ARTESIAN ENVIRONMENTAL

August 18, 1999

Mr. Barney Chan
Alameda County Environmental Health Services,
Environmental Protection Division
1131 Harbor Bay Parkway, Ste. 250
Alameda, CA 94502-6577

Re: **Remedial Options to Treat Elevated Concentrations of MTBE in Soil**
Eagle Gas
4301 San Leandro Street
Oakland, California
StID # 2118

Dear Mr. Chan:

I have prepared this letter in response to your verbal request during our telephone conversation of today. During that conversation you requested that Artesian evaluate remedial options and feasibility of remediating elevated concentrations of methyl tertiary butyl ether (MTBE) and petroleum hydrocarbons present in soils at the referenced site prior to installation of new underground storage tanks (USTs).

BACKGROUND

During April, 1999, Artesian Environmental (Artesian) removed five USTs at the subject site. Confirmational soil samples collected after UST removal indicated that an unauthorized release of petroleum has occurred. As required by the Alameda County Department of Environmental Health, Artesian then returned to the site in July, 1999 to remediate petroleum impacted soils by excavation and land disposal. Approximately 750 tons of petroleum impacted soil has been excavated and disposed as a Class II non-hazardous waste. Artesian excavated impacted soils to the degree feasible in the former USTs vicinity without removing the onsite structure, without compromising the integrity of the adjacent street and offsite structures, and without compromising worker safety. After impacted soils were excavated to the degree feasible, confirmational soil samples were collected from the walls of the excavation to determine the contaminant concentrations which remained in place. Attachment A contains a sample location map for soil samples collected from the excavation and piping trenches.

ANALYTICAL RESULTS

Sample results indicate that remaining soils in the excavation walls contain concentrations of MTBE ranging from 2.2 mg/Kg to 230 mg/Kg, Total Petroleum Hydrocarbons as Gasoline (TPHg) ranging from 120 mg/Kg to 960 mg/Kg, and TPH as diesel (TPHd) ranging from 250 mg/Kg to 1,700 mg/Kg. Concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) were below 50 mg/Kg and mostly remained below 10 mg/Kg.

Sample results indicate that soils in the product piping trenches contain concentrations of MTBE ranging from 3.8 mg/Kg to 310 mg/Kg, Total Petroleum Hydrocarbons as Gasoline (TPHg) ranging from 50 mg/Kg to 4,300 mg/Kg, and TPH as diesel (TPHd) ranging from 200 mg/Kg to 5,200 mg/Kg. Concentrations of benzene, toluene,

ethylbenzene, and xylenes (BTEX) are widely varied. Benzene concentrations ranged from below laboratory detection limits to 11 mg/Kg, Toluene concentrations ranged from below laboratory detection limits to 130 mg/Kg, ethylbenzene concentrations ranged from below laboratory detection limits to 82 mg/Kg, and concentrations of xylenes ranged from below laboratory detection limits to 420 mg/Kg. Laboratory analytical reports are contained in Attachment B.

Because no further excavation of impacted soil in the vicinity of the former UST locations is feasible and because remaining soils are considerably impacted, further remedial action by other means appears appropriate.

REMEDIAL OPTIONS FOR SITE SOIL

When evaluating options to reduce contaminant concentrations in impacted soils at the referenced site, a number of factors were considered and include the following:

- Method Effectiveness;
- Technical Feasibility;
- Ability to Complete Remedial Action in a Rapid Time Frame;
- Ability to Evaluate Effectiveness of Remedial Action in a Rapid Time Frame;
- Method Applicability to Various Types of Sites to Compensate for the Lack of Site Characterization; and
- Method Cost.

Impacted soils remaining in the vicinity of the former USTs are located beneath or near buildings and cannot be excavated without removing them or risking compromise to their structural integrity. To treat soils beneath and near buildings, an in-situ remediation method is required. It may be possible to remediate impacted soils in the product piping trench areas by excavation and land disposal, however, if an in-situ remediation method is to be implemented in other areas of the site, the selected method should be tested in the piping trench areas also. If an in-situ method is found to be successful at remediating contaminants in the excavation area, that method should be employed in the piping trench areas as a more cost-effective alternative to land disposal.

The sheet pile type shoring currently installed in the excavation is designed as a temporary solution to excavation wall stability concerns and cannot be expected to perform its function for extended periods of time. Of further concern regarding a remediation time table is the escalating financial hardship of the property owner as his only source of income continues to be zero while the service station remains closed. To prevent problems associated with excavation wall failure and to prevent placing undue financial burden on the property owner due to extended service station closure, a remediation method should be selected which can be designed, field tested, and implemented within a relatively short time frame (within approximately 30 days).

Many remediation methods require a complete site characterization before they can be designed and implemented successfully. To conduct a site characterization prior to designing a remediation method or system would require that the business remain closed for an period of time such that the owner may not be financially able to re-open his business. The remediation method selected for the site should be applicable to a broad range of geologic / geochemical conditions and specifically to the known site conditions to compensate for the lack of site characterization data.

Soil Vapor Extraction as a Remediation Method

Of the conventional remediation methods, soil vapor extraction seems to be the only one which warrants consideration due to the extensive site characterization required to properly design most conventional remediation systems. Because soils hosting the remaining contamination in the excavation area are predominantly clayey, silty gravels which appear to have high permeability and porosity, soil vapor extraction would seem to be a viable remediation method given the limited subsurface information available. However, due to the high expense and large time requirement for designing a soil vapor extraction system for the entire site, this method should be explored if in-situ methods prove unsuccessful. Further, the amount of time required to determine the effectiveness of a soil vapor extraction system is unacceptable. Soil vapor extraction may be partially implemented as a contingency by installing soil vapor extraction trenches in the vicinity of the excavation area for use at a later date as part of a complete system to be designed after installation of new USTs and completion of site characterization.

Bioremediation and Assisted Natural Attenuation as Remediation Methods

Both of these methods are in-situ and could be implemented in areas with limited access. However, these methods also require complete site characterization to determine the specifically required biocultures, nutrients, and/ or supplements necessary to achieve the desired result. These methods are long-term solutions which are typically expensive and time consuming to properly and successfully design, field test, implement, and evaluate for effectiveness. Because site characterization is so critical with these remediation methods, they must be evaluated thoroughly with detailed site characterization data which will not be available at the subject site within a reasonable time frame.

Chemical Oxidation as a Remediation Method

Chemical oxidation of contaminants using an aqueous hydrogen peroxide solution injected into site soils can reduce petroleum constituent concentrations, can be used in limited access locations, can be field tested and evaluated for effectiveness in a rapid time frame, and can be a cost-effective alternative to other remediation methods. Laboratory bench scale testing indicates that chemical oxidation can remediate MTBE, however, no field testing results are available. The anticipated high porosity and permeability of the gravelly soils hosting most of the known contamination at the site are well suited for in-situ injection of an aqueous oxidizing solution. This method is not dependent upon soil chemistry (other than the presence of organic material) and may be implemented in a variety of biochemical/ geological environments. The presence of non-petroleum organic material would simply consume more of the oxidant making less available for remediation, however, known site soils appear to contain relatively small amounts of natural organic matter. This method can be evaluated for effectiveness on a rapid time table because the oxidation reaction (and therefore remedial action) is typically complete within approximately 48 hours of injection. This remediation method appears to be the best suited for use at the subject site when considering that remedial action is required before new USTs may be installed.

REMEDIATION OF GROUNDWATER

Site groundwater may or may not have been impacted by the unauthorized release of petroleum which has impacted site soils. The presence of a tight, clean clay soil at depth of approximately 10 feet to 12 feet below ground surface (bgs) may be continuous across the site and may act to contain contaminants above the water table. The level of groundwater is currently below 13.5 feet bgs (below the clay soil and below the floor of the excavation. Groundwater is not currently in contact with impacted soils in the excavation. When re-opened for business as a service station, the site will be paved such that infiltration of surface water (and therefore downward migration of contaminants toward the water table) should be minimal. Before the new USTs are installed at the site, one groundwater sample should be collected to determine if groundwater is impacted. If site groundwater has been impacted, three groundwater monitoring wells should be installed during installation of new USTs and quarterly monitoring begun. In the event that the water table rises such that it can come into contact with impacted soils, two UST basin dewatering wells should be installed at opposite ends of the new USTs. UST basin dewatering wells should be placed directly in the backfill material as the excavation is filled. The dewatering wells should be checked for water on a monthly basis and dewatered as necessary to prevent groundwater from carrying contaminants offsite. Further groundwater remediation or system design would be inappropriate prior to installation of new USTs due to the necessity of site characterization data to the design and implementation of an effective groundwater remediation system.

RECOMMENDATIONS

- A pilot study should be conducted in an area of known impacted soils to determine the effectiveness of chemical oxidation in remediating gasoline and diesel range hydrocarbons as well as MTBE.
- If contaminant concentrations in soil can be reduced sufficiently using chemical oxidation, this method should be implemented around the perimeter of the excavation and new USTs should be installed as soon as treatment is completed. When installation of new USTs begins, treatment of the piping trench areas should begin.
- If the pilot study indicates that contaminant reductions are not acceptable, soil vapor extraction trenches should be installed for future use where impacted soils remain and installation of new USTs begun. In this situation, soils in the product piping trench areas would be excavated to the degree feasible and soil vapor extraction trenches installed for future use where necessary.
- One groundwater sample should be collected during the pilot study to determine if groundwater is impacted and groundwater monitoring wells installed if groundwater is impacted.
- During installation of new USTs, two UST basin dewatering wells should be installed in the excavation backfill material for future use in extracting groundwater which has contacted impacted soils.

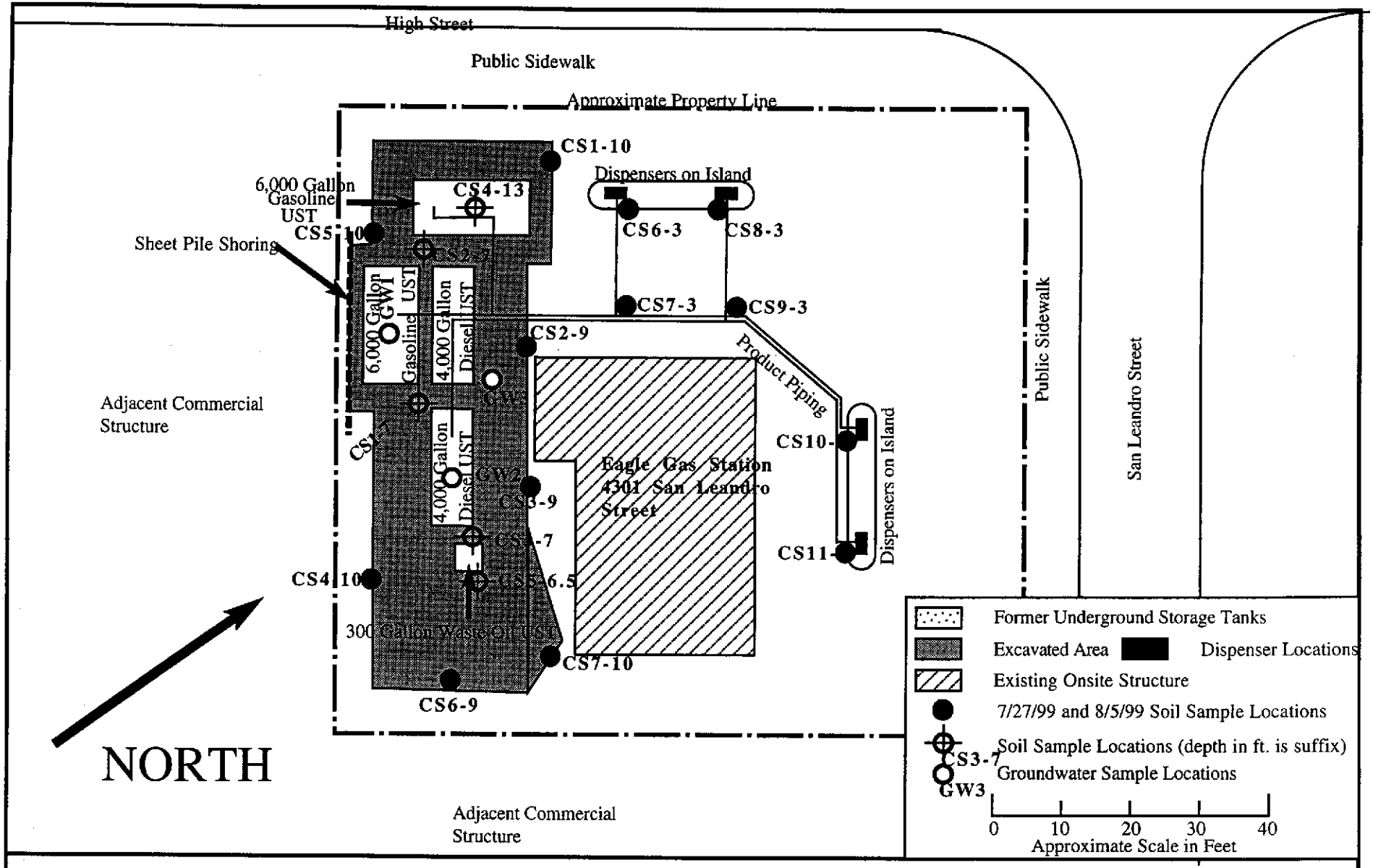
If you have any questions or comments, please do not hesitate to contact me at (510) 307-9943, extension 230.

Sincerely,
Artesian Environmental

Paul E. Jones
Project Geologist

CERTIFIED HYDROGEOLOGIST
JAMES A. JACOBS
NO. 88
STATE OF CALIFORNIA

James A. Jacobs, CHG #88
Principal Hydrogeologist



ARTESIAN ENVIRONMENTAL
229 Tewksbury Avenue
Point Richmond, California 94801
Phone (510) 307-9943 Fax (510) 232-2823

Soil Sampling Location Map
Eagle Gas
4301 San Leandro Street
Oakland, California

Project No.: 413-001-01	Date: 05/13/99	Prepared by: P. Jones	Figure 1

Attachment B

Laboratory Analytical Results and Chain-of-Custody Documentation

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #422-001-01; Eagle Gas	Date Sampled: 07/27/99
		Date Received: 07/28/99
	Client Contact: Paul Jones	Date Extracted: 07/28/99
	Client P.O:	Date Analyzed: 07/28/99

08/04/99

Dear Paul:

Enclosed are:

1). the results of 7 samples from your **#422-001-01; Eagle Gas** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director

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		Date Received: 07/28/99
	Client Contact: Paul Jones	Date Extracted: 07/28/99
	Client P.O:	Date Analyzed: 07/28-07/30/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
16120	CS1-10	S	370,a	7.2	6.5	ND<0.05	3.8	8.4	99
16121	CS2-9	S	570,a	2.2	1.6	1.6	3.9	5.5	104
16122	CS3-9	S	420,a	230	2.1	5.4	7.8	36	97
16123	CS4-10	S	120,g,j	96	0.21	1.4	0.61	2.5	99
16124	CS5-10	S	960,a	63	2.7	8.3	15	42	115
16125	CS6-9	S	350,a	110	1.9	19	8.0	38	102
16126	CS7-10	S	450,a	120	1.2	4.0	4.6	5.2	106
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #422-001-01; Eagle Gas	Date Sampled: 07/27/99
		Date Received: 07/28/99
	Client Contact: Paul Jones	Date Extracted: 07/28/99
	Client P.O:	Date Analyzed: 07/29-08/02/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
16120	CS1-10	S	1700,a	102
16121	CS2-9	S	680,g,d	106
16122	CS3-9	S	250,d,g	109
16123	CS4-10	S	370,b	101
16124	CS5-10	S	510,d	101
16125	CS6-9	S	260,d	99
16126	CS7-10	S	1200,d,b	103
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment.

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Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 07/28/99 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#09617)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	2.151	2.062	2.03	106	102	4.2
Benzene	0.000	0.200	0.208	0.2	100	104	3.9
Toluene	0.000	0.208	0.216	0.2	104	108	3.8
Ethylbenzene	0.000	0.214	0.214	0.2	107	107	0.0
Xylenes	0.000	0.630	0.630	0.6	105	105	0.0
TPH(diesel)	0	274	285	300	91	95	3.8
TRPH (oil and grease)	0.0	21.3	20.6	20.8	102	99	3.3

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

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110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 07/29/99 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#09617)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	2.126	2.268	2.03	105	112	6.5
Benzene	0.000	0.200	0.208	0.2	100	104	3.9
Toluene	0.000	0.208	0.220	0.2	104	110	5.6
Ethylbenzene	0.000	0.212	0.222	0.2	106	111	4.6
Xylenes	0.000	0.624	0.648	0.6	104	108	3.8
TPH(diesel)	0	289	297	300	96	99	2.7
TRPH (oil and grease)	0.0	24.7	21.7	20.8	119	104	12.9

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

160937A15.doc

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY

Report To: Paul Jones Bill To: Artesian
Company: Artesian Environmental
229 Tewksbury Avenue
Point Richmond, CA 94801
Tele: (510) 307-9943 Fax: (510) 232-7823
Project #: 427-001-01 Project Name: Eagle Gas
Project Location: 4301 San Leandro Street, Oakland
Sampler Signature:

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX: Water	Soil	Air	Sludge	Other	METHOD PRESERVED: Ice	HCl	HNO_3	Other	BTEX & TPH as Gas (602/8020 + 8015) MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other	Comments
CS1-10		7/27	10:30	1	Brass		X				X				X	X															16120
CS2-9			10:40	1	Tube		X				X				X	X															16121
CS3-9			10:45	1	"		X				X				X	X															16122
CS4-10			10:53	1	"		X				X				X	X															16123
CS5-10			11:00	1	"		X				X				X	X															16124
CS6-9			11:20	1	"		X				X				X	X															16125
CS7-10			11:40	1	"		X				X				X	X															16126

Relinquished By:	Date:	Time:	Received By:
	7/29/99	920	FAY 1381 SCAN'D
FAY 1381 SCAN'D	7/29/99	1050	VWOR (VIA FE)
Relinquished By:	Date:	Time:	Received By:

Remarks:

	VOAS	O&G	METALS	OTHER
PRESERVATION				

ICE/T° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓
APPROPRIATE CONTAINERS ✓

TB.MV

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #413-001-01; RPC/ Okland	Date Sampled: 08/05/99
		Date Received: 08/05/99
	Client Contact Paul Jones	Date Extracted: 08/05/99
	Client P.O:	Date Analyzed: 08/05/99

08/12/99

Dear Paul:

Enclosed are:

1). the results of **6** samples from your **#413-001-01; RPC/Okland** project,

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

for

Edward Hamilton, Lab Director

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		Date Received: 08/05/99
	Client Contact Paul Jones	Date Extracted: 08/05/99
	Client P.O:	Date Analyzed: 08/05-08/06/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	MTBE	Benzene	Toluene	Ethylben-zene	Xylenes	% Recovery Surrogate
16693	CS6-3	S	4300,a	70	11	130	82	420	111
16694	CS7-3	S	50,b	14	ND<0.020	2.4	0.85	3.8	100
16695	CS8-3	S	250,g,j	3.8	0.32	0.72	0.81	1.0	105
16696	CS9-3	S	380,g,j	9.5	ND<0.010	ND<0.010	ND<0.010	ND<0.010	101
16697	CS10-3	S	930,b	310	ND<0.50	78	17	99	98
16698	CS11-3	S	1400,a	62	3.2	13	25	90	98
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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Artesian Environmental 229 Tewksbury Avenue Point Richmond, CA 94801	Client Project ID: #413-001-01; RPC/ Okland	Date Sampled: 08/05/99
		Date Received: 08/05/99
	Client Contact Paul Jones	Date Extracted: 08/05/99
	Client P.O:	Date Analyzed: 08/06-08/11/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
16693	CS6-3	S	1300,d,b	111
16694	CS7-3	S	200,b,d	113
16695	CS8-3	S	3400,a	112
16696	CS9-3	S	1900,a	102
16697	CS10-3	S	350,d,b	102
16698	CS11-3	S	5200,a	113
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment.

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Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/05/99 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#09948)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	1.877	2.004	2.03	92	99	6.6
Benzene	0.000	0.198	0.202	0.2	99	101	2.0
Toluene	0.000	0.204	0.210	0.2	102	105	2.9
Ethylbenzene	0.000	0.212	0.218	0.2	106	109	2.8
Xylenes	0.000	0.630	0.650	0.6	105	108	3.1
TPH(diesel)	0	293	285	300	98	95	3.0
TRPH (oil and grease)	0.0	21.1	22.0	20.8	101	106	4.2

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/06/99-08/07/99 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#09948)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	2.074	2.209	2.03	102	109	6.3
Benzene	0.000	0.188	0.210	0.2	94	105	11.1
Toluene	0.000	0.194	0.216	0.2	97	108	10.7
Ethylbenzene	0.000	0.202	0.220	0.2	101	110	8.5
Xylenes	0.000	0.588	0.640	0.6	98	107	8.5
TPH(diesel)	0	354	353	300	118	118	0.4
TRPH (oil and grease)	0.0	21.0	21.2	20.8	101	102	0.9

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

1401ZA17

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☒ 24 HOUR ☐ 48 HOUR ☐ 5 DAY

Report To: Paul Jones Bill To: Paul Jones

Company: Artesian Environmental

229 Tewksbury Avenue

Point Richmond, CA 94801

Tele: (510) 307-9943 Fax: (510) 232-2823 ARC/Oakland

Project #: 413-001-01 Project Name: [redacted]

Project Location: San Leandro & Hoin Street

Sampler Signature: Amber Eldridge

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX: Water	Soil	Air	Sludge	Other	METHOD PRESERVED: Ice	HCl	HNO_3	Other	BTEX & TPH as Gas (602/8020 + 8015) MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other: MTBE	Comments
CS6-3	tank/piping trench	8/5/99	9:09	1	liner		✓				✓				✓	✓														✓	16693
CS7-3	tank/piping trench	8/5/99	9:15	1	liner		✓				✓				✓	✓														✓	16694
CS8-3	"	8/5/99	9:25	1	liner		✓				✓				✓	✓														✓	16695
CS9-3	"	8/5/99	9:33	1	liner		✓				✓				✓	✓														✓	16696
CS10-3	"	8/5/99	9:45	1	liner		✓				✓				✓	✓														✓	16697
CS11-3	"	8/5/99	9:50	1	liner		✓				✓				✓	✓														✓	16698
~~CS12-3~~	"	8/5/99																													

Relinquished By:	Date:	Time:	Received By:
Amber Eldridge	8/5/99	10:47	Richard Garcia
Richard Garcia	8/5	2:10	UPS
Relinquished By:	Date:	Time:	Received By:

Remarks: 5-day turnaround please.

	VOAs	O&G	METALS	OTHER
ICE/T ✓				
GOOD CONDITION ✓				
HEAD SPACE ABSENT ✓				
PRESERVATION APPROPRIATE ✓				
CONTAINERS ✓				