APPENDIX J-10:
EXPLORATION TECHNOLOGIES INC. (ETI), "SUBSURFACE GEOCHEMICAL ASSESSMENT OF METHANE GAS OCCURRENCES, PLAYA VISTA DEVELOPMENT, FIRST PHASE PROJECT, LOS ANGELES, CALIFORNIA," PREPARED FOR THE CITY OF LOS ANGELES, DEPARTMENT OF BUILDING AND SAFETY, PROJECT NO. 99-2219, APRIL 17, 2000

SUBSURFACE GEOCHEMICAL ASSESSMENT OF METHANE GAS OCCURRENCES

PLAYA VISTA DEVELOPMENT
First Phase Project
Los Angeles, California

Prepared for:

CITY OF LOS ANGELES
DEPARTMENT OF BUILDING AND SAFETY

April 17, 2000

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EXECUTIVE SUMMARY

Exploration Technologies, Inc. (ETI) was retained in May 1999 by the City of Los Angeles, Department of Building and Safety (LADBS), and Playa Capital to serve as Peer Reviewer regarding subsurface methane gas issues in the proposed Playa Vista Development in Los Angeles, California. In order to provide adequate methane data for evaluation, ETI designed and supervised the collection and analysis of two shallow soil vapor surveys consisting of 812 sites placed on a 100 foot staggered grid over the First Phase of the Playa Vista Development. The soil gas samples were collected by Scientific Geochemical Services in Casper, Wyoming and analyzed by Microseeps in Pittsburgh, Pennsylvania. Using the soil gas data as a guide, 32 monitor wells were installed by Camp, Dresser and McKee and sampled for their free and dissolved gases. Gas analysis for these samples were also conducted by Microseeps. Stable carbon isotopes for the free gases in the ground water were analyzed by Isotech Labs in Champaign, Illinois.

This soil gas and ground water data have defined two main areas of methane gas seepage, one very large thermogenic gas anomaly (the soil gas expression is over 1700 feet in length and 200 feet wide) in Track 01 and another, slightly smaller thermogenic gas anomaly (slightly smaller in size, but not in concentrations) in the southern part of Track 02. Anomalous levels of ethane, propane and butanes are coincident with methane in both anomalies, inferring that the methane is related to deeper thermogenic sources. The free gases and the dissolved gas anomalies in the ground water within the 50-foot gravel aquifer are also directly related to the soil gas anomalies indicating a vertical migration pathway from deeper sources. Methane isotopes completes this investigation, confirming a common, thermogenic source for the gases measured within these two anomalous areas.

The source of the thermogenic gas observed at the Site is most likely derived from shallow natural gas sands within the Upper Pliocene Pico Formation, probably sourced from the gross interval from 510 feet to 3434 feet, encountered in the non-commercial wells surrounding the Site. There is a north-south linear trend (1700 feet long and 200 feet wide) of very large to intermediate methane concentrations defined by soil gas, dissolved gas, free gas and isotopes measured in the aquifer, which lies to the east and parallel to Lincoln Boulevard. This anomaly has been interpreted as migration of thermogenic gases from depth from a proposed subsurface fault, herein named the Lincoln Boulevard Fault.

The position and attitude of the proposed Lincoln Boulevard Fault is based upon a combination of subsurface geologic data, surface topographic lineations, and a north-south trend of anomalous geochemical data. With respect to seismicity, this fault should be considered as a potentially active low potential fault. Geochemically, this fault is an active pathway for vertical natural gas migration. The proposed Lincoln Boulevard Fault provides a permeable vertical pathway for the natural gases at depth to migrate to the near-surface and have the observed distribution and concentrations.

A future earthquake with an epicenter close to the site could potentially cause a rapid flux of very large volumes of thermogenic methane gas to the surface along the Lincoln Boulevard Fault plane. Because the geologic data from the surrounding wells is only of a general nature and of an early vintage, it is not possible to calculate, or even estimate, the volumes of shallow natural gas beneath the Site. Adequate well logs or other testing data is not available.

Present data indicate that the anomalous methane gas concentrations could extend to the north into Area C. Data from this assessment do not show any evidence that the source of thermogenic gas is from the gas storage facility.

Methane mitigation systems should be required for all buildings in the First Phase of the Playa Vista Development. The design of the methane mitigation systems should follow the same specifications as previously modified and approved for the Fountain Park Apartments in Tract 03.

Because of the very high methane concentrations in soil vapor in the Tract 01 and Tract 02 anomalies, and the future potential for an earthquake-induced flux of additional very large volumes of methane gas in these same anomalous areas, it is recommended that there be mitigation of the 50-foot gravel aquifer in these two areas. A monitor well system should be required to continuously measure methane gas concentrations in the 50-foot gravel aquifer.

A similar subsurface methane assessment should be conducted in the Tract 49104-04 and Tract 52092 areas of the remainder of the First Phase Playa Vista Development. Although the available data is too limited in scope for adequate evaluation, there is no question that a similar methane issue exists in these areas.

Although only leaking minor amounts of thermogenic gas, the Universal City Syndicate Vidor #1 well and the Cooperative Development Co. Community #1 well should be re-abandoned.

1.0 INTRODUCTION

Exploration Technologies, Inc. (ETI) was retained in May 1999 by the City of Los Angeles, Department of Building and Safety (LADBS), and Playa Capital to serve as Peer Reviewer of the previous attempts to characterize subsurface methane gas occurrences in the proposed Playa Vista Development in Los Angeles, California.

1.1 Location

The proposed Playa Vista Development (Site) is comprised of approximately 1,087 acres located approximately 15 miles west of downtown Los Angeles (Figure 1). Regionally, the site is four miles south of the City of Santa Monica, 0.5 miles west of the City of Culver City, and approximately 1.5 miles north of Los Angeles International Airport. The Playa Vista Development is bounded by Marina del Rey on the north, Culver City on the east, Playa del Rey and Weschester Bluffs on the south, and Vista del Mar and Playa del Rey on the west. Playa Vista will be an integrated, mixed-use, master-planned community composed of residential, commercial, recreational, and civic structures. Lincoln and Jefferson Boulevards are the major north-south and east-west traffic arteries, respectively, in the area.

The site has been subdivided into four planning areas based upon the quadrants formed by the intersection of Ballona Channel and Lincoln Boulevard. The planning areas, Area A, B, C, and D, are shown in Figure 2. Proposed development of Playa Vista includes two major phases (Figure 2). The First Phase has been approved and some portions are currently under construction. The Second Phase is currently undergoing environmental review. The subsurface methane assessment conducted by ETI was primarily over the western portion of the First Phase area. The western portion of the First Phase is divided into Tracts 01, 02, 03, 05, and 06 (Figure 3).

1.2 Scope of Work

The scope of work was as follows: (1) Review and comment on previous reports concerning the methane gas issue at the Playa Vista Development. (2) Conduct a four-foot soil gas survey on a 100-foot grid over the west half of the First Phase Playa Vista Development to provide basline analytical data; these data would show the distribution and magnitude of methane gas that directly underlie the planned construction. (3) To use additional geochemical techniques to determine if the methane gas is biogenic or thermogenic in origin. (4) If the methane gas is thermogenic in origin, investigate the subsurface geology of the area to determine the source and probable vertical pathway(s) of methane gas migration. (5) Review and comment on proposed methane mitigation systems designed for Playa Vista construction. (6) Review the City of Los Angeles Methane Gas Code.

2.0 PREVIOUS WORK

2.1 Geotechnical Boreholes and Monitor Wells

Since approximately 1987, numerous geotechnical and groundwater assessments have been conducted at the Site by various consultants. Borehole lithologic data from reports, both whole and in part, from the following consultants have been reviewed: Leroy Crandall and Associates (LCA), Group Delta Consultants, Inc. (GDC), McLaren Environmental Engineering (MEE), Pacific Soils Engineering, Inc. (PSE), Kovacs-Byer and Associates, Inc. (KBA), Converse Consultants (CC), ENSR Consulting and Engineering (ENSR), and Camp Dresser & McKee (CDM).

Methane monitoring was conducted by Brown and Caldwell during the drilling of some boreholes using a flame ionization detector (FID) and photoionization detector (PID). Numerous bucket auger locations and boreholes had both sustained and non-sustained subsurface methane concentrations while drilling. Some borehole locations were terminated due to hazardous methane concentrations.

Group Delta Consultants previously installed nine monitor wells that were completed in the 50-foot gravel aquifer. The five monitor wells completed in Tract 03 and four monitor wells completed in Tract 01 are shown on Plate 2. Monitor wells MMW 4 and MMW 3 (Plate 2) required one-hour standby after drilling into the 50-foot gravel aquifer due to methane concentrations above 5000 ppmv.

2.2 Soil Gas Surveys

Regional and limited soil gas surveys were conducted over various areas of the Playa Vista Development from 1997 to 1999 by ENSR and CDM to determine distributions of shallow methane gas concentrations. Approximately 132 locations were investigated (tested) for shallow methane concentrations over the entire area by ENSR and CDM. This number of soil gas sample sites is inadequate for the characterization of shallow methane concentrations for a Site comprised of 1087 acres. Methane concentrations were mainly analyzed in the field using FID screening analyses. This method of analysis is also inadequate to properly quantify the methane concentrations in the shallow subsurface. Methane and methane homolog concentrations should be analyzed under laboratory conditions using chromatographs capable of reporting very low concentrations (10 ppbv) of methane, ethane, propane, n-butane, and C5+ speciations in order to provide a proper assessment in regard to biogenic versus thermogenic sources. ETI proposed a different sampling protocol for resampling Track 03. A detailed description of this methodology is contained in Appendix A.

2.3 Monitor Wells

Methane concentrations in groundwater from three zones were measured in each of the five monitor wells in Tract 03 by Sepich and Associates. The report from this assessment was included in the report by Integrated Environmental Services, Inc. (May 28, 1999). These wells confirmed the presence of large methane concentrations in the 50-foot gravel aquifer, but were not sampled in a consistent enough manner to provide definitive methane content in the aquifer.

2.4 Isotope Analyses

Limited isotopic analyses of methane were performed on selected soil gas and groundwater samples in some portions of Area D. These analyses were discussed in the October 14, 1998 report by CDM. CDM's report suggested the presence of a thermogenic and biogenic gas mix, but did not contain adequate data for resolving this issue.

2.5 Tract 03 Methane Assessment

A preliminary subsurface methane assessment (ETI, 1999) was conducted by ETI during October and November, 1999 over Tract 03 in the proposed Playa Vista Development. The assessment was conducted to determine the nature, magnitude, and distribution of subsurface methane gas that was previously detected by limited sampling and analyses in the area. Although previous studies had suggested the methane gas in this area was mainly biogenic in origin, the previous soil gas studies did not contain adequate sampling density or satisfactory analytical detection limits to properly characterize the subsurface nature, magnitude, and distribution of methane, and the composition of other light gases.

Using the protocol described in Appendix A, light gas analyses for methane through butanes (C1 to C4) were preformed on 136 shallow soil gas samples collected from a depth of four feet on a 100-foot sampling grid. ETI also suggested using a different protocol for sampling monitor wells that is described in Appendix B. This involved the collection of free gas bubbles in an inverted bottle and a dissolved gas sample collected from successive well volumes pumped from each well over an extended period of time. This new procedure for sampling the wells was carried out by CDM Engineers in September of 1999 within Track 03. These groundwater and free gas samples were obtained from five previously completed monitor wells in the 50-foot aquifer. These samples provided three independent light gas data sets for evaluation of the gas charging in this area.

Concentrations of methane in the vicinity of the most anomalous soil gas sites were several orders of magnitude higher than those detected in previous soil gas surveys. Methane was detected at substantial concentrations (> 50% methane) in 2.3% of the soil gas sites using ETI's methodology. Significant methane concentrations (0.1% to 5.0% methane) were detected in 15% of the soil gas sites. Previous soil gas surveys carried

out by CDM and ENSR using the standard California Geoprobe method apparently resulted in the dilution of the soil gases (with the introduction of ambient air) collected and analyzed. In their two previous soil gas surveys, the largest methane reported by CDM was 970 ppmv. ETI's soil gas maps (ETI, 1999) show methane anomalies ranged upwards of 75 percent using ETI's methodology (Plate 2).

Measureable concentrations of ethane, propane, iso-butane, and normal-butane were also consistently detected/reported for the first time from Playa Vista soil gas samples using ETI's protocols. Concentrations for all four of these light gas components were noted to increase in a southwest direction. Ethane, propane and butanes are never found associated with 100% biogenic methane gas. These three independent light gases indicate a definite thermogenic gas contribution in the subsurface of this area. The gases become more thermogenic in composition to the southwest towards the University City Syndicate Inc. LTD #1 well, a possible source of thermogenic gas.

Analytical results from both free gas and dissolved gas collected from the five previously completed monitor wells in Track 03 also support the same interpretation derived from the soil gas data. The light gas compositions of the free and dissolved gases obtained from the water wells were found to be nearly identical to those measured at four feet in the soil gas samples. Even more important, the presence of ethane, propane and butanes confirmed the presence of thermogenic gases in the water wells.

Methane isotope analyses provide another independent method to identify and separate biogenic from thermal methane. Stable carbon isotopes analyses were performed on free gas samples collected from each of the five monitor wells in Track 03. Delta C-13 values generally decrease in a southwest direction, indicating an increased thermogenic contribution of methane gas in that direction. Results from the various independent media (soil gas, dissolved gas in ground water, and free gas bubbles) show the concentrations of methane and other light gases have a common source, which generally increases in a southwest direction from MW3.

The University City Syndicate Inc. LTD #1 well blewout while drilling at approximately 1800 feet. Natural gas liberated during the blowout of this well was suggested as a possible source of the thermogenic gas detected in the subsurface of Tract 03. In order to confirm this interpretation, it was necessary to conduct a more regional soil gas survey, followed by the installation of additional monitor wells in the 50-foot gravel aquifer.

3.0 SITE CHARACTERIZATION

The Site is located in the southwestern portion of the Ballona Gap physiographic province. The Ballona Gap is a Recent Age entrenched alluvial valley of the ancestral Los Angeles River within the Los Angeles Coastal Plain and is defined by the upland areas of the Baldwin Hills and Ballona Escarpment to the south and the Beverly Hills to the north. The entrenched valley reached depths of approximately 400 feet in the

vicinity of the Baldwin Hills, and 50 feet near the coast. The Los Angeles River was diverted from this westerly flowing course in 1884 by the U.S. Army Corps of Engineers and routed to the present day course into San Pedro Bay (Poland and others, 1959). The Ballona Channel was straightened and has contained a concrete lined drainage channel since the 1930's.

3.1 Topography and Surface Geology

Native soils at the Site consist of recent alluvial deposits that gradually slope to the west toward the coast; the soils terminate at the coast as a marsh or wetlands area. The original (native) ground surface of the Site has been altered by various emplacements of fill throughout recent time in the four different quadrants. Most of the fill has resulted from either operations on the former Hughes Aircraft Facility, dredging of Ballona Channel, or dredging of Marina del Rey. A detailed discussion of the dates and sources of fill in the four areas is included in CDM report, October 20, 1998 (p. 3-2 to 3-3).

Present day elevations over the Site range from approximately 30 feet to two feet above sea level, depending upon the amount of fill. The south boundary of the Site is the Ballona Escarpment or Playa del Rey Bluffs, which have approximately 120 feet of relief.

Native soils over the Site consist of typical Recent age (Holocene) floodplain deposits comprised of sand, silt, and clays (Figure 4). Sediments on top of the Playa del Rey Bluffs consist of Pleistocene age deposits. Based on similarity of topographic features, the land surface on top of the Playa del Rey Bluffs were divided into four topographic provinces (Metzner, 1935, p. 7-9). The boundaries between the topographic provinces (Figure 5) were interpreted by Metzner to be the surface expression of subsurface faults. The eastern boundary, between Province 3 and Province 4, is parallel and just to the east of Lincoln Boulevard. Projection of this geologic lineament to the north, places the fault through the western portion of Tract 06, Tract 01, and Tract 03 (Figure 5). Although there is no surface expression of this lineament on the Site, the near-surface presence of this fault has been defined by geochemical data collected by this study. This potential subsurface fault has been named herein as the Lincoln Boulevard Fault.

3.2 Subsurface Geology

Both the deep and shallow subsurface geology beneath the Site are well documented by data from numerous oil wells and geotechnical boreholes, respectively. Locations of the former productive oil wells and dry holes in the area are shown on Plate 1.

Oil wells in the area are the result of the discovery, development, and attempts to extend the Playa del Rey Oil Field into the Del Rey Hills area. The Del Rey Hills portion of the oil field (Plate 1, Figure 5) was discovered in May 1931 (Metzner, 1935). Development drilling of the field occurred from 1932 until 1936. In 1942, the depleted oil field reservoir was converted to an underground natural gas storage facility (Riegle, 1953). The Gas Company (Southern California Gas Company) is the current operator of the facility.

The oil producing reservoir in the Del Rey Hills portion of the field was a Miocene age basal conglomerate of the Puente Formation deposited on the surface of a northwest trending Jurassic age Catalina Schist ridge (Plate 1). The Catalina Schist dips to the east from an elevation of approximately 6600 feet below mean sea level (-6600 MSL) at the east edge of the field (Figure 6). The basal conglomerate, which varies in thickness from 0 to over 200 feet, was deposited on the southeast flank of the schist ridge (Figure 6). The surface of the schist is cut by a northwest trending fault that dips to the west and is downthrown to the west (Riegle, 1953, Wright, 1991). The Puente Formation is overlain by the Lower Pliocene Repetto Formation, having an average thickness of 2500 feet. Upper Pliocene deposits comprise the Pico Formation, which is approximately 2000 feet thick.

The Lower Pleistocene San Pedro Formation overlies the Pliocene Pico Formation. The upper 100 to 250 feet of the San Pedro Formation contains fresh water and is referred to as the Silverado Aquifer, which is one of the main groundwater aquifers in the Los Angeles Basin (Figure 7). The Silverado Aquifer is overlain by the Recent alluvial deposits of the Ballona Gap. Water bearing units of the Recent alluvium are referred to as the Ballona aquifer. The primary water-bearing zone of the Ballona Aquifer is a basal lithologic unit composed of sand and gravel, referred to as the 50-foot gravel. The 50-foot gravel aquifer is approximately 15 feet thick beneath the Site and dips to the west from an elevation of approximately –32 feet MSL in Tract 02 to –50 feet MSL in Area B.

3.3 Faults

There is no evidence of surface displacement of Recent age sediments by faults in the area of the Site. There is, however, evidence of subsurface displacement of Pleistocene and older sediments by two faults beneath the Site. These two faults should be classified as potentially active, low-potential faults. Geologic, hydrologic, and geochemical evidence for these two faults is discussed below.

3.3.1 Charnock Fault

The Charnock Fault (Plate 1, Figure 4) was named by Pollard and others (1959, p 77-78) based upon hydrologic and lithologic data. The north trending fault is downthrown to the east and displaces the San Pedro Formation 140 feet. Geologic evidence (Figure 7) for the Charnock Fault has also been presented by McLaren Environmental Engineering (1987, p. III-8). The Charnock Fault is also recognized as a groundwater barrier by the Los Angeles County Flood Control District.

3.3.2 Lincoln Boulevard Fault

The proposed Lincoln Boulevard Fault (Plate 1) is a north trending fault, subparallel to the Charnock Fault, that is downthrown to the west. As previously discussed, the fault displaces the basement rock on the east side of the Del Rey Hills portion of Playa del Rey Field (Figure 6). Evidence for near-surface expression and northward projection of

the fault has been discussed above (3.1 Topography and Surface Geology). Additional geochemical evidence for the existence and activity of this fault will be discussed below.

3.4 Shallow Natural Gas

Five wells (dry holes) that were drilled on the Site during the 1920's and early 1930's encountered shallow natural gas during drilling operations. The shallow natural gas was encountered in the wells over the gross interval between 510 feet to 3434 feet. Locations of the five dry holes are shown on Plate 1.

3.4.1 Universal City Syndicate, Inc. Vidor #1

The Universal City Syndicate, Inc. Vidor #1, located in Area B, was drilled to a total depth of 5960 feet and was plugged and abandoned as a dry hole in 1931. Shallow natural gas was encountered while drilling at depths of 1140 to 1150 feet. The well blew out on August 27, 1930, at an estimated rate of 5000 MCF of gas per day, while drilling at 1821 feet. On May 2, 1931 the well blew out a second time while drilling at a depth of 5960 feet. It is not clear from the well records if there were additional gas zones at the depths of 1821 feet and 5960 feet.

3.4.2 Cooperative Development Co. Community #1

The Cooperative Development Co. Community #1, located in the southwest corner of Area D, was drilled to a total depth of 6700 feet and was plugged and abandoned as a dry hole in December 1932. Shallow natural gas was encountered while drilling at depths of 510 to 515 feet, 682 to 709 feet, 1752 to 1770 feet, and 2803 to 2814 feet.

3.4.3 Kitselmann Del Rey #1 and Del Rey #2

The Kitselmann Del Rey #1 and Del Rey #2, located in Area C, were drilled to total depths of 2785 feet and 3434 feet, respectively. Both wells were plugged and abandoned as dry holes in 1922. Shallow natural gas was encountered in the wells while drilling at depths of 1225 feet and 3434 feet.

3.4.4 Mesmer City Realty Co. Well #1

The Mesmer City Realty Co. Well #1, located in the eastern part of Area D, was drilled to a total depth of 6704 feet and was plugged and abandoned as a dry hole in September 1931. Shallow natural gas was encountered while drilling at depths of 1802 to 1885 feet and 2162 to 2354 feet.

The areas of shallow subsurface natural gas encountered in the above mentioned wells are shown on Plate 1. The near-surface projections of both the Lincoln Boulevard Fault and the Charnock Fault intersect within the areas demonstrated to contain shallow natural gas. Geochemical data, to be presented later in the report, indicate these faults

are most likely the main migration pathways of the methane gas anomalies observed in the near-surface at the Site.

4.0 METHANE ASSESSMENT METHODOLOGIES AND ANALYSES

The methane assessment of the First Phase of the Playa Vista Development involved sample collection of soil gas from the shallow subsurface and the collection of groundwater and free gas samples from a group of newly installed monitor wells screened in the 50-foot gravel aquifer. The geochemical assessment methodologies and analytical techniques employed in the methane assessment are as follows.

4.1 Soil Gas Survey

A four-foot deep soil gas survey, consisting of 812 samples collected on a surveyed grid with 100 feet between samples, was conducted from October through December 1999 (Plate 3) over the western portion of the First Phase of the Playa Vista Development. The purpose of the soil gas survey was to provide baseline data, which would indicate the distribution and magnitude of methane gas anomalies in the near subsurface directly underlying the planned construction area. The survey was also utilized to determine if there were any associated methane homologs (ethane, propane, or butanes) from a deep thermogenic source. Soil gas samples were collected by Scientific Geochemical Services, Casper, Wyoming. Soil gas collection procedures are contained in Appendix A.

4.2 Soil Gas Sample Analyses

The soil gas samples were analyzed by Microseeps Laboratory in Pittsburgh, Pennsylvania. Concentrations of methane, ethane, propane, and butane were reported with detection limits of approximately 10 ppbv (parts per billion). Analytical laboratory results are included in Table 1. Soil gas samples were also analyzed for benzene, toluene, ethylbenzene, and xylenes concentrations by Microseeps Laboratory. Analytical laboratory results for these analyses are included in Table 2. Hydrogen sulfide (H2S) analyses were also conducted on soil gas samples onsite in real-time using a Jerome 631-X instrument manufactured by Arizona Instruments. The Jerome 631-X was set to the most sensitive mode and programmed to extract 25 cc of soil gas from the sampling probe using an internal sampling pump. H2S concentrations are reported in Table 2.

ETI was initially asked to work on the methane issue, and was not asked to measure BTEX (benzene, toluene, ethylbenzene and xylenes) or hydrogen sulfide concentrations. For this reason these components were not included in the first soil gas survey conducted in Track 03. When these components became an issue during the planning of the follow-up regional soil gas survey, these analyses were added. A limited number of soil gas sample locations were revisited within Track 03 during the regional survey to provide some BTEX and H2S data for evaluation of Track 03. These data are included

in Table 2 with the remainder of the regional sample results; not all of the original sites were resampled at this time. Additional construction activities had literally excavated deep holes and even moved the excavated soil (into large piles) such that the original site locations were gone, making it impossible to repeat the original survey.

Hydrogen sulfide analyses for these repeated samples were run using the same protocol used for the regional sites (samples 100 through Z). Table 2 also shows H2S measurements for all sites; those sites that do not have associated BTEX measurements were run using a different protocol. An attempt was made to analyze the original Track 03 soil gas samples for H2S. BTEX was not attempted on those samples because the samples had expired for BTEX analysis. Evaluation of this H2S data (in the first 83 sites) suggests that the H2S had also expired and been adsorbed by the bottle walls. This experiment was attempted because all of the previous H2S measurements made by engineering companies had used tedlar bags for sample containers. Tedlar bags are well known for their adsorbtive capacity and are not recommended for sample containers. All of the BTEX and H2S samples that were analyzed during the regional program (all samples which have both BTEX and H2S) in Table 2 are valid.

4.3 Monitor Well Installation and Sampling

An array of 32 monitor wells, screened in the 50-foot gravel aquifer, were installed under the supervision of personnel from CDM during March 2000 (Plate 2). The monitor wells were installed in areas of high near-surface methane anomalies delineated by the soil gas survey. Both groundwater and free gas samples (from the 50-foot gravel aquifer) were collected from the monitor wells by CDM personnel during March and April 2000. Samples were also previously collected from nine other monitor wells screened in the 50-foot gravel.

The sampling protocol suggested by ETI involves the collection of free gas bubbles in a inverted bottle and a dissolved gas sample collected from successive well volumes pumped from each well over a period of time. The average well volume is approximately 10 gallons of water. The water flow rate used was approximately ½ gallon per minute. This methodology allowed multiple free gas and dissolved gas samples to be collected over time from different well volumes. When possible, up to five (to seven) well volumes were removed and sampled from each well. Only one well (MMW-476) was too impermeable to allow adequate sampling using this method. Purge logs for this sampling operation are available from CDM Engineers.

The sampling protocol provides representative water samples from the aquifer that are consistent with respect to one another. Independent but separate samples from successive well volumes can be averaged to provide a very well determined estimate of the methane gas levels contained within each monitor well. More detailed methodologies for collection of groundwater and free gas from the monitor wells are contained in Appendix B. Completion logs for the monitor wells are contained in Appendix C.

4.4 Monitor Well Sample Collection and Analyses

Groundwater (dissolved gas) and free gas samples from 41 monitor wells completed in the 50-foot gravel aquifer were analyzed for methane and other light gases.

4.4.1 Groundwater (Dissolved Gas) Analyses

Groundwater samples were analyzed by Microseeps Laboratory; concentrations of dissolved methane, ethane, propane, and butane were reported with detection limits of approximately 10 ng/l (nanograms per liter). Analytical results that range from mg/l to ug/l levels are presented in Table 3.

4.4.2 Free Gas Analyses

Free gas samples collected from the water wells were analyzed by Microseeps Laboratory; concentrations of methane, ethane, propane, and butane were reported with detection limits of approximately 10 ppb (parts per billion). Analytical results that range from % levels to ppmv are presented in Table 4.

4.5 Isotope Analyses

Free gas samples from the monitor wells completed in the 50-foot gravel aquifer were submitted to Isotech Laboratories, Champaign, Illinois for analyses of their stable carbon isotopes. These analyses were performed to determine whether the methane gas was biogenic or thermogenic in origin (Coleman et al. 1977, 1979, 1981, 1988). Analytical results of the isotopic analyses are listed in Table 5.

5.0 RESULTS AND INTERPRETATION

5.1 Soil Gas Survey

The soil gas survey results, consisting of 812 samples, are listed in Table 1. Methane, ethane, propane and normal-butane concentrations are posted and contoured on Plate 4 through Plate 7. Contour maps of hydrogen sulfide, toluene and total xylenes are illustrated in Plates 8, 9 and 10, respectively.

Although methane concentrations (Table 1, Plate 4) are highly variable over the survey area, high concentrations cluster within two main areas. Methane concentrations within these two seepage areas reach values as large as 75% at a large number of the anomalous sites within each area. As compared to other regional surveys that ETI has conducted over many frontier and petroliferous basins, these concentrations are very high considering the shallow depth from which the gases are migrating. The free gas bubbles in Ballona Channel are, by definition, classified as macroseeps. In addition, CDM Engineers documented a macroseep (sample number CDM-SG-4-0) within Track 03 on 2/12/98 during a rainy period when the surface was too wet to use their Geoprobe.

They managed to collect a gas sample at the surface having a methane concentration of 0.4 percent. This sample, analyzed by Global Geochemistry, had a stable carbon isotope value of –39.95 part per mil, suggesting a very mature and probably oxidized gas sample. Given the high methane concentrations (75%) at only four feet in depth, this is not surprising. Two other samples collected by CDM at this time had very appreciable methane and ethane soil gas concentrations. Sample CDM-SG-3 contained 83.8% methane and 0.4% ethane, and sample CDM-SG-2-9 contained 41.2% methane and 0.3% ethane. These samples clearly show there was a methane problem in this area; the survey was otherwise too limited in scope to be used for evaluation.

The presence of methane homologs (ethane, propane, and normal-butane), that have the exact same distribution as the methane, proves that a major portion of the methane is thermogenic, that is generated by heat and pressure at depth within the Pliocene and/or older rocks that underlie this Site. It is well known that biogenic processes do not generate these methane homologs (Jones & Drozd, 1983 and Jones et. al., 2000). Isoconcentration (contour maps) of ethane, propane and normal-butane are shown on Plates 5, 6 and 7, respectively. These component methane homolog maps indicate that a large portion of the methane must be derived from a thermogenic source.

The largest and most extensive methane anomaly occurs along a north–south trend that extends from site 267 on the south edge up to site 164, a distance of 1000 feet. Although slightly lower in magnitude, this anomaly can be extended to at least site 3 in Track 03 (an additional 700 feet). The width of this impressive anomaly varies from 200 to 400 feet over this distance. Methane concentrations within this anomaly range from 43% to over 75%.

It is well known and accepted that hydrocarbon gases are expulsed from the earth along active fault and fracture traces (Jones and Drozd, 1983 and Jones et. al., 2000). This geochemical signal, especially when accompanied by ethane through butanes, can only be interpreted as deep-earth gases (thermogenic gases) migrating up along an active fault trace. As will be discussed later, additional isotopic measurements of stable carbon isotopes, using the carbon 12/13 ratio, further suggests that these gases can only be related to a deep thermogenic source. Further confirmation of the presence of significant gas potential from this large anomaly was demonstrated by minor blowouts of gas that occurred during the drilling of the monitor wells.

Monitor well MMW-211 was most troublesome to the CDM drilling crew. The initial well at site 211, upon reaching the aquifer, blew water over the derrick of the drilling rig (40 feet into the air). Unfortunately, the crew had to standby for 24 hours while this well discharged. Since the well had bridged (caved in), the drilling crew had to redrill the hole the following day and inject bentonite into the formation reseal this drill hole. An offset hole was drilled and finally established at an alternate location before the well screen could be set. Another nearby hole that was allowed to vent for 24 hours was site 207. Including these two holes with MMW-3 and 4 (discussed earlier), there were four monitor wells within the large elongated methane anomaly that had adequate gas to require venting before safe handling could be assured.

Previous experience gathered over artificial, underground gas storage fields and over man-made underground coal bed methane retorts has demonstrated that the time required by gases to migrate through the earth is very short (only a few days to hours from depths of 1000 feet). Actual measurements made over an underground coal-gasification retort located approximately 1000 feet below the surface indicated seepage as large as these would decrease by an order of magnitude within six months if not continuously recharged from depth (Jones and Thune, 1982; Jones et al., 2000). Concentration of 75% methane at a depth of only four feet, without a local source or recharge from depth, is not possible. There is no easy way to determine the actual flux from a seep having such a large surface expression, but there is no doubt that it must be active to sustain these very large concentrations at a depth of only four feet.

The initial regional survey was started under the premise that the methane seepage in this area might be associated with the two abandoned wells, the Universal City Syndicate Vidor #1 and Cooperative Development Co. Community #1. The shallow soil gas survey did detect near-surface seepage in the vicinity of the Universal City Syndicate Vidor #1. Two of the soil gas seeps contained 18% (site 503) and 41% (site 535) methane. When considered on a more regional scale, however, the amount of potential leakage from these two dry holes is very small when compared with the natural seepage associated with the big, elongated methane anomaly described above.

This natural seepage is better demonstrated by the propane and butane contour maps for the free and dissolved gases found in the 41 monitor wells. The normal-butane contour map clearly shows that the majority of the gases in the 50-foot gravel aquifer issue directly from the Pliocene sediments. The petrogenic nature of the gas composition (ethane through butanes and thermogenic isotopes), and the extended north–south linear orientation of this macroseep, strongly suggests that these gases must be related to a fault. This fault provides communication to the surface from the deeper horizons below.

An independent thermogenic source is further demonstrated by the larger propane and butane concentrations within this fault-related anomaly, as compared to the Universal City Syndicate Vidor #1 abandoned well casing. It is generally accepted that heavier hydrocarbons, such as propane and butane, can be filtered out (lost) during migration, but they can never increase in concentration during migration. There must be a local source within Area 01 for an increase to occur. The easternmost methane anomaly at sites 928 contains heavier hydrocarbons (such as butanes) than the anomaly in Area 01. This again confirms that these two methane anomalies must have independent sources, and these sources are local to each anomaly. Migration of well casing related gases through the aquifer cannot explain this behavior.

Given the very low levels of seepage associated with the Universal City Syndicate Vidor #1 and the Cooperative Development Co. Community #1 wells, it might be advisable to not rework these wells. Many attempts to re-abandon the wells have been unsuccessful. In all likelihood, both wells will need to be re-abandoned in order to insure a safe

construction project, however, this will probably have no effect on the gases migrating to the surface from the Lincoln Blvd. fault. It may be significant to note that the Universal City Syndicate Vidor #1 first blewout at 1831 feet, very close to the intersection of this wellbore with the proposed Lincoln Blvd. fault. Communication with this fault could present a complication during the abandonment process.

The second largest methane anomaly occurs on the east side of the survey area at sites 928 to 921. This anomaly is over 600 feet by 800 feet in areal extent. As with the other methane anomalies, this smaller, but significant anomaly was accompanied by other petrogenic gases (such as ethane, propane and butanes), indicating a deep thermogenic source for these gases. Isotopic data confirm this as a thermogenic gas seep. As noted above, this anomaly also has even larger propane and butane concentrations than the western Track 01 anomaly, again suggesting an independent thermogenic source from depth. The slight changes in composition would be typical of thermogenic gases from depth, but not from biogenic gases which never contain ethane through butanes.

The presence of anomalous concentrations of ethane, propane, and normal-butane, coincident with the anomalous methane concentrations in both of these anomalies, infers that the methane gas is thermogenic in origin. The spatial correlation between the light hydrocarbon soil gases and the 50-foot gravel aquifer, and their similarity in compositions demonstrates their obvious relationship.

In contrast, the BTEX and H2S components in the soil gas show no correlation to any of the other gases, either at the surface or in the 50-foot gravel aquifer. CDM analyzed several of the deep monitor well samples and never found any detectable BTEX in the deeper gases. None of the deep wells has had any H2S reported in the vented gases, nor would they be expected to from the thermogenic sources that underlie this Site.

There are reports of La Brea tar sand fill being used during past filling operations (CDM, October 20, 1998, p.3-2 to 3-3). Although some limited H2S hits were occasionally noted in the drilling logs, there does not appear to be any H2S sources associated with the thermogenic gases. The H2S is also believed to represent near-surface contamination, probably from dumping and/or from organic rich fill that was added to the Site over time. All detectable H2S measurements made by all operators (surveyors) have been random and generally found to be associated with recent sedimentary deposits.

A review of Table 2 as well as the toluene, total xylenes and H2S maps, indicates there are generally very low levels of BTEX contained within the soil gas collected over the survey area. There is essentially no benzene and only modest levels of toluene and total xylenes. Some of the largest toluene and total xylene concentrations do cluster. These fairly minor BTEX anomalies are probably related to near-surface contamination, and do not appear to represent a hazard to construction.

5.2 Dissolved Light Gas Distributions in the 50-Foot Gravel Aquifer

Following the interpretation of the regional soil gas data, it was clear that the groundwater should be sampled to determine whether there was any gas sources in the 50-foot gravel aquifer. It was also necessary to determine the relationship between deeper gas sources and the shallow gases observed at four feet. To accomplish this objective, groundwater was sampled from the 50-foot gravel aquifer in all 41 monitor wells. Nine of the monitor wells had been previously installed, while 32 new monitor wells were added for this assessment. The purpose of the groundwater sampling was to determine the distribution and magnitude of dissolved methane gas within the 50-foot gravel aquifer, and to determine the composition of other associated dissolved gases within the aquifer.

The 50-foot gravel aquifer is approximately 15 feet thick and dips to the west in this area. The measured groundwater flow direction determined from these 41 wells installed within the 50-foot gravel aquifer is to the north-northwest toward Ballona Channel. Previous hydrological studies had suggested that groundwater flow was from west to east (MEE, 1987).

Because methane had previously been detected at fairly large concentrations in the groundwater, it was suggested that these 41 monitor wells be drilled on a grid spacing determined from the soil gas data and used to collect two different and independent samples. A free gas sample was collected using a bubble pail and a dissolved gas sample was collected directly from the aquifer in a 125 ml bottle. Both samples were collected under water by water displacement, providing very high quality samples with no ambient air or other possible contaminants. Each well was pumped at a fairly low flow rate (approximately ½ gallon per minute) for an extended period of time, designed to provide numerous samples from successive well volumes. These free gas and dissolved gases samples were then averaged for each well and plotted on contour maps so that any methane gas anomalies in the 50-foot gravel aquifer could be mapped and studied. Average methane concentrations ranged from 0.005 mg/l to 48.3 mg/l (Plate 11). The highest concentration of methane (99.7%) was observed in MMW 226. This sample also contained the 48.3 mg/l dissolved gas concentration.

The methane concentrations in the groundwater are highest in areas of anomalous methane soil gas, and that the largest methane values are accompanied by methane homologs, such as ethane through butanes. This correlation with deep thermal, non-biogenic gases proves that these gases observed near the surface are themselves derived from the 50-foot gravel aquifer, and these gases must be further derived from deeper sediments. The maximum observed average saturation for dissolved methane in groundwater was 48.3 mg/l in MMW 226 (Plate 11) indicating that methane is approximately at maximum saturation in the groundwater for that depth.

Dissolved concentrations of ethane, propane and n-butane are illustrated on Plate 11. As previously noted for methane, the concentrations of these components are also highest in areas of anomalous methane soil gas. The presence of dissolved

concentrations of ethane, propane and n-butane in groundwater is indicative of a thermogenic gas contribution.

5.3 Free Gas Distributions in the 50-Foot Gravel Aquifer

Analytical results of methane concentrations in the free gas samples from the 41 monitor wells are illustrated on Plate 11. The highest concentration of methane (99.7%) was observed in MMW 226. In general, the highest free gas methane concentrations are present in areas of anomalous methane soil gas and anomalous methane concentrations in groundwater. However, there is not a direct correlation that would indicate that Henry's law is completely controlling the relationship between the free gases and the headspace (dissolved gases in the groundwater). A very good example is provided by MMW-211, which had enough free gas to blow the water to a height of over 40 feet into the air. When finally sampled, this well had only about 60 % methane and 17 mg/l of dissolved gas, whereas MMW-226 had 99.7% methane and 48.3 mg/l of dissolved gas. Monitor well 211 occurs on the eastern edge of the big, fault-related methane anomaly. There was a very large soil gas anomaly at this site (89.2% methane) despite of the fact that the methane in groundwater was not at a maximum. This suggests that there is gas migration at the top of the aquifer (or at least in the fill above the aquifer) that is independent of the gases in the aquifer. This independent gas pocket was the likely cause of the blowout in monitor well 211.

The strong spatial correlation between the soil gas anomalies and the groundwater anomalies implies that the dominant migration of gas is vertical. There is very little migration of gas laterally within the aquifer. Previous experience by ETI in exploration surveys indicates that groundwater flow almost never has any controlling effect on the distribution of gases within the near-subsurface strata. The time for gas to pass vertically through the aquifer is very short when compared to the time for groundwater to move laterally.

The free gases liberated from the monitor wells provide an independent data set for comparison with the soil gases and with the dissolved gases in the groundwater. When accompanied by significant levels of methane homologs (ethane, propane, and butanes), it is concluded that these gases have a thermal origin. The source of this thermal methane gas has to be derived from Pliocene and possibly deeper gas sands, as previously discussed (3.4 Shallow Natural Gas).

5.4 Isotopic Analyses of Free Gas Samples

The free gas bubbles liberated from the monitor wells were collected into 125 ml gas bottles by volume displacement and sent to Isotech Laboratories in Champaign, Illinois for analysis of the methane through hexane vapors and the permanent gases nitrogen, oxygen, carbon dioxide, helium, argon, hydrogen and carbon monoxide. These analytical results are listed in Table 5 along with the carbon and hydrogen isotopes of the methane, ethane and carbon dioxide. This light gas data provides an independent

confirmation on the Microseeps Laboratory analysis. Appendix D provides a report by Dennis Coleman of Isotech Laboratories.

A plot which shows the carbon and hydrogen isotopic compositions of the methane samples from this study relative to typical compositional ranges of gases from different sources is shown in Plate 12a. Most of the samples fall within the mixed zone between the subsurface microbial gas zone and extend into the edge of the thermogenic gas zone. This suggests that these samples represent different mixtures of thermogenic gas and biogenic methane. Another group of samples extends vertically above the thermogenic zone. These latter samples represent gases that have been subjected to bacterial oxidation affects. In addition, there are two samples from MMW-743 that do not appear on this plot because they are off-scale.

Plate 12b provides a map view of the methane concentration with dot size proportional to the methane concentration. The color of the dots has been selected according to the individual carbon isotopic values for each methane sample, with red colors being the most thermogenic and blue the most biogenic. This map clearly shows the strong clustering of the largest magnitude and most thermogenic gas seeps. A comparison with the contour maps shown on Plate 11 clearly defines the presence of two thermal gas macroseeps. A correlation with the soil gas data is also obvious.

Plate 12c provides an expanded view of Plate 12a, showing in more detail the distribution of all the samples. For this plot, these samples have been color-coded according to their clusters as thermogenic (red), biogenic (green), mixed thermo-biogenic (yellow) and thermogenic oxidized (orange). The red group clusters together near the right end of this trend. These samples contain the least, if any biogenic methane. The samples (orange group) within the very strong vertical trend on this figure have been strongly affected by bacterial oxidation. As shown by the arrow labeled "Oxidation Effects" on Plate 12a, oxidation effects typically move up and to the right. However, in this data set, it appears that there is an oxidation effect that is strongly affecting the hydrogen isotope composition, with little if any affect on the carbon isotope composition. The result is a shift in a vertical direction, as shown by the orange population on Plate 12c. This appears to be a very strong trend that is different from what is typically observed. The oxygen deficiencies in these samples are also shown by the carbon isotopic composition of the carbon dioxide. One sample, MMW-39, appears to have been strongly affected both by oxidation and mixing with biogenic methane.

The cluster of samples in the lower right hand corner of Plate 12c show the least affects of either methane oxidation or biogenic methane formation. A comparison of the isotopes of this clustered data with the remaining samples, suggests three samples, in particular, which show the least secondary affects, and thus would appear to contain the freshest thermogenic methane. These three are wells MMW-153, MMW-175, and MMW-912. As confirmed by Plate 11 and the soil gas maps, there are at least two very well defined anomalies within the study area where thermogenic gas seeps exist. Thus there is one source of thermogenic methane in the southeast corner of the study area near monitor wells MMW-912 and MMW-921, and the other is just southeast of the

intersection of Lincoln Boulevard and Jefferson Boulevard near MMW-153 and MMW-175.

Plate 12d shows the locations of this color-coded data from Plate 12c in a map format. The red dots represent relatively pure unaltered thermogenic gas. The term relative has been applied because some of these gases do appear to show some secondary affects. The yellow dots are those wells, which represent mixtures of thermogenic gas and biogenic methane. The green group of samples are mainly biogenic, and the most interesting group of samples are shown as orange dots. They represent gases that have been significantly altered by bacterial oxidation. Most of these samples, which have been severely oxidized, are thermogenic gases, although some of the biogenic mixtures may also have been subjected to some oxidation affects. The geographical order of this data clearly suggests two main thermogenic seeps, which have been oxidized and partially mixed with some biogenic gas.

According to Dennis Coleman (see letter report in Appendix D) this data suggests an interesting relationship that appears to exist between the thermogenic gas seeps and the biogenic methane. There are many other sites where biogenic methane appears to be associated with thermogenic natural gas seeps, Jones, V. T. and Burtell S. G., 1996, Jones and Agostino, 1998, Thompson 1966. In this environment, there can be a very substantial culture of bacteria developed that lives on this thermogenic gas. In such situations, the interface between the oxic and anoxic zones can change depending upon hydrostatic conditions, barometric pressure, and the rate of gas seepage. Therefore a specific location that is anoxic at one time could be oxic at another time, or vice versa. If an oxic zone becomes anoxic, it may be possible for anoxic bacteria to consume the residual cell material present in that zone and convert it to methane. Thus, the methanogens could be living on the dead methanotrophs. Therefore, the zones where biogenic gases reside today may have been the site of methane oxidation at some time in the past. In this case these seeps have probably existed for hundreds to thousands of years, allowing amply time for such behavior.

In addition, there is the possibility that some methanogens are actually switch hitters. That is, under some conditions they can be methane producers whereas under other conditions they can be methane consumers. In particular this appears to apply to sulphate reducing bacteria. It is well known that sulphate reducing bacteria can consume methane. If this type of phenomena is occurring at Playa Vista, that would explain the lack of carbon isotope fractionation that is observed with the methane oxidation. This may be a site of anaerobic oxidation and not aerobic oxidation. This could also suggest that the oxidation may actually be occurring at greater depth and not in the near-surface where these samples were collected.

As discussed above, the areas of thermogenic gas coincide with areas of anomalous methane soil gas and the presence of heavier methane homologs (ethane, propane and butanes). The majority of the isotopic analyses performed on samples obtained within the largest magnitude gas anomalies indicate the presence of immature thermogenic gas, in the range of –55 to –60 parts per mil.

This interpretation is easily confirmed by comparing these gases with some actual reservoir gases measured directly from other commercial gas fields in California, Table 6 contains nine reservoir gases collected directly from commercial gas fields in California. These reservoir gas samples were collected and analyzed by Global Geochemistry Corporation as part of a Crustal Gas Data File sponsored by the Gas Research Institute. The stable carbon isotopes of these samples (Table 6) range from –50.0 to –61.3, and are very similar to those measured from the 41 monitor wells in Playa Vista. In addition, the presence of low, but significant ethane accompanied by measurable and much smaller propane is typical of shallow immature thermogenic gases. Another distinction and marker commonly noted in shallow immature thermal gases is the presence of iso-butane, that is dominant over normal-butane. Any one of these eleven commercial gases are directly comparable to the Playa Vista gas seepage. This composition is exactly what would be expected for a shallow, immature, but definitely thermal gas as observed on the Playa Vista Site.

The levels of the more biogenic-type gases occur mainly between the main two thermal gas seeps. Monitor wells located to the west of the Universal City Syndicate Vidor #1, site 509 and to the south, near the Cooperative Development Co. Community #1 contain very little gas in the aquifer. This is consistent with the shallow soil gas data. Both methods yield valid indications regarding gas anomalies from depth. The two wells that have isotopic values that indicate extensive biological oxidation, MMW 272 (-23.48 parts per mil) and MMW 509 (-34.55 parts per mil), also occur in these areas; they also exhibit very low methane concentrations. These very heavy carbon isotopes indicate significant levels of oxidation of the hydrocarbons in the aquifer, as would be expected if there were no methane present in the aquifer at these locations.

The soil gas and monitor well data from site 509 indicates there is no gas migration at this location from the adjacent Playa del Rey gas storage field. The groundwater data clearly indicate there are areas within the gravel aquifer where there is no gas present, either biogenic or thermal. Regional surveys using these methods will allow the gas-charged and non-gas-charged portions of the proposed construction site to be delineated and used for planning and permitting. It is strongly recommended that soil gas and groundwater surveys be conducted over all areas planned for future construction. There will be many areas where no methane mitigation of any kind will be required.

The two main methane anomalies contain thermal gases that have, and still are migrating upward from the potential gas sources defined by the non-commercial wells drilled in this area. The only scientific explanation that makes sense is that deep thermogenic gases from the zones located between 500 to 3000' are migrating to the surface along fault planes.

Without additional deep gas drilling and testing, it will be impossible to determine the true potential for future gas flux into these anomalous areas. Many scientific studies have been conducted throughout the world by geochemists using similar methods to

attempt to predict earthquakes through the use of deep gas fluxes issuing from active and open fault zones, Jones, V. T. and Burtell S. G., 1996. The best approach would be to leave these seepage areas open. If they have to be used for construction, then one should build non-residential buildings within such areas. Active and aggressive monitoring systems should be designed to predict the onset of significant gas seepage from depth that could cause a loss of life or limb.

We believe that to ensure a safe environment, it will be necessary to mitigate the underlying groundwater aquifer if residential housing is to be constructed. In the event of a major earthquake in this area, there will be little to no warning of the onset of significant gas seepage from depth. In addition, the volume of a natural seep cannot be calculated, nor turned off in the event of an earthquake, as with natural gas lines.

An oil field related rupture of this type occurred in the early morning hours in February 9, 1971 associated with a 6.6 magnitude earthquake. The epicenter of this earthquake was near the town of Saugus, California, yet the area of surface rupture and greatest damage occurred some five to six miles away in the San Fernando-Sylmar area, Slossen, 1971. One rupture zone occurred just to the south of a mapped fault that was referred to as the Hospital Fault. However, according to Slossen this fault more closely coincided with a fault zone that has little surface expression, but had been interpreted from subsurface data. Another rupture zone coincided with the location of a ground water barrier, which had suggested geological activity. Both of these examples have a clear analogy to the fault relationships mapped in the Playa Vista area.

Of even more interest, is the fact that five oil and gas seepages were reported to have occurred within the old Salt Lake oil field. These seepages were the result of rupture in the near surface zone of some abandoned oil wells. One example cited by Slossen was of a well located within a residential area that started to produce approximately 20 barrels of oil per day and 100,000 cubic feet of gas per day after the earthquake. According to Slossen, this situation did create a fire and explosion hazard, which had to be corrected.

The senior author has had previous experience with sampling of water wells located within the San Andreas and other fault zones where the seepage production rates changed in response to changes in the geological stress fields associated with earth movement, Jones and Burtell, 1996 and Jones et. al. 2000. Additional references are provided by these latter two citations.

6.0 METHANE MITIGATION SYSTEM FOR 50-FOOT GRAVEL AQUIFER

In addition to methane mitigation for the building foundations in Tracts 01 and 02, methane mitigation systems are also recommended in the 50-foot gravel aquifer. The mitigation of the 50-foot gravel aquifer will require a "pump and treat" system consisting of recovery/extraction and injection wells. The wells should be installed in areas containing methane concentrations in excess of 70%, as shown by the brown to orange contours on the free gas map in Plate 11. The number of wells required will depend upon the radius of influence of a series of test wells, as determined by performing pump tests over the methane charged aquifer. The final spacing and the number of wells will be determined from the results of these pump tests. Ten to fifteen feet of PVC slotted well screen should be set in each recovery well, beginning at the top of the 50-foot aquifer.

These methane recovery/extraction wells will be utilized to pump water from the 50-foot gravel aquifer to the surface, where the water will be "degassed" or stripped of methane and other gases. This can be accomplished using an air-stripper or equivalent system. The treated water should then be re-injected into the 50-foot aquifer utilizing wells located on the updip, outside edge of the recovery well system (these will probably be located in the yellow, green and blue contoured areas shown on the free gas map in Plate 11. The spacing and number of injection wells will also be determined based upon the results of the pump testing. The re-injection of the water will prevent de-watering of the aquifer and possible land subsidence.

Existing monitoring wells will be utilized during pump testing of the recovery wells to determine the area of influence of each pumping well. Monitoring wells will also be sampled during the mitigation of the 50-foot aquifer to determine the effectiveness of the pump and treat system, and the progress of the methane mitigation.

Once the mitigation system is in equilibrium a real-time monitoring system can be established, using the technology previously outlined for monitoring in Track 03 for the Visitor Center and Fountain Park Apartments.

7.0 CONCLUSIONS

1. Results from this comprehensive assessment indicate the source of the anomalous thermogenic methane is primarily from shallow natural gas within the Upper Pliocene Pico Formation. These shallow natural gas sands are beneath the area of First Phase Playa Vista Development, and are migrating up the Lincoln Boulevard Fault.

2. A previous subsurface methane assessment, limited to the area of Tract 03, indicated that the probable source of anomalous methane was leakage of thermogenic gas from the Universal City Syndicate Vidor #1 well. Although there is some leakage from this well, the dominant seepage appears to issue from a natural, fault related seep.

3. Methane concentrations in soil gas samples from the near-subsurface and from groundwater samples within the 50-foot gravel aquifer range from background to nearly 100%. The correlation between these samples is excellent, indicating migration from natural subsurface pathways.

4. There are two main areas of high methane concentrations (above 70% methane, see Plate 11) in the west half of Tract 01 and the south half of Tract 02. Anomalous levels of ethane, propane, and butanes are also coincident with these two methane seepage areas, indicating the methane is related to deeper thermogenic sources.

5. There is a north-south linear trend (1700 feet long and 200 feet wide) of very large to intermediate methane concentrations of soil gas, which lies to the east and parallel to Lincoln Boulevard. This anomaly has been interpreted as migration of thermogenic gases from depth from an associated subsurface fault.

6. Areas of anomalous methane concentrations dissolved in groundwater and methane from free gas in the groundwater from the 50-foot gravel aquifer are coincident with the anomalous areas of ethane, propane and butanes, which are only sourced by thermogenic sources. The data indicate that all three data sets have a common origin. This correlation of independent data sets confirms that the methane is from a deeper thermogenic source.

7. Methane isotope analyses on free gases collected from the 50-foot gravel aquifer further confirm a thermogenic source for the anomalous methane gas. Areas of background to low methane concentrations are primarily biogenic in origin, but bear a spatial relationship that suggests that the biogenic gases have been generated in response to the thermogenic gases.

8. Three independent analytical data sets (soil gas, groundwater, and isotopes) are in concert and confirm that the source of areas of anomalous methane soil gas is due solely to a thermogenic source.

9. The source of the thermogenic gas observed at the Site is most likely derived from shallow natural gas sands within the Upper Pliocene Pico Formation, probably sourced from the gross interval from 510 feet to 3434 feet, encountered in the non-commercial wells surrounding the Site.

10. It is not possible to calculate, or even estimate, the volumes of shallow natural gas beneath the Site due to nature of the surrounding well data. Adequate well logs or other testing data is not available.

11. The position and attitude of the proposed Lincoln Boulevard Fault is based upon a combination of subsurface geologic data, surface topographic lineations, and a north-south trend of anomalous geochemical data. With respect to seismic activity, this fault should be considered as a potentially active low-potential fault. Geochemically, this fault is an active pathway for vertical natural gas migration.

12. The proposed Lincoln Boulevard Fault provides a permeable vertical pathway for the natural gases at depth to migrate to the near-surface, and exhibit the distribution and magnitudes observed.

13. A future earthquake with an epicenter close to the Site could potentially cause a rapid flux of very large volumes of thermogenic methane gas to the surface along the Lincoln Boulevard Fault plane.

14. Present data indicate that the anomalous methane gas concentrations could extend to the north into Area C.

15. Data from this assessment do not show any evidence that the source of thermogenic gas is from the gas storage facility.

8.0 RECOMMENDATIONS

1. Methane mitigation systems should be required for all buildings in the First Phase of the Playa Vista Development. The design of the methane mitigation systems should follow the same specifications as previously approved for the Fountain Park Apartments in Track 03.

2. Because of the very high methane concentrations of free gas (greater than 70 %, see free gas contour map, Plate 11) in the gravel aquifer, and the future potential for an earthquake-induced flux of large volumes of methane gas in these same anomalous areas, it is recommended that there be mitigation of the 50-foot gravel aquifer in these areas having methane concentration in excess of 70%.

3. For the methane mitigation system of the 50-Foot gravel aquifer a pump and treat methane stripper system is recommended. Pump tests in the aquifer are required in order to determine the number and spacing of the recovery wells required. This must also include water reinjection to prevent subsidence.

4. A monitoring well system following the design approved for the Visitor Center in Track 03 will also be required to continuously measure methane gas concentrations in the 50-foot gravel aquifer.

5. A similar subsurface methane assessment should be conducted in the Tract 49104-04 and Tract 52092 areas of the First Phase Playa Vista Development.

6. Although only leaking minor amounts of thermogenic gas, the Universal City Syndicate Vidor #1 well and the Cooperative Development Co. Community #1 well should be re-abandoned.

7. In the future, methane assessments should be conducted and methane mitigation and monitoring systems completely designed at sites slated for development before zoning is approved.

8. A similar subsurface methane assessment should be conducted in the area of Second Phase Playa Vista Development before zoning use is established and, more important, to aid in the planning.

9. The City of Los Angeles Methane Gas Code should be revised to provide conditions for mitigation based upon whether the methane gas is of a biogenic or thermogenic origin.

Submitted this 17th day of April, 2000

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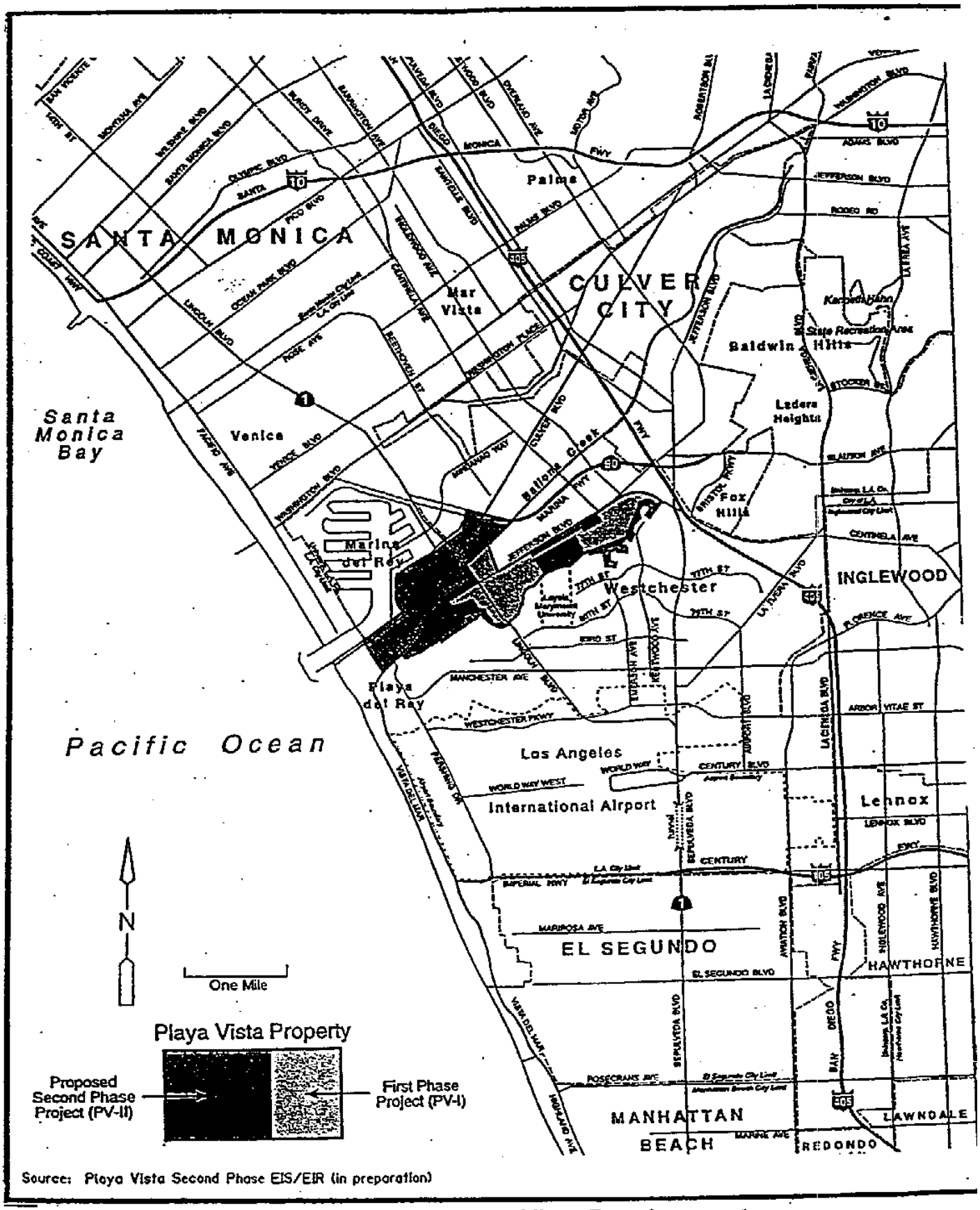


Source: Playa Vista Second Phase EIS/EIR (in preparation)

Figure 1. Location of Playa Vista Development
(Modified after CDM, 1998)

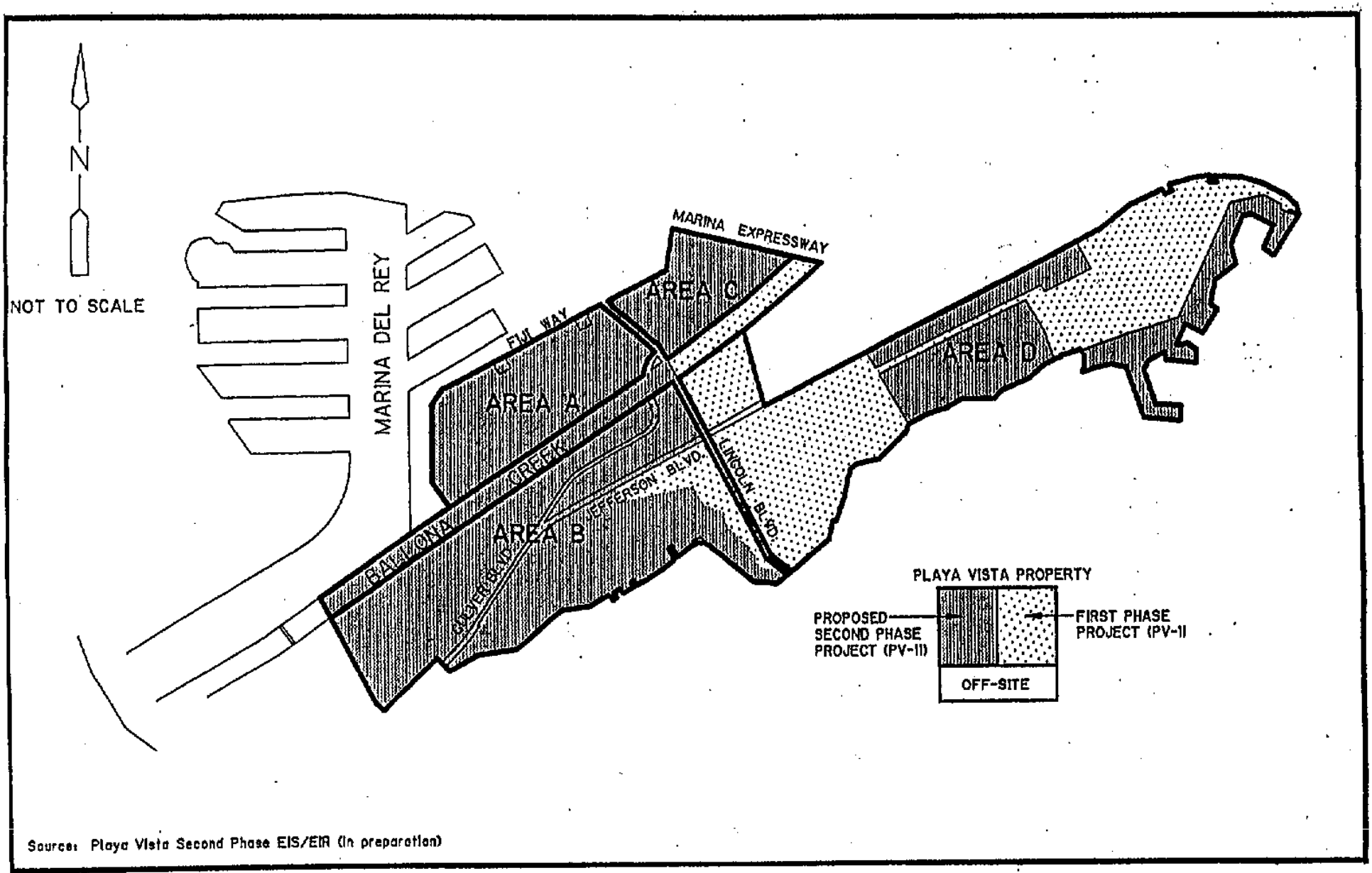


Figure 2. Playa Vista Development Planning Areas
(Modified after CDM, 1998)

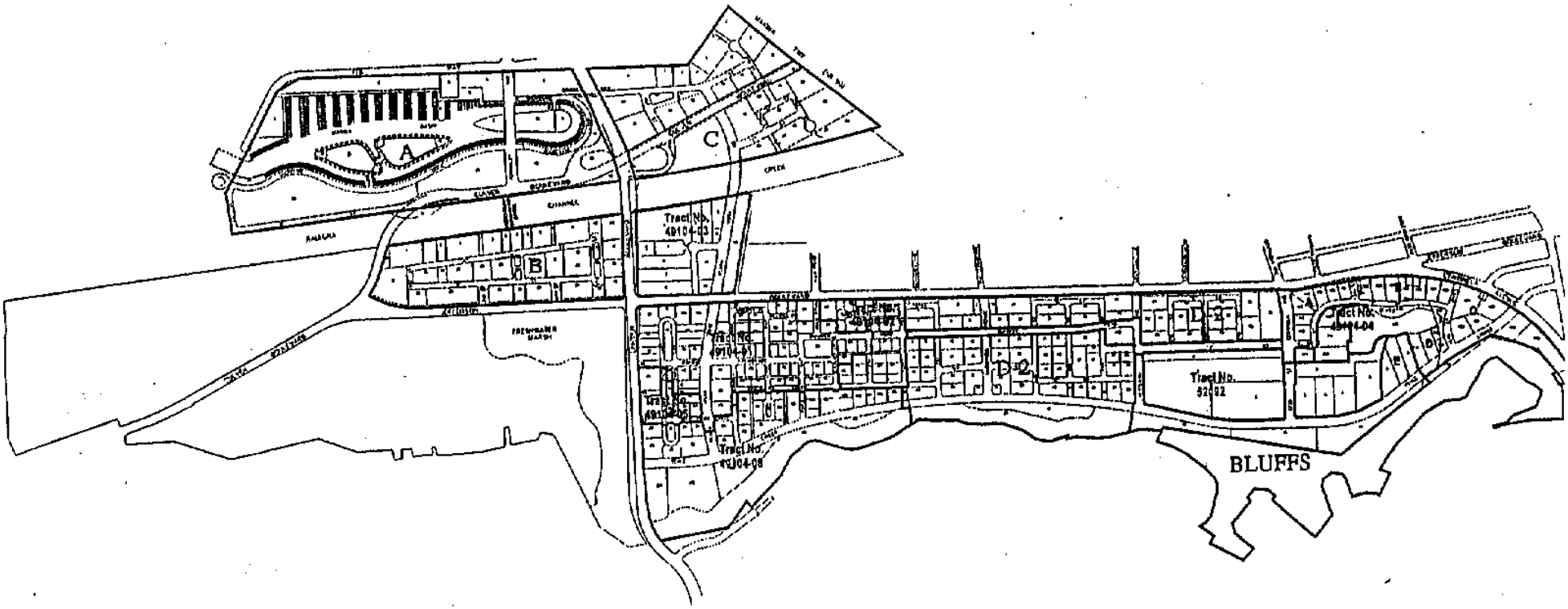


Figure 3. Playa Vista Development First Phase Tract Numbers

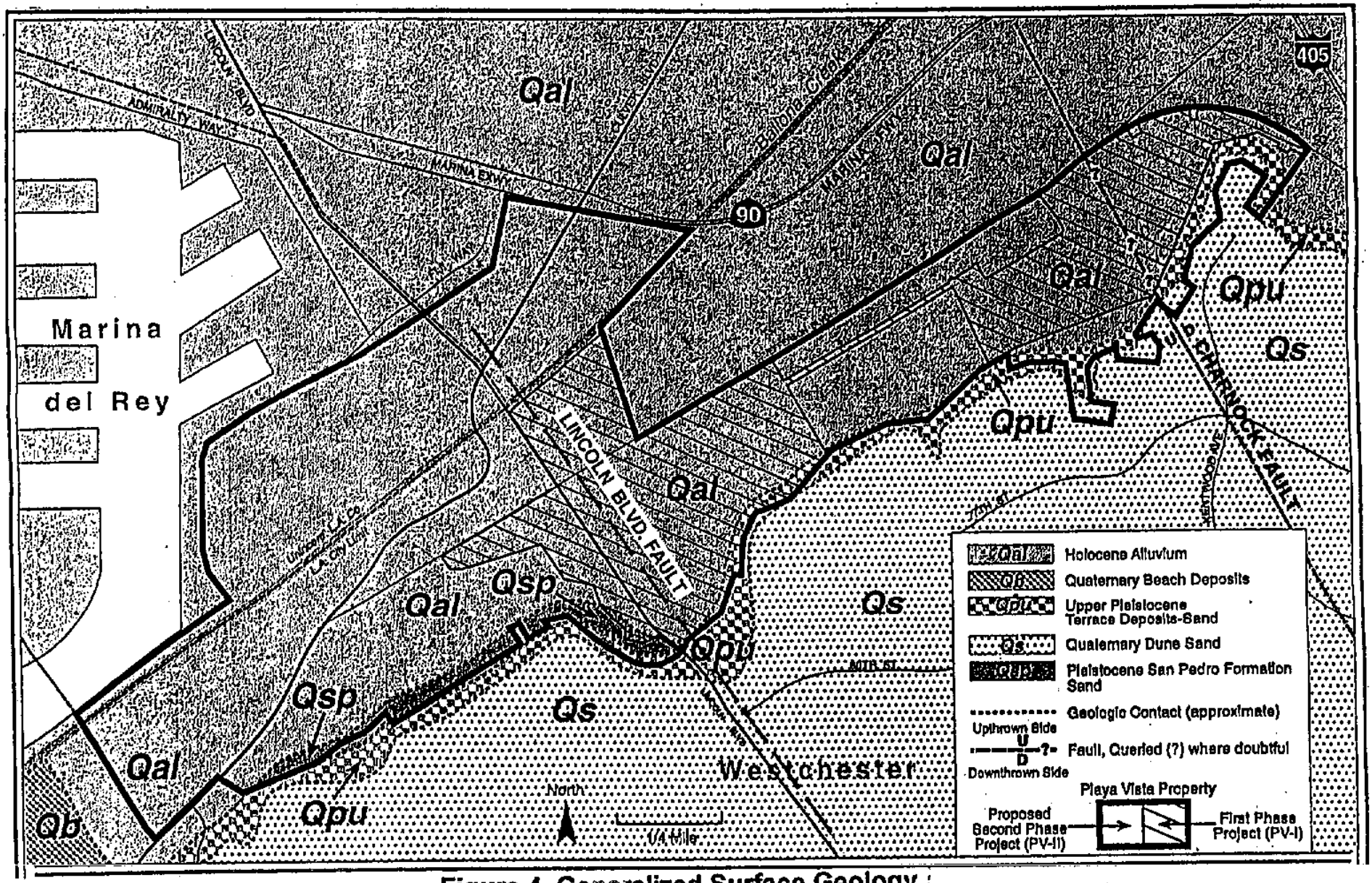


Figure 4. Generalized Surface Geology
(Modified after CDM, 1998)

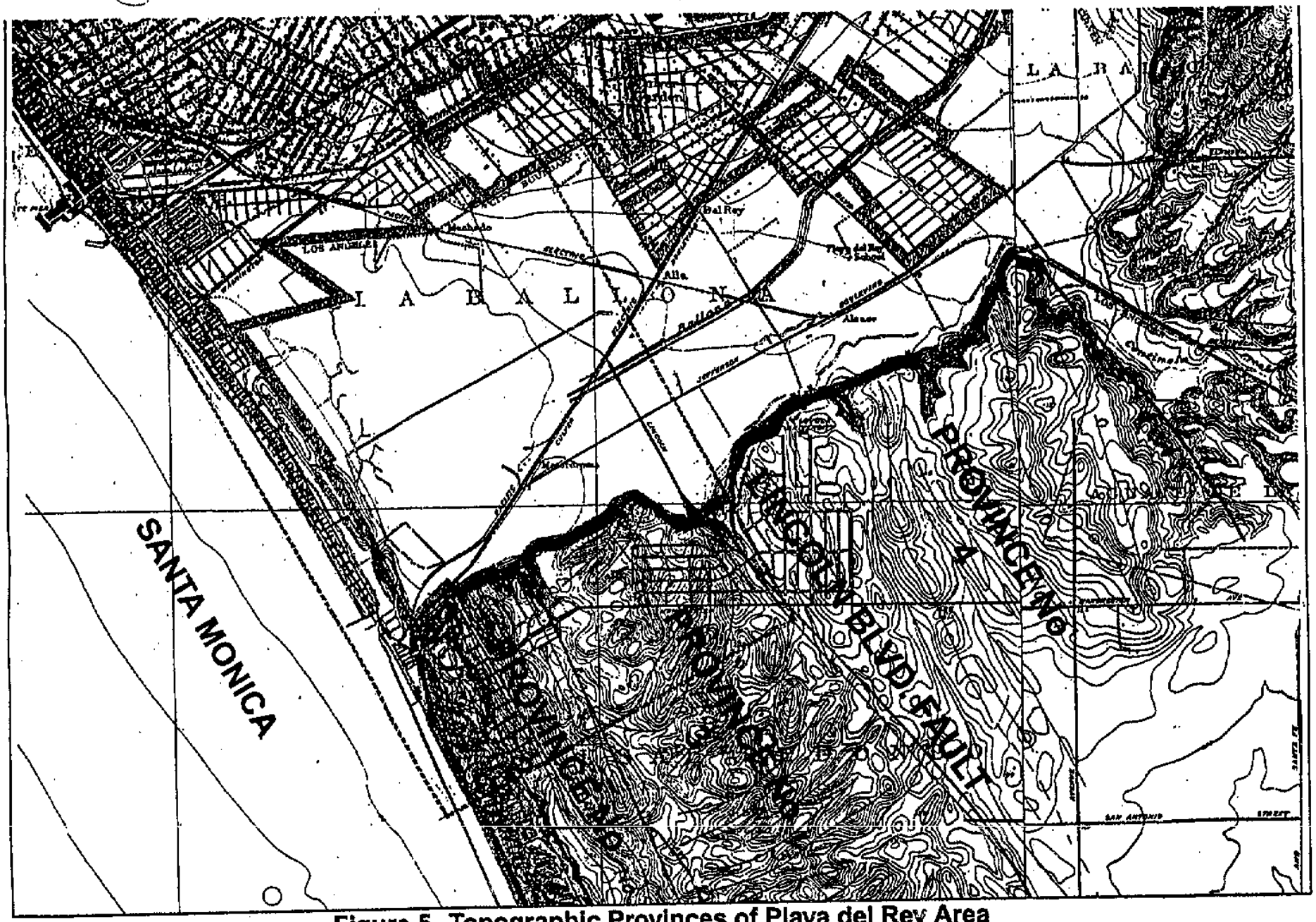
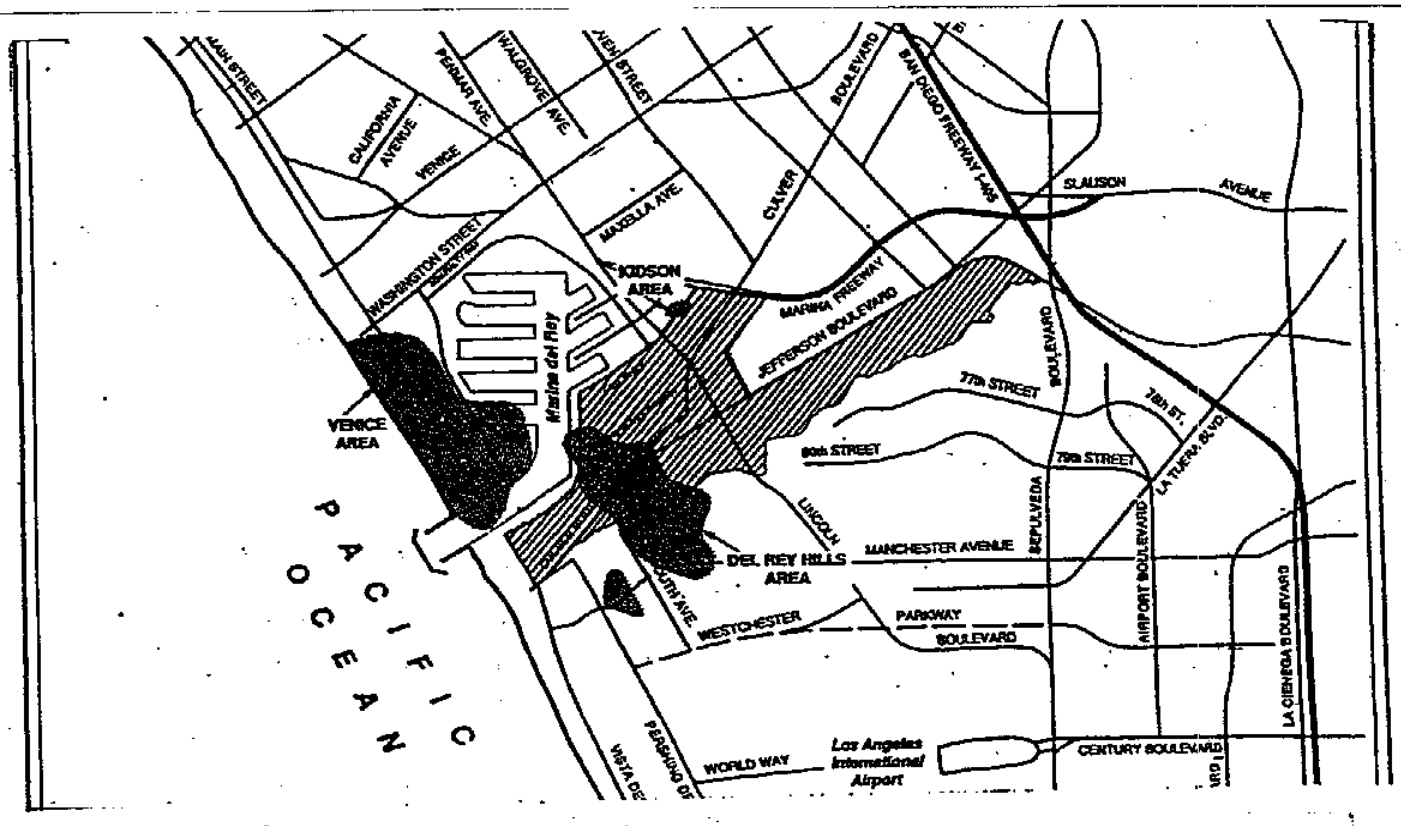


Figure 5. Topographic Provinces of Playa del Rey Area
Metzner (1935)



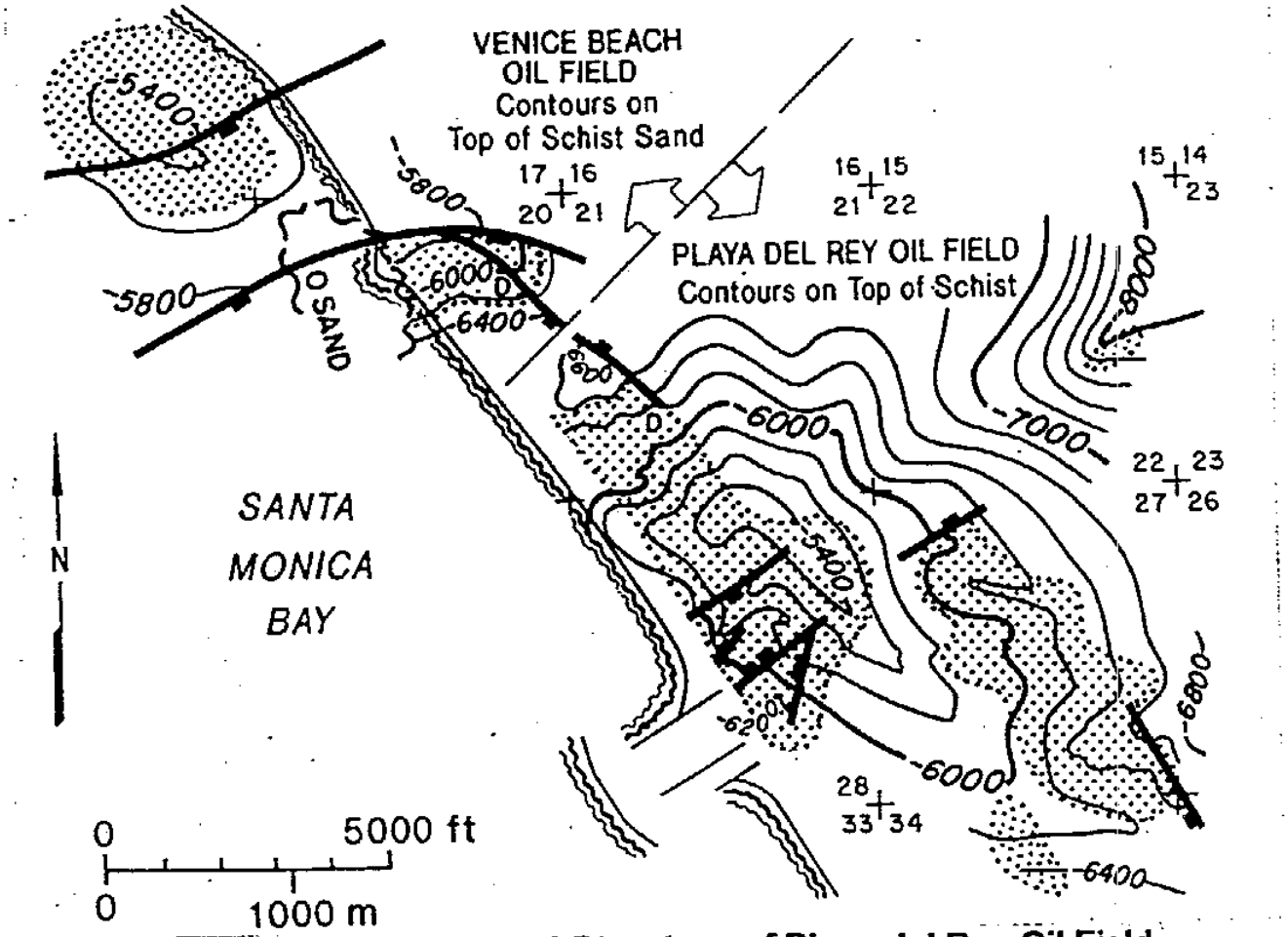


Figure 6. Location and Structure of Playa del Rey Oil Field

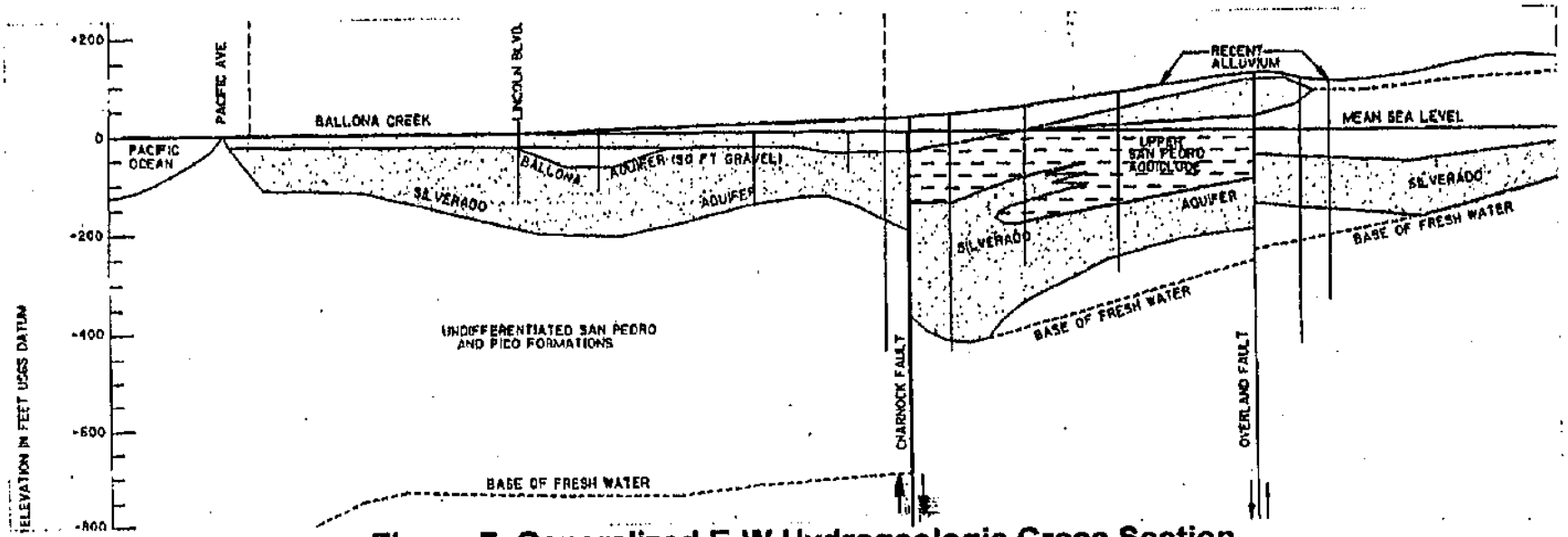


Figure 7. Generalized E-W Hydrogeologic Cross Section
(Modified after Cal: Dept. Wtr. Res., 1961 & CDM, 1998)

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
1	58.20	0.41	0.06	0.04	0.06	<0.01	<0.01
2	194.00	0.27	0.18	0.12	0.18	<0.01	<0.01
3	1400.00	0.31	0.16	0.19	0.16	<0.01	<0.01
4	102.00	0.71	0.19	0.76	0.12	0.13	0.18
5	26.60	0.30	0.24	0.16	0.20	<0.01	<0.01
6	2400.00	0.36	0.22	0.24	0.22	<0.01	0.09
7	2.90	0.22	0.22	0.09	0.18	<0.01	<0.01
8	8.30	0.51	0.46	0.18	0.33	<0.01	<0.01
9	49.10	0.23	0.18	0.10	0.14	<0.01	<0.01
10	23.20	0.25	0.25	0.13	0.20	<0.01	<0.01
11	31.20	1.13	0.21	0.94	0.18	0.14	0.45
12	214.00	0.72	0.20	0.30	0.19	0.07	0.12
13	47.10	0.37	0.17	0.13	0.12	<0.01	<0.01
14	10.00	0.18	0.18	0.08	0.14	<0.01	<0.01
15	39.40	0.82	1.16	0.35	0.86	0.04	0.12
16	4.00	0.31	0.22	0.12	0.20	<0.01	<0.01
17	490.00	0.70	0.14	0.49	0.15	0.17	0.12
18	33.80	0.12	0.07	0.05	0.07	<0.01	<0.01
19	12.40	0.11	0.08	0.04	0.04	<0.01	<0.01
20	59.90	0.26	0.12	0.12	0.10	<0.01	<0.01
21	78.90	0.34	0.17	0.12	0.16	<0.01	<0.01
22	3.80	0.34	0.20	0.20	0.18	<0.01	<0.01
23	7.30	0.43	0.32	0.21	0.28	<0.01	<0.01
24	7.00	0.28	0.15	0.17	0.21	<0.01	<0.01
25	91.70	0.44	0.23	0.24	0.23	<0.01	<0.01
26	1300.00	2.17	0.09	1.32	0.07	0.21	0.24
27	64.00	0.58	0.44	0.28	0.41	0.07	0.12
28	14.70	0.42	0.40	0.15	0.35	<0.01	<0.01
29	42.90	0.12	0.08	0.04	0.08	<0.01	<0.01
30	37.70	0.24	0.13	0.09	0.11	<0.01	<0.01
31	22.80	0.18	0.13	0.10	0.14	<0.01	<0.01
32	641.00	2.79	0.50	0.76	0.36	0.08	0.12
33	59.70	0.48	0.66	0.20	0.52	<0.01	<0.01
34	1100.00	3.42	0.12	1.84	0.11	0.14	0.24
35	7.30	0.13	0.11	0.08	0.10	<0.01	<0.01
36	2.40	0.15	0.16	0.06	0.12	<0.01	<0.01
37	218.00	0.96	0.24	0.31	0.22	0.08	0.08
38	1700.00	5.44	0.19	2.71	0.17	0.85	0.84
39	6.40	0.25	0.20	0.13	0.16	<0.01	<0.01
40	19.60	0.57	0.55	0.25	0.42	0.04	0.07
41	8.20	0.05	0.04	<0.01	<0.01	<0.01	<0.01
42	1.20	0.08	0.07	0.02	0.03	<0.01	<0.01
43	3.20	0.25	0.29	0.10	0.25	<0.01	<0.01
44	2.80	0.21	0.19	0.08	0.18	<0.01	<0.01
45	1600.00	7.17	0.02	2.74	<0.01	0.25	0.25

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
46	3700.00	7.23	0.07	2.82	<0.01	0.50	0.56
47	190.00	1.07	0.26	0.47	0.30	0.05	0.09
48	16.60	0.44	0.48	0.20	0.35	<0.01	<0.01
49	33.30	0.90	0.71	0.39	0.56	0.07	0.12
50	79.20	0.56	0.14	0.32	0.15	0.08	0.07
51	143.00	1.39	0.19	0.53	0.15	<0.01	<0.01
52	4.30	0.33	0.32	0.13	0.25	<0.01	<0.01
53	4.10	0.22	0.16	0.10	0.14	<0.01	<0.01
54	2.40	0.16	0.13	0.07	0.13	<0.01	<0.01
55	2800.00	0.58	0.39	0.31	0.36	0.04	0.10
56	1000.00	0.45	0.45	0.58	0.40	0.15	0.09
57	600.00	0.90	0.77	0.32	0.64	0.07	0.12
58	90.30	1.04	0.62	0.44	0.50	0.09	0.15
59	3.50	0.37	0.32	0.13	0.26	<0.01	<0.01
60	11.60	0.17	0.15	0.07	0.12	<0.01	<0.01
61	45000.00	217.00	0.45	1.22	0.48	0.71	0.05
62	666.00	0.38	0.17	0.14	0.13	<0.01	<0.01
63	4.40	0.27	0.16	0.10	0.16	<0.01	<0.01
64	4.20	0.27	0.19	0.11	0.17	<0.01	<0.01
65	4.30	0.35	0.33	0.12	0.26	<0.01	<0.01
66	500.00	0.59	0.20	0.33	0.35	0.07	0.14
67	5.20	0.22	0.20	0.11	0.15	<0.01	<0.01
68	42.40	0.93	0.22	0.42	0.20	0.15	0.15
69	8.10	0.43	0.33	0.18	0.28	<0.01	<0.01
70	68.20	1.34	0.10	0.73	0.06	0.16	0.25
71	20.40	0.50	0.11	0.37	0.06	0.11	0.19
72	2.10	0.13	0.14	0.05	0.11	<0.01	<0.01
73	65.60	0.40	0.18	0.09	0.13	<0.01	<0.01
74	62.80	0.35	0.19	0.15	0.18	<0.01	<0.01
75	0.80	0.07	0.06	<0.01	<0.01	<0.01	<0.01
76	14.90	0.22	0.20	0.09	0.20	<0.01	<0.01
77	732000.00	2973.00	0.00	33.30	0.04	8.33	0.40
78	590400.00	3737.00	0.08	33.80	0.14	8.38	0.71
79	5300.00	14.60	0.23	0.24	0.26	0.08	0.11
80	800.00	2.37	0.22	0.76	0.46	0.15	0.25
81	2000.00	3.26	0.21	0.48	0.19	0.06	0.12
82	1.60	0.13	0.12	0.04	0.12	<0.01	<0.01
83	327.00	0.72	0.19	0.23	0.17	0.09	<0.01
84	1100.00	8.56	0.12	0.10	0.11	<0.01	<0.01
85	449.00	5.73	0.11	0.19	0.10	0.08	<0.01
100	4.20	0.32	0.2	0.13	0.13	<.01	<.01
101	4100.00	2.86	1.05	1.36	0.77	0.15	0.47
102	36800.00	5.87	1.93	3.45	1.2	0.4	1.1
103	79.14	0.42	0.23	0.24	0.18	<.01	<.01
104	69400.00	4.46	0.14	3.09	0.11	0.34	0.89

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TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
105	10.72	1.09	1.24	0.42	0.85	0.07	0.14
106	18.07	1.04	0.61	0.53	0.56	0.09	0.18
107	23.73	1.75	1.28	0.71	1.06	0.11	0.36
108	11.38	0.97	0.62	0.36	0.44	0.05	0.14
109	43.98	2.73	3.63	1.07	2.37	0.13	0.43
110	40.75	1.7	1.32	0.65	1.1	0.09	0.34
111	122.00	1.32	1.32	0.53	0.99	0.11	0.19
112	205100.00	497	0.81	5.03	0.84	1.36	0.4
113	11700.00	113	0.12	2.18	0.12	0.55	0.09
114	340.00	1.1	0.42	0.32	0.31	0.08	0.08
115	17100.00	84.3	0.17	1.04	0.17	0.45	0.07
116	40000.00	184	0.74	0.98	0.66	0.35	0.09
117	700.00	2.37	0.45	0.87	0.35	0.17	0.21
118	1400.00	1.61	0.78	0.72	0.63	<0.01	0.31
119	11.23	0.57	0.33	0.23	0.26	0.04	0.12
120	41100.00	6.2	0.27	4.17	<.01	0.5	1.25
121	7.17	0.96	0.69	0.3	0.54	0.03	0.18
122	64.05	1.49	1.31	0.42	0.84	0.04	0.27
123	12.01	0.69	0.64	0.29	0.43	0.06	0.17
124	2700.00	3.81	0.82	2.42	0.61	0.26	0.72
125	6700.00	2.29	0.55	1.3	<.01	0.18	0.5
126	23.88	0.95	0.47	0.32	0.34	0.08	0.14
127	6800.00	2.33	0.83	1.06	0.6	0.13	0.24
128	6.49	0.33	0.24	0.11	0.17	<.01	<.01
129	7.95	0.64	0.54	0.24	0.42	<.01	<.01
130	9.08	0.8	0.6	0.29	0.46	0.04	0.06
131	10.74	0.71	0.6	0.25	0.42	<.01	<.01
132	14.66	1.11	0.88	0.39	0.64	0.13	0.14
133	7.88	0.75	0.62	0.32	0.52	0.04	0.11
134	3.19	0.0699	0.2376	<0.01	<0.01	<0.01	<0.01
135	1160.76	4.2335	0.1606	0.2224	<0.01	<0.01	<0.01
136	1379.38	7.4965	0.1223	0.2454	<0.01	<0.01	<0.01
136A	2900.00	35.1	0.86	3.02	0.57	0.7	0.18
136B	11400.00	53.3	0.17	1.04	0.2	0.22	0.05
136C	45.50	2.16	0.84	0.41	0.61	0.21	0.11
137	689449.00	3379.35	<0.01	41.7739	<0.01	8.7567	0.7992
138	473600.00	2001.844	<0.01	27.8119	0.239	5.73	0.711
139	605.19	4.6111	1.0569	1.3755	0.723	0.2033	0.2144
140	7544.00	31.2268	0.29	0.6334	0.2695	0.1213	<0.01
141	30553.00	722.86	<0.01	8.938	0.6572	1.86	0.33
142	3544.00	8.0828	0.4742	1.9421	0.3383	0.4542	0.4502
143	121.80	0.65	0.13	0.18	0.26	<.01	<.01
144	5.26	0.4887	0.2829	0.1907	0.2018	0.0271	0.0303
145	12.53	0.5335	0.2739	0.2678	0.2088	0.0333	0.0704
146	180.82	1.2374	0.7751	1.3106	0.6079	0.06	0.17

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TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
147	10.44	0.46	0.18	0.2	0.14	<.01	<.01
148	148.74	0.8597	0.4626	0.3124	0.3116	0.0414	0.0802
149	235.25	1.9687	0.6737	0.8252	0.5627	0.13	0.17
150	38.04	5.159	8.6653	2.7006	5.4144	0.1322	0.4185
151	127.77	1.03	0.26	0.2	0.21	<.01	<.01
152	600.00	10.33	1.03	2.91	0.68	0.78	0.39
153	80.86	2.5332	0.5343	0.3621	0.3111	<0.01	<0.01
154	612.52	22.4541	0.4565	0.7678	0.3184	0.4282	<0.01
155	1000.00	1.24	0.05	1.49	<.01	0.28	0.34
156	11735.00	1.3365	0.8326	0.7533	1.2811	<0.01	<0.01
157	3450.00	0.8712	0.2962	0.6873	0.2793	<0.01	<0.01
158	342.00	1.5	0.88	0.56	0.69	0.11	0.18
159	11.15	1.36	0.96	0.52	0.78	0.07	0.18
160	10.19	1.04	0.6	0.44	0.51	0.08	0.16
161	487.39	3.5516	0.3771	0.3142	0.2945	0.04	0.03
162	15.58	1.32	1.42	0.44	0.99	0.06	0.1
163	3300.00	26.42	3.89	2.25	2.27	0.38	0.3
164	742000.00	3162	0.04	49.41	0.07	8.92	1.13
165	1371.38	2.1759	0.3604	1.8026	0.1899	0.2233	0.2827
166	29.79	1.5631	0.9047	0.7438	<0.01	<0.01	<0.01
167	5.55	0.4147	0.2087	0.1623	0.1633	0.0236	0.0434
168 DUP	4.25	0.2	0.08	0.07	0.09	0.04	0.06
169	18.39	0.7897	0.4581	2.0432	0.3192	0.18	0.08
170	50.33	0.87	0.12	0.34	0.11	0.1	0.1
171	32.42	1.47	0.55	0.66	0.45	0.12	0.19
172	644748.00	2576.15	<0.01	38.825	<0.01	7.341	0.6954
173	634813.00	2815.015	<0.01	40.5464	<0.01	8.0695	1.0749
174	735500.00	3062	0.09	48.69	<.01	8.85	1.04
175	800600.00	3254	<.01	53.09	<.01	9.64	1.18
176	17.20	1.78	1.15	0.6	0.87	0.06	0.31
177	510200.00	1595	0.41	51.71	0.27	9.76	1.34
178	38600.00	2.14	0.67	1.4	0.51	0.2	0.33
179	251.07	0.92	0.19	0.44	0.14	0.11	0.16
180	77.43	2.05	1.32	0.9	1.14	0.11	0.27
181	32.31	3	1.41	1.37	1.19	0.25	0.46
182	5.56	0.62	0.93	0.25	0.68	0.04	0.14
183	39.40	1.4	0.49	0.45	0.34	0.2	0.1
184	58.88	1.4	0.42	0.4	0.31	0.1	0.15
185	1429.04	1.5064	0.6194	1.0527	0.5226	0.22	0.24
186	749400.00	3183	<.01	47.48	<.01	8.77	0.85
187	8100.00	34.86	0.48	1.47	0.44	0.16	0.14
188	15652.00	14.7054	0.32	4.5668	4.2536	0.6177	0.368
189	2300.00	1.24	1.26	0.54	0.8	0.08	0.14
190	3.97	0.2	0.12	0.06	0.08	<.01	<.01
191	8.43	0.08	0.04	0.03	<.01	<.01	<.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
192	17532.00	80.364	<0.01	2.1935	0.203	0.46	0.09
193	413600.00	1921	0.23	31.45	0.38	5.73	0.64
194	0.77	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
195	24.25	1.5944	1.9077	0.7018	1.2938	0.1079	0.1511
196	760900.00	3157	<.01	44.34	<.01	4.97	0.65
197	438900.00	1701	0.16	25.02	0.27	4.02	0.54
198	721100.00	2974	<.01	41.89	0.12	4.76	1.17
199	286400.00	1152	0.18	13.48	0.36	1.25	0.34
200	315400.00	1591	0.09	23.48	0.22	5.52	0.75
201	27.76	1.52	0.48	0.73	0.37	0.14	0.23
202	14400.00	2.69	0.99	1.99	0.79	0.24	0.55
203	27519.00	27.4775	0.0774	3.3001	0.0868	0.4983	0.155
204	18.99	0.91	0.16	0.49	0.12	0.1	0.16
205	173000.00	478	0.48	11.53	0.44	2.29	0.35
206	65.56	2.3	1.17	0.8	0.83	0.18	0.17
207	798800.00	3234	<.01	49.38	<.01	8.52	0.86
208	752500.00	3039	<.01	44.19	<.01	7.67	0.82
209	796600.00	3428	<.01	46.78	<.01	5.96	0.74
210	679864.00	2205.792	<0.01	32.4597	0.1116	6.2854	0.6106
211	891543.00	3188.304	<0.01	42.7624	<0.01	8.05	0.59
212	136.90	2.3	1.04	0.96	0.82	0.18	0.34
213	149600.00	501	0.19	10.7	0.16	2	0.27
214	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
215	338.30	1.9858	1.0763	0.7904	0.819	0.0971	0.1724
216	58.59	1.3494	0.6633	0.6514	0.3707	0.1088	0.0794
217	7117.00	11.4712	0.2298	1.2691	0.2224	0.1664	0.2234
218	336.92	6.7478	0.2368	0.7617	0.2166	0.0924	0.0739
219	131561.00	600.8932	<0.01	16.2576	<0.01	4.4367	1.3162
220	406000.00	1840	<.01	33.63	0.21	6.61	0.95
221	140900.00	143.6794	<.01	3.96	<0.01	0.99	0.12
222	12.19	0.6005	0.212	0.3247	0.1685	0.3455	0.0389
223	5.08	0.1523	0.0504	0.0659	<0.01	<0.01	<0.01
224	6.18	0.6535	0.431	0.2146	0.2881	<0.01	<0.01
226	13.04	1.3211	0.9319	0.4117	0.6486	<0.01	0.072
227	9.37	0.665	0.2435	0.3342	0.1885	0.0602	0.0692
228	11.90	0.78	0.45	0.31	0.33	0.11	0.08
229	34.46	2.64	1.43	1.04	1.13	0.18	0.4
230	477599.00	2194.655	<0.01	28.6072	0.2491	5.5801	0.6143
231	135159.00	205.7681	<0.01	11.4737	0.0955	5.1416	0.7889
232	636929.00	2843.84	<0.01	42.1502	<0.01	8.2126	0.6482
233	80.03	2.05	2.45	0.6	1.54	0.08	0.15
234	7.23	0.67	0.41	0.23	0.34	0.04	0.08
235	800.00	0.92	0.5	0.39	0.41	0.06	0.12
236	8505.00	19.3796	0.1374	1.2393	0.1185	0.6822	0.0825
237	24.45	0.53	0.53	0.18	0.38	0.04	0.06

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
238	11839.00	295.2838	<0.01	13.2445	0.5877	2.8064	0.6789
239	359.76	9.07	0.82	5.04	0.55	1.08	0.3
240	1056.02	5.0935	0.6352	1.3422	0.8931	0.3183	<0.01
241	1000.00	2.82	0.29	2.66	0.17	0.74	0.37
242	377700.00	1252	0.02	35.85	0.01	7.32	0.76
243	557438.00	2236.648	<0.01	38.481	<0.01	7.2036	0.8699
244	566000.00	2717	0.01	41.88	0.15	7.41	1.01
245	0.82	1.6707	0.3886	0.3234	0.5432	0.03	0.03
246	13.42	0.4161	0.4047	0.1396	<0.01	<0.01	<0.01
247	9.71	0.9989	0.6272	0.3235	0.4096	0.038	0.0508
248	3.95	0.29	0.14	0.1	0.08	<.01	<.01
250	13.94	0.3704	0.1163	0.1768	<0.01	<0.01	<0.01
251	1404.12	21.5331	1.3568	0.7795	0.5486	0.15	0.06
252	566000.00	1925	0.23	44.1	0.08	8.7	0.91
253	50000.00	1373	<.02	10.89	<.02	4.68	0.24
254	3.67	0.23	0.18	0.08	0.12	<.01	<.01
255	5.30	0.3902	0.2693	0.1417	<0.01	<0.01	<0.01
256	974.85	5.8117	0.7832	1.335	1.0927	0.3154	<0.01
257	446.00	3.09	0.61	1.06	0.43	0.32	0.12
258	9146.00	120.2975	0.2346	3.6697	0.2777	<0.01	<0.01
259	69.32	0.91	0.56	0.28	0.39	0.03	0.11
260	114224.00	1068.28	<0.01	4.8857	0.0831	2.7672	0.0975
261	822.00	2.96	0.28	1.86	0.21	0.69	0.32
262	17435.00	95.6562	6.7668	22.1165	2.861	3.7092	4.594
263	4072.00	18.8237	1.5191	7.3614	1.0613	1.1166	0.6365
264	95.64	1.5	0.77	0.53	0.5	0.08	0.16
265	1558.34	9.6586	0.4104	0.6226	0.5727	1.45	0.09
266	5.37	0.28	0.35	0.1	0.25	<.01	<.01
267	23600.00	0.6	0.11	0.54	0.14	0.19	<.01
268	5.42	0.1998	0.177	0.0674	<0.01	<0.01	<0.01
269	12.89	0.8365	0.3088	0.4273	0.6367	0.08	0.11
270	4.40	0.2291	0.1324	1.4171	<0.01	<0.01	<0.01
271	3.10	0.2484	0.1503	0.1081	<0.01	<0.01	<0.01
272	333714.00	1146.805	<0.01	9.8639	<0.01	1.7417	0.342
273	2.61	0.0937	0.0696	0.1267	<0.01	<0.01	<0.01
274	3.02	0.21	0.16	0.08	0.11	<.01	<.01
275	6.27	0.27	0.17	0.11	0.09	<.01	<.01
276	2.12	0.16	0.13	0.07	0.08	<.01	<.01
277	3.66	0.2975	0.289	0.1025	<0.01	<0.01	<0.01
278	7.39	0.67	0.43	0.27	0.33	0.04	0.07
279	16.87	1.96	1.27	0.62	1.01	0.07	0.2
280	13.06	2.2	1.35	0.78	1.1	0.11	0.24
281	10.60	1.1	0.67	0.35	0.5	0.05	0.11
282	18332.00	104.7021	0.1952	0.6596	0.2071	0.7287	0.0846
283	30.90	1.6383	1.1441	0.4114	0.7495	0.0645	0.0829

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
284	12.83	0.4705	0.4253	0.1402	0.2384	0.024	0.0193
285	115.21	0.44	0.16	0.07	0.13	<.01	<.01
286	11.51	0.9164	1.061	0.3799	0.7178	0.0538	0.0739
287	158.50	1.21	0.66	0.48	0.45	0.08	0.16
288	3.57	0.17	0.11	0.06	0.09	<.01	<.01
289	9.42	<.01	0.13	0.37	0.14	0.12	0.18
290	42.10	5.4499	8.2156	5.1761	6.1187	0.7213	3.5473
291	28.53	2.04	0.99	0.91	0.69	0.18	0.36
292	7.47	0.5531	0.2745	0.2918	0.1357	<0.01	<0.01
293	493.86	1.1692	0.6886	0.1858	0.4922	<0.01	<0.01
294	4.80	0.1272	0.1166	0.1253	<0.01	<0.01	<0.01
311	2.82	0.14	0.06	0.06	0.03	<.01	<.01
312	2.60	0.16	0.13	0.06	0.09	<.01	0.08
313	2.33	0.21	0.24	0.09	0.13	0.07	<.01
314	2.90	0.3	0.26	0.11	0.16	0.02	0.08
315	4.18	0.26	0.24	0.1	0.16	<.01	0.07
316	4.24	0.58	0.3	0.21	0.22	0.03	0.11
317	2.67	0.19	0.19	0.08	0.13	<.01	0.09
318	0.61	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
319	37623.00	41.0797	0.2063	0.8451	0.2639	0.3115	0.1765
320	7.26	0.5179	0.141	0.2801	0.1056	0.0773	0.0947
321	9.90	0.4804	0.2886	0.2168	0.193	<0.01	<0.01
322	8.93	1.01	1.11	0.43	0.83	0.09	0.31
323	3.60	0.18	0.13	0.07	0.09	<.01	0.05
324	9.51	1.58	2.76	0.61	1.83	0.06	0.32
325	4.25	0.5	0.46	0.19	0.38	0.04	0.14
326	4.20	0.42	0.26	0.17	0.22	0.02	0.09
327	10.34	0.78	0.53	0.34	0.37	0.06	0.21
328	5.97	0.56	0.51	0.22	0.36	0.04	0.17
329	13.30	1.83	2.29	0.81	1.84	0.28	0.34
330	6.44	0.93	1.29	0.36	0.95	0.05	0.23
331	236000.00	1015	0.12	4.12	0.28	3.01	0.32
332	0.15	0.01	<.01	<.01	<.01	<.01	<.01
333	18.80	1.74	2.7	0.71	1.92	0.09	0.32
334	12.36	2.25	3.42	1	2.92	0.07	0.38
335	5.69	0.64	0.46	0.23	0.37	0.04	0.2
336	9.77	0.81	0.33	0.46	0.24	0.13	0.4
337	11.51	0.89	0.26	0.5	0.19	0.12	0.28
338	4.06	0.2086	0.0429	0.1442	<0.01	<0.01	<0.01
339	5.95	0.22	0.02	0.13	<.01	0.04	0.07
340	2.46	0.15	0.12	0.06	0.08	<.01	<.01
341	8.81	0.5592	0.1928	0.2625	0.1256	0.0474	0.0694
342	7.48	0.776	0.5466	0.2981	0.3856	0.0302	0.0652
343	3.83	0.33	0.2	0.19	0.11	0.04	<.01
344	9.95	0.731	0.195	0.4369	0.1324	0.1025	0.1441

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
345	11.77	1.0203	0.2844	0.7816	0.1716	0.108	0.223
346	10.59	0.7351	0.6477	0.3706	0.4155	0.0749	0.0851
347	24.84	3.8351	6.3856	1.4058	3.825	0.1767	0.3513
348	7.29	0.5926	0.2894	0.272	0.1833	0.0289	0.0568
349	2.76	0.22	0.16	0.13	0.13	0.06	0.1
350	10.36	0.88	0.53	0.46	0.41	0.15	0.26
351	8.99	0.6338	0.5057	0.2887	0.3104	<0.01	<0.01
352	0.99	0.0753	0.0262	<0.01	<0.01	<0.01	<0.01
354	8.12	0.641	0.4091	0.3092	<0.01	<0.01	<0.01
355	2.50	0.2701	0.2408	0.1545	0.1519	<0.01	<0.01
356	18.96	1.3194	0.3942	0.752	0.3147	0.132	0.2032
357	8.22	0.7031	0.3724	0.3277	0.2799	0.0536	0.0663
358	125.23	1.678	0.945	1.1649	0.7003	0.1449	0.1952
359	14.94	1.18	0.61	0.64	0.48	0.15	0.38
360	5000.00	0.95	0.43	0.65	0.45	0.14	0.37
361	21.61	1.3431	0.4853	0.6114	0.3284	0.1082	0.1816
362	4.94	0.31	0.08	0.21	0.06	0.09	0.18
363	2.38	0.22	0.12	0.1	0.08	0.03	0.06
364	5.38	0.38	0.17	0.17	0.12	0.06	0.14
365	6.49	0.53	0.26	0.26	0.2	0.06	0.16
366	6.50	0.53	0.24	0.26	0.24	0.08	0.18
367	22.16	1.3899	0.7953	0.5805	0.5505	0.072	0.1747
368	9.96	0.865	0.627	0.4645	0.4912	0.064	0.1308
369	9.44	0.61	0.11	0.38	0.1	0.1	0.25
370	21.49	1.37	0.21	0.83	0.16	0.23	0.43
371	5.65	0.6587	0.6761	0.3076	<0.01	<0.01	<0.01
372	6.74	0.6	0.53	0.28	0.35	0.09	0.12
373	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
376	4.62	0.3099	0.1943	0.0535	<0.01	<0.01	<0.01
377	3.06	0.1468	0.0583	<0.01	<0.01	<0.01	<0.01
378	5.06	0.5208	0.4847	0.2631	0.3655	0.04	0.05
379	11.35	1.35	1.71	0.6	1.22	0.11	0.19
380	9.48	1.2	1.47	0.49	0.97	0.1	0.18
381	4.28	0.31	0.07	0.2	0.06	0.04	0.08
382	17.41	1.47	1.4	0.74	0.92	0.17	0.29
383	10.31	0.6184	0.1807	0.291	0.0746	0.0576	0.0776
384	12.37	0.9289	0.233	0.5272	0.1706	0.1585	0.206
385	2.97	0.1062	0.0244	0.0771	<0.01	<0.01	<0.01
386	7.40	0.7033	0.4087	0.2137	0.2234	<0.01	<0.01
387	1.81	0.1509	0.0677	0.0488	0.0163	<0.01	<0.01
388	12.47	0.6628	0.1191	0.3743	0.0839	0.1058	0.0806
389	13.89	0.76	0.16	0.44	0.13	0.11	0.14
390	12.00	0.73	0.18	0.4	0.19	0.07	0.13
391	5.37	0.3416	0.0887	0.1933	<0.01	<0.01	<0.01
392	6.90	0.3697	0.137	0.2069	0.0896	<0.01	<0.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
393	0.21	<0.01	<0.01	<0.01	0.0181	<0.01	<0.01
394	2.21	0.1365	0.1321	<0.01	<0.01	<0.01	<0.01
395	3.48	0.27	0.09	0.14	0.06	<.01	<.01
396	4.92	0.26	0.05	0.14	<.01	<.01	<.01
401	4.85	0.33	0.12	0.16	0.05	<.01	<.01
402	1.76	0.0771	<0.01	<0.01	<0.01	<0.01	<0.01
403	4.06	0.3252	0.181	0.1525	<0.01	<0.01	<0.01
404	2.06	0.17	0.08	0.1	<.01	<.01	<.01
405	3.11	0.17	0.08	0.1	<.02	<.02	<.02
406	2.15	0.1829	0.1006	0.1528	<0.01	<0.01	<0.01
407	3.13	0.2491	0.1779	0.1194	<0.01	<0.01	<0.01
408	4.21	0.24	0.05	0.18	<.01	<.01	<.01
411	4.35	0.64	0.41	0.27	0.28	0.06	0.09
412	4.36	0.57	0.33	0.22	0.24	0.03	0.06
413	3.32	0.51	0.33	0.23	0.28	0.02	0.05
414	2.27	0.44	0.25	0.16	0.16	<.01	<.01
428	2.43	0.39	0.24	0.14	0.16	<.01	<.01
429	0.39	0.07	0.07	0.04	<0.01	<0.01	<0.01
430	3.17	0.51	0.28	0.2	0.18	<.01	0.05
431	2.67	0.16	0.07	0.06	0.03	<.01	<.01
433	1.76	0.22	0.14	0.07	0.12	<0.01	<0.01
434	1.55	0.31	0.23	0.13	0.18	<.01	<.01
435	1.00	0.18	0.12	0.06	0.07	<0.01	<0.01
436	3.47	0.51	0.38	0.2	0.29	0.02	0.07
449	0.33	0.07	0.06	0.03	<.01	<.01	<.01
450	0.26	0.02	0.02	<.01	<.01	<.01	<.01
451	1.48	0.11	0.08	0.05	0.06	<0.01	<0.01
452	1.32	0.12	0.14	0.05	0.07	<.01	<.01
456	1.16	0.04	0.05	0.02	<0.01	<0.01	<0.01
457	1.29	0.04	0.05	0.01	0.02	<.01	<.01
458	1.99	0.03	0.02	<0.01	<0.01	<0.01	<0.01
459	0.79	0.04	0.04	0.02	<.01	<.01	<.01
460	0.35	0.03	0.02	0.01	<0.01	<0.01	<0.01
465	1.41	0.26	0.17	0.11	0.15	< 0.01	< 0.01
466	2.01	0.201	0.128	0.093	0.115	0.03	0.04
467	1.08	0.112	0.098	0.05	0.068	<.01	<.01
468	0.82	0.08	0.06	0.03	0.03	<0.01	<0.01
469	0.78	0.06	0.03	0.02	0.02	<0.01	<0.01
470	0.75	0.06	0.06	0.02	0.04	<.01	<.01
471	0.90	0.04	0.02	0.01	<.01	<.01	<.01
472	0.44	0.06	0.04	0.02	<.01	<.01	<.01
473	2.05	0.09	0.04	0.02	<0.01	<0.01	<0.01
474	0.90	0.05	0.02	0.01	<.01	<.01	<.01
477	0.65	0.04	0.03	<0.01	<0.01	<0.01	<0.01
478	2.55	0.11	0.06	0.04	0.03	<0.01	<0.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
479	0.95	0.09	0.07	0.04	0.03	<.01	<.01
480	2.72	0.13	0.02	0.04	<0.01	<0.01	<0.01
481	0.77	0.04	0.01	0.02	<0.01	<0.01	<0.01
482	0.93	0.04	0.03	0.02	<.01	<.01	<.01
483	0.60	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
484	1.68	0.125	0.082	0.055	0.07	<.01	<.01
485	1.27	0.258	0.213	0.13	0.181	0.02	0.04
486	1.17	0.23	0.165	0.095	0.126	0.03	0.05
487	3.55	0.377	0.273	0.165	0.244	0.02	0.04
488	2.84	0.163	0.123	0.068	0.093	0.02	0.03
489	1.62	0.09	0.07	0.03	< 0.01	< 0.01	< 0.01
490	1.21	0.05	0.03	0.03	<.01	<.01	<.01
491	1.22	0.05	0.04	0.02	0.02	<0.01	<0.01
492	2.37	0.13	0.11	0.06	0.09	<.01	<.01
493	2.17	0.05	0.01	0.03	<0.01	<0.01	<0.01
494	1.39	0.05	0.06	0.02	0.09	<.01	<.01
495	1.09	0.07	0.03	0.04	<0.01	<0.01	<0.01
496	0.82	0.07	0.04	0.02	<.01	<.01	<.01
497	2.48	0.16	0.09	0.06	0.07	<0.01	<0.01
498	1.89	0.13	0.08	0.04	0.05	<.01	<.01
499	0.90	0.06	0.04	0.03	0.01	<0.01	<0.01
500	3.37	0.19	0.1	0.07	0.05	<.01	<.01
501	0.80	0.05	0.02	0.01	<.01	<.01	<.01
502	1.94	0.13	0.04	0.05	<.01	<.01	<.01
503	17700.00	18.35	0.03	0.33	<.01	0.07	<.01
504	0.96	0.05	0.05	0.04	<0.02	<0.02	<0.02
505	2.32	0.1	0.06	0.05	<.01	<.01	<.01
506	2.45	0.128	0.031	0.061	0.05	<.01	<.01
507	2.44	0.116	0.033	0.047	0.03	<.01	<.01
508	1.37	0.057	0.03	0.02	0.03	<.01	<.01
509	3.75	0.4	0.7	0.16	0.54	< 0.01	< 0.01
510	5.17	0.272	0.344	0.091	0.138	0.03	0.03
511	250.83	0.269	0.209	0.086	0.162	0.03	0.04
512	1.69	0.18	0.19	0.09	0.2	< 0.01	< 0.01
513	6.51	0.946	2.267	0.31	1.589	0.036	0.073
514	2.17	0.14	0.08	0.06	0.04	< 0.01	< 0.01
515	7.53	0.68	1.05	0.25	0.75	< 0.01	< 0.01
516	4.03	0.29	0.23	0.11	0.15	<.01	<.01
517	7.51	0.62	0.56	0.2	0.42	0.05	0.08
518	4.27	0.2489	0.1823	0.0802	0.1754	<0.01	<0.01
519	5.42	0.31	0.22	0.1	0.12	<.01	<.01
520	7.87	0.3653	0.2871	0.1343	0.1979	0.0385	0.0638
521	4.90	0.29	0.23	0.1	0.2	<.01	<.01
522	4.15	0.1	0.05	0.04	<.01	<.01	<.01
523	8.76	0.22	0.14	0.08	0.12	< 0.01	< 0.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
524	1.10	0.095	0.022	0.03	0.03	<.01	<.01
525	2.29	0.193	0.071	0.067	0.05	0.02	0.03
526	2.06	0.07	0.025	0.023	<.01	<.01	<.01
527	7.85	1.142	0.542	0.429	0.395	0.044	0.122
528	4.21	0.27	0.072	0.093	0.07	0.03	0.05
529	2.38	0.113	0.043	0.04	0.037	<.01	<.01
530	4.00	0.26	0.15	0.11	0.13	< 0.01	< 0.01
531	3.35	0.559	0.329	0.223	0.247	0.032	0.052
532	4.66	0.743	0.543	0.342	0.453	0.039	0.108
533	1.69	0.08	0.04	0.04	< 0.01	< 0.01	< 0.01
534	1.36	0.12	0.05	0.05	0.03	<.01	<.01
535	413800.00	1255.64	< 0.01	20.31	0.21	3.62	0.61
536	2.33	0.37	0.26	0.14	0.17	< 0.01	< 0.01
537	2.28	0.4	0.26	0.17	0.19	< 0.01	< 0.01
538	1.42	0.08	0.05	0.02	0.04	<.01	<.01
539	8.42	0.1409	<0.02	<0.02	<0.02	<0.02	<0.02
540	5.65	0.1551	0.1151	<0.01	<0.01	<0.01	<0.01
541	5.98	0.2578	0.1737	0.1263	<0.01	<0.01	<0.01
542	15.28	0.4464	0.3112	0.1525	0.2116	0.0494	0.045
543	157.10	0.54	0.31	0.21	0.24	0.05	0.09
544	2.55	<.01	<.01	<.01	<.01	<.01	<.01
545	1.44	0.24	0.19	0.09	0.11	<.01	<.01
546	4.09	0.56	0.38	0.23	0.28	0.03	0.07
547	2.25	0.12	0.04	0.05	<.01	<.01	<.01
548	1.27	0.1	0.1	0.04	0.08	<.01	<.01
549	1.52	0.12	0.11	0.07	0.09	<.01	<.01
550	1.06	0.06	0.04	0.02	<.01	<.01	<.01
555	6.52	0.58	0.16	0.2	0.12	<.01	<.01
556	1.05	0.12	0.11	0.06	0.08	<.01	<.01
557	5.32	0.9	0.59	0.36	0.4	0.04	0.12
559	1.30	0.23	0.17	0.1	0.12	<.01	<.01
560	1.77	0.15	0.1	0.06	0.07	<.01	<.01
561	3.29	0.25	0.15	0.1	0.09	<.01	<.01
563	4.91	0.23	0.17	0.11	0.15	<.01	<.01
564	3.26	0.18	0.19	0.09	0.16	<.01	<.01
566	1.96	0.05	0.04	0.02	<.01	<.01	<.01
567	1.87	0.14	0.09	0.06	<.01	<.01	<.01
571	1.87	0.14	0.09	0.06	<.01	<.01	<.01
572	95.36	0.43	0.2	0.16	0.11	0.04	0.05
582	3.33	0.43	0.24	0.18	0.14	<.01	0.05
585	2.48	0.13	0.1	0.06	0.08	<.01	<.01
586	2.47	0.06	0.05	0.02	0.03	<.01	<.01
619	5.18	0.37	0.17	0.19	0.13	0.04	0.07
620	3.55	0.2	0.11	0.12	0.08	0.05	0.05
621	3.99	0.2075	0.0574	0.1515	<0.01	<0.01	<0.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
622	9.96	0.2184	<0.01	0.1299	<0.01	<0.01	<0.01
623	8.66	0.1593	0.1051	<0.01	<0.01	<0.01	<0.01
624	3.00	0.2	0.05	0.14	0.07	0.08	0.09
625	3.74	0.4	0.48	0.21	0.46	0.08	0.11
631	4.04	0.2196	<0.01	0.1377	<0.01	0.03	0.05
638	2.26	0.0598	<0.01	<0.01	<0.01	<0.01	<0.01
639	2.92	0.0482	0.0382	<0.01	<0.01	<0.01	<0.01
640	5.12	0.55	0.59	0.27	0.46	0.09	0.11
641	2.13	0.23	0.21	0.1	0.16	0.1	0.05
643	3.43	0.12	0.09	0.05	0.05	<.01	<.01
656	4.73	0.4907	0.5293	0.1967	0.3302	0.036	0.0321
657	37.36	1.1415	0.581	0.4304	0.4147	<0.01	0.0641
658	6.92	0.8659	0.6581	0.2989	0.4522	<0.01	0.0703
659	303.12	0.53	0.74	0.21	0.22	0.03	0.07
660	8500.00	0.542	0.235	0.599	0.173	0.074	0.143
661	2709.00	0.2718	0.1566	0.1194	0.1331	0.0266	0.0216
662	279.11	0.263	0.151	0.105	0.112	0.025	0.031
663	10.43	0.719	0.3964	0.3518	0.1995	0.0582	0.86
664	6.15	0.32	0.13	0.13	0.08	0.06	0.07
669	4.06	0.37	0.19	0.18	0.16	0.05	0.1
670	6.15	0.36	0.09	0.19	0.07	0.07	0.09
671	61.11	1.33	0.43	0.68	0.34	0.16	0.27
672	7.26	0.8	0.42	0.41	0.34	0.09	0.16
673	5.99	0.65	0.4	0.21	0.31	0.04	0.07
674	2.43	0.0873	0.0468	0.0262	<0.01	<0.01	<0.01
675	6.93	0.42	0.15	0.2	0.09	0.06	0.08
676	32.90	0.9515	0.6494	0.3434	0.4594	0.0481	0.0795
677	83.73	0.406	0.203	0.225	0.19	0.036	0.045
678	742.00	1.1043	0.3777	0.4736	0.2529	0.0303	0.0819
679	141.87	1.551	2.2041	0.6602	1.3665	0.0632	0.1317
680	6.22	0.5962	0.4398	0.1942	0.2758	<0.01	<0.01
681	7.18	0.4533	0.1959	0.2238	0.0992	0.0197	0.034
682	1182.00	1.4431	0.3349	0.6262	0.1593	0.0505	0.118
683	7.26	0.5417	0.3402	0.1799	0.2116	<0.01	<0.01
684	8.84	0.5294	0.2691	0.1702	0.2085	<0.01	<0.01
685	7.49	0.459	0.171	0.182	0.112	0.037	0.05
686	6.98	0.372	0.167	0.101	0.121	0.012	0.021
687	6.46	0.5831	0.5429	0.1952	0.2659	0.0175	0.0272
688	12.98	0.411	0.176	0.123	0.145	0.036	0.068
689	198.95	0.8755	0.4892	0.4197	0.3593	0.063	0.0767
690	495.00	1.53	0.96	0.51	0.71	0.18	0.16
691	4.17	0.32	0.3	0.12	0.19	<.01	<.01
692	9.43	1.11	0.77	0.35	0.57	0.04	0.08
693	1.74	0.14	0.1	0.05	0.07	<.01	<.01
694	5.92	0.32	0.13	0.14	0.08	0.04	0.05

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
695	9.76	0.58	0.65	0.23	0.53	0.03	0.08
696	5.59	0.25	0.14	0.07	0.08	< 0.01	0.02
697	3.64	0.090	0.0477	0.0413	0.05	0.027	< 0.01
698	4.28	0.24	0.11	0.09	0.07	<.01	<.01
699	8.08	0.514	0.252	0.197	0.177	0.032	0.044
700	13.07	1.1159	0.5557	0.5078	0.4246	0.0775	0.1639
701	18.24	0.625	0.271	0.228	0.187	0.058	0.082
702	2.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
703	7.63	0.47	0.21	0.21	0.21	0.02	0.05
704	14.29	1.0465	0.4485	0.4387	0.3762	0.089	0.1124
705	6.39	0.6876	0.5533	0.3386	0.436	0.0268	0.0619
706	66.76	0.3284	0.2661	0.1462	0.1828	<0.01	0.0294
707	13.22	1.35	0.78	0.44	0.57	0.07	0.15
708	11.23	0.76	0.5502	0.2305	0.3731	<0.01	<0.01
709	5.81	0.4231	0.1687	0.2005	0.1348	<0.01	0.0586
710	1500.00	1.41	0.72	0.71	0.55	0.08	0.41
711	129.05	1.52	0.92	0.52	0.71	0.06	0.31
712	10.58	0.56	0.34	0.19	0.27	0.1	0.06
713	21.11	0.427	0.226	0.215	0.195	0.044	0.111
714	1.51	0.0973	0.1155	0.0595	0.0409	<0.01	<0.01
715	90.42	0.415	0.23	0.173	0.167	0.034	0.056
716	6.61	0.4014	0.242	0.1436	0.1526	<0.01	<0.01
717	3.75	0.197	0.067	0.067	0.046	0.022	0.039
718	9.10	0.61	0.35	0.21	0.31	0.04	0.06
719	6.69	0.33	0.14	0.12	0.11	0.05	0.06
720	19.62	1.22	0.59	0.46	0.47	0.09	0.16
721	7.84	0.46	0.22	0.23	0.18	0.07	0.09
722	4.74	0.41	0.25	0.18	0.2	0.04	0.08
723	4.74	0.21	0.12	0.08	0.08	<.01	<.01
724	10.41	0.34	0.28	0.15	0.22	0.03	0.09
725	400.00	1.24	0.74	0.43	0.54	0.06	0.11
726	587.40	0.76	0.36	0.57	0.26	0.08	0.12
727	7.76	0.77	0.62	0.31	0.48	0.06	0.13
728	4.72	0.32	0.14	0.1	0.1	<0.01	<0.01
729	900.00	3.28	0.62	1.71	0.44	0.27	0.59
730	14.48	0.98	0.35	0.53	0.33	0.14	0.19
731	131.43	0.194	0.112	0.116	0.065	0.048	0.08
732	10.16	0.49	0.47	0.18	0.37	0.1	0.05
733	47586.00	64.6505	0.4535	0.0972	0.4807	0.7032	0.0781
734	398117.00	1563.758	<0.01	35.8355	0.2726	7.0388	0.6286
735	227000.00	1145	0.12	39.74	0.34	8.32	1.19
736	63607.00	304.3192	<0.01	15.2099	0.0874	4.6806	0.4624
738	988.00	1.5	0.48	0.62	0.36	0.12	0.19
739	13.75	1.39	0.86	0.5	0.72	0.06	0.15
740	17.80	2.01	2.33	0.86	1.75	0.13	0.23

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
741	17.64	2.06	1.43	1.28	1.14	0.19	0.63
742	5.91	0.36	0.18	0.15	0.16	<0.01	<0.01
743	600.00	1.22	0.41	0.39	0.28	0.06	0.14
744	317.27	0.61	0.22	0.35	0.22	0.06	0.12
745	500.00	1.5	0.9	0.5	0.69	0.07	0.14
746	10.47	0.24	0.06	0.1	0.07	0.05	0.06
747	11.67	0.55	0.14	0.29	0.11	0.08	0.1
748	1.11	0.09	0.08	0.04	0.08	<0.01	<0.01
750	13900.00	33.49	<0.01	0.63	<0.01	0.55	<0.01
751	9.31	0.11	0.04	0.04	0.01	<0.01	<0.01
752	38700.00	307.73	0.35	10.76	0.32	2.5	0.55
753	12.12	0.52	0.34	0.19	0.26	0.04	0.07
754	6.51	0.22	0.15	0.11	0.1	0.04	0.06
755	11.07	1.1	0.97	0.4	0.72	0.06	0.12
756	294.52	1.85	0.63	0.86	0.54	0.13	0.29
757	12.06	0.7	0.34	0.24	0.24	0.04	0.05
758	263.22	1.08	0.65	0.53	0.49	0.12	0.13
759	4100.00	35.76	0.17	1.55	0.17	0.36	0.23
760	3800.00	19.7	0.2	1.26	0.19	0.53	0.23
761	233072.00	868.0455	<0.01	21.6513	0.0781	5.6306	0.497
762	172000.00	879	0.14	21.16	0.46	4.51	0.65
763	0.41	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
764	689.36	4.3774	0.4292	0.9989	0.3134	0.9469	0.3103
764A	4.50	0.26	0.16	0.1	0.11	<.01	<.01
765	2.27	0.08	0.05	0.04	<0.01	<0.01	<0.01
766	5.09	0.29	0.14	0.11	0.1	<.01	<.01
767	6.43	0.18	0.06	0.1	0.06	0.04	0.03
768	12.11	0.89	0.4	0.46	0.35	0.12	0.18
769	7.32	0.49	0.18	0.28	0.16	0.05	0.09
770	3.98	0.19	0.1	0.11	0.04	< 0.01	< 0.01
771	5.34	0.25	0.09	0.12	0.08	0.04	0.06
772	24.43	1.89	3.63	0.61	2.2	0.08	0.09
773	570900.00	2175.49	<0.01	46.55	0.07	8.3	2.35
774	56.23	43	0.08	0.11	0.08	< 0.01	< 0.01
775	4.33	0.23	0.17	0.07	0.16	<0.01	<0.01
776	5.64	0.37	0.22	0.11	0.17	<0.01	<0.01
777	8.86	0.63	0.77	0.27	0.64	0.06	0.13
778	5.55	0.27	0.05	0.17	0.06	0.05	0.04
779	6.30	0.39	0.41	0.19	0.39	0.05	0.08
780	6.65	0.45	0.29	0.18	0.18	< 0.01	0.06
785	6.78	0.47	0.33	0.16	0.23	<.01	<.01
786	8.73	0.6	0.43	0.18	0.29	0.08	0.07
787	7.29	0.56	0.4	0.18	0.28	<.01	0.04
788	20.73	0.59	0.39	0.18	0.29	<.01	0.04
789	3.89	0.2531	0.1528	0.1032	0.1302	<0.01	<0.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
791	38.00	0.1875	0.1185	0.0561	0.0347	<0.01	<0.01
793	19.68	0.68	0.53	0.3	0.37	0.05	0.12
794	8.75	0.57	0.24	0.25	0.21	0.09	0.11
795	13.23	1.19	0.63	0.48	0.5	0.11	0.07
796	7.56	0.56	0.27	0.22	0.25	0.06	0.1
797	7.34	0.71	0.65	0.27	0.47	0.06	0.04
798	406700.00	1639.56	3.16	44.25	0.21	9.81	2.57
799	6.00	0.21	0.18	0.07	0.05	<0.01	<0.01
802	51730.00	328	1.21	11.49	0.34	2.55	0.98
803	236000.00	1301	0.2	2.16	0.21	4.2	0.09
804	61000.00	185	0.35	5.07	0.22	0.51	0.1
805	31300.00	67.8	0.73	1.2	0.53	0.06	0.15
806	500.00	1.97	0.57	0.24	0.39	0.04	0.06
808	3.38	0.16	0.11	0.08	0.08	<.01	<.01
810	16306.00	102.9537	0.1707	4.4822	0.136	0.867	0.0861
811	119596.00	997.2519	<0.01	7.7262	0.1331	2.3999	0.028
812	114961.00	558.2906	<0.01	2.3132	0.0982	1.6864	0.0516
813	475156.00	2014.163	<0.01	3.4778	<0.01	4.1209	<0.01
814	369491.00	1363.937	<0.01	35.2086	0.0927	6.9654	0.4382
815	209.00	0.87	0.44	0.2	0.3	<.01	<.01
817	26.07	0.7251	0.4295	0.5187	0.2006	0.0221	0.0918
820	17.62	2.23	3.68	0.68	2.25	0.04	0.14
821	6.13	0.77	0.59	0.25	0.4	0.04	0.1
822A	4.33	0.46	0.41	0.18	0.31	0.02	0.04
822B	6.30	0.59	0.47	0.2	0.35	<.01	0.05
823	4.83	0.48	0.27	0.22	0.24	0.04	0.1
824	5.38	0.34	0.11	0.2	0.1	0.06	0.08
835	164.77	1.4943	0.6589	0.9573	0.3388	<0.01	<0.01
837	2656.00	6.5594	0.4056	2.4245	0.2851	0.3632	0.14
838	287.76	1.0124	0.3105	0.1314	0.1061	<0.01	<0.01
846	10.13	0.95	1	0.46	0.72	0.1	0.16
847	2.52	0.16	0.12	0.08	0.1	<.01	<.01
848	2.13	0.11	0.02	0.04	< 0.01	< 0.01	< 0.01
849	3.19	0.31	0.47	0.15	0.36	0.06	0.09
850	2.78	0.08	0.05	0.04	0.06	0.04	0.03
851	3.00	0.15	0.09	0.03	0.04	0.05	< 0.01
852	11.72	0.72	0.12	0.43	0.07	0.12	0.16
853	21.88	1.26	0.22	0.7	0.17	0.18	0.24
854	10.50	0.74	0.21	0.41	0.16	0.08	0.14
865	3.43	0.38	0.29	0.15	0.2	0.02	0.08
878	6.20	0.39	0.1	0.23	0.07	0.09	0.12
879	0.94	0.09	0.06	0.05	0.04	0.03	0.02
883	4.41	0.47	0.53	0.22	0.41	0.05	0.09
884	2.89	0.11	0.08	0.06	0.03	< 0.01	< 0.01
885	14.48	1.13	0.69	0.52	0.51	0.1	0.17

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE I

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
886	3.27	0.1	0.05	0.04	0.03	< 0.01	< 0.01
904	1339.24	3.21	0.31	0.25	0.29	0.22	0.09
905	81.87	0.48	0.18	0.11	0.18	0.04	0.03
909	323600.00	1121.61	< 0.01	0.92	0.18	0.57	< 0.01
910	52500.00	219.97	0.15	1.19	0.21	0.41	0.08
911	43800.00	178.11	0.07	3.54	0.14	0.62	0.11
912	537500.00	1838.85	< 0.01	39.65	0.1	7.29	2.02
913	380800.00	671.74	0.08	2.38	0.43	3.23	0.21
914	65300.00	334.78	0.15	8.71	0.26	2.03	0.25
915	9.12	0.57	0.31	0.25	0.19	0.04	0.06
916	249900.00	282.74	<0.01	7.99	0.15	4.61	0.28
917	78600.00	385.31	0.04	9.75	0.19	1.94	0.48
918	495800.00	1648.09	0.03	26.23	0.53	5.52	0.89
919	396600.00	1519.01	0.16	13.49	0.4	3.48	2.16
920	384500.00	1319.71	< 0.01	7.88	0.46	1.41	0.5
921	321800.00	1540.61	< 0.01	1.37	0.44	1.52	1
922	550.22	1.38	0.73	0.4	0.68	0.1	0.1
923	190.82	0.92	0.26	0.11	0.17	<0.01	<0.01
924	24700.00	< 0.01	< 0.01	< 0.01	< 0.01	0.07	< 0.01
925	130900.00	352.61	<0.01	1.84	0.03	1.46	0.09
926	44200.00	40.6	0.43	0.8	0.36	< 0.01	< 0.01
927	20100.00	96.93	0.03	1.72	0.04	0.25	< 0.01
928	654800.00	3680.89	< 0.01	52.92	< 0.01	9.13	2.41
929	8200.00	31.28	1.45	1.35	1.17	0.17	0.06
930	10800.00	52.37	1.47	1.96	1.33	0.24	0.12
931	189400.00	737.53	1.75	18.67	1.74	3.35	1.08
932	24.76	2.61	4.42	0.98	2.75	0.09	0.17
933	17.98	0.78	0.51	0.27	0.4	< 0.01	< 0.01
934	196.69	2.09	3.07	0.81	2.23	0.32	0.48
935	74.77	0.97	1.66	0.41	1.22	0.07	0.1
936	900.00	1.42	1.35	0.52	1.07	0.08	0.17
937	22100.00	112.99	2.87	4.07	2.27	0.74	0.45
938	4.69	0.48	0.22	0.21	0.18	0.03	0.07
939	7.28	0.54	0.72	0.22	0.54	0.05	0.09
940	465500.00	1678.28	0.48	49.65	0.25	7.72	2.18
941	11.82	0.5	0.2	0.2	0.15	0.04	0.1
942	9.88	0.54	0.32	0.19	0.24	<0.01	<0.01
943	5.47	0.08	0.05	0.02	0.04	< 0.01	< 0.01
944	183200.00	975.5	1.06	24.55	0.85	4.27	1.08
945	13800.00	38.71	2.3	2.78	1.56	0.79	0.2
946	641000.00	2613	0.76	54.92	0.48	2.27	0.94
947	10.42	0.37	0.36	0.14	0.31	<.01	<.01
948	9.77	0.89	0.51	0.25	0.38	0.04	0.07
949	6.51	0.342	0.128	0.131	0.073	0.038	0.044
950	11.90	0.97	0.69	0.32	0.51	0.04	0.11

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE I

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
951	5.43	0.152	0.068	0.078	0.051	0.031	0.028
952	6.04	0.31	0.13	0.12	0.09	<.01	<.01
953	3.31	0.35	0.2	0.12	0.1	<.01	<.01
954	8.60	0.126	0.055	0.05	0.055	0.027	0.035
955	4.95	0.29	0.49	0.12	0.39	< 0.01	0.07
956	15.25	1.55	2.14	0.58	1.43	0.09	0.18
957	166.47	0.0955	0.0695	0.055	0.0299	0.0332	0.0357
958	4.51	0.14	0.09	0.06	0.06	<.01	<.01
959	6.22	0.29	0.16	0.14	0.11	0.03	0.05
960	5.51	0.31	0.17	0.13	0.13	0.02	0.04
961	5.85	0.55	0.33	0.18	0.29	0.03	0.06
962	6.59	0.28	0.1	0.11	0.05	0.03	0.04
963	6.22	0.48	0.27	0.17	0.23	0.04	0.06
964	7.68	0.6	0.31	0.32	0.24	0.04	0.12
965	5.80	0.5	0.48	0.19	0.29	0.04	0.07
966	7.02	0.65	0.63	0.25	0.46	0.06	0.11
967	7.15	0.62	0.44	0.22	0.32	0.06	0.12
968	3.44	0.46	0.28	0.24	0.22	0.19	0.1
969	5.44	0.45	0.22	0.19	0.16	0.06	0.09
970	3.62	0.33	0.18	0.15	0.14	0.02	0.05
971	14.23	0.9	0.37	0.31	0.26	0.04	0.06
972	6.07	0.51	0.27	0.19	0.25	0.07	0.08
973	16.91	0.7	0.84	0.25	0.52	0.05	0.08
974	20300.00	6.69	2.26	4.28	1.73	0.3	0.19
975	3.66	0.23	0.17	0.09	0.11	<0.01	<0.01
976	9900.00	0.52	0.3	0.71	0.29	0.11	0.12
977	2.79	0.31	0.17	0.09	0.1	<0.01	<0.01
978	5.62	0.28	0.08	0.1	0.06	0.09	0.03
979	40000.00	170.67	0.06	0.48	0.18	0.42	0.03
980	139.59	0.93	0.45	0.29	0.32	0.08	0.06
981	3.76	0.17	0.14	0.06	0.1	<0.01	<0.01
A	2.03	0.34	0.13	0.1	0.16	<.01	<.01
AA	61.16	3.8276	0.2886	2.345	<0.01	0.29	0.53
B	2.90	0.22	0.32	0.09	0.18	<.01	<.01
BB	5.36	0.1948	0.107	<0.01	<0.01	<0.01	<0.01
C	1.82	0.19	0.26	0.07	0.2	<.01	<.01
CC	11.55	1.07	0.64	0.33	0.4	0.04	0.16
D	1.59	0.1	0.12	0.05	0.07	<.01	<.01
DD	77.19	1.29	0.76	0.66	0.74	0.12	0.26
DW2-01	79604.00	162.7236	<0.01	6.728	<0.01	2.9414	<0.01
E	1.30	0.12	0.11	0.04	0.07	<.01	<.01
EE	5.28	0.46	0.36	0.18	0.28	<.01	<.01
F	7.09	1.17	2.1	0.48	1.52	0.09	0.14
FF	58.56	3.57	1.7	1.45	1.79	0.16	0.49
G	2.79	0.27	0.35	0.07	0.22	<.01	<.01

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
GG	214.41	3.2	3.16	1.3	2.35	0.15	0.45
H	2.40	0.27	0.33	0.11	0.24	<.01	<.01
HH	62.30	2.41	0.76	1.17	1.2	0.12	0.29
I	1.80	0.04	0.05	<.01	<.01	<.01	<.01
II	55.20	2.29	0.78	1.37	1.07	0.25	0.74
J	4.42	0.4	0.34	0.13	0.23	<.01	<.01
JJ	34.06	1.64	1	0.65	0.84	0.15	0.32
K	5.37	0.94	1.8	0.4	1.31	0.06	0.13
KK	36.50	1.66	1.29	0.72	0.9	0.14	0.21
L	138.00	0.48	0.38	0.25	0.3	<.01	<.01
LL	1400.00	4.66	0.44	0.23	0.45	0.12	0.1
M	94.50	1.17	1.09	0.43	0.83	0.07	0.15
MM	5.36	0.66	0.67	0.24	0.68	0.03	0.14
N	295.00	2.35	0.56	0.94	0.44	0.06	0.15
O	286.00	1.9	1	0.87	0.73	0.13	0.25
OW1	3300.00	14.5	0.04	0.21	0.05	0.07	<.01
OW2	8000.00	37.55	< 0.01	0.43	0.04	0.13	< 0.01
OW3	2.74	0.35	0.23	0.14	0.17	0.04	0.07
OW4	6.05	0.9	0.48	0.34	0.32	0.05	0.12
OW5	3.34	0.2	0.12	0.08	0.08	< 0.01	< 0.01
OW6	4.44	0.14	0.08	0.07	0.08	<.01	<.01
OW7	6.89	0.36	0.12	0.2	0.08	0.08	0.1
OW8	3.34	0.08	0.02	0.04	<.01	<.01	<.01
OW9	12.76	0.89	0.73	0.46	0.49	0.12	0.17
OW10	4.52	0.16	0.05	0.1	< 0.01	< 0.01	< 0.01
OW11	2.67	0.1	0.02	0.06	<.01	<.01	<.01
OW12	9.50	0.61	0.1	0.39	0.06	0.13	0.19
OW13	3.21	0.19	0.15	0.09	0.08	0.03	0.03
OW14	4.71	0.4	0.11	0.22	0.09	0.06	0.09
OW15	6.09	0.38	0.11	0.2	0.06	0.07	0.11
P	269.00	2.4	0.51	1.55	0.44	0.19	0.3
PV-1	42200.00	287.85	0.55	5.6	0.2	1.04	0.18
PV-2	45.91	0.65	0.77	0.26	0.5	0.07	0.11
PV-3	11.96	0.75	0.32	0.35	0.26	0.09	0.15
PV-4	7.68	0.36	0.15	0.16	0.13	0.06	0.11
PV-5	2.23	0.24	0.16	0.11	0.19	0.03	0.06
PV-6	3.97	0.52	0.37	0.2	0.33	0.07	0.13
Q	136.00	1.03	0.44	0.52	0.33	<.01	<.01
R	85624.00	268.6862	<0.01	3.7906	0.3932	0.71	0.11
S	742000.00	2638	<.01	25.01	0.09	3.84	0.24
T	3100.00	7.72	0.24	0.18	0.18	0.1	<.01
U	0.46	0.0143	<0.01	<0.01	<0.01	<0.01	<0.01
V	4.21	0.1817	0.1202	<0.01	<0.01	<0.01	<0.01
W	277.28	46.884	0.775	4.5956	0.4121	3.3504	2.2568
X	92.96	1.1314	0.0576	0.7644	<0.01	0.09	0.12

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SUMMARY OF LIGHT GAS ANALYSES (ppmv) , 4-FOOT SOIL VAPOR SURVEY

TABLE 1

SAMPLE NO.	METHANE	ETHANE	ETHYLENE	PROPANE	PROPLYENE	I-BUTANE	N-BUTANE
Y	27.10	0.7585	0.3773	0.2626	0.1278	<0.01	<0.01
Z	9.99	1.172	0.1978	0.5077	<0.01	<0.01	<0.01

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
1						0.000
2						0.000
3	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
4						0.000
5	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
6						0.000
7	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
8						0.001
9	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
10						0.003
11						0.001
12	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
13						0.000
14	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.007
15						0.000
16						0.000
17						0.000
18						0.003
19						0.000
20	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
21						0.000
22						0.001
23	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
24						0.000
25	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.018
26	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.051
27	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
28						0.000
29						0.000
30						0.000
31	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.000
32						0.000
33	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
34						0.000
35						0.000
36						0.000
37	< 0.07	0.099	< 0.07	< 0.07	< 0.07	0.003
38						0.001
39	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
40						0.000
41						0.000
42						0.000
43						0.000
44						0.000
45	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
46	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
47						0.000
48	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
49						0.002
50	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
51						0.000
52	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
53						0.000
54						0.000
55						0.000
57						0.000
58						0.000
59						0.000
60						0.002
61						0.000
62	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
63						0.000
64	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
65						0.000
66	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
67						0.003
68						0.000
69						0.000
70	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
71						0.000
72						0.001
73						0.007
74						0.000
75						0.000
76	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
80						0.000
81						0.003
82						0.000
83						0.000
100	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
101	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.001
102	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
103	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
104	< 0.07	< 0.07	< 0.07	< 0.07	0.09	0.013
105	< 0.07	< 0.07	< 0.07	< 0.07	0.108	0.022
106	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
107	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
108	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
109	< 0.07	0.12	< 0.07	< 0.07	< 0.07	0.008
110	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
111	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.013
112	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
113	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
114	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.034
115	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
116	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
117	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
118	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
119	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.002
120	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
121	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.110
122	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.002
123	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
124	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
125	< 0.07	< 0.07	< 0.07	< 0.07	0.16	0.008
126	< 0.07	< 0.07	< 0.07	< 0.07	0.175	0.009
127	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
128	< 0.07	< 0.07	< 0.07	< 0.07	0.115	0.003
129	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
130	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
131	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
132	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
133	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
134	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
135	< 0.07	0.109	< 0.07	< 0.07	< 0.07	0.035
136	3.846	5.092	1.502	3.123	1.39	0.000
137	< 0.07	0.227	< 0.07	< 0.07	< 0.07	1.900
138	< 0.07	0.14	< 0.07	< 0.07	< 0.07	0.027
139	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.015
140	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.009
141	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.022
142	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
143	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
144	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
145	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
146	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.008
147	< 0.07	0.131	< 0.07	< 0.07	< 0.07	0.006
148	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
149	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.017
150	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.008
151	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.006
152	< 0.07	0.19	< 0.07	< 0.07	< 0.07	0.007
153	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.004
154	< 0.07	0.12	< 0.07	< 0.07	< 0.07	0.002
155	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
156	< 0.07	0.085	< 0.07	< 0.07	< 0.07	0.041
157	< 0.07	0.16	< 0.07	< 0.07	< 0.07	0.023
158	< 0.07	0.12	< 0.07	< 0.07	< 0.07	0.014
159	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
160	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
161	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
162	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.006
163	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.000
164	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.015
165	< 0.07	0.088	< 0.07	< 0.07	< 0.07	0.003
166	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
167	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
168 DUP	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
169	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.002
170	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.110
171	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
172	< 0.07	0.16	< 0.07	< 0.07	< 0.07	0.420
173	< 0.07	0.15	< 0.07	< 0.07	0.07	2.400
174	< 0.07	0.1	< 0.07	< 0.07	< 0.07	2.100
175	< 0.07	0.1	< 0.07	< 0.07	< 0.07	2.300
176	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.008
177	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.010
178	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.018
179	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.017
180	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.045
181	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.012
182	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
183	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.012
184	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
185	< 0.07	0.126	< 0.07	< 0.07	< 0.07	0.007
186	< 0.07	0.168	< 0.07	< 0.07	< 0.07	1.400
187	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
188	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.057
189	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.007
190	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
191	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
192	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.003
193	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.044
194	< 0.07	0.15	< 0.07	< 0.07	< 0.07	0.033
195	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.002
196	< 0.07	0.101	< 0.07	< 0.07	< 0.07	5.100
197	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.009
198	< 0.07	0.14	< 0.07	< 0.07	< 0.07	0.041
199	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.003
200	< 0.07	0.123	< 0.07	< 0.07	< 0.07	0.094

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
201	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.011
202	< 0.07	0.096	< 0.07	< 0.07	< 0.07	0.060
203	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
204	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.008
205	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
206	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.008
207	< 0.07	0.18	< 0.07	< 0.07	0.09	41.000
208	< 0.07	0.11	< 0.07	< 0.07	< 0.07	1.200
209	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.510
210	< 0.07	0.29	< 0.07	0.12	< 0.07	0.024
211	< 0.07	0.214	< 0.07	< 0.07	0.076	6.900
212	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
213	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.041
214	< 0.07	0.545	< 0.07	0.15	< 0.07	0.009
215	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
216	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
217	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
218	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
219	< 0.07	0.33	< 0.07	0.08	0.07	0.108
220	< 0.07	0.27	< 0.07	0.09	0.07	0.001
221	< 0.07	0.23	< 0.07	< 0.07	< 0.07	0.110
222	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
223	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
224	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	
226	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
227	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.004
228	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
229	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.017
230	< 0.07	0.2	< 0.07	0.08	< 0.07	0.004
231	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.117
232	< 0.07	0.23	< 0.07	< 0.07	0.07	0.005
233	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
234	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
235	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
236	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
237	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
238	< 0.07	0.133	< 0.07	< 0.07	< 0.07	0.004
239	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.002
240	< 0.07	0.108	< 0.07	< 0.07	< 0.07	0.007
241	< 0.07	0.23	< 0.07	0.08	< 0.07	0.003
242	< 0.07	0.38	< 0.07	0.1	< 0.07	0.077
243	< 0.07	0.35	< 0.07	0.09	0.27	0.011
244	< 0.07	0.19	< 0.07	< 0.07	< 0.07	0.740
245	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.049
246	< 0.07	0.12	< 0.07	< 0.07	< 0.07	0.006

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
247	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.006
248	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.002
250	< 0.07	< 0.07	< 0.07	0.13	0.08	0.014
251	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
252	< 0.07	0.22	< 0.07	< 0.07	0.1	2.100
253	< 0.07	0.4	< 0.07	0.15	0.22	0.40
254	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
255	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
256	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.013
257	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
258	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
259	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
260	< 0.07	0.16	< 0.07	0.11	< 0.07	0.004
261	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.150
262	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
263	< 0.07	0.099	< 0.07	< 0.07	< 0.07	0.016
264	< 0.07	0.25	< 0.07	0.14	< 0.07	0.000
265	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
266	< 0.07	0.1	< 0.07	< 0.07	0.23	0.029
267	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
268	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
269	< 0.07	0.073	< 0.07	< 0.07	0.09	0.019
270	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
271	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
272	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.036
273	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.003
274	< 0.07	< 0.07	< 0.07	< 0.07	0.2	0.019
275	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.018
276	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.017
277	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
278	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
279	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
280	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.011
281	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
282	< 0.07	0.1	< 0.07	0.08	0.12	0.005
283	< 0.07	0.41	< 0.07	0.19	< 0.07	0.021
284	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
285	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
286	< 0.07	0.15	< 0.07	0.15	< 0.07	0.006
287	< 0.07	0.07	< 0.07	< 0.07	0.12	0.006
288	< 0.07	0.09	< 0.07	< 0.07	0.11	0.005
289	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
290	0.1	< 0.07	< 0.07	< 0.07	< 0.07	0.021
291	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.020
292	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
293	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
294	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
311	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
312	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
313	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
314	< 0.07	< 0.07	< 0.07	< 0.07	0.09	0.002
315	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
316	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
317	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
318	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
319	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.016
320	< 0.07	0.11	< 0.07	< 0.07	0.26	0.004
321	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
322	< 0.07	< 0.07	< 0.07	< 0.07	0.11	0.006
323	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
324	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
325	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
326	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
327	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
328	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
329	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.013
330	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
331	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.002
332	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
333	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
334	0.1	< 0.07	< 0.07	< 0.07	< 0.07	0.007
335	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
336	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
337	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
338	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
339	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
340	< 0.07	< 0.07	< 0.07	< 0.07	0.13	0.001
341	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
342	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
343	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
344	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.007
345	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
346	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
347	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
348	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
349	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
350	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
351	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
352	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
354	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
355	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
356	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
357	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
358	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.036
359	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.013
360	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.560
361	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
362	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
363	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
364	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
365	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
366	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.008
367	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.007
368	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
369	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
370	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
371	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
372	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
373	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
376	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
377	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
378	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
379	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
380	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
381	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
382	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
383	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
384	< 0.07	< 0.07	< 0.07	< 0.07	0.09	0.007
385	< 0.07	< 0.07	< 0.07	< 0.07	0.12	0.002
386	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
387	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
388	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
389	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
390	< 0.07	< 0.07	< 0.07	< 0.07	0.11	
391	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
392	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
393	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
394	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
395	< 0.07	< 0.07	< 0.07	< 0.07	0.07	0.003
396	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
401	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
402	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
403	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
404	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
405	< 0.07	0.096	< 0.07	< 0.07	< 0.07	0.002

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
406	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
407	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
408	< 0.07	< 0.07	< 0.07	< 0.07	0.07	0.004
411	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
412	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
413	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
414	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
428	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
429	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
430	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
431	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	
433	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
434	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
435	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
436	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
449	< 0.07	< 0.07	< 0.07	< 0.07	0.08	0.000
450	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
451	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
452	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
456	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
457	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
458	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
459	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
460	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
465	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
466	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
467	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
468	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
469	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
470	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
471	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
472	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
473	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
474	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
477	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
478	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
479	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
480	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
481	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
482	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
483	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
484	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
485	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
486	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	
487	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
488	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
489	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
490	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
491	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
492	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
493	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
494	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
495	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
496	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
497	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
498	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
499	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
500	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
501	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
502	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.000
503	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
504	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
505	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
506	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
507	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
508	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
509	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
510	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
511	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
512	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
513	0.12	< 0.07	< 0.07	< 0.07	< 0.07	0.006
514	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
515	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
516	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
517	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.005
518	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
519	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
520	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
521	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.006
522	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
523	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
524	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
525	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
526	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
527	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
528	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
529	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
530	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
531	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
532	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
533	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
534	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
535	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.015
536	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
537	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
538	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
539	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
540	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
541	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
542	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
543	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
544	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
545	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
546	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
547	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
548	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
549	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
550	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
555	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
556	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
557	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
559	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
560	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
561	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
562	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
563	< 0.07	< 0.07	< 0.07	< 0.07	0.105	0.002
564	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
566	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
567	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
571	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
572	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
582	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
585	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
586	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
619	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
620	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
621	< 0.07	< 0.07	< 0.07	< 0.07	0.07	0.002
622	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
623	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
624	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
625	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
631	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
638	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
639	< 0.07	< 0.07	< 0.07	< 0.07	0.12	0.001
640	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
641	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
643	< 0.07	< 0.07	< 0.07	< 0.07	0.096	0.002
656	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
657	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
658	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
659	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
660	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.005
661	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
662	< 0.07	0.07	< 0.07	< 0.07	0.07	0.003
663	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
664	< 0.07	< 0.07	< 0.07	< 0.07	0.07	0.004
669	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
670	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
671	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
672	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.015
673	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
674	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
675	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.005
676	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
677	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
678	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
679	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
680	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
681	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
682	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
683	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
684	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.017
685	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
686	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
687	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
688	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
689	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
690	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
691	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
692	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
693	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
694	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
695	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
696	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
697	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
698	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
699	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
700	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
701	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.002
702	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
703	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
704	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
705	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
706	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
707	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
708	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
709	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
710	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
711	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
712	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
713	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
714	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
715	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.006
716	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
717	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
718	< 0.07	< 0.07	< 0.07	< 0.07	0.08	0.004
719	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
720	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
721	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
722	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
723	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
724	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
725	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
726	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
727	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
728	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
729	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.019
730	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.008
731	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
732	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.016
733	< 0.07	0.2	< 0.07	< 0.07	< 0.07	0.041
734	< 0.07	0.39	< 0.07	0.09	< 0.07	0.320
735	< 0.07	1.26	< 0.07	0.23	0.09	3.900
736	< 0.07	0.97	< 0.07	0.18	0.08	8.800
738	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
739	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
740	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.007
741	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.019
742	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
743	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
744	< 0.07	0.12	< 0.07	< 0.07	< 0.07	0.001
745	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
746	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
747	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
748	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
750	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.002
751	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
752	< 0.07	0.7	< 0.07	0.45	0.24	0.006
753	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.015
754	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
755	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
756	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.002
757	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.013
758	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
759	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.007
760	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.008
761	< 0.07	0.33	< 0.07	0.12	< 0.07	0.002
762	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
763	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.015
764	< 0.07	0.17	< 0.07	< 0.07	< 0.07	0.003
765	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
766	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
767	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
768	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.013
769	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.009
770	< 0.07	< 0.07	< 0.07	< 0.07	0.17	0.001
771	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
772	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
773	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.014
774	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
775	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
776	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
777	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
778	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
779	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
780	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.001
785	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
786	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.006
787	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
788	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	0.002
789	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
791	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
793	< 0.07	0.13	< 0.07	< 0.07	0.091	0.002
794	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
795	< 0.07	0.084	< 0.07	< 0.07	< 0.07	0.007
796	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.011
797	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.008
798	< 0.07	0.36	< 0.07	< 0.07	< 0.07	0.200
799	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
802	< 0.07	0.228	< 0.07	< 0.07	0.07	0.350

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
803	< 0.07	0.383	< 0.07	0.105	0.24	0.290
804	< 0.07	0.946	< 0.07	0.338	0.44	0.003
805	< 0.07	0.75	< 0.07	0.07	0.366	0.009
806	< 0.07	0.2	< 0.07	0.19	0.27	0.004
808	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.002
810	< 0.07	0.72	< 0.07	0.18	0.16	0.008
811	< 0.07	0.24	< 0.07	0.08	0.16	0.008
812	< 0.07	0.36	< 0.07	< 0.07	< 0.07	0.004
813	< 0.07	0.96	< 0.07	0.21	0.09	0.042
814	< 0.07	0.69	< 0.07	0.16	0.09	0.260
815	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.013
817	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.015
820	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
821	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
822A	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
822B	< 0.07	0.099	< 0.07	< 0.07	0.189	
823	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
824	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
835	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
837	< 0.07	0.6	< 0.07	0.11	0.12	0.014
838	< 0.07	< 0.07	< 0.07	< 0.07	0.1	0.003
841	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	
846	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.002
847	< 0.07	0.085	< 0.07	< 0.07	< 0.07	0.002
848	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
849	< 0.07	0.082	< 0.07	< 0.07	< 0.07	0.001
850	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
851	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
852	< 0.07	0.092	< 0.07	< 0.07	< 0.07	0.002
853	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.004
854	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
865	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
878	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.001
879	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
883	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
884	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
885	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.008
886	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
904	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
905	< 0.07	0.08	< 0.07	< 0.07	0.1	0.005
909	< 0.07	0.885	< 0.07	0.33	< 0.07	0.009
910	< 0.07	0.125	< 0.07	< 0.07	< 0.07	0.005
911	< 0.07	0.862	< 0.07	0.37	< 0.07	0.005
912	< 0.07	0.12	< 0.07	< 0.07	< 0.07	0.009
913	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
914	< 0.07	0.509	< 0.07	0.195	0.09	0.009
915	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
916	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.095
917	< 0.07	0.145	< 0.07	< 0.07	< 0.07	0.005
918	< 0.07	0.263	< 0.07	0.094	< 0.07	0.007
919	0.14	0.91	< 0.07	0.258	0.19	0.007
920	< 0.07	0.11	< 0.07	0.07	0.1	0.004
921	< 0.07	0.544	< 0.07	0.164	0.1	0.008
922	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
923	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
924	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
925	< 0.07	0.14	< 0.07	< 0.07	< 0.07	0.005
926	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
927	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
928	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.064
929	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
930	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	
931	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
932	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
933	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
934	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.002
935	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
936	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
937	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
938	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
939	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
940	< 0.07	0.14	< 0.07	< 0.07	< 0.07	0.004
941	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
942	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
943	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.000
944	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.001
945	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.002
946	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
947	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
948	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
949	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
950	< 0.07	0.19	< 0.07	0.09	< 0.07	0.011
951	< 0.07	0.09	< 0.07	< 0.07	< 0.07	0.005
952	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
953	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
954	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
955	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
956	< 0.07	0.077	< 0.07	< 0.07	< 0.07	0.006
957	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.004
958	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001

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TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
959	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.003
960	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
961	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
962	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
963	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
964	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
965	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
966	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
967	< 0.07	0.08	< 0.07	< 0.07	< 0.07	0.003
968	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
969	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
970	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
971	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
972	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
973	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
974	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
975	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
976	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
977	< 0.07	0.07	< 0.07	0.11	< 0.07	0.008
978	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.002
979	< 0.07	0.11	< 0.07	< 0.07	< 0.07	0.004
980	< 0.07	0.44	< 0.07	0.34	0.13	0.006
981	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
AA	< 0.07	< 0.07	< 0.07	< 0.07	0.09	0.003
BB	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
L	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.012
M	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.006
N	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.030
O	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.020
OW1	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
OW2	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
OW3	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
OW4	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
OW5	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.002
OW6	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
OW7	< 0.07	0.078	< 0.07	< 0.07	< 0.07	0.006
OW8	< 0.07	0.108	< 0.07	< 0.07	0.08	0.003
OW9	< 0.07	0.122	< 0.07	< 0.07	0.085	0.010
OW10	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.001
OW11	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.003
OW12	< 0.07	0.097	< 0.07	< 0.07	0.129	0.003
OW13	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
OW14	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
OW15	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.004
P	< 0.07	0.092	< 0.07	< 0.07	0.083	0.015

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SUMMARY OF HYDROGEN SULFIDE & BTEX ANALYSES (ppmv), 4-FOOT SOIL VAPOR SURVEY

TABLE 2

SAMPLE NO.	BENZENE	TOLUENE	ETHYL-BENZENE	M,P-XYLENE	O-XYLENE	H2S
Q	< 0.07	0.07	< 0.07	< 0.07	< 0.07	0.004
R	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.017
S	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.170
T	< 0.07	0.1	< 0.07	< 0.07	< 0.07	0.034
U	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007
V	< 0.07	< 0.07	< 0.07	< 0.07	0.07	0.004
W	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.010
X	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.004
Y	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.005
Z	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	0.007

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TABLE 3

SUMMARY OF LIGHT GAS ANALYSES OF GROUNDWATER FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(mg/l)	METHANE(ug/l)	ETHANE(ng/l)	ETHYLENE(ng/l)	PROPANE(ng/l)	PROPYLENE(ng/l)	ISO-BUTANE(ng/l)	N-BUTANE(ng/l)
Area B Wells									
MMW476-GW-1	04/06/00	17.25	*	212536	356.00	1841.00	452.00	260.00	93.00
MMW476-GW-4	04/06/00	18.04	*	223973	357.00	1963.00	476.00	280.00	80.00
MMW476-GW-7	04/06/00	15.34	*	192744	338.00	1650.00	427.00	252.00	86.00
AVERAGE - MMW476		**16.88**	*	**209751**	**350.33**	**1818.00**	**451.67**	**264.00**	**86.33**
MMW509-GW-1	03/22/00	0.14	*	194	21.00	<10	<10	<10	<0.01
MMW509-GW-2	04/05/00	*	105.7	403	14.00	24.00	<10	<10	<0.01
MMW509-GW-4	04/05/00	*	105.0	186	11.00	13.00	<10	<10	<0.01
MMW509-GW-6	04/05/00	*	96.1	137	11.00	14.00	<10	<10	<0.01
AVERAGE - MMW509		**0.14**	*	**230**	**14.25**	**17.00**	*	*	*
MMW514-GW-2	03/23/00	16.87	*	305556	6.00	3782.00	30.00	401.00	24.00
MMW514-GW-3	03/23/00	14.28	*	269199	<5	3168.00	37.00	321.00	20.00
MMW514-GW-4	03/23/00	16.26	*	302560	<5	3486.00	49.00	386.00	22.00
AVERAGE - MMW514		**15.80**	*	**292438**	**6.00**	**3478.67**	**38.67**	**369.33**	**22.00**
MMW520-GW-2	03/24/00	33.72	*	468944	<5	7920.00	43.00	1015.00	36.00
MMW520-GW-3	03/24/00	27.92	*	399187	<5	6604.00	40.00	833.00	43.00
MMW520-GW-4	03/24/00	25.98	*	368802	<5	6120.00	42.00	772.00	37.00
AVERAGE - MMW520		**29.21**	*	**412311**	*	**6881.33**	**41.67**	**873.33**	**38.67**
MMW542-GW-2	03/23/00	27.04	*	404219	6.00	8510.00	73.00	1134.00	49.00
MMW542-GW-3	03/23/00	25.52	*	381592	<5	8063.00	62.00	1121.00	42.00
MMW542-GW-4	03/23/00	27.99	*	420065	<5	8891.00	63.00	1222.00	41.00
AVERAGE - MMW542		**26.85**	*	**401959**	**6.00**	**8488.00**	**66.00**	**1159.00**	**44.00**
Tract -01 Wells									
MMW1-GW-1	02/05/2000	14.36	*	60741	78.00	160.00	75.00	<10	<0.01
MMW1-GW-2	02/05/2000	15.91	*	69874	11.00	178.00	<10	<10	<0.01
AVERAGE - MMW1		**15.14**	*	**65308**	**44.50**	**169.00**	**75.00**	*	*
MMW153-GW-1	03/09/00	32.24	*	280906	<5	9363.00	<10	1076.00	347.00
MMW153-GW-2	03/09/00	30.54	*	270648	<5	8426.00	<10	934.00	218.00
MMW153-GW-3	03/09/00	28.79	*	261243	<5	8158.00	<10	919.00	242.00
AVERAGE - MMW153		**30.52**	*	**270932**	*	**8649.00**	*	**976.33**	**269.00**
MMW175-GW-2	03/10/00	*	64.0	743	30.00	32.00	<10	<10	<0.01

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TABLE 3

SUMMARY OF LIGHT GAS ANALYSES OF GROUNDWATER FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(mg/l)	METHANE(ug/l)	ETHANE(ng/l)	ETHYLENE(ng/l)	PROPANE(ng/l)	PROPYLENE(ng/l)	ISO-BUTANE(ng/l)	N-BUTANE(ng/l)
MMW175-GW-3	03/10/00	32.41	*	276487	<5	9092.00	<10	1098.00	295.00
MMW175-GW-4	03/10/00	33.50	*	292874	<5	9637.00	<10	1198.00	372.00
AVERAGE - MMW175		**32.95**	**64.0**	**190035**	**30.00**	**6253.67**	*	**1148.00**	**333.50**
MMW2-GW-1	02/04/00	15.97	*	197430	267.00	2243.00	267.00	599.00	101.00
MMW2-GW-2	02/04/00	16.42	*	204575	119.00	2229.00	175.00	598.00	74.00
MMW2-GW-3	02/04/00	17.36	*	213960	73.00	2276.00	167.00	656.00	79.00
AVERAGE - MMW2		**16.58**	*	**205322**	**153.00**	**2249.33**	**203.00**	**617.67**	**84.67**
MMW207-GW-2	03/14/00	32.89	*	312786	<5	5554.00	49.00	768.00	86.00
MMW207-GW-3	03/14/00	33.24	*	317893	<5	5622.00	46.00	754.00	61.00
MMW207-GW-4	03/14/00	33.65	*	315964	<5	5637.00	41.00	755.00	68.00
AVERAGE - MMW207		**33.26**	*	**315548**	*	**5604.33**	**45.33**	**759.00**	**71.67**
MMW211-GW-2	03/13/00	14.63	*	77344	10.00	1183.00	44.00	189.00	34.00
MMW211-GW-2	03/29/00	17.90	*	50510	32.00	1244.00	54.00	238.00	48.00
MMW211-GW-3	03/29/00	16.01	*	58379	22.00	1233.00	60.00	234.00	45.00
MMW211-GW-3	03/13/00	17.07	*	61790	18.00	1181.00	68.00	210.00	33.00
MMW211-GW-4	03/29/00	18.82	*	78055	13.00	1469.00	40.00	255.00	35.00
MMW211-GW-4	03/13/00	16.88	*	63756	16.00	1185.00	39.00	232.00	26.00
AVERAGE - MMW211		**16.89**	*	**64972**	**18.50**	**1249.17**	**50.83**	**226.33**	**36.83**
MMW244-GW-2	03/10/00	21.81	*	153556	<5	3074.00	<10	550.00	49.00
MMW244-GW-3	03/10/00	22.19	*	154890	<5	3117.00	<10	595.00	86.00
MMW244-GW-4	03/10/00	20.85	*	145390	<5	2932.00	<10	530.00	<0.01
AVERAGE - MMW244		**21.62**	*	**151279**	*	**3041.00**	*	**558.33**	**67.50**
MMW3-GW-2	02/04/00	30.83	*	316415	36.00	7889.00	282.00	1004.00	304.00
MMW3-GW-3	02/04/00	26.51	*	288992	29.00	7017.00	238.00	836.00	236.00
MMW3-GW-4	02/04/00	34.78	*	356222	15.00	8857.00	221.00	1122.00	281.00
AVERAGE - MMW3		**30.71**	*	**320543**	**26.67**	**7921.00**	**247.00**	**987.33**	**273.67**
MMW4-GW-2	02/04/00	36.36	*	507129	<5	12777.00	41.00	1536.00	152.00
MMW4-GW-3	02/04/00	43.55	*	581335	<5	14993.00	63.00	1872.00	148.00
MMW4-GW-4	02/04/00	41.39	*	566550	<5	14451.00	61.00	1747.00	161.00
AVERAGE - MMW4		**40.43**	*	**551671**	*	**14073.67**	**55.00**	**1718.33**	**153.67**
MMW676-GW-2	03/16/00	12.39	*	46397	<5	290.00	24.00	29.00	<0.01
MMW676-GW-3	03/16/00	13.86	*	51082	<5	320.00	18.00	30.00	<0.01

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SUMMARY OF LIGHT GAS ANALYSES OF GROUNDWATER FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(mg/l)	METHANE(ug/l)	ETHANE(ng/l)	ETHYLENE(ng/l)	PROPANE(ng/l)	PROPYLENE(ng/l)	ISO-BUTANE(ng/l)	N-BUTANE(ng/l)
MMW676-GW-4	03/16/00	16.30	*	59606	<5	372.00	26.00	50.00	<0.01
AVERAGE - MMW676		**14.18**	*	**52362**	*	**327.33**	**22.67**	**36.33**	*
MMW735-GW-1	03/10/00	7.01	*	36078	18.00	155.00	<10	<10	<0.01
MMW735-GW-2	03/10/00	7.75	*	41440	<5	184.00	<10	13.00	<0.01
AVERAGE - MMW735		**7.38**	*	**38759**	**18.00**	**169.50**	*	**13.00**	*
MMW738-GW-2	03/15/00	14.67	*	3674	10.00	229.00	32.00	86.00	13.00
MMW738-GW-3	03/15/00	16.20	*	1247	<5	116.00	33.00	66.00	<0.01
MMW738-GW-4	03/15/00	17.74	*	151	<5	99.00	28.00	92.00	12.00
AVERAGE - MMW738		**16.20**	*	**1691**	**10.00**	**148.00**	**31.00**	**81.33**	**12.50**
MMW743-GW-1	03/11/00	7.05	*	79864	1687.00	2801.00	<10	263.00	<0.01
AVERAGE - MMW743		**7.05**	*	**79864**	**1687.00**	**2801.00**	*	**263.00**	*
				Tract -02 Wells					
MMW912-GW-2	03/12/00	31.09	*	438409	<5	10971.00	52.00	1428.00	608.00
MMW912-GW-3	03/12/00	36.11	*	516090	<5	12927.00	44.00	1655.00	733.00
MMW912-GW-4	03/12/00	29.81	*	430717	<5	10793.00	32.00	1377.00	559.00
AVERAGE - MMW912		**32.34**	*	**461739**	*	**11563.67**	**42.67**	**1486.67**	**633.33**
MMW921-GW-2	03/12/00	30.04	*	538371	<5	16431.00	26.00	1991.00	788.00
MMW921-GW-3	03/12/00	33.33	*	582914	<5	18086.00	38.00	2216.00	941.00
MMW921-GW-4	03/12/00	29.76	*	531617	<5	16456.00	29.00	1992.00	825.00
AVERAGE - MMW921		**31.04**	*	**550967**	*	**16991.00**	**31.00**	**2066.33**	**851.33**
MMW928-GW-1	03/14/00	12.42	*	235488	1167.00	5443.00	102.00	583.00	259.00
MMW928-GW-2	03/14/00	11.92	*	234162	1019.00	5292.00	95.00	523.00	249.00
MMW928-GW-3	03/14/00	12.98	*	251190	1027.00	5831.00	87.00	588.00	271.00
MMW928-GW-4	03/14/00	12.30	*	242894	971.00	5606.00	98.00	571.00	270.00
AVERAGE - MMW928		**12.41**	*	**240934**	**1046.00**	**5543.00**	**95.50**	**566.25**	**262.25**
MMW944-GW-1	03/15/00	28.73	*	349464	204.00	7312.00	34.00	1064.00	371.00
MMW944-GW-2	03/15/00	27.54	*	347491	214.00	7137.00	46.00	952.00	341.00
MMW944-GW-3	03/15/00	27.67	*	347729	211.00	7251.00	56.00	979.00	340.00
MMW944-GW-4	03/15/00	28.10	*	346199	192.00	7340.00	48.00	1042.00	368.00
AVERAGE - MMW944		**28.01**	*	**347721**	**205.25**	**7260.00**	**46.00**	**1009.25**	**355.00**
				Tract -03 Wells					

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SUMMARY OF LIGHT GAS ANALYSES OF GROUNDWATER FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(mg/l)	METHANE(ug/l)	ETHANE(ng/l)	ETHYLENE(ng/l)	PROPANE(ng/l)	PROPYLENE(ng/l)	ISO-BUTANE(ng/l)	N-BUTANE(ng/l)
MMW39-GW-1	03/15/00	1.58	*	3747	46.00	56.00	36.00	<10	<0.01
MMW39-GW-2	03/15/00	1.82	*	4409	54.00	63.00	79.00	<10	<0.01
AVERAGE - MMW039		**1.70**	*	**4078**	**50.00**	**59.50**	**57.50**	*	*
MMW46-GW-2	03/16/00	28.32	*	136021	<5	670.00	22.00	56.00	<0.01
MMW46-GW-3	03/16/00	26.28	*	124827	<5	610.00	38.00	45.00	<0.01
MMW46-GW-4	03/16/00	26.93	*	130805	<5	644.00	22.00	39.00	<0.01
AVERAGE - MMW046		**27.18**	*	**130551**	*	**641.33**	**27.33**	**46.67**	*
MMW77-GW-2	03/14/00	22.70	*	239442	20.00	4266.00	56.00	345.00	71.00
MMW77-GW-3	03/14/00	24.56	*	253996	<5	4549.00	30.00	356.00	70.00
MMW77-GW-4	03/14/00	25.08	*	259431	<5	4631.00	28.00	360.00	62.00
AVERAGE - MMW077		**24.11**	*	**250956**	**20.00**	**4482.00**	**38.00**	**353.67**	**67.67**
MMW82-GW-1	03/16/00	22.58	*	223296	11.00	2685.00	50.00	257.00	17.00
MMW82-GW-2	03/16/00	20.13	*	193760	<5	2283.00	44.00	215.00	40.00
MMW82-GW-3	03/16/00	23.31	*	219960	<5	2583.00	58.00	279.00	26.00
MMW82-GW-4	03/16/00	22.72	*	215440	<5	2499.00	38.00	246.00	38.00
AVERAGE - MMW082		**22.18**	*	**213114**	**11.00**	**2512.50**	**47.50**	**249.25**	**30.25**
MMW103-GW-2	03/14/00	19.48	*	130162	<5	1748.00	40.00	188.00	31.00
MMW103-GW-3	03/14/00	20.68	*	137435	<5	1856.00	29.00	194.00	26.00
MMW103-GW-4	03/14/00	21.54	*	53558	40.00	1263.00	64.00	183.00	30.00
AVERAGE - MMW103		**20.57**	*	**107052**	**40.00**	**1622.33**	**44.33**	**188.33**	**29.00**
MMW112-GW-2	03/14/00	27.35	*	312787	20.00	6727.00	69.00	871.00	48.00
MMW112-GW-3	03/14/00	34.24	*	439907	<5	9119.00	49.00	1135.00	59.00
MMW112-GW-4	03/14/00	35.67	*	426960	<5	9167.00	52.00	1213.00	54.00
AVERAGE - MMW112		**32.42**	*	**393218**	**20.00**	**8337.67**	**56.67**	**1073.00**	**53.67**
MW1-GW-1	10/02/99	22.26	*	153973	91.00	2341.00	131.00	222.00	130.00
MW1-GW-3	10/02/99	26.75	*	186904	9.00	2831.00	66.00	274.00	<0.01
MW1-GW-5	10/02/99	28.91	*	197504	6.00	2999.00	53.00	249.00	76.00
AVERAGE - MW1		**25.97**	*	**179460**	**35.33**	**2723.67**	**83.33**	**248.33**	**103.00**
MW2-GW-1	10/03/99	20.91	*	99050	<5	687.00	<10	62.00	<0.01
MW2-GW-3	10/03/99	26.76	*	132731	<5	989.00	<10	76.00	<0.01
MW2-GW-3K	10/03/99	26.98	*	133618	<5	999.00	<10	68.00	<0.01
MW2-GW-8	10/03/99	27.40	*	137297	<5	1042.00	<10	73.00	<0.01

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SAMPLE NO.	DATE	METHANE(mg/l)	METHANE(ug/l)	ETHANE(ng/l)	ETHYLENE(ng/l)	PROPANE(ng/l)	PROPYLENE(ng/l)	ISO-BUTANE(ng/l)	N-BUTANE(ng/l)
MW2-GW-8K	10/03/99	27.62	*	137782	<5	1047.00	<10	84.00	<0.01
AVERAGE - MW2		**25.93**	*	**128096**	*	**952.80**	*	**72.60**	*
MW3-GW-1	10/01/99	20.82	*	59428	140.00	244.00	158.00	22.00	91.00
MW3-GW-2	10/01/99	22.49	*	72244	68.00	238.00	100.00	<10	<0.01
MW3-GW-5	10/01/99	23.33	*	82117	11.00	206.00	52.00	<10	<0.01
MW3-GW-7	10/01/99	22.48	*	79655	18.00	200.00	45.00	<10	56.00
AVERAGE - MW3		**22.28**	*	**73361**	**59.25**	**222.00**	**88.75**	**22.00**	**73.50**
MW4A-GW-1	10/14/99	33.93	*	250746	109.00	4908.00	152.00	482.00	133.00
MW4A-GW-3	10/14/99	33.79	*	250125	39.00	4913.00	90.00	483.00	121.00
MW4A-GW-5	10/14/99	30.82	*	235288	25.00	4538.00	95.00	<10	<0.01
AVERAGE - MW4A		**32.85**	*	**245386**	**57.67**	**4786.33**	**112.33**	**482.50**	**127.00**
MW5A-GW-1	10/12/99	40.36	*	391869	156.00	9232.00	122.00	874.00	219.00
MW5A-GW-3	10/12/99	30.63	*	320545	21.00	7442.00	49.00	628.00	108.00
MW5A-GW-5	10/12/99	35.99	*	362261	<5	8617.00	52.00	772.00	135.00
AVERAGE - MW5A		**35.66**	*	**358225**	**88.50**	**8430.33**	**74.33**	**758.00**	**154.00**
					Tract -05 Wells				
MMW226-GW-1	03/08/00	45.41	*	317841	<5	5868.00	<10	1080.00	199.00
MMW226-GW-2	03/08/00	47.39	*	333881	<5	6193.00	<10	1110.00	210.00
MMW226-GW-3	03/08/00	52.11	*	357965	<5	6621.00	<10	1176.00	244.00
AVERAGE - MMW226		**48.30**	*	**336562**	*	**6227.33**	*	**1122.00**	**217.67**
MMW272-GW-1	03/16/00	*	36.4	162	<5	<10	<10	<10	<0.01
MMW272-GW-1	03/09/00	30.65	*	278868	<5	8712.00	<10	857.00	202.00
MMW272-GW-2	03/09/00	0.27	*	2088	34.00	90.00	<10	<10	<0.01
MMW272-GW-3	03/09/00	0.14	*	1359	60.00	58.00	<10	<10	<0.01
AVERAGE - MMW272		*	**36.4**	**70619**	**47.00**	*	*	*	*
MMW276-GW-2	03/13/00	10.85	*	130703	16.00	727.00	25.00	84.00	<0.01
MMW276-GW-3	03/13/00	10.68	*	132128	<5	722.00	43.00	92.00	<0.01
MMW276-GW-4	03/13/00	11.55	*	145873	<5	771.00	43.00	118.00	<0.01
AVERAGE - MMW276		**11.03**	*	**136235**	**16.00**	**740.00**	**37.00**	**98.00**	*
					Tract -06 Wells				
MMW319-GW-1	03/14/00	*	54.3	647	38.00	39.00	43.00	<10	<0.01

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SAMPLE NO.	DATE	METHANE(mg/l)	METHANE(ug/l)	ETHANE(ng/l)	ETHYLENE(ng/l)	PROPANE(ng/l)	PROPYLENE(ng/l)	ISO-BUTANE(ng/l)	N-BUTANE(ng/l)
AVERAGE - MMW319		*	**54.3**	**647**	**38.00**	**39.00**	**43.00**	*	*
MMW331-GW-2	03/13/00	13.57	*	68818	38.00	1003.00	54.00	127.00	<0.01
MMW331-GW-3	03/13/00	11.81	*	58156	15.00	825.00	52.00	116.00	<0.01
MMW331-GW-4	03/13/00	11.75	*	56372	7.00	799.00	30.00	107.00	<0.01
AVERAGE - MMW331		**12.38**	*	**61115**	**20.00**	**875.67**	**45.33**	**116.67**	*
MMW362-GW-1	03/13/00	*	6.5	62	34.00	9.00	34.00	<10	<0.01
MMW362-GW-2	03/13/00	*	4.6	30	23.00	12.00	21.00	<10	<0.01
MMW362-GW-3	03/13/00	*	4.8	20	13.00	<10	<10	<10	<0.01
MMW362-GW-4	03/13/00	*	4.6	22	22.00	<10	<10	<10	<0.01
AVERAGE - MMW362		*	**5.1**	34	**23.00**	**10.50**	**27.50**	*	*
MMW803-GW-1	03/13/00	10.73	*	184645	2056.00	13335.00	38.00	1370.00	84.00
AVERAGE - MMW803		**10.73**	*	**184645**	**2056.00**	**13335.00**	**38.00**	**1370.00**	**84.00**
MMW813-GW-2	03/13/00	31.36	*	290085	<5	8517.00	24.00	1492.00	89.00
MMW813-GW-3	03/13/00	26.38	*	246427	<5	7247.00	17.00	1246.00	50.00
MMW813-GW-4	03/13/00	25.91	*	246432	<5	7265.00	26.00	1264.00	84.00
AVERAGE - MMW813		**27.88**	*	**260981**	*	**7676.33**	**22.33**	**1334.00**	**74.33**

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TABLE 4

SUMMARY OF LIGHT GAS ANALYSES OF FREE GAS FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(%)	METHANE(ppmv)	ETHANE(ppmv)	ETHYLENE(ppmv)	PROPANE(ppmv)	PROPYLENE(ppmv)	ISO-BUTANE(ppmv)	N-BUTANE(ppmv)
Area B Wells									
MMW509-FG-1	04/05/00	0.40	*	2	0.02	0.10	<0.01	<0.01	<0.01
AVERAGE - MMW509		**0.40**	*	**2**	**0.02**	**0.10**	*	*	*
MMW514-FG-1	03/23/00	76.73	*	4815	0.06	60.90	0.10	5.85	0.14
MMW514-FG-2	03/23/00	73.72	*	5000	0.02	53.40	0.07	5.36	0.15
MMW514-FG-3	03/23/00	71.96	*	4911	<0.01	49.70	0.09	5.15	0.13
AVERAGE - MMW514		**74.14**	*	**4909**	**0.04**	**54.67**	**0.09**	**5.45**	**0.14**
MMW520-FG-2	03/24/00	87.75	*	4743	<0.01	63.30	0.09	6.87	0.24
MMW520-FG-3	03/24/00	87.79	*	4839	<0.01	63.40	0.09	7.01	0.26
MMW520-FG-4	03/24/00	87.90	*	4682	<0.01	63.50	0.08	7.01	0.32
AVERAGE - MMW520		**87.81**	*	**4755**	*	**63.40**	**0.09**	**6.96**	**0.27**
MMW542-FG-2	03/23/00	93.15	*	5266	<0.01	88.60	0.23	10.90	0.30
MMW542-FG-3	03/23/00	92.92	*	5294	<0.01	88.60	0.19	10.80	0.28
MMW542-FG-4	03/23/00	93.17	*	5135	<0.01	89.10	0.16	10.98	0.28
AVERAGE - MMW542		**93.08**	*	**5232**	*	**88.77**	**0.19**	**10.89**	**0.29**
Tract -01 Wells									
MMW1-FG-1	02/05/2000	55.60	*	923	0.12	1.74	0.17	0.24	0.15
MMW1-FG-2	02/05/2000	52.70	*	940	<0.01	1.80	0.11	0.27	0.13
AVERAGE - MMW1		**54.15**	*	**932**	**0.12**	**1.77**	**0.14**	**0.26**	**0.14**
MMW153-FG-1	03/09/00	97.35	*	4393	<0.01	95.70	<0.01	9.59	2.00
MMW153-FG-2	03/09/00	98.63	*	4467	<0.01	95.70	<0.01	9.32	1.83
MMW153-FG-3	03/09/00	96.41	*	4375	<0.01	96.80	<0.01	9.33	1.91
AVERAGE - MMW153		**97.46**	*	**4412**	*	**96.07**	*	**9.41**	**1.91**
MMW175-FG-2	03/10/00	95.66	*	3997	<0.01	93.80	<0.01	10.10	2.67
MMW175-FG-3	03/10/00	96.85	*	4085	<0.01	94.60	<0.01	10.50	2.57
MMW175-FG-4	03/10/00	94.74	*	4062	<0.01	95.50	<0.01	10.30	2.56
AVERAGE - MMW175		**95.75**	*	**4048**	*	**94.63**	*	**10.30**	**2.60**
MMW2-FG-1	02/04/2000	61.60	*	2655	1.70	26.90	1.18	6.28	0.81
MMW2-FG-2	02/04/2000	61.40	*	2760	0.61	25.70	0.73	6.27	0.59
MMW2-FG-3	02/04/2000	61.40	*	2691	0.55	25.20	0.59	5.06	0.38
AVERAGE - MMW2		**61.47**	*	**2702**	**0.95**	**25.93**	**0.83**	**5.87**	**0.59**

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TABLE 4

SUMMARY OF LIGHT GAS ANALYSES OF FREE GAS FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(%)	METHANE(ppmv)	ETHANE(ppmv)	ETHYLENE(ppmv)	PROPANE(ppmv)	PROPYLENE(ppmv)	ISO-BUTANE(ppmv)	N-BUTANE(ppmv)
MMW207-FG-2	03/14/00	93.97	*	3380	<0.01	47.10	0.12	5.56	0.56
MMW207-FG-3	03/14/00	94.08	*	3353	<0.01	47.10	0.10	5.58	0.56
MMW207-FG-4	03/14/00	94.28	*	3363	<0.01	48.10	0.12	5.69	0.55
AVERAGE - MMW207		**94.11**	*	**3365**	*	**47.43**	**0.11**	**5.61**	**0.56**
MMW211-FG-2	03/13/00	60.74	*	1226	<0.01	14.80	0.08	2.04	0.17
MMW211-FG-2	03/29/00	63.43	*	1118	<0.01	13.30	0.12	1.83	0.16
MMW211-FG-3	03/29/00	62.93	*	1353	<0.01	16.30	0.09	2.29	0.17
MMW211-FG-3	03/13/00	60.81	*	1177	<0.01	14.10	0.10	1.96	0.13
MMW211-FG-4	03/29/00	62.53	*	1365	<0.01	16.40	0.08	2.30	0.17
MMW211-FG-4	03/13/00	60.52	*	1210	<0.01	14.40	0.09	2.01	0.12
AVERAGE - MMW211		**61.83**	*	**1242**	*	**14.88**	**0.09**	**2.07**	**0.15**
MMW244-FG-2	03/10/00	87.06	*	3027	<0.01	42.50	<0.01	6.57	0.57
MMW244-FG-3	03/10/00	88.30	*	3041	<0.01	42.30	<0.01	6.62	0.51
MMW244-FG-4	03/10/00	88.74	*	3048	<0.01	42.70	<0.01	6.73	0.56
AVERAGE - MMW244		**88.03**	*	**3039**	*	**42.50**	*	**6.64**	**0.55**
MMW3-FG-2	02/04/2000	87.60	*	3430	0.14	68.90	1.16	6.91	1.85
MMW3-FG-3	02/04/2000	86.80	*	3492	0.05	69.60	0.89	7.07	1.76
MMW3-FG-4	02/04/2000	87.50	*	3557	0.03	71.50	0.78	7.26	1.74
AVERAGE - MMW3		**87.30**	*	**3493**	**0.07**	**70.00**	**0.94**	**7.08**	**1.78**
MMW4-FG-2	02/04/2000	91.30	*	4872	<0.01	98.40	0.10	10.00	0.82
MMW4-FG-3	02/04/2000	89.90	*	4881	<0.01	98.30	0.11	9.93	0.81
MMW4-FG-4	02/04/2000	89.90	*	4813	<0.01	97.20	0.11	9.70	0.80
AVERAGE - MMW4		**90.37**	*	**4855**	*	**97.97**	**0.11**	**9.88**	**0.81**
MMW676-FG-2	03/16/00	69.01	*	1090	<0.01	4.96	0.09	0.47	0.06
MMW676-FG-3	03/16/00	68.87	*	1083	<0.01	4.97	0.10	0.46	0.02
MMW676-FG-4	03/16/00	68.59	*	1074	<0.01	4.94	0.07	0.45	0.04
AVERAGE - MMW676		**68.82**	*	**1082**	*	**4.96**	**0.09**	**0.46**	**0.04**
MMW735-FG-1	03/10/00	30.32	*	651	<0.01	2.05	<0.01	0.51	<0.01
MMW735-FG-2	03/10/00	30.71	*	653	<0.01	2.06	<0.01	0.47	<0.01
AVERAGE - MMW735		**30.52**	*	**652**	*	**2.05**	*	**0.49**	*
MMW738-FG-2	03/15/00	65.97	*	1252	<0.01	10.30	0.08	0.95	0.04
MMW738-FG-3	03/15/00	65.69	*	1253	<0.01	10.30	0.05	0.94	0.03

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TABLE 4

SUMMARY OF LIGHT GAS ANALYSES OF FREE GAS FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(%)	METHANE(ppmv)	ETHANE(ppmv)	ETHYLENE(ppmv)	PROPANE(ppmv)	PROPYLENE(ppmv)	ISO-BUTANE(ppmv)	N-BUTANE(ppmv)
MMW738-FG-4	03/15/00	65.34	*	1236	<0.01	10.10	0.08	0.96	0.03
AVERAGE - MMW738		**65.67**	*	**1247**	*	**10.23**	**0.07**	**0.95**	**0.03**
MMW743-FG-1	03/11/00	31.07	*	1439	14.00	47.60	<0.01	5.39	<0.01
AVERAGE - MMW743		**31.07**	*	**1439**	**14.00**	**47.60**	*	**5.39**	*
				Tract -02 Wells					
MMW912-FG-2	03/12/00	93.71	*	4303	0.81	87.80	0.11	9.64	3.66
MMW912-FG-3	03/12/00	93.81	*	4250	0.82	87.70	0.07	9.51	3.56
MMW912-FG-4	03/12/00	93.87	*	4520	0.88	89.50	0.08	9.81	3.78
AVERAGE - MMW912		**93.80**	*	**4358**	**0.84**	**88.33**	**0.09**	**9.65**	**3.67**
MMW921-FG-2	03/12/00	87.98	*	5090	<0.01	127.00	0.07	12.80	4.45
MMW921-FG-3	03/12/00	88.25	*	5174	<0.01	131.00	0.06	13.40	4.71
MMW921-FG-4	03/12/00	87.90	*	5236	<0.01	131.00	0.06	13.30	4.72
AVERAGE - MMW921		**88.04**	*	**5167**	*	**129.67**	**0.06**	**13.17**	**4.63**
MMW928-FG-1	03/14/00	91.18	*	6064	5.83	53.90	0.31	5.48	1.99
MMW928-FG-2	03/14/00	91.14	*	6078	11.20	127.00	0.44	14.70	5.45
MMW928-FG-3	03/14/00	91.09	*	5928	10.90	123.00	0.36	14.30	5.36
MMW928-FG-4	03/14/00	91.16	*	5871	10.20	123.00	0.34	14.70	5.37
AVERAGE - MMW928		**91.14**	*	**5985**	**9.53**	**106.72**	**0.36**	**12.30**	**4.54**
MMW944-FG-1	03/15/00	89.80	*	4265	1.44	70.70	0.12	8.02	2.48
MMW944-FG-2	03/15/00	90.20	*	4127	1.25	71.70	0.14	8.15	2.54
MMW944-FG-3	03/15/00	89.61	*	4299	1.23	73.10	0.13	8.41	2.63
MMW944-FG-4	03/15/00	90.06	*	4266	1.16	73.70	0.14	8.51	2.68
AVERAGE - MMW944		**89.92**	*	**4239**	**1.27**	**72.30**	**0.13**	**8.27**	**2.58**
				Tract -03 Wells					
MMW39-FG-1	03/15/00	8.88	*	78	0.21	0.82	0.19	0.15	0.27
MMW39-FG-2	03/15/00	9.14	*	85	0.22	0.86	0.19	0.13	0.23
AVERAGE - MMW039		**9.01**	*	**81**	**0.22**	**0.84**	**0.19**	**0.14**	**0.25**
MMW46-FG-2	03/16/00	80.59	*	1456	<0.01	5.52	0.05	0.33	0.05
MMW46-FG-3	03/16/00	80.19	*	1467	<0.01	5.67	0.05	0.31	0.06
MMW46-FG-4	03/16/00	80.31	*	1469	<0.01	5.77	0.06	0.33	0.03
AVERAGE - MMW046		80.36	*	**1464**	*	**5.65**	**0.05**	**0.32**	**0.05**

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TABLE 4

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SAMPLE NO.	DATE	METHANE(%)	METHANE(ppmv)	ETHANE(ppmv)	ETHYLENE(ppmv)	PROPANE(ppmv)	PROPYLENE(ppmv)	ISO-BUTANE(ppmv)	N-BUTANE(ppmv)
MMW77-FG-2	03/14/00	85.62	*	3371	<0.01	48.80	0.12	3.38	0.53
MMW77-FG-3	03/14/00	85.69	*	3337	<0.01	48.10	0.09	3.31	0.51
MMW77-FG-4	03/14/00	85.53	*	3301	<0.01	48.30	0.09	3.33	0.47
AVERAGE - MMW077		**85.61**	*	**3336**	*	**48.40**	**0.10**	**3.34**	**0.50**
MMW82-FG-1	03/16/00	81.83	*	2958	<0.01	28.90	0.10	2.53	0.13
MMW82-FG-2	03/16/00	83.23	*	2945	<0.01	28.70	0.07	2.45	0.12
MMW82-FG-3	03/16/00	83.05	*	2917	<0.01	27.90	0.06	2.32	0.07
MMW82-FG-4	03/16/00	83.17	*	2866	<0.01	27.70	0.07	2.37	0.14
AVERAGE - MMW082		**82.82**	*	**2922**	*	**28.30**	**0.08**	**2.42**	**0.12**
MMW103-FG-2	03/14/00	76.93	*	1923	<0.01	21.20	0.10	1.82	0.20
MMW103-FG-3	03/14/00	76.91	*	1895	<0.01	21.30	0.12	1.85	0.18
MMW103-FG-4	03/14/00	76.96	*	1860	<0.01	21.10	0.08	1.84	0.16
AVERAGE - MMW103		**76.93**	*	**1893**	*	**21.20**	**0.10**	**1.84**	**0.18**
MMW112-FG-2	03/14/00	90.09	*	4885	<0.01	74.20	0.12	7.38	0.29
MMW112-FG-3	03/14/00	90.37	*	4878	<0.01	74.00	0.10	7.39	0.22
MMW112-FG-4	03/14/00	90.39	*	4819	<0.01	74.30	0.08	7.49	0.27
AVERAGE - MMW112		**90.28**	*	**4861**	*	**74.17**	**0.10**	**7.42**	**0.26**
MW1-FG-1	10/02/99	71.79	*	1966	0.28	23.29	0.42	1.82	0.50
MW1-FG-3	10/02/99	74.72	*	1963	<0.01	24.50	0.14	1.79	0.24
MW1-FG-5	10/02/99	74.80	*	1953	<0.01	25.80	0.12	1.84	0.13
AVERAGE - MW1		**73.77**	*	**1961**	**0.28**	**24.53**	**0.23**	**1.82**	**0.29**
MW2-FG-1	10/03/99	78.14	*	1347	<0.01	8.25	0.08	0.52	0.10
MW2-FG-3	10/03/99	77.87	*	1442	<0.01	9.45	0.08	0.57	0.11
MW2-FG-3K	10/03/99	77.82	*	1452	<0.01	9.48	0.07	0.61	0.08
MW2-FG-5	10/03/99	78.23	*	1498	<0.01	9.12	0.08	0.59	0.10
MW2-FG-8	10/03/99	77.62	*	1472	<0.01	9.44	0.07	0.59	0.05
AVERAGE - MW2		**77.94**	*	**1442**	*	**9.15**	**0.08**	**0.58**	**0.09**
MW3-FG-1	10/01/99	70.29	*	817	0.94	2.60	0.64	0.22	0.59
MW3-FG-2	10/01/99	69.73	*	938	0.24	2.24	0.33	0.16	0.33
MW3-FG-5	10/01/99	69.45	*	1036	<0.01	1.91	0.17	0.12	0.16
MW3-FG-7	10/01/99	68.79	*	1010	<0.01	1.91	0.18	0.14	0.17
AVERAGE - MW3		**69.57**	*	**950**	**0.59**	**2.17**	**0.33**	**0.16**	**0.31**

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SAMPLE NO.	DATE	METHANE(%)	METHANE(ppmv)	ETHANE(ppmv)	ETHYLENE(ppmv)	PROPANE(ppmv)	PROPYLENE(ppmv)	ISO-BUTANE(ppmv)	N-BUTANE(ppmv)
MW4A-FG-1	10/13/99	74.58	*	2014	0.44	33.00	0.34	2.71	0.52
MW4A-FG-3	10/14/99	74.48	*	2017	0.05	32.90	0.23	2.73	0.44
MW4A-FG-5	10/14/99	74.77	*	2053	0.03	33.40	0.18	2.76	0.42
AVERAGE - MW4A		**74.61**	*	**2028**	**0.17**	**33.10**	**0.25**	**2.73**	**0.46**
MW5A-FG-1	10/12/99	80.46	*	3028	1.05	58.10	0.38	4.56	0.92
MW5A-FG-3	10/12/99	80.46	*	2704	0.03	59.00	0.12	4.70	0.82
MW5A-FG-5	10/12/99	80.79	*	3040	<0.01	59.70	0.10	4.72	0.78
AVERAGE - MW5A		**80.57**	*	**2924**	**0.54**	**58.93**	**0.20**	**4.66**	**0.84**
				Tract -05 Wells					
MMW226-FG-1	03/08/00	99.00	*	3629	<0.01	44.90	<0.01	6.10	0.89
MMW226-FG-2	03/08/00	96.30	*	3412	<0.01	45.10	<0.01	6.74	0.95
MMW226-FG-3	03/08/00	97.50	*	3445	<0.01	44.90	<0.01	8.89	1.44
AVERAGE - MMW226		**97.60**	*	**3495**	*	**44.97**	*	**7.24**	**1.09**
MMW272-FG-1	03/16/00	0.29	*	5	0.04	0.12	0.10	<0.01	<0.01
AVERAGE - MMW272		**0.29**	*	**5**	**0.04**	**0.12**	**0.10**	*	*
MMW276-FG-2	03/13/00	39.81	*	1555	<0.01	8.43	0.06	0.83	0.31
MMW276-FG-3	03/13/00	40.87	*	1731	<0.01	8.55	0.07	0.99	0.07
MMW276-FG-4	03/13/00	40.54	*	1743	<0.01	8.22	0.06	1.12	0.05
AVERAGE - MMW276		**40.41**	*	**1676**	*	**8.40**	**0.06**	**0.98**	**0.14**
				Tract -06 Wells					
MMW319-FG-1	03/14/00	0.43	*	1	0.15	0.26	0.10	0.10	0.07
AVERAGE - MMW319		**0.43**	*	**1**	**0.15**	**0.26**	**0.10**	**0.10**	**0.07**
MMW331-FG-2	03/13/00	45.47	*	830	<0.01	9.73	0.06	1.28	0.04
MMW331-FG-3	03/13/00	43.74	*	805	<0.01	9.30	0.07	1.28	0.06
MMW331-FG-4	03/13/00	43.75	*	811	<0.01	9.37	0.07	1.30	0.06
AVERAGE - MMW331		**44.32**	*	**815**	*	**9.47**	**0.07**	**1.29**	**0.05**
MMW362-FG-1	03/13/00	*	190.9	1	0.11	0.12	0.04	0.02	0.03
MMW362-FG-2	03/13/00	*	165.7	0	0.07	0.07	0.03	0.02	0.03
MMW362-FG-3	03/13/00	*	156.5	0	0.06	0.05	0.03	0.02	0.02
MMW362-FG-4	03/13/00	*	151.4	0	0.05	0.05	0.03	<0.01	<0.01
AVERAGE - MMW362		*	**166.1**	**0**	**0.07**	**0.07**	**0.03**	**0.02**	**0.03**

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TABLE 4

SUMMARY OF LIGHT GAS ANALYSES OF FREE GAS FROM 50-FOOT GRAVEL AQUIFER

SAMPLE NO.	DATE	METHANE(%)	METHANE(ppmv)	ETHANE(ppmv)	ETHYLENE(ppmv)	PROPANE(ppmv)	PROPYLENE(ppmv)	ISO-BUTANE(ppmv)	N-BUTANE(ppmv)
MMW803-FG-1	03/13/00	46.70	*	2618	15.70	184.00	0.12	20.50	1.08
AVERAGE - MMW803		**46.70**	*	**2618**	**15.70**	**184.00**	**0.12**	**20.50**	**1.08**
MMW813-FG-2	03/13/00	85.45	*	2572	<0.01	62.10	0.05	9.14	0.43
MMW813-FG-3	03/13/00	85.57	*	2546	<0.01	64.30	0.05	9.57	0.45
MMW813-FG-4	03/13/00	85.42	*	2590	<0.01	64.40	0.06	9.43	0.42
AVERAGE - MMW813		**85.48**	*	**2569**	*	**63.60**	**0.05**	**9.38**	**0.43**

SAMPLE NO.	METHANE	ETHANE	PROPANE	AR	O2	CO2	N2
MMW476-GW-2	*	*	*	*	*	*	*
MMW509-FG-1	0.65	ND	ND	0.94	0.04	0.69	97.52
MMW514-FG-3	73.59	0.48	0.01	0.37	0.07	1.10	23.55
MMW520-FG-4K	92.28	0.47	0.01	0.14	0.06	0.47	6.57
MMW542-FG-4K	96.80	0.52	0.01	0.05	0.09	0.60	1.84
MMW 153-FG-3	96.53	0.45	0.01	0.04	0.08	0.81	1.99
MMW 175-FG-4	96.66	0.43	0.01	0.04	0.17	0.68	1.79
MMW 207-FG-4	96.39	0.32	0.01	0.08	0.10	0.49	2.62
MMW 211-FG-4	61.29	0.10	0.00	0.59	0.10	0.65	37.27
MMW 244-FG-4	88.69	0.33	0.00	0.24	0.16	0.60	9.88
MMW 735-FG-2	30.77	0.07	ND	0.80	0.11	0.97	67.00
MMW 743-FG-1	31.41	0.15	0.01	0.76	0.13	1.10	66.34
MMW-676-FG-4K	70.49	0.11	ND	0.49	0.87	1.40	26.64
MMW1-FG-2	57.19	0.10	0.00	ND	ND	1.21	41.45
MMW2-FG-3	65.95	0.29	0.00	0.49	0.10	1.03	32.13
MMW211-FG-4K	63.02	0.13	0.00	0.57	0.10	0.71	35.47
MMW3-FG-4	94.10	0.37	0.01	ND	ND	1.18	4.33
MMW4-FG-4	97.50	0.48	0.01	0.03	0.11	0.73	1.13
MMW738-FG-4	67.06	0.11	ND	0.52	0.17	1.05	31.09
MMW 928-FG-4	93.96	0.58	0.01	0.05	0.13	2.82	2.44
MMW912-FG-4	96.01	0.45	0.01	0.04	0.11	1.62	1.67
MMW921-FG-4	90.65	0.52	0.01	0.06	0.10	1.77	6.88
MMW944-FG-4K	94.86	0.44	0.01	0.06	0.10	2.36	2.17
MMW103-FG-4K	79.93	0.18	0.00	0.37	0.11	1.23	18.18
MMW112-FG-4K	93.95	0.48	0.01	0.12	0.07	0.97	4.40
MMW39-FG-2	9.58	0.01	ND	0.80	ND	3.38	86.23
MMW46-FG-4K	83.13	0.16	0.00	0.31	0.10	1.73	14.56
MMW77-FG-4K	89.02	0.34	0.01	0.22	0.08	1.13	9.20
MMW82-FG-4K	86.41	0.30	0.00	0.27	0.01	1.25	11.75
MW1-FG-4	80.93	0.20	0.00	0.32	0.12	1.47	16.96
MW2-FG-7	84.92	0.16	0.00	0.28	0.12	1.63	12.89
MW3-FG-6	74.87	0.10	ND	0.40	0.14	1.82	22.67
MW4A-FG-6	82.32	0.22	0.00	0.23	0.02	1.32	15.87
MW5A-FG-4	88.30	0.32	0.01	0.14	0.11	1.21	9.82
MMW 226-FG-3	97.34	0.36	0.01	0.03	0.19	0.71	1.28
MMW 276-FG-4	40.89	0.18	ND	0.74	0.13	0.55	57.51
MMW272-FG-1	0.33	ND	ND	0.97	0.09	0.78	97.83
MMW 331-FG-4	44.17	0.08	0.00	0.73	0.08	0.57	54.27
MMW 803-FG-1	49.22	0.29	0.02	0.55	0.12	1.97	47.71
MMW319-FG-1	0.04	ND	ND	0.92	1.13	0.49	97.42
MMW362-FG-4	0.01	ND	ND	0.81	0.11	0.70	98.37
MMW813-FG-4	87.71	0.27	0.01	0.26	0.09	1.54	10.12

(1) All Gas Analyses in mol Percent

Carbon Isotopes in part per mil in relation to PDB

ND = Not Detected

Table 6

California Natural Gas Analysis
Global Geochemistry
Crustal Gas Data File

DESCRIPTIVE DATA					GAS CONCENTRATION DATA									STABLE ISOTOPE DATA		
GGC #	PROV	STATE COUNTY	FIELD WELL	LOCATION FORMATION	C1FID (%)	C2 (%)	C3 (%)	IC4 (%)	NC4 (%)	C1TCD (%)	CO2 (%)	N2 (%)	He (%)	13C1 (permil)	2C1 (permil)	13C2 (permil)
388	730	California Sutter	Butte, W. Mapco-Kylling #1	17-16N-1E Forbes	91.300	0.338	0.020	0.020	n.d.	89.100	0.040	7.100	n.d.	-53.0	-127	---------
811	730	California San Joaquin	East Islands Sargent Slough #1	15-3N-5E Meganos	88.000	0.234	0.002	0.001	0.001	90.600	0.023	6.220	0.006	-54.0	-184	---------
20	730	California Colusa	Grimes Schohr #1	27-14N-1E Forbes	92.000	0.519	0.038	0.007	0.005	88.500	0.077	6.120	n.d.	-51.7	-145	---------
385	730	California San Joaquin	Lathrop Lathrop Unit C#7	1-1S-5E Lathrop	83.000	0.605	0.037	0.020	n.d.	85.300	0.540	14.000	n.d.	-51.8	-156	-57.7
104	730	California San Joaquin	Tracy Rossi #1	10-2S-5E ----------	87.200	0.220	n.d.	n.d.	n.d.	87.500	0.200	11.700	n.d.	-61.3	-187	---------
387	730	California San Joaquin	Vernalis Maciez #1	16-3S-6E ----------	85.500	0.600	0.056	0.020	n.d.	88.600	0.100	8.000	0.140	-53.6	-169	-31.3
808	730	California Solano	Millar Dixon East Unit 1#2	28-7N-2E ----------	88.900	1.190	0.009	0.001	0.001	89.200	0.154	5.900	0.010	-54.1	-188	-26.6
806	730	California Solano	Millar Dixon East Unit 1#4	28-7N-2E ----------	86.500	0.442	0.004	0.001	0.001	86.400	0.067	8.180	0.011	-52.4	-203	-16.6
16	730	California Sacramento	Poppy Ridge Elliott Ranch #32-36	32-7N-5E Mokelumne	75.600	0.025	0.001	0.001	0.001	75.400	0.009	19.800	n.d.	-50.0	-187	---------
379	730	California Sacramento	Poppy Ridge Elliott Ranch #32-36	32-7N-5E Mokelumne	83.800	0.026	0.005	0.005	n.d.	86.900	0.100	14.300	n.d.	-52.8	-190	---------
378	730	California Sacramento	River Island River Island Company #6	29-4N-4E Domengine	95.200	0.570	0.037	0.005	n.d.	93.300	0.220	4.100	n.d.	-50.7	-192	-27.4

APPENDIX A

FIELD AND LABORATORY PROCEDURES

FOR

SOIL VAPOR SAMPLING

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January 5, 2000

TABLE OF CONTENTS

1.0 INTRODUCTION

The field procedures and protocols implemented for the Exploration Technologies, Inc. (ETI) proposed soil vapor sampling methodology is described in this plan. This Field Sampling Plan (FSP) describes the methodologies to be used during collection and analysis of soil vapor samples and the requirements for documentation and reporting.

In preparing this soil gas work plan, the following documents were consulted and implemented in developing the proposed field and analytical procedures:

- ASTM D5314-92 *Standard for Soil Gas Monitoring in the Vadose Zone*
- Los Angeles RWQCB *Interim Guidance for Active Soil Gas Investigation*

2.0 FIELD PROCEDURES

The field procedures to be used during collection of soil vapor samples are as follows:

2.1 Preparation of Soil Vapor Sampling Bottles

All soil vapor samples are collected in 22, 50 or 125-cubic centimeter (cc) glass serum bottles, depending upon available soil gas volumes. All bottles are pre-washed and soaked by filling with a detergent solution for 24 hours. These sample bottles are rinsed by filling with water and soaking for an additional 24 hours. After rinsing, the bottles are heated to 150° C for 24 hours, purged with pre-purified nitrogen (defined as 99.998% pure nitrogen with maximum levels of oxygen, total hydrocarbons and water not to exceed 5 parts per million volume (ppmv), 1 ppmv and 3 ppmv, respectively), capped and sealed with a butyl rubber septum and a crimped aluminum cap with a removable center protector.

2.2 Collection of Soil Vapor Samples

Soil vapor samples are collected in accordance with the following procedures and methodology:

1) Before initiating field activities, a utility locator will survey and clear each proposed boring or sampling location for any subsurface utilities or interferences. If an underground utility is identified within the proposed sampling location, the boring will be repositioned or relocated nearby and resurveyed for underground utilities.

2) After each sampling location is cleared of utilities, the sample hole is made with a manually operated ½ - inch outside diameter steel plunger bar to the specified sampling depth of 4, 7 or 12 feet below ground surface. This is generally located within the vadose zone above the capillary fringe, although water samples can also be collected through ETI's soil gas probe.

3) For each sampling location, two of the pre-prepared septum top glass 125-cc sample bottles are evacuated onsite with a hand pump to a vacuum of approximately 20 inches of mercury for use in collecting soil vapor and ambient air samples.

4) After each boring has been punched to the specified sampling depth, the ½-inch outside diameter plunger bar is removed from the hole.

5) Before inserting the stainless-steel sampling probe into the pre-drilled borehole, one of the evacuated sample bottles is attached to a three-way stop cock valve mounted on the top of the probe with a new 20-gauge needle attached to a 60 cc hypodermic syringe. The three-way valve is opened to allow a sample of ambient air to fill the evacuated bottle through the sampling probe and to collect a background air sample for quality control between sampling locations. An additional 60 cc of ambient air is injected into the blank sample bottle using the new syringe, after which the sample bottle is removed from the valve and the puncture hole is sealed with a silicone rubber adhesive sealant.

6) After the blank sample is collected, the sampling probe is inserted into the sample hole and purged by withdrawing at least 15 cc of ambient air using the syringe mounted on the three-way valve attached to the top of the probe. The stainless steel sampling probe has an outside diameter of ½-inch and an inside diameter of 1/8 inch and a perforated tip for collecting the soil vapor sample at the bottom of the pre-drilled hole. This volume of purge is adequate to remove ambient air from the probe, while providing minimal disturbance to the soil gas near the probe tip. A 4-foot-long sampling probe with a 1/8-inch inside diameter has an internal volume of 9.65 cc.

7) Following this purging process, the second evacuated bottle is placed on the probe needle and the valve is opened to allow soil vapor to enter the evacuated bottle. The same 60-cc syringe used to collect the ambient air sample is then used to extract an additional 60 cc of soil vapor through the probe. The additional soil vapor is injected through the three-way valve into the bottle to overpressure the sampling bottle. The sample bottle is then removed and sealed with a silicone rubber adhesive cement (similar to the above procedure for collecting blank samples). The syringe is discarded following collection of each sample. The positive pressure on the bottle will prevent the influx of ambient air into the bottle and diluting the sample vapors during transportation from the field to the laboratory.

8) All sampling equipment is decontaminated between sample collection. The ½-inch-diameter sampling probe is washed both outside and inside by injecting a detergent solution through the probe, followed by a distilled water rinse before for collecting a soil vapor sample from each location. After rinsing, the inside of the probe is flushed with compressed air at approximately 25 pounds per square inch (psi) pressure using bottled breathing air.

The ETI sampling protocol is designed to collect only a small volume of equilibrium soil vapor sample from the subsurface sediments at the selected sampling depth under various conditions. If impermeable and/or water saturated soils are encountered at the selected

sampling depth, the field personnel will observe a significant vacuum in the syringe mounted on the three-way valve such that the syringe plunger cannot be withdrawn. It will be necessary to relieve the high vacuum before a soil gas sample can be collected. In cases where high vacuum is encountered, one of the following options can be implemented depending on actual conditions in the field:

1. The probe can be pulled up a few inches to clear the free water and/or wet clays that are sealing the bottom of the probe tip.

2. A new hole can be redrilled one to two feet from the initial sampling location. In most cases, this impermeable subsurface condition is not uniformly present across the site.

Under extreme impermeable conditions, the volume of the sample to be collected can be reduced from 125 cc to 50 cc or even 22 cc.

All sampling equipment is decontaminated between sampling locations. The manually operated sampling probes and any other field equipment is decontaminated between sampling locations using a high-pressure steam cleaner. Waste or rinse water generated during steam cleaning and decontamination is contained for proper disposal offsite. The soil vapor probe is also steam-cleaned, washed with soap, rinsed and blown dry with compressed air, using bottled breathing air as described above.

2.3 Quality Control Samples

Quality control samples will include ambient air samples collected through the probe at each location and one trip blank for each day of field activity. All trip blanks and 20 percent of ambient air samples collected will be analyzed using the same analytical procedures for the suite of analytes proposed for the soil vapor samples.

2.4 Field Recording of Samples

All soil vapor collection bottles will be labeled at each sample site with an appropriate map or grid reference number. A base map will be posted daily with all completed sites, and a list of samples collected will be retained by the sampler as part of the field notes. A copy of the field form to be used during soil vapor sampling is attached.

2.5 Field Labeling/Recording of Samples

A bound record book will be used by field personnel to document and record field observations and data collected during soil vapor sample collection. The record will include the times, locations, and the person collecting the samples. Each soil vapor sample container will be labeled in the field with the following information: site number, sample collection depth, date and time of sample collection, person collecting the sample. Records of field observations/ measurements will be maintained for record keeping.

2.6 Shipment of Samples

Samples will be shipped/delivered to ETI's, or to any other designated analytical laboratory for analyses of constituents of concern following the recommended procedures of the U.S. Environmental Protection Agency (EPA) and American Society for Testing and Materials (ASTM). Samples are shipped/delivered to the designated analytical laboratory within 24 hours of collection and within the specified holding times for each analysis following appropriate chain of custody procedures as described below.

2.7 Chain of Custody Procedures/Documentation

A chain of custody form will accompany all samples collected and submitted to ETI's, or to any other designated laboratory for analysis, and are maintained as part of record keeping and documentation of the soil vapor sampling activities. All samples are maintained under chain of custody control during transportation and until transfer and receipt by the laboratory. Immediately upon receipt by the laboratory, the samples are logged in with the appropriate sample designation, matrix, time and date of sampling, analyses required, client, and the sample designation. A copy of the chain of custody form is attached.

2.8 Water Source

An onsite potable water source will be identified by site personnel for use during field activities. Deionized water used for decontamination is normally purchased from a retail store.

2.9 Disposition of Soil Vapor Collection Holes

After the soil vapor samples are collected, each soil gas sample hole is backfilled with bentonite and/or neat cement as required by the local culture and finished to grade to match existing surface materials. All wastes generated during equipment cleaning are managed in accordance with the appropriate environmental procedures.

3.0 CHAIN OF CUSTODY AND DOCUMENTATION

The following section describes the project documentation requirements and procedures to be followed during field activities and sampling.

3.1 Field Logbook

A bound logbook dedicated to the project that has consecutively numbered pages is maintained. All fieldwork performed is recorded in this logbook. At a minimum, the following information is included in the logbook:

- Date and time of arrival and departure
- Weather conditions
- Personnel on site
- Level of personal protection
- Deviations from work plan standards

- Purpose of site visit
- Timed entries of the site activities performed
- All sample identification numbers and description of sample (including related QC samples)
- Field instruments used and calibration information
- Description of the number of shipping coolers and shipping method
- Name of receiving laboratory or laboratories
- Signature of the person maintaining the logbook

In cases where separate field sheets or forms are used to record data, the specific sheets are referenced by title in the logbook. All entries in the logbook will be made with waterproof markers. The logbook is maintained for record keeping for the duration of the project.

Other information, which is recorded, includes:

- Field screening instrument readings, if any
- Brand name and amount of each material used
- Any problems encountered and their resolutions
- Date and time of start and completion of soil gas samples, and notation as to depths
- Boundaries between individual lithologies

3.2 Sample Documentation

The following sections describe the sample documentation procedures that will be used during soil vapor sampling. Complete sample documentation is required from the time of sample collection to the preparation of analytical reports to ensure the integrity of sample data generated.

3.2.1 Sample Labels and/or Tags

Each sample collected will have a label affixed immediately following sample collection. If more than one container is collected for each location, then each container from that sample location will have identical information on the sample labels plus information regarding the time that each sample is collected. Each sample label will contain the following information:

- Project code, site name, or project number
- Sample identification number
- Sampler's name
- Preservative information
- Requested analysis
- Date and time of collection
- Type of sample, either soil gas or water

3.2.2 Chain of Custody Records

Chain of custody (COC) documents is used to maintain a record of sample collection, transfer of samples between personnel, sample shipping, and receipt by the laboratory. Sample information is entered on the COC documents at the time of sample collection. If there is any transfer of samples prior to shipment, the COC will reflect the change of possession. Samples are considered to be under custody if one or more of the following criteria are met:

- The sample is in the sampler's possession
- The sample is in the sampler's view after being in possession
- The sample was in the sampler's possession and was then locked up to prevent tampering
- The sample is in a designated secure area

All samples, including quality assurance/quality control samples, will be entered on a COC form. The COC form will include name, address, phone number, and project contact; project code, site name, and project number; full sample identification numbers; sampler's name; sample matrix; sample type; number of sample containers for each identification number; requested analyses; and any other pertinent information required by the laboratory. The COC form will be signed, dated, and timed by the relinquishing and receiving party each time sample possession is transferred. Transfer of sample custody will be kept to a minimum to simplify the COC record.

3.3 Corrections to Documentation

Any corrections made to field documentation, either in the field or during review, will be made by a single strike-through, the correct information will be recorded adjacent to the corrected information, and the person making the correction will initial and date next to the correction. The person who made the initial entry will make the corrections.

3.4 Management of Investigation-Derived Wastes

Waste soil and water generated during field activities and soil vapor sampling will be stored on site. These investigation-derived wastes (IDW) will be stored in proper containers pending characterization and proper disposal to a permitted facility.

4.0 LABORATORY PROCEDURES FOR ANALYSIS OF SOIL VAPOR SAMPLES

4.1 Summary of Methodology

Analysis of the permanent gases and light hydrocarbons in a gaseous sample is accomplished using gas chromatographs following a modified procedure outlined in EPA Method 8000 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846 (Third Edition). If a sample loop is used to introduce the sample onto the columns, it is attached to a multi-port valve and is flushed with the carrier gas following rotation of

the valve. Direct injection by gas tight syringe is acceptable. The permanent gases are analyzed using a thermal conductivity detector (TCD). The light hydrocarbons are analyzed using a flame ionization detector (FID). C5+ compounds are analyzed using a flame ionization detector (FID). The data is transferred to a computer where it is converted to digital format, stored, and processed using a chromatography data system.

This method is recommended for use by (or under the supervision of) analysts experienced in sample preparation, the operation of gas chromatographs and in the interpretation of chromatograms.

4.2 Suite of Analysis and Reporting/Detection Limits

Concentrations of analytes in the gas sample will be reported in percent by volume (for permanent gases) and parts per million by volume (PPMV) in accordance with the following detection limits:

Light Hydrocarbons	**Reporting limits, FID**	**Reporting limits, TCD**	
Methane *	0.04 PPMV	0.10%	*
Ethane	0.01		PPMV
Ethene	0.01		PPMV
Propane	0.01		PPMV
Propene	0.01		PPMV
I-Butane	0.01		PPMV
N-Butane	0.01		PPMV

Permanent Gas	**Reporting limits, TCD**
Hydrogen	0.5 PPMV
Carbon dioxide	0.03%
Oxygen	1%
Nitrogen	5%

* ***NOTE:*** *Samples and standards that contain high levels of methane must be reported using both TCD and FID methods. The results must agree to within 15% RPD.*

C5 Plus Analyses

The C5 plus analysis will be grouped and reported according to the relative boiling points of the following compounds:

C5-Benzene

The sum of all hydrocarbons with a boiling point greater than pentane and less than benzene are reported as ppmv benzene equivalents.

Benzene-Toluene

The sum of all hydrocarbons with a boiling point equal to or greater than benzene and less than toluene are reported as benzene equivalents.

Toluene-Xylene

The sum of all hydrocarbons with a boiling point equal to or greater than toluene and less than xylene are reported as benzene equivalents.

Xylene Plus

The sum of all hydrocarbons with a boiling point greater than p-xylene are reported as benzene equivalents.

The reporting limit of each group of components in the C5+ analysis is 1.0 PPMV.

4.3 Interferences

The most likely source of "interference" is ambient air. Due to the relatively high concentrations of oxygen and nitrogen in air, a very small amount of air as a contaminant will seriously skew the results. The analyst must take care to ensure that air is flushed from the gas tight syringe before sample preparation and that no air has entered the syringe or needle prior to injection of the sample into the gas chromatograph.

Contamination by carryover can occur whenever high-level and low-level samples are sequentially analyzed. An unrestricted flow of pure carrier gas from a 10 psig source should be allowed to flow through each sample loop for 30 seconds prior to each analyses.

Syringes should be cleaned with laboratory soap and water (Alconox or equivalent) between sample extraction and analysis to insure absence of carryover from previous samples.

As required, the analyst should demonstrate the absence of carryover contamination by analysis of the contents of the sample loop when purged with carrier gas. This demonstration should be performed when carryover contamination is suspected (after high samples). In the event that `ghost peaks' (peaks similar to previous sample) appear when a pure carrier gas sample is analyzed, measures should be taken to eliminate the carryover contamination.

4.4 Data Collection and Archival

The output of the chromatograph is directed to a computer where the signal is converted to digital format, stored, and processed using a chromatography data system.

Tabulated data is to be made available in electronic format as specified by the client. Data will be preserved and archived for a period of time as specified by the client.

4.5 Calibration and Results

The standard calibration gas should be introduced in the same manner, as is the sample (sample loop or direct injection). Measured peak areas are converted to concentrations using certified commercial gas standards traceable to NIST standards (Matheson Gas Products and Scott Specialty Gases). Dilutes may be made to achieve multi point calibration curves.

Initial calibration is accomplished by analyzing multiple standards of appropriate calibration ranges. The results should agree to within 10% RPD. These results will be used to establish a multi-point calibration curve.

A Continuing Calibration Verification (CCV) standard will be run for every 20 samples (or more frequently if contractually required). If the instrument response for any CCV standard varies by more than 20%, the analyst will not analyze samples until the reason is determined and the problem is corrected.

4.6 Quality Control

The quality control procedures to be implemented for analysis of soil gas samples for the analytes listed in Section 2.0 shall be as follows:

1. If the requirements set forth above are not met, the analytical program will be terminated until the cause is determined and a solution is effected.

2. The analyst should demonstrate the absence of ambient air in the sample preparation system by filling a sample syringe with inert gas and injecting the inert gas onto the columns in the same manner as a sample. The results of this 'syringe blank' should show all analyte levels below the minimum detection limits.

3. Before and during sample analysis, instrument blanks (sample loop filled with flush inert gas) should be analyzed to assure the absence of interference as described in Section 3.0 above.

4. An experienced analyst should examine all chromatograms.

5. Calibration records are generated in electronic and hard copy formats and stored. All such records will be maintained in the laboratory during the course of the project and thereafter as determined by the client.

APPENDIX B

Collection of Free and Dissolved Gases from Water Wells

Both free and dissolved gases can be sampled from water wells by using the "Bubble Pail Method" (Keech and Gaber, 1982, "Methane in Water Wells", WWJ, February, PP 32-36). The bubbler pail can be constructed easily with two buckets and appropriate tubing configured to control the water flow as shown in Figure 1.

Water enters the system through the tube marked "flow in" and rises through an upright tube (the standpipe) and fills the first bucket. The overflow from the first bucket is directed into the second bucket, which is used for calculating the water flow rate. Sample collection bottles are filled with water and inverted over the standpipe allowing free gas to collect and displace the water from the inverted sample bottle. The water flow rate is determined by stopwatch, recording the time required to fill the second bucket.

By recording the water flow rate, length of the test and the volume of gas collected, the percentage of gas in the water can be determined. The concentration of methane in the collected free gas should be analyzed in a laboratory to determine the composition of all combustible gases. This should include methane through butanes at a minimum. The detection limit for the heavier hydrocarbons needs to be in the 10 ppb range. Portable combustible gas meters should be used for determination of methane levels in the field.

An example calculation from a typical gas bubbler would be as follows: 1) flow rate 3 liters/minute, 2) length of test 5 minutes yielding 3) a total water volume of 3l/minute X 5 minutes = 15 liters of water tested. If the gas volume collected during this time is 750 ml (0.75 liters) then the percent gas in water is 0.75/15, or 0.05 which is 5%. If the laboratory gas concentration is 30% methane then the percent methane in water is 5% of 0.30, which is 1.5%. The Michigan Department of Public Health considers the water as safe from explosions if this percentage is less than 1% methane in water by volume. It would be interesting to look up California's regulation for methane in water wells.

We generally measure the water volume collected by weighing the sample bottles when empty and then reweighing the bottles after collection and calculating the volume of gas collected by subtracting the weight of the empty bottle. Weighing the filled sample bottles not only provides the most accurate way to measure the volume of gas collected, but also allows an estimate of gas volumes collected when there is very little free gas available.

Whenever adequate volumes of free gas are available, then this free gas sample also provides the very best sample for stable carbon isotope analysis.

In addition to the free gas sample, it is possible to collect a completely filled water bottle (no headspace) for analysis of the dissolved gas content. This sample is collected by placing additional sample bottles into the bubble pail system and

flowing the water from the standpipe into the bottle, replacing all the air in the bottle with water. The bottle is filled underwater, excluding ambient air, and providing a full bottle of water having no headspace.

A 10 ml water sample is exchanged with nitrogen in the analytical laboratory using a syringe, providing a 10 ml headspace. The bottle is shaken vigorously before analyzing the headspace volume for its contents of methane and other combustible gases. We strongly recommend that these two samples for the free and dissolved gases be collected in 125 ml septem capped bottles. The standard 40 ml VOA bottles have often been used for this purpose, but they are not gas tight and should be used only for BTEX analysis. In this case we would also recommend that at least one sample be collected and analysed for benzene.

The water levels of the monitor wells should be measured both before and after the test and the volume of water tested should exceed three well volumes. However, if possible it is desirable to pump the wells beyond the three volumes and to collect a series of free and dissolved gas samples on timed intervals, such as every fifteen minutes over the lifetime of the pump test. This will give true duplicate samples that will provide very high quality data regarding the levels of gas charging of the shallow aquifers. A plot of the gas concentration versus time (i.e. volume of water pumped) is unequivocal information as to the amount of gas charging of the shallow aquifers within the areas occupied by the water wells tested.

APPENDIX C

CDM
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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 26.80 ft. MSL
TOP OF CASING 27.29 ft. MSL
LOGGED BY A. Fajardo (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-39
DATE DRILLED 03/09/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					0			SANDY CLAY, WITH GRAVEL: grayish brown.		
					5					
					10	CL				
					15					Cement with 5% Bentonite Grout (0-59 ft bgs)
					20				20.0	
0								CLAY: dark gray.		
					25					2" Diam. Sch 40, PVC Blan (0-62 ft bgs)
0										
					30					
					35	CL				
					40					

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PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-39
PROJECT NAME Playa Vista
DATE DRILLED 03/09/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0					45 50 55 60 65 70	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler. Total depth is 70 feet bgs.	52.0 70.0	Bentonite Grout (49-59 ft bgs) Bentonite Pellets (59-61 ft bgs) #3 Lonestar Sand (61-70 ft bgs) 2" Diam. Sch 40, PVC, 10-slot (62-67 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 9.2 ft. MSL
TOP OF CASING 12.78 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-46
DATE DRILLED 03/11/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0			(FILL) GRAVEL: Base laid by construction for access.	4.0	
					5	CL		CLAY, TRACE GRAVEL AND SAND: very dark brown, slightly plastic, coarse sand, damp, light organic odor.	6.0	Portland Cement with 5% Bentonite Grout (0-43.8 ft bgs)
						CL		CLAY, SOME SILT: dark grayish brown, non plastic, micaceous, increase in moisture, slight organic odor.	8.0	
					10			No silt, plastic, very damp, soft, no odor.		2" Diam. Sch 40, PVC Blank (0-54 ft bgs)
					15	CL				
					20			Very soft.	20.0	
					25	CL				
					30			SILT: dark grayish brown, plastic, very soft.	30.0	
					35	ML				

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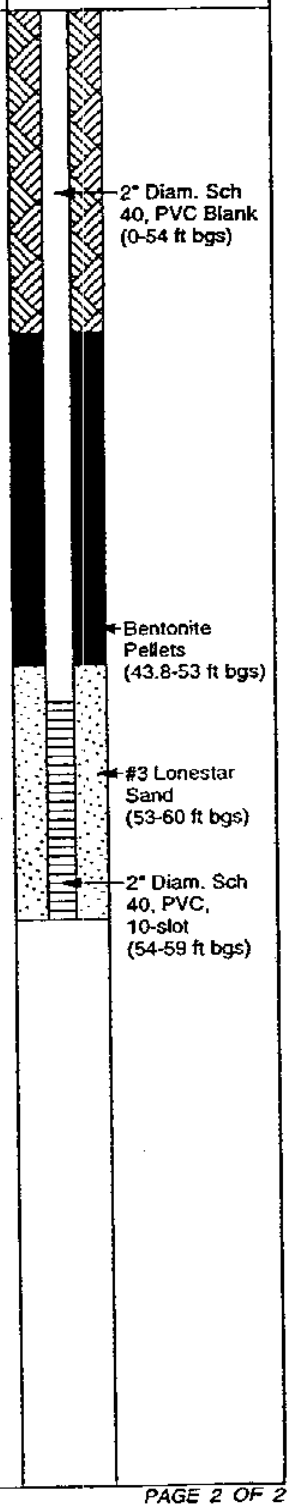
BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-46
DATE DRILLED 03/11/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
								Increase in water.	37.0
					40	ML		Decrease in water.	40.0
						ML		Increase in water.	45.0
					45	ML			
								GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	49.0
					50				
					55	GP			
					60				60.0
								Total depth is 60 feet bgs.	

WELL DIAGRAM



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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 16.50 ft. MSL
TOP OF CASING 19.21 ft. MSL
LOGGED BY A. Fajardo (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-77
DATE DRILLED 03/08/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0					0			SILTY SAND: brown, with gravel.	
					5	SM			9.0
					10			CLAY: dark grey.	
					15	CL			
					20				21.0
						ML		SANDY SILT: olive brown.	23.0
100					25			CLAY: gray, some silt.	
					30				
					35				
					40				

WELL DIAGRAM
- Portland Cement with 5% Bentonite Grout (0-51 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-65 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-77
DATE DRILLED 03/08/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
260					45	CL			
					50				
					55				
									58.0
260					60	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	
					65				
					70			Total depth is 70 feet bgs.	70.0

WELL DIAGRAM
- 2" Diam. Sch 40, PVC Blank (0-65 ft bgs)
- Bentonite Grou (51-61 ft bgs)
- Bentonite Pellets (61-63 ft bgs)
- #3 Lonestar Sand (63-70 ft bgs)
- 2" Diam. Sch 40, PVC, 10-slot (65-70 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	**BORING/WELL NUMBER**	MMW-82
PROJECT NAME	Playa Vista	**DATE DRILLED**	3/10/2000
LOCATION	Playa Vista Area D	**CASING TYPE/DIAMETER**	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	**SCREEN TYPE/SLOT**	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	**GRAVEL PACK TYPE**	#3 Lonestar Sand
GROUND ELEVATION	11.60 ft. MSL	**GROUT TYPE/QUANTITY**	Portland Cement/5% Bentonite
TOP OF CASING	15.18 ft. MSL	**DEPTH TO WATER**	NM
LOGGED BY	E. Schinsing	**GROUND WATER ELEVATION**	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					5	SM		SILTY SAND, LITTLE CLAY: light brown to brown (5YR4/2), well graded sand, moist.		Portland Cement with 5% Bentonite Grout (0-56 ft bgs)
					10	CL		CLAY WITH SAND AND GRAVEL: brown (5YR4/2); slightly plastic.	10.0	2" Diam. Sch 40, PVC Blank (0-64 ft bgs)
					15	SM		SAND, TRACE SILT: green olive (5YR5/3), fine sand, micaceous, very wet.	15.0	
					20					
					25	CL		SANDY CLAY: grayish brown, subrounded, coarse sand; very wet.	25.0	
					30			CLAY, LITTLE SAND: gray, slightly plastic; very wet.	30.0	
					35					
					40					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-82

PROJECT NAME Playa Vista **DATE DRILLED** 3/10/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	CL				Portland Cement with 5% Bentonite Grout (0-56 ft bgs)
					50					2" Diam. Sch 40, PVC Blank (0-64 ft bgs)
					55					Bentonite Pellets (56-61 ft bgs)
					60	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	59.0	#3 Lonestar Sand (61-69 ft bgs)
					65					2" Diam. Sch 40, PVC, 10-slot (64-69 ft bgs)
									69.0	
								Total depth is 69 feet bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 14.90 ft. MSL
TOP OF CASING 20.70 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-103
DATE DRILLED 03/08/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					5	ML		(FILL) SANDY SILT: brown (10YR4/3), very fine sand.	
					10				
					15	ML		SILT: grayish black (2.5/5GY), slightly plastic, soft.	13.0
					20			CLAYEY SAND: grayish black (2.5/5GY).	20.0
					25				
					30				
					35				
					40	SC			

WELL DIAGRAM
Portland Cement with 5% Bentonite Grout (0-48 ft bgs)
2" Diam. Sch 40, PVC Blan (0-60 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-103
DATE DRILLED 03/08/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45				
					50				
					55				55.0
					60	SP GP		SAND/GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were to fluid and/or loose to be collected by the split spoon sampler.	
					65				
					70			Total depth is 70 feet bgs.	70.0

WELL DIAGRAM

- Portland Cement with 5% Bentonite Grout (0-48 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-60 ft bgs)
- Bentonite Pellets (57-64 ft bgs)
- #3 Lonestar Sand (64-70 ft bgs)
- 2" Diam. Sch 40, PVC, 10-slot (65-70 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 13.20 ft. MSL
TOP OF CASING 15.59 ft. MSL
LOGGED BY ATF (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-112
DATE DRILLED 03/08/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0					5	SC		CLAYEY SAND: brown.	8.0
					10			CLAY: dark gray.	
					15	CH			
					20				22.0
					25	ML		SANDY SILT: olive brown.	25.0
0					30			CLAY: gray, some silt.	
					35				
					40	CL			

WELL DIAGRAM
Portland Cement with 5% Bentonite Grout (0-47 ft bgs)
2" Diam. Sch 40, PVC Blan (0-60 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-112
DATE DRILLED 03/08/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
40					45					Portland Cement with 5% Bentonite Grout (0-47 ft bgs)
					50					Bentonite Grout (47-57 ft bgs)
									52.0	
					55	GP		POORLY GRADED GRAVEL: The lithology was determined by the driller by the rough drilling conditions. As the augers were recovered from the hole, well rounded gravel from 1/2" to 1 1/2" were transported to the surface in a thick clay matrix that was likely to have been collected as the augers were withdrawn. Samples were to fluid and/or loose to be collected by the split spoon sampler.		2" Diam. Sch 40, PVC Blank (0-60 ft bgs)
					60					#3 Lonestar Sand (57-65 ft bgs)
					65				65.0	2" Diam. Sch 40, PVC, 10-slot (60-65 ft bgs)
20								Total depth is 65 feet bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 21.1 ft. MSL
TOP OF CASING 20.79 ft. MSL
LOGGED BY E. Schinsing
REMARKS

BORING/WELL NUMBER MMW-153
DATE DRILLED 02/28/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.0/0.0					5	SP		(FILL) SILTY SAND, LITTLE CLAY: grayish brown (2.5Y3/2), very fine to medium sand, wet.	
0.0/0.0					10	CL		CLAY, LITTLE SAND: grayish brown (2.5Y3/2), non plastic, wet.	10.0
0.0/0.0					15				
3.0/0.0					20				
1.2/0.0					25	SC		CLAYEY SAND: gray (5Y4/2), fine to medium sand, very fluid, slight H_2S odor.	25.0
No Reading					30			Decrease in sand, increase in clay. Color change to grayish brown (2.5Y 4/2), medium to coarse sand, subrounded to rounded, high sphericity; pyrite and mica observed, saturated.	30.0
0.0/0.0					35				
					40				

WELL DIAGRAM
Portland Cement with 5% Bentonite Grout (0-63 ft bgs)
2" Diam, Sch 40, PVC Blar (0-74 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-153
DATE DRILLED 02/28/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
0.0/0.0					45					Portland Cement with 5% Bentonite Grout (0-63 ft bgs)
0.0/0.0					50	SC				
2.5/0.0					55					2" Diam, Sch 40, PVC Blanl (0-74 ft bgs)
0.0/0.0					60					
0.0/0.0					65					Bentonite Pellets (63-73 ft bgs)
									69.0	
					70	GM		GRAVEL: very coarse, 1/2-1" sub-rounded gravel, quartzitic in clay matrix as described from, cutting returned from auger bit during withdraw. Samples were too fluid and/or loose to be collected by the split spoon sampler.	
					75					#3 Lonestar Sand (73-79 ft bgs)
									78.0	
						SP		SAND: driller noted softer drilling conditions. Actual samples could not be collected.	79.0	2" Diam, Sch 40, PVC 10-s (74-79 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 20.10 ft. MSL
TOP OF CASING 20.07 ft. MSL
LOGGED BY E. Schinsing
REMARKS

BORING/WELL NUMBER MMW-175
DATE DRILLED 02/28/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.0/0.0					5	SM		SILTY SAND, TRACE CLAY: reddish brown (5YR4/3), very fine to fine, subrounded, angular, very moist.	
0.0/0.0					10	SP		SAND: brown (10YR3/3), medium to coarse, subrounded.	10.0
0.0/0.0					15				
0.0/0.0					20	CL		CLAY, SOME SILT: dark brown (10YR3/3), very soft, non plastic, wet, trace pyrite.	20.0
13.1/0.0					25				
4.0/0.0					30	CL		Some yellow staining.	30.0
4.0/0.0					35			CLAYEY SAND: grayish brown (5Y 4/2), coarse sand, angular to subrounded.	35.0
					40				

WELL DIAGRAM
Cement with 5% Bentonite Grout (0-62 ft bgs)
2" Diam. Sch 40, PVC Blank (0-74 ft bgs)

Continued Next Page

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-175
DATE DRILLED 02/28/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.0/0.0					45				
0.0/0.0					50	SC			
0.0/0.0					55				
15.0/0.0					60				
28.0/0.0					65				
14.0/0.0					70	GP SP		GRAVEL AND SAND: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler. Rounded to subrounded gravel was observed on auger upon withdraw.	68.0
					75			Total depth is 79 feet bgs.	79.0

WELL DIAGRAM

- 2" Diam. Sch 40, PVC Blank (0-74 ft bgs)
- Bentonite Pellets (62-72 ft bgs)
- #3 Lonestar Sand (72-79 ft bgs)
- 2" Diam. Sch 40, PVC, 10-slot (74-79 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 17.80 ft. MSL
TOP OF CASING 17.61 ft. MSL
LOGGED BY SHR (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-207
DATE DRILLED 03/07/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	SM		(FILL) SILTY SAND: brown.	5.0
					5			SAND / SILTY SAND: gray.	
					10				14.0
					15	CL		CLAY, SOME SILT: gray.	16.0
					20	SP		SAND: gray.	
					25				29.0
100					30	CL		CLAY: dark gray.	33.0
					35	ML		SILT: gray, micaceous.	
					40				40.0

WELL DIAGRAM
- Portland Cement with 5% Bentonite Grout (0-45 ft bgs)
- 2" Diam, Sch 40, PVC Blank (0-57 ft bgs)

Continued Next Page

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-207
PROJECT NAME Playa Vista
DATE DRILLED 03/07/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45	CL		CLAY, SOME SILT: greenish gray.	
					50				
					55	CL		H_2S odor.	55.0
					60				
					65	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	62.0
					70			Total depth is 70 feet bgs.	70.0

WELL DIAGRAM

- Portland Cement with 5% Bentonite Grout (0-48 ft bgs)
- 2" Diam, Sch 40, PVC Blank (0-61.5 ft bgs)
- Bentonite Grou (51-63 ft bgs)
- #3 Lonestar Sand (63-70 ft bgs)
- 2" Diam, Sch 40, PVC 10-slc (65-70 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 17.78 ft. MSL
TOP OF CASING 17.63 ft. MSL
LOGGED BY E. Schinsing
REMARKS

BORING/WELL NUMBER MMW-211
DATE DRILLED 3/7/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0			(FILL) SANDY SILT: brown; fine to medium sand.		
					5	ML		SILT, LITTLE CLAY: red brown; slightly plastic	5.0	Portland Cement with 5% Bentonite Grout (0-50 ft bgs)
					10	SP		SAND: reddish-brown; poorly graded; subrounded to rounded; wet.	10.0	2" Sch. 40, PVC Blank (0-61 ft bgs)
					15	ML		SILT: black; firm; slightly moist.	15.0	
					20	CL		CLAY, LITTLE SILT: black, slightly plastic, dry to moist, micaceous, pyrite present.	20.0	
					25					
					30					
					35			CLAY: gray, moist to wet.	35.0	
					40					

Continued Next Page

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-211
PROJECT NAME Playa Vista
DATE DRILLED 3/7/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						CL				
					45				45.0	
						SP		SAND WITH CLAY: gray; poorly graded; subangular to subrounded; very wet		
					50					
					55				56.0	
						GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.		
					60					
					65				67.0	
								Total depth is 67 feet bgs.		

WELL DIAGRAM:
- Portland Cement with 5% Bentonite Grout (0-50 ft bgs)
- 2" Sch. 40, PVC Blank (0-61 ft bgs)
- Bentonite Pellets (50-60 ft bgs)
- #3 Lonestar Sand (60-66 ft bgs)
- 2" Sch. 40, PVC 10-slot (61-66 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 27.40 ft. MSL
TOP OF CASING 29.89 ft. MSL
LOGGED BY M. Hoffman
REMARKS MMW-226 is located on top of an approximately 20 to 25 feet tall berm of fill material (surcharge).

BORING/WELL NUMBER MMW-226
DATE DRILLED 1/28/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0			(FILL) SILT: very dark brown (7.5YR2.5/2), soft, moist, loose.	
					5				
					10				
					15				
					20				
					25			(FILL) SAND: brown (7.5YR5/4), very fine to fine, subrounded to rounded, moderate to high sphericity.	25.0
					30			(FILL) SILT: very dark brown (7.5YR2.5/2), soft, moist, loose.	30.0
					35	CL		CLAY: very dark gray (3/N), slightly plastic, soft.	35.0
					40				40.0

WELL DIAGRAM
Portland Cement with 5% Bentonite Grout (0-67 ft bgs)
2" Diam, Sch 40, PVC Blar (0-77 ft bgs)

Continued Next Page

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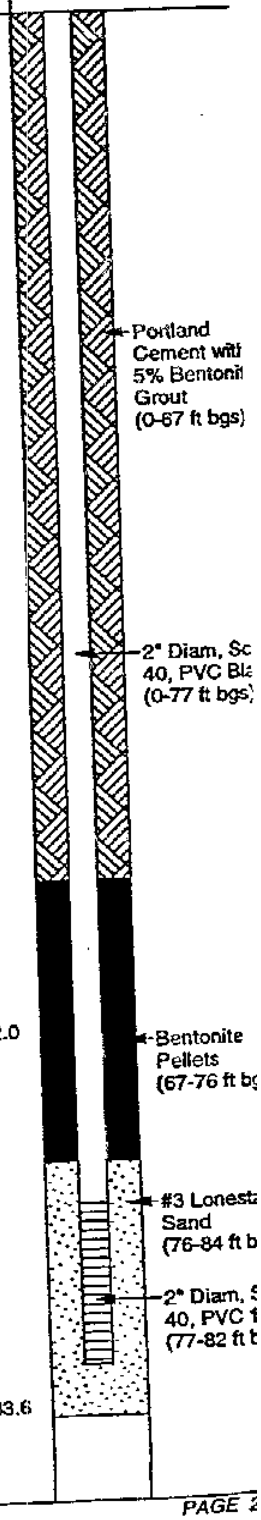
BORING/WELL CONSTRUCTION LO

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-226
DATE DRILLED 1/28/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45	CL		Color change to gray (3/N).	
						CL		Color change to very dark gray (5/N).	45.0
					50	SC		CLAYEY SAND: gray (5/N), saturated.	50.0
					70	SP GP		POORLY GRADED SAND/GRAVEL: Conclusion drawn from the experience of the driller. The sand is too fluid to be collected with the split spoon. Coarse sand is mixed with clay on the bottom augers. The clay is likely to have been collected by the augers on the way out of the hole. Coarse sand and fine gravel (1/4" to 1/2" diameter, angular to rounded, low to moderate sphericity) were circulated from the casing during development.	72.0
					80			Total Depth is 83.6 feet bgs.	83.6

WELL DIAGRAM



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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 20.10 ft. MSL
TOP OF CASING 20.06 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-244
DATE DRILLED 02/29/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0			(FILL): SANDY CLAY: brown (10YR6/4), fine to medium sand, slightly plastic.	
					5	CL			
					10			CLAY: dark brown, soft to firm, plastic, slight organic odor, moist.	10.0
					15				
					20	CL			
					25				
					30			Very soft, saturated.	27.0
					35	CL			
					40			Color change to dark gray.	35.0

WELL DIAGRAM
Portland Cement with 5% Bentonite Grout (0-59 ft bgs)
2" Diam, Sch 40, PVC Blank (0-70 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-244
PROJECT NAME Playa Vista
DATE DRILLED 02/29/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45	CL			
					50				
					55				
					60	CL		Little fine sand.	60.0
					65	GP		POORLY GRADED SAND/GRAVEL: The sand and gravel interval was determined by the driller since the lithology is to saturated to be sampled by the split spoon.	65.0
					70				
					75			Total depth is 75 ft bgs.	75.0

WELL DIAGRAM

- Portland Cement with 5% Bentonite Grout (0-59 ft bgs)
- 2" Diam, Sch 40, PVC Blank (0-70 ft bgs)
- Bentonite Pellets (58-68 ft bgs)
- #3 Lonestar Sand (68-75 ft bgs)
- 2" Diam, Sch 40, PVC 10-slot (70-75 ft bgs)

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BORING/WELL CONSTRUCTION LO(

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 10.75 ft. MSL
TOP OF CASING 14.33 ft. MSL
LOGGED BY M. Hoffman
REMARKS

BORING/WELL NUMBER MMW-272
DATE DRILLED 1/28/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0	SP		(FILL) SAND: gray (2.5Y5/1), very fine to fine, subrounded to angular sand, moderate to high sphericity.	5.0	Portland Cement with 5% Bentonit Grout (0-48 ft bgs)
					5	CL		CLAY: very dark grayish brown (2.5Y3/2), soft.		
					10	CL		Color change to very dark gray (3/N); slightly plastic, soft.	10.0	2" Diam, Scl 40, PVC Bla (0-61.5 ft bg
					15	CL		Strong sulfur odor.	15.0	
					20	CL		Color change to gray (5/N); moderate sulfur odor.	20.0	
					25	SC		CLAYEY SAND: gray (5/N), very fine to fine, saturated.	25.0	
					30					
					35					
					40					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-272
DATE DRILLED 1/28/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45	SC		Increase in clay, decrease in sand.	45.0
					50	CL		CLAY WITH SAND: gray (5/N), very fine to fine sand, slightly plastic, soft.	50.0
					55	SP GP		POORLY GRADED SAND/GRAVEL: The sand and gravel interval was determined by the driller since the lithology is to saturated to be sampled by the split spoon.	55.0
					60				
					65			Total Depth is 68 ft bgs.	68.0

WELL DIAGRAM

- Portland Cement with 5% Bentonite Grout (0-48 ft bgs)
- 2" Diam, Sch 40, PVC Blank (0-61.5 ft bgs)
- Bentonite Pellets (48-59 ft bgs)
- #3 Lonestar Sand (59-66.5 ft bgs
- 2" Diam, Sch 40, PVC 10-sl (61.5-66.5 ft bgs)
- Slough Bottom

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 12.41 ft. MSL
TOP OF CASING 15.57 ft. MSL
LOGGED BY M. Hoffman
REMARKS

BORING/WELL NUMBER MMW-276
DATE DRILLED 1/27/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
								(FILL) SANDY SILT: very dark grayish brown (10YR3/2); very fine to fine sand.	
								(FILL) SAND: brown (10YR5/3), very fine to fine, angular to rounded, low to high sphericity.	2.0
	10 15 20	18			5			CLAY: black (2.5/N); slightly plastic, firm.	5.0
	3 5 7	18			10	CL			
	3 7 11	18			15	ML		SILT: dark gray (2.5Y4/1); slightly plastic, soft, micaceous.	15.0
	3 5 5	18			20			SILT, LITTLE SAND: dark gray (2.5Y4/1), very fine to fine sand, trace sea shells.	20.0
	3 4 9	18			25	ML			
	3 7 11	18			30				
					35			POORLY GRADED SAND WITH SILT: dark gray (2.5Y4/1); too fluid to be sampled by split spoon.	35.0
					40				

WELL DIAGRAM
Portland Cement with 5% Bentonite Grout (0-45 ft bgs)
2" Diam, Sch 40, PVC Blan (0-57 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-276
DATE DRILLED 1/27/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	SP SM				Portland Cement with 5% Bentonite Grout (0-45 ft bgs)
										2" Diam, Sch 40, PVC Blank (0-61.5 ft bgs)
					50				51.0	
						GP		POORLY GRADED GRAVEL: The lithology was determined by the driller by the rough drilling conditions. As the augers were recovered from the hole, well rounded gravel from 1/2" to 1 1/2" were transported to the surface in a thick clay matrix that was likely to have been collected as the augers were withdrawn. Samples were to fluid and/or loose to be collected by the split spoon sampler.	55.0	Bentonite Pellets (45-55.5 ft bgs
					55			POORLY GRADED SAND: The change in lithology was determined by the driller by the increased smoothness in the drilling. As the augers were recovered from the hole, coarse sand was transported to the surface in a thick clay matrix that was likely to have been collected as the augers were withdrawn.		#3 Lonestar Sand (55.5-62 ft bgs
						SP				2" Diam, Sch 40, PVC 10-sl (57-62 ft bgs)
					60				62.0	
		0						A split spoon sample was attempted several times at 62 feet bgs, however, the sediment was too fluid and/or loose to be collected by the split spoon. Total Depth is 62 ft bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 11.60 ft. MSL
TOP OF CASING 13.63 ft. MSL
LOGGED BY R. Basilio (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-319
DATE DRILLED 3/8/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite & Volclay
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					5	SM		SILTY SAND: brown.	9.0	Portland Cement with 5% Bentonite Grout (0-34 ft bgs)
					10	CL		SANDY CLAY: dark gray.	14.0	2" Diam. Sch 40, PVC Blan (0-54 ft bgs)
					15			CLAY, SOME SILT: gray; medium plasticity, soft.		
					20					
					25					
					30	CL				Volclay Grout (34-48 ft bgs)
					35					
					40					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-319
PROJECT NAME Playa Vista
DATE DRILLED 3/8/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45					Volclay Grout (34-48 ft bgs)
									47.0	2" Diam. Sch 40, PVC Blank (0-54 ft bgs)
					50	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.		Bentonite Pellets (48-52 ft bgs)
					55					#3 Lonestar Sand (52-59 ft bgs)
										2" Diam. Sch 40, PVC, 10-slot (54-59 ft bgs)
									60.0	
								Total depth is 60 feet bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 10.50 ft. MSL
TOP OF CASING 13.15 ft. MSL
LOGGED BY E. Schinsing
REMARKS

BORING/WELL NUMBER MMW-331
DATE DRILLED 03/07/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0			SILTY SAND: light grey to brownish grey, fine sand, very moist.		
					5	SM				
					10			CLAY, SOME SILT: very dark grayish brown, moist, slight organic odor.	10.0	
					15					
					20					
					25	CL				
					30					
					35			SILTY SAND: saturated.	35.0	
					40					

Cement with 5% Bentonite Grout (0-47 ft bgs)

2" Diam. Sch 40, PVC Blank (0-50 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-331
PROJECT NAME Playa Vista
DATE DRILLED 03/07/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	SM			45.0	Bentonite Pellets (47-57 ft bgs); 2" Diam. Sch 40, PVC Blank (0-59 ft bgs)
					50	SW		WELL GRADED SAND WITH GRAVEL: dark gray and white, fine to coarse sand, rounded gravel, saturated.		#3 Lonstar Sand (57-64 ft bgs); 2" Diam. Sch 40, PVC, 10-slot (59-64 ft bgs)
					55					
					60			Total depth is 60 feet bgs.	60.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 10.40 ft. MSL
TOP OF CASING 13.25 ft. MSL
LOGGED BY R. Basilio (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-362
DATE DRILLED 03/07/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION NM

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0	SP		SAND: yellowish brown, fine sand.	5.0	Cement with 5% Bentonite Grout (0-47 ft bgs)
					5	SM		SILTY SAND: brown.	10.0	
					10	CL		SANDY CLAY: dark gray.	17.0	
					15					
					20	CL		CLAY: gray.	24.0	
					25			Color change to light gray.		2" Diam. Sch 40, PVC Blank (0-50 ft bgs)
					30					
					35	CL				

Continued Next Page

NEWGINT PLA .PJ NEWGINT.GDT 4/14/00

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-362
PROJECT NAME Playa Vista
DATE DRILLED 03/07/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					40					Bentonite Pellets (47-57 ft bgs)
										2" Diam. Sch 40, PVC Blank (0-59 ft bgs)
					45				45.0	
								GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.		#3 Lonstar Sand (57-64 ft bgs)
					50	GP				2" Diam. Sch 40, PVC, 10-slot (59-64 ft bgs)
					55				55.0	
								Total depth is 55 feet bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 4.30 ft. MSL
TOP OF CASING 5.58 ft. MSL
LOGGED BY E. Schinsing
REMARKS

BORING/WELL NUMBER MMW-476
DATE DRILLED 4/1/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		CLAY, SOME SILT: brown, soft, non plastic, moist.	
					5	CL		CLAY, LITTLE SILT: dark brown to black, organic, slightly plastic, wet.	5.0
					10	ML		SILT, SOME CLAY: loose, very wet.	10.0
					15	SM		SILTY SAND: light yellowish green, fine to very fine sand, micaceous, subangular, low sphericity, wet.	15.0
					20	CL		CLAY: dark brown to black, moderately plastic, abundant micaceous, soft, very wet.	20.0
					25	CL		CLAY, LITTLE SILT: dark brown to black, slightly plastic, soft.	25.0
					30				
					35				
					40				40.0

WELL DIAGRAM
2" Diam. Sch 40, PVC Blank (0-54 ft bgs)
Cement with 5% Bentonite Grout (0-43 ft bgs)

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NEWGINT.PLJ 3PJ NEWGINT.GDT 4/17/00

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-476
PROJECT NAME Playa Vista
DATE DRILLED 4/1/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
						CL		CLAY, SOME SILT: dark brown to black, wet.		
					45	GP		POORLY GRADED GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were to fluid and/or loose to be collected by the split spoon sampler.	45.0	Bentonite Pellets (43-53 ft bgs)
					50					#3 Lonestar Sand (53-59 ft bgs)
					55					2" Diam. Sch 40, PVC, 10-slot (54-59 ft bgs)
								Total depth is 59 ft bgs.	59.0	

NEWGINT.PI .GPJ NEWGINT.GDT 4/17/00

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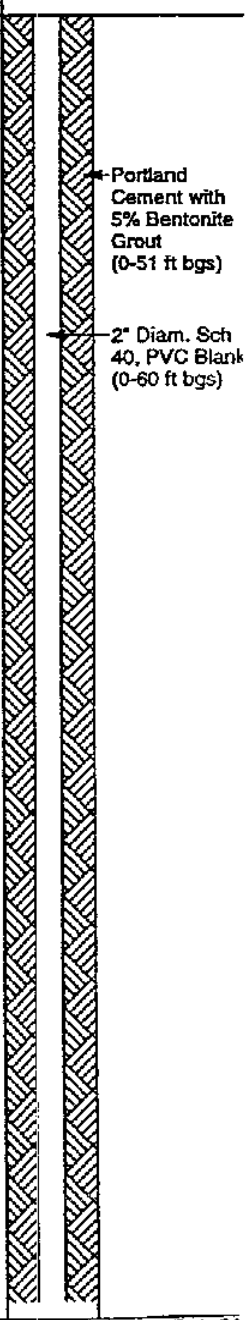
BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	BORING/WELL NUMBER	MMW-509
PROJECT NAME	Playa Vista	DATE DRILLED	03/17/2000
LOCATION	Playa Vista Area D	CASING TYPE/DIAMETER	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	SCREEN TYPE/SLOT	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	GRAVEL PACK TYPE	#3 Lonestar Sand
GROUND ELEVATION	11.25 ft. MSL	GROUT TYPE/QUANTITY	Portland Cement/5% Bentonite
TOP OF CASING	13.90 ft. MSL	DEPTH TO WATER	NM
LOGGED BY	R. Lopez	GROUND WATER ELEVATION	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					5	CL		(FILL) CLAY, SOME SILT, TRACE SAND AND GRAVEL: reddish brown, slight plastic, firm to soft, damp, fine gravel and coarse sand.	7.0
					10	CL		CLAY: dark brownish gray, soft, plastic (increasing moisture and softness with depth), damp to moist.	
					15	CL		Color change to grayish brown, very soft, saturated, slight odor.	15.0
					20	SP		SAND, SOME GRAVEL: dense, saturated (very few cuttings).	22.0
					25	CL		CLAY: dark brownish gray, very soft, saturated, shell materials present, organic odor.	25.0
					30	CL		Color change to dark brownish gray.	30.0
					35				
					40				

WELL DIAGRAM



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BORING/WELL CONSTRUCTION LO(

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-509
PROJECT NAME Playa Vista
DATE DRILLED 03/17/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	SP		POORLY GRADED SAND: saturated.	42.0	
					50	CL		CLAY: dark brownish gray, very soft, saturated, shell material present, organic odor.	51.0	Bentonite Pellets (49-59 ft bgs
					55	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	55.0	#3 Lonestar Sand (59-65 ft bgs
					60					2" Diam. Sc 40, PVC, 10-slot (60-65 ft bgs
					65			Total depth is 65 ft bgs.	65.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 11.80 ft. MSL
TOP OF CASING 13.93 ft. MSL
LOGGED BY J. Jonas
REMARKS

BORING/WELL NUMBER MMW-514
DATE DRILLED 3/17/200
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		CLAY, SOME SILT: reddish brown.	
					5	CL		CLAY, SOME SAND AND GRAVEL: dark brownish gray, slightly plastic, soft to firm, coarse sand to fine gravel.	5.0
					10	CL		Trace sand and gravel, plastic, soft; increasing moisture.	7.0
					15	SP		SAND WITH GRAVEL: no cuttings recovered; lithology is based in resistance during drilling.	15.0
					20	CL		CLAY: brownish gray, very soft, saturated.	18.0
					25				
					30			CLAY, SOME SILT: saturated, H2S odor.	30.0
					35				
					40				

WELL DIAGRAM:
- 2" Sch 40, PVC Blank (0-60 ft bgs)
- Portland Cement with 5% Bentonite Grout (0-59 ft bgs)

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NEWGINT PLAYAVIS.GPJ NEWGINT.GDT 4/14/60

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-514

PROJECT NAME Playa Vista **DATE DRILLED** 3/17/200

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	CL				Portland Cement with 5% Bentonite Grout (0-59 ft bgs)
										2" Sch 40, PVC Blank (0-60 ft bgs)
					50					Bentonite Pellets (47-59 ft bgs)
									54.0	
					55	GP		GRAVEL: The lithology was determined by the drilling by rough drilling conditions. Samples were too fluid and/or loose to be collected with the split-spoon sampler.		
					60					#3 Lonestar Sand (59-65 ft bgs)
										2" Sch 40, 10-slot (60-65 ft bgs)
					65				65.0	
								Total depth is 65 feet bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 8.25 ft. MSL
TOP OF CASING 10.51 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-520
DATE DRILLED 3/19/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					5	CL		CLAY, SOME SILT, TRACE SAND AND GRAVEL: dark reddish brown, dry to damp, slightly plastic, coarse sand fine gravel.	
					10				
								CLAY: dark brownish gray, very moist, plastic.	12.0
					15	CL			
					20			CLAY, SOME SILT: dark brownish gray, very moist, plastic.	20.0
						CL			
					25			Color change to dark gray.	25.0
						CL			
					30			Color change to very dark brownish gray, saturated, H_2S odor.	30.0
					35	CL			
					40				40.0

WELL DIAGRAM: Portland Cement with 5% Bentonite Grout (0-47 ft bgs); 2" Diam. Sch 40, PVC Blank (0-64 ft bgs)

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GPJ NEWGINT.GDT 4/14/00
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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-520
PROJECT NAME Playa Vista
DATE DRILLED 3/19/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45			No Recovery.	
					50	SP		SAND: The lithology was determined by the driller. No soil cuttings were retrieved during drilling.	51.0
					55	SP GP		SAND AND GRAVEL: The lithology wasd determined by the driller by rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	53.0
					60			Total depth is 64 feet bgs.	64.0

WELL DIAGRAM

- 2" Diam. Sch 40, PVC Blank (0-64 ft bgs)
- Bentonite Pellets (47-57 ft bgs)
- #3 Lonestar Sand (57-64 ft bgs)
- 2" Diam. Sch 40, PVC, 10-slot (58-63 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	**BORING/WELL NUMBER**	MMW-542
PROJECT NAME	Playa Vista	**DATE DRILLED**	3/18/2000
LOCATION	Playa Vista Area D	**CASING TYPE/DIAMETER**	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	**SCREEN TYPE/SLOT**	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	**GRAVEL PACK TYPE**	#3 Lonestar Sand
GROUND ELEVATION	8.06 ft. MSL	**GROUT TYPE/QUANTITY**	Portland Cement/5% Bentonite
TOP OF CASING	10.06 ft. MSL	**DEPTH TO WATER**	NM
LOGGED BY	J. Jonas	**GROUND WATER ELEVATION**	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		CLAY, TRACE SAND AND GRAVEL/COBBLES: reddish brown, slightly plastic.	
					5	CL		CLAY: dark brown, slightly plastic.	5.0
						CL		CLAY, SOME SILT: gray, plastic, micaceous.	7.0
					10	CL		Increasing moisture with depth.	10.0
					15			No recovery	15.0
					20	ML		SILT: grayish brown, saturated.	20.0
					25			SILT, SOME CLAY: gray.	25.0
					30	ML			
					35	CL		CLAY, SOME SILT: gray.	35.0
					40			Continued Next Page	

WELL DIAGRAM:
- Portland Cement with 5% Bentonite Grout (0-47 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-65 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-542

PROJECT NAME Playa Vista **DATE DRILLED** 3/18/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
									43.0	
						GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. No cuttings were generated at this interval.	45.0	2" Diam. Sch 40, PVC Blank (0-65 ft bgs)
					45	GP		GRAVEL WITH SAND: The lithology was determined by the driller by the slightly softer drilling conditions than obsurved above. No cutting were generated at this interval.		Bentonite Grout (47-51 ft bgs)
					50	SM		SILTY SAND: saturated.	50.0	
						ML		SILT: gray, saturated.	52.0	Bentonite Pellets (51-57 ft bgs)
					55				57.0	
					60	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected with the split spoon sampler.		#3 Lonestar Sand (57-64 ft bgs) 2" Diam. Sch 40, PVC, 10-slot (58-63 ft bgs)
						CL		CLAY, SOME SILT: gray, saturated.	63.0	Bentonite Pellets (64-65 ft bgs)
					65			Total depth is 65 feet bgs.	65.0	

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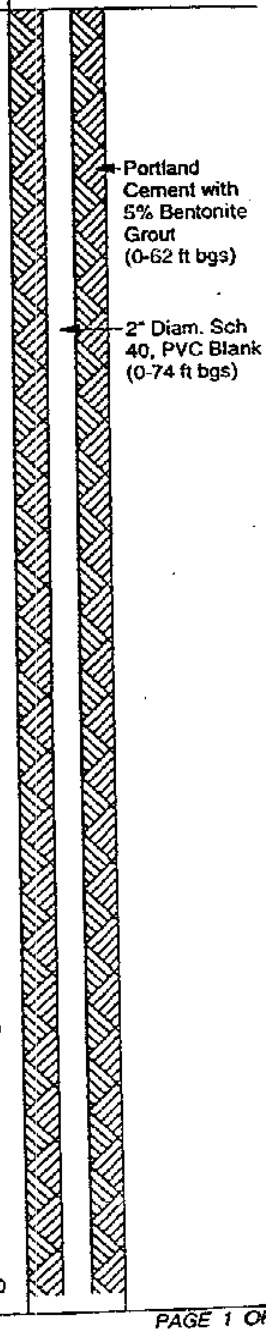
BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	BORING/WELL NUMBER	MMW-676
PROJECT NAME	Playa Vista	DATE DRILLED	3/9/2000
LOCATION	Playa Vista Area D	CASING TYPE/DIAMETER	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	SCREEN TYPE/SLOT	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	GRAVEL PACK TYPE	#3 Lonestar Sand
GROUND ELEVATION	27.10 ft. MSL	GROUT TYPE/QUANTITY	Portland Cement/5% Bentonite
TOP OF CASING	27.01 ft. MSL	DEPTH TO WATER	NM
LOGGED BY	R. Basilio (Group Delta)	GROUND WATER ELEVATION	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		CLAY WITH SAND AND GRAVEL: dark reddish brown, coarse sand, angular gravel, plastic, damp.	
					5	CL		CLAY, TRACE SAND AND GRAVEL: dark brown, plastic, soft, cohesive.	5.0
					10	CL		CLAY WITH SAND: very dark brown, slightly plastic, cohesive, damp, soft.	13.0
					15	SP		POORLY GRADED SAND: light yellow brown, mostly fine sand.	15.0
					20	SC		CLAYEY SAND: brown, slightly cohesive, very moist; poorly graded, fine sand.	20.0
					25	SP		POORLY GRADED SAND WITH CLAY: light yellow brown, fine sand, saturated.	23.0
					30	CL		CLAY: very dark brown, soft, plastic, slight organic odor.	27.0
					35	CL		Color change to very dark grayish brown to black, soft plastic, slight organic odor.	29.0
					40	CL		Color changes to dark grey, very soft, very sticky, saturated.	32.0

Continued Next Page

WELL DIAGRAM



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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-676

PROJECT NAME Playa Vista **DATE DRILLED** 3/9/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45			Color changes to gray, soft, wet.		Portland Cement with 5% Bentonite Grout (0-62 ft bgs)
					50					
					55	CL				2" Diam. Sch 40, PVC Blank (0-74 ft bgs)
					60					
					65					Bentonite Pellets (62-72 ft bgs)
									68.0	
					70			POORLY GRADED GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were to fluid and/or loose to be collected by the split spoon sampler.		#3 Lonestar Sand (72-79 ft bgs)
					75	GP				2" Diam. Sch 40, PVC, 10-slot (74-79 ft bgs)
					80				80.0	Sluff (79-80 ft bgs)
								Total depth is 80 feet bgs.		

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	BORING/WELL NUMBER	MMW-735
PROJECT NAME	Playa Vista	DATE DRILLED	3/1/2000
LOCATION	Playa Vista Area D	CASING TYPE/DIAMETER	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	SCREEN TYPE/SLOT	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	GRAVEL PACK TYPE	#3 Lonestar Sand
GROUND ELEVATION	21.26 ft. MSL	GROUT TYPE/QUANTITY	Portland Cement/5% Bentonite
TOP OF CASING	21.24 ft. MSL	DEPTH TO WATER	NM
LOGGED BY	R. Lopez	GROUND WATER ELEVATION	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					5	CL		SANDY CLAY: well-graded; nonplastic due to sand content; soft; slightly cohesive	
									9.0
					10	SC		CLAYEY SAND: dark reddish brown, medium to fine sand, poorly graded; non-cohesive.	10.0
						CL		CLAY: brown; plastic to slightly plastic; dry to damp	
					15	SP		POORLY GRADED SAND: brown; trace silt; dry.	15.0
									19.0
						SC		CLAYEY SAND: dark brown	20.0
					20	CL		CLAY: dark grayish brown to dark brown; plastic; firm to soft; no odor.	22.0
					25	CL		Color change to black; soft; highly organic; slight odor; increasing moisture with depth.	
					30				33.0
					35			Color change to dark gray; moist, very soft. Trace sand.	
					40				

WELL DIAGRAM

- Portland Cement with 5% Bentonite Grout (0-54 ft bgs)
- 2" Diam. Sch 40, PVC Blar (0-65 ft bgs)

Continued Next Page

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-735
PROJECT NAME Playa Vista
DATE DRILLED 3/1/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					45	CL			
					50				
					55				
					60				60.0
						GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	
					65				
					70				70.0
								Total depth is 70 feet bgs.	

WELL DIAGRAM

- 2" Diam. Sch 40, PVC Blank (0-65 ft bgs)
- Bentonite Grout (51-61 ft bgs)
- Bentonite Pellets (54-64 ft bgs)
- #3 Lonestar Sand (64-70 ft bgs)
- 2" Diam. Sch 40, PVC, 10-slot (65-70 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	BORING/WELL NUMBER	MMW-738
PROJECT NAME	Playa Vista	DATE DRILLED	3/9/2000
LOCATION	Playa Vista Area D	CASING TYPE/DIAMETER	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	SCREEN TYPE/SLOT	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	GRAVEL PACK TYPE	#3 Lonestar Sand
GROUND ELEVATION	20.40 ft. MSL	GROUT TYPE/QUANTITY	Portland Cement/5% Bentonite
TOP OF CASING	20.33 ft. MSL	DEPTH TO WATER	NM
LOGGED BY	R. Basilio (Group Delta)	GROUND WATER ELEVATION	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0					5	SC		CLAYEY SAND: brown, moist.	
20									
40					10	CL		CLAY: grayish brown, moist, firm.	9.0
40					15	SM		SILTY SAND: yellowish brown, moist, fine to medium grained sand.	14.0
20					20			SANDY CLAY: brown.	19.0
0					25	CL			
0					30			CLAY, SOME SILT: gray, wet, soft, medium plasticity.	30.0
0					35				
					40				

WELL DIAGRAM:
- Portland Cement with 5% Bentonite Grout (0-47 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-64 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-738
PROJECT NAME Playa Vista
DATE DRILLED 3/9/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0					45	CL			
0					50				
0					55			GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	55.0
20					60	GP			
40								Total depth is 65 feet bgs.	65.0

WELL DIAGRAM

- Portland Cement with 5% Bentonite Grout (0-47 ft bgs)
- Bentonite Pellets (47-57 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-64 ft bgs)
- #3 Lonestar Sand (57-64 ft bgs)
- 2" Diam. Sch 40, PVC, 10-slot (59-64 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	BORING/WELL NUMBER	MMW-743
PROJECT NAME	Playa Vista	DATE DRILLED	3/6/2000
LOCATION	Playa Vista Area D	CASING TYPE/DIAMETER	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	SCREEN TYPE/SLOT	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	GRAVEL PACK TYPE	#3 Lonestar Sand
GROUND ELEVATION	19.70 ft. MSL	GROUT TYPE/QUANTITY	Portland Cement/5% Bentonite
TOP OF CASING	19.66 ft. MSL	DEPTH TO WATER	NM
LOGGED BY	R. Basilio (Group Delta)	GROUND WATER ELEVATION	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0			(FILL) CLAYEY SAND: brown.	
					5				
					10	SC			
					15				
					20			CLAY, SOME SILT: gray, soft, medium plasticity.	20.0
					25	CL			
					30				
					35			Continued Next Page	35.0

WELL DIAGRAM

- Cement with 5% Bentonite Grout (0-48 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-59 ft bgs)

GPJ NEWGINT.GDT 4/14/00

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-743
PROJECT NAME Playa Vista
DATE DRILLED 3/6/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					40			Wet.		Cement with 5% Bentonite Grout (0-48 ft bgs)
					45	CL				
					50					2" Diam. Sch 40, PVC Blank (0-59 ft bgs)
					55			GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	55.0	Bentonite Pellets (48-58 ft bgs)
					60	GP				#3 Lonestar Sand (58-64 ft bgs)
								Total depth is 65 feet bgs.	65.0	2" Diam. Sch 40, PVC 10-slot (59-64 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 13.38 ft. MSL
TOP OF CASING 16.10 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-803
DATE DRILLED 03/06/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION NM

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		(FILL) SANDY CLAY: brown, fine sand, slightly plastic, damp.	
									4.0
					5	SW		WELL GRADED SAND: light brown to light grayish brown, fine sand, damp.	
								Color change to yellowish brown.	5.5
						SW			
					10				10.0
						CL		CLAY: dark grayish brown to dark brown, slightly plastic, moist, slight organic odor.	
					15			Color change to dark grey, high plasticity.	15.0
					20				
					25				
					30	CL			
					35				

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WELL DIAGRAM
- Portland Cement with 5% Bentonite Grout (0-44 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-65 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-803

PROJECT NAME Playa Vista **DATE DRILLED** 03/06/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					40					
					45					
								GRAVEL AND SAND: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler. Dark gray fine to medium sand was observed in the cuttings however appears to be only a portion of the soils at that depth. Extrusive chatter indicative of gravel was observed.	48.0	Bentonite Pellets (44-50.5 ft bgs)
					50					#3 Lonestar Sand (50.5-57 ft bgs)
						GP SP				2" Diam. Sch 40, PVC, 10-slot (52-57 ft bgs)
					55					
					60				60.0	
								Total depth is 60 feet bgs.		

NEWGINT.PL .GPJ NEWGINT.GDT 4/14/00

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	**BORING/WELL NUMBER**	MMW-813
PROJECT NAME	Playa Vista	**DATE DRILLED**	3/2/2000
LOCATION	Playa Vista Area D	**CASING TYPE/DIAMETER**	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	**SCREEN TYPE/SLOT**	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	**GRAVEL PACK TYPE**	#3 Lonestar Sand
GROUND ELEVATION	14.20 ft. MSL	**GROUT TYPE/QUANTITY**	Portland Cement/5% Bentonite
TOP OF CASING	14.1 ft. MSL	**DEPTH TO WATER**	NM
LOGGED BY	R. Lopez	**GROUND WATER ELEVATION**	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					5	CL		CLAY, TRACE SAND AND GRAVEL: mottled dark reddish brown to dark brownish gray, fine gravel, soft, slightly plastic, moist, slight to strong organic odor.		Portland Cement with 5% Bentonite Grout (0-39 ft bgs)
					10	SP		POORLY GRADED SAND: yellow brown, fine sand.	8.0	
					15	CL		CLAY, TRACE TO LITTLE SAND AND GRAVEL: dark brownish grey, fine angular gravel, moist, soft, moderate organic odor. Debris noted in cuttings, includes: glass, brick, and ceramics.	11.0	2" Diam. Sch 40, PVC Blank (0-49 ft bgs)
					20					
					25	CL		Color change to dark grey, very moist to saturated, strong organic odor.	22.0	
					30					
					35	CL		TRACE SAND	35.0	
					40					

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-813

PROJECT NAME Playa Vista **DATE DRILLED** 3/2/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split-spoon sampler. Saturated fine sand is retrieved from the cuttings but are most likely derived from depths greater than 44 feet bgs.	44.0	Bentonite Pellets (39-49 ft bgs)
					50					#3 Lonestar Sand (49-55 ft bgs) 2" Diam. Sch 40, PVC, 10-slot (49-54 ft bgs)
					55			Total depth is 55 feet bgs.	55.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER	10610-27775-NEWELLS	**BORING/WELL NUMBER**	MMW-912
PROJECT NAME	Playa Vista	**DATE DRILLED**	3/3/2000
LOCATION	Playa Vista Area D	**CASING TYPE/DIAMETER**	2" Sch 40 PVC
DRILLING METHOD	Hollow Stem Auger	**SCREEN TYPE/SLOT**	2" Sch 40 PVC/10 slot
SAMPLING METHOD	Cuttings	**GRAVEL PACK TYPE**	#3 Lonestar Sand
GROUND ELEVATION	14.56 ft. MSL	**GROUT TYPE/QUANTITY**	Portland Cement/5% Bentonite
TOP OF CASING	14.33 ft. MSL	**DEPTH TO WATER**	NM
LOGGED BY	R. Lopez	**GROUND WATER ELEVATION**	
REMARKS			

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0	CL		CLAY WITH SAND: dark reddish brown	1.0	
						CL		Color change to dark brownish grey, slightly plastic, with strong petroleum hydrocarbon odor.		
					5				6.0	Portland Cement with 5% Bentonite Grout (0-41 ft bgs)
						SP		POORLY GRADED SAND, TRACE SILT: light brown to brown, fine to medium sand, moist to very damp, no organic odor.	8.0	
					10	SP		Color change to dark grey, fine to medium sand, moist, slight organic odor.		2" Diam. Sch 40, PVC Blank (0-52 ft bgs)
						CL		CLAY, LITTLE SAND: very dark brownish grey, fine sand.	12.0	
						CL		CLAY: very dark brownish grey, very plastic, soft, damp.	14.0	
					15				17.0	
						CL		CLAY, TRACE SAND: dark grey, very soft.		
					20				22.0	
						CL		Very little cuttings from 22-25'.		
					25				25.0	
						SC		CLAYEY SAND: dark gray, saturated.		
					30					
					35					
					40				40.0	

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-912

PROJECT NAME Playa Vista **DATE DRILLED** 3/3/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	CL		CLAY, TRACE SAND: dark grey, very soft, saturated, slight organic odor.		Bentonite Pellets (41-51 ft bgs) 2" Diam. Sch 40, PVC Blank (0-52 ft bgs)
					50	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.	47.0	#3 Lonestar Sand (51-57 ft bgs) 2" Diam. Sch 40, PVC, 10-slot (52-57 ft bgs)
					55			Total depth is 57 feet bgs.	57.0	

NEWGINT.F GPJ NEWGINT.GDT 4/14/00

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 16.66 ft. MSL
TOP OF CASING 16.47 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-921
DATE DRILLED 3/2/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		(FILL) CLAY, TRACE SAND: dark reddish brown; nonplastic.	
					5	CL		SANDY CLAY: dark brownish gray; very strong organic odor; construction debris (e.g. broken up asphalt).	4.0
					10	SP		POORLY GRADED SAND, TRACE SILT: dark yellowish brown becoming darker with depth to a dark brownish gray; fine to medium sand; dry to slightly damp.	9.0
					15	CL		CLAY: black; plastic; damp; strong organic odor.	16.0
					20	CL		Color change to dark gray; slightly organic; very moist.	23.0
					25	CL		Increase in water content.	30.0
					30	CL		No odor; no organic debris	35.0
					35				
					40				

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WELL DIAGRAM
- Portland Cement with 5% Bentonite Grout (0-48 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-60 ft bgs)

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NEWGINT PLAYA

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
BORING/WELL NUMBER MMW-921
PROJECT NAME Playa Vista
DATE DRILLED 3/2/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	CL				Portland Cement with 5% Bentonite Grout (0-48 ft bgs)
					50	GP		POORLY GRADED GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sample.	50.0	Bentonite Pellets (48-59 ft bgs)
					55					2" Diam. Sch 40, PVC Blank (0-60 ft bgs)
					60					#3 Lonestar Sand (59-65 ft bgs)
					65			Total depth is 65 feet bgs.	65.0	2" Diam. Sch 40, PVC, 10-slot (60-65 ft bgs)

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BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 16.35 ft. MSL
TOP OF CASING 15.95 ft. MSL
LOGGED BY R. Lopez
REMARKS

BORING/WELL NUMBER MMW-928
DATE DRILLED 03/03/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
					0	CL		CLAY, SOME SILT, LITTLE SAND: very dark brownish grey, non plastic to slightly plastic, soft, damp, fine to coarse sand, slight organic odor.	
					5	SM		SILTY SAND: dark brownish grey, fine sand.	5.0
						SP		POORLY GRADED SAND: dark brown to brown to light brown, fine sand, loose, dry, slight odor.	8.0
					10	SP		Color change to dark brownish gray, fine to medium sand, some mica.	10.0
						CL		CLAY SOME SILT: very dark brownish grey, dry to damp, moderately firm, slightly plastic to plastic.	12.0
					15	CL		CLAY: black, strong organic odor, plastic, soft.	15.0
					20				22.0
					25			Color change to dark grey, very soft, very moist.	
					30				
					35	CL			
					40				

WELL DIAGRAM
- Bentonite Cement with 5% Bentonite Grout (0-38 ft bgs)
- 2" Diam. Sch 40, PVC Blank (0-49 ft bgs)

Continued Next Page

NEWGINT 3.GPJ NEWGINT.GDT 4/17/00

Camp Dresser & McKee, Inc.
18881 Von Karman Avenue, Suite 650
Irvine, CA 92612
Telephone: (949) 752-5452
Fax: (949) 752-1307

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS **BORING/WELL NUMBER** MMW-928

PROJECT NAME Playa Vista **DATE DRILLED** 03/03/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45	GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected with a split-spoon sampler.	45.0	Bentonite Pellets (38-48 ft bgs); 2" Diam. Sch 40, PVC Blan (0-49 ft bgs); #3 Lonestar Sand (48-55 ft bgs); 2" Diam. Sch 40, PVC, 10-slot (49-54 ft bgs)
					50					
					55			Total depth is 55 feet bgs.	55.0	

NEWPOINT FL... S.GPJ NEWPOINT.GDT 4/17/00

CDM
Camp Dresser & McKee, Inc.
18881 Von Karman Avenue, Suite 650
Irvine, CA 92612
Telephone: (949) 752-5452
Fax: (949) 752-1307

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
LOCATION Playa Vista Area D
DRILLING METHOD Hollow Stem Auger
SAMPLING METHOD Cuttings
GROUND ELEVATION 14.87 ft. MSL
TOP OF CASING 18.01 ft. MSL
LOGGED BY R. Basilio (Group Delta)
REMARKS

BORING/WELL NUMBER MMW-944
DATE DRILLED 3/6/2000
CASING TYPE/DIAMETER 2" Sch 40 PVC
SCREEN TYPE/SLOT 2" Sch 40 PVC/10 slot
GRAVEL PACK TYPE #3 Lonestar Sand
GROUT TYPE/QUANTITY Portland Cement/5% Bentonite
DEPTH TO WATER NM
GROUND WATER ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					0	SC		CLAYEY SAND: brown.	3.0	
						SP		POORLY GRADED SAND: yellowish brown, fine to coarse sand.	5.0	
					5	CL		CLAY, SOME SILT: dark gray.		Bentonite Cement with 5% Bentonite Grout (0-42 ft bgs)
					10					2" Diam. Sch 40, PVC Blank (0-54 ft bgs)
					15					
					20			Color change to gray.	20.0	
					25					
					30					
					35	CL				
					40					

Continued Next Page

NEWGINT.PLA AJ NEWGINT.GDT 4/14/00

CDM
Camp Dresser & McKee, Inc.
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Irvine, CA 92612
Telephone: (949) 752-5452
Fax: (949) 752-1307

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 10610-27775-NEWELLS
PROJECT NAME Playa Vista
BORING/WELL NUMBER MMW-944
DATE DRILLED 3/6/2000

Continued from Previous Page

PID (ppm)	BLOW COUNTS	RECOVERY (Inches)	SAMPLE ID.	EXTENT	DEPTH (ft. BGL)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH	WELL DIAGRAM
					45					2" Diam. Sch 40, PVC Blank (0-54 ft bgs)
					50				50.0	Bentonite Pellets (42-52 ft bgs)
						GP		GRAVEL: The lithology was determined by the driller by the rough drilling conditions. Samples were too fluid and/or loose to be collected by the split spoon sampler.		#3 Lonestar Sand (52-59 ft bgs)
					55					2" Diam. Sch 40, PVC
									60.0	2" Diam. Sch 40, PVC, 10-slot (54-59 ft bgs)
								Total depth is 60 feet bgs.		

NEWGINT PLA\ ..\ NEWGINT.GDT 4/14/00

APPENDIX D

ISOTECH®

Isotech Laboratories, Inc. 1308 Parkland Court Champaign, IL 61821-1826 Telephone 217/398-3490 FAX 217/398-3493

April 14, 2000

Victor Jones
Exploration Technologies Inc.
3698 Westchase Dr
Houston, TX 77042

Dear Vic:

I have done a quick review, in the short time available, of the newly acquired data from the Playa Vista site. Although I have looked at a number of different parameters within the data set, I do not have time to go into great detail now. To help demonstrate my observations I am enclosing three figures. Figure 1 is a plot similar to plots that I have sent you in the past which shows the carbon and hydrogen isotopic compositions of the methane samples from this study relative to typical compositional ranges of gases from different sources. As you can see, most of the samples fall along a zone stretching from the sub surface microbial gas zone into the edge of the thermogenic gas zone. This zone, I believe, represents different mixtures of thermogenic gas and biogenic methane. Another group of samples falls above this zone. Those samples represent gases that have been subjected to bacterial oxidation affects. As a matter of fact, there are two more samples which do not appear on this plot because they are off scale, above the plot.

The second figure enclosed is the same data at an expanded scale to show more detail, and including all of the samples from this group. Again, we see a spread of samples along a horizontal trend which appears to indicate mixtures of biogenic methane and thermogenic methane. There are a number of samples which cluster near the right end of this trend, and these samples are the ones which have the least, if any biogenic methane with them.

There is also a very strong vertical trend on this figure. These samples are believed to have been strongly affected by bacterial oxidation. Shown on the figure is a V shaped arrow indicating possible oxidation affects. The right hand arm of the V is the trend that we normally observe for methane oxidation effects. However, with the current data set, it appears that oxidation is strongly affecting the hydrogen isotope composition with little if any affect on the carbon isotope composition. The result is a shift in a vertical direction, approximately parallel to the left leg of the V. This appears to be a very strong trend, but is different than what I have observed previously. I should point out that it is not only this data that is used to draw the conclusion that these samples have been subjected to oxidation. This is also demonstrated by the oxygen deficiencies in the samples and the carbon isotopic composition of the carbon dioxide. One sample, well # 39, appears to have been strongly affected both by oxidation and mixing with biogenic methane.

The cluster of samples in the lower right hand corner of Figure 2 show the least affects of either methane oxidation and biogenic methane formation. In fact if we compare this data to the other available data for the samples, there appear to be three samples in particular that show the least secondary affects, and thus are the freshest thermogenic methane. These three are wells 153, 175, and 912. This suggests that there are two different locations within the study area where gas seeps exist. Assuming that the maps you sent me are laid out in a normal north-south east-west arrangement, it appears that there is one source of thermogenic methane in the southeast corner of the study area near wells 912 and 921, and the other is just southeast of the intersection of Lincoln Boulevard and Jefferson Boulevard.

Figure 3 is again the same data, but I have colored the sample markers differently to indicate three different groups of gases. The solid black dots represent relatively pure unaltered thermogenic gas. Please note the term relative, as even some of these gases do appear to show some secondary affects. The open circles are those which represent mixtures of thermogenic gas and biogenic methane. Of course some of these samples are predominately thermogenic gas and some appear to be predominately biogenic gas. The third group of samples are shown as shaded dots and they represent gases that have been significantly altered by bacterial oxidation. Most of the samples which have been severely oxidized are thermogenic gases, but some of the biogenic mixtures also appear to have been subjected to some oxidation affects.

If one applies the coding shown on Figure 3 to the map that you sent me, there are some definite zones that can be identified. There are two zones which are relatively pure unaltered thermogenic gas centering around the wells identified previously. There is also a zone in between these two areas which contains bacterial methane or biogenic gas. There are also zones which appear to be predominately oxidized gases.

The relationship between the thermogenic gas seeps and the biogenic methane is somewhat difficult to understand, but is a phenomenon that I have observed previously. At another site that I worked on in Southern California, we appeared to find evidence of biogenic methane associated with natural gas seeps where those seeps were pure thermogenic gas. My explanation for this in the past was that with a natural seep such as we appear to have here, where gas has probably been coming to the surface for hundreds or thousands of years, there can be a very substantial culture of bacteria developed that lives on this gas. The interface between the oxic and anoxic zones can change depending upon hydrostatic conditions, barometric pressure, and the rate of gas seepage. Therefore a specific location that is anoxic at one time could be oxic at another time, or vice versa. If an oxic zone becomes anoxic, it seems reasonable to me that anoxic bacteria could consume the residual cell material present in that zone and convert it to methane. In simple words, I believe that the methanogens could be living on the dead methanotrophs. Therefore, the zones where we see biogenic gas today may have been, at some time in the past, the site of methane oxidation.

And another twist to this story is that last summer at the AAPG conference in Durango, Colorado, there was a paper given in which it was concluded that some methanogens are actually switch hitters. That is, under some conditions they can be methane producers whereas under

Isotech Laboratories, Inc. 1308 Parkland Court Champaign, IL 61821-1826 Telephone 217/398-3490 FAX 217/398-3493

other conditions they can be methane consumers. In particular the author, I believe, was referring to sulphate reducing bacteria. This is an intriguing idea because we have a great deal of field evidence that sulphate reducing bacteria can consume methane, yet the microbiologists have not been able to culture sulphate reducing bacteria that consume methane. The author's conclusion was, I believe, that the reason for this is that it is not sulphate reducing bacteria that are consuming methane, but that it is methanogens that are reducing sulphate. If it is this type of phenomena that is occurring at Playa Vista, that may also explain the lack of carbon isotope fractionation that we see associated with the methane oxidation. That is, this may be a site of anaerobic oxidation and not aerobic oxidation as we usually see. This would also suggest that the oxidation may actually be occurring at greater depth and not in the near-surface where our samples are collected.

With a previous group of samples from this area we observed trends in the ethane isotope data. However, for the current data set, which covers a much larger area, the trends are not so clear cut and thus I have not included that data in this discussion.

This is a fascinating set of data and I am sorry that I don't have more time to work with it, but I hope that my comments are helpful to you. Is I mentioned, I will be out of town next week, but will be back in the office on April 24th.

Sincerely Yours,

Dennis D. Coleman
Laboratory Director

DDC:lc
Enclosures

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Figure 1

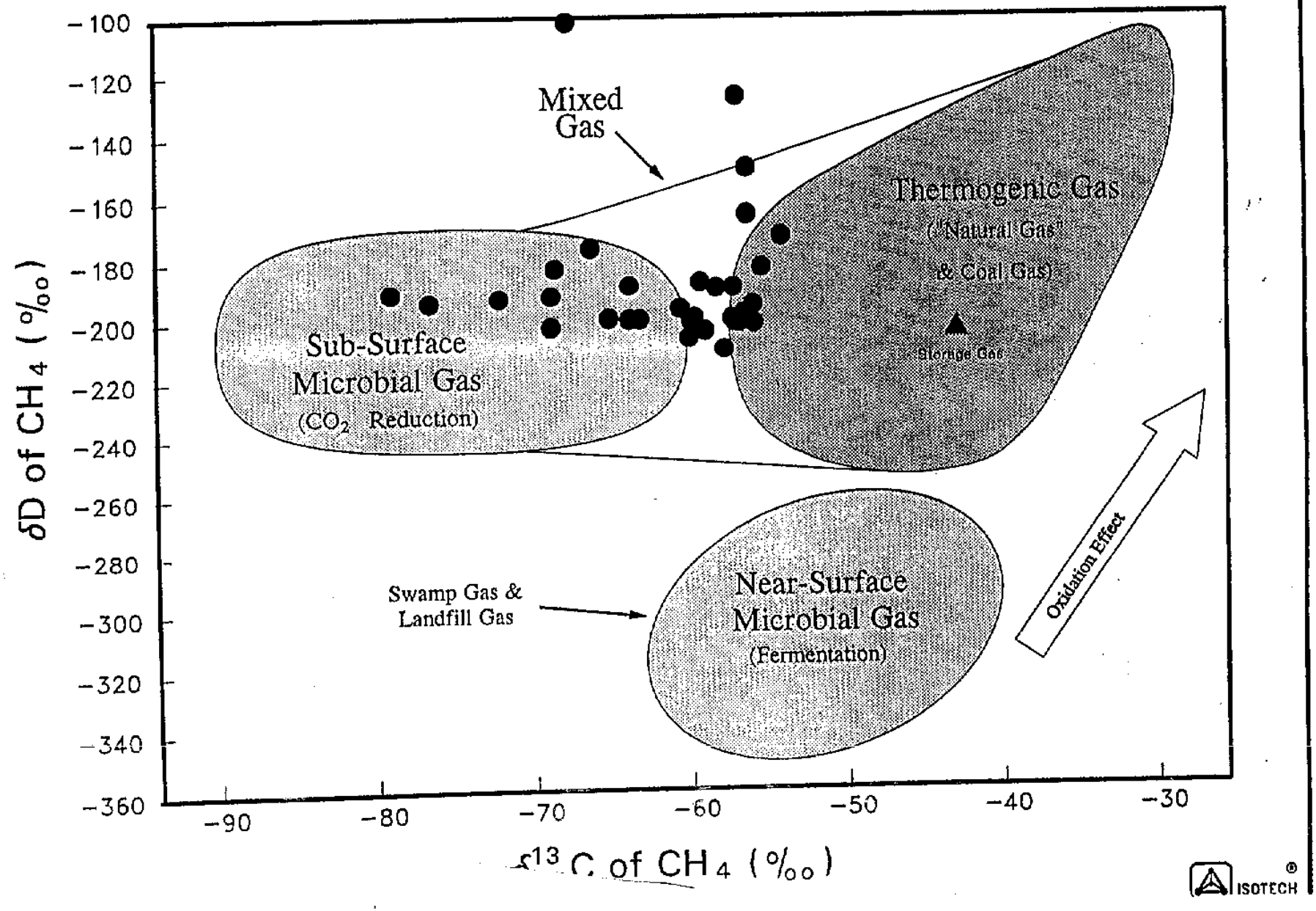

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Figure 2

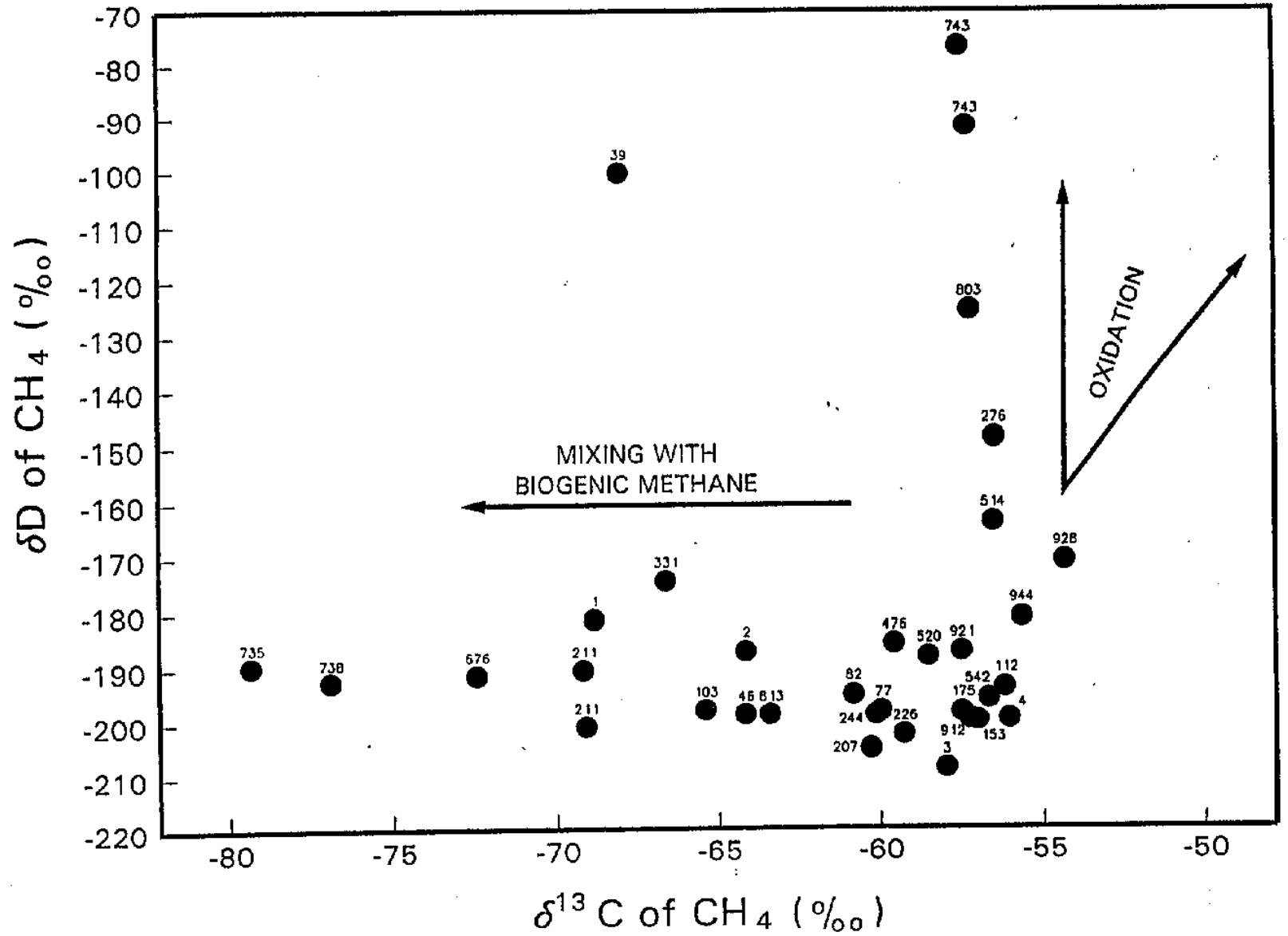

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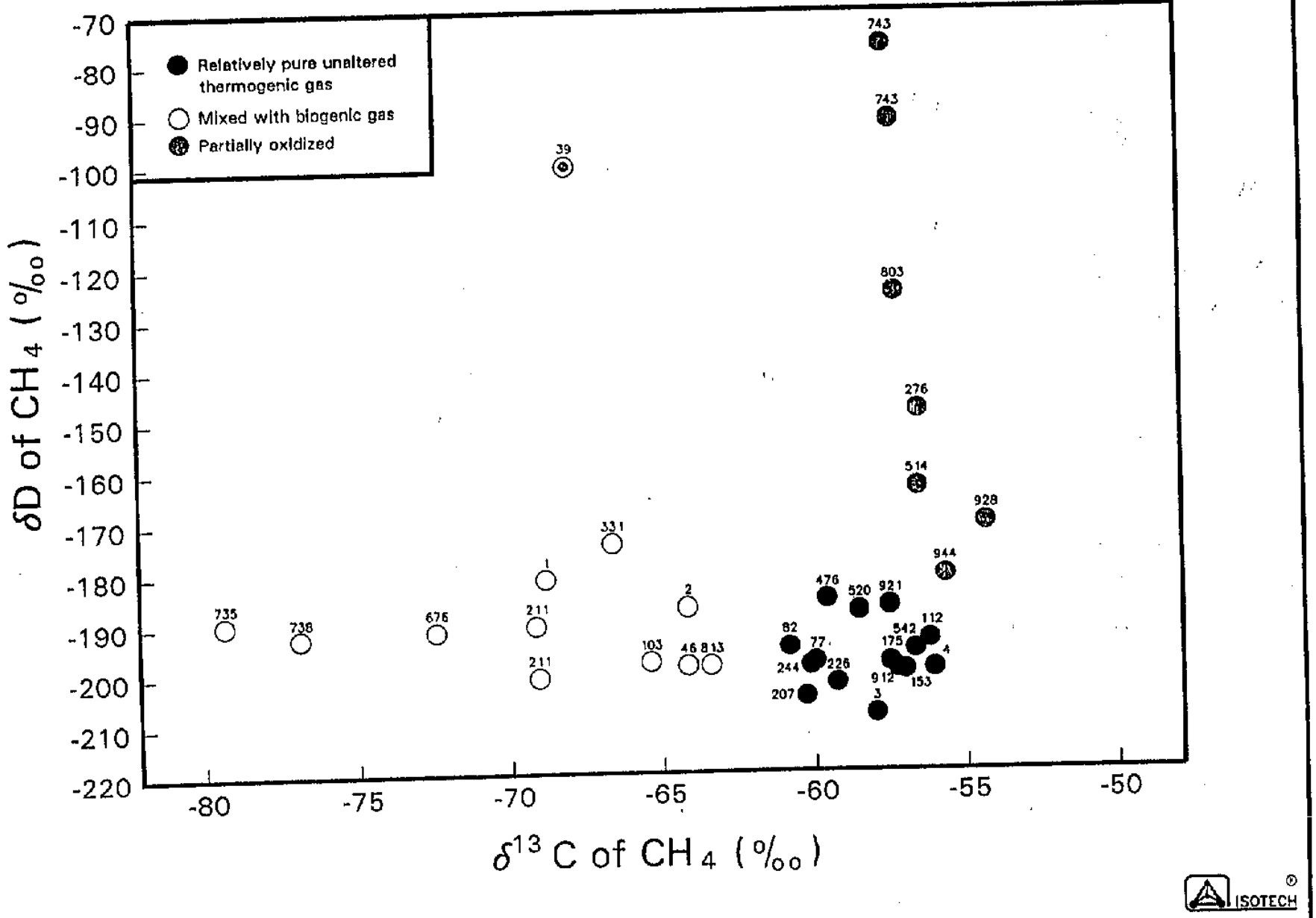
Figure 3


Relatively pure unaltered thermogenic gas
Mixed with biogenic gas
Partially oxidized
δD of CH4 (‰)
δ13 C of CH4 (‰)
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
-80
-75
-70
-65
-60
-55
-50
743
743
39
803
276
514
928
331
944
1
476
520
921
735
738
676
211
2
82
77
112
542
175
103
46
8
13
4
244
226
912
153
207
3
211
ISOTECH

Planning & Permitting			
		Duration	Cost
Assumes No CDP Required		4 weeks	$15,000

Field Work			Duration			Duration		
Sampling Grid	# of Points	# of Points/Crew/Day	# of Crews=	# of days	# of weeks	# of Crews=	# of days	# of weeks	Cost
800	19	15	1	1.3	0.3	2	0.63	0.13	$2,171
400	107	20	1	5.4	1.1	2	2.68	0.54	$12,229
300	183	20	1	9.2	1.8	2	4.58	0.92	$20,914
200	0	25	2	0.0	0.0	3	0.00	0.00	$0
100	0	30	2	0.0	0.0	3	0.00	0.00	$0

Lab Analysis		Costs					
	# of Samples (# of points + 12%)	LH @ 6 d/TAT	BTEX @ 14d/TAT	10% of Isotopes @4 Weeks	H2S @ min crew	Total	Field Work Plus Lab Costs
800	2.28	$114	$137	$130	$203	$583	$2,755
400	12.84	$642	$770	$732	$856	$3,000	$15,229
300	21.96	$1,098	$1,318	$1,252	$1,464	$5,131	$26,046
200	0	$0	$0	$0	$0	$0	$0
100	0	$0	$0	$0	$0	$0	$0

Data Compilation and Evaluation		
	Duration	Cost
	4 weeks	$20,000

Report Preparation		
	Duration	Cost
	4 weeks	$20,000

Management & Coordination	
	Cost
	$20,000

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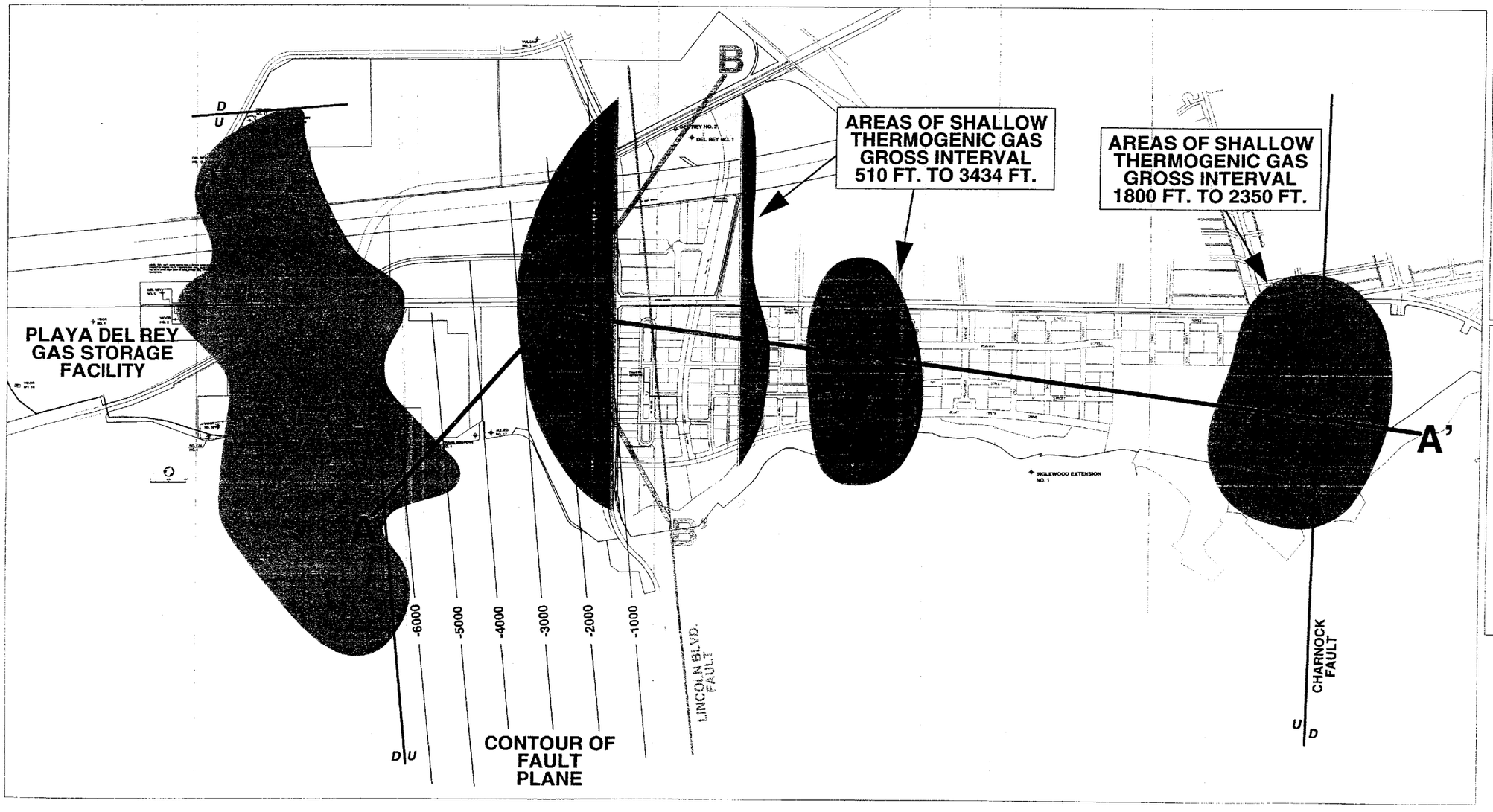

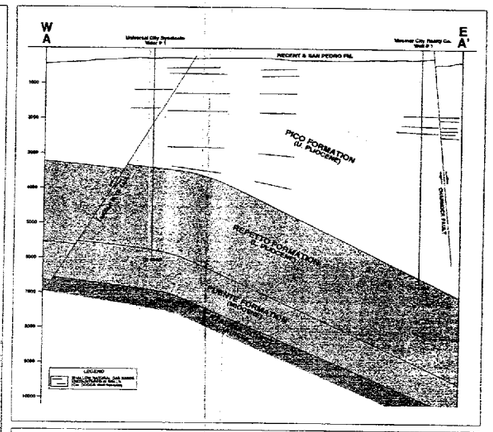

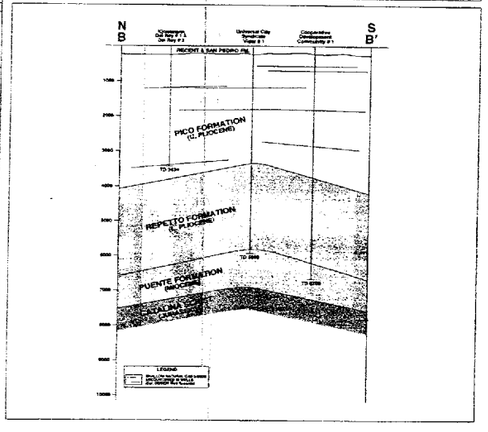

Exploration Technologies, Inc.

Plate 1
Site Characterization

Playa Vista Development
First Phase Project
Los Angeles, California

Prepared For:
City of Los Angeles Department of Building and Safety

09-211904-2000PR000001 Date Prepared: 04/13/00

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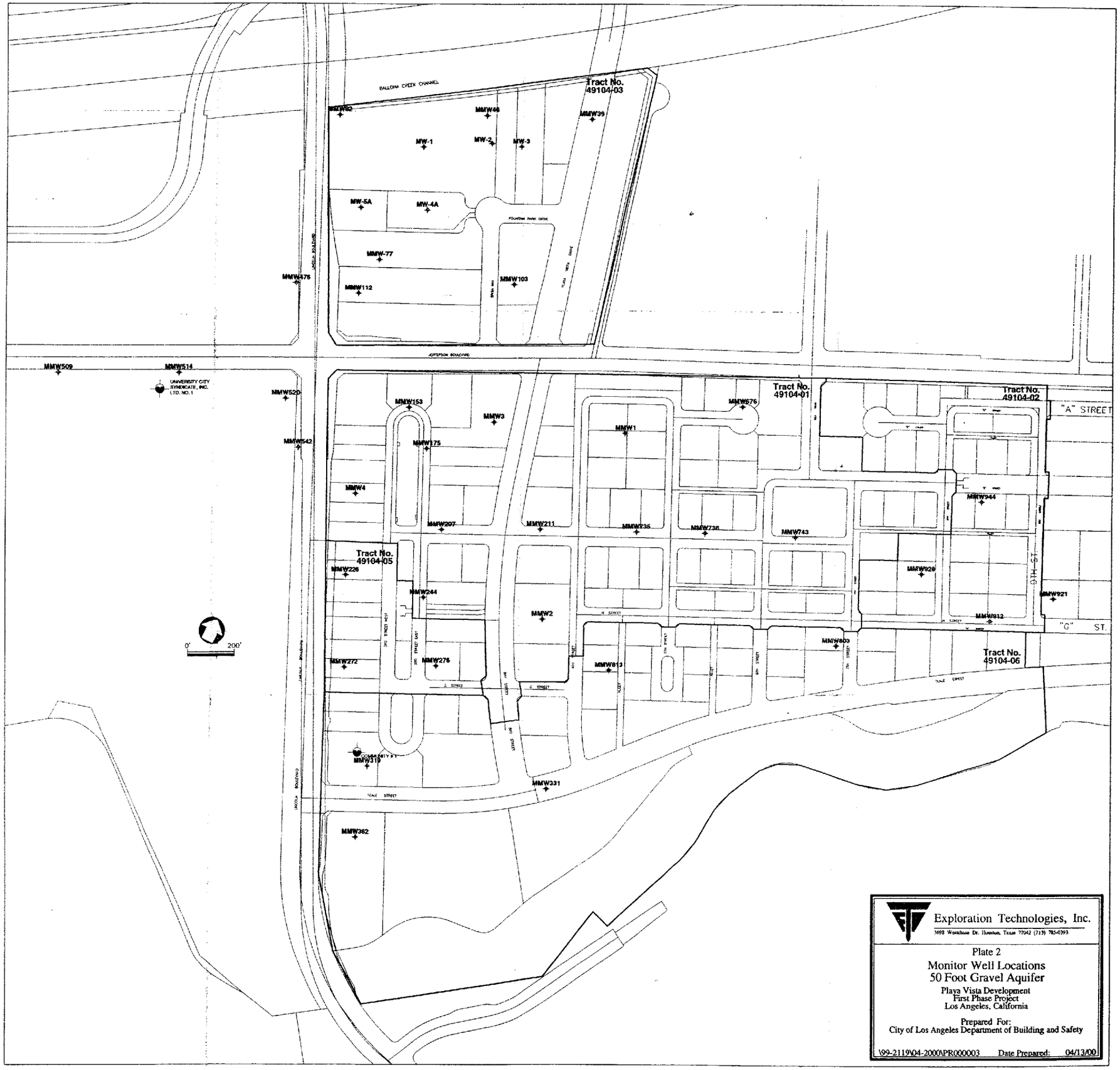

Exploration Technologies, Inc.
3698 Westchase Dr. Houston, Texas 77042 (713) 785-0393

Plate 2
Monitor Well Locations
50 Foot Gravel Aquifer
Playa Vista Development
First Phase Project
Los Angeles, California

Prepared For:
City of Los Angeles Department of Building and Safety

\99-2119\04-2000\PR000003 Date Prepared: 04/13/00

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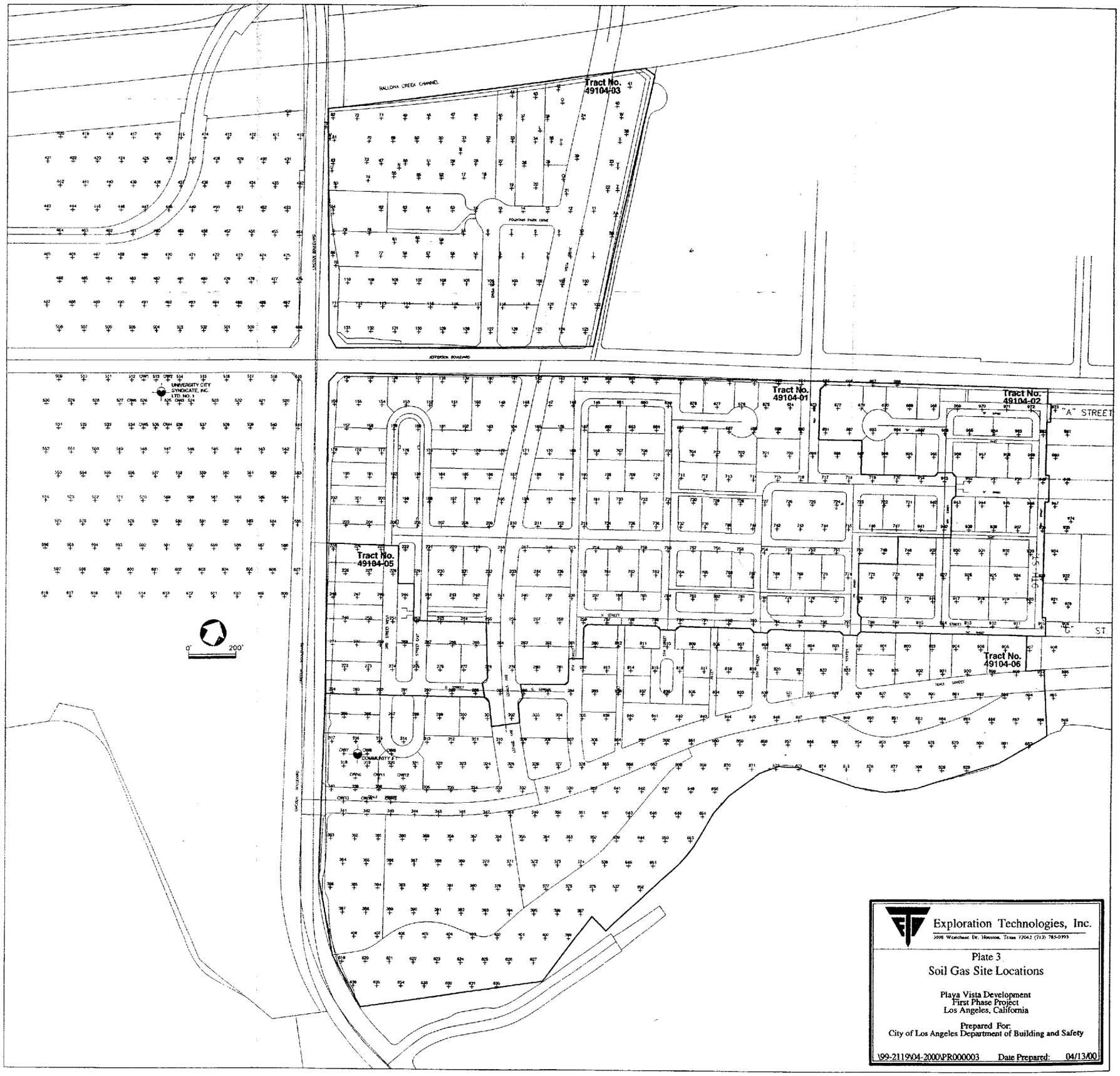

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Plate 3
Soil Gas Site Locations

Playa Vista Development
First Phase Project
Los Angeles, California

Prepared For:
City of Los Angeles Department of Building and Safety

\99-2119\04-2000\PR000003 Date Prepared: 04/13/00

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Plate 4
Methane Concentrations (ppmv)
4 Foot Soil Gas Survey
Playa Vista Development
First Phase Project
Los Angeles, California

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City of Los Angeles Department of Building and Safety

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Plate 5
Ethane Concentrations (ppmv)
4 Foot Soil Gas Survey
Playa Vista Development
First Phase Project
Los Angeles, California

Prepared For:
City of Los Angeles Department of Building and Safety

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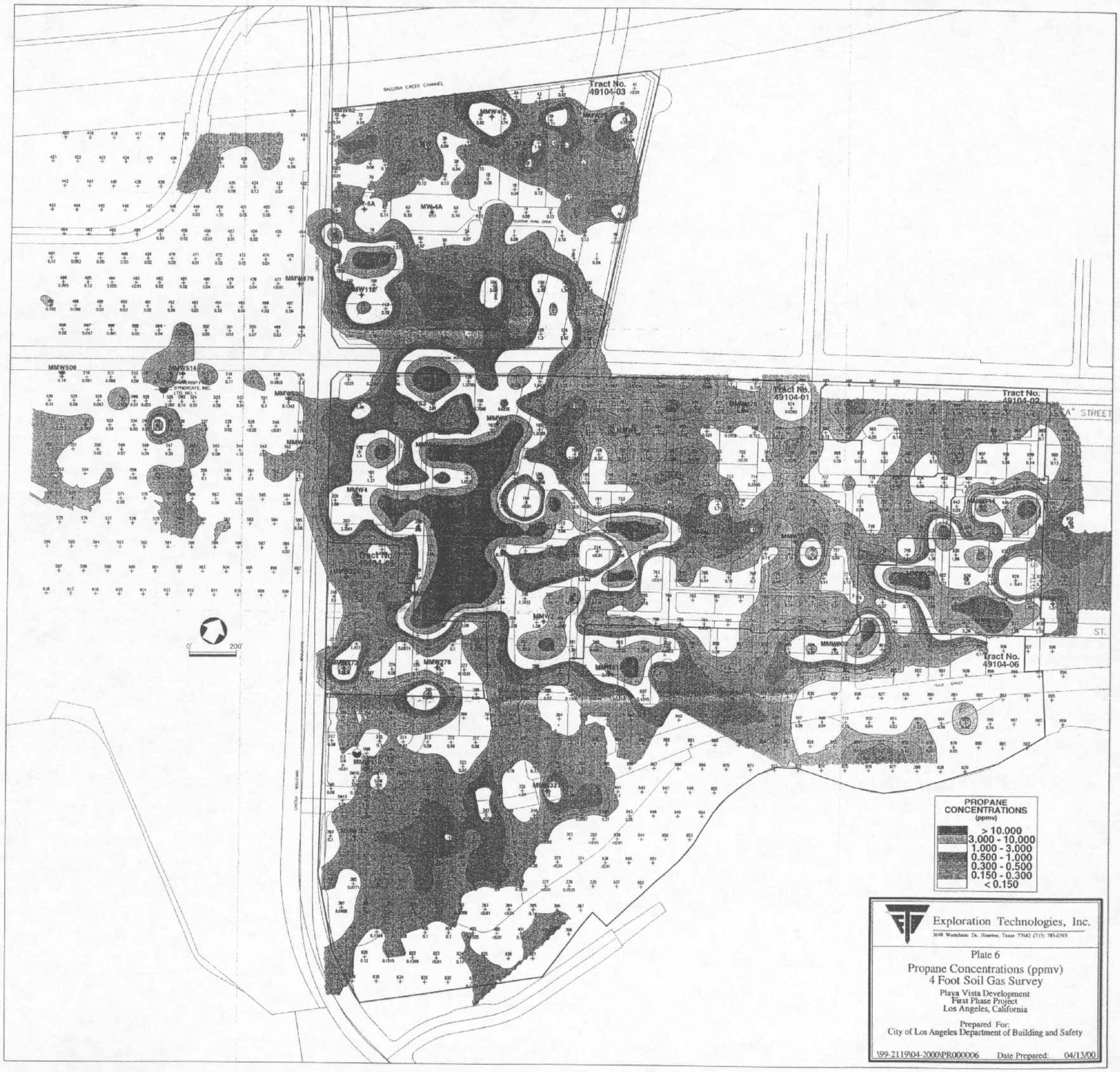

Exploration Technologies, Inc.
3608 Westheimer Dr. Houston, Texas 77042 (713) 785-0393

Plate 8

Hydrogen Sulfide Concentrations (ppmv)
4 Foot Soil Gas Survey

Playa Vista Development
First Phase Project
Los Angeles, California

Prepared For:
City of Los Angeles Department of Building and Safety

\99-2119\04-2000\PR000008 Date Prepared: 04/13/00

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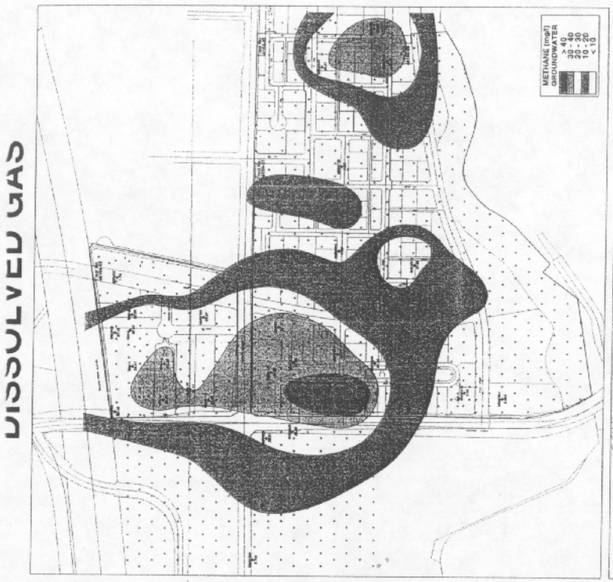
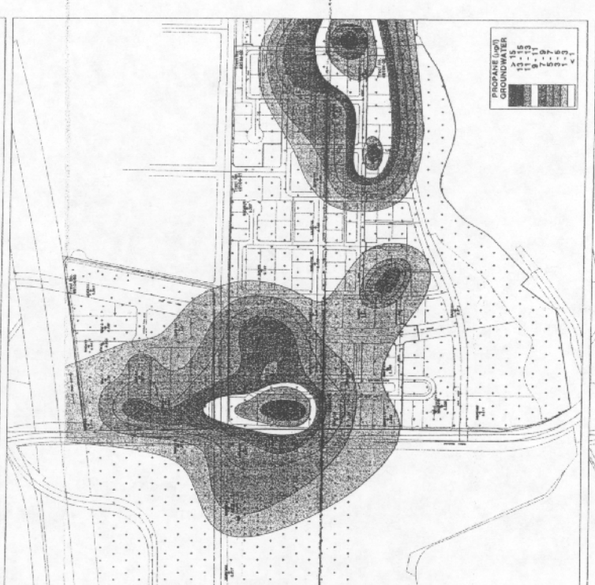
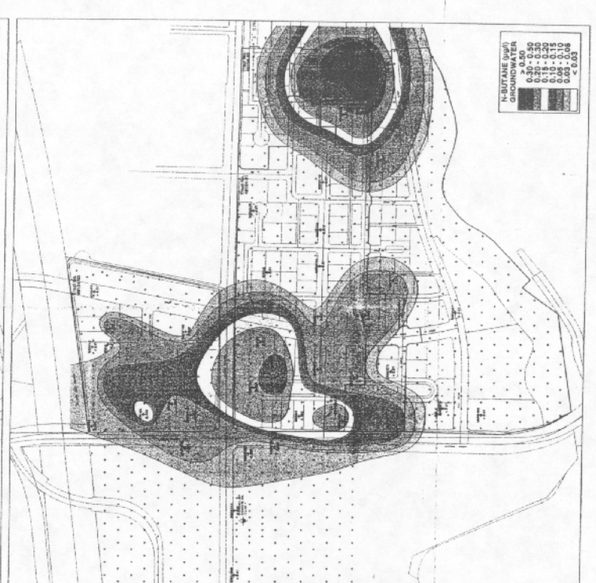
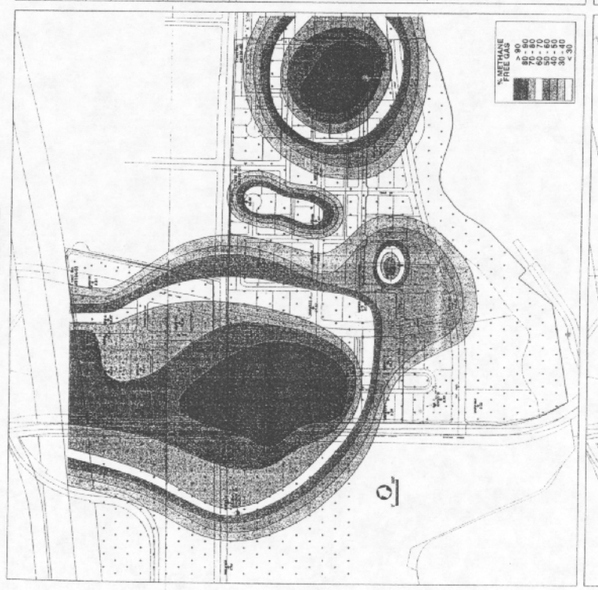
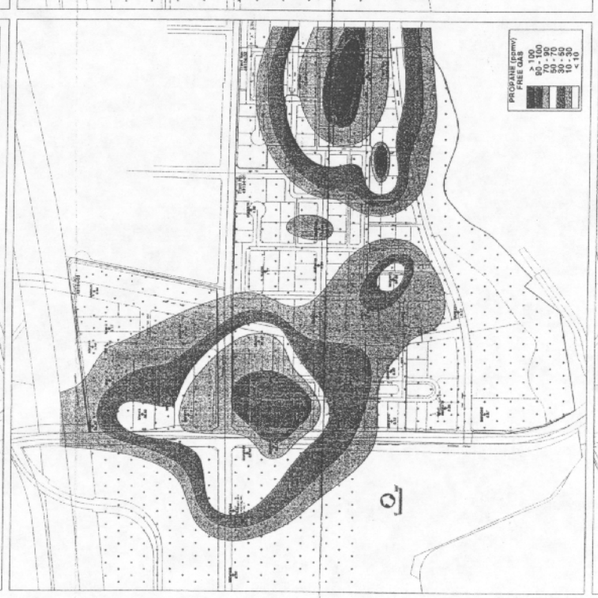
DISSOLVED GAS











Exploration Technologies, Inc.

Plate 11

Light Hydrocarbon Concentrations of Dissolved and Free Gas from 30-Foot Groundwater Aquifer

Playa Vista Development
Third Phase Project
Los Angeles, California

Prepared For:

City of Los Angeles Department of Building and Safety

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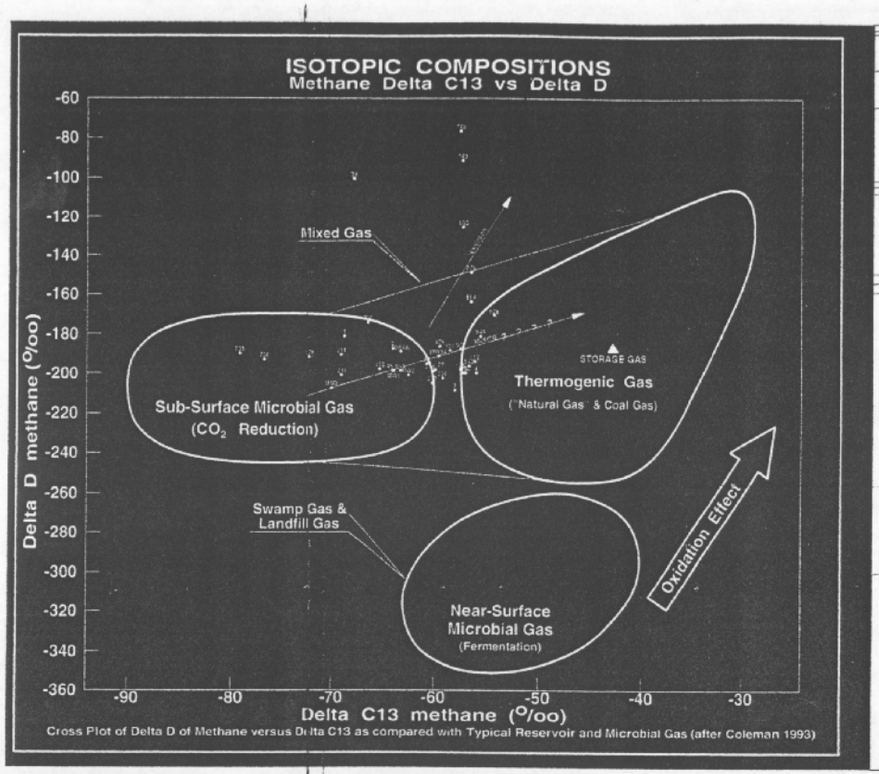

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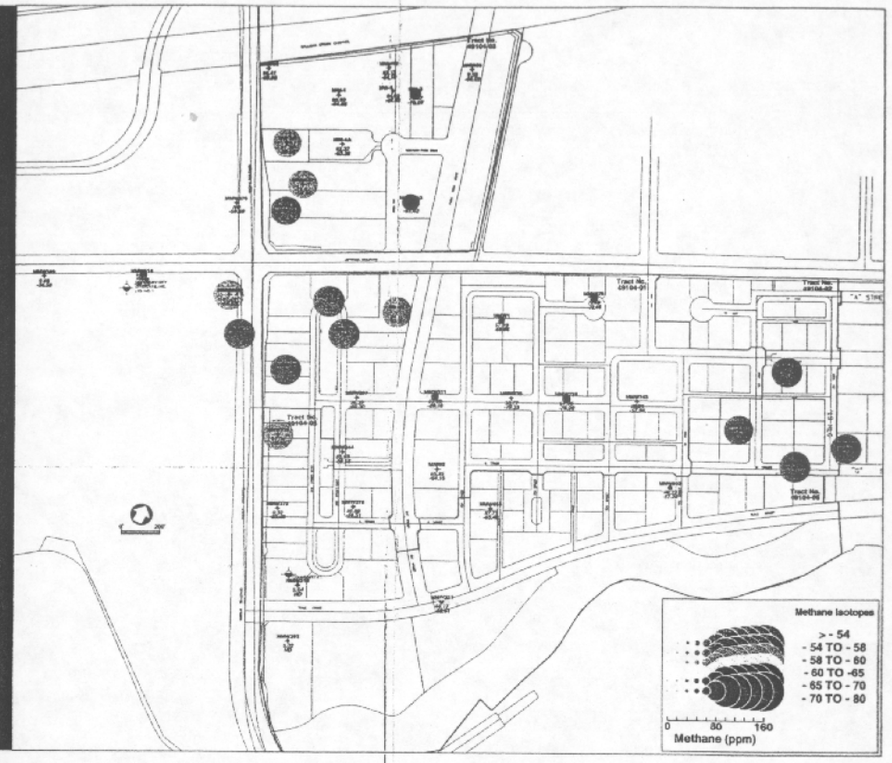

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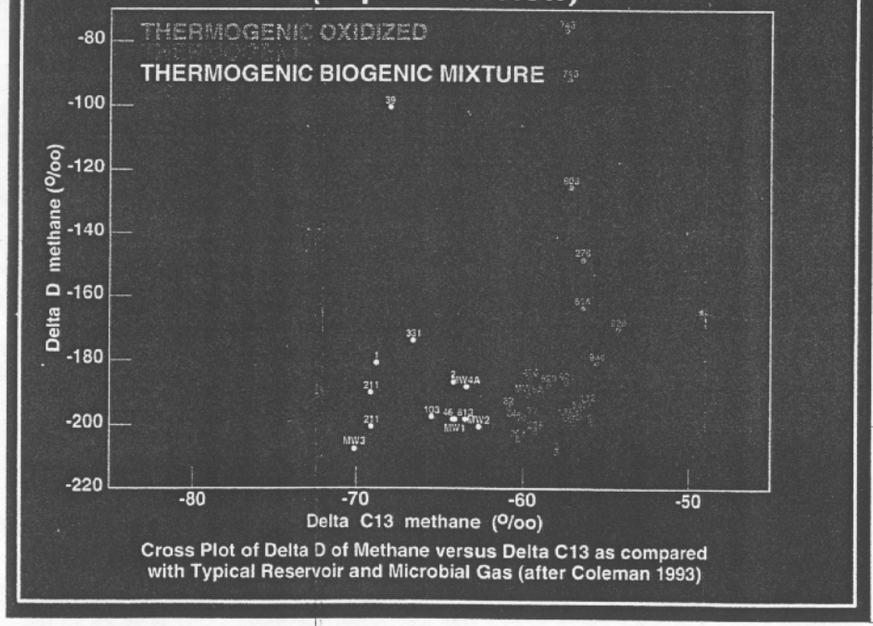

c)

d)

Exploration Technologies, Inc.
3658 Westchase Dr. Houston, Texas 77042 (713) 785-0393

Plate 12
Summary of Methane Stable Carbon Isotope Analyses
Playa Vista Development
First Phase Project
Los Angeles, California

Prepared For:
City of Los Angeles Department of Building and Safety

\99-2219\04-2000\PR000012 Date Prepared: 04/14/00