Browning, R. E.

United States Department of the Interior

GEOLOGICAL SURVEY
BOX 25046 M.S. 421
DENVER FEDERAL CENTER
DENVER, COLORADO 80225

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

WBS#: 1.2.3.3.3.1
QA : "QA"
December 19, 1988

Carl P. Gertz, Project Manager
Yucca Mountain Project Office
U. S. Department of Energy
P. O. Box 98518
Las Vegas, NV 89193-8518

Dear Carl:

This is in response to a letter dated November 29, 1988 (copy enclosed) from Robert R. Loux, Nevada Waste Project Office, to Richard Luckey, USGS hydrologist. The letter is concerning repeated blocks of data in a magnetic tape of raw transducer data from Yucca Mountain observation wells transmitted to DOE on April 6, 1987 to satisfy NWPO's December 11, 1986 request for water-level data.

While I regret that the data tape received by NWPO contained a splicing error, I must point out that the USGS, on several occasions, expressed concerns about transmitting raw, unreviewed data to any potential user of the data. In addition, the USGS provided more than adequate cautions and warnings when the raw data were transmitted. The April 16, 1987 transmittal letter stated: "these data are preliminary subject to revision, and have not had the review that the USGS deems necessary prior to publication". Later in the same paragraph, the letter stated "Therefore, judgment and caution should be applied to using these data". The first file on the magnetic tape containing the data included the following statements:

"DATA SUBJECT TO REVISION"
and
"CONTENTS OF THESE FILES HAVE NOT BEEN TESTED !!!!!"

The data files themselves periodically contained the statement "PRELIMINARY DATA SUBJECT TO REVISION". Such a statement was inserted in the 1985 file in question for well UE-25 p#1 between Julian days 212 and 213. Apparently, this caution statement had been deleted from the copy of the data file attached to the November 29 NWPO letter. Given the above, it appears obvious to me that the State of Nevada was adequately warned that the data in question had not received full USGS review and was subject to revision if any errors were found.

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Further, the NWPO letter of November 29, 1988, incorrectly asserts that "the Survey allowed the problem to occur and go uncorrected for five years". In reality, the splicing error in the 1985 data probably occurred in March of 1987 while data were being assembled from separate files for the December 11, 1986 State of Nevada data request. Twelve hours of data from Julian day 212 in 1986 was spliced into the 1985 file. The USGS discovered and corrected this error before the State of Nevada's contractor questioned the data. Therefore, the USGS strongly disagrees with the NWPO assertion that the splicing error "presents a new and disturbing question of data credibility and confidence". In actuality, the splicing error demonstrates clearly that raw field data should not be transmitted to users of the data until it has received thorough review, and any artifacts of data compilation have been found and corrected. This position was clearly stated by the USGS when it was first requested to supply water-level data to the State of Nevada.

All parties involved in the Yucca Mountain project must realize that the saturated-zone water-level data base is large and complex. Therefore, as raw data are collected by automated systems in the field and then processed for storage, artifacts of the data-compilation process are bound to occur. For example, the USGS is presently operating 15 wells in the continuous (automated) water-level network. The data recorded by the data logger for each well are transferred to cassette tape twice each month and then spliced into working files. This means that well over 300 data splices will be made in 1988. With some of the data going back to 1983, there are in excess of a thousand data splices in the data base. One, or even a few, errors in splicing do not compromise the entire data base, provided that any such errors are identified and corrected systematically. Furthermore, the routine identification and correction of the splicing error in question by the USGS is strong objective evidence that the USGS review will identify data-compilation artifacts. Again, the USGS has always maintained that thorough review of the data prior to release and publication is critical, and we will continue to perform these reviews.

Regarding NWPO's disappointment at not being notified of data errors, the USGS considered the data transmitted to the State of Nevada as preliminary and notified the State of this fact; therefore, we saw no need to notify the State of any errors that were identified and corrected until after the entire data set was reviewed. The USGS was aware that the State likely would request and receive the corrected data once it was fully reviewed by the USGS. However, like the State of Nevada, the USGS also has limited resources for data analysis and thought it counterproductive to dilute these resources by trying to keep the State's preliminary copy of the data consistent with the USGS working copy.

The USGS hopes to complete its review of the 1983-Dec. 87 data by the end of February, 1989. Once this review is complete, the data report in preparation will go through both the USGS and DOE report-approval process. This review and approval process will provide additional assurance that the data are free from splicing errors and meet high USGS standards. The USGS assumes that, once this review process is complete, the DOE Yucca Mountain Project Office will notify NWPO of the availability of the reviewed data and will make arrangements to transmit the data to NWPO. Once the reviews of the 1983-87

data are completed, the USGS will begin to review the 1988 data. Considering the complexity and thoroughness of the review, it may take several months to complete. Because of conflicting demands on our project staff, including such things as completing study plans and continuing operation of the water-level monitoring network, it is uncertain when review of the 1988 data will be completed.

Concerning NWPO's request for a listing of data files reviewed to date and the results of those reviews, the USGS does not believe that project resources should be diverted to compile such a list, especially considering that the reviewed data for 1983-1987 will be made available in the near future. Furthermore, the NWPO should be reminded that such requests for information should be made to the DOE-YMPO, and not directly to the USGS.

In conclusion, the USGS will continue to cooperate with objective technical evaluation of water-level data collected at Yucca Mountain. In addition, the USGS will continue to make these data available to all interested parties, provided that the importance of thorough review of the data before release is recognized and supported by all concerned.

Sincerely,

Larry R. Hayes

Larry R. Hayes
Technical Project Officer
Yucca Mountain Project, USGS

Enclosure: Letter dated November 29, 1988 (Loux to Luckey)

cc: Robert R. Loux, NWPO
Linda Lehman, L. Lehman & Assoc.
Robert Browning, NRC
Paul Prestholt, NRC
John Fordham, DRI
Martin Mifflin, Mifflin & Assoc.
Kathleen Turner, GAO
Verne Schneider, USGS, Reston
Mitch Reynolds, DOE
Bob Raup, USGS
Don Jorgensen, USGS
David Harris, USBR
Joe Willmon, USGS
Dick Luckey, USGS

LRH/pnb
DATATAPE.LRH

RICHARD H. BRYAN
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director

AGENCY FOR NUCLEAR PROJECTS
NUCLEAR WASTE PROJECT OFFICE
Capitol Complex
Carson City, Nevada 89710
(702) 885-3744

November 29, 1988

Automated water-Level Data

cc: USGS RC/ 12333 / 1 / 1

DATE 12-1-88

DH

Richard Luckey
U.S. Geological Survey
Denver Federal Center
Box 25046, Mail Stop 421
Lakewood, CO 80225

Dear Mr. Luckey:

As you are aware, this Office has been reviewing the Yucca Mountain water level data collected by the U.S. Geological Survey. Mr. Jay Rice of L. Lehman & Associates, one of our contractors, recently discussed with you the problem of repeated blocks of data in the 1983-1987 USGS Yucca Mountain water level transducer data. The attached telephone summary documents the relevant aspects of the conversation. According to the conversation summary, it appears some of the data files were incorrectly spliced. Further, according to the conversation, the USGS is aware of the problem, has been reviewing the Yucca Mountain transducer data, and has been correcting the data as the errors are identified. Attached to this letter are examples of the errors identified by L.Lehman & Associates.

In the view of the State, this problem presents a new and disturbing question of data credibility and confidence. While we applaud the Survey for identifying the problem and establishing a program for its correction, we are greatly concerned that the Survey allowed the problem to occur and go uncorrected for five years. Additionally, given Nevada's limited resources for data analysis, it is very disturbing that the State was not notified of the data errors when they were first identified by the USGS. We now question whether the USGS data review will discover all of the induced errors and whether, in fact, the quality of these data can be restored to a level consistent with their necessary and required reliability.

So that the State and its contractors, L. Lehman & Associates, can better assess the usefulness of this transducer data, we request that the USGS provide to this Office, <u>as soon as possible</u>, a list of all data files (by well and date) that have

been reviewed to date. The list should indicate either that a file is free of splicing errors or the precise location(s) of the splicing error(s). If a splicing error is identified, a complete corrected data file for that well should be provided.

As reported in the conversation summary, the USGS plans to complete its review of the transducer data by February 1989. The State requests that at that time the Survey provide a final list that identifies all splicing errors with the 1983-87 transducer data; provide all remaining corrected data files; provide additional transducer data collected for Yucca Mountain since January 1987 (period January 1987 - December 1988); and assure that the 1987 - 1988 data does not contain similar splicing errors.

We desire resolution of this issue at the earliest time. Should you need any clarification, do not hesitate to contact me or Carl Johnson of my staff.

Sincerely,

Robert R. Loux
Executive Director

RRL:CAJ:ed

encs.

cc: Larry Hayes, USGS
Carl Gertz, DOE
Linda Lehman, L. Lehman & Assoc.
Robert Browning, NRC
Paul Prestholt, NRC
John Fordham, DRI
Martin Mifflin, Mifflin & Assoc.
Kathleen Turner, GAO

TELEPHONE CONVERSATION SUMMARY

CLIENT/PROJECT/TASK/SUBTASK:

Nevada/Saturated Zone Analysis/Task 5

PURPOSE OF CALL:

Discuss the problem of repeated data

DATE:

November 4, 1988

CONTACT:

Richard Luckey

LLA CONTACT:

Jay Rice

AFFILIATION:

USGS, Denver

TELEPHONE #:

303/236-5193

CONVERSATION SUMMARY:

The USGS has been reviewing the Nevada transducer data and has made corrections to errors in the data. It is possible some of the data files were spliced incorrectly. For example, the well UE25-P1, 1985 data file transmitted to L. Lehman & Associates, Inc. contains duplicate records on day 212 from 1200-1300 hours. The repeated day and hour values are identical, but the data fields differ. During the telephone conversation, Richard Luckey reviewed his copy of the 1985 UE25-P1 data on his computer. Mr. Luckey's copy did not have repeating data at day 212 from 1200 - 1300 hours. After 1300 hours on day 212, the values in the transducer columns in his copy of the data are inconsistent with the values in the transducer columns for LLA's copy. From this, Mr. Luckey concluded that his copy must have been edited and the UE25-P1, 1985 data file is probably an example of an improper file splice. The USGS data and LLA data in this file conflict. This file is probably an example of an incorrect splice.

The USGS has not yet finished processing the transducer data, and therefore will not release a new copy of the data. The USGS hopes to have all data processing finished by February 1989.

FOLLOW-UP ACTION ITEMS:

1) Inform Carl Johnson of this problem.

2) Request USGS to submit all available information on this problem to L. Lehman & Associates.

RECEIVED
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NUCLEAR WASTE PROJECT OFFICE

Example of repeater data.

FILE12.dat = 1985, well ue25-p1 d

FILE25.dat = 1986, well ue25-p1 da

day	hour	voltage	voltage		
212	1000	+13.13	+5003.	+25.19	-2.735
212	1100	+13.15	+5002.	+27.65	-2.845
212	1200	+13.14	+5003.	+29.62	-2.901
212	1300	+13.08	+5003.	+31.37	-2.950
212	1200	+13.10	+5003.	+37.15	+09.89
212	1300	+12.99	+5003.	+38.05	+10.02
212	1400	+12.83	+5003.	+39.38	+10.12
212	1500	+12.67	+5002.	+41.49	+10.24
212	1600	+12.50	+5003.	+43.23	+10.30
212	1700	+12.45	+5002.	+44.32	+10.34
212	1800	+12.34	+5001.	+43.56	+10.34
212	1900	+12.24	+5002.	+38.96	+10.31
212	2000	+12.19	+5002.	+33.57	+10.27
212	2100	+12.15	+5002.	+28.49	+10.23
212	2200	+12.11	+5002.	+25.24	+10.23
212	2300	+12.08	+5003.	+22.74	+10.23
213	0000	+12.16	+5002.	+24.79	-2.623
213	0100	+12.14	+5002.	+24.16	-2.669
213	0200	+12.13	+5003.	+23.56	-2.688
213	0300	+12.12	+5002.	+22.06	-2.671
213	0400	+12.10	+5002.	+19.47	-2.626
213	0500	+12.08	+5002.	+17.61	-2.587
213	0600	+12.06	+5002.	+15.94	-2.571
213	0700	+12.44	+5002.	+15.90	-2.578
213	0800	+12.85	+50		
189	2300	+12.11	+5002.	+24.12	+10.30
190	0000	+12.08	+5003.	+21.27	+10.23
190	0100	+12.05	+5003.	+19.12	+10.19
190	0200	+12.02	+5003.	+17.64	+10.17
190	0300	+12.00	+5002.	+16.46	+10.17
190	0400	+11.99	+5002.	+15.44	+10.21
190	0500	+11.98	+5002.	+14.54	+10.24
190	0600	+12.10	+5003.	+13.65	+10.28
190	0700	+12.64	+5003.	+16.16	+10.28
190	0800	+12.94	+5003.	+20.69	+10.24
190	0900	+13.07	+5003.	+24.41	+10.17
190	1000	+12.74	+5003.	+27.44	+2.367
190	1000	+13.13	+5003.	+29.08	+09.96
190	1100	+13.11	+5003.	+30.87	+09.86
190	1200	+12.99	+5003.	+32.40	+09.79
190	1300	+12.93	+5003.	+34.02	+09.77
190	1400	+12.72	+5003.	+35.62	+09.79
190	1500	+12.70	+5003.	+36.23	+09.89
190	1600	+12.57	+5002.	+38.79	+10.04
190	1700	+12.47	+5002.	+39.83	+10.19
190	1800	+12.32	+5003.	+37.65	+10.31
190	1900	+12.24	+5002.	+34.30	+10.41

190^C

E:\NEVADA\TRANSDUC.DAT\UE25-P1.DAT>

L. Lehman & Assoc.
11/9/88