	<b>Scientific Analysis/Calculation Error Resolution Document</b> <i>Complete only applicable items.</i>	QA: QA Page 1 of 44
---	--	------------------------

1. Document Number: ANL-NBS-HS-000039	2. Revision/Addendum: REV 02	3. ERD: 02
--	---------------------------------	---------------

4. Title: Saturated Zone In-Situ Testing	5. No. of Pages Attached: 43
---	---------------------------------

6. Description of and Justification for Change (Identify affected pages, applicable CRs and TBVs):

**I BACKGROUND INFORMATION SUMMARY**

This Error Resolution Document (ERD) addresses Condition Report (CR) 12626, which is associated with analysis report *Saturated Zone In-Situ Testing* (ANL-NBS-HS-000039 REV 02, SNL 2007 [DIRS 177394]).

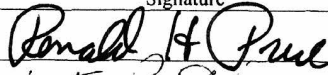
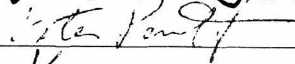
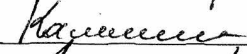

**CR 12626: Editorial Corrections to DTN Numbers ANL-NBS-HS-000039 R2-Saturated Zone In-Situ Testing.**

The CR description contains three items. Items (1) and (3) identify incorrect DTN numbers in Appendix K and Appendix L of the ANL-NBS-HS-000039 REV 02. Item (2) identifies an issue related to the TDIF for DTN: LA0705PR150304.007 [DIRS 181202].

Extent of condition for CR 12626 is provided in the Excel file *CR 12626 Extent of Condition.xls* attached to the CR. A number of conditions are identified in this document. The most prevalent issue is lack of traceability between the DTN data and tables and figures that reference these DTN data.

This ERD addresses the issues identified in both the condition description and the extent of condition document. The Excel file *CR 12626 Extent of Condition.xls* was updated to include the description of how each issue was resolved or to provide a reason why no action was needed.

*(see attached)*

	Printed Name	Signature	Date
7. Checker	Ron Price		4/6/2010
8. QCS/QA Reviewer	Peter Persoff		04/06/2010
9. Originator	Elena Kalinina		04/06/2010
10. Responsible Manager	Stephanie Kuzio		4/6/2010

*(Continued from Block 6)*

## II INPUTS AND/OR SOFTWARE

DTN: MO0306NYE05260.166 [DIRS 165877] was identified as an additional input for ANL-NBS-HS-000039 REV 02 and the DIRS has been changed to reflect this.

No software was used in the development of this ERD.

## III ANALYSIS AND RESULTS

### III.1 CONDITION REPORT ISSUES

This section addresses the issues identified under items (1) and (3) in the condition report. Item (2) is related to the TDIF for DTN: LA0705PR150304.007 [DIRS 181202] and is not addressed in this ERD. Note that the changes made to address these issues are either editorial or clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

#### III.1.1 Item (1) in Condition Report

Item (1) identifies two following issues:

- DTN: MO0306NYE05260.165 [DIRS 165876] listed on the Data Qualification Plan in Appendix K is incorrect. The correct DTN number is: MO0306NYE05260.166 [DIRS 165877].
- Appendix K does not create a transparent connection between the well numbers and their corresponding DTNs.

The changes made to ANL-NBS-HS-000039 REV 02 and DIRS to address these issues are described below.

Make the following changes to create a transparent connection between the well numbers and their corresponding DTNs:

- Add the following paragraph after the first paragraph (p. K-1): “The data qualified in this appendix are included in DTN: LA0705PR150304.007 [DIRS 181202]. This DTN uses the well completion diagrams from DTNs: MO0306NYE05260.166 [DIRS 165877] (well NC-EWDP-19IM2); MO0306NYE05264.170 [DIRS 179376] (well NC-EWDP-22S); MO0306NYE05265.171 [DIRS 179377] (well NC-EWDP-22PA); MO0306NYE05266.172 [DIRS 179378] (well NC-EWDP-22PB); and MO0505NYE06464.314 [DIRS 179599] (well NC-EWDP-22PC).”
- Change the note to Figure K-1 from “Source: DTN: LA0705PR150304.007 [DIRS 181202]” to “Source: DTNs: LA0705PR150304.007 [DIRS 181202] and MO0306NYE05260.166 [DIRS 165877].”
- Change the note to Figure K-2 from “Source: DTN: LA0705PR150304.007 [DIRS 181202]” to “Source: DTNs: LA0705PR150304.007 [DIRS 181202] and MO0306NYE05264.170 [DIRS 179376].”

- Change the note to Figure K-3 from “Source: DTN: LA0705PR150304.007 [DIRS 181202]” to “Source: DTNs: LA0705PR150304.007 [DIRS 181202] and MO0306NYE05265.171 [DIRS 179377].”
- Change the note to Figure K-4 from “Source: DTN: LA0705PR150304.007 [DIRS 181202]” to “Source: DTNs: LA0705PR150304.007 [DIRS 181202] and MO0306NYE05266.172 [DIRS 179378].”
- Change the note to The Figure K-5 from “Source: DTN: LA0705PR150304.007 [DIRS 181202]” to “Source: DTNs: LA0705PR150304.007 [DIRS 181202] and MO0505NYE06464.314 [DIRS 179599].”

Make the following changes to correct the DTN number:

- Change the second line in Section II of the data qualification plan (p. K-10) from “NC-EWDP-19IM2 well completion data contained in DTN: MO0306NYE05260.165” to “NC-EWDP-19IM2 well completion data contained in DTN: MO0306NYE05260.166.”
- Change the note for Figure 6.1-9 (p. 6-16) to “Sources: DTNs: MO0112DQRWLNYE.018 [DIRS 157187] (19D completion); MO0112DQRWLNYE.014 [DIRS 157184] (19P completion; for illustration only); GS011008314211.001 [DIRS 158690] (19D lithologic log); MO0306NYE05260.166 [DIRS 165877] (19IM1 well completion; for illustration only); LA0705PR150304.007 – qualified for use in this report in Appendix K [DIRS 181202] (19IM2 well completion).”
- Remove the third reference (MO0306NYE05259.165 [DIRS 165876]) (p. 8-25).
- Add the following reference as a third reference (p. 8-25) (following MO0212SPANYESJ.149 [DIRS 161274] and preceding MO0306NYE05264.170 [DIRS 179376]):

165877 MO0306NYE05260.166. Revised NC-EWDP-19IM2 Well Completion Diagram. Submittal date: 07/02/2003.

Make the following changes to the DIRS report for *Corrections to DIRS Report for Saturated Zone In-Situ Testing* (SNL 2008 [DIRS 185550]) to correct the DTN number:

- Add the following reference to the DIRS report:

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
MO0306NYE05260.166. Revised NC-EWDP-19IM2 Well Completion Diagram. Submittal date: 07/02/2003. 185877 verified	Entire	Figure 6.1-9, Appendix K and Figure K-1	Well completion diagram	Indirect Input	NA	NA	NA

The references in the DIRS report should be revised as follows:

- MO0306NYE05264.170 [DIRS 179376]: Add “Appendix K and Figure K-2” in column 4, add “Well completion diagram” in column 5.

- MO0306NYE05265.171 [DIRS 179377]: Add “Appendix K and Figure K-3” in column 4, add “Well completion diagram” in column 5.
- MO0306NYE05266.172 [DIRS 179378]: Add “Appendix K and Figure K-4” in column 4, add “Well completion diagram” in column 5.
- MO0505NYE06464.314 [DIRS 179599]: Add “Appendix K and Figure K-5” in column 4, add “Well completion diagram” in column 5.

### **III.1.2 Item (3) in Condition Report**

Item 3 identifies the following issue:

- The DTN: GS031008312313.016 listed on the Data Qualification Plan in Appendix L is incorrect. The correct DTN number is: DTN: GS931008312313.016 [DIRS 148173].

The following change should be made to correct the DTN number:

- Change the second sentence in Section II of the data qualification plan (p. L-3) from “This report is associated with DTN: GS031008312313.016” to “This report is associated with DTN: GS931008312313.016.”

## **III.2 EXTENT OF CONDITION ISSUES**

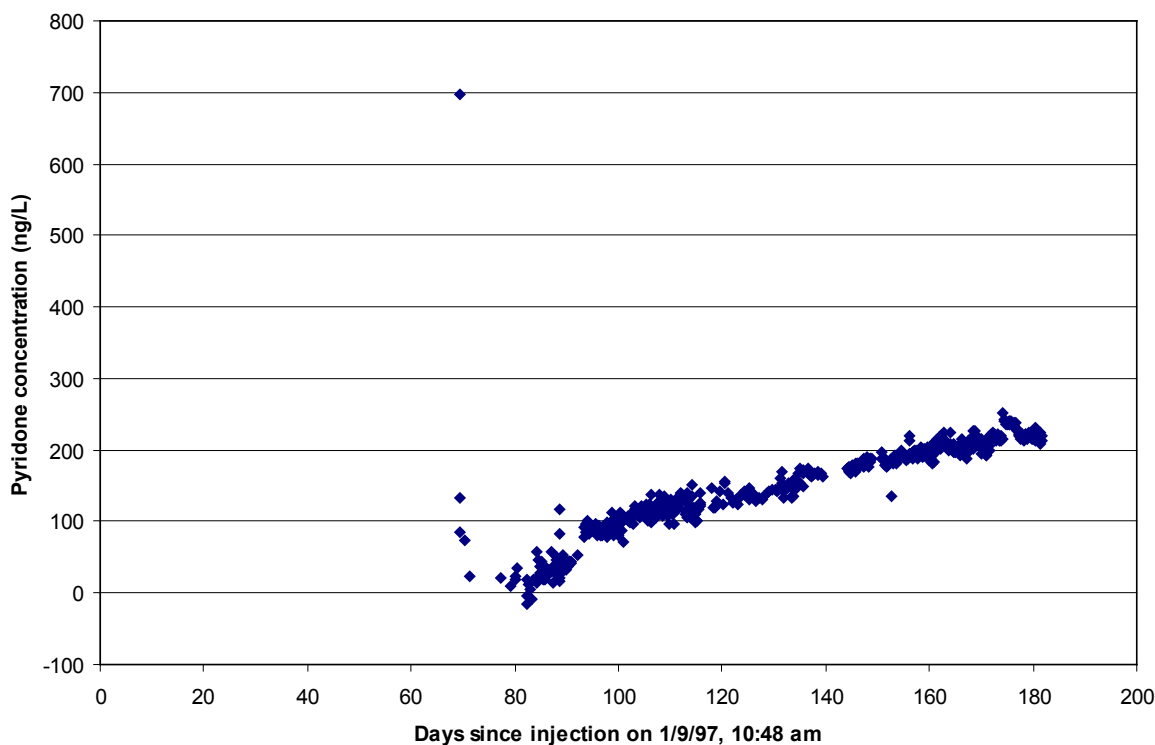
This section addresses the issues identified in extent of condition for CR 12626 provided in the Excel file *CR 12626 Extent of Condition.xls*. Only those issues that require changes to the report are discussed in this section. The issues that did not required any changes to the report are discussed in the Excel file *CR 12626 Extent of Condition.xls*, which is attached to the condition report. The justification is provided in each such case to explain why no change is necessary.

### **III.2.1 DTN: GS010508312315.001 [DIRS 155860]**

Issue identified is related to the data shown in Figure D-9 of ANL-NBS-HS-000039 REV 02 and the corresponding data in the DTN. Five pyridone data points included in this DTN (period of time from 03/19/1997 to 03/20/1997) are not included in the plot (Figure D-9). Five pyridone data points that are included in Figure D-9 should not have been included because according to the footnote [1] in this DTN these data should not have been used. The high concentrations that appeared at the beginning of the test and prior to the breakthrough of pyridone are not explained.

The data shown in Figure D-9 were not used for the parameter estimation. These data are shown to qualitatively demonstrate the pyridone transport. There are 547 data points in this plot. This is sufficient for demonstrating general tendencies of the process. Including five points that should have not been included and excluding five points that should not have been excluded does not change the qualitative conclusions made based on this plot. However, Figure D-9 should be updated and some additional explanation should be provided in Section D1.1.3 as it described below.

- Replace Figure D-9 (p. D-15) with the figure provided below:



Source: DTN: GS010508312315.001 [DIRS 155860].

NOTE 1: Pyridone concentrations continued to increase for another 124 days beyond the last data point shown on this plot (until November 12, 1997), but the data beyond July 10, 1997 do not appear in the above DTN and are unqualified.

NOTE 2: Five data points are excluded from this plot as recommended in footnote [1] in DTN: GS010508312315.001 [DIRS 155860].

Figure D-9. Breakthrough Curve for Pyridone Injection in UE-25 c#1

The updated Figure D-9 includes five data points for the period from 03/19/1997 to 03/20/1997. Five data points were removed based on the recommendation made in footnote [1] in DTN: GS010508312315.001 [DIRS 155860].

- Insert the following sentence after the first sentence in the first paragraph after Figure D-8 (p. D-14): “This conclusion is consistent with the general trend based on the data in Figure D-9 (a few data points around 70 days after injection with concentrations exceeding the peak pyridone concentration are outliers).”

As discussed, the changes made do not affect the results and the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.2 DTN: GS01079992315.001 [DIRS 157067]

Issue identified is related to the lack of traceability between the information in Table D-5 and the location of this information in DTN: GS01079992315.001 [DIRS 157067].

Make the following change to create a transparent connection between the data in Table D-5 and location of these data in DTN: GS01079992315.001 [DIRS 157067]:

- Change Table D-5 footnote (p. D-38) to “Sources: DTNs: GS970308312314.001 [DIRS 159240], GS970708312314.005 [159241] (Bullfrog production rates); MO0110BFROGREC.001 [DIRS 157066] (Bullfrog recirculation rates); GS010799992315.001 [DIRS 157067] (Prow Pass production and recirculation rates), SN-USGS-SCI-036-V1 [DIRS 162858], Supplemental Binder Number 15, Section M34 (flow interruptions).”

Make the following changes to the flow interruption information in Table D-5 to match the daily shift duties measurements and readings in the scientific notebook (SN-USGS-SCI-036-V1 [DIRS 162858], Supplemental Binder Number 15, Section M34):

- Change the second flow interruption data in Table D-5 to:
  - Flow Shut Off: 11/23/98, ~10:00 am
  - Flow Turned On: 11/30/98, ~7:00 pm
  - Duration (hr): 177
- Change the third flow interruption data in Table D-5 to:
  - Flow Shut Off: 12/21/98, ~11:00 am
  - Flow Turned On: 01/05/99, ~6:00 pm
  - Duration (hr): 367

Make the following change to Figure D-22:

- Change the label on Figure D-22 to “Planned 15-day flow interruption (12/21/98 to 1/5/99).”

Note that estimates of transport parameters for use in solute transport models were derived from the best-fitting parameters in Tables D-6 and D-7. The transport parameters in these tables were estimated using computer code RELAP V 2.0. RELAP was used for the periods of time when the flow was constant (before the flow interruptions). The flow interruptions were only used in MULTRAN V 1.0 simulations in which the simulation time was extended until the end of the test and the flow interruptions were included. However, the MULTRAN V 1.0 simulations were not used to estimate the transport parameters. They were only used to fit the observed concentrations using the transport parameters obtained with RELAP. Consequently, slight differences between the original and updated information on the flow interruptions have no impacts on the results and conclusions made in ANL-NBS-HS-000039 REV 02. The other changes are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.3 DTN: GS020708312316.001 [DIRS 162678]**

Issues identified are related to the lack of traceability related to DTN: GS020708312316.001 [DIRS 162678]. The citations of this DTN do not provide necessary information on location of the specific data being referenced.

Make the following changes to create a transparent connection between the data citations in ANL-NBS-HS-000039 REV 02 and data locations in the DTN: GS020708312316.001 [DIRS 162678]:

- Change the note for Table 6.5-1 (p. 6-59) to “Sources: DTNs: GS020708312316.001 [DIRS 162678] (injection and discharge rates in files: *313318 0-Day Drift.xls* for the 1/5/01 to 1/12/01 test, *313318 2-Day Drift Injection Portion.xls* and *313318 2-Day Drift Pump Back Portion.xls* for 12/1/00 to 12/18/00 test, and *313318 30-Day Drift Injection Portion.xls* and *313318 30-Day Drift Pump Back Portion.xls* for 1/27/01 to 4/25/01 test); UN0109SPA008IF.006 [DIRS 162442] (0.5-hr tracer concentration data); UN0102SPA008KS.003 [DIRS 162614] (2-day tracer concentration data); UN0109SPA008KS.007 [DIRS 162615] (30-day PFBA concentration data); UN0109SPA008KS.008 [DIRS 162616] (30-day bromide concentration data); Stetzenbach 2001 [DIRS 180730] (two-day tracer injection masses); Farnham 2001 [DIRS 180732] (0.5-hr tracer injection masses), 2001 [DIRS 180733] (30-day tracer injection masses).
- Change the notes for Figures F-2 to F-10 to “Source: DTN: GS020708312316.001 [DIRS 162678], file *313318 Open Alluvium Test.xls* (data).”
- Change the first paragraph (p. F-29) to “Based on the two analyses above that compare the drawdown in the screens #5, #6, and #7 interval when it was directly pumped during the December 18, 2001, test with the drawdown in the screens #5, #6, and #7 interval in response to pumping screen #4 in both the August 24, 2000, and January 8, 2002, tests, it is concluded that up to 23% (upper envelope of 8.65% and 22.6%) of the flow rate may have been a contribution from the screens #5, #6, and #7 interval when pumping screen #4 in 19D (DTNs: GS020708312316.001 [DIRS 162678], file *313318 Screen 4 Pump Test.xls*; GS020908312316.002 [DIRS 162679]; and Output DTN: GS031008312316.002).”
- Change the note for Table G-5 (p. G-28) to “Sources: DTNs: GS020708312316.001 [DIRS 162678] (injection and discharge rates in files: *313318 0-Day Drift.xls* for the 1/5/01 to 1/12/01 test, *313318 2-Day Drift Injection Portion.xls* and *313318 2-Day Drift Pump Back Portion.xls* for 12/1/00 to 12/18/00 test, and *313318 30-Day Drift Injection Portion.xls* and *313318 30-Day Drift Pump Back Portion.xls* for 1/27/01 to 4/25/01 test); UN0109SPA008IF.006 [DIRS 162442] (0.5-hr tracer concentration data); UN0102SPA008KS.003 [DIRS 162614] (2-day tracer concentration data); UN0109SPA008KS.007 [DIRS 162615] (30-day PFBA concentration data); UN0109SPA008KS.008 [DIRS 162616] (30-day bromide concentration data); Stetzenbach 2001 [DIRS 180730] (2-day tracer injection masses); Farnham 2001 [DIRS 180732] (0.5-hr tracer injection masses); Farnham 2001 [DIRS 180733] (30-day tracer injection masses).”
- Change the note for Figure G-27 (p. G-46) to “Sources: DTNs: GS020708312316.001 [DIRS 162678], *313318 30-Day Drift Injection Portion.xls* (data).” Note that DTN: GS020908312316.002 [DIRS 162679] was removed from the sources because the data in this DTN are for the different test conducted at the end of 2001 and the beginning of 2002.
- Change the note for Figure G-28 (p. G-47) to “Sources: DTNs: GS020708312316.001 [DIRS 162678], *313318 30-Day Drift Injection Portion.xls* (data); UN0109SPA008IF.006 [DIRS 162442] (conc.); UN0109SPA008KS.007 [DIRS 162615] (conc.); UN0109SPA008KS.008 [DIRS 162616] (conc).” Note that DTN: GS020908312316.002 [DIRS 162679] was removed from the sources because the data in this DTN are for the different test conducted at the end of 2001 and the beginning of 2002.

The following reference in the DIRS report should be revised as shown below:

- GS020908312316.002 [DIRS 162679]: Remove Figures G-27 and G-28 from column 4 of the DIRS report.

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.4 DTN: GS020908312316.002 [DIRS 162679]**

Issues identified are related to the lack of traceability related to DTN: GS020908312316.002 [DIRS 162679]. The citations of this DTN in ANL-NBS-HS-000039 REV 02 do not provide necessary information on location of the specific data being referenced.

Make the following changes to create a transparent connection between the data citations in ANL-NBS-HS-000039 REV 02 and data locations in DTN: GS020908312316.002 [DIRS 162679]:

- Change the note for Figure 6.4-1 (p. 6-50) to “Source: DTN: GS020908312316.002 [DIRS 162679], file: *012902OA.xls* (data).
- Change the note for Figure F-15 (p. F-20) to “Source: DTN: GS020908312316.002 [DIRS 162679], file: *121801TF.xls* (data).
- Change the notes for Figures F-16, F-17, and F-18 to “Source: DTN: GS020908312316.002 [DIRS 162679], file: *010402OA.xls* (data).
- Change the note for Figure F-20 (p. F-25) to “Sources: DTNs: GS020708312316.001 [DIRS 162678] and GS020908312316.002 [DIRS 162679], file: *121801TF.xls* (data).
- Change the notes for Figures F-21, F-22, and F-23 to “Source: DTN: GS020908312316.002 [DIRS 162679], file: *010802OA.xls* (data).

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.5 DTN: GS020908312316.003 [DIRS 162680]**

Issues identified are related to the lack of traceability related to DTN: GS020908312316.003 [DIRS 162680]. The citations of this DTN in ANL-NBS-HS-000039 REV 02 do not provide necessary information on location of the specific data being referenced.

Make the following changes to create a transparent connection between the data citations in ANL-NBS-HS-000039 REV 02 and the data locations in the GS020908312316.003 [DIRS 162680]:

- Revise the first paragraph after Equation F-22 (p. F-23) as follows: “The barometric efficiency, *BE*, was obtained by analyzing background water-level monitoring conducted between May 1 and July 3, 2002 (DTN: GS020908312316.003 [DIRS 162680], file: *313550NATIVE.xls*, workbook *050102\_Barometric\_Monitoring*).”
- Revise the second sentence in the second paragraph after Equation F-22 (p. F-23) as follows: “The hydraulic pressure and atmospheric pressure (also represented as equivalent feet of water) records for the period of monitoring (DTN: GS020908312316.003 [DIRS 162680], file: *313550NATIVE.xls*,



workbook: *050102\_Barometric\_Monitoring*) are then filtered (Output DTN: GS031008312316.002; Software: Filter.vi V 1.0, STN: 10970-1.0-00 [DIRS 162668]) to remove all oscillations with frequencies higher than 0.8 cycles/day.”

- Change the note for Figure F-24 (p. F-33) to “Source: DTN: GS020908312316.003 [DIRS 162680], file: *313550NATIVE.xls*, workbook: *050102\_Barometric\_Monitoring* (data).”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.6 DTN: GS030108314211.001 [DIRS 163483]**

Issues identified are related to the lack of traceability related to DTN: GS030108314211.001 [DIRS 163483]. The citations of this DTN in note for Figure 6.1-10 (p. F-38) does not provide necessary information on location of the specific data being referenced.

Make the following changes to create a transparent connection between the data citations in Figure 6.1-10 note and the data locations in the DTN: GS030108314211.001 [DIRS 163483]:

- Change the note for Figure 6.1-10 (p. 6-17) to “Sources: DTNs: S030108314211.001, file: *NC\_EWDP\_22SA\_Lithlog.doc* (Stratigraphy shown in this figure) [DIRS 163483], LA0705PR150304.007, files: *22PA\_from\_RID5265.pdf*, *22PB\_from\_RID5266.pdf*, *22PC\_from\_RID6464.pdf*, *22S\_from\_RID5264.pdf* (Well Completions shown in this figure) [DIRS 181202].”
- Change the seventh sentence in the second full paragraph (p. F-38) to “The lithostratigraphy data for the well 22SA are from DTN: GS030108314211.001 [DIRS 163483], file: *NC\_EWDP\_22SA\_Lithlog.doc*.”
- Change the second to the last sentence in the second full paragraph (p. F-38) to “Based on the lithologic data in the adjacent Nye County wells 24P, 29P, and 10SA (DTNs: GS040908314211.001 [DIRS 174114] and GS030108314211.001 [DIRS 163483], file: *NC\_EWDP\_22SA\_Lithlog.doc*), the alluvium deposits extend several kilometers from the 22 Site.”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.7 DTN: GS031108312314.005 [DIRS 179648]**

Issues identified are related to the lack of traceability between the DTN data and the data in Tables C-2, C-3, C-4, R-1, and R-2 and Figures C-8, C-9, and C-10 in ANL-NBS-HS-000039 REV 02.

Make the following changes to create a transparent connection between the data in the DTN and in Tables C-2, C-3, C-4, R-1, and R-2 and Figures C-8, C-9, and C-10:

- Update Table C-2 (p. C-5) with the table provided below containing the revised transducer depth. Footnotes a, b, c, and d to Table C-2 are not included because they retained with no change.

Borehole	Interval	Transducer		
		Number	Depth (m)	Altitude (m)
UE-25 c#1	Prow Pass	2	552.08	578.51
	Upper Bullfrog	3	610.03	520.57
	Lower Bullfrog <sup>a</sup>	4	703.02	427.56
UE-25 c#2	Calico Hills	1	519.99	612.36
	Prow Pass	2	536.27	595.91
	Upper Bullfrog	3	610.70	521.49
	Lower Bullfrog <sup>a</sup>	4	701.59	430.61
UE-25 c#3	Calico Hills <sup>b</sup>	1	533.80	598.62
	Upper Bullfrog	3	614.48	517.93
	Lower Bullfrog <sup>c</sup>	4	708.93	423.49
	Upper Tram <sup>d</sup>	5	817.68	314.75

Table C-2. Operative Transducers in the C-Wells, 1995 to 1997

The following changes were incorporated in Table C-2:

- The transducer depth in the Prow Pass interval in well UE-25 c#1 was changed from 552.09 to 552.08.
- The transducer depth in the Lower Bullfrog interval in well UE-25 c#1 was changed from 703.04 to 703.02.
- The transducer depth in the Calico Hills interval in well UE-25 c#2 was changed from 519.83 to 519.99.
- The transducer depth in the Prow Pass interval in well UE-25 c#2 was changed from 536.28 to 536.27.
- The transducer depth in the Lower Bullfrog interval in well UE-25 c#2 was changed from 701.58 to 701.59.
- The transducer depth in the Calico Hills interval in well UE-25 c#3 was changed from 533.81 to 533.80.
- The transducer depth in the Upper Bullfrog interval in well UE-25 c#3 was changed from 614.49 to 614.48.
- Change the note for Table C-2 (p. C-5) to “Sources: DTNs: GS031108312314.005 [DIRS 179648], (hydraulic head and discharge data for February 1996 test in C-wells), GS981008312314.003 [DIRS 144464] (1996 hydraulic heads in C- wells), GS981008312314.002 [DIRS 147068] (1997 hydraulic heads in C-wells), GS010608312314.001 [DIRS 179647] (1997 atmospheric pressure in C-wells).”
- Change the note for Table C-3 note (p. C-12) to “Sources: DTNs: LA0705PR150304.002 [DIRS 181198] ((June 1995 test in C-wells), GS031108312314.005 [DIRS 179648] (hydraulic head and discharge data for February 1996 test in C-wells), GS981008312314.003 [DIRS 144464] (May 1996 to November 1997 test), GS960708312312.009 [DIRS 180534] (water table altitude in UE and USW wells, January 1995).”
- Add the following text to the Table C-3 note (p. C-12):

“The barometric efficiency is the slope of water-level changes as a function of atmospheric-pressure changes. The water level and atmospheric pressure data in DTN: GS031108312314.005 [DIRS 179648], file: *020796HT.xls* were used to calculate barometric efficiency in UE-25 c#3 well shown in this table. The water level and atmospheric pressures data in DTN: LA0705PR150304.002 [DIRS 181198], file: *June 1995 C-Wells Pressure Data.xls* were used to calculate barometric efficiency in UE-25 c#1 and c#2 wells shown in this table.”

- Add the following note to Table C-4 (p. C-15):  
“NOTE: The discharge rates are in DTNs: LA0705PR150304.003 [DIRS 181201] (June 1995 test); GS031108312314.005 [DIRS 179648], file: *020796DQ.xls* (February 1996 test); and GS970308312314.001 [DIRS 159240] (May 1996 to November 1997 test). The hydraulic head data are in DTNs: LA0705PR150304.002 [DIRS 181198] (June 1995 test); GS031108312314.005 [DIRS 179648], file: *020796HT.xls* (February 1996 test); GS981008312314.003 [DIRS 144464] (May 1996 to November 1997 test); and LA0705PR150304.004 [DIRS 181210] (June 1995 test, data for lower Tram interval (c#2, L2, T6) and upper Tram interval (c#2, L2, T5)).”
- Change the note for Figure C-8 (p. C-21) to “Source: DTN: GS031108312314.005 [DIRS 179648], file: *020796DQ.xls* (discharge rates) and *020796HT.xls* (hydraulic heads).”
- Change the notes for Figures C-9 and C-10 (p. C-22) to “Source: DTN: GS031108312314.005 [DIRS 179648], *020796HT.xls*.”
- Add the following note to Table R-1 (p. R-3):  
“NOTE: The discharge rates are in DTN: GS031108312314.005 [DIRS 179648], file: *020796DQ.xls* (February 1996 test) and GS970308312314.001 [DIRS 159240] (May 1996 to November 1997 test). The hydraulic head data are in DTNs: GS031108312314.005 [DIRS 179648], file: *020796HT.xls* (February 1996 test) and GS981008312314.003 [DIRS 144464] (May 1996 to November 1997 test).”
- Add the following note to Table R-2 (p. R-5):  
“NOTE: The discharge rates are in DTNs: LA0705PR150304.002 [DIRS 181198] (June 1995 test); GS031108312314.005 [DIRS 179648], file: *020796DQ.xls* (February 1996 test); and GS970308312314.001 [DIRS 159240] (May 1996 to November 1997 test). The hydraulic head data are in DTNs: LA0705PR150304.002 [DIRS 181198] (June 1995 test); DTN: GS031108312314.005 [DIRS 179648], file: *020796HT.xls* (February 1996 test); and GS981008312314.003 [DIRS 144464] (May 1996 to November 1997 test).”

Note that the differences between the original and updated transducer depths in Table C-2 do not exceed 0.03% and can be considered insignificant. Also, the transducer depths are provided for information purpose only, they are not used in any calculations. The other changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.8 DTN: GS040808312322.006 [DIRS 179434]

Issues identified are related to the lack of traceability between the DTN data and the data in Figure F-48.

Make the following changes to create a transparent connection between the data in the DTN and in Figure F-48:

- Delete the upper figure in Figure F-48 because it is the same as the lower one.
- Change the caption to Figure F-48 to “Figure F-48. Geochemistry Depth Profiles in Boreholes 22S, 22PA, and 22PB.”
- Change the note to Figure F-48 to “Source: DTNs: GS040108312322.001 (2002 data) [DIRS 179422]; GS040808312322.006 (2003 data) [DIRS 179434] (uranium data).”
- Change the Figure F-48 caption in Table of Figures (p. xviii) to “F-48. Geochemistry Depth Profiles in Boreholes 22S, 22PA, and 22PB”

The changes made to address these issues are either editorial or clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.9 DTN: GS931008312313.016 [DIRS 148173]**

The issues identified are related to a few typographical errors.

The following should be done to correct these errors:

- Change the Appendix L entry in Table of Contents (p. vii) to read “APPENDIX L – QUALIFICATION OF C-WELLS FLOW DISTRIBUTION DATA (DTN: GS931008312313.016).”
- Change the first sentence in the last paragraph (p. L-2) to “Given the previous qualification of the flowing interval depth data, the good agreement between the 1984 and 1995 quantitative flow survey information from UE25c#3, and the ultimate use of the flow distribution information to obtain an estimate with a relatively high degree of uncertainty, the flow distribution data in the USGS report (Geldon 1996 [DIRS 100396]) that constitutes DTN: GS931008312313.016 [DIRS 148173] is considered qualified for its intended use in this analysis report.”

The changes made to address these issues are editorial and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.10 DTN: GS960108312313.001 [DIRS 164801]**

Issues identified are related to the lack of traceability between the DTN data and the data in Table C-8 in ANL-NBS-HS-000039 REV 02.

Make the following change to create a transparent connection between the data in the DTN and in Table C-8:

- Change the note for Table C-8 to “Sources: DTNs: GS960108312313.001 [DIRS 164801] (Corroborative only, hydraulic head and pumping rate data for 5/22/95 test), LA0705PR150304.002 [DIRS 181198] (hydraulic heads in C-wells, June 1995 test), LA0705PR150304.003 [DIRS 181201] (discharge rates in C-wells, June 1995 test) (Qualified in Appendix R), GS970308312314.001 [DIRS 159240] (discharge rates in C-wells, May 1996 test), GS970708312314.005 [DIRS 159241] (discharge rates in C-wells, May 1996 test, 1997 data), GS981008312314.002 [DIRS 147068] (hydraulic heads in C-wells, May 1996 test, 1997 data), GS981008312314.003 [DIRS 144464] (hydraulic heads in C-wells, May 1996 test), GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996), GS970708312314.006

[DIRS 144468] (hydraulic heads in H-4, WT#14, and WT#3, December 1996 to March 1997), MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997).”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.11 DTN: GS970308312314.001 [DIRS 159240]**

Issues identified are related to the lack of traceability between the DTN data and the data in Tables 6.2-2, C-4, C-7, C-8, C-9, D-5, R-1, and R-2 in ANL-NBS-HS-000039 REV 02.

The traceability issues related to Tables C-4, R-1, and R-2 were corrected in Section III.2.7.

Make the following changes to correct the remaining transparency/traceability issues:

- Change the note for Table 6.2-2 (p. 6-26) to: “Output DTN: GS031008312314.004, (from Source DTNs: LA0705PR150304.002 [DIRS 181198] (hydraulic heads, June 1995 test), LA0705PR150304.003 [DIRS 181201] (discharge rates, June 1995 test), GS970308312314.001 [DIRS 159240] (discharge rates, May 1996 test), GS970708312314.005 [DIRS 159241] (discharge rates, May 1996 test, 1997 data), GS981008312314.002 [DIRS 147068] (hydraulic heads, May 1996 test, 1997 data), GS981008312314.003 [DIRS 144464] (hydraulic heads, May 1996 test), and GS990408312315.002 [DIRS 140115] (hydraulic head, discharge, and barometric pressure, 1998 data).”
- Change the note for Figure C-11 (p. C-24) to: “Sources: DTNs: GS970308312314.001 [DIRS 159240] (1996 discharge rates), GS970708312314.005 [DIRS 159241] (1997 discharge rates), GS981008312314.002 [DIRS 147068] (1997 hydraulic heads), GS010608312314.001 [DIRS 179647] (1997 atmospheric pressure), GS981008312314.003 [DIRS 144464] (1996 hydraulic heads).”
- Change the notes for Figures C-12 (p. C-26), C-13 (p. C-27), and C-14 (p. C-28) to: “Sources: DTNs: GS970308312314.001 [DIRS 159240] (1996 discharge rates), GS970708312314.005 [DIRS 159241] (1997 discharge rates), GS981008312314.002 [DIRS 147068] (1997 hydraulic heads), GS981008312314.003 [DIRS 144464] (1996 hydraulic heads).”
- Add the following note for Figures C-12 (p. C-26), C-13 (p. C-27), and C-14 (p. C-28): “DTNs with the discharge rates are referenced to provide traceability of the data used in the pumping test interpretation.”
- Change the note for Table C-7 (p. C-47) to: “Sources: DTNs: LA0705PR150304.002 [DIRS 181198] (hydraulic heads, June 1995 test), LA0705PR150304.003 [DIRS 181201] (discharge rates, June 1995 test) (qualified in Appendix R), GS970308312314.001 [DIRS 159240] (discharge rates, May 1996 test), GS970708312314.005 [DIRS 159241] (discharge rates, May 1996 test, 1997 data), GS981008312314.002 [DIRS 147068] (hydraulic heads, May 1996 test, 1997 data), GS981008312314.003 [DIRS 144464] (hydraulic heads, May 1996 test), GS010608312314.001 [DIRS 179647] (1997 atmospheric pressure).”
- Change the notes for Figures C-27 (p. C-48), C-30 (p. C-51), and C-31 (p. C-52) to: “Sources: DTNs: GS970308312314.001 [DIRS 159240] (1996 discharge rates),

GS970708312314.005 [DIRS 159241] (1997 discharge rates), GS981008312314.002 [DIRS 147068] (1997 hydraulic heads), GS981008312314.003 [DIRS 144464] (1996 hydraulic heads).”

- Add the following note for Figures C-27 (p. C-48), C-30 (p. C-51), and C-31 (p. C-52): “DTNs with the discharge rates are referenced to provide traceability of the data used in the pumping test interpretation.”
- Change the note for Table C-8 (p. C-54) to: “Sources: DTNs: GS960108312313.001 [DIRS 164801] (hydraulic heads in C-wells, May 1995 test) (Corroborative only), LA0705PR150304.002 [DIRS 181198] (hydraulic heads in C-wells, June 1995 test), LA0705PR150304.003 [DIRS 181201] (discharge rates in C-wells, June 1995 test) (Qualified in Appendix R), GS970308312314.001 [DIRS 159240] (1996 discharge rates in C-wells), GS970708312314.005 [DIRS 159241] (1997 discharge rates in C-wells), GS981008312314.002 [DIRS 147068] (1997 hydraulic heads in C-wells), GS981008312314.003 [DIRS 144464] (1996 hydraulic heads), GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996), GS970708312314.006 [DIRS 144468] (hydraulic heads in H-4, WT#14, and WT#3, December 1996 to March 1997), MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997).”
- Change the notes for Figures C-37 (p. C-61), C-38 (p. C-62), C-39 (p. C-63), and Table C-9 (p. C-63) to: “Sources: DTNs: GS970308312314.001 [DIRS 159240] (1996 discharge rates in C-wells), GS970708312314.005 [DIRS 159241] (1997 discharge rates in C-wells), GS981008312314.002 [DIRS 147068] (1997 hydraulic heads in C-wells), GS981008312314.003 [DIRS 144464] (1996 hydraulic heads in C-wells), GS010608312314.001 [DIRS 179647] (1997 atmospheric pressure in C-wells), GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996), GS970708312314.006 [DIRS 144468] (hydraulic heads in H-4, WT#14, and WT#3, December 1996 to March 1997), MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997).”
- Add the following note for Figures C-37 (p. C-61), C-38 (p. C-62), and C-39 (p. C-63): “DTNs with the discharge rates are referenced to provide traceability of the data used in the pumping test interpretation.”
- Change the note for Table D-5 (p. D-38) to: “Sources: DTNs: GS970308312314.001 [DIRS 159240] (1996 discharge rates), GS970708312314.005 [159241] (Bullfrog production Rates, 1997); MO0110BFROGREC.001 [DIRS 157066] (Bullfrog recirculation rates, May 1996 to January 1997); GS010799992315.001 [DIRS 157067] (Prow Pass production and recirculation rates, November 1998 to January 1999).”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.12 DTN: GS970308312314.002 [DIRS 161273]**

Issues identified are related to the lack of traceability between the DTN data and the references to this DTN in ANL-NBS-HS-000039 REV 02.

Some traceability issues related to this DTN were corrected in Section III.2.11.

Make the following changes to correct the remaining transparency/traceability issues:

- Change the note for Table 6.2-3 (p. 6-28) to: “Source: DTNs: GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996); MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997) (qualified for use in this report in Appendix M). (Filtered data taken from Output DTNs: GS030208312314.001 and GS030208312314.002).”
- Change the notes for Figures C-17 (p. C-32), C-18 (p. C-34), C-33 (p. C-56), C-34 (p. C-57), C-35 (p. C-58), and C-40 (p. C-65) to: “Source: DTNs: GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996), GS970708312314.006 [DIRS 144468] ] (hydraulic heads in H-4, WT#14, and WT#3, December 1996 to March 1997).”
- Change the note for Figure C-41 (p. C-71) to: “Sources: DTNs: GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996); MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997). Output DTNs: GS030208312314.001, GS030208312314.002 (filtered data).”
- Change the note for Table C-10 (p. C-72) to: “Sources: DTNs: GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996); MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997).”
- Change the notes for Figures C-42 (p. C-75), C-43 (p. C-76), C-44 (p. C-77), and C-12 (p. C-78) to: “Sources: DTNs: GS970308312314.002 [DIRS 161273] (hydraulic heads in H-4, WT#14, and WT#3, May to December 1996); MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997). Output DTNs: GS030208312314.001 and GS030208312314.002 (filtered data).

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.13 DTN: GS970708312314.005 [DIRS 159241]**

Issues identified are related to the lack of traceability between the DTN data and the references to this DTN in ANL-NBS-HS-000039 REV 02.

All the traceability issues related to this DTN were corrected in Section III.2.11.

### **III.2.14 DTN: GS970708312314.006 [DIRS 144468]**

Issues identified are related to the lack of traceability between the DTN data and the references to this DTN in ANL-NBS-HS-000039 REV 02.

All the traceability issues related to this DTN were corrected in Section III.2.12.

### **III.2.15 DTN: GS981008312314.002 [DIRS 147068]**

Issues identified are related to the lack of traceability between the DTN data and the references to this DTN in ANL-NBS-HS-000039 REV 02.

All the traceability issues related to this DTN were corrected in Sections III.2.7 and III.2.11.

### **III.2.16 DTN: GS981008312314.003 [DIRS 144464]**

Issues identified are related to the lack of traceability between the DTN data and the references to this DTN in ANL-NBS-HS-000039 REV 02.

All the traceability issues related to this DTN were corrected in Sections III.2.7 and III.2.11.

### **III.2.17 DTN: GS990208312315.001 [DIRS 159238]**

Issues identified are related to the lack of traceability between the DTN data and the data in Tables 6.3-2, D-1, and D-3 of ANL-NBS-HS-000039 REV 02.

Make the following changes to create a transparent connection between the data in the DTN and in the report tables:

- The following note should be added to Table 6.3-2 (p. 6-40):

NOTE: Bullfrog: PFBA (c#2) and iodide (c#1) test data are from DTN: LA0007PR831231.001 [DIRS 156043]. The travel time from c#1 to c#3 corresponds to the peak concentration time of iodide, file: *la0007pr831231\_001\_s00349\_001.txt* (numerator in the tracer arrival time ratio). The travel time from c#2 to c#3 corresponds to the peak concentration time of PFBA, file: *la0007pr831231\_001\_s00349\_002.txt* (denominator in the tracer arrival time ratio).

Bullfrog: 2,6-DFBA (c#2) and pyridone (c#1) test data are from DTN: GS010508312315.001 [DIRS 155860]. The travel time from c#1 to c#3 corresponds to the peak concentration time of pyridone (numerator in the tracer arrival time ratio). The travel time from c#2 to c#3 corresponds to the peak concentration time of DFBA (denominator in the tracer arrival time ratio).

Prow Pass: iodide and 2,4,5-TFBA (c#3) are from DTN: GS990208312315.001 [DIRS 159238]. 2,3,4,5-TeFBA (c#1) test data are from DTN: MO0308SPATRCRC.000 [DIRS 164821]. The travel time from c#1 to c#2 corresponds to the peak concentration time of TFBA (numerator in the tracer arrival time ratio). The travel time from c#3 to c#2 corresponds to the peak concentration time of TFBA (denominator in the tracer arrival time ratio).

- Change the note for Table D-3 (p. D-32) to: “Sources: DTNs: GS990208312315.001 [DIRS 159238] (TFBA and iodide data) and MO0308SPATRCRC.000 [DIRS 164821] (TFBA data).”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.18 DTN: GS990408312315.002 [DIRS 140115]**

Issues identified are related to the lack of traceability between the DTN data and the data in Tables 6.2-2, C-5, and C-6 and in all the figures referencing this DTN in ANL-NBS-HS-000039 REV 02.



The traceability issue related to Table 6.2-2 was corrected in Section III.2.11.

The following changes need to be done to correct the remaining traceability issues:

- Change the note for Table C-5 (p. C-35) to: “Sources: DTNs: GS990408312315.002 [DIRS 140115] (atmospheric pressure, hydraulic heads and discharge rates in c#1, c#2, and c#3, June-November 1998) and MO0212SPANYESJ.149 [DIRS 161274] (hydraulic heads in ONC-1, March 1996 to December 1997)”
- Change the note for Table C-6 (p. C-40) to: “Sources: DTNs: GS990408312315.002 [DIRS 140115] (atmospheric pressure, hydraulic heads and discharge rates in c#1, c#2, and c#3, June-November 1998) and MO0408NYE05474.217 [DIRS 171464] (pressures in ONC-1 in 1998, corroborative data, file: *rid5474\_ONC1\_98.xls*)”
- Change notes for Figures C-19 (p. C-36), C-20 (p. C-37), C-21 (p. C-37), C-22 (p. C-38), C-23 (p. C-41), C-24 (p. C-42), and C-25 (p. C-42) to: “Output DTN: GS031008312314.004 (from Input DTN: GS990408312315.002 [DIRS 140115], file: *gs990408312315\_002\_s01102\_004.txt*.”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.19 DTN: LA0007PR831231.001 [DIRS 156043]

Issues identified are related to the lack of traceability between the DTN data and the data in all the tables and figures referencing this DTN in ANL-NBS-HS-000039 REV 02.

Some of the traceability issues were addressed in Section III.2.17.

The following changes need to be done to address the remaining traceability issues:

- Change the note for Figure 6.3-2 (p. 6-38) to: “Sources: DTNs: LA0007PR831231.001 [DIRS 156043], file: *la0007pr831231\_001\_s00349\_003.txt* (raw data), LA0410PR831231.001 [DIRS 171899] (normalized concentrations)”
- Change the note for Figure D-10 (p. D-17) to: “Source: DTN: LA0007PR831231.001 [DIRS 156043], file: *la0007pr831231\_001\_s00349\_001.txt* (data)”
- Change the note for Table D-4 (p. D-36) to: “Sources: DTNs: LA0007PR831231.001 [DIRS 156043], files: *la0007pr831231\_001\_s00349\_004.txt* (polystyrene microspheres) and *la0007pr831231\_001\_s00349\_003.txt* (PFBA, bromide, and lithium) (Bullfrog Test); LAPR831231AQ99.001 [DIRS 140134] (PFBA, bromide, lithium, and polystyrene microspheres) (Prow Pass Test); LA0302PR831231.001 [DIRS 162605] (PFBA and bromide); LA0911PR831231.002 [DIRS 186506] (summary of the tracer test data).” See Section III.2.29 regarding DTN: LA0911PR831231.002 [DIRS 186506].
- Change the note for Figure D-19 (p. D-40) to: “Sources: DTNs: LA0007PR831231.001 [DIRS 156043], file: *la0007pr831231\_001\_s00349\_003.txt* (PFBA, bromide, and lithium) (raw data), LA0410PR831231.001 [DIRS 171899] (normalized concentrations)”
- Change the note for Figure D-20 (p. D-41) to: “Sources: DTNs: LA0007PR831231.001 [DIRS 156043], files: *la0007pr831231\_001\_s00349\_003.txt* (PFBA) and *la0007pr831231\_001\_s00349\_004.txt* (polystyrene microspheres) (raw data), LA0410PR831231.001 [DIRS 171899] (normalized concentrations)”

- Change the note for Figure D-21 (p. D-41) to: “Sources: DTNs: LA0007PR831231.001 [DIRS 156043], files: *la0007pr831231\_001\_s00349\_001.txt* (May 1996) and *la0007pr831231\_001\_s00349\_003.txt* (October 1996) (raw data), LA0410PR831231.001 [DIRS 171899] (normalized concentrations).”
- Change the note for Figure D-26 (p. D-54) to: Sources: DTNs: LA0007PR831231.001 [DIRS 156043], file: *la0007pr831231\_001\_s00349\_003.txt* (PFBA, bromide, and lithium) (raw data), LA0410PR831231.001 [DIRS 171899] (normalized concentrations).”
- Change the note for Figure D-29 (p. D-59) to: “Sources: DTNs: LA0007PR831231.001 [DIRS 156043], file: *la0007pr831231\_001\_s00349\_004.txt* (polystyrene microspheres) (raw data), LA0410PR831231.001 [DIRS 171899] (normalized concentrations).”

Note that an editorial correction was made to the footnote to the data table included in DTN: LA0007PR831231.001 [DIRS 156043] per CR12626, Action 008.

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.20 DTN: LA0201JS831321.001 [DIRS 162623]**

Issue identified is related to the inconsistency in defining grain sizes in the DTN and Tables H-1 and H-2 of ANL-NBS-HS-000039 REV 02.

An editorial correction to DTN: LA0201JS831321.001 [DIRS 162623] was done to correct the description of grain size information. The fines in this DTN are now defined as the particles with grain sizes less than 75 microns.

The following note was added to Tables H-1 and H-2 to explain which particles were included in the category greater than 75 microns based on the information provided in DTN LA0201JS831321.001 [DIRS 162623]:

NOTE: The grain sizes of the particles denoted as >75  $\mu\text{m}$  are in the range greater than 425  $\mu\text{m}$  and smaller than 850  $\mu\text{m}$ .

### **III.2.21 DTN: LA0201JS831341.001 [DIRS 162627]**

Issue identified is related to the lack of traceability between the DTN data and the data in Tables H-2 and H-3 of ANL-NBS-HS-000039 REV 02.

The following was done to address this issue:

- The following text was added to the note to Table H-2 (p. H-5): “Two samples were available for some depth intervals. These samples are denoted by A and B in DTN: LA0201JS831341.001 [DIRS 162627] data table. In case when two samples were available, the mean CEC value was calculated. The CEC values in this table show either

a single value (only one sample was available) or the mean value (in the case of two samples).

- The following text was added to the note to Table H-3 (p. H-8): “In CEC experiments two samples were available for some depth intervals. These samples are denoted by A and B in DTN: LA0201JS831341.001 [DIRS 162627] data table. When two samples were available, the mean CEC value was calculated. The CEC values in this table show either a single value (only one sample was available) or the mean value (in the case of two samples).

In addition to this, the following typographical error in Table H-2 should be corrected:

- Change the first column in the 18th row (the table heading is not counted as a row) in Table H-2 from “19D, 720-725, >75  $\mu\text{m}$ ” to “19D, 725-730, >75  $\mu\text{m}$ .”

The changes made to address these issues are either editorial or clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.22 DTN: LA0201JS831421.002 [DIRS 162625]**

Issue identified is related to the surface area values in Table H-2 of ANL-NBS-HS-000039 REV 02 and in the DTN: LA0201JS831421.002 [DIRS 162625]. One table entry for the surface area value for sample “19P, 410 to 415, < 75 mm” is listed as “NM: not measured” whereas the DTN lists its value as 43.94  $\text{m}^2/\text{g}$ .

The following change should be made to address this issue:

- Change the surface area value in the second column, third row (not counting the table heading) in Table-H-2 (p. H-5) from “NM” to “43.94.”

Note that the surface area values are not used to fit the laboratory experiment data. Consequently, the missing surface area value has no impacts on the results and conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.23 DTN: LA0212PR831231.001 [DIRS 162607]**

Issue identified is related to Figures E-31 and E-32 in ANL-NBS-HS-000039 REV 02 and the data in DTN: LA0212PR831231.001 [DIRS 162607]. The horizontal axis in these figures represents the injection volumes, not elapsed time since the beginning of injection.

The following changes should be done to address this issue:

- Change the horizontal axis labels for Figures E-31 (p. E-52) and E-32 (p. E-53) to: “Volume Injected (mL).”

The changes made to address these issues are editorial and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.24 DTN: LA0212PR831231.002 [DIRS 162608]**

Issue identified is related to discrepancies in the flow rate values shown in the Figures E-34 and E-36 notes in ANL-NBS-HS-000039 REV 02 and the data in DTN: LA0212PR831231.001 [DIRS 162607].

To address this issue, make the following changes:

- Change the note for Figure E-34 (p. E-56) to:” NOTE: The jumps in the concentrations and in the model curves correspond to flow interruptions in the tests. The flow rate in Test 1 (left) was 5.9 mL/h, and the flow rate in Test 2 (right) was 0.45 mL/h. Data for Br<sup>-</sup> and PFBA were fit simultaneously by constraining the D<sub>m</sub> ratio for Br:PFBA to 3:1. “Model” refers to MULTRAN simulations.”
- Change the note for Figure E-36 (p. E-59) to:” NOTE: The jumps in the concentrations and in the model curves correspond to flow interruptions in the tests. The flow rate in Test 1 (left) was 5.00 mL/h, and the flow rate in Test 2 (right) was 0.47 mL/h. Data for Br<sup>-</sup> and PFBA were fit simultaneously by constraining the D<sub>m</sub> ratio for Br:PFBA to 3:1. “Model” refers to MULTRAN simulations.”

Note that the volumes shown in these figures were calculated using actual flow rates at each time step, not the mean flow rate value. Thus, the discrepancies between the mean values have no impacts on the results and conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.25 DTN: LA0212PR831231.003 [DIRS 162609]**

Issue identified is related to the lack of traceability between the DTN data and the data shown in Figure E-38 in ANL-NBS-HS-000039 REV 02.

The following change addresses this traceability issue:

- Change the note for Figure E-38 (p. E-63) to: “Source: DTN: LA0212PR831231.003 [DIRS 162609] (lithium data for c#1, Lower Bullfrog test with the average flow rate 5.0 mL/hr).”

This change clarifies but does not affect the results or conclusions made in ANL-NBS-HS-000039, REV 02.

### **III.2.26 DTN: LA0212PR831231.005 [DIRS 166215]**

The identified issue is related to an incorrect source cited in the note for Figure E-34. DTN: LA0212PR831231.005 [DIRS 166215] does not contain the data shown in this figure.

The following change addresses this issue:

- Change the note for Figure E-34 (p. E-56) to: “Sources: DTNs: LA0212PR831231.002 [DIRS 162608] (sodium, calcium data); LA0212PR831231.003 [DIRS 162609] (lithium, bromine, PFBA data).”

The following references in the DIRS report should be revised as:

- LA0212PR831231.005 [DIRS 166215]: Delete E-34 from column 4
- LA0212PR831231.003 [DIRS 162609]: Add E-34 to column 4.

The changes made to address these issues are editorial and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

**III.2.27 DTN: LA0302PR831231.001 [DIRS 162605]**

Issue identified is related to the lack of traceability between the DTN data and the data shown in Table D-4 of ANL-NBS-HS-000039 REV 02.

Some of the traceability issues were addressed in Section III.2.19.

The following change addresses the remaining traceability issue:

- Change note (d) for Table D-4 to: “<sup>d</sup>Based on results of laboratory batch sorption experiments (DTN: LA0302PR831231.001 [DIRS 162605]), which show initial and final concentrations of PFBA and bromide are the equivalent.”

The change made to address this issue is clarifying and as such it does not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

**III.2.28 DTN: LA0302PR831341.001 [DIRS 162604]**

Issue identified is related to the lack of traceability between the DTN data and the data shown in Figure E-10 and Table E-5 of ANL-NBS-HS-000039 REV 02.

DTN: LA0302PR831341.001 [DIRS 162604] was superseded with DTN: LA0911PR831341.001 [DIRS 186522]. The reason for supersession is to correct the average cation exchange capacity and standard deviation values for cesium based on exchanged calcium, sodium, magnesium, and potassium and average total cation exchange capacity values. These values represent the summary of the calculations and the data provided in scientific notebook SN-LANL-SCI-280-V1, “Laboratory Testing in Support of Saturated Zone Investigations [final submittal]”, Appendix F-2 (Reimus 2004 [DIRS 185476]). The calculations of the average CEC values and standard deviation values in this scientific notebook were corrected. The data in superseded DTN: LA0302PR831341.001 were revised in accordance with the corrections made in the scientific notebook. The supersession was performed in accordance with CR 12626, Action 12626-009.

Make the following changes need in relation with the superseded DTN: LA0302PR831341.001 [DIRS 162604] and to address the traceability issue:

- Replace the fourth row in “Direct Inputs Appendix E” in Table 4-1 (p. 4-4) with the following:

Cation exchange capacity data on C-wells tufts based on the measured displacement of Li and other cations by Cs.	LA0911PR831341.001 [DIRS 186522]
--	----------------------------------

- Remove the following from Section 8.3 (p. 8-21):

162604 LA0302PR831341.001. Cation Exchange Capacity Measurements on C-Wells Tuffs Involving Displacement of Li and Other Cations by Cs. Submittal date: 03/06/2003

- Add the following reference to Section 8.3 (p. 8-23) before LA9909PR831231.004 [DIRS 129623]):

186522 LA0911PR831341.001. Cation exchange capacity data on C-wells tuffs based on the measured displacement of Li and other cations by Cs.

- Substitute Table E-5 with the table provided below. The values highlighted in yellow show the values that were revised based on the data in DTN: LA0911PR831341.001 [DIRS 186522]. The data highlighted in blue show the values that were revised as well, but for a different reason. These values are the same in superseded DTNs: LA0302PR831341.001 [DIRS 162604] and LA0911PR831341.001 [DIRS 186522], but were different in Table E-5. Note that the output DTN: LA0303PR831341.001 was removed from the table note. This DTN contains the same data as the superseded DTN: LA0302PR831341.001 [DIRS 162604].

Table E-5. Cation-exchange Capacity Measurements for C-wells Tuffs

Sample <sup>a</sup>	Cation-exchange Capacity (meq/100g)				Lithium Excess
	CEC-Li <sub>r</sub>	CEC- Cs <sub>Nat</sub>	CEC- C Li <sub>r</sub>	CEC-Cs <sub>r</sub>	
Upper Prow Pass (1)	2.0±0.5	1.5±0.03	6.1±0.8	7.6	4.1
Central Prow Pass (2)	4.3±0.1	2.2±0.01	7.4±0.4	9.6	3.1
Lower Prow Pass (3)	3.2±0.4	1.0±0.84	9.8±1.9	10.8	6.6
Bedded Prow Pass (4)	21.3±0.1	22.2±0.09	25.0±1.4	47.2	3.8
Central Bullfrog (5) <sup>b</sup>	3.7±0.1	1.8±0.06	7.7±0.7	9.4	4.0
Lower Bullfrog (6)	18.0±0.2	7.7±0.20	21.8±0.5	29.5	3.8
Upper Tram (7)	1.9±0.1	0.6±0.003	6.6±0.5	7.2	4.7

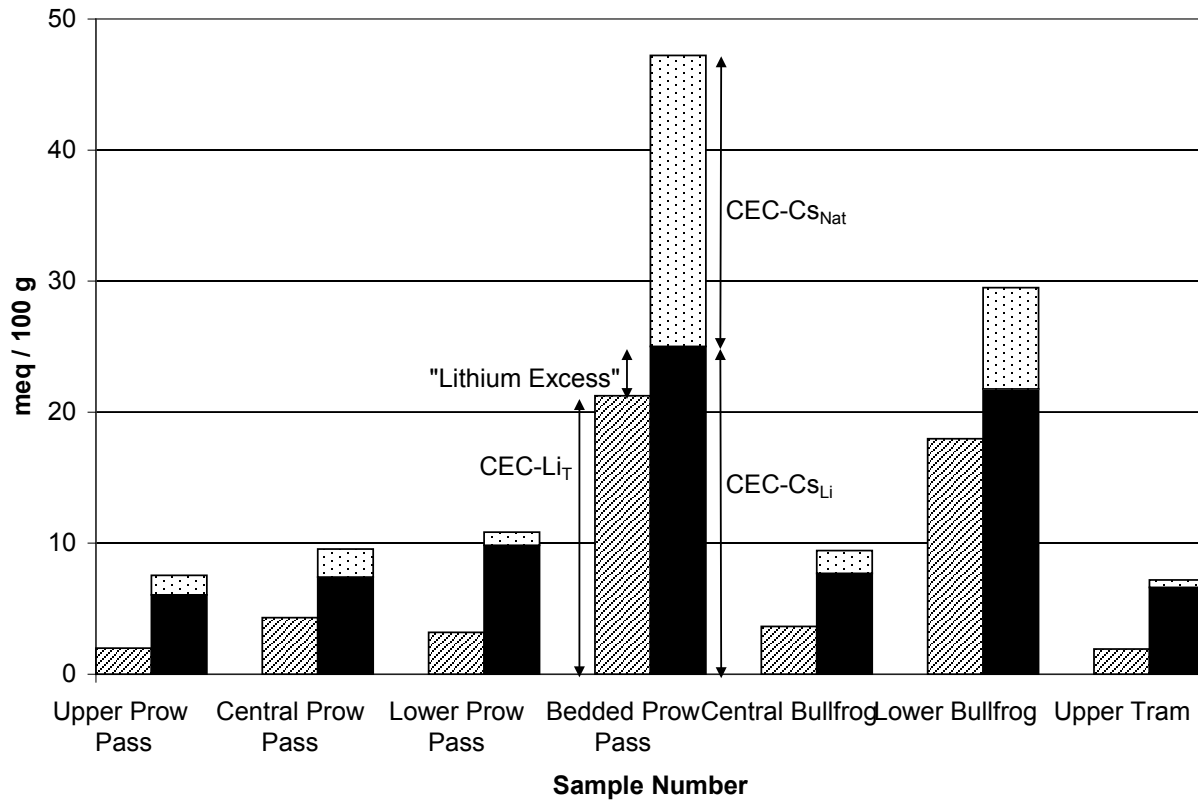
Sources: DTNs: MO0012CATECHOL.000 [DIRS 153371] (CEC-Li data); LA0911PR831341.001 [DIRS 186522] (CEC- cesium data).

NOTE: Range shown is ± one standard deviation. Refer to text for definitions.

<sup>a</sup>Numbers correspond to numbers in Figure E-10.

<sup>b</sup>Only the Central Bullfrog Tuff from c#1 was analyzed for CEC.

- Replace Figure E-10 with the figure provided below. The changes to this figure were done to incorporate the changes in Table E-5. Note that the output DTN: LA0303PR831341.001 was removed from the figure note as this DTN contains the same data as the superseded DTN: LA0302PR831341.001 [DIRS 162604].



Sources: DTNs: MO0012CATECHOL.000 [DIRS 153371] (CEC-Li data); LA0911PR831341.001 [DIRS 186522] (CEC- cesium data).

NOTE: Interval numbers in legend do not correspond to numbers in Table E-2 or Figure E-1. Explanation of bar patterns provided for interval 4 applies to all intervals.

Figure E-10. Cation-exchange Capacity Results for the Seven Different C-Wells Tuff Intervals

- Remove Output DTN: LA0303PR831341.001 from Section 8.4 (p. 8-27). This DTN was referenced only in Table E-5 and Figure E-10. These references were removed.

The following reference in the DIRS report should be revised as shown below:

- Remove LA0302PR831341.001 [DIRS 162604] from DIRS report
- Add LA0911PR831341.001 [DIRS 186522] as follows:

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
LA0911PR831341.001 1 Cation exchange capacity data on C-wells tuffs based on the measured displacement of Li and other cations by Cs. Submittal date: 11/25/2009. 186522	Cs_CEC. x/s	Tables 4-1 and E-5 and Figure E-10.	Cation exchange data.	Indirect Input	N/A	N/A	NA

The difference between the original (DTN: LA0302PR831341.001 [DIRS 162604]) and the revised total cation exchange values based on lithium and natural cations displaced by cesium (DTN: LA0911PR831341.001 [DIRS 186522]) range from 0.1% to 1.1%. These values as well as the cation exchange capacity values based on natural cations displaced by cesium and the lithium excess values summarized in Table E-5 and displayed in Figure E-10 are not the input parameters in any transport calculations or models. These values were used in the qualitative discussion of the cation exchange capacity only. Because of this and because the differences between the original and revised parameters are small the changes made to Table E-5 and Figure E-10 do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.29 DTN: LA0401PR831231.001 [DIRS 171859]

Issue identified is related to the inconsistency between the DTN and Table D-4 for Bullfrog test.

(1) The injection mass (number of 0.36 micron microspheres) in Bullfrog test is  $3.6 \times 10^{14}$  according to Table D-4 and is  $3.5 \times 10^{14}$  according to the data table provided in DTN: LA0401PR831231.001 [DIRS 171859]. Consequently the injection concentrations reported in Table D-4 and this DTN are different as well because they are calculated as a ratio of injection mass and injection volume (the injection volume was 7,800 L in this test).

(2) The injection concentration in Prow Pass test (0.64 micron microspheres) is  $5.1 \times 10^{10}$  microspheres/L in Table D-4 and  $5.0 \times 10^{10}$  microspheres/L in the data table provided in DTN: LA0401PR831231.001 [DIRS 171859].

The data and calculations in the scientific notebook (MOL.20050222.0176 [DIRS 185477]) and Attachment A to this notebook (MOL.20050222.0177) were reviewed to determine which values are correct. Based on the information on pp. 115 and 116 of MOL.20050222.0176 [DIRS 185477], the injection mass in Bullfrog test was calculated from the measured injection concentrations as follows.

First, 1,000 mL of the injection stock solution was prepared. 10 mL of the injection stock solution was taken out of the injection stock and kept for flow cytometry analyses to determine the injection concentration. The 990 mL of the injection stock solution was diluted in the injection volume and injected it into the aquifer. The 10 mL of the injection stock solution was diluted using dilution factor  $10^7$ . The total of 48 samples was analyzed using flow cytometry.



The results of these analyses are reported on p. A-1 of MOL.20050222.0177 using units of number of microspheres per mL. The actual concentrations of the samples were calculated by multiplying the measured concentrations by the dilution factor ( $10^7$ ). Because the volume of the injected solution was 990 mL, the total number of microspheres injected was calculated as the sample concentration (microspheres/mL) times 990 mL. The estimated values of the total number injected are reported in the table on p. A-1. The table note explains why only the first 10 samples were used in calculation of the mean injection mass, which, based on these data and calculations, was  $3.57 \times 10^{14}$  microspheres).

Based on the review described above it was concluded that the values of  $3.6 \times 10^{14}$  (0.36 micron microspheres) provided in Table D-4 for the Bullfrog test is correct. Consequently, the injection concentration of  $4.6 \times 10^{10}$  microsphere/L reported in Table D-4 is correct as well.

The number of 0.64 micron microspheres in the Prow Pass test was  $3.04 \times 10^{14}$  (MOL.20050222.0177, p. A-3). This value was rounded to  $3.0 \times 10^{14}$  in table D-4. Consequently, the injection concentration of  $5.1 \times 10^{10}$  microsphere/L is also correct ( $3.04 \times 10^{14}$  microspheres/6,000 L).

Add the following note to Table D-4 (p. D-36) to explain that the injection concentration in Prow Pass test was calculated using mass equal to  $3.04 \times 10^{14}$  in the case of 0.64 micron microspheres.

- NOTE: Injection amount of 0.64- $\mu$ m CML microspheres (blue) was  $3.04 \times 10^{14}$ . This number was rounded to  $3.0 \times 10^{14}$  in this table.

DTN: LA0401PR831231.001 [DIRS 171859] was superseded with DTN: LA0911PR831231.002 [DIRS 186506] per CR-12626, Action 007, to correct the number and injection concentration of 0.36 micron microspheres in Bullfrog test and the 0.64 micron microsphere injection concentration in the Prow Pass test.

An editorial correction was done to DTN: LA0007PR831231.001 [DIRS 156043] per CR 12626, Action 008 to correct the number of 0.36 micron microspheres in Bullfrog test shown in the note to the data table in file: *la0007pr831231\_001\_s00349\_004.txt* included in this DTN.

Make the following changes in relation with the superseded DTN: LA0401PR831231.001 [DIRS 171859]:

- Replace the ninth row in “Direct Inputs Appendix D” in Table 4-1 (p. 4-4) with the following:

Tabulations of Data used in Tracer Test Interpretations	LA0911PR831231.002 [DIRS 186506]
---	----------------------------------

- Remove the following reference from Section 8.3 (p. 8-24):

171859 LA0401PR831231.001. Tabulations of Data Used in Tracer Test Interpretations. Submittal date: 01/29/2004

- Add the following reference to Section 8.3 (p. 8-23) following LA0705PR150304.012 [DIRS 181208]:

186506 LA0911PR831231.002. Tabulations of Data used in Bullfrog and Prow Pass Tracer Test Interpretations. Submittal date: 11/03/2009.

- Replace DTN: LA0401PR831231.001 [DIRS 171859] in Table D-4 notes with DTN: LA0911PR831231.002 [DIRS 186506].

Revise the following reference in the DIRS report as shown below:

- Remove LA0401PR831231.001 [DIRS 171859]
- Add LA0911PR831231.002 [DIRS 186506].

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
LA0911PR831231.002. Tabulations of Data used in Bullfrog and Prow Pass Tracer Test Interpretations. Submittal date: 11/03/2009.186506	Spreadsheet <i>Tracer_Injections.xls</i>	Tables 4-1 and D-4.	Tracer injection masses, concentrations, volumes, and durations in C-wells tracer tests.	Direct Input	Data	Qualified	NA

The change made to address this issue is editorial and as such it does not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.30 DTN: LA0410PR831231.001 [DIRS 171899]

Issues identified are related to the inconsistency between the DTN data and the data presented in Section D of ANL-NBS-HS-000039 REV 02.

Make the following changes to address these issues:

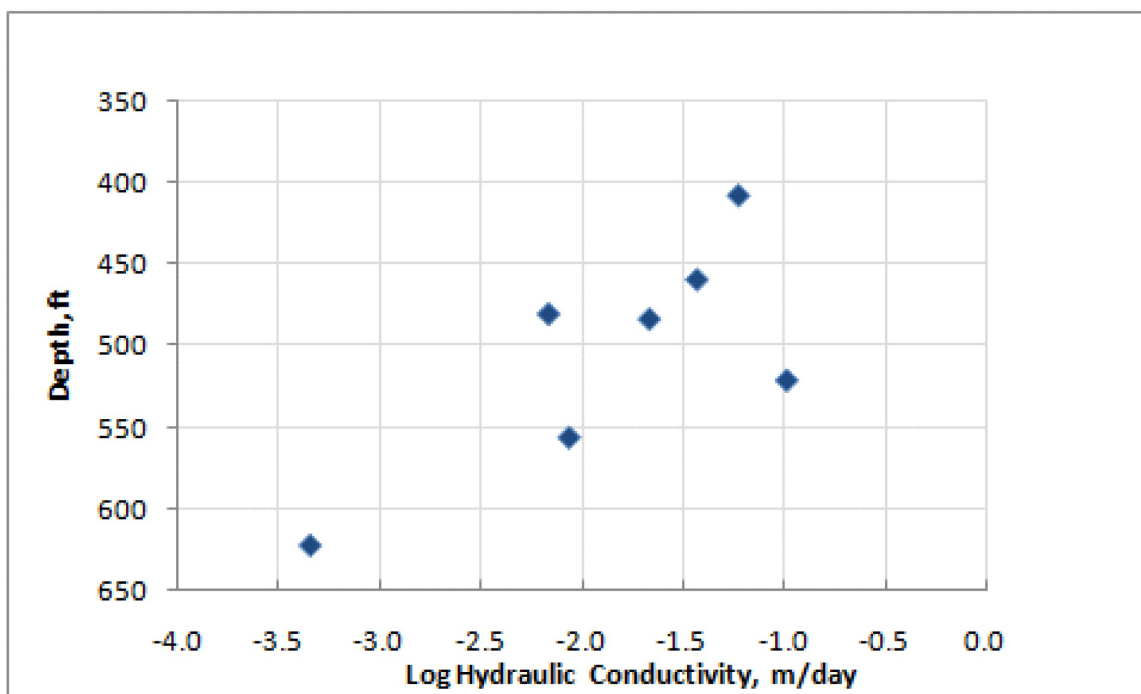
- Change the third to the last sentence on p. D-16 to “The estimated iodide recovery from the c#1 injection by June 1, 1997, (after correcting for the declining background by assuming that it followed an exponential decay) was approximately 13% of the injected iodide mass (DTN: LA0410PR831231.001 [DIRS 171899]).”
- Change the second to the last sentence on p. D-16 to “In contrast, the PFBA recovery from c#2 was about 73% on October 1, 1996 (DTN LA0410PR831231.001 [DIRS 171899]).”
- Change the Fourth sentence in the first paragraph on p. D-39 to “The fractional recoveries of the tracers over the duration of the test were 0.73 for PFBA, 0.69 for bromide, and 0.39 for lithium (DTN: LA0410PR831231.001 [DIRS 171899]).”
- Delete the following Figure D-22 note: “NOTE: “Spheres” in the legend refers to CML microspheres.”
- Change the Figure D-29 vertical axis label on p. D-59 to “Norm. Conc., µg/L per kg injected.”

The first change corrected the date at which the recovery of iodide was estimated. The correct date is June 1, 1997, not October 1, 1996. The second change corrected the percentage of PFBA recovery. It should be 73%, not 72%. The results of the iodide and PFBA tests were provided for qualitative purpose only. Neither the PFBA nor the iodide tracer tests were interpreted quantitatively. The other changes are editorial in nature. Consequently, none of these changes affect the results and conclusions presented in ANL-NBS-HS-000039 REV 02.

**III.2.31 DTN: LA0501PR831231.001 [DIRS 179428]**

Issue identified is related to the lack of traceability between the DTN data and the data shown in Figure F-50 in ANL-NBS-HS-000039 REV 02.

To address this issue replace Figure F-50 with the following figure (Figure F-50).



Source: DTN: LA0501PR831231.001 [DIRS 179428] (data shown are for the seven moist packed samples).

NOTES: As determined from laboratory permeameter measurements on sonic “core” that was packed to match the *in-situ* bulk density of the alluvium. The field-scale log hydraulic conductivity measured in cross-hole pump testing at this location was 0.36, over an order of magnitude larger than the largest measurement plotted.

Figure F-50. Log-saturated Hydraulic Conductivity as a Function of Depth below Land Surface in NC-EWDP-19PB.

The change made to address this issue is clarifying and as such it does not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

**III.2.32 DTN: LA0703PR150304.001 [DIRS 179625]**

Issue identified is related to a typographical error on p. G-100 of ANL-NBS-HS-000039 REV 02.

Make the following change to correct this error:

- Change the second sentence in the second to the last paragraph on p. G-100 to “The  $K_d$  values in Table G-22 do not reflect direct measurements, but rather they are calculated from the Freundlich isotherm parameters that provided the best fits to the experimental sorption isotherms, which are shown in Figure G-55 and provided in its caption (DTN: LA0703PR150304.001 [DIRS 179625]).”

The change made to address this issue is editorial and as such it does not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.33 DTN: LA0705PR150304.002 [DIRS 181198]

Issues identified are related to the lack of traceability between the DTN data and the data shown in Tables 6.2-2, C-3, C-4, C-7, and C-8 and in Figures C-5, C-6, C-7, C-28, and C-29 in ANL-NBS-HS-000039 REV 02.

The traceability issues related to the data in Tables 6.2-2, C-7, and C-8 were addressed in Section III.2.11. The traceability issues related to the data in Tables C-3 and C-4 were addressed in Section III.2.7.

The following changes address the remaining traceability issues:

- Change the note for Figure C-5 (p. C-18) to “Sources: DTNs: LA0705PR150304.002 [DIRS 181198] (hydraulic head data), LA0705PR150304.003 [DIRS 181201] (discharge rate data) (qualified in Appendix R).”
- Change the note for Figure C-6 (p. C-19) to “Source: DTN: LA0705PR150304.002 [DIRS 181198] (Prow Pass - c#1, L1,T2 hydraulic heads; Upper Bullfrog - c#1, L1,T3 hydraulic heads; and Lower Bullfrog - c#1, L1,T4 hydraulic heads in *June 1995 C-Wells Pressure Data.xls*). ”
- Change the note for Figure C-7 (p. C-19) to “Source: DTN: LA0705PR150304.002 [DIRS 181198] (Calico Hills – c#2, L1,T1 hydraulic heads; Prow Pass - c#2, L1,T2 hydraulic heads; Upper Bullfrog - c#2, L1,T3 hydraulic heads; and Lower Bullfrog - c#2, L1,T4 hydraulic heads in *June 1995 C-Wells Pressure Data.xls*). ”
- Change the note for Figure C-28 (p. C-49) to “Sources: DTNs: LA0705PR150304.002 [DIRS 181198] (Prow Pass hydraulic heads data are for c#1, L1,T2 in *June 1995 C-Wells Pressure Data.xls*), LA0705PR150304.003 [DIRS 181201] (discharge rate data) (Qualified in Appendix R). ”
- Change the note for Figure C-29 (p. C-50) to “Sources: DTNs: LA0705PR150304.002 [DIRS 181198] (Upper Bullfrog hydraulic heads data are for c#2, L1,T3 in *June 1995 C-Wells Pressure Data.xls*), LA0705PR150304.003 [DIRS 181201] (discharge rate data) (Qualified in Appendix R). ”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.34 DTN: LA0705PR150304.003 [DIRS 181201]**

Issues identified are related to the lack of traceability between the DTN data and the data shown in Tables 6.2-2, C-3, C-4, C-7, and C-8 and in Figure C-5, C-6, C-7, C-28, and C-29 in ANL-NBS-HS-000039 REV 02.

All the traceability issues were addressed in Section III.2.33.

### **III.2.35 DTN: LA0705PR150304.004 [DIRS 181210]**

Issues identified are related to the lack of traceability between the DTN data and the data shown in Table C-4.

This traceability issue was addressed in Section III.2.7.

### **III.2.36 DTN: MO0007MAJIONPH.011 [DIRS 151524]**

Issue identified is related to the inconsistent degree of precision in reporting concentrations between the DTN and Table E-1.

The following changes to well c#3 concentrations listed in Table E-1 address this issue:

- Change Ca to 11
- Change Na to 55
- Change SiO<sub>2</sub> to 53
- Change SO<sub>4</sub> to 22
- Change HCO<sub>3</sub> to 137.

The changes made to address this issue are editorial and as such do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.37 DTN: MO0007MAJIONPH.013 [DIRS 151530]**

Issue identified is related to the inconsistent degree of precision in reporting concentrations between the DTN and Table E-1.

The following changes to well J-13 concentrations listed in Table E-1 address this issue:

- Change Ca to 12
- Change K to 5
- Change Na to 42
- Change SiO<sub>2</sub> to 47
- Change SO<sub>4</sub> to 17
- Change HCO<sub>3</sub> to 124.

The changes made to address this issue are editorial and as such do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.38 DTN: MO0012FLOW25C3.001 [DIRS 154765]**

Issues identified are related to inconsistency between the data in this DTN and data in Figure C-4 and Table C-4.

Make the following changes to address this issue:

- Remove DTN: MO0012FLOW25C3.001 [DIRS 154765] from Table C-4 note.
- Change flow velocity values for the Calico Hills interval shown in Figure C-4 from 8.5% to 6.6%.

The following reference in the DIRS report should be revised as:

- MO0012FLOW25C3.001 [DIRS 154765]: Remove Table C-4 from column 4 of the DIRS report.

The results of the flow survey (distribution of flow velocities in the different intervals) in Figure C-4 are provided to qualitatively compare the permeability of the volcanic deposits in well c#3. These flow velocity values are not used in any calculations included in this report. Consequently this discrepancy has no impacts on the results and conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.39 DTN: MO0012PERMCHOL.000 [DIRS 153368]**

Issues identified are related to the lack of traceability between the permeability values listed in Table E-6 and data in this DTN.

This DTN provides the measured permeability values in cores collected at the different depths in wells c#1 and c#2. When two core samples were collected from the same interval they were identified as core A and core B. In some cases a few measurements were done using the same core sample. The core samples were then used in the diffusion cell experiments (ANL-NBS-HS-000039 REV 02, Section E.2). For each experiment a pellet was cut off a core sample representing different depth interval. Two different samples from the same depth were used in two experiments to determine the reproducibility and variability of these tests. The values reported in Table E-6 represent the average permeability of the core samples.

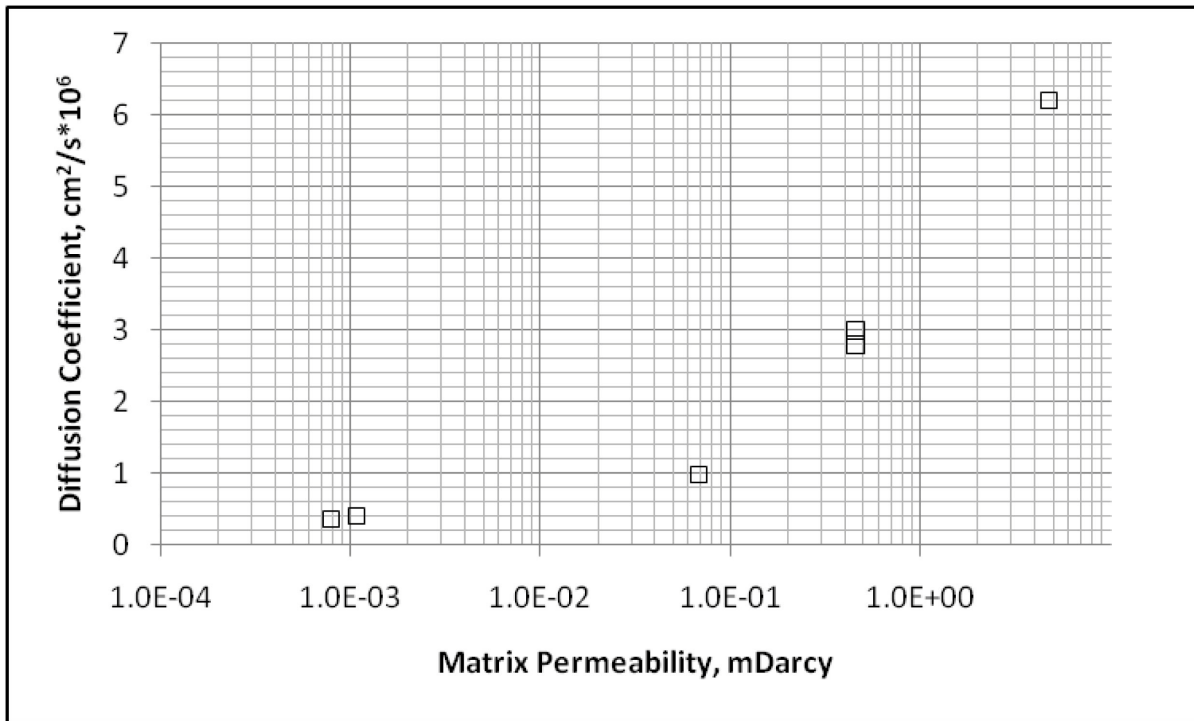
DTN: MO0012PERMCHOL.000 [DIRS 153368] has two samples for the depth 1,880 ft (573 m) in well c#1. This DTN was superseded with DTN: MO0911PERMCHOL.001 [DIRS 186507] to include one missing value for this interval. The permeability of 0.455 mDarcy in Table E-6 represents the average of the 3 samples available for this depth interval.

There are two core samples (A and B) collected from the Lower Bullfrog interval in c#1 at 2,608 ft (795 m). Core sample A has three measurements of permeability and core sample B has two measurements of permeability. The value reported in Table E-6 (0.0949 mDarcy) represents an average of three samples for core A. The permeability of core sample B should be included in calculation of the average permeability of this depth interval. Consequently, the average permeability should be 0.0675 mDarcy.

Based on the above analysis, make the following changes:

- Change the permeability of the Lower Bullfrog (3) in Table E-6 (p. E-29) to 0.0675 mDarcy.
- Replace Figure E-19 (p. E-30) with the updated figure provided below.
- Add the following note to Table E-6: “NOTE: The permeability values for Lower Prow-1 and Lower Prow-2 samples represent the average of three values available for this depth interval.”

Note that the permeability values were not used to calculate the diffusion coefficients in these experiments. The diffusion coefficients were plotted in Figure E-19 versus the core permeability values to qualitatively estimate the relationship between the two parameters. The small difference in average permeability value identified for one sample does not affect the qualitative conclusion concerning the correlation between the diffusion coefficients and permeability.



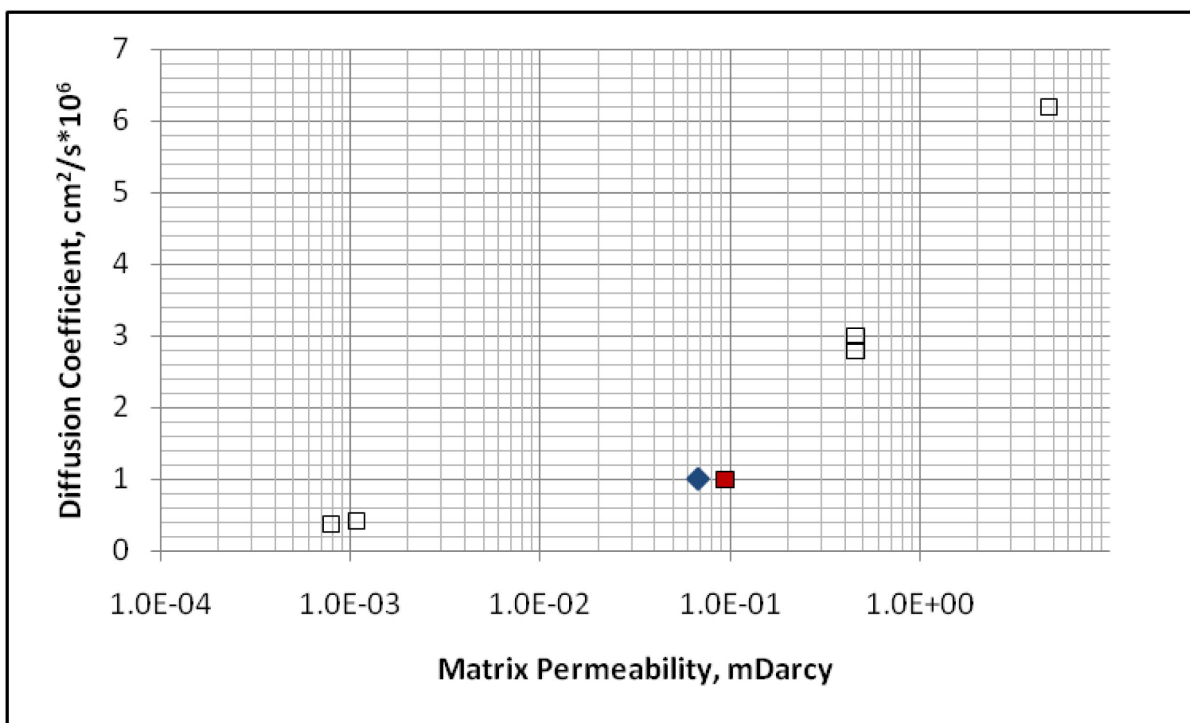
Source: DTN: MO0012PERMCHOL.000 [DIRS 153368] (permeability data).

Output DTN: LA0303PR831362.001 (diffusion coefficients).

NOTE: Permeability and diffusion coefficient are listed in Table E-6.

Figure E-19. Bromide Diffusion Coefficients versus Tuff Permeability for All C-Wells Diffusion Cell Experiments

The comparison between the original and updated data in Figure E-19 is presented in the figure below to demonstrate the statement concerning no impact on the qualitative conclusion based on Figure E-19. The red data point represents the data that were originally plotted in the document and corrected in the revised plot above (blue data point).”



The following changes need to be done in relation with the superseded DTN: MO0012PERMCHOL.000 [DIRS 153368]:

- Substitute the seventh row in the “Direct Inputs Appendix E” in Table 4-1 (p. 4-4) with:

Permeability data for UE-25 c#1 and c#2	MO0911PERMCHOL.001 [DIRS 186507]
---	----------------------------------

- Remove the following reference from Section 8.3 (p. 8-24):

153368 MO0012PERMCHOL.000. Permeability Data (Using Filtered J-13 Water) from UE-25 C #1, UE-25 C #2, and UE-25 C #3. Submittal date: 12/05/2000.

- Add the following reference to Section 8.3 (p. 8-25, preceding TMUE25C3000095.001 [DIRS 172179]):

186507 MO0911PERMCHOL.001. Permeability Data (Using Filtered J-13 Water) from UE-25 C #1 and UE-25 C #2. Submittal date: 11/04/2009.

- Change the note for Figure E-19 to “Source: DTN: MO0911PERMCHOL.001 [DIRS 186507] (permeability data).”
- Change the note for Table E-6 to “Sources: DTNs: MO090812POROCHOL.001 [DIRS 186372] (porosity); MO0911PERMCHOL.001 [DIRS 186507] (permeability); MO0012DIFFCHOL.000 [DIRS 159243] (diffusion cells).” See Section III.2.40 regarding the change related to DTN: MO090812POROCHOL.001 [DIRS 186372].



The following references should be revised as:

- Remove MO0012PERMCHOL.000 [DIRS 153368] from the DIRS report
- Add MO0911PERMCHOL.001 [DIRS 186507] to the DIRS report as:

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
MO0911PERMCHOL.001. Permeability Data (Using Filtered J-13 Water) from UE-25 C #1 and UE-25 C #2. Submittal date: 11/04/2009. 186507	Table S00447_001	Tables 4-1, E-6 and Figure E-19.	Permeability data for UE-25 c#1 and c#2.	Direct Input	Data	Qualified	NA

As discussed, the changes made to address these issues have no impacts on the results and conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.40 DTN: MO0012POROCHOL.000 [DIRS 153376]

Issue identified is related to the lack of traceability between the Central Prow Pass porosity value listed in Table E-6 and data in this DTN.

The porosity data for the three cores (A, B, and C) are available for the Central Prow Pass interval (depth 1,814 ft). The average porosity based on these three data points is 0.116. The porosity in Table E-6 for this interval is 0.138.

The porosity of 7.1% for the depth interval 1,814 ft (core C) in the well UE-25 c#2 provided in DTN: MO0012POROCHOL.000 [DIRS 153376] is incorrect. The correct porosity of this sample is 13.6% (DTN: MO090812POROCHOL.001). DTN: MO0012POROCHOL.000 was superseded with DTN: MO090812POROCHOL.001 [DIRS 186372] in accordance with CR 12626, Action 12626-004 to correct this porosity value. The average porosity of the three samples is 0.138. This is the same value as in Table E-6.

The following changes need to be done in relation with the superseded DTN: MO0012POROCHOL.000 [DIRS 153376]:

- Replace the sixth row in the “Direct Inputs Appendix E” in Table 4-1 on p. 4-4 with the following:

Porosity data for UE-25 c#1 and c#2	MO090812POROCHOL.001 [DIRS 186372]
-------------------------------------	------------------------------------

- Remove the following reference from Section 8.3 (p. 8-24):

153376 MO0012POROCHOL.000. Porosity Data (Using Deionized Water) from UE-25 C#1, UE-25 C #2, and UE-25 C #3. Submittal date: 12/05/2000.

- Add the following reference needs to Section 8.3 (p. 8-25, following MO0703U25CHPTL.000 [DIRS 180070]):

186372 MO090812POROCHOL.001 Drill Core Porosity Data for Wells UE-25 C# 1, UE-25 C# 2. Submittal date: 8/17/2009.

- Change the note for Figure E-18 to “Source: DTN: MO090812POROCHOL.001 [DIRS 186372] (porosity data).”
- Change the note for Table E-17 to “Source: DTN: MO090812POROCHOL.001 [DIRS 186372] (for porosity).”

The following reference in the DIRS report should be revised as shown below:

- Remove MO0012POROCHOL.000 [DIRS 153376] from the DIRS report.
- Add MO090812POROCHOL.001 [DIRS 186372] to the DIRS report as follows:

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
MO090812POROCHOL.001 Drill Core Porosity Data for Wells UE-25 C# 1, UE-25 C# 2. Submittal date: 8/17/2009. 186372	Entire	Tables 4-1, E-6, E-16, E-17 and Figure E-18.	Porosity	Direct Input	Data	Qualified	NA

### III.2.41 DTN: MO0105GPLOG19D.000 [DIRS 163480]

Issue identified is related to the lack of traceability between the density data on p. F-34, in Figure F-25, and data in this DTN.

The density data on p. F-34 and Figure F-25 are from EDCON 2000 [DIRS 154704]. These data are not provided in the DTN: MO0105GPLOG19D.000 [DIRS 163480]. The following needs to be done to address this issue.

- Change the second sentence in the first paragraph of Section F.4 on p. F-34 to “In addition, borehole gravimetry (BHGM) logging of 19D was conducted by EDCON, Inc. in September 2000 (EDCON 2000 [DIRS 154704]). The bulk density values for the 36 depth intervals based on this logging are reported in a tabular format on p. 2 of EDCON 2000 [DIRS 154704].”
- Change the Figure F-25 note on p. F-36 to “Source: EDCON 2000 [DIRS 154704], p. 2.”
- Add the following reference to Section 8.1 on p. 8-5 after Eckstein, Y.; Yaalon, D.H.; and Yariv, S. 1970 [DIRS 156653]:

154704 EDCON. 2000. *Report for the Borehole Gravity Survey in the NC-EWDP-19D Well in Nye County, Nevada on Behalf of TRW Corp.* EDCON Job# 00011. Denver, Colorado: EDCON. TIC: 249823.

- Revise the DIRS report to include EDCON 2000 [DIRS 154704] as follows:

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
EDCON. 2000. <i>Report for the Borehole Gravity Survey in the NC-EWDP-19D Well in Nye County, Nevada on Behalf of TRW Corp.</i> EDCON Job# 00011. Denver, Colorado: EDCON. TIC: 249823. 154704	p. 2	Section F.4 and Figure F-25.	Bulk density	N/A	N/A	Qualified	NA

The changes made to address these issues are editorial and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.42 DTN: MO0205UCC008IF.001 [DIRS 162617]

Issue identified is related to the lack of traceability between the data in Figure G-31 and the data in this DTN.

Make the following change to address this issue:

- Add the following note to Figure G-31:

“NOTE: the date and time when the sample was collected is identified as a part of the sample ID provided in DTN: MO0205UCC008IF.001 [DIRS162617]. For example, the sample with the ID 19D1-022802-1750 identifies the sample from the well 19D collected on February 28, 2002 at 17:50 (5:50 pm).”

The change made to address these issues is clarifying and as such it does not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.43 DTN: MO0212SPANYESJ.149 [DIRS 161274]

Issues identified are related to the lack of traceability between the data in tables and figures in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

The DTN includes 22 Excel files with the pressures and temperatures collected in 9 probes installed in the well ONC-1. Each file contains the data for a specified period of time. The total period of time covered by these data is from March 1, 1996 through December 22, 1997. The Excel file *onc\_96\_07\_25.xls* includes the description of 9 probes. The more detailed description of the probes installed in ONC-1 is provided in *Borehole UE-25 ONC #1 and USW NRG-4 Drilling and Instrumentation Report, Yucca Mountain, Nevada, September 1, 1995, Nye County Independent Scientific Investigation Program* (Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859], pp. 27 to 28 and Figure 6). These probes are also described in Appendix M4. The data used in the report are the atmospheric pressures (probe 0) and aquifer pressures (probe 8 and probe 9). As it is explained in (Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859]), probe 8 is located just below the water table (elevation of 1420 ft) and probe 9 is located 12 m above the well bottom in the Prow Pass tuff. Probe 9 is isolated from probe 8 by a packer. The atmospheric pressures data (probe 0) were used to calculate barometric efficiency. This is done by plotting the aquifer pressures versus the atmospheric pressures and estimating the linear regression coefficient. The report table summarizing barometric efficiency parameters (Table C-5) refers to this DTN because the atmospheric pressures from this DTN were used to estimate barometric efficiency.

The aquifer pressure data (probe 8 and 9) were used to calculate the drawdown versus time. The drawdowns are calculated as the difference between the current pressure and the pressure at the beginning of the pumping test. The pumping test in ONC-1 started on May 8, 1996 (stated in Figure C-16 and related report text). The pressure on May 7, 1996 was used as the beginning pressure at time equal to 0. The elapsed time is calculated as the difference between the current date and time and the date and time when the pumping started. The drawdowns versus elapse time reproduced using the DTN data agree with the data in Figure C-16 and Figures M-1 to M-4.

The drawdowns were corrected to account for atmospheric pressure fluctuations during the pumping test. The product of the atmospheric pressure and the well barometric efficiency was subtracted from the aquifer pressure for each observation time to do this. The corrected drawdowns reproduced using the DTN data agree with the data in Figure C-32. The corrected drawdowns were used to estimate the aquifer parameters. The report tables summarizing aquifer parameters (Tables 6.2-3, 6.2-4, C-8, C-9, C-10, and C-12) and the report figures visualizing the aquifer parameters (Figures C-36, C-38, C-42, C-43, and C-44) refer to this DTN because the pressures from this DTN were used to estimate these parameters. The other report figures referring to this DTN (Figures C-37, C-39, and C-41) contain different representations of the pressures data in this DTN.

Make the following changes need to clarify the use of the data from this DTN:

- Add the following note to Figure C-16 on p. C-31:

“NOTE: the drawdowns are calculated using probe 8 and probe 9 pressure data in DTN: MO0212SPANYESJ.149 [DIRS 161274]. The probe information is provided in the file *onc\_96\_07\_25.xls* included in this DTN. The details on the probes installed in the well ONC-1 are provided in *Borehole UE-25 ONC #1 and USW NRG-4 Drilling and Instrumentation Report, Yucca Mountain, Nevada, September 1, 1995, Nye County Independent Scientific Investigation Program* (Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859], pp. 27 to 28 and Figure 6).”

- Add the following note to Figure C-32 on p. C-55:

“NOTE: the drawdowns are calculated using probe 8 and probe 9 pressure data in DTN: MO0212SPANYESJ.149 [DIRS 161274]. The drawdowns were corrected using the atmospheric pressure data for probe 0 and barometric efficiency in Table C-5. The probe information is provided in the file *onc 96\_07\_25.xls* included in this DTN. The details on the probes installed in the well ONC-1 are provided in Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859], pp. 27 and 28 and Figure 6).”

- Add the following note to Figures M-1, M-2, M-3, and M-4:

“NOTE: The probe information is provided in the file *onc 96\_07\_25.xls* included in this DTN. The details on the probes installed in the well ONC-1 are provided in Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859], pp. 27 to 28 and Figure 6.”

The references in the DIRS report should be revised as follows:

- Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859]: Add “pp. 27 to 28 and Figure 6” to column 3, add “Figures C-16, C-26, C-32, M2 to M-4” to column 4, add “Probe installation information” to column 5., add “Indirect Input” to column 6, and add “NA” to columns 7, 8, and 9.

This revision of DIRS also includes the change described in Section III.2.49.

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.44 DTN: MO0408NYE05474.217 [DIRS 171464]**

Issues identified are related to the lack of traceability between the data in tables and figures in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

DTN: MO0408NYE05474.217 [DIRS 171464] contains five Excel files with the pressures and temperatures collected in nine probes installed in the well ONC-1. Each file contains the data for one year period. A total of five years (1995 through 1999) is included. The data used in ANL-NBS-HS-000039 REV 02 are the pressures in probe 0 (atmospheric pressure) and probe 9 (Prow Pass tuff saturated interval) during the June 11 to September 1, 1998 tracer test (file *rid5474\_ONC1\_98.xls*). In this test, well c#3 was the injection well and well c#2 was the pumping well. The pressures expressed in psi were converted to m. The drawdowns (water level rise) and elapsed time from the beginning of the test were calculated as described in Section III.2.42 and used in hydrogeologic parameter estimation (Table C-6 in ANL-NBS-HS-000039 REV 02).

The note Table C-6 was revised to provide additional information concerning the location of the referenced data in this DTN (Section III.2.18)

Make the following change to clarify the use of the data from this DTN:

- Add the following note to Figure C-26 on p. C-43:

“NOTE: The drawdowns are calculated using probe 0 (atmospheric pressure) and probe 9 (Prow Pass) pressure data in DTN: MO0212SPANYESJ.149 [DIRS 161274], file: *rid5474\_ONCI\_98.xls*. The details on the probes installed in the well ONC-1 are provided in Nye County Nuclear Waste Repository Project Office 1995 [DIRS 156859], pp. 27 to 28 and Figure 6).”

The revision to DIRS report related to this change is included in Section III.2.42.

The change made to address this issue is clarifying and as such it does not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.45 DTN: TMUE25C3000095.001 [DIRS 172179]**

Issue identified is related to the lack of traceability between the information in Appendix L of ANL-NBS-HS-000039 REV 02 and the data in this DTN.

The comparison between the 1984 tracejector survey and 1995 spinner and oxygen-activation survey provided in Section L of ANL-NBS-HS-000039 REV 02 references DTN: TMUE25C3000095.001 [DIRS 172179] as a source for the conclusions made regarding the accuracy of the calculation of the flow rates. DTN: TMUE25C3000095.001 [DIRS 172179] includes geophysical logs; however, the analysis of these data is provided in *Analysis of Flow Rate Logs from Borehole UE-25c #3 in Support of Characterization of the Site Saturated-Zone Groundwater Flow System at Yucca Mountain, Nevada* (CRWMS M&O 1997 [DIRS 107898]). The citations provided in Appendix L of ANL-NBS-HS-000039 REV 02 were also taken from that analysis (CRWMS M&O 1997 [DIRS 107898]).

Make the following changes to address this issue:

- Add the following reference after Craig, R.W. and Robison, J.H. 1984 [DIRS 101040] on p. 8-4:

107898 CRWMS M&O 1997. *Analysis of Flow Rate Logs from Borehole UE 25c #3 in Support of Characterization of the Site Saturated Zone Groundwater Flow System at Yucca Mountain, Nevada*. BAA000000 01717020000002 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19971031.0053.

- Revise the last paragraph on p. L-1 as follows:

“The authors also cite a comparison of 1984 UE25c#3 tracejector survey data with more recent spinner and oxygen-activation survey data taken under pumping conditions in the same well and described in *Analysis of Flow Rate Logs from Borehole UE-25c #3 in Support of Characterization of the Site Saturated-Zone Groundwater Flow System at Yucca Mountain, Nevada* (CRWMS M&O 1997 [DIRS 107898]). The data analyzed in that report (CRWMS M&O 1997 [DIRS 107898]) are based on the results of geophysical investigations in qualified DTN: TMUE25C3000095.001 [DIRS 172179], which concluded that the qualified data from 1995 corroborate the unqualified 1984 data. The report also states (CRWMS M&O 1997 [DIRS 107898], p. 5):

Close agreement between the Full-Bore Flowmeter (spinner) and Water Flow Log (oxygen activation) provide confidence in the

accuracy of the calculation of water flow rates. The radioactive tracer (tracejector) survey, which was run 10 years earlier, also indicates close agreement with the Full-Bore Flowmeter and Water Flow Log, though the absolute flow rates are slightly greater.

It is further stated (CRWMS M&O 1997 [DIRS 107898], Section 1) that, “Comparison of flow measurements taken 10 years earlier indicated flow from the same zones in the borehole, and resulted in comparable flow rates and percentage of contribution.”

The reader can verify these conclusions by comparing the flow distribution data from UE25c#3 depicted in Figures 6.1-2 [based on work by Geldon (1996 [DIRS 100396])] and data presented in track 2 of logplot 1 (production rate-spinner plot) on p. 26 of CRWMS M&O 1997 [DIRS 107898]. These data are also summarized in tabular format in Section 2.2 (p. 4) of *Analysis of Flow Rate Logs from Borehole UE-25c #3 in Support of Characterization of the Site Saturated-Zone Groundwater Flow System at Yucca Mountain, Nevada* (CRWMS M&O 1997 [DIRS 107898]).”

- The DIRS report should be revised to include CRWMS M&O 1997 [DIRS 107898] as follows:

2. Technical Product Input Source Title and Identifier(s) with Version	3. Specifically Used From:	4. Specifically Used In:	5. Input Description	6. Input Usage	7. Input Category	8. Q Status	9. TBV/TBD Status
CRWMS M&O 1997. <i>Analysis of Flow Rate Logs from Borehole UE-25c #3 in Support of Characterization of the Site Saturated-Zone Groundwater Flow System at Yucca Mountain, Nevada.</i> BAA000000-01717-0200-00002 REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19971031.0053. 107898	pp. 4 and 26	Appendix L	Flow distribution data (production rate-spinner plot)	Indirect Input	NA	NA	NA

The changes made to address this issue are either clarifying or editorial and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### III.2.46 DTN: UN0102SPA008KS.003 [DIRS 162614]

Issues identified are related to the lack of traceability between the data shown in the figures in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

Make the following changes to address this issue:

- Add the following note to Figures 6.5-2 and G-23:

“NOTE: The date and time when the sample was collected is identified as a part of the sample ID provided in DTNs: UN0102SPA008KS.003 [DIRS 162614], UN0109SPA008IF.006 [DIRS 162442], and UN0109SPA008KS.007 [DIRS 162615]. For example, the sample with the ID ATC-19D1-120300-2120 means that the sample from the Alluvial Testing Complex (ATC) well 19D was collected on December 3, 2000 at 21:20 hours. The test conditions (dates and injection concentrations) used to calculate elapsed time and normalized concentrations are summarized in Table 6.5-1.”

- Add the following note to Figure G-19:

“NOTE: The date and time when the sample was collected is identified as a part of the sample ID provided in DTN: UN0102SPA008KS.003 [DIRS 162614]. For example, the sample with the ID ATC-19D1-120300-2120 means that the sample from the Alluvial Testing Complex (ATC) well 19D was collected on December 3, 2000 at 21:20 hours. The test conditions (dates and injection concentrations) used to calculate elapsed time and normalized concentrations are summarized in Table 6.5-1.”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.47 DTN: UN0109SPA008IF.006 [DIRS 162442]**

Issues identified are related to the lack of traceability between the data shown in the figures in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

Some of these issues were addressed in Section III.2.46 above.

Make the following change to address the remaining issue:

- Add the following note to Figure G-18:

“NOTE: The date and time when the sample was collected is identified as a part of the sample ID provided in DTN: UN0109SPA008IF.006 [DIRS 162442]. For example, the sample with the ID ATC-19D1-010501-1840 means that the sample from the Alluvial Testing Complex (ATC) well 19D was collected on January 5, 2001 at 18:40 hours. The test conditions (dates and injection concentrations) used to calculate elapsed time and normalized concentrations are summarized in Table 6.5-1.”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.48 DTN: UN0109SPA008KS.007 [DIRS 162615]**

Issues identified are related to the lack of traceability between the data shown in the figures in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

Some of these issues were addressed in Section III.2.46.

Make the following change to address the remaining issue:



- Add the following note to Figures 6.5-1 and G-20:

“NOTE: The date and time when the sample was collected is identified as a part of the sample ID provided in DTNs: UN0109SPA008KS.007 [DIRS 162615] and UN0109SPA008KS.008 [DIRS 162616]. For example, the sample with the ID ATC-EWDP-19D1-012701 1340 means that the sample from the Alluvial Testing Complex (ATC) well 19D was collected on January 27, 2001 at 13:40 hours. The test conditions (dates and injection concentrations) used to calculate elapsed time and normalized concentrations are summarized in Table 6.5-1.”

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

### **III.2.49 DTN: UN0109SPA008KS.008 [DIRS 162616]**

Issues identified are related to the lack of traceability between the data shown in the figures in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

These issues were addressed in Sections III.2.46 and III.2.48 by adding notes to Figures 6.5-1 and G-20.

### **III.2.50 DTN: GS040108312322.001 [DIRS 179422]**

Issues identified are related to the lack of traceability between the data shown in Figures F-46 and F-48 in ANL-NBS-HS-000039 REV 02 and the data in this DTN.

Figure F-46 is based on the data in DTNs: GS040108312322.001 [DIRS 179422] and GS011108312322.006 [DIRS 162611]. The data from these DTNs were copied into output DTN: LA0704PR150304.001. The output DTN includes plots shown in Figures F-46 and F-48. Two source DTNs contain chemical composition data for the different zones in the different wells. The depth of each zone is provided in the *readme* file in DTN: GS040108312322.001 [DIRS 179422] and in the data file (text file) in DTN: GS011108312322.006 [DIRS 162611]. The depth data were added to the chemical composition data in the output DTN: LA0704PR150304.001 to generate geochemical profiles shown in Figures F-46 and F-48.

The data for the wells NC-EWDP-19D and NC-EWDP-19IM1 were combined in Figure F-46. The depth of zone 2 in well NC-EWDP-19D is 455 to 516 ft with midpoint of 485.5 ft (DTN: GS011108312322.006 [DIRS 162611]). The depth of zone 2 in well NC-EWDP-19IM1 is 420 ft (*readme* file in DTN: GS040108312322.001 [DIRS 179422]). The depth of this zone shown in Figure F-46 is 505 ft, which is an average between the zone depth in wells NC-EWDP-19D and NC-EWDP-19IM1. The note for Figure F-46 explains how the depths shown in the figure are related to the screened intervals in the different wells.

To provide additional explanation concerning the location of the data for the zone depths, make the following change to ANL-NBS-HS-000039 REV 02:

- Add the following note to Figure F-46.

NOTE: The depths of the different zones in well NC-EWDP-19D are in the text file *gs011108312322\_006\_s01174\_001.txt* in DTN: GS011108312322.006 [DIRS 162611]. The

depths of the different zones in well NC-EWDP-19IM1 are in *readme* file in data in DTN: GS040108312322.001 [DIRS 179422].

The changes made to address these issues are clarifying and as such they do not affect the results or the conclusions made in ANL-NBS-HS-000039 REV 02.

#### IV IMPACT EVALUATION

A number of changes were done in this ERD to address the issues identified in Condition Report (CR) 12626. Most of the issues are related to the lack of traceability between the DTN data and the data in the report tables and figures that reference these DTN data. A few typographical errors were identified as well. In a few cases, the changes were done to correct discrepancies between the data in the report and DTN(s). The analysis was done in each such case to evaluate the potential impacts. In all these cases it was concluded that the difference in data does not impact the result and conclusions made in the report, its downstream documents, or the LA.

The Yucca Mountain Repository License Application (LA) on the LA Database was searched for impacts from this ERD. ANL-NBS-HS-000039 REV 02 is cited in SAR Sections 5, 2.3.8, 2.3.9, and 2.4. However, the changes made in this ERD do not impact the text, tables, or figures in these sections.

Similarly, a search of *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250) and *Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250F-S1) showed that these two documents are not impacted by the changes in this ERD.

**Controlled documents that cite ANL-NBS-HS-000039 REV 02 [DIRS 177394] that were checked for potential impacts include the following:**

- ANL-WIS-MD-000027 Rev. 00. *Features, Events, and Processes for the Total System Performance Assessment: Analyses*
- MDL-MGR-HS-000001 Rev. 00. *Irrigation Recycling Model*
- MDL-NBS-HS-000010 Rev. 03. *Site-Scale Saturated Zone Transport*
- MDL-NBS-HS-000011 Rev. 03. *Saturated Zone Site-Scale Flow Model*
- MDL-NBS-HS-000020 Rev. 02, Addendum 01. *Particle Tracking Model and Abstraction of Transport Processes*
- MDL-NBS-HS-000021 Rev. 03, Addendum 01. *Saturated Zone Flow and Transport Model Abstraction*
- MDL-WIS-PA-000005 Rev. 00. *Total System Performance Assessment Model/Analysis for the License Application*
- TDR-MGR-NS-000001 Rev. 00. *Qualification of Matrix Diffusion Data from Diffusion Cell Experiments.*

## V REFERENCES

- 177394 SNL (Sandia National Laboratories) 2007. *Saturated Zone In Situ Testing*. ANL-NBS-HS000039 REV 02. Las Vegas, Nevada: Sandia National Laboratories. ACC: DOC.20070608.0004; DOC.20070911.0001; DOC.20071018.0020; LLR.20080324.0012.

INTENTIONALLY LEFT BLANK