WIPP File

State of New Mexico
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August 19, 1996

The Honorable Max Coll
State Representative, District 47
Route 9, Box 72-F
Santa Fe, New Mexico 87505

Dear Representative Coll:

Thank you for your inquiry about the recent news concerning lead-contaminated water at the Waste Isolation Pilot Plant (**WIPP**). In order to gain an understanding of the issue, I made a visit to the WIPP facility accompanied by Dr. Ed Kelley, Director of the Water and Waste Management Division; Mr. Neil Weber, Chief of the DOE Oversight Bureau; and Mr. Steve Zappe, a member of the Hazardous Waste Permits Management Program. We were given a briefing by DOE technical staff regarding the history, possible causes of the brine seepage, possible sources of the lead and zinc in the brine, and review of potential migration paths of brine water from the base of the Exhaust Shaft to the Waste Handling Shaft. I have obtained current information and analyses from both the Department of Energy (**DOE**) and NMED's DOE Oversight Bureau staff at the WIPP site. Enclosed is a background summary document prepared by DOE, along with various summary tables, charts, maps, and cross sections illustrating the situation.

NMED concludes at this time that WIPP is properly managing lead-contaminated water. WIPP is classified as a generator of hazardous waste (EPA ID NM4890139088), and as such must comply with 20 NMAC 4.1, Subpart III, 40 CFR §262. These regulations require the generator to accumulate, manage, characterize, package, manifest, and ship all hazardous wastes to a permitted treatment, storage, or disposal facility. NMED believes that there is no apparent threat to human health or the environment and that, to our knowledge, WIPP is complying with regulatory requirements.

NMED's DOE Oversight Bureau staff is continuing to collect samples and analyze them for metals such as lead and zinc. Preliminary results confirm the presence of lead and zinc in the S400 drift area between the Exhaust Shaft and the Waste Handling Shaft sump, but at lower concentrations than detected by WIPP evaluations.

You may notice two different analytical methods stated on the attached "Summary of Lead Concentration" tables provided by DOE: "TCLP" and "Total". TCLP is the acronym for *Toxicity Characteristic Leaching Procedure*, and is an EPA test method used to determine if a substance exhibits the characteristic of toxicity and must therefore be managed as a hazardous waste. Total methods determine the actual concentration of an analyte present in a substance, and more accurately depict the absence or presence of hazardous constituents.

NMED understands that WIPP now runs the exhaust fans at rates sufficient to evaporate infiltrating water. However, we will encourage DOE to conduct additional sampling to monitor the extent and levels of lead contamination, as well as to identify both the source of water and origin of the lead. If I can be of further service, please contact my office at 827-2834.

Sincerely,

Mark E. Weidler, Secretary
New Mexico Environment Department

MEW:SOZ:dpb

Enclosures

July 11, 1996

Brine Inflow data per the Request of the New Mexico Environment Department

1. What is the total amount of brine?

Water infiltration into the WIPP is minimal compared to most mines, and appears to have a seasonal impact. Per the attached chart, water removed from the WIPP, either from the Waste Shaft Sump (prior to 1996) or from the Exhaust Shaft catch basin (installed in March 1996) ranges from 0 gallons to a maximum observed 4700 gallons per month.

Water accumulation occurs during periods when the mine ventilation is reduced from a typical single-fan rate of 240,000 cubic feet per minute. Normal ventilation is adequate to evaporate the small amount of water entering the Exhaust Shaft. On weekends, ventilation is reduced to approximately 60,000 cfm. This lower rate is inadequate to evaporate seepage, and also does not appear to provide enough velocity to prevent moisture in the air from precipitating as the air rises in the Exhaust Shaft.

Total water removed from the WIPP underground was 5,850 gallons in 1994, 10,980 gallons in 1995, and 6,115 gallons to date in 1996. As a basis for comparison, the WIPP Air Intake Shaft had an estimated inflow of 10,000 gallons per week prior to grouting between the host rock and the shaft liner.

2. What is the total amount of brine per day?

As noted above, the collected amount is zero gallons per day when normal ventilation is maintained. During a typical weekend (from Friday afternoon through Monday morning), the maximum accumulation has been 1835 gallons.

3. What are the analytical results?

Attached are the analytical results for lead from sump and catch basin water dating back to 1990. All samples have been tested for TCLP metals and zinc, although only lead has been identified as a concern.

4. How often are samples taken?

Since the installation of the catch basin in March 1996, sampling has been conducted monthly. With the indication of lead in excess of 5 mg/l in the 6/10/96 Exhaust Shaft catch basin sample, the frequency has been increased to weekly.

Backgrounder

Lead in Brine Water at WIPP

July 12, 1996

Background Information

Lead levels higher than regulatory limits were detected in brine (salty) water at the U.S. Department of Energy's Waste Isolation Pilot Plant (WIPP) in May 1995. The brine originated in the Exhaust Shaft and accumulated in the Waste Handling Shaft sump at the facility. The discovery presents two separate and nearly independent issues:

- Predictable and seasonal increased amounts of brine entering the Exhaust Shaft.
- The presence of lead in the brine.

The two issues overlap when considering disposing of quantities of leaded water as hazardous waste and examining whether the increase in the quantity of water in the Exhaust Shaft could affect long-term performance of the repository.

Water in the Exhaust Shaft is primarily the result of condensation and some minor leakage through the shaft liner at about the 75-foot level. It appears that the water is picking up lead as it passes through construction materials in the liner or as it passes chain link fence used for support in the shaft. The source of this leakage is the main focus of current investigation.

Neither the lead nor the water is an issue that will impact WIPP's scheduled opening by April 1998.

Moreover, the lead is not an issue in terms of repository performance. It is a manageable hazardous waste issue that is being resolved in accordance with all applicable regulatory requirements.

The small amount of water entering the Exhaust Shaft is minimal compared to most mines, is easily managed, and is not considered a long-term issue. Water removed from the site has reached a maximum of 4700 gallons per month. Ultimately, the shaft will be closed and completely sealed once WIPP is decommissioned, permanently blocking any water from reaching the disposal area 2,150 feet underground.

Lead in WIPP Brine
July 12, 1996

Questions and Answers

Q. Where is the water in the Exhaust Shaft coming from?

A. While most of it comes from condensation, a small amount of the water comes from leakage through a crack in the shaft liner, about 75 feet below the surface. The crack was first noticed shortly after construction in 1987, and is a typical concrete crack caused by tension due to shrinkage.

The condensation turns to precipitation, which is the result of moisture in the air cooling as it rises up the Exhaust Shaft. This is a seasonal and predictable condition. It increases in the more humid summer months, and decreases in the drier winter months. Normal operation of the mine ventilation fans is adequate to evaporate the small amount of leakage and condensation entering the shaft. However, as a cost cutting measure in 1993, the ventilation system was curtailed on weekends when no operations were occurring in the mine. This caused an increase in moisture in the shaft. Observed accumulations during the Spring of 1996 were 35 gallons per week in March (dry weather) to as much as 1850 gallons per week in June (when relative humidity normally rises). There is virtually no accumulation of water when the ventilation system is in normal operation.

Q. What actions are being taken?

A. Leakage:

We are testing the fire water and domestic water distribution systems to make sure there are no subsurface leaks. In parallel, we are looking at ways to address the hydrology around the shaft. While geophysical non-intrusive methods are being considered as a first step, intrusive methods may ultimately be required. This could include drilling a well to gain physical access to the potential source. This activity will most likely require a permit from the New Mexico Environment Department. It is hoped the non-intrusive studies will produce the data necessary to resolve the issue.

Leaded Water:

Initially, most of the water from condensation in the Exhaust Shaft was being collected after it reached a sump in the nearby Waste Handling Shaft. To control this source, a catch basin was designed and installed (March 1996) at the bottom of the Exhaust Shaft to capture this condensation. This has substantially reduced the amount of water in the Waste Handling Shaft sump. It also allows more efficient management and handling of this water.

Lead in WIPP Brine
July 12, 1996

When the water contains lead concentrations higher than the RCRA regulatory limit (5 milligrams per liter), we are managing it as we would any hazardous waste -- according to requirements of the Resource Conservation and Recovery Act. We accumulate and store it for no more than 90 days and ship it to an approved and permitted treatment/storage/disposal facility.

Q. Is this drinking water?

A. No. The water -- with or without lead -- is not for drinking. It's saturated sodium chloride brine -- a great deal saltier than sea water.

Q. Where is the lead coming from?

A. The Exhaust Shaft Water and Lead Working Group, comprised of senior engineers, scientists, and quality assurance personnel, is evaluating possible lead sources. One likely source of consideration is chain link fence used for support in the Exhaust Shaft. Other potential sources, such as lead wool packing behind the Exhaust Shaft liner, are also being evaluated.

Q. Why do you feel it's the fencing?

A. The fence is galvanized. The galvanizing process uses zinc, and lead is a minor impurity of the zinc used in this process.

Initial data indicate a higher level of zinc than lead, which makes the fencing an obvious candidate as the lead source. We'll take fence samples and test them by subjecting them to corrosion. We can then see whether lead leaches out from the galvanized fence, and in what quantities.

Q. Should WIPP employees or the public be concerned about the water and the lead in it?

A. No. The water in the shaft (and whatever's in it) is being analyzed, monitored continually, and managed responsibly. There is no connection with any drinking water supplies.

Q. Were the proper regulatory agencies notified?

A. Yes. The DOE made both the New Mexico Environment Department and the U.S. Environmental Protection Agency aware of this issue in 1995.

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State of New Mexico
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DOE Oversight Bureau / Waste Isolation Pilot Plant Site Office
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Keith E. McKamey, POC/WIPP Off. 505-234-8984; Fax 505 887-5871

M*E*M*O*R*A*N*D*U*M

DATE: 07-22-96

TO: Mr. Neil S. Weber, DOE Oversight Bureau Chief

FROM: KEITH E. MCKAMEY, POC, DOE Oversight Bureau/WIPP

SUBJECT: LEAD WATER REPORT

WIPP Repository Lead Water Report

I. History

Exhaust Shaft Lead contamination: Presently the lead contaminated area is confined to the S400 drift of the repository. The first sampling event that indicated lead contamination was conducted by Westinghouse on June 16, 1995 with more detailed sampling occurring in 1-96. AIP staff participated in a 1-96 sampling event and preliminary analysis confirms the presence of lead in the contaminated area. The lead problem became evident after a economic decision was made by Westinghouse management to reduce fan volume from 250,000 CFM to 60,000 CFM on weekends. Following this decision, water accumulated along the walls of the Exhaust Shaft and collected at the bottom in the Exhaust Shaft Sump flowing down gradient to the Waste Shaft Sump. Accumulation rates from June through September 1995 averaged 1014 gals./week with estimated disposal costs of $5555/week. WID took action in October of 1995 to obtain a disposal permit, obtain analytical water data from potential sources, obtain meteorological data, and assume voluntary corrective action by excavating the Exhaust Shaft and Waste Shaft sumps. Exhaust Shaft catch basins (large metal tubs) were installed 3-96 thereby decreasing the flow of the water from the Exhaust Shaft to the Waste Shaft. The source of the water is still unknown but efforts to determine the source was initiated by AIP staff by requesting a meeting to view camera inspections of the Exhaust Shaft in 6-6-95. Subsequent sampling of leaks viewed by the camera inspections revealed no lead at 80' below collar to lead concentrations of .14 at 101.3', and inflow rates estimated at 2000 gals./week. The first detailed analysis in 1-96 reported lead values of .03 mg/l in the Exhaust shaft wall, .72 to 1.9 mg/l in the Exhaust Shaft Sump, 12-20 mg/l in the boreholes along the S400 drift, 12 mg/l in the Waste Shaft Sump, and less than the minimum detectable limit of .2 mg/l in the surrounding drifts (Note: all analyses are preliminary values without QA/QC documentation).

II. **Present**

Mr. Stan Patchet with Westinghouse provided technical support on verifying high ionic brine water samples concerning the lead water issue in the underground. Dr. Rich Abitz (IT Geochemist) and Ms. Patty Loughmiller (Westinghouse) presented AIP staff with important facts on comparing >300,000 TDS brine water analysis and the process needed to QA/QC internal data specific to this media. Ms. Loughmiller indicated that a Work Plan is being developed to determine the source of water and the concentration of lead in the underground water. AIP staff is preparing a phase II sampling plan which will include the following:

1) Verification of past and future DOE data
2) Verifying the boundaries of the lead contaminated plume (to include independent sampling)
3) Providing both Westinghouse and NMED labs with duplicate parameters for analytical analysis and verification
4) Phase II sampling costs

III. **Conclusion**

The conclusion to the 7-17-96 Westinghouse meeting and the recent partial receipt of Phase I data indicates that AIP staff has verified that elevated levels of lead are present in the S400 drift boreholes OH-224 and OH-225. These boreholes are the highest lead concentrations in the underground and are located between the Exhaust Shaft and the Waste Shaft (see map attached).

1-22-96 - Split samples of OH-224 were taken by AIP staff and total metal ICP analysis indicated lead concentrations of 3 mg/l . Westinghouse TCLP Graphite Furnace Atomic Absorption metal analysis indicated lead concentrations of 12 mg/l.

6-10-96 - Split samples of OH-225 were taken by AIP staff and total metal ICP analysis indicated lead concentrations of 3.4 mg/l . Westinghouse TCLP Graphite Furnace Atomic Absorption metal analysis indicated lead concentrations of 20 mg/l.

AIP staff are presently involved in weekly sampling of the exhaust shaft catchment basin.

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GARY E. JOHNSON
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August 2, 1996

Mr. Kent Hunter
CAO/NMED Point of Contact
Carlsbad Area Office
P.O. Box 3090
Carlsbad, NM 88221-3090

Subject: Underground Lead Work Plan

Dear Mr. Hunter,

Enclosed you will find a copy of the Lead Sampling Work Plan AIP staff wishes to submit to CAO. This plan will give CAO primary sampling responsibility while allowing AIP staff to collect split samples to verify data. This plan is robust and comprehensive with as many as 31 boreholes surrounding the contaminated area that have not been tested (see Underground Borehole Map). It is our opinion that CAO needs to identify the boundary of the contamination by sampling the current boreholes and remediate as necessary, monitor fluid levels in the boreholes to insure the source head is being reduced, sample source streams at various depths in the Exhaust Shaft, sample surrounding ground water wells, take addition soil/salt samples to verify whether the lead does or does not remain in solution, and as a last resort consider drilling a shallow well to sample all Dewey Lake water zones near the Exhaust Shaft to determine lead content.

I hope that this plan will meet your approval since it provides for CAO to take primary responsibility, allows for AIP split samples for verification, and contributes ideas to make the current Lead Sampling Plan more comprehensive. Should any questions arise, feel free to call my office.

Sincerely,

Keith E. McKamey

Keith E. McKamey
Health Program Manager I, DOE Oversight Bureau/WIPP

Enclosures
cc Neil Weber

RECOMMENDED LEAD SAMPLING WORK PLAN

Introduction:

The New Mexico Environment Department DOE Oversight Bureau has been tasked according to the Agreement In Principle (9-95), to help assure that activities at DOE facilities are protective of the public health and safety and the environment. AIP staff recommends that DOE consider these ideas for a more comprehensive evaluation and remediation of the lead issue and recommends additional sampling and corrective action. AIP staff is willing to collect split samples to verify DOE data and to accomplish the objectives listed below. A visual inspection and preliminary sampling have already been conducted by AIP staff to verify that lead is present. This plan is presented to DOE/CAO as a recommendation to define the limits of the contamination for the purpose of extraction and disposal of contaminated waste.

Purpose:

The purpose of this plan is to systematically define the boundaries of contamination, identify source of contaminated water, and remediate the entire contaminated area at the lowest possible cost to the taxpayer.

Facility and Contamination Description:

The lead contaminated area occurs in the underground repository located 26 miles Southeast of Carlsbad, NM, known as the Waste Isolation Pilot Plant. Contaminated area is divided into two areas (see attached map with conservative contaminated area estimates) composed of approximately of 14,139 sq. ft. and 740 sq. ft. respectively. It is likely that the contamination covers a larger area from the Exhaust Shaft to the Waste Sump estimated at roughly 21,000 sq. ft. This estimated contaminated area is only the horizontal sampled area in the mine at approximately 2150' beneath the surface. Contamination has also been recorded at the 101' level beneath the surface.

The only known potential sources of lead are the galvanized fencing lining the walls of the Exhaust Shaft and the lead wool packing between the cement liner and the formation.

Department of Energy Objectives:

1) Determine all possible sources of lead contamination
2) Establish the nature and extent of contamination
3) Conduct comprehensive ground water monitoring evaluations
4) Participate in compliance evaluation inspections
5) Evaluate corrective action procedures

Methods for Choosing Sample Locations, Media, and recommended progression:

1) Determine contaminated boundary by sampling brine between the contaminated boreholes and the uncontaminated boreholes:
   A) sample boreholes in the S400 drift between OH225 and Waste Shaft Sump to determine continuous contamination or separate contaminated areas (ie. OH222, MB1392, 51x-GE-00282, DH306, DH 306A, 51x-GE-00281, 51x-GE-00280)
   B) sample boreholes in drifts either side of the S400 drift (ie. MB1393, MB1394, DO202, OH61, OH63-69, DH304, EEP 20 B, EEP 20 D, EEP 20 F, EEP22 B, EEP22 D, EEP22 F, 51x-GE-00231, DH208)
2) Monitor fluid levels in boreholes surrounding S400 drift to determine if the volume of brine is ~~reducing~~ diminishing.
3) Re-sample potential source stream at 101' and sample other visible source steams at various depths in the Exhaust Shaft
4) Sample ground water in surface boreholes to determine source and extent (ie. ERDA 9 all open zones, H-16 all open zones, H-1 all open zones, WIPP 21 all open zones
5) Once contamination boundary is defined by brine samples and water source is eliminated consideration should be given to soil/salt sampling along the boundary to determine level of hazardous waste and the necessary corrective action
6) If source of lead is determined to come from the Dewey Lake in the Exhaust Shaft but no contamination is found in the surrounding Dewey Lake monitoring wells (ie. H-16) consideration should be given to drilling a shallow well near the Exhaust Shaft to sample various Dewey Lake water zones.

Principles/Types of Sampling:

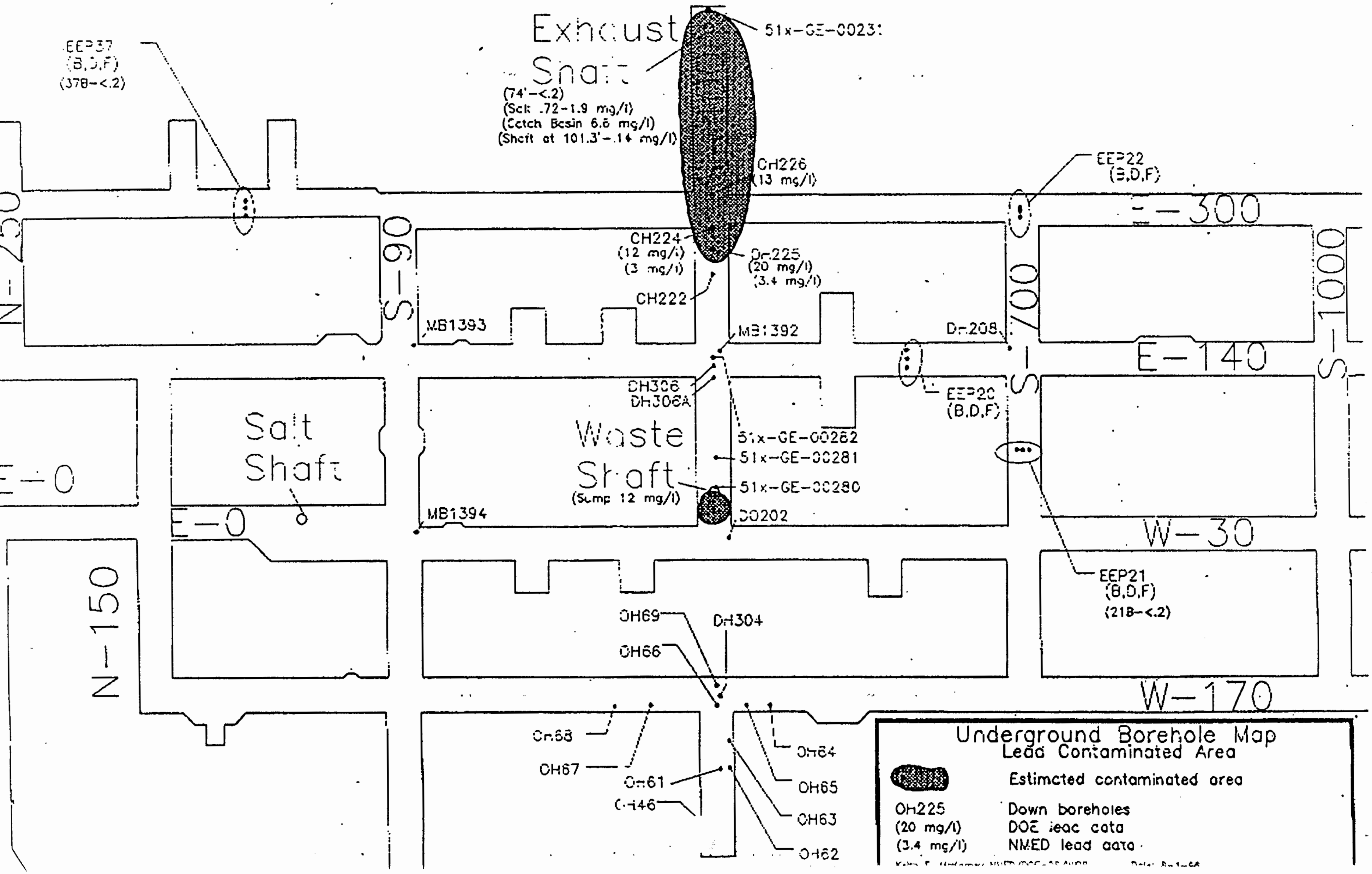
Grab sampling is suggested since it is a discrete aliquot which is representative of a specific location at a given point in time.

Methods and parameters used for analysis:

The brine water containing the lead contamination are highly ionized with large TDS values. The method of evaluating these complicated brines were addressed in the BSEP program. It is recommended that the analysis include the BSEP parameters (ie. acceptable recoveries on matrix spike and duplicate samples for all analytes, use +- 5% charge balance, request Standard Addition be performed). NMED recommends that the highest value be obtained and used regardless of analysis type (Total vs. TCLP). Total metal analysis is recommended by NMED if sample is taken from a borehole.

Duration and Frequency of Sampling:

Once the contaminant boundaries are defined, sampling should occur randomly to conserve sampling funds. The only exception to this rule might be during high climatic changes which affect the contaminated area.


Underground Borehole Map
Lead Contaminated Area
Estimated contaminated area
OH225 (20 mg/l) (3.4 mg/l)
Down boreholes
DOE lead data
NMED lead data
Exhaust Shaft
(74'-<.2)
(Sck .72-1.9 mg/l)
(Catch Basin 6.6 mg/l)
(Shaft at 101.3'-.14 mg/l)
51x-GE-00231
EEP37 (B,D,F) (378-<.2)
OH226 (13 mg/l)
EEP22 (B,D,F)
E-300
CH224 (12 mg/l) (3 mg/l)
OH225 (20 mg/l) (3.4 mg/l)
CH222
N-250
S-90
MB1393
MB1392
OH208
S-700
S-1000
E-140
OH306
DH306A
EEP20 (B,D,F)
Salt Shaft
Waste Shaft
(Sump 12 mg/l)
51x-GE-00282
51x-GE-00281
51x-GE-00280
00202
E-0
MB1394
W-30
N-150
EEP21 (B,D,F) (218-<.2)
OH69
DH304
OH66
W-170
OH68
OH67
OH61
OH46
OH64
OH65
OH63
OH62

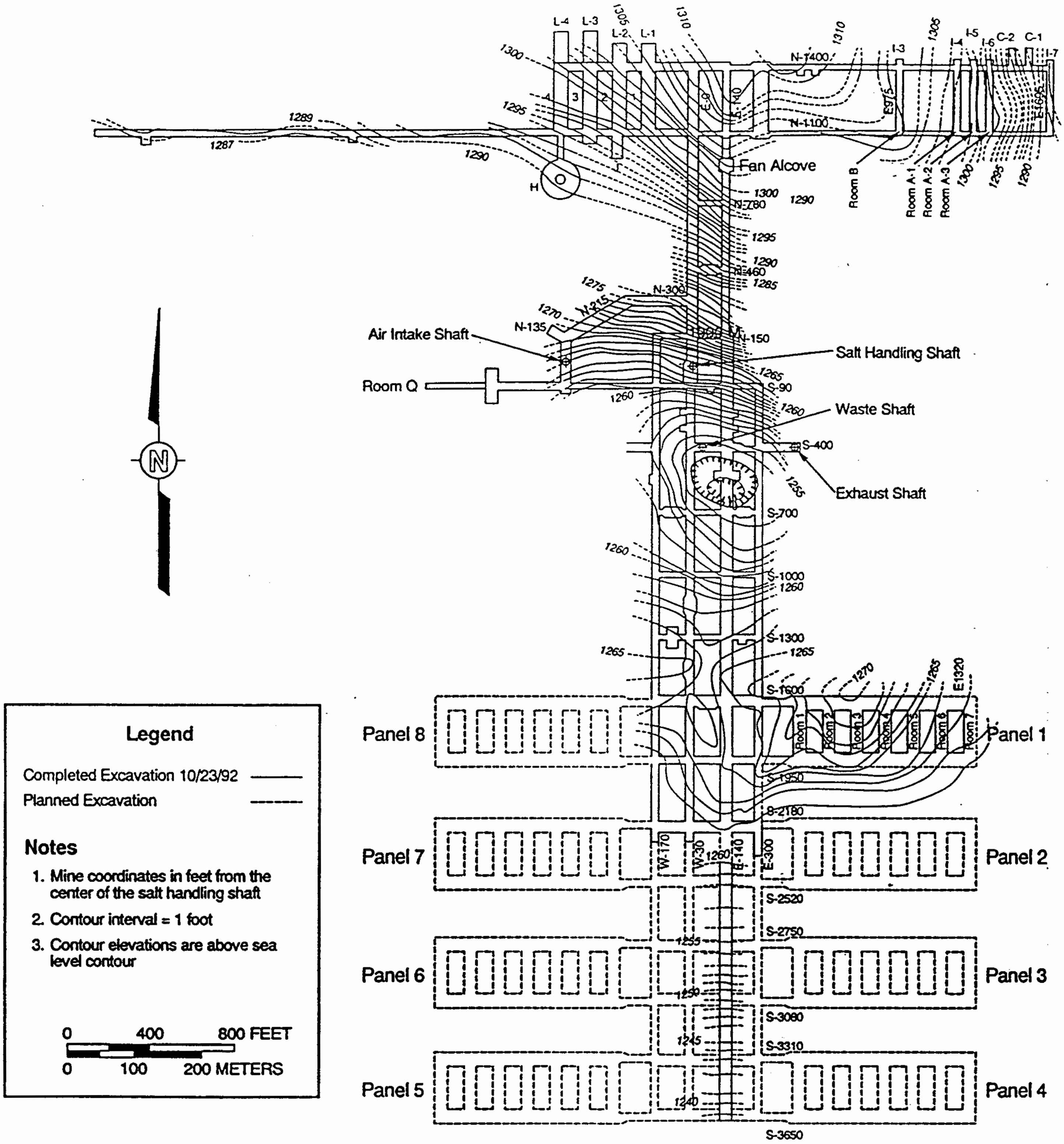
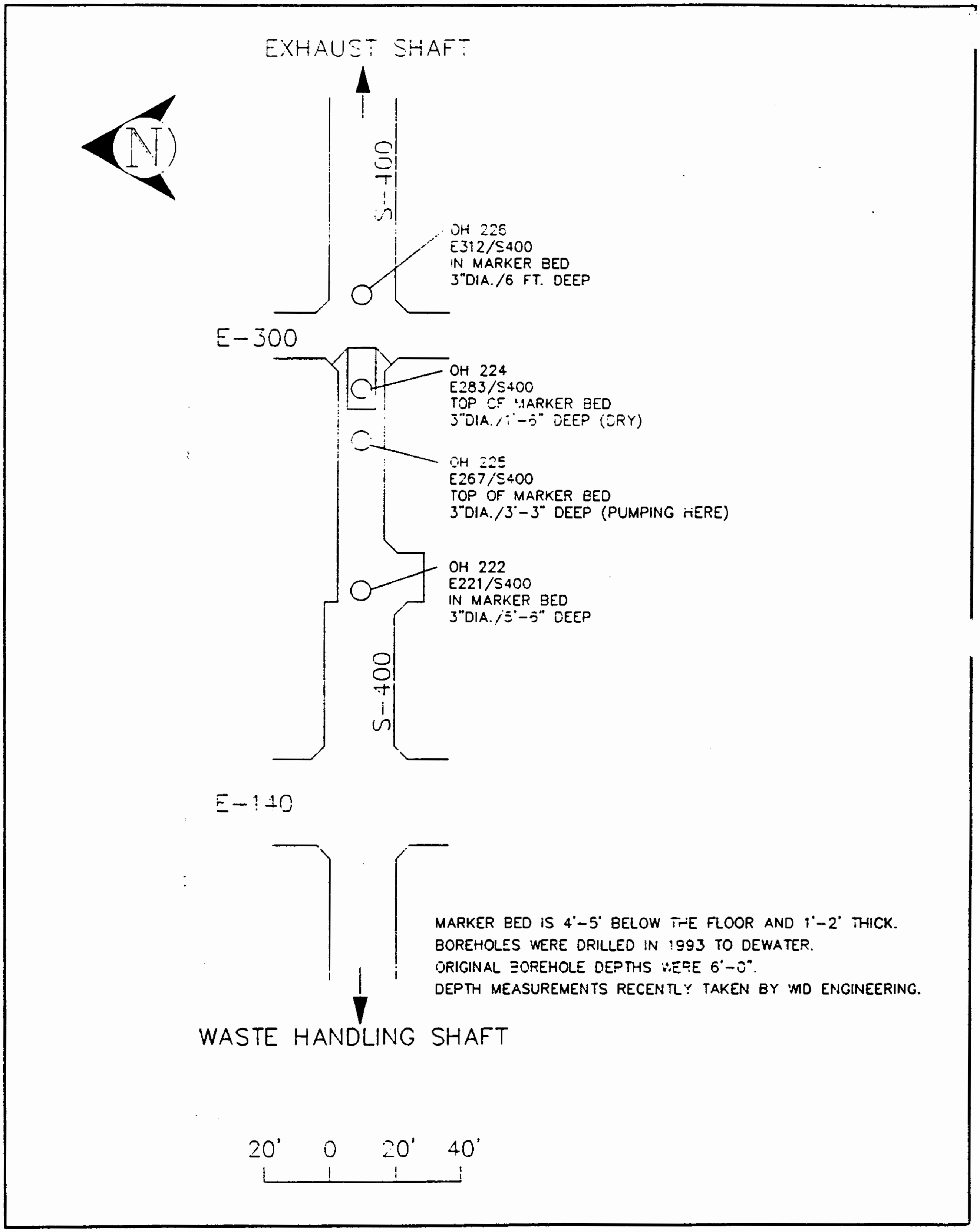
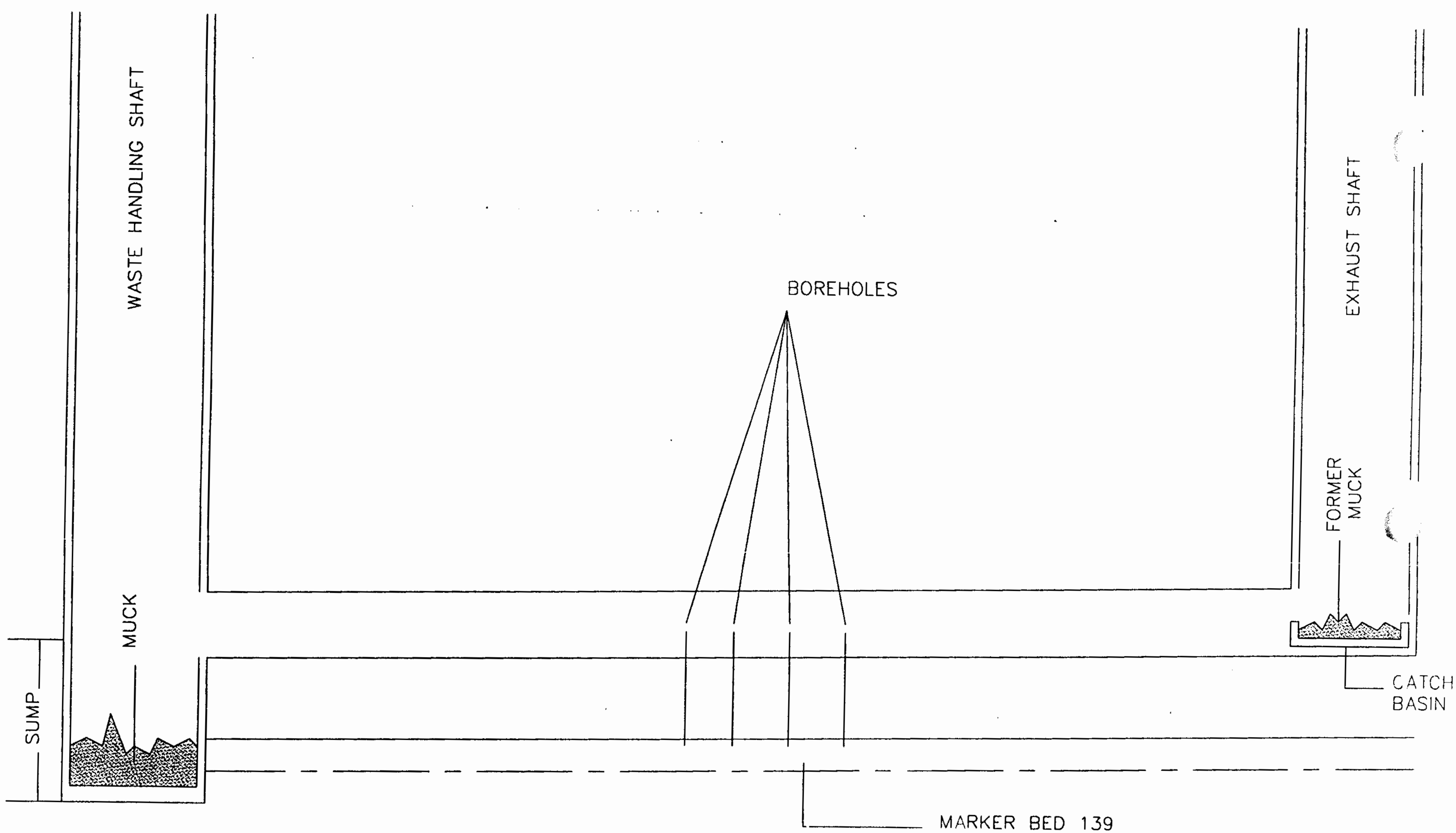


Figure B-11
Plan View of the Underground Showing Midheight Centers of Underground Disposal Area at the Orange Marker Band Relative to Sea Level



S400 BOREHOLES


WASTE HANDLING SHAFT
EXHAUST SHAFT
BOREHOLES
FORMER MUCK
MUCK
SUMP
CATCH BASIN
MARKER BED 139

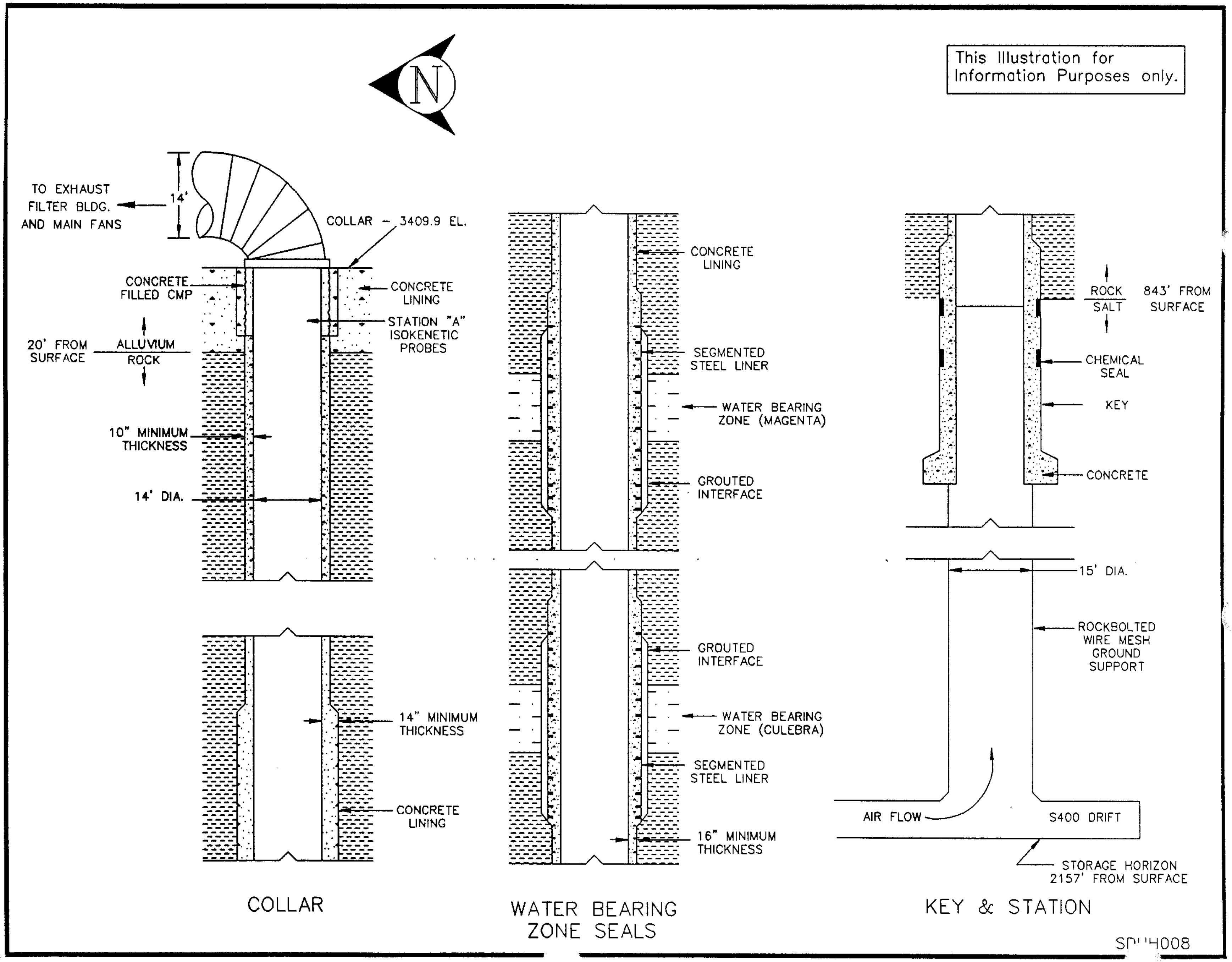
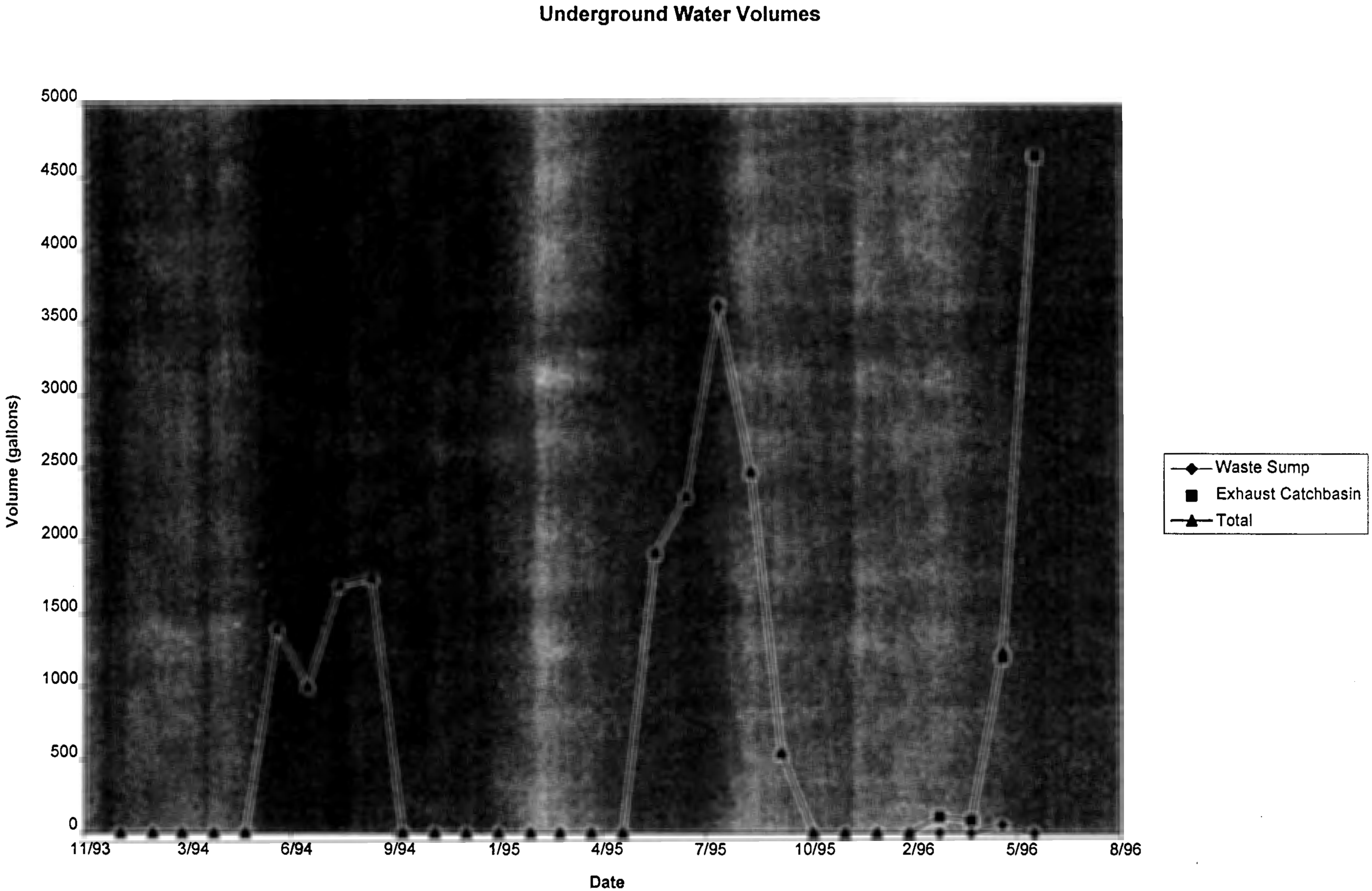


FIGURE 3-7. Exhaust Shaft

X-X


Underground Water Volumes
Volume (gallons)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
11/93
3/94
6/94
9/94
1/95
4/95
7/95
10/95
2/96
5/96
8/96
Date
Waste Sump
Exhaust Catchbasin
Total

SUMMARY OF LEAD CONCENTRATION
WASTE HANDLING SHAFT SUMP WATER

SAMPLE NUMBER	DATE	METHOD	Pb mg/L	SAMPLE LOCATION
WIPP-243	01/16/90	TCLP	<0.05	Waste Handling Shaft Sump Brine - out of sump
WIPP-478	03/17/92	TCLP	<0.05	Waste Handling Shaft Sump Brine - out of sump
HEWHS199308162.4	08/16/93	TOTAL	1.1	Waste Handling Shaft Sump Brine - out of sump
WST-95-083	05/16/95	TCLP	3.9	Sample from portable transfer container
WST-95-084	05/16/95	TCLP	4.7	Sample from portable transfer container
WST-95-103	06/16/95	TCLP	8.1	Waste Handling Shaft Sump Brine - out of sump
WST-95-104	06/16/95	TCLP	6.1	Waste Handling Shaft Sump Brine - out of sump
WST-95-116	06/28/95	TCLP	6.7	Brine sample from portable transfer container
WST-95-117	06/28/95	TCLP	7.3	Duplicate of above
WST-95-149	07/20/95	TCLP	12	Random sample of 55 gallon drums containing sump water
WST-95-150	07/20/95	TCLP	10	Random sample of 55 gallon drums containing sump water
WST-95-151	07/20/95	TCLP	11	Random sample of 55 gallon drums containing sump water
WST-95-152	07/20/95	TCLP	11	Random sample of 55 gallon drums containing sump water
WST-95-156	07/21/95	TCLP	11	Sample from portable transfer container
WST-95-157	07/21/95	TCLP	11	Sample from portable transfer container
WST-95-161	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-162	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-163	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-164	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-165	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-166	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-167	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-168	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-169	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-170	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-171	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-172	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-173	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-174	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-175	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-176	07/26/95	TCLP	12	Sample from 55 gallon drum containing sump water
WST-95-177	07/26/95	TCLP	11	Sample from 55 gallon drum containing sump water
WST-95-178	07/26/95	TCLP	11	Sample from 55 gallon drum containing sump water
WST-95-179	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-180	07/26/95	TCLP	11	Sample from 55 gallon drum containing sump water
WST-95-181	07/26/95	TCLP	11	Sample from 55 gallon drum containing sump water
WST-95-182	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-183	07/26/95	TCLP	11	Sample from 55 gallon drum containing sump water

SUMMARY OF LEAD CONCENTRATION
WASTE HANDLING SHAFT SUMP WATER (cont'd)

SAMPLE NUMBER	DATE	METHOD	Pb mg/L	SAMPLE LOCATION
WST-95-184	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-185	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-186	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-187	07/26/95	TCLP	9.6	Sample from 55 gallon drum containing sump water
WST-95-188	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-189	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-190	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-191	07/26/95	TCLP	10	Sample from 55 gallon drum containing sump water
WST-95-237	08/30/95	Total	10.4	Waste Handling Shaft Sump Brine - from sump (preserved with HNO3)
WST-95-238	08/30/95	Total	12.0	Waste Handling Shaft Sump Brine - from sump (preserved with HNO3)
WST-95-239	08/30/95	Total	1.3	Waste Handling Shaft Sump Brine - from sump (unpreserved) NUS Labs
WST-95-240	08/30/95	Total	9.4	Waste Handling Shaft Sump Brine - from sump (unpreserved) DATA CHEM
WST-95-267	09/15/95	TCLP	0.93	Waste Handling Shaft Sump Brine - Composite of 3 containers 95-267-269
WST-96-010	01/22/96	TCLP	12.0	Waste Handling Shaft Sump Brine - out of sump
WST-96-060	02/07/96	TCLP	5.0	Sample from 55 gallon drums containing sump water
WST-96-067	02/20/96	TCLP	6.0	Sample from 55 gallon drums containing sump water
WST-96-068	02/20/96	TCLP	0.7	Sample from 55 gallon drums containing sump water
WST-96-070	02/20/96	TCLP	11.0	Sample from 55 gallon drums containing sump water
WST-96-071	02/20/96	TCLP	8.0	Sample from 55 gallon drums containing sump water
WST-96-010	02/22/96	TCLP	12.0	Waste Handling Shaft Sump Brine - out of sump
WST-96-135	04/23/96	TCLP	1.4	Waste Handling Shaft Sump Brine - out of sump
WST-96-142	05/02/96	TCLP	1.8	Sample from 55 gallon drums containing sump water
WST-96-143	05/02/96	TCLP	2.3	Sample from 55 gallon drums containing sump water
WST-96-160	05/21/96	TCLP	0.02	Waste Handling Shaft Sump Brine - out of sump
Average concentration of 1995-1996			9.4 +/-	3.4

SUMMARY OF LEAD CONCENTRATION
S400/E300 BOREHOLE WATER

SAMPLE NUMBER	DATE	METHOD	Pb mg/L	SAMPLE LOCATION
WST-95-118	06/28/95	TCLP	11.0	S400/E300 Borehole Brine Hole nearest exhaust shaft
WST-95-119	06/28/95	TCLP	7.1	S400/E300 Borehole Brine Hole closest to WHS
WST-95-241	08/30/95	Total	30.0	S400/E130 Borehole Brine Hole nearest WHS - NUS Labs
WST-95-242	08/30/95	Total	27.0	S400/E130 Borehole Brine Hole nearest WHS - DATA CHEM
WST-95-243	08/30/95	Total	31.0	S400/E130 Borehole Brine Hole nearest WHS - DATA CHEM
WST-95-287	12/11/95	TCLP	23.0	S400/E300 Borehole Brine Hole closest to WHS

WST-95-288	12/11/95	TCLP	22	S400/E300 Borehole Brine Hole closest to WHS
WST-95-289	12/11/95	TCLP	21	S400/E300 Borehole Brine Hole closest to WHS
WST-96-012	02/22/96	TCLP	11	OH224
WST-96-014	02/22/96	TCLP	12	OH224
WST-96-016	02/22/96	TCLP	12	OH224
WST-96-018	02/22/96	TCLP	20	OH225
WST-96-022	02/22/96	TCLP	13	OH226
WST-96-069	02/20/96	TCLP	14.0	Sample from 55 gallon drums containing borehole water
WST-96-133	04/22/96	TCLP	19	OH225
WST-96-161	05/21/96	TCLP	0.69	OH225

Average concentration of 1995 1996 **18.2 mg/L +/- 7.5**

SUMMARY OF LEAD CONCENTRATION
WASTE SHAFT SUMP SOLIDS

SAMPLE NUMBER	DATE	METHOD	Pb mg/L	SAMPLE LOCATION
WST-96-059	02/07/96	TCLP	0.1	Waste Handling Shaft Sump Salt - Composite of pile in S550 Alcove
WST-96-073	02/21/96	TCLP	0.1	Waste Handling Shaft Sump Salt - N Salt Pile (N Side)
WST-96-076	02/21/96	TCLP	0.1	Waste Handling Shaft Sump Salt - N Salt Pile (S Side)
WST-96-078	02/22/96	TCLP	0.1	Waste Handling Shaft Sump Salt-Sump Sludge
WST-96-059	02/07/96	TCLP	0.1	Waste Handling Shaft Sump Salt-Sump Sludge
WST-96-073	02/21/96	TCLP	0.12	Waste Handling Shaft Sump Salt Muck
WST-96-076	02/21/96	TCLP	0.1	Waste Handling Shaft Sump Salt Muck
WST-96-078	02/22/96	TCLP	0.1	Waste Handling Shaft Sump Muck/Insitu

Average concentration of 1996 0.1 mg/L +/- 0.0

SUMMARY OF LEAD CONCENTRATION
EXHAUST SHAFT SUMP SOLIDS

SAMPLE NUMBER	DATE	METHOD	Pb mg/L	SAMPLE LOCATION
WST-96-007	01/19/96	TCLP	1.9	Exhaust Shaft Muck In Situ
WST-96-008	01/19/96	TCLP	0.72	Exhaust Shaft Muck In Situ
WST-96-091	03/01/96	TCLP	0.33	Exhaust Shaft Muck - removed
WST-96-092	03/01/96	TCLP	0.1	Exhaust Shaft Muck - removed
WST-96-093	03/01/96	TCLP	0.1	Exhaust Shaft Muck - removed
WST-96-094	03/01/96	TCLP	0.2	Exhaust Shaft Muck - removed
WST-96-097	03/01/96	TCLP	0.1	Exhaust Shaft Muck - removed

Average concentration of 1996 0.5 mg/L +/- 0.6

Analysis Results w/e 6-14-96

(1)
Sample Number: WST-96-160
Date Sampled: 5-21-96
Location: Waste Shaft Sump 6' pipe "Pit" area
Concentrations: Pb-0.02 mg/l, Zn-160 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

(2)
Sample Number: WST-96-161
Date Sampled: 5-21-96
Location: Borehole: OH 225
Concentrations: Pb-0.69 mg/l, Zn-1200 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

Quantitative Water Collection

Catch Basin (weekly catch amount): 152 gallons
Borehole OH225: None
Waste Handling Shaft Sump: None

Water Levels

Boreholes OH226: 43 1/2"
OH222: 49"
Waste Handling Shaft Sump "Pit": None

Other Indicators

EC&S sampled two locations in the S90 E140 drift at the request of DOE. During a weekly SAA inspection, water seepage was sighted in this area. Samples were taken to determine if analysis of the brine/salt in this area would reveal high concentrations of lead. The decision to sample this location was based on the premise that the seepage was within a close proximity of the S400 E300 and S400 E200 boreholes that previously exhibited high lead concentrations.

WEEKLY STATUS OF UNDERGROUND WATER – S400 FOCUS Week Ending 6-28-96
Sampling Activities
Description of samples taken: Exhaust Shaft Brine Location: Pumped from catch basin on 5-6-96. Sample Date: 6-28-96 Number of Samples: 1 composite Constituents analyzed: TCLP Metals and Zinc
Description of samples taken: Exhaust Shaft Brine Location: Pumped from catch basin on 5-13-96. Sample Date: 6-28-96 Number of Samples: 1 composite Constituents analyzed: TCLP Metals and Zinc
Description of samples taken: Exhaust Shaft Brine Location: Pumped from catch basin on 5-20-96. Sample Date: 6-28-96 Number of Samples: 1 composite Constituents analyzed: TCLP Metals and Zinc
Description of samples taken: Exhaust Shaft Brine Location: Pumped from catch basin on 5-29-96. Sample Date: 6-28-96 Number of Samples: 1 composite Constituents analyzed: TCLP Metals and Zinc
Description of samples taken: Exhaust Shaft Brine Location: Pumped from catch basin on 6-3-96. Sample Date: 6-28-96 Number of Samples: 1 composite Constituents analyzed: TCLP Metals and Zinc
Description of samples taken: Exhaust Shaft Brine Location: Pumped from catch basin on 6-18-96. Sample Date: 6-28-96 Number of Samples: 1 composite Constituents analyzed: TCLP Metals and Zinc

WEEKLY STATUS OF UNDERGROUND WATER - S400 FOCUS
Week Ending 6-28-96

Sampling Activities (cont'd)

Description of samples taken: Exhaust Shaft Salt Debris
Location: Debris from catch basin after clean out on 6-21-96.
Sample Date: 6-28-96
Number of Samples: 1 composite
Constituents analyzed: TCLP Metals and Zinc

Description of samples taken: Exhaust Shaft Brine
Location: Pumped from catch basin on 6-24-96.
Sample Date: 6-28-96
Number of Samples: 1 composite
Constituents analyzed: TCLP Metals and Zinc

Description of samples taken: Exhaust Shaft Brine
Location: Pumped from catch basin on 6-28-96.
Sample Date: 6-28-96
Number of Samples: 1 composite
Constituents analyzed: TCLP Metals and Zinc

Analysis Results

Sample Number: WST-96-177
Date Sampled: 6-10-96
Location: Exhaust Shaft Catch Basin Insitu
Concentrations: Pb - 5.0 mg/l, Zn - 310 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

Sample Number: WST-96-178
Date Sampled: 6-10-96
Location: Exhaust Shaft Catch Basin Insitu
Concentrations: Pb - 6.6 mg/l, Zn - 340 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

WEEKLY STATUS OF UNDERGROUND WATER - S400 FOCUS
Week Ending 6-28-96

Sample Number: WST-96-185
Date Sampled: 6-10-96
Location: Waste Shaft Sump Insitu
Concentrations: Pb - <0.3 mg/l, Zn - 240 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

Sample Number: WST-96-186
Date Sampled: 6-10-96
Location: Waste Shaft Sump Insitu
Concentrations: Pb - 0.5 mg/l, Zn - 270 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

Sample Number: WST-96-193
Date Sampled: 6-10-96
Location:S400 Borehole OH 225
Concentrations: Pb - 9 mg/l, Zn - 1100 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

Sample Number: WST-96-194
Date Sampled: 6-10-96
Location:S400 Borehole OH 225
Concentrations: Pb - 10 mg/l, Zn - 1100 mg/l
Methods used: Graphite Furnace Atomic Absorption (GFAA)-TCLP Metals, Inductively Coupled Plasma Routine (ICP)-Zinc

Quantitative Water Collection

Catch Basin (weekly catch amount): 1,485 gallons brine
Borehole OH225: None
Waste Handling Shaft Sump: None

WEEKLY STATUS OF UNDERGROUND WATER - S400 FOCUS Week Ending 6-28-96
Water Levels
Boreholes OH226: 3'8" OH222: 4'0" Waste Handling Shaft Sump "Pit": 28" From Pipe Collar
Other Information
None