Department of Energy
Washington, DC 20585

QA: QA

FEB 26 2002

M. T. Peters
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EVALUATION OF INITIAL AND COMPLETE RESPONSE, VERIFICATION OF CORRECTIVE ACTIONS AND CLOSURE OF DEFICIENCY REPORT (DR) BSC-02-D-052

The Office of Quality Assurance staff has evaluated the initial and complete response, verified the corrective actions of DR BSC-02-D-052 and determined the results to be satisfactory. As a result, the DR is considered closed.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Donald J. Harris at (702) 794-1467.

James Blaylock for
Ram Murthy, Acting Director
Office of Quality Assurance

OQA:JB-0705

Enclosure:
DR BSC-02-D-052

cc w/encl:
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ORIGINAL

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

8. [XX] DEFICIENCY REPORT [ ] CORRECTIVE ACTION REPORT

NO. BSC-02-D-052

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DEFICIENCY/CORRECTIVE ACTION REPORT

1. Controlling Document:	2. Related Report No.:
Quality Assurance Requirements and Description Revision 6, 7, 8, and 9. (Revisions in affect during data taking and data transmittal.)	DTN LB980901233124.101
3. Responsible Organization:	**4. Discussed With:**
LBNL	Gerald Neider-Westermann/Robert Terberg

5. Requirement:

- QARD 12.2.1C ...For measuring and test equipment used in one-time-only applications, the calibration shall be done **both before and after use**. Also 12.2.4 When measuring and test equipment is lost, the validity obtained using that equipment since its last valid calibration shall be evaluated. (Note: This provision has been in the QARD since Revision 0)
- YAP-12.3Q (in effect at time of this case) Revision 0. 5.4.3a - Ensure that M&TE used in a one-time only application is calibrated both before and after use. 5.9a - Document the loss of or damage to M&TE if it has been used since its last valid calibration by using the M&TE OCR in accordance with the instructions provided. Current procedure is AP-12.1Q R0 section 5.3.3a and 5.7.1a.
- YMP-LBNL-QIP-12.0 Rev 1. 3.2.3 When required, users shall check measuring equipment performance prior to and after use for data collection, per methods appropriate for the individual unit and conditions of use such as equipment used in one-time-only applications. 3.4.3 - When measuring equipment is found to be out of calibration or when measuring equipment has been lost or irreparably broken after use, the PI or designee shall initiate an evaluation of any data generated, or processes monitored by the subject equipment since its last known data of being in calibration, and the acceptability and disposition of that data.

6. Description of Condition: Found in verifying traceability (AP-3.15Q) of data from DTN.

- Contrary to the above procedures six pressure transducers (out of 56) used to collect data for TDMS **were not calibrated after use**. DTN LB980901233124.101 titled Pneumatic Pressure And Air Permeability Data From Niche 3107 And Niche 4788 In The ESF From Chapter 2 Of Report SP33PBM4: Fracture Flow And Seepage Testing In The ESF, FY98. According to LBNL, these transducers were no longer used (in other testing) and cannot be located. Note: Data acquisition started on 5/15/97 and ended on 10/28/99 (ref. MOL.20000224.0305, TDIF 309275)

  The ones with no post calibration used in Niche 3107 are Kavlico LBL 13, E-1497-003 (75 psi), Kavlico LBL 14, E-1497-023 (75 psi), Kavlico LBL 15, E-1497-007 (75 psi), and Kavlico LBL 16, E-1497-022 (75 psi). The other two with no post calibration used in niche 4788 are Kavlico 108 SN A2198-021 (30 psi), and Kavlico 109 SN A2198-010 (30 psi).
- Also, at the time of the DTN data transmittal, no Out of Calibration Reports (OCR) for the lost M&TE were generated. LBNL is currently generating this report.
- Recommended Action
  a) DTN data using these pressure transducers should be declared unqualified.
  b) OCR completed on deficient M&TE
  c) OCR, if done as an evaluation, may be used IAW AP-SIII.2Q to qualify the data corresponding to these six instruments.

7. Initiator: Charles D. Beach	9. Does a stop work condition exist? (Not required for a DR) [ ] Yes [X] No
Charles D. Beach Date 12/19/2001	If Yes, Check One: [ ] A [ ] B [ ] C [ ] D
10. Recommended Actions: "NONE" dgd 1/3/02	
11. QA Review: QAR Ronald J. Harris Date 1/3/02	12. Response Due Date: 10 Working Days From Issuance
13. DOQA Issuance Approval: Printed Name RAM MURTHY Signature James Blaylock for Date 1/10/02	
22. Corrective Actions Verified: QAR Ronald J. Harris Date 2/15/02	23. Closure Approved by: DOQA James Blaylock for Date 2/26/02

Exhibit AP-16.1Q.1 Rev. 12/20/1999

ENCLOSURE

TYPE RESPONSE:
☒ Initial
☒ Complete
☐ Amended

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

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DEFICIENCY/CORRECTIVE ACTION REPORT (RESPONSE)

14a. Immediate Actions:

N/A

Compliance Date: N/A

14. Remedial Actions:

See continuation page.

15. Extent of Condition:

This occurrence of an item of M&TE being taken out-of-service without a calibration at LBNL was not determined to be an isolated incident. However, it is the only incident, not evaluated and resolved through other processes, related to principal factor quality-affecting data at LBNL. This was determined by the following information:

- The DTN associated with this deficiency is the only principal factor LBNL pre-PVAR DTN that has not completed verification. All other principal factor LBNL pre-PVAR DTNs have completed verification with an approved checklist. A series of PVAR procedures released on 6/30/1999 address past procedural inadequacies. The data verification checklists have proven to be a valuable tool in identifying and addressing past data shortcomings. Once this checklist is finalized, all of the LBNL principal factor checklists will be considered complete, and so there is a level of confidence that there are no remaining items of M&TE that were used in quality-affecting work used for YMP, that fall into this category.
- Since the time that PVAR processes came out, there has been a central LBNL point-of-contact for coordinating M&TE-related issues and maintaining a list of M&TE items. Out-of-calibration conditions are identified on this list and actions are completed according to AP-12.1Q.
- The trend database for NCRs reflect that this is only the second occurrence of no closing calibration documented since October 1, 1999. Therefore, there is a level of confidence that quality-affecting data has not been affected by this condition.

16. Cause: (Attach results of root cause determination prepared in accordance with AP-16.4Q for a significant deficiency.)

~~See LVMO-98-C-002 (CAR-002), issued on 02/11/1998 and closed on 04/10/2000. CAR-002 addressed many of the problems associated with pre-PVAR data, such as the data set identified in this DR.~~ WWW 1/31/02

It was determined that the M&TE being removed from service without calibration was the result of an administrative oversight. It was caused by the fact that, at the time, LBNL did not have a central person performing M&TE oversight activities, as they do now.

17. Action to Preclude Recurrence: LVMO-98-C-002 WWW 1/31/02

The data problems identified in this DR were resolved with the use of a checklist in order to verify all pre-PVAR data, as discussed in (CAR-002) The fact that this problem was found shows that the checklists verifying pre-PVAR data are working. With respect to the issue of data quality, there is no need to perform an action to preclude recurrence beyond those already completed as part of CAR-002.

To preclude recurrence of M&TE being removed from service without calibration, the M&TE LBNL Coordinator is tracking the status of all Q equipment and issues out -of-calibration reports as appropriate (reference McClung e-mail to Aden-Gleason dated 1/25/02, Attachment B).

18. Due Date: January 31, 2002 ☐ For submittal of complete response ☒ For completion of corrective action	19. Response by: Mark Peters (R. E. Rucinski – responsible ind) RR 1-31-02 Date: January 31, 2002 Phone: 702-295-3644 RR R.L.W. 1-31-02 QA-POC
20. Evaluation: ☒ Accept ☐ Partially Accept ☐ Reject QAR Donald J Harris Date 2/4/02	21. Concurrence: DOQA James B Blaylock Date 2/26/02

Exhibit AP-16.1Q.1 Rev. 12/20/1999

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Continued from block 14, Remedial Action:

The deficiency identified in Item 6 of BSC-02-D-052 needs clarification as follows:

- The deficiency states that " six pressure transducers used to collect data for TDMS were not calibrated after use." The transducers in question were not required to be calibrated after use as they were not intended for one time only application. They were required to be calibrated annually. Fifty-six (56) transducers were taken out-of-service and replaced with more expensive and more accurate sensors after they were last used. As of 1/25/02 six (of 56) pressure transducers have not been located and the after use "As Found" data are unavailable. An impact evaluation was conducted to assess the performance of these six pressure transducers (Attachment A).
- The deficiency states that "Data acquisition started on 5/15/97 and ended on 10/28/99". TDIF 309275 has been corrected to show the time span of acquisition as 1/28/98 to 6/28/98 based on the actual days of the experiment as listed in the scientific notebook SN-LBNL-SCI-078-V1, pp. 5 - 46 (MOL.19991013.0469). The corrected TDIF 309275 was reflected in the ATDT as of 1/25/02.
- The procedure governing M&TE during the time these data sets were acquired (1/28/98 to 6/28/98) was not YAP-12.3Q as the DR suggests, but rather YMP-LBNL-QIP-12.0, *Control and Calibration of Measuring and Test Equipment,* Rev1, Mod 1, (effective 1/17/97).

OCRs were not required to be generated by the above procedures for the affected data sets. Section 3.4.3 of YMP-LBNL-QIP-12.0, Rev1, Mod1 states "When measuring equipment is found to be out of calibration or when measuring equipment has been lost or irreparably broken after use, the PI or designee shall initiate an evaluation of any data generated, or processes monitored by the subject equipment since its last known date of being in calibration, and the acceptability and disposition of that data. The evaluation shall include the determination of acceptability for previously collected data, processes monitored, or items previously inspected or tested. The evaluation shall be documented by the PI or designee in the equipment logbook. If data is found to be unacceptable based on the evaluation, a nonconformance report shall be initiated per YAP-15.1Q and any necessary corrective action shall be taken per AP-16.1Q."

As part of the data verification checklists (per AP-3.15Q) for pre-PVAR data sets, a data impact evaluation was conducted by comparing data (ambient conditions) obtained for the lost six pressure transducers to neighboring pressure transducers that were properly calibrated. The six pressure transducers were determined to be operating within their sensor accuracy of +- 10% as required (see Master Scientific Notebook YMP-LBNL-JSW-6.0, MOL.20000412.0749; RISWeb pp.13-15) at the time they were taken out-of-service based on the Impact Evaluation for LB980901233124.101 (Attachment A). The subject data were determined to be qualified based on the results and conclusions of the same Impact Evaluation. It can be noted that the results of the evaluation were not documented in the equipment logbook, as required by the above procedure, which is no longer used. The subject logbook is obsolete and no longer open for additional information. Therefore, the evaluation, besides being submitted as part of this deficiency report, will continue to be processed in accordance with the AP-3.15Q data verification checklists discussed above.

VR-052 ATTACHMENT 1

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Earth Science Division
Nuclear Waste Program

Subject: Impact Evaluation for LB980901233124.101

To: Subject DTN File for Data Confirmation Checklist

From: Robert TerBerg c/o Paul Cook

Date: January 17, 2002

Background
For LB980901233124.101, the instrumentation listed below did not have post-work calibrations after 6/26/98 (see TDIF 309275 for span of data acquisition: 1/28/98-6/26/98).

Niche 3107 75 psi Kavlicos:

LBNL #	Serial #
13	E-1497-003
14	E-1497-023
15	E-1497-007
16	E-1497-022

Niche 4788 30 psi Kavlicos:

LBNL #	Serial #
108	A2198-021
109	A2198-010

Purpose
The governing procedure in effect at the time of data acquisition was QIP-12.0 Rev 1 Mod 1 (1/17/97), which mandates an impact evaluation for Out-of-Calibration conditions. Lack of post-work calibrations constitutes an Out-of-Calibration condition as per section 3.4.1 of QIP-12.0 Rev 1 Mod 1. This document addresses the mandate for an impact evaluation as per section 3.4.3 of QIP-12.0 Rev 1 Mod 1.

Objective
Evaluate whether the performance of the above-mentioned transducers had any impact to the generated data. Check if the performance is within Technical Work Plan specifications (= 10 % as per Master Scientific Notebook YMP-LBNL-JSW-6.0 [MOL.20000412.0749; RISWeb p. 13-15]) during data acquisition for DTN LB980901233124.101.

Approach
Do a performance comparison on ambient pressure readings between pressure transducers, with only pre-work calibrations, similar and adjacent to those with pre- and post-work calibrations that are within Technical Work Plan specifications (= 10 % Full Scale).

For the Niche 3107 75 psi Kavlicos, we chose LBNL #11,12 (similar and adjacent transducers with passed post-work calibrations; maximum 0.17% error as-found [MOL.20010822.012]).

For the Niche 4788 30 psi Kavlicos, we chose LBNL #107,110 (similar and adjacent transducers with passed post-work calibrations; maximum 0.15% error as-found [MOL.20010629.061])

The converted data (pressure from voltage signal) from LB980901233124.101 are examined because the basis for comparison is the ambient condition that is shared by adjacent transducers. As soon as pressure is introduced in one

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given test interval for permeability testing purposes, gradients will be apparent between transducers. The pressure readings are an expression of voltage signals using known calibration constants. If there is variance in transducer performance, the variance will be linearly translated from voltage to pressure.

We chose the earliest and latest ambient data recorded within the data set to cover the broadest range of proximal and comparable testing conditions pertinent to this data set. No significantly anomalous pressure transducer responses (attributable to transducer performance) were observed within or between the data chosen for this performance comparison.

Assumptions

We limited the extent of performance comparison in order to limit the assumed range of similar ambient conditions. This would follow a geological expectation of increased heterogeneity with increased scale. The existing fracture permeability is assumed to transmit ambient pressure uniformly within the rock body penetrated by the packer assemblies containing adjacent transducers.

Results

Niche 3107 75 psi Kavlicos:

LBNL #	Serial #
13	E-1497-003
14	E-1497-023
15	E-1497-007
16	E-1497-022

Performance Comparison of the above 4 transducers with LBNL #11,12 (similar and adjacent transducers with passed post-work calibrations; maximum 0.17% error as-found [MOL.20010822.012]) in measuring ambient pressure conditions:
Maximum positive difference = +0.70 % Full Scale
Maximum negative difference = -0.11 % Full Scale
Maximum potential error is 0.70 + 0.17 = 0.87%

Niche 4788 30 psi Kavlicos:

LBNL #	Serial #
108	A2198-021
109	A2198-010

Performance Comparison of the above 2 transducers with LBNL #107,110 (similar and adjacent transducers with passed post-work calibrations; maximum 0.15% error as-found [MOL.20010629.061]) in measuring ambient pressure conditions:
Maximum positive difference = +0.02 % Full Scale
Maximum negative difference = -3.42 % Full Scale
Maximum potential error is 3.42 + 0.15 = 3.57%

Conclusions

The performance of the 6 transducers, lacking post-work calibrations, is within the Technical Work Plan specifications (± 10 % Full Scale as per Master Scientific Notebook YMP-LBNL-JSW-6.0 [MOL.20000412.0749; RISWeb p. 13-15]), and does not affect the quality of the data in LB980901233124.101

Attachments

Attachment A: Kavlico Impact Analysis LBL 13-16 011402.xls
Attachment B: Kavlico Impact Analysis LBL 108-109 011402.xls

Attachment A

The following is a performance comparison between 75 psi pressure transducers with pre- and post-work calibrations (LBNL 11-12) and those with only pre--work calibrations (LBNL 13-16). The following are the first 17 lines of data columns 63-68 in the first data taken at ambient conditions at Niche 3 (pre--construction). Ambient readings are taken just before flow is introduced, whereafter the readings are no longer ambient or comparable in a definable way. The "converted" data are examined because the issue is the validity of the overall results of transducers without post-work calibrations. The raw voltage is not examined because the conversions have already been verified as valid in the initial calibrations.

The following pressure data (psi) were taken from "Niche 3 UL 20 inj - 11 obs ft 1-28-98.csv converted.csv" (from 1/28/98)

Kavlico #s	LBL 11	LBL 12	LBL 13	LBL 14	LBL 15	LBL 16	LBL 13-16 differences from LBL 11				LBL 13-16 differences from LBL 12			
time	i1	i2	i3 ✓	i4 ✓	i5 ✓	i6 ✓	LBL 13	LBL 14	LBL 15	LBL 16	LBL 13	LBL 14	LBL 15	LBL 16
15:05:59	12.25863	12.58612	12.68339	12.75341	12.59735	12.70297	0.42476	0.49478	0.33871	0.44433	0.09727	0.16729	0.01123	0.11685
15:05:59	12.25863	12.58612	12.68339	12.75341	12.59735	12.70297	0.42476	0.49478	0.33871	0.44433	0.09727	0.16729	0.01123	0.11685
15:06:04	12.26012	12.62533	12.69961	12.72602	12 64958	12.70315	0.43949	0.46590	0.38945	0.44303	0.07428	0.10069	0.02425	0.07783
15:06:10	12.26012	12.60876	12.71804	12.78043	12.62577	12.67501	0.45792	0.52031	0.36565	0.41489	0.10928	0.17168	0.01701	0.06625
15:06:15	12.26645	12.59919	12.70790	12.70157	12.64644	12.71603	0.44145	0.43512	0.37999	0.44958	0.10871	0.10238	0.04725	0.11684
15:06:20	12.27445	12.58317	12.69261	12.74128	12.61802	12.69506	0.41816	0.46683	0.34357	0.42061	0.10943	0.15810	0.03484	0.11189
15:06:25	12.26105	12.59716	12.71730	12.70230	12.61433	12.68862	0.45625	0.44125	0.35327	0.42757	0.12014	0.10514	0.01716	0.09146
15:06:31	12.25677	12.60434	12.68192	12.76959	12.61193	12.71235	0.42514	0.51281	0.35515	0.45558	0.07757	0.16525	0.00759	0.10801
15:06:36	12.25938	12.63122	12.71067	12.70102	12.65438	12.69506	0.45129	0.44164	0.39500	0.43568	0.07945	0.06980	0.02316	0.06384
15:06:41	12.24282	12.64465	12.68063	12.69734	12.64939	12.69451	0.43781	0.45452	0.40657	0.45169	0.03597	0.05269	0.00474	0.04985
15:06:46	12.26180	12.60894	12.70403	12.70322	12.59550	12.67170	0.44223	0.44143	0.33370	0.40990	0.09509	0.09428	-0.01344	0.06276
15:06:52	12.24375	12.60140	12.66367	12.70929	12.59402	12.70683	0.41992	0.46554	0.35028	0.46308	0.06228	0.10789	-0.00737	0.10544
15:06:57	12.25659	12.60305	12.71048	12.72639	12.65954	12.70996	0.45389	0.46980	0.40296	0.45337	0.10743	0.12333	0.05649	0.10691
15:07:02	12.24263	12.58152	12.70256	12.77069	12.60584	12.70977	0.45993	0.52806	0.36320	0.46714	0.12104	0.18917	0.02432	0.12826
15:07:08	12.26496	12.62625	12.69371	12.67528	12.63426	12.70849	0.42875	0.41032	0.36930	0.44353	0.06747	0.04903	0.00801	0.08224
15:07:13	12.25863	12.64134	12.71730	12.75525	12.62392	12.69966	0.45867	0.49661	0.36529	0.44102	0.07596	0.11391	-0.01742	0.05832
15:07:18	12.30069	12.61318	12.71638	12.73925	12.66545	12.68145	0.41569	0.43857	0.36476	0 38076	0.10320	0.12608	0.05227	0.06827

		% of Full Scale reading (75 psi)
Max. discrepancy		
pos	0.52806	0.70408
neg	-0.01742	-0.02322
Max. Allowable		10.00

Attachment A

The following are the last 18 lines of data columns 63-68 in the last data taken at ambient conditions at Niche 3 (pre construction). These final readings were taken some time (0 sec) after flow was stopped and the readings returned to being ambient and comparable in a definable way. Again, the "converted" data are examined because the issue is the validity of the overall results of transducers without post-work calibrations. The raw voltage is not examined because the conversions have already \been verified as valid in the initial calibrations.

The following pressure data (psi) were taken from "Niche 3 B2.5 20inj - 11 obs ft 3-26-98.csv converted.csv" (from 3/26/98) _

Kavlico #s	LBL 11	LBL 12	LBL 13	LBL 14	LBL 15	LBL 16	LBL 13-16 differences from LBL 11				LBL 13-16 differences from LBL 12			
time	i1	i2	i3	i4	i5	i6	LBL 13	LBL 14	LBL 15	LBL 16	LBL 13	LBL 14	LBL 15	LBL 16
12:33:47	12.20300	12.56882	12.60802	12.65947	12.53256	12.64209	0.40502	0.45647	0.32956	0.43909	0.03920	0.09065	-0.03625	0.07327
12:33:53	12.20616	12.57710	12.60064	12.64347	12.49787	12.63877	0.39448	0.43731	0.29170	0.43261	0.02355	0.06638	-0.07923	0.06168
12:33:58	12.19574	12.57379	12.61262	12.64109	12.54345	12.64080	0.41688	0.44534	0.34771	0.44506	0.03884	0.06730	-0.03033	0.06701
12:34:03	12.21882	12.57194	12.61576	12.63465	12.51688	12.63344	0.39694	0.41584	0.29806	0.41463	0.04381	0.06271	-0.05507	0.06150
12:34:09	12.20207	12.56182	12.60175	12.66884	12.55711	12.63657	0.39968	0.46678	0.35504	0.43450	0.03993	0.10702	-0.00471	0.07475
12:34:14	12.20095	12.56587	12.59548	12.63336	12.53755	12.64227	0.39453	0.43241	0.33659	0.44132	0.02961	0.06749	-0.02832	0.07640
12:34:19	12.19593	12.55391	12.58719	12.65285	12.54641	12.64411	0.39126	0.45692	0.35048	0.44818	0.03328	0.09895	-0.00750	0.09020
12:34:25	12.19425	12.56992	12.60415	12.63814	12.51171	12.62774	0.40989	0.44389	0.31745	0.43348	0.03423	0.06822	-0.05821	0.05782
12:34:30	12.17658	12.56072	12.62995	12.64844	12.52869	12.63510	0.45337	0.47186	0.35211	0.45852	0.06923	0.08772	-0.03203	0.07438
12:34:35	12.19444	12.57176	12.58332	12.64219	12.55268	12.64006	0.38888	0.44775	0.35824	0.44562	0.01156	0.07043	-0.01908	0.06830
12:34:40	12.23147	12.56587	12.60562	12.62950	12.48033	12.63123	0.37415	0.39804	0.24887	0.39977	0.03975	0.06363	-0.08554	0.06536
12:34:46	12.20635	12.57084	12.60931	12.63263	12.55397	12.63381	0.40296	0.42628	0.34762	0.42746	0.03847	0.06179	-0.01687	0.06297
12:34:51	12.20244	12.55777	12.61428	12.63870	12.56468	12.63123	0.41184	0.43625	0.36224	0.42879	0.05651	0.08092	0.00691	0.07346
12:34:56	12.18663	12.56200	12.59143	12.66296	12.53090	12.62608	0.40480	0.47633	0.34428	0.43946	0.02942	0.10096	-0.03110	0.06408
12:35:02	12.20728	12.55427	12.62331	12.62050	12.54641	12.63123	0.41603	0.41322	0.33913	0.42395	0.06904	0.06622	-0.00787	0.07696
12:35:07	12.20244	12.56734	12.59991	12.62013	12.54179	12.63749	0.39747	0.41769	0.33935	0.43505	0.03256	0.05279	-0.02555	0.07015
12:35:12	12.19742	12.55519	12.62497	12.63520	12.53792	12.63620	0.42755	0.43778	0.34050	0.43878	0.06978	0.08001	-0.01728	0.08100
12:35:18	12.21379	12.57599	12.58922	12.64531	12.53773	12.64301	0.37543	0.43152	0.32394	0.42921	0.01322	0.06932	-0.03826	0.06701

		% of Full Scale reading (75 psi)
Max. discrepancy		
pos	0.47633	0.63511
neg	-0.08554	-0.11405
Max. Allowable		10.00

DR-052 A p. 4/7

1 of 14

Attachment B

The following is a performance comparison between 30 psi pressure transducers with pre- and post-work calibrations (LBNL 107, 110) and those with only pre-work calibrations (LBNL 108-109). For these comparisons the "converted" data file was reconverted by cancelling the nominal field calibration constants, and using the actual calibration constants from the calibration sheets. This is the same process used in the submitted data except that here it is done for many points in sequence in the data set, not just the single ambient and steady state measurement points.

The following are the first 44 lines of pressure data (psi) from columns 3-6 in the first data acquired at ambient conditions at Niche 4 (pre construction). The data were taken from "N4 air K 6.24.98.csv converted.csv" (reconverted data from 6/24/98)

Kavlico #s	LBL 110	LBL 109	LBL 108	LBL 107	Differences from LBL 110 for:		Differences from LBL 107 for:	
time	UL-0	UL-1	UL-2	UL-3	109	108	109	108
20:23:31	13.91652	13.02375	12.93847	13.09092	-0.89277	-0.97805	-0.06717	-0.15245
20:23:36	13.89544	13.02645	12.92393	13.08949	-0.86899	-0.97151	-0.06303	-0.16556
20:23:42	13.91449	13.02811	12.94231	13.10133	-0.88639	-0.97218	-0.07322	-0.15901
20:23:48	13.92702	13.02277	12.92114	13.09914	-0.90425	-1.00588	-0.07637	-0.17800
20:23:53	13.92530	13.01759	12.91729	13.09363	-0.90771	-1.00800	-0.07605	-0.17634
20:23:59	13.91209	13.01436	12.90154	13.09514	-0.89774	-1.01055	-0.08079	-0.19360
20:24:04	13.89724	12.99167	12.90237	13.07561	-0.90557	-0.99487	-0.08394	-0.17324
20:24:09	13.89889	13.00820	12.93531	13.07870	-0.89069	-0.96358	-0.07051	-0.14340
20:24:14	13.88749	13.00572	12.90712	13.09250	-0.88177	-0.98037	-0.08679	-0.18538
20:24:19	13.88426	13.01383	12.91865	13.07493	-0.87043	-0.96561	-0.06110	-0.15628
20:24:24	13.91877	13.01218	12.91707	13.07425	-0.90659	-1.00170	-0.06207	-0.15718
20:24:29	13.91832	13.01969	12.91225	13.08006	-0.89863	-1.00607	-0.06037	-0.16781
20:24:35	13.93632	13.01947	12.91127	13.08949	-0.91686	-1.02506	-0.07002	-0.17822
20:24:40	13.88456	13.02337	12.93922	13.09009	-0.86119	-0.94534	-0.06672	-0.15087
20:24:45	13.90564	13.02668	12.92091	13.09793	-0.87896	-0.98473	-0.07125	-0.17702
20:24:50	13.91907	13.02796	12.92491	13.09243	-0.89111	-0.99416	-0.06447	-0.16752
20:24:55	13.93565	13.02893	12.92792	13.08956	-0.90672	-1.00773	-0.06063	-0.16164
20:25:01	13.90632	13.02908	12.94043	13.09137	-0.87723	-0.96589	-0.06229	-0.15094
20:25:06	13.92642	13.03006	12.93410	13.10374	-0.89636	-0.99232	-0.07368	-0.16964
20:25:11	13.93992	13.02938	12.94910	13.08428	-0.91054	-0.99083	-0.05490	-0.13519
20:25:16	13.91794	13.01984	12.93809	13.09484	-0.89810	-0.97985	-0.07500	-0.15675
20:25:21	13.92755	13.03014	12.92393	13.09929	-0.89741	-1.00362	-0.06916	-0.17536
20:25:26	13.93040	13.02908	12.94118	13.08783	-0.90131	-0.98921	-0.05874	-0.14664
20:25:32	13.91172	13.03600	12.94344	13.09808	-0.87572	-0.96827	-0.06209	-0.15464
20:25:37	13.92500	13.03231	12.91722	13.10412	-0.89268	-1.00778	-0.07180	-0.18690
20:25:42	13.91584	13.00992	12.92310	13.10910	-0.90592	-0.99275	-0.09917	-0.18600
20:25:47	13.92275	13.00880	12.92709	13.08594	-0.91395	-0.99565	-0.07714	-0.15885
20:25:52	13.91907	13.02803	12.93726	13.10465	-0.89104	-0.98181	-0.07661	-0.16738
20:25:57	13.92815	13.02615	12.94224	13.11279	-0.90199	-0.98591	-0.08664	-0.17055
20:26:02	13.91832	13.02766	12.93365	13.10789	-0.89066	-0.98467	-0.08023	-0.17424

20:26:07	13.88404	13.02811	12.93515	13.05434	-0.85593	-0.94888	-0.02624	-0.11919
20:26:12	13.92530	13.02983	12.92476	13.10163	-0.89546	-1.00054	-0.07179	-0.17687
20:26:17	13.91284	13.02548	12.93455	13.10630	-0.88737	-0.97829	-0.08083	-0.17175
20:26:22	13.92432	13.03231	12.92777	13.05600	-0.89201	-0.99655	-0.02369	-0.12823
20:26:27	13.91164	13.03096	12.94420	13.10525	-0.88068	-0.96745	-0.07429	-0.16105
20:26:32	13.91562	13.02826	12.93124	13.10329	-0.88736	-0.98438	-0.07503	-0.17205
20:26:37	13.91929	13.02878	12.92732	13.05985	-0.89051	-0.99198	-0.03107	-0.13253
20:26:42	13.93137	13.02645	12.92867	13.08896	-0.90492	-1.00270	-0.06251	-0.16029
20:26:47	13.92425	13.02645	12.94261	13.07222	-0.89779	-0.98163	-0.04576	-0.12960
20:26:52	13.91262	13.02751	12.93048	13.10314	-0.88511	-0.98214	-0.07563	-0.17265
20:26:57	13.89274	13.02983	12.93274	13.05970	-0.86290	-0.96000	-0.02986	-0.12696
20:27:02	13.93197	13.03036	12.92061	13.08655	-0.90161	-1.01136	-0.05619	-0.16594
20:27:07	13.91389	13.03149	12.94028	13.10985	-0.88241	-0.97361	-0.07836	-0.16957
20:27:12	13.91892	13.03156	12.92860	13.07674	-0.88736	-0.99032	-0.04518	-0.14814

	Max. discrepancy	% of Full Scale reading (30 psi)
pos	0.00000	0.00000
neg	-1.02506	-3.41686
Max. Allowable		10.00

The following are the ambient readings in the last data acquired with these transducers. These final readings were taken some time after flow was stopped and the readings returned to being ambient and comparable in a definable way. The "converted" data is examined because the issue is whether the transducer's (without post-work calibrations) overall results are valid. The raw voltage is not examined because the conversions have already been verified as valid in the initial calibrations. Although the difference between the 107 and 110 transducers is greater than the difference between the 108 and 109 unit, both 107 and 110 units had acceptable post-work calibrations.

The following are the last 44 lines of pressure data (psi) from columns 3-6 in the last data acquired at ambient conditions at Niche 4 (pre-construction). The following data were taken from "N4 air K 6.26.98.csv converted.csv" (reconverted data from 6/29/98)

Kavlico #s	LBL 110	LBL 109	LBL 108	LBL 107	Differences from LBL 110 for:		Differences from LBL 107 for:	
time	UL-0	UL-1	UL-2	UL-3	LBL 109	LBL 108	LBL 109	LBL 108
8:16:23	13.89094	13.09625	13.00931	13.16075	-0.79469	-0.88163	-0.06450	-0.15145
8:16:29	13.92230	13.08889	12.99778	13.17244	-0.83341	-0.92452	-0.08356	-0.17467
8:16:34	13.91314	13.09753	13.00328	13.14680	-0.81562	-0.90987	-0.04927	-0.14352
8:16:39	13.91877	13.09738	12.99830	13.18104	-0.82139	-0.92047	-0.08366	-0.18274
8:16:45	13.88854	13.09467	13.02038	13.16332	-0.79386	-0.86815	-0.06865	-0.14293
8:16:49	13.91839	13.10159	13.01134	13.17584	-0.81681	-0.90705	-0.07425	-0.16450
8:16:55	13.91239	13.09850	13.01925	13.17109	-0.81389	-0.89314	-0.07258	-0.15183
8:17:00	13 91134	13.09062	13.00825	13.15683	-0.82073	-0.90309	-0.06622	-0.14858
8:17:05	13.92402	13.09670	13.01006	13.17750	-0.82732	-0.91396	-0.08079	-0.16744

Attachment B

8:17:10	13.92425	13.09768	13.00546	13.12667	-0.82657	-0.91878	-0.02899	-0.12120
8:17:15	13.88666	13.10301	13.00365	13.17207	-0.78365	-0.88301	-0.06905	-0.16841
8:17:21	13.91134	13.09903	13.00456	13.18014	-0.81231	-0.90678	-0.08110	-0.17558
8:17:26	13.88974	13.09798	13.01323	13.14974	-0.79176	-0.87651	-0.05176	-0.13652
8:17:31	13.89221	13.09918	12.99326	13.15713	-0.79303	-0.89896	-0.05795	-0.16388
8:17:36	13.91412	13.09978	13.00697	13.16784	-0.81434	-0.90715	-0.06806	-0.16087
8:17:41	13.89439	13.10249	12.98986	13.14590	-0.79190	-0.90452	-0.04341	-0.15603
8:17:46	13.91757	13.09535	12.99657	13.11113	-0.82222	-0.92100	-0.01578	-0.11456
8:17:52	13.91622	13.09843	13.00072	13.18919	-0.81779	-0.91550	-0.09076	-0.18847
8:17:56	13.92440	13.09933	13.01466	13.14152	-0.82506	-0.90974	-0.04219	-0.12687
8:18:02	13.91044	13.09670	13.00720	13.14281	-0.81374	-0.90325	-0.04610	-0.13561
8:18:07	13.91854	13.10016	13.01194	13.15721	-0.81839	-0.90660	-0.05705	-0.14527
8:18:12	13.87083	13.09956	13.01006	13.14529	-0.77128	-0.86077	-0.04574	-0.13523
8:18:17	13.91074	13.09678	13.01006	13.15103	-0.81397	-0.90068	-0.05425	-0.14097
8:18:22	13.92245	13.10098	13.00705	13.16716	-0.82146	-0.91540	-0.06618	-0.16012
8:18:27	13.91877	13.09655	13.00840	13.16437	-0.82222	-0.91037	-0.06782	-0.15597
8:18:32	13.88501	13.09490	12.99288	13.16814	-0.79011	-0.89213	-0.07325	-0.17527
8:18:38	13.89454	13.09850	13.01014	13.17124	-0.79603	-0.88440	-0.07273	-0.16110
8:18:43	13.91262	13.10211	13.00931	13.17071	-0.81051	-0.90331	-0.06860	-0.16140
8:18:48	13.92327	13.08866	13.00501	13.17516	-0.83461	-0.91826	-0.08650	-0.17015
8:18:53	13.88216	13.09858	13.00388	13.17335	-0.78358	-0.87828	-0.07477	-0.16947
8:18:58	13.91847	13.09460	13.00411	13.17003	-0.82387	-0.91436	-0.07543	-0.16592
8:19:03	13.91007	13.09490	13.00893	13.14922	-0.81517	-0.90114	-0.05432	-0.14029
8:19:08	13.93032	13.10038	13.00659	13.09492	-0.82994	-0.92373	0.00547	-0.08832
8:19:14	13.91862	13.09896	13.00381	13.14220	-0.81966	-0.91481	-0.04325	-0.13840
8:19:19	13.86738	13.09655	13.00192	13.16566	-0.77083	-0.86546	-0.06910	-0.16373
8:19:24	13.94225	13.10301	13.00335	13.14575	-0.83924	-0.93890	-0.04273	-0.14239
8:19:29	13.92087	13.09685	12.98482	13.15080	-0.82402	-0.93605	-0.05395	-0.16598
8:19:34	13.91862	13.09588	13.01458	13.18632	-0.82274	-0.90404	-0.09044	-0.17174
8:19:39	13.90797	13.10128	13.00931	13.14876	-0.80668	-0.89866	-0.04748	-0.13946
8:19:44	13.89604	13.10068	12.99130	13.15932	-0.79536	-0.90474	-0.05864	-0.16803
8:19:49	13.92575	13.09896	13.01647	13.16890	-0.82679	-0.90928	-0.06994	-0.15243
8:19:54	13.92702	13.09835	13.00795	13.15465	-0.82867	-0.91907	-0.05629	-0.14670
8:19:59	13.92575	13.09385	12.98414	13.17297	-0.83190	-0.94161	-0.07912	-0.18883
8:20:04	13.92102	13.09828	13.00237	13.16792	-0.82274	-0.91865	-0.06964	-0.16554

Max. discrepancy	% of Full Scale reading (30 psi)
pos 0.00547	0.01822
neg -0.94161	-3.13870
Max. Allowable	10.00

Subject: Re: FYI - DR-052
Date: Fri, 25 Jan 2002 10:02:28 -0800
From: Ivelina_McClung@notes.ymp.gov
To: NAden-Gleason@lbl.gov

---------- Forwarded by Ivelina McClung/YM/RWDOE on 01/25/2002 09:51 AM ----------

Ivelina McClung
01/25/2002 09:44 AM

To: Nancy Aden-Gleason/YM/RWDOE@CRWMS
cc:

Subject: Re: FYI - DR-052 (Document link: Ivelina McClung)
QA:N/A Exclusionary

Concerning the FYI - DR-052 referencing the data collected using Kavlico transducers in the period 1/28/98-10/14/98 I can provide the following information:
The Kavlico transducers had an annual calibration period. According to our usage history information these transducers were used for data collection/measurements before the end of their annual due date. After I was designated M&TE coordinator in 1999 I was informed (as a part of the data gathering process) that these equipment items had been removed from service and were no longer in use. When YAP-12.3Q, Control of Measuring and Test Equipment and Calibration Standards became effective (7/30/1999) I requested that all removed from service equipment be sent for calibration, as required by the new procedure.

The following is a list from my records of equipment removed from service after July 30, 1999 which shows the removed from service dates and calibration dates.

Ivelina

(See attached file: removed-from-service.xls)

Nancy Aden-Gleason
01/24/2002 04:50 PM

To: Ivelina McClung/YM/RWDOE@CRWMS
cc:

Subject: Re: FYI - DR-052
QA:N/A Exclusionary

We need to meet this deadline. Please let me know if there are problems.

---------- Forwarded by Nancy Aden-Gleason/YM/RWDOE on 01/24/2002 04:51 PM ----------

(Embedded image moved to file: pic24946.pcx)

Shellie Rucinski
01/24/2002 03:42 PM
(Embedded image moved to file: pic27506.pcx)

Out Of Calibration Report	Vendor	Description	Serial Number	Last Calibration Date	Out Of Calibration Report	Removed from service date
LBNL-2000-004	Vaisala, Inc.	Humidity/Temperature Probe	R3020004	9/20/00	LBNL-2000-004	11/9/00
LBNL-2000-005	Vaisala, Inc.	Humidity/Temperature Probe	P4240007	9/6/00	LBNL-2000-005	11/9/00
LBNL-2000-006	Vaisala, Inc.	Humidity/Temperature Probe	R2820002	9/21/00	LBNL-2000-006	11/9/00
LBNL-2000-007	Vaisala, Inc.	Humidity/Temperature Probe	R2520004	9/6/00	LBNL-2000-007	11/9/00
LBNL-2000-008	Hewlett-Packard	Oscilloscope	1916A00814	9/14/00	LBNL-2000-008	12/19/00
LBNL-2001-02	Setra Systems, Inc.	Pressure Transducer	709229	2/13/01	LBNL-2001-02	4/11/01
LBNL-2001-03	Setra Systems, Inc.	Pressure Transducer	765026	2/14/01	LBNL-2001-03	4/11/01
LBNL-2001-04	Setra Systems, Inc.	Pressure Transducer	790410	2/14/01	LBNL-2001-04	4/11/01
LBNL-2001-05	Setra Systems, Inc.	Pressure Transducer	790399	2/8/01	LBNL-2001-05	4/11/01
LBNL-2001-07	Setra Systems, Inc.	Pressure Transducer	1127351	1/31/01	LBNL-2001-07	4/11/01
LBNL-2001-08	Setra Systems, Inc.	Pressure Transducer	1156579	1/29/01	LBNL-2001-08	3/26/01
LBNL-2001-09	Setra Systems, Inc.	Pressure Transducer	1156580	2/7/01	LBNL-2001-09	3/26/01
LBNL-2001-10	Setra Systems, Inc.	Pressure Transducer	1156572	1/30/01	LBNL-2001-10	3/26/01
LBNL-2001-11	Setra Systems, Inc.	Pressure Transducer	1156573	1/31/01	LBNL-2001-11	3/26/01
LBNL-2001-15	Setra Systems, Inc.	Pressure Transducer	1158574	5/8/01	LBNL-2001-15	3/26/01

DEFICIENCY/CORRECTIVE ACTION REPORT/STOP WORK ORDER CONTINUATION PAGE

Verification and Closure of DR BSC-02-D-052

Block 14a: Immediate Actions

None

Block 14: Remedial Action

1. Verified that six of the 56 transducers taken out of service were subsequently lost. All the transducers (56) were on an annual calibration schedule.

2. Verified an impact analyses was performed by a comparison on ambient pressure readings between pressure transducers, with only pre-test calibration, similar and adjacent to those with pre-test and post calibrations that were within the technical work plan specification of $\pm$ 10% full scale. The conclusion of the impact analysis was the six transducers were within technical work plan specification and do not affect the quality of the data (see DR Attachment A).

3. Verified the data acquisition time span was 1/28/98 to 6/28/98 by review of the Scientific Notebook SN-LBNL-SCI-078-VI (MOL.19991013.0469). In addition, verified TDIF 309275 for DTN LB980901233124.101, changed the data acquisition period to 1/28/98-6/26/98.

4. Verified LBNL Procedure YMP-LBNL-QIP-12.0, Rev. 1, Mod. I, Control and Calibration of Measuring and Test Equipment, effective 1/17/97, was the controlling procedure at the time. The procedure only required the PI or designee to initiate an evaluation of any data generated or processes monitored by the subject equipment since last calibration. If data evaluation reflects a nonconformance, an NCR shall be initiated per YAP-15.1Q.

5. Verified amendment four to CAR LVMO-98-C-002, that all data entered into the Technical Data Management System (TDMS), prior to 6/30/99 was flagged as To Be Verified (TBV). A checklist used to verify the Q status was added to AP-3.15Q.

Block 15: Extent of Condition

1. Verified LBNL has determined this was not an isolated condition of M&TE being removed from service without a post calibration. However, it was the only incident not evaluated and resolved through other processes, related to principal factor quality-affecting data at LBNL. Once this checklist is finalized, all LBNL principal factor checklist will be considered complete.

Verification and Closure of DR BSC-02-D-052

Block 15: Extent of Condition (cont.)

2. Verified the trend database for NCRs reflect this is only the second occurrence of no closing calibration since October 1, 1999.

Block 16: Cause

LBNL determined that the M&TE removal from service without a post calibration was an administrative oversight, due to no central person performing M&TE oversight activities.

Block 17: Action to Preclude Recurrence

1. Verified that currently the checklist for AP-3.15Q resulting from CAR LVMO-98-C-002, Amendment Four, to verify all Q data prior to 6/30/99 identified as TBV is currently resolving the issue related to data identified as TBV.
2. Verified the LBNL coordinator is tracking the status of M&TE (See Attachment B to DR)
3. Verified all project M&TE coordinators were trained on their responsibilities related to M&TE on January 29, 2002.

Based on the above verifications, it is recommended that this DR be closed.

QAR: Donald J. Harris 2/15/02

Donald J. Harris Date