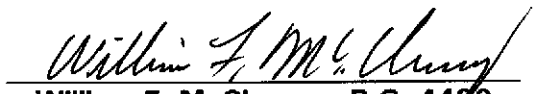
SUBSURFACE INVESTIGATION
1362 AND 1384 RUUS LANE
HAYWARD, CALIFORNIA

Prepared for:

WARMINGTON HOMES
3160 Crow Canyon Place, Suite 200
San Ramon, California 94583

Prepared by:

Marc Papineau, R.E.A. 791
Project Manager



William F. McClenney, R.G. 4430
Environmental Services Manager

Recon Environmental Corp.
7000 Marina Boulevard, 4th Floor
Brisbane, California 94005
(415-742-9900)

Project Number S40109

July 21, 1995

Recon
Environmental Corp.

July 21, 1995

Mr. Steve Millar
Warmington Homes
3160 Crow Canyon Place, Suite 200
San Ramon, California 94583

Subject: Further Delineation of Petroleum Hydrocarbons at 1362 and 1384 Ruus Lane, Hayward, California (RECON project number S40109)

Dear Mr. Millard:

Recon Environmental Corp. (RECON) is pleased to submit two copies of this report in general accordance with proposal number 13495, dated February 21, 1995.

RECON appreciates the opportunity to assist Warmington Homes with their environmental projects. If you have any questions regarding this report, please contact either of us at your convenience at (415) 742-9900.

Sincerely,

Marc Papineau
Project Manager

William F. McClenney, R.G. 4430
Branch Manager

Enclosure

7000 Marina Boulevard, 4th Floor, Brisbane, CA 94005 • (415) 742-9900 • Fax (415) 742-1033

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1.0 INTRODUCTION

Recon Environmental Corp. (RECON) has prepared this report to present the results of a subsurface investigation conducted at 1362 and 1384 Ruus Lane (site) in the city of Hayward, California (see Figure 1). The work was performed in response to direction of the Alameda County Department of Environmental Health, Hazardous Materials Division, to delineate the depth and volume of Total Extractable Petroleum Hydrocarbons (TEPH) in the soil at the site. Previous work did not delineate depth and volume of TEPH-affected soil. Delineation work was conducted by RECON during June 1995, in general accordance with proposal number 13495 submitted to Warmington Homes dated February 21, 1995. The work was conducted at the request and authorization of Mr. Ken Rembold of Warmington Homes.

The current work constitutes the pre-remediation assessment of depth and volume of TEPH-affected soil, as required by Alameda County. Results may be relied upon for the purpose of defining remedial measures.

1.1 Historical and Current Site Usage

In a historical aerial photograph dated 1947, the site appears to have been tilled agricultural land. Interpretation of a 1968 historical aerial photograph indicated that heavy equipment was stored over an area that may have overlapped both the Tallyn and Hohener parcels, in the southern portion of both parcels (CERTIFIED, 1994a).

Previous uses of the Tallyn parcel included interim storage of chemical toilet waste and surface storage of 55-gallon drums of formaldehyde used in the toilets. Previous uses of the Hohener parcel included storage of a variety of hazardous materials, hazardous wastes, batteries, junk metal, tires, and equipment. Review of records indicates that over thirty 55-gallon drums containing waste oil, methyl ethyl ketone, and other materials, and numerous partially full drums and empty drums were present on the Tallyn parcel at one time. Additionally, a variety of containers containing paints, shellacs, and chemical strippers were also present. These materials were reported to have been removed from the site (CERTIFIED, 1994a).

The Hohener parcel is not currently used and consists of mostly open field. There is a shallow 2-inch diameter monitoring well (MW-1) in the southern portion of the Hohener parcel which was installed previously in 1994 for the assessment of potential groundwater impairment. The Tallyn parcel is currently used by A-1 Sanitation for its portable toilet business. In their hazardous materials business plan filed with the City of Hayward, A-1 Sanitation is reported to store up to three 55-gallon drums of waste oil, up to two 55-gallon drums of new oil, and up to 20 gallons of portable toilet chemical. Currently, the portable toilet chemical is reported to contain 1 to 5 percent n-alkyl dimethyl benzyl ammonium chlorides (CERTIFIED, 1994a).

1.2 Previous Site Investigations

Previous investigations of shallow subsurface soil and groundwater conditions were performed by Essenes Environmental, Inc. (Essenes, 1992a; 1992b; 1993), CERTIFIED Engineering & Testing Company, Inc. (CERTIFIED, 1994a), and RECON (RECON, 1994). The results of these investigations reported the presence of elevated concentrations of TEPH as oil and grease in the soil in concentrations of up to 9,224 milligrams per kilogram (mg/kg). The previous 1994 RECON investigation illustrated an area of shallow TEPH-affected soil extending to a depth of 3 feet below ground surface (BGS). The area of TEPH-affected soil was illustrated to be generally located in the southern portion of the site, overlapping the Tallyn and Hohener parcels. In soil samples collected from the deeper boring SB12, at depths of 5, 7, and 10 feet BGS, no detectable TEPH was reported.

Groundwater samples were collected from temporary screened borings generally located along the western property boundary of the Hohener parcel in February, 1993 and from a dedicated monitoring well (MW-1) in September and October, 1994. From the temporary screened borings four groundwater samples were collected and analyzed for total petroleum hydrocarbons as kerosene, diesel, and petroleum oil, and halogenated volatile organic compounds (VOCs). These analytes were not reported to be detected in any of the four groundwater samples in concentrations exceeding the laboratory analytical method detection limits (Essenes, 1993).

The monitoring well (MW-1) was located generally downgradient of the area of documented TEPH-affected soil and toilet chemical staining. The two ground water samples collected from MW-1 were analyzed for TEPH, VOCs, and formaldehyde. These analytes were not reported to be detected in either sample in concentrations exceeding the method detection limits (RECON, 1994). Based upon well monitoring results reported in November 1994, the California Regional Water Quality Control Board has not required further monitoring for groundwater impairment. Therefore, at this time the subject of remediation is the soil.

2.0 OBJECTIVES

The objective of the investigation summarized in this report was to assess the lateral and vertical extent of TEPH in the shallow subsurface of the site and discuss the volume of TEPH-affected soil subject to mitigation. The site is planned for single-family development. The previous 1994 RECON investigation summarized in a report dated November 17, 1994, and the current investigation, were conducted to provide additional information to be used for the development of a site mitigation plan to guide site remediation prior to development of the site with residential subdivision.

3.0 SCOPE OF WORK

In order to meet the objectives, the scope of work included the following:

- Review of previous soil sampling locations and test results with Warmington Homes. This meeting occurred on site on May 30, 1995.
- Select 13 shallow exploratory pit locations.
- Collection of twenty nine soil samples from the exploratory pits. All soil samples were collected using a driven sampler with a "spoon" and 2-inch diameter by 6-inch long brass sleeve. Samples were generally collected from 1.5, 3, and 5 feet below grade. Pit walls were observed and logged, photographed, and backfilled after sampling.
- Analyze all samples for TEPH as petroleum oil and grease by U.S. EPA Method 413.1. This is a gravimetric method considered by RECON to meet the QA/QC and detection limit requirements of this delineation study.

why not 5520

- Analyze one soil sample for chemistry parameters often requested by sanitary landfills for the purpose of considering soil suitability for land disposal. These parameters included Title 22 metals, volatile and semivolatile organic compounds, corrosivity (pH), reactivity, and ignitability.
- Assessing the vertical and lateral extent and soil volume subject to mitigation.

4.0 SUBSURFACE INVESTIGATION

4.1 Shallow Soil Exploratory Pits

The soil sampling program was conducted on June 9, 1995, and involved excavating test pits with a backhoe at locations directed by RECON's geologist. Each test pit was approximately 3 feet wide by 8 feet long by 5 feet deep, and had an intermediate bench at each end to assist entry and exit. To collect soil samples for chemical analyses, one of RECON's geologists entered the pit and used a slide hammer to obtain discrete driven samples from the sidewalls. A second geologist logged the test pit soil types and labeled the samples.

The rationale for using exploratory test pits was to enable observation of soil lithologies visible in the sidewalls. The rationale for the selection of exploratory pit locations was to 1) obtain soil samples deeper than 3 feet in or near the locations previously reported to have TEPH-affected soil at the 3-foot depth, 2) obtain soil samples for analysis of new locations not previously sampled, and 3) recollect soil samples from the 1.5- and 3-foot

depths for the purpose of evaluating continuity with the previous results reported November 17, 1994. A description of the field procedures is presented in Appendix A. The rationale is summarized in the following chart.

Test Pit Designation	Location and Rationale for Sampling	Depths Sampled for Continuity (a)	New Depths Sampled
C	Near previous SB2 to delineate TEPH depth	None	3, 5
D	Near previous SB1 to delineate TEPH depth	1.5	3
G	Near previous SB10 to delineate TEPH depth	None	3, 5
M	Near previous SB15 to delineate TEPH depth	None	3, 5
N	Near previous SB5 to delineate TEPH depth	1.5, 3	5
I	This letter was not used	N/A	N/A
J	Near previous SB9 to delineate TEPH depth	1.5	3, 5
L	Near previous SB13 and SB17 to delineate TEPH depth	None	5
A	New location west of previous SB8 to delineate lateral extent of TEPH	N/A	1.5, 3
B	New location northwest of SB2 to delineate TEPH depth and lateral extent	N/A	1.5, 3, 5
E	New location between SB1 and SB3 to delineate lateral extent of TEPH	N/A	1.5, 3
F	New location west of SB12 to delineate TEPH depth	N/A	3, 5
H	New location northeast of SB9 to delineate lateral extent of TEPH	N/A	1.5, 3
K	New location between SB9 and SB11 to delineate TEPH depth and lateral extent	N/A	1.5, 3, 5
Total Number of Samples		**4**	**25**

NOTES: N/A Not applicable (a) Continuity with previous analysis results.

4.2 Conditions Encountered

Lithologies encountered while conducting the exploratory pits were heterogeneous in the first 18 to 24 inches, and nearly uniform from pit to pit after the first 24 inches (BGS). The first approximately 18 inches were generally heterogeneous, typically logged as sandy silts with rounded gravel to 1-inch diameter. In the first 18 inches, orange-brown mottling was noted (Pits H, J, N); light grey-white fines were noted (Pits B, C, D, F, G, L, M, and N); and asphalt chunks were noted from 12 inches to the 2-foot depth BGS (Pits A, E, and H). In Pit G a buried log was noted at approximately 2 feet BGS.

Between 2 feet and 5 feet BGS, the native soils consist generally of silty clays and dark brown organic clay. At approximately 5 feet BGS a distinct light grey or light olive grey clay was logged in Pits A, C, J, and K, underlying the dark brown-black clay with little gradation or transition between the lithologies. Appendix B summarizes the logs of exploratory pits.

5.0 LABORATORY ANALYSES

5.1 Results

Soil samples collected and retained for chemical analysis were submitted to North State Environmental of South San Francisco, California. North State Environmental is a State-certified hazardous waste laboratory. Chain of custody procedures, including the use of chain of custody forms, were used to document sample handling and transport to the laboratory. Chain of custody forms and laboratory reports are presented in Appendix C.

All soil samples were analyzed for TEPH in general accordance with Standard Method 5520 F. RECON contacted North State Environmental which clarified that the method reference is Standard Method 5520 EF. Standard Method 5520 EF is equivalent to U.S. EPA Method 413.1 (Murphy, 1995). One soil sample was additionally analyzed for volatile and semivolatile organic compounds in general accordance with U.S. EPA Method No. 8240 and 8270, metals, and reactivity/corrosivity/ignitability (RCI).

TEPH above 450 mg/kg in concentration was not found in any of the soil samples collected on June 9, 1995. TEPH between 210 mg/kg and 450 mg/kg was reported in soil samples from the 1.5-foot depth BGS in Pits D, E, and N. In Pits A, B, H, and K TEPH in soil samples collected from the 1.5-foot depth BGS was reported to have a concentration less than the detection limit (50 mg/kg). TEPH in all soil samples collected from the deeper 3-foot and 5-foot depths BGS was reported to have a concentration less than the detection limit. The analyses conducted on specific soil samples and the reported results are presented in Table 1.

5.2 Quality Assurance

Quality assurance was provided by North State Environmental and RECON. Accuracy and precision were reported by the laboratory in terms of the method spike recovery (MSR = 59 percent) and the relative percent difference (RPD = 5 percent). These were stated by the laboratory to be within the accepted range of the method for accuracy and precision.

Standard Method 5520 F was reported to be used by the laboratory. RECON contacted North State Environmental to confirm the Standard Method used was SM 5520 EF, which is equivalent to U.S. EPA Method 413.1. North State Environmental used a gravimetric determination specified in U.S. EPA Method 413.1. The method procedure calls for extraction of the analyte by sonication after a silica gel clean up to remove nonpetroleum-based hydrocarbons. The terms *extractable* and *recoverable* are synonymous; therefore, TRPH and TEPH are interchangeable.

The detection limit for gravimetric determination typically is 50 mg/kg, higher by a factor of ten than for infrared determination. However, this detection limit is acceptable for the purpose of this study since the levels targeted for delineation were 50 mg/kg and higher.

Accuracy is generally limited by the extraction and sample preparation procedure and determination method, and typically more so by the extraction and sample preparation procedure. Because U.S. EPA Methods 413.1 and 418.2 use an equivalent analyte extraction and sample preparation procedure, this is a common uncertainty factor in the analysis. RECON collected and submitted for analysis four soil samples from the 1.5- and 3-foot depths which were intended for the purpose of evaluating continuity with the previous results reported November 17, 1994. The results reported by the laboratory for these samples are listed in Table 2 and interpreted in Section 6.

6.0 DISCUSSION

6.1 Soil Chemistry

Thirteen exploratory pits were excavated to enable examination of soil lithologies and collection of soil samples. Twenty nine soil samples were collected from the Tallyn and Hohener parcels to assess the presence and concentration of TEPH. Soil samples were collected from approximately 1.5, 3 feet and 5 feet below the ground surface (Figure 1 and Table 1).

The reported presence of TEPH is discussed in following paragraphs. Volatile organic compounds (VOCs) and semivolatile organic compounds were not reported in concentrations exceeding the analytical method detection limits in the soil samples analyzed. The reported metals concentrations are considered be represent natural background concentrations of metals within the soil.

The horizontal extent of TEPH is currently assessed to extend south and west approximately to the limits defined by test Pits B, D, E, and N (previous sample locations SB1, SB3, SB5 and SB4), where concentrations of TEPH in shallow soil are expected generally in the range of 50 to 1,000 mg/kg. The horizontal extent of TEPH is currently assessed to extend north and east no farther than the limits defined by test Pits A, H, and K, where concentrations of TEPH in shallow soil were reported to be less than 50 mg/kg. TEPH-affected soil is currently assessed to extend vertically to a nominal depth of 2 feet BGS, but not deeper than 3 feet BGS. The 2-foot depth represents the beginning of the native clay soil horizon, based upon RECON's interpretation of soil lithology in the logs of test pits (see Appendix B).

Based upon the revised area illustrated in Figure 2, the volume of TEPH-affected soil is assessed to be approximately 1,000 in-place cubic yards. Mitigation measures for this soil volume could address TEPH having concentrations in soil above 500 mg/kg. The above interpretation gives relatively greater weight to the current June 9, 1995 sampling program which by design allowed identification of nonnative fill, including placed asphalt and asphalt debris, and which avoided sampling of the asphalt as best as possible by visual observation.

6.2 Soil Lithology

The first approximately 18 inches were generally heterogeneous, typically logged as sandy silts with rounded gravel to 1-inch diameter. In the first 18 inches, orange-brown mottling was noted (Pits H, J, N); light grey-white fines were noted (Pits B, C, D, F, G, L, M, and N); and asphalt chunks were noted from surface to the 2-foot depth BGS (Pits A, E, and H). The origin of the light grey-white fines is not known. Based upon widespread area and uniform depth of this material, and its relative depth above asphalt debris noted between 12 and 24 inches BGS, this material is considered to be nonnative fill.

RECON noted asphalt below the ground surface in the interval 12 inches to 24 inches BGS. Asphalt in one exploratory pit was observed in a uniform horizontal layer or "horizon." Asphalt is determined in the TEPH analyses as petroleum oil and grease. Owing to the high petroleum hydrocarbon content of asphalt, presence of any asphalt in samples extracted by the laboratory for analysis can produce elevated TEPH concentrations.

During the June 9, 1995 sample collection RECON's geologist exercised care not to sample the soil from the asphalt horizon generally found between 12 and 16 inches BGS, where present. Soil samples collected from the 3-foot depth BGS were generally from soil considered to be a native clay.

7.0 CONCLUSIONS

Based on the information presented in this report, the following conclusions have been made:

- It is unlikely that VOCs and semivolatile organic compounds are present in the shallow subsurface of the Tallyn and Hohener parcels. The reported metals concentrations are considered to be representative of natural background concentrations for metals in soil.

- TEPH in near-surface soil extends laterally over the southern portion of the site, overlapping the Tallyn and Hohener parcels (Figure 2). It is RECON's opinion that the TEPH reside in the nonnative fill from surface to 2 feet BGS. It is unlikely that TEPH extends deeper than 3 feet BGS, owing to the presence of native clay soils.

- There is a low likelihood that TEPH where present could migrate through the native clay soils, which were logged to be present uniformly between 3 and 5 feet BGS, to the groundwater beneath the site.

8.0 RECOMMENDATIONS

Based on the information presented in this report, current regulatory guidelines, and the professional judgment of RECON, the following mitigation alternatives are presented:

- **No Action.** No Action is feasible relative to appropriateness and adequacy of No Action for the protection of groundwater. However, RECON understands that the RWQCB and Alameda County Department of Environmental Health may consider No Action for soil having up to 500 mg/kg TEPH, as appropriate or adequate given the proposal to develop housing on the site. TEPH do not necessarily pose a toxic exposure risk but chemical constituents, if present, may. The No Action alternative is contingent upon satisfactory analytical results that characterize that soil has less than 500 mg/kg as TEPH *and* no detectable toxic constituents above accepted remedial action goals.

- **Alternative A: Relocation of TEPH-Affected Soil On-Site.** Sequestering approximately 2,000 in-place cubic yards would involve placement of this soil beneath a landscaped berm. Sequestering of TEPH-or pesticide-affected soil is an accepted practice in many jurisdictions including, for example, the City of San Jose, but would require too much land to be cost effective.

- **Alternative B: Removal of TEPH-Affected Soil for Off-Site Landfilling.** Certain local sanitary landfills such as the one on Vasco Road in Livermore can accept for sanitary landfilling TEPH-affected soil having TEPH concentrations to 1,000 mg/kg, or above 1,000 mg/kg if disposed in its Title D, lined facility.

Based upon the current test results of discrete soil samples, the average TEPH concentration in the 1,000 in-place cubic yards of soil on the Tallyn and Hohener parcels is likely to be less than 1,000 mg/kg. Chemical profiling for off-site disposal would be based on an average in 4-point composite soil samples.

- **Alternative C: Reuse of TEPH-Affected Fill as Road Base.** Under this alternative the target area would be grubbed and the TEPH-affected fill would be excavated and stockpiled temporarily on-site. After grading for new streets, the stockpiled soil would be placed in windrows, mixed with a proprietary binder, spread, and compacted. The treated base would consist of an approximate 8-inch thick lift (after compaction), over which base rock and asphalt pavement would be placed.

  Most of the above-described procedure, except stockpiling and mixing, is required for street construction to meet standard specifications. Based upon the available analytical results and soil logs, the fill contains petroleum hydrocarbons, sands, gravels, fines, and assorted asphalt debris. The fill appears to be devoid of any toxic chemical constituents such as VOCs, semivolatile organic compounds, and metals. This alternative is subject to successful completion of a mix design and acceptance by Alameda County and the City of Hayward. THe approach has been accepted previously by Alameda County Department of Environmental Health, Cal/EPA Department of Toxic Substances Control, California RWQCB, Caltrans, and the U.S. Army Corps of Engineers (Monlux, ENCAPCO, 1995).

Based upon the above information, RECON concludes that the No Action alternative and Alternatives B and C are available. No Action may be implemented in conjunction with Alternatives B or C to assure that TEPH concentrations do not exceed 500 mg/kg anywhere on the future residential lots. The No Action alternative is the lowest cost, available alternative. Alternative B is similar in cost to Alternative C.

9.0 LIMITATIONS

Our professional services were performed, data evaluated, and recommendations prepared in accordance with generally-accepted geological/engineering principles and practices. The judgments, conclusions, and recommendations described in this report pertain to the conditions considered to be present or applicable at the time the work was performed. Future conditions may differ from those described herein and this report is not intended for use in future evaluations unless an update is conducted by a consultant familiar with subsurface investigations. Use of this report is provided to Warmington Homes for their exclusive use and shall be subject to the terms and conditions in the applicable contract between Warmington Homes and RECON. Any third party use of this report shall also be subject to the terms and conditions governing the work in the contract between Warmington Homes and RECON. Any unauthorized release or misuse of this report shall be without risk or liability to RECON.

Certain information contained in this report may have been rightfully provided to RECON by third parties or outside sources. RECON does not make any warranties or representations, whether expressed or implied, regarding the accuracy of such information, and shall not be held accountable or responsible in the event that any such inaccuracies are present.

10.0 REFERENCES

CERTIFIED (CERTIFIED Engineering & Testing Company, Inc.), 1994a, Limited near surface soil chemistry testing: 1362 and 1384 Ruus Lane Hayward, California; report dated March 22, 1994, 3 pp.

_____, 1994b, Summary of site contamination characterization and sampling plan for delineation of soil and groundwater constituents; work plan dated June 22, 1994, 7 pp.

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_____, 1994d, Warmington Homes project at 1362 and 1384 Ruus Lane, Hayward, California; letter dated September 2, 1994, 1 p.

Essenes (Essenes Environmental, Inc.), 1992a, Status report, soil sampling, Hohener property, 1384 Ruus Lane, Hayward, California, Essenes job # 920504.B; report dated June 1, 1992, 2 pp.

_____, 1992a, Status report, soil sampling, Tallyn property, 1362 Ruus Lane, Hayward, California, Essenes job # 920505.B; report dated June 1, 1992, 2 pp.

_____, 1993, Subsurface investigation, site: Hohener property, 1384 Ruus Lane, Hayward, California; report dated March 1, 1994, 7 pp.

Hunziker, Fred, Browning Ferris Industries (BFI), telephone communication (July 11, 1995).

Monlux, Ken, ENCAPCO, letter to Marc Papineau (July 18, 1995).

McClellan, Mike, Warmington Homes, telephone communication (July 11, 1995).

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TABLE 1
SOIL ANALYTICAL RESULTS FOR JUNE 9, 1995 SOIL SAMPLING
1362 AND 1384 RUUS LANE
HAYWARD, CALIFORNIA

Sample No.	Date Collected	Sample Depth (1)	TEPH (2)	Notes
A-1.5	6/9/95	1.5	<50 (3)	Near previous SB8
A-3	6/9/95	3	<50	Near previous SB8
B-1.5	6/9/95	1.5	<50	New location
B-3	6/9/95	3	<50	New location
B-5	6/9/95	5	<50	New location
C-3	6/9/95	3	<50	Near previous SB2
C-5	6/9/95	5	<50	Near previous SB2
D-1.5	6/9/95	1.5	210	Near previous SB1
D-3	6/9/95	3	<50	Near previous SB1
E-1.5	6/9/95	1.5	450	New location
E-3	6/9/95	3	<50	New location
F-3	6/9/95	3	<50	New location
F-5	6/9/95	5	<50	New location
G-3	6/9/95	3	<50	Near previous SB10
G-5	6/9/95	5	<50	Near previous SB10
H-1.5	6/9/95	1.5	<50	New location
H-3	6/9/95	3	<50	New location
J-1.5	6/9/95	1.5	<50	Near previous SB9
J-3	6/9/95	3	<50	Near previous SB9
J-5	6/9/95	5	<50	Near previous SB9
K-1.5	6/9/95	1.5	<50	New location
K-3	6/9/95	3	<50	New location
K-5	6/9/95	5	<50	New location
L-5	6/9/95	5	<50	Near previous SB13 and SB17
M-3	6/9/95	3	<50	Near previous SB15
M-5	6/9/95	5	<50	Near previous SB15
N-1.5	6/9/95	1.5	280	Near previous SB5
N-3	6/9/95	3	<50	Near previous SB5
N-5	6/9/95	5	<50	Near previous SB5

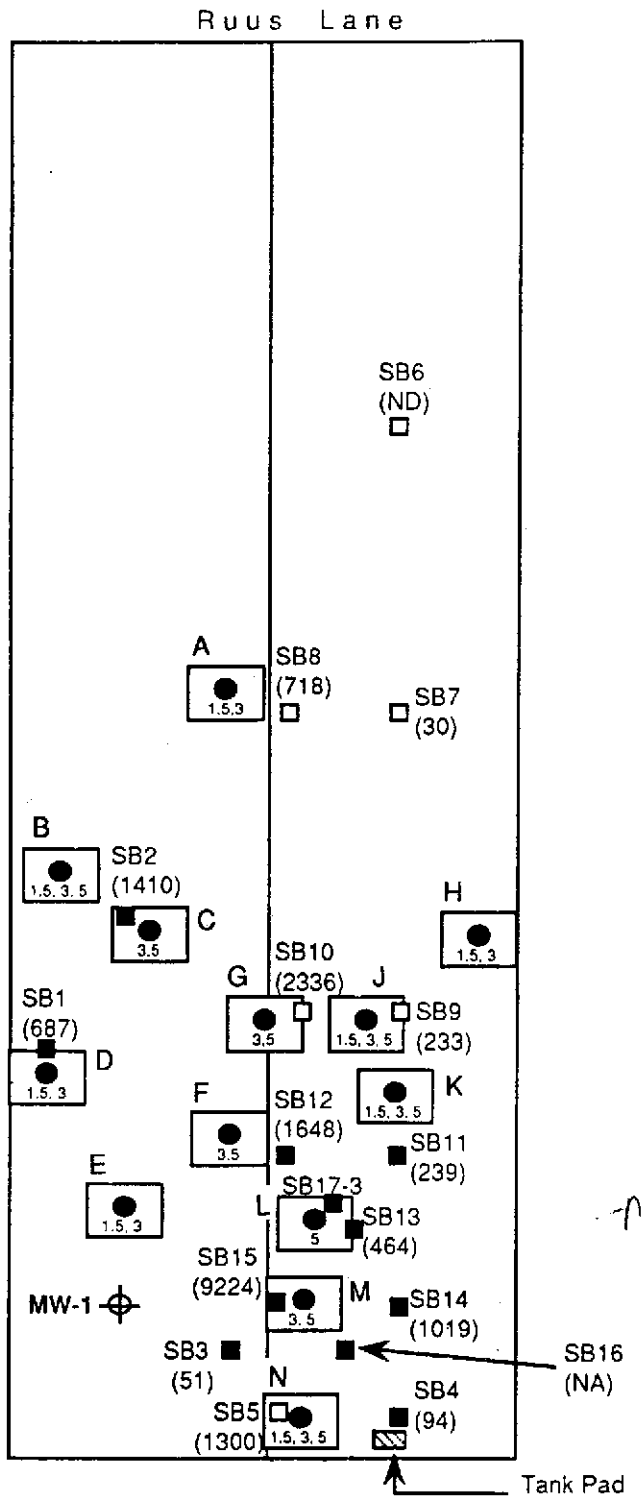
Notes:

1. Sample depth reported in approximate feet below the ground surface.
2. Analysis conducted in general accordance with Standard Method 5520 EF. Concentrations reported in milligrams per kilogram (mg/kg).
3. "<" means less than the reporting limit of 50 mg/kg.

TABLE 2

COMPARISON OF CURRENT AND PREVIOUS TEPH ANALYTICAL RESULTS
1362 AND 1384 RUUS LANE
HAYWARD, CALIFORNIA

Sampled June 9, 1995		Reported November 17, 1994	
Sample Identification	TEPH Result (mg/kg)	Sample Identification	TEPH Result (mg/kg)
D-1.5	210	SB1-1.5	687
J-1.5	< 50	SB-9-1.5	233
N-1.5	280	SB5-1.5	1300
N-3	< 50	SB5-3	1500



KEY

■, □ Previous soil samples reported November, 1994

( ) Total Extractable Petroleum Hydrocarbons (TEPH) Concentration in mg/kg

1,5,3 Test Pit June, 1995

Sample Depth

ND Below Method Detection Level

NA Not Analyzed

NOTES:
1) Site structures and storage areas are not shown.
2) All locations and dimensions are approximate.

naturally 2 and 3 feet

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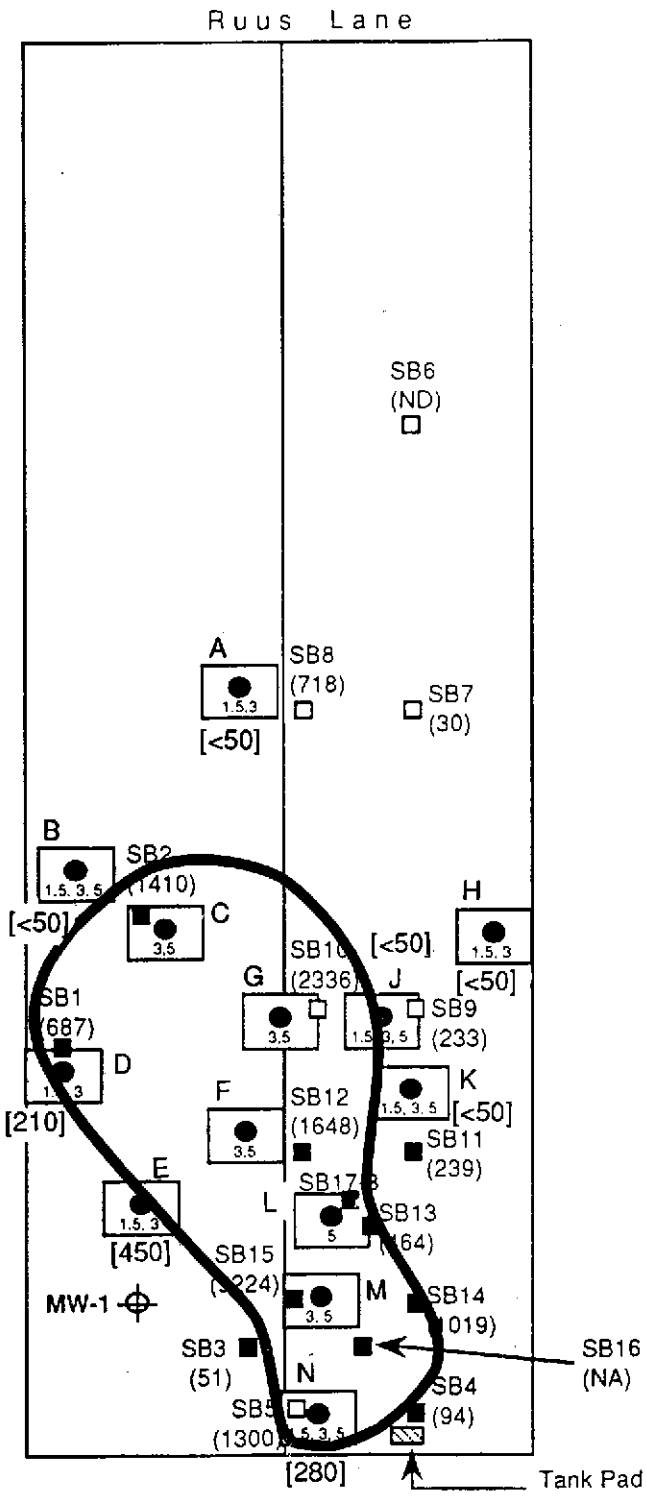
Brisbane, CA 94005

N

Scale: 1" = 100'

FIGURE 1.
TEST PIT LOCATIONS
1362 AND 1384 RUUS LANE
HAYWARD, CALIFORNIA



KEY

■, □ Previous soil samples reported November, 1994

( ) Total Extractable Petroleum
[ ] Hydrocarbons (TEPH) Concentration in mg/kg

1,5,3 Test Pit June, 1995
[ ] Sample Depth

Approximate TEPH 200 mg/kg Iso-Concentration

ND Below Method Detection Level

NA Not Analyzed

NOTES:
1) Site structures and storage areas are not shown.
2) All locations and dimensions are approximate.

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Scale: 1" = 100'

FIGURE 2.
TARGET AREA OF TEPH-AFFECTED SOIL
1362 AND 1384 RUUS LANE
HAYWARD, CALIFORNIA

APPENDIX A

SAMPLING PROCEDURES
EXPLORATORY TEST PIT AND SOIL SAMPLING PROCEDURES

The procedures that were used for excavating exploratory pits and sampling the soil are presented below.

- Each exploratory pit was excavated with a backhoe by an operator provided by Warmington Homes. Locations were directed by RECON's field geologist.
- The pits each were approximately 3 feet wide by eight feet long by five feet deep, with an intermediate bench on each end at approximately 2.5 feet below ground surface.
- Soil samples were collected from the sidewalls using a driven sampler consisting of a slide hammer with spoon loaded with a 2-inch diameter by 6-inch long brass sleeve.
- The spoon and sleeves were washed with water and trisodium phosphate (TSP) and rinsed with water prior to drilling.
- Exploratory pit location, soil descriptions, sample identification and depth, and related sampling information were recorded on a exploratory test pit log.
- Soil samples were generally collected at pre-selected depth intervals (1.5-, 3-, and 5-feet). Each sidewall was observed to avoid sampling of asphalt.
- The spoon was washed between sample intervals using a bristle brush with TSP solution followed by tap water rinse. The spoon was allowed to dry by air prior to sampling.
- Soil samples were collected in brass sample sleeves inserted inside the spoon. Prior to use, the sample sleeves were washed and dried by air or with paper towels.
- Samples were driven by hand-driven slide-hammer.
- Following retrieval of the brass sleeve from the spoon, the ends were covered with aluminum foil and capped with PVC end caps. Each sample was labeled with the sample number, date, time, project number, and sampler's initials.
- Samples retained for laboratory analysis were placed in ziplock bags and stored on ice in an insulated chest cooled to a temperature of approximately 4 degrees Celsius.
- Chain of custody procedures, including the use of chain of custody forms, were used to document sample handling and transport from collection to delivery to the laboratory for analysis.
- All exploratory test pits were backfilled after sampling.

APPENDIX B

SUMMARY OF SOIL TYPES LOGGED IN TEST PITS
1362 AND 1384 RUUS LANE
HAYWARD, CALIFORNIA
June 9, 1995

ID	Soil Types Recorded at Depth in Inches Below Ground Surface					
	0 to 12	12 to 18	18 to 24	24 to 36	36 to 48	48 to 60
A		Asphalt chunks noted	Dark brown silty clay	Dark brown silty clay	Dark brown silty clay	Dark brown silty clay/Olive grey silty clay at 5 feet
B	Gravelly silt	Light grey-white sandy silt, partially cemented,	Dark brown clay	Dark brown clay	Dark brown clay	Dark brown clay
C		Light grey-white and black sand and fines, partially cemented		Brown sandy silt with gravel to 1-inch diameter pebbles	Dark brown clay	Dark brown clay/Grey green clay at 5 feet
D	Silt	Light grey-white fines	Brown sandy silt	Brown sandy silt	Dark brown clay, stiff plastic	
E	Light grey-white fines, partially consolidated		Brown gravelly silt and silty gravel (Asphalt noted in sidewall)	Brown sandy silty gravel and gravelly silt 1/8- to 1-inch diameter		Dark brown clay, stiff, plastic
F	Light grey fines and aggregate, partially consolidated	Light brown sandy silt with rounded pebbles		Brown silty clay		Dark brown clay, plastic
G	Light grey silty sand		Orange brown silty clay with sand	Orange brown silty clay with sand	Dark brown-black clay to silty clay	Dark brown-black clay, stiff, plastic
H		Medium brown silty sandy clay w/ orange brown mottled sand	Medium brown silty sandy clay w/ orange brown mottled sand (Asphalt noted to 2 feet)	Light brown-olive brown sandy silt with clay	Dark brown silty organic clay	Dark brown - black silty organic clay

ID	Soil Types Recorded at Depth in Inches Below Ground Surface					
	0 to 12	12 to 18	18 to 24	24 to 36	36 to 48	48 to 60
J	Aggregate over Brown clayey sandy silt	Brown clay silt with orange brown sand and gravel to 1/2-inch diameter	Brown clayey silt with orange brown sand and gravel to 1/2-inch diameter		Dark brown clay, stiff plastic	Dark brown clay/ Light grey clay, stiff at 5 feet
K	Aggregate over Orange brown silty sand	Light brown sandy silty clay	Dark brown silty clay, stiff plastic	Olive grey clayey sand and light grey sandy clay to 3.5 feet	From 3.5 feet, Dark brown-black organic clay, plastic	Dark brown-black organic clay/Light grey clay at 5 feet
L	Aggregate over Light brown silty gravel/Grey-white fines 3-inch layer	Medium brown sandy silty clay	Medium brown sandy silty clay	Medium brown sandy gravelly clay with 2-inch diameter cobbles and orange brown partially consolidated sand	From 3.5 feet, Dark brown-black organic clay, stiff, plastic	Dark brown-black organic clay, stiff, plastic
M	Aggregate over Light grey fines	Brown sandy gravelly clay with aggregate to 1-inch diameter		Medium brown clayey sandy silt	From 3.8 feet, Dark brown-black clay, stiff plastic	Dark brown-black clay, stiff plastic
N	Aggregate over grey-white fines	Medium brown silty clay with orange brown mottling, aggregate to 1-inch diameter		Light brown silty clay with sand	Light brown clayey silty clay with increased sand	Dark brown-black clay, stiff plastic

APPENDIX C

CHAIN OF CUSTODY FORMS AND LABORATORY ANALYTICAL REPORTS

95-250

RECON ENVIRONMENTAL CORP.
7000 Marina Boulevard, 4th Floor, Brisbane, California 94005
Phone: 415-742-9900; Fax: 415-742-1033

CHAIN OF CUSTODY RECORD

Project Name	Project Number							Type of Analysis																					Condition of Samples	
Ruus Lane Hayward, CA	S40109							418.1/5520 F	8240	8270	CAM 17 metals (TTLC)	pH (corros.)	Reactivity	Ignitability																
Send Report Attention of: M. Papineau	Analytical Laboratory: NORTH STATE ENVIRONMENTAL		No. of Containers	Type of Containers	Preservative																									
Sample Number	Date	Time	Matrix	Location																										
A-1.5	6/9/95	1312	Soil	1384 Ruus	1	BRASS	N/A	✓																				95-25	0-01
A-3	6/9/95		Soil		1			✓																					-02
B-1.5	6/9/95	1255	Soil		1			✓																					-03
B-3	6/9/95	1300	Soil		1			✓																					-04
B-5	6/9/95		Soil		1			✓																					-05
C-3	6/9/95	1237	Soil		1			✓																					-06
C-5	6/9/95	1252	Soil		1			✓																					-07
D-1.5	6/9/95	1222	Soil		1			✓																					-08
D-3	6/9/95	1226	Soil		1			✓																					-09
E-1.5	6/9/95		Soil		1			✓																					-10
E-3	6/9/95		Soil		1			✓																					-11
F-3	6/9/95	1150	Soil		1			✓																					-12
F-5	6/9/95		Soil	1384 Ruus	1			✓																					-13
G-3	6/9/95		Soil	1384/1362	1			✓	✓	✓	✓		✓	✓	✓														-14
G-5	6/9/95		Soil	1384/1362	1			✓																					-15
H-1.5	6/9/95	1040	Soil	1362 Ruus	1			✓																					-16
H-3	6/9/95	1030	Soil		1			✓																					-17
J-1.5	6/9/95		Soil		1			✓																					-18
J-3	6/9/95		Soil		1			✓																					-19
J-5	6/9/95		Soil	1362 Ruus	1	BRASS	N/A	✓																					-20

Relinquished by:	Date/Time:	Received by:	Date/Time:
[signature]	6/9/95 1443	[signature] 6/9/95	2:43p
Relinquished by:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Date/Time:	Received by:	Date/Time:

Remarks:

ONLY SAMPLE G-3 NEEDS 8240, 8270, CAM 17 metals (TTLC) and RCI.

RECON ENVIRONMENTAL CORP.
7000 Marina Boulevard, 4th Floor, Brisbane, California 94005
Phone: 415-742-9900; Fax: 415-742-1033

CHAIN OF CUSTODY RECORD

Project Name			Project Number					Type of Analysis			Condition of Samples	
Rvus Lane, Haywood, CA			S40109					418.1/5520F				
Send Report Attention of:			Analytical Laboratory:									
M. Papineau			North State Environmental									
Sample Number	Date	Time	Matrix	Location	No. of Containers	Type of Containers	Preservative					
K-1.5	6/9/95	1017	Soil	1362 Rvus	1	Brass	N/A	✓			95-25	-21
K-3	6/9/95	1021	Soil		1			✓				-22
K-5	6/9/95		Soil		1			✓				-23
L-5	6/9/95	1055	Soil		1			✓				-24
M-3	6/9/95	1138	Soil		1			✓				-25
M-5	6/9/95		Soil		1			✓				-26
N-1.5	6/9/95	1103	Soil		1			✓				-27
N-3	6/9/95		Soil	1362 Rvus	1	Brass	N/A	✓				-28
N-5	6/9/95	1116	Soil	1362 Rvus	1	Brass	N/A	✓				-29

Relinquished by:	Date/Time:	Received by:	Date/Time:	Remarks:
M. Papineau	6/9/95 1443	[illegible] 6/9/95	2:43p	
Relinquished by:	Date/Time:	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received by:	Date/Time:	

North State Environmental
Chemical Waste Disposal · Trucking · Consulting

C E R T I F I C A T E O F A N A L Y S I S

JOB NO:95-250
CLIENT:RECON
PROJECT NAME: Rvuslane
Hayward, CA
S40109

DATE SAMPLED: 06-09-95
DATE EXTRACTED:06-14-95
DATE ANALYZED: 06-19-95

TTLC METALS BY ATOMIC ABSORPTION SPECTROMETRY
SAMPLES PREPARED BY EPA METHOD 3050

SAMPLE NO.	CLIENT ID	ANALYTE/METHOD		RESULT	
95-250-14	G-3	Antimony	7040	ND	
		Arsenic	7061	1	mg/Kg
		Barium	7080	ND	
		Beryllium	7090	ND	
		Cadmium	7130	ND	
		Chromium	7190	19	mg/Kg
		Cobalt	7200	14	mg/Kg
		Copper	7210	21	mg/Kg
		Lead	7420	ND	
		Mercury	7470	ND	
		Molybdeum	7780	ND	
		Nickel	7520	44	mg/Kg
		Selenium	7741	ND	
		Silver	7760	ND	
		Thallium	7840	ND	
		Vanadium	7910	ND	
		Zinc	7950	40	mg/Kg

Quality Control Quality Assurance Summary:

Analyte	Method	Reporting limit	Blank	MS/MSD Recovery	RPD
Antimony	7040	2.0 mg/Kg	ND	98%	1
Arsenic	7061	5.0 ug/Kg	ND	111%	14
Barium	7080	2.0 mg/Kg	ND	101%	2
Beryllium	7090	0.2 mg/Kg	ND	93%	1
Cadmium	7130	0.5 mg/Kg	ND	100%	1
Chromium	7190	0.5 mg/Kg	ND	88%	1
Cobalt	7200	0.5 mg/Kg	ND	100%	1
Copper	7210	0.2 mg/Kg	ND	99%	1
Lead	7420	1.0 mg/Kg	ND	103%	1
Mercury	7470	2.0 ug/Kg	ND	109%	3
Molybdenum	7480	2.0 mg/Kg	ND	99%	3
Nickel	7520	0.5 mg/Kg	ND	103%	1
Selenium	7741	5.0 ug/Kg	ND	106%	6
Silver	7760	0.5 mg/Kg	ND	90%	4
Thallium	7840	2.0 mg/Kg	ND	97%	1
Vanadium	7910	5.0 mg/Kg	ND	99%	1
Zinc	7950	0.1 mg/Kg	ND	100%	2

ELAP CERTIFICATION NUMBER 1753

Reviewed and Approved by

John Murphy
Laboratory Director

P.O.Box 5624 • South San Francisco, California 94083 • 415-588-2838 FAX 588-1950

North State Environmental
Chemical Waste Disposal · Trucking · Consulting

C E R T I F I C A T E O F A N A L Y S I S

JOB NO: 95-250
CLIENT: RECON
PROJECT NAME: Rvusland
Hayward,CA

DATE SAMPLED: 06-09-95
DATE EXTRACTED:06-12-95
DATE ANALYZED: 06-12-95

DETERMINATION OF TOTAL PETROLEUM HYDROCARBONS
GRAVIMETRIC METHOD 5520 F

SAMPLE NO.	CLIENT ID	ANALYTE/METHOD		RESULT	
95-250-01	A-1.5	TEPH	5520 F	ND	
95-250-02	A-3	TEPH	5520 F	ND	
95-250-03	B-1.5	TEPH	5520 F	ND	
95-250-04	B-3	TEPH	5520 F	ND	
95-250-05	B-5	TEPH	5520 F	ND	
95-250-06	C-3	TEPH	5520 F	ND	
95-250-07	C-5	TEPH	5520 F	ND	
95-250-08	D-1.5	TEPH	5520 F	210	mg/Kg
95-250-09	D-3	TEPH	5520 F	ND	
95-250-10	E-1.5	TEPH	5520 F	450	mg/Kg
95-250-11	E-3	TEPH	5520 F	ND	
95-250-12	F-3	TEPH	5520 F	ND	
95-250-13	F-5	TEPH	5520 F	ND	
95-250-14	G-3	TEPH	5520 F	ND	
95-250-15	G-5	TEPH	5520 F	ND	
95-250-16	H-1.5	TEPH	5520 F	ND	
95-250-17	H-3	TEPH	5520 F	ND	
95-250-18	J-1.5	TEPH	5520 F	ND	

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North State Environmental
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C E R T I F I C A T E O F A N A L Y S I S

JOB NO: 95-250
CLIENT: RECON
PROJECT NAME: Rvusland
Hayward, CA

DATE SAMPLED: 06-09-95
DATE EXTRACTED: 06-12-95
DATE ANALYZED: 06-12-95

DETERMINATION OF TOTAL PETROLEUM HYDROCARBONS
GRAVIMETRIC METHOD 5520 F

SAMPLE NO.	CLIENT ID	ANALYTE/METHOD		RESULT	
95-250-19	J-3	TEPH	5520 F	ND	
95-250-20	J-5	TEPH	5520 F	ND	
95-250-21	K-1.5	TEPH	5520 F	ND	
95-250-22	K-3	TEPH	5520 F	ND	
95-250-23	K-5	TEPH	5520 F	ND	
95-250-24	L-5	TEPH	5520 F	ND	
95-250-25	M-3	TEPH	5520 F	ND	
95-250-26	M-5	TEPH	5520 F	ND	
95-250-27	N-1.5	TEPH	5520 F	280	mg/Kg
95-250-28	N-3	TEPH	5520 F	ND	
95-250-29	N-5	TEPH	5520 F	ND	

Quality Control/Quality Assurance Summary:

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
TEPH	5520 F	50 mg/Kg	ND	59%	5

ELAP CERTIFICATION NUMBER 1753

Reviewed and Approved by

John Murphy
Laboratory Director

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North State Environmental
Chemical Waste Disposal · Trucking · Consulting

C E R T I F I C A T E O F A N A L Y S I S

JOB NO: 95-250
CLIENT: RECON
PROJECT NAME: Rvuslane
Hayward, CA
S40109

DATE SAMPLED: 06-09-95
DATE EXTRACTED: 06-14-95
DATE ANALYZED: 06-14-95

FLASHPOINT BY METHOD 1010 CLOSED CUP PENSKY-MARTENS

SAMPLE NO.	CLIENT ID	ANALYTE/METHOD	RESULT
95-250-14	G-3	Flashpoint 1010	> 200 0 F

Flashpoint test was run in duplicate

ELAP CERTIFICATION NUMBER 1753

Reviewed and Approved by

John Murphy
Laboratory Director

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C E R T I F I C A T E O F A N A L Y S I S

JOB NO: 95-250
CLIENT: RECON
PROJECT NAME: Rvuslane
Hayward,CA
S40109

DATE SAMPLED: 06-09-95
DATE EXTRACTED: 06-14-95
DATE ANALYZED: 06-14-95

PH OF SOIL WASTES BY METHOD 9045

SAMPLE NO.	CLIENT ID	ANALYTE/METHOD	RESULT
95-250-14	G-3	pH 9045	7.48

pH meter was calibrated using 3 buffer solutions from Spectrum Chemical Co., at pH 4, 7 and 10.

ELAP CERTIFICATION NUMBER 1753

Reviewed and Approved by

John Murphy
Laboratory Director

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Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

NORTH STATE ENVIRONMENTAL
90 SOUTH SPRUCE ST. UNIT W
SOUTH SAN FRANCISCO, CA 94053

Date: June 19, 1995

Attn: JOHN MURPHY

Laboratory Number : 81882

Project Number/Name :

This report has been reviewed and

approved for release.

Michael R. Veroms
Senior Chemist
Account Manager

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

NORTH STATE ENVIRONMENTAL
Attn: JOHN MURPHY

Project
Reported on June 19, 1995

Reactive Cyanide by SW-846 Method 9010
Reactive Sulfide by SW-846 Method 9030

Chronology

Laboratory Number 81882

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
GR-3	06/09/95	06/12/95	06/15/95	06/15/95	BF153.33	01

QC Samples

QC Batch #	QC Sample ID	Type	Ref.	Matrix	Extract.	Analyzed
BF153.33-01	Method Blank	MB		Soil	06/15/95	06/15/95
BF153.33-02	Laboratory Spike	LS		Soil	06/15/95	06/15/95
BF153.33-04	D.14	MS	81888-01	Soil	06/15/95	06/15/95
BF153.33-05	D.14	MSD	81888-01	Soil	06/15/95	06/15/95

Certified Laboratories

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Martinez, California 94553
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1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

NORTH STATE ENVIRONMENTAL
Attn: JOHN MURPHY

Project
Reported on June 19, 1995

Reactive Cyanide by SW-846 Method 9010
Reactive Sulfide by SW-846 Method 9030

LAB ID	Sample ID	Matrix	Dil.Factor	Moisture
81882-01	GR-3	Soil	1.0	-

R E S U L T S O F A N A L Y S I S

Compound	81882-01 Conc. mg/kg	RL
Reactive Cyanide	ND	1
Reactive Sulfide	ND	1

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Martinez, California 94553
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309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Reactive Cyanide by SW-846 Method 9010
Reactive Sulfide by SW-846 Method 9030

Quality Assurance and Control Data

Laboratory Number: 81882
Method Blank(s)

	BF153.33-01 Conc. mg/kg	RL
Reactive Cyanide	ND	1
Reactive Sulfide	ND	1

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Martinez, California 94553
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San Francisco, California 94124
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309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Reactive Cyanide by SW-846 Method 9010
Reactive Sulfide by SW-846 Method 9030

Quality Assurance and Control Data

Laboratory Number: 81882

Compound	Sample conc.	SPK Level	SPK Result	Recovery %	Limits %	RPD %
For Soil Matrix (mg/kg)						
BF153.33 02 / - Laboratory Control Spikes						
Reactive Cyanide		1	1.0	100	25-75	
Reactive Sulfide		1	1.0	100	25-75	
For Soil Matrix (mg/kg)						
BF153.33 04 / 05 - Sample Spiked: 81888 - 01						
Reactive Cyanide	ND	1	0.9/0.9	90/90	25-75	0
Reactive Sulfide	ND	1	0.9/0.9	90/90	25-75	0

Definitions:
ND = Not Detected
RL = Reporting Limit
NA = Not Analysed
RPD = Relative Percent Difference
ug/L = parts per billion (ppb)
mg/L = parts per million (ppm)
ug/kg = parts per billion (ppb)
mg/kg = parts per million (ppm)

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Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

ORTH STATE ENVIRONMENTAL
Attn: JOHN MURPHY

Project
Reported on June 16, 1995

EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

Chronology

Laboratory Number 81882

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
GR-3	06/09/95	06/12/95	06/13/95	06/15/95	BF132.24	01

QC Samples

QC Batch #	QC Sample ID	TypeRef.	Matrix	Extract.	Analyzed
BF132.24-01	Method Blank	MB	Soil	06/13/95	06/13/95
BF132.24-02	Laboratory Spike	LS	Soil	06/13/95	06/13/95
BF132.24-03	Laboratory Spike Duplicate	LSD	Soil	06/13/95	06/13/95
BF132.24-04	W.O 5.5'	MS 81834-01	Soil	06/13/95	06/13/95
BF132.24-05	W.O 5.5'	MSD 81834-01	Soil	06/13/95	06/13/95
BF132.24-06	Method Blank	MB	Soil	06/13/95	06/15/95

Certified Laboratories

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Martinez, California 94553
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San Francisco, California 94124
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309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

NORTH STATE ENVIRONMENTAL
Attn: JOHN MURPHY

Project
Reported on June 16, 1995

EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

LAB ID	Sample ID	Matrix	Dil.Factor	Moisture
81882-01	GR-3	Soil	1.0	-

R E S U L T S O F A N A L Y S I S

Compound	81882-01 Conc. ug/Kg	RL
bis(2-chloroethyl)ether	ND	300
aniline	ND	300
phenol	ND	300
2-chlorophenol	ND	300
1,3-dichlorobenzene	ND	300
1,4-dichlorobenzene	ND	300
1,2-dichlorobenzene	ND	300
benzyl alcohol	ND	300
bis-(2-chloroisopropyl)ether	ND	300
2-methylphenol	ND	300
hexachloroethane	ND	300
n-nitroso-di-n-propylamine	ND	300
4-methylphenol	ND	300
nitrobenzene	ND	300
isophorone	ND	300
2-nitrophenol	ND	300
2,4-dimethylphenol	ND	300
bis(2-chloroethoxy)methane	ND	300
2,4-dichlorophenol	ND	300
1,2,4-trichlorobenzene	ND	300
naphthalene	ND	300
benzoic acid	ND	300
4-chloroaniline	ND	300
hexachlorobutadiene	ND	300
4-chloro-3-methylphenol	ND	300
2-methyl-naphthalene	ND	300
hexaclorocyclopentadiene	ND	300
2,4,6-trichlorophenol	ND	300
2,4,5-trichlorophenol	ND	300
2-chloronaphthalene	ND	300
2-nitroaniline	ND	300
acenaphthylene	ND	300

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NORTH STATE ENVIRONMENTAL
Attn: JOHN MURPHY

Project
Reported on June 16, 1995

EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

LAB ID	Sample ID	Matrix	Dil.Factor	Moisture
81882-01	GR-3	Soil	1.0	-

R E S U L T S O F A N A L Y S I S

Compound	81882-01 Conc. ug/Kg	RL
dimethylphthlate	ND	300
2,6-dinitrotoluene	ND	300
Acenaphthene	ND	300
3-nitroaniline	ND	300
2,4-dinitrophenol	ND	300
dibenzofuran	ND	300
2,4-dinitrotoluene	ND	300
4-nitrophenol	ND	300
fluorene	ND	300
4-chlorophenyl-phenylether	ND	300
diethylphthlate	ND	300
4-nitroaniline	ND	300
4,6-dinitro-2-methylphenol	ND	300
n-nitrosodiphenylamine	ND	300
4-bromo-phenyl-phenylether	ND	300
hexachlorobenzene	ND	300
pentachlorophenol	ND	300
phenanthrene	ND	300
anthracene	ND	300
di-n-butylphthlate	ND	300
fluoranthene	ND	300
benzidine	ND	300
pyrene	ND	300
butylbenzylphthlate	ND	300
3.3'-dichlorobenzidine	ND	300
Benzo(a)Anthracene	ND	300
chrysene	ND	300
bis(2-ethylhexyl)phthalate	ND	300
di-n-octylphthalate	ND	300
benzo(b,k)fluoranthene	ND	300
Benzo(a)Pyrene	ND	300
Indeno(1,2,3)Pyrene	ND	300

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825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

NORTH STATE ENVIRONMENTAL
Attn: JOHN MURPHY

Project
Reported on June 16, 1995

EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

LAB ID	Sample ID	Matrix	Dil.Factor	Moisture
81882-01	GR-3	Soil	1.0	-

R E S U L T S O F A N A L Y S I S

Compound	81882-01 Conc. ug/Kg	RL
dibenzo[a,h]anthracene	ND	300
Benzo(g,h,i)Perylene	ND	300
9H-Carbazole	ND	300
> Surrogate Recoveries (%) <<		
2-fluorophenol	83	
phenol-d5	92	
nitrobenzene-d5	96	
2-fluorobiphenyl	93	
2,4,6-tribromophenol	92	
terphenyl-d14	74	

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EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

Quality Assurance and Control Data

Laboratory Number: 81882
Method Blank(s)

	BF132.24-01		BF132.24-06	
	Conc. ug/kg	RL	Conc. ug/kg	RL
bis(2-chloroethyl)ether	ND	300	ND	300
aniline	ND	300	ND	300
phenol	ND	300	ND	300
2-chlorophenol	ND	300	ND	300
1,3-dichlorobenzene	ND	300	ND	300
1,4-dichlorobenzene	ND	300	ND	300
1,2-dichlorobenzene	ND	300	ND	300
benzyl alcohol	ND	300	ND	300
bis-(2-chloroisopropyl)ether	ND	300	ND	300
2-methylphenol	ND	300	ND	300
hexachloroethane	ND	300	ND	300
n-nitroso-di-n-propylamine	ND	300	ND	300
4-methylphenol	ND	300	ND	300
nitrobenzene	ND	300	ND	300
isophorone	ND	300	ND	300
2-nitrophenol	ND	300	ND	300
2,4-dimethylphenol	ND	300	ND	300
bis(2-chloroethoxy)methane	ND	300	ND	300
2,4-dichlorophenol	ND	300	ND	300
1,2,4-trichlorobenzene	ND	300	ND	300
naphthalene	ND	300	ND	300
benzoic acid	ND	300	ND	300
4-chloroaniline	ND	300	ND	300
hexachlorobutadiene	ND	300	ND	300
4-chloro-3-methylphenol	ND	300	ND	300
2-methyl-naphthalene	ND	300	ND	300
hexaclorocyclopentadiene	ND	300	ND	300
2,4,6-trichlorophenol	ND	300	ND	300
2,4,5-trichlorophenol	ND	300	ND	300
2-chloronaphthalene	ND	300	ND	300
2-nitroaniline	ND	300	ND	300
acenaphthylene	ND	300	ND	300
dimethylphthlate	ND	300	ND	300
2,6-dinitrotoluene	ND	300	ND	300
Acenaphthene	ND	300	ND	300
3-nitroaniline	ND	300	ND	300
2,4-dinitrophenol	ND	300	ND	300
dibenzofuran	ND	300	ND	300

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Quality Assurance and Control Data

Laboratory Number: 81882
Method Blank(s)

	BF132.24-01 Conc. ug/kg	RL	BF132.24-06 Conc. ug/kg	RL
2,4-dinitrotoluene	ND	300	ND	300
4-nitrophenol	ND	300	ND	300
fluorene	ND	300	ND	300
4-chlorophenyl-phenylether	ND	300	ND	300
diethylphthlate	ND	300	ND	300
4-nitroaniline	ND	300	ND	300
4,6-dinitro-2-methylphenol	ND	300	ND	300
n-nitrosodiphenylamine	ND	300	ND	300
4-bromo-phenyl-phenylether	ND	300	ND	300
hexachlorobenzene	ND	300	ND	300
pentachlorophenol	ND	300	ND	300
phenanthrene	ND	300	ND	300
anthracene	ND	300	ND	300
di-n-butylphthlate	ND	300	ND	300
fluoranthene	ND	300	ND	300
benzidine	ND	300	ND	300
pyrene	ND	300	ND	300
butylbenzylphthlate	ND	300	ND	300
3.3'-dichlorobenzidine	ND	300	ND	300
Benzo(a)Anthracene	ND	300	ND	300
chrysene	ND	300	ND	300
bis(2-ethylhexyl)phthalate	ND	300	ND	300
di-n-octylphthalate	ND	300	ND	300
benzo(b,k)fluoranthene	ND	300	ND	300
Benzo(a)Pyrene	ND	300	ND	300
Indeno(1,2,3)Pyrene	ND	300	ND	300
dibenzo[a,h]anthracene	ND	300	ND	300
Benzo(g,h,i)Perylene	ND	300	ND	300
9H-Carbazole	ND	300	ND	300
>> Surrogate Recoveries (%) <<				
2-fluorophenol	88		85	
phenol-d5	90		90	
nitrobenzene-d5	88		88	
2-fluorobiphenyl	98		94	
2,4,6-tribromophenol	94		94	
terphenyl-d14	86		75	

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EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

Quality Assurance and Control Data

Laboratory Number: 81882

Compound	Sample conc.	SPK Level	SPK Result	Recovery %	Limits %	RPD %
For Soil Matrix (ug/Kg)						
BF132.24 02 / 03 - Laboratory Control Spikes						
phenol		3300	2698/2670	82/81	26-90	1
2-chlorophenol		3300	2821/2751	85/83	25-102	2
1,4-dichlorobenzene		1650	1590/1569	96/95	28-104	1
n-nitroso-di-n-propylamine		1650	1535/1499	93/91	41-126	2
1,2,4-trichlorobenzene		1650	1657/1651	100/100	38-107	0
4-chloro-3-methylphenol		3300	2769/2749	84/83	26-103	1
Acenaphthene		1650	1653/1635	100/99	31-137	1
2,4-dinitrotoluene		1650	1781/1773	108/107	28-89	1
4-nitrophenol		3300	3048/2957	92/90	11-114	2
pentachlorophenol		3300	2931/2915	89/88	17-109	1
pyrene		1650	1637/1636	99/99	35-142	0
>> Surrogate Recoveries (%) <<						
2-fluorophenol				93/91	25-121	
phenol-d5				92/88	24-113	
nitrobenzene-d5				88/87	23-120	
2-fluorobiphenyl				96/95	30-115	
2,4,6-tribromophenol				100/99	19-122	
terphenyl-d14				85/85	18-137	
For Soil Matrix (ug/Kg)						
BF132.24 04 / 05 - Sample Spiked: 81834 - 01						
phenol	ND	3300	2695/2563	82/78	26-90	5
2-chlorophenol	ND	3300	2735/2695	83/82	25-102	1
1,4-dichlorobenzene	ND	1650	1548/1522	94/92	28-104	2
n-nitroso-di-n-propylamine	ND	1650	1510/1454	92/88	41-126	4
1,2,4-trichlorobenzene	ND	1650	1614/1594	98/97	38-107	1
4-chloro-3-methylphenol	ND	3300	2732/2720	83/82	26-103	1
Acenaphthene	ND	1650	1629/1603	99/97	31-137	2
2,4-dinitrotoluene	ND	1650	1747/1735	106/105	28-89	1
4-nitrophenol	ND	3300	2809/2921	85/89	11-114	5
pentachlorophenol	ND	3300	2920/2964	88/90	17-109	2
pyrene	ND	1650	1465/1444	89/88	35-142	1

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Seattle, Washington 98108
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EPA SW-846 Method 8270 Semivolatile Organics by GC/MS

Quality Assurance and Control Data

Laboratory Number: 81882

Compound	Sample conc.	SPK Level	SPK Result	Recovery %	Limits %	RPD %
>> Surrogate Recoveries (%) <<						
2-fluorophenol				91/89	25-121	
phenol-d5				89/87	24-113	
nitrobenzene-d5				92/91	23-120	
2-fluorobiphenyl				104/100	30-115	
2,4,6-tribromophenol				100/102	19-122	
terphenyl-d14				83/81	18-137	

Definitions:

ND = Not Detected
RL = Reporting Limit
NA = Not Analysed
RPD = Relative Percent Difference
ug/L = parts per billion (ppb)
mg/L = parts per million (ppm)
ug/kg = parts per billion (ppb)
mg/kg = parts per million (ppm)

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NORTH STATE ENVIRONMENTAL
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Reported on June 15, 1995

EPA SW-846 Method 8240 Volatile Organics by GC/MS

Chronology

Laboratory Number 81882

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
GR-3	06/09/95	06/12/95	06/13/95	06/13/95	BF131.23	01

QC Samples

QC Batch #	QC Sample ID	Type	Ref.	Matrix	Extract.	Analyzed
BF131.23-01	Method Blank	MB		Soil	06/13/95	06/13/95
BF131.23-02	Laboratory Spike	LS		Soil	06/13/95	06/13/95
BF131.23-03	MW1A(2,5,7,9)	MS	81865-01	Soil	06/13/95	06/13/95
BF131.23-04	MW1A(2,5,7,9)	MSD	81865-01	Soil	06/13/95	06/13/95

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EPA SW-846 Method 8240 Volatile Organics by GC/MS

LAB ID	Sample ID	Matrix	Dil.Factor	Moisture
81882-01	GR-3	Soil	1.0	-

R E S U L T S O F A N A L Y S I S

Compound	81882-01 Conc. ug/kg	RL
Chloromethane	ND	50
Bromomethane	ND	50
Vinyl Chloride	ND	50
Chloroethane	ND	50
Dichloromethane	ND	50
Acetone	ND	200
Carbon Disulfide	ND	15
Trichlorofluoromethane	ND	15
1,1-Dichloroethene	ND	15
1,1-Dichloroethane	ND	15
t-1,2-Dichloroethene	ND	15
Chloroform	ND	15
1,2-Dichloroethane	ND	5
2-Butanone	ND	100
1,1,1-Trichloroethane	ND	15
Carbon tetrachloride	ND	15
Vinyl Acetate	ND	50
Bromodichloromethane	ND	15
1,2-Dichloropropane	ND	15
c-1,2-Dichloroethene	ND	15
c-1,3-Dichloropropene	ND	15
Trichloroethene	ND	15
Dibromochloromethane	ND	15
1,1,2-Trichloroethane	ND	15
Benzene	ND	5
t-1,3-Dichloropropene	ND	15
Bromoform	ND	15
4-methyl-2-Pentanone	ND	50
2-Hexanone	ND	50
Tetrachloroethene	ND	15
1,1,2,2-Tetrachloroethane	ND	15
Toluene	ND	15

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LAB ID	Sample ID	Matrix	Dil.Factor	Moisture
81882-01	GR-3	Soil	1.0	-

R E S U L T S O F A N A L Y S I S

Compound	81882-01 Conc. ug/kg	RL
Chlorobenzene	ND	15
Ethyl Benzene	ND	15
Styrene	ND	15
Xylenes	ND	15
1,3-Dichlorobenzene	ND	15
1,4-Dichlorobenzene	ND	15
1,2-Dichlorobenzene	ND	15
> Surrogate Recoveries (%) <<		
1,2-Dichloroethane-d4	111	
Toluene-d8	100	
Bromofluorobenzene	91	

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EPA SW-846 Method 8240 Volatile Organics by GC/MS

Quality Assurance and Control Data

Laboratory Number: 81882
Method Blank(s)

BF131.23-01

	Conc. ug/kg	RL
Chloromethane	ND	50
Bromomethane	ND	50
Vinyl Chloride	ND	50
Chloroethane	ND	50
Dichloromethane	ND	50
Acetone	ND	200
Carbon Disulfide	ND	15
Trichlorofluoromethane	ND	15
1,1-Dichloroethene	ND	15
1,1-Dichloroethane	ND	15
t-1,2-Dichloroethene	ND	15
Chloroform	ND	15
1,2-Dichloroethane	ND	5
2-Butanone	ND	100
1,1,1-Trichloroethane	ND	15
Carbon tetrachloride	ND	15
Vinyl Acetate	ND	50
Bromodichloromethane	ND	15
1,2-Dichloropropane	ND	15
c-1,2-Dichloroethene	ND	15
c-1,3-Dichloropropene	ND	15
Trichloroethene	ND	15
Dibromochloromethane	ND	15
1,1,2-Trichloroethane	ND	15
Benzene	ND	5
t-1,3-Dichloropropene	ND	15
Bromoform	ND	15
4-methyl-2-Pentanone	ND	50
2-Hexanone	ND	50
Tetrachloroethene	ND	15
1,1,2,2-Tetrachloroethane	ND	15
Toluene	ND	15
Chlorobenzene	ND	15
Ethyl Benzene	ND	15
Styrene	ND	15
Xylenes	ND	15
1,3-Dichlorobenzene	ND	15
1,4-Dichlorobenzene	ND	15

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Quality Assurance and Control Data

Laboratory Number: 81882
Method Blank(s)

	BF131.23-01 Conc. ug/kg	RL
1,2-Dichlorobenzene	ND	15
>> Surrogate Recoveries (%) <<		
1,2-Dichloroethane-d4	97	
Toluene-d8	100	
Bromofluorobenzene	91	

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EPA SW-846 Method 8240 Volatile Organics by GC/MS

Quality Assurance and Control Data

Laboratory Number: 81882

Compound	Sample conc.	SPK Level	SPK Result	Recovery %	Limits %	RPD %
For Soil Matrix (ug/kg)						
BF131.23 02 / - Laboratory Control Spikes						
1,1-Dichloroethene		200	220	110	59-172	
Trichloroethene		200	200	100	62-137	
Benzene		200	200	100	66-142	
Toluene		200	210	105	59-139	
Chlorobenzene		200	210	105	60-133	
>> Surrogate Recoveries (%) <<						
1,2-Dichloroethane-d4				95	71-126	
Toluene-d8				102	90-115	
Bromofluorobenzene				91	72-103	
For Soil Matrix (ug/kg)						
BF131.23 03 / 04 - Sample Spiked: 81865 - 01						
1,1-Dichloroethene	ND	200	210/220	105/110	59-172	5
Trichloroethene	ND	200	190/190	95/95	62-137	0
Benzene	ND	200	200/200	100/100	66-142	0
Toluene	ND	200	180/210	90/105	59-139	15
Chlorobenzene	ND	200	180/200	90/100	60-133	11
>> Surrogate Recoveries (%) <<						
1,2-Dichloroethane-d4				105/102	71-126	
Toluene-d8				90/107	90-115	
Bromofluorobenzene				91/91	72-103	

Definitions:

ND = Not Detected
RL = Reporting Limit
NA = Not Analysed
RPD = Relative Percent Difference
ug/L = parts per billion (ppb)
mg/L = parts per million (ppm)
ug/kg = parts per billion (ppb)
mg/kg = parts per million (ppm)

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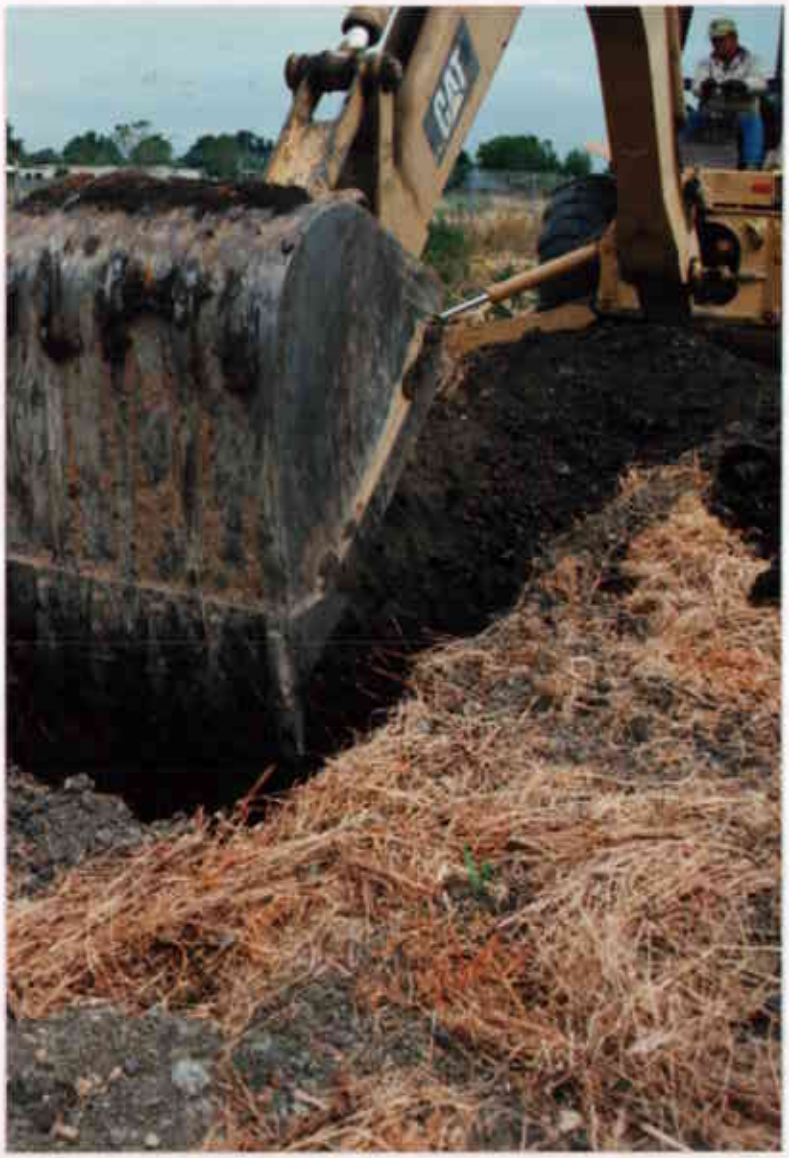
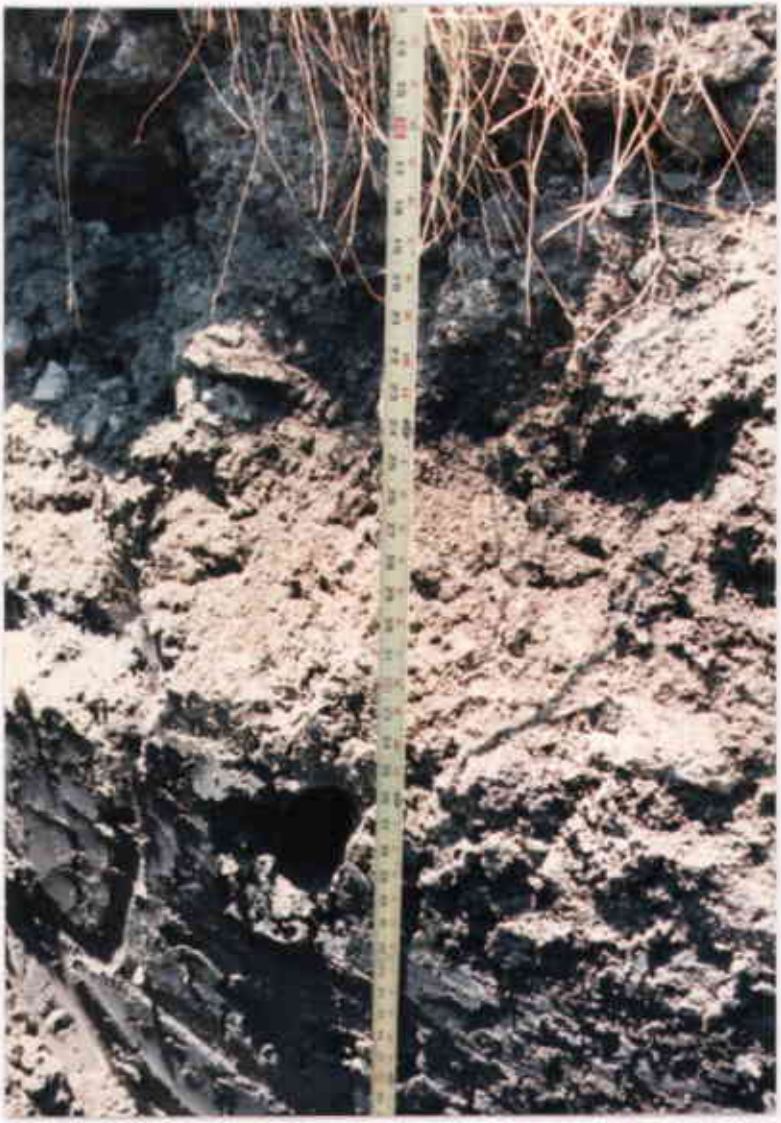
APPENDIX D

PHOTOGRAPHS OF EXPLORATORY PITS

PIT A PHOTOGRAPHS



PIT B PHOTOGRAPHS



PIT C PHOTOGRAPHS

PIT D PHOTOGRAPH

PIT F PHOTOGRAPHS

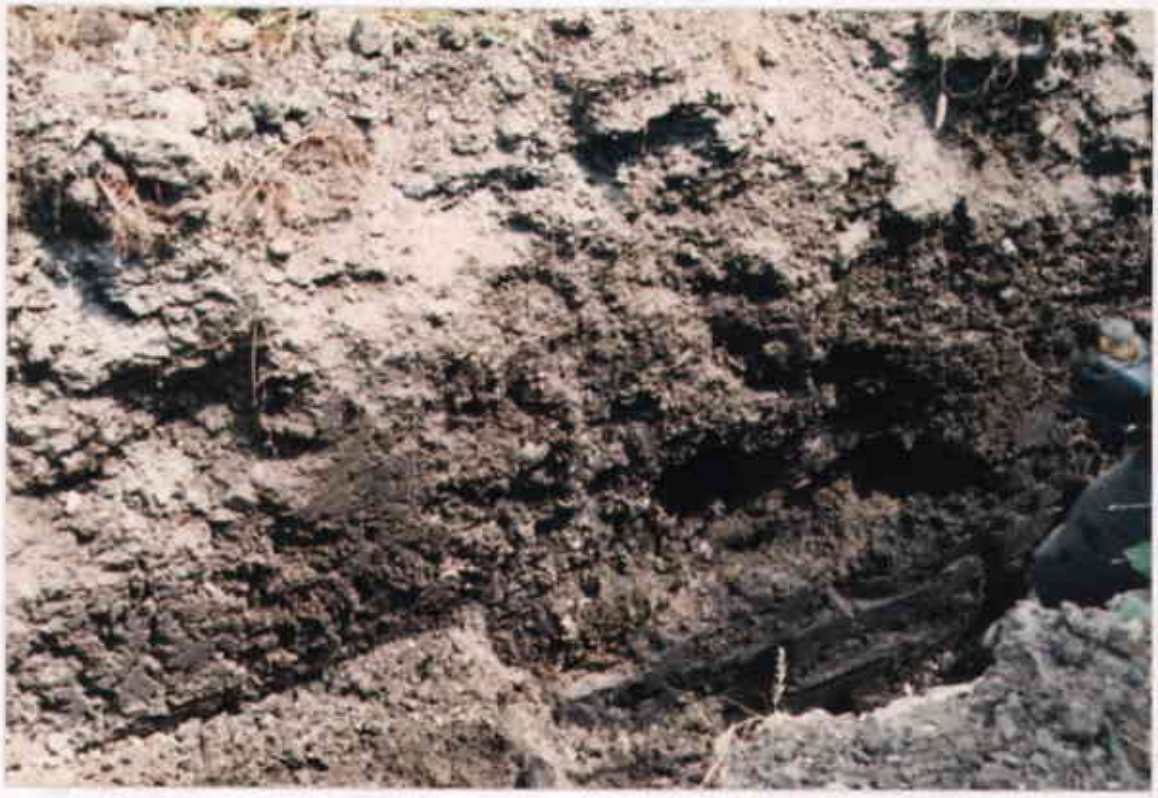
PIT G PHOTOGRAPHS

PIT H PHOTOGRAPHS

PIT J PHOTOGRAPHS

PIT K PHOTOGRAPHS

PIT L PHOTOGRAPHS



PIT M PHOTOGRAPHS

PIT N PHOTOGRAPHS