are involved at this stage.

Drip Shield/Waste Package Interaction Analysis: A report is in preparation from several contributors. Calculations using Hypermesh 7.0 and Abaqus 6.5 are documented in scientific notebook 772E. Additional calculations using Abaqus 6.4 and 6.5 are documented in notebook 726. Several suggestions to improve notebook 726 were offered. Calculations using SAP 2000 version 8.3.1 and Abaqus 6.4 are documented in scientific notebook 656.

Work to validate the drip shield/waste package interaction abstraction to the Mechfail module of the TPA code is documented in notebook 782.

Titanium creep experiments are underway at approved supplier Westmoreland Laboratories. The material used in the experiments was obtained for ENG1 activities and confirmatory analysis was performed to verify its composition. A literature search regarding Titanium was performed by consultant S. Ankem and his report was determined to be acceptable by MGFE staff.

UNSATISFACTORY FINDINGS: None

NCR NO.: N/A

CAR NO.: N/A

ATTACHMENTS: None

RECOMMENDATIONS/ACTIONS: ANSYS version 10.0 and LS-Dyna 970 were used for calculations performed by SwRI Division 18 staff and had not been placed under TOP-018 control before their use. While use of uncontrolled software is allowed by TOP-018, 3.2.1, this provision is intended for single use software. ANSYS and LS-Dyna are likely to be used for subsequent calculations, so must be placed under control. In addition, project management must communicate and impose software controls on consultants, particularly when the software used is not GED property. ANSYS version 10.0 and LS-Dyna 970 were in process for being placed under TOP-018 control at the conclusion of the surveillance.

APPROVED: 

DISTRIBUTION:
ORIGINAL—QA RECORDS
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DATE: 6/8/06