

QA: QA

**U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
OFFICE OF QUALITY ASSURANCE**

**REPORT FOR PERFORMANCE BASED AUDIT OQAP-BSC-03-14
OF TECHNICAL PRODUCT INPUTS
AT BECHTEL SAIC COMPANY, LLC
LAS VEGAS, NEVADA**

SEPTEMBER 8 - 19, 2003

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EXECUTIVE SUMMARY

Auditors representing the U.S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM) conducted a performance-based audit of technical product input activities performed by Bechtel SAIC Company, LLC (BSC). The audit was conducted from September 8 to 19, 2003. The audit was performed to evaluate the implementation of the requirements contained in the OCRWM DOE/RW-0333P, Revision 13, *Quality Assurance Requirements and Description* (QARD), focusing on technical product input integrity relating to selected model and analysis reports associated with the Yucca Mountain Project License Application (LA) process.

The audit team concluded that, overall, the technical product input procedures and processes were adequate (i.e., upper-tier requirements are identified in the implementing procedures) and that the processes were effective in producing technical products that will meet LA requirements. However, the audit team found that the procedures were not being satisfactorily implemented. The definition of “Technical Information” and the implications of the use of the term were of primary concern, including data packages submitted to the Records Processing Center without “Records Road Maps.”

The procedure definition for “Technical Information” was imprecise, thus causing misinterpretation and misunderstanding for the audit team and BSC staff. In addition, project training implied that only data collected or derived “on-site” were data and that “data” collected by other than OCRWM entities were not “data,” but “Technical Information.” This concept does not appear to be consistent with the definition of “existing data” in Nuclear Regulation (NUREG) 1298, *Qualification of Existing Data for High-Level Nuclear Waste Repositories*, or with the term “data” in NUREG-1804, Revision 2, *Yucca Mountain Review Plan*.

A number of previously issued Deficiency Reports had identified concerns with “Records Road Maps” not being included with records packages submitted to document the creation or modification of Technical Data Information Forms (TDIFs). Current and previous versions of applicable procedures required these documents to be submitted because they link to other critical documents that substantiate the quality of the data and the manner of collection of those data. This audit identified further conditions of missing “Records Road Maps,” leading to the conclusion that the extent of condition for missing “Records Road Maps” is larger than previously understood.

The process effectiveness of three technical products MDL-NBS-HS-000010, *Saturated Zone Transport Method and Component Integration* (in process) (S0025); MDL-NBS-HS-000021, *Input and Results Base Case SZ Flow & Transport Model TSPA* (issued 8/1/2003) (S0055); and ANL-EBS-MD-000016, *HLW Glass Degradation* (issued 8/11/2003) (F0060), were determined to be unsatisfactory due primarily to the extensive use of “Technical Input” as input to the analysis or model report.

The audit team also identified procedural inadequacies as follows:

- Twelve Conditions Adverse to Quality (CAQ) issued as Condition Reports (CR) were identified. None were corrected during the audit. In addition, the audit team identified two recommendations for management consideration to improve processes. These conditions are summarized in Section 4.4 of this report.
- It was not possible to verify the effectiveness of corrective actions associated with Corrective Action Report (CAR) BSC(B)-03-C-107 because the actions to be performed were still in development. Future assessments should include this determination.
- The audit team identified three notable practices related to data use transparency. The notable practices allow the reader of the document to quickly and clearly understand the process used in selection of the specific data and technical inputs used in the document. The specifics of these are discussed in Section 4.4 of this report.

It is important to note that 5 of the 12 technical products reviewed by the audit team were still being developed at the time of the audit, had not completed the final Administrative Procedure (AP)-2.14Q reviews, and were considered draft documents subject to change. The status as of the time of the audit or the issue date of each document is identified throughout this report.

1.0 SCOPE

A team of auditors from DOE OCRWM Office of Quality Assurance and BSC QA conducted a performance-based audit from September 8 to 19, 2003, of technical product input activities and processes that were performed by BSC and supporting national laboratories. The audit team reviewed the adequacy of the applicable technical product input procedures, controls on technical product inputs, and the effectiveness of the associated processes. In addition, the audit team reviewed procedures to ensure that the technical product input requirements identified in the QARD have been included and that they are being effectively implemented.

The audit team evaluated:

1. Critical process steps in the development, control, and documentation of technical product input used in selected products that support the LA.
2. Processes and activities used to manage the development, acquisition, qualification, control, and use of technical product inputs supporting the LA.
3. Twelve technical products that support the LA from a performance-based perspective including the objectives, important steps, and performance measures for the critical process steps and each of the sub-processes within them.

These formed the basis for the checklist questions used by the audit team during the audit. The audit team also evaluated previous technical product input deficiencies to determine the effectiveness of the corrective actions. In addition, the audit team offered improvement recommendations for management consideration where potential improvements were noted.

2.0 AUDIT TEAM MEMBERS AND OBSERVERS

2.1 AUDIT TEAM MEMBERS

James V. Voigt, Navarro Quality Services (NQS)/Audit Team Leader, Las Vegas, NV
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2.2 AUDIT OBSERVERS

Ted Carter, U.S. Nuclear Regulatory Commission (NRC)/Team Leader, Rockville, MD
David Esh, NRC, Rockville, MD
Ernesto Quiñones, NRC, Rockville, MD
Randy Fedors, NRC/Southwest Research Institute/Center for Nuclear Waste Regulatory Analysis (SRIC), San Antonio, TX
Rod Weber, NRC/SRIC, San Antonio, TX

3.0 AUDIT MEETINGS AND PERSONNEL CONTACTED

A pre-audit meeting was held on September 8, 2003, in Las Vegas, Nevada (and at remote locations via telephone). Daily team meetings were conducted with NRC observers in attendance to discuss the progress and status of the audit, including potential CAQs. Daily management meetings were also held to keep BSC and laboratory management informed of audit issues and status. The audit was concluded with a post-audit meeting on September 19, 2003, in Las Vegas, Nevada.

Personnel contacted during the audit, including those who attended the pre-audit and post-audit meetings are listed in Attachment 1, Personnel Contacted During the Audit.

4.0 SUMMARY OF AUDIT RESULTS

4.1 OVERALL EVALUATION OF PROGRAM ADEQUACY, IMPLEMENTATION, AND EFFECTIVENESS

Program Adequacy	Procedure Compliance	Process Effectiveness
Satisfactory	Unsatisfactory	Satisfactory

The audit team concluded that, overall, the technical product input procedures and processes are adequate (i.e., upper-tier requirements are identified in the implementing procedures) within the scope of this audit (evaluation of technical product inputs) and that the technical input processes are effective in producing technical products that will meet LA requirements. However, the audit team found that procedures are not being satisfactorily implemented.

The definition of “Technical Information” and the implications of the use of the term were of primary concern, as were data packages that were submitted to records without “Records Road Maps.”

The criteria used in the evaluation are found in Section 4.2. Detailed evaluations of process and product elements are found in Section 4.3. Detailed evaluations of each of the three parts of the technical input process steps are found in Section 4.3.1. Detailed evaluations of each of the twelve products reviewed are found in Section 4.3.2.

4.2 CRITERIA USED TO DETERMINE PROGRAM ADEQUACY, IMPLEMENTATION, AND EFFECTIVENESS

The criteria used in developing the conclusions stated in Section 4.1 were defined in the audit plan and are repeated below:

1. Accuracy and appropriateness of inputs (i.e., inputs were used as represented; direct inputs were qualified as required; and inputs supporting assumptions were not direct inputs)
2. Consistency of input use, as defined in supporting documentation
3. Adequacy of documentation to support inputs
4. Traceability of technical product inputs

5. Implementation of corresponding QARD requirements and satisfactory completion of critical process steps (i.e., technical product input development, control, selection, documentation, and management)
6. Effectiveness of previous technical product input corrective actions

The following paragraphs describe how the evaluation criteria were implemented during the audit.

4.2.1 Accuracy and Appropriateness of Inputs

The review of the analysis model reports (AMRs) and their inputs resulted in a determination that inputs for the AMRs were or were not appropriately used. The data/information in the report was evaluated to determine whether they were consistent with the type of data/information being used. Data/information values were also reviewed against the values in the original sources. Technical justifications for the use or non-use of data were reviewed to determine if they were clear and appropriate.

4.2.2 Consistency of Input Use

For analysis reports, direct inputs were reviewed to determine if they: were properly identified in Section 4.0, "Inputs"; were consistently used in Section 6.0, "Analysis" and Section 7.0, "Conclusions"; and were correctly cited in Section 8.0, "Inputs and References." For Model Reports, direct inputs: were reviewed to determine if they were properly identified in Section 4.0, "Inputs"; were consistently used in Section 6.0, "Analysis," Section 7.0, "Model Validation," and Section 8.0, "Conclusions"; and were correctly cited in Section 9.0, "Inputs and References." Section 5.0, "Assumptions," for both analyses and models were reviewed to ensure that direct inputs were not being introduced through assumptions. Document Input Reference System (DIRS) sheets for the document were reviewed to ensure consistency with the Section 9.0, "Inputs and References," of the documents.

4.2.3 Adequacy of Documentation To Support Inputs

Section 4.0 of each analysis or model report lists direct inputs and their sources. Documentation of the source of the inputs within the Technical Data Management System (TDMS) was reviewed to ensure the documentation was sufficient for the use of the data in the analysis or model report. Technical support information provided with the data were reviewed to ensure they were sufficient to describe the data, their intended uses, and the history of the development of the data.

4.2.4 Traceability of Technical Product Inputs

The overall traceability of product inputs was evaluated for adequacy. Inputs referenced by data tracking numbers (DTNs) within the reports were traced through the DIRS and the TDMS systems to ensure there were clear, unambiguous, and transparent relationships between the data identified in the report, the source of the data (electronic files), and the data values in the data

files. Some data files were traced to their origins (scientific notebooks or other source documents). Other non-DTN references in the document were reviewed to ensure that they were readily available and that the specific references in these documents as cited in the analysis or model report supported the statement made in the report.

4.2.5 Implementation of Corresponding QARD Requirements

Direct inputs were evaluated primarily against QARD, Supplement III, “Scientific Investigations,” Sections III.2.3 and III.2.4 and their subsections

4.2.6 Evaluation of the Effectiveness of Previous Technical Product Input Corrective Actions

Previous closed CAQs initiated in fiscal year 2003 were reviewed to determine if the actions to prevent recurrence of those conditions have successfully prevented their recurrence. The status of open CAQs was discussed with BSC management to determine if actions are progressing as planned. In addition, as conditions were found during this audit that warranted the issuance of a new CAQ, these conditions were reviewed against both open and closed existing CAQs to determine if the condition found was a repeat condition. The results of these reviews are found in Sections 4.4 and 4.5 of this report.

4.3 DETAILS OF AUDIT RESULTS

A summary of the results for each of the sub-processes and products evaluated by the audit team are provided in Attachment 2, “Summary Table of Audit Results.” Details of audit activities, including a description of the objective evidence reviewed and the *Performance-Based Audit Worksheets*, are documented in the audit checklist. The checklist is processed as a QA record in accordance with AP-18.3Q, Revision 0, *Internal Audit Program*. Statistics on the total number of technical product inputs and the number reviewed are identified in Attachment 3, “Number of DTNs and Documents Reviewed by Product.” A listing of specific documentation reviewed is identified in Attachment 4, “Data Tracking Numbers (DTNs) and Documentation Evaluated during the Audit.”

4.3.1 Results by Process Element

4.3.1.1 Data Input and Development

Program Adequacy	Procedure Compliance	Process Effectiveness
Satisfactory	Unsatisfactory	Satisfactory

The data input and development process was found to be adequately implementing program requirements, and was found to be effective. However, the area of procedure compliance was deemed unsatisfactory.

A number of previously issued CRs had identified concerns with “Records Road Maps” not being included with records packages submitted to document the creation or modification of TDIFs. These documents are required to be submitted by current and previous versions of

applicable procedures and are pivotal documents that link the reader to other critical documents that substantiate the quality of the data and the manner of collection of those data. This audit identified further conditions of missing “Records Road Maps” leading to the conclusion that the extent of condition for missing “Records Road Maps” was larger than previously understood.

The database system is well constructed to accept data from numerous sources, to contain those data electronically, and to make those data available to developers of other data elements or documents. The software for managing the data elements includes identification of where that particular data element was used in other data elements or project documents, electronic links to the records supporting the data, and a full and concise history of the changes made in the database for each data element.

4.3.1.2 Technical Product Input and Selection

Program Adequacy	Procedure Compliance	Process Effectiveness
Unsatisfactory	Unsatisfactory	Unsatisfactory

Technical product input and selection was found to be unsatisfactory for all evaluation criteria. The primary reason for these unsatisfactory evaluations is the definition and implementation of the term “Technical Information.” The team found that program requirements are not adequately implemented and are ineffective due to the definition and implementation of the term “Technical Information.” The use of “Technical Information” has added confusion and has reduced the traceability and defensibility of inputs to documents intended to support the LA. Additional concerns in this area include “Records Road Maps” not being included with records packages submitted to document the creation or modification of TDIFs.

The procedure definition for “Technical Information” is imprecise and causes misinterpretation and misunderstanding. In addition, project training implied that only data collected or derived “on-site” were data and that “data” collected by entities other than OCRWM were not “data,” but “Technical Information.” This use does not appear to be consistent with the definition of “existing data” in NUREG-1298, *Qualification of Existing Data for High-Level Nuclear Waste Repositories*, or with the term “data” in NUREG-1804, Revision 2, *Yucca Mountain Review Plan*. The team considers these to be primarily implementation issues, although the use of the term “Technical Information” instead of “data” affects process adequacy and effectiveness. In fact, the team has identified three documents as “unsatisfactory” for the evaluation criteria “effectiveness” because of the use of “technical information” as input where the inputs should have been identified as “data” and were fully qualified for their intended use.

The three technical products evaluated were:

- MDL-NBS-HS-000010 *SZ Transport Methodology and Transport Component Integration* (in process) (S0025)
- MDL-NBS-HS-000021 *SZ Flow and Transport Model Abstraction* (S0055) (issued 8/1/2003)
- ANL-EBS-MD-000016, *Defence HLW Glass Degradation Model* (F0060) (issued 8/22/2003)

4.3.1.3 Analysis and Documentation

Program Adequacy	Procedure Compliance	Process Effectiveness
Satisfactory	Satisfactory	Satisfactory

Overall, the analysis and documentation was found satisfactory for all evaluation criteria. Document authors have used the inputs in a manner that adequately support their use, are appropriate for the intended use of the inputs, and that are documented as required by procedures. Specifically, inputs are identified in Section 4.0 of analysis and model reports as required by procedures, are used within the requirements of the governing procedures, and adequately form the basis for the outputs of the reports.

4.3.2 Results by Product

4.3.2.1 MDL-NBS-HS-000010, Draft Revision 01C, Site-Scale Saturated Zone Transport (S0025)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Unsatisfactory

MDL-NBS-HS-000010 adequately implemented program requirements and satisfactorily implemented the procedures governing its development but resulted in an ineffective product primarily due to the inappropriate use of direct data input that were classified as “Technical Information.”

The “Technical Information” (essentially unqualified data) was obtained from five references. The use of this unqualified data as direct input causes the model to be less defensible. A total of 27 DTNs were used as direct data input with 18 DTNs reviewed during the audit. The reviewed DTNs were traceable, accurate, appropriate for intended use, and demonstrated adequate supporting documentation. With the exception of “Technical Information” inputs, this report implemented the corresponding QARD requirements and satisfactorily completed the critical process steps.

The use of “Technical Information” as direct data input represented a (CAQ). The data describing sorption coefficients, surface complexation binding constants, and sample surface areas for silica meet the definition for “Data (Collected)” contained in AP-3.15Q, Revision 4, ICN 2, and, therefore, cannot be “Technical Information.” The five data references should be classified as “To Be Verified” (TBV) in the associated DIRS entries. This classification is consistent with the direction contained in Attachment 3, Input Status Decision Checklist for Direct Input, to AP-3.15Q, Revision 4, ICN 2. This CAQ is the same as that previously identified in CR BSC(O)-03-D-214.

4.3.2.2 MDL-NBS-HS-000021, Revision 00 , SZ Flow and Transport Model Abstraction (S0055)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Unsatisfactory

MDL-NBS-HS-000021 adequately implemented program requirements and satisfactorily implemented the procedures governing its development but resulted in an ineffective product primarily due to the inappropriate use of direct data input that were classified as “Technical Information.”

The “Technical Information” (essentially unqualified data) was obtained from six references. The use of this unqualified data as direct input causes the model to be less defensible. A total of 27 DTNs were used as direct input with 12 DTNs reviewed during the audit. The reviewed data inputs were traceable, accurate, appropriate for intended use, and demonstrated adequate supporting documentation. With the exception of “Technical Information” inputs, this model report implemented the corresponding QARD requirements and satisfactorily completed the critical process steps.

The use of “Technical Information” as direct data input represented a CAQ. The data describing effective porosity meet the definition for “Data (Collected)” contained in AP-3.15Q, Revision 4, ICN 2, and, therefore, cannot be “Technical Information.” The six data references should be classified as “TBV” in the associated DIRS. This classification is consistent with the direction contained in Attachment 3, “Input Status Decision Checklist for Direct Input in AP-3.15Q, Revision 4, ICN 2.” This CAQ is the same as that previously identified in CR BSC(O)-03-D-214.

4.3.2.3 MDL-NBS-HS-000002, Revision 02, Seepage Model for PA Including Drift Collapse (U0075)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

MDL-NBS-HS-000002 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This model report did not use direct input data obtained as “Technical Information.” A total of nine DTNs were used as direct data input, and all were reviewed during the audit. Data inputs were traceable, accurate, appropriate for intended use, and demonstrated adequate supporting documentation.

4.3.2.4 ANL-MGR-GS-000003, Revision 00), Number of Waste Packages Hit by Igneous Intrusion (T0055)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

ANL-MGR-GS-000003 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This AMR did not use direct input data obtained as “Technical Information.” A total of two DTNs were used as direct data input, and both were evaluated during the audit. Data inputs were traceable, accurate, appropriate for intended use, and demonstrated adequate supporting documentation.

Noteworthy Practice: The author of this AMR included a summary description of the contents of input DTNs in ANL-MGR-GS-000003, Section 4.0. The descriptions were useful in gaining insights into each specific DTN before listing specific input values in required tables. This noteworthy practice helped in traceability of locating specific DTN values by knowing in advance the DTN contents.

4.3.2.5 ANL-EBS-MD-000016, Revision, 01, ICN 00, Defense HLW Glass Degradation Model (F0060)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Unsatisfactory

ANL-EBS-MD-000016 adequately implemented program requirements and satisfactorily implemented the procedures governing its development but resulted in an ineffective product primarily due to the inappropriate use of direct data input that were classified as “Technical Information.”

Section 4 of the report lists direct inputs and their sources. A total of nine “non technical information” DTNs were used as direct input. All were reviewed during the audit. A total of seven “Technical Information” DTNs were used as direct input, four of these DTNs were reviewed during the audit.

There were clear relationships between the inputs listed in section 4 and the use of these inputs in section 6. The majority of data/information in the report was consistent with the type of data/information being used and any applicable explanations associated with the inputs. Data/information values were also found to be consistent with the values in the original sources. Technical justifications for the use or non-use of data were clear and appropriate.

One instance was identified of unqualified data used in the report without adequate justification (MO0306ANLGAMR2.016). Documentation regarding the unqualified status of MO0306ANLGAMR2.016 was not found in the report. Otherwise, the document was found to have adequately documented inputs.

The overall traceability of product inputs was found to be adequate. Based on a limited number reviewed, references in the document were found to be readily available. All inputs referenced by DTNs were traced and there were clear relationships between the data in the report and the source data. In addition, some of the nomenclature used in Table III-1 was different from that used in the data source; this inconsistency can impede traceability.

4.3.2.6 ANL-EBS-MD-000015, Revision, 01, ICN 00, CSNF Waste Form Degradation: Summary Abstraction (F0055)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

ANL-EBS-MD-000015 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This AMR did not use direct input data obtained as “Technical Information.” Inputs for this AMR were appropriately selected, described, justified, and used. The use of data/information in the report was consistent with the type of data/information being used, the qualification and verification status of the data/information, and any applicable explanations associated with the inputs. Inputs that are used exclusively to support assumptions have been properly identified. Data/information values in the report were found to be consistent with the values in the original sources. Technical justifications for the use or non-use of data were clear and appropriate.

All seven direct inputs referenced by DTNs were traced and there were clear relationships between the data in the report and the source data. However, a single value in the output of this data set in the TDMS was different from the value for the same parameter as given in the report. If other products use this output value, adequate traceability for this particular parameter is not available.

4.3.2.7 ANL-EBS-MD-000005, Revision, 01, ICN 00, Stress Corrosion Cracking of the Drip Shield, the Waste Package Outer Barrier and the Stainless Steel Structural Material (W0095)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Unsatisfactory	Satisfactory

ANL-EBS-MD-000005 adequately implemented program requirements and resulted in an effective product. However, the product did not satisfactorily implement the procedures governing its development. The traceability of technical product inputs was found to be lacking. DTNs: LL000319805924.143 and LL000319905924.144 were referenced in the report and in DIRS as inputs for the product, but the Automated Technical Data Tracking (ATDT) lists the DTNs as output from the model report, which results in a circular reference. LL030412512251.057 and LL021105312215.023 on page 13 had typographical errors.

One value in this report was obtained from an outside source (Ford and Andresen 1988), listed as “Technical Information,” then passed on unchanged in the output data set along with qualified data. This obscures the true unqualified nature of this datum.

There was also an instance where a Technical Information Center catalog number was incorrectly listed in the DIRS, but the title of the reference was correctly stated in both the DIRS and the report so there was no significant impact to the traceability of this particular input.

This AMR did not use direct input data (DTNs) obtained as “Technical Information.” Except as noted above, inputs for this AMR were appropriately selected, described, justified, and used. The use of data/information in the report was consistent with the type of data/information being used, the qualification and verification status of the data/information, and any applicable explanations associated with the inputs. Inputs that are used exclusively to support assumptions have been properly identified. Data/information values in the report were found to be consistent with the values in the original sources. Technical justifications for the use or non-use of data were clear and appropriate.

Based on a limited number reviewed, references in the document were found to be readily available. All inputs referenced by DTNs were traced and there were clear relationships between the data in the report and the source data.

4.3.2.8 MDL-DSU-NU-000001, Revision, 00, ICN 00, Isotopic Model Report for Commercial SNF Burnup Credit (WC08C)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

MDL-DSU-NU-000001 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This AMR did not use direct input data obtained as “Technical Information.” Inputs for this AMR were appropriately selected, described, justified, and used. The use of data/information in the report was consistent with the type of data/information being used, the qualification and verification status of the data/information, and any applicable caveats associated with the inputs. Inputs that are used exclusively to support assumptions have been properly identified. Data/information values in the report were found to be consistent with the values in the original sources. Technical justifications for the use or non-use of data were clear and appropriate.

The traceability of product inputs was found to be adequate. Based on a limited number reviewed, references in the document were found to be readily available. All inputs referenced by data tracking numbers were traced and there were clear relationships between the data in the report and the source data.

4.3.2.9 ANL-MGR-GS-000002, Draft Revision 01D, Characterize Eruptive Processes at Yucca Mountain, Nevada (T0025)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

ANL-MGR-GS-000002 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This AMR did not use direct input data obtained as “Technical Information.”

Except for a few inaccuracies, the report was adequate for its intended purpose. The report was a work in progress, and a number of the problems had been corrected during the period between preparation for the audit and conduct of the audit. The inputs selected were appropriate and consistent, and the inputs were traceable.

There were concerns about three items in the report, one of which resulted in a CR. These three items were:

1. There were four citations in the report to “personal communications.” These references were not listed in the records system, nor were they listed in the DIRS report. As such, the information conveyed was not verifiable or traceable. The citation of these references can be found on pages 78, 96, 120, and 142 of the draft that was examined (draft indicated is REV 01C). These references also appeared in the most recent draft of the report (REV 01D). CR 844 was issued identifying this condition.
2. A sample input DTN (DTN: LA000000000099.002) was examined and found to contain 44 parameters. Only 12 of those parameters were used in the report (in Table 6 in the draft examined). The process for selecting these 12 parameters for the report is vague but alluded to in the report. After some discussion with the author, it was concluded that the use was acceptable but vague. The author agreed to add text to clarify the vagueness.
3. The report refers to an incorrect DTN for input in Table 9. The most recent version of the DIRS lists this reference as DIRS: 119693. The citation in the report (to DIRS: 151592) appears to be wrong. The correct citation (to DIRS: 119693) will be made in a future revision to the report.

The author also agreed to make other changes to the report to clarify information in other sections. Because this report is a work in progress, it appeared to the audit team that the QA program, as applied to this work, was effective.

Data traceability and transparency were reviewed and traced from DTN LA000000000099.001, which was identified as unqualified to DTN LA000000000099.002, which was identified as qualified. The data was qualified in *Final Report on Qualification of Volcanism Isotope, Trace-Element, and Halogen Data Using Procedure YAP-SIII.1Q/Rev. 3/ICN 0*. Data from source

DTN LA000000000099.001 was traced to its origin from reference report *Geochemistry of the Lathrop Wells Volcanic Center* (MOL.19961015.0079). Data traceability and transparency were effective for the one DTN identified in the analysis.

4.3.2.10 MDL-WIS-PA-000003, Revision 00, Seismic Consequence Abstraction (E0145)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

MDL-WIS-PA-000003 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This AMR did not use direct input data obtained as “Technical Information.” Inputs selected were appropriate and consistent, and the inputs were traceable. Data traceability and transparency was reviewed and was found to be effective. The team closely examined 12 of 49 references, both output DTNs, and 11 input DTNs. These were found to be properly cited and classified.

DTN MO0303DPGVB106.002 was traced from source DTN MO0303DPGVB106.001 to investigate how it became qualified when the source DTN was unqualified. Record package MOY-030319-79-02 contained appropriate AP-2.14Q documentation qualifying the DTN. TBV number 5107 was added to the ATDT screen for DTN MO0303DPGVB106.002 during the audit because verification needs to be completed. The DIRS was appropriately updated as well.

Noteworthy Practice: One noteworthy practice was identified in MDL-WIS-PA-000003 at page 50. The discussion about a minor discrepancy in one of the direct input DTNs (MO0305MWDNLRKF.001) clearly stated the condition, described the impact as negligible, and provided the rationale for the viewpoint. When discrepancies of this nature are found, it is a good practice to state the condition, describe the impact and provide the reasoning. This aids transparency for future readers.

4.3.2.11 MDL-MGR-GS-000003 Draft Revision 00A and Draft Revision 00D, Development of Earthquake Ground Motion Input for Preclosure Seismic Design and Postclosure Performance Assessment of a Geologic Repository at Yucca Mountain, Nevada (PR141)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

MDL-MGR-GS-000003 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product.

This AMR did not use direct input data obtained as “Technical Information.” Inputs selected were appropriate and consistent, and the inputs were traceable. Data traceability and transparency was reviewed and was found to be effective.

Except for a few inaccuracies, the report was adequate for its intended purpose. The report was a work in progress, and a number of the problems had been corrected during the period between preparation for the audit and conduct of the audit. Even though the report was not yet finalized, it was apparent that it was effective in implementing the project requirements.

Noteworthy practice: The version of the report examined in preparation for the audit was draft 00A, but the report had progressed to draft 00D and was in AP-2.14Q review. During the course of the audit a copy of draft 00D was provided and examined. Most of the questions during this audit related to inadequate references in the draft 00A that had been corrected in the draft 00D version. Both drafts of the report had a good discussion of the reason why some data were not used in data sets containing large numbers of parameters. The process of examining both drafts of the report showed how well the review process works at identifying and correcting flaws.

One typographical error was found that had not been identified by the review was related to the spelling of the name of an author referred to in the report. The spelling in the reference section of the report did not agree with the spelling in the DIRS report. The reference was citing work by Anderson or Andersen 1989 (DIRS 163169 with accession number TBD). The author indicated that he would check to see which spelling was correct, and make sure that the correction was made. A number of entries were in the DIRS report that did not appear in the reference section (Section 9) of the first draft examined (draft 00A). All of these omissions had been corrected in draft 00D.

Data traceability and transparency was reviewed and found to be effective. Of the 193 references cited in the report, 13 were examined. There were 52 data input DTNs listed in the report, and 16 were examined. There were no product output DTNs listed for the report. DTN MO0211AVTMH107.001 was traced from source DTN MO0211AVTMH107.000 to investigate how it became qualified when the source DTN was unqualified. Records MOL.20030318.0371 and MOL.20030318.0372 contained appropriate AP-2.14Q review documentation qualifying the DTN. The source of these DTNs was traced back to scientific notebooks SN-M&O-SCI-037-V1 & V2. The notebooks contained documentation of a technical review of the data.

4.3.2.12 ANL-EBS-MD-000045, Draft Revision 01F, In-Drift Precipitates/Salts Model (E0105)

Program Adequacy	Procedure Compliance	Product Effectiveness
Satisfactory	Satisfactory	Satisfactory

ANL-EBS-MD-000045 adequately implemented program requirements, satisfactorily implemented the procedures governing its development, and resulted in an effective product. This AMR did not use direct input data obtained as “Technical Information.” Inputs selected were appropriate and consistent, and the inputs were traceable. Data traceability and transparency was reviewed and was found to be effective.

Except for a few inaccuracies, the report was adequate for its intended purpose. The report was a work in progress, and a number of the problems had been corrected during the period between preparation for the audit and conduct of the audit. Even though the report was not yet finalized, it was apparent that it was effective in implementing the project requirements. The inputs selected were appropriate and consistent, and the inputs were traceable to the source data.

Audit preparation was made using draft 01D. The current version is draft 01F. Many inconsistencies related to references have been corrected in the most recent version.

Section 6.5 of the report contains a good discussion of alternative conceptual models.

Data traceability and transparency was reviewed and found to be effective. DTN MO006J13WTRCM.000 was traced from source DTN MO0005J13WTRCM.000 to investigate how it became qualified when the source DTN was unqualified. The data was qualified from the result of report *Data Qualification Report: Composition of J-13 Well Water for Use on the Yucca Mountain Project, Revision 0* dated May 16, 2000 (MOL.20001220.0001). In addition, data from DTN LL991008004241.041 was traced to its source scientific notebook number 0408 through the Site & Engineering Properties database.

4.4 SUMMARY OF CONDITIONS ADVERSE TO QUALITY, RECOMMENDATIONS FOR IMPROVEMENT, AND NOTEWORTHY PRACTICES

The audit team identified twelve (12) CAQs, offered two recommendations for management consideration, and offered three noteworthy practices. Section 4.4.1 describes the CAQs generated during the audit. Section 4.4.2 describes the recommendations. Section 4.4.3 describes the noteworthy practices. Section 4.5 provides a discussion of previously identified CAQs in the area of technical product inputs. Section 4.6 provides a discussion of conditions identified during this audit that are repetitive examples of previously identified CAQs.

4.4.1 CAQs Generated During the Audit

The following subsections summarize the CAQs generated during the audit.

4.4.1.1 CR 773, ANL-EBS-MD-000005 Revision 1, Conclusion Does Not Include Any Uncertainties or Restrictions for Use of Unqualified Data

Requirement:

AP-SIII.10Q, Revision 1, ICN 2, Attachment 2, Outline Item 8 states that “conclusions shall include any uncertainties and restrictions for subsequent use.”

Condition:

ANL-EBS-MD-000005 Revision 1 has an output DTN, LL030607012251.065 that incorporates a model parameter regarding initiated crack size. This parameter was not directly used in this model, but was a recommended value to be used for other models. The source of the parameter

is from the DIRS Entry: Ford, F.P. and Andresen, P.L. 1988, *Development and Use of a Predictive Model of Crack Propagation in 304/316L, A533B/A508 and Inconel 600/182 Alloys in 288°C Water*.

This use of DIRS entry is identified as “Technical Information” per AP-3.15Q Revision 4, ICN 2. Technical Information is defined as information that does not meet the definition of data and is used as direct input. Technical information may include, but is not limited to, information from controlled Office of Repository Development (ORD) reports and design products, established fact (e.g., engineering handbooks, codes, standards, density tables, gravitational laws, or other physical constants), or documented and substantiated information, including electronic databases (National Oceanic and Atmospheric Administration, National Geodetic Survey, National Transportation Safety Board, etc.) or direct input based on the Code of Federal Regulations, applicable statutes, DOE Orders, and DOE Manuals (e.g., *Radiation Protection Manual*).

Per the QARD, Revision 13, data is defined as factual information obtained from investigation activities such as sample collection, physical measurements, testing, and analyses both in the field and in the laboratory.

The initiated crack size parameter is obtained from physical measurements. Therefore, the parameter does not meet the definition of technical information. Given that, Ford and Andresen (1988) is unqualified data from an uncontrolled source. The requirement regarding conclusions containing statements of uncertainty and restriction applies to this parameter in the output DTN.

4.4.1.2 CR 784, AP-SIII.4Q Does Not Allow Reference Information Base (RIB) Data Developed from Acquired Technical Information

Requirement:

AP-SIII.4Q, Revision 0, ICN 5, Section 5.2.1, “RIB Development Author and/or Compiler/Coordinator”

- a) Develop the RIB Data Item from the best available data/information sources using qualified data obtained from a controlled source, qualified, verification level 2 data from a controlled source, accepted data documented in accordance with AP-SIII.2Q, *Qualification of Unqualified Data and the Documentation of Rationale for Accepted Data*, and unqualified data, as required.

Condition:

RIB Data Items MO0003RIB00071.000, MO0003RIB00072.000, and MO0003RIB00073.000 contain only sources identified with the qualification status of “Technical Information.” This type of input is not a recognized source of a RIB Data Item per AP-SIII.4Q.

4.4.1.3 *CR 785, Incorrect Content in Analysis/Model Reports Not Caught by Checkers*

Requirement:

AP-SIII.10Q, Revision 1, ICN 2, Section 5.5.3, “Checker”

- a) “Check the model documentation ensuring that (an optional Models Checklist, Form 1098 on the BSC Intranet Automated Form System, may be completed by the Checker):
 1. The content of the model is technically adequate, complete, and correct, and the documentation has been prepared in accordance with this procedure and the applicable Technical Work Plan (TWP).”

Condition:

The following incorrect content was noted:

1. For ANL-EBS-MD-000005 Revision 1, page 13, DTNs: LL030412512251.057 and LL021105312251.023 have typographical errors.
2. For ANL-EBS-MD-000005, Revision 1, the following reference CRWMS M&O. *General Corrosion and Localized Corrosion of Waste Package Outer Barrier*. ANL-EBS-MD-000003 Rev. 00. Las Vegas, Nevada: CRMWS M&O. ACC: MOL.20000202.0172 [14429] is found in Section 9 of ANL-EBS-MD-000005 but is neither in DIRS nor the body of the report.
3. For ANL-EBS-MD-000016 Revision 1, pages II-4 and II-5 list incorrect units on parameter “R,” kJ/mol instead of kJ/mol-K. The reference on table 7.4-1 refers to Attachment IV instead of Attachment V. Table III-1 lists SRL131-TDS instead of SRL-131.
4. For ANL-EBS-MD-000016, Revision 01, Equation 11b on page 38 does not match the corresponding regression line in figure 6.5-1b on page 40 which the body of the report indicates is a graphical representation of the equation.
5. In ANL-EBS-MD-000015, Revision 1, one value in Table 8.1-3, under the conclusions section of the AMR, does not match the value in the output data set submitted to the TDMS (MO0306ANLSF001.001)

4.4.1.4 *CR 786, Unqualified Developed Data Was Used as Model Input Without Any Justification*

Requirement:

AP-SIII.10Q, Revision 1, ICN 2, Attachment 2.

4.1 “Data and Parameters–The appropriateness of technical product inputs directly relied on to develop the model shall be described in this section. The rationale for use of any accepted data and the rationale and justification for the use and qualification of unqualified data shall be documented in this section.

- Provide lists or tables of technical product inputs that were used directly in the development of the model.
- If the present study uses, revises, or changes a previously developed and validated model to complete the present study, list associated DTNs, accession numbers, documentation titles, and document identifying numbers.”

Condition:

In ANL-EBS-MD-000016 Revision 1, unqualified developed data MO0306ANLGAMR2.016 is used in Table 4.1-2 without any justification provided in section 4.1.

4.4.1.5 CR 787, Circular Usage of 2 DTNs LL000319805924.143 & LL000319905924.144

Requirement:

AP-SIII.3Q Revision 1 ICN 2, section 3.30 defines Technical Product Output (TPO) as “information, developed data, conclusions, and/or results of an approved technical product, subject to the QARD, and developed using procedures in effect on or after 06/30/1999. TPO must have a supporting DIRS document.”

Condition:

Two DTNs (LL000319805924.143 & LL000319905924.144) were submitted to the TDMS as TPO from ANL-EBS-MD-000005 Revision 0. After a review of ANL-EBS-MD-000005 Revision 0, it was determined that these DTNs are actually developed data from LL000316205924.142. This DTN is procured data from an OCRWM Qualified Supplier, Structural Integrity Associates, Inc. These DTNs are also cited in the DIRS for ANL-EBS-MD-000005, Revision 1, as “Reference Only.” It is unclear how two DTNs can be TPO from the same document that uses them as input.

4.4.1.6 CR 789, DTNs Previously Identified as Data Had Qualification Status Changed to “Technical Information”

Requirement:

QARD Revision 13, Supplement III.2.3, Paragraph C, states: “Data shall be identified in a manner that facilitates traceability to its qualification status.”

Condition:

When the latest revisions of AP-SIII.3Q and AP-3.15Q went into effect, a new definition of direct input called Technical Information was introduced. The definition of Technical Information per these procedures is as follows:

“Information that does not meet the definition of data and is used as direct input. Technical information may include, but is not limited to, information from controlled ORD reports and design products, established fact (e.g., engineering handbooks, codes, standards, density tables, gravitational laws, or other physical constants), or documented and substantiated information, including electronic databases (National Oceanic and Atmospheric Administration, National Geodetic Survey, National Transportation Safety Board, etc.) or direct input based on Code of Federal Regulations, applicable statutes, DOE Orders, and DOE Manuals (e.g., Radiation Protection Manual).”

As these procedures took effect, a change in the qualification status was made within the TDMS for several DTNs that were once identified as data. Examples of these DTNs include:

1. Data was qualified per AP-SIII.2Q as “Accepted Data (Fact)”
2. Qualified data that was “Technical Product Output” from approved OCRWM documents
3. Qualified data that reside in the Technical Information Center (TIC)
4. Unqualified Data that resided in the TIC.

When the qualification status was changed to “Technical Information,” the identification and the qualification status of this data were rendered indeterminate because of the changes to AP-SIII.3Q.

Attachments 5 to 8 provide examples of these conditions. These attachments are:

- Attachment 5 - Listing of DTNs that were previously classified as “Accepted Data (Fact)” that have been reclassified as “Technical Information”
- Attachment 6 - Listing of “Qualified” DTNs that were previously classified as Technical Product Output that have been reclassified as “Technical Information”
- Attachment 7 - Listing of DTNs from the Technical Information Center (TIC) that were previously classified as “Qualified” that have been reclassified as “Technical Information”
- Attachment 8 - Listing of “Unqualified” DTNs from the Technical Information Center (TIC) that were previously classified as “Unqualified” that have been reclassified as “Technical Information”

4.4.1.7 Condition Report 790, Qualified Data Does Not Have Required Record Road Map

Requirement:

AP-SIII.3Q, Revision 1, ICN 2, Section 5.1.1, “Data Originator/Preparer”

- h) “If data are Qualified, Acquired, or Developed, on (or after) 06/30/1999, and are not TPO, develop a Record Road Map (form AP-3.15Q.2) in accordance with AP-3.15Q, *Managing Technical Product Inputs*. Once the Record Road Map is completed, retain for processing of applicable records in accordance with Section 6.0.”

Condition:

The following qualified and final DTNs from ANL-EBS-MD-000015, Revision 01, do not have Record Road Maps:

1. MO0304PNLLPHDD.000
2. MO03061E9PSHA1.000
3. LA0302CH831811.001
4. LA0302CH831811.002
5. LA0302GH831811.002
6. LA0302GH831811.003
7. LA0302GH831811.004
8. LA0305DK831811.001

4.4.1.8 Condition Report 791, DTN Was Not identified as a Superseding Data Set

Requirement:

AP-SIII.3Q, Revision 1 ICN 2, Section 5.1.1, “Data Originator/Preparer”

- e) “If submitted data are to supersede an existing DTN (coordinate supersession effort with applicable DBA[s]), an Impact Review Action Notice (IRAN) must be initiated in accordance with AP-2.14Q, Review of Technical Products and Data. The IRAN must be initiated prior to submission of the supersession. Supply Data Coordinator with copies of initiated IRAN forms.”

Condition:

1. Output data from ANL-EBS-MD-000016, REV 00, ICN 02, was submitted to the TDMS under DTN: MO0207AMRDHLWG.001. This DTN was then used as a source for RIB item MO0207RIB00091.002. The report was then revised (ANL-EBS-MD-000016 REV 01) and a new output data set was submitted to the TDMS (MO0304ANLGAMR1.016), which was then superseded by MO0307ANLGAMR1.016. However, MO0304ANLGAMR1.016 was never identified in TDMS as superseding MO0207AMRDHLWG.001.

4.4.1.9 CR 792, Inputs Identified as “Reference Only” Were Used To Make Decisions That Addressed Waste Isolation

Requirement:

AP-3.15Q, Revision 4, ICN 2, Attachment 3, “Input Status Decision Checklist”

The status Reference Only is given for technical product inputs that are not directly used to address safety and waste isolation issues.

Condition:

ANL-EBS-MD-000005, Revision 01, Section 6.3.4, page 39, directly uses two DTNs LL021105312251.023 & LL020603612251.015 to make the following conclusion: “Thus, there appears to be no basis for concern that Pb will affect SCC susceptibility in these relevant concentrated brine environments over a broad range of pH values.” This conclusion to exclude lead concentrations from the model being developed in this AMR addresses waste isolation.

According to the AMR originator and the Performance Assessment Project Manager, the input to make this conclusion was decided to be Reference Only because these inputs were never to be a direct feed into the model. The definition of Reference Only is inconsistent with their intended usage.

4.4.1.10 CR 821, Data Used as Technical Information

Requirement:

AP-3.15Q, Revision 4, ICN 2, Section 3.2, “*Data (Collected)* - Factual information obtained from investigation activities such as sample collection, physical measurements, testing and analyses, both in the field and in the laboratory (QARD).”

Section 3.10, “*Technical Information* - Information that does not meet the definition of data and used as direct input. . . .”

Attachment 3, Input Status Decision Checklist for Direct Input, specifies the use of “Data-Qualified” or “TBV” for direct data input depending on qualification status.

Condition:

1. For MDL-NBS-HS-000021, Revision 00, *SZ Flow and Transport Model Abstraction*, porosity data have been classified as “Technical Information” rather than “TBV” in associated DIRS entries. Porosity data meet the definition of “Data (Collected).” Because porosity data meet the definition for “Data (Collected),” they cannot meet the definition for “Technical Information.” The six references for porosity data listed in Table 4-1 of MDL-NBS-HS-000021 are Bedinger et al. 1989 [129676], BSC 2003 [161773], Burbey and Wheatcraft 1986 [129679], CRWMS M&O 1997 [100328], DOE 1997 [103021], and Wilson et al. 1994 [100191].

2. For MDL-NBS-HS-000010, Revision 01C, *Site-Scale Saturated Zone Transport*, data describing sorption coefficients, surface complexation binding constants, and sample surface areas for silica have been classified as “Technical Information” rather than “TBV” in associated DIRS. These data meet the definition for “Data (Collected).” Because these data meet the definition for “Data (Collected),” they cannot meet the definition for “Technical Information.” The five data references listed in Table 4-1 of MDL-NBS-HS-000010 are Allard et al. 1983 [162982], Allard et al. 1980 [104410], Beall et al. 1986 [162983], Bertetti et al. 1998 [162984], and Pabalan et al. 1998 [162987].
3. For ANL-EBS-MD-000016, Revision 01, *Defense HLW Glass Degradation Model*, testing and analysis results have been classified as “Technical Information” rather than “TBV” in associated DIRS. Because these testing and analysis results meet the definition for “Data (Collected),” they cannot meet the definition for “Technical Information.” The three references for ANL-EBS-MD-000016 are Aines, R.D., Weed, H.C., and Bates, J.K., 1987 (DIRS entry #8); Smith, T.H., and Ross, W.A., 1975 (DIRS entry #107); and Smith, P.K., and Baxter, C.A., 1981 (DIRS entry #106). These references have been identified to reside in the Technical Information Center (TIC) (an uncontrolled source).

These conditions appear to be a repetitive condition adverse to quality used to introduce unqualified data as direct input into an analysis, model, or calculation. In your response, address the similarity in the following deficiency reports:

- BSC(O)-03-D-014 (unqualified data introduced as Assumptions)
- BSC(O)-03-D-080 [unqualified data introduced as Accepted Data (Not Established Fact)]
- BSC(O)-03-D-214 (unqualified data introduced as Technical Information)

4.4.1.11 CR 845, *Supersession of DTNs Without Initiation of IRAN*

Requirement:

AP-SIII.9Q, Revision 1, ICN 0, Section 5.2.1, “Originator”

- f) “Document technical product inputs used to develop the scientific analysis in the Document Input Reference System (DIRS) in accordance with AP-3.15, *Managing Technical Product Inputs*”

Condition:

Revision 00G of ANL-MGR-GS-000003 listed DTN LA0307DK831811.001 as a Calculation Input in Table 1. However, this DTN was not documented in the DIRS.

DTN LA0307DK831811.001 has been superseded by DTN MO0307SPADKBSM.000. Because the superseded DTN was never documented in the DIRS, no impact review action notice was initiated listing ANL-MGR-GS-000003 as an impacted document. Revision 00H of ANL-MGR-GS-000003 lists the new DTN (MO0307SPADKBSM.000) and is documented in the current DIRS.

4.4.1.12 CR 844, Use of Personal Communication Without Documentation

Requirement:

AP-3.15Q, Section 5.2.2 b) states, “For preliminary technical product input not available in an approved technical product, provide the preliminary input by letter, inter-office correspondence, inter-office memorandum, or draft document to the Originator. The title of the correspondence or records submittal package shall indicate the transmittal of preliminary information.”

AP-3.15Q, Section 5.2.2 c) states, “Submit the preliminary technical product input as a record, in accordance with Section 6.0.”

Condition:

Analysis report ANL-MGR-GS-000002, *Characterize Eruptive Processes at Yucca Mountain, Nevada*, Revision 01C contains four inputs identified as “personal communication” that have not been documented by letter, interoffice correspondence, interoffice memorandum, or draft document. These four inputs have not been submitted as records in accordance with AP-3.15Q requirements.

The four examples are found in the following sections of the analysis report:

1. The note associated with Figure 13 on page 78
2. Section 6.4.2.1 first paragraph on page 96
3. The first paragraph below Table 33 on page 120
4. The paragraph above equation 13 on page 142

4.4.2 Recommendations

The following two recommendations are offered by the audit team for management consideration:

Recommendation 1:

ANL-MGR-GS-000002, (T0025), Revision 0 (in process), *Characterize Eruptive Processes*, includes DTN LA00000000099.002, that contains 45 parameters. A subset of 12 parameters was selected and used in the report as direct input. The selection process for determining which parameters of the 41 in the DTN was not provided in the report or references. It is a recommendation that the transparency of data selection would be enhanced if there were an explanation of the selection process within the AMR or a reference document. See Noteworthy Practices in Section 4.4.3 below for methods used by other authors to provide this transparency.

Recommendation 2:

The Data Management System currently does not have a process in place to identify and correct discrepancies at a lower level before a Deficiency Report (DR) or CAR is initiated. In the past, when a data error was identified, a CIRS item was typically generated, determined to be a

potential CAQ by the CIRS Evaluation Team, and processed as a CR to be evaluated for validity as a CAQ in accordance with AP-16.1Q. It is a recommendation that the Data Management organization should consider initiating a process to identify and correct discrepancies at a lower level before a DR or CAR is initiated. This process should be coordinated with the Corrective Action Program (CAP) to ensure consistency of approach and compliance with the QARD requirements for a CAP program.

4.4.3 Noteworthy Practices

The following three noteworthy practices were identified during the audit and are offered by the audit team as ways to enhance the transparency of the data selection process:

Noteworthy Practice 1:

Table 4.1-3 in AMR ANL-EBS-MD-000005, (W0095), Revision 1, *SCC of DS, WP Outer Barrier & SS Structural Material* (issued 7/16/2003) is very well presented by displaying the Excel Spreadsheet file name that is in the TDMS. In addition, the cell location and worksheet name is also given. This provides excellent traceability to the tabular data files in the TDMS.

Noteworthy Practice 2:

ANL-MGR-GS-000003, (T0055), *Number of Waste Packages Hit by Igneous Intrusion*, (in process) included a summary description of the contents of each input DTN in Section 4.0. The description was useful in gaining insights into each specific DTN before listing specific input values in required tables. This noteworthy practice helped in traceability of locating specific DTN values by knowing in advance the DTN contents.

Noteworthy Practice 3:

MDL-WIS-PA-000003, page 50, discusses a minor discrepancy in one of the direct input DTNs (MO0305MWDNLRKF.001). The description clearly stated the condition, described the impact as negligible, and provided the rationale for the viewpoint. When discrepancies of this nature are found, it is a good practice to state the condition, describe the impact and provide the reasoning. This aids transparency for future readers.

4.5 DISCUSSION OF PREVIOUSLY IDENTIFIED CONDITIONS ADVERSE TO QUALITY IN THE AREA OF TECHNICAL PRODUCT INPUTS

The audit team evaluated closed CAQs initiated in fiscal year 2003 that were not part of the resolution of CAR BSC(B)-03-C-107. These CAQs were evaluated to determine if previously identified closed CAQs in the area of technical product inputs continue to remain resolved.

Open CAQs were not specifically evaluated during this audit for repetitiveness since corrective actions are still in process; however, if repetitive conditions were identified during the audit that were related to an open CAQ, these were identified in Section 4.4.1 above.

CAR BSC(B)-03-C-107 was initiated by BSC line management on April 14, 2003 because of the large number of CAQs that had been identified in the area of technical product inputs and data management. These CAQs were specifically identified in that CAR as the basis for the initiation of the CAR. CAR BSC(B)-03-C-107 specifically addresses the lack of an effective corrective action program in the area of technical product input and data.

Because the corrective action response to CAR BSC(B)-03-C-107 has not yet been finalized, those CAQs that are a part of the CAR were not specifically evaluated during this audit for repetitiveness. However, if repetitive conditions were identified during the audit that were related to a CAQ identified in CAR BSC(B)-03-C-107, these were identified in Section 5.4.1 above.

To define what is and is not included in CAR BSC(B)-03-C-107, the following attachments to this report are provided. Attachment 9, "Technical Product Input Deficiency Documents Issued Prior to the Initiation of CAR BSC(B)-03-C-107 (April 14, 2003)," lists those CAQs that were identified before the initiation of CAR BSC(B)-03-C-107. A notation is provided for those CAQs related to technical product inputs that were not specifically included in the CAR.

Attachment 10, "Technical Product Input Deficiency Documents Issued Since CAR BSC(B)-03-C-107 was Initiated (April 14, 2003), lists those CAQs that were identified since the initiation of CAR BSC(B)-03-C-107.

4.5.1 Previously Identified Data and Technical Information Related CAQs With No Noted Recurrences of the Deficient Condition

The following previously identified FY 2003 CAQs were evaluated during the audit and were found to continue to be adequately implemented with no noted recurrences of the deficient condition:

- LLNL(B)-03-O-021, Incorrect Designation of Submitted Data
- BSC(B)-03-D-032, Failure to submit geophysical data to records
- LLNL(O)-03-D-033, Lack of Documentation of Electronic Data Controls
- DR BSC(B)-03-D-037, No Objective Evidence of Two TDIFs Being Submitted to the Records Processing Center
- BSC(B)-03-D-042, Project Procedures not Reflecting QARD Supplement III, Data Requirements
- DR BSC(B)-03-D-043, Failure in the Implementation of the Review, Checking and Approval Processes as Described in AP-SIII.9Q
- BSC(B)-03-D-045, Inaccurate Data Description Entries into the ATDT

- BSC(O)-03-D-046, Inadequate Quality Requirements in ANL Statement of Work
- BSC(B)-03-D-051, Failure to identify data tracking numbers for data that was listed in an approved technical report
- DR BSC(O)-03-D-059, Engineering Drawings' DIRS Refer to Incorrect Status Inputs
- BSC(O)-03-D-070, EM Data Not Identified as such Nor Controlled Per Supplement III
- BSC(B)-03-D-073, Incorrect Designation of the DIRS Input Status of Unqualified Data
- BSC(B)-03-O-080, A Post-PVAR Data Set (DTN) Includes a Quality Verification Level-2 DTN Within It (Converted to BSC(B)-03-D-194 under new AP-16.1Q)
- BSC(B)-03-D-084, Incorrect Direct Inputs into Model Report
- BSC(B)-03-D-091, Data Errors in LANL Scientific Notebooks
- DR BSC(O)-03-D-129, Non-Specific Data Evaluation Criteria
- DR BSC(O)-03-D-130, Failure to Apply Data Evaluation Criteria During Data Qualification
- DR BSC(O)-03-D-134, Data Submittal Records Packages Do Not Include All Required Information
- DR BSC(O)-03-D-135, Lack of Traceability and Transparency in Analysis Model Reports
- DR BSC(B)-03-D-136, Incorrect Data Tracking Number (DTN) Data Entry
- DR BSC(B)-03-D-188, Procedure Conflict Regarding Use of TIC/RIS Information as Direct Input ("Controlled Source" Issue)
- BSC(B)-03-D-194, A Post-PVAR Data Set (DTN) Includes a Quality Verification Level-2 DTN Within It
- BSC(B)-03-D-196, TDMS Database Identifies Output DTNs as Product Output when Technical Product has been Canceled or Superseded
- USGS(B)-03-D-201, Electronic Data Records in RPC are Corrupted, and Associated Documentation Inadequate (MOL.19970723.0270, DTN GS960108314211.001)
- BSC(B)-03-D-211, Technical Information source documents are not being tracked properly as required by AP-3.15Q

- BSC(O)-03-D-218, Ventilation Model and Analysis Report Table 4-14 Invalid Inputs and No Traceability
- BSC(B)-03-D-219, Missing Technical Data Information Forms (TDIFs)
- BSC(B)-03-D-221, TDMS does not accurately depict input description; i.e. data, technical information, product output, etc.
- BSC(O)-03-D-236, Technical Assessment of Unqualified Data
- BSC(B)-03-D-241, Metadata not clearly marked as Limited for a Specific Use
- BSC(B)-03-D-257, DIRS report did not reference open TBV number
- BSC(B)-03-D-259, Incorrect Technical Product Input Status Listed in DIRS

4.5.2 Previously Identified Data and Technical Information Related CAQs With Recurrences of the Deficient Condition

Section 4.4.1 describes conditions identified in this audit. These descriptions are not repeated here. This section describes which CRs are repetitive of previously identified conditions and identifies those previously identified documents by number and description.

CR 821 issued as a result of this audit identified conditions that were repeats of the conditions previously identified in the following CAQs:

- BSC(O)-03-D-014, Direct Input of Unqualified Data Into Models and Analyses as Assumptions
- BSC(O)-03-D-080, Unqualified Data introduced as Accepted Data - Not Established Fact
- BSC(O)-03-D-214, Unqualified Data introduced as Technical Information

CR 790 issued as a result of this audit identified conditions that are very similar in nature to the conditions previously identified in the following CAQs:

- BSC(B)-03-D-054, Failure to Generate Record Road Map for Data Sets
- BSC(B)-03-D-152, Record Road Maps Not Developed and Record Packages Not Sent to the RPC for Geographic Information System (GIS) Data Packages
- BSC(B)-03-D-227, Record road maps not generated for DTNs
- BSC(B)-03-D-242, Data Verification Checklists and Record Road Maps not developed for superceded DTNs

5.0 LIST OF ATTACHMENTS

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Attachment 5 - Listing of DTNs Previously Classified as “Accepted Data (Fact)” That Have Been Reclassified as “Technical Information”

Attachment 6 - Listing of “Qualified” DTNs That Were Previously Classified As Technical Product Output That Have Been Reclassified as “Technical Information”

Attachment 7 - Listing of DTNs from the Technical Information Center (TIC) Previously Classified As “Qualified” That Have Been Reclassified As “Technical Information”

Attachment 8 - Listing of “Unqualified” DTNs from the Technical Information Center (TIC) that were previously classified as “Unqualified” That Have Been Reclassified as “Technical Information”

Attachment 9 - Technical Product Input Deficiency Documents Issued Prior to the Initiation of CAR BSC(B)-03-C-107 (April 14, 2003)

Attachment 10 - Technical Product Input Deficiency Documents Issued Since CAR BSC(B)-03-C-107 was Initiated (April 14, 2003)

**Attachment 1
 Personnel Contacted During the Audit**

Name	Organization	Pre-Audit Meeting	Contacted During Audit	Post-Audit Meeting
Aden-Gleason, Nancy	LBNL/EA	✓	✓	✓
Adkins, Howard	BSC/PA/ES/WF		✓	✓
Andrews, Robert	BSC/PA	✓	✓	✓
Archuleta, Jose A.	SNL	✓		
Arnold, Bill W.	SNL	✓	✓	
Beall, Ken	BSC/CM		✓	✓
Bennington, Mary E.	DOE/OQA	✓	✓	✓
Bess, Jack	BSC/Licensing		✓	✓
Biggar, Norma	BSC/PA/NS		✓	
Blaylock, James	DOE/OQA		✓	
Boyle, William	DOE/ORD		✓	✓
Brown, R. Dennis	DOE/ OQA		✓	✓
Brumfield, Edward	BSC/QA	✓	✓	
Burningham, Andrew	BSC/PATI		✓	
Capshaw, Roy	DOE- HQ/RW/OQA	✓		
Carter, Ted	NRC	✓	✓	✓
Castagna, Iris	SNL	✓		
Cereghino, Stephen	BSC/LA		✓	
Cunnane, James	ANL/ES		✓	
Dahl, Pamela	BSC/CM	✓	✓	✓
Devers, John K.	BSC/QA	✓		
Dove, Floyd H. (Technical Specialist)	OQA/NQS	✓		✓
Duffy, William	BSC/PATI		✓	
Ebert, William	ANL/ES		✓	
Economy, Kathleen M.	SNL		✓	
Esh, David	NRC	✓		
Fedors, Randall W.	NRC/SRIC	✓		✓

Attachment 1 (Continued)
Personnel Contacted During the Audit

Name	Organization	Pre-Audit Meeting	Contacted During Audit	Post-Audit Meeting
Fissekidou, ViVi	LBNL		✓	
Foster, Bruce	OQA/NQS		✓	✓
Gil, April	DOE-OLAS			✓
Gordon, Gerald	FANP/WPM&M		✓	
Graff, James F.	BSC/QA	✓		
Grooms, Kerry	DOE/ OQA	✓		
Habbe, Robert	BSC/QA	✓	✓	✓
Haefele, Cheryl	BSC/PATI		✓	
Harper, James B. (Audit Team Leader-in-Training)	BSC/QA	✓		✓
Hartstern, Robert	BSC/QA	✓	✓	✓
Hasson, Robert	NQS	✓		✓
Hastings, Cheryl	BSC/PATI	✓	✓	✓
Heaney, Jerry (Auditor)	BSC/QA	✓		✓
Horseman, Marlin	OQA/NQS		✓	✓
Houseworth, James	LBNL		✓	
Howard, Cliff	BSC/PA/ES			✓
Howard, Robert	BSC/PA		✓	
Jaeger, Michael	BSC/PA	✓	✓	✓
James, Eloise	SNL	✓		
Kavchak, Marilyn	NQS	✓	✓	
Keeler, Raymond (Technical Specialist)	UCCSN/QA	✓		✓
Keith, Dale	BSC/PATI		✓	
Kelkar, Sharad	LANL		✓	
Kersch, Keith M. (Technical Specialist)	BSC/IDT	✓		✓
Kicker, Dwayne	BSC/Facilities Design		✓	

Attachment 1 (Continued)
Personnel Contacted During the Audit

Name	Organization	Pre-Audit Meeting	Contacted During Audit	Post-Audit Meeting
Knop, Matthew	BSC/PATI		✓	✓
Knowles, M. Kathryn	SNL	✓		
Krier, Donald	LANL		✓	
Kuzio, Stephanie	SNL	✓	✓	
Latta, Robert	NRC		✓	✓
Lu, Stephen	LLNL		✓	
Mason, Michael	BSC/QA		✓	✓
Mattes, Vincent	BSC/PATI		✓	
Maudlin, Richard C.	BSC/QA			✓
Meijer, Arend	LANL		✓	
Mon, Kevin	BSC/Engineering		✓	
Palay, Christian (Auditor)	OQA/NQS	✓		✓
Pasupathi, Venkataraman	BSC/WPM&M		✓	
Persoff, Peter	LBNL		✓	
Quiñones, Ernesto	NRC		✓	✓
Sassani, David C.	MTS/GAI			✓
Scaglione, John	BSC/Risk & Criticality		✓	
Schreiner, Randy	BSC/ES		✓	
Seamans, David	BSC/AS/DDP		✓	
Sweeney, Brian	BSC/Licensing		✓	
Tormey, Martin J.	QAMA Team, English Consulting		✓	
Toro, Robert	OQA/NQS		✓	✓
Tsang, Chin-Fu	LBNL		✓	
VanDillen, Roxanna (Auditor)	BSC/QA	✓		✓
Voigt, James V. (Audit Team Leader)	OQA/NQS	✓		✓

Attachment 1 (Continued)
Personnel Contacted During the Audit

Name	Organization	Pre-Audit Meeting	Contacted During Audit	Post-Audit Meeting
Von Tiesenhausen, Englebrecht	Clark County	✓	✓	
Wallace, Mike	SNL	✓	✓	
Watson, William	BSC/PA		✓	
Weber, Rodney	NRC/SRIC	✓	✓	✓
Whitcraft, James	BSC/Engineering	✓		✓
White, Jon M.	DOE/OLAS	✓	✓	
Williams, Nancy	BSC/PM		✓	✓
Yunker, Jean	BSC/CSO	✓	✓	
Zinkevich, Fred	BSC/CM		✓	

Attachment 2
Summary Table of Audit Results

Area/ Product Number	Team	Technical Product Input Area/Product	Condition Reports	Recom- mendations	Program Adequacy	Procedure Compliance	Process/Product Effectiveness
1.	A	Data Input and Development	790		Satisfactory	Unsatisfactory**	Satisfactory
2.	C	Technical Product Input and Selection	821 789	#2	Unsatisfactory*	Unsatisfactory*	Unsatisfactory**
3.	B	Analysis and Documentation			Satisfactory	Satisfactory	Satisfactory
4.	D	Overall Evaluation	821		Satisfactory	Unsatisfactory***	Satisfactory
5.	ALL	Conditions Adverse to Quality			Not Applicable	Not Applicable	Not Applicable
6.	A	MDL-NBS-HS-000010 (S0025) <i>Saturated Zone Transport Method and Component Integration (In process)</i>	821		Satisfactory	Satisfactory	Unsatisfactory*
7.	A	MDL-NBS-HS-000021 (S0055) <i>Input and Results Base Case SZ Flow & Transport Model TSPA (8/1/2003)</i>	821		Satisfactory	Satisfactory	Unsatisfactory*
8.	A	MDL-NBS-HS-000002 (U0075) <i>Seepage Model for PA Including Drift Collapse (7/3/2003)</i>			Satisfactory	Satisfactory	Satisfactory
9.	A	ANL-MGR-GS-000003 (T0055) <i>Number of Waste Packages Hit by Igneous Intrusion (In process)</i>	845		Satisfactory	Satisfactory	Satisfactory
10.	B	ANL-EBS-MD-000015 (F0055) <i>CSNF Waste Form Degradation Model Summary Abstraction(7/2/2003)</i>	790 785		Satisfactory	Satisfactory	Satisfactory
11.	B	ANL-EBS-MD-000016 (F0060) <i>HLW Glass Degradation(8/11/2003)</i>	821, 791 786, 785		Satisfactory	Satisfactory	Unsatisfactory*

* Evaluation based primarily on the use of the term "Technical Information"

** Evaluation based primarily on concerns with incomplete Record Roadmaps

*** Evaluation based primarily on the use of the term "Technical Information" and concerns with incomplete Record Roadmaps

A=Dove/VanDillen B=Keeler/Palay C=Kersch/Heaney D=Harper/Voigt

Attachment 2 (Continued)
Summary Table of Audit Results

Area/ Product Number	Team	Technical Product Input Area/Product	Condition Reports	Recom- mendations	Program Adequacy	Procedure Compliance	Process/Product Effectiveness
12.	B	MDL-DSU-NU-000001 (WC08C) <i>Isotopic Model Report for CSNF Rev 0 (PWR)</i> <i>(6/30/2003)</i>			Satisfactory	Satisfactory	Satisfactory
13.	B	ANL-EBS-MD-000005 (W0095) <i>SCC of DS, WP Outer Barrier & SS Structural</i> <i>Material (7/16/2003)</i>	773, 92, 789, 87. 785, 784		Satisfactory	Unsatisfactory	Satisfactory
14.	C	ANL-MGR-GS-000002 (T0025) <i>Characterize Eruptive Processes (In process)</i>	844	#1	Satisfactory	Satisfactory	Satisfactory
15.	C	ANL-EBS-MD-000045 (E0105) <i>In-Drift Precipitates/Salts Model (In process)</i>			Satisfactory	Satisfactory	Satisfactory
16.	C	MDL-MGR-GS-000003 (PR141) <i>(In process)</i> <i>Development of Earthquake Ground Motion</i> <i>Input</i>			Satisfactory	Satisfactory	Satisfactory
17.	C	MDL-WIS-PA-000003 (E0145) <i>Seismic Consequence Abstraction (8/14/2003)</i>			Satisfactory	Satisfactory	Satisfactory

* Evaluation based primarily on the use of the term “Technical Information”

** Evaluation based primarily on concerns with incomplete Record Roadmaps

*** Evaluation based primarily on the use of the term “Technical Information” and concerns with incomplete Record Roadmaps

A=Dove/VanDillen B=Keeler/Palay C=Kersch/Heaney D=Harper/Voigt

Attachment 3 - Number of DTNs and Documents Reviewed by Product

- NOTES: 1. Total Direct Input DTNs include only those DTNs listed in the References section of the Analysis or Model Report that were used as “Direct Input” to the Analysis or Model Report.
2. Direct input DTNs reviewed include the above DTNs included in the References section of the Analysis or Model Report and DTNs identified in the trace trees for those DTNs.
3. Total Non-Technical Information References include DTNs identified as output of the Analysis or Model Report, DTNs identified as “Reference Only,” and references that do not have a “Technical Information” classification in the DIRS for that product.

Team	Area/Product	Total Direct Input DTNs	Direct Input DTNs Reviewed	Total Technical Information References or DTNs	Technical Information References or DTNs Reviewed	Total Non-Technical Information References	Non-Technical Information References Reviewed
A	MDL-NBS-HS-000010, <i>Saturated Zone Transport Method and Component Integration</i> (in process) (S0025)	27	18	5	5	122	1
A	MDL-NBS-HS-000021, <i>SZ Flow and Transport Model Abstraction</i> (8/1/2003) (S0055)	27	12	6	6	88	4
A	MDL-NBS-HS-000002, <i>Seepage Model for PA Including Drift Collapse</i> (7/3/2003) (U0075)	9	9	0	0	44	0
A	ANL-MGR-GS-000003, <i>Number of Waste Packages Hit by Igneous Intrusion</i> (in process) (T0055)	3	2	0	0	35	2
B	ANL-EBS-MD-000015, <i>CSNF Waste Form Degradation Model Summary Abstraction</i> (7/2/2003) (F0055)	7	7	0	0	71	6
B	ANL-EBS-MD-000016, <i>Defense HLW Glass Degradation Model</i> (8/11/2003) (F0060)	9	9	7	4	115	1
B	MDL-DSU-NU-000001, <i>Isotopic Model Report for Commercial SNF Burnup Credit</i> (6/30/2003) (WC08C)	0	0	0	0	37	8
B	ANL-EBS-MD-000005, <i>Stress Corrosion Cracking of the Drip Shield, The Waste Package Outer Barrier, and the Stainless Steel Structural Material</i> (7/16/2003) (W0095)	11	11	1	1	45	11
C	ANL-MGR-GS-000002 (T0025) <i>Characterize Eruptive Processes</i> (In process)	7	7	2	0	47	4
C	ANL-EBS-MD-000045 (E0105) <i>In-Drift Precipitates/Salts Model</i> (In process)	7	7	50	0	102	7
C	MDL-MGR-GS-000003, <i>Development of Earthquake Ground Motion Input</i> (in process)(PR141)	52	6	9	0	193	13
C	MDL-WIS-PA-000003, <i>Seismic Consequence Abstraction</i> (E0145) (8/14/2003)	11	11	0	0	51	14
	TOTALS	170	99	80	16	950	71

Attachment 4
Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

MDL-NBS-HS-000010, Revision 01C, Site-Scale Saturated Zone Transport (S0025)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

SN0306T0502103.007, LA000000000042.001, LA0010JC831341.002
LA0010JC831341.004, LA0010JC831341.006, LA0305AM831341.001
LA0302MD831341.003, LA000000000086.002, LAJC831321AQ98.005
LADV831321AQ99.001, MO0106XRDDRILC.003, MO0101XRDDRILC.002
MO0101XRDMINAB.001, LA0302MD831341.004, LA0206AM831234.001
LA0308SK831341.001, SN9907T0571599.001, SN0302T0502203.001

Technical Information references and DTNs Evaluated during the Audit

1. Allard, B.; Beall, G.W.; and Krajewski, T. 1980. "The Sorption of Actinides in Igneous Rocks." *Nuclear Technology*, 49, (3), 474–480. La Grange Park, Illinois: American Nuclear Society. TIC: 245772. DIRS No. 104410.
2. Allard, B.; Olofsson, U.; Torstenfelt, B.; and Kipatsi, H. 1983. *Sorption Behaviour of Well-Defined Oxidation States*. SKB TR-83-61. Stockholm, Sweden: Svensk Kärnbränsleförsörjning A.B. TIC: 206122. DIRS No. 162982.
3. Beall, G.W.; Lee, W.W.-L.; and Van Luik, A.E. 1986. "Americium Speciation and Distribution Coefficients in a Granitic Ground Water." *Scientific Basis for Nuclear Waste Management IX, Symposium held September 9–11, 1985, Stockholm, Sweden*. Werme, L.O., ed. 50, 501–508. Pittsburgh, Pennsylvania: Materials Research Society. TIC: 203664. DIRS No. 162983.
4. Bertetti, F.P.; Pabalan, R.T.; and Almendarez, M.G. 1998. "Studies of Neptunium {superscript V} Sorption on Quartz, Clinoptilolite, Montmorillonite, and {alpha}-Alumina." *Adsorption of Metals by Geomedia*. Jenne, E.A., ed. Pages 131–148. New York, New York: Academic Press. TIC: 239501. DIRS No. 162984.
5. Pabalan, R.T.; Turner, D.R.; Bertetti, F.P.; and Prikryl, J.D. 1998. "Uranium VI Sorption onto Selected Mineral Surfaces, Key Geochemical Parameters." *Adsorption of Metals by Geomedia*. Jenne, E.A., ed. Pages 99–130. New York, New York: Academic Press. TIC: 239504. DIRS No. 162987.

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit
LA0307SK831231.003 (Output DTN)

Attachment 4 (Continued)
Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

MDL-NBS-HS-000021, Revision 00, SZ Flow and Transport Model Abstraction (S0055)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

SN0004T0501399.003, MO0105HCONEPOR.000, SN0004T0501399.002
MO0010CPORGLOG.002, MO0003SZFWTEEP.000, LB990801233129.009
LA0306SK831231.001, LA0302RP831228.001, LA0302AM831341.001
LA0303HV831352.004, SN0302T0502203.001, SN0306T0504103.006

Technical Information references and DTNs Evaluated during the Audit

1. Bedinger, M.S.; Sargent, K.A.; Langer, W.H.; Sherman, F.B.; Reed, J.E.; and Brady, B.T. 1989. *Studies of Geology and Hydrology in the Basin and Range Province, Southwestern United States, for Isolation of High-Level Radioactive Waste—Basis of Characterization and Evaluation*. U.S. Geological Survey Professional Paper 1370-A. Washington, D.C.: U.S. Government Printing Office. ACC: NNA.19910524.0125. DIRS No. 129676.
2. BSC (Bechtel SAIC Company) 2003. *Analysis of Hydrologic Properties Data*. MDL-NBS-HS-000014 REV 00. Las Vegas, Nevada: Bechtel SAIC Company. ACC: DOC.20030404.0004. DIRS No. 161773.
3. Burbey, T.J. and Wheatcraft, S.W. 1986. *Tritium and Chlorine-36 Migration from a Nuclear Explosion Cavity*. DOE/NV/10384-09. Reno, Nevada: University of Nevada, Desert Research Institute, Water Resources Center. TIC: 201927. DIRS No. 129679.
4. CRWMS M&O 1997. *Report of Results of Hydraulic and Tracer Tests at the C-Holes Complex*. Deliverable SP23APM3. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19971024.0074. DIRS No. 100328.
5. DOE (U.S. Department of Energy) 1997. *Regional Groundwater Flow and Tritium Transport Modeling and Risk Assessment of the Underground Test Area, Nevada Test Site, Nevada*. DOE/NV-477. Las Vegas, Nevada: U.S. Department of Energy. ACC: MOL.20010731.0303. DIRS No. 103021.
6. Wilson, M.L.; Gauthier, J.H.; Barnard, R.W.; Barr, G.E.; Dockery, H.A.; Dunn, E.; Eaton, R.R.; Guerin, D.C.; Lu, N.; Martinez, M.J.; Nilson, R.; Rautman, C.A.; Robey, T.H.; Ross, B.; Ryder, E.E.; Schenker, A.R.; Shannon, S.A.; Skinner, L.H.; Halsey, W.G.; Gansemer, J.D.; Lewis, L.C.; Lamont, A.D.; Triay, I.R.; Meijer, A.; and Morris, D.E. 1994. *Total-System Performance Assessment for Yucca Mountain – SNL Second Iteration (TSPA-1993)*. SAND93-2675. Executive Summary and two volumes. Albuquerque, New Mexico: Sandia National Laboratories. ACC: NNA.19940112.0123. DIRS No. 100191.

Attachment 4 (Continued)
Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

1. BSC (Bechtel SAIC Company) 2003. *Repository Design, Repository/PA IED Subsurface Facilities*. 800-IED-EBSO-00401-000-00C. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030303.0002. DIRS No. 162289.
2. BSC (Bechtel SAIC Company) 2003. *Repository Design, Repository/PA IED Subsurface Facilities*. 800-IED-EBSO-00402-000-00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20030109.0146. DIRS No. 161727..
3. Flint, L.E. 1998. *Characterization of Hydrogeologic Units Using Matrix Properties, Yucca Mountain, Nevada*. Water-Resources Investigations Report 97-4243. Denver, Colorado: U.S. Geological Survey. ACC: MOL.19980429.0512. DIRS No. 100033.
4. Moyer, T.C. and Geslin, J.K. 1995. *Lithostratigraphy of the Calico Hills Formation and Prow Pass Tuff (Crater Flat Group) at Yucca Mountain, Nevada*. Open-File Report 94-460. Denver, Colorado: U.S. Geological Survey. ACC: MOL.19941208.0003. DIRS No. 101269.

MDL-NBS-HS-000002, Revision 02, Seepage Model for PA Including Drift Collapse (U0075)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

LB997141233129.001, LB0304DRSCLTHM.001, LB0302SCMREV02.002
LB0012AIRKTEST.001, LB980901233124.101, LB0011AIRKTEST.001
LB0205REVUZPRP.001, LB0302PTNTSW91.001, MO0109RDDAAMRR.003

Technical Information references and DTNs Evaluated during the Audit

None.

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

None.

ANL-MGR-GS-000003, Revision 00G, Number of Waste Packages Hit by Igneous Intrusion (T0055)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

LA0303BY831811.001, LA0307DK831811.001, MO0307SPADKBSM.000

Technical Information references and DTNs Evaluated during the Audit

None.

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

1. BSC (Bechtel SAIC Company) 2003. *Underground Layout Configuration*. 800-POC-MGR0-00100-000-00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030219.0002. DIRS No. 161887.

Attachment 4 (Continued)

Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

2. BSC (Bechtel SAIC Company) 2003. *Repository Design, Repository/PA IED Subsurface Facilities*. 800-IED-EBS0-00401-000-00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20030109.0145. DIRS No. 161726.

ANL-EBS-MD-000005 , Revision 01, SCC of DS, WP Outer Barrier & SS Structural Material (W0095)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

LL000312705924.132, LL000316205924.142, LL000319805924.143
LL000319905924.144, LL000320005924.145, LL020603612251.015
LL021105312251.023, LL030412512251.057, MO0003RIB00071.000
MO0003RIB00073.000, MO0301SEPFEPS1.000

Technical Information references and DTNs Evaluated during the Audit

1. Ford, F.P. and Andresen, P.L. 1988. "Development and Use of a Predictive Model of Crack Propagation in 304/316L, A533B/A508 and Inconel 600/182 Alloys in 288°C Water." *Environmental Degradation of Materials in Nuclear Power Systems—Water Reactors, [Proceedings of the Third International Symposium, Traverse City, Michigan, August 30-September 3, 1987]*. Theus, G.J. and Weeks, J.R., eds. Pages 789-800. [Warrendale, Pennsylvania: Metallurgical Society]. TIC: 247505.

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

1. Bradford, S.A. 1987. "Fundamentals of Corrosion in Gases." In *Corrosion*, Volume 13, Pages 61-76 of *Metals Handbook*. 9th Edition. Metals Park, Ohio: ASM International. TIC: 209807.
2. BSC (Bechtel SAIC Company) 2001. Plugging of Stress Corrosion Cracks by Precipitates. CAL-EBS-MD-000017 REV 00. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20011010.0168.
3. BSC (Bechtel SAIC Company) 2003. Analysis of Mechanisms for Early Waste Package/Drip Shield Failure. CAL-EBS-MD-000030 REV A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: DOC.20030227.0002.
4. BSC (Bechtel SAIC Company) 2003. Drip Shield Structural Response to Rock Fall. 000-00C-TED0-00500-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030327.0001.
5. Canori, G.F. and Leitner, M.M. 2003. Project Requirements Document. TER-MGR-MD-000001 REV 01. Las Vegas, Nevada: Bechtel SAIC Company. ACC: DOC.20030404.0003
6. CRWMS M&O 1996. Waste Package Closure Weld Development Report. BBA000000-01717-2500-00006 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19960909.0188.

Attachment 4 (Continued)

Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

7. CRWMS M&O 1998. Waste Package Phase II Closure Methods Report. BBA000000-01717-5705-00016 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19981208.0099.
8. CRWMS M&O 1999. Classification of the MGR Ex-Container System. ANL-XCS-SE-000001 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990928.0221.
9. CRWMS M&O 1999. Classification of the MGR Uncanistered Spent Nuclear Fuel Disposal Container System. ANL-UDC-SE-000001 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990928.0216.
10. Macdonald, D.D. and Urquidi-Macdonald, M. 1991. "A Coupled Environment Model for Stress Corrosion Cracking in Sensitized Type 304 Stainless Steel in LWR Environments." *Corrosion Science*, 32, (1), 51-81. New York, New York: Pergamon Press.
11. LL030607012251.065 (Output DTN)

ANL-EBS-MD-000016, Revision 01, HLW Glass Degradation (F0060)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

MO0301ANLGNN01.527, MO0306ANLGAMR2.016, MO0301ANLGNN02.527,
MO0307ANLGAMR1.016, MO0307ANLGAMR3.016, MO0306ANLGIM01.525
MO0306ANLGIM02.525, MO0306ANLGVH01.526, MO0308ANLGPC01.528

Technical Information references and DTNs Evaluated during the Audit

None

1. For ANL-EBS-MD-000016 Rev 01, the Ford, F.P. and Andresen, P.L. 1988 has been given a DIRS input status as "Technical Information" and is used to pass on a recommend model input parameter in sections 6.1, 6.2.1, & 6.3.1. This reference is not from a controlled source; rather it resides in the TIC (see TIC#247505).
2. Aines, R.D.; Weed, H.C.; and Bates, J.K. 1987. "Hydrogen Speciation in Hydrated Layers on Nuclear Waste Glass." Scientific Basis for Nuclear Waste Management X, Symposium held December 1-4, 1986, Boston, Massachusetts. Bates, J.K. and Seefeldt, W.B., eds. 84, 547-558. Pittsburgh, Pennsylvania: Materials Research Society. TIC: 203663.
3. Smith, T.H. and Ross, W.A. 1975. *Impact Testing of Vitreous Simulated High-Level Waste in Canisters*. BNWL-1903. Richland, Washington: Battelle Pacific Northwest Laboratories. TIC: 238924.
4. Weast, R.C., ed. 1977. *CRC Handbook of Chemistry and Physics*. 58th Edition. Cleveland, Ohio: CRC Press. TIC: 242376.

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

MO0306ANLGIM01.525 (Output DTN)

Attachment 4 (Continued)

Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

MDL-DSU-NU-000001, Revision 00, ICN 01, Isotopic Model Report for CSNF Rev 0 (PWR) (WC08C)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

None

Technical Information references and DTNs Evaluated during the Audit

None

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

MO0003RIB00071.000 (model validation input parameter)

MO0003RIB00072.000 (model validation input parameter)

MO0109RIB00049.001 (model validation input parameter)

1. Bowman, S.M.; Hermann, O.W.; and Brady, M.C. 1995. *Sequoyah Unit 2 Cycle 3*. Volume 2 of *Scale-4 Analysis of Pressurized Water Reactor Critical Configurations*. ORNL/TM-12294/V2. Oak Ridge, Tennessee: Oak Ridge National Laboratory. TIC: 244397.
2. Lynch, C.T., ed. 1989. *Practical Handbook of Materials Science*. Boca Raton, Florida: CRC Press. TIC: 2405 7.
3. CRWMS M&O 2000. Software Code: SCALE. V4.4A. HP. 10129-4.4A-00.
4. BSC (Bechtel SAIC Company) 2002. Calculation of Isotopic Bias and Uncertainty for PWR Spent Nuclear Fuel. CAL-DSU-NU-000001 REV A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20020814.0055.
5. BSC (Bechtel SAIC Company) 2002. Summary Report of Code to Code Comparisons Performed for the Disposal Criticality Analysis Methodology. TDR-UDC-NU-000005 REV 00. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20020603.0127.

ANL-EBS-MD-000015, Revision 01, CSNF Waste Form Degradation Model (F0055)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

LL000107951021.107, LL030300112241.027, LL991001251021.090, MO0301ANLSF001.450
MO0301ANLSF001.451, MO0302PNLDUFTD.000, MO0304PNLLPHDD.000

Technical Information references and DTNs Evaluated during the Audit

None

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

MO0306ANLSF001.001 (output DTN)

Attachment 4 (Continued)
Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

1. Taylor, P.; Wood, D.D.; Duclos, A.M.; and Owen, D.G. 1989. "Formation of Uranium Trioxide Hydrates on UO₂ Fuel in Air-Steam Mixtures Near 200°C." *Journal of Nuclear Materials*, 168, (1&2), 70-75. Amsterdam, The Netherlands: Elsevier. TIC: 246601.
2. Shoemith, D.W. 2000. "Fuel Corrosion Processes under Waste Disposal Conditions." *Journal of Nuclear Materials*, 282, ([1]), 1-31. [Amsterdam, The Netherlands]: North-Holland. TIC: 254043.
3. Gray, W.J. 1999. "Inventories of Iodine-129 and Cesium-137 in the Gaps and Grain Boundaries of LWR Spent Fuels." *Scientific Basis for Nuclear Waste Management XXII, Symposium held November 30-December 4, 1998, Boston, Massachusetts, U.S.A.* Wronkiewicz, D.J. and Lee, J.H., eds. 556, 487-494. Warrendale, Pennsylvania: Materials Research Society. TIC: 246426.
4. Forsyth, R. 1997. *The SKB Spent Fuel Corrosion Program. An Evaluation of Results from the Experimental Programme Performed in the Studsvik Hot Cell Laboratory.* SKB TR-97-25. Stockholm, Sweden: Svensk Kärnbränsleförsörjning A.B. TIC: 246406.
5. Final Report on Qualification of Volcanism Isotope, Trace-Element, and Halogen Data Using Procedure YAP-SIII.1Q/ rev. 3/ ICN 0 (Reference not in DIRS at time of audit – AMR in draft)

ANL-MGR-GS-000002, Characterize Eruptive Processes (T0025) (in process)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

LA000000000099.001, LA000000000099.002, LA0302CH831811.001
LA0302CH831811.002, LA0302GH831811.003, LA0302GH831811.004
LA0305DK831811.001

Technical Information references and DTNs Evaluated during the Audit

1. NRC (U.S. Nuclear Regulatory Commission) 1999. "Issue Resolution Status Report Key Technical Issue: Igneous Activity." Rev. 2. [Washington, D.C.]: U.S. Nuclear Regulatory Commission. Accessed September 18, 2000. (TI)
2. Reamer, C.W. 1999. "Issue Resolution Status Report (Key Technical Issue: Igneous Activity, Revision 2)." Letter from C.W. Reamer (NRC) to Dr. S. Brocoum (DOE/YMSCO), July 16, 1999, with enclosure

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

LA0305DK831811.002 (Reference Only)

1. Final Report on Qualification of Volcanism Isotope, Trace-Element, and Halogen Data Using Procedure YAP-SIII.1Q/ rev. 3/ ICN 0 (Reference not in DIRS at time of audit – AMR in draft)
2. CRWMS M&O 2000. *Data Qualification Report: Data Related to Characterization of Eruptive Processes for Use on the Yucca Mountain Project.* TDR-NBS-GS-000016 REV 00. Las Vegas, Nevada: CRWMS M&O
3. Perry, F.V. and Straub, K.T. 1996. *Geochemistry of the Lathrop Wells Volcanic Center.* LA-13113-MS. Los Alamos, New Mexico: Los Alamos National Laboratory. ACC: MOL.19961015.0079.

Attachment 4 (Continued)

Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

ANL-EBS-MD-000045 (E0105), In-Drift Precipitates/Salts Model (E0105) (in process)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

MO0302SPATHDYM.000, MO0302SPATHDYM.001, MO0303SPAMEQ36.000
MO0303SPAMNSUP.000, MO0308SPAESMUN.000, SN0302T0510102.002
SN0306T05102.007

Technical Information references and DTNs Evaluated during the Audit

None

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

LL000202905924.117, LL991008004241.041, LL991008104241.042
MO03026J13WTRCM.000, LL991008004241.041, MO006J13WTRCM.000
MO005J13WTRCM.000

MDL-MGR-GS-000003, Development of Earthquake Ground Motion Input (in process) (PR141)

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

MO9905LABDYNRS.000, MO0004MWDRIFM3.002, MO9905LABDYNRS.000
SNL02030193001.004, MO0004MWDRIFM3.002, GS030783114233.001

Technical Information references and DTNs Evaluated during the Audit

None

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

MO0211AVTMH107.001, MO0211AVTMH107.000, MO0004MWDRIFM3.002
MO0209UNHAZ107.000, MO0208UNHZ5X10.000, MO0206UNHAZ106.001
MO0003SEPSDATH.003, MO0003SEPSDARS.002, MO0004SEPPGVRB.006
MO9906GPS98410.000, MO03061E9PSHA1.000, MO03061E9PSHA1.000

1. Anderson, D.G. and Tang, Y.K. 1989. "Summary of Soil Characterization Program for the Lotung Large-Scale Seismic Experiment." *Proceedings, EPRI/NRC/TPC Workshop on Seismic Soil-Structure Interaction Analysis Techniques Using Data from Lotung, Taiwan. NP-6 154 (1)*, 4-i to 4-20. Palo Alto, California: Electric Power Research Institute

Attachment 4 (Continued)

Data Tracking Numbers (DTNs) and Documentation Evaluated During the Audit

MDL-WIS-PA-000003 (E0145), Seismic Consequence

Direct Input DTNs (not identified as Technical Information) Evaluated during the Audit

LL030704623122.031, MO0004MWDRIFM3.002, MO0004MWDRIFM3.002
MO0301MWD3DE27.003, MO0211TMHIS104.002, GS960908314224.017
MO0303DPGVB106.002, MO0305MWDNLRKF.001, MO03061E9PSHA1.000
MO0209UNHAZ107.000, MO0303DPGVB106.001

Technical Information references and DTNs Evaluated during the Audit

None

Non-Technical Information References and Reference Only DTNs Evaluated during the Audit

LB0307SEEPDRCL.002

Output DTNs

MO0305SPASFEGM.000
MO0308SPACALSS.002

1. BSC (Bechtel SAIC Company) 2001. *Site Recommendation Subsurface Layout*. ANL-SFS-MG-000001 REV 00 ICN 02. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20010411.0131.
2. BSC (Bechtel SAIC Company) 2003. *Drip Shield Statically Loaded by Backfill and Loose Rock Mass*. 000-00C-TED0-00300-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030224.0004.
3. BSC (Bechtel SAIC Company) 2003. *Maximum Accelerations on the Fuel Assemblies of a 21-PWR Waste Package During EndG*.20030327.0002.
4. BSC (Bechtel SAIC Company) 2003. *Repository Design Project, RDP/PA IED Typical Waste Package Components Assembly (2)*. 800-IED-WIS0-00202-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030702.0002.
5. BSC (Bechtel SAIC Company) 2003. *Repository Design Project, RDP/PA IED Typical Waste Package Components Assembly (5)*. 800-IED-WI Impacts. 000-00C-DSU0-01100-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENS0-00205-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030707.0001
6. BSC (Bechtel SAIC Company) 2003. *Repository Design Project, RDP/PA IED Typical Waste Package Components Assembly (7)*. 800-IED-WIS0-00207-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030707.0003.
7. BSC (Bechtel SAIC Company) 2003. *Repository Design Project, RDP/PA IED Typical Waste Package Components Assembly (8)*. 800-IED-WIS0-00208-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030707.0004.
8. BSC (Bechtel SAIC Company) 2003. *Repository Design Project, RDP/PA IED Typical Waste Package Components Assembly 1 of 9*. 800-IED-WIS0-00201-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20030702.0001.

9. BSC (Bechtel SAIC Company) 2003. *Repository Design Project, Repository/PA IED Subsurface Facilities*. 800-IED-WIS0-00101-000-00Ad . Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20030730.0337. TBV-5310
10. BSC (Bechtel SAIC Company) 2003. *Sampling of Stochastic Input Parameters for Rockfall and Structural Response Calculations Under Vibratory Ground Motion*. ANL-EBS-PA-000009 REV 00. Las Vegas, Nevada: Bechtel SAIC Company. ACC: DOC.20030707.0003.
- 11.TBV-5107

**Attachment 5 - Listing of DTNs that were previously classified as “Accepted Data (Fact)”
that have been reclassified as “Technical Information”**

GS000100001221.001	MO0106SPASTA01.006	MO0107TC240022.000	MO0210GSC2125A.004
GS000200001221.002	MO0106STRATHFM.001	MO0107TC240026.000	MO0210GSC2125A.005
GS000200001221.003	MO0106STRATHFM.010	MO0107TC240028.000	MO0210SEPCLIMA.001
GS000200005121.001	MO0106STRATHFM.011	MO0107TC240032.000	MO0210SPADOSEC.00
GS000200005121.002	MO0106STRATHFM.012	MO0107TC240034.000	MO0210SPALIMIT.010
GS000200005121.003	MO0106STRATHFM.013	MO0107TC240036.000	MO0210SPATSP01.023
GS000300001221.009	MO0106STRATHFM.014	MO0107TC240037.000	MO0211HISTMPEX.000
GS000300001221.010	MO0106STRATHFM.015	MO0107TC240182.000	MO0211SPAAVE07.020
GS000400002332.001	MO0106STRATHFM.016	MO0107TC240356.000	MO0211SPABSF05.024
GS000700012847.001	MO0106STRATHFM.017	MO0107TC240370.000	MO0211SPAENH09.010
GS000900005121.004	MO0106STRATHFM.018	MO0107TC240372.000	MO0211SPAOUT07.022
GS020500002332.001	MO0106STRATHFM.019	MO0107TC240374.000	MO0211SPARAD07.021
GS020900002332.002	MO0106STRATHFM.020	MO0107TC240558.000	MO0211SPARTM05.027
GS920408312314.008	MO0107GISUSCBG.000	MO0107TC240560.000	MO0211SPASTA07.019
GS920408312314.009	MO0107TC103312.000	MO0107TC240567.000	MO0211TONOSNOW.000
GS920408312314.011	MO0107TC209799.000	MO0107TC240575.000	MO0212DSRKSNSOW.000
GS920408312314.013	MO0107TC209800.000	MO0107TC240576.000	MO0212SPADOS05.028
GS930408312132.005	MO0107TC209801.000	MO0107TC240577.000	MO0212SPAUS05.033
GS930408312132.007	MO0107TC216194.000	MO0107TC240578.000	MO0212SPATIL06.032
GS930408312291.001	MO0107TC225730.000	MO0107TC240579.000	MO0301MTRIMPCT.000
GS930483117472.003	MO0107TC226511.000	MO0107TC240701.000	MO0302PEAASGMD.000
GS930583117432.005	MO0107TC231761.000	MO0107TC240709.000	MO0302UCC021SS.009
GS930708314211.025	MO0107TC237693.000	MO0107TC240989.000	MO0303UCC021SS.014
GS991100002330.001	MO0107TC238771.000	MO0107TC241053.000	MO0303WDDLMFUT.000
LA0003JF12213U.002	MO0107TC239585.000	MO0107TC241248.000	MO0303WDNGTCAZ.000
LL000201305924.120	MO0107TC239587.000	MO0107TC242374.000	MO0304CLIMSPWA.000
LL000203105924.119	MO0107TC239596.000	MO0107TC242378.000	MO9811COV96311.000
LL000312705924.132	MO0107TC239602.000	MO0107TC242715.000	MO9811COV98591.000
LL990610851022.017	MO0107TC239606.000	MO0107TC242716.000	MO9811NCDCSAD0.000
LL991212305924.108	MO0107TC239608.000	MO0107TC242717.000	MO9811INCDSD0.000
MO0001COV00032.000	MO0107TC239681.000	MO0107TC243221.000	MO9901COV8622A.000
MO0001SPABCC01.002	MO0107TC239686.000	MO0107TC247000.000	MO9901COV8622B.000
MO0001SPACBR01.004	MO0107TC239691.000	MO0108SPACRC02.008	MO9901COV8622C.000
MO0001SPACEN05.014	MO0107TC239694.000	MO0109SPACAL04.002	MO9901NGSHARNC.000
MO0001SPACSS38.017	MO0107TC239704.000	MO0109SPACTC05.001	MO9902COV98295.000
MO0001SPARSD38.014	MO0107TC239714.000	MO0109SPADRNO4.003	MO9902EISEBF9A.000
MO0001SPATFC01.003	MO0107TC239716.000	MO0109STRATHFM.001	MO9903COV9129F.000
MO0001SPAAPD38.009	MO0107TC239717.000	MO0109TC250553.000	MO9903COV98430.000
MO0002COV96241.000	MO0107TC239748.000	MO0110SPAQUA04.010	MO9903COV98432.000
MO0002SPACENSU.00	MO0107TC239751.000	MO0110SPARAD04.009	MO9903EISEBF91.000
MO0002SPAGWP00.00	MO0107TC239753.000	MO0110TC240361.000	MO9903MIXHEIGV.000
MO0002SPASDC00.002	MO0107TC239768.000	MO0111GSC01148.000	MO9904SUNRSSET.000
MO0003COV99411.000	MO0107TC239775.000	MO0111GSC01149.000	MO9909SPABMASS.000
MO0003SPABPS00.002	MO0107TC239780.000	MO0111GSC01150.000	MO9909SPAMICRO.001
MO0003SPASSC24.041	MO0107TC239782.000	MO0202GSC02002.000	MO9909SPATYPEK.004
MO0004SPAHL00.001	MO0107TC239807.000	MO0202GSC02010.000	MO9911ANLMGRMD.000
MO0007SPAAPM00.012	MO0107TC239825.000	MO0202GSC02023.000	MO9911ANLMGRMD.001
MO0007SPAEDC20.002	MO0107TC239830.000	MO0202SPABSS00.011	MO9911ANLMGRMD.002
MO0008SPATIG13.016	MO0107TC239841.000	MO0204CONVTABL.000	MO9911ANLMGRMD.003
MO0008SPATSP00.013	MO0107TC239842.000	MO0204GSC02050.000	MO9912SEPMKTFDC.000
MO0009GISVEA13.001	MO0107TC239873.000	MO0204GSC02054.000	MO9912SPAGIBFE.000
MO0009SPACEN13.017	MO0107TC239920.000	MO0204SPABCF04.012	MO9912SPAMEL06.009
MO0009SPACEN13.018	MO0107TC239923.000	MO0204SPAIRB04.013	MO9912SPANAS06.004
MO0011ELLOCAMD.00	MO0107TC239924.000	MO0208SPACNASS.018	MO9912SPANAS06.005
MO0102SPAFNI00.003	MO0107TC239926.000	MO0208SPACROPC.019	MO9912SPASF01.032
MO0103SPAFNI00.015	MO0107TC239929.000	MO0208SPACROPY.017	MO9912SPASUB02.001
MO0105HCONEPOR.00	MO0107TC239931.000	MO0209SPAAMARG.004	SN0002KDVALUES.000
MO0105SPACR300.002	MO0107TC239934.000	MO0209SPACLIMA.001	SN0004WINDDATA.000
MO0105SPACR301.003	MO0107TC239935.000	MO0209SPAMET06.021	SN9912USDASOIL.000
MO0105SPACR302.004	MO0107TC239936.000	MO0209SPAWATER.020	UN0104SPA021SS.001
MO0105SPACR303.001	MO0107TC239938.000	MO0210GSC2125A.001	UN0104SPA021SS.002
MO0106SPADEP01.007	MO0107TC239952.000	MO0210GSC2125A.002	UN0112SPA021SS.004
MO0106SPASTA00.005	MO0107TC240020.000	MO0210GSC2125A.003	

Attachment 6 - Listing of “Qualified” DTNs that were previously classified as Technical Product Output that have been reclassified as “Technical Information”

GS000208311221.001	LB0104AMRU0185.009	LB0305TSPA18FF.001	LB991200DSTTHC.004
GS000208311221.002	LB0104AMRU0185.010	LB0306DRSCLTHM.001	LB991200DSTTHC.006
GS000208311221.003	LB0104AMRU0185.011	LB0306DRSCLTHM.002	LB991201233129.001
GS000308311221.004	LB0104AMRU0185.012	LB0306DSTTHMVL.001	LB991220140160.001
GS000308311221.005	LB0104AMRU0185.013	LB0306DSTTHMVL.002	LB991220140160.002
GS000308311221.006	LB0104AMRU0185.014	LB0307DSTTHCR2.001	LB991220140160.004
GS000308311221.008	LB0110AIRK0015.001	LB0307DSTTHCR2.002	LB991220140160.005
GS000308311221.010	LB0110AMRU0185.015	LB990051233129.001	LB991220140160.006
GS000308311221.011	LB0110LIQR0015.001	LB990501233129.001	LB991220140160.007
GS000308315121.003	LB0110MESHPROP.001	LB990501233129.002	LB991220140160.008
GS000399991221.002	LB0110NICH4LIQ.001	LB990501233129.003	LB991220140160.009
GS000508312332.001	LB0110SYST0015.001	LB990501233129.004	LB991220140160.011
GS000508312332.002	LB0205REVUZPRP.001	LB990701233129.001	LB991220140160.012
GS010608312332.001	LB0207REVUZPRP.001	LB990701233129.002	LB991220140160.013
GS010908312332.002	LB0207REVUZPRP.002	LB990801233129.001	LB991220140160.014
GS010908312332.003	LB02081DKMGRID.001	LB990801233129.002	LB991220140160.015
GS030208312332.001	LB0208ACEMDSTH.001	LB990801233129.003	LB991220140160.016
LA0002BR12213S.002	LB0208AIRKDSTH.001	LB990801233129.004	LB991220140160.017
LA0002MCG12213.001	LB0208AIRKSHTC.001	LB990801233129.005	LB991220140160.001
LA0002MCG12213.002	LB0208GPRDSTHP.001	LB990801233129.006	LB991220140160.002
LA0002MCG12213.003	LB0208GPRDSTHP.002	LB990801233129.007	LB991220140160.003
LA0003AM831341.001	LB0208H2ODSTHP.001	LB990801233129.008	LL000113904242.089
LA0003JC831362.001	LB0208HYDSTRAT.001	LB990801233129.009	LL000114004242.090
LA0004AW12213S.001	LB0208ISODSTHP.001	LB990801233129.010	LL000114104242.091
LA0009FP831811.001	LB0208UZDSCPLI.001	LB990801233129.011	LL000116005924.114
LA0009FP831811.004	LB0208UZDSCPLI.002	LB990801233129.012	LL000201405924.121
LA0101PR831231.001	LB0208UZDSCPMI.001	LB990801233129.013	LL000201505924.122
LA0107GV831811.001	LB0208UZDSCPMI.002	LB990801233129.014	LL000209205924.128
LA0202EK831231.001	LB0208UZDSCPUI.001	LB990801233129.015	LL000209305924.129
LA0302BY831811.001	LB02091DSSCP3I.001	LB990801233129.016	LL000313504243.036
LA9908JC831321.001	LB02091DSSCP3I.002	LB990801233129.017	LL000314304242.094
LA9909WS831372.019	LB02092DGRDVER.001	LB990801233129.018	LL000314404242.095
LA9909WS831372.020	LB02092DSSECFPR.001	LB990801233129.019	LL000315905924.139
LA9909WS831372.021	LB02092DSSECFPR.002	LB990801233129.020	LL000316005924.140
LA9911GZ12213S.001	LB02103DPNEUSM.001	LB990801233129.021	LL000316105924.141
LA9912MCG12213.001	LB0210AMRU0035.002	LB990801233129.022	LL000319805924.143
LB000300123142.001	LB0210THRMLPRP.001	LB990801233129.023	LL000319905924.144
LB0010SCMREV01.001	LB0212AFPGAMMA.001	LB990801233129.024	LL000321204242.092
LB0010SCMREV01.002	LB0212AFPGAMMA.002	LB990801233129.025	LL000321704242.093
LB0011DSTFRAC1.001	LB0212C14INFIL.001	LB990801233129.026	LL000405805924.147
LB0011DSTFRAC1.002	LB0212C14INFIL.002	LB990801233129.027	LL000509012312.002
LB0011DSTTHCR1.001	LB03013DSSCP3I.001	LB990801233129.028	LL000509112312.003
LB0011DSTTHCR1.002	LB0301FRACSEAL.001	LB990831012027.001	LL000509212312.004
LB0011SMDCREV1.001	LB0301FRACSEAL.002	LB990861233129.001	LL000903512342.003
LB0011SMDCREV1.002	LB0301PLUGFLOW.001	LB990861233129.002	LL010109723123.011
LB0011THCDISSM.002	LB03023DKMGRID.001	LB990861233129.003	LL010109812342.004
LB0012SMDCATT3.001	LB03023DSSCP9I.001	LB9908T1233129.001	LL010700123123.013
LB0012SMDCATT3.002	LB0302AMRU0035.001	LB990901233129.001	LL010703623123.015
LB0101DSTTHCR1.001	LB0302DSCPTHCS.001	LB991091233129.001	LL020709923142.023
LB0101DSTTHCR1.002	LB0302DSCPTHCS.002	LB991091233129.003	LL020710523142.025
LB0101DSTTHCR1.003	LB0302PTNTSW9I.001	LB991091233129.004	LL020801723142.028
LB0101DSTTHCR1.004	LB0302SCMREV02.001	LB991091233129.005	LL020801823142.029
LB0101DSTTHCR1.005	LB0302SCMREV02.002	LB991091233129.006	LL030607012251.065
LB0101DSTTHCR1.006	LB0302UZDSCPUI.002	LB991101233129.001	LL991208205924.096
LB0101DSTTHCR1.007	LB03033DSSFF9I.001	LB991101233129.002	LL991210605924.107
LB0101DSTTHGRD.001	LB03033DUZTRAN.001	LB991121233129.001	MO0001SPAICC48.037
LB0101SMDCREV1.001	LB0303A8N3MDLG.001	LB991121233129.002	MO0001SPANEU38.018
LB0102DSTHCLTD.001	LB0303C14INF3D.001	LB991121233129.003	MO0001SPARDB05.013
LB0102DSTHCLTD.002	LB0303CLINFL3D.001	LB991121233129.004	MO0001SPASUP03.001
LB0103CHVUPROP.001	LB0303GASFLW3D.001	LB991121233129.005	MO0002SPACRI02.002
LB0103CHVUPROP.002	LB0303THERMESH.001	LB991121233129.006	MO0002SPALOO46.010
LB0104AMRU0185.001	LB0303THERMSIM.001	LB991121233129.007	MO0003MWDTAB45.013
LB0104AMRU0185.002	LB0304RDTRNSNS.001	LB991131233129.001	MO0003MWDVUL03.002
LB0104AMRU0185.003	LB0304SMDCREV2.001	LB991131233129.002	MO0003SEPRDRDA.000
LB0104AMRU0185.004	LB0304SMDCREV2.002	LB991131233129.003	MO0003SEPRWDRM.001
LB0104AMRU0185.005	LB0304SMDCREV2.003	LB991131233129.004	MO0003SPAHI12.002
LB0104AMRU0185.006	LB0304SMDCREV2.004	LB991200DSTTHC.001	MO0003SPAHL012.004
LB0104AMRU0185.007	LB0304UZSRTRAN.001	LB991200DSTTHC.002	MO0003SPAINP04.007
LB0104AMRU0185.008	LB0305PTNTSW9I.001	LB991200DSTTHC.003	MO0003SPAINP10.009

**Attachments 6 (Continued) - Listing of “Qualified” DTNs that were previously classified as
Technical Product Output that have been reclassified as “Technical Information”**

MO0003SPAION02.003	MO0011SPAMLU38.033	MO0205AMRGM02.000	SN0011T0810599.024
MO0003SPALOW12.001	MO0012MWDDBAR01.024	MO0205MWDREFD29.001	SN0011T0810599.025
MO0003SPAMLU38.020	MO0012MWDDEB11.001	MO0206AMRWCACL.000	SN0011T0810599.026
MO0003SPAPAT04.006	MO0012MWDGFM02.002	MO0207AMRDHLWG.001	SN0011T0810599.027
MO0003SPAPAT10.008	MO0012MWDHUM01.028	MO0208RESTRDST.002	SN0011T0810599.028
MO0003SPAPCC03.004	MO0012MWDIGN01.027	MO0208RESTRSHT.002	SN0011T0810599.029
MO0003SPASEA08.005	MO0012MWDIM401.031	MO0209EBSPMFS02.029	SN0011T0810599.030
MO0003SPASGU01.003	MO0012MWDIM501.029	MO0210MWDEXC01.008	SN0011T0810599.031
MO0003SPASUP02.003	MO0012MWDJUV01.026	MO0301MWD3DE27.003	SN0011T0811199.010
MO0004SPACLD07.043	MO0012MWDMED01.032	MO0304MWDEQ3NR.000	SN0012T0511599.003
MO0004SPAKDS42.005	MO0012MWDML01.034	MO0305MWDNLRKF.001	SN0012T0810599.032
MO0004SPASMA05.004	MO0012MWDNBC01.030	MO0305SPAINEXI.001	SN0012T0810599.033
MO0004SPASOL10.002	MO0012MWDNEU01.025	MO0305SPASRPBM.001	SN0012T0810599.034
MO0004SPASUP01.004	MO0012MWDNM601.033	MO0306MWDDBGSMF.001	SN0012T0810599.035
MO0004SPAUPI01.002	MO0012SPARSL10.003	MO0306MWDDDMIO.001	SN0012T0810599.036
MO0006SPABDC01.007	MO0101MWDPLU03.001	MO0306MWDDPPDR.000	SN0012T0810599.037
MO0006SPAPVE03.001	MO0101MWDPLU03.002	MO0306MWDMISL4.000	SN0012T0810599.038
MO0006SPASTR01.003	MO0101MWDPPV13.006	MO0306SPAEEIBM.001	SN0012T0810599.039
MO0007MWDIDD31.001	MO0102MWDJUV02.003	MO0306SPACRBSM.001	SN0103T0810599.040
MO0007MWDSAT02.004	MO0102MWDMED02.004	MO0306SPAETPBM.001	SN0103T0810599.041
MO0007MWDTSP01.002	MO0102MWDML02.006	MO0306SPAGLCLS.001	SN0103T0810599.042
MO0007MWDTSP01.003	MO0102MWDSSOU02.005	MO0306SPASL14E.001	SN0103T0810599.043
MO0007MWDTSP02.001	MO0102SPAFRA01.002	MO0307MWDDEBDC.001	SN0103T0810599.044
MO0007SEPPRECP.000	MO0102SPALIT10.001	MO0307MWDNPBDC.001	SN0103T0810599.045
MO0007SPADMM05.002	MO0103MWDTEM00.007	MO9910MWDISMRP.002	SN0103T0810599.046
MO0008MWDDBARRI.000	MO0103MWDTHS03.001	MO9910SPAFWPWF.001	SN0103T0810599.047
MO0008MWDDEISRN.000	MO0104SPAFLO55.004	MO9911SPACDP37.001	SN0106T0502900.004
MO0008MWDHUMAN.000	MO0105MWDGRO02.008	MO9912MWDEEA06.003	SN0109T0502900.005
MO0008MWDIGNEO.000	MO0105MWDTHE05.009	MO9912SPAINOG6.033	SN0111T0511101.001
MO0008MWDIM501.006	MO0105SPATHE04.005	MO9912SPAPAI29.002	SN0207F3912298.037
MO0008MWDJUVEN.000	MO0106MWDTDG01.035	MO9912SPAPT4PD.001	SN0208F3511695.011
MO0008MWDNEUTR.000	MO0106MWDTHE05.010	SN0001T0581699.004	SN0208F3903102.002
MO0008MWDNM501.005	MO0106SPAECLO2.016	SN0001T0801500.001	SN0208F3912298.039
MO0008MWDNM501.007	MO0106SPAIDM01.034	SN0001T0810599.008	SN0208F3912298.038
MO0008MWDNM601.004	MO0107AMRWASPK.000	SN0001T0872799.006	SN0208F3912298.039
MO0008MWDNM601.008	MO0107MWDTEM05.011	SN0002T0512299.003	SN0208T0503102.007
MO0008MWDVEB03.003	MO0107MWDWPM20.005	SN0002T0872799.007	SN0306T0504103.005
MO0008SEPRFCDD.000	MO0108AMRTMHDC.000	SN0002T0872799.008	SN0306T0504103.006
MO0008SPAFRA06.004	MO0108MWDMVC01.036	SN0002T0872799.009	SN0306T0504103.007
MO0008SPATHS03.001	MO0108SPAMTS11.037	SN0003T0503100.001	SN0306T0504103.008
MO0009MWDIM401.015	MO0109AMRDHLWG.000	SN0003T0810599.010	SN9907T0571599.001
MO0009MWDIMED01.020	MO0109RDDAAMRR.003	SN0003T0872799.012	SN9907T0872799.001
MO0009MWDNM501.017	MO0109SPAFIE10.006	SN0004T0501399.002	SN9907T0872799.002
MO0009MWDNM601.016	MO0109THRMODYN.000	SN0004T0501399.003	SN9908T0581699.001
MO0009MWDNM601.018	MO0110MWDIPIT45.018	SN0004T0501600.004	SN9908T0581999.001
MO0009MWDNTSP01.019	MO0110RPCRFCDD.001	SN0004T0501600.005	SN9908T0872799.004
MO0009SEPTIHMP.000	MO0110SPAEB513.038	SN0004T0501600.006	SN9910T0501399.001
MO0010MWDANS03.005	MO0110SPAPT245.017	SN0004T0571599.004	SN9910T0581699.002
MO0010MWDIDM38.032	MO0110SPAPT545.016	SN0004T0810599.009	SN9911T0811199.001
MO0010MWDMIN38.031	MO0111AMRDSNFA.000	SN0005T0505500.001	SN9911T0811199.002
MO0010MWDPBD03.007	MO0111AMRENTPA.000	SN0005T0581699.005	SN9911T0811199.005
MO0010MWDPBD09.006	MO0111AMRICGFW.000	SN0005T0810599.012	SN9912T0511599.002
MO0010MWDSUP04.010	MO0111AMRICGFW.001	SN0005T0872799.013	SN9912T0512299.002
MO0010MWDWAP01.009	MO0111AMRIPREA.000	SN0006T0502900.002	SN9912T0581699.003
MO0010RDDAAMRR.002	MO0111AMRXFRCA.000	SN0007T0872799.014	SN9912T0872799.005
MO0010SPAAM01.014	MO0111AMRXFRCA.001	SN0009T0581699.006	
MO0010SPAABS08.007	MO0111MWDHRH12.019	SN0009T0810599.013	
MO0010SPAABS08.008	MO0111MWDSEE12.022	SN0009T0810599.014	
MO0010SPAOUT01.002	MO0111MWDVAR12.021	SN0009T0811199.008	
MO0010SPAPET07.004	MO0111SPAeva14.041	SN0009T0811199.009	
MO0010SPAPTC08.005	MO0111SPAMSC14.042	SN0010T0502900.003	
MO0010SPASIL02.002	MO0111SPAMVC14.039	SN0010T0810599.015	
MO0010SPASUP04.011	MO0111SPAPSM12.023	SN0010T0810599.016	
MO0010SPAVOL01.001	MO0111SPASGI14.040	SN0010T0810599.017	
MO0011MWDEQ345.014	MO0111SPATHC14.040	SN0010T0810599.018	
MO0011MWDEQ345.015	MO0112AMRLED5M.000	SN0010T0810599.019	
MO0011MWDML01.022	MO0112MWDHRH10.025	SN0010T0810599.020	
MO0011MWDNM601.021	MO0112MWDHRH10.026	SN0010T0810599.021	
MO0011MWDREG01.001	MO0112MWDTHC12.024	SN0010T0810599.022	
MO0011SPAABS07.009	MO0112SPAefd04.001	SN0010T0872799.015	
MO0011SPACMU07.049	MO0201EBSTRTCM.013	SN0011T0571897.014	
MO0011SPAIPC37.002	MO0201SPAGIN07.001	SN0011T0810599.023	

**Attachment 7 - Listing of DTNs from the Technical Information Center (TIC)
that were previously classified as “Qualified” that have been reclassified as
“Technical Information”**

GS000483351030.003
GS000683351030.004
GS000683351030.005
GS000683351030.008
GS000683351030.009
GS001108312242.009
GS020183351030.001
GS020783114233.005
LL000112551021.110
LL000112951021.113
LL990806651021.078
MO0106STRATHFM.022
MO0106STRATHFM.023
MO0111SPAMVC14.039

Attachment 8 - Listing of “Unqualified” DTNs from the Technical Information Center (TIC) that were previously classified as “Unqualified” that have been reclassified as “Technical Information”

GS000300001221.007	MO0211SPAWEA07.012
GS000683351030.006	MO0212SPASWC09.012
GS000883351030.011	MO0304GSALFAIW.000
GS911208312293.001	MO0305GSC03072.000
GS921208312271.002	MO9812SCCT1SAT.000
GS930408312111.005	MO9812SCCT2MCU.000
GS930608312231.003	MO9812SCCT5RAD.000
GS930708312272.004	MO98CENSUS1986.000
GS930708312272.005	MO98CENSUS1996.000
GS940183117462.003	MO9904COV99158.000
GS940208312291.001	MO9904PROPCRLA.000
GS950108318211.001	MO9912SPAASF01.020
GS971108315215.014	MO9912SPABAS00.001
GS980708312144.001	MO9912SPABWR50.022
LA000000000030.001	MO9912SPACCC06.010
LA0305AM831341.001	MO9912SPACDD06.018
LL000112751021.111	MO9912SPACFF00.024
LL000112851021.112	MO9912SPACIF06.011
LL000113051021.114	MO9912SPACSD06.017
LL000202705924.115	MO9912SPACYR06.007
LL990610951022.018	MO9912SPAFFD00.001
MO0001SPAFGR06.036	MO9912SPAFFD37.021
MO0001SPAPRA00.035	MO9912SPAFFR76.029
MO0003SPATCR22.038	MO9912SPAFGF00.007
MO0003SPATCR30.039	MO9912SPAFGP72.003
MO0003SPATCR70.040	MO9912SPAFGR00.005
MO0004SPAFRE00.003	MO9912SPAFGR00.006
MO0006SPACRE00.044	MO9912SPAFGR00.008
MO0006SPACRE00.045	MO9912SPAFGR06.009
MO0006SPACRE00.046	MO9912SPAFGR11.004
MO0006SPACRE00.047	MO9912SPAFGR34.010
MO0011GSC00378.000	MO9912SPAFRT00.014
MO0208PNLSFLDD.000	MO9912SPAFRV23.013
MO0210GSC97555.000	MO9912SPAFST06.006
MO0210GSC98483.000	MO9912SPAGE800.023
MO0210SPAAPC01.031	MO9912SPAGSL06.012
MO0210SPAGRO06.027	MO9912SPAHEL06.012
MO0210SPA HAR06.026	MO9912SPAHPM34.016
MO0210SPAOXIDA.001	MO9912SPAHTF06.008
MO0210SPAROO06.025	MO9912SPAMCC00.030
MO0210SPAWAT06.024	MO9912SPAPFR00.028
MO0211SPAACR07.013	MO9912SPAPFR01.027
MO0211SPABIO07.018	MO9912SPAPWR50.026
MO0211SPACAR07.023	MO9912SPAROD00.019
MO0211SPACHA07.014	MO9912SPASOX00.015
MO0211SPAERO09.011	MO9912SPATHD00.031
MO0211SPAFAC07.016	SN0004ERUPTION.000
MO0211SPAISI05.026	UN0006TIC000PA.001
MO0211SPANHA05.025	UN0006TIC000PA.002
MO0211SPAPAR07.015	UN0006TIC000PA.003
MO0211SPATRA07.017	UN0006TIC000PA.004
MO0211SPATSP07.011	UN0006TIC000PA.005

**Attachment 9 – Technical Product Input Deficiency Documents Issued
 Prior to the Initiation of CAR BSC(B)-03-C-107 (April 14, 2003)**

Number	Date Opened	Status/ Closed Date	Authored By	Description of Condition	Notes
FY 1996, 1997, 1998					
YM-96-D-107	10/04/96	06/22/99		Failure to properly identify data as "UNQUALIFIED"	
LBNL-98-D-011	12/08/97	10/20/98		LBNL did not complete TDIF for data in report	
LVMO-98-D-054	03/24/98	09/18/98		CRWMS M&O did not develop/transmit review documentation for three synthesis reports; DTN numbers were not assigned nor were TDIFs created for the three reports that included developed data	
LVMO-98-D-055	03/26/98	05/30/00		CRWMS M&O Failed to Establish Measures to ID and Describe Activities that Result in Determining Controls for the Electronic Mgmt of Data; and the Admin of the Site and Engineering Properties Database is Being Conducted Without an Approved Procedure in Place	
USGS-98-D-072	05/12/98	07/31/98		Data collected without approved technical procedures (YMP-USGS-HP-219, YMP-USGS-HP-299)	Not included in scope of CAR BSC(B)-03-C-107
USGS-98-D-083	05/18/98	09/18/98		Preliminary Data was Distributed Without Indicating its Preliminary Status (PSHA Report)	Not included in scope of CAR BSC(B)-03-C-107
LANL-98-D-108	07/10/98	06/01/99		TIP preparation inadequate; Traceability of data and scientific notebooks not consistently documented	
LVMO-98-D-122	08/28/98	09/29/99		Measures for Identification/Description of Technical Data Management's Activities Not Established; Software Codes Not Formally Verified	Not included in scope of CAR BSC(B)-03-C-107
LVMO-98-D-123	08/28/98	12/10/99		SEP Database Supporting Software Requires Verification	Not included in scope of CAR BSC(B)-03-C-107
LVMO-98-D-140	10/16/98	07/29/99		Entry Errors Drawn from the TDMS On the Reversal of Strike and Dip Values	Not included in scope of CAR BSC(B)-03-C-107
LVMO-98-C-002	02/11/98	04/10/00		Data Listed as Qualified in the Technical Database is Suspect Due to Vendor Qualification Inadequacies	Not included in scope of CAR BSC(B)-03-C-107
FY 1999					
LVMO-99-C-001	10/13/98	08/02/00		Lack of Traceability of Data From Technical Report to TDMS	
LVMO-99-D-002	10/27/98	03/16/99		Report using unqualified data submitted as qualified	
LBNL-99-D-051	06/02/99	09/22/99		Reviews of Specific Data Associated With Milestone Deliverables Not Documented or Indeterminate	
LVMO-99-D-059	06/07/99	08/31/99		The Technical Data Management System (TDMS) Not Used in the Development of Listed SDDs	Not included in scope of CAR BSC(B)-03-C-107
LVMO-99-D-096	10/06/99	11/18/99		Material (Marvel Mystery Oil) was Found to be Not Included in the TFM Database	Not included in scope of CAR BSC(B)-03-C-107
LVMO-99-D-098	09/03/99	01/06/00		Approved Calculation Did Not Flag That Data Used Must be Confirmed/Verified	

Attachment 9 – Technical Product Input Deficiency Documents Issued

Prior to the Initiation of CAR BSC(B)-03-C-107 (April 14, 2003)

Number	Date Opened	Status/ Closed Date	Authored By	Description of Condition	Notes
FY 2000					
LVMO-00-D-032	02/17/00	03/28/00		UZTT Data Submitted with Reference to Incorrect WBS Numbers	Not included in scope of CAR BSC(B)-03-C-107
LVMO-00-D-071	06/24/99	12/21/99		GPS Equipment Out-of-Calibration	
LVMO-00-D-097	06/13/00	10/18/00		Failure to Implement the Requirements of AP-3.15Q; TBV/TBD Tracking Numbers Not Assigned Prior to Product Checking Group Lockout of DIRS Report	Not included in scope of CAR BSC(B)-03-C-107
LVMO-00-D-117	08/22/00	05/31/01		Assessments of the Impact of TBV Inputs/Unqualified Data are Not Included in AMRs as Required by AP-3.10Q. Use of "N/A Technical Product Output" in the DIRS Database Hinders Ability of AMR Authors to Conduct this Assessment, as the Status of Inputs is Not Readily Apparent	
LVMO-00-D-120	08/22/00	1/23/01		Model Warehouse Submittals Do Not Contain All Information Required by AP-3.10Q and AP-SIII.3Q	Not included in scope of CAR BSC(B)-03-C-107
LVMO-00-D-135	08/29/00	12/05/00		Ineffective Identification of Process Controls for Control of Management of Electronic Data	
LVMO-00-D-148	09/21/00	02/13/01		Metadata for the ATDT are Not Being Maintained Consistent with the DIRS Database	
FY 2001					
LVMO-01-D-007	10/30/00	1/16/02		Inadequate Implementation of Procedures for Transmittal of Project Inputs, Model Verification, and Identification of Developed Data	
LVMO-01-D-011	11/01/00	02/07/01		Failure to Correctly Document, in Block 4 of DIRS Reports, the TBV/TBD Status of Data/Non-Data Received Via Design Input Transmittals	
LVMO-01-D-028	01/19/01	1/16/02		Developed Data Not Identified with DTN(s) and Submitted to TDMS; Uncertainties and Restrictions on NV Developed Data Not Identified	
BSC-01-D-055	03/26/01	05/17/01		Impact Review Not Initiated for Superseded Data Set	
BSC-01-D-063	05/08/01	11/15/01		Input Data Labeled as 'Accepted Data' is Either Incorrectly Labeled or Not in Accepted Data Database	
BSC-01-D-073	06/07/01	09/25/01		Use of Technical Product Output (TPO) as a Qualification Status Indicator Does Not Meet QARD Requirement for Maintenance of the Status of Unqualified Data	
BSC-01-D-097	07/12/01	10/25/01		On-Line Review Checklists for the RIB Not Approved/Submitted to Records as Per Procedure	
BSC-01-D-142	10/04/01	1/23/02		Failure to Accurately and Adequately Document Technical and Scientific Data in a Technical Product; Failure of the Checking Process to Detect Errors in the Technical Product	

Attachment 9 – Technical Product Input Deficiency Documents Issued

Prior to the Initiation of CAR BSC(B)-03-C-107 (April 14, 2003)

Number	Date Opened	Status/ Closed Date	Authored By	Description of Condition	Notes
FY 2002					
BSC-02-D-009	11/01/2001	7/9/02	Palay	No Objective Evidence of a Technical Review for Data Classified as Final and Qualified in the TDMS	
BSC-02-D-034	12/06/2001	3/27/02	Palay	No Objective Evidence of a Supplement V Evaluation Being Performed on YMP-QP-S5.01 for LANL Electronic Data Management	
BSC(B)-02-O-071	09/05/2002	10/07/2002	Clark	Objective evidence of previous data transfers not generated as required.	
BSC-02-D-074	03/04/2002	6/5/02	Auer	Data Used in Scientific Notebook at URS Group in Santa Ana, CA, Not Obtained from TDMS Nor Identified by Appropriate Data Tracking Number	
BSC(B)-02-O-078	09/24/2002	09/24/2002	Gilkerson	DTN Reference in AMR	Not included in scope of CAR BSC(B)-03-C-107
LBNL-02-D-079	04/04/2002	6/25/02	Voigt	DTN Submittal had Deficiency with Data Traceability and Completeness of Data	
BSC(O)-02-D-120	06/05/2002	6/27/02	Palay	Concurrence Sections not Completed for Technical Reviews of Data	
BSC(O)-02-D-123	06/05/2002	09/18/2002	Palay	No Records Road Map Developed for Submitted Data to TDMS	
BSC(O)-02-D-124	06/05/2002	11/1/02	Palay	Procured Data Classified as Final was not Technically Reviewed per AP-2.14Q	
BSC(O)-02-D-125	06/05/2002	6/27/03	Palay	Data not Submitted Within 30 Days After the Submittal of the TDIF	
USGS(B)-02-D-126	06/04/2002	10/07/2002	Sinks	Data Records Packages Did Not Include the Reviewed Data as Required by AP-2.14Q	
BSC(B)-02-D-144	07/17/2002	07/02/2003	Dana	Parameters Represented by Table 4-1 of the Analysis of Infiltration Uncertainty are Not Adequately Justified	
BSC(B)-02-D-191	10/17/2002	01/29/2003	Gilkerson	Use of Unqualified Data from Uncontrolled Source	
FY 2003					
BSC(O)-03-D-014	10/24/2002	04/22/2003	Dove	Direct Input of Unqualified Data Info Models and Analyses as Assumptions	
LLNL(B)-03-O-021	11/20/2002	12/09/2002	Warren	Incorrect Designation of Submitted Data	
BSC(B)-03-D-032	11/27/2002	03/06/2003	McFall	Failure to submit geophysical data to records	
LLNL(O)-03-D-033	11/19/2002	2/19/03	Kavchak	Lack of Documentation of Electronic Data Controls	
BSC(B)-03-D-037	11/20/2002	04/07/2003	Schuermann	No Objective Evidence of Two TDIFs Being Submitted to the Records Processing Center	Not included in scope of CAR BSC(B)-03-C-107
BSC(B)-03-D-042	06/19/2003	07/18/2003	Hartstern	Project Procedures not Reflecting QARD Supplement III, Data Requirements	
BSC(B)-03-D-043	12/13/2003	07/29/2003	Hartstern	Failure in the Implementation of the Review, Checking and Approval Processes as Described in AP-SIII.9Q	Not included in scope of CAR BSC(B)-03-C-107
BSC(B)-03-D-045	12/19/2002	07/30/2003	Heaney	Inaccurate Data Description Entries into the ATDT	
BSC(O)-03-D-046	12/10/2002	5/20/03	Auer	Inadequate Quality Requirements in ANL Statement of Work	

Attachment 9 – Technical Product Input Deficiency Documents Issued

Prior to the Initiation of CAR BSC(B)-03-C-107 (April 14, 2003)

Number	Date Opened	Status/ Closed Date	Authored By	Description of Condition	Notes
BSC(B)-03-D-051	12/19/2002	03/27/2003	Heaney	Failure to identify data tracking numbers for data that was listed in an approved technical report	
BSC(B)-03-D-054	12/20/2002	03/13/2003	Heaney	Failure to Generate Record Road Map for Data Sets	
BSC(B)-03-O-059	03/06/2003	03/12/2003	Therien	Impact Review Action Notices (IRANs) were not Initiated Prior to Supersession of Data in the TDMs	Not included in scope of CAR BSC(B)-03-C-107
BSC(O)-03-D-070	01/17/2003	Open	Palay	EM Data Not Identified as such nor Controlled Per Supplement III	
BSC(B)-03-D-073	02/13/2003	05/20/2003	Svalstad	Incorrect Designation of the DIRS Input Status of Unqualified Data	
BSC(O)-03-D-080	01/31/2003	Open	Dove	Not Generally Accepted "Not Established Fact Data"	
BSC(B)-03-O-080	04/14/2003	07/07/2003	Harper	A Post-PVAR Data Set (DTN) Includes a Quality Verification Level-2 DTN Within It Converted to BSC(B)-03-D-194 under new AP-16.1Q	Not included in scope of CAR BSC(B)-03-C-107
BSC(B)-03-D-084	02/14/2003	08/11/2003	Gilkerson	Incorrect Direct Inputs into Model Report	Not included in scope of CAR BSC(B)-03-C-107
BSC(B)-03-D-091	02/18/2003	05/01/2003	Gilkerson	Data Errors in LANL Scientific Notebooks	

Attachment 10 – Technical Product Input Deficiency Documents Issued

Since CAR BSC(B)-03-C-107 Was Initiated (April 14, 2003)

Number	Date Opened	Status/ Date Closed	Authored By	Description of Condition
BSC(O)-03-D-129	04/24/2003	08/11/2003	Dove	Non-Specific Data Evaluation Criteria
BSC(O)-03-D-130	04/24/2003	08/15/2003	Dove	Failure to Apply Data Evaluation Criteria During Data Qualification
BSC(O)-03-D-134	04/10/2003	07/28/2003	Auer	Data Submittal Records Packages Do Not Include All Required Information
BSC(O)-03-D-135	04/24/2003	07/09/2003	Voigt	Lack of Traceability and Transparency in Analysis Model Reports
BSC(B)-03-D-136	05/01/2003	06/18/2003	Graf	Incorrect Data Tracking Number (DTN) Data Entry
BSC(B)-03-D-152	05/13/2003	08/19/2003	Heaney	Record Road Maps Not Developed and Record Packages Not Sent to the RPC for GIS Data Packages
BSC(B)-03-D-188	06/30/2003	07/16/2003	Keele	Procedure Conflict Regarding Use of TIC/RIS Information as Direct Input ("Controlled Source" Issue)
BSC(B)-03-D-194	07/07/2003	Open	Harper	A Post-PVAR Data Set (DTN) Includes a Quality Verification Level-2 DTN Within It
BSC(B)-03-D-196	07/22/2003	Open	Dana	TDMS Database Identifies Output DTNs as Product Output when Technical Product has been Canceled or Superseded
USGS(B)-03-D-201	08/06/2003	Open	Sinks	Electronic Data Records in RPC are Corrupted, and Associated Documentation Inadequate (MOL.19970723.0270, DTN GS960108314211.001)
BSC(B)-03-D-211	08/06/2003	Open	Powe	Technical Information source documents are not being tracked properly as required by AP-3.15Q
BSC(O)-03-D-214	07/29/2003	Open	Dove	Data Used as Technical Information
BSC(O)-03-D-218	08/06/2003	Open	Dove	Ventilation Model and Analysis Report Table 4-14 Invalid Inputs and No Traceability
BSC(B)-03-D-219	08/05/2003	Open	Schuermann	Missing Technical Data Information Forms (TDIFs)
BSC(B)-03-D-221	08/05/2003	Open	Gilkerson	TDMS does not accurately depict input description; i.e. data, technical information, product output, etc.
BSC(B)-03-D-227	08/13/2003	Open	Heaney	Record road maps not generated for DTNs
BSC(O)-03-D-236	08/20/2003	Open	Dove	Technical Assessment of Unqualified Data
BSC(B)-03-D-241	08/26/2003	Open	Heaney	Metadata not clearly marked as Limited for a Specific Use
BSC(B)-03-D-242	09/02/2003	Open	Heaney	Data Verification Checklists and Record Road Maps not developed for superceded DTNs
BSC(B)-03-D-257	08/26/2003	Open	Heaney	DIRS report did not reference open TBV number
BSC(B)-03-D-259	09/04/2003	Open	VanDillen	Incorrect Technical Product Input Status Listed in DIRS