



Department of Energy

Washington, DC 20585

QA: QA

JAN 17 2003

R. W. Andrews
Bechtel SAIC Company, LLC
1180 Town Center Drive, M/S 423
Las Vegas, NV 89144

REISSUANCE OF DEFICIENCY REPORT (DR) BSC(O)-03-D-014

An Office of Quality Assurance (OQA) surveillance report, OQA-SI-03-006, resulted in deficiencies, including one condition adverse to quality that is being consolidated with DR BSC(O)-03-D-014.

Enclosed is the addendum to the previous DR. In response to this reissuance, BSC is requested to provide an amended initial response that takes credit for appropriate actions already taken while addressing the new issues presented by this addendum. Since this DR is nearing 100 days open, this response should include a Request for Extended Processing in the event that corrective action does not allow completion within that timeframe.

Please provide an amended initial response within 10 working days of the date of this letter.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Floyd H. Dove at (702) 794-5025.

James Blaylock for
R. Dennis Brown, Director
Office of Quality Assurance

OQA:JB-0545

Enclosure:
DR BSC(O)-03-D-014



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R. W. Andrews

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JAN 17 2003

cc w/encl:

N. K. Stablein, NRC, Rockville, MD
Robert Latta, NRC, Las Vegas, NV (2 cys)
S. W. Lynch, State of Nevada, Carson City, NV
L. W. Bradshaw, Nye County, Pahrump, NV
D. T. Krishna, BSC, Las Vegas, NV
N. H. Williams, BSC, Las Vegas, NV
F. H. Dove, NQS, Las Vegas, NV
W. J. Glasser, NQS, Las Vegas, NV
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W. J. Arthur, III, DOE/ORD (RW-2W), Las Vegas, NV
B. M. Terrell, DOE/ORD (RW-40W), Las Vegas, NV

1-13-03
11:00

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
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 WASHINGTON, D.C

ORIGINAL
 THIS IS A RED STAMP

8 X Deficiency Report
 Corrective Action Report
 No. BSC(O)-03-D-014
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DEFICIENCY REPORT/CORRECTIVE ACTION REPORT

1. Controlling Document. (Document ID and Revision or Date)
 (1) AP-3.10Q, Revision 2, ICN 5; and (2) AP-3.15Q, Revision 3, ICN 0.

2. Related Report No
 N/A

3. Responsible Organization:
 BSC Science and Analysis Project

4. Discussed With:
 Darren Jolley, Terry Steinborn, and Steven Swenning

5. Requirement.
 (1) Section 3.2, Definition of Assumption: "A statement or proposition that is taken to be true in the absence of direct confirming data or evidence."
 (2) Attachment 4, Input Status Decision Checklist: Data that are unqualified receive a "TBV" as an input status

6. Description of Condition.
 (1) Contrary to the definition of assumption (made in the absence of data), unqualified data have been directly used as input to models (and potentially other analyses) documented in Analysis and Model Reports (AMR) by calling them "assumptions" Two examples are:
 A. ANL-EBS-MD-000045, Revision 00, ICN 03, *In-Drift Precipitates/Salts Analysis*, page 26: "For FE and AL, the input values are approximated from additional data tabulated in Harrar et al. (1990). These values are based on few data and, like the major ions, are assumed to approximate representative J-13 sample concentrations (Assumption 5.2 5)"
 B. ANL-EBS-MD-000038, Revision 00, ICN 01, *In-Drift Microbial Communities*, page 31: "The rationale for this assumption is that the values similar to this are present in the groundwater at Yucca Mountain (Harrar et al. 1990 and CRWMS M&O 1997b). CRWMS M&O (1997b, page 10) presents a discussion on the groundwater content of DOC where the mean and distribution of DOC in J-13 compares to the mean and distribution in wells in the Death Valley region and other locations within the United States."
 (2) Contrary to the guidance for selection criteria presented in the "Input Status Decision Checklist" (which should result in a "TBV" designation), the DIRS Input Status (Column 4) for the subject AMRs were incorrectly labeled as "N/A-Reference Only" when the cited text in the examples of Item 1 (above) indicated that the data were directly used as model input.

Has work been stopped? Yes X No

7. Initiator
 Floyd H. Dove

9. Does a stop work condition exist?
 Yes X No N/A

Printed Name Signature Date If Yes, Check One A B C D

10. Recommended Actions:
NONE.

11. QAR Review.
 Floyd H. Dove

12. Response Due Date
 10 Working days after issuance.

Printed Name Signature Date

13. QAM Issuance Approval
 R. Dennis Brown

15. QAM Closure Approval

Printed Name Signature Date

14. Corrective Actions Verified/Closure.

Printed Name Signature Date

ENCLOSURE 1 of 8

260 11/13/02

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2 Check if Amended

3 Extended Processing

No Yes (If yes, submit Extended Processing request)

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DEFICIENCY REPORT/CORRECTIVE ACTION REPORT INITIAL RESPONSE

4. Immediate Actions Necessary to Bring the Process Under Control: (If none, provide justification statement)

Issue a Management Directive (via email) to the performance assessment/scientific staff, clarifying any ambiguity concerning the proper use of assumptions and the appropriate use of confirming data within an assumption. The email will further note that changes have been made to AP-SIII.2Q Qualification of Unqualified Data and Rationale for the Acceptance of Data to allow qualification or acceptance of unqualified data in a technical product and AP-3.15Q Managing Technical Product Inputs. In addition, the email will discuss future changes to be made to the next revision of the Scientific Processes Guidelines Manual. The changes provide clarification for any ambiguity and direct document originators, checkers, and responsible managers/leads to confirm their products are correct.

Date when process will meet requirements: December 6, 2002

5. Immediate Remedial Actions Completed:

Changes made to procedures: AP-SIII.2Q Qualification of Unqualified Data and Rationale for the Acceptance of Data and to AP-3.15Q Managing Technical Product Inputs.

6. Plan for Determining the Extent of Condition:

Sample ~20% of the documents that are providing direct input to the Total System Performance Assessment License Application Review (as identified in the listing of key documents in Appendix G of the Total System Performance Assessment License Application Methods and Approach document, TDR-WIS-PA-000006 REV00) and that are not scheduled for revision prior to TSPA-LA.

7 Due Date for Submittal of Completed Response:

December 13, 2002

8 Response by. (Responsible Manager)

Robert Andrews [Signature] 11/7/02
Printed Name Signature Date

9. QAR Evaluation: Accept Partially Accept Reject

FLOYD H. DOVE F. Harney Stone 11/20/02
Printed Name Signature Date

10. QAM Concurrence:

Downie Brown James Blaylock 11/22/02
Printed Name Signature Date

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CONDITION ADVERSE TO QUALITY CONTINUATION PAGE

9. QAR Evaluation: (Continued)

Accept initial response (dated November 11, 2002) with the following exceptions noted:

Item 6. Plan for Determining the Extent of Condition is inadequate. The number of key documents listed in Appendix G of TDR-WIS-PA-000006 is 32. A sample size of 20% for evaluation is equivalent to approximately 6 reports (selected randomly). The problem of including data as direct input by calling them "assumptions" is more prevalent in model and analysis reports (AMRs) where data must be obtained from literature published outside the project. These areas include EBS, Waste Package and Drift Shield Degradation, Waste Form Degradation, Biosphere, and Disruptive Events. Suggest that you consider a sample size of 50% for these five specific areas (approximately 11 reports).

F. Harvey Dove 11/20/02

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2. Check if Amended

3. Extended Processing

No Yes (If yes, submit Extended Processing request)

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DEFICIENCY REPORT/CORRECTIVE ACTION REPORT INITIAL RESPONSE

4. Immediate Actions Necessary to Bring the Process Under Control: (If none, provide justification statement)

Issue a Management Directive (via email) to the performance assessment/scientific staff, clarifying any ambiguity concerning the proper use of assumptions and the appropriate use of confirming data within an assumption. The email will further note that changes have been made to AP-SIII.2Q Qualification of Unqualified Data and Rationale for the Acceptance of Data to allow qualification or acceptance of unqualified data in a technical product and AP-3.15Q Managing Technical Product Inputs. In addition, the email will discuss future changes to be made to the next revision of the Scientific Processes Guidelines Manual. The changes provide clarification for any ambiguity and direct document originators, checkers, and responsible managers/leads to confirm their products are correct. See attached email.

Date when process will meet requirements: December 11, 2002

5. Immediate Remedial Actions Completed:

Changes made to procedures: AP-SIII.2Q Qualification of Unqualified Data and Rationale for the Acceptance of Data and to AP-3.15Q Managing Technical Product Inputs.

6. Plan for Determining the Extent of Condition:

Review all the key documents that are not scheduled for revision prior to TSPA-LA (including but not necessarily limited to: "Future Climate Analysis", ANL-NBS-GS-000008). The key documents are those that provide direct input to TSPA-LA (as identified in the listing of key documents in Appendix G of the Total System Performance Assessment License Application Methods and Approach document, TDR-WIS-PA-000006 REV00, Table G-1, Pages G-12 and G-13). If problems are identified in the documents being reviewed, technical error reports will be developed, and appropriate correction made (e.g., revision or ICN to the document). For the documents already scheduled for revision, any problems will be corrected as part of the new process.

7. Due Date for Submittal of Completed Response:

January 31, 2003

8. Response by: (Responsible Manager)

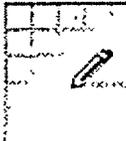
T. Dearing [Signature] for 12/10/02
Printed Name Signature Date

9. QAR Evaluation: Accept Partially Accept Reject

FLOYD H. DOVE [Signature] 12/16/02
Printed Name Signature Date

10. QAM Concurrence:

DENNIS BROWN [Signature] for 12/23/02
Printed Name Signature Date



Robert Andrews
12/09/2002 04:48 PM

To: William Watson/YM/RWDOE@CRWMS, Paul Dixon/YM/RWDOE@CRWMS, Ernest Hardin/YM/RWDOE@CRWMS, Peter Swift/YM/RWDOE@CRWMS, Rob Howard/YM/RWDOE, Thomas Doering/YM/RWDOE@CRWMS, Mike Jaeger/YM/RWDOE@CRWMS, Douglas Weaver/YM/RWDOE@CRWMS, Ron Oliver/YM/RWDOE@CRWMS, Jeff Weaver/YM/RWDOE@CRWMS, Dennis Thomas/YM/RWDOE@CRWMS, Cheryl Schneider/YM/RWDOE@CRWMS, Stanley Pedersen/YM/RWDOE@CRWMS, Judith Gebhart/YM/RWDOE@CRWMS, Joe Wang/YM/RWDOE@CRWMS, Jim Houseworth/YM/RWDOE@CRWMS, Ardyth Simmons/YM/RWDOE@CRWMS, Anthony Smith/YM/RWDOE@CRWMS, Maryla Wasiolek/YM/RWDOE@CRWMS, Al Eddebarh/YM/RWDOE@CRWMS, Stephanie Kuzio/YM/RWDOE@CRWMS, Kathy Gaither/YM/RWDOE@CRWMS, Frank Perry/YM/RWDOE@CRWMS, Richard Quittmeyer/YM/RWDOE@CRWMS, Tammy Summers/YM/RWDOE@CRWMS, Greg Gdowski/YM/RWDOE@CRWMS, Pasu Pasupathi/YM/RWDOE@CRWMS, Christine Stockman/YM/RWDOE@CRWMS, pvbrady@sandia.gov@CRWMS, Howard Adkins/YM/RWDOE@CRWMS, Dan Thomas/YM/RWDOE@CRWMS, Doug Brownson/YM/RWDOE@CRWMS, Jerry McNeish/YM/RWDOE@CRWMS, James Blink/YM/RWDOE@CRWMS, Roger Henning/YM/RWDOE@CRWMS, Matt Knop/YM/RWDOE@CRWMS, Cheryl Hastings/YM/RWDOE@CRWMS, Ron Oliver/YM/RWDOE@CRWMS, Robert Jones/YM/RWDOE@CRWMS, Cliff Howard/YM/RWDOE@CRWMS, Clinton Lum/YM/RWDOE@CRWMS

cc: Harvey Dove/YD/RWDOE@CRWMS

Subject: Guidance on treatment of data in Sections 4 and 5 of AMRs

User Filed as: Excl/AdminMgmt-14-4/QA/N/A

If you have any questions or concerns, please contact the Computer Support Center at 702-794-1335.

Approval must be obtained from the Computer Support Center prior to using the address group in the "TO" line above. In the interest of managing disk space on the Lotus Notes servers, please discard this message when you have finished reading it.

Recent reviews, discussions and e-mails have indicated an inconsistent treatment of data and other information in the input section (Section 4) of AMRs. In order to clarify my expectations and those of the CSO for AMR content, I am providing the following guidance. This guidance will soon be incorporated in an update to the Scientific Guidelines Process Manual, but I want to get this guidance out as soon as possible.

This guidance will be presented at training sessions that we are setting up for Wednesday 12/11 here in LV and at LLNL on Monday 12/16 and LBNL on Tuesday 12/17 (LP-TEC-03-005). Some aspects were discussed at training sessions held at SNL on 12/2 and at LANL on 12/3, and this e-mail provides additional clarification.

1. Section 4 and Section 4.1 in particular, is designed to contain only the direct inputs to the AMR. These direct inputs include:
 - project or accepted data obtained from TDMS,
 - outputs from other analyses or models or calculations obtained from TDMS
 - literature or other data that are qualified in accordance with criteria specified in AP-SIII.2Q (those basis should be in Section 4.1 or an Appendix)
 - data used to qualify other data (using the corroborative criteria specified in AP-SIII.2Q) used as direct input should be presented in Section 4.1
 - design information that may be obtained from drawings (including IEDs) or calcs
2. Chapter 4 (Section 4.1) should not be used to provide or identify data or other information that :

- supports an assumption
- corroborates other data (unless used to qualify other data in accordance with AP-SIII.2Q)
- enhances confidence or provide other support to the model or analysis

3. It is preferable to present the numerical values in Section 4.1. However, for large data sets, it is OK to limit the treatment in Section 4.1 to where (and how) in the AMR the quantitative numerical values (and/or ranges of values) are presented, discussed and used and present the values in another location within the AMR.

4. Any direct inputs that are used to generate intermediate results that are subsequently used as the values input to the model or analysis should be presented in Section 4.1 as direct inputs to the model/analysis development. Intermediate results generated within the AMR itself which are only used in the AMR (e.g., in Section 6 or an Attachment) should not be presented in Section 4.1. These intermediate results should be presented where they are generated and discussion provided tracing how they are used (presumably the use is in either Chapters 6 or 7). It is not necessary to create a separate DTN for these intermediate results.

5. Assumed values and their basis should be presented in Section 5, not in Section 4.1. Data used as direct input should be presented in Section 4.1. Data used to justify assumptions should be presented in Section 5.

6. Data used to qualify other data which are used as direct input (using the corroboration method in AP-SIII.2 Q) should be presented in Section 4.1, but presented separately from already-qualified data which are used as direct input. (Note that the data used to qualify other data would be labeled as corroborative in DIRS, which is consistent with the usage in AP-SIII.2Q.)

7. It is not appropriate to use assumptions that implement unqualified data as direct input to a model or analysis. If it is necessary to use non-qualified data as direct input, that data needs to be qualified in accordance with AP-SIII.2Q. It is possible to carry non-qualified data forward with a TBV #, but in order to get the TBV #, there must be definite plans (i.e. baselined work scope) for removing the TBV in a timely manner.

8. Numerical values used in the model or analysis (for example numerical values used in input files to computational software) should be presented in Chapter 6 of the document not in Section 4.1 (unless they are exactly the same).

Additional notes:

We are trying to make a clear distinction between the inputs to the AMR in Section 4.1 versus the input values to the model or analysis that should be in Chapter 6. The values used in the model or analysis must consider the originators (i.e., AMR authors) professional scientific judgment and experience and a range of factors above and beyond the input to the AMR. For example, the originator must consider data and parameter uncertainty that may not be reflected in the input to the AMR.

An actual example may help illustrate this point. Suppose you, the Originator, are developing the model to describe the expected range of water saturations in the invert for 10,000 years. You need a direct input to your model or analysis for the value of invert permeability. You identify a DTN that contains a value for the invert permeability, say it is $1.3 \text{ E-}10 \text{ m}^2$. You know that this value does not consider the many coupled process interactions that can occur in the invert over this timeframe and you must represent this uncertainty. In Section 4.1 you list the DTN and the value of $1.3 \text{ E-}10 \text{ m}^2$ as a direct input. In Chapter 6 you run your model over a range of input values from $\text{E-}8$ to $\text{E-}12 \text{ m}^2$ (with a mean of $\text{E-}10 \text{ m}^2$) to capture the uncertainty. The use of a

factor of approximately 100 greater or smaller than the direct input value could be justified as an assumption in Section 5, or justified in a technical discussion of the model uncertainty in Section 6. The discussion and rationale of the actual values used should be resident in Chapter 6.

9. The numerical values that are presented in Section 4.1 should replicate the value found in the TDMS or TIC to the same number of significant figures as presented in the original source. The numerical values used as direct input to a model or analysis should use an appropriate number of significant figures corresponding to the degree of uncertainty associated with that parameter, but never more than the original source. The fact that you can calculate with high precision is not to be construed as the degree of precision of the input value.

For the example cited above, note the change from 2 significant figures in the data in Section 4.1 to order-of-magnitude in estimating the range of values used to quantify the model uncertainty.

10. The requirements for documentation of direct inputs and assumptions are set by procedure, but discussion of these requirements demands careful use of the term "corroborative" as follows:

- In Section 4, qualified data are identified as direct inputs. "Corroborative" data sets may also be used in Section 4 in the qualification process, in accordance with AP-SIII.2Q.

- For assumptions in Section 5, data (either qualified or non-qualified) may be used to provide the basis or justification of an assumption, but not to "corroborate" the assumption.

- Qualified or non-qualified data may be introduced in Section 6 of an AMR to support or add confidence to the results of an analysis or intermediate results of a modeling effort.

- Qualified or non-qualified data may be introduced in Section 7 of a Model Report, as "corroborative" use in model validation.

11. Design input cited as direct input in Section 4 is not data. A DTN is not necessary for such input if it comes from a controlled source of design information. Design input must come from a controlled source.

12. Output that is developed within an AMR (e.g., "developed data" or "TPO") are considered to be appropriate for use as direct input to other quality-affecting models or analyses.

If you have any questions about this guidance, please feel free to contact me.

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NO. BSC(O)-03-D-014

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CONDITION ADVERSE TO QUALITY CONTINUATION PAGE

Addendum to Deficiency Report (DR) BSC(O)-03-D-014

This addendum is a result of OQA surveillance report, OQA-SI-03-006. Surveillance OQA-SI-03-006 reviewed BSC calculations originating from the BSC Performance Assessment Project that contained input from the DOE Office of Environment Management. The deficiencies from that surveillance were discussed with the BSC line management and the DOE OQA Verification management. As a result of those discussions, it was agreed to consolidate the following condition adverse to quality described below into DR BSC(O)-03-D-014:

Requirement:

AP-3.12Q, Revision 0, ICN 4, Section 3.0, "Definitions," paragraph 3.1, "Assumption - A statement or proposition that is taken to be true or representative in the absence of confirming data or evidence."

Description of Condition:

Contrary to the above requirement, the BSC calculation CAL-WIS-PA-000009 Revision 00, *Performance Assessment of a Potential Post-Closure Pyrophoric Event Involving Uranium Metal Spent Fuel*, contains data derived from National Spent Nuclear Fuel Program (NSNFP) report, DOE/SNF/REF-047 Revision 1, *DOE Spent Nuclear Fuel Information in Support of TSPA-SR*.

This report has a Document Input Reference System (DIRS) Reference Control Status of Verified and has an input status of Assumption and is used as input to this calculation. Unqualified data from this report (designated as DOE 2001) incorrectly used as assumptions to the following sections of CAL-WIS-PA-000009:

Assumption 3.4: ". . . The radionuclide inventory used in the simulations for Group 7 DSNF was provided by the DOE (DOE 2001, Attached electronic file). The radionuclide inventory for Group 7 DSNF was reported in curies and was converted into grams using the activity coefficients given in Table II-2 in Appendix II. It is assumed that these radionuclide inventories are appropriate for use in the Calculation. . . . The radioactive inventories were used to perform the simulations that developed the dose rates results presented in Section 6.2."

Assumption 3.7: "The physical properties and dissolution rates (models) assumed for the DSNF Group 7 were recommended by the National Spent Nuclear Fuel Program (DOE 2001, Attached electronic file) These recommendations are presented in Table 5.2-4 that shows physical properties (surface area, free or gap inventory, and fuel area and volume) and dissolution rates for each spent fuel group . . . The recommended physical properties and dissolution rates are used in the dose calculations in Section 6.2."

Assumption 3.11: "For the calculation of energy release from oxidation of uranium to U₃O₈, it is assumed that one metric ton of uranium (MTU) is equal to one metric ton of heavy ton of heavy metal (MTHM). . . . The amount of N Reactor fuel is giving in MTHM (DOE, 2001, Attached electronic file) . . . is used in the dose calculations in Section 6.1."

These assumptions, i.e., dissolution rates, inventory numbers, and physical properties, do not meet the definition as described in Section 3.1 of AP-3.12Q. The above referenced "assumptions" are unqualified data from a published report and are used as direct input to the dose calculations in CAL-WIS-PA-000009, Rev. 00.

Prepared by:

DR BSC(O)-03-D-014 QAR concurrence:

Christian Palay Christian Palay 1/8/03
Printed Name Signature Date

FLOYD H. DAVIS F. Harvey Davis 01/08/03
Printed Name Signature Date