RCRA FACILITY INVESTIGATION (RFI)
REPORT OF FINDINGS

REVISED

For Person Generating Station Hazardous
Waste Storage Facility - Natural Pit Area
(NMT360010342)

August 20, 1990

TABLE OF CONTENTS

Certification Statement

Document:
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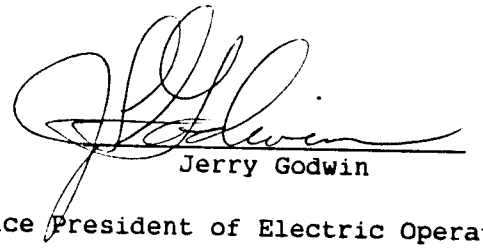


Jerry Godwin

Vice President of Electric Operations

1.0 Introduction

In November 1986, Public Service Company of New Mexico (PNM), submitted its "Permit Application for a Hazardous Waste Storage Facility at Person Generating Station", hereafter permit application, for the waste oil storage tank located at Person Generating Station. The permit was approved and became effective on August 31, 1988. That permit has the EPA designation of NMT360010342.

Paragraph C.4(a) of the permit required that PNM perform a RCRA Facility Investigation (RFI) for the Solid Waste Management Unit (SWMU), identified as the Natural Pit Area, to assess and verify any release of hazardous waste to soil.

An RFI Workplan was prepared and submitted to EPA in Janaury 1989. On March 1, 1989, EPA notified PNM of several modifications it wanted to see in the workplan. These modifications were made and the workplan was resubmitted to EPA in late March 1989.

On July 31, 1989, EPA notified PNM by letter that the RFI Workplan had been approved. The letter included two revisions which EPA added to the workplan. These revisions are further discussed in Section 2.0 of this report. A revised workplan did not need to be submitted, rather EPA instructed PNM to immediately initiate implementation of the approved RFI Workplan (as revised).

Soil sampling was conducted on August 1-2, 1989. This RFI report presents the analytical results from the soil samples and outlines our plan of action for further investigation of the site.

2.0 Departures From the RFI Workplan

This section deals with Person RFI activities which departed from the RFI Workplan as submitted in March 1989. Included as departures are revisions to the Workplan made by EPA in its approval letter. They are identified here because they were not included in the Workplan as written, but were added to the Workplan by reference in the EPA approval letter.

Other departures discussed here include changes in procedures made after the Workplan was submitted. In all cases these changes were made because preliminary testing of proposed procedures showed them to be unworkable in the field. These changes were discussed with EPA prior to actual implementation.

2.1 EPA Revisions

In the July 31, 1989 letter (See Appendix A) approving the RFI Workplan, EPA incorporated two revisions to the Workplan by reference to the letter. They were minor in nature but are included here since they are not present in the current Workplan as written.

Depth of Sampling

The Workplan states that soil borings will be at one foot intervals down to 5 feet. EPA added the following requirement:

> "If soil borings from the 4 to 5 foot sampling intervals indicate contamination, then further soil sampling will be required to determine the vertical extent of contamination."

Statistical Analysis

The Workplan describes tolerance interval analysis as the selected statistical method for the data. The method, as described, is sensitive to the normality of the data. In the event that the data are not normally distributed, or cannot be transformed to normal for analysis, the EPA added the following requirement:

> "If data from soil borings does not conform to procedures described in Section 5.3, then a different statistical procedure will be used. This different procedure must be approved by the Administrative Authority."

2.2 Procedural Revisions

In early July 1989, PNM personnel tested the hand auger method described in Section 7.2 of the Workplan. The hand auger was found to be unusable for the following two reasons:

1. The soil type at the study area is a gravelly sand with very low cohesion. It was very easy to core into, but more

often than not the plug would not stay in the coring bucket, but would fall back down into the hole. It was felt that using the hand auger would exacerbate attempts to collect samples in a timely manner and would cause great disturbance to the soil sample.

2. The hand auger was impossible to operate without causing upper levels of the soil to fall down into the hole. It was felt that if the hand auger was used it would be impossible to prevent upper layers of contamination from penetrating to deeper layers. This would cause two problems: a) cross contamination in the analysis, and b) dispersion of the contamination to deeper soil layers.

To address these concerns, a drilling contractor was hired. The contractor used a drilling rig and core sampling device which typically provides undisturbed and intact soil cores. The soil cores were taken from a split tube sampler which penetrated the soil from the inside of a continual rotary auger tube. Separate split tube samplers were used for each suceeding sampling depth.

The auger and split spoon sections were steam cleaned on site prior to and after the drilling of each hole.

3.0 Description of Sampling Activities

3.1 Sampling Objective

The sampling and analysis scheme employed for this RFI was designed to determine the presence and extent of various organic and metallic parameters in the soil of the Natural Pit area at Person Station. The specifics of the scheme are described in detail in Sections 5.0 and 6.0 of the RFI workplan, and will not be repeated here. Except for the procedural departure noted above in Section 2.2 of this report (split tube and rotary auger combination used instead of a hand auger) the proposed sampling scheme was followed exactly.

The basic approach was to collect soil samples at one foot intervals down to five feet from several locations inside the Natural Pit for comparison to like samples taken from a "background" location. The Natural Pit samples were taken from the approximate locations shown on Exhibit 5, Sampling Map for the Natural Pit Area, of the RFI workplan (sample numbers 5, 6, 7 and 8). This map is also contained in this report as Exhibit 1.

Background sample locations (sample numbers 1, 2, 3 and 4) were not specified in the RFI workplan but were selected at the time of sampling. The background sample locations selected were located just east of the northeast corner of the Person Station property boundary. This area was believed to be more suitable for background analysis than any area within the Person Station property boundary. A map showing the approximate locations of the background samples is presented as Exhibit 2 of this report.

3.2 Sampling Team

The sampling team consisted of five persons with the following duties. Two persons operated the drilling rig. One person handled all containers and documented date and time of collection on sampling sheets and labels. One person collected the samples from the split tube assemblies and placed representative amounts in the sampling containers. This person also set aside a portion of the sample for soil characterization. The fifth person took photographs of each core section and the sampling operations in general and provided other assistance as needed. All photographs are contained as Exhibit 3 of this report.

3.3 Soil Descriptions

The soils underlying the RFI site are describe in detail by the Soil Conservation Service (SCS) in a collective document, the Bernalillo County Soil Survey (USDA-SCS, 1977) (Provided as Table III-3, in Attachment 1 of the RFI workplan, "Assessment of Exposure Potentials of Person Generating Station"). The soil mapping unit of the RFI vicinity is desribed in the SCS as the Bluepoint-Kokan association comprising two fairly identifiable soil series. A reconnasisance hand augering of the study area identified the RFI study area to consist specifically of the

Kokan soil series.

The background sample location (samples 1, 2, 3 and 4) was consequently selected in a Kokan soil series location.

Each depth interval at each sampling location was examined for physical soil properties to verify consistancy in soil type between the investigation samples (samples 5, 6, 7 and 8) and the background samples (samples 1, 2, 3, and 4). Soil examinations were performed in the field by the same individual.

Representative samples were collected from each soil sampling increment to be analyzed and were described for texture, color, and calcareousness. Soil texture was determined utilizing a wet soil ribbon technique. Reaction to a 10% solution of hydrochloric acid identified calcareousness. A Munsell Soil Color Chart was used to describe the sample color while dry and wet. In some cases the sample was already wet due to rain. No attempt was made to artificially dry the sample for a dry color description.

In general, all samples were a gravelly sand, slightly calcareous, and of a very pale brown color (dry), pale brown color (wet). This description is consistant with the Kokan soil series described in detail by the Soil Conservation Service and presented in the Bernalillo County Soil Survey.

Only one sample location (number 4 - background) varied slightly from the above description. Beneath the top foot, the soil became a gravelly loamy sand, slightly calcareous, and of a light yellow brown color (dry), yellowish brown (wet). This description probably still tends to follow the characteristics of the Kokan series.

Other variations in color were noted at sample location number 7 (0-36 inches) and at sample location number 8 (0-10 inches). This was due to obvious soil contamination from the fuel oil spill described in Section 3.2.1 of the RFI workplan. The fuel oil imparted a dark brown to black color to the soil.

Soil description charts for all sampling locations and depth intervals are presented as Exhibit 4 of this report.

3.4 Sample Collection and Preservation

Sampling occurred over a two day period commencing August 1, 1989 and ending August 2, 1989. Sample locations 1, 2, 3, 4, 5 and 8 were drilled on August 1; while 6 and 7 were drilled on August 2. It should be noted that sampling was to occur early on August 1, 1989. Due to looseness of sandy soil at sample locations, a small tracked dozer was needed to provide access to sampling locations and move the drill rig.

The rotary auger/split tube sampling procedure was capable of withdrawing approximately 18 inches of undisturbed soil core per split tube sampler assembly. Due to the extreme dryness and fine grain

particles of deeper samples, some sample material was lost. There was, however, sufficient sample to perform needed analysis in all cases. Each split tube was pulled out of the hole, laid across a metal rack, and opened. A photograph was taken of the section, then a representative sample from each one foot interval was removed with stainless steel sampling spoons and placed in 8oz wide mouth glass jars. The jars were QA/QC checked and supplied by Eagle Picher Environmental Services. A copy of the Certificate of Analysis for the container lot used in this investigation is contained as Exhibit 5 of this report.

Each sample jar was pre-labeled as to sample location number, and depth interval. The date and time of collection, and name and signature of sample collector were written on the label after each sample was collected. The sample was then taped and placed on ice in a large cooler.

Documentation for each sample was also maintained on sample logs. An example log is shown in Exhibit 1 of the RFI workplan. Chain of custody forms (See Exhibit 2 of the RFI workplan) were used to track movement of the samples from collection through delivery to the analytical laboratory.

Samples collected on August 1, 1989 were delivered to the laboratory early on August 2, 1989. Samples collected on August 2, 1989 were delivered to the laboratory later on the same day.

3.5 Quality Assurance

Several steps were taken to ensure the quality of the results obtained from the sampling procedure. As mentioned above, a rotary auger - split tube sampling procedure was used to minimize cross contamination between soil layers. The rotary drills and split spoon samplers were steam cleaned before and after each hole to prevent cross contamination between sample locations. Individual split tube samplers were used for each successive sample interval.

All team members involved in the handling of samples wore latex examination gloves.

Two soil blanks were provided by the analytical laboratory. One blank contained soil washed in methyl alcohol, the other blank contained soil washed in an acetone/hexane solvent.

The laboratory also provided containers of the reagent solvents above for use in generating two additional field blanks from the initial cleaning of the sampling spoons. These solvents were also used for the cleaning of the spoons between each sample collection.

Laboratory precision was assessed by the submittal of sample duplicates from sample location number 7. The duplicates were collected at the same time and consisted of placing similar amounts of soil from each interval of the soil core into their respective sample jars.

The analytical laboratory also selected several samples from the set to analyze in duplicate. For purposes of analysis these duplicate results are averaged into a single value and reported as such in this report.

4.0 Data Results

Exhibit 6 of this report contains a copy of the analytical data report prepared by Assaigai Laboratories, Inc. The data tables contained in this report are extracted from the laboratory data report.

4.1 Heavy Metals Analysis

Natural Pit and background samples were analyzed for arsenic, cadmium, chromium, and lead. As more fully described in Section 8.4 of the RFI workplan, the approach on heavy metals analysis was to statistically compare results from background samples to results from sample locations within the natural pit.

Because it was felt that the results may be sensitive to moisture content of the soil sample, a percent moisture analysis was performed by the laboratory on each sample. The statistical analysis was then done in duplicate (uncorrected for moisture content and corrected for moisture content). Both results are reported here, but it was found that correcting for moisture content made no difference in this study as to which samples exceeded their threshold limit.

Exhibit 7 of this report contains the Tolerance Interval Analysis spreadsheet listings for the four background sample locations (1,2,3 and 4), corrected for moisture content and uncorrected. Since each natural pit sample was to be compared to its corresponding depth from the background, the listings in Exhibit 7 are organized by metal with statistical parameters based on all background samples from each depth. Thus, there are four samples for each depth on which to perform the Tolerance Interval Analysis. The Threshold Limit (TL) was calculated from:

$$TL = AVG + K * SD$$

where,

AVG = arithmetic mean of the four samples
K = Tolerance Factor for 95% coverage and 95% confidence
SD = standard deviation of the four samples

The Tolerance Factor (K) was taken from Table 5 of Appendix B in the EPA document Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities. Table 5 is reproduced in Exhibit 8 of this report.

After calculating the Threshold Limit for each heavy metal at each depth, all Natural Pit samples were compared against their corresponding threshold limit. Tables 1 and 2 of this report show the comparison of each Natural Pit sample with its Threshold Limit. Table 1 is uncorrected for moisture content while Table 2 is corrected for moisture content.

Sample values, as reported by the laboratory were corrected for moisture content by the following formula:

$$Mc = \frac{Mr}{1 - (W/100)}$$

where,

Mc = Metal concentration, corrected
Mr = Metal concentration, reported
W = Percent moisture as reported

As mentioned above, correcting for moisture content made no difference as to which samples exceeded their corresponding Threshold Limits in this study.

The results of this analysis are further discussed in Section 5 of this report.

Table 1

Analytical Results from Natural Pit Area - Metals
(Uncorrected For Moisture Content)

ARSENIC (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	5.08	14.89	5.2*	3.9	7.6	6.6*	5.1
1 - 2	5.08	8.93	31.2*	2.4	5.2	5.1	3.8
2 - 3	3.55	9.71	<2.0	2.2	6.7	13.9	2.2
3 - 4	3.23	10.74	<2.0	2.2	6.7	5.5	5.8
4 - 5	3.52	5.13	2.3	3.9	2.9	2.4	2.0

CADMIUM (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	2.98	22.10	0.6	0.1*	0.2	0.2	<0.1
1 - 2	1.11	6.45	2.4	0.2	<0.1	<0.1	<0.1
2 - 3	0.36	1.38	0.6	<0.1	<0.1	0.2	<0.1
3 - 4	0.46	3.56	0.2	<0.1	<0.1	<0.1	<0.1
4 - 5	2.05	19.43	<0.1	0.1	<0.1	<0.1	<0.1

CHROMIUM (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	4.50	10.68	6506*	5.6	22.3*	16.6*	6.1
1 - 2	4.20	11.76	89.6*	3.5*	6.3	5.5*	4.6
2 - 3	2.95	9.21	3.1	3.7	12.3	10.3	<2.0
3 - 4	3.38	4.75	3.0	2.5	8.8	6.2	2.2
4 - 5	3.40	5.95	2.2	3.0	2.4	1.6	3.8

LEAD (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	10.93	34.32	12.4*	14.4	38.4*	44.8*	7.1
1 - 2	6.72	24.59	71.2*	7.8	6.9	6.3	4.4
2 - 3	3.67	4.73	4.4	6.9	5.1	4.9	3.3
3 - 4	3.65	6.34	3.1	4.5	3.9	3.9	4.0
4 - 5	4.07	7.42	4.2	4.1	3.4	3.5	4.5

* Average from duplicate results reported by lab.

Table 2

Analytical Results from Natural Pit Area - Metals
(Corrected For Moisture Content)

ARSENIC (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	5.35	15.91	5.5*	4.1	7.9	6.8*	5.2
1 - 2	5.17	9.03	33.7*	2.5	5.4	5.3	4.0
2 - 3	3.60	9.97	<2.0	2.2	6.8	14.2	2.4
3 - 4	3.30	11.01	<2.0	2.2	6.8	5.6	5.9
4 - 5	3.63	5.23	2.3	4.0	2.9	2.4	2.0

CADMIUM (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	3.15	23.56	0.6	0.1*	0.2	0.2	<0.1
1 - 2	1.14	6.62	2.6	0.2	<0.1	<0.1	<0.1
2 - 3	0.36	1.38	0.6	<0.1	<0.1	0.2	<0.1
3 - 4	0.46	3.56	0.2	<0.1	<0.1	<0.1	<0.1
4 - 5	2.10	19.93	<0.1	0.1	<0.1	<0.1	<0.1

CHROMIUM (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	4.73	11.55	6832*	5.9	23.3*	17.3*	6.2
1 - 2	4.30	11.86	96.3*	3.6*	6.5	5.7*	4.8
2 - 3	3.02	9.50	3.2	3.8	12.5	10.5	<2.0
3 - 4	3.45	4.97	3.1	2.6	8.9	6.3	2.2
4 - 5	3.50	6.05	2.2	3.0	2.4	1.6	3.8

LEAD (mg/kg)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	11.47	36.47	13.1*	15.0	40.1*	46.4*	7.2
1 - 2	6.88	25.18	76.6*	8.1	7.1	6.5	4.6
2 - 3	3.77	4.83	4.5	7.0	5.2	5.0	3.6
3 - 4	3.75	6.44	3.2	4.6	4.0	3.9	4.0
4 - 5	4.17	7.52	4.3	4.2	3.4	3.5	4.5

* Average from duplicate results reported by lab.

4.2 Heavy Organics

Natural Pit samples were also analyzed for Oil and Grease, Toluene, Napthalene, and Polychlorinated Biphenyls (PCBs). These parameters were not measured in the background samples. As stated in the RFI workplan, any level of presence in the samples would constitute contamination. For these parameters, the Threshold Limit was set to the nominal detection limit of the parameter as supplied by the analytical laboratory. Table 3 shows the comparison of each Natural Pit sample with the nominal detection limit (Threshold Limit) for that parameter. The results are further discussed in Section 5 of this report.

Table 3

Analytical Results from Natural Pit Area - Heavy Organics

Oil and Grease (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	50	<50	<50	35427	62640	7381
1 - 2	NA	50	<50	<50	68692	59566	<50
2 - 3	NA	50	<50	<50	17285	13596	<50
3 - 4	NA	50	<50	<50	835	176	<50
4 - 5	NA	50	<50	<50	<50	<50	<50

Toluene (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	0.25	<0.25	<0.25	0.34	0.32	<0.25
1 - 2	NA	0.25	<0.25	<0.25	1.7	1.9	<0.25
2 - 3	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3 - 4	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4 - 5	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Napthalene (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1 - 2	NA	0.25	<0.25	<0.25	5.7	5.6	<0.25
2 - 3	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3 - 4	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4 - 5	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25

PCB (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1 - 2	NA	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2 - 3	NA	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3 - 4	NA	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4 - 5	NA	1.0	<1.0	<1.0	<1.0	<1.0	<1.0

* Average from duplicate results reported by lab.

4.3 Solvents

Natural Pit samples were also analyzed for 1,1,1-Trichloroethane (TCA), Perchloroethylene (PCE), and Trichloroethylene (TCE). These parameters were not measured in the background samples. As stated in the RFI workplan, any level of presence would constitute contamination. For these parameters, the Threshold Limit was set to the nominal detection limit of the parameter as supplied by the analytical laboratory. Table 4 shows the comparison of each Natural Pit sample with the nominal detection limit (Threshold Limit) for that parameter. The results are further discussed in Section 5 of this report.

Table 4

Analytical Results from Natural Pit Area - Solvents

1,1,1 - TCA (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1 - 2	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2 - 3	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3 - 4	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4 - 5	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25

PCE (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1 - 2	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2 - 3	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3 - 4	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4 - 5	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25

TCE (ug/g)

Depth (ft)	Background Average	Threshold Limit	Site # 5	Site # 6	Site # 7A	Site # 7B	Site # 8
0 - 1	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
1 - 2	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
2 - 3	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
3 - 4	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4 - 5	NA	0.25	<0.25	<0.25	<0.25	<0.25	<0.25

* Average from duplicate results reported by lab.

5.0 Findings

5.1 Heavy Metals

Background

In general, heavy metal concentrations tended to decrease with depth at the background sampling locations. This trend was most obvious for lead concentrations and least for cadmium concentrations.

A requirement for use of the Tolerance Interval Analysis procedure was that the data be normally distributed. The Coefficient of Variance (CV in the listings of Exhibit 7) was used as an indicator of normality. This method was described in Section 4.2.2 of the EPA document Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, February 1989. If the CV exceeds 1.00, there is evidence that the data are not normally distributed.

Only for the parameter cadmium, did CV values exceed 1.00. Usually this would have required that the data be transformed and made normal for the statistical comparison. This was not done, however, because the analytical results from the Natural Pit samples were extremely low for cadmium and it was intuitively obvious that no amount of transformation would yield Natural Pit values above the background Threshold Limits.

The CV for all sampling intervals for arsenic, chromium, and lead were below 1.00 and the data was assumed to meet the normality requirement for use of the Tolerance Interval Analysis procedure.

Natural Pit

The results obtained for three of the heavy metal parameters were not expected based on information about the Natural Pit known at the time the sampling scheme was designed. Historical use of the Natural Pit area did not indicate that high concentrations of heavy metals would be found.

Values slightly above the threshold limits for arsenic, chromium and lead were seen at sample location number 7. This was not totally unexpected as this site was characterized by number 6 fuel oil contamination down to about four feet. Chromium exceedances were seen in the top interval (0-1 foot) and in the intervals 2-3 feet and 3-4 feet. An arsenic exceedance occurred at the 2-3 foot level. Lead values exceeded their threshold limits at the 0-1 foot interval and the 2-3 foot interval. The magnitude of the exceedances ranged from about 5 times background average down to 1.5 times background average.

An unexpected finding was the presence of a "hot spot" of contamination at sample location number 5. Chromium levels were 1500 times the background average in the first foot of the soil and 20 times the background average in the 1-2 foot interval. Below that level, concentrations were identicle to background values. Sample values exceeding the threshold limit for arsenic and lead were also detected in

the 1-2 foot interval at this sample location. The magnitude was 6 times the background average for arsenic and 10 times the background average for lead. The top interval (0-1 foot) did not show exceedences for these parameters.

Only one other threshold limit exceedance was detected. The 2-3 foot interval at sample location number 6 showed lead concentrations slightly above the background. This is probably not significant for the following reasons. The measured value (6.9 mg/kg) fits neatly in the decreasing progression of data from 14.4 mg/kg at the 0-1 foot interval to 4.1 mg/kg at the 4-5 foot interval. The progression mimics that seen in the background data. A close look at the background data (See Exhibit 7) shows that the four samples used to calculate the Threshold Limit are closely grouped in concentration. This yielded a very small standard deviation (0.20 mg/kg) which in turn caused the threshold limit to be very restrictive. It is therefore believed that this exceedance is an anomaly of the method and not a true contamination event.

5.2 Heavy Organics

Background

No background samples were analyzed for the four heavy organic parameters (Oil and Grease, Toluene, Napthalene, and PCB). These parameters were assumed to be absent in the background soil. For comparison purposes the Threshold Limit was set to the nominal detection limit for each parameter as reported by the analytical laboratory.

Natural Pit

No PCBs were detected at any depth interval at any sample location.

No heavy organic parameters were detected at sample location numbers 5 and 6. Sample location number 8 showed some Oil and Grease in the 0-1 foot interval only. No other heavy organic parameter was detected at sample location number 8.

At sample location number 7, where the fuel oil number 6 contamination was present, Oil and Grease was detected down to 4 feet, Toluene and Napthalene were detected down to 2 feet.

5.3 Solvents

Background

No background samples were analyzed for the three chlorinated solvent parameters (1,1,1-TCA, PCE, TCE). These parameters were assumed to be absent in the background soil. For comparison purposes the Threshold Limit was set to the nominal detection limit for each parameter as reported by the analytical laboratory.

Natural Pit

No chlorinated solvents were detected at any depth interval of any sample location.

5.4 Quality Assurance

Field Blanks

The analytical laboratory provided two soil trip blanks for delivery to field and back (identified on the laboratory sheets as PNM-0-1 and PNM-0-2). The first soil blank had been washed with methyl alcohol reagent and the second soil blank had been washed with an acetone/hexane solvent reagent.

The first soil blank was analyzed for PCB content. No detectable levels (<1.0 ug/g) were found.

The second soil blank was analyzed for PCE, TCE, 1,1,1-TCA, Toluene, and Napthalene. No detectable levels (<0.25 ug/g) were found.

The laboratory also provided containers of the reagent solvents describe above for use in cleaning of the sampling spoons between uses. The initial cleaning of the spoons with each solvent was collected and submitted for laboratory analysis (identified on the laboratory analysis sheets as PNM-0-3 and PNM-0-4). The methyl alcohol wash was analyzed for PCB content. No detectable levels (<1.0 ug/g) were found. The acetone/hexane wash was analyzed for PCE, TCE, 1,1,1-TCA, Toluene, and Napthalene. No detectable levles (<0.1 ug/ml) were found.

Laboratory Duplicates

The laboratory randomly selected numerous samples for duplicate analysis. The paired results listed by parameter are shown in Table 5. This table also summarizes the percent difference between pairs and shows the mean and standard deviation of the data values (if sufficient numbers of pairs are available). Pairs comprised of non-dectable values are shown but not included in the summary. Only analytical results for chromium, lead, and Oil and Grease were sufficient for statistical analysis.

The standard deviation of the percent differences were 43.4%, 34.1%, and 3.0% for chromium, lead, and Oil and Grease, respectively.

Field Duplicates

Samples from sample location number 7 were split in the field and provided to the laboratory for duplicate analysis. The paired results listed by parameter are shown in Table 6. This table also summarizes the percent difference between pairs and shows the mean and standard deviation of the data values (if sufficient numbers of pairs are available). Pairs comprised of non-detectable values are shown but not included in the summary.

For the heavy metals, the standard deviation of the percent difference were 7.8%, 8.6%, and 48.3% for chromium, lead, and arsenic, respectively. Only one valid pair was available for cadmium (0.0% difference), thus no standard deviation could be calculated.

The standard deviation of the percent difference for Oil and Grease analysis was 55,7%. The standard deviation of the percent difference for Toluene was 8.8%.

No statistical summation was possible for Napthalene, PCB, 1,1,1-TCA, PCE, or TCE.

Table 5

Precision Assessment for Laboratory Duplicates

	Arsenic			Cadmium			Chromium		
	A	B	%Diff	A	B	%Diff	A	B	%Diff
	2.7	7.7	185	0.2	0.2	0.0	6.1	6.5	6.6
	26.8	35.7	33.2	<0.1	<0.1	--	3.1	3.3	6.5
				<0.1	<0.1	--	12900	111	-99.1
							169.1	10.0	-94.1
							3.5	3.4	-2.9
							22.0	22.5	2.3
							22.0	11.3	-48.6
							5.3	5.7	7.5
N	2	2	2	1	1	1	8	8	8
Mean	--	--	--	--	--	--	1641	21.7	-27.7
Std.Dev	--	--	--	--	--	--	4256	34.2	43.4

	Lead			Oil and Grease			PCB		
	A	B	%Diff	A	B	%Diff	A	B	%Diff
	13.9	11.0	-20.9	7463	7299	-2.2	<1.0	<1.0	--
	58.0	84.4	45.5	< 50	< 50	--	<1.0	<1.0	--
	39.0	37.7	-3.3	< 50	< 50	--	<1.0	<1.0	--
	59.0	30.6	-48.1	865	804	-7.1	<1.0	<1.0	--
				59677	59454	-0.4	<1.0	<1.0	--
				14117	13075	-7.4			
N	4	4	4	4	4	4	--	--	--
Mean	42.5	40.9	-6.7	20531	20158	-4.3	--	--	--
Std.Dev.	18.3	26.9	34.1	23082	23099	3.0	--	--	--

Table 5
(Continued)

Precision Assessment for Laboratory Duplicates

	PCE			TCE			TCA		
	A	B	%Diff	A	B	%Diff	A	B	%Diff
	<0.25	<0.25	--	<0.25	<0.25	--	<0.25	<0.25	--
N	--	--	--	--	--	--	--	--	--
Mean	--	--	--	--	--	--	--	--	--
Std.Dev	--	--	--	--	--	--	--	--	--

	Napthalene			Toluene		
	A	B	%Diff	A	B	%Diff
	<0.25	<0.25	--	<0.25	<0.25	--
N	--	--	--	--	--	--
Mean	--	--	--	--	--	--
Std.Dev	--	--	--	--	--	--

Table 6

Precision Assessment for Field Duplicates

	Arsenic			Cadmium			Chromium		
	A	B	%Diff	A	B	%Diff	A	B	%Diff
	7.6	6.6	-13.2	0.2	0.2	0.0	22.2	16.7	-24.8
	5.2	5.1	- 1.9	<0.1	<0.1	--	6.3	5.5	-12.7
	6.7	13.9	107.5	<0.1	0.2	--	12.3	10.3	-16.3
	6.7	5.5	-17.9	<0.1	<0.1	--	8.8	6.2	-29.5
	2.9	2.4	-17.2	<0.1	<0.1	--	2.4	1.6	-33.3
N	5	5	5	1	1	1	5	5	5
Mean	5.8	6.7	11.4	--	--	--	10.4	8.1	-23.3
Std.Dev	1.7	3.9	48.3	--	--	--	6.7	5.1	7.8

	Lead			Oil and Grease			PCB		
	A	B	%Diff	A	B	%Diff	A	B	%Diff
	38.4	44.8	16.7	35427	62640	76.8	<1.0	<1.0	--
	6.9	6.3	-8.7	68692	59566	-13.3	<1.0	<1.0	--
	5.1	4.9	-3.9	17285	13596	-21.3	<1.0	<1.0	--
	3.9	3.9	0.0	835	176	-78.9	<1.0	<1.0	--
	3.4	3.5	2.9	< 50	< 50	--	<1.0	<1.0	--
N	5	5	5	4	4	4	--	--	--
Mean	11.5	12.7	1.4	20531	20158	-4.3	--	--	--
Std.Dev.	13.5	16.1	8.6	23082	23099	3.0	--	--	--

Table 6
(Continued)

Precision Assessment for Field Duplicates

	PCE			TCE			TCA		
	A	B	%Diff	A	B	%Diff	A	B	%Diff
	<0.25	<0.25	--	<0.25	<0.25	--	<0.25	<0.25	--
	<0.25	<0.25	--	<0.25	<0.25	--	<0.25	<0.25	--
	<0.25	<0.25	--	<0.25	<0.25	--	<0.25	<0.25	--
	<0.25	<0.25	--	<0.25	<0.25	--	<0.25	<0.25	--
	<0.25	<0.25	--	<0.25	<0.25	--	<0.25	<0.25	--
N	--	--	--	--	--	--	--	--	--
Mean	--	--	--	--	--	--	--	--	--
Std.Dev	--	--	--	--	--	--	--	--	--

	Napthalene			Toluene		
	A	B	%Diff	A	B	%Diff
	<0.25	<0.25	--	0.34	0.32	-5.9
	5.7	5.6	-1.8	1.7	1.9	11.8
	<0.25	<0.25	--	<0.25	<0.25	--
	<0.25	<0.25	--	<0.25	<0.25	--
	<0.25	<0.25	--	<0.25	<0.25	--
N	1	1	1	2	2	2
Mean	--	--	--	--	--	--
Std.Dev	--	--	--	--	--	--

6.0 Future Action

6.1 General Discussion

The results of this investigation indicate that in certain areas of the Natural Pit residual fuel oil contamination still exists and remains a source for the release of miscellaneous organic compounds into the environment. Chlorinated solvents and PCBs were not detected, and only small amounts of Napthalene and Toluene were detected. The fuel oil contaminated areas did not appear to be a source of heavy metal compounds.

Statistically significant concentrations of chromium and arsenic were detected at another site within the Natural Pit. It cannot be determined from this investigation whether or not this represents movement of heavy metals away from the fuel oil contamination areas, or if a second contamination source exists.

Either way, it is doubtful that the level of heavy metal contamination detected would exceed any regulatory threshold for designation of the soil as "hazardous".

6.2 Additional Sampling

PNM will initial a second sampling phase known as "Phase II" which will consist of three soil borings with locations indicated in Exhibit 9. These borings will be sampled at the following intervals: 0 - 1', 1 - 2', 4 - 5', and 9 -10'. Each sampling interval will be analyzed for lead, chromium, and arsenic. Background comparisons will be made to the same background samples collected during the initial sampling phase. Because no background sample was collected at the 9 - 10' interval, this new depth will be compared to the 4 - 5' background sampling depth. For the Phase II sampling, PNM will adhere to all requirements and conditions of the RFI Workplan.

6.3 Soil Removal and Disposal

All recommendations for removal and disposal of contaminated soil will be contained in the Phase II Report of Findings.

Appendix A

EPA RFI Approval Letter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202

JUL 3 1 1989

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Ron D. Johnson
Public Service Company of New Mexico
Alvarado Square
Albuquerque, New Mexico 87158

RE: RFI Workplan - Public Service Company - NMT360010342

Dear Mr. Johnson:

We have completed a review of your response to our March 1, 1989, letter regarding deficiencies in your RFI Workplan. We have determined the Workplan to be approvable with the revisions that are described below:

Page 9 of the revised RFI Workplan; Added to 2nd paragraph: If soil borings from the 4 to 5 foot sampling intervals indicate contamination, then further soil sampling will be required to determine the vertical extent of contamination.

Page 18 of revised RFI Workplan; Added to 5th paragraph: If data from soil borings does not conform to procedures described in Section 5.3, then a different statistical procedure will be used. This different procedure must be approved by the Administrative Authority.

Therefore, the approved RFI Workplan consists of the original January 11, 1989, submittal, plus your March 29, 1989, response to our notice of deficiency, and the above revisions.

You shall immediately initiate the implementation of this approved RFI Workplan, with the above stated revisions, according to the schedule contained in the Workplan. If you have any questions concerning this matter, please contact Rich Mayer of my staff at (214) 655-6785.

Sincerely yours,

WK Hansen

Allyn M. Davis
Director
Hazardous Waste Management Division

cc: Kelley C. Crossman
New Mexico Environmental Improvement Division

Exhibit 1

Sampling Map for the Natural Pit Area

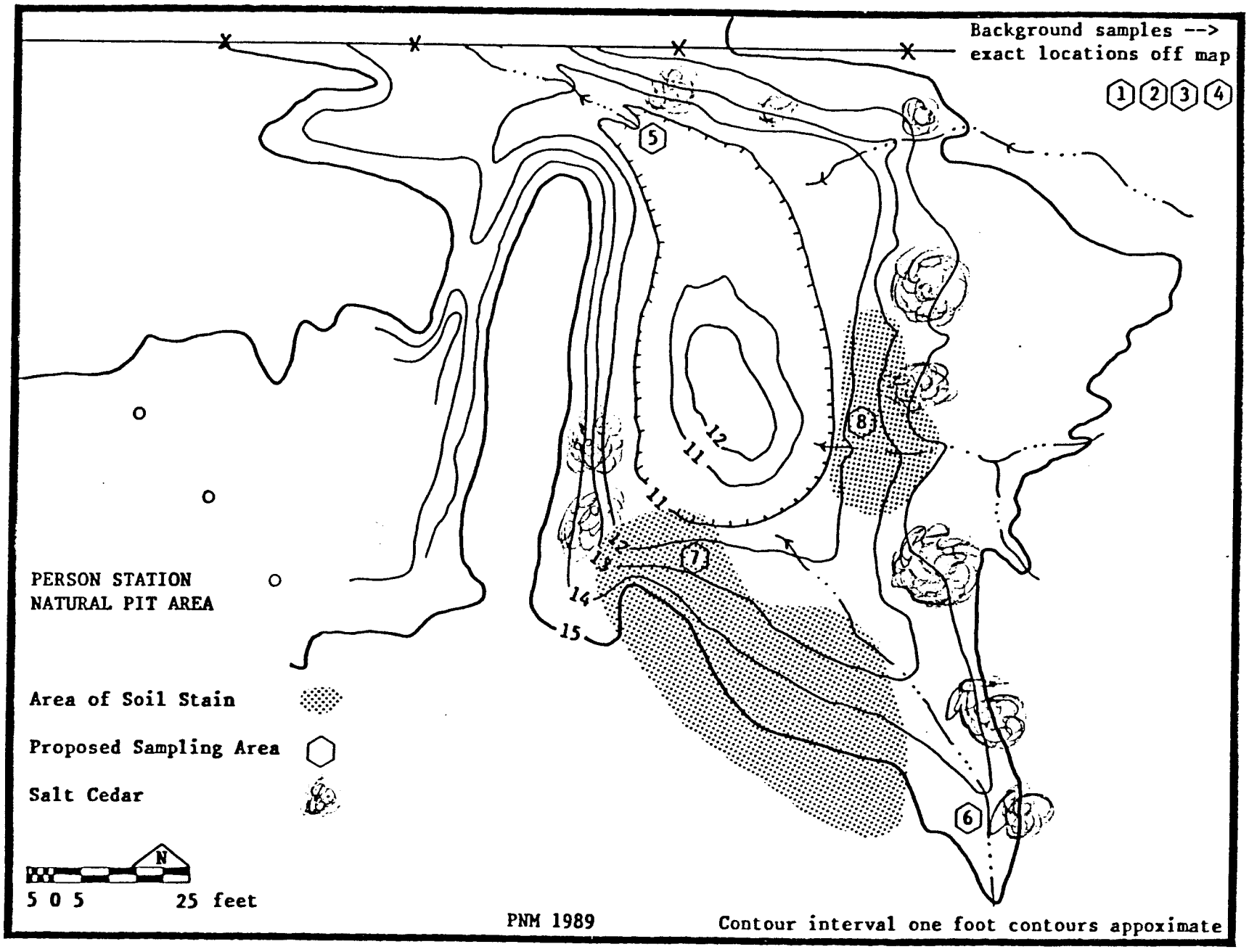

Background samples --> exact locations off map
1
2
3
4
5
6
7
8
PERSON STATION
NATURAL PIT AREA
Area of Soil Stain
Proposed Sampling Area
Salt Cedar
N
5 0 5
25 feet
PNM 1989
Contour interval one foot contours appoximate

Exhibit 2

Sampling Map for the Background Samples

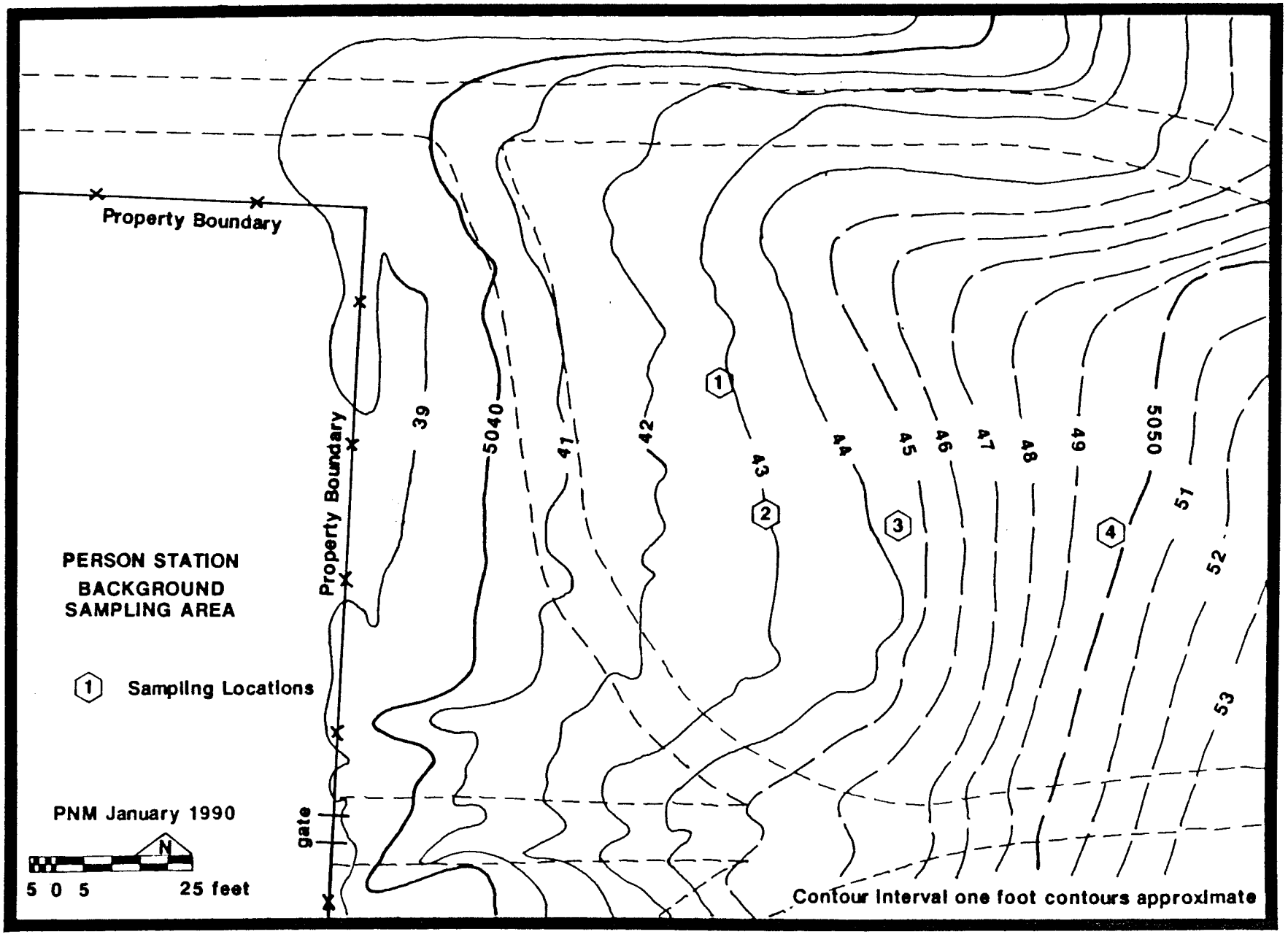

Property Boundary
Property Boundary
39
5040
41
42
43
44
45
46
47
48
49
5050
51
52
53
1
2
3
4
PERSON STATION
BACKGROUND
SAMPLING AREA
1 Sampling Locations
PNM January 1990
N
5 0 5
25 feet
gate
Contour interval one foot contours approximate

Exhibit 3

Photographs of the Sampling Activities

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 1 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: STEAM CLEANING PROCEDURE FOR AUGER DRILL BITS

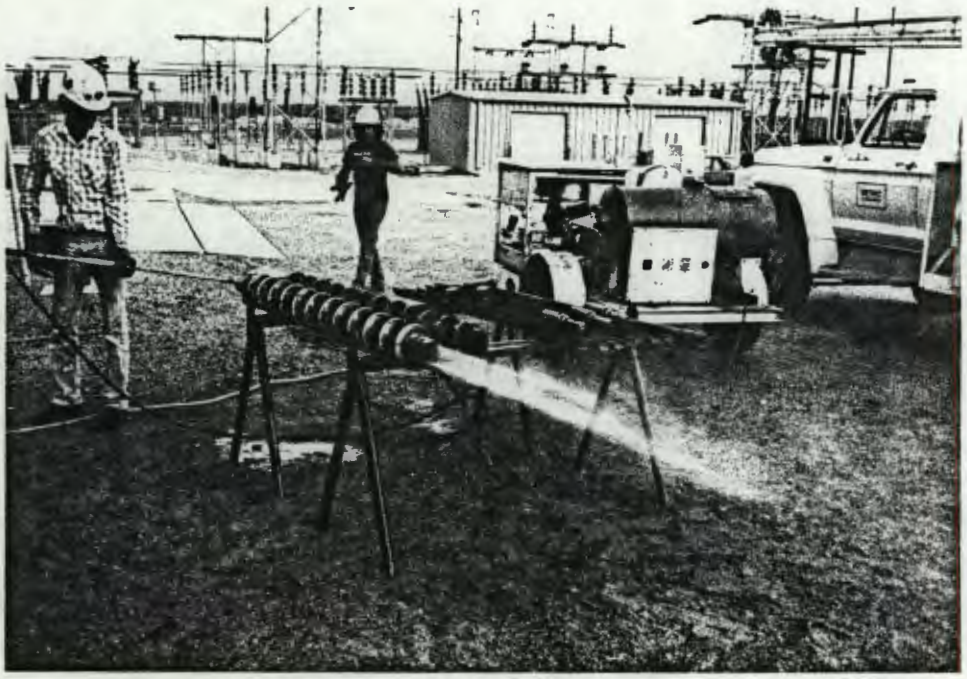
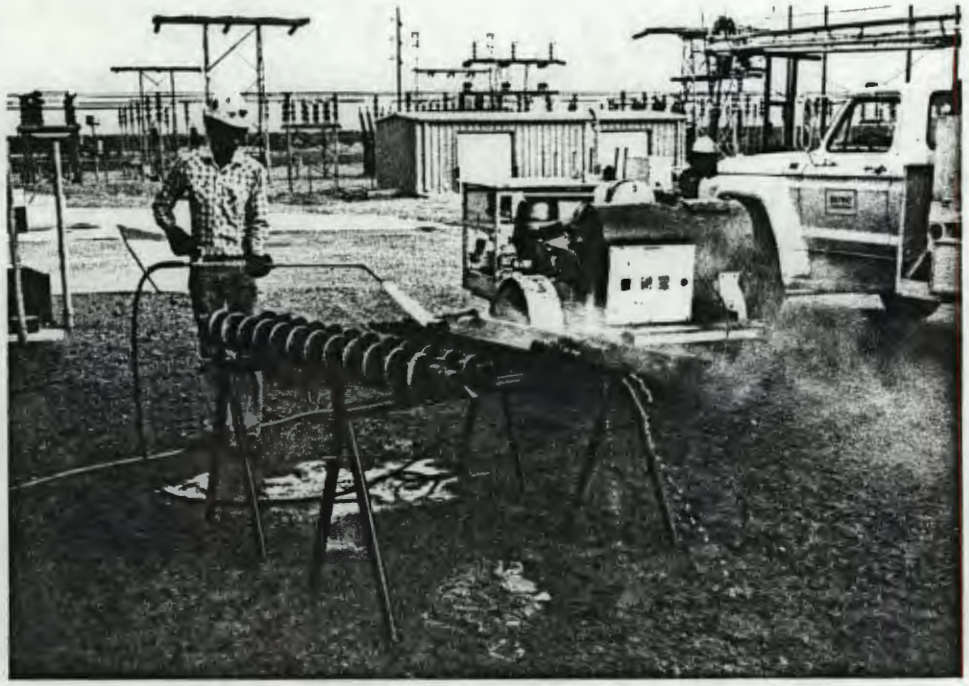


PHOTO NO. 2 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: STEAM CLEANING PROCEDURE FOR SPLIT SPOON SAMPLERS



PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 3 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: DRILL RIG SETUP FOR SOIL CORE SAMPLING

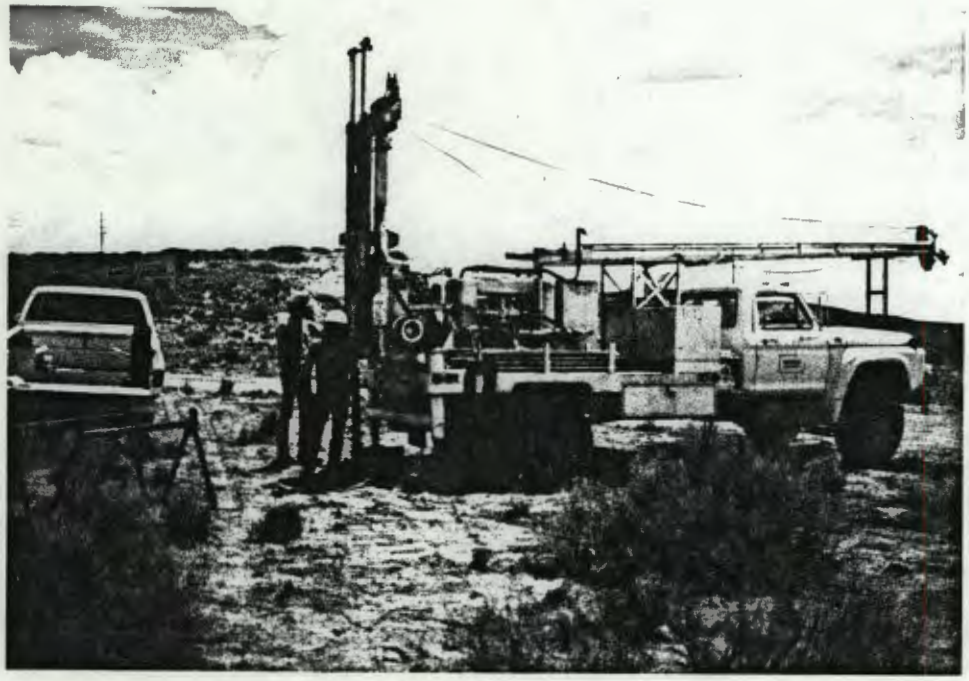
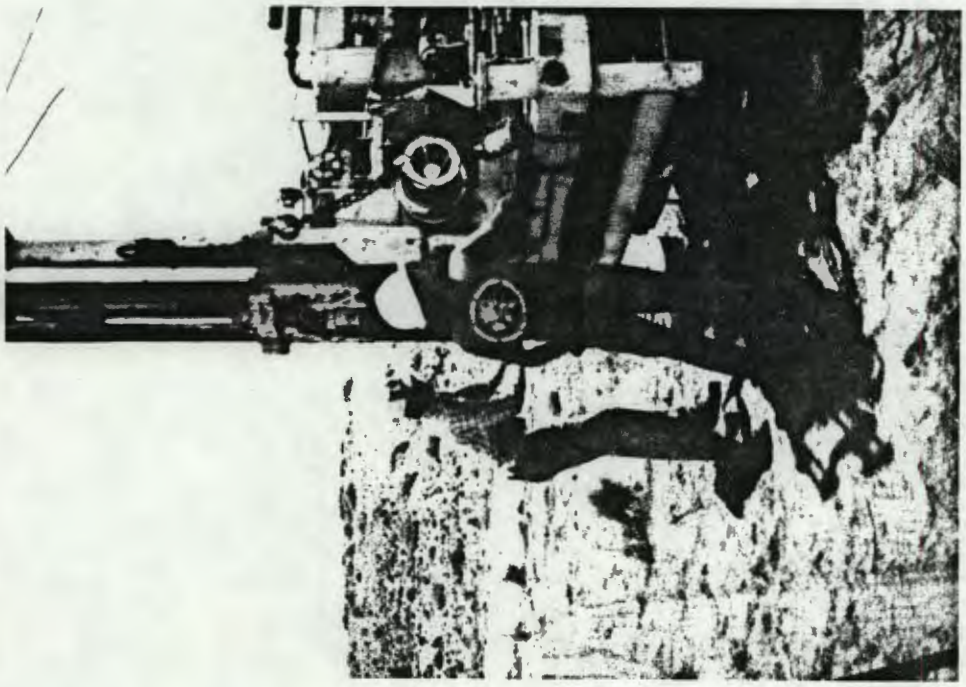


PHOTO NO. 4 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: DRILL RIG SETUP FOR SOIL CORE SAMPLING



PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 5 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: REMOVAL OF SPLIT SPOON SAMPLER FROM AUGER

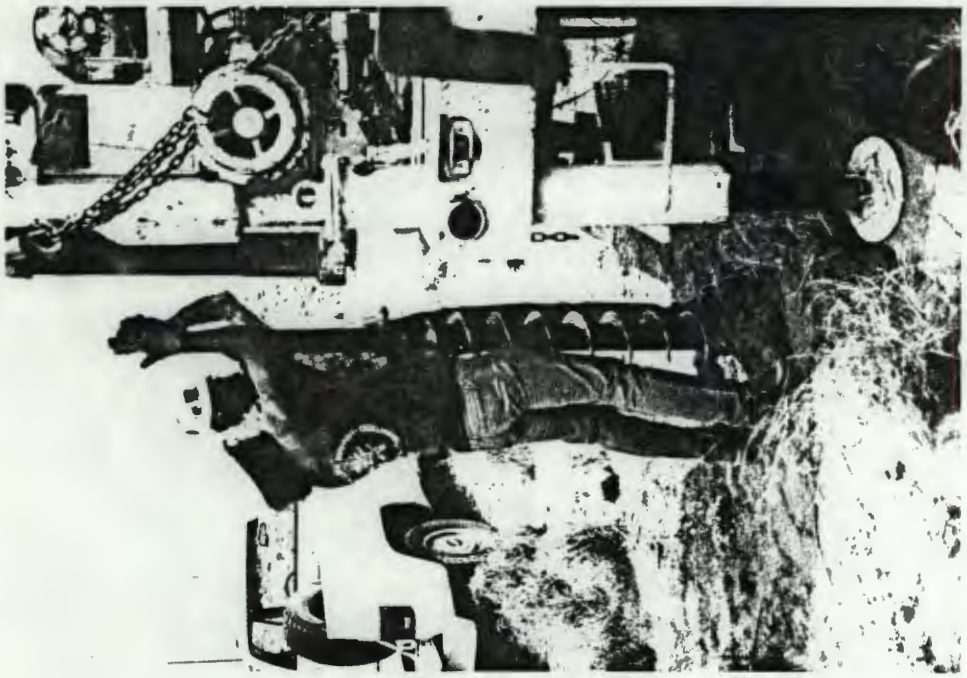


PHOTO NO. 6 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: POSITIONING SPLIT SPOON SAMPLER FOR SAMPLE REMOVAL

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 7 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: SAMPLE COLLECTION

PHOTO NO. 8 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CHARACTERIZATION OF SOIL SAMPLE COLOR

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 9 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 1 DEPTH 0-20"

PHOTO NO. 10 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 1 DEPTH 20-40"

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 11 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 1 DEPTH 40-60"

PHOTO NO. 12 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 2 DEPTH 0-20"

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 13 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 2 DEPTH 20-40"

PHOTO NO. 14 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 2 DEPTH 40-60"

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 15 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 3 DEPTH 0-20"

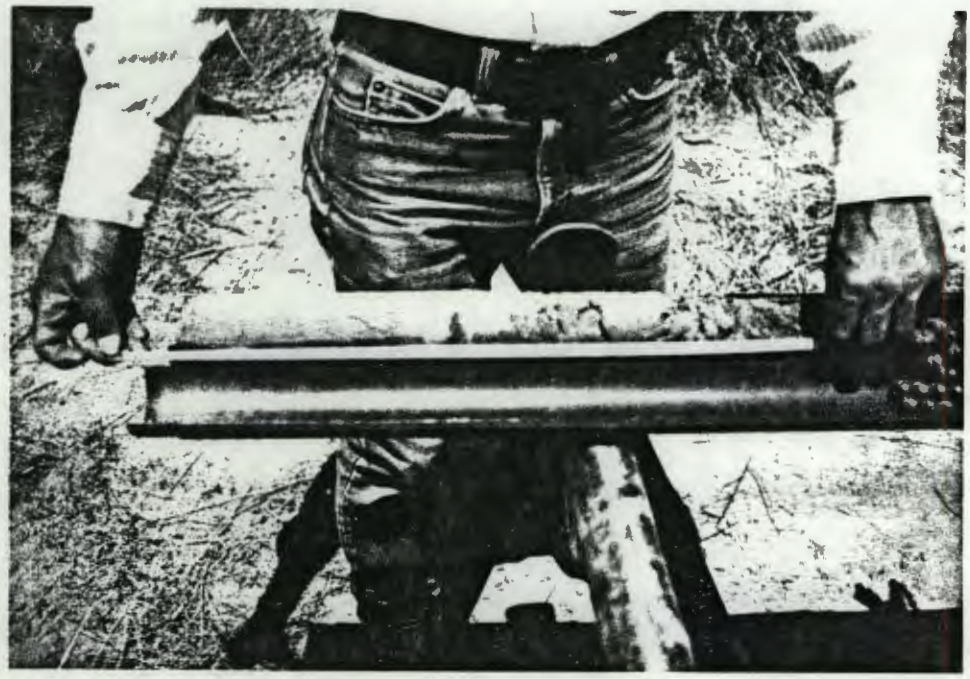


PHOTO NO. 16 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 3 DEPTH 20-36"

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 17 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 3 DEPTH 36-60"

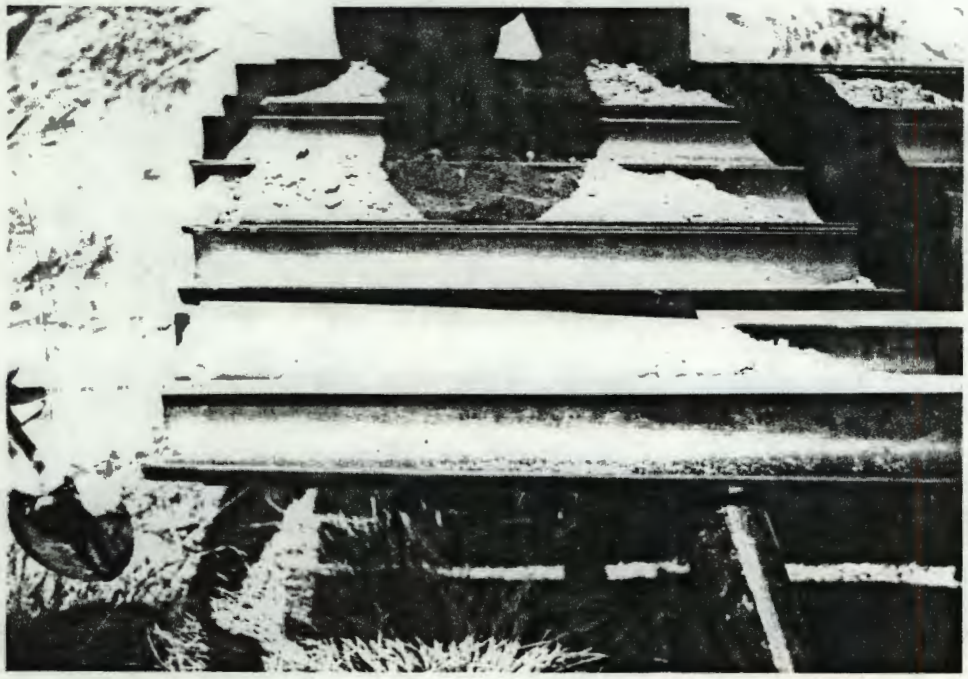
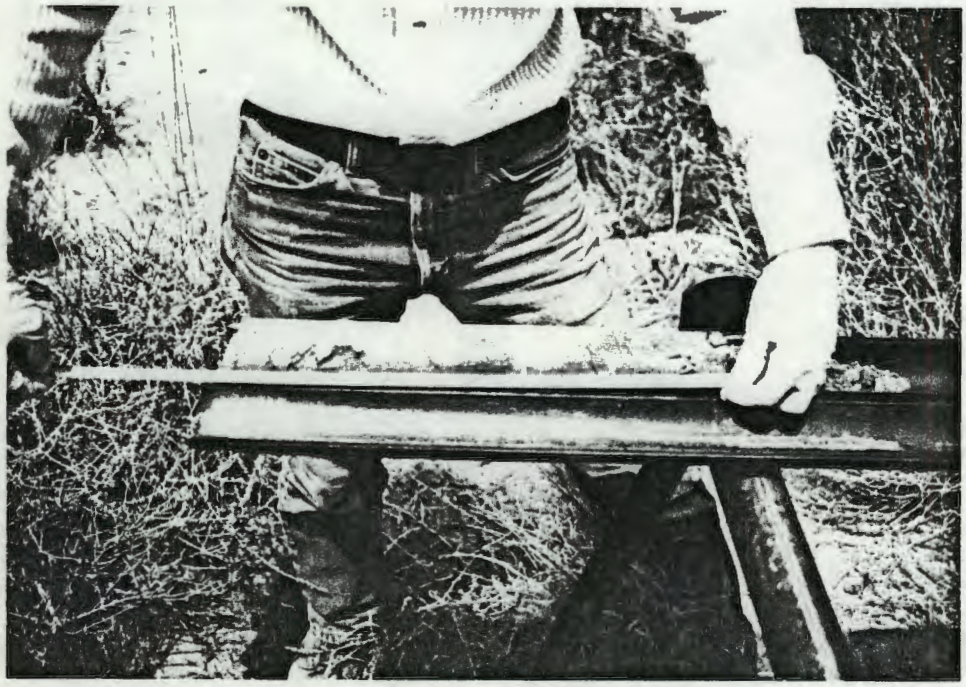


PHOTO NO. 18 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 4 DEPTH 0-20"



PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 19 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 4 DEPTH 20-36"

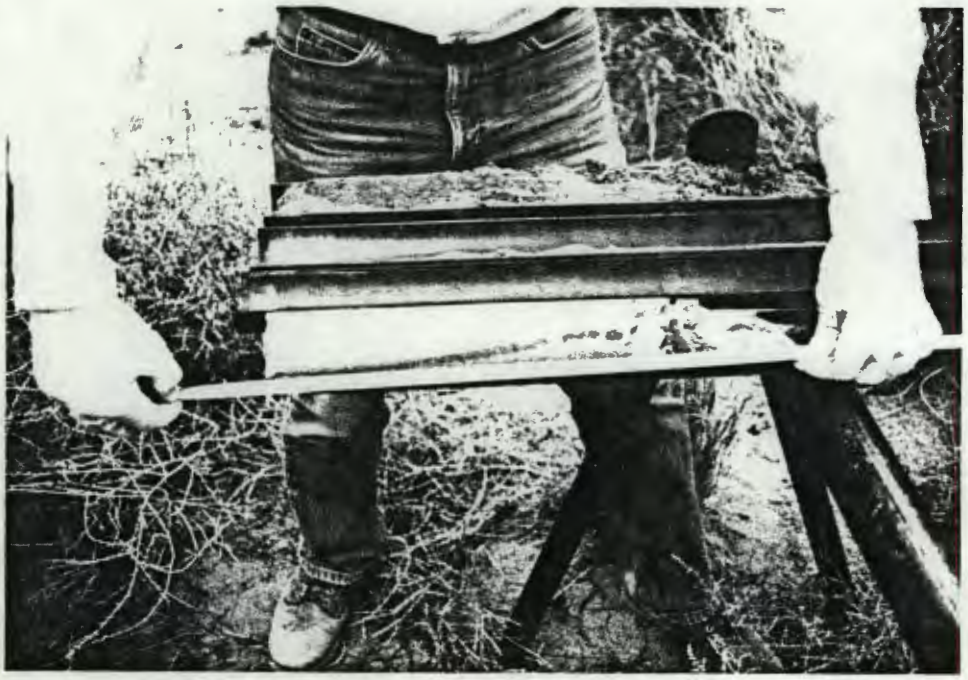
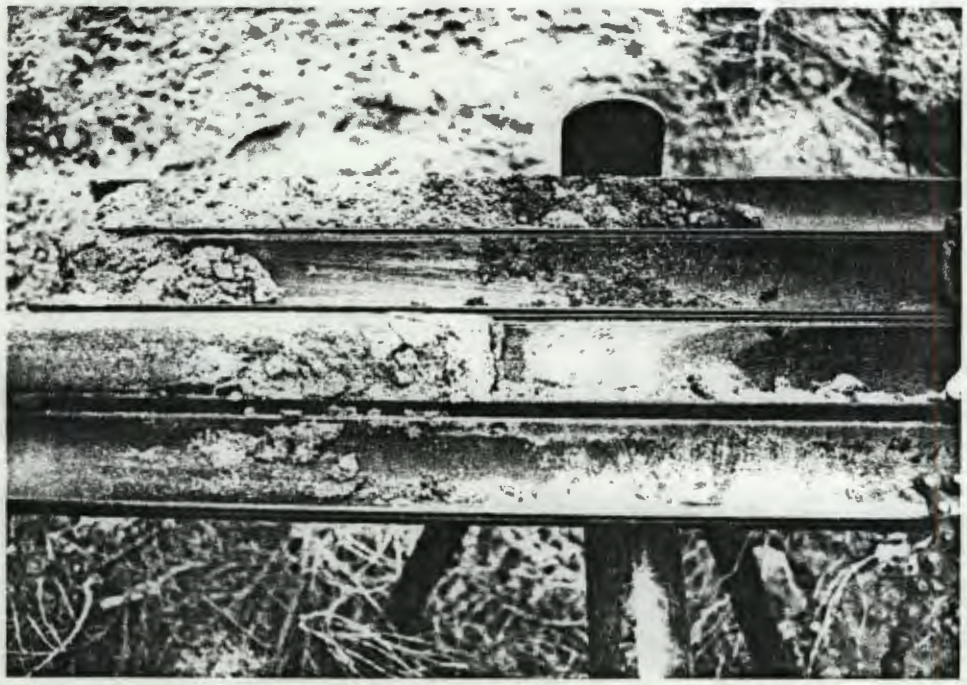


PHOTO NO. 20 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 4 DEPTH 36-40"

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 21 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 5 DEPTH 0-20"

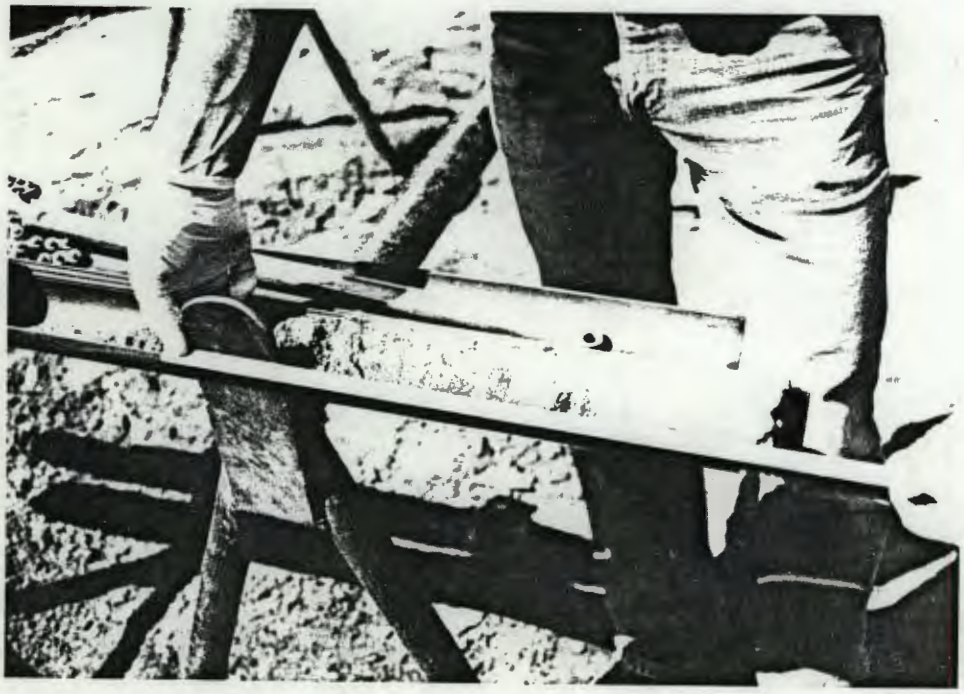
PHOTO NO. 22 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 5 DEPTH 20-35"



PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 23 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 5 DEPTH 35-60"

PHOTO NO. 24 DATE TAKEN: 8/2/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 6 DEPTH 0-20"



PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 25 DATE TAKEN: 8/2/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 6 DEPTH 20-40"

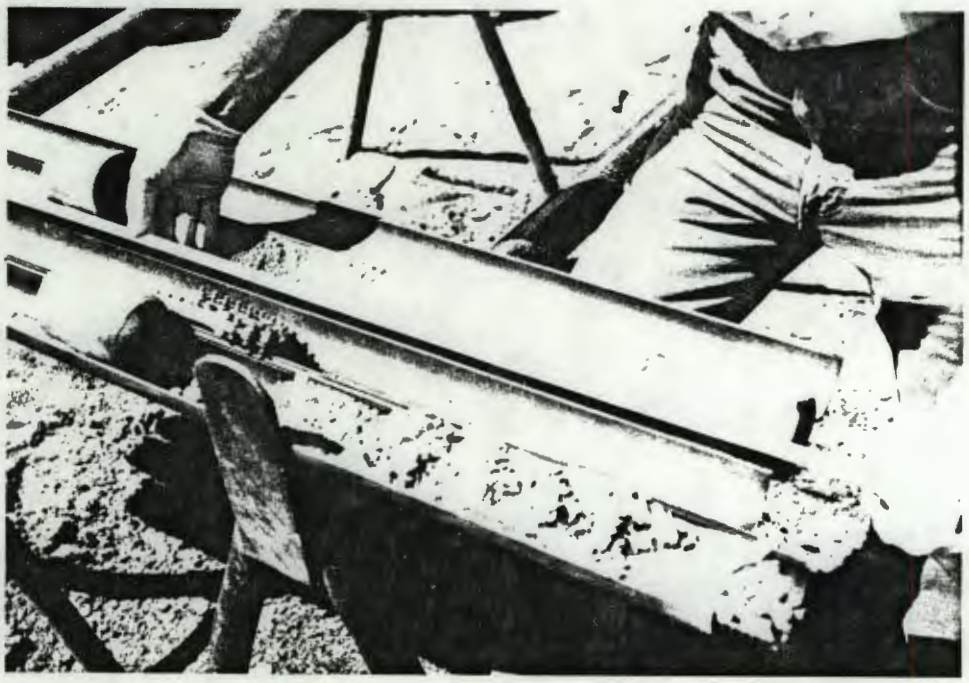


PHOTO NO. 26 DATE TAKEN: 8/2/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 6 DEPTH 40-60"

PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 27 DATE TAKEN: 8/2/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 7 DEPTH 0-20"

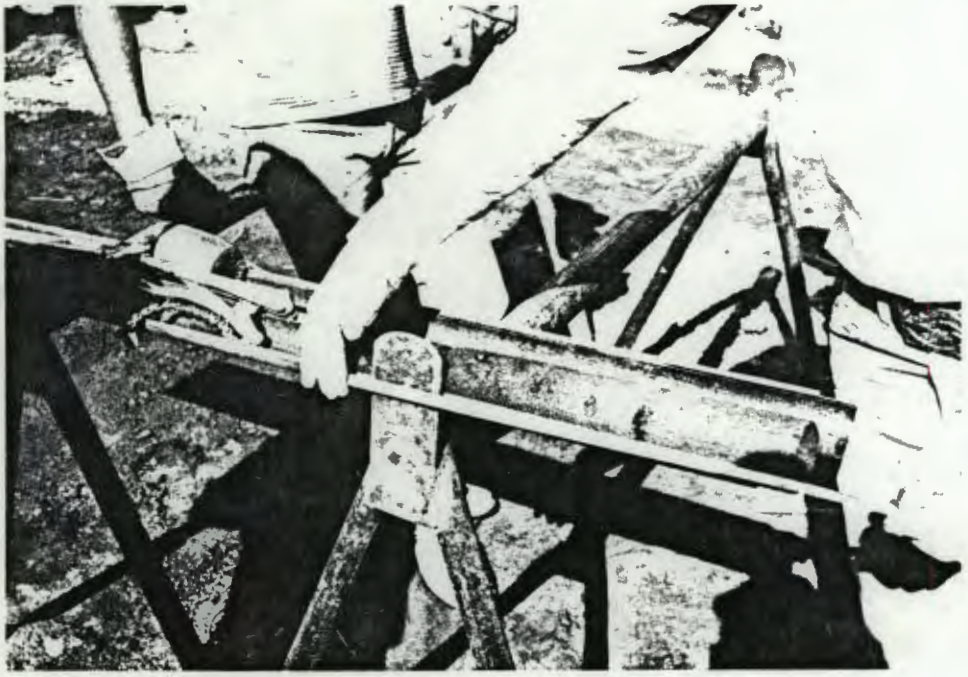


PHOTO NO. 28 DATE TAKEN: 8/2/89 TAKEN BY: H.L. PLUM
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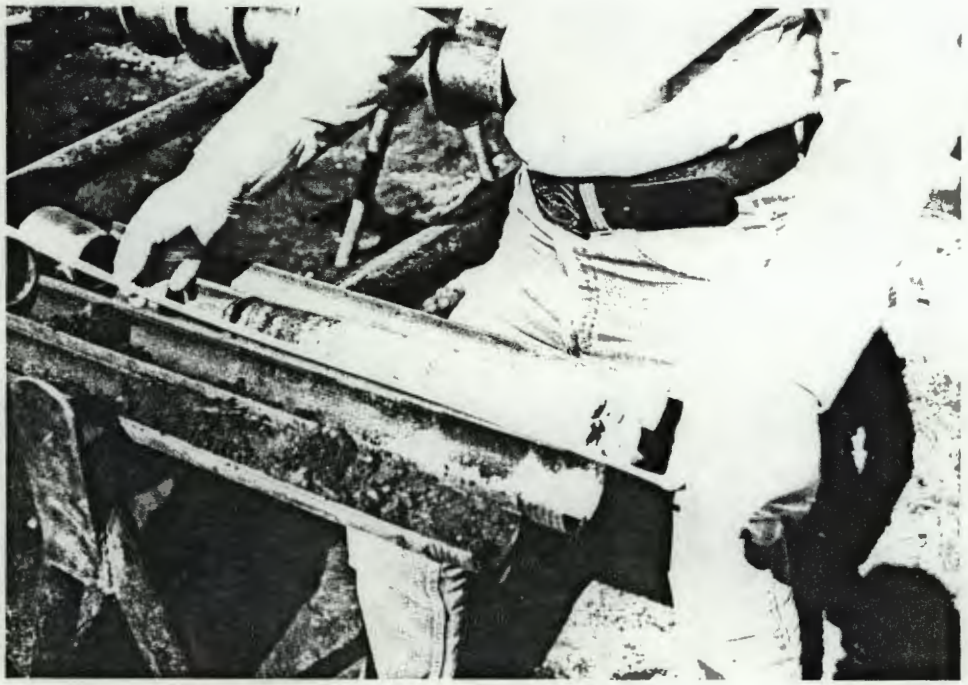
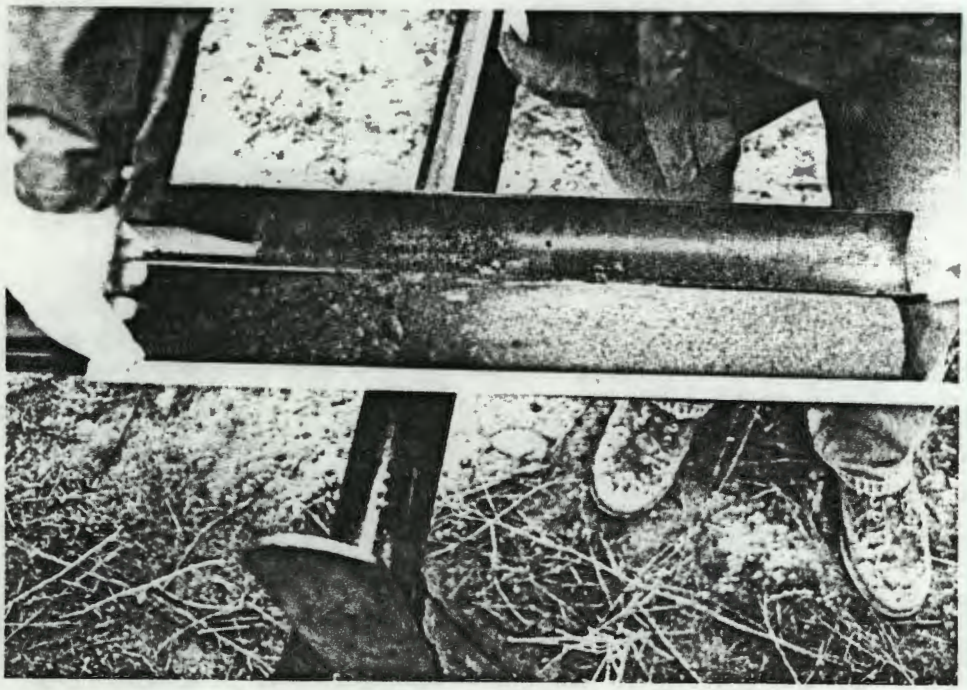


PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 29 DATE TAKEN: 8/2/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 7 DEPTH 40-60"

PHOTO NO. 30 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 8 DEPTH 0-20"



PERSON STATION RCRA FACILITY INVESTIGATION
PHOTOGRAPHIC RECORD
AUGUST 1-2, 1989

PHOTO NO. 31 DATE TAKEN: 8/1/89 TAKEN BY: H.L. PLUM
DESCRIPTION: CORE SAMPLE. LOCATION NO. 8 DEPTH 20-44"

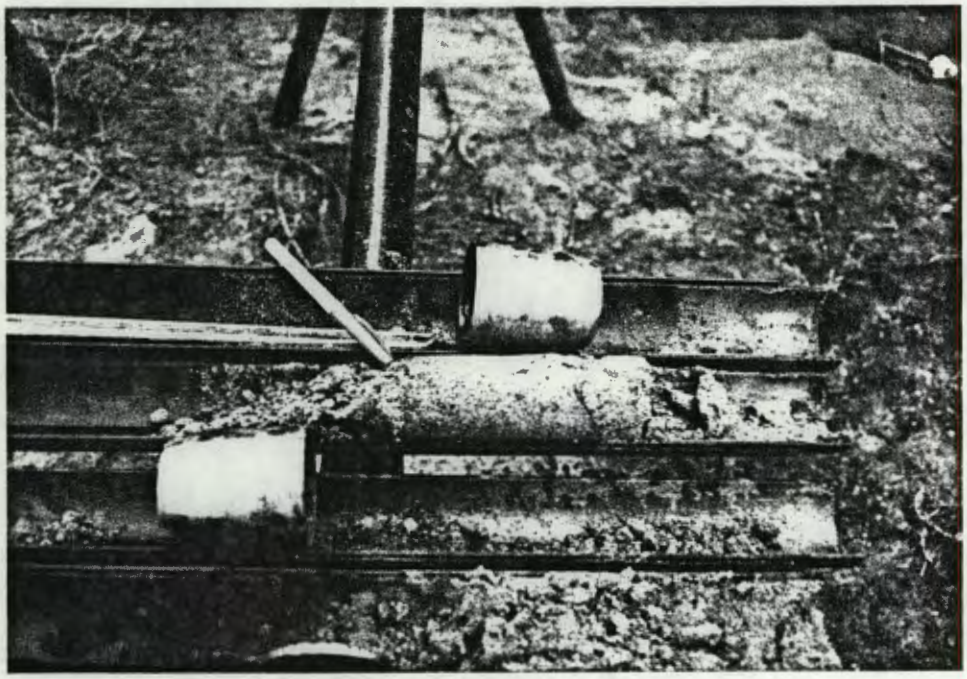


PHOTO NO. DATE TAKEN: TAKEN BY:
DESCRIPTION:

Exhibit 4

Soil Description Charts

SOIL DESCRIPTION CHART

PROJECT: PERSON STATION RFI
LOCATION: PERSON GENERATING STATION
DATE: AUGUST 1-2, 1989
LOGGER: JOHN FERRAIUOLO

KEY:

SOIL TYPE REACTION TO HCL	
WET COLOR*	DRY COLOR*

* MUNSELL SOIL COLOR CHART

DEPTH INTERVAL (FEET)

NATURAL PIT SAMPLE LOCATIONS

	5		6		7		8 ***	
0	GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND NO CALCAREOUS REACTION (ORG. CONTAM)		GRAVELLY SAND VERY SLIGHTLY CALCAREOUS 0-10" ORG.CONT.	
	10YR 6/3 PALE BROWN	10YR 7/3 VERY PALE BRWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 2/2 VRY DRK BROWN	NA (SOIL MOIST)	10YR 2/2 VRY DRK BROWN	NA (SOIL MOIST)
1	GRAVELLY SAND SL. CALCAREOUS **		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND NO CALCAREOUS REACTION (ORG. CONTAM)		GRAVELLY SAND SL. CALCAREOUS	
	10YR 6/3 PALE BROWN	10YR 7/3 VERY PALE BRWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 2/1 BLACK	NA (SOIL MOIST)	10YR 6/3 PALE BROWN	NA (SOIL MOIST)
2	GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND 0-5" VRY SL CAL 0-5" ORG CONTAM 5-12" SL CALCAR		GRAVELLY SAND SL. CALCAREOUS	
	10YR 6/3 PALE BROWN	10YR 7/3 VERY PALE BRWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 4/3 BROWN 10YR 5/3 BROWN	0-5" NA 10YR 6/3 PA BRWN	10YR 6/3 PALE BROWN	NA (SOIL MOIST)
3	GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CARCAREOUS	
	10YR 6/3 PALE BROWN	10YR 7/3 VERY PALE BRWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 6/3 PALE BROWN	NA (SOIL MOIST)
4	GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS		GRAVELLY SAND SL. CALCAREOUS	
	10YR 6/3 PALE BROWN	10YR 7/3 VERY PALE BRWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 5/3 BROWN	10YR 6/3 PALE BROWN	10YR 6/3 PALE BROWN	NA (SOIL MOIST)
5								

Exhibit 5

Certificate of Analysis for Sampling Containers

Certificate of Analysis

Environmental Services Laboratory Analysis

Metals Analysis

Bottle Type & QA Level: F, Level 1

Description : 8 oz. Clear Glass

Lot No.: F9040084 Date: 3-13-89

This is to certify that this lot was tested and found to comply with Eagle Picher specification for this product.

Compound Analyzed	Quantity Found(ug/L)
Silver	<5.0
Aluminum	<80.0
Arsenic	<5.0
Barium	<50.0
Beryllium	<1.0
Calcium	<5000.0
Cadmium	<1.0
Cobalt	<25.0
Chromium	<10.0
Copper	<15.0
Iron	<75.0
Mercury	<0.2
Potassium	<3000.0
Magnesium	<3000.0
Manganese	<10.0
Sodium (glass)	<5000.0
Sodium (polyethylene)	<3000.0
Nickel	<40.0
Lead	<8.0
Antimony	<5.0
Selenium	<2.0
Thallium	<5.0
Vanadium	<10.0
Zinc	<40.0

Approved: Jule Beights

Date : 3-13-89

EAGLE PICHER
ENVIRONMENTAL SERVICES
200 9TH AVE. N.E. • MIAMI, OKLAHOMA 74354 • (800) 331-7425

Certificate of Analysis

Environmental Services Laboratory Analysis

Pesticide Extractables

Bottle Type & QA Level: F, Level 1

Description : 8 oz. Clear Glass

Lot No.: F9040084 Date: 3-13-89

This is to certify that this lot was tested and found to comply with Eagle Picher specifications for this product.

Compound Analyzed	Quantity Found(ng/Bottle)
alpha-BHC	<.03
gamma-BHC(Lindane)	<.03
beta-BHC	<.03
Heptachlor	<.03
delta-BHC	<.03
Aldrin	<.03
Heptachlor epoxide	<.03
Endosulfan I	<.03
4,4'-DDE	<.06
Dieldrin	<.06
Endrin	<.06
4,4'-DDD	<.06
Endosulfan II	<.06
4,4'-DDT	<.06
Endosulfan sulfate	<.06
Methoxychlor	<.30
Endrin Ketone	<.06
Chlordane(tech)	<.30
Toxaphene	<.30
Arochlor-1016	<.30
Arochlor-1221	<.30
Arochlor-1232	<.30
Arochlor-1242	<.30
Arochlor-1248	<.30
Arochlor-1254	<.60
Arochlor-1260	<.60

Approved: Jul Bright

Date : 3-13-89

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ENVIRONMENTAL SERVICES

200 9TH AVE. N.E. • MIAMI, OKLAHOMA 74354 • (800) 331-7425

Certificate of Analysis

Environmental Services Laboratory Analysis

Base/Neutral/Acid Extractables

Bottle Type & QA Level: F, Level 1

Description : 8 oz. Clear Glass

Lot No.: F9040084 Date: 3-13-89

This is to certify that this lot was tested and found to comply with Eagle Picher specifications for this product.

Compound Analyzed	Quantity Found(ng/Bottle)
Phenol	<5.
Bis(2-Chlorethyl)ether	<5.
2-Chlorophenol	<5.
1,3-Dichlorobenzene	<5.
1,4-Dichlorobenzene	<5.
Benzyl Alcohol	<5.
2-Methylphenol	<5.
Bis(2-Chloroisopropyl)ether	<5.
4-Methylphenol	<5.
N-Nitroso-di-n-propylamine	<5.
Hexachloroethane	<5.
Nitrobenzene	<5.
Isophorone	<5.
2-Nitrophenol	<5.
2,4-Dimethylphenol	<5.
Benzoic Acid	<5.
Bis(2-Chloroethoxy)methane	<5.
2,4-Dichlorophenol	<5.
1,2,4-Trichlorobenzene	<5.
Naphthalene	<5.
4-Chloroaniline	<5.
Hexachlorobutadiene	<5.
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	<5.
2-Methylnaphthalene	<5.
Hexachlorocyclopentadiene	<5.
2,4,6-Trichlorophenol	<5.
2,4,5-Trichlorophenol	<5.
2-Chloronaphthalene	<5.
2-Nitroaniline	<5.
Dimethylphthalate	<5.
Acenaphthylene	<5.
2,6-Dinitrotoluene	<5.
3-Nitroaniline	<5.
Acenaphthene	<5.
2,4-Dinitrophenol	<5.
4-Nitrophenol	<5.

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Certificate of Analysis

Lot: F9040084

BNA Page 2

Dibenzofuran	<5.
2,4-Dinitrotoluene	<5.
Diethylphthalate	<5.
4-Chlorophenyl-phenyl ether	<5.
Fluorene	<5.
4-Nitroaniline	<5.
4,6-Dinitro-2-methylphenol	<5.
N-Nitrosodiphenylamine	<5.
4-Bromophenyl-phenylether	<5.
Hexachlorobenzene	<5.
Pentachlorophenol	<5.
Phenanthrene	<5.
Anthracene	<5.
Di-N-Butylphthalate	<5.
Fluoranthene	<5.
Pyrene	<5.
Butylbenzylphthlate	<5.
3,3'-Dichlorobenzidine	<5.
Benzo(a)anthracene	<5.
Chrysene	<5.
Bis(2-ethylhexyl)phthalate	<5.
D.-n-Octylphthalate	<5.
Benzo(b)fluoranthene	<5.
Benzo(k)fluoranthene	<5.
Benzo(a)pyrene	<5.
Indeno(1,2,3-cd)pyrene	<5.
Dibenz(a,h)anthracene	<5.
Benzo(g,h,i)perylene	<5.

Approved: Juli Beights

Date : 3-31-89

EAGLE PICHER
ENVIRONMENTAL SERVICES
200 9TH AVE. N.E. • MIAMI, OKLAHOMA 74354 • (800) 331-7425

Exhibit 6

Laboratory Data Report

ASSAIGAI
ANALYTICAL
LABORATORIES

REVISED: October 19, 1989

To:
PNM - Albuquerque
Alvarado Square
Albuquerque, NM 87158
ATTN: Ron Johnson

Work Order No. 1651
Date: 31 August 1989

SAMPLE ID: Person Station RF1, Generating Station

DATE RECEIVED: 2 August 1989

SAMPLE IDENTIFICATION

ANALYTE	PNM-1-1	PNM-1-2	PNM-1-3	PNM-1-4	PNM-1-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	5.0 mg/Kg	3.9 mg/Kg	3.8 mg/Kg	3.4 mg/Kg	3.8 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	2 mg/Kg	2.2 mg/Kg	0.4 mg/Kg	1.5 mg/Kg	7.9 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	4.8 mg/Kg	4.2 mg/Kg	3.7 mg/Kg	3.1 mg/Kg	2.7 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	18.2 mg/Kg	12.7 mg/Kg	3.7 mg/Kg	4.2 mg/Kg	3.1 mg/Kg	7421	8/11/89	0.5 mg/Kg
% Moisture	5.19 %	2.35 %	1.45 %	1.48 %	2.21 %			

SAMPLE IDENTIFICATION

ANALYTE	PNM-2-1	PNM-2-2	PNM-2-3	PNM-2-4	PNM-2-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	8.2 mg/Kg	5.9 mg/Kg	2.0 mg/Kg	(2.0 mg/Kg	3.0 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	9.3 mg/Kg	2.1 mg/Kg	0.6 mg/Kg	0.2 mg/Kg	0.2/0.2 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	6.1/6.5 mg/Kg	6.6 mg/Kg	4.2 mg/Kg	3.8 mg/Kg	4.0 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	11.1 mg/Kg	5.3 mg/Kg	4.0 mg/Kg	2.8 mg/Kg	4.0 mg/Kg	7421	8/11/89	0.5 mg/Kg
% Moisture	6.28 %	2.21 %	2.21 %	1.89 %	1.67 %			

SAMPLE IDENTIFICATION

ANALYTE	PNM-3-1	PNM-3-2	PNM-3-3	PNM-3-4	PNM-3-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	3.3 mg/Kg	5.0 mg/Kg	3.1 mg/Kg	3.4 mg/Kg	3.7 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	0.4 mg/Kg	0.1 mg/Kg	0.4 mg/Kg	(0.1 mg/Kg	(0.1/(0.1	7131	8/14/89	0.1 mg/Kg
Chromium	3.8 mg/Kg	3.0 mg/Kg	(2.0 mg/Kg	3.1/3.3 mg/Kg	3.2 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	6.2 mg/Kg	4.7 mg/Kg	3.5 mg/Kg	3.7 mg/Kg	4.3 mg/Kg	7421	8/11/89	0.5 mg/Kg
% Moisture	3.71 %	2.06 %	1.45 %	2.15 %	2.29 %			

WORK ORDER NO: 1651
DATE: 31 August 1989

SAMPLE IDENTIFICATION

ANALYTE	PNM-4-1	PNM-4-2	PNM-4-3	PNM-4-4	PNM-4-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	3.8 mg/Kg	5.5 mg/Kg	5.3 mg/Kg	5.1 mg/Kg	3.6 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	0.2 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	0.1 mg/Kg	(0.1 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	3.1 mg/Kg	3.0 mg/Kg	2.9 mg/Kg	3.4 mg/Kg	3.7 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	8.2 mg/Kg	4.2 mg/Kg	3.5 mg/Kg	3.9 mg/Kg	4.9 mg/Kg	7421	8/11/89	0.5 mg/Kg
% Moisture	3.86 %	1.66 %	2.61 %	2.58 %	2.34 %			

SAMPLE IDENTIFICATION

ANALYTE	PNM-8-1	PNM-8-2	PNM-8-3	PNM-8-4	PNM-8-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	5.1 mg/Kg	3.8 mg/Kg	2.2 mg/Kg	5.8 mg/Kg	2.0 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	(0.1 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	6.1 mg/Kg	4.6 mg/Kg	(2.0 mg/Kg	2.2 mg/Kg	3.8 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	7.1 mg/Kg	4.4 mg/Kg	3.3 mg/Kg	4.0 mg/Kg	4.5 mg/Kg	7421	8/11/89	0.5 mg/Kg
Oil & Grease	7463/7299 ug/g	(50 ug/g	(50 ug/g	(50 ug/g	(50 ug/g	9071 modified	8/4/89	50 ug/g
PCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/9, 8/10/89	0.25 ug/g
TCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/9, 8/10/89	0.25 ug/g
Toluene	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/9, 8/10/89	0.25 ug/g
Napnthalene	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/9, 8/10/89	0.25 ug/g
1,1,1-TCA	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/9, 8/10/89	0.25 ug/g
PCB AROCLOR	(1.0 ug/g ---	(1.0 ug/g ---	(1.0/(1.0 ug/g ---	(1.0 ug/g ---	(1.0/(1.0 ug/g ---	3540/ 8080	8/6/89	1.0 ug/g ---
% Moisture	1.42 %	4.26 %	1.76 %	0.94 %	0.95 %			

WORK ORDER NO: 1651
DATE: 31 August 1989

SAMPLE IDENTIFICATION

ANALYTE	PNM-5-1	PNM-5-2	PNM-5-3	PNM-5-4	PNM-5-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	2.7/7.7 mg/Kg	26.8/35.7	(2.0 mg/Kg	(2.0 mg/Kg	2.3 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	0.6 mg/Kg	2.4 mg/Kg	0.6 mg/Kg	0.2 mg/Kg	(0.1 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	12900/111	169.1/10.0	3.1 mg/Kg	3.0 mg/Kg	2.2 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	13.9/11.0	58/84.4	4.4 mg/Kg	3.1 mg/Kg	4.2 mg/Kg	7421	8/11/89	0.5 mg/Kg
Oil & Grease	(50 ug/g	(50 ug/g	(50/(50 ug/g	(50 ug/g	(50 ug/g	9071 modified	8/4/89	50 ug/g
PCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/8, 8/9/89	0.25 ug/g
TCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/8, 8/9/89	0.25 ug/g
Toluene	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/8, 8/9/89	0.25 ug/g
Naphthalene	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/8, 8/9/89	0.25 ug/g
1,1,1-TCA	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/8, 8/9/89	0.25 ug/g
PCB AROCLOR	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	3540/ 8080	8/6/89	1.0 ug/g ---
Moisture	4.78 %	7.07 %	2.11 %	2.32 %	1.66 %			

SAMPLE IDENTIFICATION

ANALYTE	PNM-0-1	PNM-0-2	PNM-0-3	PNM-0-4	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS	NOMINAL DETECTION LIMITS
PCE	---	(0.25 ug/g	(0.1 ug/mL	---	8010	8/8/89	0.1 ug/mL	0.25 ug/g
TCE	---	(0.25 ug/g	(0.1 ug/mL	---	8010	8/8/89	0.1 ug/mL	0.25 ug/g
Toluene	---	(0.25 ug/g	(0.1 ug/mL	---	8020	8/8/89	0.1 ug/mL	0.25 ug/g
Naphthalene	---	(0.25 ug/g	(0.1 ug/mL	---	8020	8/8/89	0.1 ug/mL	0.25 ug/g
1,1,1-TCA	---	(0.25 ug/g	(0.1 ug/mL	---	8010	8/8/89	0.1 ug/mL	0.25 ug/g
PCB AROCLOR	(1.0 ug/g ---	---	---	(1.0 ug/g ---	3540/ 8080	8/6/89	---	1.0 ug/g

Soil Moisture Content: Method #26, pg 107; Agriculture Handbook #60, US Dept. of Agriculture,(1969)

Moisture Content Analysis was performed over a period of 2 weeks, 8/15/89-8/29/89.

Sample digestion for Metals (Total): EPA Method 3050

Purge and Trap: EPA Method 5030

ASSAIGAI
ANALYTICAL
LABORATORIES

REVISED: October 19, 1989

To:
PNM - Albuquerque
Alvarado Square
Albuquerque, NM 87158
ATTN: Ron Johnson

Work Order No. 1654
Date: 31 August 1989

SAMPLE ID: Person Station RFI

DATE RECEIVED: 2 August 1989

SAMPLE IDENTIFICATION

ANALYTE	PNM-6-1	PNM-6-2	PNM-6-3	PNM-6-4	PNM-6-5	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	3.9 mg/Kg	2.4 mg/Kg	2.2 mg/Kg	2.2 mg/Kg	3.9 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	0.1/0.1 mg/Kg	0.2 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	0.1 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	5.6 mg/Kg	3.5/3.4 mg/Kg	3.7 mg/Kg	2.5 mg/Kg	3.0 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	14.4 mg/Kg	7.8 mg/Kg	6.9 mg/Kg	4.5 mg/Kg	4.1 mg/Kg	7421	8/14/89	0.5 mg/Kg
Oil & Grease	(50 ug/g	(50 ug/g	(50 ug/g	(50 ug/g	(50/(50 ug/g	9071 modified	8/4/89	50 ug/g
PCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/10, 8/11/89	0.25 ug/g
TCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/10, 8/11/89	0.25 ug/g
Toluene	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/10, 8/11/89	0.25 ug/g
Naphthalene	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/10, 8/11/89	0.25 ug/g
1,1,1-TCA	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/10, 8/11/89	0.25 ug/g
PCB AROCLOR	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0/(1.0 ug/g ---	3540/ 8080	8/8/89	1.0 ug/g ---
% Moisture	4.30 %	3.21 %	1.55 %	2.06 %	1.60 %			

P.O. Box 90430 • Albuquerque, New Mexico 87199-0430 • (505) 345-8964

WORK ORDER NO: 1654
DATE: 31 August 1989

SAMPLE IDENTIFICATION

ANALYTE	PNM-7-1-A	PNM-7-2-A	PNM-7-3-A	PNM-7-4-A	PNM-7-5-A	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	7.6 mg/Kg	5.2 mg/Kg	6.7 mg/Kg	6.7 mg/Kg	2.9 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	0.2 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	22/22.5	6.3 mg/Kg	12.3 mg/Kg	8.8 mg/Kg	2.4 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	39/37.7	6.9 mg/Kg	5.1 mg/Kg	3.9 mg/Kg	3.4 mg/Kg	7421	8/11/89	0.5 mg/Kg
Oil & Grease	35427 ug/g	68692 ug/g	17285 ug/g	865/804 ug/g	(50 ug/g	9071 modified	8/4/89	50 ug/g
PCE	(0.25 ug/g	(0.25 ug/g	(0.25/(0.25	(0.25 ug/g	(0.25 ug/g	8010	8/14/89	0.25 ug/g
TCE	(0.25 ug/g	(0.25 ug/g	(0.25/(0.25	(0.25 ug/g	(0.25 ug/g	8010	8/14/89	0.25 ug/g
Toluene	0.34 ug/g	1.7 ug/g	(0.25/(0.25	(0.25 ug/g	(0.25 ug/g	8020	8/14/89	0.25 ug/g
Naphthalene	(0.25 ug/g	5.7 ug/g	(0.25/(0.25	(0.25 ug/g	(0.25 ug/g	8020	8/14/89	0.25 ug/g
1,1,1-TCA	(0.25 ug/g	(0.25 ug/g	(0.25/(0.25	(0.25 ug/g	(0.25 ug/g	8010	8/14/89	0.25 ug/g
PCB AROCLOR	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0/(1.0 ug/g ---	3540/ 8080	8/8/89	1.0 ug/g ---
% Moisture	4.34 %	3.24 %	1.90 %	1.30 %	1.41 %			

WORK ORDER NO: 1654
DATE: 31 August 1989

SAMPLE IDENTIFICATION

ANALYTE	PNM-7-1-B	PNM-7-2-B	PNM-7-3-B	PNM-7-4-B	PNM-7-5-B	EPA METHOD NUMBER	DATE OF EXTRACTION/ ANALYSIS	NOMINAL DETECTION LIMITS
Arsenic	7.8/5.4	5.1 mg/Kg	13.9 mg/Kg	5.5 mg/Kg	2.4 mg/Kg	7060	8/15/89	2.0 mg/Kg
Cadmium	0.2 mg/Kg	(0.1 mg/Kg	0.2 mg/Kg	(0.1 mg/Kg	(0.1 mg/Kg	7131	8/14/89	0.1 mg/Kg
Chromium	22/11.3	5.3/5.7 mg/Kg	10.3 mg/Kg	6.2 mg/Kg	1.6 mg/Kg	7190	8/15/89	2.0 mg/Kg
Lead	59/30.6	6.3 mg/Kg	4.9 mg/Kg	3.9 mg/Kg	3.5 mg/Kg	7421	8/11/89	0.5 mg/Kg
Oil & Grease	62640 ug/g	59677/59454	14117/13075	176 ug/g	(50 ug/g	9071 modified	8/4/89	50 ug/g
PCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/15/89	0.25 ug/g
TCE	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/15/89	0.25 ug/g
Toluene	0.32 ug/g	1.9 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/15/89	0.25 ug/g
Naphthalene	(0.25 ug/g	5.6 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8020	8/15/89	0.25 ug/g
1,1,1-TCA	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	(0.25 ug/g	8010	8/15/89	0.25 ug/g
PCB AROCLOR	(1.0 ug/g ---	(1.0 ug/g ---	(1.0 ug/g ---	(1.0/(1.0 ug/g ---	(1.0 ug/g ---	3540/ 8080	8/8/89	1.0 ug/g ---
% Moisture	3.45 %	3.45 %	2.03 %	1.14 %	1.31 %			

Soil Moisture Content: Method #26, pg 107; Agriculture Handbook #60,
US Department of Agriculture, (1969).
Moisture Content Analysis was performed over a period of 2 weeks, 8/15/89-8/29/89.

Sample digestion for Metals (Total): EPA Method 3050
Purge and Trap: EPA Method 5030

Exhibit 7

Tolerance Interval Analysis for Sample Locations 1, 2, 3, and 4 (Background)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMETALS.WK1

BACKGROUND CORE SAMPLES
PARAMETER: ARSENIC (MG/KG)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	5.00	3.90	3.80	3.40	3.80
2	8.20	5.90	2.00	1.00	3.00
3	3.30	5.00	3.10	3.40	3.70
4	3.80	5.50	5.30	5.10	3.60
N	4	4	4	4	4
AVG	5.08	5.08	3.55	3.23	3.52
MAX	8.20	5.90	5.30	5.10	3.80
MIN	3.30	3.90	2.00	1.00	3.00
STD.DEV.	1.91	0.75	1.20	1.46	0.31
CV	0.38	0.15	0.34	0.45	0.09
K(N)	5.14	5.14	5.14	5.14	5.14
TL	14.89	8.93	9.71	10.74	5.13

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMETALS.WK1

PARAMETER: CADMIUM (MG/KG)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	2.00	2.20	0.40	1.50	7.90
2	9.30	2.10	0.60	0.20	0.20
3	0.40	0.10	0.40	0.05	0.05
4	0.20	0.05	0.05	0.10	0.05
N	4	4	4	4	4
AVG	2.98	1.11	0.36	0.46	2.05
MAX	9.30	2.20	0.60	1.50	7.90
MIN	0.20	0.05	0.05	0.05	0.05
STD.DEV.	3.72	1.04	0.20	0.60	3.38
CV	1.25	0.93	0.55	1.30	1.65
K(N)	5.14	5.14	5.14	5.14	5.14
TL	22.10	6.45	1.38	3.56	19.43

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMETALS.WK1

PARAMETER: CHROMIUM (MG/KG)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	4.80	4.20	3.70	3.10	2.70
2	6.30	6.60	4.20	3.80	4.00
3	3.80	3.00	1.00	3.20	3.20
4	3.10	3.00	2.90	3.40	3.70
N	4	4	4	4	4
AVG	4.50	4.20	2.95	3.38	3.40
MAX	6.30	6.60	4.20	3.80	4.00
MIN	3.10	3.00	1.00	3.10	2.70
STD.DEV.	1.20	1.47	1.22	0.27	0.49
CV	0.27	0.35	0.41	0.08	0.15
K(N)	5.14	5.14	5.14	5.14	5.14
TL	10.68	11.76	9.21	4.75	5.95

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMETALS.WK1

PARAMETER: LEAD (MG/KG)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	18.20	12.70	3.70	4.20	3.10
2	11.10	5.30	4.00	2.80	4.00
3	6.20	4.70	3.50	3.70	4.30
4	8.20	4.20	3.50	3.90	4.90
N	4	4	4	4	4
AVG	10.93	6.72	3.67	3.65	4.07
MAX	18.20	12.70	4.00	4.20	4.90
MIN	6.20	4.20	3.50	2.80	3.10
STD.DEV.	4.55	3.47	0.20	0.52	0.65
CV	0.42	0.52	0.06	0.14	0.16
K(N)	5.14	5.14	5.14	5.14	5.14
TL	34.32	24.59	4.73	6.34	7.42

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMOIST.WK1

BACKGROUND CORE SAMPLES
PARAMETER: ARSENIC (MG/KG) (CORRECTED FOR MOISTURE CONTENT)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	5.30	4.00	3.90	3.50	3.90
2	8.70	6.00	2.00	1.00	3.10
3	3.40	5.10	3.10	3.50	3.80
4	4.00	5.60	5.40	5.20	3.70
N	4	4	4	4	4
AVG	5.35	5.17	3.60	3.30	3.63
MAX	8.70	6.00	5.40	5.20	3.90
MIN	3.40	4.00	2.00	1.00	3.10
STD.DEV.	2.05	0.75	1.24	1.50	0.31
CV	0.38	0.14	0.34	0.45	0.09
K(N)	5.14	5.14	5.14	5.14	5.14
TL	15.91	9.03	9.97	11.01	5.23

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMOIST.WK1

PARAMETER: CADMIUM (MG/KG) (CORRECTED FOR MOISTURE CONTENT)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	2.10	2.30	0.40	1.50	8.10
2	9.90	2.10	0.60	0.20	0.20
3	0.40	0.10	0.40	0.05	0.05
4	0.20	0.05	0.05	0.10	0.05
N	4	4	4	4	4
AVG	3.15	1.14	0.36	0.46	2.10
MAX	9.90	2.30	0.60	1.50	8.10
MIN	0.20	0.05	0.05	0.05	0.05
STD.DEV.	3.97	1.06	0.20	0.60	3.46
CV	1.26	0.94	0.55	1.30	1.65
K(N)	5.14	5.14	5.14	5.14	5.14
TL	23.56	6.62	1.38	3.56	19.93

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMOIST.WK1

PARAMETER: CHROMIUM (MG/KG) (CORRECTED FOR MOISTURE CONTENT)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	5.10	4.30	3.80	3.10	2.80
2	6.70	6.70	4.30	3.90	4.10
3	3.90	3.10	1.00	3.30	3.30
4	3.20	3.10	3.00	3.50	3.80
N	4	4	4	4	4
AVG	4.73	4.30	3.02	3.45	3.50
MAX	6.70	6.70	4.30	3.90	4.10
MIN	3.20	3.10	1.00	3.10	2.80
STD.DEV.	1.33	1.47	1.26	0.30	0.49
CV	0.28	0.34	0.42	0.09	0.14
K(N)	5.14	5.14	5.14	5.14	5.14
TL	11.55	11.86	9.50	4.97	6.05

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

PERSON STATION RCRA FACILITY INVESTIGATION (RFI) DATA ANALYSIS
SAMPLING CONDUCTED AUGUST 1-2, 1989
METALS ANALYSIS LOTUS FILE NAME: PSMOIST.WK1

PARAMETER: LEAD (MG/KG) (CORRECTED FOR MOISTURE CONTENT)

	DEPTH				
HOLE #	0-1 FT	1-2 FT	2-3 FT	3-4 FT	4-5 FT
1	19.20	13.00	3.80	4.30	3.20
2	11.80	5.40	4.10	2.90	4.10
3	6.40	4.80	3.60	3.80	4.40
4	8.50	4.30	3.60	4.00	5.00
N	4	4	4	4	4
AVG	11.47	6.88	3.77	3.75	4.17
MAX	19.20	13.00	4.10	4.30	5.00
MIN	6.40	4.30	3.60	2.90	3.20
STD.DEV.	4.86	3.56	0.20	0.52	0.65
CV	0.42	0.52	0.05	0.14	0.16
K(N)	5.14	5.14	5.14	5.14	5.14
TL	36.47	25.18	4.83	6.44	7.52

IF CV >1.0 DATA MAY NOT BE NORMALLY DISTRIBUTED
TOLERANCE LIMIT (TL = AVG + K*SD)

Exhibit 8

Tolerance Factors (K) for One-Sided Normal Tolerance Intervals with Probability Level (Confidence Factor) Y = 0.95 and Coverage P = 95%

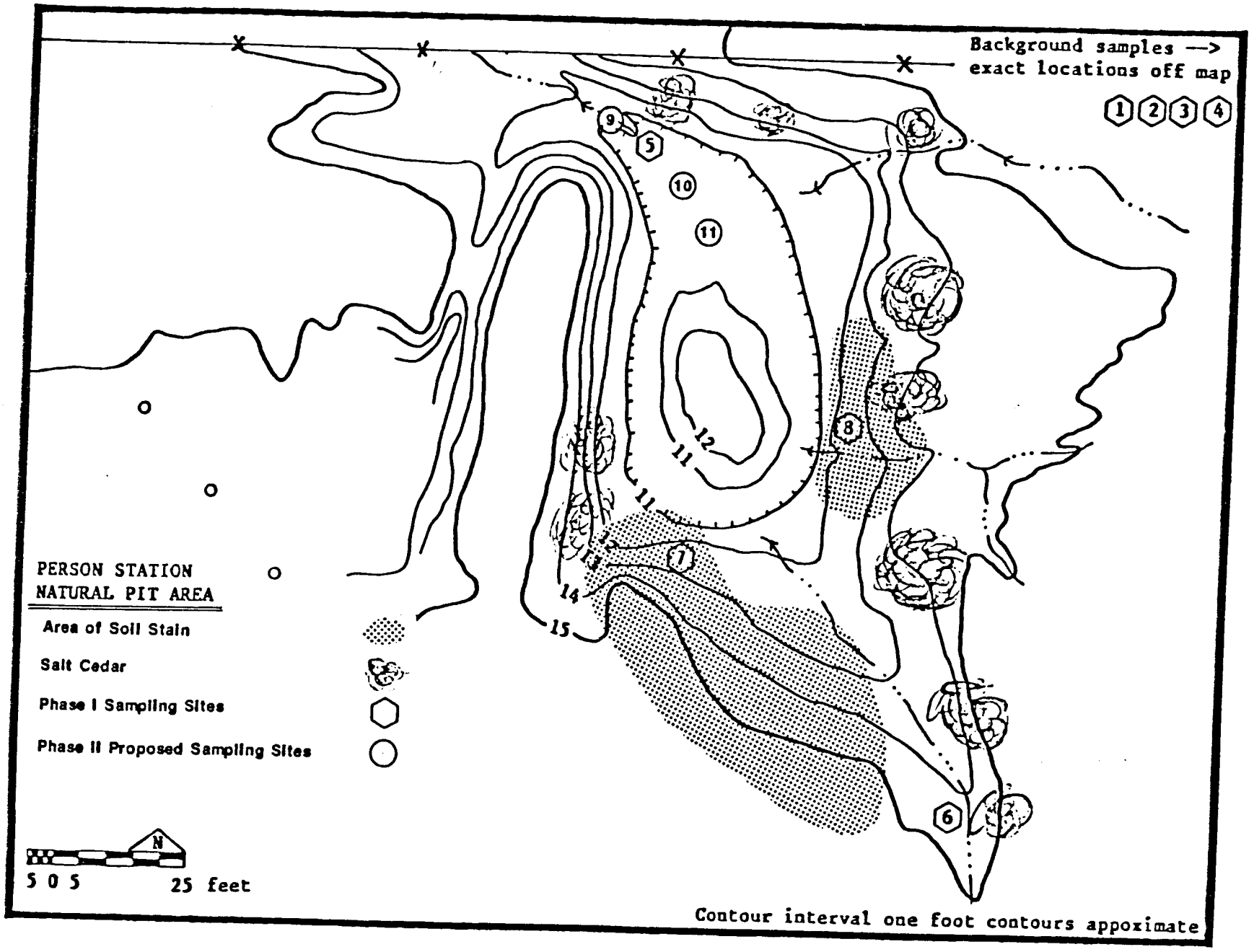
TABLE 5. TOLERANCE FACTORS (K) FOR ONE-SIDED NORMAL TOLERANCE INTERVALS WITH PROBABILITY LEVEL (CONFIDENCE FACTOR) Y = 0.95 AND COVERAGE P = 95%

n	K	n	K
3	7.655	75	1.972
4	5.145	100	1.924
5	4.202	125	1.891
6	3.707	150	1.868
7	3.399	175	1.850
8	3.188	200	1.836
9	3.031	225	1.824
10	2.911	250	1.814
11	2.815	275	1.806
12	2.736	300	1.799
13	2.670	325	1.792
14	2.614	350	1.787
15	2.566	375	1.782
16	2.523	400	1.777
17	2.486	425	1.773
18	2.543	450	1.769
19	2.423	475	1.766
20	2.396	500	1.763
21	2.371	525	1.760
22	2.350	550	1.757
23	2.329	575	1.754
24	2.309	600	1.752
25	2.292	625	1.750
30	2.220	650	1.748
35	2.166	675	1.746
40	2.126	700	1.744
45	2.092	725	1.742
50	2.065	750	1.740
		775	1.739
		800	1.737
		825	0.736
		850	1.734
		875	1.733
		900	1.732
		925	1.731
		950	1.729
		975	1.728
		1000	1.727

SOURCE: (a) for sample sizes ≤ 50: Lieberman, Gerald F. 1958. "Tables for One-sided Statistical Tolerance Limits." *Industrial Quality Control.* Vol. XIV, No. 10. (b) for sample sizes ≥ 50: K values were calculated from large sample approximation.

Exhibit 9

Sampling Map for Phase II Sampling


Background samples —>
exact locations off map
1 2 3 4
9
5
10
11
12
11
11
13
14
15
8
7
6
PERSON STATION
NATURAL PIT AREA
Area of Soil Stain
Salt Cedar
Phase I Sampling Sites
Phase II Proposed Sampling Sites
N
5 0 5
25 feet
Contour interval one foot contours appoximate

PNM 1990