10/16 Not much re: diesel/fuel oil 05.
Need to request QMR

SITE CHARACTERIZATION REPORT BUILDING 109-ASH PARKS RESERVE FORCES TRAINING AREA DUBLIN, CA

Prepared for

U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, California 95814-2922

September 11, 1995

Woodward-Clyde

500 12th Street
Suite 100
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Woodward-Clyde

CERTIFICATION

SITE CHARACTERIZATION REPORT
BUILDING 109-ASH
PARKS RESERVE FORCES TRAINING AREA
DUBLIN, CALIFORNIA

September 11, 1995
7196

This report has been prepared by the staff of Woodward-Clyde and has been reviewed and approved by the professional whose signature appears below.

The findings, recommendations, specifications, or professional opinions are presented within the limits prescribed by the client, and prepared in accordance with generally accepted engineering practice in Northern California at the time this work plan was prepared. No other warranty is either expressed or implied.

WOODWARD-CLYDE

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EXECUTIVE SUMMARY

During demolition of Building 109, a former incinerator, lenses of a mixture of metal, porcelain, glass and ash (often referred to simply as "ash rubble" in this report) were observed in the walls of the excavation. Demolition activities were suspended in March 1994, pending an evaluation of the extent and chemical content of this material. Woodward-Clyde Federal Services (WCFS) was contracted by the U. S. Army Corps of Engineers, Sacramento District, to conduct an investigation. This report describes WCFS's activities related to the ash investigation. The tasks included:

- On September 28, 1994, a grab sample of the material was collected and analyzed for semivolatile organics, a suite of metals and polychlorinated dibenzodioxins and -furans (PCDD/PCDFs). Lead was detected at a level which would cause the material to be regulated as a hazardous waste. Semivolatile organics were not detected and PCDD/PCDFs were not detected at levels of concern.

- Groundwater monitoring wells installed in December, 1994, as a part of an investigation of a spill from an underground diesel storage tank at Building 109, were sampled. Groundwater has not been impacted by contaminants from the ash material.

- The area to the south and west of the excavation, where the lenses were observed, was cleared of stockpiled soil and graded to allow access for investigation. An exploratory trench was dug to trace one of the lenses back from the face of the excavation. That lens appeared to pinch out within a few feet from the face of the excavation.

- A geophysical investigation using terrain conductivity measurement was performed in December 1994. Lenses of concentrated ash rubble were not detected.

- Nine soil borings were advanced in May, 1994. None encountered concentrated lenses of ash rubble, but each was drilled through a fill soil material, some of which contained fragments of metal, glass and ash. One sample contained lead

at a concentration which would characterize the material as a hazardous waste, if it were to be disposed.

From the information obtained during these activities, it is concluded that concentrated ash likely does not extend more than a few feet back from the excavation. Soil excavated in conjunction with the completion of the demolition should be sampled, analyzed and properly disposed based upon the concentration of contaminants detected.

1.0 INTRODUCTION

1.1 SCOPE OF WORK

This report addresses the procedures involved with the investigation and evaluation of a former incinerator site located within the Parks Reserve Forces Training Area (PRFTA) in Dublin, CA, at the former Building 109. This work was performed by Woodward-Clyde Federal Services (WCFS) in order to investigate the extent and magnitude of incinerator ash and its constituent chemicals in the subsurface soil and groundwater at the site and to assist planning the completion of Building 109's demolition and waste disposal. Specific activities included the collection of an ash grab sample, a geophysical investigation, the collection of soil samples during the drilling of nine soil borings at the site, monitoring well groundwater sample collection, sample analysis, and waste disposal. This report has been prepared in accordance with WCFS's "Site Characterization Workplan Building 109-ASH" which was dated July 8, 1994.

1.2 SITE CONTACTS

Woodward-Clyde is providing consulting engineering services for the project to the U.S. Army Corps of Engineers, Sacramento District. Table 1 presents the names and addresses of other important entities involved with the site investigation, including the regulatory agencies who might have jurisdiction.

1.3 SITE LOCATION AND DESCRIPTION

PRFTA is located in Townships 2 and 3 South, Range 1 East on the Dublin 7.5 minute topographic quadrangle in Alameda and Contra Costa Counties, California (Figure 1). PRFTA occupies approximately 2800 acres and is bounded by multiple entities. PRFTA's neighbors include Federal Correctional Institutions, Santa Rita Rehabilitation Center, Alameda County Santa Rita Jail, Tassajara Creek Regional Park, local businesses, and residential districts.

PRFTA is a multi-use installation that hosts a variety of tenants, both military and civilian. PRFTA organizations utilize the installation for activities which include: fire services, maintenance of buildings, range control, storage facilities, demolition activities, and administration of utilities. Tenant organizations who lease buildings or space at PRFTA include Federal entities (U.S. Army Reserve components and U.S. Border Patrol), private companies, and private and public organizations. Building 109 was located in the southern portion of the facility (Figure 2).

1.4 SITE HISTORY

Prior to its demolition, which is currently underway, Building 109 was a trash incinerator. During building demolition and removal activities in mid-March 1994, a material which appears to be ash rubble from the incinerator was discovered. It is visible in the excavation walls on the south and west sides of the building as multicolored lenses buried about 4 feet deep. Its lateral extent was unknown.

A previously unknown 2000-3000 gallon UST was also discovered under the building floor and damaged. It is suspected that the tank held fuel oil, possibly as a supplemental fuel for the incinerator. On March 22, 1994, the UST was punctured during the demolition of Building 109, resulting in fuel leakage into a 12 foot deep excavation pit within the perimeter of the incinerator building foundations. Three groundwater monitoring wells were installed in December, 1994 to investigate the impact of the leak on groundwater. This UST investigation is described in WCFS's report dated June 29, 1995. Certain samples collected during the UST monitoring well installation were analyzed for ash constituents of concern and the results are discussed here in this Ash Report.

Demolition activities were suspended, pending an investigation of the environmental concerns at the site.

2.0
FIELD ACTIVITIES

This section describes field activities that were completed to evaluate and delineate ash and its constituents in the soil and groundwater in the vicinity of Building 109.

2.1 GRAB SAMPLE COLLECTION

On September 28, 1994, representatives of WCFS collected ash rubble directly from the lenses which were visible in the walls of the excavation. The objective of this sampling effort was to analyze the most representative sample for a broad spectrum of potential constituents. The results of the analyses allowed the appropriate health and safety precautions to be taken in subsequent phases of the investigation, and allowed the range of laboratory analyses to be narrowed for subsequent samples.

A sample of rubble was collected in a glass sample jar from each of three areas, and a composite sample was prepared from these three samples and analyzed as described in Section 3.1 of this report. The material consisted of broken dishes, glass, rusted metal pieces and ash. It is quite distinctive when compared to the surrounding soil.

Following collection, the sample jars were sealed, labeled and placed in a chilled cooler containing ice for transport to the analytical laboratory. The samples were shipped for analysis under chain-of-custody protocol to Quanterra Environmental Services Laboratory in West Sacramento, California. The sample was composited and analyzed for polychlorinated dibenzodioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution GC high resolution MS (EPA Method 8290), for semivolatile organics by EPA Method 8270, and for 17 selected CCR total metals by EPA Method 6010/7000 series.

2.2 GEOPHYSICAL INVESTIGATION

Because the concentrated ash rubble visible in the excavation wall contained a large amount of metallic debris and other material quite distinct from the surrounding soil, it was thought that a geophysical investigation would be the most efficient method for evaluating the lateral

extent of the ash on the site. The results of the geophysical mapping allowed the subsequent confirmation soil boring program to be designed around anomalous areas. The results also increased confidence that the boring program findings are laterally representative.

On December 6-8, 1994, a Woodward-Clyde geophysicist investigated the area to the south and west of the excavation, where ash was suspected (about 4200 square feet). A number of investigative methods were used, primarily terrain conductivity surveying, an electromagnetic technique which provides a rapid method of site characterization. The ash rubble directly visible in the excavation wall exhibited very high electrical conductivity, as measured by the terrain conductivity meter. A complete technical report, which describes both methodology and results, is included as Appendix A of this report.

A few days prior to the investigation, the stockpiled soil at the edges of the excavation was moved to a location about a hundred feet west of Building 109. The area was graded to allow access and more accurate geophysical readings. A trench about 10 feet long and 5 feet deep was excavated back from the southwest excavation wall to see how far one particular ash lens extended. This lens extended back no more than a few feet until it pinched out and was not visible.

The terrain conductivity measurements of the surrounding area did not conclusively indicate excessive non-homogeneity. (Excessive non-homogeneity would have been indicative of lenses of concentrated ash rubble.) Three areas were identified as being somewhat anomalous, and were later investigated by soil borings, as were other areas with normal readings, as described in Section 2.3 of this report. No concentrated ash rubble was encountered in any of the borings. The geophysical investigation indicates that concentrated ash rubble lenses probably do not occur outside the area close to the excavation walls.

2.3 DRILLING AND SUBSURFACE SOIL SAMPLING METHODOLOGY

Nine boreholes were drilled on May 8, 1995 and were identified as B-1 through B-9 (Figure 3). The borings varied in depth from 6 to 12 feet. The borings were located to assess the lateral and vertical extent of ash constituents within the property and were selected using the visible ash lenses as indicators, as well as the results of the previously described geophysical investigation. None of the borings encountered concentrated rubble similar to what was seen

in the lenses in the excavation walls. Each of the borings, however, were drilled through fill soil material, some of which contained glass or rusty fragments like the ash rubble, particularly B-1 and B-2 on the south side of Building 109.

The boreholes were drilled using truck mounted Mobile B-61 and B-53 drill rigs equipped with 6-inch outside diameter, hollow-stem, continuous flight augers. The drilling subcontractor was Kvilhaug Well Drilling and Pump Company, Inc., of Concord, California. The boring was drilled in accordance with a permit issued by the Alameda County Flood Control and Water Conservation District Zone 7 (Appendix B).

Soil samples were collected using a split-spoon drive sampler capable of holding three 2.5-inch diameter, 6-inch long brass liners. Samples were collected by advancing the hollow-stem auger flights to the specified depth and then driving the sampler within the augers to obtain the sample. A 140-pound hammer with 30-inch drop was used to drive the sampler. Subsurface soil samples were collected for chemical analysis from two of the borings, and for lithologic logging during drilling at each borehole location. Soil samples were described in accordance with the Unified Soil Classification System (USCS). A boring log was completed by the WCC hydrogeologist for each borehole. Boring logs are provided in Appendix C. Cuttings generated during drilling were placed in drums for eventual proper disposal by the Army.

Following collection, the soil sample liner designated for chemical analysis was sealed with teflon sheeting, plastic end caps, and duct tape and labeled. Each sample was sealed in a plastic ziplock bag and placed in a chilled cooler containing ice for transport to the analytical laboratory. The soil samples were shipped for analysis under chain-of-custody protocol to Anametrix Laboratories of San Jose, California. The soil samples submitted to the laboratory were analyzed for STLC metals by CWET and EPA Method 6010A (7471 for Hg). In addition, as described in the June 29, 1995 UST report, the samples from the bottom of each monitoring well had been analyzed for a suite of metals to see if underlying soil had been impacted by leaching from overlying ash.

A neat cement grout mixture was used to fill the borehole throughout its entire depth following completion of drilling. The neat cement grout consisted of a mixture of Type I

and II Portland cement (94-lbs per bag), bentonite powder (up to 5 percent), and potable water (approximately 7 gallons per bag of cement).

2.4 GROUNDWATER SAMPLING

Groundwater monitoring wells were sampled on January 25, 1995 as part of the UST investigation. The purging and sampling methodology is fully described in Woodward-Clyde Federal Services, Site Characterization Report, Building 109-UST Parks Reserve Forces Training Area, Dublin, California, dated June 29, 1995.

Immediately following sample collection, the sample bottles were placed in a chilled cooler for storage and transport to the analytical laboratory. All groundwater samples collected were recorded on chain-of-custody forms prior to shipment to the laboratory. Groundwater samples collected were submitted to a state certified laboratory for analysis. The samples collected for this project were submitted to Anametrix Laboratories of San Jose, California.

The groundwater sample from MW-1 (the suspected ash area) was analyzed by Method 6010A for lead and by Method 8290 for PCDD/PCDF, in addition to analysis for petroleum hydrocarbons.

2.5 HEALTH AND SAFETY

Field activities at PRFTA were conducted in accordance with the provisions of the site specific Health and Safety Plan which was included in the Work Plan for this project. The plan was prepared to comply with state, federal and COE occupational health and safety regulations to ensure health and safety of all workers, regulators, and public at the site.

3.0
CHEMICAL ANALYTICAL RESULTS

3.1 ASH GRAB SAMPLE

No semivolatile organics were detected by EPA Method 8270. A discussion of the other chemical analyses follows. Analytical laboratory data reports for all analytes are included in Appendix D.

3.1.1 PCDD/PCDF Evaluation

As noted previously, the ash grab sample was analyzed for PCDD/PCDFs by EPA Method 8290. This section presents and discusses those results. As explained below, PCDD/PCDFs were not detected at levels of concern.

Analytical results are summarized in Table 2. Summarized data and cited criteria are reported in picograms per gram (pg/g) which is equivalent to parts per trillion. Laboratory data reports are provided in Appendix D.

Data analysis for this report included:

- 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), the dioxin of most concern, was not detected.
- Summation of detected PCDD/PCDF for the sample.
- Application of toxicity equivalency factors (TEF) to detected concentrations of PCDD/PCDF to calculate 2,3,7,8-TCDD equivalents (TEQ).
- Comparison of TEQ to applicable assessment criteria including USEPA preliminary remediation goals (PRG) and the Agency for Toxic Substance Disease Registry (ATSDR) Environmental Media Evaluation Guide (EMEG) criteria for adults and children.

3.1.1.1 Calculation of TEQ

Calculations for TEQ in the ash sample are shown in Table 2. The calculation procedure utilizes TEFs as defined by the 1989 USEPA document Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) (EPA/625/3-89/016). This document defines TEFs for each of the PCDD/PCDF with chlorine substituted in the 2,3,7,8 positions. Note that PCDD/PCDF that are not chlorine-substituted in the 2,3,7,8 positions are assigned a TEF of 0 and therefore do not impact assessment of the TEQ. TEQ associated with each detected PCDD/PCDF are derived and the sum of the TEQ for each sample is calculated.

3.1.1.2 Comparison to Preliminary Remediation Goals

The USEPA Region IX August 1, 1994 memorandum (Subject - Region IX Preliminary Remediation Goals (PRGs) Second Half 1994) has defined preliminary remediation goals (PRGs) as tools for identifying levels above which... "there may be enough concern to warrant further evaluation of risks." PRGs have been established for residential and industrial land use and incorporate risks associated with multiple exposure pathways.

The USEPA guidance document for PRGs states that "A contaminant that exceeds a PRG level does not in itself mean that there is an unacceptable health threat. However, exceedances should be evaluated further."

The residential land use PRG for 2,3,7,8-TCDD has been established as 3.8 pg/g. The industrial land use PRG has been established as 24 pg/g. For purposes of this evaluation, these PRGs will be compared to reported 2,3,7,8-TCDD results and to calculated TEQ.

2,3,7,8-TCDD Comparison. The USEPA residential and industrial PRG for 2,3,7,8-TCDD are 3.8 pg/g and 24 pg/g, respectively. 2,3,7,8-TCDD was not detected in the ash sample at a detection limit of 3.3 pg/g.

TEQ Comparison. The TEQ for the ash sample of 2.96 pg/g was below the residential and industrial PRGs.

3.1.1.3 Comparison to ATSDR EMEG

The ATSDR, located in Atlanta, Georgia, is the toxicological advisory arm of the USEPA. The ATSDR Environmental Media Evaluation Guides (EMEG) are defined to assist the ATSDR in evaluating whether analytical results for a given site warrant further investigation or evaluation. The soil EMEG for 2,3,7,8-TCDD in soil are 700 pg/g for adults and 50 pg/g for children. The TEQ for the ash sample was below both the adult and child EMEG by at least an order of magnitude.

3.1.1.4 Comparison to OSHA Standards

OSHA has not established numerical exposure limits for PCDD/PCDFs.

3.1.2 Metals Evaluation

The results of the analyses for metals in the ash are tabulated in Table 3, along with the soil sample analyses. Analytical laboratory data are included in Appendix D. Total metal concentrations were measured. The detected concentrations of each metal were then compared to the California Title 26 Total Threshold Concentration Limit (TTLC). This is one of several regulatory limits above which a waste containing that constituent is regulated as hazardous waste in the State of California.

Only lead was detected at a level above these limits. Total lead was detected in the ash grab sample at a concentration of 1190 mg/Kg. The TTLC for lead is 1000 mg/Kg. This means that excavated concentrated ash rubble should be properly disposed as a hazardous waste.

3.2 SOIL SAMPLES

The results of the analyses for metals in the ash and soil samples are tabulated in Table 3. Analytical laboratory data are included in Appendix E. Total metal levels were measured in the first samples collected (those from the bottom of the monitoring well borings) and leachable metals were measured in the other samples. The concentrations of each metal were then compared to appropriate regulatory concentration limits. The California Title 26 Total Threshold Concentration Limit (TTLC) or Soluble Threshold Concentration Limit (STLC)

determine if a waste containing a certain constituent is regulated as hazardous waste in the State of California. Only lead was detected at levels above these limits. @ 1190 mg/kg

Soluble (leachable) lead was detected in two soil samples above the STLC of 5 mg/L. MW-1 (4' depth) contained 319 mg/L, and B-2 (6' depth) contained 78.9 mg/L, both well above the STLC. Both of these samples, while not concentrated ash rubble like the visible lenses, did contain fragments of glass, rust and other ash-like materials. This type of material was encountered widely throughout the soil boring investigation. It should be noted that another soil sample (B-9 at 5.5' depth) did not contain soluble lead above the detection limit. Although B-9 was located closer to observed ash lenses than B-2, it was more representative of the fill materials noted throughout the site.

The TTLC for lead is 1000 mg/Kg. Total lead concentrations in soil samples from the bottom of each monitoring well boring were less than 6 mg/Kg at a depth of 14 feet in MW-1, and less than 5 mg/Kg at depths of 15 feet in MW-2 and MW-3.

These results indicate that both the concentrated ash and the surrounding soil should be considered potentially hazardous waste.

In addition, the complete results of the metals analyses should be consulted when planning health and safety precautions for future work onsite.

3.3 GROUNDWATER SAMPLE

As noted earlier, groundwater from the monitoring well closest to the ash (MW-1) was analyzed for PCDD/PCDFs and lead, in addition to petroleum hydrocarbon consituents. Analytical results data are included in Appendix F. Neither PCDD/PCDFs nor lead were found to be present above the detection limits. This indicates that buried ash has not impacted the groundwater at the site. As reported previously, however, the groundwater has been impacted by diesel fuel.

3.4 QA/QC OF ANALYTICAL RESULTS

The analytical results for this project were submitted to a thorough QA/QC review, and were found to be of satisfactory quality. The review included the following:

- Holding Time Review - Check for exceedences of prescribed holding times.
- Blank Review - Review blank analyses for evidence of potential contaminants.
- Spike Review - Review spike recoveries and spike duplicates relative percent differences as a check for analytical precision and accuracy.
- Duplicate Review - Review duplicate analyses for agreement of results as a check for analytical precision.
- Surrogate Review - Review surrogate recoveries for possible matrix interference.
- Elevated Detection Limits - Analytical results are reviewed to check for effects for elevated detection limits.

Certain data was annotated with qualifiers by the laboratories as part of their in house QA/QC review. A discussion of those data qualifiers follows.

3.4.1 "Ash" (Appendix D) Data Review

The duplicate control sample (DCS) for the metals analysis yielded a relative percent recovery (RPD) for antimony (25%) which exceeded the control limit of 20%. However, the DCS pair showed acceptable accuracy as the percent recovery for each element was within the specified control limit. As the precision limits are advisory and do not represent historical limits based on actual data, this batch was accepted.

Antimony was not detected in the sample. Following EPA guidelines, no qualification of the data for precision is required when the result is N.D.

Reporting limits for a number of metals were raised due to matrix interference.

> These elevated detection limits were considered in the data interpretation, particularly of the metals reported as N.D. None of the elevated detection limits were so high as to affect the usefulness or interpretation of the results.

For selenium, post-digestion spike recovery fell between 40% and 85% due to matrix interference.

> The accuracy of this analysis is slightly below acceptable range, but not in the range which would require rejection of the data. The reported value (N.D.) should be considered an estimated value.

3.4.2 Soil (Appendix E) Data Review

Matrix spike recoveries for sample MW-2-15 and MW-1-14 for antimony were outside Anametrix control limits, possibly due to interferences encountered during the sample preparation. A post digestion spike was performed, and the result was within control limits, indicating no spectral interferences.

> The accuracy of this analysis is slightly below acceptable range, but not in the range which would require rejection of the data. The reported value (N.D.) should be considered an estimated value.

For the matrix spike reports, a number of metals were annotated with the data qualifier : "U".

> The definition of the qualifier "U" is: "Analyte concentration was below the method reporting limit. For matrix and post digestion spike reports, a value of "0.0" is entered for calculation of the percent recovery". This does not mean the data quality is reduced, but simply that the sample results were N.D.

Matrix spike report for MW-1-4 for lead was annotated that the spike recovery was outside of Anametrix control limits due to interferences from relatively high concentration level of

the analyte in the unspiked sample. The percent recovery was not reported due to high level of lead concentration in the sample compared to spiked amount.

The spike concentration was less than 4 times the sample concentration. Therefore, following EPA guidelines, the calculated recovery cannot be used to evaluate accuracy and thus is not reported.

The relative percent difference for sample B-2-6.0 and its duplicate (0.0030 and 0.0010 mg/L respectively) were outside Anametrix control limits for mercury, possibly due to the heterogeneous nature of the sample.

The heterogeneity of the sample, as noted by the laboratory, has been considered in interpreting these results.

The laboratory control sample for mercury was outside Anametrix control limits. However, the matrix spike was within Anametrix control limits.

Therefore, no qualification of the data is necessary.

3.4.3 Groundwater (Appendix F) Data Review

Groundwater anlytical results were annotated with no data qualifiers.

4.0
CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

Based on the combined results of the geophysical, test trench and soil boring investigations, it appears that concentrated lenses of ash rubble do not extend laterally more than a few feet beyond the immediate area of the existing excavation. Based on the lead content of the one composite sample, this ash rubble would be regulated as a hazardous waste. PCDD/PCDFs are not present at levels of concern.

Fill soil material, some of which contains fragments of metal, glass and brick debris, extends throughout the investigation area. There is no clear delineation of the extent of debris in the fill soil.

One soil sample, which contained a higher percentage of debris than most of the fill material, contained lead at hazardous levels. Another soil sample from a similar depth in another boring, did not contain a detectable level of lead. Although this second sample was not noted to contain visible amounts of debris, visual observations alone cannot be used to draw conclusions regarding the chemical composition of the material. As noted below, all excavated soil should be visually inspected, categorized, and sampled prior to disposal.

Groundwater does not appear to have been impacted by the ash.

4.2 RECOMMENDATIONS

Based on the above conclusions, the following are recommended:

- Analytical results, particularly those for metals, should be consulted when preparing the health and safety plan for future demolition activities. OSHA recommends that occupational exposure to PCDD/PCDFs be reduced to a minimum but gives no numerical exposure limits. Although PCDD/PCDF analytical results are not above

other regulatory levels, their presence should be considered by the preparer of the health and safety plan.

- Concentrated ash rubble, such as is visible in the existing excavation walls, should be removed, stockpiled separately and sampled and analyzed for proper disposal. It is anticipated that most of the ash rubble will need to be disposed as hazardous waste, based on the elevated lead content.

- Excavated soil, including the stockpiled soil previously excavated, should be sampled and analyzed to determine whether it is regulated as hazardous waste. Care should be taken during excavation and stockpiling activities to segregate soil containing observable ash-like debris from soil without observable ash-like debris. This may allow some of the excavated soil to be disposed as non-hazardous waste, and thus in a less costly manner than disposal of hazardous soil.

- Excavated soil, particularly from below the level of the groundwater table, or from the vicinity of the diesel spill, may also contain petroleum hydrocarbons. Analysis for petroleum hydrocarbons should be performed prior to soil disposal.

- A qualified environmental professional familiar with the site should be onsite during excavation activities to observe activities and soil conditions and evaluate options as additional subsurface information is obtained.

- A workplan should be prepared which outlines the objectives of the soil excavation activities, methods of excavation and field sampling, and disposal alternatives.

- Copies of this report should be forwarded to the Alameda County Health Care Services Agency and to the State of California Regional Water Quality Control Board (addresses in Table 1).

5.0
LIMITATIONS

The conclusions presented in this report are based on the available data and the professional opinion and experience of WCFS. If additional data are collected, the conclusions presented herein may be revised. WCFS's services were performed with the standard of care and skill commonly used as state of the practice in the profession. No other representation, expressed or implied, and no warranty or guarantee, is included or intended.

6.0
REFERENCES

Woodward-Clyde Federal Services, Site Characterization Workplan Building 109-ASH Parks Reserve Forces Training Area, Dublin, CA. July 8, 1994.

Woodward-Clyde Federal Services, Site Characterization Report, Building 109-UST Parks Reserve Forces Training Area, Dublin, CA. June 29, 1995.

TABLE 1

LIST OF CONTACTS
BUILDING 109-UST
PRFTA, DUBLIN, CALIFORNIA

Owner's Representatives:

U.S Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2922
Attn: CESPK-ED-EC
Richard Haavisto (916) 557-7440

Parks Reserve Forces Training Area (PRFTA)
Building 790
Camp Parks, CA 94568
Marshall Marik

Environmental Management Division
AFRC-FM-PWE
2160 South J Street
Fort McCoy, WI 54656-5162
Dennis Stone (608) 388-4794

Environmental Consultants:

Woodward-Clyde Federal Services
500-12th Street, Suite 100
Oakland, California 94607
Michael Sartor (510) 874-3173
Jo Beth Folger (510) 874-3138

Potential Lead Implementing Agency:

Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621
Attn: Eva Chu
(510) 271-4530

Regional Water Quality Control Board:

Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612
Attn: Sum Arigala
(510) 286-1255

TABLE 2

DETECTED PCDD/PCDF AND TEQ CALCULATION
ASH-1 COMPOSITE

DIOXINS:	Concentration (pg/g)		Toxicity Equivalency Factors (TEF)	Toxicity Equivalency (TEQ)
2,3,7,8-TCDD	ND		1	-
Total TCDD		ND	NA	-
1,2,3,7,8-PeCDD	ND		0.5	-
Total PeCDD		ND	NA	-
1,2,3,4,7,8-HxCDD	ND		0.1	-
1,2,3,6,7,8-HxCDD	ND		0.1	-
1,2,3,7,8,9-HxCDD	ND		0.1	-
Total HxCDD		22	NA	-
1,2,3,4,6,7,8-HpCDD	94		0.01	0.94
Total HpCDD		160	NA	-
OCDD		460	0.001	0.46
		642		
FURANS:				
2,3,7,8--TCDF	4.4		0.1	0.44
Total TCDF		90	NA	-
1,2,3,7,8-PeCDF	ND		0.05	-
2,3,4,7,8-PeCDF	ND		0.5	-
Total PeCDF		27	NA	-
1,2,3,4,7,8-HxCDF	ND		0.1	-
1,2,3,6,7,8-HxCDF	ND		0.1	-
2,3,4,6,7,8-HxCDF	ND		0.1	-
1,2,3,7,8,9-HxCDF	ND		0.1	-
Total HxCDF		ND	NA	-
1,2,3,4,6,7,8-HpCDF	34		0.01	0.34
1,2,3,4,7,8,9-HpCDF	ND		0.01	-
Total HpCDF		49	NA	-
OCDF		ND	0.001	-
		166		
TOTAL PCDD/PCDF:		**808**	**TOTAL TEQ:**	**2.96**

Notes:

Residential PRG for 2,3,7,8-TCDD = 3.8 pg/g
Industrial PRF for 2,3,7,8-TCDD = 24 pg/g
Adult EMEG for 2,3,7,8-TCDD = 700 pg/g
Child EMEG for 2,3,7,8-TCDD = 50 pg/g

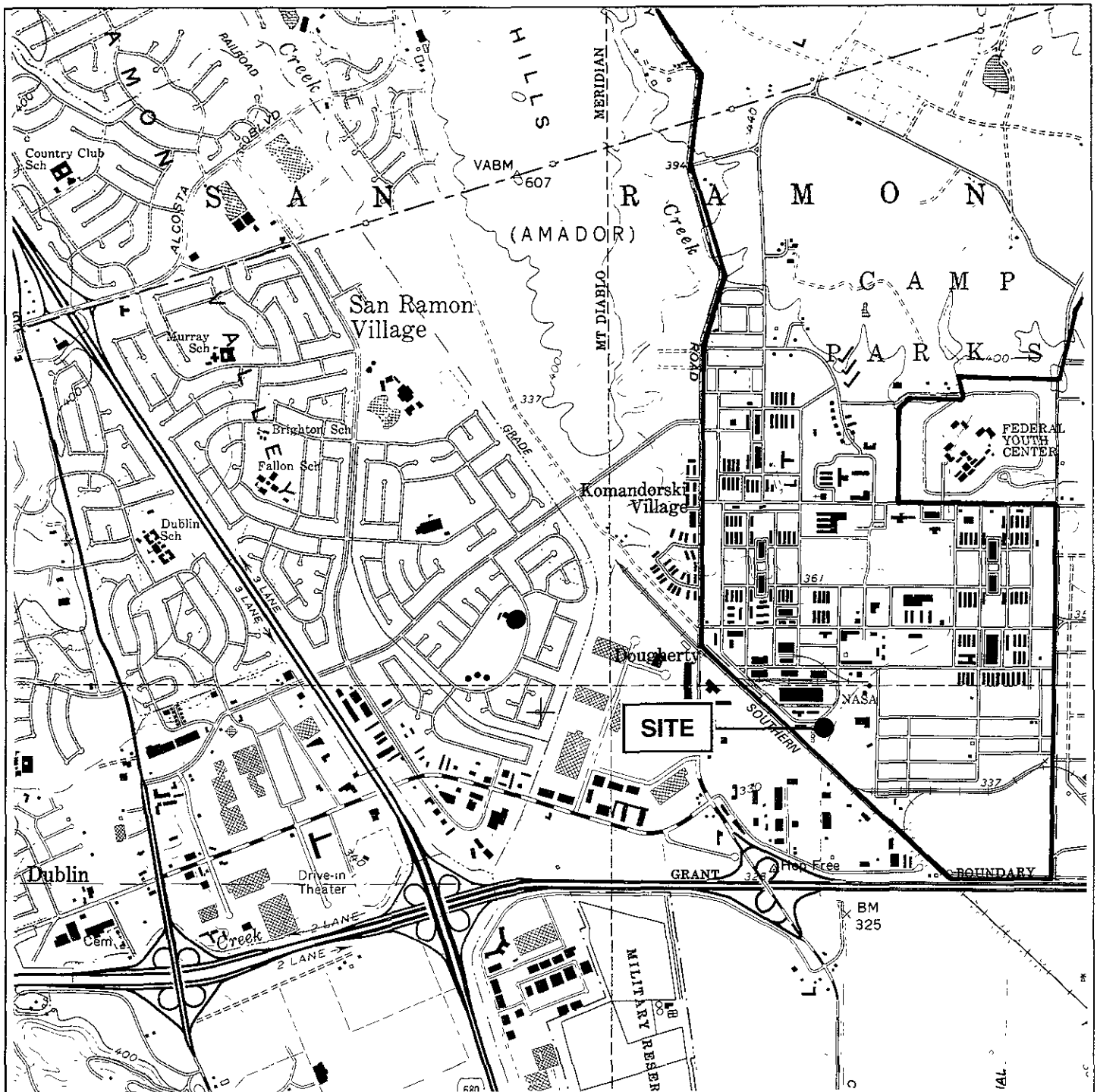
TABLE 3

ASH AND SOIL SAMPLES METALS ANALYTICAL RESULTS
BUILDING 109-ASH

	Total Metals by EPA Method 6010A (7471 for Hg)[1]																
	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
ASH-1	ND[2]	7.6	1220	ND	19.2	80.1	14.2	501	**1190**[4]	ND	ND	72	ND	8.3	ND	29.9	1540
MW-1 (14')	ND	5.1	112	ND	ND	19.6	9.0	15.6	5.6	ND	ND	26.5	ND	ND	ND	31.0	32.9
MW-2 (15')	ND	3.9	--[3]	ND	ND	15.0	--	10.7	4.3	ND	--	19.4	ND	ND	ND	-	23.4
MW-3 (15')	ND	4.4	86	ND	ND	16.5	7.5	11.6	4.4	ND	ND	19.3	ND	ND	ND	27.9	28.0

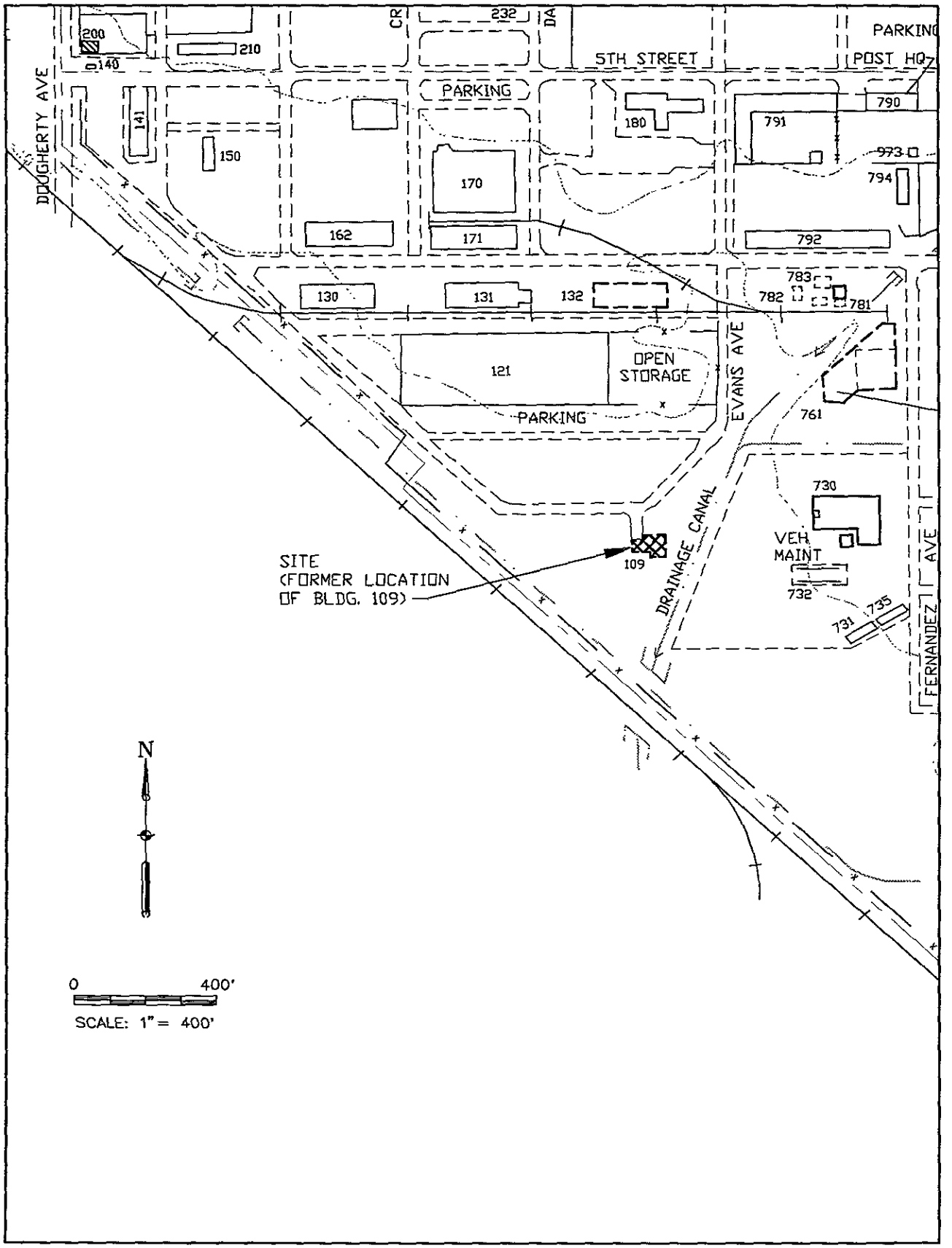
	Soluble (STLC) Metals by CWET and EPA Method 6010A (7471 for Hg)[5]																
	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
MW-1 (4')	--	--	--	--	--	--	--	--	**319**[6]	--	--	--	--	--	--	--	--
B-2 (6')	ND	0.49	2.6	ND	0.064	0.34	ND	4.7	**78.9**[6]	0.0030	ND	5.1	ND	ND	ND	0.81	80.1
B-9 (5.5')	ND	ND	13.3	ND	ND	ND	0.53	ND	ND	0.00044	ND	0.98	ND	ND	ND	0.59	ND

[1] Results are in mg/Kg
[2] ND = not detected
[3] -- = not analyzed
[4] Exceeds Lead TTLC regulatory limit of 1000 mg/Kg
[5] Results are in mg/L
[6] Exceeds Lead STLC regulatory limit of 5 mg/L



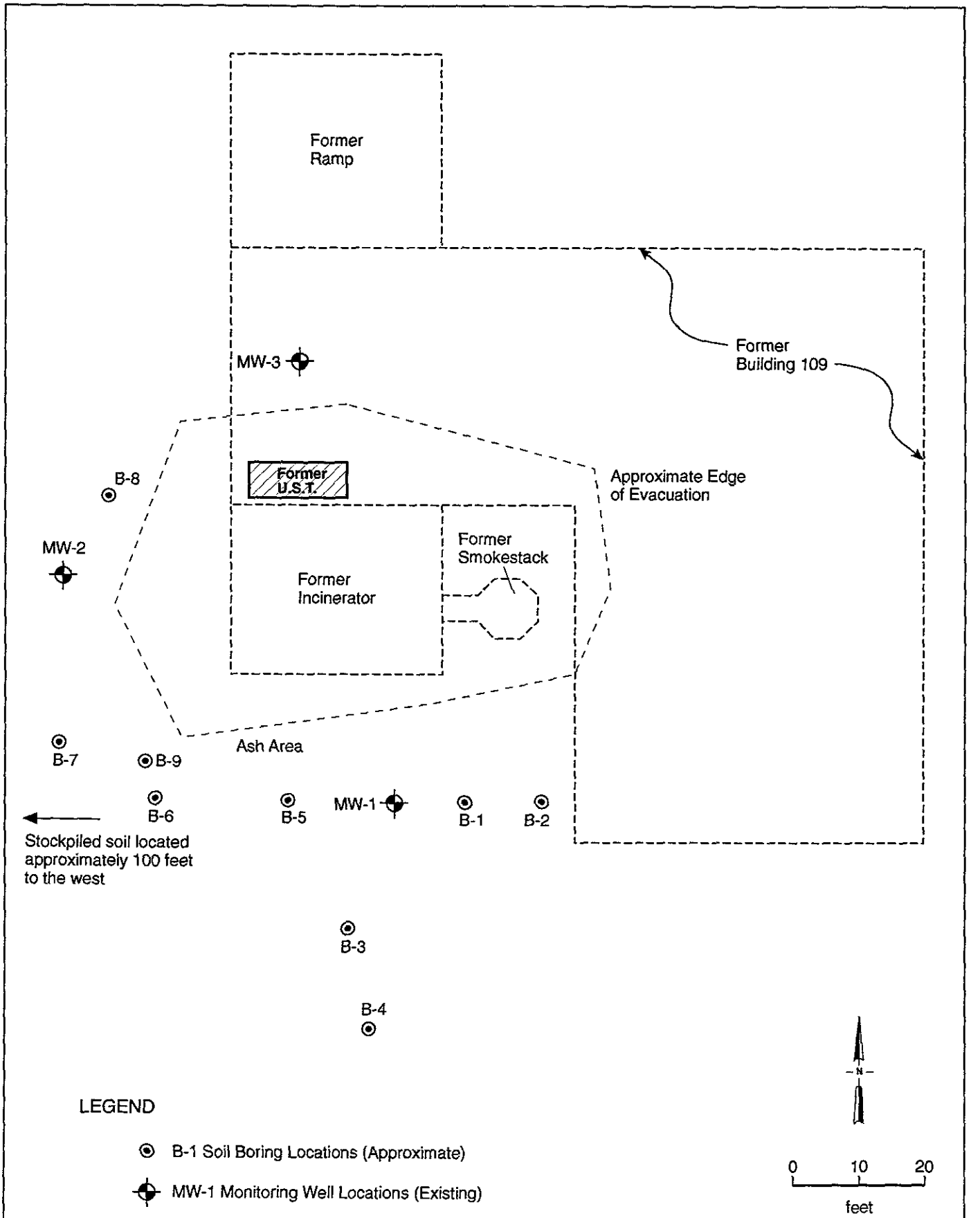
Project No. 7136/7137	Parks Reserve Forces Training Area	FACILITY MAP LOCATION PARKS RESERVE FORCES TRAINING AREA DUBLIN, CALIFORNIA	Figure 1
Woodward-Clyde			

7136-300/062895/mcl



PARK-13 052094

Project No. 7112	PARKS RESERVE FORCES TRAINING AREA	SITE LOCATION BLDG. 109 INVESTIGATION	Figure 2
Woodward-Clyde Consultants			

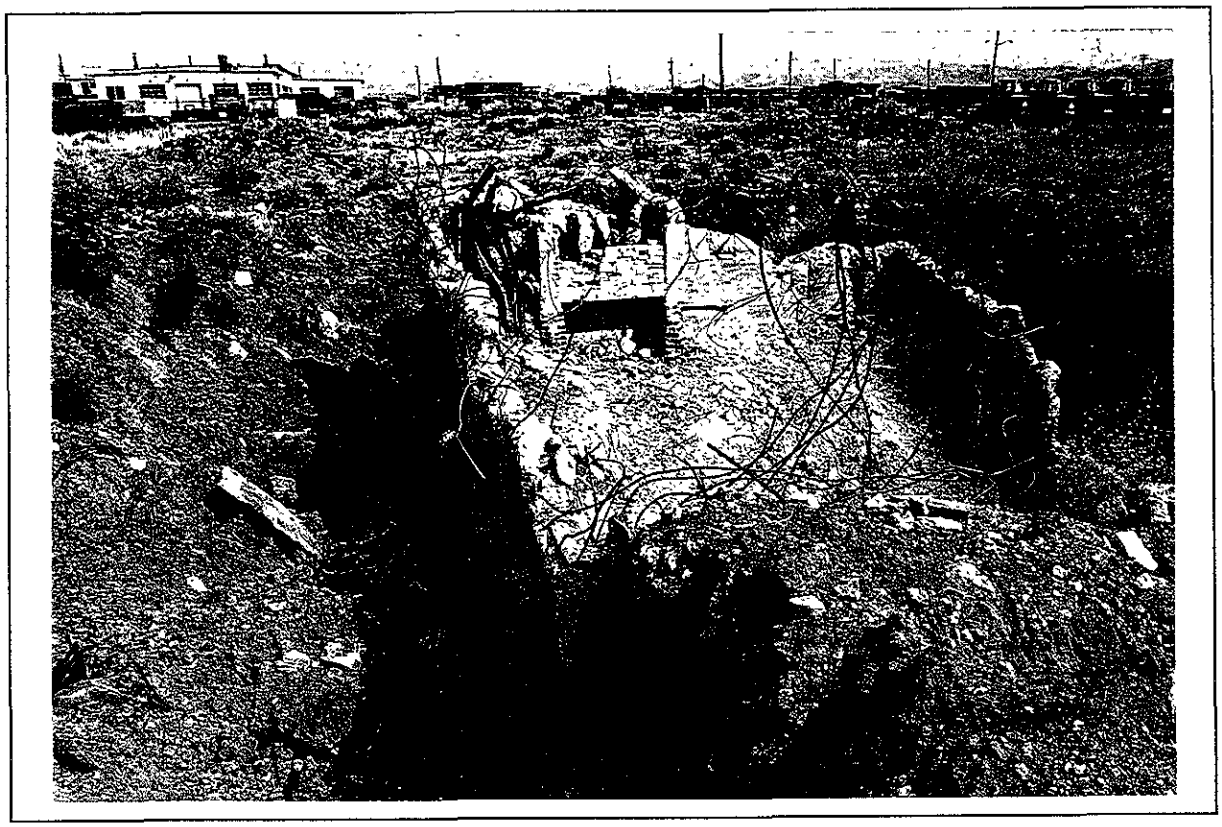


Project No. 7136	Parks Reserve Forces Training Area	APPROXIMATE SOIL BORING LOCATIONS BUILDING 109 INVESTIGATION	Figure 3
Woodward-Clyde			

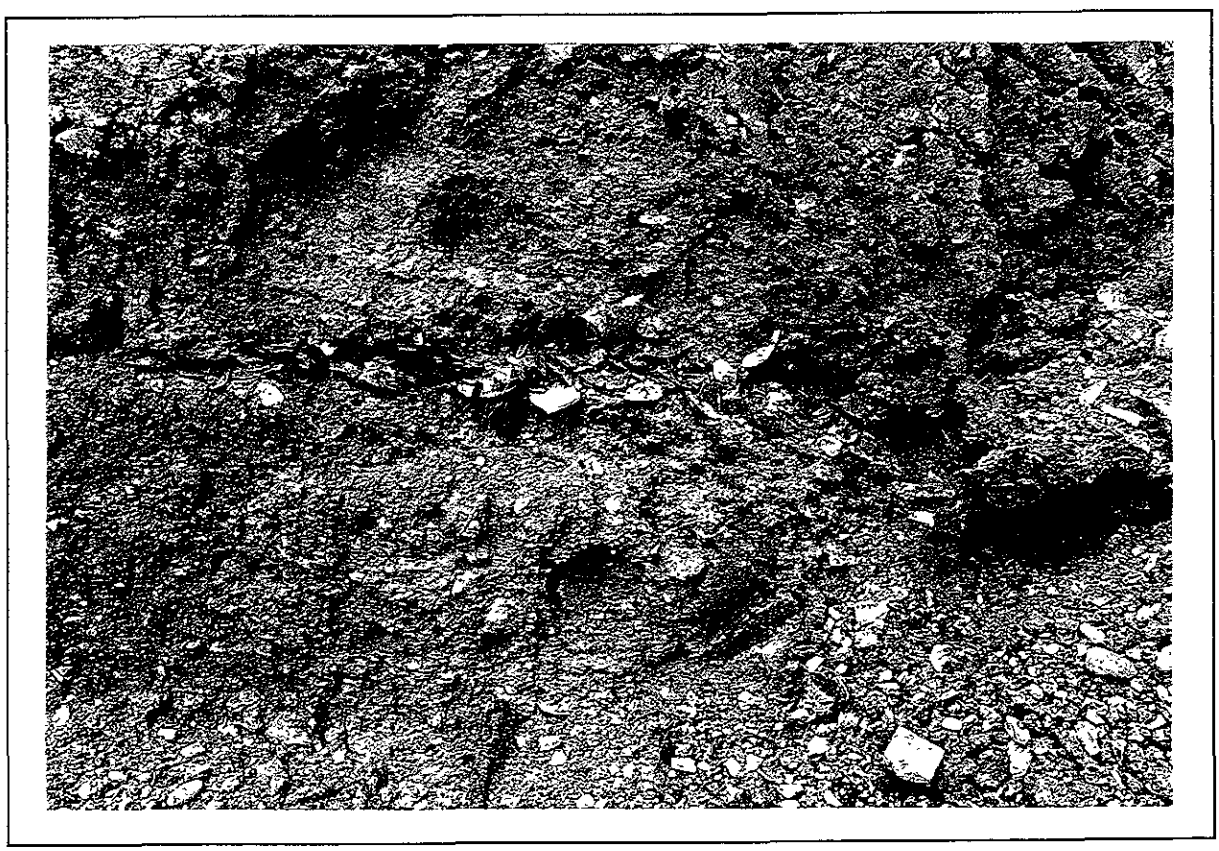
7136-300/090795/cum,vone,mci

Parks Reserve Forces Training Area
Building 109 ASH Investigation

9/29/94 Eastward view of partially demolished incinerator



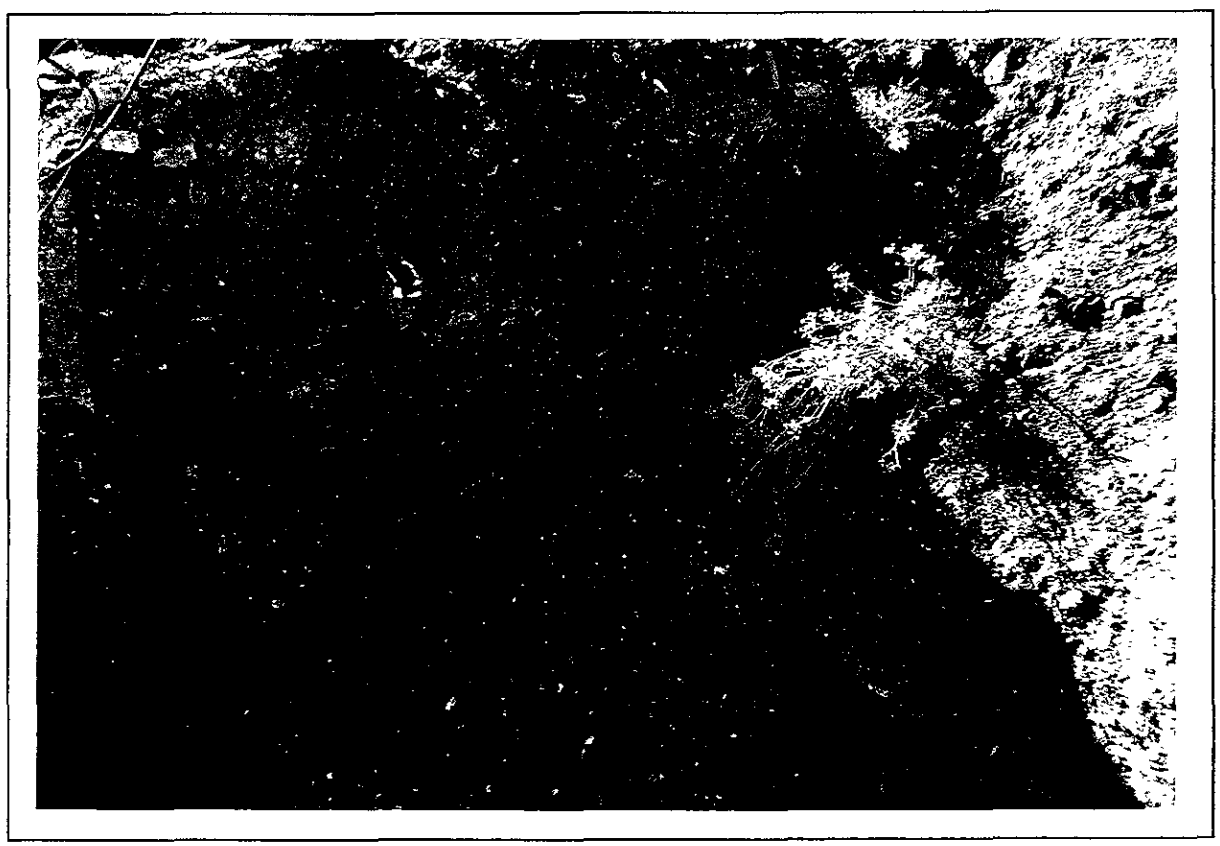
9/29/94 Typical "Ash" rubble lens from which grab sample was collected



Parks Reserve Forces Training Area
Building 109 ASH Investigation

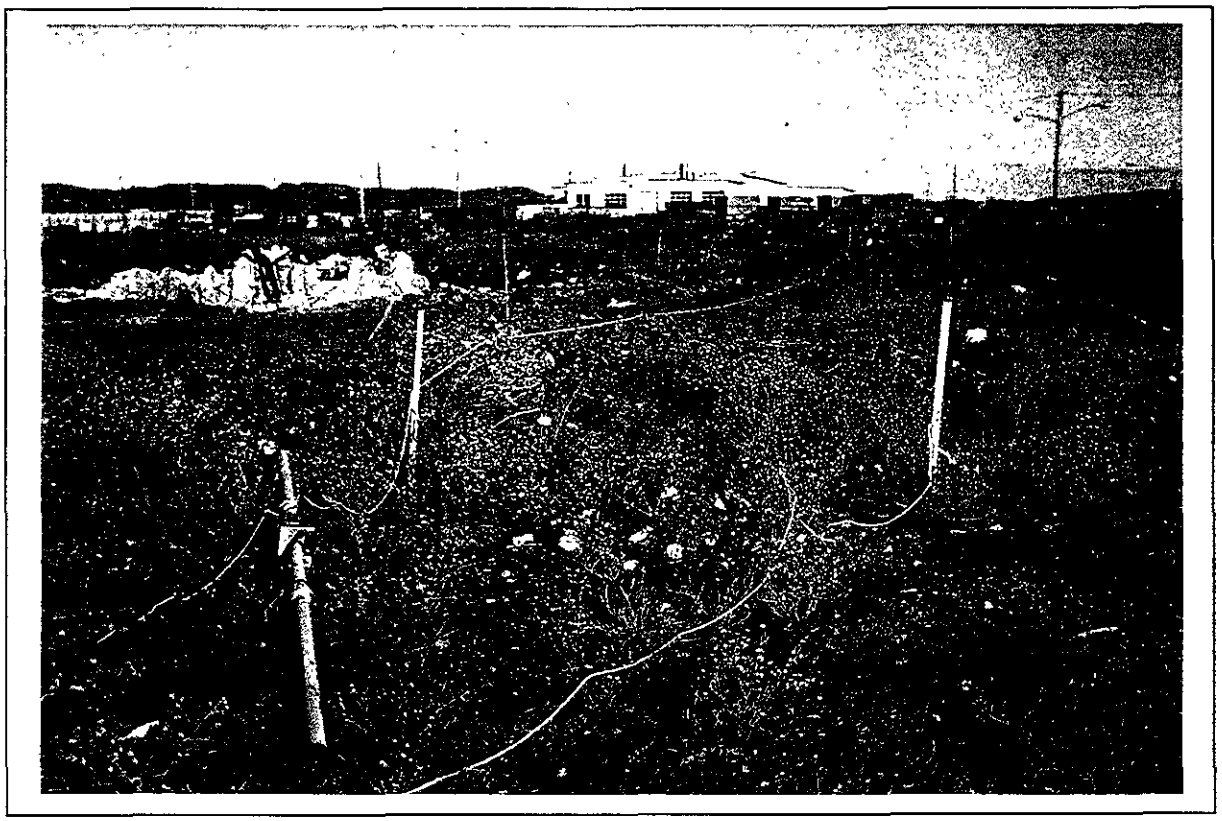
12/8/94 West of former incinerator, after clearing of stockpiled soil to allow access

12/8/94 "Ash" rubble near northwest corner of former incinerator



Parks Reserve Forces Training Area
Building 109 ASH Investigation

12/8/94 Preparation of grid for geophysical survey, south side of former incinerator



12/8/94 Terrain conductivity survey underway, south side of former incinerator

APPENDIX A
GEOPHYSICAL INVESTIGATION REPORT

THE APPLICATION OF GEOPHYSICAL TECHNIQUES TO SUBSURFACE SITE CHARACTERIZATION

CAMP PARKS PROJECT
DRAFT FINAL

INTRODUCTION

Woodward-Clyde Consultants has utilized geophysical techniques for underground site characterization for over twelve years. In December, 1994 a project was undertaken at Camp Parks Reserve Forces Training Area in Dublin, California (Figure 1). During this phase of the project, a detailed investigation was undertaken at the site of Building 109. This structure is a former trash incinerator facility which has been partially demolished, revealing the presence of ash deposits. The purpose of the present geophysical survey is to define anomalous areas in the vicinity of Building 109 that may indicate the presence of subsurface ash deposits, or other areas of potential contamination.

METHODOLOGY

During this investigation, the following techniques were utilized: magnetic and electromagnetic surveys to identify subsurface disturbance and to locate and delineate underground storage tanks; ground penetrating radar surveys to define the characteristics of underground anomalies; and utility (pipe and cable) identification and tracing.

Terrain conductivity surveying, an electromagnetic technique, provides a rapid method of site characterization. In urban settings, terrain conductivity studies are used to locate disturbed areas which are not visible from the surface. Metallic objects such as landfill deposits, buried tanks, point sources (buried drums, etc.) and pipelines are easily identified, pinpointing areas of modern site disturbance. Other areas of disturbance that may be identified include backhoe trenches, test pits, and regions of anomalous values which are generally associated with unusual soil conditions such as brine deposits, petroleum product contamination, or buried "trash". In addition, the subsurface geological conditions of large areas may be rapidly characterized using electromagnetic techniques associated with occasional "ground truth" reference points

such as soil borings or seismic reflection profiles at periodic intervals along the EM traverse. The results obtained from these studies provide critical decision-making information to aid in the placement of subsurface test excavations.

A Geonics EM-31 Terrain Conductivity Meter, which is a controlled-source, induction-type instrument, was used to characterize subsurface deposits at Camp Parks. The EM-31 is a portable two-part instrument which includes a 3.7 meter long boom containing transmitting and receiving loop antennas at either end, and an electronics console with an analog display for continuous readout of ground conductivities. The EM-31 is responsive to the electrical properties of the upper 16 to 18 feet of soil, with most of the response being derived from the upper six feet.

A Geonics EM-38 was used for localized detection and boundary delineation of subsurface anomalies, and to characterize specific soils and contaminant deposits observed within trench sidewalls. The EM-38 is similar to the EM-31 except that it has a one-meter coil spacing and is responsive to the electrical properties of the upper 3 to 4 feet of soil.

Ground penetrating radar (GPR) uses high frequency electromagnetic waves to provide information on the nature and geometry of subsurface reflecting horizons and to delineate underground structures such as buried tanks, pipelines, and other utilities. Energy is radiated downward into the subsurface from a transmitting antenna which is moved slowly across the surface of the ground. This electromagnetic energy is differentially reflected back to a receiving antenna, where variations in the return signal are continuously recorded on a graphic recorder. The reflections produce a continuous cross-sectional profile of the shallow subsurface conditions. The vertical axis represents the two-way travel time of the reflected radar signal and may be calibrated to depth by obtaining information over known sources.

The response variations of the return signal are caused by radar wave reflections from distinctive interfaces of materials having different electrical properties. Such reflections are often associated with natural geologic conditions such as bedding, cementation, moisture and clay content, voids, fractures, and intrusions, as well as man-made objects such as underground storage tanks, pipelines, etc. Detectability is strongly controlled by interrelated factors such as size, contrast in

properties, sharpness of the change, and the smoothness of the reflecting surface. A 500 MHz antenna was used to obtain the radar profiles to more accurately define electromagnetic anomalies.

Electromagnetic pipe and cable locators are used for the detailed tracing of individual utility conductors such as underground electrical conduits, water and sewer lines, and chemical or product lines associated with underground storage tanks. These instruments are capable of tracing individual lines in highly congested areas. Generally, a transmitter is used to inject an audio-frequency signal into a metallic conductor such as a pipeline through inductive or conductive coupling. The conductor simulates a large antenna and radiates this signal, which may be traced with an acoustic receiver, thereby outlining the buried conductor.

Gradient magnetics was used to locate buried iron and steel objects and to define the edges of buried storage tanks. This magnetometer detects the natural magnetic gradient associated with the metallic objects and is capable of working in relatively close proximity to objects with known high-field gradients.

RESULTS

Terrain conductivity measurements were obtained along a predetermined survey grid throughout the areas to the south and west of the former location of incinerator Building 109 to locate the subsurface presence of anomalous soils conditions that may indicate the presence of buried ash deposits or other forms of contaminated materials. Conductivity measurements were made within an x-y grid on a nominal five-foot spacing except where precluded by topographic obstacles. Surficial features within the survey area are shown on Figure 2. Values were also not recorded, or noted by the value "m", where significant interference was observed from a potentially-identifiable metallic source such as a "linear anomaly". Readings were obtained in both the horizontal and vertical co-planer mode, and are presented on Figures 3 and 4 respectively as shallow mode and deep mode values. While the EM-31 in its normal mode of operation (ie: vertical co-planer) is responsive to the electrical properties of the upper 16 to 18 feet of soil, with most of the response being derived from the upper six feet, operation of the instrument in the horizontal co-planer mode effectively limits the depth of response to approximately one-half. Therefore, anomalies shown only on the shallow

mode conductivity map can be concluded to be limited to the upper 5 to 6 feet of the subsurface, or less.

Two metallic linear anomalies were identified within the survey area, and likely indicate the presence of a buried pipe or electrical cable. No visible terminations were observed in trench sidewalls. These include a north-south trending anomaly along 72 West at the northern limits of the survey area, extending northward toward the street from the survey area, and an east-west trending anomaly at 6.5 South. This anomaly extends westward out of the survey area. No conductivity measurements were obtained within close proximity to these anomalies, and it is assumed the area within the immediate vicinity of these anomalies is disturbed by past trenching operations.

Ash deposits have reportedly been observed within two areas in the vicinity of Building 109. These include deposits observed within trench sidewalls adjacent to the northwest corner of the structure, and those observed to the south (20S, 41W) in soil boring MW-1. Discrete lenses were observed at several locations exposed within trench sidewalls near the northwest corner of the structure. These lenses consisted primarily of residual glass and metal debris, and exhibited a very high electrical conductivity, principally due to the metallic content. Ash rubble identified in boring MW-1 consisted of rusty stains and various color aggregate with mostly black-brown glass fragments. The presence of metallic components was not indicated, but may have been present in minor amounts.

In general, the soils throughout the survey area consist of an upper layer which is a buff to light brown silty to gravelly clay overlying a gray to dark brown heavy gravelly clay. Both units were clearly exposed in the sidewalls of excavation trenches at the site. Relative electrical conductivity of the upper clay layer is approximately one-half of that noted in the lower clay layer.

Electrical conductivities throughout the area surveyed, as shown on Figures 3 and 4, in general show lateral changes that are most likely attributed to variations in the thickness of the upper clay layer. Thicker sections would be expected in the area around 15W - 25W and 50W. Higher values and an irregular lateral pattern seen in the southwest portion of the survey area are attributed to the presence of miscellaneous non-

metallic debris mixed with the surficial materials. Wood debris was noticeably present within this area. Higher conductivities noted at 35W (Figure 4) and between 25W - 40W (Figure 3) adjacent to the structure are associated with the topographic swale at this location, where the lower clay layer is present at the surface.

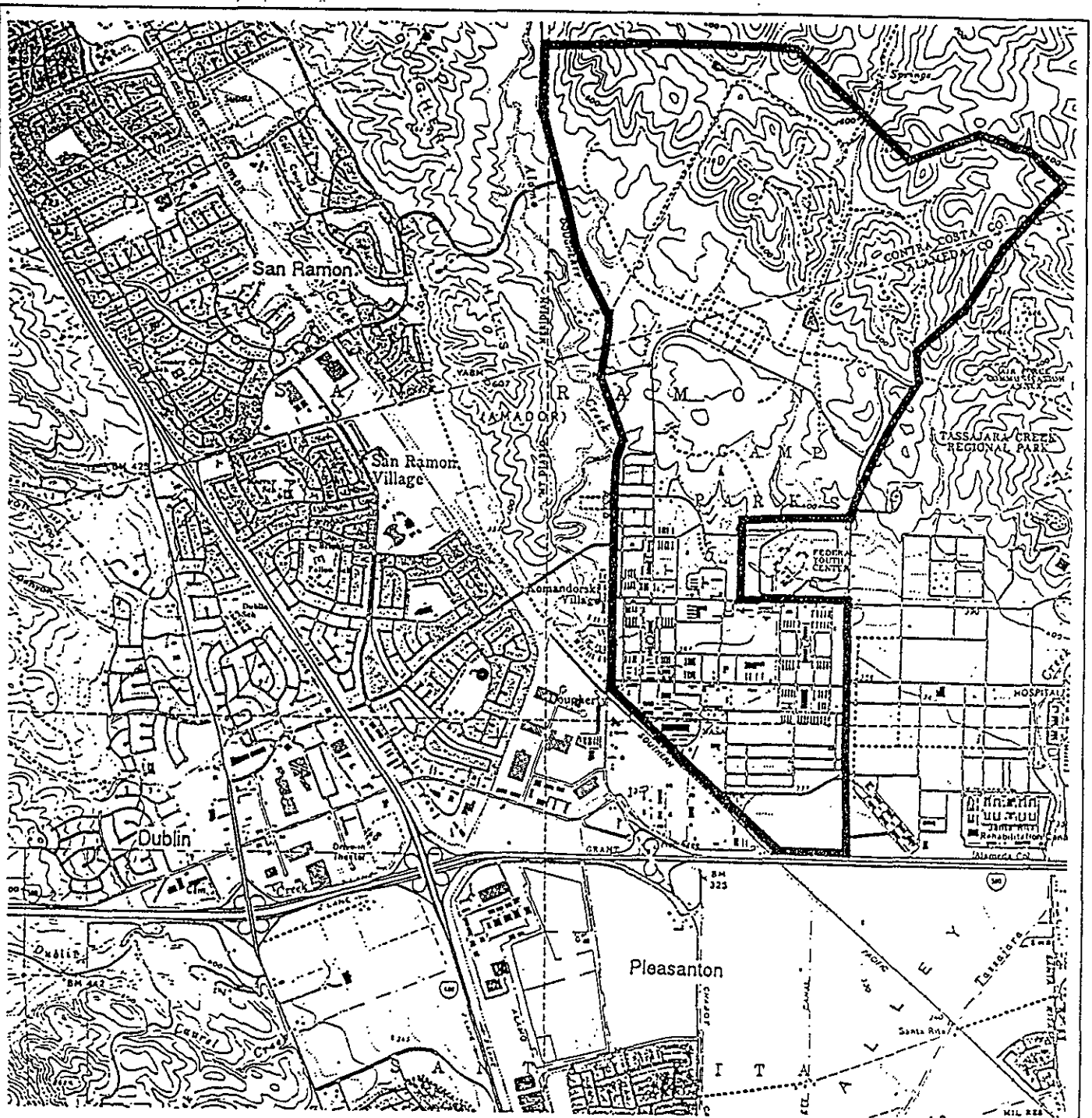
Three distinctively-anomalous areas occur within the study area. These include an area at 50W near the southwest corner of Building 109 and at 85W - 90W centered at 20S (Figure 3), and a large area directly west of the structure as shown on Figure 4. This area exhibited conductivity variations typically found associated with trash deposits containing metallic debris.

RECOMMENDATIONS

Test anomalous areas with additional borings and/or backhoe excavations.

Monitor construction grading, being prepared to redirect or suspend operations should lenses of potentially contaminated materials be encountered.

Establish a mitigation plan for the collection and disposal of contaminated materials encountered during construction grading. This should include the onsite evaluation of the materials' components which would be expected to include glass/porcelain debris, metal debris, and residual ash.



Legend

Site Boundary

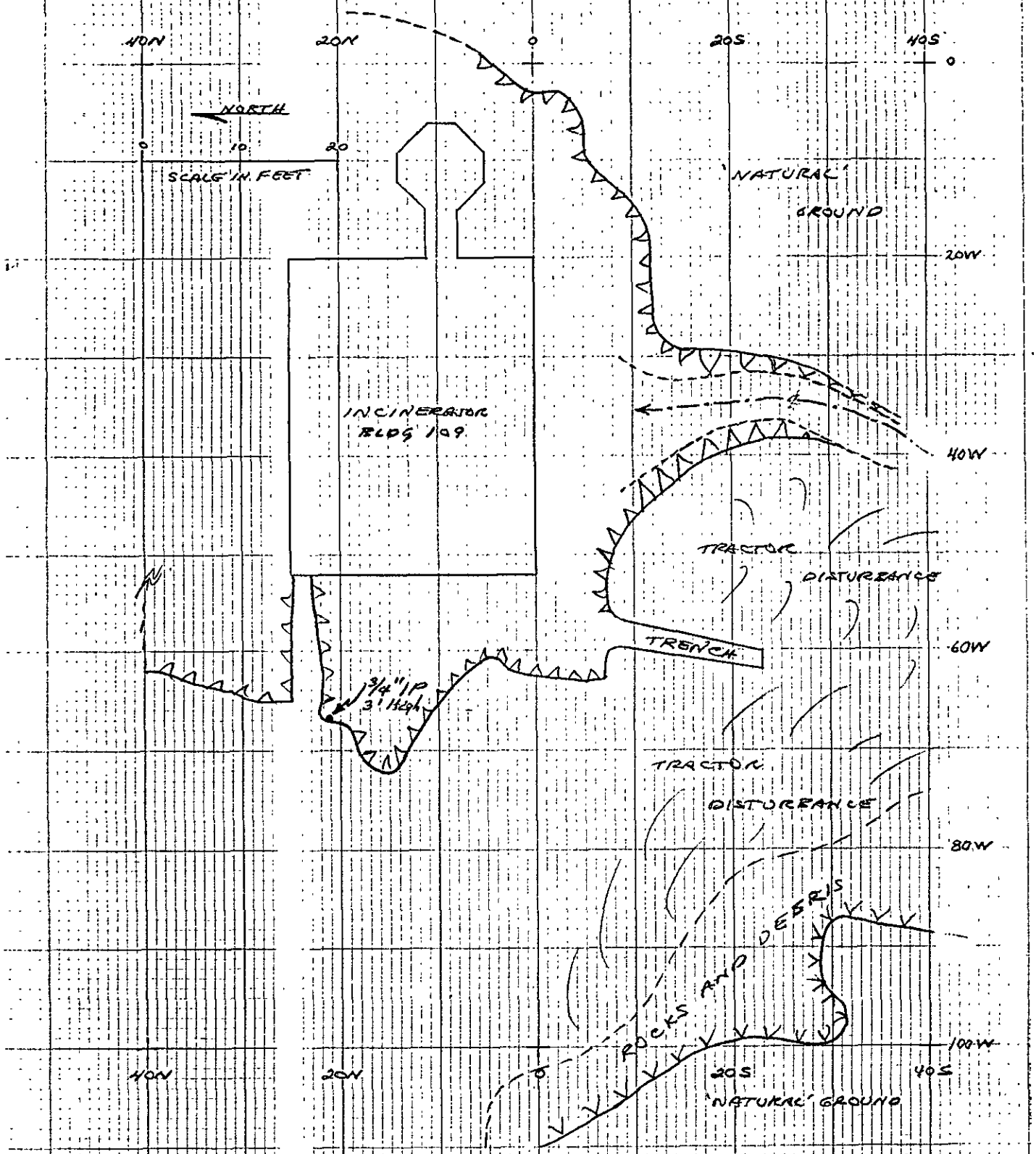
0 1 MILE

SCALE 1: 48,000

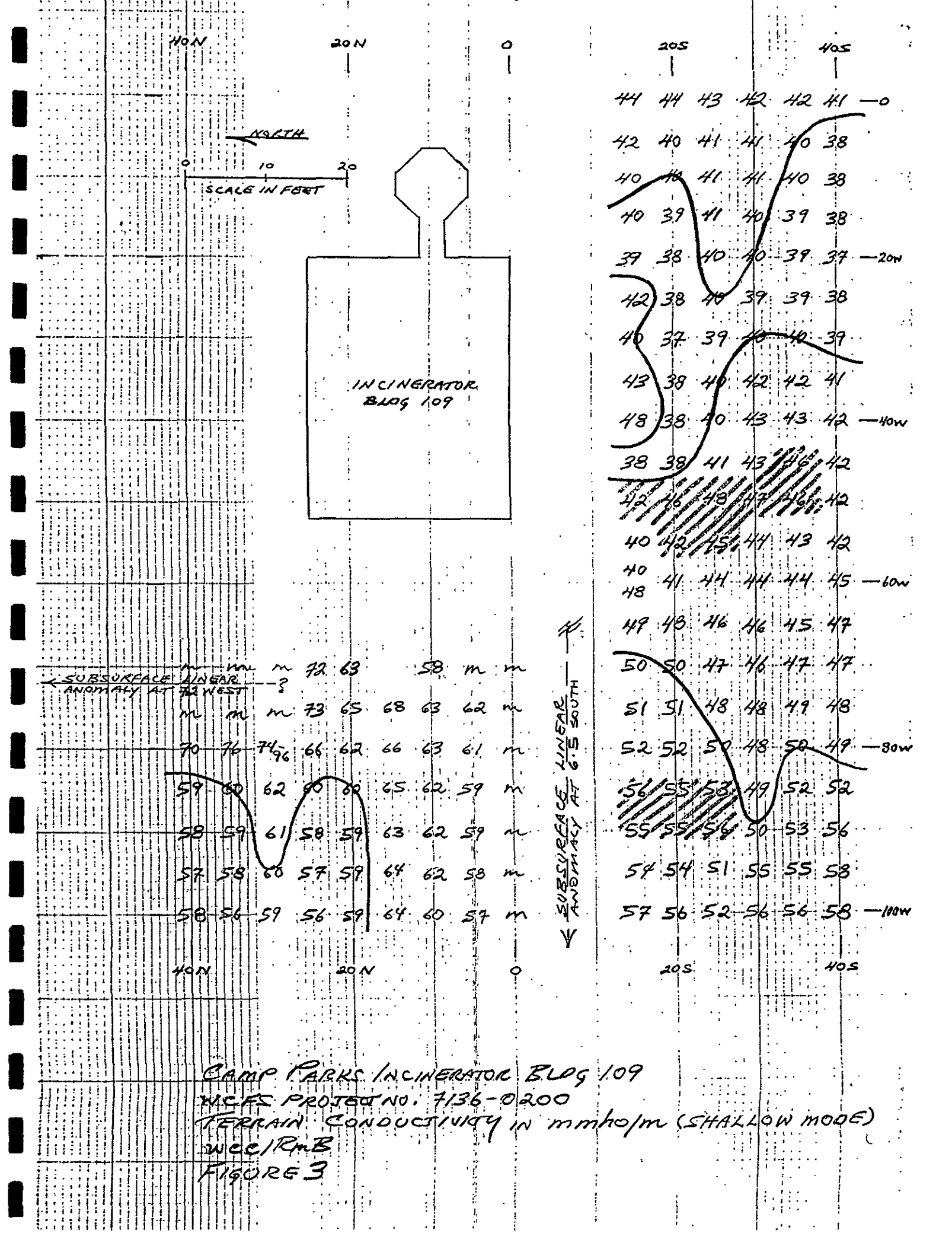
QUADRANGLE LOCATION

Note: Base Map from Dublin Quadrangle, 7.5 Minute Series (Topographic) 1961, Photorevised 1980

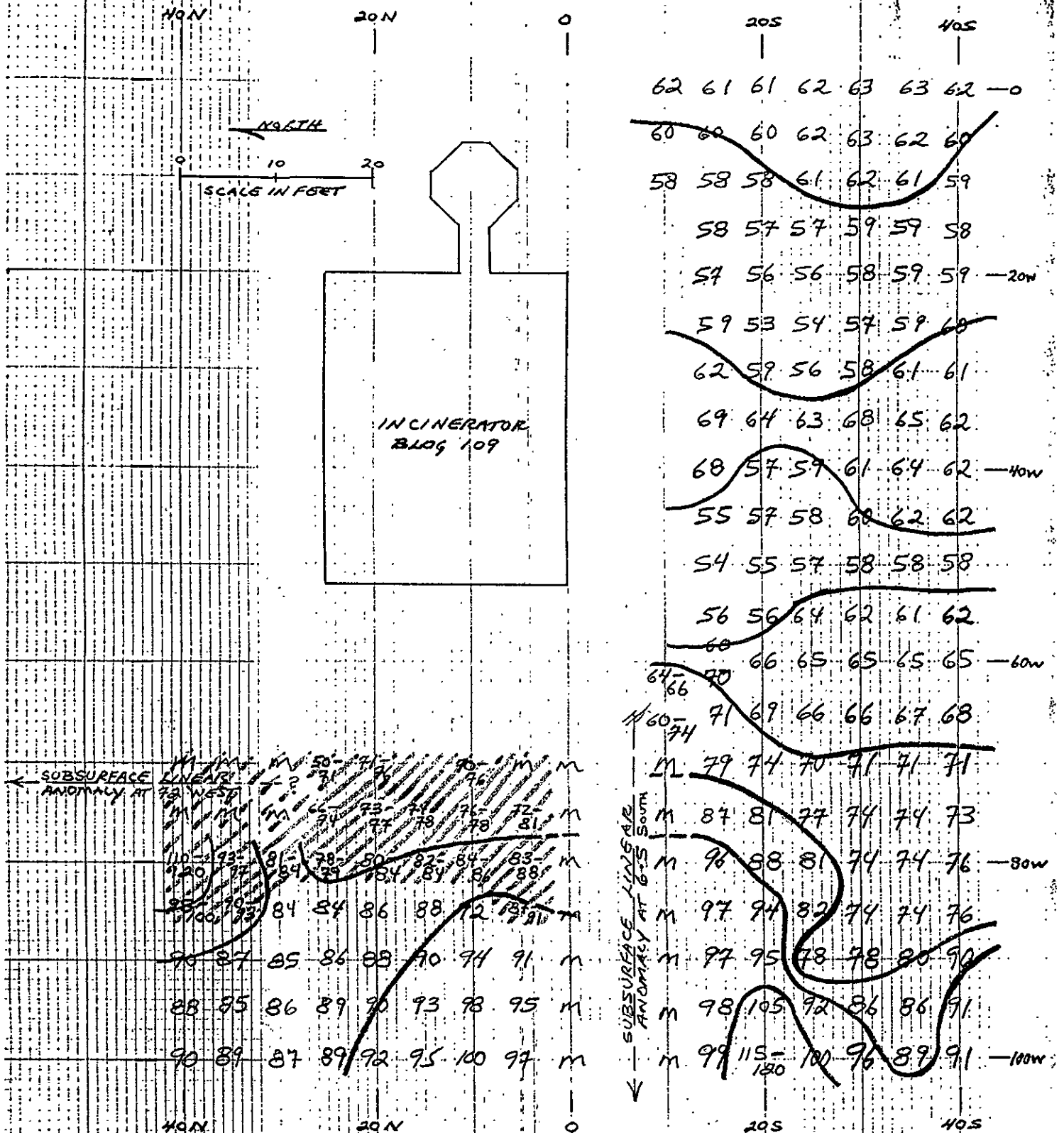
Project No. 7112	Parks Reserve Forces Training Area	SITE LOCATION MAP PARKS RESERVE FORCES TRAINING AREA DUBLIN, CALIFORNIA	Figure 1
Woodward-Clyde			



CAMP PARKS / INCINERATOR BLDG 109
WCFS PROJECT NO. 7136-0200
SURFACE FEATURES MAP
WCF/RMB
FIGURE 2



CAMP PARKS INCINERATOR BLDG 109
WCFS PROJECT NO. 7136-0200
TERRAIN CONDUCTIVITY IN mmho/m (SHALLOW MODE)
WCC/RmB
FIGURE 3



CAMP PARKS INCINERATOR BLDG 109
MCES PROJECT NO. 7136-0200
TERRAIN CONDUCTIVITY IN mmho/m (DEEP MODE)
WCC/RMB
FIGURE 4

MEMORANDUM

To: Jo Beth Folger
WCC - Oakland

From: Bob Beer
WCC - Santa Ana

Re: Camp Parks Building 109 Ash Survey

Attached are copies of maps and profiles sent earlier per the results of our geophysical investigation at Building 109

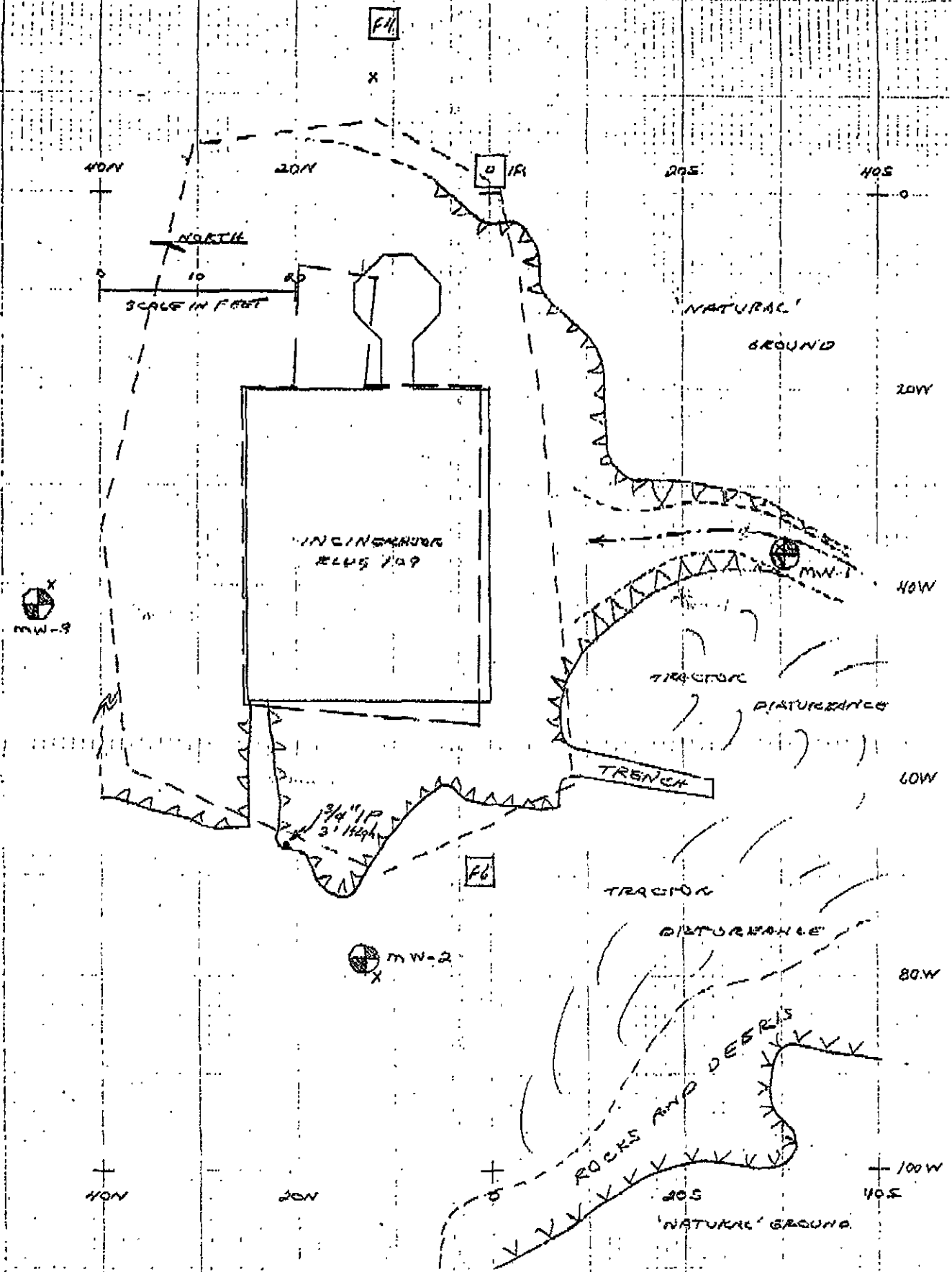
One map shows an overlay of the surveyor's map on my surficial features map. This was how I was able to plot the location of the soils borings. I did note that they were as close as practicle to the recomended locations.

The conductivity profiles along line 30S show the general relationship of conductivity values to surficial features. For instance, note that both the shallow and deep mode readings increase at the west end of the survey area due to the presence of surficial rocks and debris. The surficial nature of these materials is evident in the gradual increase in values on the shallow mode readings, and the rapid increase in the deep mode readings.

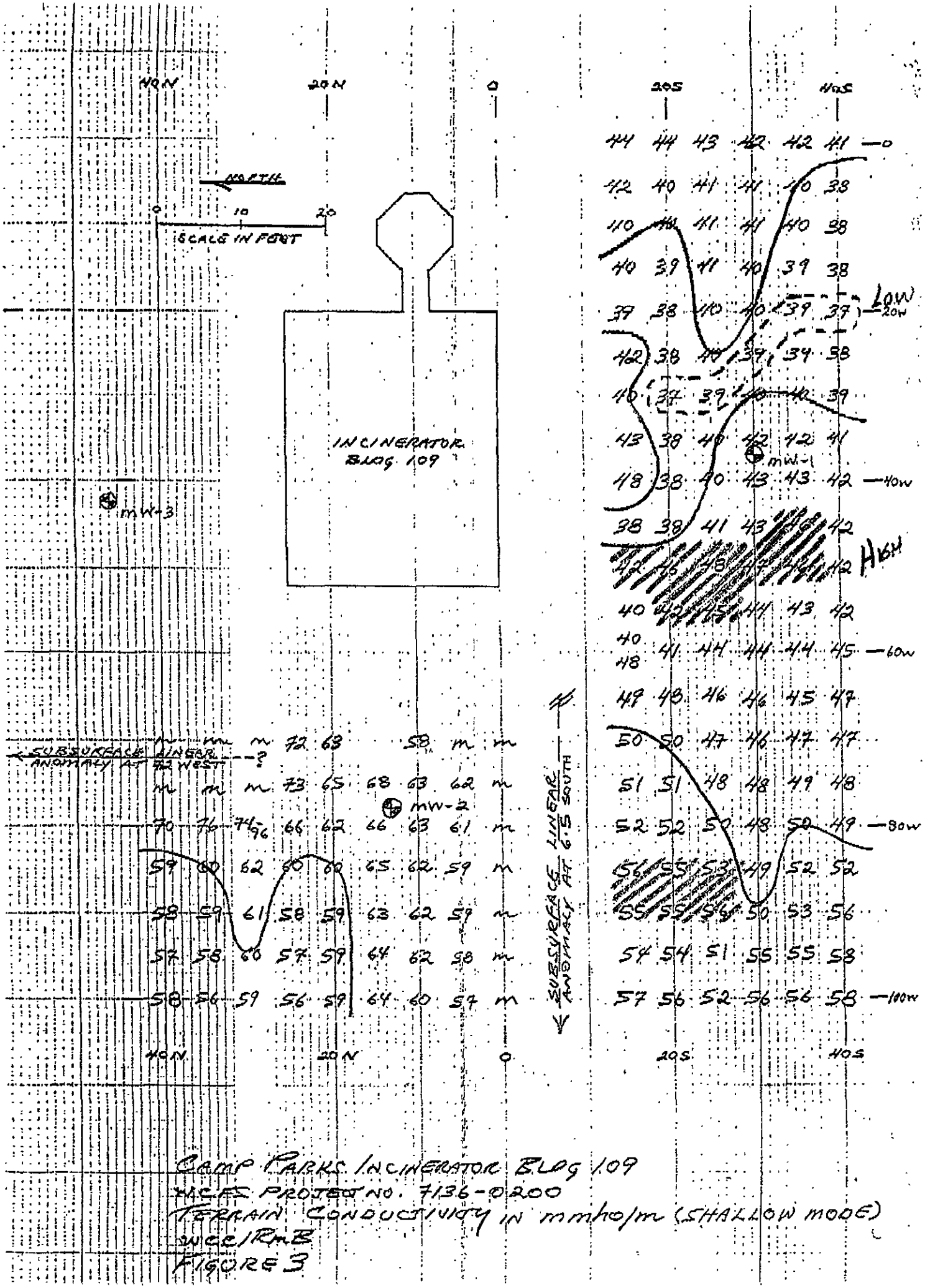
There is a narrowly-defined area of anomalously-high conductivity values in the deep mode readings along 35W. This is directly associated with the swale leading toward Building 109 from the south, and the area we sited boring MW-1. We expected to locate ash in this area, if it were present. It is flanked on both sides by anomalous lows at about 20W and 50W. It is within this area, directly south of the structure, where there is the highest likelyhood of encountering subsurface contamination. The low at about 20W is also reflected in the shallow mode readings, and may possibly represent thicker sections of the upper clay layer. The area to the east of 20W has a low potential for containing ash. The deep mode low at about 50W is reflected in the shallow mode readings by a zone of anomalously high values. This area is highly suspect and is a serious candidate for further borings, although it too may be a reflection of localized changes in the soils profile. The area to the west of 60W also has a low potential for containing ash. However, the hatchured anomalous

area on the shallow mode map indicates the possible presence of some near-surface debris and is a candidate for further subsurface investigation.

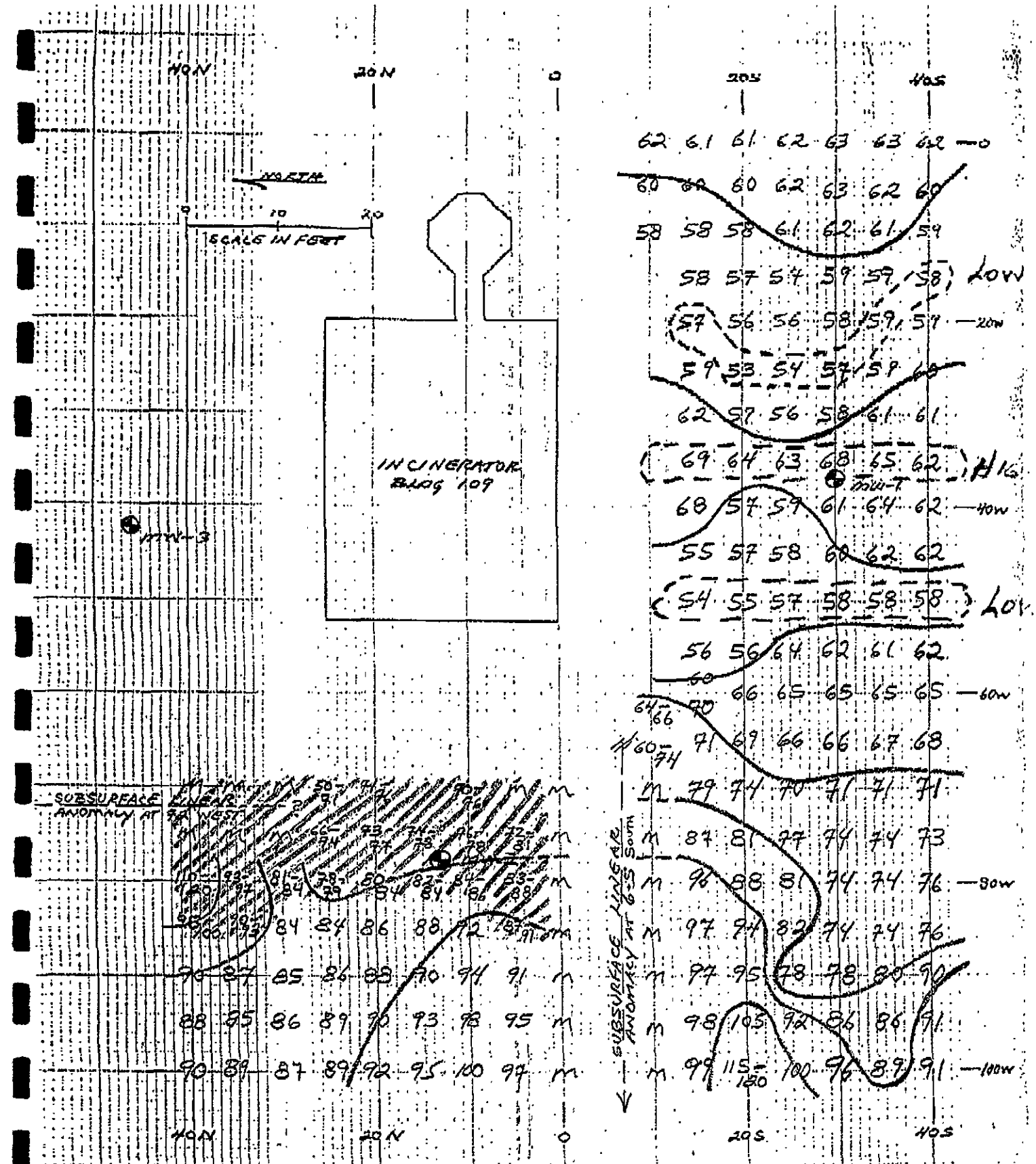
The area to the west of the structure, north of the linear anomaly at 6.5S, appears to be of normal soil types. This appears to be supported by the results of boring MW-2. The anomalous area hatchured on the deep-mode map appears to be associated with the linear anomaly located here, and may possibly contain some additional metallic debris.



CAMP PARKS INCINERATOR BLDG 109
WCFS PROJECT NO. 7136-0200
SURFACE FEATURES MAP
WCE/RMB



CAMP PARKS INCINERATOR BLDG 109
NCEE PROTECT NO. 7136-0200
TERRAIN CONDUCTIVITY IN mmho/m (SHALLOW MODE)
WCE/RMB
FIGURE 3



CAMP PARKS / INCINERATOR BLDG 109.
MCAS PROJECT NO. 7136-0200
TERRAIN CONDUCTIVITY IN mmho/m (DEEP MODE)
WCC/RmB
FIGURE 4

Woodward-Clyde Consultants

Subject: Conductivity Profile

By: R.M.E. Date: 3/14/95

Checked By: K Date:

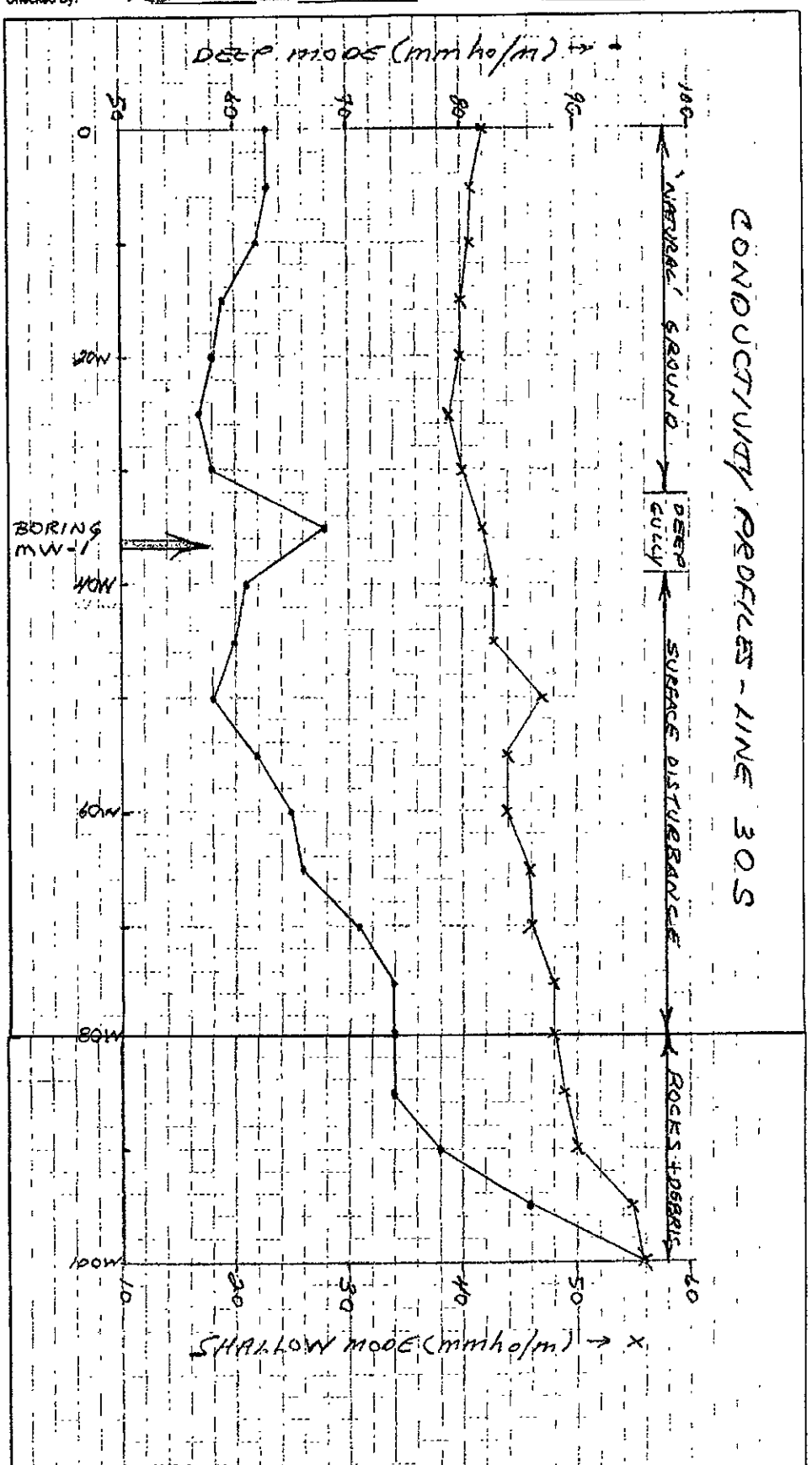
Project Notes

Project Name: Camp Parks

Project No.: 7136

Task No.: 3200 File No.: 9

Sheet 1 of 1



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APPENDIX B
DRILLING PERMIT

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94566 • (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Building 109 (outside)
Camp Parks, RFTA
Dublin, CA

CLIENT
Name Sacramento District Corps of Engineers
Address 1325 J. Street Phone
City Sacramento Zip 95814

APPLICANT
Name Sevin Bilir 874-3268
Woodward Clyde Consultants
Address 500 12th Street Phone (510) 893-3600
City Suite 100 Oakland Zip 94607

TYPE OF PROJECT
Well Construction
Cathodic Protection ___
Water Supply ___
Monitoring ___
Geotechnical Investigation
General ___
Contamination X
Well Destruction ___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

DRILLER'S LICENSE NO. C57 492390

WELL PROJECTS
Drill Hole Diameter ___ in. Maximum
Casing Diameter ___ in. Depth ___ ft.
Surface Seal Depth ___ ft. Number ___

GEOTECHNICAL PROJECTS
Number of Borings As many as possible Maximum
Hole Diameter 7 in. Depth 8' ft.

ESTIMATED STARTING DATE 8 MAY 95
ESTIMATED COMPLETION DATE 8 MAY 95

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Date 5/5/95

FOR OFFICE USE

PERMIT NUMBER 95281
LOCATION NUMBER

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

(C.) GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 5 May 95
Wyman Hong

121989

APPENDIX C
BORING LOGS

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION CP- Bldg. 109 1L' east of MW-1		ELEVATION AND DATUM	
DRILLING AGENCY Kuithang	DRILLER Rod Furlow	DATE STARTED 5/8/95 DATE FINISHED	
DRILLING EQUIPMENT B-53 Mobile Drill		COMPLETION DEPTH 10	SAMPLER: 2 1/2.5" CA-ID
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY Billie	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 16 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No	SAMPLES: Recov ft	SAMPLES: Penetra Resist (Blows/6 in)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
2	Clayey gravel-Rubble —FILL— Brown to dark brown, aggregate (bricks), medium stiff, low plasticity, dry to moist, organic matter (roots)	GM/GC						12	Begun Drill 0910 Redo due to poor recovery w/ Moss System
	becomes very stiff, non plastic							26	
								38	
	Clay brown with very dark brown, stiff, slight plasticity to low plasticity, cobbles up to 2", moist, some light	CL						5	
5	brown							7	
								12	
								18	
	Ash Rubble Rusty Stains, various color aggregate, mostly brown-black, glass fragments, porcelain chips, slag, pebbles, moist								
7								3	
								2	
8	becomes wet							6	
								8	
9								4	
								8	
								22	
10	CLAY yellowish brown, some fine sand/silt, aggregate at top, damp	CL/ML							Bottom of Boring 1020

FIELD LOG OF BORING NO. B-1 SHEET 1 of 1

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION CP Bldg 109 21' east of NW-1		ELEVATION AND DATUM	
DRILLING AGENCY Kuilhaug	DRILLER Rod Furlow	DATE STARTED / DATE FINISHED 5/8/95	
DRILLING EQUIPMENT B53 Mobile drill		COMPLETION DEPTH 6.5	SAMPLER 2 & 2.5" CA ID
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BLAIR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 6.5 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No	SAMPLES: Below It	SAMPLES: Penetr. Resist (Blows/6 in.)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
2	Clayey gravel-Rubble -FILL- Brown with various color aggregate, pebbles up to 3cm, brick aggregate	GM/GC				X		8 15 20	Begin Drill 1025
4	Ash Rubble Rusty stains, various color aggregate, glass-brick-porcelain fragments, ash (white), slag up to 0.5cm, pebbles, damp					X		7 10 12 18	
6	CLAY Gray to dark gray, Medium stiff, damp, Medium dense, slight plasticity	CL						7 8 20	Bottom of hole 1045
8									

FIELD LOG OF BORING NO. B-2 SHEET 1 of 1

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION Bldg 109 5'W & 20'S of MW-1		ELEVATION AND DATUM	
DRILLING AGENCY Vilhaug	DRILLER Rodfurlaw	DATE STARTED / DATE FINISHED 5/8/95	
DRILLING EQUIPMENT B-53 Mobile Drill		COMPLETION DEPTH 12	SAMPLER 2½ 2.5" CA ID
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY Bilir	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 12 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No. / Hollow It	SAMPLES: Penetration Resist (Blows/6 in.)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
0	Clayey gravel – FILL – Gray to brown, various colors of aggregate, aggregate up to 2",	GM/GC						Begin drill 1055
2							12	
						X	14	
	Ash Rubble						30	poor recovery
	various color aggregate and matrix, clayey and sandy matrix, pebbles glass and metal fragments, some ash less percent Rubble than in B-1 and B-2)						11	
4							16	
							24	
						X	20	
							7	
6	becomes black, coal like matter, fine sand size, some aggregate						10	
	becomes as above					X	20	B-2-6 1115
							7	
							4	
8	becomes moist,						4	
						X	10	
	becomes wet, black						7	
							8	
10						X	11	
							6	
							5	
		CL				X	5	
	CLAY dark brown-gray brown, medium dense, stiff, slight plasticity						18	
12								Bottom 1130

FIELD LOG OF BORING NO. B-3 SHEET 1 of 1

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION Bldg 109 30' S of MW-1		ELEVATION AND DATUM	
DRILLING AGENCY Kuilwang	DRILLER Rod Furlow	DATE STARTED / DATE FINISHED 5/8/95	
DRILLING EQUIPMENT B-53 Mobile Drill		COMPLETION DEPTH 12	SAMPLER 2 1/2.5" CA ID
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BILIR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 12 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No	SAMPLES: Recov in	SAMPLES: Penetra Resist (Blows/6 in)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
0	Clayey gravel -FILL- gray to brown, various color aggregate dry, dense, sandy clayey matrix, nonplastic, pebbles up to 1cm (not like B-1, B-2) no ash detected	GM/GC				12			Begin Drill 1140
2	With more sand - silty					14			
	trace glass fragments, coal like fragments					20			Poor Recovery
4	becomes loose, some glass fragments and chunks up to 15cm					12			
						14			
						7			
6	becomes wet					8			
						2			
						2			
						3			
8						5			
						3			
						3			
						4			
	trace porcelain fragments up to 1cm					3			
10						4			
						4			
						6			
						6			
	Clay Brown to dark grey, moist-damp, medium dense, slight plasticity	CL				5			
12						5			
						5			Bottom @ 12

FIELD LOG OF BORING NO. B-4 SHEET 1 of 1

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 736

BORING LOCATION Bldg 109 20' W of MW-1		ELEVATION AND DATUM	
DRILLING AGENCY Kuljhavg	DRILLER Rod Furlow	DATE STARTED / DATE FINISHED	5/8/95
DRILLING EQUIPMENT B-53 Mobile drill		COMPLETION DEPTH 8.5	SAMPLER 2 1/2.5" CA ID
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BILIR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL	FROM 0 TO 8.5 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No	SAMPLES: Recov ft	SAMPLES: Penetro Resist (Blows/6 in.)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
2	FILL Gray to Brown, various color aggregate, brick fragments roots, pebbles up to 4cm, dense and loose (alternating). some weathered brick,							7	Begin 1245
								8	
								12	
								7	Poor Recovery
4								8	
								12	
								15	
								10	
6	becomes dark brown, loose, trace glass shards							10	
								10	
								4	
								7	
8	CLAY Brown to dark brown, medium stiff, some silt and sand	CL						9	
								15	Bottom 1300
10									

FIELD LOG OF BORING NO. B-5 SHEET 1 of 1

Woodward-Clyde Consultants

PROJECT NAME Camp Parks NO. 7136

BORING LOCATION 40'W of MW-1		ELEVATION AND DATUM	
DRILLING AGENCY Kvilhaug	DRILLER Bob Furlow	DATE STARTED 5/8/95 DATE FINISHED	
DRILLING EQUIPMENT Ho		COMPLETION DEPTH 6.5	SAMPLER 2½" I.D. CA
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BLR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland cement	FROM 0 TO 6.5 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No	SAMPLES: Recov ft	SAMPLES: Penetra Resist (Blows/6 in.)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
2	FILL clayey matrix w/ dark brown, slightly to high plasticity, Pebbles and cobbles up to 2", rock fragments (serpentinite), various color material	GM/GC						5 11 16	Begin Drill 1310
4								4 5 22 18	
6	CLAY/dark brown, some roots, med. dense, stiff, damp	CL						6 14 21	
8									Bottom 1330
10									

FIELD LOG OF BORING NO. B-6 SHEET 1 of 1

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION 50' W & 8' N of MW-1		ELEVATION AND DATUM	
DRILLING AGENCY Kuilhaug	DRILLER Red Furlow	DATE STARTED / DATE FINISHED 5/8/95	
DRILLING EQUIPMENT B-53 Mobile Drill		COMPLETION DEPTH 6.5	SAMPLER 2 1/2" OD
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BILIR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 6.5 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Penetrometer Data	SAMPLES: Type No	SAMPLES: Recov in	SAMPLES: Penetro Resist (Blows/6 in.)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
	FILL brown to dark brown, clay matrix, pebbles and aggregate up to 1"	GM/GC							Begin drill 1340
2	CLAY dark brown, stiff, dense, some pebbles	CL						14 11 13	
4	FILL? CLAYEY GRAVEL Various colors, matrix brown clay to orange-rusty silt, angular fragments of rock,	GM/GC						6 25 30 15	
6	CLAY as above, compacted structure	CL						7 12 16	Bottom 1400

FIELD LOG OF BORING NO. B-7 SHEET __ of __

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION		ELEVATION AND DATUM	
DRILLING AGENCY Kuihaug	DRILLER Rod Furlow	DATE STARTED 5/8/95 DATE FINISHED	
DRILLING EQUIPMENT B53 Mobile Drill		COMPLETION DEPTH 6.5	SAMPLER 2½ 2.5" ID CA
DRILLING METHOD Hollow Stem Auger	DRILL BIT 6¼	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BILIR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 6.5 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Piezometer Data	SAMPLES: Type No	SAMPLES: Recov ft	SAMPLES: Penetra Resist (Blows/6 in)	REMARKS (Drill Rate, Fluid loss, Odor, etc)
	FILL Clayey gravel, brown, aggregate up to 3cm	GM/GC							Begin Drill 1410
2	becomes damp, more fines (silt + clay)							8	
	becomes moist							11	
	becomes loose, dry							25	
	becomes dense, damp, more clay							25	
4								20	
								8	
								12	
	CLAY dark brown, damp, some pebbles, rooting, compacted structure	CL						7	
6								14	
								20	Bottom 1420

FIELD LOG OF BORING NO. B-8 SHEET 1 of 1

Woodward-Clyde Consultants PROJECT NAME Camp Parks NO. 7136

BORING LOCATION		ELEVATION AND DATUM	
DRILLING AGENCY KVILHAUG	DRILLER Rodfurlow	DATE STARTED / DATE FINISHED 5/8/95	
DRILLING EQUIPMENT B-53 Mobile Drill		COMPLETION DEPTH	SAMPLER 2½" CA ID
DRILLING METHOD	DRILL BIT 6"	NO. OF SAMPLES / DIST.	UNDIST.
SIZE AND TYPE OF CASING —		WATER ELEV. / FIRST	COMPL. / 24 HRS
TYPE OF PERFORATION —	FROM TO FT.	LOGGED BY BILIR	CHECKED BY:
SIZE AND TYPE OF PACK —	FROM TO FT.		
TYPE OF SEAL Portland Cement	FROM 0 TO 6.5 FT.		

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Piezometer Installation	Water Content	Pretrometer Data	SAMPLES: Type No	SAMPLES: Recov in	SAMPLES: Penetra Resist (Blows/6 in)	REMARKS (Drill Rate, Fluid loss, Odor, etc.)
2	Fill Clayey gravel to gravelly clay, various colors aggregate, compacted clay matrix, roots, pebbles upto 4cm	GM GC						7 9 10	Begin Drill 1430
4	clay dark brown, medium dense/stiff, some pebbles upto 1cm, slightly plastic.	CL						10 23 17 13	
6								5 10 17	B-9-5.5 1445
									Bottom 1445

FIELD LOG OF BORING NO. B-9 SHEET 1 of 1

APPENDIX D
"ASH" CHEMICAL ANALYTICAL DATA

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

October 11, 1994
QUANTERRA ENVIRONMENTAL SERVICES PROJECT NUMBER: 077945
PO/CONTRACT: NA

Jo Beth Folger
Woodward-Clyde Consultants
500 12th Street
Suite 100
Oakland, CA 94607-4014

Dear Ms. Folger:

This report contains the analytical results for the one ash sample which was received under chain of custody by Quanterra Environmental Services on 29 September 1994. These samples are associated with your Project Number 7136/100.

The case narrative is an integral part of this report.

Preliminary results were sent to you via facsimile on 11 October 1994.

If you have any questions, please call me at (916) 374-4414.

Sincerely,

Bonnie McNeill

Bonnie McNeill
Project Manager

mbw

Quanterra
Environmental
Services

TABLE OF CONTENTS

QUANTERRA ENVIRONMENTAL SERVICES PROJECT NUMBER 077945

Quanterra
Environmental Services

CASE NARRATIVE

QUANTERRA ENVIRONMENTAL SERVICES PROJECT NUMBER 077945

C.C.R. Selected Metals - Various Methods

The duplicate control sample (DCS) for the metals analyses yielded a relative percent recovery (RPD) for antimony (25%) which exceeded the control limit of 20%. However, the DCS pair showed acceptable accuracy as the percent recovery for each element was within the specified control limit. As the precision limits are advisory and do not represent historical limits based on actual data this batch was accepted.

There were no other anomalies associated with this report.

Quanterra
Environmental Services

QUANTERRA ENVIRONMENTAL SERVICES QUALITY ASSURANCE PROGRAM

Quanterra Environmental Services has implemented an extensive Quality Assurance (QA) program to ensure the production of scientifically sound, legally defensible data of known documental quality. A key element of this program is Quanterra's Laboratory Control Sample (LCS) system. Controlling lab operations with LCS (as opposed to matrix spike/matrix spike duplicate samples), allows the lab to differentiate between bias as a result of procedural errors versus bias due to matrix effects. The analyst can then identify and implement the appropriate corrective actions at the bench level, without waiting for extensive senior level review or costly and time-consuming sample re-analyses. The LCS program also provides our client with information to assess batch, and overall laboratory performance.

Laboratory Control Samples - (LCS)

Laboratory Control Samples (LCS) are well-characterized, laboratory generated samples used to monitor the laboratory's day-to-day performance of routine analytical methods. The results of the LCS are compared to well-defined laboratory acceptance criteria to determine whether the laboratory system is "in control". Three types of LCS are routinely analyzed: Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks. Each of these LCS are described below.

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand, sodium sulfate or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits.

Single Control Samples. An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g. metals or conventional analyses) a single control sample identical to the DCS serves as the control sample. An SCS is prepared for each sample lot. Accuracy is calculated identically to the DCS.

Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

Woodward-Clyde Consultants
500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. 7136/100

SAMPLERS: (Signature) Jo Beth Folger / Sharon J Sullivan

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method 8290	EPA Method 8270	EPA Method 6010/7000	EPA Method	Number of Containers
	14:13 -							
9/28/94	14:17	ASH-1	Ash/Soil	X	X	X		3

ANALYSES
High Resolution GC/MS Semi-Volatile Organics/EPA Illinois 17 Priority Pollutant Metals

REMARKS (Sample preservation, handling procedures, etc.)

← Composite Please

results to
Jo Beth
Folger
(510)874-3138
Fax(510)874-3268

Samples placed under blue ice in cool cooler

Standard T.A.T.

Sample Containers state three times; 14:13, 14:14 and 14:17. Samples rec'd in good condition 9/29/94

TOTAL NUMBER OF CONTAINERS: 3

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Jo Beth Folger	9/28 16:00				

METHOD OF SHIPMENT	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Federal Express				9/29/94 9:20

Polychlorinated Dioxins/Furans - Method 8290

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Woodward-Clyde Consultants
Client ID: Ash-1 Composite
Lab ID: 077945-0002-SA
Matrix: SOLID Sampled: 29 SEP 94 Received: 29 SEP 94
Authorized: 29 SEP 94 Prepared: 01 OCT 94 Analyzed: 05 OCT 94

Sample Amount 2.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	90	pg/g	--	
2,3,7,8-TCDF	4.4	pg/g	--	g
PeCDFs (total)	27	pg/g	--	
1,2,3,7,8-PeCDF	ND	pg/g	6.8	
2,3,4,7,8-PeCDF	ND	pg/g	7.3	
HxCDFs (total)	ND	pg/g	12	
1,2,3,4,7,8-HxCDF	ND	pg/g	11	
1,2,3,6,7,8-HxCDF	ND	pg/g	5.1	
2,3,4,6,7,8-HxCDF	ND	pg/g	5.1	
1,2,3,7,8,9-HxCDF	ND	pg/g	2.1	
HpCDFs (total)	49	pg/g	--	
1,2,3,4,6,7,8-HpCDF	34	pg/g	--	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	2.7	
OCDF	ND	pg/g	23	
Dioxins				
TCDDs (total)	ND	pg/g	3.3	
2,3,7,8-TCDD	ND	pg/g	3.3	
PeCDDs (total)	ND	pg/g	4.2	
1,2,3,7,8-PeCDD	ND	pg/g	4.2	
HxCDDs (total)	22	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	7.5	
1,2,3,6,7,8-HxCDD	ND	pg/g	5.9	
1,2,3,7,8,9-HxCDD	ND	pg/g	6.3	
HpCDDs (total)	160	pg/g	--	
1,2,3,4,6,7,8-HpCDD	94	pg/g	--	
OCDD	460	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara Approved By: Maricon Estrada

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Woodward-Clyde Consultants
Client ID: Ash-1 Composite
Lab ID: 077945-0002-SA
Matrix: SOLID Sampled: 29 SEP 94 Received: 29 SEP 94
Authorized: 29 SEP 94 Prepared: 01 OCT 94 Analyzed: 05 OCT 94

Sample Amount 2.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	89
13C-2,3,7,8-TCDD	83
13C-1,2,3,7,8-PeCDF	75
13C-1,2,3,7,8-PeCDD	75
13C-1,2,3,4,7,8-HxCDF	95
13C-1,2,3,6,7,8-HxCDD	93
13C-1,2,3,4,6,7,8-HpCDF	104
13C-1,2,3,4,6,7,8-HpCDD	100
13C-OCDD	115

Note g : 2,3,7,8-TCDF results have been confirmed on DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara Approved By: Maricon Estrada

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Woodward-Clyde Consultants
Client ID: Method Blank
Lab ID: 077945-0002-MB
Matrix: SOLID Sampled: NA Received: NA
Authorized: 29 SEP 94 Prepared: 01 OCT 94 Analyzed: 04 OCT 94

Sample Amount 2.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	1.2	
2,3,7,8-TCDF	ND	pg/g	1.2	
PeCDFs (total)	ND	pg/g	4.4	
1,2,3,7,8-PeCDF	ND	pg/g	4.3	
2,3,4,7,8-PeCDF	ND	pg/g	4.4	
HxCDFs (total)	ND	pg/g	1.7	
1,2,3,4,7,8-HxCDF	ND	pg/g	1.6	
1,2,3,6,7,8-HxCDF	ND	pg/g	1.6	
2,3,4,6,7,8-HxCDF	ND	pg/g	1.7	
1,2,3,7,8,9-HxCDF	ND	pg/g	1.6	
HpCDFs (total)	ND	pg/g	1.0	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.89	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	1.0	
OCDF	ND	pg/g	3.5	
Dioxins				
TCDDs (total)	ND	pg/g	1.9	
2,3,7,8-TCDD	ND	pg/g	1.9	
PeCDDs (total)	ND	pg/g	4.6	
1,2,3,7,8-PeCDD	ND	pg/g	4.6	
HxCDDs (total)	ND	pg/g	5.5	
1,2,3,4,7,8-HxCDD	ND	pg/g	5.5	
1,2,3,6,7,8-HxCDD	ND	pg/g	4.4	
1,2,3,7,8,9-HxCDD	ND	pg/g	4.7	
HpCDDs (total)	ND	pg/g	2.8	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	2.8	
OCDD	ND	pg/g	3.9	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara Approved By: Maricon Estrada

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Woodward-Clyde Consultants
Client ID: Method Blank
Lab ID: 077945-0002-MB
Matrix: SOLID
Authorized: 29 SEP 94

Sampled: NA
Prepared: 01 OCT 94

Received: NA
Analyzed: 04 OCT 94

Sample Amount 2.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	58
13C-2,3,7,8-TCDD	57
13C-1,2,3,7,8-PeCDF	54
13C-1,2,3,7,8-PeCDD	54
13C-1,2,3,4,7,8-HxCDF	66
13C-1,2,3,6,7,8-HxCDD	60
13C-1,2,3,4,6,7,8-HpCDF	64
13C-1,2,3,4,6,7,8-HpCDD	61
13C-OCDD	55

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara

Approved By: Maricon Estrada

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Advanced Technology Group - High Resolution
Project: 077945

Category: 8290-HR-S C14-C18 D/F plus 2378-substituted isomers by Method 8290
Matrix: SOLID
QC Lot: 08 SEP 94-B QC Run: 13 SEP 94-C
Concentration Units: pg/uL

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) LCS	Accuracy(%) Limits
2,3,7,8-TCDF	10.0	8.35	84	60-140
1,2,3,7,8-PeCDF	25.0	21.8	87	60-140
2,3,4,7,8-PeCDF	25.0	22.8	91	60-140
1,2,3,4,7,8-HxCDF	25.0	22.5	90	60-140
1,2,3,6,7,8-HxCDF	25.0	22.7	91	60-140
2,3,4,6,7,8-HxCDF	25.0	22.5	90	60-140
1,2,3,7,8,9-HxCDF	25.0	24.0	96	60-140
1,2,3,4,6,7,8-HpCDF	25.0	22.6	90	60-140
1,2,3,4,7,8,9-HpCDF	25.0	27.2	109	60-140
OCDF	50.0	50.5	101	60-140
2,3,7,8-TCDD	10.0	9.81	98	60-140
1,2,3,7,8-PeCDD	25.0	23.4	94	60-140
1,2,3,4,7,8-HxCDD	25.0	23.0	92	60-140
1,2,3,6,7,8-HxCDD	25.0	23.1	93	60-140
1,2,3,7,8,9-HxCDD	25.0	24.3	97	60-140
1,2,3,4,6,7,8-HpCDD	25.0	21.6	86	60-140
OCDD	50.0	44.7	89	60-140
13C-2,3,7,8-TCDF	50.0	48.9	98	40-135
13C-1,2,3,7,8-PeCDF	50.0	45.8	92	40-135
13C-1,2,3,4,7,8-HxCDF	125	104	83	40-135
13C-1,2,3,4,6,7,8-HpCDF	125	82.3	66	40-135
13C-2,3,7,8-TCDD	50.0	42.3	85	40-135
13C-1,2,3,7,8-PeCDD	50.0	47.6	95	40-135
13C-1,2,3,6,7,8-HxCDD	125	107	85	40-135
13C-1,2,3,4,6,7,8-HpCDD	125	97.9	78	40-135
13C-OCDD	250	126	51	40-135

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Semivolatile Organics - Method 8270

Quanterra
Environmental Services

Semivolatile Organics
Target Compound List (TCL)
Method 8270

Client Name: Woodward-Clyde Consultants
Client ID: Ash-1 Composite
Lab ID: 077945-0002-SA
Matrix: SOLID
Authorized: 29 SEP 94
Sampled: 29 SEP 94
Prepared: 07 OCT 94
Received: 29 SEP 94
Analyzed: 10 OCT 94

Parameter	Result	Wet wt. Units	Reporting Limit
Acenaphthene	ND	ug/kg	330
Acenaphthylene	ND	ug/kg	330
Anthracene	ND	ug/kg	330
Benzo(a)anthracene	ND	ug/kg	330
Benzo(a)pyrene	ND	ug/kg	330
Benzo(b)fluoranthene	ND	ug/kg	330
Benzo(g,h,i)perylene	ND	ug/kg	330
Benzo(k)fluoranthene	ND	ug/kg	330
Benzoic acid	ND	ug/kg	1600
Benzyl alcohol	ND	ug/kg	330
4-Bromophenyl phenyl ether	ND	ug/kg	330
Butyl benzyl phthalate	ND	ug/kg	330
4-Chloroaniline	ND	ug/kg	330
bis(2-Chloroethoxy)-methane	ND	ug/kg	330
bis(2-Chloroethyl) ether	ND	ug/kg	330
2,2'-Oxybis(1-chloropropane)	ND	ug/kg	330
4-Chloro-3-methylphenol	ND	ug/kg	330
2-Chloronaphthalene	ND	ug/kg	330
2-Chlorophenol	ND	ug/kg	330
4-Chlorophenyl phenyl ether	ND	ug/kg	330
Chrysene	ND	ug/kg	330
Di-n-butyl phthalate	ND	ug/kg	330
Dibenz(a,h)anthracene	ND	ug/kg	330
Dibenzofuran	ND	ug/kg	330
1,2-Dichlorobenzene	ND	ug/kg	330
1,3-Dichlorobenzene	ND	ug/kg	330
1,4-Dichlorobenzene	ND	ug/kg	330
3,3'-Dichlorobenzidine	ND	ug/kg	660
2,4-Dichlorophenol	ND	ug/kg	330
Diethyl phthalate	ND	ug/kg	330
2,4-Dimethylphenol	ND	ug/kg	330
Dimethyl phthalate	ND	ug/kg	330
4,6-Dinitro-2-methylphenol	ND	ug/kg	1600
2,4-Dinitrophenol	ND	ug/kg	1600
2,4-Dinitrotoluene	ND	ug/kg	330
2,6-Dinitrotoluene	ND	ug/kg	330
Di-n-octyl phthalate	ND	ug/kg	330

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: David Nishimura
Approved By: Pam Niiya

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

Semivolatile Organics
Target Compound List (TCL)
Method 8270

Client Name: Woodward-Clyde Consultants
Client ID: Ash-1 Composite
Lab ID: 077945-0002-SA
Matrix: SOLID
Sampled: 29 SEP 94
Received: 29 SEP 94
Authorized: 29 SEP 94
Prepared: 07 OCT 94
Analyzed: 10 OCT 94

Parameter	Result	Wet wt. Units	Reporting Limit
bis(2-Ethylhexyl)-phthalate	ND	ug/kg	330
Fluoranthene	ND	ug/kg	330
Fluorene	ND	ug/kg	330
Hexachlorobenzene	ND	ug/kg	330
Hexachlorobutadiene	ND	ug/kg	330
Hexachlorocyclopentadiene	ND	ug/kg	330
Hexachloroethane	ND	ug/kg	330
Indeno(1,2,3-cd)pyrene	ND	ug/kg	330
Isophorone	ND	ug/kg	330
2-Methylnaphthalene	ND	ug/kg	330
2-Methylphenol	ND	ug/kg	330
4-Methylphenol	ND	ug/kg	330
Naphthalene	ND	ug/kg	330
2-Nitroaniline	ND	ug/kg	1600
3-Nitroaniline	ND	ug/kg	1600
4-Nitroaniline	ND	ug/kg	1600
Nitrobenzene	ND	ug/kg	330
2-Nitrophenol	ND	ug/kg	330
4-Nitrophenol	ND	ug/kg	1600
N-Nitrosodiphenylamine	ND	ug/kg	330
N-Nitroso-di-n-propylamine	ND	ug/kg	330
Pentachlorophenol	ND	ug/kg	1600
Phenanthrene	ND	ug/kg	330
Phenol	ND	ug/kg	330
Pyrene	ND	ug/kg	330
1,2,4-Trichlorobenzene	ND	ug/kg	330
2,4,5-Trichlorophenol	ND	ug/kg	330
2,4,6-Trichlorophenol	ND	ug/kg	330

Surrogate	Recovery	
Nitrobenzene-d5	95	%
2-Fluorobiphenyl	93	%
Terphenyl-d14	86	%
Phenol-d5	102	%
2-Fluorophenol	82	%
2,4,6-Tribromophenol	88	%

ND = Not detected
NA = Not applicable

Reported By: David Nishimura
Approved By: Pam Niiya

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
077945-0002-SA	SOIL	8270-S	05 OCT 94-36A	05 OCT 94-16A

Quanterra
Environmental Services

METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: 8270CPL-TCL-S
Matrix: SOLID
QC Lot: 05 OCT 94-36A QC Run: 05 OCT 94-16A

Analyte	Result	Units	Reporting Limit
Acenaphthene	ND	ug/kg	330
Acenaphthylene	ND	ug/kg	330
Anthracene	ND	ug/kg	330
Benzo(a)anthracene	ND	ug/kg	330
Benzo(a)pyrene	ND	ug/kg	330
Benzo(b)fluoranthene	ND	ug/kg	330
Benzo(g,h,i)perylene	ND	ug/kg	330
Benzo(k)fluoranthene	ND	ug/kg	330
Benzoic acid	ND	ug/kg	1600
Benzyl alcohol	ND	ug/kg	330
4-Bromophenyl phenyl ether	ND	ug/kg	330
Butyl benzyl phthalate	ND	ug/kg	330
4-Chloroaniline	ND	ug/kg	330
bis(2-Chloroethoxy)-methane	ND	ug/kg	330
bis(2-Chloroethyl) ether	ND	ug/kg	330
2,2'-Oxybis(1-chloropropane)	ND	ug/kg	330
4-Chloro-3-methylphenol	ND	ug/kg	330
2-Chloronaphthalene	ND	ug/kg	330
2-Chlorophenol	ND	ug/kg	330
4-Chlorophenyl phenyl ether	ND	ug/kg	330
Chrysene	ND	ug/kg	330
Di-n-butyl phthalate	ND	ug/kg	330
Dibenz(a,h)anthracene	ND	ug/kg	330
Dibenzofuran	ND	ug/kg	330
1,2-Dichlorobenzene	ND	ug/kg	330
1,3-Dichlorobenzene	ND	ug/kg	330
1,4-Dichlorobenzene	ND	ug/kg	330
3,3'-Dichlorobenzidine	ND	ug/kg	660
2,4-Dichlorophenol	ND	ug/kg	330
Diethyl phthalate	ND	ug/kg	330
2,4-Dimethylphenol	ND	ug/kg	330
Dimethyl phthalate	ND	ug/kg	330
4,6-Dinitro-2-methylphenol	ND	ug/kg	1600
2,4-Dinitrophenol	ND	ug/kg	1600
2,4-Dinitrotoluene	ND	ug/kg	330
2,6-Dinitrotoluene	ND	ug/kg	330
Di-n-octyl phthalate	ND	ug/kg	330

Quanterra
Environmental Services

METHOD BLANK REPORT
Semivolatile Organics by GC/MS (cont.)

Test: 8270CPL-TCL-S
Matrix: SOLID
QC Lot: 05 OCT 94-36A QC Run: 05 OCT 94-16A

Analyte	Result	Units	Reporting Limit
bis(2-Ethylhexyl)-phthalate	ND	ug/kg	330
Fluoranthene	ND	ug/kg	330
Fluorene	ND	ug/kg	330
Hexachlorobenzene	ND	ug/kg	330
Hexachlorobutadiene	ND	ug/kg	330
Hexachlorocyclopentadiene	ND	ug/kg	330
Hexachloroethane	ND	ug/kg	330
Indeno(1,2,3-cd)pyrene	ND	ug/kg	330
Isophorone	ND	ug/kg	330
2-Methylnaphthalene	ND	ug/kg	330
2-Methylphenol	ND	ug/kg	330
4-Methylphenol	ND	ug/kg	330
Naphthalene	ND	ug/kg	330
2-Nitroaniline	ND	ug/kg	1600
3-Nitroaniline	ND	ug/kg	1600
4-Nitroaniline	ND	ug/kg	1600
Nitrobenzene	ND	ug/kg	330
2-Nitrophenol	ND	ug/kg	330
4-Nitrophenol	ND	ug/kg	1600
N-Nitrosodiphenylamine	ND	ug/kg	330
N-Nitroso-di-n-propylamine	ND	ug/kg	330
Pentachlorophenol	ND	ug/kg	1600
Phenanthrene	ND	ug/kg	330
Phenol	ND	ug/kg	330
Pyrene	ND	ug/kg	330
1,2,4-Trichlorobenzene	ND	ug/kg	330
2,4,5-Trichlorophenol	ND	ug/kg	330
2,4,6-Trichlorophenol	ND	ug/kg	330

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Limits	Precision (RPD) DCS	Limit
Category: 8270-S								
Matrix: SOIL								
QC Lot: 05 OCT 94-36A								
Concentration Units: ug/kg								
Phenol	3340	2790	2650	2720	81	40-119	5.1	17.0
2-Chlorophenol	3340	2860	2750	2800	84	39-119	3.9	18.0
1,4-Dichlorobenzene	1660	1360	1300	1330	80	36-111	4.5	19.0
N-Nitroso-di-n-propylamine	1660	1490	1400	1440	87	35-117	6.2	17.0
1,2,4-Trichlorobenzene	1660	1420	1330	1380	83	36-107	6.5	17.0
4-Chloro-3-methylphenol	3340	2800	2630	2720	81	41-122	6.3	13.0
Acenaphthene	1660	1480	1440	1460	88	36-111	2.7	21.0
2,4-Dinitrotoluene	1660	1480	1380	1430	86	43-114	7.0	17.0
4-Nitrophenol	3340	2320	2220	2270	68	45-130	4.4	18.0
Pentachlorophenol	3340	1880	2120	2000	60	39-119	12	26.0
Pyrene	1660	1280	1230	1260	76	35-142	4.0	15.0

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 8270-S				
Matrix: SOIL				
QC Lot: 05 OCT 94-36A QC Run: 05 OCT 94-16A				
Concentration Units: ug				
Nitrobenzene-d5	50.0	46.7	93	35-114
2-Fluorobiphenyl	50.0	46.9	94	39-115
Terphenyl-d14	50.0	50.3	101	40-127
2-Fluorophenol	100	91.3	91	35-121
Phenol-d5	100	104	104	35-113
2,4,6-Tribromophenol	100	82.9	83	24-112

Calculations are performed before rounding to avoid round-off errors in calculated results.

C.C.R. Selected Metals - Various Methods

Quanterra
Environmental Services

C.C.R. METALS
California Title 22 (Title 26) Protocol
TTLC (Total) Data Sheet

Client Name: Woodward-Clyde Consultants
Client ID: Ash-1 Composite
Lab ID: 077945-0002-SA
Matrix: SOLID — Sampled: 29 SEP 94 — Received: 29 SEP 94
Authorized: 29 SEP 94 — Prepared: See Below — Analyzed: See Below

Parameter	Result	Wet wt. Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Antimony	ND	mg/kg	30.0	6010	04 OCT 94	06 OCT 94	G
Arsenic	7.6	mg/kg	2.5	7060	04 OCT 94	10 OCT 94	G
Barium	1220	mg/kg	5.0	6010	04 OCT 94	06 OCT 94	G
Beryllium	ND	mg/kg	1.0	6010	04 OCT 94	06 OCT 94	G
Cadmium	19.2	mg/kg	2.5	6010	04 OCT 94	06 OCT 94	G
Chromium	80.1	mg/kg	5.0	6010	04 OCT 94	06 OCT 94	G
Cobalt	14.2	mg/kg	5.0	6010	04 OCT 94	06 OCT 94	G
Copper	501	mg/kg	10.0	6010	04 OCT 94	06 OCT 94	G
Lead	1190	mg/kg	25.0	6010	04 OCT 94	06 OCT 94	G
Mercury	ND	mg/kg	0.10	7471	05 OCT 94	06 OCT 94	
Molybdenum	ND	mg/kg	10.0	6010	04 OCT 94	06 OCT 94	G
Nickel	72.0	mg/kg	20.0	6010	04 OCT 94	06 OCT 94	G
Selenium	ND	mg/kg	0.50	7740	04 OCT 94	10 OCT 94	q
Silver	8.3	mg/kg	5.0	6010	04 OCT 94	06 OCT 94	G
Thallium	ND	mg/kg	0.50	7841	04 OCT 94	07 OCT 94	
Vanadium	29.9	mg/kg	5.0	6010	04 OCT 94	06 OCT 94	G
Zinc	1540	mg/kg	10.0	6010	04 OCT 94	06 OCT 94	G

Note G : Reporting Limit raised due to matrix interference.

Note q : Post-digestion spike recovery fell between 40% and 85% due to matrix interference.

ND = Not detected
NA = Not applicable

Reported By: Allan Wong — Approved By: Darlene Flores

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
077945-0002-SA	SOIL	ICP-S	04 OCT 94-Q	04 OCT 94-Q
077945-0002-SA	SOIL	AS-FAA-S	04 OCT 94-Q	04 OCT 94-Q
077945-0002-SA	SOIL	SE-FAA-S	04 OCT 94-Q	04 OCT 94-Q
077945-0002-SA	SOIL	TL-FAA-S	04 OCT 94-Q	04 OCT 94-Q
077945-0002-SA	SOIL	HG-CVAA-S	04 OCT 94-J	04 OCT 94-J

Quanterra
Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-CAMT-LO-S			
Matrix: SOLID			
QC Lot: 04 OCT 94-Q QC Run: 04 OCT 94-Q			
Antimony	ND	mg/kg	6.0
Barium	ND	mg/kg	1.0
Beryllium	ND	mg/kg	0.20
Cadmium	ND	mg/kg	0.50
Chromium	ND	mg/kg	1.0
Cobalt	ND	mg/kg	1.0
Copper	ND	mg/kg	2.0
Lead	ND	mg/kg	0.050
Molybdenum	ND	mg/kg	2.0
Nickel	ND	mg/kg	4.0
Silver	ND	mg/kg	1.0
Vanadium	ND	mg/kg	1.0
Zinc	ND	mg/kg	2.0
Test: AS-FAA-CAMT-LO-S			
Matrix: SOLID			
QC Lot: 04 OCT 94-Q QC Run: 04 OCT 94-Q			
Arsenic	ND	mg/kg	0.50
Test: SE-FAA-CAMT-LO-S			
Matrix: SOLID			
QC Lot: 04 OCT 94-Q QC Run: 04 OCT 94-Q			
Selenium	ND	mg/kg	0.50
Test: TL-FAA-CAMT-LO-S			
Matrix: SOLID			
QC Lot: 04 OCT 94-Q QC Run: 04 OCT 94-Q			
Thallium	ND	mg/kg	0.50

Quanterra
Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation (cont.)

Analyte	Result	Units	Reporting Limit
Test: HG-CVAA-CAMT-LO-S			
Matrix: SOLID			
QC Lot: 04 OCT 94-J QC Run: 04 OCT 94-J			
Mercury	ND	mg/kg	0.10

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Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-S Matrix: SOIL QC Lot: 04 OCT 94-Q Concentration Units: mg/kg								
Aluminum	3650	3890	4250	4070	111	52-152	8.8	20.0
Antimony	75.0	74.0	95.0	84.5	113	42-466	25*	20.0
Arsenic	72.1	76.4	71.6	74.0	103	48-152	6.4	20.0
Barium	64.8	66.4	69.7	68.1	105	69-135	4.9	20.0
Beryllium	26.7	28.3	29.0	28.6	107	63-138	2.4	20.0
Boron	NA	NA	NA	NC	NC	50-150	NC	20.0
Cadmium	61.6	60.6	64.0	62.3	101	58-139	5.4	20.0
Calcium	2330	2360	2460	2410	103	67-136	4.5	20.0
Chromium	44.1	45.6	48.7	47.2	107	58-138	6.6	20.0
Cobalt	177	181	190	185	105	63-138	4.8	20.0
Copper	78.1	78.7	81.6	80.1	103	61-140	3.5	20.0
Iron	7360	8350	9230	8790	119	66-149	9.9	20.0
Lead	50.9	51.7	53.9	52.8	104	53-139	4.1	20.0
Lithium	NA	NA	NA	NC	NC	50-150	NC	20.0
Magnesium	2550	2590	2750	2670	105	63-141	6.0	20.0
Manganese	141	143	150	147	104	68-134	4.8	20.0
Molybdenum	104	106	112	109	105	61-141	4.9	20.0
Nickel	110	115	120	118	107	59-142	4.4	20.0
Potassium	3310	3560	3780	3670	111	63-132	5.8	20.0
Selenium	74.2	77.9	79.1	78.5	106	48-145	1.5	20.0
Silicon	NA	NA	NA	NC	NC	0- 0	NC	0.0
Silver	71.7	69.2	73.3	71.2	99	40-146	5.8	20.0
Sodium	346	336	363	349	101	52-146	7.8	20.0
Thallium	64.1	61.5	64.8	63.2	99	48-152	5.2	20.0
Titanium	158.1	220	252	236	149	23-254	14	20.0
Vanadium	83.0	86.7	90.8	88.7	107	67-136	4.6	20.0
Zinc	78.2	76.8	80.9	78.8	101	57-152	5.2	20.0
Category: AS-FAA-S Matrix: SOIL QC Lot: 04 OCT 94-Q Concentration Units: mg/kg								
Arsenic	72.1	104	97.7	101	140	48-152	6.2	20.0

* = RPD outside QC Limits
ND = Not detected.
NC = Not calculated, calculation not applicable.
NA = Not applicable.

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quanterra
Environmental Services

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: SE-FAA-S Matrix: SOIL QC Lot: 04 OCT 94-Q Concentration Units: mg/kg								
Selenium	74.2	104	98.4	101	136	48-145	5.5	20.0
Category: TL-FAA-S Matrix: SOIL QC Lot: 04 OCT 94-Q Concentration Units: mg/kg								
Thallium	64.1	69.5	66.6	68.0	106	48-152	4.3	20.0
Category: HG-CVAA-S Matrix: SOIL QC Lot: 04 OCT 94-J Concentration Units: mg/kg								
Mercury	32.0	33.8	31.4	32.6	102	53-150	7.6	20.0

Calculations are performed before rounding to avoid round-off errors in calculated results.

APPENDIX E
SOIL CHEMICAL ANALYTICAL DATA

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9412134
Date Received : 12/13/94
Project ID : 7137
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9412134- 3	MW-2-15	SOIL	12/12/94	PP-MET

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9412134
Date Received : 12/13/94
Project ID : 7137
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

QA/QC SUMMARY :

- All holding times have been met for the analyses reported in this section.
- Matrix spike recoveries for sample MW-2-15 for antimony were outside Anametrix control limits, possibly due to interferences encountered during the sample preparation. A post digestion spike was performed, and the result was within control limits, indicating no spectral interferences.

12/22/94
Department Supervisor Date

12/22/94
Chemist Date

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Anametrix Sample ID: **9412134-03**
Client Sample ID: **MW-2-15**
Client Project Number: **7137**
Matrix: **SOIL**

Date Sampled: **12/12/94**
Analyst: SC
Supervisor: MJ

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	6.0	**ND**	
Arsenic	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	1.0	**3.9**	
Beryllium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	0.50	**ND**	
Cadmium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	0.50	**ND**	
Chromium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	1.0	**15.0**	
Copper	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	2.5	**10.7**	
Lead	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	0.30	**4.3**	
Mercury	3050A	6010A	HGA1	12/14/94	12/15/94	1	mg/Kg	0.10	**ND**	
Nickel	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	4.0	**19.4**	
Selenium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	0.50	**ND**	
Silver	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	1.0	**ND**	
Thallium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	1.0	**ND**	
Zinc	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	2.0	**23.4**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
METHOD BLANK REPORT

Anametrix Sample ID: **BD144SA**
Anametrix WO #: **9412134**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	6.0	ND	
Arsenic	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	1.0	ND	
Beryllium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	0.50	ND	
Cadmium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	0.50	ND	
Chromium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	1.0	ND	
Copper	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	2.5	ND	
Lead	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	0.30	ND	
Mercury	3050A	6010A	HGA1	12/14/94	12/15/94	1	mg/Kg	0.10	ND	
Nickel	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	4.0	ND	
Selenium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	0.50	ND	
Silver	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	1.0	ND	
Thallium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	1.0	ND	
Zinc	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	2.0	ND	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
SAMPLE DUPLICATE REPORT

Anametrix Sample ID: **9412134-03D**
Client Sample ID: **MW-2-15**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analyt. Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Sample Conc.	Sample Duplicate Conc.	RPD	Q
Antimony	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	ND	ND	N/A	
Arsenic	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	3.9	3.8	2.6	
Beryllium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	ND	ND	N/A	
Cadmium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	ND	ND	N/A	
Chromium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	15.0	17.7	16.5	
Copper	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	10.7	12.0	11.5	
Lead	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	4.3	4.2	2.4	
Mercury	3050A	6010A	HGA1	12/14/94	12/15/94	1	mg/Kg	ND	ND	N/A	
Nickel	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	19.4	21.8	11.7	
Selenium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	ND	ND	N/A	
Silver	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	ND	ND	N/A	
Thallium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	ND	ND	N/A	
Zinc	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	23.4	26.6	12.8	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
MATRIX SPIKE REPORT

Anametrix. Sample ID: **9412134-03MS,MD**
Client Sample ID: **MW-2-15**
Client Proj. Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Analyt. Method	Instr. I.D.	Date Prepared	Date Analyzed	Units	Spike Amount	Sample Conc.	Matrix Spike Conc.	% Rec.	Matrix Sp. Dup. Conc.	% Rec.	RPD	Q
Antimony	6010A	ICP1	12/14/94	12/20/94	mg/Kg	50.0	0.0	12.3	**24.6**	14.1	**28.2**	**13.6**	U
Arsenic	6010A	ICP2	12/14/94	12/21/94	mg/Kg	10.0	3.9	13.8	**99.0**	13.6	**97.0**	**1.5**	
Beryllium	6010A	ICP1	12/14/94	12/20/94	mg/Kg	5.0	0.0	5.1	**102**	5.0	**100**	**2.0**	U
Cadmium	6010A	ICP1	12/14/94	12/20/94	mg/Kg	5.0	0.0	4.3	**86.0**	4.3	**86.0**	**0.0**	U
Chromium	6010A	ICP1	12/14/94	12/20/94	mg/Kg	20.0	15.0	38.5	**118**	34.9	**99.5**	**9.8**	
Copper	6010A	ICP1	12/14/94	12/20/94	mg/Kg	25.0	10.7	36.7	**104**	34.9	**96.8**	**5.0**	
Lead	6010A	ICP2	12/14/94	12/21/94	mg/Kg	50.0	4.3	52.8	**97.0**	52.2	**95.8**	**1.1**	
Mercury	6010A	HGA1	12/14/94	12/15/94	mg/Kg	0.50	0.0	0.48	**96.0**	0.48	**96.0**	**0.0**	U
Nickel	6010A	ICP1	12/14/94	12/20/94	mg/Kg	50.0	19.4	69.7	**101**	69.6	**100**	**0.1**	
Selenium	6010A	ICP2	12/14/94	12/21/94	mg/Kg	5.0	0.0	5.1	**102**	5.1	**102**	**0.0**	U
Silver	6010A	ICP1	12/14/94	12/20/94	mg/Kg	5.0	0.0	4.1	**82.0**	4.1	**82.0**	**0.0**	U
Thallium	6010A	ICP2	12/14/94	12/21/94	mg/Kg	10.0	0.0	8.9	**89.0**	9.2	**92.0**	**3.3**	U
Zinc	6010A	ICP1	12/14/94	12/20/94	mg/Kg	50.0	23.4	72.1	**97.4**	67.6	**88.4**	**6.4**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

POST DIGESTION SPIKE REPORT

Anametrix Sample ID: **9412134-03PDS**
Client Sample ID: **MW-2-15**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Analyt. Method	Instr. ID	Date Prepared	Date Analyzed	D.F.	Units	Spike Amount	Sample Conc.	PDS Conc.	% Rec.	Q
Antimony	6010A	ICP1	12/21/94	12/21/94	1	mg/Kg	25.0	0.0	22.3	89.2	U

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

LABORATORY CONTROL SAMPLE REPORT

Lab. Control Sample ID: **LD144SA**
Anametrix WO #: **9412134**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Spike Amount	LCS Results	% Recovery	Q
Antimony	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	50.0	43.5	**87.0**	
Arsenic	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	10.0	10.0	**100**	
Beryllium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	5.0	4.7	**94.0**	
Cadmium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	5.0	4.2	**84.0**	
Chromium	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	20.0	18.0	**90.0**	
Copper	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	25.0	22.5	**90.0**	
Lead	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	50.0	50.7	**101**	
Mercury	3050A	6010A	HGA1	12/14/94	12/15/94	1	mg/Kg	0.50	0.50	**100**	
Nickel	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	50.0	45.4	**90.8**	
Selenium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	5.0	5.2	**104**	
Silver	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	5.0	4.3	**86.0**	
Thallium	3050A	6010A	ICP2	12/14/94	12/21/94	1	mg/Kg	10.0	10.1	**101**	
Zinc	3050A	6010A	ICP1	12/14/94	12/20/94	1	mg/Kg	50.0	41.5	**83.0**	

COMMENTS:

Inchcape Testing Services
Anametrix Laboratories

SAMPLE RECEIVING CHECKLIST

WORKORDER NUMBER: 9417134 CLIENT PROJECT ID: 7137

COOLER

Shipping slip (airbill, etc.) present?	YES	NO	(N/A)
If YES, enter carrier name and airbill # : ____			
Custody Seal on the outside of cooler?	YES	NO	(N/A)
Condition: INTACT ____ BROKEN ____			
Temperature of sample (s) within range?	(YES)	NO	N/A
List temperature of cooler (s): 2°C			

SAMPLES

Chain of custody seal present for each container?	YES	NO	(N/A)
Condition: INTACT ____ BROKEN ____			
Samples arrived within holding time?	(YES)	NO	N/A
Samples in proper containers for methods requested?	(YES)	NO	
Condition of containers: INTACT ✓ BROKEN ____			
If NO, were samples transferred to proper container? ____			
Were VOA containers received with zero headspace?	YES	NO	(N/A)
If NO, was it noted on the chain of custody? ____			
Were container labels complete? (ID, date, time preservative, etc.)	(YES)	NO	
Were samples preserved with the proper preservative?	YES	NO	(N/A)
If NO, was the proper preservative added at time of receipt? ____			
pH check of samples required at time of receipt?	YES	(NO)	
If YES, pH checked and recorded by: ____			
Sufficient amount of sample received for methods requested?	(YES)	NO	
If NO, has the client or lab project manager been notified? ____			
Field blanks received with sample batch? # of Sets: ____	YES	NO	(N/A)
Trip blanks received with sample batch? # of Sets: ____	YES	NO	(N/A)

CHAIN OF CUSTODY

Chain of custody received with samples?	(YES)	NO
Has it been filled out completely and in ink?	(YES)	NO
Sample ID's on chain of custody agree with container labels?	(YES)	NO
Number of containers indicated on chain of custody agree with number received?	(YES)	NO
Analysis methods clearly specified?	(YES)	NO
Sampling date and time indicated?	(YES)	NO
Proper signatures of sampler, courier, sample custodian in appropriate place? with time and date?	(YES)	NO
Turnaround time? REGULAR ✓ RUSH ____		

Any NO response and/or any "BROKEN" that was checked must be detailed in the Corrective Action Form.

Sample Custodian: [illegible] Date: 12-13-94 Project Manager: [illegible] Date: 12/13/94

ANAMETRIX REPORT DESCRIPTION
INORGANICS

Analytical Data Report (ADR)

The ADR contains tabulated results for inorganic analytes. All field samples, QC samples and blanks were prepared and analyzed according to procedures in the following references:

- "Test Methods for Evaluating Solid Waste," SW-846, EPA, 3rd Edition, November 1986.
- "Methods for Chemical Analysis of Water and Wastes," EPA, 3rd Edition, 1983.
- CCR Title 22, Section 66261, Appendix II, California Waste Extraction Test.
- CCR Title 22, Section 66261, Appendix XI, Organic Lead.
- "Standard Methods for the Examination of Water and Wastewater," APHA, AWWA, WEF, 18th Edition, 1992.
- USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, ILM02.1, 1991.

Matrix Spike Report (MSR)

The MSR summarizes percent recovery and relative percent difference information for matrix spikes and matrix spike duplicates. This information is a statement of both accuracy and precision. MSRs may not be provided with all analytical reports. Anametrix control limit for MSR is 75-125% with 25% for RPD limits, except for Method 6010A, which is 80-120% with 25% RPD limits.

Laboratory Control Sample Report (LCSR)

The LCSR summarizes percent recovery information for laboratory control spikes on reagent water or soil. This information is a statement of performance for the method, i.e., the samples are properly prepared and analyzed according to the applicable methods. Anametrix control limit for LCSR is 80-120%.

Method Blank Report (MBR)

The MBR summarizes quality control information for reagents used in preparing samples. The absolute value of each analyte measured in the method blank should be below the method reporting limit for that analyte.

Post Digestion Spike Report (PDSR)

The PDSR summarizes percent recovery information for post digestion spikes. A post digestion spike is performed for a particular analyte if the matrix spike recovery is outside of established control limits. Any percent recovery for a post digestion spike outside of established limits for an analyte indicates probable matrix effects and interferences for that analyte. Anametrix control limit for PDSR is 75-125%.

Qualifiers (Q)

Anametrix uses several data qualifiers in inorganic reports. These qualifiers give additional information on the analytes reported. The following is a list of qualifiers and their meanings:

- I - Sample was analyzed at the stated dilution due to spectral interferences.
- U - Analyte concentration was below the method reporting limit. For matrix and post digestion spike reports, a value of "0.0" is entered for calculation of the percent recovery.
- B - Sample concentration was below the reporting limit but above the instrument detection limit. Result is entered for calculation of the percent recovery only.
- H - Spike percent recovery was outside of Anametrix control limits due to interferences from relatively high concentration level of the analyte in the unspiked sample.
- L - Reporting limit was increased to compensate for background absorbances or matrix interferences.

Comment Codes

In addition to qualifiers, the following codes are used in the comment section of all reports to give additional information about sample preparation methods:

- A - Sample was prepared for silver based on the silver digestion method developed by the Southern California Laboratory, Department of Health Services, "Acid Digestion for Sediments, Sludges, Soils and Solid Wastes. A Proposed Alternative to EPA SW846, Method 3050." Environmental Science and Technology, 1989, 23, 898-900.
- T - Spikes were prepared after extraction by the Toxicity Characteristic Leaching Procedure (TCLP).
- C - Spikes were prepared after extraction by the California Waste Extraction Test (CWET) method.
- D - Reported results are dissolved, not total, metals.

Reporting Conventions

Analytical values reported are gross values, i.e., <u>not</u> corrected for method blank contamination. Solid matrices are reported on a wet weight basis, unless specifically requested otherwise.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9412222
Date Received : 12/21/94
Project ID : 7137
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9412222- 3	MW-3-15	SOIL	12/20/94	T 22-MET
9412222- 6	MW-1-14	SOIL	12/20/94	T 22-MET

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9412222
Date Received : 12/21/94
Project ID : 7137
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

QA/QC SUMMARY :

- All holding times have been met for the analyses reported in this section.
- Matrix spike recoveries for sample MW-1-14 for antimony were outside Anametrix cotrol limits, possibly due to matrix effects. A post digestion spike was performed, and the result was within control limits, indicating no spectral interferences.

Department/Supervisor 12/30/94 Date

Chemist 12/30/94 Date

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Anametrix Sample ID: **9412222-03**
Client Sample ID: **MW-3-15**
Client Project Number: **7137**
Matrix: **SOIL**

Date Sampled: **12/20/94**
Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	6.0	**ND**	
Arsenic	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	**4.4**	
Barium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	10.0	**86.0**	
Beryllium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	0.50	**ND**	
Cadmium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	0.50	**ND**	
Chromium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	1.0	**16.5**	
Cobalt	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	**7.5**	
Copper	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	2.5	**11.6**	
Lead	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	0.30	**4.4**	
Mercury	7471	7471	HGA1	12/27/94	12/29/94	1	mg/Kg	0.10	**ND**	
Molybdenum	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	1.0	**ND**	
Nickel	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	4.0	**19.3**	
Selenium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	0.50	**ND**	
Silver	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	**ND**	
Thallium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	**ND**	
Vanadium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	**27.9**	
Zinc	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	2.0	**28.0**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Anametrix Sample ID: **9412222-06**
Client Sample ID: **MW-1-14**
Client Project Number: **7137**
Matrix: **SOIL**

Date Sampled: **12/20/94**
Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	6.0	**ND**	
Arsenic	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	**5.1**	
Barium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	10.0	**112**	
Beryllium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	0.50	**ND**	
Cadmium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	0.50	**ND**	
Chromium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	1.0	**19.6**	
Cobalt	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	**9.0**	
Copper	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	2.5	**15.6**	
Lead	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	0.30	**5.6**	
Mercury	7471	7471	HGA1	12/27/94	12/29/94	1	mg/Kg	0.10	**ND**	
Molybdenum	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	1.0	**ND**	
Nickel	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	4.0	**26.5**	
Selenium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	0.50	**ND**	
Silver	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	**ND**	
Thallium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	**ND**	
Vanadium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	**31.0**	
Zinc	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	2.0	**32.9**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

METHOD BLANK REPORT

Anametrix Sample ID: **BD274SA**
Anametrix WO #: **9412222**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: S.C
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	6.0	ND	
Arsenic	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	ND	
Barium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	10.0	ND	
Beryllium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	0.50	ND	
Cadmium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	0.50	ND	
Chromium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	1.0	ND	
Cobalt	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	ND	
Copper	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	2.5	ND	
Lead	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	0.30	ND	
Mercury	7471	7471	HGA1	12/27/94	12/29/94	1	mg/Kg	0.10	ND	
Molybdenum	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	1.0	ND	
Nickel	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	4.0	ND	
Selenium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	0.50	ND	
Silver	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	ND	
Thallium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	1.0	ND	
Vanadium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	ND	
Zinc	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	2.0	ND	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
MATRIX SPIKE REPORT

Anametrix. Sample ID: **9412222-06MS,MD**
Client Sample ID: **MW-1-14**
Client Proj. Number: **7137**
Matrix: **SOIL**

Analyst: JC
Supervisor: MW

Analyte	Analyt. Method	Instr. I.D.	Date Prepared	Date Analyzed	Units	Spike Amount	Sample Conc.	Matrix Spike Conc.	% Rec.	Matrix Sp. Dup. Conc.	% Rec.	RPD	Q
Antimony	6010A	ICP1	12/27/94	12/29/94	mg/Kg	50.0	0.0	21.8	**43.6**	22.3	**44.6**	**2.3**	U
Arsenic	6010A	ICP2	12/27/94	12/27/94	mg/Kg	10.0	5.1	14.2	**91.0**	14.7	**96.0**	**3.5**	
Barium	6010A	ICP1	12/27/94	12/29/94	mg/Kg	200	112	305	**96.5**	312	**100**	**2.3**	
Beryllium	6010A	ICP1	12/27/94	12/29/94	mg/Kg	5.0	0.0	5.3	**106**	5.3	**106**	**0.0**	U
Cadmium	6010A	ICP1	12/27/94	12/29/94	mg/Kg	5.0	0.0	4.3	**86.0**	4.5	**90.0**	**4.5**	U
Chromium	6010A	ICP1	12/27/94	12/29/94	mg/Kg	20.0	19.6	38.2	**93.0**	38.3	**93.5**	**0.3**	
Cobalt	6010A	ICP1	12/27/94	12/29/94	mg/Kg	50.0	9.0	53.8	**89.6**	54.3	**90.6**	**0.9**	
Copper	6010A	ICP1	12/27/94	12/29/94	mg/Kg	25.0	15.6	38.7	**92.4**	39.7	**96.4**	**2.6**	
Lead	6010A	ICP2	12/27/94	12/27/94	mg/Kg	50.0	5.6	50.9	**90.6**	50.4	**89.6**	**1.0**	
Mercury	7471	HGA1	12/27/94	12/29/94	mg/Kg	0.50	0.0	0.46	**92.0**	0.47	**94.0**	**2.2**	U
Molybdenum	6010A	ICP1	12/27/94	12/29/94	mg/Kg	200	0.0	170	**85.0**	168	**84.0**	**1.2**	U
Nickel	6010A	ICP1	12/27/94	12/29/94	mg/Kg	50.0	26.5	71.4	**89.8**	71.1	**89.2**	**0.4**	
Selenium	6010A	ICP2	12/27/94	12/27/94	mg/Kg	5.0	0.0	4.9	**98.0**	4.7	**94.0**	**4.2**	U
Silver	6010A	ICP2	12/27/94	12/27/94	mg/Kg	5.0	0.0	4.8	**96.0**	4.9	**98.0**	**2.1**	U
Thallium	6010A	ICP2	12/27/94	12/27/94	mg/Kg	10.0	0.0	9.2	**92.0**	8.8	**88.0**	**4.4**	U
Vanadium	6010A	ICP1	12/27/94	12/29/94	mg/Kg	50.0	31.0	75.9	**89.8**	76.2	**90.4**	**0.4**	
Zinc	6010A	ICP1	12/27/94	12/29/94	mg/Kg	50.0	32.9	75.0	**84.2**	76.7	**87.6**	**2.2**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
POST DIGESTION SPIKE REPORT

Anametrix Sample ID: **9412222-06PDS**
Client Sample ID: **MW-1-14**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Analyt. Method	Instr. ID	Date Prepared	Date Analyzed	D.F.	Units	Spike Amount	Sample Conc.	PDS Conc.	% Rec.	Q
Antimony	6010A	ICP1	12/29/94	12/29/94	1	mg/Kg	25.0	0.0	23.1	92.4	U

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

LABORATORY CONTROL SAMPLE REPORT

Lab. Control Sample ID: **LD274SA**
Anametrix WO #: **9412222**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: JW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Spike Amount	LCS Results	% Recovery	Q
Antimony	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	50.0	44.0	**88.0**	
Arsenic	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	10.0	9.6	**96.0**	
Barium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	200	192	**96.0**	
Beryllium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	4.8	**96.0**	
Cadmium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	5.0	4.2	**84.0**	
Chromium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	20.0	18.3	**91.5**	
Cobalt	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	50.0	46.1	**92.2**	
Copper	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	25.0	23.3	**93.2**	
Lead	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	50.0	48.5	**97.0**	
Mercury	7471	7471	HGA1	12/27/94	12/29/94	1	mg/Kg	0.50	0.46	**92.0**	
Molybdenum	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	200	181	**90.5**	
Nickel	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	50.0	45.0	**90.0**	
Selenium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	5.0	5.1	**102**	
Silver	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	5.0	5.0	**100**	
Thallium	3050A	6010A	ICP2	12/27/94	12/27/94	1	mg/Kg	10.0	10.3	**103**	
Vanadium	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	50.0	45.1	**90.2**	
Zinc	3050A	6010A	ICP1	12/27/94	12/29/94	1	mg/Kg	50.0	41.8	**83.6**	

COMMENTS:

Inchcape Testing Services
Anametrix Laboratories

SAMPLE RECEIVING CHECKLIST

WORKORDER NUMBER: 9412222 CLIENT PROJECT ID: 7137

COOLER

Shipping slip (airbill, etc.) present?	YES	NO	(N/A)
If YES, enter carrier name and airbill # : _____			
Custody Seal on the outside of cooler?	YES	NO	(N/A)
Condition: INTACT ____ BROKEN ____			
Temperature of sample (s) within range?	(YES)	NO	N/A
List temperature of cooler (s): 6°C			

SAMPLES

Chain of custody seal present for each container?	YES	NO	(N/A)
Condition: INTACT ____ BROKEN ____			
Samples arrived within holding time?	(YES)	NO	N/A
Samples in proper containers for methods requested?	(YES)	NO	
Condition of containers: INTACT ✓ BROKEN ____			
If NO, were samples transferred to proper container? ____			
Were VOA containers received with zero headspace?	YES	NO	(N/A)
If NO, was it noted on the chain of custody? ____			
Were container labels complete? (ID, date, time preservative, etc.)	(YES)	NO	
Were samples preserved with the proper preservative?	YES	NO	(N/A)
If NO, was the proper preservative added at time of receipt? ____			
pH check of samples required at time of receipt?	YES	(NO)	
If YES, pH checked and recorded by: ____			
Sufficient amount of sample received for methods requested?	(YES)	NO	
If NO, has the client or lab project manager been notified? ____			
Field blanks received with sample batch? # of Sets: ____	YES	NO	(N/A)
Trip blanks received with sample batch? # of Sets: ____	YES	NO	(N/A)

CHAIN OF CUSTODY

Chain of custody received with samples?	(YES)	NO
Has it been filled out completely and in ink?	(YES)	NO
Sample ID's on chain of custody agree with container labels?	(YES)	NO
Number of containers indicated on chain of custody agree with number received?	(YES)	NO
Analysis methods clearly specified?	YES	(NO)
Sampling date and time indicated?	(YES)	NO
Proper signatures of sampler, courier, sample custodian in appropriate place? with time and date?	(YES)	NO
Turnaround time? REGULAR ____ RUSH ____		

Any NO response and/or any "BROKEN" that was checked must be detailed in the Corrective Action Form.

Sample Custodian: [illegible] Date: 12/21/94 Project Manager: [illegible] Date: 12/21/94

ANAMETRIX REPORT DESCRIPTION
INORGANICS

Analytical Data Report (ADR)

The ADR contains tabulated results for inorganic analytes. All field samples, QC samples and blanks were prepared and analyzed according to procedures in the following references:

- "Test Methods for Evaluating Solid Waste," SW-846, EPA, 3rd Edition, November 1986.
- "Methods for Chemical Analysis of Water and Wastes," EPA, 3rd Edition, 1983.
- CCR Title 22, Section 66261, Appendix II, California Waste Extraction Test.
- CCR Title 22, Section 66261, Appendix XI, Organic Lead.
- "Standard Methods for the Examination of Water and Wastewater," APHA, AWWA, WEF, 18th Edition, 1992.
- USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, ILM02.1, 1991.

Matrix Spike Report (MSR)

The MSR summarizes percent recovery and relative percent difference information for matrix spikes and matrix spike duplicates. This information is a statement of both accuracy and precision. MSRs may not be provided with all analytical reports. Anametrix control limit for MSR is 75-125% with 25% for RPD limits, except for Method 6010A, which is 80-120% with 25% RPD limits.

Laboratory Control Sample Report (LCSR)

The LCSR summarizes percent recovery information for laboratory control spikes on reagent water or soil. This information is a statement of performance for the method, i.e., the samples are properly prepared and analyzed according to the applicable methods. Anametrix control limit for LCSR is 80-120%.

Method Blank Report (MBR)

The MBR summarizes quality control information for reagents used in preparing samples. The absolute value of each analyte measured in the method blank should be below the method reporting limit for that analyte.

Post Digestion Spike Report (PDSR)

The PDSR summarizes percent recovery information for post digestion spikes. A post digestion spike is performed for a particular analyte if the matrix spike recovery is outside of established control limits. Any percent recovery for a post digestion spike outside of established limits for an analyte indicates probable matrix effects and interferences for that analyte. Anametrix control limit for PDSR is 75-125%.

Qualifiers (Q)

Anametrix uses several data qualifiers in inorganic reports. These qualifiers give additional information on the analytes reported. The following is a list of qualifiers and their meanings:

- I - Sample was analyzed at the stated dilution due to spectral interferences.
- U - Analyte concentration was below the method reporting limit. For matrix and post digestion spike reports, a value of "0.0" is entered for calculation of the percent recovery.
- B - Sample concentration was below the reporting limit but above the instrument detection limit. Result is entered for calculation of the percent recovery only.
- H - Spike percent recovery was outside of Anametrix control limits due to interferences from relatively high concentration level of the analyte in the unspiked sample.
- L - Reporting limit was increased to compensate for background absorbances or matrix interferences.

Comment Codes

In addition to qualifiers, the following codes are used in the comment section of all reports to give additional information about sample preparation methods:

- A - Sample was prepared for silver based on the silver digestion method developed by the Southern California Laboratory, Department of Health Services, "Acid Digestion for Sediments, Sludges, Soils and Solid Wastes. A Proposed Alternative to EPA SW846, Method 3050." Environmental Science and Technology, 1989, 23, 898-900.
- T - Spikes were prepared after extraction by the Toxicity Characteristic Leaching Procedure (TCLP).
- C - Spikes were prepared after extraction by the California Waste Extraction Test (CWET) method.
- D - Reported results are dissolved, not total, metals.

Reporting Conventions

Analytical values reported are gross values, i.e., not corrected for method blank contamination. Solid matrices are reported on a wet weight basis, unless specifically requested otherwise.

Inchcape Testing Services
Anametrix Laboratories

1961 Concourse Drive
Suite E
San Jose, CA 95131
Tel: 408-432-8192
Fax: 408-432-8198

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9501029
Date Received : 01/05/95
Project ID : 7137
Purchase Order: N/A

The following samples were received at Anametrix for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9501029- 1	MW-1-4

This report is organized in sections according to the specific Anametrix laboratory group which performed the analysis(es) and generated the data.

The results contained within this report relate to only the sample(s) tested. Additionally, these data should be considered in their entirety and Anametrix cannot be responsible for the detachment, separation, or otherwise partial use of this report.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234.

If you have any further questions or comments on this report, please call your project manager as soon as possible. Thank you for using Inchcape Testing Services.

Susan Kraska Yeager
Laboratory Director

01/17/95
Date

Project Manager

This report consists of 1 pages.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9501029
Date Received : 01/05/95
Project ID : 7137
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9501029- 1	MW-1-4	SOIL	12/20/94	CWET-INORG
9501029- 1	MW-1-4	SOIL	12/20/94	CWETMETALS

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9501029
Date Received : 01/05/95
Project ID : 7137
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

QA/QC SUMMARY :

- All holding times have been met for the analyses reported in this section.

Department Supervisor 1/17/95 Date

Chemist 1/17/95 Date

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Analyte-Method: **Lead-STLC-6010A**
Client Project Number: **7137**
Matrix - Units: **SOIL - mg/L**

Analyst: SC
Supervisor: MN

Anametrix Sample ID	Client Sample ID	Prep. Method	Instr. ID	Date Sampled	Date Prepared	Date Analyzed	D.F.	Reporting Limit	Results	Q
9501029-01	MW-1-4	CWET	ICP1	12/20/94	01/12/95	01/13/95	50	2.0	**319**	
BJ125EA	METHOD BLANK	CWET	ICP1	N/A	01/12/95	01/13/95	5	0.20	**ND**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
SAMPLE DUPLICATE REPORT

Anametrix Sample ID: **9501029-01D**
Client Sample ID: **MW-1-4**
Client Project Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: LH

Analyte	Prep. Method	Analyt. Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Sample Conc.	Sample Duplicate Conc.	RPD	Q
Lead	CWET	6010A	ICP1	01/12/95	01/13/95	50	mg/L	319	326	2.2	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
MATRIX SPIKE REPORT

Anametrix. Sample ID: **9501029-01MS**
Client Sample ID: **MW-1-4**
Client Proj. Number: **7137**
Matrix: **SOIL**

Analyst: SC
Supervisor: MM

Analyte	Analyt. Method	Instr. I.D.	Date Prepared	Date Analyzed	Units	Spike Amount	Sample Conc.	Matrix Spike Conc.	% Rec.				Q
Lead	6010A	ICP1	01/12/95	01/13/95	mg/L	5.0	319	332	NR				H

COMMENTS: NR - Not reported due to high level of analyte concentration in the sample compared to spiked amount.

ANAMETRIX INC
Environmental & Analytical Chemistry
1961 Concourse Drive, Suite E, San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

#4914 9501029 (10/7)

CHAIN-OF-CUSTODY RECORD

PROJECT NUMBER	PROJECT NAME	Send Report Attention of:	Report Due	Verbal Due
7137		Ms. Jobeth Folger	1/20/95	/ /

	Sample Number	Date	Time	Comp	Matrix	Station Location	Number of Cntnrs	Type of Containers	Type of Analysis: STLC Pb	Condition of Samples	Initial
(1)	MW-1-4	12/20/94	1040		S		3	Brass liner	X		

Relinquished by:(Signature)	Date/Time	Received by: (Signature)	Date/Time
Relinquished by:(Signature)	Date/Time	Received by: (Signature)	Date/Time
Relinquished by:(Signature)	Date/Time	Received by Lab:	Date/Time
		[signature]	1/5/95 0900

Remarks: This sample was taken from workorder 9412222.

COMPANY: Woodward-Clyde Consultants
ADDRESS: 500 12th Street, Suite 100, Oakland, CA 94607-4014
PHONE : (510) 893-3600 FAX :

Inchcape Testing Services
Anametrix Laboratories

1961 Concourse Drive
Suite E
San Jose, CA 95131
Tel: 408-432-8192
Fax: 408-432-8198

MS. JO BETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9505090
Date Received : 05/09/95
Project ID : 7136/201
Purchase Order: N/A

The following samples were received at Anametrix for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9505090- 1	B-2-6.0
9505090- 2	B-9-5.5

This report is organized in sections according to the specific Anametrix laboratory group which performed the analysis(es) and generated the data.

The results contained within this report relate to only the sample(s) tested. Additionally, these data should be considered in their entirety and Anametrix cannot be responsible for the detachment, separation, or otherwise partial use of this report.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234.

If you have any further questions or comments on this report, please call your project manager as soon as possible. Thank you for using Inchcape Testing Services.

Corinne Gram for
Susan Kraska Yeager
Laboratory Director

06/29/95
Date

Cristina V. Rayburn
Project Manager

This report consists of 12 pages.

ANAMETRIX REPORT DESCRIPTION
INORGANICS

Analytical Data Report (ADR)

The ADR contains tabulated results for inorganic analytes. All field samples, QC samples and blanks were prepared and analyzed according to procedures in the following references:

- "Test Methods for Evaluating Solid Waste," SW-846, EPA, 3rd Edition, November 1986.
- "Methods for Chemical Analysis of Water and Wastes," EPA, 3rd Edition, 1983.
- CCR Title 22, Section 66261, Appendix II, California Waste Extraction Test.
- CCR Title 22, Section 66261, Appendix XI, Organic Lead.
- "Standard Methods for the Examination of Water and Wastewater," APHA, AWWA, WEF, 18th Edition, 1992.
- USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, ILM02.1, 1991.

Matrix Spike Report (MSR)

The MSR summarizes percent recovery and relative percent difference information for matrix spikes and matrix spike duplicates. This information is a statement of both accuracy and precision. MSRs may not be provided with all analytical reports. Anametrix control limit for MSR is 75-125% with 25% for RPD limits, except for Method 6010A, which is 80-120% with 25% RPD limits.

Laboratory Control Sample Report (LCSR)

The LCSR summarizes percent recovery information for laboratory control spikes on reagent water or soil. This information is a statement of performance for the method, i.e., the samples are properly prepared and analyzed according to the applicable methods. Anametrix control limit for LCSR is 80-120%.

Method Blank Report (MBR)

The MBR summarizes quality control information for reagents used in preparing samples. The absolute value of each analyte measured in the method blank should be below the method reporting limit for that analyte.

Post Digestion Spike Report (PDSR)

The PDSR summarizes percent recovery information for post digestion spikes. A post digestion spike is performed for a particular analyte if the matrix spike recovery is outside of established control limits. Any percent recovery for a post digestion spike outside of established limits for an analyte indicates probable matrix effects and interferences for that analyte. Anametrix control limit for PDSR is 75-125%.

Qualifiers (Q)

Anametrix uses several data qualifiers in inorganic reports. These qualifiers give additional information on the analytes reported. The following is a list of qualifiers and their meanings:

- I - Sample was analyzed at the stated dilution due to interferences.
- U - Analyte concentration was below the method reporting limit. For matrix and post digestion spike reports, a value of "0.0" is entered for calculation of the percent recovery.
- B - Sample concentration was below the reporting limit but above the instrument detection limit. Result is entered for calculation of the percent recovery only.
- H - Spike percent recovery was outside of Anametrix control limits due to interferences from relatively high concentration level of the analyte in the unspiked sample.
- L - Reporting limit was increased to compensate for background absorbances or matrix interferences.

Comment Codes

In addition to qualifiers, the following codes are used in the comment section of all reports to give additional information about sample preparation methods:

- A - Sample was prepared for silver based on the silver digestion method developed by the Southern California Laboratory, Department of Health Services, "Acid Digestion for Sediments, Sludges, Soils and Solid Wastes. A Proposed Alternative to EPA SW846, Method 3050." Environmental Science and Technology, 1989, 23, 898-900.
- T - Spikes were prepared after extraction by the Toxicity Characteristic Leaching Procedure (TCLP).
- C - Spikes were prepared after extraction by the California Waste Extraction Test (CWET) method.
- D - Reported results are dissolved, not total, metals.

Reporting Conventions

Analytical values reported are gross values, i.e., <u>not</u> corrected for method blank contamination. Solid matrices are reported on a wet weight basis, unless specifically requested otherwise.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JO BETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9505090
Date Received : 05/09/95
Project ID : 7136/201
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9505090- 1	B-2-6.0	SOIL	05/08/95	CWET-INORG
9505090- 2	B-9-5.5	SOIL	05/08/95	CWET-INORG
9505090- 1	B-2-6.0	SOIL	05/08/95	CWETMETALS
9505090- 2	B-9-5.5	SOIL	05/08/95	CWETMETALS

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JO BETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9505090
Date Received : 05/09/95
Project ID : 7136/201
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

QA/QC SUMMARY :

- Holding times have been met for the analyses reported in this section.
- The relative percent difference for sample B-2-6.0 and its duplicate were outside Anametrix control limits for mercury, possibly due to the heterogenous nature of the sample.
- The laboratory control sample for mercury was outside Anametrix control limits. However, the matrix spike was within Anametrix control limits.

Department Supervisor 6/27/95 Date

Chemist 6/27 Date

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Anametrix Sample ID: **9505090-01**
Client Sample ID: **B-2-6.0**
Client Project Number: **7136/201**
Matrix: **SOIL**

Date Sampled: **05/08/95**
Analyst:
Supervisor:

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.60	**ND**	
Arsenic-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	**0.49**	
Barium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	1.0	**2.6**	
Beryllium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.050	**ND**	
Cadmium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.050	**0.064**	
Chromium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	**0.34**	
Cobalt-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.50	**ND**	
Copper-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.25	**4.7**	
Lead-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	50	mg/L	2.0	**78.9**	
Mercury-STLC	CWET	7471	HGA1	05/15/95	05/17/95	1	mg/L	0.00040	**0.0030**	
Molybdenum-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.10	**ND**	
Nickel-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.40	**5.1**	
Selenium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.20	**ND**	
Silver-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	**ND**	
Thallium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	**ND**	
Vanadium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.50	**0.81**	
Zinc-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	50	mg/L	1.0	**80.1**	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Anametrix Sample ID: **9505090-02**
Client Sample ID: **B-9-5.5**
Client Project Number: **7136/201**
Matrix: **SOIL**

Date Sampled: **05/08/95**
Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.60	ND	
Arsenic-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	ND	
Barium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	1.0	13.3	
Beryllium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.050	ND	
Cadmium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.050	ND	
Chromium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.10	ND	
Cobalt-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.50	0.53	
Copper-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.25	ND	
Lead-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.40	ND	
Mercury-STLC	CWET	7471	HGA1	05/15/95	05/17/95	1	mg/L	0.00040	0.00044	
Molybdenum-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.10	ND	
Nickel-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.40	0.98	
Selenium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.20	ND	
Silver-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	ND	
Thallium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	ND	
Vanadium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.50	0.59	
Zinc-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.20	ND	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
METHOD BLANK REPORT

Anametrix Sample ID: **BY125EB, BY155EA**
Anametrix WO #: **9505090**
Client Project Number: **7136/201**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Reporting Limit	Results	Q
Antimony-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.60	ND	
Arsenic-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	ND	
Barium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	1.0	ND	
Beryllium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.050	ND	
Cadmium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.050	ND	
Chromium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.10	ND	
Cobalt-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.50	ND	
Copper-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.25	ND	
Lead-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.40	ND	
Mercury-STLC	CWET	7471	HGA1	05/15/95	05/17/95	1	mg/L	0.00040	ND	
Molybdenum-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.10	ND	
Nickel-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.40	ND	
Selenium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.20	ND	
Silver-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	ND	
Thallium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.10	ND	
Vanadium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.50	ND	
Zinc-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.20	ND	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

SAMPLE DUPLICATE REPORT

Anametrix Sample ID: **9505090-01D**
Client Sample ID: **B-2-6.0**
Client Project Number: **7136/201**
Matrix: **SOIL**

Analyst:
Supervisor: MW

Analyte	Prep. Method	Analyt. Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Sample Conc.	Sample Duplicate Conc.	RPD	Q
Antimony-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	ND	ND	N/A	
Arsenic-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.49	0.51	4.0	
Barium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	2.6	2.5	3.9	
Beryllium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	ND	ND	N/A	
Cadmium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.064	0.059	8.1	
Chromium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	0.34	0.36	5.7	
Cobalt-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	ND	ND	N/A	
Copper-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	4.7	4.6	2.2	
Lead-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	50	mg/L	78.9	77.9	1.3	
Mercury-STLC	CWET	7471	HGA1	05/15/95	05/17/95	1	mg/L	0.0030	0.0010	100	
Molybdenum-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	ND	ND	N/A	
Nickel-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	5.1	4.9	4.0	
Selenium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	ND	ND	N/A	
Silver-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	ND	ND	N/A	
Thallium-STLC	CWET	6010A	ICP2	05/12/95	05/16/95	10	mg/L	ND	ND	N/A	
Vanadium-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	10	mg/L	0.81	0.79	2.5	
Zinc-STLC	CWET	6010A	ICP1	05/12/95	05/17/95	50	mg/L	80.1	79.5	0.75	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
MATRIX SPIKE REPORT

Anametrix. Sample ID: **9505090-01MS**
Client Sample ID: **B-2-6.0**
Client Proj. Number: **7136/201**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Analyt. Method	Instr. I.D.	Date Prepared	Date Analyzed	Units	Spike Amount	Sample Conc.	Matrix Spike Conc.	% Rec.				Q
Antimony-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	15.0	0.0	16.6	111				U
Arsenic-STLC	6010A	ICP2	05/12/95	05/16/95	mg/L	5.0	0.49	5.3	96.2				U
Barium-STLC	6010A	ICP2	05/12/95	05/16/95	mg/L	25.0	2.6	24.8	88.8				
Beryllium-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	0.75	0.0	0.90	120				U
Cadmium-STLC	6010A	ICP2	05/12/95	05/16/95	mg/L	1.0	0.064	0.93	86.6				
Chromium-STLC	6010A	ICP2	05/12/95	05/16/95	mg/L	5.0	0.34	4.8	89.2				
Cobalt-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	25.0	0.0	24.1	96.4				U
Copper-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	25.0	4.7	29.7	100				
Lead-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	5.0	78.9	85.2	126				H
Mercury-STLC	7471	HGA1	05/15/95	05/17/95	mg/L	0.10	0.0030	0.102	99.0				
Molybdenum-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	25.0	0.0	23.5	94.0				U
Nickel-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	24.0	5.1	24.1	79.2				
Selenium-STLC	6010A	ICP2	05/12/95	05/16/95	mg/L	1.0	0.0	1.1	110				U
Silver-STLC	6010A	ICP2	05/12/95	05/16/95	mg/L	5.0	0.0	4.8	96.0				U
Thallium-STLC	6010A	ICP2	05/12/95	05/17/95	mg/L	7.0	0.0	5.6	80.0				U
Vanadium-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	25.0	0.81	23.2	89.6				
Zinc-STLC	6010A	ICP1	05/12/95	05/17/95	mg/L	25.0	80.1	108	112				

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

LABORATORY CONTROL SAMPLE REPORT

Lab. Control Sample ID: **LY155EA**
Anametrix WO #: **9505090**
Client Project Number: **7136/201**
Matrix: **SOIL**

Analyst: SC
Supervisor: MW

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Spike Amount	LCS Results	% Recovery	Q
Mercury-STLC	CWET	7471	HGA1	05/15/95	05/17/95	25	mg/L	0.10	0.065	65.0	

COMMENTS:

S 9505090 (26)

Woodward-Clyde Consultants
500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. 7136/201

SAMPLERS: (Signature) J. Bartholomew J. Winkler

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	ANALYSES: EPA Method STLC/WET	EPA Method	EPA Method	EPA Method	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
5/8/95	1115	B-2-6.0	S					1	
5/8/95	1445	B-9-5.5	S					1	
				WET/STLC Metals (17)					
								TOTAL NUMBER OF CONTAINERS: 2	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
J. Winkler	5/8 1400	J. Bartholomew	J. Bartholomew	5/9 1520	ITS

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Anametrix Courier		5/9/95 1630		5-9-95 16:30

Inchcape Testing Services
Anametrix Laboratories

SAMPLE RECEIVING CHECKLIST

WORKORDER NUMBER: 9505090 CLIENT PROJECT ID: 7136/201

COOLER

Shipping slip (airbill, etc.) present?	YES	NO	(N/A)
If YES, enter carrier name and airbill # : _____			
Custody Seal on the outside of cooler?	YES	NO	(N/A)
Condition: INTACT ____ BROKEN ____			
Temperature of sample (s) within range?	(YES)	NO	N/A
List temperature of cooler (s): 6°C			

SAMPLES

Chain of custody seal present for each container?	YES	NO	(N/A)
Condition: INTACT ____ BROKEN ____			
Samples arrived within holding time?	(YES)	NO	N/A
Samples in proper containers for methods requested?	(YES)	NO	
Condition of containers: INTACT ✓ BROKEN ____			
If NO, were samples transferred to proper container? ____			
Were VOA containers received with zero headspace?	YES	NO	(N/A)
If NO, was it noted on the chain of custody? ____			
Were container labels complete? (ID, date, time preservative, etc.)	YES	(NO)	
Were samples preserved with the proper preservative?	YES	NO	(N/A)
If NO, was the proper preservative added at time of receipt? ____			
pH check of samples required at time of receipt?	YES	(NO)	
If YES, pH checked and recorded by: ____			
Sufficient amount of sample received for methods requested?	(YES)	NO	
If NO, has the client or lab project manager been notified? ____			
Field blanks received with sample batch? # of Sets: ____	YES	NO	(N/A)
Trip blanks received with sample batch? # of Sets: ____	YES	NO	(N/A)

CHAIN OF CUSTODY

Chain of custody received with samples?	(YES)	NO
Has it been filled out completely and in ink?	(YES)	NO
Sample ID's on chain of custody agree with container labels?	(YES)	NO
Number of containers indicated on chain of custody agree with number received?	(YES)	NO
Analysis methods clearly specified?	(YES)	NO
Sampling date and time indicated?	(YES)	NO
Proper signatures of sampler, courier, sample custodian in appropriate place? with time and date?	(YES)	NO
Turnaround time? REGULAR ✓ RUSH ____		

Any NO response and/or any "BROKEN" that was checked must be detailed in the Corrective Action Form.

Sample Custodian: EW Date: 05-22-95 Project Manager: [illegible] Date: 5/22/95

APPENDIX F
GROUNDWATER CHEMICAL ANALYTICAL DATA

Inchcape Testing Services
Anametrix Laboratories

1961 Concourse Drive
Suite E
San Jose, CA 95131
Tel: 408-432-8192
Fax: 408-432-8198

February 14, 1995

Ms. Jo Beth Folger
WOODWARD CLYDE CONSULTANTS
500 12th Street
Suite 100
Oakland, CA 94607-4041

Dear Ms. Folger:

Enclosed are the analytical results for your project ID: 7137-0200, we received on January 25, 1995. The enclosed work was performed by a laboratory subcontracted by Inchcape Testing Services - Anametrix Laboratories.

I.T.S. Anametrix ID:	Client ID:
9501222-2	MW1

If you have any questions regarding this workorder, please give me a call at (408)432-8192.

Sincerely,

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES

Cristina V. Rayburn

Cristina Velasquez Rayburn
Project Manager

Quanterra Environmental Services

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

February 10, 1995
Lab ID: 079979

Cristina V. Rayburn
Inchcape Testing Services
1961 Concourse Drive, Suite E
San Jose, CA 95131

Dear Ms. Rayburn:

Enclosed is the report for the PCDD/PCDF analysis by Method 8290 of your one aqueous sample for your Project #9501222 received at Quanterra Incorporated on 26 January 1995 under chain-of-custody.

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique. For an analyte reported as 'Not Detected' the associated detection limit represents its maximum possible concentration. The method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

All samples and extracts are retained for 30 days from the date of this report. If longer storage is required or you would like samples returned to you, please call with instructions.

Results are on the attached data sheets.

If you have any questions, please feel free to call.

Sincerely,

Eric W. Redman
Senior Scientist
Advanced Technology Group

Kathleen A. Gill
Program Administrator

KG/jk

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Anametrix, Inc.

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
079979-0001-MB	Method Blank	AQUEOUS			26 JAN 95
079979-0001-SA	7137-0200 MW-1	AQUEOUS	25 JAN 95	13:40	26 JAN 95

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Anametrix, Inc.
Client ID: Method Blank
Lab ID: 079979-0001-MB
Matrix: AQUEOUS
Authorized: 26 JAN 95

Sampled: NA
Prepared: 30 JAN 95

Received: NA
Analyzed: 03 FEB 95

Sample Amount 1.00 L
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/L	0.92	
2,3,7,8-TCDF	ND	pg/L	0.92	
PeCDFs (total)	ND	pg/L	2.4	
1,2,3,7,8-PeCDF	ND	pg/L	2.3	
2,3,4,7,8-PeCDF	ND	pg/L	2.4	
HxCDFs (total)	ND	pg/L	1.7	
1,2,3,4,7,8-HxCDF	ND	pg/L	1.6	
1,2,3,6,7,8-HxCDF	ND	pg/L	1.6	
2,3,4,6,7,8-HxCDF	ND	pg/L	1.7	
1,2,3,7,8,9-HxCDF	ND	pg/L	1.5	
HpCDFs (total)	ND	pg/L	2.2	
1,2,3,4,6,7,8-HpCDF	ND	pg/L	1.9	
1,2,3,4,7,8,9-HpCDF	ND	pg/L	2.2	
OCDF	ND	pg/L	4.9	
Dioxins				
TCDDs (total)	ND	pg/L	2.2	
2,3,7,8-TCDD	ND	pg/L	0.66	
PeCDDs (total)	ND	pg/L	1.6	
1,2,3,7,8-PeCDD	ND	pg/L	1.6	
HxCDDs (total)	ND	pg/L	1.9	
1,2,3,4,7,8-HxCDD	ND	pg/L	1.9	
1,2,3,6,7,8-HxCDD	ND	pg/L	1.7	
1,2,3,7,8,9-HxCDD	ND	pg/L	1.7	
HpCDDs (total)	ND	pg/L	2.6	
1,2,3,4,6,7,8-HpCDD	ND	pg/L	2.6	
OCDD	ND	pg/L	6.5	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Jill Kellmann

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Anametrix, Inc.
Client ID: Method Blank
Lab ID: 079979-0001-MB
Matrix: AQUEOUS
Authorized: 26 JAN 95

Sampled: NA
Prepared: 30 JAN 95

Received: NA
Analyzed: 03 FEB 95

Sample Amount 1.00 L
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	74
13C-2,3,7,8-TCDD	70
13C-1,2,3,7,8-PeCDF	69
13C-1,2,3,7,8-PeCDD	71
13C-1,2,3,4,7,8-HxCDF	64
13C-1,2,3,6,7,8-HxCDD	65
13C-1,2,3,4,6,7,8-HpCDF	55
13C-1,2,3,4,6,7,8-HpCDD	56
13C-OCDD	45

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Jill Kellmann

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Anametrix, Inc.
Client ID: 7137-0200 MW-1
Lab ID: 079979-0001-SA
Matrix: AQUEOUS
Authorized: 26 JAN 95

Sampled: 25 JAN 95
Prepared: 30 JAN 95

Received: 26 JAN 95
Analyzed: 08 FEB 95

Sample Amount 1.04 L
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/L	2.0	
2,3,7,8-TCDF	ND	pg/L	2.0	
PeCDFs (total)	ND	pg/L	3.9	
1,2,3,7,8-PeCDF	ND	pg/L	3.9	
2,3,4,7,8-PeCDF	ND	pg/L	3.4	
HxCDFs (total)	ND	pg/L	2.1	
1,2,3,4,7,8-HxCDF	ND	pg/L	1.2	
1,2,3,6,7,8-HxCDF	ND	pg/L	1.6	
2,3,4,6,7,8-HxCDF	ND	pg/L	1.7	
1,2,3,7,8,9-HxCDF	ND	pg/L	2.1	
HpCDFs (total)	ND	pg/L	2.1	
1,2,3,4,6,7,8-HpCDF	ND	pg/L	2.1	
1,2,3,4,7,8,9-HpCDF	ND	pg/L	0.93	
OCDF	ND	pg/L	3.9	
Dioxins				
TCDDs (total)	ND	pg/L	2.7	
2,3,7,8-TCDD	ND	pg/L	2.7	
PeCDDs (total)	ND	pg/L	2.4	
1,2,3,7,8-PeCDD	ND	pg/L	2.4	
HxCDDs (total)	ND	pg/L	2.5	
1,2,3,4,7,8-HxCDD	ND	pg/L	2.4	
1,2,3,6,7,8-HxCDD	ND	pg/L	2.4	
1,2,3,7,8,9-HxCDD	ND	pg/L	2.5	
HpCDDs (total)	ND	pg/L	2.0	
1,2,3,4,6,7,8-HpCDD	ND	pg/L	2.0	
OCDD	ND	pg/L	15	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada
Approved By: Jill Kellmann

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Anametrix, Inc.
Client ID: 7137-0200 MW-1
Lab ID: 079979-0001-SA
Matrix: AQUEOUS
Authorized: 26 JAN 95

Sampled: 25 JAN 95
Prepared: 30 JAN 95

Received: 26 JAN 95
Analyzed: 08 FEB 95

Sample Amount 1.04 L
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	63
13C-2,3,7,8-TCDD	67
13C-1,2,3,7,8-PeCDF	60
13C-1,2,3,7,8-PeCDD	64
13C-1,2,3,4,7,8-HxCDF	73
13C-1,2,3,6,7,8-HxCDD	72
13C-1,2,3,4,6,7,8-HpCDF	83
13C-1,2,3,4,6,7,8-HpCDD	77
13C-OCDD	67

ND = Not detected
NA = Not applicable

Reported By: Maricon Estrada
Approved By: Jill Kellmann

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Advanced Technology Group - High Resolution
Project: 079979

Category: 8290-HR-A C14-C18 D/F plus 2378-substituted isomers by Method 8290
Matrix: AQUEOUS
QC Lot: 27 JAN 95-A QC Run: 03 FEB 95-A
Concentration Units: pg/uL

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) LCS	Accuracy(%) Limits
2,3,7,8-TCDF	10.0	11.2	112	60-140
1,2,3,7,8-PeCDF	25.0	25.8	103	60-140
2,3,4,7,8-PeCDF	25.0	27.6	110	60-140
1,2,3,4,7,8-HxCDF	25.0	26.5	106	60-140
1,2,3,6,7,8-HxCDF	25.0	26.0	104	60-140
2,3,4,6,7,8-HxCDF	25.0	26.8	107	60-140
1,2,3,7,8,9-HxCDF	25.0	24.8	99	60-140
1,2,3,4,6,7,8-HpCDF	25.0	28.4	113	60-140
1,2,3,4,7,8,9-HpCDF	25.0	29.8	119	60-140
OCDF	50.0	58.2	116	60-140
2,3,7,8-TCDD	10.0	10.2	102	60-140
1,2,3,7,8-PeCDD	25.0	27.5	110	60-140
1,2,3,4,7,8-HxCDD	25.0	25.9	104	60-140
1,2,3,6,7,8-HxCDD	25.0	27.6	110	60-140
1,2,3,7,8,9-HxCDD	25.0	27.4	110	60-140
1,2,3,4,6,7,8-HpCDD	25.0	26.4	106	60-140
OCDD	50.0	52.9	106	60-140
13C-2,3,7,8-TCDF	50.0	37.1	74	40-135
13C-1,2,3,7,8-PeCDF	50.0	39.4	79	40-135
13C-1,2,3,4,7,8-HxCDF	125	88.9	71	40-135
13C-1,2,3,4,6,7,8-HpCDF	125	79.0	63	40-135
13C-2,3,7,8-TCDD	50.0	36.4	73	40-135
13C-1,2,3,7,8-PeCDD	50.0	38.0	76	40-135
13C-1,2,3,6,7,8-HxCDD	125	85.2	68	40-135
13C-1,2,3,4,6,7,8-HpCDD	125	85.3	68	40-135
13C-OCDD	250	139	55	40-135

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Inchcape Testing Services
Anametrix Laboratories
1961 Concourse Drive, Suite E
San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

CHAIN-OF-CUSTODY RECORD

PROJECT NUMBER: 9501222
PROJECT NAME:
Send Report Attention of: CRISTINA RAYBURN
Report Due: 2/3/95
Verbal Due: / /

Sample Number	Date	Time	Comp	Matrix	Station Location	Number of Cntnrs	Type of Containers	Type of Analysis: Dioxin (8290)	Condition of Samples	Initial
2*	1/25/95	1340		W		2	liter	X	Good, t = 3.9°C;	

* sample identified on label as project: 7137-020 #: MW-1

RJB 012695

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	1/25/95 1600	Fed Ex # 416623957 1	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]			
Relinquished by: (Signature)	Date/Time	Received by Lab:	Date/Time
		RJ Bonaly	012695/1025

Remarks: PLEASE SEND ORIGINAL CHAIN OF CUSTODY ALONG WITH THE REPORT. Please hold samples for 45 days after the report is mailed.
Subto Quanterra

COMPANY: INCHCAPE TESTING SERVICES, ANAMETRIX LABS
ADDRESS: 1961 CONCOURSE DRIVE, SUITE E
SAN JOSE, CA 95131
PHONE: (408)432-8192 FAX: (408)432-8198

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9501222
Date Received : 01/25/95
Project ID : 7137-0200
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9501222- 2	MW-1	WATER	01/25/95	6010
9501222- 4	MW-4 -equipment blank	WATER	01/25/95	6010

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MS. JOBETH FOLGER
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4041

Workorder # : 9501222
Date Received : 01/25/95
Project ID : 7137-0200
Purchase Order: N/A
Department : METALS
Sub-Department: METALS

QA/QC SUMMARY :

- All holding times have been met for the analyses reported in this section.

1/31/95
Department Supervisor Date

Stephen Carroll 1/31/95
Chemist Date

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
DATA REPORT

Analyte-Method: **Lead-6010A**
Client Project Number: **7137-0200**
Matrix - Units: **WATER - ug/L**

Analyst: SC
Supervisor: mdt

Anametrix Sample ID	Client Sample ID	Prep. Method	Instr. ID	Date Sampled	Date Prepared	Date Analyzed	D.F.	Reporting Limit	Results	Q
9501222-02	MW-1	3010A	ICP2	01/25/95	01/26/95	01/27/95	1	40.0	ND	
9501222-04	MW-4	3010A	ICP2	01/25/95	01/26/95	01/27/95	1	40.0	ND	
BJ265WB	METHOD BLANK	3010A	ICP2	N/A	01/26/95	01/27/95	1	40.0	ND	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
SAMPLE DUPLICATE REPORT

Anametrix Sample ID: **9501222-04D**
Client Sample ID: **MW-4**
Client Project Number: **7137-0200**
Matrix: **WATER**

Analyst: SC
Supervisor: MBL

Analyte	Prep. Method	Analyt. Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Sample Conc.	Sample Duplicate Conc.	RPD	Q
Lead	3010A	6010A	ICP2	01/26/95	01/27/95	1	ug/L	ND	ND	N/A	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192
MATRIX SPIKE REPORT

Anametrix. Sample ID: **9501222-04MS,MD**
Client Sample ID: **MW-4**
Client Proj. Number: **7137-0200**
Matrix: **WATER**

Analyst: SC
Supervisor: MAB

Analyte	Analyt. Method	Instr. I.D.	Date Prepared	Date Analyzed	Units	Spike Amount	Sample Conc.	Matrix Spike Conc.	% Rec.	Matrix Sp. Dup. Conc.	% Rec.	RPD	Q
Lead	6010A	ICP2	01/26/95	01/27/95	1.0	500	0.0	512	102	515	103	0.6	

COMMENTS:

INCHCAPE TESTING SERVICES
ANAMETRIX LABORATORIES
(408) 432-8192

LABORATORY CONTROL SAMPLE REPORT

Lab. Control Sample ID: **LJ265WB**
Anametrix WO #: **9501222**
Client Project Number: **7137-0200**
Matrix: **WATER**

Analyst: SC
Supervisor: mst

Analyte	Prep. Method	Analytical Method	Instr. ID	Date Prepared	Date Analyzed	Dil. Factor	Units	Spike Amount	LCS Results	% Recovery	Q
Lead	3010A	6010A	ICP2	01/26/95	01/27/95	1	ug/L	500	512	**102**	

COMMENTS:

ANAMETRIX REPORT DESCRIPTION
INORGANICS

Analytical Data Report (ADR)

The ADR contains tabulated results for inorganic analytes. All field samples, QC samples and blanks were prepared and analyzed according to procedures in the following references:

- "Test Methods for Evaluating Solid Waste," SW-846, EPA, 3rd Edition, November 1986.
- "Methods for Chemical Analysis of Water and Wastes," EPA, 3rd Edition, 1983.
- CCR Title 22, Section 66261, Appendix II, California Waste Extraction Test.
- CCR Title 22, Section 66261, Appendix XI, Organic Lead.
- "Standard Methods for the Examination of Water and Wastewater," APHA, AWWA, WEF, 18th Edition, 1992.
- USEPA Contract Laboratory Program Statement of Work for Inorganic Analyses, ILM02.1, 1991.

Matrix Spike Report (MSR)

The MSR summarizes percent recovery and relative percent difference information for matrix spikes and matrix spike duplicates. This information is a statement of both accuracy and precision. MSRs may not be provided with all analytical reports. Anametrix control limit for MSR is 75-125% with 25% for RPD limits, except for Method 6010A, which is 80-120% with 25% RPD limits.

Laboratory Control Sample Report (LCSR)

The LCSR summarizes percent recovery information for laboratory control spikes on reagent water or soil. This information is a statement of performance for the method, i.e., the samples are properly prepared and analyzed according to the applicable methods. Anametrix control limit for LCSR is 80-120%.

Method Blank Report (MBR)

The MBR summarizes quality control information for reagents used in preparing samples. The absolute value of each analyte measured in the method blank should be below the method reporting limit for that analyte.

Post Digestion Spike Report (PDSR)

The PDSR summarizes percent recovery information for post digestion spikes. A post digestion spike is performed for a particular analyte if the matrix spike recovery is outside of established control limits. Any percent recovery for a post digestion spike outside of established limits for an analyte indicates probable matrix effects and interferences for that analyte. Anametrix control limit for PDSR is 75-125%.

Qualifiers (Q)

Anametrix uses several data qualifiers in inorganic reports. These qualifiers give additional information on the analytes reported. The following is a list of qualifiers and their meanings:

- I - Sample was analyzed at the stated dilution due to spectral interferences.
- U - Analyte concentration was below the method reporting limit. For matrix and post digestion spike reports, a value of "0.0" is entered for calculation of the percent recovery.
- B - Sample concentration was below the reporting limit but above the instrument detection limit. Result is entered for calculation of the percent recovery only.
- H - Spike percent recovery was outside of Anametrix control limits due to interferences from relatively high concentration level of the analyte in the unspiked sample.
- L - Reporting limit was increased to compensate for background absorbances or matrix interferences.

Comment Codes

In addition to qualifiers, the following codes are used in the comment section of all reports to give additional information about sample preparation methods:

- A - Sample was prepared for silver based on the silver digestion method developed by the Southern California Laboratory, Department of Health Services, "Acid Digestion for Sediments, Sludges, Soils and Solid Wastes. A Proposed Alternative to EPA SW846, Method 3050." Environmental Science and Technology, 1989, 23, 898-900.
- T - Spikes were prepared after extraction by the Toxicity Characteristic Leaching Procedure (TCLP).
- C - Spikes were prepared after extraction by the California Waste Extraction Test (CWET) method.
- D - Reported results are dissolved, not total, metals.

Reporting Conventions

Analytical values reported are gross values, i.e., not corrected for method blank contamination. Solid matrices are reported on a wet weight basis, unless specifically requested otherwise.