Department of Energy
Washington, DC 20585

QA: QA

APR 29 2003

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

VERIFICATION OF CORRECTIVE ACTION AND CLOSURE OF DEFICIENCY REPORT (DR) BSC(O)-03-D-014 RESULTING FROM DIRECT INPUT OF UNQUALIFIED DATA INFORMATION MODELS AND ANALYSES AS ASSUMPTIONS

The Office of Civilian Radioactive Waste Management staff has verified the corrective actions of DR BSC(O)-03-D-014 and determined the results to be satisfactory. As a result, the DR is considered closed.

If you have any questions, please contact either Kerry M. Grooms at (702) 794-1367 or F. Harvey Dove at (702) 794-5025.

R. Dennis Brown, Director
Office of Quality Assurance

OQA:KMG-1096

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

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
T. W. Doering, BSC, Las Vegas, NV
M. J. Mason, BSC, Las Vegas, NV
F. H. Dove, NQS, Las Vegas, NV
W. J. Glasser, NQS, Las Vegas, NV
D. G. Opielowski, NQS, Las Vegas, NV
W. J. Boyle, DOE/ORD (RW-40W), Las Vegas, NV
B. M. Terrell, DOE/ORD (RW-40W), Las Vegas, NV

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C ORIGINAL THIS IS A RED STAMP

8. X Deficiency Report
☐ Corrective Action Report

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

Page 1 of ___

QA: QA

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 02, *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 — F. Harvey Dove — 10/17/02
Printed Name — Signature — Date

9 Does a stop work condition exist?
☐ Yes X No ☐ N/A
If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:
NONE.

11. QAR Review:
Floyd H. Dove — F. Harvey Dove — 10/17/02
Printed Name — Signature — Date

12 Response Due Date:
10 Working days after issuance.

13 QAM Issuance Approval:
R. Dennis Brown — REISSUE James Blaylock for — 1/17/03
Printed Name — Signature — Date
James Blaylock for — 10/24/02

14. Corrective Actions Verified/Closure:
FLOYD H. DOVE — F. Harvey Dove — 04/22/03
QAR Printed Name — Signature — Date

15. QAM Closure Approval:
R Dennis Brown — R Dennis Brown — 4/23/03
Printed Name — Signature — Date

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C ORIGINAL
THIS IS A RED STAMP

8. X Deficiency Report
☐ Corrective Action Report

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

Page 1 of ___

QA: QA

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 — F. Harvey Dove — 10/17/02
Printed Name — Signature — Date

9 Does a stop work condition exist?
☐ Yes X No ☐ N/A
If Yes, Check One: ☐ A ☐ B ☐ C ☐ D

10. Recommended Actions:
NONE.

11. QAR Review:
Floyd H. Dove — F. Harvey Dove — 10/17/02
Printed Name — Signature — Date

12 Response Due Date:
10 Working days after issuance.

13. QAM Issuance Approval:
R. Dennis Brown — REISSUE James B Blaylock — 1/17/03
Printed Name — Signature — Date
James B Blaylock for — 10/24/02

14. Corrective Actions Verified/Closure:
FLOYD H. DOVE — F. Harvey Dove — 04/22/03
QAR Printed Name — Signature — Date

15. QAM Closure Approval:
Printed Name — Signature — Date

Template AP161-1
Rev 3/25/02

D69 11/13/02

Submittal Page 1 of 1

2. Check if Amended ☐

3. Extended Processing

☑ No ☐ Yes (If yes, submit Extended Processing request)

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

1 DR/CAR NO BSC(O)-03-~~D011~~ D-014
PAGE 1 OF 1
QA: QA

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:	8. Response by: (Responsible Manager)
December 13, 2002	Robert Andrews (Printed Name) Signature 11/7/02 (Date)
9 QAR Evaluation: ☐ Accept ☒ Partially Accept ☐ Reject	10. QAM Concurrence:
Floyd H. Dove (Printed Name) F. Harvey Dove (Signature) 11/20/02 (Date)	Dennis Brown (Printed Name) James Blaylock (Signature) 11/22/02 (Date)

AP-16 1Q.7 Rev. 03/25/2002

Submittal Page 1 of 1

OFFICE OF
CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

X DR/CAR/QO
☐ SWO

No: BSC(O)-03-D-014

Page ___ of ___

QA: QA

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

Submittal Page 1 of 1

2. Check if Amended ☑

3 Extended Processing

☑ No ☐ Yes (If yes, submit Extended Processing request)

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

1 DR/CAR NO BSC(0)-03-D-014
PAGE 1 OF 1
QA: QA

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:	8. Response by: (Responsible Manager)
January 31, 2003	T. Doering RWFS for — Printed Name / Signature — 12/10/02 Date
9. QAR Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject	10. QAM Concurrence:
FLOYD H. DOVE — Printed Name; F. Harney Dove — Signature; 12/16/02 — Date	DENNIS BECHTEL — Printed Name; [signature] — Signature; 12/23/02 — Date

Enclosure Pg. 1 of 3 for
DIR BSC(0)-02-D-014

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 Eddebbarh/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 <u>not</u> 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 E-10 m2. 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 E-10 m2 as a direct input. In Chapter 6 you run your model over a range of input values from E-8 to E-12 m2 (with a mean of E-10 m2) 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-magnifude 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.

Submittal Page 1 of 1

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

☒ DR/CAR/QO
☐ SWO

NO. BSC(O)-03-D-014
PAGE OF
QA: QA

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 U_3O_8, 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-00009, Rev. 00.

Prepared by:

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

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

Printed Name	Signature	Date
Floyd H. Dove	F. Harvey Dove	01/08/03

Submittal Page 1 of 9 DGO 2/23/03

2. Check if Amended ☑
Check if also Initial Response ☑

3. Extended Processing
☑ No ☐ Yes (If yes, submit Extended Processing request)

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

1. DR/CAR NO. BSC(0)-03-D-014
PAGE ~~1~~ ~~OF 2~~ DGO
QA: QA 2/23/03

DEFICIENCY REPORT/CORRECTIVE ACTION REPORT COMPLETE RESPONSE

4 Extent of Condition. (Amended response will be required if all Extent of Condition investigations are not complete and documented herein)
The list of Key Document supporting 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, Table G-1, Pages G-12 and G-13) were reviewed to determine which are not being revised for the TSPA-LA. From the list of key documents presented in the above reference, the Future Climate Analysis, ANL-NBS-GS-000008, is the only document that is not being revised for the TSPA-LA

(See Continuation Page)

5. Impact: (Provide an impact statement relative to waste isolation and safety, and impact to other work, if any)
No impact to Waste Isolation and Safety. The impact to other work is as follows:

The additional guidance provided to responsible managers, as well as interim management reviews of in-process Performance Assessment products will resolve the issues for all products being revised for TSPA-LA. Products not being revised have not been identified with the issue for this DR or have not been identified as being used to support TSPA-LA.

6 Remedial Actions: (Document all actions necessary to address the results of the Extent of Condition)
Results of the Chief Science Office's review of Future Climate Analysis, ANL-NBS-GS-000008 are attached. No remedial actions are required.

7 ☐ Root Cause (For a significant CAQ, attach results of formal root cause determination prepared in accordance with AP-16.4Q)
☑ Apparent Cause

Alternative interpretations of what constitutes "Input" versus what is an "Assumption" have lead to the documentation of some information in the "Assumption" section of Analyses and Models documents that more appropriately should be placed in the "Input" section. These alternative treatments have been exacerbated by alternative interpretations of the definition of "data"; as "assumptions" are to be used in the absence of direct confirming "data". These alternative interpretations are being clarified by the additional management guidance described below.

8 Action to Preclude Recurrence: (Address those actions necessary to prevent the identified cause from recurring)
In addition to the immediate actions identified in Block 4 of the initial response, further actions to preclude recurrence were taken to address the overall issue of use of assumptions in Analyses prepared in accordance with AP-SIII.9Q and Models prepared in accordance with AP-SIII.10Q as well as the specific issue associated with use of NSNFP information. In particular, the Performance Assessment Project Manager provided additional guidance on documentation of assumptions. In addition, he provided guidance on the appropriate referencing of NSNFP information used as direct input in LA-related Analyses or Models. (See Continuation Page)

9 Due Date for Completion of Corrective Action:	10. Responsible Manager: 2/20/03 DKS
24 February 2003	T. Doering — Printed Name; Signature; 2-20-03 Date
11. QAR Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject ☒ Re-evaluated for significance	12. QAM Concurrence:
FLOYD H. DOVE — Printed Name; J. Harvey Dove — Signature; 04/10/03 — Date	DENNIS BROWN — Printed Name; James Blaylock for — Signature; 4/10/03 — Date

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

☐ DR/CAR/QO
☐ SWO

NO. BSC(0)-03-D-014
PAGE ~~2~~ ~~OF 2~~ DEO 2/23/03
QA: QA

CONDITION ADVERSE TO QUALITY CONTINUATION PAGE

4 Extent of Condition (continued)
As indicated in Block 6 of the Initial Response, the Chief Science Office conducted a detailed review of the assumptions section of the Future Climate Analysis, ANL-NBS-GS-000008, to determine if conditions similar to those described in Block 6 of the Deficiency Report existed. This review indicated no such conditions existed in this Analysis. The results of the review are attached

The addendum to BSC(O)-03-D-014, identified a calculation that has cited DOE's Office of Environmental Management (EM) National Spent Nuclear Fuel Program (NSNFP) information as an assumption rather than as direct input. To address this addendum, an additional extent of condition was performed and identified three Performance Assessment calculations that had cited this EM information These calculations are planned to be revised to support the TSPA-LA.

8. Action to Preclude Reoccurence (continued)

In addition to the above, management reviews of in-process products to support TSPA-LA are being performed to evaluate the effectiveness of the guidance and communication associated with this deficiency.

Review Comments of Assumptions Section of AMR *Future Climate Analysis* (U0005), ANL-NBS-GS-000008 Rev 00 ICN 01, September 2001
Ming Zhu, 01/10/03

In response to request from the Project staff (via email from Dan Thomas to Jean Younker on 01/02/03) as part of the effort to address BSC(O)-03-D-014, CSO has performed a limited review of AMR *Future Climate Analysis*, ANL-NBS-GS-000008 Rev 00 ICN 01. This review was constrained to the assumptions section and the associated data entries in the DIRS sheets of the subject AMR. The following is a brief summary of our findings.

The key aspect of this AMR involves the development of timing and duration of future climate stages based on past climate data. In this analysis, the timing was forecasted with an earth-orbital parameter climate-change clock. The orbital clock was derived from the Devils Hole chronology, which was used to identify the past/present point in the Owen Lake record. For this reason, MVSR recommended that this analysis be re-classified as a model. The analysis was performed using the following assumptions:

1. Climate is cyclical, so past climates provide insight into potential future climates; in other words, the past is the key to the future.

2. A relation exists between the timing of long-term past climate change (the glacial/interglacial cycles) and the timing of changes in certain earth-orbital parameters. This establishes a millennial-scale climate-change clock, which provides a possible way to time future climate change.

3. A relation exists between the characteristics of past climates and the sequence of those climates in the long, approximately 400,000-year, earth-orbital cycle. The characteristics of past glacial and interglacial climates within the long earth-orbital cycle differ from each other, and appear to do so in a systematic way. This climate sequence relation provides a defensible criterion for the selection of a particular past climate as an analog for future climate.

4. Long-term earth-based climate forcing functions, primarily tectonics, that operate on the million-year time scale have remained relatively unchanged during the last long earth climate cycle, and will not change during the next 10,000 years. Consequently, the potential and unpredictable impact of long-term, earth-based forcing functions on climate need not be considered for understanding climate change during the past 400,000 years or the next 10,000 years.

The basis for each of the first three assumptions was provided in Sections 6.3 through 6.5 of the AMR, respectively. In addition, Assumption 4 was discussed in Section 5 based on interpretation of EPA proposed rule 40 CFR 197 (Federal Register, Vol. 64, No. 166/Friday, August 27, 1999/Proposed Rules, page 46994). The AMR stated that further verification of these assumptions would not be warranted.

This section of Rev 00 ICN 01 of the AMR is identical to that of Rev 00.

ASSUMPTIONS SECTION

The technical basis for Assumptions 1 through 3 was discussed in detail in Section 6.3 through 6.5. This discussion involves 7 DTNs (see attached list). The justification of these assumptions and the associated data treatment in the AMR, including removal of relevant TBVs, can be summarized as the following:

Assumption 1: Justified with DTN: GS000200005121.003, which was qualified in accordance with AP-SIII.2Q based on DOE AMOPE acceptance of the data prior to the issuance of Rev 00 of the AMR.

Assumption 2: Justified with DTNs: GS000200005121.001 (TBV-4254) and GS000200005121.002 (TBV-4253). Both TBVs were removed during the preparation of Rev 00 ICN 01 of AMR in accordance with AP-SIII.2Q based on DOE OPE acceptance of the data.

Assumption 3: Justified with DTNs: GS000200005121.001 (TBV-4254) and GS000200005121.002 (TBV-4253). As mentioned earlier, both TBVs were removed per AP-SIII.2Q. The justification of this assumption also used DTNs: GS970708315121.001 (TBV-3559), GS970708315121.002 (TBV-3560), GS991008315121.001 (TBV-3562), and GS991008315121.002 (TBV-3560). All these four DTNs were qualified and TBV-3559, 3560 and 3562 were removed during the preparation of Rev 00; they are Qualified – Verification Level 2 data, requiring verification for downstream use that estimates the principal factors.

In addition, output data from the AMR were submitted (DTN: GS000308315121.003, Meteorological Stations Selected to Represent Future Climate States at Yucca Mountain, Nevada). The timing and duration of future climate stages from this DTN were subsequently used in *Total System Performance Assessment for the Site Recommendation* (TDR-WIS-PA-000001 REV 00 ICN 01). These and associated precipitation and air temperature data of climate analogue stations were also used in *Simulation of Net Infiltration for Modern and Potential Future Climates* (U0010, ANL-NBS-HS-000032 REV 00 ICN 02). Furthermore, DTN: GS000308315121.003 was also used to develop FEP screening arguments in *Engineered Barrier System Features, Events, and Processes* (E0110, ANL-WIS-PA-000002). None of the above use is considered supporting the principal factors as defined in AP-3.15Q, Rev 03 ICN 04, Attachment I.

DIRS SHEETS

The DIRS sheets (MOL. 20020214.0331) show that all the above 7 DTNs were correctly labelled as either "N/A – Accepted Data (AMOPE approved)" or "N/A - Qualified – Verification Level 2".

SUMMARY

In conclusion, the treatments of assumptions and DIRS sheets in this AMR are both free of the conditions as identified in BSC(O)-03-D-014. Although the Assumptions section of the AMR referred to Section 6 which are associated with a number of DTNs, all the data were properly qualified for the intended use in the AMR, and their qualification status was properly identified in the DIRS sheets. In addition, current use of the output DTN from this AMR in other (downstream) products does not estimate any principal factors.

LIST OF DTNS

GS000200005121.001. Earth Orbital Parameter Data for the Last 10 Million Years. Submittal date: 03/06/2000.

GS000200005121.002. Earth Orbital Parameter Data for the Present to 100,000 Years in the Future. Submittal date: 03/06/2000.

GS000200005121.003. Radiometric Dating and 18O Data from Devils Hole, Nevada. Submittal date: 03/06/2000.

GS970708315121.001. Diatom Data from Owens Lake 1984-1992 Cores. Submittal date: 07/30/1997.

GS970708315121.002. Ostracode Data from Owens Lake 1984-1992 Cores. Submittal date: 07/31/1997.

GS991008315121.001. Supplementary Data to Ostracode Data from Owens Lake 1984 - 1992 Cores. Submittal date: 10/27/1999.

GS991008315121.002. Supplementary Data to Diatom Data from Owens Lake 1984-1992 Cores. Submittal date: 10/27/1999.

Robert Andrews
02/07/2003 11:20 AM

To: William Watson/YM/RWDOE@CRWMS, Paul Dixon/YM/RWDOE@CRWMS, Ernest Hardin/YM/RWDOE@CRWMS, Jerry King/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 Eddebbarh/YM/RWDOE@CRWMS, Stephanie Kuzio/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, Randolph Schreiner/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: Jean Younker/YM/RWDOE@CRWMS
Subject: Guidance on documentation of assumptions in Section 5 of AMRs

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

Performanc Assessment Project and CSO Guidance on the Documentation of Assumptions in Section 5 vs. Model Descriptions and Validation in Sections 6 and 7 of Model Documents

Introduction

Recent PA Management Reviews of draft Performance Assessment Analyses and Model Reports have revealed that the information contained in Section 5 "Assumptions" of the AMRs is not being treated in a uniform and consistent manner within the PA Project. AP-SIII.10Q – Models Attachment 3 states the following:

> Assumptions–This section shall provide a list of the assumptions used to perform the model activity. Discuss assumptions in immediately preceding upstream documentation or input documentation that may significantly impact the results of the present model. Document the assumptions made to develop the model and the rationale for the assumptions. If an assumption is determined not to require further confirmation, provide justification. Identify the subsections where assumptions are used. For frequently used assumptions, the comment "used throughout" may be substituted instead of individual references. Assumptions that require confirmation by testing, analysis, or design must also be designated in accordance with AP-3.15Q.

Several draft AMRs reviewed by PA Management contain information in Section 5 that

appear to be conceptual model descriptions and bases rather than assumptions.

Guidance

Assumptions appropriate for Section 5 of Model Reports or Scientific Analyses should be cases where there is an absence of data or information for the parameter or concept, and should generally address broad cross-cutting topics. When a variety of information from internal and external sources is combined to form the conceptual basis for the mathematical model, this should be presented in Section 6 in the Model Discussion. Confusion has occurred because in the scientific community, we often refer to the model framework and bases as "assumptions". The formulations/algorithms/methods should not be labeled assumptions and need not be discussed in Section 5.

Note that the outline on pg 26/29 in AP-SIII.10Q for Section 6 anticipates that "assumptions" of the type generally made when developing/exercising mathematical models should be presented as part of the model documentation. These "assumptions" are not expected to be the type of "global" assumption that are intended to be captured in Section 5.

Another way to think about this issue is to ask yourself the question: "Is this information part of the basis for my model that will be considered and evaluated as part of the model validation?" If it is, then the information is probably not an assumption that you would document in Section 5, but rather part of your model description and validation in Sections 6 & 7.

A revision is in process for AP-SIII.10Q that will clarify the outline for the Model Report regarding documentation of assumptions. Additional guidance will also be provided in the next revision of the Scientific Processes Guidelines Manual.

If you have any questions regarding this guidance please contact me.

Submittal
Page 8 of 9

Robert Andrews
02/14/2003 11:55 AM

To: William Watson/YM/RWDOE@CRWMS, Paul Dixon/YM/RWDOE@CRWMS, Ernest Hardin/YM/RWDOE@CRWMS, Jerry King/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 Eddebbarh/YM/RWDOE@CRWMS, Stephanie Kuzio/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, Randolph Schreiner/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: James Voigt/YD/RWDOE@CRWMS, Christian Palay/YD/RWDOE@CRWMS, Sounia Darnell/YM/RWDOE@CRWMS, David Mohr/YM/RWDOE@CRWMS
Subject: GUIDANCE - Appropriate referencing of DOE Spent Nuclear Fuel Information in AMRs
User Filed as: Excl/AdminMgmt-14-4/QA N/A

Issue

Two recent Deficiency Reports BSC(O)-03-D-059 and BSC(O)-03-D-070 found references in DIRS with incorrect input status. Specifically, in some cases DOE Spent Nuclear Fuel Information was directly used as an input to an AMR, yet referenced in Chapter 5 or Chapter 6. In other cases the quality status of this information was improperly noted in the DIRS. In order to bring the process under immediate control, management is providing the following guidance concerning appropriate Input Status in the DIRS for such documents:

Guidance

If DOE Spent Nuclear Fuel documents (DOE/SNF/REP) are used as a source for direct input, you must chose the category "TBV" in the DIRS, pending resolution of the status of the SNF documents. Once this resolution is reached, the appropriate status can change and you will be informed. Note that the use of "N/A – Corroborative Information" or "N/A – Reference Only" is not applicable if these references are used as a source of direct inputs.

If the DOE/SNF/REP information is used to substantiate an assumption or used to support and add confidence to a model, but not a source of direct input, then either

of the above N/A categories would be appropriate depending on its use.

Reminder

You are reminded that preparation of DIRS is governed by OCRWM Procedure AP-3.15Q. Use the current version of the procedure when determining the correct input status for DIRS references. The following are reminders of the current definitions in Attachment 4 of AP-3.15Q.

N/A - Accepted Data(Fact) -

Accepted data considered established fact (e.g., engineering handbooks, density tables, gravitational laws, or other physical constants, etc.). The cited data will be used without TBV.

N/A - Corroborative Information -

Input used to corroborate data, validate models, or serve as the basis for assumptions (for example, a conservative, bounding, or industry accepted assumption) and other technical information including equations or formulas. Corroborative information is not used as a direct input into the results or conclusion and does not require further co

N/A - Qualified Data

The result of expert elicitation in accordance with approved governing procedures (e.g , AP-AC.1Q, Expert Elicitation).
OR
Data previously qualified in accordance with governing procedures (e.g., AP-SIII.2Q).
OR
Data acquired or developed in accordance with Q-procedures in effect prior to 06/30/1999, and have been confirmed to be qualified by completing Attachment 5, Data/Document Confirmation Checklist.
OR
Data acquired in accordance with Q-procedures in effect on or after 06/30/1999 and the acquired data are labeled as "qualified" in the TDMS.

N/A - Reference Only

The input does not fit into any of the above categories and has no impact to the results or the conclusions of the document.

If you need clarification on the selection of an input status, call David Mohr at 5-4873 or Cheryl Hastings at 5-5531.

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.

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

☑ DR/CAR/QO
☐ SWO

NO. BSC(O)-03-D-014
PAGE OF
QA: QA

CONDITION ADVERSE TO QUALITY CONTINUATION PAGE

14. Corrective Actions Verified/Closure (Continued from Page 1):
Corrective action commitments contained in the response of November 7, 2002, and subsequent amendments were:

1. Commitment: 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 the 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 in 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.

   Verification: A Management Directive from the Manager of the BSC Science and Analysis Project was issued on December 9, 2002 (see email attached to the Amended Response of December 12, 2002).

2. Commitment: Review all 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 and Approach document, TDR-WIS-PA-000006, Revision 00, 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 corrections 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.

   Verification: For the key documents presented in the above reference, the "Future Climate Analysis," ANL-NBS-GS-000008, is the only document that is not being revised for the TSPA-LA (see Amended Initial Response dated February 20, 2003).

3. Commitment: Review "Future Climate Analysis," ANL-NBS-GS-000008, not scheduled for revision prior to TSPA-LA

   Verification: A review by the Chief Science Office's of "Future Climate Analysis," ANL-NBS-GS-000008, Revision 00, ICN 01 was performed (see review comments attached to Amended Initial Response dated February 20, 2003)

4. Commitment: In response to the re issuance of BSC(O)-03-D-014, perform an extent of condition for assumptions within calculations that used the same Environmental Management (EM) data as assumptions rather than as direct input .

   Verification: Determination of the extent of condition identified three calculations used in Performance Assessment that cited this same EM National Spent Nuclear Fuel Program (NSNFP) data. The calculations are: (1) CAL-WIS-PA-000002, Revision 00, (2) CAL-WIS-PA-000003, Revision 00, and (3) CAL-WIS-PA-000009, Revision 00. These calculations will be revised to support TSPA-LA.

5. Commitment: The Performance Assessment Project Manager provided additional guidance on documentation of assumptions.

   Verification: Management Directives from the Manager of the BSC Science and Analysis Project were issued on February 7 and February 14, 2003 (see pages 6 through 9 of the Amended Initial Response dated February 20, 2003).

6. Commitment: Management reviews of in-process products to support TSPA-LA are being performed to evaluate the effectiveness of the guidance and communication associated with this deficiency.

   Verification: Three Performance Assessment Project Manager's reviews have been performed in December 2002, January 2003, and March 2003. Verified BSC letters from Nancy Williams to Joseph Ziegler, December 18, 2002 (MOL.20030213.0146) ; February 11, 2003, entitled Second Performance Assessment Management Review Report for Performance Based Incentive 1-2.9 (Correspondence Log # 0207035977); and March 31, 2003 entitled Third Performance Assessment Management Review Report for Performance Based Incentive 1-2.9 (Correspondence Log # 0328036675).

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT U.S. DEPARTMENT OF ENERGY WASHINGTON, D.C.

☑ DR/CAR/QO
☐ SWO

NO BSC(O)-03-D-014
PAGE OF
QA: QA

CONDITION ADVERSE TO QUALITY CONTINUATION PAGE

14. Corrective Actions Verified/Closure (Continued from Page 1):

The corrective actions for BSC(O)-03-D-014 are complete. Technical Error Reports (TER) have been generated to track the deficiencies in the following Analysis and Model Reports (AMR) and Calculations until the necessary corrections have been implemented. The deficient documents and associated TERs are:

1. ANL-EBS-MD-000045, Revision 00, ICN 03, "In-Drift Precipitates/Salts Analysis," TER-03-027,

2. ANL-EBS-MD-000038, Revision 00, ICN 01, "In-Drift Microbial Communities," TER-03-026,

3. CAL-WIS-PA-000002, Revision 00, "Performance Assessment of U.S. Department of Energy Spent Fuels in Support of Site Recommendation," TER-03-028,

4. CAL-WIS-PA-000003, Revision 00, "Performance Assessment of Disposal of Selected U.S. Department of Energy Spent Fuel in High Integrity Cans," TER-03-029, and

5. CAL-WIS-PA-000009, Revision 00, "Performance Assessment of a Potential Post-Closure Pyrophoric Event Involving Uranium Metal Spent Fuel," TER-03-030.

F. Harvey Dove
Floyd H. Dove

04/22/03
Date