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Alameda County Department of Environmental Health 1131 Harbor Bay Parkway, 2<sup>nd</sup> Floor Alameda, CA 94502

Attention: Paresh Khatri

Subject: Report of CPT Groundwater Investigation Dublin Toyota UST Site, 6450 Dublin Court, Dublin, California Fuel Leak Case RO# 0000333

Ladies and Gentlemen:

Attached please find a copy of the *Report of CPT Groundwater Investigation*, prepared by Gribi Associates. I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Very truly yours,

 $\Delta l_{\star}$ 

Scott F. Anderson Chief Financial Officer Dublin Toyota

#### REPORT OF CPT GROUNDWATER INVESTIGATION Dublin Toyota UST Site 6450 Dublin Court Dublin, California

ACEH RO# 0000333

Prepared for:

Dublin Toyota 4321 Toyota Drive Dublin, CA 94568

June 19, 2009



**GEOLOGIC & ENVIRONMENTAL CONSULTING SERVICES** 

1090 Adams Street, Suite K Benicia, California, 94510 Phone: (707)748-7743 Fax: (707) 748-7763



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Attention: Mr. Paresh Khatri

Subject: Report of CPT Groundwater Investigation Dublin Toyota UST Site 6450 Dublin Court, Dublin, California Fuel Leak Case RO# 0000333

Ladies and Gentlemen:

Gribi Associates is pleased to submit this *Report of Cone Penetration Testing (CPT) Groundwater Investigation* on behalf of Dublin Toyota for the underground storage tank (UST) site located at 6450 Dublin Court in Dublin, California. This letter report describes and documents the drilling and sampling of four onsite CPT borings (CPT-1 through CPT-4) and three offsite CPT borings (CPT-5 through CPT-7). This investigation was conducted to satisfy directives contained in an October 4, 2008 letter from Alameda County Environmental Health (ACEH) to further define and characterize the vertical and lateral groundwater MTBE impacts at the subject site and downgradient from the subject site.

We appreciate the opportunity to present this report for your review. Please call if you have any questions or require additional information.

Very truly yours,

AROL

Matthew A. Rosman Project Engineer

MAR/ct

Suns A

James E. Gribi Professional Geologist California No. 5843



cc: Mr. Scott Anderson, Dublin Toyota Mr. Wyman Hong, Zone 7 Water Agency

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#### **EXECUTIVE SUMMARY**

Gribi Associates is pleased to submit this *Report of Cone Penetration Testing (CPT) Groundwater Investigation* on behalf of Dublin Toyota for the underground storage tank (UST) site located at 6450 Dublin Court in Dublin, California. This letter report describes and documents the drilling and sampling of four onsite CPT borings (CPT-1 through CPT-4) and three offsite CPT borings (CPT-5 through CPT-7). This investigation was conducted to satisfy directives contained in an October 4, 2008 letter from Alameda County Environmental Health (ACEH) to further define and characterize the vertical and lateral groundwater MTBE impacts at the subject site and downgradient from the subject site.

In order to further define and characterize MTBE impacts to groundwater, and to characterize vertical soil lithology, seven CPT borings, CPT-1 through CPT-7, were drilled and sampled between April 28 and April 30, 2009. Borings CPT-1, CPT-2, and CPT-3 were sited on the southern boundary of the Site, in an expected downgradient groundwater flow direction from the former Site USTs. Boring CPT-4 was sited in an expected upgradient groundwater flow direction from the former Site UST excavation cavity. Borings CPT-5, CPT-6, and CPT-7 were located offsite along Johnson Drive, approximately 350 feet south of the subject property and on the opposite side of Interstate 580, in an expected downgradient groundwater flow direction from the former Site USTs. The offsite boring locations along Johnson Drive were the closest available downgradient locations from the site, without having to drill within the limits of Interstate 580, a Caltrans right-of-way. All activities will be conducted in accordance with applicable local, State, and Federal guidelines and statutes.

According to driller-generated CPT boring logs, soils beneath the site are generally similar, consisting primarily of silts and clays to 90 feet total boring depth, with occasional generally discontinuous thin sand and silty sand layers. Three thin sand zones, each generally less than five feet in thickness, were encountered, with the first between 30 and 40 feet bgs, the second between 50 and 60 feet bgs, and the third between 70 and 80 feet bgs. The first sand zone, between 30 and 40 feet bgs, corresponds to the previously identified "B" Zone.

Laboratory analytical results for the depth-discrete grab groundwater samples showed groundwater MTBE impacts only in the uppermost ("B" Zone) sand zone, with detectable MTBE concentrations of 2,400 ug/l in CPT boring CPT-1, 4.9 ug/l in CPT-2, 400 ug/l in CPT-3, 13 ug/l in CPT-4, and 490 ug/l in CPT-5. Deeper groundwater MTBE impacts were all nondetect except in borings CPT-4 and CPT-5, which showed respective MTBE concentrations of 2.3 ug/l and 21 ug/l in samples collected in silts and clays at approximately 44 and 48 feet bgs (both CPT borings did not encounter the intermediate sand zone between 50 and 60 feet bgs).

Results of this investigation showed a fairly pervasive permeable thin sand zone, previously identified as the "B" Zone, between approximately 30 and 35 feet bgs. This zone was present in all borings except downgradient borings CPT-6 and CPT-7, the respective middle and westerly CPT borings on Johnson Drive. Groundwater analytical results from this investigation and from onsite "B" Zone wells MW-4D, MW-5D, MW-6D, MW-8, MW-9, and MW-10 define a groundwater MTBE plume in the "B" Zone that appears to extend southwest from the UST source area and then, apparently due to lithologic variability, turns to the south beneath US



Interstate 580. This "B" Zone MTBE plume appears to extend at least as far south as CPT-5, in Johnson Drive approximately 500 feet south from the Dublin Toyota UST source area. Note that these conclusions are slightly tenuous, given the data gap which exists due to the difficulty in characterizing MTBE impacts beneath US Interstate 580.

Two deeper unnamed sand zones, one between 50 and 60 feet bgs and the other between 70 and 80 feet bgs, showed no detectable groundwater MTBE impacts. Thus, it appears that MTBE from the project site has migrated laterally in the "B" Zone, but has not migrated vertically deeper than the "B" Zone in significant quantities.

In order to provide additional long-term groundwater MTBE data, we recommend installing four "B" Zone groundwater monitoring wells. Three of these wells would be located near CPT boring locations CPT-3 (onsite, southwest corner), CPT-5 (Johnson Drive, east boring), and CPT-6 (Johnson Drive, middle boring). The fourth well would be located approximately 150 east of CPT-5. Note that for the three wells on Johnson Drive, an attempt would be made to obtain access to install these wells on the adjacent south mall parking lot, 30 to 40 feet south from the original CPT boring locations. This would preclude the need for a City encroachment permit and would improve safety during installation and sampling of these wells.



#### **1.0 INTRODUCTION**

Gribi Associates is pleased to submit this *Report of Cone Penetration Testing (CPT) Groundwater Investigation* on behalf of Dublin Toyota for the underground storage tank (UST) site located at 6450 Dublin Court in Dublin, California. This letter report describes and documents the drilling and sampling of four onsite CPT borings (CPT-1 through CPT-4) and three offsite CPT borings (CPT-5 through CPT-7). This investigation was conducted to satisfy directives contained in an October 4, 2008 letter from Alameda County Environmental Health (ACEH) to further define and characterize the vertical and lateral groundwater MTBE impacts at the subject site and downgradient from the subject site.

#### 1.1 Scope of Work

Gribi Associates was contracted by the Dublin Toyota to conduct the following scope of work.

- Task 1 Conduct prefield activities.
- **Task 2 Conduct drilling and sampling activities of seven CPT borings.**
- **Task 3 Conduct laboratory analyses.**
- **Task 4 Prepare report of findings.**

These tasks were conducted in accordance with the approved workplan and with generally accepted sampling guidelines and protocols.

#### 1.2 Limitations

The services provided under this contract as described in this report include professional opinions and judgments based on data collected. These services have been provided according to generally accepted environmental protocol. The opinions and conclusions contained in this report are typically based on information obtained from:

- 1. Observations and measurements made by our field staff.
- 2. Contacts and discussions with regulatory agencies and others.
- 3. Review of available hydrogeologic data.

#### 2.0 SITE BACKGROUND

#### 2.1 General Site Description

The Site is located in a primarily commercial area of Dublin, California and is formerly the location of a Toyota/Scion automobile dealership (Figures 1 and 2). The site comprises an irregularly shaped land parcel of nearly 3.5 acres. An irregularly shaped building is located in the center of the site parcel that houses the business activities of the dealership. The west



portion of the site building is primarily a show room and sales area. The east portion of the site building is primarily used as an automotive service area. The site, with the exception of the site building, is entirely paved with asphalt.

The Site is bounded to the south by Interstate 580 freeway, to the west by Dublin Sports Grounds Park, to the north by Dublin Court followed by a retail plaza, and to the east by an office-supply warehouse store.

#### 2.2 Site Environmental Conditions

The Dublin Toyota UST site consisted of three USTs located in a common tank farm located adjacent to the northeast corner of the maintenance garage (see Figure 2). The tank farm was composed of two 2,000-gallon steel gasoline tanks and one 1,000-gallon steel waste oil tank. The three USTs were removed from a common excavation by Scott Company on June 10, 1998. Based on soil and grab groundwater sampling results, which showed elevated levels of gasoline-and diesel-range hydrocarbons, the UST excavation cavity was over-excavated, and approximately 500 gallons of groundwater was pumped from the excavation cavity. Approximately 92 tons of hydrocarbon-impacted soil were disposed of offsite.

In December 1998, Gribi Associates drilled and sampled four investigative soil borings (IB-1 through IB-4), and drilled, installed, and sampled two groundwater monitoring wells (MW-1 and MW-2) at the site. Soil and groundwater samples collected from the borings and wells contained no significant levels of hydrocarbons, except for the groundwater sample from well MW-1, located about 15 feet southwest from the former UST cavity. Groundwater samples from this well contained levels of methyl tert-butyl ether (MTBE).

In August 2000, Gribi Associates drilled and sampled one soil boring (IB-5) sited inside the Dublin Toyota service building west from the former USTs, and drilled, installed, and sampled one groundwater monitoring well (MW-3) sited south-southwest from the former USTs. Soil analytical results from these borings showed no detectable concentrations of gasoline-range hydrocarbons. Groundwater samples from these borings showed concentrations of MTBE that were significantly lower than MTBE concentrations in MW-1, indicating lateral attenuation of MTBE impacts in groundwater southwest from the former USTs. Subsequent groundwater monitoring of the three site groundwater monitoring wells in May 2002, November 2002, and April 2003 showed decreasing concentrations of MTBE in MW-1.

In May 2005, a soil and water investigation (SWI) was conducted that consisted of drilling and sampling twelve soil boring (B-1 through B-12) at the site (*SWI Summary of Findings*, Gribi Associates, June 2005). Results of the investigation indicated groundwater MTBE impacts in a shallow "A" zone immediately downgradient from the source (former location of site USTs) and in a deeper "B" zone further downgradient from the source. The SWI summary report included a brief workplan proposing the installation of ten groundwater monitoring wells, to include four shallow "A" zone wells and six deeper "B" zone wells.

In July 2005, two 2-inch diameter extraction wells (EW-1 and EW-2) were installed in a carwash bay of the Dublin Toyota facility to a depth of approximately 15 feet below surface grade. The extraction wells were constructed within the gravel backfill of the former UST excavation.



Between February and April 2006, Gribi Associates conducted seven aggressive fluid vapor recovery (AFVR) events (*Report or Interim Remedial Measures*, Gribi Associates, April 2006). Each event consisted of approximately four hours of extraction of soil vapor and groundwater at wells EW-1 and EW-2 using a vacuum truck. During the AFVR events, groundwater and vapor samples were collected to monitor remedial progress. The combined total estimated volume of removed groundwater (approximately 3,200 gallons) and the combined total estimated mass of removed gasoline-range hydrocarbons (four pounds) during the seven AFVR events were relatively small. These results indicated that AFVR had only limited applicability as a source area remedial option for the project site. Given the results and conclusions, implementation of additional AFVR activities at the site was not recommended.

In April 2006, Gribi Associates drilled and installed ten 3/4-inch diameter groundwater monitoring wells (MW-4S, MW-4D, MW-5S, MW-5D, MW-6S, MW-6D, MW-7, MW-8, MW-9, and MW-10) at the site. The locations of the monitoring wells closely mirrored the locations of the soil borings conducted during the 2005 investigation. Results of groundwater monitoring and sampling were very similar to results from the soil and water investigation conducted in May 2005. Groundwater results show elevated MTBE concentrations in Zone A (shallow aquifer, above 20 feet in depth) immediately downgradient from the former UST excavation and elevated MTBE levels in Zone B (deeper aquifer, between 30 and 40 feet bgs) further downgradient from the former UST excavation.

Gribi Associates prepared and submitted *Soil and Groundwater Investigation Workplan* and *Soil and Groundwater Investigation Workplan Addendum* on January 8, 2009 and March 4, 2009, respectively. The workplan and workplan addendum were approved by ACEH in a letter dated March 20, 2009.

#### 3.0 DESCRIPTION OF FIELD ACTIVITIES

In order to further define and characterize MTBE impacts to groundwater, and to characterize vertical soil lithology, seven CPT borings, CPT-1 through CPT-7, were drilled and sampled between April 28 and April 30, 2009. Four of the CPT borings (CPT-1 through CPT-4) were located onsite and three of the CPT borings (CPT-5 through CPT-7) were located approximately 350 feet downgradient, along Johnson Drive.

All activities will be conducted in accordance with applicable local, State, and Federal guidelines and statutes.

### 3.1 Prefield Activities

Prior to beginning field activities, written approval was obtained from ACEH. A drilling drilling permit was obtained from Alameda County Zone 7 Water Agency and 72-hour notification was given prior to implementing field activities. Additionally, an encroachment permit was obtained from the City of Pleasanton to facilitate drilling the offsite soil borings within the city right-of-way. Copies of the permits are provided as Appendix A.

Prior to implementing field activities, proposed drilling locations were be marked with white paint, and Underground Services Alert (USA) was notified at least 48 hours prior to drilling. A



private underground utility locator was retained to conducted an independent clearance of the proposed well locations.

Prior to initiating drilling activities, a Site Safety Plan was prepared, and a tailgate safety meeting will be conducted with all site workers.

#### **3.2** Location of Borings

CPT boring locations are shown on Figure 3. Borings CPT-1, CPT-2, and CPT-3 were sited on the southern boundary of the Site, in an expected downgradient groundwater flow direction from the former Site USTs. Boring CPT-4 was sited in an expected upgradient groundwater flow direction from the former Site UST excavation cavity. Borings CPT-5, CPT-6, and CPT-7 were located offsite along Johnson Drive, approximately 350 feet south of the subject property and on the opposite side of Interstate 580, in an expected downgradient groundwater flow direction from the former Site USTs. The offsite boring locations along Johnson Drive were the closest available downgradient locations from the site, without having to drill within the limits of Interstate 580, a Caltrans right-of-way.

#### 3.3 Drilling and Sampling of Soil Borings

The seven investigative CPT borings were drilled to a depth of approximately 90 feet below surface grade CPT drilling equipment. At each boring location, this method involved, first, pushing an electronic piezocone penetrometer to the desired total depth while measuring lithologic parameters, and then, pushing a groundwater sampling probe to the desired sampling depths in either the same or a separate boring located one to two feet away from the initial CPT boring. During the initial CPT boring run, "real time" data, including cone bearing pressure, sleeve friction, and pore pressure, were measured and processed, generating a lithologic log in the field, which was then used to select groundwater sampling depths in the adjacent water sampling boring. A copy of the CPT report from Gregg Drilling is contained in Appendix B.

Three grab groundwater samples were collected from identified permeable zones at each of the CPT borings, with the exception of CPT-6, in which only two permeable zones were identified and sampled. Permeable zones were identified based on correlating soil types and recorded pore pressures with depth. A zone with significant sand content and/or a measured negative soil pore pressure would indicate zones of higher permeability.

Each grab groundwater sample was collected by pushing a closed tool to the desired depth, and then retracting the tool approximately four feet to expose small diameter PVC well screen. A clean stainless steel bailer was then used to collect the water sample as follows: (1) Laboratory-supplied containers were completely filled directly from the bailer with a minimum of agitation; (2) After making sure that no air bubbles were present, each container was then tightly sealed with a Teflon-lined septum; and (3) Each container was then labeled and placed in cold storage for transport to the analytical laboratory under formal chain-of-custody. All coring and sampling equipment was thoroughly cleaned and decontaminated between each boring and sample collection by triple rinsing first with water, then with dilute tri-sodium phosphate solution, and finally with distilled water. Following completion of water sampling activities, both borings at each CPT boring location were grouted by tremieing from the bottom up.



#### 3.4 Laboratory Analysis of Water Samples

Twenty discrete groundwater samples were collected from the seven CPT borings and analyzed by the following methods:

- USEPA 8260B Total Petroleum Hydrocarbons as Gasoline (TPH-G)
- USEPA 8260B Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- USEPA 8260B Oxygenates (TAME, TBA, DIPE, ETBE, and MTBE)

All analyses were conducted by Sunstar (a California-certified laboratory) with standard turnaround time on results.

#### 4.0 **RESULTS OF INVESTIGATION**

#### 4.1 General Subsurface Conditions

CPT boring logs are provided in the Gregg Drilling CPT report in Appendix B. Cross-sections using driller-generated CPT lithologic logs, are provided as Figures 4, 5, and 6.

According to driller-generated CPT boring logs, soils beneath the site are generally similar, consisting primarily of silts and clays to 90 feet total boring depth, with occasional generally discontinuous thin sand and silty sand layers. Three thin sand zones, each generally less than five feet in thickness, were encountered, with the first between 30 and 40 feet bgs, the second between 50 and 60 feet bgs, and the third between 70 and 80 feet bgs. The first sand zone, between 30 and 40 feet bgs, corresponds to the previously identified "B" Zone.

#### 4.2 Results of Laboratory Analyses

Groundwater analytical results are summarized in Table 1 and on Figures 7 and 8. The laboratory data report and chain of custody are contained in Appendix C.

Laboratory analytical results for the depth-discrete grab groundwater samples showed groundwater MTBE impacts only in the uppermost ("B" Zone) sand zone, with detectable MTBE concentrations of 2,400 ug/l in CPT boring CPT-1, 4.9 ug/l in CPT-2, 400 ug/l in CPT-3, 13 ug/l in CPT-4, and 490 ug/l in CPT-5. Deeper groundwater MTBE impacts were all nondetect except in borings CPT-4 and CPT-5, which showed respective MTBE concentrations of 2.3 ug/l and 21 ug/l in samples collected in silts and clays at approximately 44 and 48 feet bgs (both CPT borings did not encounter the intermediate sand zone between 50 and 60 feet bgs).

#### 5.0 CONCLUSIONS

Results of this investigation showed a fairly pervasive permeable thin sand zone, previously identified as the "B" Zone, between approximately 30 and 35 feet bgs. This zone was present in all borings except downgradient borings CPT-6 and CPT-7, the respective middle and westerly CPT borings on Johnson Drive. Groundwater analytical results from this investigation and from onsite "B" Zone wells MW-4D, MW-5D, MW-6D, MW-8, MW-9, and MW-10 define a groundwater MTBE plume in the "B" Zone that appears to extend southwest from the UST source area and then, apparently due to lithologic variability, turns to the south beneath US



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Two deeper unnamed sand zones, one between 50 and 60 feet bgs and the other between 70 and 80 feet bgs, showed no detectable groundwater MTBE impacts. Thus, it appears that MTBE from the project site has migrated laterally in the "B" Zone, but has not migrated vertically deeper than the "B" Zone in significant quantities.

#### 6.0 **RECOMMENDATIONS**

In order to provide additional long-term groundwater MTBE data, we recommend installing four "B" Zone groundwater monitoring wells. Three of these wells would be located near CPT boring locations CPT-3 (onsite, southwest corner), CPT-5 (Johnson Drive, east boring), and CPT-6 (Johnson Drive, middle boring). The fourth well would be located approximately 150 east of CPT-5. Note that for the three wells on Johnson Drive, an attempt would be made to obtain access to install these wells on the adjacent south mall parking lot, 30 to 40 feet south from the original CPT boring locations. This would preclude the need for a City encroachment permit and would improve safety during installation and sampling of these wells.



FIGURES

















TABLES

Table 1         SUMMARY OF GROUNDWATER ANALYTICAL RESULTS         Dublin Toyota         6450 Dublin Court, Dublin, California									
	Concentration (micrograms per liter, ug/l or ppb)								
Sample ID	Sample Date	Sample Depth Interval	TPH-G	В	Т	E	X	MTBE	Other Oxygenates
CPT-1-34	04/28/09	30-34 ft	1,100	< 0.50	< 0.50	< 0.50	<1.0	2,400	All ND
CPT-1-58	04/28/09	54-58 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-1-82	04/28/09	76-82 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-2-37	04/28/09	33-37 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	4.9	All ND
CPT-2-58	04/28/09	54-58 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-2-79	04/28/09	75-79 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-3-36	04/29/09	32-36 ft	240	< 0.50	< 0.50	< 0.50	<1.0	400	All ND
CPT-3-55	04/29/09	51-55 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-3-82	04/29/09	78-82 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-4-34	04/29/09	30-34 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	13	All ND
CPT-4-48	04/29/09	44-48 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	2.3	All ND
CPT-4-73	04/29/09	69-73 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-5-36	04/30/09	32-36 ft	270	< 0.50	< 0.50	< 0.50	<1.0	490	All ND
CPT-5-47	04/30/09	43-47 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	21	All ND
CPT-5-79	04/30/09	75-79 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-6-55	04/30/09	51-55 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-6-80	04/30/09	76-80 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-7-39	04/30/09	35-39 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-7-62	04/30/09	58-62 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
CPT-7-70	04/30/09	66-70 ft	<50	< 0.50	< 0.50	< 0.50	<1.0	<1.0	All ND
GW ESLs (Drinking Water) 100 1.0 40 30 20 5.0 Various									

Notes:

F

TPH-G = total petroleum hydrocarbons as gasoline

 $\mathbf{B} = \mathbf{benzene}$ 

T = toluene

E=ethylbenzene

X = xylenes

MTBE = methyl tert-butyl ether

<0.50 = Not detected above the expressed value.

ND = no concentrations detected above laboratory detection limit

GW ESL = Groundwater Environmental Screening Levels for sites in which drinking water is a present or current drinking water source as contained in SFRWQCBs *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (May 2008).

#### APPENDIX A

#### DRILLING AND ENCROACHMENT PERMITS



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7 100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551-9486 • PHONE (925) 454-5000

March 31, 2009

Mr. Matthew Rosman Gribi Associates 1090 Adams Street, Suite K Benicia, CA 94510

Dear Mr. Rosman:

Enclosed is drilling permit 29022 for a contamination investigation at 6450 Dublin Court for Dublin Toyota. Also enclosed is a current drilling permit application for your files. Drilling permit applications for future projects can also be downloaded from our web site at www.zone7water.com.

Please note that permit conditions A-2 and G requires that a report be submitted after completion of the work. <u>The report must be completed on a California</u> <u>Department of Water Resources Water Well Drillers Report (DWR Form 188) and signed by the driller</u>. Also include any laboratory analysis of the soil and water samples. Please submit the original of your completion report. We will forward your submittal to the California Department of Water Resources.

If you have any questions, please contact me at extension 5056 or Matt Katen at extension 5071.

Sincerely,

Wýman Hong () Water Resources Specialist



Enc.



## ZONE 7 WATER AGENCY

100 NORTH CANYONS PARKWAY, LIVERMORE, CALIFORNIA 94551 VOICE (925) 454-5000 FAX (925) 454-5728

#### DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE	FOR OFFICE USE
6450 DUBLIN COUPT DUBLIN CALLE	PERMIT NUMBER 29022
2103 DODIER COOKI, DODDIE, CALIFO	WELL NUMBER
	APN941-1400-007-00
California Coordinates Sourceft_Accuracy CCNft_CCE APN	ft PERMIT CONDITIONS
CLIENT	(Circled Permit Requirements Apply)
Address 6450 DURLIN CONDER DE-	GENERAL
City DUBLIN, CALIFORNIA Zip 94568	1. A permit application should be submitted so as to arrive at the
	Zone 7 office five days prior to proposed starting date.
APPLICANT Name CRIDI Accounting (Matthew Reamon)	<ol> <li>Submit to Zone 7 within 60 days after completion of permitted work the original Dopartment of Males Department of Males Department</li> </ol>
Fay 707-748-	Drillers Report or equivalent for well projects or drilling logs and
Address 1090 ADAMS STREET, #K Phone 707-748-	7743 location sketch for geotechnical projects
City BENICIA, CALIFORNIA Zip 94510	3 Permit is void if project not begun within 90 days of approval
TYPE OF PROJECT	B WATER SUPPLY WELLS
Well Construction Geotechnical Investigation	1. Minimum surface seal thickness is two inches of cement
Cathodic Protection General General	grout placed by tremie.
Water Supply C Contamination	<ol> <li>Minimum seal depth is 50 feet for municipal and industrial wells</li> </ol>
Well Destruction	or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
PROPOSED WELL USE	<ol> <li>An access port at least 0.5 inches in diameter is required</li> </ol>
New Domestic D Irrigation	on the wellhead for water level measurements
Municipal Remediation	<ol> <li>A sample port is required on the discharge pipe near the unallocated</li> </ol>
Dewatering O Other	C GROUNDWATER MONITORING WELLS INCLUDING
DRILLING METHOD	1 Minimum surface seal thickness is two update of comparisons
Mud Rotary Air Rotary Hollow Stem Aug	er a placed by tremie
Cable Tool Direct Push X Other	<ul> <li>Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.</li> </ul>
DRILLING COMPANY GREGG DRILLING AND TESTING	(D.) GEOTECHNICAL. Backfill bore hole with compacted cuttings or
DRILLER'S LICENSE NO. 485165	heavy bentonite and upper two feet with compacted material In
WELL PROJECTS	shall be used in place of compacted outlines
Drill Hole Diameter in Maximum	E. CATHODIC. Fill hole above anode zone with concrete placed by
Casing DiameterinDepth	ft tremie.
Surface Seal Depthft. Number	G SPECIAL CONDITIONS Submitte Zone Zone Sector
SOIL BORINGS	completion of permitted work the well installation report including all
Number of Borings 7 Maximum	soil and water laboratory analysis results.
Hole Diameter 3.0 in Depth 80	ft,
ESTIMATED STARTING DATE APPTL 20, 2000	
ESTIMATED COMPLETION DATE APRIL 25, 2009	
	Maria Alexan
	Approved Date 3/31/09
I nereby agree to comply with all requirements of this permit ar	d Alameda
County Ordinance No. 73-68.	· //
APPLICANT'S ALTER	12 6
SIGNATURE / MARCO Date Date	20/0009

ATTACH SITE PLAN OR SKETCH

Revised April 27, 2005



# **PUBLIC WORKS PERMIT**

#### -Inspections must be requested 24 Hours prior to Starting Work-

Project Address	APN#		Permit #: ENCR 201849 Applicant GREGG DRILLING
Project: ASSIGN -			
Owner GREGG DRILLING 950 HOWE ROAD MARTINEZ, CA 94553 Phone: 925-313-5800	Con GRE MAR WEL	<b>tractor</b> GG DRILLING TINEZ, CA 94553 L DRILLING	485165
Scope of Work ENCR-BOR This permit is soil boring It is contractor's resp Backfill material and pave Inspection before starting	ENCR FOR BORING WORK g work at locations sho onsibility to restore t ement cap to be approve g work.	own on attached ske the boring hole and ed by the Inspector	etch on Johnson Drive. d pavement surface. c. Call Public Works
Comments APPLICANT SHALL BORE 6 x DEPOT. APPLICANT SHALL US TRAFRFIC .	4" HOLES ON JOHNSON DRI SE GROUTE/CEMENT TO FII	IVE BETWEEN THE HII LL HOLE. ATTACHED	TTON HOTEL AND HOME IS THE REVIEWED
Quantity Description UTILITY IN	ISPECTION		<b>Amount</b> 115.00
Entered: HH			
	CALL PUBLIC W INSPECTION 24 PRIOR TO STAR WORK (925) 931	CRKS HRS IT OF -5680	
All work to be performed to City of Pleas City of Pleasanton Municipal Code, Chap Total Fees:	anton Standard Details and Specifi oter 13.04, Encroachment. \$115.00	cations. This permit is issue Payment	ed pursuant to all provisions of the t: \$115.00
Issued By:	In Tem	Date o	of Issue: 13-APR-2009
Applicant or Agent:	1 Mac		Date: 7/13/Coo9

Engineering Division: (925) 931-5650

Public Works Inspections: (925) 931-5680





**APPENDIX B** 

GREGG DRILLING CPT REPORT



May 5, 2009

Gribi Associates Attn: Matthew Rosman 1090 Adams St., Suite K Benicia, California 94510

Subject: CPT Site Investigation Dublin Toyota Dublin, California GREGG Project Number: 09-064MA

Dear Mr. Rosman:

The following report presents the results of GREGG Drilling & Testing's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	$\boxtimes$
2	Pore Pressure Dissipation Tests	(PPD)	$\boxtimes$
3	Seismic Cone Penetration Tests	(SCPTU)	
4	Resistivity Cone Penetration Tests	(RCPTU)	
5	UVOST Laser Induced Fluorescence	(UVOST)	
6	Groundwater Sampling	(GWS)	$\boxtimes$
7	Soil Sampling	(SS)	
8	Vapor Sampling	(VS)	
9	Vane Shear Testing	(VST)	
10	SPT Energy Calibration	(SPTE)	

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (925) 313-5800.

Sincerely, GREGG Drilling & Testing, Inc.

Mary Walden Operations Manager



#### GREGG DRILLING & TESTING, INC.

GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

#### Cone Penetration Test Sounding Summary

#### -Table 1-

CPT Sounding Identification	Date	Termination Depth (Feet)	Depth of Groundwater Samples (Feet)	Depth of Soil Samples (Feet)	Depth of Pore Pressure Dissipation Tests (Feet)
CPT-01	4/28/09	90	34, 55, 82	-	31.3
CPT-02	4/28/09	90	37, 58, 79	-	-
CPT-03	4/29/09	90	36, 55, 82	-	-
CPT-04	4/29/09	90	32, 48, 73	-	-
CPT-05	4/30/09	90	36, 47, 79		
CPT-06	4/30/09	90	55, 80	-	-
CPT-07	4/30/09	90	39, 62, 70	-	-



GREGG DRILLING & TESTING, INC. GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

## Bibliography

Lunne, T., Robertson, P.K. and Powell, J.J.M., "Cone Penetration Testing in Geotechnical Practice" E & FN Spon. ISBN 0 419 23750, 1997

Roberston, P.K., "Soil Classification using the Cone Penetration Test", Canadian Geotechnical Journal, Vol. 27, 1990 pp. 151-158.

Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available through <a href="http://www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html">www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html</a>, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

Robertson, P.K., Sully, J., Woeller, D.J., Lunne, T., Powell, J.J.M., and Gillespie, D.J., "Guidelines for Estimating Consolidation Parameters in Soils from Piezocone Tests", Canadian Geotechnical Journal, Vol. 29, No. 4, August 1992, pp. 539-550.

Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Campanella, R.G. and I. Weemees, "Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegger, "Reliability of Soil Gas Sampling and Characterization Techniques", International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org



## Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*. The soundings were conducted using a 20 ton capacity cone with a tip area of 15 cm<sup>2</sup> and a friction sleeve area of 225 cm<sup>2</sup>. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.80.

The cone takes measurements of cone bearing  $(q_c)$ , sleeve friction  $(f_s)$  and penetration pore water pressure  $(u_2)$  at 5cm intervals during penetration to provide a nearly continuous hydrogeologic log. CPT data reduction and interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored on disk for further analysis and reference. All CPT soundings are performed in accordance with revised (2002) ASTM standards (D 5778-95).

The cone also contains a porous filter element located directly behind the cone tip  $(u_2)$ , *Figure CPT*. It consists of porous plastic and is 5.0mm thick. The filter element is used to obtain penetration pore pressure as the cone is advanced as well as Pore Pressure Dissipation Tests (PPDT's) during appropriate pauses in penetration. It should be noted that prior to penetration, the element is fully saturated with silicon oil under vacuum pressure to ensure accurate and fast dissipation.



Figure CPT

When the soundings are complete, the test holes are grouted using a Gregg support rig. The grouting procedures generally consist of pushing a hollow CPT rod with a "knock out" plug to the termination depth of the test hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.



## **Cone Penetration Test Data & Interpretation**

The Cone Penetration Test (CPT) data collected from your site are presented in graphical form in the attached report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings extending greater than 50 feet, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. do not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and do not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on  $q_t$ ,  $f_s$ , and  $u_2$ . In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.





#### (After Robertson, et al., 1986)

Figure SBT


# **Cone Penetration Test (CPT) Interpretation**

Gregg has recently updated their CPT interpretation and plotting software (2007). The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

#### Input:

- 1 Units for display (Imperial or metric) (atm. pressure, pa = 0.96 tsf or 0.1 MPa)
- 2 Depth interval to average results, (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
- 3 Elevation of ground surface (ft or m)
- 4 Depth to water table, z<sub>w</sub> (ft or m) input required
- 5 Net area ratio for cone, a (default to 0.80)
- 6 Relative Density constant, C<sub>Dr</sub> (default to 350)
- 7 Young's modulus number for sands,  $\alpha$  (default to 5)
- 8 Small strain shear modulus number
  - a. for sands,  $S_G$  (default to 180 for  $SBT_n$  5, 6, 7)
  - b. for clays,  $C_G$  (default to 50 for SBT<sub>n</sub> 1, 2, 3 & 4)
- 9 Undrained shear strength cone factor for clays, Nkt (default to 15)
- 10 Over Consolidation ratio number, k<sub>ocr</sub> (default to 0.3)
- 11 Unit weight of water, (default to  $\gamma_w = 62.4 \text{ lb/ft}^3 \text{ or } 9.81 \text{ kN/m}^3$ )

#### Column

- 1 Depth, z, (m) CPT data is collected in meters
- 2 Depth (ft)
- 3 Cone resistance, q<sub>c</sub> (tsf or MPa)
- 4 Sleeve friction, f<sub>s</sub> (tsf or MPa)
- 5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u<sub>2</sub>)
- 6 Other any additional data, if collected, e.g. electrical resistivity or UVIF
- 7 Total cone resistance,  $q_t$  (tsf or MPa)  $q_t = q_c + u$  (1-a)

8	Eriction Ratio R. (%)	$R_{e} = (f_{e}/q_{e}) \times 100\%$					
0	Soil Behavior Type (non-normalized), SBT	see note					
10	Unit weight $\gamma$ (ncf or kN/m <sup>3</sup> )	based on SBT, see note					
11	Total overburden stress $\sigma_{\rm c}$ (tsf)	$\sigma_{vo} = \gamma Z$					
12	Insitu pore pressure u (tsf)	$u_0 = \gamma_w (z - z_w)$					
12	Effective overburden stress $\sigma'$ (tsf)	$G'_{ij} = G_{ij} = H_{ij}$					
13	Normalized cone resistance Q.	$O_{v_0} = (\sigma_{v_0} - \sigma_{v_0}) / \sigma'_{v_0}$					
15	Normalized friction ratio F. (%)	$F_{r} = f_{r} / (q_{r} - \sigma_{rr}) \times 100\%$					
15	Normalized Pore Pressure ratio B	$B_{1} = \mu - \mu_{1} / (\alpha_{1} - \sigma_{1})$					
17	Soil Behavior Type (normalized) SBT-	see note					
18	SBT_ Index L	see note					
19	Normalized Cone resistance. On (n varies with	Ic) see note					
20	Estimated permeability, k <sub>spr</sub> (cm/sec or ft/sec)	see note					
21	Equivalent SPT N <sub>60</sub> blows/ft	see note					
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note					
23	Estimated Relative Density, Dr, (%)	see note					
24	Estimated Friction Angle, 6', (degrees)	see note					
25	Estimated Young's modulus, Es (tsf)	see note					
26	Estimated small strain Shear modulus, Go (tsf)	see note					
27	Estimated Undrained shear strength, su (tsf)	see note					
28	Estimated Undrained strength ratio	$s_u/\sigma_v$					
29	Estimated Over Consolidation ratio, OCR	see note					
Notes:							
1	Soil Behavior Type (non-normalized), SBT listed below	Lunne et al. (1997)					
2	Unit weight, $\gamma$ either constant at 119 pcf or base (Lunne et al., 1997 and table below)	ed on Non-normalized SBT					
3	Soil Behavior Type (Normalized), $SBT_n$	Lunne et al. (1997)					
4	SBT <sub>n</sub> Index, $I_c = ((3.47 - \log Q_{t1})^2)$	$^{2} + (\log F_{\rm r} + 1.22)^{2})^{0.5}$					
5	Normalized Cone resistance, $Q_{tn}$ (n varies with	Ic)					
	$Q_{tn} = ((q_t - \sigma_{vo})/pa) (pa/(\sigma'_{vo})^n \text{ and recalculate } I_t)$	c, then iterate:					
	$ \begin{array}{ll} \mbox{When } I_c < 1.64, & n = 0.5 \mbox{ (clean sand)} \\ \mbox{When } I_c > 3.30, & n = 1.0 \mbox{ (clays)} \\ \mbox{When } 1.64 < I_c < 3.30, & n = (I_c - 1.64) 0.3 + 0 \\ \mbox{Iterate until the change in } n, \ \Delta n < 0.01 \\ \end{array} $	.5					

8./28/2007

- Estimated permeability, k<sub>SBT</sub> (based on Normalized SBT<sub>n</sub>) (Lunne et al., 1997 and table below)
- 7 Equivalent SPT N<sub>60</sub>, blows/ft

$$\frac{(q_i/p_a)}{N_{60}} = 8.5 \left( 1 - \frac{I_c}{4.6} \right)$$

- 8 Equivalent SPT (N<sub>1</sub>)<sub>60</sub> blows/ft where  $C_N = (pa/\sigma'_{vo})^{0.5}$
- 9 Relative Density, Dr, (%) Only SBT<sub>n</sub> 5, 6, 7 & 8
- 10 Friction Angle,  $\phi'$ , (degrees)

Only SBT<sub>n</sub> 5, 6, 7 & 8

- Young's modulus, E<sub>s</sub>
  Only SBT<sub>n</sub> 5, 6, 7 & 8
- 12 Small strain shear modulus, Go a.  $G_o = S_G (q_t \sigma'_{vo} pa)^{1/3}$ b.  $G_o = C_G q_t$
- Undrained shear strength, s<sub>u</sub>
  Only SBT<sub>n</sub> 1, 2, 3, 4 & 9
- 14 Over Consolidation ratio, OCR Only SBT<sub>n</sub> 1, 2, 3, 4 & 9

#### SBT Zones

 $D_r^2 = Q_{tn} / C_{Dr}$ Show 'N/A' in zones 1, 2, 3, 4 & 9

 $(N_1)_{60} = N_{60} C_N$ 

 $\tan \phi' = \frac{1}{2.68} \left[ \log \left( \frac{q_c}{\sigma'_{vo}} \right) + 0.29 \right]$ Show 'N/A' in zones 1, 2, 3, 4 & 9

E<sub>s</sub> = α q<sub>t</sub> Show 'N/A' in zones 1, 2, 3, 4 & 9

For  $SBT_n 5$ , 6, 7 For  $SBT_n 1$ , 2, 3& 4 Show 'N/A' in zones 8 & 9

 $s_u = (q_t - \sigma_{vo}) / N_{kt}$ Show 'N/A' in zones 5, 6, 7 & 8

OCR =  $k_{ocr} Q_{t1}$ Show 'N/A' in zones 5, 6, 7 & 8

#### SBT<sub>n</sub> Zones

The following updated and simplified SBT descriptions have been used in the software:

sensitive fine grained	1	sensitive fine grained
organic soil	2	organic soil
clay	3	clay
clay & silty clay	4	clay & silty clay
clay & silty clay		
sandy silt & clayey silt		
silty sand & sandy silt	5	silty sand & sandy silt
sand & silty sand	6	sand & silty sand
sand		
sand	7	sand
	sensitive fine grained organic soil clay clay & silty clay clay & silty clay sandy silt & clayey silt silty sand & sandy silt sand & silty sand sand sand	sensitive fine grained1organic soil2clay3clay & silty clay4clay & silty clay4sandy silt & clayey silt5sand & sandy silt5sand6sand7

Gregg CPT Interpretation Software 1.1., 2007

11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

\*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print 'clays & silty clays')

### Estimated Permeability (see Lunne et al., 1997)

SBT <sub>n</sub>	Permeability (ft/sec)	(m/sec)
1	3x 10 <sup>-8</sup>	$1 \times 10^{-8}$
2	$3 \times 10^{-7}$	$1 \times 10^{-7}$
3	1x 10 <sup>-9</sup>	$3 \times 10^{-10}$
4	3x 10 <sup>-8</sup>	$1 \times 10^{-8}$
5	3x 10 <sup>-6</sup>	$1 \times 10^{-6}$
6	$3x 10^{-4}$	$1 \times 10^{-4}$
7	$3x \ 10^{-2}$	$1 \times 10^{-2}$
8	3x 10 <sup>-6</sup>	$1 \times 10^{-6}$
9	1 x 10 <sup>-8</sup>	3x 10 <sup>-9</sup>

### Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft <sup>3</sup> )	$(kN/m^3)$
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0



# Groundwater Sampling (GWS)

Gregg Drilling conducts groundwater sampling using a Hydropunch<sup>®</sup> type groundwater sampler, *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the drill rig to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 1 3/4 inch hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen groundwater infiltrate and allowing to hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately 1/2 or 3/4 inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

A summary of the groundwater samples collected, including the sampling date, depth and location identification, is presented in Table 1 and the corresponding CPT plot.



Figure GWS

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.



# Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals measured hydrostatic water pressures and determined the approximate depth of the ground water table. A PPDT is conducted when the cone is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u*) with time is measured behind the tip of the cone and recorded by a computer system.

Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c<sub>h</sub>)
- In situ horizontal coefficient of permeability (k<sub>h</sub>)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until such time as there is no variation in pore pressure with time, *Figure PPDT*. This time is commonly referred to as  $t_{100}$ , the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992.

A summary of the pore pressure dissipation tests is summarized in Table 1.



Figure PPDT



Max. Depth: 90.223 (ft) Avg. Interval: 0.656 (ft)



Max. Depth: 90.059 (ft) Avg. Interval: 0.656 (ft)



Max. Depth: 90.059 (ft) Avg. Interval: 0.656 (ft)



Avg. Interval: 0.656 (ft)



Max. Depth: 90.387 (ft) Avg. Interval: 0.656 (ft)



Max. Depth: 90.059 (ft) Avg. Interval: 0.656 (ft)



Max. Depth: 90.059 (ft) Avg. Interval: 0.656 (ft)

## **APPENDIX C**

## LABORATORY DATA REPORTS AND CHAIN OF CUSTODY RECORDS

05 May 2009

Jim Gribi Gribi Associates 1090 Adam Street, Suite K Benicia, CA 94510 RE: Dublin Toyota

Enclosed are the results of analyses for samples received by the laboratory on 05/02/09 09:54. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Joh J. eft

John Shepler Laboratory Director

## **Chain of Custody Record**

SunStar Laboratories, Inc. 3002 Dow Ave, Suite 212 Tustin, CA 92780 714-505-4010

client: Gribi Associates
Address: 1090 Adams St. #K Benicia, CA
Phone: 707-748-7743 Fax: 707-748-7763
Project Manager: M. Rosman

Date: 5/01/2009	Page: Of
Project Name: Dublin Toya	off
Collector: M. Rosman	Client Project #:
Batch #: 7906388	

COC 83896 চ x F 8015M Ext./Carbon Chain 6010/7000 Title 22 Metals OXY only Total # of containers 8015M (gasoline) # 8015M (diesel) Laboratory ID 8260 + OXY 8260 BTEX, 8021 BTEX 8260 8270 Sample Container Comments/Preservative Sample ID Date Sampled Type Type Time CPT-4128 104 1020 - 34 weel X 0\ X CPT-1-58 1110 62 X 0755 CPT-1-82 4124 03 4128 Weles JOA COT-2-37 1400 X 04 X CPT-2-58 1435 05 1540 CPT-2-29 06 CPT-3-36 4124 0950 تعليعهما **10**4 X 67 × CP+-2-55 1020 68 × 1105 C PT-3 4 09 -82 Received by; (signature) Date / Time Relinguished by: (signature) Date / Time Notes 1130 1000 2005

Total # of containers	
Chain of Custody seals Y/N/NA	
Seals intact? Y/N/MA	
Received good condition/e010	3.0
_	

Turn around time: (N)

STD. TAT

Sample disposal Instructions: Disposal @ \$2.00 each \_\_\_\_

Relinguished by: (signature)

Relinguished by: (signature)

61

Date, Time

Date / Time

Return to client

eived by (signal ne)

Received by: (signature)

Pickup

Date / Time

Date / Time

## **Chain of Custody Record**

SunStar Laboratories, Inc. 3002 Dow Ave, Suite 212 Tustin, CA 92780 714-505-4010

client: Gribi Associates	
Address: 1090 Adams Sty	#K, Benicia CA
Phone: 707-798-7743	Fax: 707-748-7763
Project Manager: M.Racman	-

Date: 5/01/2009	Page:	Ζ	Of	Σ	
Project Name: Dublin Toyoj	4				
Collector: M. Racman	Client P	roject #:			

Collector: M. Racman 7900388 Batch #:

COC 83898

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260	8260 + OXY	8260 BTEX, OXY only 704-0	8270	8021 BTEX	8015M (gasoline)	8015M (diesel)	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals				-	Laboratory ID #	Com	ments/	Preserv	ative	Total # of containers
<u> </u>	1/20	1425	120/00	141	-			_															
CP7-1-31	1107	1520	voje	VQ4	┼──		X	_							-	_	-	10					
(P+-Y-73)	6	1605	6	5			T								-+			12		<u>.</u>			
CPT-5-36	4/30	(0)	wer	V04			X											(3					
CPT-5-47		1105					X											14					
CPT-5-79	+	1040	40	•			<u>X</u>											15					-
10-1-55	1/120		1.10100	141	<b> </b>		<del>.</del> ,	$\rightarrow$							_	_	_	1/					
()-1-6 - 53	4120	13/3	wate	007			<del>&gt;</del>										_	16					
CF1-0-00	v	1.242	<b>v</b>	<b>.</b>			귀		_							-+-	-	17					+
CPT-7-29	4/20	100	INK-FOC	JOA	+		$\mathbf{x}^{\dagger}$	$\dashv$	_								+	18					+
CPT-7 - 62		1550		7	†		<b>x</b>									+		19					
CPT-7-70	4	1515	~	为			X											20					
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Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project Project	Project: Dublin Toyota Number: [none] Manager: Jim Gribi		<b>Reported:</b> 05/05/09 16:05						
ANALYTICAL REPORT FOR SAMPLES										
Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received						
CPT-1-34	T900388-01	Water	04/28/09 10:20	05/02/09 09:54						
CPT-1-58	T900388-02	Water	04/28/09 11:10	05/02/09 09:54						
CPT-1-82	T900388-03	Water	04/29/09 07:55	05/02/09 09:54						
CPT-2-37	T900388-04	Water	04/28/09 14:00	05/02/09 09:54						
CPT-2-58	T900388-05	Water	04/28/09 14:35	05/02/09 09:54						
CPT-2-79	T900388-06	Water	04/28/09 15:40	05/02/09 09:54						
CPT-3-36	T900388-07	Water	04/29/09 09:50	05/02/09 09:54						
CPT-3-55	T900388-08	Water	04/29/09 10:20	05/02/09 09:54						
CPT-3-82	T900388-09	Water	04/29/09 11:05	05/02/09 09:54						
CPT-4-34	T900388-10	Water	04/29/09 14:35	05/02/09 09:54						
CPT-4-48	T900388-11	Water	04/29/09 15:20	05/02/09 09:54						
CPT-4-73	T900388-12	Water	04/29/09 16:05	05/02/09 09:54						
CPT-5-36	T900388-13	Water	04/30/09 10:10	05/02/09 09:54						
CPT-5-47	T900388-14	Water	04/30/09 11:05	05/02/09 09:54						
CPT-5-79	T900388-15	Water	04/30/09 10:40	05/02/09 09:54						
CPT-6-55	T900388-16	Water	04/30/09 13:15	05/02/09 09:54						
CPT-6-80	T900388-17	Water	04/30/09 13:45	05/02/09 09:54						
CPT-7-39	T900388-18	Water	04/30/09 15:00	05/02/09 09:54						
CPT-7-62	T900388-19	Water	04/30/09 15:50	05/02/09 09:54						
CPT-7-70	T900388-20	Water	04/30/09 15:15	05/02/09 09:54						

Gribi Associates

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	Proje Project Numb roject Manag	ect: Dubl er: [none er: Jim C	in Toyota e] Gribi				<b>Reported</b> 05/05/09 16	: :05
		CI T90038	PT-1-34 8-01 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	2400	100	"	100	"	"	05/04/09	"	
C6-C12 (GRO)	1100	50	"	1	"	"	05/03/09	"	
Surrogate: 4-Bromofluorobenzene		111 %	77.1	-110	"	"	"	"	S-GC
Surrogate: Dibromofluoromethane		95.5 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		87.6 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-1-58 8-02 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/04/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50		"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10		"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"		"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		95.2 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		95.8 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported:</b> 05/05/09 16:05							
		CI T90038	PT-1-82 8-03 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		95.5 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		83.4 %	84.7	7-109	"	"	"	"	S-GC

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	F P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-2-37 8-04 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by H	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	4.9	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		92.5 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		84.9 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-2-58 8-05 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50		"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10		"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"		"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		99.8 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		85.8 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported:</b> 05/05/09 16:05							
		CF T90038	PT-2-79 8-06 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	B							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50		"		"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		96.6 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		89.2 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	l P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-3-36 8-07 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by H	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50		"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50		"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	400	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	240	50			"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.8 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		97.6 %	66.3	-111	"	"	"	"	
Surrogate: Toluene-d8		82.4 %	84.7	-109	"	"	"	"	S-GC

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported:</b> 05/05/09 16:05							
		CF T90038	PT-3-55 8-08 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"		"	"	"	
Surrogate: 4-Bromofluorobenzene		98.9 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		95.6 %	66.3	-111	"	"	"	"	
Surrogate: Toluene-d8		83.2 %	84.7	-109	"	"	"	"	S-GC

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	P Pi	<b>Reported</b> 05/05/09 16	:05						
		CF T90038	PT-3-82 8-09 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50		"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50		"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0		"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50		"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		95.8 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		87.1 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-4-34 8-10 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	13	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		97.4 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		91.8 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-4-48 8-11 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	2.3	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		97.4 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		88.4 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	I P	<b>Reported</b> 05/05/09 16	: :05						
		CI T90038	PT-4-73 8-12 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Volatile Organic Compounds by 1	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50		"	"	"	"	"	
Ethylbenzene	ND	0.50		"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50		"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0		"	"	"	"	"	
Tert-butyl alcohol	ND	10		"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50		"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		99.1 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		84.9 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi							<b>Reported</b> 05/05/09 16	: :05
		CI T90038	PT-5-36 8-13 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"		"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50		"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	490	25	"	25	"	"	05/04/09	"	
C6-C12 (GRO)	270	50	"	1	"	"	05/03/09	"	
Surrogate: 4-Bromofluorobenzene		108 %	77.1	1-110	"	"	"	"	
Surrogate: Dibromofluoromethane		97.1 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		90.0 %	84.7-109		"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi							<b>Reported</b> 05/05/09 16	: :05
		CI T90038	PT-5-47 8-14 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by B	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"		"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	21	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50		"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		99.5 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		82.4 %	84.7	7-109	"	"	"	"	S-GC

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi								: :05
		CI T90038	PT-5-79 8-15 (W	) /ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"		"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50		"		"	"	"	
Surrogate: 4-Bromofluorobenzene		108 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		102 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		92.2 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi								: :05
		CI T90038	PT-6-55 8-16 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by I	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		98.2 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		94.8 %	84.7-109		"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi								:05
		CI T90038	PT-6-80 8-17 (W	) (ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by 1	EPA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50		"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0		"	"	"	"	"	
Tert-butyl alcohol	ND	10		"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50		"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		99.8 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		88.9 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director

Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi								:05
		CI T90038	PT-7-39 8-18 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10		"	"	"	"	"	
Di-isopropyl ether	ND	2.0		"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
C6-C12 (GRO)	ND	50		"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		102 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		86.6 %	84.7	7-109	"	"	"	"	

J. eht John

John Shepler, Laboratory Director
Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi						<b>Reported</b> 05/05/09 16	: :05	
		CI T90038	PT-7-62 8-19 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	B							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0		"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0		"	"	"	"	"	
C6-C12 (GRO)	ND	50		"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		102 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		88.9 %	84.7	7-109	"	"	"	"	

SunStar Laboratories, Inc.

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John Shepler, Laboratory Director

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Gribi Associates 1090 Adam Street, Suite K Benicia CA, 94510	Project: Dublin Toyota Project Number: [none] Project Manager: Jim Gribi						<b>Reported</b> 05/05/09 16	:05	
		CF T90038	PT-7-70 8-20 (W	ater)					
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		SunStar La	aborato	ries, Inc.					
Volatile Organic Compounds by E	PA Method 8260	В							
Benzene	ND	0.50	ug/l	1	9050208	05/02/09	05/03/09	EPA 8260B	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
m,p-Xylene	ND	1.0	"	"	"	"	"	"	
o-Xylene	ND	0.50	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	2.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	10	"	"	"	"	"	"	
Di-isopropyl ether	ND	2.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	2.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"		"	
C6-C12 (GRO)	ND	50	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	77.1	-110	"	"	"	"	
Surrogate: Dibromofluoromethane		102 %	66.3	8-111	"	"	"	"	
Surrogate: Toluene-d8		90.2 %	84.7	7-109	"	"	"	"	

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John Shepler, Laboratory Director

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Gribi Associates	Project: Dublin Toyota	
1090 Adam Street, Suite K	Project Number: [none]	Reported:
Benicia CA, 94510	Project Manager: Jim Gribi	05/05/09 16:05

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

## SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9050208 - EPA 5030 GCMS										
Blank (9050208-BLK1)				Prepared:	05/02/09	Analyzed	1: 05/03/09			
Surrogate: 4-Bromofluorobenzene	8.42		ug/l	8.00		105	77.1-110			
Surrogate: Dibromofluoromethane	7.40		"	8.00		92.5	66.3-111			
Surrogate: Toluene-d8	6.99		"	8.00		87.4	84.7-109			
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
m,p-Xylene	ND	1.0	"							
o-Xylene	ND	0.50	"							
Tert-amyl methyl ether	ND	2.0	"							
Tert-butyl alcohol	ND	10	"							
Di-isopropyl ether	ND	2.0	"							
Ethyl tert-butyl ether	ND	2.0	"							
Methyl tert-butyl ether	ND	1.0	"							
1,1,2-trichloro-1,2,2-trifluoroethane (CFC 113)	ND	5.0	"							
LCS (9050208-BS1)				Prepared:	05/02/09	Analyzed	1: 05/04/09			
Surrogate: 4-Bromofluorobenzene	8.06		ug/l	8.00		101	77.1-110			
Surrogate: Dibromofluoromethane	7.85		"	8.00		98.1	66.3-111			
Surrogate: Toluene-d8	7.90		"	8.00		98.8	84.7-109			
Chlorobenzene	19.4	1.0	"	20.0		96.9	75-125			
1,1-Dichloroethene	18.4	1.0	"	20.0		92.2	75-125			
Trichloroethene	21.6	1.0	"	20.0		108	75-125			
Benzene	18.5	0.50	"	20.0		92.6	75-125			
Toluene	18.3	0.50	"	20.0		91.4	75-125			
LCS Dup (9050208-BSD1)				Prepared:	05/02/09	Analyzed	: 05/04/09			
Surrogate: 4-Bromofluorobenzene	8.26		ug/l	8.00		103	77.1-110			
Surrogate: Dibromofluoromethane	7.72		"	8.00		96.5	66.3-111			
Surrogate: Toluene-d8	7.82		"	8.00		97.8	84.7-109			
Chlorobenzene	20.3	1.0	"	20.0		102	75-125	4.64	20	
1,1-Dichloroethene	18.6	1.0	"	20.0		93.2	75-125	1.08	20	
Trichloroethene	21.6	1.0	"	20.0		108	75-125	0.185	20	
Benzene	19.4	0.50	"	20.0		96.8	75-125	4.49	20	
Toluene	18.6	0.50	"	20.0		93.0	75-125	1.74	20	

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John Shepler, Laboratory Director

Gribi Associates	Project: Dublin Toyota	
1090 Adam Street, Suite K	Project Number: [none]	Reported:
Benicia CA, 94510	Project Manager: Jim Gribi	05/05/09 16:05

## **Notes and Definitions**

Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
Analyte DETECTED
Analyte NOT DETECTED at or above the reporting limit
Not Reported
Sample results reported on a dry weight basis
Relative Percent Difference

SunStar Laboratories, Inc.

J. eht John

John Shepler, Laboratory Director

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