



To/MS: Distribution
From/MS: Ken Hargis, EM-8, MS K490 KH
Phone/FAX: 7-5021 / FAX: 7-0486
Symbol: EM-8:93-2091
Date: July 31, 1993

memorandum
Environmental Protection Group
EM-8

SUBJECT: PROPOSED SAMPLING FOR LEAD PROBLEM

Attached is a proposed investigation plan designed to attempt to determine the source of lead observed in the May 1993 sampling of Laboratory test wells. Because of the priority of this investigation, we would appreciate it if you could please provide us review comments on the proposal by the early part of the week of August 1.

Our current plans are to initiate a pilot test of a filtering system to remove particulate lead from pumped water at well DT-5A. The test will consist of running 50 to 100 gallons of well water through a series of high-capacity filters to evaluate the lead removal efficiency. All produced water will be containerized in 55-gallon drums in case the filter system is not sufficiently effective. If the treatment system is effective, it will greatly simplify management of the purge water.

Should you have questions on this matter, please contact Alan Stoker at 667-0818 or Bruce Gallaher at 667-3040.

KH/BG/se

- Cy: Steve Alexander, NMED Tech Compl. - FAX No. 827-4361
- Dave Englert, NMED/AIP, FAX No. - 827-4361
- Fraser Goff, LANL, EES-1, FAX No. - 665-3285
- Jeanne Lubbering, San Ildefonso POEP, FAX No. - 883-7641
- John Parker, NMED/HRMB AIP, FAX No. - 827-4361
- Alex Puglisi, DOE/LAAO, Sciencetech, FAX No. - 667-8038
- Franco Sisneros, LANL, HS-7, FAX No. - 665-6977
- Bruce Swanton, NMED/AIP, FAX No. - 827-4361
- Reading File
- Circ. File



12417

15WA LANL 6/15/93

TR

PROPOSED INITIAL RESAMPLING OF TEST WELLS

SAMPLING EFFORT PROPOSAL

The initial resampling of the Los Alamos Test Wells to attempt to determine the source of lead observed in May 1993 samples will include these principal efforts:

1 A. Test Wells TW-1 and DT-5A will be pumped for an extended period, now anticipated to be approximately two weeks, with samples collected at intervals of approximately 0hr., 4 hr., 8hr., 24, hr, 2 days, 3, days, 4 days, 6 days, 8 days, 12 days. At each sampling time, the samples collected would include an unfiltered sample, and three filtered samples (0.45 micron, one larger pore 10 micron, and one smaller 0.02 micron if filter size is readily available via commercial sources). Field measurements of temperature, pH, conductivity, dissolved oxygen (DO), and redox potential (if DO levels are < 1 mg/L) will be made as each sample is collected.

The unfiltered sample and the filtrates would be analyzed by EM-9 for lead (by the Drinking Water procedure) and other metals (those possible by ICPEs).

The filtered material would be given to EES-1 (Fraser Goff) for evaluation of the utility and feasibility of Scanning Electron Microscopy to evaluate the nature and possible source identification of the particulate-associated lead.

B. Samples of the electric conduit and samples of the red paint noted on some of the well caps drilled for installation of the transducer access tubes will be subject to bench scale leaching tests. (The leach tests may be conducted with pH adjusted to match that in test wells, possibly with TCLP "solution", and/or possibly some "surface abrasion" to generate particles as might have occurred during pipe emplacement). This will also be reviewed with EES-1 to evaluate the applicability and/or feasibility of the SEM techniques.

C. Data on the general chemistry and metal content of the water samples from the test wells taken 1991, 1992 and May 1993 will be compiled for evaluation of potentially related parameters.

All information from the above tasks will be compiled for distribution, review, and discussion among LANL, DOE, NMED, and the San Ildefonso Pueblo. This review/discussion will determine subsequent investigation/evaluation steps. (This will include reviewing appropriate actions for the other test wells.)

IMPLEMENTATION CONSIDERATIONS

2 The proposal to focus initially only on DT-5A and TW-1 was brought about by considering the following:

--Discussion with the Environmental Chemistry Group, EM-9, has indicated that one-day turnaround on Priority 1 samples should be

feasible for a limited number of samples (e.g. about 10 Pb samples/day, 2-4 other "metals" by ICPES)

--TW-1 and DT-5A are the two wells that had the highest (by a very large margin) concentrations of lead. (The other wells showed results not very different than other intermittent "hits" for lead dating back to 1988, and none of them were more than a few times the old MCL or the present Action Level). Both TW-1 and DT-5A have electrically powered pumps and thus no major logistics problems in keeping them operating for an extended period.

Careful consideration is being given to determination of the appropriate means for handling and/or treating the water that will be pumped from these wells during a two week period. Personnel from EM-8 are evaluating the best options for staying in both letter and spirit compliance with NPDES discharge requirement, potential to generate RCRA waste, transportation requirements, potential impacts on LANL waste management facilities/procedures. Coordinating these efforts may in fact, be the determining issues regarding when the tests can be started.

Handwritten notes:
Pb = 1.0 mg/L
MCL = 50 mg/L
MCL = 1.5 mg/L
Pb = 5.0 mg/L

FACSIMILE TRANSMITTAL SHEET

FROM:  Bruce Swanton, Supervisor
DOE/LANL Oversight Program Manager
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department

Fax Number: (505) 827-4361

Phone Number: (505) 827-4300

Address: HRMB/NMED
525 Camino de los Marquez
P.O. Box 26110
Santa Fe, NM 87502-6110

TO: Alan Stoker, EM-8
FAX NUMBER: 7-0480

TO: John Parker, HRMB AIP
FAX NUMBER: 827-4361

TO: Franco Sisneros, LANL/HS-7
FAX NUMBER: 5-6977

TO: Alex Puglisi, DOE/LAAO/Scientech
FAX NUMBER: 7-8038

TO: David Englert, NMED/AIP
FAX NUMBER: 827-4361

TO: Jeanne Lubbering, POEP/San Ildefonso
FAX NUMBER: 883-7641

TO: Steve Alexander, NMED Tech.Compl.
827-4361

SUBJECT: 7/22 TW Lead Meeting Notes (No Attachment)s

Meeting Notes
Lead in LANL Test Wells: Phase I Alternatives
July 22, 1993

The meeting attendees list is attached.

Alan Stoker provided a summary of the history of LANL's test wells:

- o The test wells (TW's) were installed by the USGS for the AEC. #'s 1,2,3 and 4 were installed as a part of an investigation into the suitability of the deep aquifer for a possible water supply system in 1949. TW's 1-4 had pumps installed by 1970. #'s 1 and 2 had pumps during the 60's. In 1971 pump for TW-4 was moved to DT-5A.
- o TW2-4 have Grundfos submersible pumps while 1, 8, 5A, 9 and 10 have O'bannon cylinder pumps.
- o Sampling for trace metals in supply wells began in 1970's pursuant to the Clean Water Act, while test well trace metal sampling began in the 1988.
- o LA-6 was taken out of service due to arsenic concentration in the 1970's.
- o Sampling schedule done on a 3-year cycle during which each test well is sampled for both metals and organics. Rad and general chemistry is done for each well annually.
- o EM-9 is not used nor regarded as a certified drinking water lab so all samples for drinking water acceptability are submitted to SLD.
- o Survey for drinking water system done 10/92 for 78 homes revealed two exceedances for lead. Subsequent tests were done at "adjacent sinks" and found no problems. Adjacent sink tests are done to determine if exceedances are due to system or to individual house plumbing. (Attachment 1)
- o Los Alamos Canyon Field (LA) wells were last used in the regional water supply system in 1990. None are now used.
- o The supply wells 1993 test results shown as "underway" in Attachment 2 are due next week.
- o In 1992 most TW's were modified as follows: 1-1/2" galvanized pipe (aka "thin walled electric conduit") was installed as a part of placement of transducers in order to begin collecting accurate water level measurements in wells 1, 3, 8, 5A, 9 and 10. No pipe dope was used, the galvanized pipe segments were joined by threaded couplings.
- o TW-2 was redrilled an additional 30' in 1990 as too little of the screen was in the saturated zone and a new 10' screen

screen installed. A lead "swedge" was removed and pvc pipe was installed rather than galvanized thin wall electric conduit for transducer access.

- o TW-4 has a plastic rather than galvanized pipe for transducer.

Alan's/colleagues' speculations as to possible lead sources if other than from aquifer:

1. The thin-walled electric conduit transducer access pipe.
2. Agitation of the casing and internal well plumbing may have dislodged system components which might include lead, e.g., pipe dope in old pump column joints.
3. In TW-4, the new galvanized pump column.
4. Paint on well caps, possibly red-lead paint which was drilled through during new access tube installation.

Alan described TA-49 and its TW system:

Deep Test (DT) wells 5,9 and 10 are located in and around TA-49.

Most lead used during the Hydronuclear tests (1959 and 60) was used at the NE and SE test locations. Total lead used 90,000 kg.

DT-5A is screened approx. 200' into the saturated zone, 8" casing. Its O'Bannon pump is capable of only about 1 gal/min. Samples from this well during May event were taken after well had been purging over 24 hours.

Group discussion on possible elements of Phase 1 lead source investigation

(Not in order of proposed sequence nor in priority)

1. Conduct a time series of well samples at all wells with significant lead in previous samples. Possibly a geometric time sequence (i.e., at one hour, two hours, four, sixteen, sixty four, etc., hours for e.g. two weeks) while wells are constantly purging. Collect water chem data at same time: pH, redox, temperature; as well as Pb and other trace metals.

Objective: determine whether the lead concentration in samples decreases as it should if the source is in the well construction elements and not in the aquifer.

Swanton considered this a large problem in that the pump may be incapable of purging the well fast enough to attain formation water relatively unaffected by the construction elements which might be the lead source. But via rough calculations for DT-5A: given 200 feet of standing water in an 8 inch screened casing:

$$2.6 \text{ gal/hr} \times 200' = 522.2 \text{ gal, or } \frac{522 \text{ gal}}{60 \text{ gal/hr}} = 9 \text{ hours}$$

2.6 gal/hr = 27 hours well sl.

radius = 4 inch = .333 feet

$V = \pi r^2 h = 3.14 \times .333^2 \times 200 \times 7.48 \text{ gal/ft}^3 = 522 \text{ gals}$

Three well casings would be 1,565 gals, which could be pumped in 26 hours at one gal/min.

Swanton's concern seems unfounded.

2. In concert with Item 1, filter each sample to, e.g., filters finer and coarser than .45 μ . Evaluate applicability/feasibility of subjecting samples to 1) scanning electron microscopy for characterization of metals as colloidal or mechanical fragments and 2) isotopic lead ratio analysis using purification and mass spectrophotometry.

Link any lead in H₂O to lead
 3. Evaluate remaining galvanized "thin wall electric conduit" pipe which has been located in supply yard for lead and evaluate applicability/feasibility of isotopic lead ratios.

4. Pull DT-5A transducer and pump stem elements for evaluations as in Item 3 above.
5. Review existing database for all trace metals for all TW's.
6. Evaluate red paint for lead content, if lead present evaluate applicability/feasibility of isotopic lead ratio analysis.

Conclusion

As there were several key persons missing from this meeting it was decided that Alan and colleagues would use the content of this meeting and propose a draft set of initial actions plus a proposed implementation schedule to be transmitted to all parties present at this meeting as well as to Robert Gallegos of the Drinking Water Bureau. Initial actions would include items 1, 2, 3, 5 and 6, above.

New news

Manner of managing purge water from time sequence study has caused concerned with LANL waste management. Pilot study featuring use of filters to remove "particulate" lead from purge water is likely to be implemented first. Other possibilities include off the shelf technology such as water softeners. This pilot study may delay start of initial actions.

Alan Stoker out of town next week, Bruce Gallaher will be contact for this subject next week.

mtg w LANL on lead in Test Wells 7/22/93

<u>Name</u>	<u>Affiliation</u>	<u>Phone</u>
John Parker	NMED/HRMB	827-4357
FRANCO SISNEROS	LANL/HS-7	665-0033
ALEX A. PUGLISI	DOE/LA/O/SCIENTECH	665-5047
Dave Englert	NMED/ALP	827 4355
Bruce Swanton	NMED/ALP	665-7124 827 4308
Jeanne M.P. Lubbering	POEP for San I (Pueblo)	881-2254 934-0480
ALAN STOKER	LANL/EM-8	667-0818
Steve Alexander	NMED/HRMB	827-4313

LOS ALAMOS NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION (EM-8)

FAX TRANSMITTAL SHEET

FAX #: (505) 667-0486
(FTS) 843-0486

VERIFICATION #: (505) 667-5021
(FTS) 843-5021

DATE: July 30, 1993

LOG NO: EM-8-93-FAX-

TO: Steve Alexander FAX #: () 827-4361 VERIFY PHONE # () _____

GRP/ORG: NMED HRMB

TO: Dave Engle FAX #: () 827-4361 VERIFY PHONE # () _____

GRP/ORG: NMED ATP

TO: John Parker FAX #: () 827-4361 VERIFY PHONE # () _____

GRP/ORG: NMED HRMB

FROM: Bruce Gallaher PHONE #: () 667-3040

MESSAGE: _____

NUMBER OF PAGES TO FOLLOW: 3

Cy: EM-8 Fax File
CRM-4, MS A150

SECTION LEADER

GROUP OR DEPUTY GROUP LEADER

Lead in LANL test wells

7/22

I. Update

- X Test wells. Sampled in 1980s for trace metals (1988 first time). 3 year schedule
- X Installed by USGS, #1-4 water supply invest. installed 1980s. Pumps replaced over time through 90s & #4 had first pump in 1990s. Some have submersibles & others have surface pumps.
- X Not minimal standards met to quality as gw monitoring wells.
- X 1988, Well #8 detected lead & others over time show trace levels of lead.

II Deter. of Source

- X 1991 several test wells detect lead & other wells (Gauge wells) show ^{no} lead
- X 1992 sample results show increases over past analysis for lead. NOTE: No supply wells show detected pb levels. These go to ~~SLD~~ EM-9. The supply system water samples are sent to SLD.

X 1993: AIP/LANL samples. Elevated levels & some sharp increases for the test wells in both AIP & LANL analysis.

X 1993 filtered samples show sharp lg. difference between from those unfiltered. 1-2 orders of magnitude. NOTE: No supply wells show detectable levels of pb. More supply wells are scheduled for sampling this year.

1, 3, 8, 5A, 9, 10 X 1992 Modified test wells with 1.5" ^{galvanized conduit} ~~to~~ to install transducers for water level recordings.

X 1990 #2 was redrilled for compensation for lowered water table. NOTE: removed lead swage, installed submersible & transducer.

#4 Installed submersible & transducer.

X NOTE: Those which have had most modifications show highest lead.

1, 5A, & 4, 9, 10 show greatest increases. NOTE: All wells in regional aquifer have been sampled/analyzed. C's lead in all wells which have conduit? (9000 kls)

X TA-49: 60-120' deep shafts (Area 2 or 4) Rad & ~~90k~~ kilograms of lead shielding, down hole, (1960). OU 1144 work Plan

Mtg w LANL on head in Test Wells 7/22/93

<u>Name</u>	<u>Affiliation</u>	<u>Phone</u>
John Parker	NMED/HRMB	827-4357
FRANCO SISNEROS	LANL/HS-7	665-0033
ALEX A. PUGLISI	DOE/LAAO/SCIENTECH	665-5047
Dave Englert	NMED/ALP	827 4355
Bruce Swanton	NMED/ALP	665-7124 827 4308
Jeanne M.P. Lubbering	POEP for San I	881-2254 984-0480
ALAN STOKER	LANL/EM-8	667-0818
Steve Alexander	NMED/HRMB	827-4313

X 90 - PM2, 91 - PM3 : In line and downgradient from ~~OT~~ TA-49 wells (test site) but don't show lead. Argument against pb source @ TA-49.

X TA-49 investigation \Rightarrow to rule out TA-49 as source.

1. Conduct time series @ ^{all} test wells to chart any changes.

2. Also, do filtering at different filter size. \Rightarrow analyze

3. Obtain samples from the test wells of the construction material.

- transducers conduit

- analysis of construction material

4. " " " from an actual well showing pb & analyze.

5. Look at all past analysis for any other trace metals & ^{changes/} increases.

NOTE: Need to look @ OU1144 Work Plan ^(allocate) to see if the investigation will include enough of an investigation to address the info. supplied from pb contamination in test wells.

6. Sample red point

7. Look at isotopic pb ratios, ^{analysis} for comparisons between gw samples & construction material

X How soon, timetable to implement these actions.

- LANH will submit a schedule of activities to address the first step. Ready to go now. NMED will need time to coordinate involvement of affected Bureaus.

Problem: The aquifer is high yield but the current submersible pumps are low yield.

Also, investigatory derived waste. LANL problem.

SUMMARY OF LEAD ANALYSES IN TEST WELLS

(Values reported in milligrams/Liter)
(Samples were unfiltered, analyses for Total Recoverable Pb)

NMED and EPA drinking water standard is 0.05 milligrams/Liter

EPA action level 0.015mg/L

	1988		1991		1992		1993	
	Result	date sampled	Result	date sampled	Result	date sampled	Result	date sampled
Test Wells								
TW-1	<0.001	3/88	0.022	9/23/91	0.010	10/8/92 ^a	1.04 ^f	5/19/93 ^e
TW-2	Out of Service		0.053	5/22/91	0.008	10/8/92 ^a	0.03	5/19/93 ^e
TW-3	<0.001	3/88	0.001	5/21/91	Out of Service		0.009	5/20/93 ^e
TW-4	No Pump		No Pump		No Pump		0.06	5/19/93 ^e
TW-8	0.060	3/88	0.006	9/23/91	Out of Service		Out of Service	
DT-5A	0.048	3/88	0.033	9/23/91	0.209 ^f	11/18/92 ^b	9.0 ^f	5/20/93 ^e
DT-9	0.017	3/88	0.026	9/23/91	0.055	2/25/93 ^c	0.053	5/20/93 ^e
DT-10	0.039	3/88	0.028	9/23/91	0.050	2/25/93 ^c	0.075	5/20/93 ^e
Supply Wells								
PM-1	0.007		0.002	5/9/91	<0.001	8/18/92	Underway	6/2/93
PM-2	0.002		<0.001	5/9/91	<0.001	8/18/92	<0.001	5/19/93 ^e
PM-3	0.006		0.002	5/9/91	<0.001	8/18/92	<0.006	5/19/93 ^e
PM-4	Out of Service		<0.001	5/9/91	Out of Service		To be sampled	
PM-5	<0.001		0.003	5/9/91	<0.001	8/18/92	To be sampled	
G-1	0.001		0.009	5/9/91	<0.001	8/18/92	To be sampled	
G-1A	<0.001		0.001	5/9/91	<0.001	8/18/92	Underway	6/2/93
G-2	0.002		<0.001	5/9/91	<0.001	8/18/92	Underway	6/2/93
G-4	<0.001		<0.001	5/9/91	<0.001	8/18/92	To be sampled	
G-5	<0.001		0.005	5/9/91	<0.001	8/18/92	Underway	6/2/93
G-6	<0.001		0.007	5/9/91	0.0011	8/18/92	To be sampled	
O-4	N/A		0.003	4/90 ^d	Not in service		0.01	5/20/93 ^e
							Underway	6/2/93

^a Analysis completed 3/19/93, reviewed in database early May 1993, resampling imminent at end of May

^b Analysis completed 3/28/93, reviewed in database early May 1993, resampling imminent at end of May

^c Analysis completed 4/27/93, reviewed in database early May 1993, resampling imminent at end of May

^d Sampled during test pumping

^e Analysis completed 7/12/93, reviewed in database 7/15/93

^f Additional samples collected at same time, but filtered through 0.45 micron filter showed 0.011 milligrams/Liter (TW-1, 5/19/93); 0.030 milligrams/Liter (DT-5A, 9/23/91); 0.037 milligrams/Liter (DT-5A, 5/20/93)

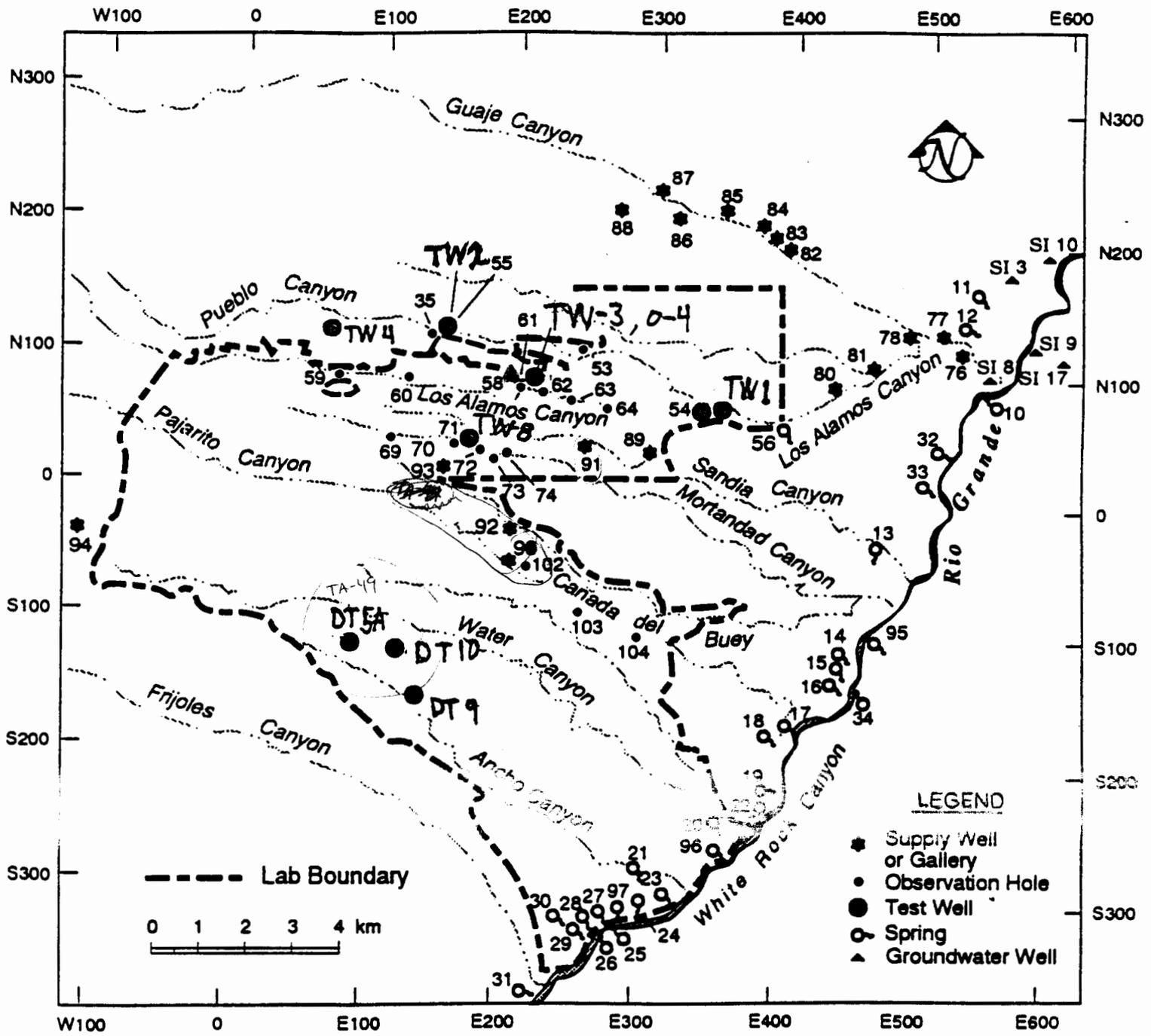


Fig. VII-1. Groundwater sampling locations on and near the Laboratory site.

Table D-20. Locations of Groundwater Sampling Stations

Station	North-South Coordinate	East-West Coordinate	Map Designation ^a
MAIN AQUIFER ON SITE			
<i>Test Wells</i>			
Test Well 1	N070	E345	TW-1
Test Well 3	N080	E215	TW 3
Test Well 8	N035	E170	TW 4
Test Well DT-5A	S110	E090	DT 5A
Test Well DT-9	S155	E140	DT 9
Test Well DT-10	S120	E125	DT 10
<i>Water Supply Wells</i>			
Pajarito Well Field			
Well PM-1	N030	E305	89
Well PM-2	S055	E202	90
Well PM-3	N040	E255	91
Well PM-4	S030	E205	92
Well PM-5	N015	E155	93
MAIN AQUIFER OFF SITE			
<i>Test Wells</i>			
Test Well 2	N120	E150	TW 2
<i>Water Supply Wells</i>			
Guaje Well Field			
Well G-1	N190	E385	82
Well G-1A	N197	E380	83
Well G-2	N205	E365	84
Well G-3	N215	E350	85
Well G-4	N213	E315	86
Well G-5	N228	E295	87
Well G-6	N215	E270	88
Los Alamos Well Field			
Well LA-1	N115	E315	76
Well LA-2	N125	E315	77
Well LA-3	N130	E490	78
Well LA-5	N076	E435	80
Well LA-6	N105	E465	81
WELL OTOWI-4 ^b			O-4
San Ildefonso Wells			
Westside Artesian Well			SI 10
Halladay Well			SI 8
Pajarito Well (Pump 1)			SI 3
Eastside Artesian Well			SI 9
Don Juan Playhouse Well			SI 17

a Shown in Figure VII-1

b New Production Well in service Feb. 93