Geo-Environmental Technology

260 Cristich Lane
Campbell, CA 95008
(408)559-1220

CALIFORNIA REGIONAL WATER

14 July, 1989

JUL 19 1989 TJC

QUALITY CONTROL BOARD

Alameda County Dept. of Environmental Health
80 Swan Way - Room 200
Oakland, CA. 94621

Attn: Ariu Levi

Re: Declassification of contaminated soil located at Di Salvo Trucking Company, 4919 Tidewater, Oakland, CA.

Dear Mr. Levi,

Enclosed please find the documentation in support for declassification of the contaminated soil that is currently stockpiled at the above mentioned site. This report identifies that the soil is non-hazardous in accordance with title 22 CCR 66305.

SOIL TREATMENT PLAN OUTLINE

In reviewing this plan, please refer to the site preliminary investigation prepared by Geo-Environmental on June 15th, 1989.

Our client is requesting that the soil be treated on site using bioremediation techniques. We propose to commence this treatment within ten days of this letter assuming that you have no objection to the method of treatment outlined here.

1. Prepare the treatment site by installing a surrounding berm (either compacted soil or other suitable material) and cover with plastic sheeting.

2. Spread the soil approximately 18 inches in depth within the berm.

3. Treat the soil as needed with an appropriate landscaping fertalizer. Rotate and aerate the soil by turning and tilling twice weekly. This process to be continued until desired reduction levels are obtained.

4. Provide periodic laboratory testing of the soil to confirm reduction of hydrocarbon levels.

5. Treatment will continue until the levels of contaminates (diesel hydrocarbons) reach less than 100 PPM. The then decontaminated soil will then be moved to the adjoining property (4909 Tidewater) and used as surface fill - needed

to extend the four foot high loading dock out from the existing building.

6. Once compacted, the soil will be encapsulated in concrete (as part of the loading dock.

7. Prepare and a final report for submittal to each of the governing agencies.

Additional Safety Provisions:

GET will provide additional plastic sheeting and sand bags in an amount adequate to cover the entire treatment area. These materials will be kept in the service area directly next to the site. In the event of rain, these materials will be employed to cover and protect the soil.

GET will provide the Client with emergency response by means of a radio pager linked to at least one GET employee 24 hours per day during the treatment period.

All facets of the treatment will comply with guidelines and regulations set by each of the governing authorities involved.

We respectfully request that the above outlined plan be accepted and permitted. Please contact Stuart G. Solomon of G.E.T. at (408) 559-1220 for further specifications or information regarding this treatment plan. Our client has requested that we begin treatment by July 28th, 1989. Unless we hear differently from you, we will begin preparation of the site by this date and start the process of decontamination.

Thank you for you consideration in this matter. We await your reply.

Very truly yours,

Stuart G. Solomon - Principal

cc: Ms. Vicky Dvorak
Bay Area Air Quality Management Dist

Mr. Tom Callahan or Peter Johnson
Bay Area Regional Water Quality Control Board

ATT

July 7, 1989

Mr. Stuart Solomon
Principal
Geo-Environmental Technology
260 Cristich Lane
Campbell, CA 95008

Subject: Stockpiled Soil
De Salvo Trucking
Oakland, CA

Dear Mr. Solomon:

In accordance with Task 1 of the Aqua Terra Technologies, Inc. (ATT) June 2, 1989 proposal addressed to you, this letter presents a summary of activities completed to date regarding the disposition of contaminated soil currently stockpiled at the De Salvo Trucking Facility located in Oakland, California. To facilitate management of the stockpiled soil, this letter provides supporting data for the preliminary self-certification, in accordance with 22 CCR 66305, of the stockpiled soil as non-hazardous.

Aqua Terra Technologies
Consulting Engineers
& Scientists

2950 Buskirk Avenue
Suite 120
Walnut Creek, CA
94596
415 934-4884

Nine samples were collected by ATT on May 26, 1989. These samples were composited into four samples and analyzed for volatile and semi-volatile organic compounds (EPA Methods 8240 and 8270), ignitability, 22 CCR metals, and total petroleum hydrocarbons (TPH) as diesel and oil and grease. Copies of the data are provided in Attachment A.

The analytical data indicate concentrations of petroleum constituents ranging from 650 mg/Kg to 18,000 mg/Kg for TPH as diesel and from 210 mg/Kg to 2,000 mg/Kg for TPH as oil and grease (TOG). Currently, no formal regulatory standard, guideline, or policy exists regarding hazardous waste classification based on TPH as diesel or TOG (waste oil) concentrations in soil. A memorandum prepared by the California Department of Health Services (DHS) addresses the hazardous character of soil containing greater than 1,000 mg/Kg TPH as gasoline, identifying the hazardous property of the gasoline containing soil to be ignitability. The stockpiled soil is not expected to exhibit characteristics of ignitability. Analytical results indicate that the soil is not ignitable at less than 186° F. This value is above that of 140° F (22 CCR 66702) required to be considered as a hazardous waste based on ignitability characteristics.

Memoranda and correspondence prepared by the DHS regarding the issue of petroleum constituents in soil are provided in Attachment B. The attached DHS documents indicate data from the analysis of soil samples for TPH and TOG are not sufficient to characterize a material as hazardous. TPH and TOG data provide a general indication of the occurrence of petroleum products in soil, and are properly used to evaluate the presence of these materials. It is accurately concluded that solely on the basis of TPH and TOG concentrations, the stockpiled soil cannot be characterized as hazardous waste.

The volatile and semi-volatile organics chemical analytical data were generated to evaluate the potential for the stockpiled soil to be classified as hazardous on the basis of toxicity. The only detected organic chemicals which is included on the list of persistent or bioaccumulative toxic substances (22 CCR 66699). Xylene does appear in 22 CCR 66680 (#776) as a possible hazardous material or waste based on toxicity and ignitability. ATT determined the calculated oral LD50 for the stockpiled soil in accordance with 22 CCR 66696. This value was found to be 860,000 mg/Kg. Applying the highest concentration of xylene detected, (660 ug/Kg), indicates that the stockpiled soil is approximately seven orders of magnitude less toxic than the calculated LD50, and five orders of magnitude less than allowed by the criteria value of 5.0×10^3 mg/Kg (22 CCR 66696). The soil does not appear to exhibit characteristics of toxicity sufficient to render it a hazardous waste.

The concentrations of metals for which analyses were performed in the stockpiled soil were below the soluble threshold limit concentration (STLC) values defined in 22 CCR 66699 and, consequently, would not impart hazardous waste characteristics to the soil. The only exceptions to this data were the concentrations of lead, copper, and nickel as provided below:

Metal	Maximum Concentration (mg/Kg)	STLC (mg/L)	TTLC (mg/Kg)
Lead	49	5	1,000
Copper	48	25	2,500
Nickel	45	20	2,000

ATT

A waste extraction test (WET) as defined in 22 CCR 66700 is required to analytically complete the evaluation of the lead, copper, and nickel detected in the soil. However, the WET protocol, which allows a 10:1 dilution of the sample, would result in maximum soluble lead, copper, and nickel concentrations of 4.9, 4.8, and 4.5 mg/L, respectively, if 100 percent of the total metals were extractable. Each of these potential maximum soluble metal concentrations is below the corresponding STLC. In addition, the DHS will allow a variance for hazardous waste classification in cases where the hazardous characteristic is based on lead concentration. Consequently, it appears unlikely that the stockpiled soil would be classified as hazardous based on the metals concentrations detected.

The evaluation of the stockpiled soil presented above supports classification of the soil as non-hazardous under 22 CCR 66305. Inasmuch as the soil is non-hazardous by the criteria of 22 CCR Article 11, the 90-day restriction for stockpiling the soil on-site does not apply.

A copy of this report should be forwarded to the appropriate regulatory agency(s) prior to commencing with bioremediation treatment.

Please contact me if you have any questions regarding the matters discussed herein.

Sincerely,

AQUA TERRA TECHNOLOGIES, INC.

Bradley J. Bennett
Project Manager

R. Wane Schneiter, Ph.D.
Civil Engineer No. 38735 (Expires 3/31/93)

BJB/RWS:dh
Attachments

ATTACHMENT A

Analytical Results

MED-TOX ASSOCIATES, INC.

ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES
3440 Vincent Road Pleasant Hill, CA 94523 • (415) 930-9090 • FAX# (415) 930-0256

LABORATORY ANALYSIS REPORT

AQUA TERRA TECHNOLOGIES
2950 BUSKIRK AVENUE
SUITE 120
WALNUT CREEK, CA 94596

ATTN: BRAD BENNETT

CLIENT PROJECT NO: 9045

REPORT DATE: 06/24/89
DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/02-11/89
MED-TOX JOB NO: 8905186/187

ANALYSIS OF: NINE SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS; FOUR SOIL SAMPLE COMPOSITES FOR FLASH POINT, VOLATILE ORGANICS, BASE/NEUTRAL & ACID EXTRACTABLES, AND PRIORITY POLLUTANT METALS

EPA Method 8015 (Extraction)

Sample Identification Client Id.	Lab No.	Total Petroleum Hydrocarbons as Diesel (mg/kg)	Total Petroleum Hydrocarbons as Waste Oil (mg/kg)
SS-1	01A	1,300	ND
SS-8	02A	3,900	ND
SS-12	03A	8,300	ND(200)
SS-16	04A	1,800	ND(200)
SS-20	05A	650	280
SS-23	06A	1,400	210
SS-28	07A	790	240
SS-31	08A	18,000	1,200
SS-36	09A	9,700	2,000
Detection Limit		50	100

ND = Not detectable at or above indicated method detection limit
(Unless otherwise indicated in parentheses)

Michael Lynch, Manager
Organic Laboratory

AQUA TERRA TECHNOLOGIES

CLIENT PROJECT NO: 9045

REPORT DATE: 06/24/89

MED-TOX JOB NO: 8905187

Sample Identification Client Id.	Lab No.	Ignitability* at <186°F
SS-1 SS-8(Comp)	01A	NI
SS-12 SS-16(Comp)	02A	NI
SS-20 SS-23 SS-28(Comp)	03A	NI
SS-31 SS-36(Comp)	04A	NI

EPA Method 1010

* Subcontracted to a DOHS certified laboratory

NI: Not igintable at <186°F

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-1 & SS-8 (comp)
CLIENT JOB NO: 9045
DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-01A
MED-TOX JOB NO: 8905187
DATE ANALYZED: 06/08/89
REPORT DATE: 06/24/89

EPA METHOD 8240
GC/MS VOLATILE ORGANICS

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acetone	67-64-1	ND	5,000
Benzene	71-43-2	ND	300
Bromodichloromethane	75-27-4	ND	300
Bromoform	75-25-2	ND	300
Bromomethane	74-83-9	ND	500
2-Butanone	78-93-3	ND	5,000
Carbon Disulfide	75-15-0	ND	500
Carbon Tetrachloride	56-23-5	ND	300
Chlorobenzene	108-90-7	ND	300
Chloroethane	75-00-3	ND	500
2-Chloroethyl Vinyl Ether	110-75-8	ND	500
Chloroform	67-66-3	ND	300
Chloromethane	74-87-3	ND	500
Dibromochloromethane	124-48-1	ND	300
1,1-Dichloroethane	75-34-3	ND	300
1,2-Dichloroethane	107-06-2	ND	300
1,1-Dichloroethene	75-35-4	ND	300
1,2-Dichloroethene, total	540-59-0	ND	300
1,2-Dichloropropane	78-87-5	ND	300
cis-1,3-Dichloropropene	10061-01-5	ND	300
trans-1,3-Dichloropropene	10061-02-6	ND	300
Ethylbenzene	100-41-4	ND	300
2-Hexanone	591-78-6	ND	2,500
Methylene Chloride	75-09-2	ND	1,000
4-Methyl-2-pentanone	108-10-1	ND	2,500
Styrene	100-42-5	ND	500
1,1,2,2-Tetrachloroethane	79-34-5	ND	300
Tetrachloroethene	127-18-4	ND	300
Toluene	108-88-3	ND	300
1,1,1-Trichloroethane	71-55-6	ND	300
1,1,2-Trichloroethane	79-00-5	ND	300
Trichloroethene	79-01-6	ND	300
Vinyl Acetate	108-05-4	ND	2,500
Vinyl Chloride	75-01-4	ND	500
Xylenes, total	1330-20-7	660	500

ND = Not Detected at or above indicated method detection limit
Sample was diluted 50 x due to significant hydrocarbon content.
Detection limits have been adjusted accordingly.

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-12 & SS-16 (comp)
CLIENT JOB NO: 9045
DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-02A
MED-TOX JOB NO: 8905187
DATE ANALYZED: 06/01/89
REPORT DATE: 06/24/89

EPA METHOD 8240
GC/MS VOLATILE ORGANICS

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acetone	67-64-1	ND	100
Benzene	71-43-2	ND	5
Bromodichloromethane	75-27-4	ND	5
Bromoform	75-25-2	ND	5
Bromomethane	74-83-9	ND	10
2-Butanone	78-93-3	ND	100
Carbon Disulfide	75-15-0	ND	10
Carbon Tetrachloride	56-23-5	ND	5
Chlorobenzene	108-90-7	ND	5
Chloroethane	75-00-3	ND	10
2-Chloroethyl Vinyl Ether	110-75-8	ND	10
Chloroform	67-66-3	ND	5
Chloromethane	74-87-3	ND	10
Dibromochloromethane	124-48-1	ND	5
1,1-Dichloroethane	75-34-3	ND	5
1,2-Dichloroethane	107-06-2	ND	5
1,1-Dichloroethene	75-35-4	ND	5
1,2-Dichloroethene, total	540-59-0	ND	5
1,2-Dichloropropane	78-87-5	ND	5
cis-1,3-Dichloropropene	10061-01-5	ND	5
trans-1,3-Dichloropropene	10061-02-6	ND	5
Ethylbenzene	100-41-4	ND	5
2-Hexanone	591-78-6	ND	50
Methylene Chloride	75-09-2	ND	5
4-Methyl-2-pentanone	108-10-1	ND	50
Styrene	100-42-5	ND	10
1,1,2,2-Tetrachloroethane	79-34-5	ND	5
Tetrachloroethene	127-18-4	ND	5
Toluene	108-88-3	ND	5
1,1,1-Trichloroethane	71-55-6	ND	5
1,1,2-Trichloroethane	79-00-5	ND	5
Trichloroethene	79-01-6	ND	5
Vinyl Acetate	108-05-4	ND	50
Vinyl Chloride	75-01-4	ND	10
Xylenes, total	1330-20-7	ND	10

ND = Not Detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-20 SS-23 & SS-28 (comp)
CLIENT JOB NO: 9045
DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-03A
MED-TOX JOB NO: 8905187
DATE ANALYZED: 06/01/89
REPORT DATE: 06/24/89

EPA METHOD 8240
GC/MS VOLATILE ORGANICS

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acetone	67-64-1	ND	100
Benzene	71-43-2	ND	5
Bromodichloromethane	75-27-4	ND	5
Bromoform	75-25-2	ND	5
Bromomethane	74-83-9	ND	10
2-Butanone	78-93-3	ND	100
Carbon Disulfide	75-15-0	ND	10
Carbon Tetrachloride	56-23-5	ND	5
Chlorobenzene	108-90-7	ND	5
Chloroethane	75-00-3	ND	10
2-Chloroethyl Vinyl Ether	110-75-8	ND	10
Chloroform	67-66-3	ND	5
Chloromethane	74-87-3	ND	10
Dibromochloromethane	124-48-1	ND	5
1,1-Dichloroethane	75-34-3	ND	5
1,2-Dichloroethane	107-06-2	ND	5
1,1-Dichloroethene	75-35-4	ND	5
1,2-Dichloroethene, total	540-59-0	ND	5
1,2-Dichloropropane	78-87-5	ND	5
cis-1,3-Dichloropropene	10061-01-5	ND	5
trans-1,3-Dichloropropene	10061-02-6	ND	5
Ethylbenzene	100-41-4	ND	5
2-Hexanone	591-78-6	ND	50
Methylene Chloride	75-09-2	ND	5
4-Methyl-2-pentanone	108-10-1	ND	50
Styrene	100-42-5	ND	10
1,1,2,2-Tetrachloroethane	79-34-5	ND	5
Tetrachloroethene	127-18-4	ND	5
Toluene	108-88-3	ND	5
1,1,1-Trichloroethane	71-55-6	ND	5
1,1,2-Trichloroethane	79-00-5	ND	5
Trichloroethene	79-01-6	ND	5
Vinyl Acetate	108-05-4	ND	50
Vinyl Chloride	75-01-4	ND	10
Xylenes, total	1330-20-7	ND	10

ND = Not Detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-31 & SS-36 (comp)
CLIENT JOB NO: 9045
DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-04A
MED-TOX JOB NO: 8905187
DATE ANALYZED: 06/01/89
REPORT DATE: 06/24/89

EPA METHOD 8240
GC/MS VOLATILE ORGANICS

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acetone	67-64-1	ND	100
Benzene	71-43-2	ND	5
Bromodichloromethane	75-27-4	ND	5
Bromoform	75-25-2	ND	5
Bromomethane	74-83-9	ND	10
2-Butanone	78-93-3	ND	100
Carbon Disulfide	75-15-0	ND	10
Carbon Tetrachloride	56-23-5	ND	5
Chlorobenzene	108-90-7	ND	5
Chloroethane	75-00-3	ND	10
2-Chloroethyl Vinyl Ether	110-75-8	ND	10
Chloroform	67-66-3	ND	5
Chloromethane	74-87-3	ND	10
Dibromochloromethane	124-48-1	ND	5
1,1-Dichloroethane	75-34-3	ND	5
1,2-Dichloroethane	107-06-2	ND	5
1,1-Dichloroethene	75-35-4	ND	5
1,2-Dichloroethene, total	540-59-0	ND	5
1,2-Dichloropropane	78-87-5	ND	5
cis-1,3-Dichloropropene	10061-01-5	ND	5
trans-1,3-Dichloropropene	10061-02-6	ND	5
Ethylbenzene	100-41-4	ND	5
2-Hexanone	591-78-6	ND	50
Methylene Chloride	75-09-2	ND	5
4-Methyl-2-pentanone	108-10-1	ND	50
Styrene	100-42-5	ND	10
1,1,2,2-Tetrachloroethane	79-34-5	ND	5
Tetrachloroethene	127-18-4	ND	5
Toluene	108-88-3	ND	5
1,1,1-Trichloroethane	71-55-6	ND	5
1,1,2-Trichloroethane	79-00-5	ND	5
Trichloroethene	79-01-6	ND	5
Vinyl Acetate	108-05-4	ND	50
Vinyl Chloride	75-01-4	ND	10
Xylenes, total	1330-20-7	ND	10

ND = Not Detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-1 & SS-8 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-01A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acenaphthene	83-32-9	ND	6,600
Acenaphthylene	208-96-8	ND	6,600
Anthracene	120-12-7	ND	6,600
Benzidine	92-87-5	ND	32,000
Benzoic Acid	65-85-0	ND	32,000
Benzo(a)anthracene	56-55-3	ND	6,600
Benzo(b)fluoranthene	205-99-2	ND	6,600
Benzo(k)fluoranthene	207-08-9	ND	6,600
Benzo(g,h,i)perylene	191-24-2	ND	6,600
Benzo(a)pyrene	50-32-8	ND	6,600
Benzyl Alcohol	100-51-6	ND	13,000
Bis(2-chloroethoxy) methane	111-91-1	ND	6,600
Bis(2-chloroethyl)ether	111-44-4	ND	6,600
Bis(2-chloroisopropyl) ether	39638-32-9	ND	6,600
Bis(2-ethylhexyl) phthalate	117-81-7	ND	6,600
4-Bromophenyl phenyl ether	101-55-3	ND	6,600
Butylbenzyl phthalate	85-68-7	ND	6,600
4-Chloroaniline	106-47-8	ND	13,000
2-Chloronaphthalene	91-58-7	ND	6,600
4-Chlorophenyl phenyl ether	7005-72-3	ND	6,600
Chrysene	218-01-9	ND	6,600
Dibenzo(a,h)anthracene	53-70-3	ND	6,600
Dibenzofuran	132-64-9	ND	6,600
Di-n-butylphthalate	84-74-2	ND	6,600
1,2-Dichlorobenzene	95-50-1	ND	6,600

ND = Not detected at or above indicated method detection limit
Sample was diluted 20 x due to significant hydrocarbon content.
Detection limits have been adjusted accordingly.

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-1 & SS-8 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-01A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES (cont.)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
1,3-Dichlorobenzene	541-73-1	ND	6,600
1,4-Dichlorobenzene	106-46-7	ND	6,600
3,3'-Dichlorobenzidine	91-94-1	ND	13,000
Diethylphthalate	84-66-2	ND	6,600
Dimethylphthalate	131-11-3	ND	6,600
2,4-Dinitrotoluene	121-14-2	ND	6,600
2,6-Dinitrotoluene	606-20-2	ND	6,600
Di-n-octylphthalate	117-84-0	ND	6,600
1,2-Diphenylhydrazine	122-66-7	ND	6,600
Fluoranthene	206-44-0	ND	6,600
Fluorene	86-73-7	ND	6,600
Hexachlorobenzene	118-74-1	ND	6,600
Hexachlorobutadiene	87-68-3	ND	6,600
Hexachlorocyclopentadiene	77-47-4	ND	6,600
Hexachloroethane	67-72-1	ND	6,600
Indeno(1,2,3-cd)pyrene	193-39-5	ND	6,600
Isophorone	78-59-1	ND	6,600
2-Methylnaphthalene	91-57-6	ND	6,600
Naphthalene	91-20-3	ND	6,600
2-Nitroaniline	88-74-4	ND	32,000
3-Nitroaniline	99-09-2	ND	32,000
4-Nitroaniline	100-01-6	ND	32,000
Nitrobenzene	98-95-3	ND	6,600
N-nitrosodimethylamine	62-75-9	ND	6,600
N-nitrosodiphenylamine	86-30-6	ND	6,600
N-nitroso-di-n-propylamine	621-64-7	ND	6,600
Phenanthrene	85-01-8	ND	6,600
Pyrene	129-00-0	ND	6,600
1,2,4-Trichlorobenzene	120-82-1	ND	6,600

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-1 & SS-8 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-01A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270

ACID EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
4-Chloro-3-methylphenol	59-50-7	ND	6,600
2-Chlorophenol	95-57-8	ND	6,600
2,4-Dichlorophenol	120-83-2	ND	6,600
2,4-Dimethylphenol	105-67-9	ND	6,600
4,6-Dinitro-2-methylphenol	534-52-1	ND	32,000
2,4-Dinitrophenol	51-28-5	ND	32,000
2-Methylphenol	95-48-7	ND	6,600
4-Methylphenol	106-44-5	ND	6,600
2-Nitrophenol	88-75-5	ND	6,600
4-Nitrophenol	100-02-7	ND	32,000
Pentachlorophenol	87-86-5	ND	32,000
Phenol	108-95-2	ND	6,600
2,4,5-Trichlorophenol	95-95-4	ND	6,600
2,4,6-Trichlorophenol	88-06-2	ND	6,600

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-12 & SS-16 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-02A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acenaphthene	83-32-9	ND	3,300
Acenaphthylene	208-96-8	ND	3,300
Anthracene	120-12-7	ND	3,300
Benzidine	92-87-5	ND	16,000
Benzoic Acid	65-85-0	ND	16,000
Benzo(a)anthracene	56-55-3	ND	3,300
Benzo(b)fluoranthene	205-99-2	ND	3,300
Benzo(k)fluoranthene	207-08-9	ND	3,300
Benzo(g,h,i)perylene	191-24-2	ND	3,300
Benzo(a)pyrene	50-32-8	ND	3,300
Benzyl Alcohol	100-51-6	ND	6,600
Bis(2-chloroethoxy) methane	111-91-1	ND	3,300
Bis(2-chloroethyl)ether	111-44-4	ND	3,300
Bis(2-chloroisopropyl) ether	39638-32-9	ND	3,300
Bis(2-ethylhexyl) phthalate	117-81-7	ND	3,300
4-Bromophenyl phenyl ether	101-55-3	ND	3,300
Butylbenzyl phthalate	85-68-7	ND	3,300
4-Chloroaniline	106-47-8	ND	6,600
2-Chloronaphthalene	91-58-7	ND	3,300
4-Chlorophenyl phenyl ether	7005-72-3	ND	3,300
Chrysene	218-01-9	ND	3,300
Dibenzo(a,h)anthracene	53-70-3	ND	3,300
Dibenzofuran	132-64-9	ND	3,300
Di-n-butylphthalate	84-74-2	ND	3,300
1,2-Dichlorobenzene	95-50-1	ND	3,300

ND = Not detected at or above indicated method detection limit
Sample was diluted 10 x due to significant hydrocarbon content.
Detection limits have been adjusted accordingly.

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-12 & SS-16 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-02A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES (cont.)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
1,3-Dichlorobenzene	541-73-1	ND	3,300
1,4-Dichlorobenzene	106-46-7	ND	3,300
3,3'-Dichlorobenzidine	91-94-1	ND	6,600
Diethylphthalate	84-66-2	ND	3,300
Dimethylphthalate	131-11-3	ND	3,300
2,4-Dinitrotoluene	121-14-2	ND	3,300
2,6-Dinitrotoluene	606-20-2	ND	3,300
Di-n-octylphthalate	117-84-0	ND	3,300
1,2-Diphenylhydrazine	122-66-7	ND	3,300
Fluoranthene	206-44-0	ND	3,300
Fluorene	86-73-7	ND	3,300
Hexachlorobenzene	118-74-1	ND	3,300
Hexachlorobutadiene	87-68-3	ND	3,300
Hexachlorocyclopentadiene	77-47-4	ND	3,300
Hexachloroethane	67-72-1	ND	3,300
Indeno(1,2,3-cd)pyrene	193-39-5	ND	3,300
Isophorone	78-59-1	ND	3,300
2-Methylnaphthalene	91-57-6	ND	3,300
Naphthalene	91-20-3	ND	3,300
2-Nitroaniline	88-74-4	ND	16,000
3-Nitroaniline	99-09-2	ND	16,000
4-Nitroaniline	100-01-6	ND	16,000
Nitrobenzene	98-95-3	ND	3,300
N-nitrosodimethylamine	62-75-9	ND	3,300
N-nitrosodiphenylamine	86-30-6	ND	3,300
N-nitroso-di-n-propylamine	621-64-7	ND	3,300
Phenanthrene	85-01-8	ND	3,300
Pyrene	129-00-0	ND	3,300
1,2,4-Trichlorobenzene	120-82-1	ND	3,300

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-12 & SS-16 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-02A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270

ACID EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
4-Chloro-3-methylphenol	59-50-7	ND	3,300
2-Chlorophenol	95-57-8	ND	3,300
2,4-Dichlorophenol	120-83-2	ND	3,300
2,4-Dimethylphenol	105-67-9	ND	3,300
4,6-Dinitro-2-methylphenol	534-52-1	ND	16,000
2,4-Dinitrophenol	51-28-5	ND	16,000
2-Methylphenol	95-48-7	ND	3,300
4-Methylphenol	106-44-5	ND	3,300
2-Nitrophenol	88-75-5	ND	3,300
4-Nitrophenol	100-02-7	ND	16,000
Pentachlorophenol	87-86-5	ND	16,000
Phenol	108-95-2	ND	3,300
2,4,5-Trichlorophenol	95-95-4	ND	3,300
2,4,6-Trichlorophenol	88-06-2	ND	3,300

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-20 SS-23 & SS-28 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-03A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12-16/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acenaphthene	83-32-9	ND	6,600
Acenaphthylene	208-96-8	ND	6,600
Anthracene	120-12-7	ND	6,600
Benzidine	92-87-5	ND	32,000
Benzoic Acid	65-85-0	ND	32,000
Benzo(a)anthracene	56-55-3	ND	6,600
Benzo(b)fluoranthene	205-99-2	ND	6,600
Benzo(k)fluoranthene	207-08-9	ND	6,600
Benzo(g,h,i)perylene	191-24-2	ND	6,600
Benzo(a)pyrene	50-32-8	ND	6,600
Benzyl Alcohol	100-51-6	ND	13,000
Bis(2-chloroethoxy) methane	111-91-1	ND	6,600
Bis(2-chloroethyl)ether	111-44-4	ND	6,600
Bis(2-chloroisopropyl) ether	39638-32-9	ND	6,600
Bis(2-ethylhexyl) phthalate	117-81-7	ND	6,600
4-Bromophenyl phenyl ether	101-55-3	ND	6,600
Butylbenzyl phthalate	85-68-7	ND	6,600
4-Chloroaniline	106-47-8	ND	13,000
2-Chloronaphthalene	91-58-7	ND	6,600
4-Chlorophenyl phenyl ether	7005-72-3	ND	6,600
Chrysene	218-01-9	ND	6,600
Dibenzo(a,h)anthracene	53-70-3	ND	6,600
Dibenzofuran	132-64-9	ND	6,600
Di-n-butylphthalate	84-74-2	ND	6,600
1,2-Dichlorobenzene	95-50-1	ND	6,600

ND = Not detected at or above indicated method detection limit
Sample was diluted 20 x due to significant hydrocarbon content. Detection limits have been adjusted accordingly.

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-20 SS-23 & SS-28 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-03A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12-16/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES (cont.)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
1,3-Dichlorobenzene	541-73-1	ND	6,600
1,4-Dichlorobenzene	106-46-7	ND	6,600
3,3'-Dichlorobenzidine	91-94-1	ND	13,000
Diethylphthalate	84-66-2	ND	6,600
Dimethylphthalate	131-11-3	ND	6,600
2,4-Dinitrotoluene	121-14-2	ND	6,600
2,6-Dinitrotoluene	606-20-2	ND	6,600
Di-n-octylphthalate	117-84-0	ND	6,600
1,2-Diphenylhydrazine	122-66-7	ND	6,600
Fluoranthene	206-44-0	ND	6,600
Fluorene	86-73-7	ND	6,600
Hexachlorobenzene	118-74-1	ND	6,600
Hexachlorobutadiene	87-68-3	ND	6,600
Hexachlorocyclopentadiene	77-47-4	ND	6,600
Hexachloroethane	67-72-1	ND	6,600
Indeno(1,2,3-cd)pyrene	193-39-5	ND	6,600
Isophorone	78-59-1	ND	6,600
2-Methylnaphthalene	91-57-6	ND	6,600
Naphthalene	91-20-3	ND	6,600
2-Nitroaniline	88-74-4	ND	32,000
3-Nitroaniline	99-09-2	ND	32,000
4-Nitroaniline	100-01-6	ND	32,000
Nitrobenzene	98-95-3	ND	6,600
N-nitrosodimethylamine	62-75-9	ND	6,600
N-nitrosodiphenylamine	86-30-6	ND	6,600
N-nitroso-di-n-propylamine	621-64-7	ND	6,600
Phenanthrene	85-01-8	ND	6,600
Pyrene	129-00-0	ND	6,600
1,2,4-Trichlorobenzene	120-82-1	ND	6,600

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-20 SS-23 & SS-28 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-03A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12-16/89
REPORT DATE: 06/24/89

EPA METHOD 8270

ACID EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
4-Chloro-3-methylphenol	59-50-7	ND	6,600
2-Chlorophenol	95-57-8	ND	6,600
2,4-Dichlorophenol	120-83-2	ND	6,600
2,4-Dimethylphenol	105-67-9	ND	6,600
4,6-Dinitro-2-methylphenol	534-52-1	ND	32,000
2,4-Dinitrophenol	51-28-5	ND	32,000
2-Methylphenol	95-48-7	ND	6,600
4-Methylphenol	106-44-5	ND	6,600
2-Nitrophenol	88-75-5	ND	6,600
4-Nitrophenol	100-02-7	ND	32,000
Pentachlorophenol	87-86-5	ND	32,000
Phenol	108-95-2	ND	6,600
2,4,5-Trichlorophenol	95-95-4	ND	6,600
2,4,6-Trichlorophenol	88-06-2	ND	6,600

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-31 & SS-36 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-04A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Acenaphthene	83-32-9	ND	6,600
Acenaphthylene	208-96-8	ND	6,600
Anthracene	120-12-7	ND	6,600
Benzidine	92-87-5	ND	32,000
Benzoic Acid	65-85-0	ND	32,000
Benzo(a)anthracene	56-55-3	ND	6,600
Benzo(b)fluoranthene	205-99-2	ND	6,600
Benzo(k)fluoranthene	207-08-9	ND	6,600
Benzo(g,h,i)perylene	191-24-2	ND	6,600
Benzo(a)pyrene	50-32-8	ND	6,600
Benzyl Alcohol	100-51-6	ND	13,000
Bis(2-chloroethoxy) methane	111-91-1	ND	6,600
Bis(2-chloroethyl)ether	111-44-4	ND	6,600
Bis(2-chloroisopropyl) ether	39638-32-9	ND	6,600
Bis(2-ethylhexyl) phthalate	117-81-7	ND	6,600
4-Bromophenyl phenyl ether	101-55-3	ND	6,600
Butylbenzyl phthalate	85-68-7	ND	6,600
4-Chloroaniline	106-47-8	ND	13,000
2-Chloronaphthalene	91-58-7	ND	6,600
4-Chlorophenyl phenyl ether	7005-72-3	ND	6,600
Chrysene	218-01-9	ND	6,600
Dibenzo(a,h)anthracene	53-70-3	ND	6,600
Dibenzofuran	132-64-9	ND	6,600
Di-n-butylphthalate	84-74-2	ND	6,600
1,2-Dichlorobenzene	95-50-1	ND	6,600

ND = Not detected at or above indicated method detection limit
Sample was diluted 20 x due to significant hydrocarbon content.
Detection limits have been adjusted accordingly.

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-31 & SS-36 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-04A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270
BASE NEUTRAL EXTRACTABLES (cont.)

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
1,3-Dichlorobenzene	541-73-1	ND	6,600
1,4-Dichlorobenzene	106-46-7	ND	6,600
3,3'-Dichlorobenzidine	91-94-1	ND	13,000
Diethylphthalate	84-66-2	ND	6,600
Dimethylphthalate	131-11-3	ND	6,600
2,4-Dinitrotoluene	121-14-2	ND	6,600
2,6-Dinitrotoluene	606-20-2	ND	6,600
Di-n-octylphthalate	117-84-0	ND	6,600
1,2-Diphenylhydrazine	122-66-7	ND	6,600
Fluoranthene	206-44-0	ND	6,600
Fluorene	86-73-7	ND	6,600
Hexachlorobenzene	118-74-1	ND	6,600
Hexachlorobutadiene	87-68-3	ND	6,600
Hexachlorocyclopentadiene	77-47-4	ND	6,600
Hexachloroethane	67-72-1	ND	6,600
Indeno(1,2,3-cd)pyrene	193-39-5	ND	6,600
Isophorone	78-59-1	ND	6,600
2-Methylnaphthalene	91-57-6	ND	6,600
Naphthalene	91-20-3	ND	6,600
2-Nitroaniline	88-74-4	ND	32,000
3-Nitroaniline	99-09-2	ND	32,000
4-Nitroaniline	100-01-6	ND	32,000
Nitrobenzene	98-95-3	ND	6,600
N-nitrosodimethylamine	62-75-9	ND	6,600
N-nitrosodiphenylamine	86-30-6	ND	6,600
N-nitroso-di-n-propylamine	621-64-7	ND	6,600
Phenanthrene	85-01-8	ND	6,600
Pyrene	129-00-0	ND	6,600
1,2,4-Trichlorobenzene	120-82-1	ND	6,600

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-31 & SS-36 (comp)
CLIENT JOB NO: 9045

DATE SAMPLED: 05/26/89
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-04A
MED-TOX JOB NO: 8905187
DATE EXTRACTED: 06/08/89
DATE ANALYZED: 06/12/89
REPORT DATE: 06/24/89

EPA METHOD 8270

ACID EXTRACTABLES

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
4-Chloro-3-methylphenol	59-50-7	ND	6,600
2-Chlorophenol	95-57-8	ND	6,600
2,4-Dichlorophenol	120-83-2	ND	6,600
2,4-Dimethylphenol	105-67-9	ND	6,600
4,6-Dinitro-2-methylphenol	534-52-1	ND	32,000
2,4-Dinitrophenol	51-28-5	ND	32,000
2-Methylphenol	95-48-7	ND	6,600
4-Methylphenol	106-44-5	ND	6,600
2-Nitrophenol	88-75-5	ND	6,600
4-Nitrophenol	100-02-7	ND	32,000
Pentachlorophenol	87-86-5	ND	32,000
Phenol	108-95-2	ND	6,600
2,4,5-Trichlorophenol	95-95-4	ND	6,600
2,4,6-Trichlorophenol	88-06-2	ND	6,600

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-1 & SS-8 (comp)
CLIENT JOB NO: 9045
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-01A
MED-TOX JOB NO: 8905187
REPORT DATE: 06/24/89

PRIORITY POLLUTANT METALS

CODE	METAL	CONCENTRATION (mg/kg)	DETECTION LIMIT (mg/kg)	METHOD REFERENCE
Sb	Antimony	ND	5	7040
As	Arsenic	8.9	0.5	7060
Be	Beryllium	0.4	0.2	7090
Cd	Cadmium	0.5	0.2	7130
Cr	Chromium	38	1	7190
Cu	Copper	48	0.5	7210
Pb	Lead	49	1	7420
Hg	Mercury	ND	0.2	7471
Ni	Nickel	45	0.5	7520
Se	Selenium	ND	2	7740
Ag	Silver	ND	0.3	7760
Tl	Thallium	ND	3	7840
Zn	Zinc	160	2	7950

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-12 & SS-16 (comp)
CLIENT JOB NO: 9045
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-02A
MED-TOX JOB NO: 8905187
REPORT DATE: 06/24/89

PRIORITY POLLUTANT METALS

CODE	METAL	CONCENTRATION (mg/kg)	DETECTION LIMIT (mg/kg)	METHOD REFERENCE
Sb	Antimony	ND	5	7040
As	Arsenic	2.5	0.5	7060
Be	Beryllium	0.3	0.2	7090
Cd	Cadmium	ND	0.2	7130
Cr	Chromium	52	1	7190
Cu	Copper	42	0.5	7210
Pb	Lead	9	1	7420
Hg	Mercury	ND	0.2	7471
Ni	Nickel	7	0.5	7520
Se	Selenium	ND	2	7740
Ag	Silver	ND	0.3	7760
Tl	Thallium	ND	3	7840
Zn	Zinc	62	2	7950

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-20 SS-23 & SS-28 (comp)
CLIENT JOB NO: 9045
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-03A
MED-TOX JOB NO: 8905187
REPORT DATE: 06/24/89

PRIORITY POLLUTANT METALS

CODE	METAL	CONCENTRATION (mg/kg)	DETECTION LIMIT (mg/kg)	METHOD REFERENCE
Sb	Antimony	ND	5	7040
As	Arsenic	3.9	0.5	7060
Be	Beryllium	0.3	0.2	7090
Cd	Cadmium	ND	0.2	7130
Cr	Chromium	39	1	7190
Cu	Copper	21	0.5	7210
Pb	Lead	38	1	7420
Hg	Mercury	ND	0.2	7471
Ni	Nickel	35	0.5	7520
Se	Selenium	ND	2	7740
Ag	Silver	ND	0.3	7760
Tl	Thallium	ND	3	7840
Zn	Zinc	120	2	7950

ND = Not detected at or above indicated method detection limit

AQUA TERRA TECHNOLOGIES

CLIENT ID: SS-31 & SS-36 (comp)
CLIENT JOB NO: 9045
DATE RECEIVED: 05/31/89

MED-TOX LAB NO: 8905187-04A
MED-TOX JOB NO: 8905187
REPORT DATE: 06/24/89

PRIORITY POLLUTANT METALS

CODE	METAL	CONCENTRATION (mg/kg)	DETECTION LIMIT (mg/kg)	METHOD REFERENCE
Sb	Antimony	ND	5	7040
As	Arsenic	1.8	0.5	7060
Be	Beryllium	0.3	0.2	7090
Cd	Cadmium	0.3	0.2	7130
Cr	Chromium	33	1	7190
Cu	Copper	22	0.5	7210
Pb	Lead	29	1	7420
Hg	Mercury	ND	0.2	7471
Ni	Nickel	44	0.5	7520
Se	Selenium	ND	2	7740
Ag	Silver	ND	0.3	7760
Tl	Thallium	ND	3	7840
Zn	Zinc	160	2	7950

ND = Not detected at or above indicated method detection limit

ATTACHMENT B

California Department of Health Services Correspondence

State of California

Department of Heal

Memorandum

To : David Lau, Ph.D., Chief
Alternative Technology &
Policy Dev. Section
Toxic Substances Control
Division

Date : December 19, 1985

Subject: Ignitability of Soi
Contaminated with
and Diesel

From : Robert D. Stephens, Ph.D., Chief
Hazardous Materials Laboratory

As discussed with your staff, we have concluded an evaluation of the ignitability of gasoline and diesel - contaminated soils. The attached report summarizes the findings. Several points should be made regarding this subject:

1. There is no widely-accepted method for ignitability of gasoline and diesel contaminated soils. As the attached report shows, it is possible to use a modified Pensky-Martens method for that purpose. The EPA Office of Solid Waste has gone on record as opposing the use of the above method for solid samples, but they have not proposed an alternative. An inter-laboratory collaborative study is being conducted by EPA on a proposed method for determining the ignitability of solid samples, but the results of that study will not be available until next year at the earliest.

2. The ignitability of gasoline-contaminated soil is highly dependent on time and sample holding conditions. The field aeration of soil can easily render it nonignitable. This has obvious implications for in situ treatment as opposed to excavation and disposal.

This information will be incorporated into the draft QA/QC/Laboratory Support document for the LUFT Task Force. If you or your staff have any questions, please contact Bart Simmons.

cc: Bill Quan
Tom Li, Ph.D

Flash Point of Gasoline & Diesel in Soil

1. Scope: The following method was used to test the ignitability of gasoline and diesel in soil.

2. Method: Pensky-Martens closed-cup Method Modification of EPA Method Procedure 1010 in Methods for the Evaluation of Solid Waste, SW-846, 2nd Edition, 1985.

3. Apparatus: 1) Pensky-Martens closed-cup Flash Tester. The apparatus consists of the following major parts: a test cup, cup cover, flame exposure device, pilot flame, stirring device, and Ful-Kontrol heater.

   2) Thermometer indicated readings - 10° to +150°C (14°F to 320°F) in 1°C division.

4. Reagent for Reference Standard: P-xylene

5. Procedure: Throughly clean and dry all parts of the cup and be sure to remove any solvent which had been used to clean the apparatus. Fill the cup with the sample to be tested. Place the lid on the cup and engage the locking device. Insert thermometer and supply heat if necessary. Apply the test flame by operating the mechanism on the cover which controls the shutter and the test flame burner, so that the flame is lowered into the vapor space of the cup in 0.5 sec. and left in its lower position for 1 (one) second. Record as the *Flash Point the temperature read on the thermometer at the time the test flame causes a flash in the interior cup.

*The sample is considered to have flashed only if a comparatively large blue flame appears and propagates itself over the surface of the sample.

Determination of Flash Point of Gasoline & Diesel in Soil

6. Procedures: 1) Gasoline - Weigh 60.0 g soil and pour into mason jar. Spike with various amounts of gasoline and mix by shaking vigorously until gasoline is well mixed with soil. Pour soil back to cup. Proceed as prescribed in Section 5. Since Flash Point of gasoline is below room temperature, it flashes at room temperature. No heat is supplied. Test flame is continuously applied at certain time intervals until there is no flash.

2) Diesel - Weigh 60.0 g soil and warm up in cup approximately 50° to 60°C. Pour soil into mason jar. Spike various amounts of diesel and mix by shaking vigorously until diesel is well mixed with soil. Pour soil back to cup. Raise the temperature at a rate of not less than 2°C/min.. Test flame is applied at every 2°C to 4°C intervals until there is a distinct flash in the interior of the cup.

Experimental Results - Flash Points for gasoline, diesel, and soil were determined and are summarized in Table 1. Experimental results for spiked gasoline and diesel soil samples are presented in Table 2 and Table 3. A plot of time vs the concentration of gasoline is represented in Fig. 1..

Conclusions and Recommendations

The ignitability of gasoline in soil can be determined by the attached method. However, the flash point is highly dependent on the time that the sample is exposed to air. Soil containing as little as 1200 µg/g gasoline (0.12 w/w%) can flash well below the criterion of 60°C. It should be recognized that in place volatilization of gasoline from soil may render the soil nonignitable.

Diesel and diesel contaminated soil did not flash below 70°C with the given test procedure; it is not expected that diesel contaminated soil could meet the ignitable hazardous waste definition.

Table 1

	Flash Point	Accepted Range
Reference standard p-xylene	27°C (80.6°F)	27.2° ± 0.8°C (81° ± 1.5°F)
Neat gasoline (Union 76 regular)	Below Room Temp. (<75°F)	
Neat diesel (Shell)	70°C (158°F)	43.3° - 87.8°C (110° - 190°F)

Conclusions and recommendations (see attached sheets)

Table 2

Summary of Results
Flash Point of Gasoline in Soil

Amount of Gasoline in 60.0 g soil	Test Flame Applied at	Observations	ug gasoline per g soil
1.0 ml.	Every 5 min. for 1st hr., then every ½ hr. for the following 2 hours.	Flash	12000 ug/g
	7th hour.	Flash	
0.5 ml.	Every 10 min. for 1st hr., then every hour.	Flash	6000 ug/g
	After 4 hours	No Flash	
0.2 ml.	Every 5 minutes	Flash	2400 ug/g
	After 35 minutes	No Flash	
0.2 ml.	Every 5 minutes	Flash	2400 ug/g
	After 35 minutes	No Flash	
0.1 ml.	Every 10 minutes	Flash	1200 ug/g
	After 35 minutes	No Flash	
0.1 ml.	Every 10 minutes	Flash	1200 ug/g
	After 35 minutes	No Flash	
0.05 ml.	Every 5 minutes for 60 minutes	No Flash	600 ug/g

Room Temperatures 24°C (75°F)
Since Flash Point of gasoline is below room temperature, it flashes at room temperatures. No heat is supplied.

1.0 ml. gasoline = 0.72 g

By: Lucy Mark

12/16/85

Table 3

Summary of Results
Flash Point of Diesel in Soil

Amount of Diesel in 60.0 g soil	Test Flame Applied at	Flash Point	ug diesel per g soil
1.0 ml.*	Every 2-3°C until an hour later, then 10-15°C until 80°C	No Flash	15000 ug/g
3.0 ml.	Every 3°C until 80°C	No Flash	44000 ug/g
4.0 ml.	Every 4°C	Flashes at 78°C	59000 ug/g
5.0 ml. Triplicates	Every 2°C until 80°C	No Flash	83000 ug/g
5.0 ml. Duplicates	Every 2°C	Flashes at 72°C and at 78°C	83000 ug/g
7.0 ml.	Every 4°C	Flashes at 78°C	117000 ug/g
9.0 ml.	Every 4°C	Flashes at 78°C	150000 ug/g

60.0 g soil is heated in cup for about 50° - 60°C, pour into mason jar, add diesel, mix well, pour back into cup.

*Soil and added diesel are heated starting at room temperatures of 24°C (~74°F)

1.0 ml. diesel = 0.88 g

By: Lucy Mark

12/16/85

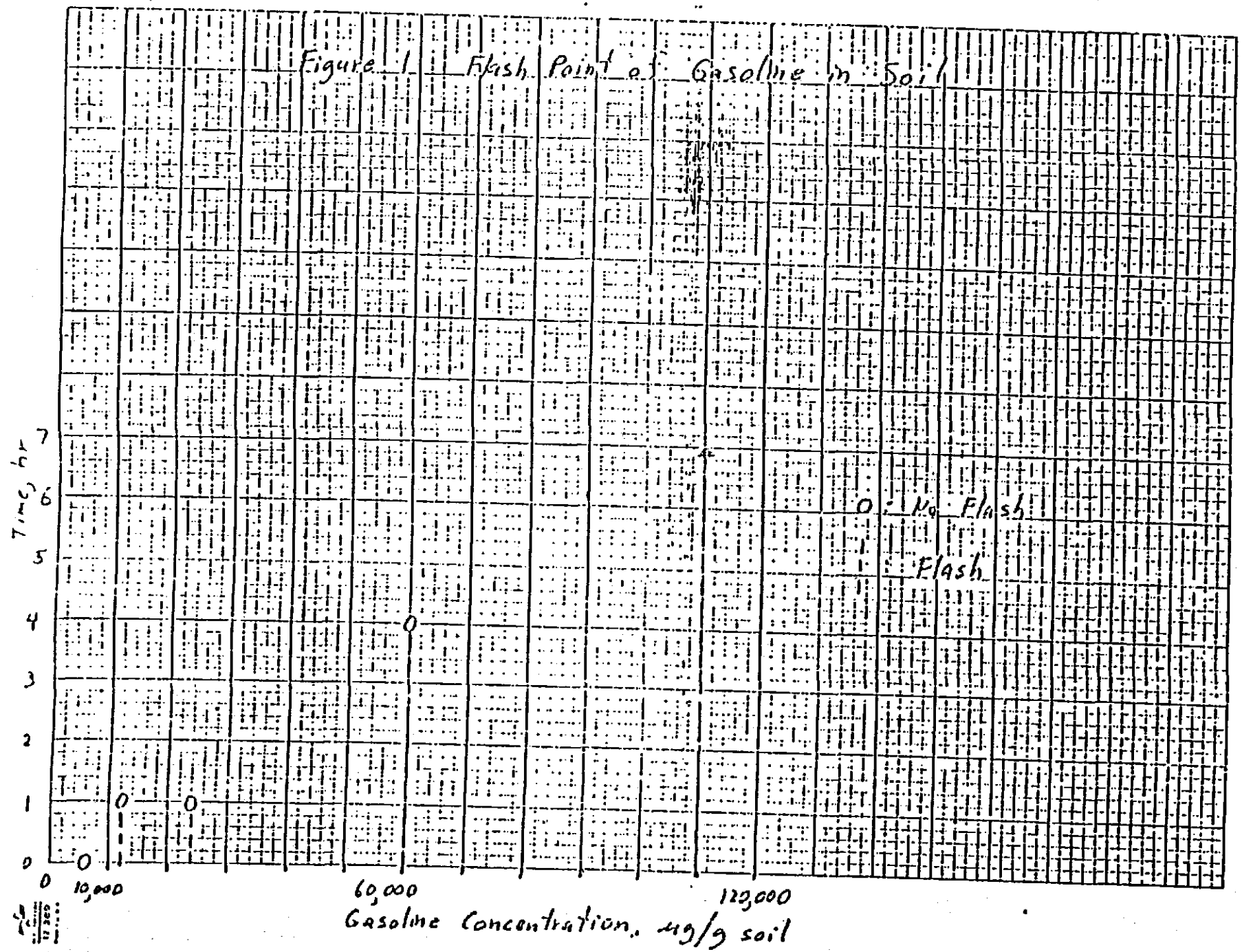
Figure 1 Flash Point of Gasoline in Soil
Time, hr
0
1
2
3
4
5
6
7
0 10,000 60,000 120,000
Gasoline Concentration, mg/g soil
O : No Flash
O : Flash

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

GEORGE DEUKMEJIAN, G

DEPARTMENT OF HEALTH SERVICES
714/744 P STREET
SACRAMENTO, CA 95814

(916) 323-2913

JUL 12 1988

Mr. Douglas Henderson
Western Oil & Gas Association
505 No. Brand Blvd., Suite 1400
Glendale, CA 91203

Dear Mr. Henderson:

Thank you for your letter dated May 31, 1988 asking for a written statement of policy regarding ignitability testing of non-liquid wastes. As you pointed out, the "proper method" for evaluating the ignitability of non-liquid wastes under State hazardous waste regulations is found in Section 66702(a)(2). You should also note that under State statutes, Section 25117(b), Health and Safety Code defines a hazardous waste as a waste or combination of wastes which "...pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Therefore, a non-liquid waste can be regulated as hazardous for other reasons than shown in Section 66702(a)(2).

Sole reliance on Section 66702 to classify non-liquid waste as hazardous due to ignitability would capture only those wastes which, when ignited, burn so vigorously and persistently that they create a hazard. This is the same criterion found in EPA regulations 40 CFR 261.21(a)(2).

EPA recognized the limitations of using only Section 261.21(a)(2) and set about developing techniques for measuring the ignitability of physical solids. We contacted Mr. David Friedman with the Office of Solid Waste at the EPA to determine the development status of the procedure for testing the ignitability of non-liquid wastes. Mr. Friedman explained that they had contracted with the American Society for Testing and Materials to develop a procedure. The test procedure has not been completed and due to funding limitations, the project has been put on hold indefinitely.

In the absence of an approved EPA method, our Hazardous Materials Laboratory developed a modified Pensky-Martens test method and is of the opinion that their modified method is suitable for testing non-liquid wastes (see enclosed). The modified test method has limited application. It should not be used to test flammable gases nor pyrophoric solids which would otherwise be regulated under Section 66702, Title 22, California Code of Regulations (CCR). However, if a sludge, semi-solid or solid waste is contaminated with a significant amount of an ignitable liquid, then ignitability should be considered. Contrary to what TSD facility operators may require, DHS does not believe all wastes need to be tested for

The waste producer is responsible for determining if the waste is classified as a hazardous waste. In doing so, the waste producer should test the waste for the applicable criteria in Article 11, Title 22, CCR and review the definition in Section 25117, Health and Safety Code (HSC). In determining the applicable criteria, the waste producer should apply his knowledge of the hazardous characteristics of the waste in light of the materials or the processes used.

You stated that substantial quantities of waste, which would otherwise be classified as nonhazardous, are being improperly classified as hazardous due to ignitability. We presume this to mean that when tested, the wastes flashed at <140°F. It would appear the waste contained an ignitable constituent and if improperly managed could pose a hazard to the public pursuant to Section 25117, HSC.

You felt that the hazardous waste classification eliminates many recycling opportunities. A hazardous waste designation does not preclude a waste from being recycled. Many hazardous wastes can be recycled. Specific exemptions for recycling are provided for in Section 25143.2, HSC. DHS encourages recycling hazardous waste as an alternative to land disposing.

If you have additional questions concerning this issue, you may wish to contact David J. Leu, Ph.D., Chief of the Alternative Technology Section at (916) 322-2822.

Sincerely,

ORIGINAL SIGNED BY
C. DAVID WILLIS

for Alex R. Cunningham
Chief Deputy Director

Enclosure

cc: See next page.

ATT

MEMORANDUM

TO: ATT Technical Staff

DATE: April 4, 1989

FROM: Karen Singer KMS

RE: Classification of Soils Containing Hydrocarbons, as Non-Hazardous Waste.

At 1:00 p.m. today I spoke with Mr. Norman Riley of the California Department of Health Services in Sacramento. He stated that at the present time, DHS has no policy which considers soil containing more than 1,000 mg/Kg TPH or gasoline, to be hazardous. Waste generators can self classify a waste according to 22 CCR, Section 66305. If waste passes all applicable criteria in Article 11, 22 CCR, it can be considered non-hazardous.

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STATE OF CALIFORNIA—HEALTH AND WELI AGENCY

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(916) 322-2822

February 15, 1989

Mr. William E. Ham
Mobil Oil Corporation
3700 West 190th Street
Torrance, CA 90509-2929

Dear Mr. Ham:

CLASSIFICATION OF CONTAMINATED SOILS, MOBIL OIL CORPORATION

The Department has completed its review of the January 6, 1988 notification received from Mobil Oil Corporation for classification of approximately 645 tons of hydrocarbon-contaminated soil as nonhazardous. This contaminated soil was generated at Mobil's West Coast Pipe Lines property in Signal Hill, California. In order to satisfy escrow timing requirements, the contaminated soil was manifested as hazardous waste and transported to the Petroleum Waste, Inc., facility at Bakersfield, California before the necessary tests were completed for classification. Based on the information provided in the notification, the Department has determined that these soils are properly classified as nonhazardous, and concurs with your notification to classify these wastes as nonhazardous.

According to the waste classification form completed by Mobil and submitted with its January 6, 1988 letter, the soil in question was contaminated with unrefined and minor amounts of refined petroleum hydrocarbons as a result of unspecified petroleum production activities occurring at this location since the early 1920's. To assess the contamination prior to sale of the property by Mobil Oil Corporation, thirty-eight samples of the soil were collected by Alton Geoscience at depths ranging from one-half foot to fifteen feet. The samples were submitted to various certified hazardous waste testing laboratories for analyses of nonhalogenated volatile organic compounds (EPA Method 8015), volatile aromatic compounds (EPA Method 8020), semivolatile organic compounds (EPA Method 8270), and total petroleum hydrocarbons (EPA Method 418.1). Tests were also conducted for Inorganic Persistent and Bioaccumulative Toxic Substances, and aquatic toxicity.

Other tests such as reactivity for hydrogen sulfide gas generation and pH were not conducted because information concerning the physical or chemical properties of the waste indicated that these parameters were not typically associated with crude oil production activities or the existence of unrefined petroleum hydrocarbons. No acute toxicity calculations were performed, and no statistical analyses of the data accompanied your notification.

The reported concentrations of total petroleum hydrocarbons (TPH) ranged as high as 73,000 mg/kg in one instance; however, according to our calculations, the mean concentration of petroleum hydrocarbons was 4,084 mg/kg. Low levels of toluene, acenaphthylene, anthracene, napthalene, assorted phthalates, and other compounds were detected by gas chromatography, however, the combined concentration of these compounds was not sufficient to cause this waste to be classified as acutely toxic by the oral LD_{50} calculation. A sample containing the highest concentration of TPH reported was tested for aquatic toxicity to represent the worst case, but this sample was not hazardous by this test procedure. No Inorganic Persistent and Bioaccumulative Toxic Substances were detected at levels above current regulatory thresholds in any of the samples examined.

Based on these findings, and our evaluation of the data pursuant to Section 66305(c) of Title 22, Division 4, Chapter 30, California Code of Regulations, the Department concludes that the contaminated soil represented by these data is properly classified as nonhazardous. The management of all nonhazardous wastes remains subject to regulation by the Regional Water Quality Control Board and local authorities. If you have any questions concerning this determination, please contact Mr. Norman Riley of my staff at the letterhead address or phone number.

Sincerely,

James T. Allen, Ph.D., Chief
Alternative Technology Section
Toxic Substances Control Division

cc: See Next Page.