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U.S. Nuclear Regulatory Commission
ATTN: Mr. Larry Campbell
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Subject: Input to NRC Observation Audit Report, Total System Performance Assessment (TSPA) Report
IM 20.1402.331.015

Dear Mr. Campbell:

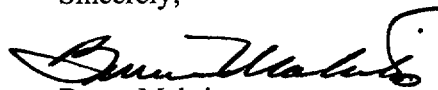
The enclosed predecisional input to the NRC Observation Audit Report on the Department of Energy (DOE) Total System Performance Assessment (TSPA) limited scope, performance based audit at the Bechtel/SAIC LLC (BSC) facilities was performed on August 20–24, 2001. An electronic version of this report is included and can be utilized as the basis of the final NRC Observation Audit Report. This submittal fulfills the Intermediate Milestone 20.01402.331.015. Prior to the NRC sending out the final Observation Audit Report, it is our understanding all team members will be afforded an opportunity to review the final report and shall sign the Observation Report indicating their acceptance of the report.

In addition to the attached input, we understand that you will be adding text from other sources to complete the report.

These NRC observations of DOE audits are to ensure that the audits are accomplished in a effective and adequate manner, that the DOE quality assurance program has been satisfactorily implemented in the areas being evaluated, and that the technical disciplines are adequately reviewed. Where possible, the acceptability of data reviewed by NRC Observation Team members will be verified.

If you have any questions regarding this report, please contact Bruce Mabrito at (210) 522-5149. Your cooperation in this matter is appreciated.

Sincerely,


Bruce Mabrito
Director of Quality Assurance

BM:mp
Enclosures

cc:	J. Linehan	T. Carter	R. Johnson	
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Input for the TSPA-SR NRC Observation Audit Report
for the
Bechtel, SAIC Company, LLC (BSC)
August 20–24, 2001

Assigned Sections provided by T. Trbovich

4.2 Conduct and Timing of the Audit

The audit was performed in a professional manner and the audit team demonstrated a sound knowledge of the applicable BSC and DOE programs and procedures. The audit team personnel were unified in approach, persistent in their interviews, challenged responses when appropriate, and followed their checklist questions, deviating when necessary to pursue discrepancies. The audit team performed an acceptable audit.

The audit team and observers caucused at the end of each day to discuss new and developing issues. Observers were encouraged to participate in the discussions with comments, concerns or questions. Also, the audit team met with BSC management each morning, with some of the observers present, to discuss the current audit status and potential discrepancies. The observers determined that the timing of the audit was appropriate for the audit team to evaluate the TSPA-SR report development activities.

4.3 Audit Team Qualification and Independence

The observers determined that the qualifications of the audit team leader and the OQA audit team members met the requirements of QAP-18.1, "Auditor Qualification." The audit team members did not have prior responsibility for performing the activities they audited. Curriculum vitae of the audit team technical specialists were reviewed by the observers and found to be acceptable.

4.4 Examination of QA Elements

The OQA programmatic and technical activities were conducted simultaneously using a team consisting of one technical specialist and one programmatic QA auditor. Often during the audit, certain programmatic aspects of the documents audited were independently reviewed by an audit team member. The observers determined that the limited-scope audit focused on the QA elements closely associated with the significant process steps of technical report development. The team evaluated the quality of the TSPA-SR report by examining the development and analysis of scenarios; performance of calculations and sensitivity analysis; incorporation of design changes; traceability/transparency of assumptions, uncertainties of and alternative conceptual models; data and other input; and software control while assuring compliance with the QARD requirements as implemented in the BSC quality procedures. In addition, a review of the status of OCRWM deficiency documents LVMO-00-117 through 121 was also performed.

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4.4.1 AP-2.21Q, Rev 0, ICN 0, "Quality Determinations and Planning activities for Scientific, Engineering, and Regulatory Compliance Activities"

The Technical Work Plan for Total System Performance Assessment, TWP-MGR-PA-000001, Rev 01, dated 2-27-01, was reviewed and found to be in compliance with the procedural requirements. The OCRWM Activity Evaluation form had been properly executed.

4.4.2 AP-2.14Q, Rev 1, ICN 0, "Review of Technical Products and Data"

The auditors examined the check and back check record copies of the report/ICN revisions and determined the checking activities had been accomplished in accordance with procedural requirements. Comment/resolution forms had been completed and check personnel had proper qualification and training. The review of these records was difficult due to the disorganization of the individual record packages. Due to the late arrival of these records from archival storage, the QA auditor will continue this review the week following the audit.

4.4.3 AP-SI.1Q, Rev 3, ICN 0, "Software Management"

Two potential deficiencies were identified in this area. The software program, ASHPLUME, had version 1.4LV and 2.0 identified in the report as being used. Version 1.4LV had been properly qualified and validated. Since Version 2.0 had not undergone qualification and validation, this was identified as the first deficiency. In addition, since the code had not been documented and identified as unqualified "for interim use" as described by the procedure a second deficiency was noted. The observers agreed with these findings.

4.4.4 AP-3.11Q, Rev 1, ICN 3, "Technical Reports" AP-3.12Q, Rev 0, ICN 3, "Calculations"

The review of the report Appendix G calculations revealed a potential discrepancy. It appears the calculation review was not performed to the more stringent requirements of AP-3.12Q but rather to the less restrictive requirements of AP-3.11Q. Discussions indicated disagreement over the interpretation and applicability of the requirements of each procedure. The observers agreed with this deficiency.

Further review of the data packages and models in this area led to the determination of repetitive conditions that had been previously identified in LVMN-01-D-118 and LVMO-99-C-001 dealing with transparency issues. The audit team determined that the TSPA-SR report transparency is insufficient due to: process inadequacies, ineffective and/or undocumented checking; lack of data traceability; and the lack of supporting objective evidence to sufficiently substantiate conclusions. This was identified as a potential significant condition adverse to quality at the closing meeting. The observers agreed with this determination.

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Assigned Sections provided by P. LaPlante and M. Smith

4.5 Summary

The technical observers were satisfied by the technical expertise and overall performance of the audit teams and technical staff participating in the audit. Audit team questions were appropriate and thorough, leading to identification of issues that were important to confirm the technical quality of the work reviewed. Staff were cooperative, candid, and appeared honest in their discussions with the audit teams. Technical observers were provided ample freedom to ask questions pertinent to the scope of the audit and were satisfied with the overall conduct of the audit sessions. Observers generally concur with the findings of the audit team. In particular, the lack of transparency in the documentation of the modeling work for the TSPA-SR appears to create a difficulty for independent technical reviewers in understanding the details of specific analyses (e.g., difficult to understand the details of how some of the more complicated barrier neutralization modeling efforts were done). The apparent misapplication of procedures or use of inadequate procedures for checking calculations has also led to identification of a situation where some TSPA calculations were not thoroughly checked by reviewers for technical adequacy and correctness. The following are summaries for segments of the audit that were observed.

4.5.1 Development of Potential Exposure Scenarios

The audit of development of potential exposure scenarios included a review of technical product input. The primary topics addressed by the audit team were (i) the method of scenario development from the FEP database, (ii) scenario construction comprehensiveness, (iii) procedures governing the scenario development process, (iv) transparency of the scenario development process, (v) risk dilution introduced by the scenario development process, (vi) lack of clarity of identification of the system boundaries, and (vii) use of expert elicitation.

The audit team interviewed two technical staff members familiar with the scenario development process. The audit team concluded that no formal procedure exists for conducting scenario development, but the description of the process in reviewed documents was sufficiently explained and conforms to international standards. The observers concurred with the audit team finding that no issues were discovered for this part of the audit.

4.5.2 Planning and Quality Determinations

The audit of planning and quality determinations lead to investigations related to transparency, traceability, and the inability to reproduce model results. The primary

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concerns addressed by the audit team were related to transparency and traceability and the review process used for the TSPA-SR.

The audit team explored the documentation of sensitivity analyses reported in Appendix G of the TSPA-SR. The process was determined to be transparent in the sense that the data and model files that were used can be easily located. However, information on how a file was modified for a particular task (i.e. degraded barrier analysis, sensitivity analysis) was not formally documented, and could only be determined through a laborious comparison of archived input files leading to lack of transparency. This lack of transparency in TSPA modeling documentation can adversely impact reviews of the technical adequacy of the TSPA modeling work.

Questions were also raised on both the decision to (i) deviate from the work plan by using AP3.11Q instead of AP3.12Q for documentation and review of calculations and (ii) not follow the intent of AP3.11Q by providing weak documentation of the calculation review process. Technical staff members were asked to describe the document review process. The author of AP3.11Q stated that the intent of the procedure was to require the same level of review required by AP3.12Q. However, this point was not clear from the auditor's review of the AP3.11Q procedures (AP3.11Q contained fewer calculation check requirements overall and no review of technical adequacy). The observers concurred with the audit team conclusion that implementation of AP3.11Q by the DOE was not documented to the same level of rigor as required by AP3.12Q and that the methods and results reported in Appendix G of the TSPA-SR were not transparent and traceable. Without such documentation, there was no objective evidence that the technical adequacy of the calculations had been checked.

4.5.3 Review of Technical Product

The review of the technical product investigated the technical quality of the TSPA-SR. This part of the audit intended to look at the technical work conducted for the sensitivity analyses reported in Appendix G of the TSPA-SR. The audit team encountered immediate difficulty due to the inaccessible records and questionable review documentation that was discussed in the previous section.

The audit team also explored a concern raised by the observers about lack of requirements for technical specialists to respond to warnings and error messages recorded in the run log produced during operation of the GoldSim model. The technical staff members and the audit team agreed that no requirement exists for operators of the GoldSim model to review, respond to, and document run log messages. Although the technical staff members stated that a review of the run log error and warning messages had been conducted, the observers concurred with the audit team recommendation that

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this process should be formally documented. In summary, observers are aware that GoldSim creates run error logs that document warnings and errors in execution of the software. Observers inquired about what procedures exist that require staff to document error log review results to confirm disposition of run errors to ensure the code is running as intended. The issue originated from observing discussions among auditors and technical specialists where it was found that TSPA-SR GoldSim error logs for stochastic calculations were not saved and therefore not reviewed by staff. This circumstance caused observers to question how staff were able to confirm that no significant run errors occurred during the TSPA-SR stochastic GoldSim runs. A related question was raised by observers regarding why the existence of errors in the log files did not lead to generation of a software deficiency notice. Technical staff responded to the observer concerns. The conclusion was that existing procedures do not require documentation of the error log checks, although technical staff acknowledged that error log checking is a good practice, however, there was insufficient time available to document the error log checks. Technical specialists also confirmed the past error log checks did not result in identification of significant GoldSim run errors that would require code modification or deficiency reports. Technical specialists confirmed that modifications to GoldSim since completion of the TSPA-SR work has provided the capability to output error logs for stochastic runs. Therefore, staff will have the capability to check this information in the future.

4.5.4 Software

The audit team reviewed the use of software for development of the TSPA-SR. The audit team discovered a problem with the use of ASHPLUME v2.0, which continues to be an unqualified software. The process for qualifying ASHPLUME v2.0 for interim use was initiated, but not completed. The technical expert stated that results from ASHPLUME v2.0 were used as corroborative evidence and the software would not need to be qualified. Further, the expert stated that no data were generated or included in the TSPA-SR that originated from use of ASHPLUME v2.0 and that no decisions were based on results of ASHPLUME v2.0. This statement was the subject of debate and interpretation between the audit team and technical staff members. The observers concurred with the audit team finding that the unqualified status of ASHPLUME v2.0 was not properly documented in the TSPA-SR and, under the existing documentation in TSPA-SR, the software should have been qualified prior to use. Technical observers viewed the findings as primarily a procedural issue, however, the development status of software used in technical reports can impact the assessment of technical adequacy of calculations and confidence in results.

4.5.5 Records

The audit team reviewed the record package associated with the TSPA-SR ICN00 and

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TSPA-SR ICN01 to ensure that the appropriate QA procedures, specifically AP2.14Q, AP3.10Q, and AP3.11Q, had been followed. The review of the record package for the TSPA-SR ICN01 indicated that procedures had been followed. The audit team reported that the record package for TSPA-SR ICN00 was very disorganized and made any assessment of technical adequacy impossible. The audit team reported that it was not satisfied with the way the "story board" method was used to track the review process. At the post-audit meeting, the audit team indicated that no major problems had been discovered, but that this item would remain open and the investigation of the TSPA-SR ICN00 record package would continue into the following week.