Tire-Derived Aggregate In Landfill Gas Collection Systems: Badlands Landfill Pilot Study

Pilot Analysis Phase III Report

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Executive Summary

In April 2012, GHD was retained by CalRecycle to provide sampling and monitoring of an in-place tire-derived aggregate (TDA) gas collection system known as Phase III of a pilot study located at the Badlands Landfill, Moreno Valley, Calif. (Figures 1 and 2). The purpose of Phase III was to compare the performance of landfill gas (LFG) collection through horizontal collection wells constructed with TDA to those constructed with traditional gravel media. Conclusions of this pilot study are limited to the findings and discussion regarding landfill gas flow and landfill gas constituent concentrations from the horizontal wells presented in this report.

For Phase III of this pilot study, five LFG wells were monitored and sampled for landfill gas: two with traditional aggregate, denoted as HW-23 and HW-26; and three with TDA, denoted as HW-25, HW-26, and HW-27. Eight bimonthly sampling and monitoring events were performed over a four-month period (July 2012 through October 2012). Specific goals related to the monitoring and sampling of landfill gas in the horizontal wells included determining relative hydraulic efficiency and relative constituent analysis comparison.

Hydraulic Efficiency Evaluation

Initial field-monitoring data showed that the gravel wells had more airflow to the wellhead than the TDA-constructed wells. However, when the airflow data for the wells were normalized to reflect 100 percent open valves for the compared wells, they indicated that the TDA wells have more flow capacity than the gravel wells. A thorough review of the monitoring events flow data determined that at refuse depths averaging 75 feet, the TDA wells are capable of extracting gas at the same or higher flow rates than comparably constructed gravel wells.

TDA material has a larger initial void space volume than typical gravel and therefore would be expected to have more airflow capacity than gravel. TDA is known to be a time-dependent (short- and long-term) compressive material (Finney et al., 2013), and compression is generally a function of the pore pressure and volume, and material composition. As the overburden load increases for TDA materials, the void space volume reduces through compaction and rearrangement of the individual TDA shreds (Finney et al., 2013). Airflow through a material is generally a function of pore space and pore connectivity. Since compression is related to burial depth, the burial depth of the three TDA wells should have an effect on the hydraulic efficiency of those wells.

Burial depths of the compared wells within the Badlands Landfill materials were estimated by taking the initial topographic map (Figure 2) of the site after the horizontal wells were installed and overlaying the 2012 site topographic map surface. Average fill depths were estimated by subtracting the previous surface elevations from the 2012 elevations. Profiles were then generated from the two topographic surveys to graphically display the average fill depth over the horizontal wells (Figures 3 through 7). The average landfill burial depth of the horizontal wells was 75 feet.

Since the long-term landfill densities within the Riverside and Orange County landfills ranges from approximately 1,100 to 1,300 lb/yd^3 (Leonard and Floom, 2000), an average density of

1,200 lb/yd^3 (44.44 lbs/ft^3) for the Badlands Landfill is assumed here for the purpose of estimating a maximum theoretical vertical stress exerted on the well piping (conservatively assuming no arching, bridging, lateral force distribution, or soil-dampening effects).

The resulting data from the hydraulic efficiency analysis indicates that gravel- and TDA-constructed wells under the estimated current fill depth (approximately 75 feet deep) conditions contain comparable theoretical porosities, and thus should have similar landfill gas flow at the wellheads. Estimated gravel porosity here is held constant, approximately 25 to 40 percent (Freeze and Cherry, 1979), because gravel compressibility is generally very low under these overburden conditions (Sowers, 1979).

Since the compression of TDA results almost entirely in porosity reduction and particle re-orientation to accommodate the strain (Finney et al., 2013), we can assume that the percent vertical strain has a linear relationship with percent porosity loss. Since the maximum initial porosity of TDA is approximately 63 percent (Wartman et al., 2007, Finey et al., 2013), and the range of maximum theoretical vertical strain associated with 75 feet of landfill burial corresponds to 25 to 50 percent vertical strain (Wartman et al., 2007, Finey et al., 2013), then the estimated remaining porosity in the HW-25 TDA trench below 75 feet of landfill refuse fill materials conservatively ranges from 31 to 47 percent.

For representation purposes, horizontal wells HW-23 (gravel) and HW-25 (TDA) are compared. Both trenches were constructed to the same length and relative orientation to the main pipe header, and they had the same average depth at the time of this evaluation (Figures 3 and 5). The normalized flow velocities in TDA well HW-25 were, on average, 35 percent higher (derived from Table 2) for the eight sampling events than gravel well HW-23. This indicates that TDA performs as efficiently or significantly better than gravel at landfill gas extraction and that the remaining in-place porosity of the TDA is more likely on the higher end of the range estimated here.

Normalized flow data of the compared wells under the current overburden conditions indicated that the TDA well trenches hydraulically perform as well or better than the typical gravel well trenches historically used.

Constituent Analysis Comparison

Average landfill gas measurements collected in the field (methane, carbon dioxide, and oxygen) were similar to that expected within solid waste landfills. In general, vapor samples collected from both TDA- and gravel-constructed landfill gas wells contained constituent concentrations and patterns similar to the historical Badlands Landfill data (Appendix D). The average percentage of methane and other typical landfill constituents collected from both TDA and aggregate types of wells are statistically similar and within the expected landfill ranges for methane, carbon dioxide, and oxygen. Additionally, the volatile organics and sulfur compounds analytical values reported from the lab appear consistent with the site's overall historic data.

The resulting data from the Phase III landfill gas sampling and constituent analysis indicates that in the given landfill site and locations, the TDA well trenches perform the same or better than the typical gravel well trenches historically used to extract landfill gas.

Introduction

In April 2012, GHD, Inc. (GHD) was retained by CalRecycle to provide sampling and monitoring of a TDA gas collection system as Phase III of a landfill gas extraction trench pilot study (herein referred to as Phase I, Phase II, or Phase III pilot study) located at the Badlands Landfill in Moreno Valley, Calif. The first two phases of the study were initiated by Kennec, Inc. (KENNEC), in April 2007, and are summarized below.

Phase I Summary

Phase I of the pilot study focused on the construction of five horizontal landfill gas collection wells/trenches to assess the constructability and performance of TDA as an alternative to gravel aggregate (gravel) for horizontal landfill gas collection wells. Of the five horizontal wells, three were constructed using TDA as the backfill material around the perforated pipe, and the other two were constructed using traditional gravel as the backfill material. The final horizontal well characteristics are indicated below.

The typical well design called for a depth of 4 feet and a width of 2 feet with the bottom 2 feet of each trench to be excavated into the landfill refuse. TDA was specified to conform to Type A TDA (maximum dimension of 8 inches, with 100% passing a 4-inch sieve, 95% by weight passing a 3-inch sieve, minimum 50% passing a 1.5-inch sieve, and a maximum of 5% passing a 3/16-inch sieve).

The gravel was specified to be 2 to 4 inches in diameter and crushed in conformance with ASTM C131. A 6-inch-diameter high-density polyethylene (HDPE), standard dimension ratio (SDR) 11, perforated pipe was to be placed on 6 inches of drainage material in the bottom of the trench, then surrounded and covered with 18 inches of drainage material. The 6-inch-diameter pipe was to be installed in 40-foot-long sections and joined with a 4-foot section of an 8-inch-diameter HDPE, SDR 11, perforated expansion pipe. The perforations for both the 6-inch and 8-inch pipe were 1/8 inch wide by 1 inch long spaced at 1.5 inches on center with four rows of perforations at 90-degree intervals perpendicular to the pipe. The top of the drainage material was covered with a 10-ounce woven geotextile material prior to placement of clean cover soil to fill the remaining 2 feet of trench depth.

In addition to the standard trench, each horizontal well was designed to have a 10-foot by 10-foot by 4-foot-deep pit incorporated along the extent of the trench. The pit was designed to have a 3-foot drainage layer with 1 foot of cover soil. The purpose of this trench design was to provide the landfill with an exact surveyed access location larger than the trench.

Gravel delivery was the largest hurdle to overcome during Phase I activities, with supply depletion on the last 50 feet of HW-26 construction. Therefore, a suitable, slightly larger 4- to 6-inch on-site gravel stockpile was used as the best readily available alternative. Information gathered during Phase I of the pilot study is presented in Appendix E. KENNEC documented the final horizontal well construction details as indicated in Table 1 below:

Table 1: Final TDA Horizontal Well Construction Details

Well ID	Final Trench Length (feet)	Drainage Backfill Materials
HW-23	800	gravel
HW-24	920	TDA
HW-25	800	TDA
HW-26	700	gravel
HW-27	715	TDA

Phase II Summary

The purpose of Phase II of this pilot study was to compare the performance of landfill gas collection through the five horizontal collection wells constructed with both TDA and traditional gravel media (HW-23 through HW-27). Phase II could not be initiated until the horizontal collection wells were covered with sufficient waste material so that landfill gas extraction could safely begin. Only a portion of the horizontal collection wells were buried at the time of Phase II initiation; therefore, KENNEC only evaluated the quality of landfill gas produced from horizontal wells HW-26 (aggregate) and HW-27 (TDA). It was determined that, over the course of the four sampling events, the analytical data was variable between the two well types and by each sampling event. It was recommended that additional monitoring and sampling events be conducted when the remaining three wells become active (complete well burial within landfill refuse fill materials) in landfill gas collection. Information performed as Phase II of the pilot study is presented in Appendix E.

Phase III Summary

This report represents Phase III of this pilot study with the purpose of continued monitoring of the Badlands Landfill extraction trenches since all five wells were actively collecting landfill gas and completely buried within landfill refuse fill materials. This report reflects the total pilot study intent: specifically, to compare the hydraulic properties of both TDA and aggregate landfill gas collection wells and to determine potential effects the TDA may have on the landfill gas quality when compared to the traditionally used aggregate media.

Phases I, II, and III of the pilot study have been sponsored by CalRecycle in cooperation with Riverside County Waste Management Department.

Site Description and Background

The Badlands Landfill is located at 31125 Ironwood Ave. (Figure 1), slightly northeast of the jurisdictional boundary of the City of Moreno Valley and north of Highway 60, west of the City of Beaumont, in an unincorporated area of Riverside County, Calif.

Of the 1,168 acres of the current landfill property, 246 acres are currently permitted for facilitating disposal of municipal solid waste. The 246-acre permitted landfill area currently encompasses:

- A 150-acre landfill disposal footprint area;

- A 40-acre borrow area;
- A 1.3-acre sedimentation basin;
- An approved waste recycling park;
- Other disturbed areas utilized for access roads, maintenance facilities, office building, and various other ancillary facilities; and
- A few undisturbed areas.

The Badlands Landfill is currently operating under Solid Waste Fill Permit (SWFP) No. 33-AA-0006/05-11, issued by the Riverside County Environmental Health Department, which is the Local Enforcement Agency. The landfill is currently permitted to receive a maximum of 4,000 tons of municipal solid waste per day.

The local services area for the Badlands Landfill is generally considered to include the City of Moreno Valley and surrounding cities and unincorporated communities. The landfill accepts residual waste from the Robert A. Nelson Transfer Station/Materials Recovery Facility, which primarily serves the City of Riverside. As a regional disposal facility, the landfill is also permitted to receive waste from the cities and unincorporated communities of the Coachella Valley in the eastern portion of Riverside County, Calif.

The Badlands Landfill, which has been in operation since 1966, is owned and operated by the Riverside County Waste Management Department and defined as a Class III sanitary landfill facility, as determined from Title 27, Sections 20240 through 20260 of the California Code of Regulations.

Landfill Gas Background

The composition and quality of landfill gas produced by a landfill depends on the rate of decomposition, which is affected by the moisture content of the waste, temperature, soil cover permeability, amount of precipitation, composition of the wastes, refuse particle size, compaction, landfilling practices, and lack of oxygen. Landfill gas, generally characterized by methane (CH_4), carbon dioxide (CO_2), hydrogen sulfide (H_4S), and sulfides (S_2-), is mostly produced through anaerobic bacterial decomposition, volatilization, and organic and inorganic chemical reactions. The majority of landfill gas is produced by bacterial decomposition that occurs when organic waste solids, food (e.g., meats and vegetables), garden waste (e.g., leaf and yard waste), wood, and paper products are broken down by the native bacteria naturally present in the waste and surrounding soils. Additionally, moisture plays a major role in the speed of decomposition. Generally, when there is more moisture in the refuse, more landfill gas is generated (unless saturated conditions are long-term).

Landfill Gas Production and Composition

There are four phases of bacterial decomposition that a landfill generally goes through the course of its lifetime. The composition of landfill gas changes with each of the four phases of decomposition. Landfills can often accept waste over a 20- to-30-year period, allowing for the waste in the landfill to be undergoing several phases of decomposition at once. Therefore,

waste in one area of the landfill is often in a different phase of decomposition than more recently buried waste in other areas.

The first phase of landfill decomposition is relatively fast and aerobic (occurs in the presence of oxygen). The second phase shifts to anaerobic decomposition conditions and is non-methanogenic. During the last two phases of decomposition, anaerobic conditions are dominant, and the composition of landfill gas is approximately 50 percent methane and 50 percent carbon dioxide with trace amounts (less than 1 percent) of nitrogen, oxygen, hydrogen sulfide, hydrogen, and non-methane organic compounds (NMOCs). The more organic waste and moisture present in a landfill, the more landfill gas is produced by bacteria during decomposition. When more chemicals, plastics, and synthetic materials are disposed in a landfill, a higher volume of volatile organic compounds and other gases are produced.

Specific anaerobic bacteria consume organic acids produced during the second phase of decomposition and subsequently create a neutral environment that is able to host a variety of methane-producing bacteria for the third phase of decomposition. The fourth phase of landfill decomposition occurs when the composition and production rates of landfill gas remain relatively constant. Moisture content is critical for the survival and growth of bacteria in a landfill. Ideal moisture content for decomposition is considered one that approaches saturation. Biological reactions can be retarded if moisture content drops below 40 percent and essentially stops when moisture content is below 20 percent. Therefore, in very dry climates, methanogenic decomposition will have a very small chance of occurring. In addition, methane can only be produced in a landfill when oxygen (O2) is no longer present.

Landfill Gas System

The Badlands Landfill, like the majority of modern landfills, utilizes an active gas control system with associated vertical and horizontal gas collection wells for the mitigation and treatment of landfill gas and the generation of electricity. An active gas management system removes gases from the landfill by creating a vacuum, which promotes gas flow from the well network and gas collection system though header lines (main pipe distribution) to an air filter and generator, where methane and NMOCs are treated, with excess flow going to a flare (gas combustion unit).

From an engineering and maintenance perspective, the most efficient header design is considered the “loop design” with integrated shutout valves spaced throughout the header system. The Badlands Landfill utilizes the loop design, which allows for the active system to operate more efficiently should the header line become clogged in some locations, requiring that section to be isolated and shut down for repair. The loop design allows for redundancy and ease of operation.

Major components of the active gas collection system at the Badlands landfill include:

- Vertical gas collection wells (standard aggregate use);
- Horizontal gas collection systems (standard aggregate and TDA use);
- Gas collection header lines;

- Blower;
- Condensate collection system; and
- Gas treatment system (generator and/or flare).

Landfill Gas System Operation and Maintenance

Routine balancing of the well field to ensure for proper operations is a critical process in active landfill gas control systems. Routine inspections for settlement, leaks, or clogged sections must be conducted. Extraction wells and header lines need to be checked routinely for leachate/condensate buildup that may inhibit the flow of landfill gas. Improper maintenance and operation of passive or active gas control systems can result in a point discharge to ambient air, odors and landfill gas migration, or explosion and fires. For these reasons, it is critical that the landfill simultaneously balance landfill gas production and recovery with electricity generation and regulatory air discharge (USEPA, 2010, ASTDR, 2001).

Sampling Methodology and Approach

The Badlands Landfill currently employs a Landfill Gas Monitoring and Control Plan (LGMCP) in accordance with local and state regulations (e.g., Title 29, Section 1150.1). All monitoring and sampling activities for Phase III of the pilot study were performed in accordance with the site's LGMCP. GHD performed monitoring and sampling of landfill gas with cooperation from the Badlands Landfill personnel independent of the existing compliance-monitoring program. Landfill gas flow at each of the horizontal wells (HW-23 through HW-27) was controlled by Badlands Landfill personnel as part of the regular system-balancing procedures. Badlands personnel regulate flow at each landfill well to balance landfill gas without the presence of oxygen (or with very small quantities, generally less than 2 percent) by adjusting flow valves that are built into each wellhead. Therefore, the initial raw landfill gas flow values measured by GHD at wells HW-23 through HW-27 were a function of the balancing conditions (primarily the absence of oxygen) that the landfill operators deemed appropriate for power generation and landfill gas treatment, not necessarily the well's construction details.

GHD, as part of the Phase III pilot study, monitored the landfill gas flow (for hydraulic efficiency evaluation) and sampled landfill gas at the wellheads of five horizontal wells twice a month for four months (July–October). For this third phase of the pilot project, five wells were monitored and sampled: HW-23 and HW-26 (aggregate wells), and HW-24, HW-25, and HW-27 (TDA wells).

The efficiency of five horizontal collection wells were evaluated using field equipment (i.e., GEM 2000+® unit and a digital airflow meter), which were used to measure airflow, temperature, carbon dioxide, methane, and oxygen from each wellhead. In order to further evaluate landfill gas being produced, discrete landfill gas samples were also collected in evacuated, specially coated stainless steel canisters (i.e., Summa®). See Appendix C for a photo log of each wellhead showing the sampling configuration, etc.

LFG samples were then delivered to Analytical Sciences, Inc., a certified third-party lab located in Petaluma, Calif. Samples were tested for typical landfill gas constituents for volatile organics (EPA-T015), dimethyl sulfide, and fixed gases. The laboratory analytical results are presented in Appendix A.

Specific goals related to the monitoring and sampling of LFG in the horizontal wells include:

- Monitoring the flow rates at each of the five wellheads;
- Monitoring and sampling gas quality and concentrations from the five horizontal wells;
- Comparing flow rates and landfill gas concentrations of aggregate versus TDA wells; and
- Comparing landfill gas constituent panels.

Field Activities

GHD field staff visited the site on a twice-monthly basis between July 11 and October 16, 2012, for a total of eight site visits, to monitor and sample the five site extraction wells (HW-23 through HW-27). Permission to enter the site and perform the work at the Badlands Landfill was granted by the current property owner, the Riverside County Waste Management Department. GHD personnel met with landfill representatives each time prior to entering the site.

During the initial field visit in July 2012, to aid in the collection of airflow measurements, small access ports were installed into the header piping of each of the five horizontal wellheads (See Appendix C). The ports are located at each wellhead such that airflow measurements could be collected with a portable manometer from each well prior to the airflow regulatory valve and prior to its connection to the main landfill gas collection header. These access port measurements, together with the percentage that the wellhead valve was open (10%, 20%, etc.), enabled the evaluation of individual wells' airflow performance and the comparison of airflow between wells.

Temperature and atmospheric pressure measurements were also collected at the time of airflow measurements. Additional field parameters (carbon dioxide, methane, and oxygen) were then collected with the GEM 2000+® unit and recorded on site with location-specific field data sheets.

After the field parameters were measured at each wellhead, discrete air samples were collected at the wellhead from the sample ports. LFG sampling ports were installed at each location prior to the airflow valve and its input into the main LFG collection header with dedicated sample tubing and fittings. At the sample port, tubing was connected to a sampling manifold using Swagelok® fittings and a Summa® 1.4 liter canister. The sampling manifold consisted of a stainless steel tube with a pressure gauge, a vacuum gauge, and connections for the sample canister. Each sample location was purged of air (from the connective tubing and sampling manifold) for a minimum of three minutes prior to sample collection to obtain a representative landfill gas sample. The time (PST), sample collection length of time, sample location, sample canister identification, sample manifold identification, and the canister vacuum before and after sample collection were noted for each air sample collected. Samples were then entered onto and accompanied by a chain-of-custody form and immediately shipped to the analytical laboratory via overnight mail.

Chemical and Physical Analysis

Chemical analyses for the landfill gas air samples included:

- Fixed gases by ASTM 1946D test method; and,
- Volatile hydrocarbons and sulfur compounds by EPA Test Method TO-15.

Quality Control Evaluation

The laboratory's quality assurance and quality control included the use of method blanks to exclude false-positive analyses and the use of laboratory control samples to evaluate the

percentage recovery of known analyte spikes. The recovery percentages for each of the sample analytes were within acceptable ranges. The complete laboratory report, QA/QC data, and the chain-of-custody form are included in Appendix A.

Results

Field Parameters

Airflow

Airflow is tabulated below according to sample date from the eight field events and the airflow at the gas collection wells were initially averaged by well type (TDA and gravel). On average (without normalizing flow to the percent the valve was open), the gravel wells had a larger volume of air, cubic feet of air flowing per minute (CFM), out of the wellheads, which is a function of the landfill operator's landfill gas extraction balance from the wellhead airflow valve. This relationship is shown on Table 2 below.

Table 2: Field-Collected Data

Well ID	Sample Date	Flow (CFM)	Normalized Flow (CFM) to Valve at 100% Open	Temp (F°)	Methane (CH_4) %	CO_2 %	O_2 %	Valve % Open*	Barometric Pressure (ATM)
HW-23 (Gravel)	7/10/2012	34.0	61.8	97.6	56.3	43.4	0	55	27.50
	7/24/2012	31.5	57.3	NM	53.5	40.3	0	55	27.56
	8/7/2012	39.4	71.6	123.2	53.5	43.2	0	55	27.57
	8/21/2012	33.1	60.2	105.6	50.2	41.2	0	55	27.51
	9/4/2012	33.4	60.6	99.1	49.2	39.7	0	55	27.69
	9/18/2012	35.9	179.4	99.6	63.3	45.2	0	20	27.60
	10/2/2012	34.7	63.1	112.5	53.5	40.3	0	55	27.28
	10/16/2012	28.6	63.6	98.6	56.1	43.9	0	45	27.52
Average		**33.8**	**77.2**	**77.2**	**54.5**	**42.2**	**0.0**	**49.4**	**27.53**
HW-24 (TDA)	7/10/2012	26.8	134.0	106.1	62.4	45.9	0	20	27.49
	7/24/2012	28.2	140.9	NM	58.0	41.9	0	20	27.56
	8/7/2012	29.9	85.4	111.6	59.4	46.4	0	35	27.56
	8/21/2012	16.4	82.2	101.9	56.4	43.5	0	20	27.50
	9/4/2012	19.3	96.7	103.1	55.9	41.3	0	20	27.65
	9/18/2012	37.2	186.0	98.4	65.7	45.0	0	20	27.60
	10/2/2012	23.5	117.6	112.8	54.3	40.4	0	20	27.29
	10/16/2012	34.4	98.3	104.4	55.0	45.0	0	35	27.52
Average		**27.0**	**117.6**	**117.6**	**58.4**	**43.7**	**0.0**	**24**	**27.52**

Well ID	Sample Date	Flow (CFM)	Normalized Flow (CFM) to Valve at 100% Open	Temp (F°)	Methane (CH_4) %	CO_2 %	O_2 %	Valve % Open*	Barometric Pressure (ATM)
HW-25 (TDA)	7/10/2012	46.8	133.7	111.5	57.8	43.7	0	35	27.49
	7/24/2012	36.6	104.4	NM	57.8	41.6	0.1	35	27.55
	8/7/2012	40.4	115.4	115.4	42.6	82.6	0	35	27.58
	8/21/2012	20.8	59.5	97.2	54.8	43.0	0	35	27.52
	9/4/2012	29.6	84.4	96.1	53.2	42.0	0	35	27.65
	9/18/2012	53.8	153.7	98.8	68.3	46.0	0	35	27.61
	10/2/2012	31.5	90.1	109.6	53.2	38.6	0	35	27.29
	10/16/2012	52.3	149.4	93.3	46.7	36.7	3.1	35	27.52
Average		**39.0**	**111.3**	**103.1**	**54.3**	**46.8**	**0.4**	**35**	**27.53**
HW-26 (Gravel)	7/10/2012	65.0	144.4	113.1	51.0	42.4	0	45	27.54
	7/24/2012	50.2	111.5	NM	55.4	38.5	0.1	45	27.59
	8/7/2012	55.1	100.2	116.8	54.0	NM	0.1	55	27.60
	8/21/2012	29.2	64.9	97.5	53.8	41.7	0	45	27.55
	9/4/2012	36.0	79.9	109.2	53.8	39.5	0	45	27.63
	9/18/2012	69.2	125.8	102.6	65.4	43.1	0	55	27.66
	10/2/2012	38.3	85.2	116.7	53.2	37.6	0	45	27.31
	10/16/2012	63.2	114.9	98.8	57.0	40.0	0	55	27.54
Average		**50.8**	**103.4**	**107.8**	**55.5**	**40.4**	**0.0**	**49**	**27.55**
HW-27 (TDA)	7/10/2012	21.5	21.5	106.1	55.8	46.6	0.06	100	27.51
	7/24/2012	17.2	17.2	NM	56.1	43.7	0	100	27.59
	8/7/2012	24.1	24.1	105.6	38.2	30.6	0	100	27.57
	8/21/2012	11.1	11.1	93.3	54.7	44.7	0.1	100	27.54
	9/4/2012	13.2	13.2	85.1	55.1	44.3	0.2	100	27.57
	9/18/2012	24.1	24.1	95.4	64.8	45.3	0	100	27.66
	10/2/2012	15.1	15.1	101.8	55.7	43.8	0.2	100	27.31
	10/16/2012	26.0	26.0	83.0	56.6	43.6	0.1	100	27.55
Average		**19.0**	**19.0**	**95.8**	**54.6**	**42.8**	**0.1**	**100**	**27.54**

NOTE:
NM = Not measured or error reading on unit
* = % Value of valve open as set by Badlands landfill personnel
CFM = Cubic feet per minute
ATM = atmospheric pressure in inches of mercury
F = Fahrenheit

Chart 1: Average Airflow vs. Time (Raw values, not normalized).

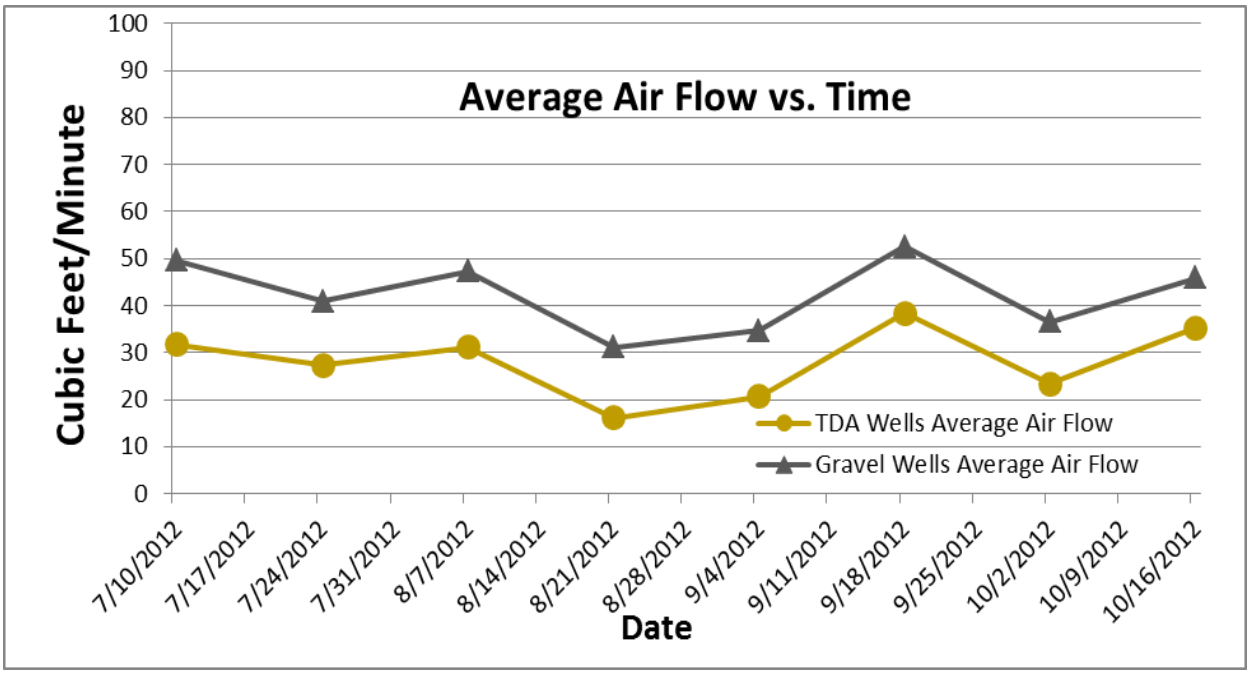


Chart 1 indicates the average measured flow velocities of gravel and TDA wells for each of the eight monitoring and sampling events. It is difficult to compare the airflow measurements from HW-27 to the other wells due to its location at the end of the gas collection system, the different screen length in the well design, and the length of header pipe to the extraction blower, all of which contribute to airflow loss. An additional problem with relating HW-27 to the other well flow data is that the flange installed at HW-27 was custom-built by site landfill personnel of an unknown diameter (assumed to be 2.5 inches) and no as-built drawings or documentation of the wellhead were available at the time of producing this report. For these reasons, HW-27 demonstrates reduced flow velocity and is not comparable to HW-23 through HW-26 with regard to airflow performance and is not shown.

Airflow in all the horizontal well trenches are individually controlled by a butterfly valve located where the header pipe meets the individual trench piping. The relationship shown in Chart 1 includes the valve adjustments (% open setting) as they were during the actual field flow measurements.

Badlands Horizontal Well Normalized Airflow Comparison

The directly measured flow velocities of gravel and TDA wells do not accurately reflect a relationship of the airflow performance to the two well types (because the landfill operators manually restrict/set the flow at each wellhead). Once the documented airflow values were normalized to the valves being open to 100 percent for wells HW-23 through HW-26, a flow performance could be analyzed. In this case, “normalization” of the flow data refers to a simplified and scaled version of statistics in which the normalized flow values allow for

comparison of values at their maximum potential. The “valve % open” data was used to estimate the maximum flow that each well could theoretically perform under the site operational conditions as they were during the sampling and monitoring period of 2012. It should be noted that this is a relative normalization estimate for comparing both well types; pipe friction and pipe head loss factors were not used in this calculation because both well types were constructed with the same type, size, and relative length of piping. Chart 2 presents average normalized airflow data.

Chart 2: Average Airflow (Normalized) vs. Sample Event Date in HW-23 through HW-26.

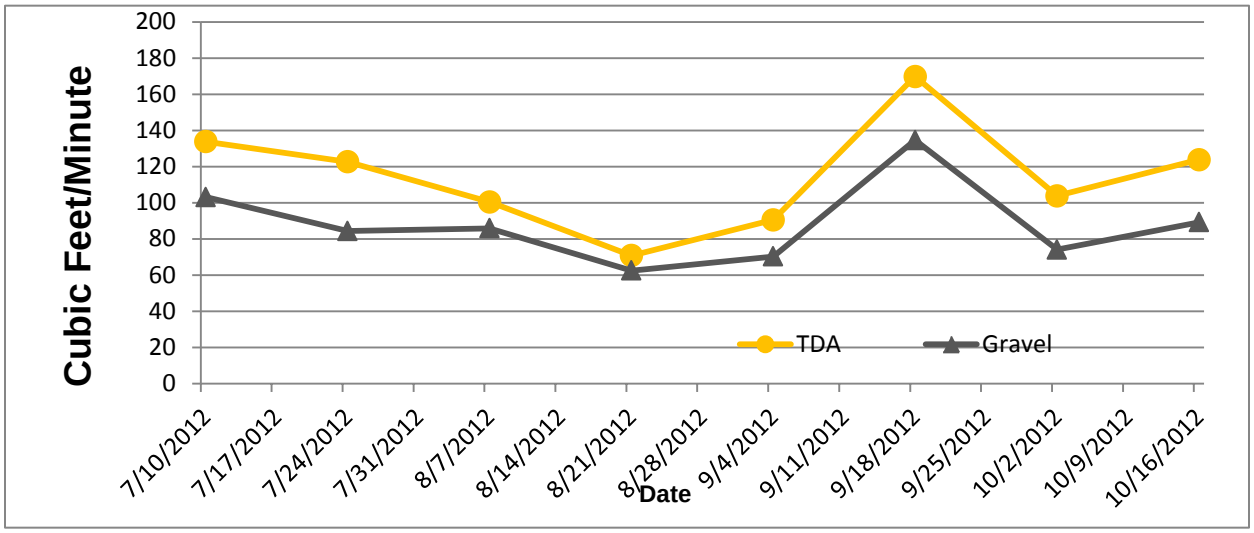
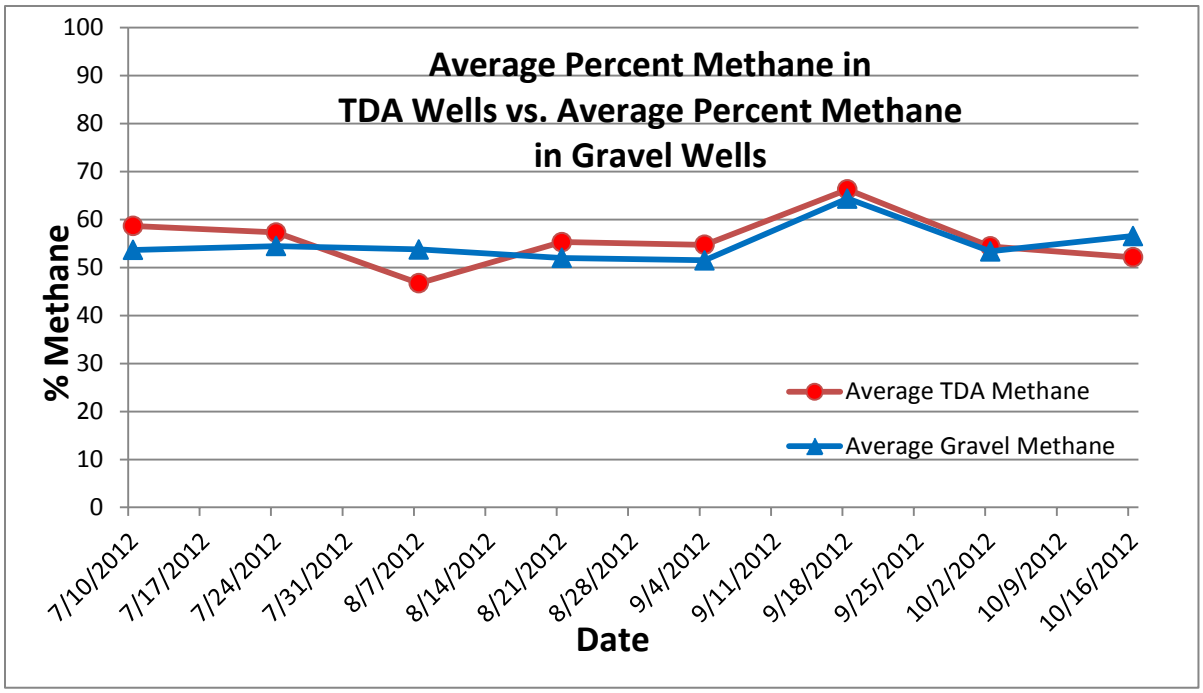


Chart 2 indicates that when the four wells’ (HW-23 through HW-26) flow data sets have been normalized, the TDA wells produce a higher resulting potential airflow velocity than the aggregate wells. Both well types appear to follow the same general flow pattern over time, with potential maximum flow in TDA increased on average 23 percent (from Table 2) more airflow than gravel wells. It should be noted that applying the Darcy friction factor to these estimates could adjust normalized maximum flow values relatively higher for both well types.

Field-Measured Methane

Methane measurements were collected from HW-23 through HW-27 during field activities from a GEM 2000+ LFG field instrument. The average percent methane measured in TDA wells and gravel wells are indicated on Chart 3 and included in Table 2. As Chart 3 shows, the average percentages of methane measured in both types of wells are comparable to each other and fall within the expected range of methane (approximately ±45-60%) within landfills.

Chart 3: Average % Methane TDA vs. Gravel Wells



Other Field-Measured Constituents

Carbon dioxide and oxygen measurements were also collected during field activities from a GEM 2000+ landfill gas field instrument. The percentages of carbon dioxide and oxygen measured in the field for the five wells were generally within the range expected of landfills, which are 40 to 60 percent and less than 1 percent, respectively. It should be noted however, that several times during the course of collecting the field-measured constituents, the landfill gas pipe collection system was stopped and restarted. Therefore, oxygen concentrations measured to be higher than 1 percent were most likely associated with the system stop/start process. Carbon dioxide and oxygen data are included in Table 2.

Other Field-Measured Parameters

Other field-measured parameters included ambient air barometric pressure (ATM units) and temperature of the landfill gas flowing through each wellhead. Temperature is monitored for qualitative analysis of bacterial activity, and barometric pressure can be monitored to model vertical and horizontal migration of landfill gas.

Generally, the rise in temperature of the refuse material is directly related to increased bacterial activity, which in turn increases landfill gas production and increases volatilization and chemical reaction rates. Generally, when the atmospheric barometric pressure is falling, the landfill gas tends to migrate out of landfills into the surrounding areas. Barometric pressure and temperature values are included in Table 2.

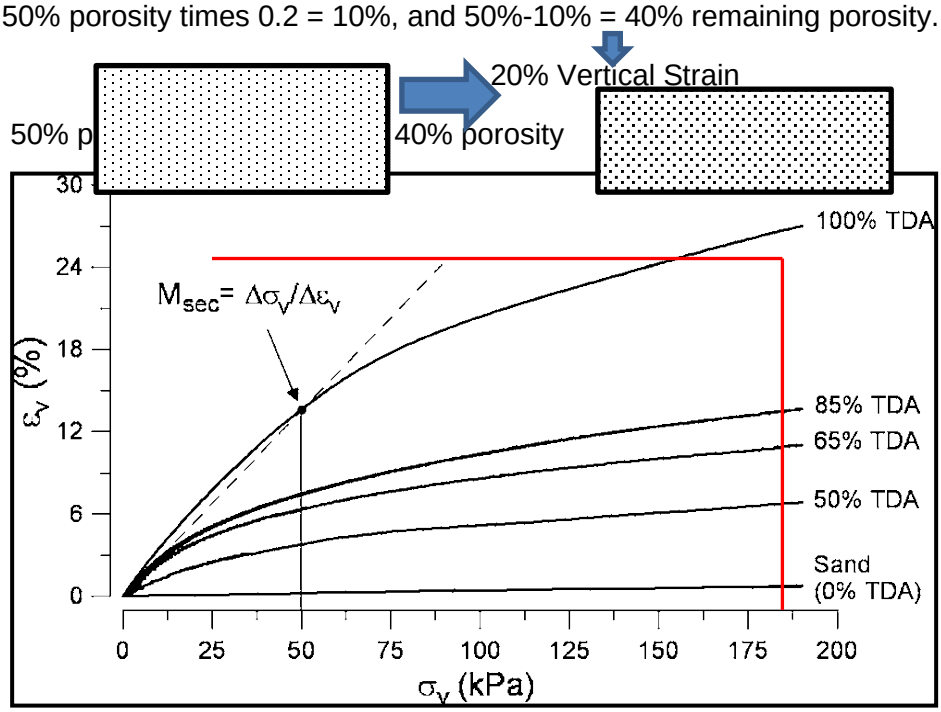
TDA Compressibility versus Landfill Burial Depth

TDA exhibits a high degree of immediate and time-dependent compression (Wartman et al., 2007, and Finney et al., 2013). Compressed TDA initially exhibits plastic deformation followed by long-term elastic behaviors under additional loading. The contribution of porosity reduction and particle rearrangement/self-packing are significant in the immediate compression of TDA and is a function of TDA particle size distribution and applied stress. Time-dependent compression is mainly a function of TDA size distribution and time. Under compressive loads (vertical stress), individual TDA particle compression is negligible, while TDA's high porosity attribute is thought to accommodate the majority of the strain (Finney et al., 2013).

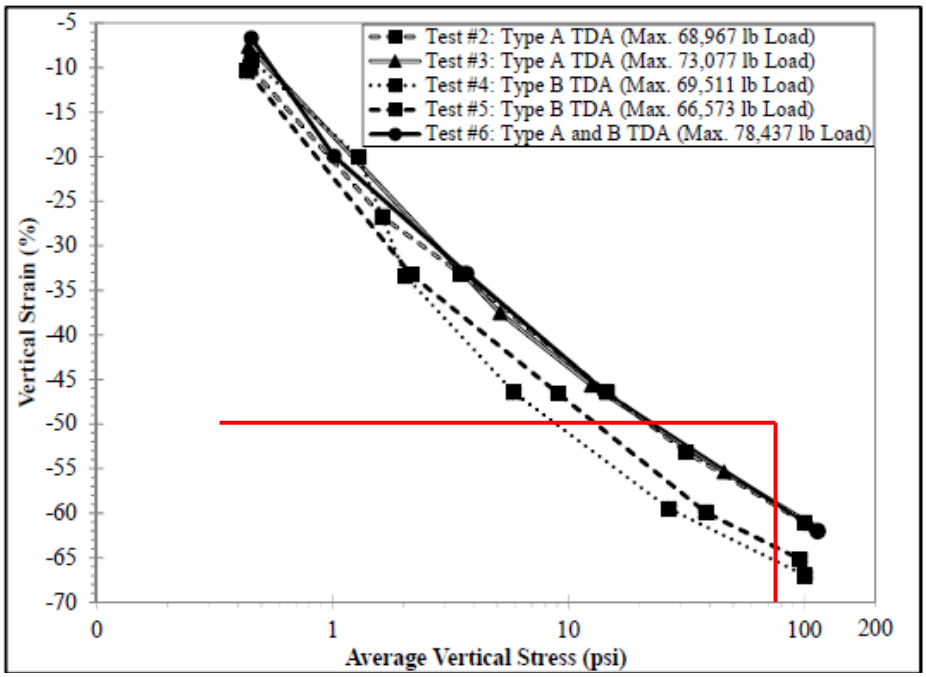
Compression experiments on TDA, holding lateral pressures constant, have provided information on the behavior of TDA under a range of compressive forces (Ahmed, 1993, Edil and Bosscher, 1994, Wartman et al., 2007, and Finney et al., 2013). Stress vs. Strain curves (Graphs 1 and 2) provide a range of theoretical vertical strain values (compression or vertical shortening) that different types of TDA or a percent composition of TDA undergo over a range of stress conditions. One can then estimate the remaining pore volume of the compressed TDA since vertical shortening through compression is inversely proportional to the pore volume of the compressed TDA.

For example, if a TDA material with an initial porosity of 50 percent has undergone 20 percent vertical strain (compressed by 20% overall in the vertical direction), and assuming all of the strain is accommodated as porosity reduction, then:

50% porosity times 0.2 = 10%, and 50%-10% = 40% remaining porosity.



Graph 1. Vertical strain (ε_v) vs. stress (σ_v) for various compositions of TDA (Wartman et al., 2007). Note: as stated in the example above, 25% ε_v corresponds to approximately 160 kPa σ_v.



Graph 2. Percent vertical strain versus stress (in pounds per sqaure inch) for Type A TDA, Type B TDA, and Type A and Type B mixture TDA (Finney et al., 2013). Note: As stated in the example above, 50% vertical strain (ε_v) corresponds to approximately 23 psi.

Current Horizontal Well Burial Depth

Burial depths of the current horizontal wells (HW-23 through HW-27) within the Badlands Landfill is estimated here. The fill depth was estimated by taking the initial topographic map (See Appendix E) of the site after the horizontal wells were installed and overlaying the 2012 site topographic map surface (Figure 2). Then average fill depths were generated by subtracting the previous surface elevations from the 2012 elevations. Profiles were then generated from the two topographic surveys to graphically display the average fill depth over the horizontal wells (Figures 3 through 7). The approximate landfill burial depths of the horizontal wells ranged from 66 to 84 feet at the time of this evaluation. Average burial depth is 75 feet.

Badlands Overburden Estimate

Horizontal wells HW-23 (gravel) and HW-25 (TDA), which have similar well construction, are compared to each other here in reference to overburden (vertical stress) and vertical deformation (vertical strain), in-place porosity, and normalized airflow because:

- Both wells are buried by approximately the same depth (~75 feet) of landfill refuse fill materials;
- Both wells have the same length of trench (800 feet, see Table 1); and,
- The wells are near each other and have the same relative orientation (the two wells were constructed generally in the northwest-southeast orientation) to the main pipe header (Figure 2);

Landfill long-term fill densities have been previously estimated from various landfills in southern California (See Table 3 below). Selecting data from landfills in the same vicinity helps represent similar conditions at the Badlands Landfill in terms of landfill type and native soil/fill mixing materials. Therefore, these estimated average landfill densities can be used to calculate theoretical maximum compression loads (vertical strain) exerted on the horizontal well trenches.

Table 3: Approximate Landfill Densities-Riverside and Orange Counties, Calif. Table Simplified from Leonard and Floom, 2000

SITE	LOCATION	LONG-TERM DENSITY metric tons/m^3 (lb/yd^3)		
		Measured/ Reported Refuse	Total Refuse and Cover	Landfilling
El Sobrante Landfill	Riverside County	1.04 (1740)	1.28 (2125)	0.78 (1294)
Olinda Alpha Landfill	Orange County	0.80 (1333)	0.99 (1651)	0.67 (1111)
FRB Landfill	Orange County	0.88 (1467)	1.15 (1910)	0.66 (1100)
Prima Descheca Landfill	Orange County	0.88 (1467)	1.15 (1910)	0.66 (1100)

Since the long-term landfill densities within the Riverside and Orange County landfills range from approximately 1,100 to 1,300 lb/yd^3, we assume an average density of 1,200 lb/yd^3 (44.44 lbs/ft^3) for the Badlands Landfill. If we assume only vertical stresses are exerted on the wells (no bridging, lateral force distribution, or soil-dampening effects), and that horizontal wells HW-23 and HW-25 have an approximate average of 75 feet of landfill materials overlying the trenches, then the resulting maximum theoretical vertical strain on the horizontal well trenches is:

75 ft x 44.44 lbs/ft^3 = 3,333.3 lb/ft^2 = 23 lb/in^2 (psi) or **160 kilopascals (kPa)**

The corresponding percent vertical strain (ε_v) associated with 23 psi /160 kPa, presented in Graphs 1 and 2, ranges from approximately 25 to 50 percent.

Current Badlands Horizontal Well Porosity Estimates

Gravel is not known to be a compressible material except under extremely high loads, and therefore, the gravel trenches buried within the landfill are not expected to significantly change or deform over time with regard to porosity. Since 2-inch gravel was used to construct the gravel horizontal wells (HW-23 and HW-26), and coarse gravel aggregates are known to range from 25 to 40 percent porosity (Freeze and Cheery, 1979), we assume the current gravel trench porosity ranges between 25 and 40 percent.

Since the vertical compression of TDA results almost entirely in porosity reduction and particle re-orientation to accommodate the strain (Finney et al., 2013), we can assume that the percent vertical strain has a linear relationship percent porosity loss. Since the initial porosity of Type A TDA ranges from 62.4% to 63.5% (Wartman et al., 2007, Finey et al., 2013), and the maximum

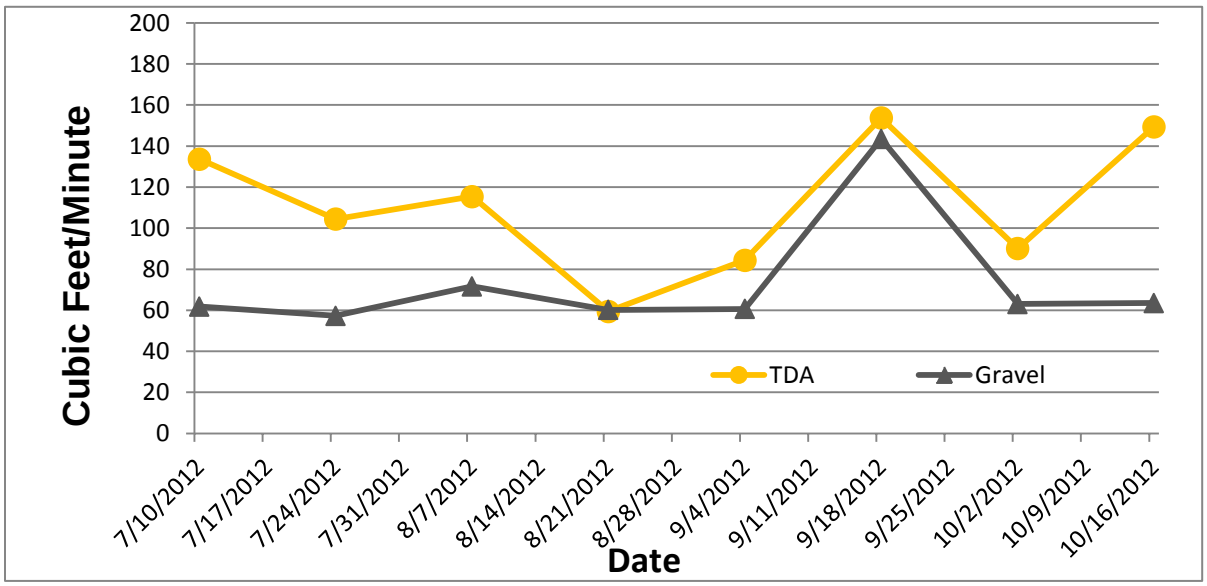
theoretical vertical strain associated with 75 feet of landfill burial corresponds to 25-50% vertical strain (as porosity reduction), then:

63+% porosity times 0.25 to 0.50 (vertical strain) is approximately 16%-32%. So 63% minus 16%-32% is approximately 31-47% remaining porosity in the HW-25 trench below 75 feet of landfill refuse fill materials

HW-23 (Gravel) and HW-25 (TDA) Hydraulic Efficiency Comparison

Since the estimated in place porosities of the gravel in trench HW-23 and the TDA in trench HW-25 are similar, and the well construction details and well orientations are also similar, then the normalized airflow velocities of the two well types should be similar.

Chart 4: Airflow (Normalized) vs. Sample Event Date in Wells HW-23 and HW-25



However, the normalized flow velocities in TDA well HW-25 were, on average, 35 percent higher (taken from Table 2) for the eight sampling events than those in gravel well HW-23. Chart 4 above shows the relationship of normalized airflow versus sample event date for the similarly constructed horizontal gravel well HW-23 and horizontal TDA well HW-25. This indicates that TDA performs the same or better than gravel at landfill gas extraction.

Analytical Laboratory Results

Landfill gas samples from horizontal wells HW-23 through HW-27 were collected and submitted to the analytical laboratory for analyses as described in Section 2.1 in order to qualitatively compare relative minor constituent concentrations of landfill gas collected from the TDA and gravel wells. As expected, volatile organic compounds (VOCs) like tetrachloroethane (PCE), petroleum hydrocarbons such as gasoline and benzene, chlorinated VOCs, and sulfur compounds (dimethyl sulfide) were detected in the landfill gas samples collected from the five monitored wells. Table 4 below summarizes examples of the average concentrations of gasoline, PCE, and dimethyl sulfide concentrations detected in wells HW-23 through HW-27.

Table 4: Average Gasoline, PCE, and Dimethyl Sulfide in TDA vs. Gravel Wells

	Sample Date							
	7/11/2012	7/24/2012	8/7/2012	8/21/2012	9/4/2012	9/18/2012	10/2/2012	10/16/2012
	Parts per Billion by Volume (ppbv)							
GASOLINE								
HW-23	520,000	1,100	1,800	460,000	340,000	440,000	61,000	150,000
HW-26	530,000	1,700	2,400	230,000	490,000	280,000	280,000	300,000
Gravel Well Average	**525,000**	**1,400**	**2,100**	**345,000**	**415,000**	**360,000**	**170,500**	**225,000**
HW-24	340,000	1,700	2,200	490,000	450,000	490,000	320,000	310,000
HW-25	570,000	1,900	2,100	440,000	510,000	440,000	430,000	920
HW-27	500,000	2,100	1,900	3,000	530,000	400,000	310,000	230,000
TDA Well Average	**470,000**	**1,900**	**2,067**	**311,000**	**496,667**	**443,333**	**353,333**	**180,307**
PCE								
HW-23	980	5	7	1,300	980	1,100	0	570
HW-26	1,100	6	6	0	1,000	920	810	660
Gravel Well Average	***1,040***	***6***	***7***	***650***	***990***	***1,010***	***405***	***615***
HW-24	860	5	5	900	920	0	610	610
HW-25	1,200	6	6	980	1,100	1,100	1,600	0
HW-27	1,000	7	6	0	1,100	900	1,400	590
TDA Well Average	***1,020***	***6***	***6***	***627***	***1,040***	***667***	***1,203***	***400***
DIMETHYL SULFIDE								
HW-23	16,000	6,000	12,000	15,000	12,000	15,000	2,400	5,800
HW-26	15,000	9,500	10,000	16,000	13,000	13,000	12,000	13,000
Gravel Well Average	***15,500***	***7,750***	***11,000***	***15,500***	***12,500***	***14,000***	***7,200***	***9,400***
HW-24	9,100	10,000	14,000	14,000	15,000	18,000	18,000	16,000
HW-25	16,000	11,000	13,000	14,000	17,000	17,000	20,000	0
HW-27	20,000	20,000	17,000	220	22,000	20,000	20,000	17,000
TDA Well Average	***15,033***	***13,667***	***14,667***	***9,407***	***18,000***	***18,333***	***19,333***	***11,000***

In general, the five wells exhibited similar average concentrations (to the same order of magnitude) and patterns of concentrations for the constituents analyzed and reported. As examples, Chart 5, Chart 6, and Chart 7 display the average concentrations of gasoline, PCE, and dimethyl sulfide, respectively, in the gravel and TDA wells. The complete laboratory

analytical reports are included in Appendix A, and a summary table of analytical results is included in Appendix B.

Chart 5: Average Gasoline Concentrations in TDA and Gravel Wells

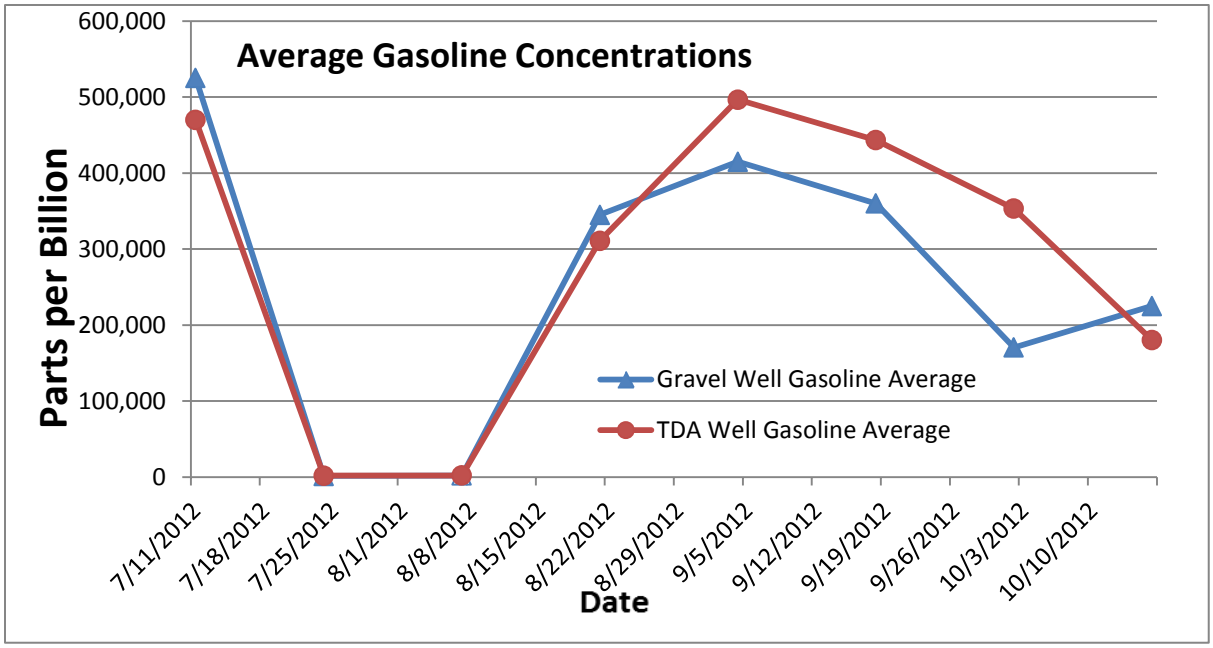


Chart 6: Average PCE Concentrations in TDA and Gravel Wells

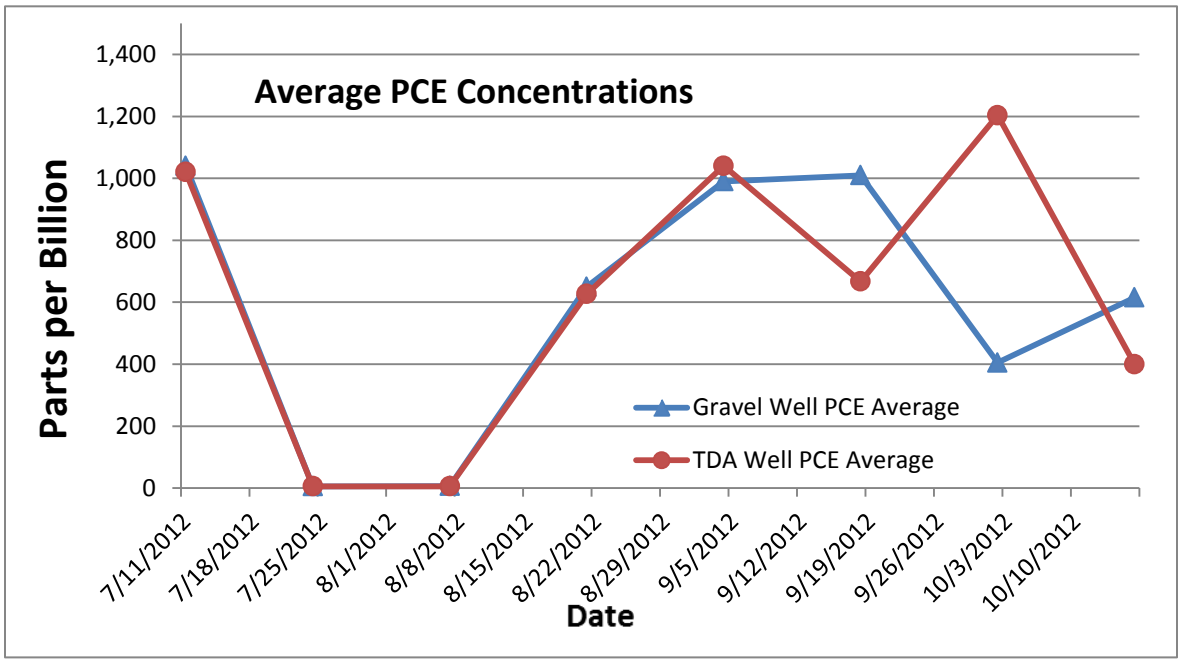
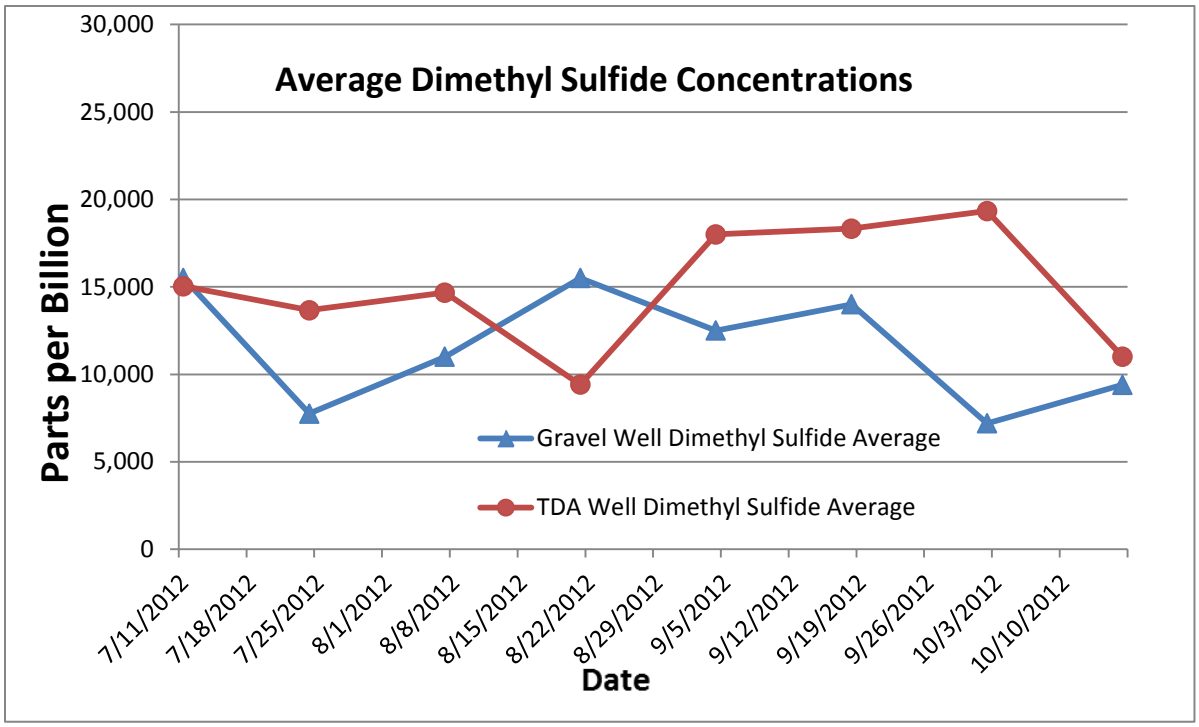


Chart 7: Average Dimethyl Sulfide Concentrations in TDA and Gravel Wells



The analytical values for volatile organics and sulfur compounds reported from the laboratory appear consistent with the site's overall historic data. However, the laboratory-reported values for methane and carbon dioxide are lower and the oxygen and nitrogen values are higher than those collected in the field (using field-calibrated equipment) and not consistent with the site's overall historical data. This may be explained by the landfill gas recovery operations and field instrumentation used. Field notes from the August 21, 2012, sampling event, and potentially on July 24 and August 7, 2012, indicated that the landfill's air collection system was intermittently and unexpectedly turned off on those days due to operational issues, and therefore, some of those analytical data reported by the laboratory were inconsistent with the historical data.

For constituent concentration comparison purposes, the sampling procedures were consistent from well to well and from sampling event to sampling event. Therefore, all samples were collected in the same manner under the same conditions. And comparing constituent concentrations for the eight sampling events was evaluated.

Comparison of TDA vs. Gravel Trenches

Hydraulic efficiency is not only related to construction of the given well but also to the trench fill material porosity and pore connectivity. Landfill gas extraction rates, and/or the amount of energy consumed to extract landfill gas, is important. The observed flows in the well piping are relative to current site conditions, and efficiency will degrade as the length of landfill gas piping and the amount of landfill gas extraction wells increase.

Hydraulic efficiency of horizontal wells HW-23 (gravel) and HW-25 (TDA) were compared to each other because they operate under almost identical conditions (landfill location, orientation,

burial depth, trench length, etc.). Since the gravel trench porosity is approximately 25 to 40 percent and the TDA trench porosity is estimated here to be 31 to 47 percent under 75 feet of landfill material overburden, we would expect to see normalized airflow velocities on the order of 15 to 20 percent higher in the TDA-constructed wells than in the gravel wells. This overburden condition results in a maximum estimated overburden stress of 23 psi/160 kPa range. However, as Chart 4 and Table 2 indicate, the TDA trenches perform with significantly more airflow (35% on average in two similarly constructed gravel and TDA wells) than the gravel trenches. Therefore, since the estimated porosity within the gravel trenches are most likely within the literature range, and since the estimated porosities in the TDA trenches are conservative, the actual remaining TDA porosities are most likely shifted higher than the estimated TDA range in this report and higher than that of the gravel trenches. This may be due to TDA's physical properties in transferring vertical stresses laterally, and resulting in a higher-than-estimated in-place TDA porosity.

Regarding the constituent sampling analysis, there does not appear to be a significant difference in the tested constituent concentrations over time between the two well types.

Conclusions

Eight sampling and monitoring events were performed at the Badlands Landfill (July through October 2012) in order to determine if TDA-constructed wells have an influence on the quality and quantity of LFG being produced as compared to that of traditionally constructed gravel wells.

After careful review of the airflow measurements, it was noted that initially the gravel wells had more air flowing to the wellheads than the TDA-constructed wells did. This was determined to be based on the landfill operator's control of the flow valves to maximize LFG for power generation. The landfill personnel determined the flow valve settings based on maximizing airflow while balancing oxygen to near zero percent of the airflow mass. When the airflow valves for the studied wells were normalized to 100 percent open (Charts 2 and 4), the data indicated that the TDA-constructed wells have the potential for higher flow rates than the aggregate wells.

The estimated long-term in-place density of the Badlands Landfill is approximately 1,200 lb/yd^3. The approximate landfill burial depth of the horizontal wells ranged from 66 to 84 feet. Holding lateral strain and dampening effects constant, the maximum estimated range of vertical strain in the Badlands TDA HW-25 trench (under an approximate average of 75 feet of fill) ranges from 25 to 50 percent. Assuming all the vertical strain is accommodated as porosity reduction (through particle repacking and reorienting), and that TDA begins with approximately 63 percent porosity, then a 25 to 50 percent vertical strain results in approximately 31 to 47 percent remaining porosity with the TDA horizontal wells.

The actual remaining porosity in the TDA well trenches, covered by 75 feet of landfill overburden, due to bridging and soil-dampening effects, is likely higher than estimated here (31-47%), while the gravel well trench is in the range of 25 to 40 percent. This is exemplified when comparing the two similarly constructed wells (HW-23 and HW-25): The normalized flow velocities in TDA well HW-25 were, on average, indicating potentially 35 percent higher flow (taken from Table 2) for the eight sampling events, and the wellhead control valves set by the landfill engineers on the TDA wells were consistently set to lower percentage open settings than gravel wellheads to get the equivalent landfill gas flow as that in the gravel wells.

Under normal operating conditions, average landfill gas measurements collected in the field (methane, carbon dioxide, and oxygen) were similar to that expected within solid waste landfills and similar in quantities and overall patterns to historical Badlands Landfill data for both the TDA- and aggregate-constructed wells. The eight sampling events were enough to show general trends in typical constituents and flow rates for both horizontal well types.

The data analysis supports the finding that the horizontal landfill gas collection wells using TDA as the pipe bedding perform the same if not better in regard to hydraulic efficiency and constituent loading than the typical gravel construction technique historically used in landfill gas collection trench systems.

Recommendations

GHD recommends the following:

- Analyze TDA for flow performance over time versus burial to see if there is an efficiency-loss relationship as the TDA wells progressively become loaded (compressed) over time.
- Perform routine maximum airflow testing in the TDA and aggregate wells.
- Improve well-sampling collection methodology by passively and actively pumping residual air from air sampling tubing and manifolds prior to sampling.
- Revise landfill gas sample analytes to test for known breakdown products of tires.

Abbreviations and Acronyms

ATM	Standard atmospheric pressure unit in inches of mercury
CalRecycle	California Department of Resources Recycling and Recovery
CFM	Cubic Feet per Minute
GHD	GHD Inc.
HDPE	High Density Polyethylene
EPA	Environmental Protection Agency
LFG	Landfill Gas
LGMCP	Landfill Gas Monitoring and Control Plan
KENNEC	Kennec, Inc.
NMOCs	Non-Methane Organic Compounds
PTE	Passenger Tire Equivalents
SDR	Standard Dimension Ratio
SWFP	Solid Waste Fill Permit
TDA	Tire-Derived Aggregate
VOCs	Volatile Organic Compounds

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Figures

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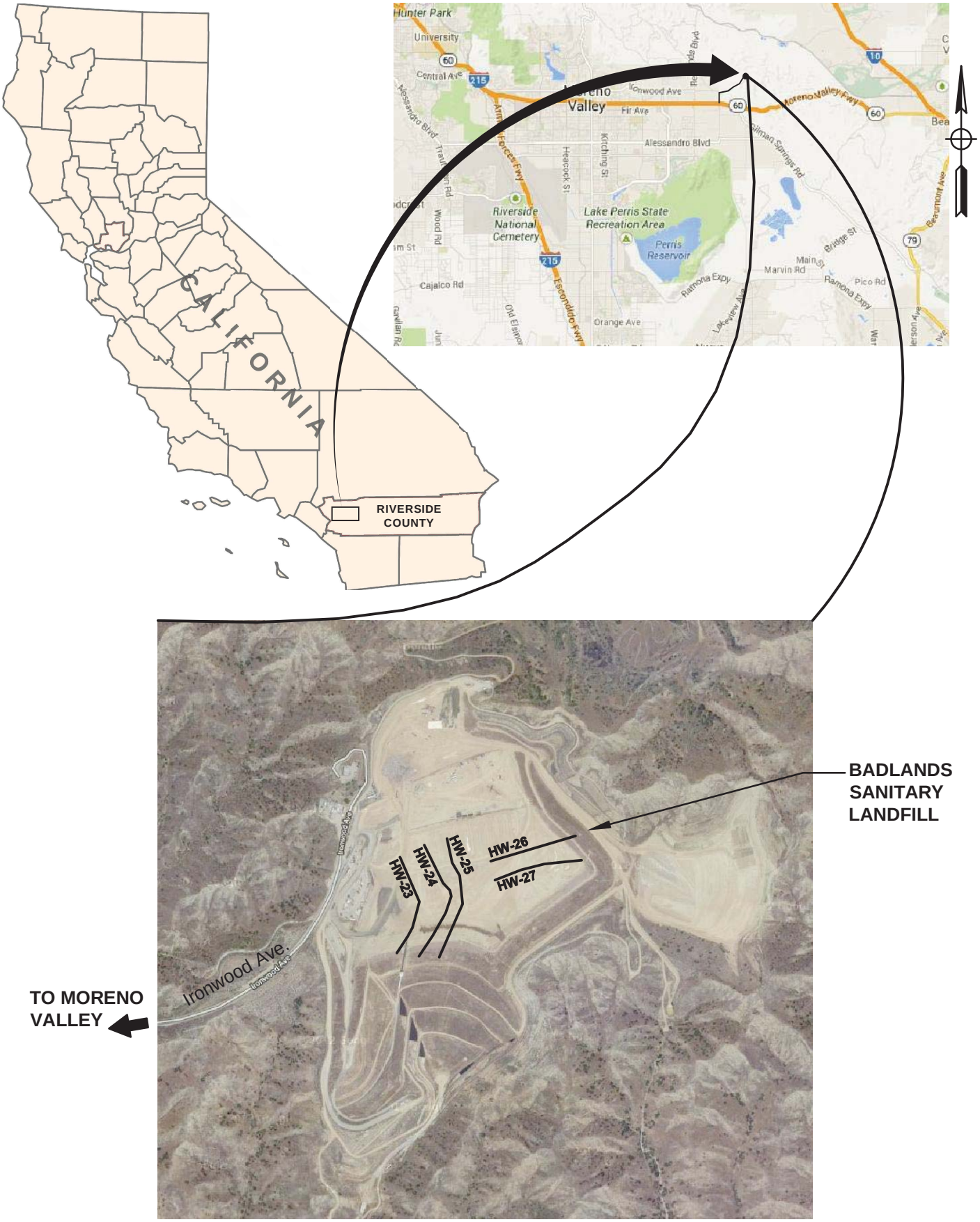
- Figure 2 Site Plan
- Figure 3 Profile View of HW-23
- Figure 4 Profile View of HW-24
- Figure 5 Profile View of HW-25
- Figure 6 Profile View of HW-26
- Figure 7 Profile View of HW-27



NORTH

GHD

CalRecycle
Badlands Landfill Riverside BL6

VICINITY MAP

Job Number 1258312008
Revision
Date August 2013

Figure 1

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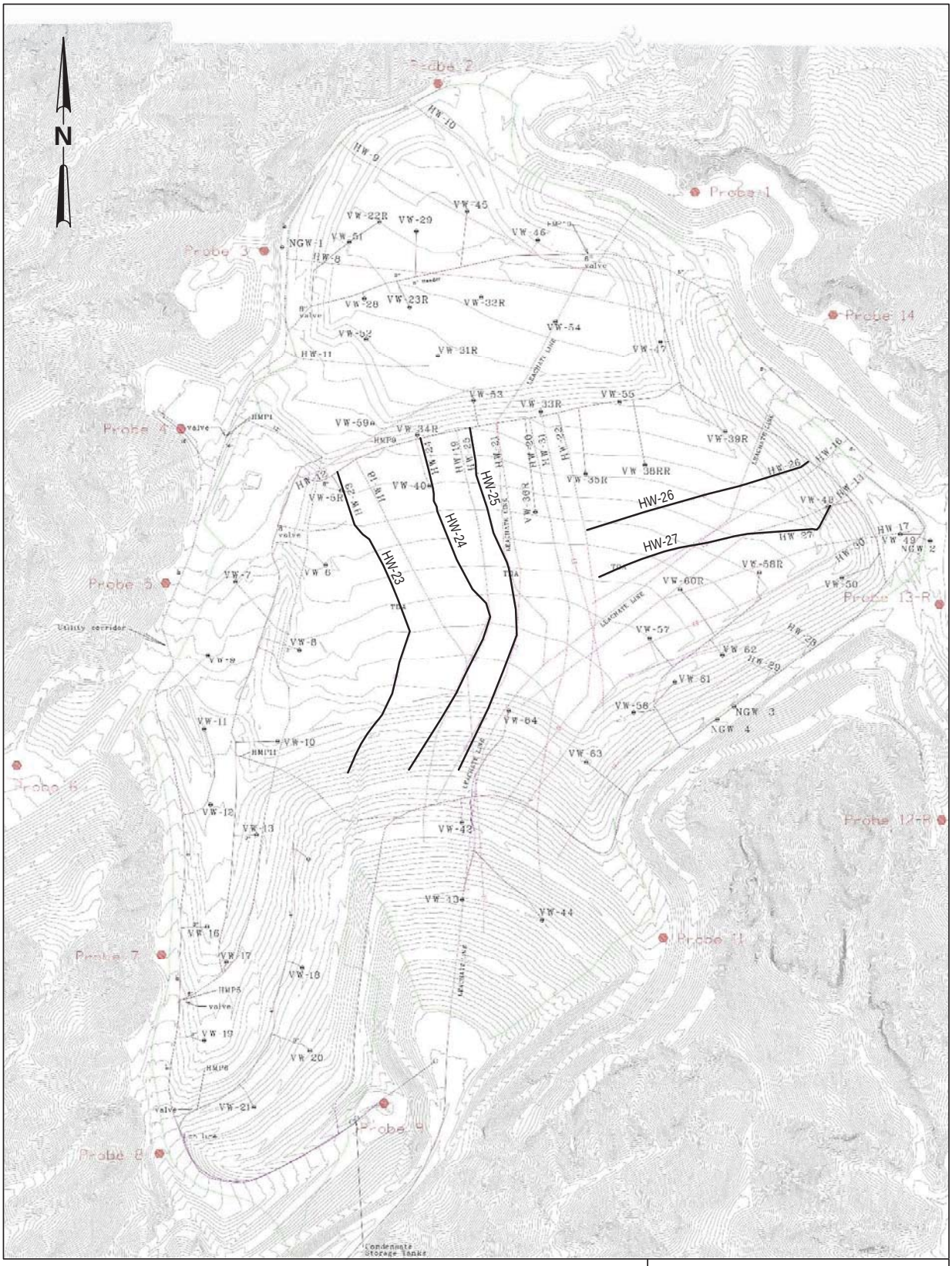
Plot Date: 21 August 2013 - 11:06 AM Cad File No: N:\US\Santa Rosa\Projects\12583 - CalRecycle\12583-12-008 Badlands Landfill Riverside BL6\06-CAD\Figures\Figure 01.dwg



Notes:

1.) HW-1 through HW-7 abandoned (assumed crushed by weight of refuse)
2) HW-14 & HW-15 abandoned (assume laterals sheared)
3) VW-22, 23, 25, 26 have very low flow rates

Vertical Well
Horizontal Well
Property Boundary (outside the map)
Footprint
HDPE Header
Probe

NOTE:
FIGURE CREATED FROM DOCUMENT FIGURE 3 PREPARED BY RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT ON 24, JAN. 2013.

CalRecycle
Badlands Landfill

SITE PLAN

Job Number 1258312008
Revision
Date August 2013

Figure 2

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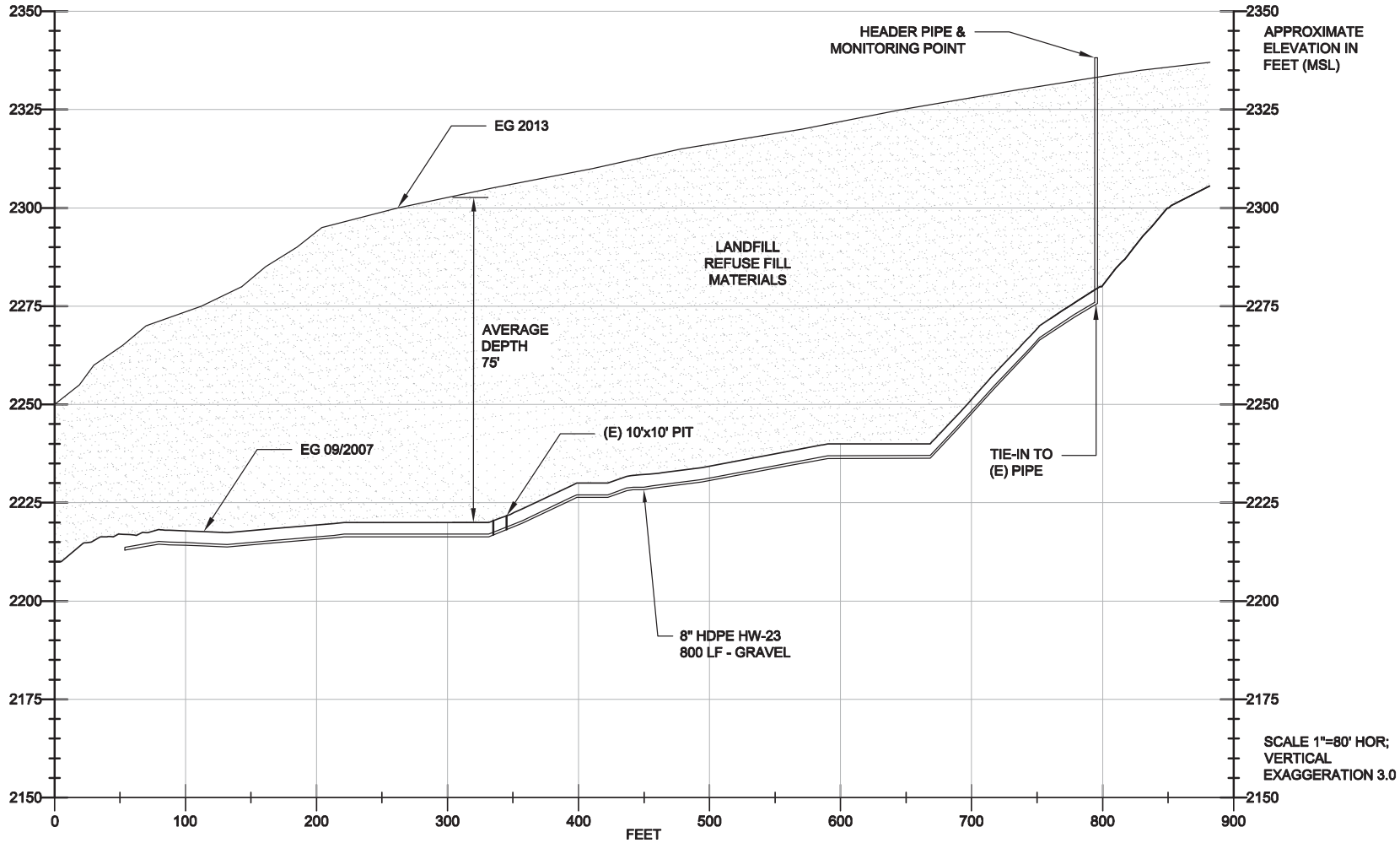
PROFILE VIEW OF HW-23



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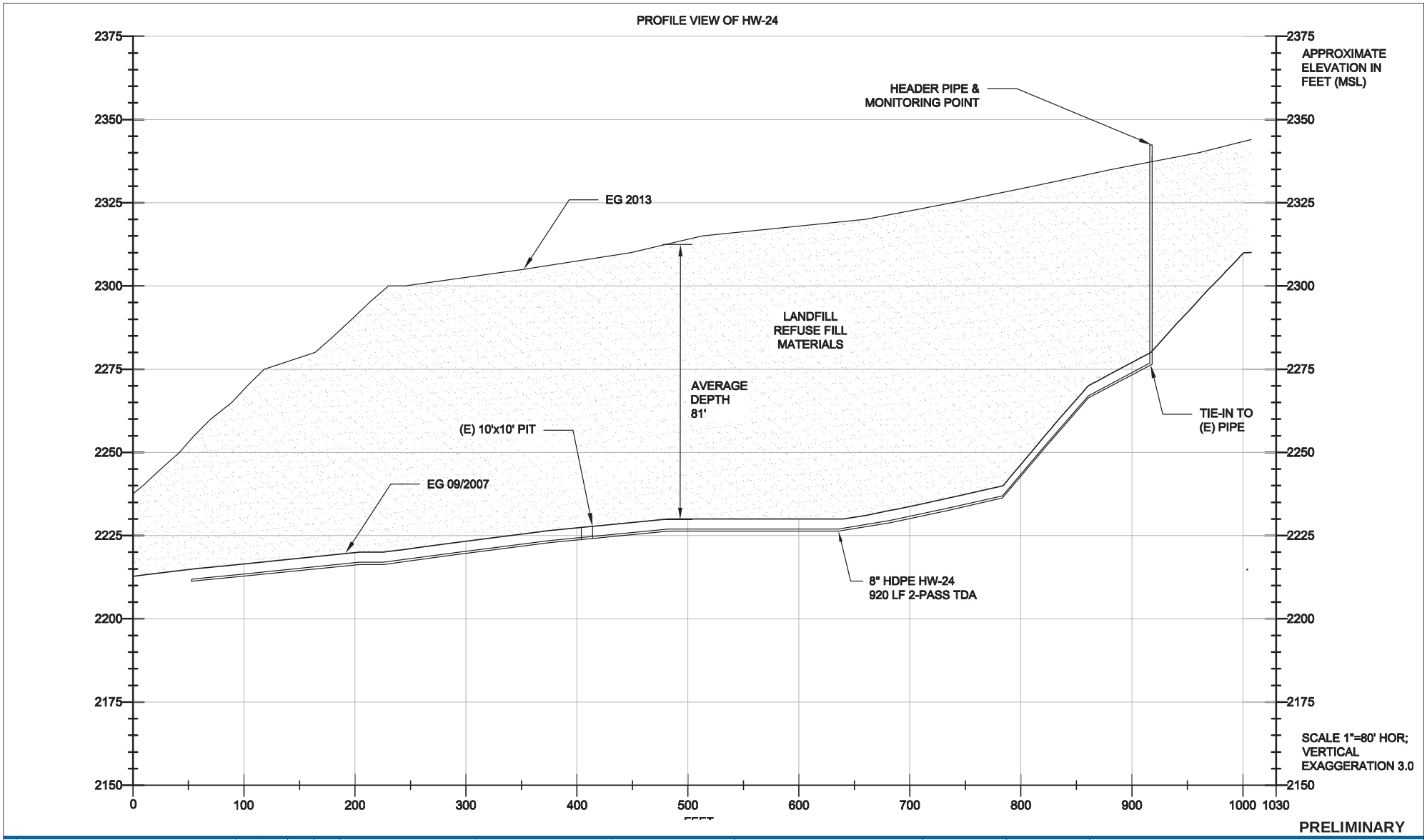
Client: CalRecycle
Project: Badlands Landfill
Title: Figure 3
Profile View of HW-23

Original Size: Ansi B
Drawing No:
Sht of
Rev:

Plot Date: 21 August 2013 - 11:55 AM Plotted by: Brano Vuksanovic Cad File No: N:\US\Santa Rosa\Projects\12583 - CalRecycle\12583-12-008 Badlands Landfill Riverside BL608-CAD\Sheets\Badlands Landfill.dwg



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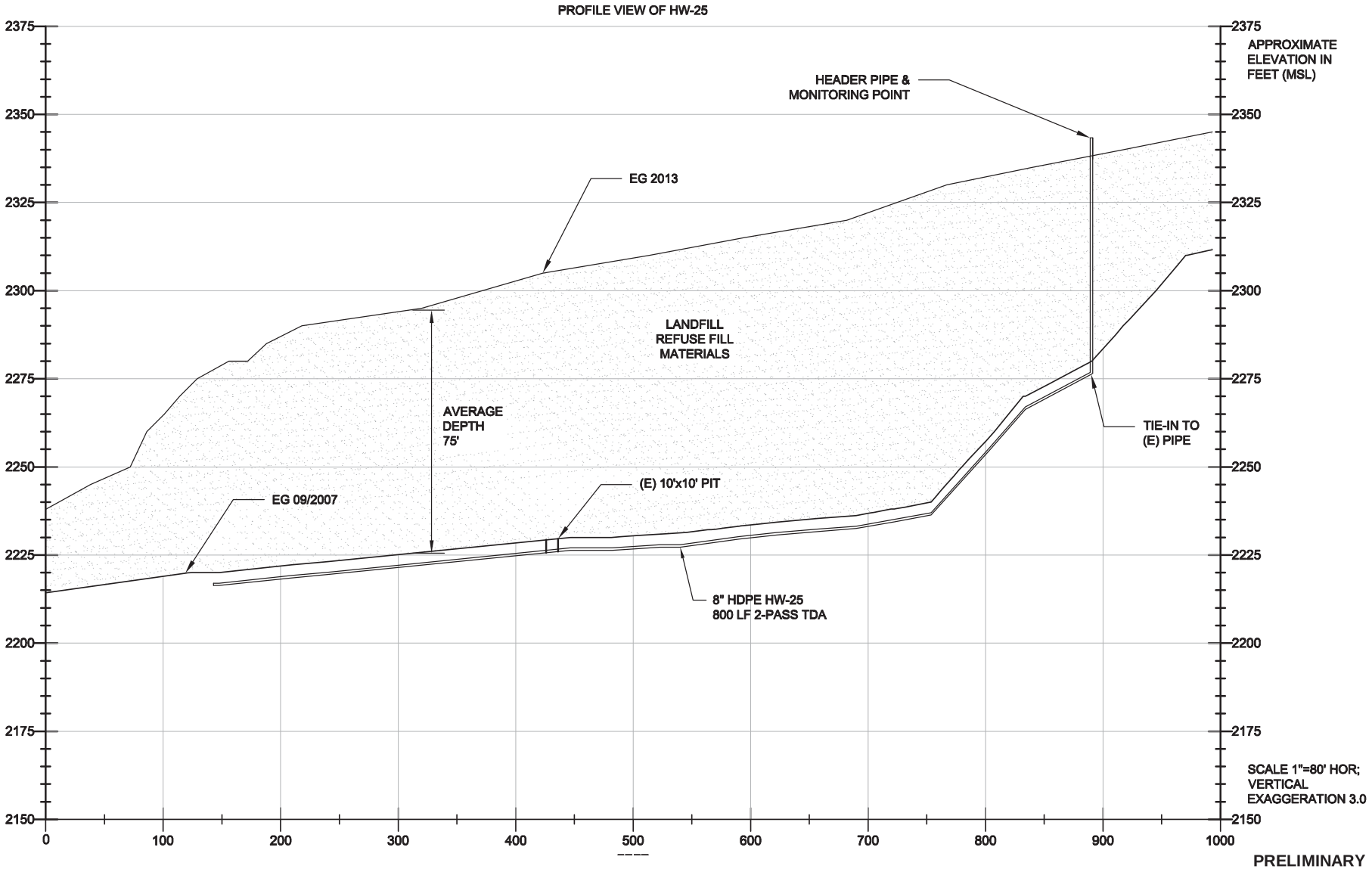
Client CalRecycle
Project Badlands Landfill
Title Figure 4
Profile View of HW-24

Original Size Ansi B Drawing No:

Sht of

Rev:

Plot Date: 21 August 2013 - 11:56 AM Plotted by: Brano Vuksanovic Cad File No: N:\US\Santa Rosa\Projects\12583 - CalRecycle\12583-12-008 Badlands Landfill Riverside BL608-CAD\Sheets\Badlands Landfill.dwg



SCALE 1"=80' HOR; VERTICAL EXAGGERATION 3.0

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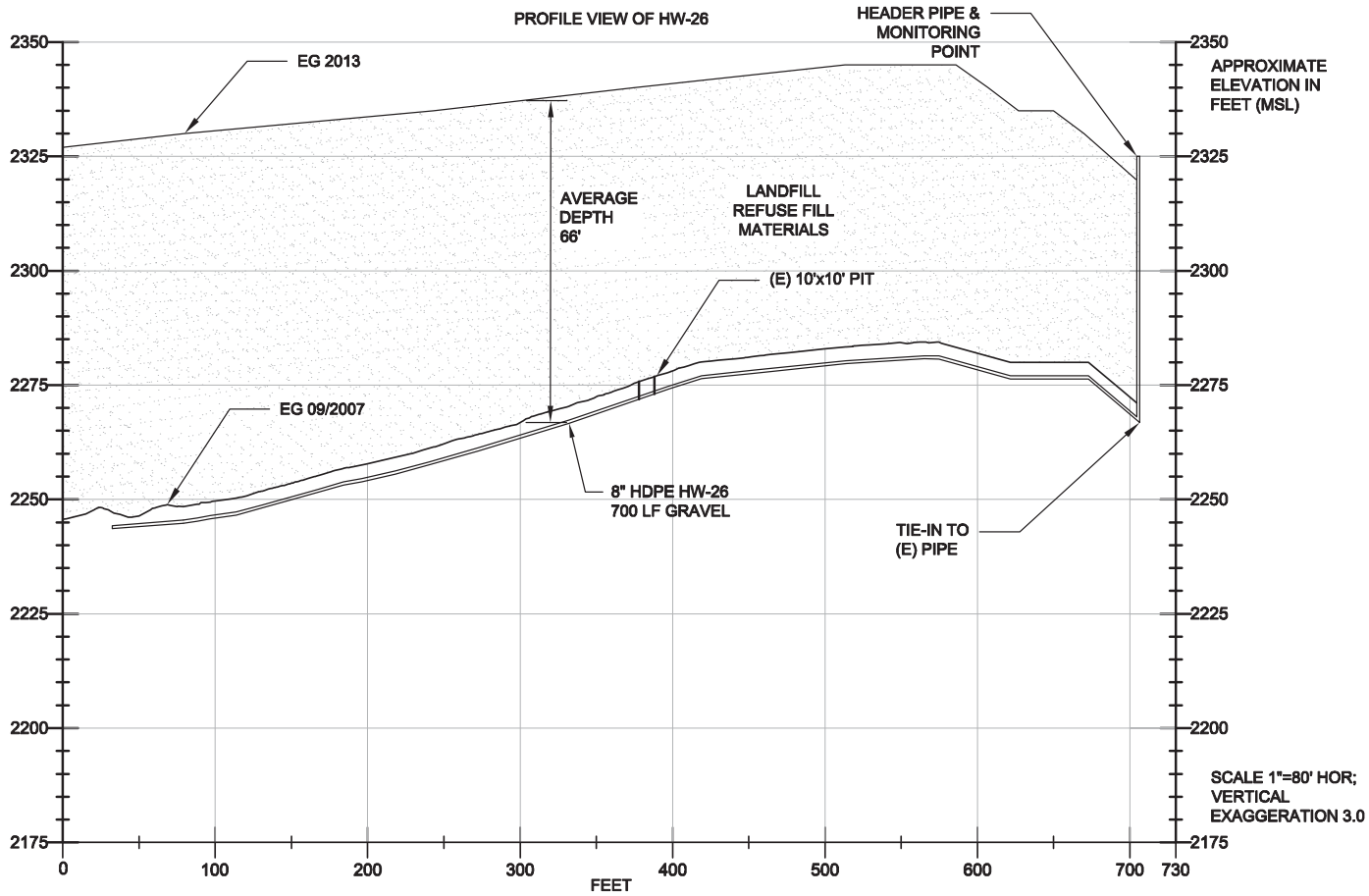
Approved (Project Director)			
Date			
Scale AS SHOWN	This Drawing shall not be used for Construction unless Signed and Sealed For Construction		

Client CalRecycle
Project Badlands Landfill
Title Figure 5
Profile View of HW-25

Original Size Ansi B
Drawing No:
Sht of
Rev:

Plot Date: 21 August 2013 - 11:56 AM Plotted by: Brano Vuksanovic Cad File No: N:\US\Santa Rosa\Projects\12583 - CalRecycle\12583-12-008 Badlands Landfill Riverside BL608-CAD\Sheets\Badlands Landfill.dwg



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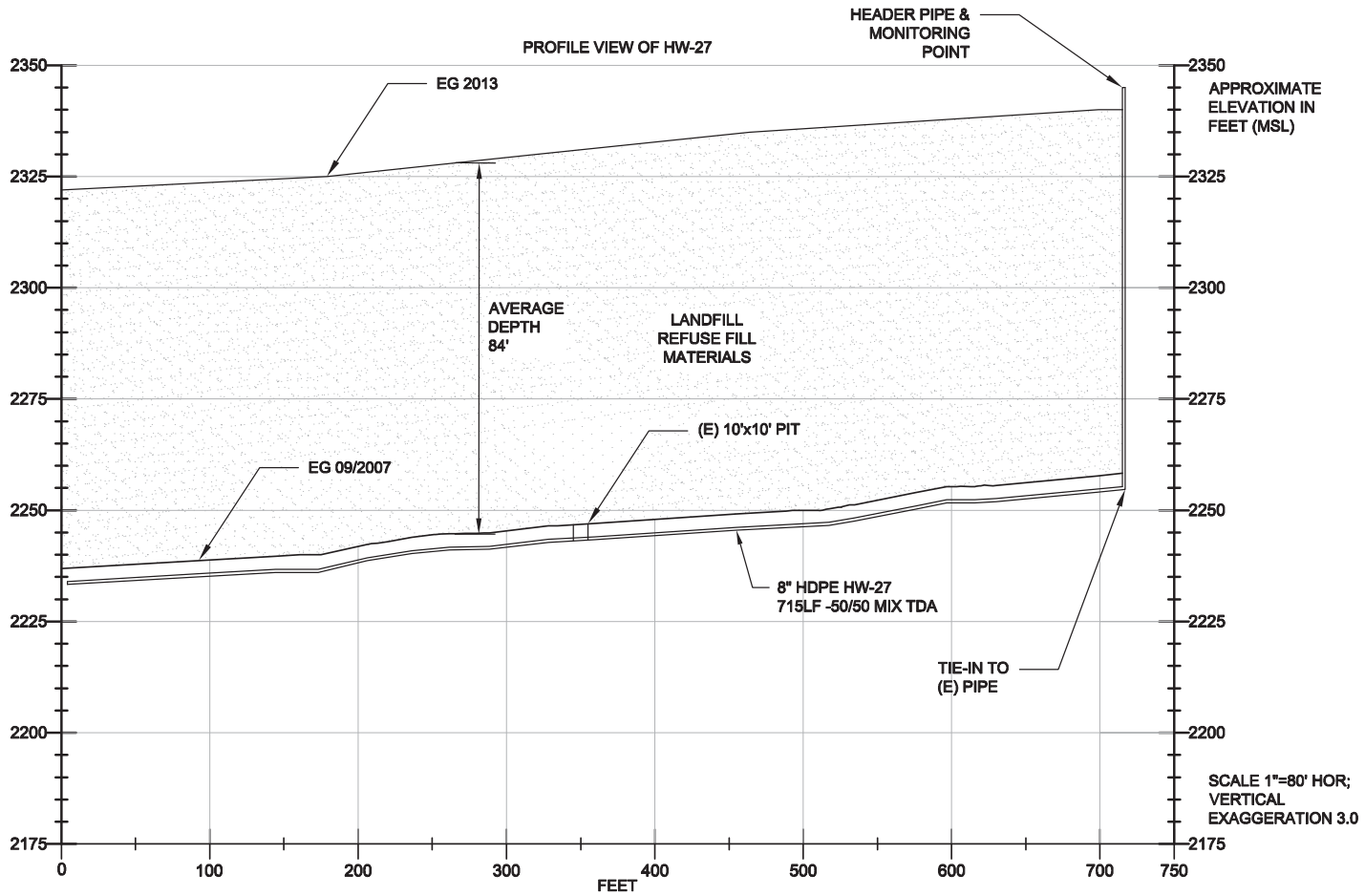
Client **CalRecycle**
Project **Badlands Landfill**
Title **Figure 6 Profile View of HW-26**

Original Size **Ansi B** Drawing No: Sht of Rev:

Plot Date: 21 August 2013 - 11:56 AM Plotted by: Brano Vuksanovic Cad File No: N:\US\Santa Rosa\Projects\12583 - CalRecycle\12583-12-008 Badlands Landfill Riverside BL608-CAD\Sheets\Badlands Landfill.dwg



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Date			
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Client: CalRecycle
Project: Badlands Landfill
Title: Figure 7 Profile View of HW-27

Original Size: Ansi B
Drawing No:
Sht of
Rev:

Plot Date: 21 August 2013 - 11:56 AM Plotted by: Brano Vuksanovic Cad File No: N:\US\Santa Rosa\Projects\12583 - CalRecycle\12583-12-008 Badlands Landfill Riverside BL608-CAD\Sheets\Badlands Landfill.dwg

Appendices

Appendix A: Laboratory Analytical Data

Analytical Sciences

November 07, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2071101 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 07, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands**

Lab Project: **2071101**

This 17 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2071101-01	**HW-27**	Gasoline	500000	(1)b	25000
		Propylene	46000		840
		Dichlorodifluoromethane (F-12)	3900		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	7200		3300
		Isopropyl alcohol	17000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	10000		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	8800		840
		2-Butanone	20000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	28000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	22000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	8100		840
		Carbon tetrachloride	ND		500
		Benzene	5900		840
		2,2,4-Trimethylpentane	2700		840
		Heptane	11000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	2300		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	17000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	1000		840
		Chlorobenzene	ND		840
		Ethylbenzene	2600		840
		m,p-Xylene	5600		840
		Styrene	1200		840
		o-Xylene	1100		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2071101-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.8	100	70-130
4-Bromofluorobenzene	25.0	115	70-130

Date Sampled:	07/10/12	Date Analyzed:	07/17/12	QC Batch: B010993
Date Received:	07/11/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2071101-02	**HW-26**	Gasoline	530000	(1)	27000
		Propylene	38000		910
		Dichlorodifluoromethane (F-12)	3100		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	6500		3600
		Isopropyl alcohol	18000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	4300		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	4800		910
		2-Butanone	16000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	29000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	19000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	5800		910
		Carbon tetrachloride	ND		550
		Benzene	5000		910
		2,2,4-Trimethylpentane	1800		910
		Heptane	9700		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	2500		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	18000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	1100		910
		Chlorobenzene	ND		910
		Ethylbenzene	4000		910
		m,p-Xylene	8100		910
		Styrene	2400		910
		o-Xylene	1900		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2071101-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.8	105	70-130
4-Bromofluorobenzene	19.8	92	70-130

Date Sampled:	07/10/12	Date Analyzed:	07/17/12	QC Batch: B010993
Date Received:	07/11/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2071101-03	**HW-25**	Gasoline	570000	(1)a	25000
		Propylene	34000		840
		Dichlorodifluoromethane (F-12)	4800		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	10000		3300
		Isopropyl alcohol	23000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	4800		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	10000		840
		2-Butanone	23000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	39000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	26000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	7900		840
		Carbon tetrachloride	ND		500
		Benzene	7400		840
		2,2,4-Trimethylpentane	2900		840
		Heptane	22000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	3700		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	23000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	1200		840
		Chlorobenzene	ND		840
		Ethylbenzene	4200		840
		m,p-Xylene	8300		840
		Styrene	1600		840
		o-Xylene	1900		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2071101-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.4	98	70-130
4-Bromofluorobenzene	23.2	107	70-130

Date Sampled:	07/10/12	Date Analyzed:	07/17/12	QC Batch: B010993
Date Received:	07/11/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2071101-04	**HW-24**	Gasoline	340000	(1)c	25000
		Propylene	21000		840
		Dichlorodifluoromethane (F-12)	1700		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	8500		3300
		Isopropyl alcohol	11000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	3700		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	4200		840
		2-Butanone	24000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	14000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	14000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	4600		840
		Carbon tetrachloride	ND		500
		Benzene	3600		840
		2,2,4-Trimethylpentane	1900		840
		Heptane	7600		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	1600		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	13000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	860		840
		Chlorobenzene	ND		840
		Ethylbenzene	2500		840
		m,p-Xylene	4900		840
		Styrene	1200		840
		o-Xylene	1200		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2071101-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.6	104	70-130
4-Bromofluorobenzene	23.4	108	70-130

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010993
Date Received:	07/11/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2071101-05	**HW-23**	Gasoline	520000	(1)a	27000
		Propylene	38000		910
		Dichlorodifluoromethane (F-12)	3900		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	8700		3600
		Isopropyl alcohol	17000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	5700		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	7000		910
		2-Butanone	19000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	37000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	20000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	7800		910
		Carbon tetrachloride	ND		550
		Benzene	6000		910
		2,2,4-Trimethylpentane	2400		910
		Heptane	14000		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	3200		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	18000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	980		910
		Chlorobenzene	ND		910
		Ethylbenzene	3400		910
		m,p-Xylene	7500		910
		Styrene	1300		910
		o-Xylene	1700		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2071101-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.2	102	70-130
4-Bromofluorobenzene	25.9	120	70-130

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010993
Date Received:	07/11/12	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2071101-01	**HW-27**	Oxygen (O2)	2.1	0.008
		Carbon Dioxide (CO2)	29	0.008
		Methane	28	0.008
		Nitrogen	17	0.008
		Hydrogen	0.71	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010942
Date Received:	07/11/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2071101-02	**HW-26**	Oxygen (O2)	0.97	0.009
		Carbon Dioxide (CO2)	29	0.009
		Methane	28	0.009
		Nitrogen	20	0.009
		Hydrogen	0.59	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010942
Date Received:	07/11/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2071101-03	**HW-25**	Oxygen (O2)	0.76	0.008
		Carbon Dioxide (CO2)	30	0.008
		Methane	30	0.008
		Nitrogen	14	0.008
		Hydrogen	0.66	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010942
Date Received:	07/11/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2071101-04	**HW-24**	Oxygen (O2)	0.64	0.008
		Carbon Dioxide (CO2)	31	0.008
		Methane	33	0.008
		Nitrogen	8.8	0.008
		Hydrogen	0.29	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010942
Date Received:	07/11/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2071101-05	**HW-23**	Oxygen (O2)	0.68	0.009
		Carbon Dioxide (CO2)	33	0.009
		Methane	34	0.009
		Nitrogen	10	0.009
		Hydrogen	0.92	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	07/10/12	Date Analyzed:	07/18/12	QC Batch: B010942
Date Received:	07/11/12	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B010993 - Air prep GC/MS										
Blank (B010993-BLK1)				Prepared & Analyzed: 07/12/12						
Gasoline	ND	75	ppbv							
Propylene	ND	2.5	ppbv							
Dichlorodifluoromethane (F-12)	ND	2.5	ppbv							
Chloromethane	ND	2.5	ppbv							
Vinyl chloride	ND	2.5	ppbv							
1,3-Butadiene	ND	2.5	ppbv							
Chloroethane (CE)	ND	2.5	ppbv							
Trichlorofluoromethane (F-11)	ND	2.5	ppbv							
Acetone	ND	10	ppbv							
Isopropyl alcohol	ND	1.0	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	2.5	ppbv							
Trichlorotrifluoroethane (F-113)	ND	2.5	ppbv							
Methylene chloride	ND	2.5	ppbv							
Carbon disulfide	ND	2.5	ppbv							
trans-1,2-Dichloroethene	ND	2.5	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	2.5	ppbv							
Hexane	ND	2.5	ppbv							
2-Butanone	ND	2.5	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	2.5	ppbv							
Ethyl Acetate	ND	2.5	ppbv							
Chloroform (THM1)	ND	2.5	ppbv							
Tetrahydrofuran	ND	2.5	ppbv							
1,1,1-Trichloroethane (TCA)	ND	2.5	ppbv							
1,2-Dichloroethane (EDC)	ND	2.5	ppbv							
Cyclohexane	ND	2.5	ppbv							
Carbon tetrachloride	ND	1.5	ppbv							
Benzene	ND	2.5	ppbv							
2,2,4-Trimethylpentane	ND	2.5	ppbv							
Heptane	ND	2.5	ppbv							
Trichloroethene (TCE)	ND	2.5	ppbv							
1,2-Dichloropropane (DCP)	ND	2.5	ppbv							
Methyl Isobutyl Ketone (MIBK)	ND	2.5	ppbv							
cis-1,3-Dichloropropene	ND	2.5	ppbv							
trans-1,3-Dichloropropene	ND	2.5	ppbv							
Toluene	ND	2.5	ppbv							
1,1,2-Trichloroethane	ND	2.5	ppbv							
Dibromochloromethane (THM3)	ND	2.5	ppbv							
Tetrachloroethene (PCE)	ND	2.5	ppbv							
Chlorobenzene	ND	2.5	ppbv							
Ethylbenzene	ND	2.5	ppbv							
m,p-Xylene	ND	2.5	ppbv							

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B010993 - Air prep GC/MS										
Blank (B010993-BLK1)				Prepared & Analyzed: 07/12/12						
Styrene	ND	2.5	ppbv							
o-Xylene	ND	2.5	ppbv							
1,1,2,2-Tetrachloroethane	ND	2.5	ppbv							
1,3-Dichlorobenzene	ND	2.5	ppbv							
1,4-Dichlorobenzene	ND	2.5	ppbv							
1,2-Dichlorobenzene	ND	2.5	ppbv							
1,2,4-Trichlorobenzene	ND	2.5	ppbv							
Naphthalene	ND	2.5	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	2.5	ppbv							
Tertiary Butyl Alcohol (TBA)	ND	20	ppbv							
Ethyl tert-Butyl Ether (ETBE)	ND	2.5	ppbv							
Tert-Amyl Methyl Ether (TAME)	ND	2.5	ppbv							
Surrogate: Dibromofluoromethane	*3.41*		*ppbv*	*3.31*		*103*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*3.40*		*ppbv*	*3.61*		*94*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B010942 - Air prep GC										
Blank (B010942-BLK1)				Prepared: 07/16/12 Analyzed: 07/18/12						
Oxygen (O2)	ND	0.005	%							
Carbon Dioxide (CO2)	ND	0.005	%							
Methane	ND	0.005	%							
Nitrogen	ND	0.005	%							
Hydrogen	ND	0.005	%							
Ethene	ND	0.005	%							
Ethane	ND	0.005	%							
Acetylene	ND	0.005	%							
Propane	ND	0.005	%							
Carbon Monoxide	ND	0.005	%							

Notes and Definitions

(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 9,100 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 20,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 16,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 15,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 207101
CLIENT'S PROJECT NAME: CalRecycler-Badlands
CLIENT'S PROJECT NUMBER: 1258312008.32100

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	SAME
ADDRESS:	2235 Mercury Way Suite 150, Santa Rosa CA	COMPANY NAME:	
CONTACT:	David J. Vossler	ADDRESS:	
PHONE#:	707-523-1010	PHONE#:	
FAX #:	707-	FAX #:	

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___Y X N
GLOBAL ID: ___

COOLER TEMPERATURE
___ °C

COC
PAGE 1 OF 1

ANALYSIS

ITEM	CLIENT SAMPLE I..D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	EPA TO-15	Volatile Sulfur compounds	Fixed Gases			COMMENTS	LAB SAMPLE #
1	HW-27	312	#10	11:17:00	11:34:00	7/10/2012	Air	X	X	X				-01
2	HW-26	1009	#12	11:30:00	11:40:00			X	X	X				-02
3	HW-25	1013	#5	13:43:00	13:52:00			X	X	X				-03
4	HW-24	1006	#4	14:08:00	14:18:00			X	X	X				-04
5	HW-23	311	#75	14:30:00	14:40:00			X	X	X				-05
6														
7														
8														
9														
10														

SIGNATURES

SAMPLED BY: David J. Vossler

RELINQUISHED BY: [signature] — SIGNATURE
7/11/2012 — DATE
7:50 — TIME

RECEIVED BY LABORATORY: [signature] — SIGNATURE
7.11.12 — DATE
7:50 — TIME

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

October 18, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2072601 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: October 18, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands** **1258312008.32100**

Lab Project: **2072601**

This 16 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2072601-01	**HW-27**	Gasoline	2100	(1)d	54
		Dichlorodifluoromethane (F-12)	15		2.1
		Propylene	60		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	16		4.0
		Isopropyl alcohol	35		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	33		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	2.1		1.7
		Hexane	29		1.5
		2-Butanone	45		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	86		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	54		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	24		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	18		1.3
		2,2,4-Trimethylpentane	12		2.0
		Heptane	42		1.7
		Trichloroethene (TCE)	3.7		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	7.7		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	61		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	6.8		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	13		1.8
		m,p-Xylene	27		1.8
		Styrene	6.6		1.8
		o-Xylene	5.9		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2072601-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.160	100	70-130
4-Bromofluorobenzene	0.170	106	70-130

Date Sampled:	07/24/12	Date Analyzed:	08/09/12	QC Batch: B011020
Date Received:	07/26/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2072601-02	**HW-26**	Gasoline	1700	(1)a	59
		Dichlorodifluoromethane (F-12)	9.3		2.3
		Propylene	45		0.78
		Chloromethane	ND		0.94
		Vinyl chloride	ND		1.2
		1,3-Butadiene	ND		1.0
		Chloroethane (CE)	ND		1.2
		Trichlorofluoromethane (F-11)	ND		2.6
		Acetone	11		4.3
		Isopropyl alcohol	33		0.45
		1,1-Dichloroethene (1,1-DCE)	ND		1.8
		Trichlorotrifluoroethane (F-113)	ND		3.5
		Methylene chloride	9.7		1.6
		Carbon disulfide	ND		1.4
		trans-1,2-Dichloroethene	ND		1.8
		1,1-Dichloroethane (1,1-DCA)	ND		1.8
		Hexane	13		1.6
		2-Butanone	35		1.3
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.8
		Ethyl Acetate	73		1.6
		Chloroform (THM1)	ND		2.2
		Tetrahydrofuran	39		1.3
		1,1,1-Trichloroethane (TCA)	ND		2.5
		1,2-Dichloroethane (EDC)	ND		1.8
		Cyclohexane	15		1.6
		Carbon tetrachloride	ND		1.7
		Benzene	13		1.5
		2,2,4-Trimethylpentane	6.4		2.1
		Heptane	28		1.9
		Trichloroethene (TCE)	3.0		2.4
		1,2-Dichloropropane (DCP)	ND		2.1
		Methyl Isobutyl Ketone (MIBK)	8.3		1.9
		cis-1,3-Dichloropropene	ND		2.1
		trans-1,3-Dichloropropene	ND		2.1
		Toluene	55		1.7
		1,1,2-Trichloroethane	ND		2.5
		Dibromochloromethane (THM3)	ND		3.9
		Tetrachloroethene (PCE)	5.7		3.1
		Chlorobenzene	ND		2.1
		Ethylbenzene	12		2.0
		m,p-Xylene	26		2.0
		Styrene	7.5		1.9
		o-Xylene	6.0		2.0
		1,1,2,2-Tetrachloroethane	ND		3.1
		1,3-Dichlorobenzene	ND		2.7
		1,4-Dichlorobenzene	ND		2.7
		1,2-Dichlorobenzene	ND		2.7
		1,2,4-Trichlorobenzene	ND		3.4
		Naphthalene	ND		2.4

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2072601-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	1.6
		Tertiary Butyl Alcohol (TBA)	ND	11
		Ethyl tert-Butyl Ether (ETBE)	ND	1.9
		Tert-Amyl Methyl Ether (TAME)	ND	1.9

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.160	100	70-130
4-Bromofluorobenzene	0.160	100	70-130

Date Sampled:	07/24/12	Date Analyzed:	08/09/12	QC Batch: B011020
Date Received:	07/26/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2072601-03	**HW-25**	Gasoline	1900	(1)c	54
		Dichlorodifluoromethane (F-12)	16		2.1
		Propylene	37		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	16		4.0
		Isopropyl alcohol	39		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	11		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	ND		1.7
		Hexane	18		1.5
		2-Butanone	41		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	94		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	50		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	19		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	16		1.3
		2,2,4-Trimethylpentane	9.1		2.0
		Heptane	40		1.7
		Trichloroethene (TCE)	2.9		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	10		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	59		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	5.5		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	14		1.8
		m,p-Xylene	30		1.8
		Styrene	6.1		1.8
		o-Xylene	7.3		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2072601-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.150	94	70-130
4-Bromofluorobenzene	0.170	106	70-130

Date Sampled:	07/24/12	Date Analyzed:	08/09/12	QC Batch: B011020
Date Received:	07/26/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2072601-04	**HW-24**	Gasoline	1700	(1)b	54
		Dichlorodifluoromethane (F-12)	12		2.1
		Propylene	39		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	15		4.0
		Isopropyl alcohol	33		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	13		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	ND		1.7
		Hexane	16		1.5
		2-Butanone	40		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	96		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	40		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	18		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	14		1.3
		2,2,4-Trimethylpentane	8.0		2.0
		Heptane	34		1.7
		Trichloroethene (TCE)	2.6		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	8.5		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	57		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	5.1		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	13		1.8
		m,p-Xylene	28		1.8
		Styrene	5.2		1.8
		o-Xylene	6.5		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2072601-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.150	94	70-130
4-Bromofluorobenzene	0.180	112	70-130

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011020
Date Received:	07/26/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2072601-05	**HW-23**	Gasoline	1100	(1)	54
		Dichlorodifluoromethane (F-12)	5.1		2.1
		Propylene	28		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	14		4.0
		Isopropyl alcohol	19		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	9.5		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	ND		1.7
		Hexane	11		1.5
		2-Butanone	44		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	35		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	27		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	11		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	9.4		1.3
		2,2,4-Trimethylpentane	6.2		2.0
		Heptane	24		1.7
		Trichloroethene (TCE)	2.4		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	5.1		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	41		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	5.3		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	9.3		1.8
		m,p-Xylene	19		1.8
		Styrene	4.8		1.8
		o-Xylene	4.7		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2072601-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.180	112	70-130
4-Bromofluorobenzene	0.200	125	70-130

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011020
Date Received:	07/26/12	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2072601-01	**HW-27**	Oxygen (O2)	3.2	0.008
		Carbon Dioxide (CO2)	27	0.008
		Methane	26	0.008
		Nitrogen	22	0.008
		Helium	ND	0.003
		Hydrogen	0.69	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	07/26/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2072601-02	**HW-26**	Oxygen (O2)	1.7	0.009
		Carbon Dioxide (CO2)	28	0.009
		Methane	27	0.009
		Nitrogen	24	0.009
		Helium	ND	0.004
		Hydrogen	0.60	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	07/26/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2072601-03	**HW-25**	Oxygen (O2)	2.5	0.008
		Carbon Dioxide (CO2)	28	0.008
		Methane	28	0.008
		Nitrogen	22	0.008
		Helium	ND	0.003
		Hydrogen	0.66	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	07/26/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2072601-04	**HW-24**	Oxygen (O2)	2.2	0.008
		Carbon Dioxide (CO2)	29	0.008
		Methane	28	0.008
		Nitrogen	19	0.008
		Helium	ND	0.003
		Hydrogen	0.78	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	07/26/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2072601-05	**HW-23**	Oxygen (O2)	2.3	0.008
		Carbon Dioxide (CO2)	27	0.008
		Methane	29	0.008
		Nitrogen	21	0.008
		Helium	ND	0.003
		Hydrogen	0.29	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	07/24/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	07/26/12	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011020 - Air prep GC/MS										
Blank (B011020-BLK1)				Prepared & Analyzed: 08/10/12						
Dichlorodifluoromethane (F-12)	ND	0.01	ppbv							
Chloromethane	ND	0.005	ppbv							
Vinyl chloride	ND	0.006	ppbv							
Chloroethane (CE)	ND	0.007	ppbv							
Trichlorofluoromethane (F-11)	ND	0.01	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	0.01	ppbv							
Trichlorotrifluoroethane (F-113)	ND	0.02	ppbv							
Methylene chloride	ND	0.009	ppbv							
trans-1,2-Dichloroethene	ND	0.01	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	0.01	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	0.01	ppbv							
Chloroform (THM1)	ND	0.01	ppbv							
1,1,1-Trichloroethane (TCA)	ND	0.01	ppbv							
1,2-Dichloroethane (EDC)	ND	0.01	ppbv							
Carbon tetrachloride	ND	0.009	ppbv							
Benzene	ND	0.008	ppbv							
Trichloroethene (TCE)	ND	0.01	ppbv							
cis-1,3-Dichloropropene	ND	0.01	ppbv							
trans-1,3-Dichloropropene	ND	0.01	ppbv							
Toluene	ND	0.009	ppbv							
1,1,2-Trichloroethane	ND	0.01	ppbv							
Dibromochloromethane (THM3)	ND	0.02	ppbv							
Tetrachloroethene (PCE)	ND	0.02	ppbv							
Chlorobenzene	ND	0.01	ppbv							
Ethylbenzene	ND	0.01	ppbv							
m,p-Xylene	ND	0.01	ppbv							
o-Xylene	ND	0.01	ppbv							
1,1,2,2-Tetrachloroethane	ND	0.02	ppbv							
1,3-Dichlorobenzene	ND	0.02	ppbv							
1,4-Dichlorobenzene	ND	0.02	ppbv							
1,2-Dichlorobenzene	ND	0.02	ppbv							
1,2,4-Trichlorobenzene	ND	0.02	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	0.009	ppbv							
Isopropyl alcohol (LEAK CHECK)	ND	0.06	ppbv							
Surrogate: Dibromofluoromethane	*0.0300*		*ppbv*	*0.0300*		*100*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0200*		*ppbv*	*0.0300*		*67*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011022 - Air prep GC/MS										
Blank (B011022-BLK1)				Prepared & Analyzed: 08/10/12						
Oxygen (O2)	ND	0.005	%							
Carbon Dioxide (CO2)	ND	0.005	%							
Methane	ND	0.005	%							
Nitrogen	ND	0.005	%							
Helium	ND	0.002	%							
Hydrogen	ND	0.005	%							
Ethene	ND	0.005	%							
Ethane	ND	0.005	%							
Acetylene	ND	0.005	%							
Propane	ND	0.005	%							
Carbon Monoxide	ND	0.005	%							

Notes and Definitions

(1)d	The following additional compound was detected: Dimethyl Sulfide (c. 20,000 ppbv).
(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 11,000 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 10,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 9,500 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 6,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2072601
CLIENT'S PROJECT NAME: CAL-RECYCLE - BADLANDS
CLIENT'S PROJECT NUMBER: 1258312008.32100

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	SAME
ADDRESS:	2235 MERCURY WAY SUITE 150, SANTA ROSA CA	COMPANY NAME:	
CONTACT:	DAVID VESSELER	ADDRESS:	
PHONE#:	707-523-1010	PHONE#:	
FAX #:		FAX #:	

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___Y_X_N
GLOBAL ID: ___

COOLER TEMPERATURE ___ °C

COC
PAGE 1 OF 2

ITEM	CLIENT SAMPLE I.D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	ANALYSIS: EPA TO-15	VOLATILE SULFUR COMPOUNDS	FIXED GASES			COMMENTS	LAB SAMPLE #
1	HW-27	307	12	1106	1116	7/24/12	AIR	X	X	X			2072601	-01
2	HW-26	302	75	1139	1150	↓	↓	↓	↓	↓			↓	-02
3	HW-25	1014	13	1314	1325	↓	↓	↓	↓	↓			↓	-03
4	HW-24	1004	4	1341	1353	↓	↓	↓	↓	↓			↓	-04
5	HW-23	1003	10	1401	1413	↓	↓	↓	↓	↓			↓	-05
6														
7														
8														
9														
10														

SIGNATURES

SAMPLED BY: RYAN CRAWFORD

RELINQUISHED BY: Ryan Crawford — SIGNATURE
7/24/12 1450 — DATE TIME

RECEIVED BY LABORATORY: [illegible] — SIGNATURE
7-26-12 1220 — DATE TIME

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

October 18, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2080802 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: October 18, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands** **1258312008.32100**

Lab Project: **2080802**

This 16 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2080802-01	**HW-27**	Gasoline	1900	(1)d	54
		Dichlorodifluoromethane (F-12)	17		2.1
		Propylene	77		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	16		4.0
		Isopropyl alcohol	37		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	32		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	2.1		1.7
		Hexane	26		1.5
		2-Butanone	48		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	84		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	47		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	24		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	16		1.3
		2,2,4-Trimethylpentane	13		2.0
		Heptane	45		1.7
		Trichloroethene (TCE)	3.2		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	7.2		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	50		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	5.7		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	9.4		1.8
		m,p-Xylene	20		1.8
		Styrene	4.4		1.8
		o-Xylene	4.3		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2080802-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.160	100	70-130
4-Bromofluorobenzene	0.140	88	70-130

Date Sampled:	08/07/12	Date Analyzed:	08/13/12	QC Batch: B011020
Date Received:	08/08/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2080802-02	**HW-26**	Gasoline	2400	(1)	59
		Dichlorodifluoromethane (F-12)	14		2.3
		Propylene	55		0.78
		Chloromethane	ND		0.94
		Vinyl chloride	ND		1.2
		1,3-Butadiene	ND		1.0
		Chloroethane (CE)	ND		1.2
		Trichlorofluoromethane (F-11)	ND		2.6
		Acetone	19		4.3
		Isopropyl alcohol	44		0.45
		1,1-Dichloroethene (1,1-DCE)	ND		1.8
		Trichlorotrifluoroethane (F-113)	ND		3.5
		Methylene chloride	13		1.6
		Carbon disulfide	ND		1.4
		trans-1,2-Dichloroethene	ND		1.8
		1,1-Dichloroethane (1,1-DCA)	ND		1.8
		Hexane	16		1.6
		2-Butanone	43		1.3
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.8
		Ethyl Acetate	92		1.6
		Chloroform (THM1)	ND		2.2
		Tetrahydrofuran	48		1.3
		1,1,1-Trichloroethane (TCA)	ND		2.5
		1,2-Dichloroethane (EDC)	ND		1.8
		Cyclohexane	18		1.6
		Carbon tetrachloride	ND		1.7
		Benzene	15		1.5
		2,2,4-Trimethylpentane	8.6		2.1
		Heptane	35		1.9
		Trichloroethene (TCE)	3.5		2.4
		1,2-Dichloropropane (DCP)	ND		2.1
		Methyl Isobutyl Ketone (MIBK)	10		1.9
		cis-1,3-Dichloropropene	ND		2.1
		trans-1,3-Dichloropropene	ND		2.1
		Toluene	64		1.7
		1,1,2-Trichloroethane	ND		2.5
		Dibromochloromethane (THM3)	ND		3.9
		Tetrachloroethene (PCE)	6.4		3.1
		Chlorobenzene	ND		2.1
		Ethylbenzene	14		2.0
		m,p-Xylene	27		2.0
		Styrene	7.3		1.9
		o-Xylene	6.6		2.0
		1,1,2,2-Tetrachloroethane	ND		3.1
		1,3-Dichlorobenzene	ND		2.7
		1,4-Dichlorobenzene	ND		2.7
		1,2-Dichlorobenzene	ND		2.7
		1,2,4-Trichlorobenzene	ND		3.4
		Naphthalene	ND		2.4

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2080802-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	1.6
		Tertiary Butyl Alcohol (TBA)	ND	11
		Ethyl tert-Butyl Ether (ETBE)	ND	1.9
		Tert-Amyl Methyl Ether (TAME)	ND	1.9

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.150	94	70-130
4-Bromofluorobenzene	0.180	112	70-130

Date Sampled:	08/07/12	Date Analyzed:	08/13/12	QC Batch: B011020
Date Received:	08/08/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2080802-03	**HW-25**	Gasoline	2100	(1)b	54
		Dichlorodifluoromethane (F-12)	19		2.1
		Propylene	26		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	16		4.0
		Isopropyl alcohol	45		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	13		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	ND		1.7
		Hexane	21		1.5
		2-Butanone	49		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	110		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	56		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	23		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	18		1.3
		2,2,4-Trimethylpentane	11		2.0
		Heptane	38		1.7
		Trichloroethene (TCE)	3.1		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	11		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	67		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	6.2		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	14		1.8
		m,p-Xylene	29		1.8
		Styrene	6.2		1.8
		o-Xylene	6.4		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2080802-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.160	100	70-130
4-Bromofluorobenzene	0.180	112	70-130

Date Sampled:	08/07/12	Date Analyzed:	08/13/12	QC Batch: B011020
Date Received:	08/08/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2080802-04	**HW-24**	Gasoline	2200	(1)c	54
		Dichlorodifluoromethane (F-12)	17		2.1
		Propylene	30		0.72
		Chloromethane	ND		0.86
		Vinyl chloride	ND		1.1
		1,3-Butadiene	ND		0.92
		Chloroethane (CE)	ND		1.1
		Trichlorofluoromethane (F-11)	ND		2.3
		Acetone	19		4.0
		Isopropyl alcohol	46		0.41
		1,1-Dichloroethene (1,1-DCE)	ND		1.7
		Trichlorotrifluoroethane (F-113)	ND		3.2
		Methylene chloride	19		1.5
		Carbon disulfide	ND		1.3
		trans-1,2-Dichloroethene	ND		1.7
		1,1-Dichloroethane (1,1-DCA)	ND		1.7
		Hexane	23		1.5
		2-Butanone	54		1.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.7
		Ethyl Acetate	130		1.5
		Chloroform (THM1)	ND		2.0
		Tetrahydrofuran	55		1.2
		1,1,1-Trichloroethane (TCA)	ND		2.3
		1,2-Dichloroethane (EDC)	ND		1.7
		Cyclohexane	23		1.4
		Carbon tetrachloride	ND		1.6
		Benzene	19		1.3
		2,2,4-Trimethylpentane	11		2.0
		Heptane	43		1.7
		Trichloroethene (TCE)	2.3		2.2
		1,2-Dichloropropane (DCP)	ND		1.9
		Methyl Isobutyl Ketone (MIBK)	12		1.7
		cis-1,3-Dichloropropene	ND		1.9
		trans-1,3-Dichloropropene	ND		1.9
		Toluene	60		1.6
		1,1,2-Trichloroethane	ND		2.3
		Dibromochloromethane (THM3)	ND		3.6
		Tetrachloroethene (PCE)	5.3		2.8
		Chlorobenzene	ND		1.9
		Ethylbenzene	13		1.8
		m,p-Xylene	29		1.8
		Styrene	4.8		1.8
		o-Xylene	6.0		1.8
		1,1,2,2-Tetrachloroethane	ND		2.9
		1,3-Dichlorobenzene	ND		2.5
		1,4-Dichlorobenzene	ND		2.5
		1,2-Dichlorobenzene	ND		2.5
		1,2,4-Trichlorobenzene	ND		3.1
		Naphthalene	ND		2.2

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2080802-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	1.5
		Tertiary Butyl Alcohol (TBA)	ND	10
		Ethyl tert-Butyl Ether (ETBE)	ND	1.7
		Tert-Amyl Methyl Ether (TAME)	ND	1.7

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.160	100	70-130
4-Bromofluorobenzene	0.170	106	70-130

Date Sampled:	08/07/12	Date Analyzed:	08/13/12	QC Batch: B011020
Date Received:	08/08/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2080802-05	**HW-23**	Gasoline	1800	(1)a	59
		Dichlorodifluoromethane (F-12)	8.9		2.3
		Propylene	45		0.78
		Chloromethane	ND		0.94
		Vinyl chloride	ND		1.2
		1,3-Butadiene	ND		1.0
		Chloroethane (CE)	ND		1.2
		Trichlorofluoromethane (F-11)	ND		2.6
		Acetone	25		4.3
		Isopropyl alcohol	32		0.45
		1,1-Dichloroethene (1,1-DCE)	ND		1.8
		Trichlorotrifluoroethane (F-113)	ND		3.5
		Methylene chloride	15		1.6
		Carbon disulfide	ND		1.4
		trans-1,2-Dichloroethene	ND		1.8
		1,1-Dichloroethane (1,1-DCA)	ND		1.8
		Hexane	18		1.6
		2-Butanone	76		1.3
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		1.8
		Ethyl Acetate	55		1.6
		Chloroform (THM1)	ND		2.2
		Tetrahydrofuran	46		1.3
		1,1,1-Trichloroethane (TCA)	ND		2.5
		1,2-Dichloroethane (EDC)	ND		1.8
		Cyclohexane	18		1.6
		Carbon tetrachloride	ND		1.7
		Benzene	15		1.5
		2,2,4-Trimethylpentane	10		2.1
		Heptane	38		1.9
		Trichloroethene (TCE)	3.0		2.4
		1,2-Dichloropropane (DCP)	ND		2.1
		Methyl Isobutyl Ketone (MIBK)	7.8		1.9
		cis-1,3-Dichloropropene	ND		2.1
		trans-1,3-Dichloropropene	ND		2.1
		Toluene	60		1.7
		1,1,2-Trichloroethane	ND		2.5
		Dibromochloromethane (THM3)	ND		3.9
		Tetrachloroethene (PCE)	7.0		3.1
		Chlorobenzene	ND		2.1
		Ethylbenzene	14		2.0
		m,p-Xylene	27		2.0
		Styrene	6.7		1.9
		o-Xylene	6.8		2.0
		1,1,2,2-Tetrachloroethane	ND		3.1
		1,3-Dichlorobenzene	ND		2.7
		1,4-Dichlorobenzene	ND		2.7
		1,2-Dichlorobenzene	ND		2.7
		1,2,4-Trichlorobenzene	ND		3.4
		Naphthalene	ND		2.4

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2080802-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	1.6
		Tertiary Butyl Alcohol (TBA)	ND	11
		Ethyl tert-Butyl Ether (ETBE)	ND	1.9
		Tert-Amyl Methyl Ether (TAME)	ND	1.9

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	0.160	100	70-130
4-Bromofluorobenzene	0.160	100	70-130

Date Sampled:	08/07/12	Date Analyzed:	08/13/12	QC Batch: B011020
Date Received:	08/08/12	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2080802-01	**HW-27**	Oxygen (O2)	2.7	0.008
		Carbon Dioxide (CO2)	27	0.008
		Methane	26	0.008
		Nitrogen	19	0.008
		Helium	ND	0.003
		Hydrogen	0.69	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/07/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	08/08/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2080802-02	**HW-26**	Oxygen (O2)	2.9	0.009
		Carbon Dioxide (CO2)	27	0.009
		Methane	27	0.009
		Nitrogen	26	0.009
		Helium	ND	0.004
		Hydrogen	0.62	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	08/07/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	08/08/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2080802-03	**HW-25**	Oxygen (O2)	1.9	0.008
		Carbon Dioxide (CO2)	29	0.008
		Methane	28	0.008
		Nitrogen	15	0.008
		Helium	ND	0.003
		Hydrogen	0.77	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/07/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	08/08/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2080802-04	**HW-24**	Oxygen (O2)	2.3	0.008
		Carbon Dioxide (CO2)	28	0.008
		Methane	29	0.008
		Nitrogen	16	0.008
		Helium	ND	0.003
		Hydrogen	0.81	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/07/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	08/08/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2080802-05	**HW-23**	Oxygen (O2)	3.2	0.009
		Carbon Dioxide (CO2)	29	0.009
		Methane	30	0.009
		Nitrogen	20	0.009
		Helium	ND	0.004
		Hydrogen	0.29	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	08/07/12	Date Analyzed:	08/10/12	QC Batch: B011022
Date Received:	08/08/12	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air (µg/m³)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011020 - Air prep GC/MS										
Blank (B011020-BLK1)				Prepared & Analyzed: 08/10/12						
Dichlorodifluoromethane (F-12)	ND	0.01	ppbv							
Chloromethane	ND	0.005	ppbv							
Vinyl chloride	ND	0.006	ppbv							
Chloroethane (CE)	ND	0.007	ppbv							
Trichlorofluoromethane (F-11)	ND	0.01	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	0.01	ppbv							
Trichlorotrifluoroethane (F-113)	ND	0.02	ppbv							
Methylene chloride	ND	0.009	ppbv							
trans-1,2-Dichloroethene	ND	0.01	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	0.01	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	0.01	ppbv							
Chloroform (THM1)	ND	0.01	ppbv							
1,1,1-Trichloroethane (TCA)	ND	0.01	ppbv							
1,2-Dichloroethane (EDC)	ND	0.01	ppbv							
Carbon tetrachloride	ND	0.009	ppbv							
Benzene	ND	0.008	ppbv							
Trichloroethene (TCE)	ND	0.01	ppbv							
cis-1,3-Dichloropropene	ND	0.01	ppbv							
trans-1,3-Dichloropropene	ND	0.01	ppbv							
Toluene	ND	0.009	ppbv							
1,1,2-Trichloroethane	ND	0.01	ppbv							
Dibromochloromethane (THM3)	ND	0.02	ppbv							
Tetrachloroethene (PCE)	ND	0.02	ppbv							
Chlorobenzene	ND	0.01	ppbv							
Ethylbenzene	ND	0.01	ppbv							
m,p-Xylene	ND	0.01	ppbv							
o-Xylene	ND	0.01	ppbv							
1,1,2,2-Tetrachloroethane	ND	0.02	ppbv							
1,3-Dichlorobenzene	ND	0.02	ppbv							
1,4-Dichlorobenzene	ND	0.02	ppbv							
1,2-Dichlorobenzene	ND	0.02	ppbv							
1,2,4-Trichlorobenzene	ND	0.02	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	0.009	ppbv							
Isopropyl alcohol (LEAK CHECK)	ND	0.06	ppbv							
Surrogate: Dibromofluoromethane	*0.0300*		*ppbv*	*0.0300*		*100*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.0200*		*ppbv*	*0.0300*		*67*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011022 - Air prep GC/MS										
Blank (B011022-BLK1)				Prepared & Analyzed: 08/10/12						
Oxygen (O2)	ND	0.005	%							
Carbon Dioxide (CO2)	ND	0.005	%							
Methane	ND	0.005	%							
Nitrogen	ND	0.005	%							
Helium	ND	0.002	%							
Hydrogen	ND	0.005	%							
Ethene	ND	0.005	%							
Ethane	ND	0.005	%							
Acetylene	ND	0.005	%							
Propane	ND	0.005	%							
Carbon Monoxide	ND	0.005	%							

Notes and Definitions

(1)d	The following additional compound was detected: Dimethyl Sulfide (c. 17,000 ppbv).
(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 14,000 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 13,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 12,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 10,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2080802
CLIENT'S PROJECT NAME: 1258312008.32100
CLIENT'S PROJECT NUMBER: TDA · CalRecycle - Badlands

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	Same
ADDRESS:	2235 Mercury Way Santa Rosa, CA 95407	COMPANY NAME:	
CONTACT:	David J. Vossler	ADDRESS:	
PHONE#:	707-523-1010	PHONE#:	
FAX #:		FAX #:	

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: _____

COOLER TEMPERATURE
_____ °C

COC

PAGE 1 OF 1

ITEM	CLIENT SAMPLE I.D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	ANALYSIS: EPA TO-15	Volatile Sulfur compounds	Fixed Gases			COMMENTS: Initly. Vac. Start/End	LAB SAMPLE #
1	HW-27	314	4	12:02:00	12:18:30	8-7-12	Air	X	X	X			30+/4	2080802-01
2	HW-26	1011	10	12:30:00	12:41:00			X	X	X			30/4	-02
3	HW-25	139	13	13:15:00	13:25:00			X	X	X			30/4	-03
4	HW-24	1008	75	13:40:00	13:50:00			X	X	X			30+/4	-04
5	HW-23	1007	12	14:10:00	14:22:00			X	X	X			28/4	-05
6														
7														
8														
9														
10														

SIGNATURES

SAMPLED BY: David J. Vossler

RELINQUISHED BY: [signature] — SIGNATURE
8-7-2012 — DATE / TIME

RECEIVED BY LABORATORY: [signature] — SIGNATURE
8-8-12 1010 — DATE / TIME

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

November 07, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2082304 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 07, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands**

Lab Project: **2082304**

This 17 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

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Petaluma, CA 94975-0336
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110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2082304-01	**HW-27**	Gasoline	3000	(1)c	130
		Propylene	700		4.2
		Dichlorodifluoromethane (F-12)	64		4.2
		Chloromethane	ND		4.2
		Vinyl chloride	ND		4.2
		1,3-Butadiene	6.7		4.2
		Chloroethane (CE)	5.0		4.2
		Trichlorofluoromethane (F-11)	ND		4.2
		Acetone	50		17
		1,1-Dichloroethene (1,1-DCE)	ND		4.2
		Isopropyl alcohol	52		1.7
		Trichlorotrifluoroethane (F-113)	ND		4.2
		Methylene chloride	67		4.2
		Carbon disulfide	ND		4.2
		trans-1,2-Dichloroethene	ND		4.2
		1,1-Dichloroethane (1,1-DCA)	6.0		4.2
		Hexane	140		4.2
		2-Butanone	44		4.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		4.2
		Ethyl Acetate	92		4.2
		Chloroform (THM1)	ND		4.2
		Tetrahydrofuran	74		4.2
		1,1,1-Trichloroethane (TCA)	ND		4.2
		1,2-Dichloroethane (EDC)	ND		4.2
		Cyclohexane	130		4.2
		Carbon tetrachloride	ND		2.5
		Benzene	28		4.2
		2,2,4-Trimethylpentane	50		4.2
		Heptane	160		4.2
		Trichloroethene (TCE)	ND		4.2
		1,2-Dichloropropane (DCP)	ND		4.2
		Methyl Isobutyl Ketone (MIBK)	ND		4.2
		cis-1,3-Dichloropropene	ND		4.2
		trans-1,3-Dichloropropene	ND		4.2
		Toluene	8.2		4.2
		1,1,2-Trichloroethane	ND		4.2
		Tetrachloroethene (PCE)	ND		4.2
		Chlorobenzene	ND		4.2
		Ethylbenzene	ND		4.2
		m,p-Xylene	ND		4.2
		Styrene	ND		4.2
		o-Xylene	ND		4.2
		1,1,2,2-Tetrachloroethane	ND		4.2
		1,3-Dichlorobenzene	ND		4.2
		1,4-Dichlorobenzene	ND		4.2
		1,2-Dichlorobenzene	ND		4.2
		1,2,4-Trichlorobenzene	ND		4.2
		Naphthalene	ND		4.2
		Methyl tert-Butyl Ether (MTBE)	ND		4.2

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2082304-01	**HW-27**	Tertiary Butyl Alcohol (TBA)	ND	33
		Di-isopropyl Ether (DIPE)	ND	4.2
		Ethyl tert-Butyl Ether (ETBE)	ND	4.2
		Tert-Amyl Methyl Ether (TAME)	ND	4.2

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	4.88	98	70-130
4-Bromofluorobenzene	6.42	118	70-130

Date Sampled:	08/21/12	Date Analyzed:	09/07/12	QC Batch: B011134
Date Received:	08/23/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2082304-02	**HW-26**	Gasoline	230000	(1)b	25000
		Propylene	20000		840
		Dichlorodifluoromethane (F-12)	1600		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	3500		3300
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Isopropyl alcohol	9000		84
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	1800		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	2300		840
		2-Butanone	7700		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	13000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	8100		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	2900		840
		Carbon tetrachloride	ND		500
		Benzene	2300		840
		2,2,4-Trimethylpentane	ND		840
		Heptane	5000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	ND		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	8000		840
		1,1,2-Trichloroethane	ND		840
		Tetrachloroethene (PCE)	ND		840
		Chlorobenzene	ND		840
		Ethylbenzene	1200		840
		m,p-Xylene	2300		840
		Styrene	ND		840
		o-Xylene	ND		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840
		Methyl tert-Butyl Ether (MTBE)	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2082304-02	**HW-26**	Tertiary Butyl Alcohol (TBA)	ND	6700
		Di-isopropyl Ether (DIPE)	ND	840
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.1	96	70-130
4-Bromofluorobenzene	27.0	125	70-130

Date Sampled:	08/21/12	Date Analyzed:	09/05/12	QC Batch: B011134
Date Received:	08/23/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2082304-03	**HW-25**	Gasoline	440000	(1)	25000
		Propylene	27000		840
		Dichlorodifluoromethane (F-12)	3200		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	6700		3300
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Isopropyl alcohol	18000		84
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	3700		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	5500		840
		2-Butanone	16000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	28000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	19000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	7100		840
		Carbon tetrachloride	ND		500
		Benzene	5300		840
		2,2,4-Trimethylpentane	2200		840
		Heptane	10000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	2300		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	17000		840
		1,1,2-Trichloroethane	ND		840
		Tetrachloroethene (PCE)	980		840
		Chlorobenzene	ND		840
		Ethylbenzene	2800		840
		m,p-Xylene	5200		840
		Styrene	ND		840
		o-Xylene	1200		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840
		Methyl tert-Butyl Ether (MTBE)	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2082304-03	**HW-25**	Tertiary Butyl Alcohol (TBA)	ND	6700
		Di-isopropyl Ether (DIPE)	ND	840
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.1	101	70-130
4-Bromofluorobenzene	25.4	117	70-130

Date Sampled:	08/21/12	Date Analyzed:	09/05/12	QC Batch: B011134
Date Received:	08/23/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2082304-04	**HW-24**	Gasoline	490000	(1)a	25000
		Propylene	34000		840
		Dichlorodifluoromethane (F-12)	4100		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	7900		3300
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Isopropyl alcohol	20000		84
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	4600		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	6700		840
		2-Butanone	18000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	33000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	18000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	7400		840
		Carbon tetrachloride	ND		500
		Benzene	5700		840
		2,2,4-Trimethylpentane	2400		840
		Heptane	12000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	2900		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	16000		840
		1,1,2-Trichloroethane	ND		840
		Tetrachloroethene (PCE)	900		840
		Chlorobenzene	ND		840
		Ethylbenzene	3100		840
		m,p-Xylene	5900		840
		Styrene	ND		840
		o-Xylene	1300		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840
		Methyl tert-Butyl Ether (MTBE)	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2082304-04	**HW-24**	Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.9	105	70-130
4-Bromofluorobenzene	25.5	118	70-130

Date Sampled:	08/21/12	Date Analyzed:	09/05/12	QC Batch: B011134
Date Received:	08/23/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2082304-05	**HW-23**	Gasoline	460000	(1)a	25000
		Propylene	28000		840
		Dichlorodifluoromethane (F-12)	1900		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	13000		3300
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Isopropyl alcohol	15000		84
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	5200		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	5400		840
		2-Butanone	31000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	22000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	21000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	6600		840
		Carbon tetrachloride	ND		500
		Benzene	5600		840
		2,2,4-Trimethylpentane	2500		840
		Heptane	10000		840
		Trichloroethene (TCE)	850		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	2300		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	20000		840
		1,1,2-Trichloroethane	ND		840
		Tetrachloroethene (PCE)	1300		840
		Chlorobenzene	ND		840
		Ethylbenzene	3500		840
		m,p-Xylene	7100		840
		Styrene	1300		840
		o-Xylene	1600		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840
		Methyl tert-Butyl Ether (MTBE)	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2082304-05	**HW-23**	Tertiary Butyl Alcohol (TBA)	ND	6700
		Di-isopropyl Ether (DIPE)	ND	840
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	21.2	107	70-130
4-Bromofluorobenzene	24.4	113	70-130

Date Sampled:	08/21/12	Date Analyzed:	09/06/12	QC Batch: B011134
Date Received:	08/23/12	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2082304-01	**HW-27**	Oxygen (O2)	22	0.008
		Carbon Dioxide (CO2)	0.39	0.008
		Methane	0.38	0.008
		Nitrogen	80	0.008
		Hydrogen	0.009	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/21/12	Date Analyzed:	09/06/12	QC Batch: B011136
Date Received:	08/23/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2082304-02	**HW-26**	Oxygen (O2)	2.4	0.008
		Carbon Dioxide (CO2)	28	0.008
		Methane	27	0.008
		Nitrogen	26	0.008
		Hydrogen	0.57	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/21/12	Date Analyzed:	09/06/12	QC Batch: B011136
Date Received:	08/23/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2082304-03	**HW-25**	Oxygen (O2)	2.8	0.008
		Carbon Dioxide (CO2)	28	0.008
		Methane	27	0.008
		Nitrogen	24	0.008
		Hydrogen	0.63	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/21/12	Date Analyzed:	09/06/12	QC Batch: B011136
Date Received:	08/23/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2082304-04	**HW-24**	Oxygen (O2)	1.8	0.008
		Carbon Dioxide (CO2)	29	0.008
		Methane	29	0.008
		Nitrogen	20	0.008
		Hydrogen	0.78	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/21/12	Date Analyzed:	09/06/12	QC Batch: B011136
Date Received:	08/23/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2082304-05	**HW-23**	Oxygen (O2)	2.3	0.008
		Carbon Dioxide (CO2)	29	0.008
		Methane	29	0.008
		Nitrogen	27	0.008
		Hydrogen	0.29	0.008
		Ethene	ND	0.008
		Ethane	ND	0.008
		Acetylene	ND	0.008
		Propane	ND	0.008
		Carbon Monoxide	ND	0.008

Date Sampled:	08/21/12	Date Analyzed:	09/06/12	QC Batch: B011136
Date Received:	08/23/12	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011134 - Air prep GC/MS										
Blank (B011134-BLK1)				Prepared & Analyzed: 08/31/12						
Gasoline	ND	75	ppbv							
Propylene	ND	2.5	ppbv							
Dichlorodifluoromethane (F-12)	ND	2.5	ppbv							
Chloromethane	ND	2.5	ppbv							
Vinyl chloride	ND	2.5	ppbv							
1,3-Butadiene	ND	2.5	ppbv							
Chloroethane (CE)	ND	2.5	ppbv							
Trichlorofluoromethane (F-11)	ND	2.5	ppbv							
Acetone	ND	10	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	2.5	ppbv							
Isopropyl alcohol	ND	1.0	ppbv							
Trichlorotrifluoroethane (F-113)	ND	2.5	ppbv							
Methylene chloride	ND	2.5	ppbv							
Carbon disulfide	ND	2.5	ppbv							
trans-1,2-Dichloroethene	ND	2.5	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	2.5	ppbv							
Hexane	ND	2.5	ppbv							
2-Butanone	ND	2.5	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	2.5	ppbv							
Ethyl Acetate	ND	2.5	ppbv							
Chloroform (THM1)	ND	2.5	ppbv							
Tetrahydrofuran	ND	2.5	ppbv							
1,1,1-Trichloroethane (TCA)	ND	2.5	ppbv							
1,2-Dichloroethane (EDC)	ND	2.5	ppbv							
Cyclohexane	ND	2.5	ppbv							
Carbon tetrachloride	ND	1.5	ppbv							
Benzene	ND	2.5	ppbv							
2,2,4-Trimethylpentane	ND	2.5	ppbv							
Heptane	ND	2.5	ppbv							
Trichloroethene (TCE)	ND	2.5	ppbv							
1,2-Dichloropropane (DCP)	ND	2.5	ppbv							
Methyl Isobutyl Ketone (MIBK)	ND	2.5	ppbv							
cis-1,3-Dichloropropene	ND	2.5	ppbv							
trans-1,3-Dichloropropene	ND	2.5	ppbv							
Toluene	ND	2.5	ppbv							
1,1,2-Trichloroethane	ND	2.5	ppbv							
Tetrachloroethene (PCE)	ND	2.5	ppbv							
Chlorobenzene	ND	2.5	ppbv							
Ethylbenzene	ND	2.5	ppbv							
m,p-Xylene	ND	2.5	ppbv							
Styrene	ND	2.5	ppbv							

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011134 - Air prep GC/MS										
Blank (B011134-BLK1)				Prepared & Analyzed: 08/31/12						
o-Xylene	ND	2.5	ppbv							
1,1,2,2-Tetrachloroethane	ND	2.5	ppbv							
1,3-Dichlorobenzene	ND	2.5	ppbv							
1,4-Dichlorobenzene	ND	2.5	ppbv							
1,2-Dichlorobenzene	ND	2.5	ppbv							
1,2,4-Trichlorobenzene	ND	2.5	ppbv							
Naphthalene	ND	2.5	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	2.5	ppbv							
Tertiary Butyl Alcohol (TBA)	ND	20	ppbv							
Di-isopropyl Ether (DIPE)	ND	2.5	ppbv							
Ethyl tert-Butyl Ether (ETBE)	ND	2.5	ppbv							
Tert-Amyl Methyl Ether (TAME)	ND	2.5	ppbv							
Surrogate: Dibromofluoromethane	*4.92*		*ppbv*	*4.96*		*99*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*4.54*		*ppbv*	*5.42*		*84*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011136 - Air prep GC/MS										
Blank (B011136-BLK1)				Prepared: 09/05/12 Analyzed: 09/06/12						
Oxygen (O2)	ND	0.005	%							
Carbon Dioxide (CO2)	ND	0.005	%							
Methane	ND	0.005	%							
Nitrogen	ND	0.005	%							
Hydrogen	ND	0.005	%							
Ethene	ND	0.005	%							
Ethane	ND	0.005	%							
Acetylene	ND	0.005	%							
Propane	ND	0.005	%							
Carbon Monoxide	ND	0.005	%							

Notes and Definitions

(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 220 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 16,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 15,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 14,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2082304
CLIENT'S PROJECT NAME: BADLANDS (CUPRICYCLE
CLIENT'S PROJECT NUMBER:

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	SAME
ADDRESS:	2235 MERCURY WAY, SANTA ROSA CA	COMPANY NAME:	
CONTACT:	DAVE VOSSLER	ADDRESS:	
PHONE#:	707 523 1010	PHONE#:	
FAX #:		FAX #:	

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	

GEOTRACKER EDF: ___Y ___N
GLOBAL ID:

COOLER TEMPERATURE
_____ °C

COC
PAGE 1 OF 1

ITEM	CLIENT SAMPLE I.D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	ANALYSIS: EPA TO-15	FIXED GASES	VOLATILE SULFUR			Hg START	COMMENTS	Hg FINISH	LAB SAMPLE #
1	HW-27	307	43	0949	1002	8/21/12	AIR						29		4	-01
2													~~30~~		~~3~~	
3	HW-26	1004	6	1030	1043	8/21/12	AIR						30		3	-02
4																
5	HW-25	1003	23	1120	1133	8/21/12	AIR						27		1	-03
6																
7	HW-24	1006	2	1140	1155	8/21/12	AIR						30		6	-04
8																
9	HW-23	314	13	1205	1219	8/21/12	AIR						30		5	-05
10																

SIGNATURES

SAMPLED BY: RYAN CRAWFORD

RELINQUISHED BY: Ryan Crawford
SIGNATURE — DATE 8/21/12 — TIME 1245 u/s

RECEIVED BY LABORATORY: [illegible]
SIGNATURE — DATE 8-23-12 — TIME 1105

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

November 07, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2090517 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 07, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands** **1258312008**

Lab Project: **2090517**

This 17 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2090517-01	**HW-27**	Gasoline	530000	(1)d	6800
		Propylene	40000		910
		Dichlorodifluoromethane (F-12)	3500		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	7900		3600
		Isopropyl alcohol	17000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	9700		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	9200		910
		2-Butanone	20000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	29000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	20000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	7900		910
		Carbon tetrachloride	ND		550
		Benzene	5800		910
		2,2,4-Trimethylpentane	3000		910
		Heptane	13000		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	2400		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	17000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	1100		910
		Chlorobenzene	ND		910
		Ethylbenzene	2800		910
		m,p-Xylene	6000		910
		Styrene	1200		910
		o-Xylene	1300		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2090517-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.8	100	70-130
4-Bromofluorobenzene	25.3	117	70-130

Date Sampled:	09/04/12	Date Analyzed:	09/17/12	QC Batch: B011204
Date Received:	09/05/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2090517-02	**HW-26**	Gasoline	490000	(1)a	6800
		Propylene	11000		910
		Dichlorodifluoromethane (F-12)	2900		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	6900		3600
		Isopropyl alcohol	36000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	3700		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	4900		910
		2-Butanone	14000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	30000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	17000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	6100		910
		Carbon tetrachloride	ND		550
		Benzene	5200		910
		2,2,4-Trimethylpentane	1800		910
		Heptane	9700		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	2200		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	18000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	1000		910
		Chlorobenzene	ND		910
		Ethylbenzene	3300		910
		m,p-Xylene	7100		910
		Styrene	1800		910
		o-Xylene	1600		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2090517-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.6	104	70-130
4-Bromofluorobenzene	23.9	110	70-130

Date Sampled:	09/04/12	Date Analyzed:	09/17/12	QC Batch: B011204
Date Received:	09/05/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2090517-03	**HW-25**	Gasoline	510000	(1)c	6800
		Propylene	27000		910
		Dichlorodifluoromethane (F-12)	2800		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	7800		3600
		Isopropyl alcohol	20000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	3900		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	5500		910
		2-Butanone	17000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	27000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	18000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	7000		910
		Carbon tetrachloride	ND		550
		Benzene	5800		910
		2,2,4-Trimethylpentane	2400		910
		Heptane	10000		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	2700		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	20000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	1100		910
		Chlorobenzene	ND		910
		Ethylbenzene	3800		910
		m,p-Xylene	7100		910
		Styrene	1600		910
		o-Xylene	1800		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2090517-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.2	102	70-130
4-Bromofluorobenzene	28.1	130	70-130

Date Sampled:	09/04/12	Date Analyzed:	09/19/12	QC Batch: B011204
Date Received:	09/05/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2090517-04	**HW-24**	Gasoline	450000	(1)b	6800
		Propylene	30000		910
		Dichlorodifluoromethane (F-12)	2900		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	9200		3600
		Isopropyl alcohol	20000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	4600		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	6400		910
		2-Butanone	16000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	33000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	18000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	6900		910
		Carbon tetrachloride	ND		550
		Benzene	5500		910
		2,2,4-Trimethylpentane	2200		910
		Heptane	13000		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	2900		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	19000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	920		910
		Chlorobenzene	ND		910
		Ethylbenzene	3200		910
		m,p-Xylene	6100		910
		Styrene	ND		910
		o-Xylene	1300		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2090517-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.5	98	70-130
4-Bromofluorobenzene	27.9	129	70-130

Date Sampled:	09/04/12	Date Analyzed:	09/19/12	QC Batch: B011204
Date Received:	09/05/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2090517-05	**HW-23**	Gasoline	340000	(1)	6800
		Propylene	25000		910
		Dichlorodifluoromethane (F-12)	1500		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	11000		3600
		Isopropyl alcohol	13000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	3900		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	3800		910
		2-Butanone	24000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	15000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	15000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	5400		910
		Carbon tetrachloride	ND		550
		Benzene	4200		910
		2,2,4-Trimethylpentane	1900		910
		Heptane	7200		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	ND		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	13000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	980		910
		Chlorobenzene	ND		910
		Ethylbenzene	2100		910
		m,p-Xylene	4100		910
		Styrene	ND		910
		o-Xylene	960		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2090517-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	21.0	106	70-130
4-Bromofluorobenzene	25.6	118	70-130

Date Sampled:	09/04/12	Date Analyzed:	09/19/12	QC Batch: B011204
Date Received:	09/05/12	Method:	EPA TO-15	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2090517-01	**HW-27**	Oxygen (O2)	4.7	0.009
		Carbon Dioxide (CO2)	28	0.009
		Methane	27	0.009
		Nitrogen	25	0.009
		Hydrogen	0.68	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	09/04/12	Date Analyzed:	09/21/12	QC Batch: B011136
Date Received:	09/05/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2090517-02	**HW-26**	Oxygen (O2)	2.2	0.009
		Carbon Dioxide (CO2)	28	0.009
		Methane	29	0.009
		Nitrogen	25	0.009
		Hydrogen	0.58	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	09/04/12	Date Analyzed:	09/21/12	QC Batch: B011136
Date Received:	09/05/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2090517-03	**HW-25**	Oxygen (O2)	2.5	0.009
		Carbon Dioxide (CO2)	29	0.009
		Methane	29	0.009
		Nitrogen	24	0.009
		Hydrogen	0.66	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	09/04/12	Date Analyzed:	09/21/12	QC Batch: B011136
Date Received:	09/05/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2090517-04	**HW-24**	Oxygen (O2)	2.1	0.009
		Carbon Dioxide (CO2)	28	0.009
		Methane	27	0.009
		Nitrogen	21	0.009
		Hydrogen	0.73	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	09/04/12	Date Analyzed:	09/21/12	QC Batch: B011136
Date Received:	09/05/12	Method:	ASTM 1946 D	

Fixed Gases (%)

Lab#	Sample ID	Compound Name	Result (%)	RDL (%)
2090517-05	**HW-23**	Oxygen (O2)	2.1	0.009
		Carbon Dioxide (CO2)	28	0.009
		Methane	28	0.009
		Nitrogen	25	0.009
		Hydrogen	0.28	0.009
		Ethene	ND	0.009
		Ethane	ND	0.009
		Acetylene	ND	0.009
		Propane	ND	0.009
		Carbon Monoxide	ND	0.009

Date Sampled:	09/04/12	Date Analyzed:	09/21/12	QC Batch: B011136
Date Received:	09/05/12	Method:	ASTM 1946 D	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011204 - Air prep GC/MS										
Blank (B011204-BLK1)				Prepared & Analyzed: 09/20/12						
Gasoline	ND	50	ppbv							
Propylene	ND	10	ppbv							
Dichlorodifluoromethane (F-12)	ND	10	ppbv							
Chloromethane	ND	10	ppbv							
Vinyl chloride	ND	10	ppbv							
1,3-Butadiene	ND	10	ppbv							
Chloroethane (CE)	ND	10	ppbv							
Trichlorofluoromethane (F-11)	ND	10	ppbv							
Acetone	ND	40	ppbv							
Isopropyl alcohol	ND	4.0	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	10	ppbv							
Trichlorotrifluoroethane (F-113)	ND	10	ppbv							
Methylene chloride	ND	10	ppbv							
Carbon disulfide	ND	10	ppbv							
trans-1,2-Dichloroethene	ND	10	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	10	ppbv							
Hexane	ND	10	ppbv							
2-Butanone	ND	10	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	10	ppbv							
Ethyl Acetate	ND	10	ppbv							
Chloroform (THM1)	ND	10	ppbv							
Tetrahydrofuran	ND	10	ppbv							
1,1,1-Trichloroethane (TCA)	ND	10	ppbv							
1,2-Dichloroethane (EDC)	ND	10	ppbv							
Cyclohexane	ND	10	ppbv							
Carbon tetrachloride	ND	6.0	ppbv							
Benzene	ND	10	ppbv							
2,2,4-Trimethylpentane	ND	10	ppbv							
Heptane	ND	10	ppbv							
Trichloroethene (TCE)	ND	10	ppbv							
1,2-Dichloropropane (DCP)	ND	10	ppbv							
Methyl Isobutyl Ketone (MIBK)	ND	10	ppbv							
cis-1,3-Dichloropropene	ND	10	ppbv							
trans-1,3-Dichloropropene	ND	10	ppbv							
Toluene	ND	10	ppbv							
1,1,2-Trichloroethane	ND	10	ppbv							
Dibromochloromethane (THM3)	ND	10	ppbv							
Tetrachloroethene (PCE)	ND	10	ppbv							
Chlorobenzene	ND	10	ppbv							
Ethylbenzene	ND	10	ppbv							
m,p-Xylene	ND	10	ppbv							

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011204 - Air prep GC/MS										
Blank (B011204-BLK1)				Prepared & Analyzed: 09/20/12						
Styrene	ND	10	ppbv							
o-Xylene	ND	10	ppbv							
1,1,2,2-Tetrachloroethane	ND	10	ppbv							
1,3-Dichlorobenzene	ND	10	ppbv							
1,4-Dichlorobenzene	ND	10	ppbv							
1,2-Dichlorobenzene	ND	10	ppbv							
1,2,4-Trichlorobenzene	ND	10	ppbv							
Naphthalene	ND	10	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	10	ppbv							
Tertiary Butyl Alcohol (TBA)	ND	80	ppbv							
Ethyl tert-Butyl Ether (ETBE)	ND	10	ppbv							
Tert-Amyl Methyl Ether (TAME)	ND	10	ppbv							
Surrogate: Dibromofluoromethane	*5.04*		*ppbv*	*4.96*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*4.76*		*ppbv*	*5.42*		*88*	*70-130*			

Fixed Gases (%)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011136 - Air prep GC/MS										
Blank (B011136-BLK1)				Prepared: 09/05/12 Analyzed: 09/06/12						
Oxygen (O2)	ND	0.005	%							
Carbon Dioxide (CO2)	ND	0.005	%							
Methane	ND	0.005	%							
Nitrogen	ND	0.005	%							
Hydrogen	ND	0.005	%							
Ethene	ND	0.005	%							
Ethane	ND	0.005	%							
Acetylene	ND	0.005	%							
Propane	ND	0.005	%							
Carbon Monoxide	ND	0.005	%							

Notes and Definitions

(1)d	The following additional compound was detected: Dimethyl Sulfide (c. 22,000 ppbv).
(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 17,000 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 15,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 13,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 12,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128
Fax (707) 769-8093

CHAIN OF CUSTODY

Lab Project Number: 2090517
GHD Project Name: BADLANDS
GHD Project Number: 125831.2008

GeoTracker Required Yes No
GeoTracker Number:

CLIENT INFORMATION

Company Name: GHD, INC.
Address: 2235 Mercury Way, Suite 150
Santa Rosa, CA 95407
Contact: DAVE VOSSLER
Phone #: (707) 523-1010
Fax #: (707) 527-8697
e-mail:

TURNAROUND TIME (check one)

Same Day ____
48 Hours ____ 24 Hours ____
5 Days ____ Normal X

Page 1 of 1

ANALYSIS

Item	Client Sample ID	Date	Matrix	Canister ID #	Regulator ID #	Sample Start Time	Sample End Time	EPA TO-15		FIXED GASES		VOLATILE SULFATIDE					Comments	Lab Sample #
1	HW-27	9-4-12	AIR	1005	1	1216	1229	X		X		X					2090517	-01
2																		
3	HW-26	9-4-12	AIR	306	9	1233	1244	X		X		X						-02
4																		
5	HW-25	9-4-12	AIR	312	21	1259	1312	X		X		X						-03
6																		
7	HW-24	9-4-12	AIR	301	5	1309	1321	X		X		X						-04
8																		
9	HW-23	9-4-12	AIR	1015	24	1334	1346	X		X		X						-05
10																		

SIGNATURES

Sampled By: RYAN CRAWFORD

Relinquished By: Ryan Crawford
Signature
9/4/2012 1730 VIA UPS
Date Time

Received By:
Signature
9/5/12 1100
Date Time

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

November 07, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2091904 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 07, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands** **1258312008.32100**

Lab Project: **2091904**

This 14 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2091904-01	**HW-27**	Gasoline	400000	(1)d	25000
		Propylene	36000		840
		Dichlorodifluoromethane (F-12)	3000		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	7200		3300
		Isopropyl alcohol	14000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	7900		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	8700		840
		2-Butanone	15000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	22000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	16000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	6800		840
		Carbon tetrachloride	ND		500
		Benzene	5000		840
		2,2,4-Trimethylpentane	2600		840
		Heptane	11000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	1700		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	14000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	900		840
		Chlorobenzene	ND		840
		Ethylbenzene	2000		840
		m,p-Xylene	3900		840
		Styrene	ND		840
		o-Xylene	860		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2091904-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.2	102	70-130
4-Bromofluorobenzene	23.4	108	70-130

Date Sampled:	09/18/12	Date Analyzed:	09/19/12	QC Batch: B011204
Date Received:	09/19/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2091904-02	**HW-26**	Gasoline	280000	(1)	27000
		Propylene	32000		910
		Dichlorodifluoromethane (F-12)	2700		910
		Chloromethane	ND		910
		Vinyl chloride	ND		910
		1,3-Butadiene	ND		910
		Chloroethane (CE)	ND		910
		Trichlorofluoromethane (F-11)	ND		910
		Acetone	6400		3600
		Isopropyl alcohol	11000		360
		1,1-Dichloroethene (1,1-DCE)	ND		910
		Trichlorotrifluoroethane (F-113)	ND		910
		Methylene chloride	3200		910
		Carbon disulfide	ND		910
		trans-1,2-Dichloroethene	ND		910
		1,1-Dichloroethane (1,1-DCA)	ND		910
		Hexane	3900		910
		2-Butanone	10000		910
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		910
		Ethyl Acetate	17000		910
		Chloroform (THM1)	ND		910
		Tetrahydrofuran	12000		910
		1,1,1-Trichloroethane (TCA)	ND		910
		1,2-Dichloroethane (EDC)	ND		910
		Cyclohexane	4900		910
		Carbon tetrachloride	ND		550
		Benzene	3900		910
		2,2,4-Trimethylpentane	1300		910
		Heptane	9100		910
		Trichloroethene (TCE)	ND		910
		1,2-Dichloropropane (DCP)	ND		910
		Methyl Isobutyl Ketone (MIBK)	ND		910
		cis-1,3-Dichloropropene	ND		910
		trans-1,3-Dichloropropene	ND		910
		Toluene	16000		910
		1,1,2-Trichloroethane	ND		910
		Dibromochloromethane (THM3)	ND		910
		Tetrachloroethene (PCE)	920		910
		Chlorobenzene	ND		910
		Ethylbenzene	2500		910
		m,p-Xylene	5000		910
		Styrene	ND		910
		o-Xylene	1100		910
		1,1,2,2-Tetrachloroethane	ND		910
		1,3-Dichlorobenzene	ND		910
		1,4-Dichlorobenzene	ND		910
		1,2-Dichlorobenzene	ND		910
		1,2,4-Trichlorobenzene	ND		910
		Naphthalene	ND		910

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2091904-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	910
		Tertiary Butyl Alcohol (TBA)	ND	7300
		Ethyl tert-Butyl Ether (ETBE)	ND	910
		Tert-Amyl Methyl Ether (TAME)	ND	910

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.8	100	70-130
4-Bromofluorobenzene	27.9	129	70-130

Date Sampled:	09/18/12	Date Analyzed:	09/20/12	QC Batch: B011204
Date Received:	09/19/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2091904-03	**HW-25**	Gasoline	440000	(1)b	25000
		Propylene	31000		840
		Dichlorodifluoromethane (F-12)	3900		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	8200		3300
		Isopropyl alcohol	18000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	3900		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	5300		840
		2-Butanone	17000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	29000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	19000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	7100		840
		Carbon tetrachloride	ND		500
		Benzene	6000		840
		2,2,4-Trimethylpentane	2300		840
		Heptane	11000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	2500		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	19000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	1100		840
		Chlorobenzene	ND		840
		Ethylbenzene	3200		840
		m,p-Xylene	6400		840
		Styrene	840		840
		o-Xylene	1300		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2091904-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.8	100	70-130
4-Bromofluorobenzene	26.6	123	70-130

Date Sampled:	09/18/12	Date Analyzed:	09/20/12	QC Batch: B011204
Date Received:	09/19/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2091904-04	**HW-24**	Gasoline	490000	(1)c	25000
		Propylene	37000		840
		Dichlorodifluoromethane (F-12)	3800		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	7500		3300
		Isopropyl alcohol	18000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	5400		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	7800		840
		2-Butanone	16000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	31000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	18000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	7900		840
		Carbon tetrachloride	ND		500
		Benzene	5600		840
		2,2,4-Trimethylpentane	2600		840
		Heptane	13000		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	2800		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	16000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	ND		840
		Chlorobenzene	ND		840
		Ethylbenzene	3100		840
		m,p-Xylene	6300		840
		Styrene	880		840
		o-Xylene	1400		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2091904-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.7	99	70-130
4-Bromofluorobenzene	26.8	124	70-130

Date Sampled:	09/18/12	Date Analyzed:	09/21/12	QC Batch: B011204
Date Received:	09/19/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2091904-05	**HW-23**	Gasoline	440000	(1)a	25000
		Propylene	27000		840
		Dichlorodifluoromethane (F-12)	2100		840
		Chloromethane	ND		840
		Vinyl chloride	ND		840
		1,3-Butadiene	ND		840
		Chloroethane (CE)	ND		840
		Trichlorofluoromethane (F-11)	ND		840
		Acetone	9600		3300
		Isopropyl alcohol	14000		330
		1,1-Dichloroethene (1,1-DCE)	ND		840
		Trichlorotrifluoroethane (F-113)	ND		840
		Methylene chloride	4500		840
		Carbon disulfide	ND		840
		trans-1,2-Dichloroethene	ND		840
		1,1-Dichloroethane (1,1-DCA)	ND		840
		Hexane	5500		840
		2-Butanone	24000		840
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		840
		Ethyl Acetate	16000		840
		Chloroform (THM1)	ND		840
		Tetrahydrofuran	15000		840
		1,1,1-Trichloroethane (TCA)	ND		840
		1,2-Dichloroethane (EDC)	ND		840
		Cyclohexane	6100		840
		Carbon tetrachloride	ND		500
		Benzene	5000		840
		2,2,4-Trimethylpentane	2400		840
		Heptane	8800		840
		Trichloroethene (TCE)	ND		840
		1,2-Dichloropropane (DCP)	ND		840
		Methyl Isobutyl Ketone (MIBK)	1900		840
		cis-1,3-Dichloropropene	ND		840
		trans-1,3-Dichloropropene	ND		840
		Toluene	17000		840
		1,1,2-Trichloroethane	ND		840
		Dibromochloromethane (THM3)	ND		840
		Tetrachloroethene (PCE)	1100		840
		Chlorobenzene	ND		840
		Ethylbenzene	3300		840
		m,p-Xylene	6900		840
		Styrene	1600		840
		o-Xylene	1600		840
		1,1,2,2-Tetrachloroethane	ND		840
		1,3-Dichlorobenzene	ND		840
		1,4-Dichlorobenzene	ND		840
		1,2-Dichlorobenzene	ND		840
		1,2,4-Trichlorobenzene	ND		840
		Naphthalene	ND		840

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2091904-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	840
		Tertiary Butyl Alcohol (TBA)	ND	6700
		Ethyl tert-Butyl Ether (ETBE)	ND	840
		Tert-Amyl Methyl Ether (TAME)	ND	840

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.3	102	70-130
4-Bromofluorobenzene	23.5	108	70-130

Date Sampled:	09/18/12	Date Analyzed:	09/21/12	QC Batch: B011204
Date Received:	09/19/12	Method:	EPA TO-15	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011204 - Air prep GC/MS										
Blank (B011204-BLK1)				Prepared & Analyzed: 09/20/12						
Gasoline	ND	50	ppbv							
Propylene	ND	10	ppbv							
Dichlorodifluoromethane (F-12)	ND	10	ppbv							
Chloromethane	ND	10	ppbv							
Vinyl chloride	ND	10	ppbv							
1,3-Butadiene	ND	10	ppbv							
Chloroethane (CE)	ND	10	ppbv							
Trichlorofluoromethane (F-11)	ND	10	ppbv							
Acetone	ND	40	ppbv							
Isopropyl alcohol	ND	4.0	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	10	ppbv							
Trichlorotrifluoroethane (F-113)	ND	10	ppbv							
Methylene chloride	ND	10	ppbv							
Carbon disulfide	ND	10	ppbv							
trans-1,2-Dichloroethene	ND	10	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	10	ppbv							
Hexane	ND	10	ppbv							
2-Butanone	ND	10	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	10	ppbv							
Ethyl Acetate	ND	10	ppbv							
Chloroform (THM1)	ND	10	ppbv							
Tetrahydrofuran	ND	10	ppbv							
1,1,1-Trichloroethane (TCA)	ND	10	ppbv							
1,2-Dichloroethane (EDC)	ND	10	ppbv							
Cyclohexane	ND	10	ppbv							
Carbon tetrachloride	ND	6.0	ppbv							
Benzene	ND	10	ppbv							
2,2,4-Trimethylpentane	ND	10	ppbv							
Heptane	ND	10	ppbv							
Trichloroethene (TCE)	ND	10	ppbv							
1,2-Dichloropropane (DCP)	ND	10	ppbv							
Methyl Isobutyl Ketone (MIBK)	ND	10	ppbv							
cis-1,3-Dichloropropene	ND	10	ppbv							
trans-1,3-Dichloropropene	ND	10	ppbv							
Toluene	ND	10	ppbv							
1,1,2-Trichloroethane	ND	10	ppbv							
Dibromochloromethane (THM3)	ND	10	ppbv							
Tetrachloroethene (PCE)	ND	10	ppbv							
Chlorobenzene	ND	10	ppbv							
Ethylbenzene	ND	10	ppbv							
m,p-Xylene	ND	10	ppbv							

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011204 - Air prep GC/MS										
Blank (B011204-BLK1)				Prepared & Analyzed: 09/20/12						
Styrene	ND	10	ppbv							
o-Xylene	ND	10	ppbv							
1,1,2,2-Tetrachloroethane	ND	10	ppbv							
1,3-Dichlorobenzene	ND	10	ppbv							
1,4-Dichlorobenzene	ND	10	ppbv							
1,2-Dichlorobenzene	ND	10	ppbv							
1,2,4-Trichlorobenzene	ND	10	ppbv							
Naphthalene	ND	10	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	10	ppbv							
Tertiary Butyl Alcohol (TBA)	ND	80	ppbv							
Ethyl tert-Butyl Ether (ETBE)	ND	10	ppbv							
Tert-Amyl Methyl Ether (TAME)	ND	10	ppbv							
Surrogate: Dibromofluoromethane	*5.04*		*ppbv*	*4.96*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*4.76*		*ppbv*	*5.42*		*88*	*70-130*			

Notes and Definitions

(1)d	The following additional compound was detected: Dimethyl Sulfide (c. 20,000 ppbv).
(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 18,000 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 17,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 15,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 13,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2091904
CLIENT'S PROJECT NAME: CalRecycle - Badlands
CLIENT'S PROJECT NUMBER: 12583120008.32100

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	Same
ADDRESS:	2235 Mercury Way, Suite 150 Santa Rosa, CA 95407	COMPANY NAME:	
CONTACT:	Dave Vossler / Sonya Chuck	ADDRESS:	
PHONE#:	707-523-1010	PHONE#:	
FAX #:	707-527-8679	FAX #:	

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___Y X N
GLOBAL ID: _____

COOLER TEMPERATURE
_____ °C

COC

PAGE ____ OF ____

ITEM	CLIENT SAMPLE I.D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	ANALYSIS: EPA TO-15					COMMENTS	LAB SAMPLE #
1	HW-27	303	1	13:35:00	13:47:00	9-18-2012	Air	X					2091904	-01
2	HW-26	140	17	13:59:00	14:08:00			X						-02
3	HW-25	1007	21	14:30:00	14:42:00			X						-03
4	HW-24	316	5	14:52:00	15:05:00			X						-04
5	HW-23	318	24	15:18:00	15:30:00			X						-05
6														
7														
8														
9														
10														

SIGNATURES

shipped UPS -

SAMPLED BY: David J. Vossler

RELINQUISHED BY: [signature] — SIGNATURE
9.18.2012 — DATE / TIME

RECEIVED BY LABORATORY: [signature] — SIGNATURE
9-19-12 — DATE
1020 — TIME

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

November 02, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2100305 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 02, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands** **1258312008.32100**

Lab Project: **2100305**

This 14 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2100305-01	**HW-27**	Gasoline	310000	(1)c	14000
		Propylene	26000		460
		Dichlorodifluoromethane (F-12)	2500		460
		Chloromethane	ND		460
		Vinyl chloride	ND		460
		1,3-Butadiene	ND		460
		Chloroethane (CE)	ND		460
		Trichlorofluoromethane (F-11)	ND		460
		Acetone	5100		1800
		Isopropyl alcohol	12000		460
		1,1-Dichloroethene (1,1-DCE)	ND		460
		Trichlorotrifluoroethane (F-113)	ND		460
		Methylene chloride	5500		460
		Carbon disulfide	ND		460
		trans-1,2-Dichloroethene	ND		460
		1,1-Dichloroethane (1,1-DCA)	ND		460
		Hexane	6100		460
		2-Butanone	12000		460
		cis-1,2-Dichloroethene (c1,2-DCE)	950		460
		Ethyl Acetate	17000		460
		Chloroform (THM1)	ND		460
		Tetrahydrofuran	13000		460
		1,1,1-Trichloroethane (TCA)	ND		460
		1,2-Dichloroethane (EDC)	ND		460
		Cyclohexane	5300		460
		Carbon tetrachloride	ND		270
		Benzene	3900		460
		2,2,4-Trimethylpentane	1900		460
		Heptane	8300		460
		Trichloroethene (TCE)	500		460
		1,2-Dichloropropane (DCP)	ND		460
		Methyl Isobutyl Ketone (MIBK)	1500		460
		cis-1,3-Dichloropropene	ND		460
		trans-1,3-Dichloropropene	ND		460
		Toluene	12000		460
		1,1,2-Trichloroethane	ND		460
		Dibromochloromethane (THM3)	ND		460
		Tetrachloroethene (PCE)	1400		460
		Chlorobenzene	ND		460
		Ethylbenzene	1800		460
		m,p-Xylene	3500		460
		Styrene	580		460
		o-Xylene	830		460
		1,1,2,2-Tetrachloroethane	ND		460
		1,3-Dichlorobenzene	ND		460
		1,4-Dichlorobenzene	ND		460
		1,2-Dichlorobenzene	ND		460
		1,2,4-Trichlorobenzene	ND		460
		Naphthalene	ND		460

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2100305-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	460
		Tertiary Butyl Alcohol (TBA)	ND	3600
		Ethyl tert-Butyl Ether (ETBE)	ND	460
		Tert-Amyl Methyl Ether (TAME)	ND	460

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.2	102	70-130
4-Bromofluorobenzene	19.4	90	70-130

Date Sampled:	10/02/12	Date Analyzed:	10/25/12	QC Batch: B011383
Date Received:	10/03/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2100305-02	**HW-26**	Gasoline	280000	(1)	14000
		Propylene	23000		460
		Dichlorodifluoromethane (F-12)	1600		460
		Chloromethane	ND		460
		Vinyl chloride	ND		460
		1,3-Butadiene	ND		460
		Chloroethane (CE)	ND		460
		Trichlorofluoromethane (F-11)	ND		460
		Acetone	4300		1800
		Isopropyl alcohol	11000		460
		1,1-Dichloroethene (1,1-DCE)	ND		460
		Trichlorotrifluoroethane (F-113)	ND		460
		Methylene chloride	2100		460
		Carbon disulfide	ND		460
		trans-1,2-Dichloroethene	ND		460
		1,1-Dichloroethane (1,1-DCA)	ND		460
		Hexane	2700		460
		2-Butanone	8900		460
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		460
		Ethyl Acetate	17000		460
		Chloroform (THM1)	ND		460
		Tetrahydrofuran	9700		460
		1,1,1-Trichloroethane (TCA)	ND		460
		1,2-Dichloroethane (EDC)	ND		460
		Cyclohexane	3400		460
		Carbon tetrachloride	ND		270
		Benzene	3200		460
		2,2,4-Trimethylpentane	1100		460
		Heptane	7000		460
		Trichloroethene (TCE)	520		460
		1,2-Dichloropropane (DCP)	ND		460
		Methyl Isobutyl Ketone (MIBK)	1600		460
		cis-1,3-Dichloropropene	ND		460
		trans-1,3-Dichloropropene	ND		460
		Toluene	13000		460
		1,1,2-Trichloroethane	ND		460
		Dibromochloromethane (THM3)	ND		460
		Tetrachloroethene (PCE)	810		460
		Chlorobenzene	ND		460
		Ethylbenzene	2200		460
		m,p-Xylene	4400		460
		Styrene	770		460
		o-Xylene	960		460
		1,1,2,2-Tetrachloroethane	ND		460
		1,3-Dichlorobenzene	ND		460
		1,4-Dichlorobenzene	ND		460
		1,2-Dichlorobenzene	ND		460
		1,2,4-Trichlorobenzene	ND		460
		Naphthalene	ND		460

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2100305-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	460
		Tertiary Butyl Alcohol (TBA)	ND	3600
		Ethyl tert-Butyl Ether (ETBE)	ND	460
		Tert-Amyl Methyl Ether (TAME)	ND	460

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.7	104	70-130
4-Bromofluorobenzene	20.4	94	70-130

Date Sampled:	10/02/12	Date Analyzed:	10/25/12	QC Batch: B011383
Date Received:	10/03/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2100305-03	**HW-25**	Gasoline	430000	(1)c	14000
		Propylene	27000		460
		Dichlorodifluoromethane (F-12)	2600		460
		Chloromethane	520		460
		Vinyl chloride	ND		460
		1,3-Butadiene	ND		460
		Chloroethane (CE)	ND		460
		Trichlorofluoromethane (F-11)	ND		460
		Acetone	7300		1800
		Isopropyl alcohol	20000		460
		1,1-Dichloroethene (1,1-DCE)	ND		460
		Trichlorotrifluoroethane (F-113)	ND		460
		Methylene chloride	3500		460
		Carbon disulfide	ND		460
		trans-1,2-Dichloroethene	ND		460
		1,1-Dichloroethane (1,1-DCA)	ND		460
		Hexane	5000		460
		2-Butanone	17000		460
		cis-1,2-Dichloroethene (c1,2-DCE)	1000		460
		Ethyl Acetate	32000		460
		Chloroform (THM1)	ND		460
		Tetrahydrofuran	19000		460
		1,1,1-Trichloroethane (TCA)	ND		460
		1,2-Dichloroethane (EDC)	ND		460
		Cyclohexane	6700		460
		Carbon tetrachloride	ND		270
		Benzene	5500		460
		2,2,4-Trimethylpentane	2300		460
		Heptane	10000		460
		Trichloroethene (TCE)	800		460
		1,2-Dichloropropane (DCP)	ND		460
		Methyl Isobutyl Ketone (MIBK)	3100		460
		cis-1,3-Dichloropropene	ND		460
		trans-1,3-Dichloropropene	ND		460
		Toluene	19000		460
		1,1,2-Trichloroethane	ND		460
		Dibromochloromethane (THM3)	ND		460
		Tetrachloroethene (PCE)	1600		460
		Chlorobenzene	ND		460
		Ethylbenzene	3700		460
		m,p-Xylene	7200		460
		Styrene	1200		460
		o-Xylene	1600		460
		1,1,2,2-Tetrachloroethane	ND		460
		1,3-Dichlorobenzene	ND		460
		1,4-Dichlorobenzene	ND		460
		1,2-Dichlorobenzene	ND		460
		1,2,4-Trichlorobenzene	ND		460
		Naphthalene	ND		460

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2100305-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	460
		Tertiary Butyl Alcohol (TBA)	ND	3600
		Ethyl tert-Butyl Ether (ETBE)	ND	460
		Tert-Amyl Methyl Ether (TAME)	ND	460

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.5	103	70-130
4-Bromofluorobenzene	21.1	97	70-130

Date Sampled:	10/02/12	Date Analyzed:	10/25/12	QC Batch: B011383
Date Received:	10/03/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2100305-04	**HW-24**	Gasoline	320000	(1)a	14000
		Propylene	19000		460
		Dichlorodifluoromethane (F-12)	1700		460
		Chloromethane	ND		460
		Vinyl chloride	ND		460
		1,3-Butadiene	ND		460
		Chloroethane (CE)	ND		460
		Trichlorofluoromethane (F-11)	ND		460
		Acetone	5500		1800
		Isopropyl alcohol	12000		460
		1,1-Dichloroethene (1,1-DCE)	ND		460
		Trichlorotrifluoroethane (F-113)	ND		460
		Methylene chloride	3100		460
		Carbon disulfide	ND		460
		trans-1,2-Dichloroethene	ND		460
		1,1-Dichloroethane (1,1-DCA)	ND		460
		Hexane	4000		460
		2-Butanone	11000		460
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		460
		Ethyl Acetate	23000		460
		Chloroform (THM1)	ND		460
		Tetrahydrofuran	13000		460
		1,1,1-Trichloroethane (TCA)	ND		460
		1,2-Dichloroethane (EDC)	ND		460
		Cyclohexane	4700		460
		Carbon tetrachloride	ND		270
		Benzene	3600		460
		2,2,4-Trimethylpentane	1500		460
		Heptane	7600		460
		Trichloroethene (TCE)	480		460
		1,2-Dichloropropane (DCP)	ND		460
		Methyl Isobutyl Ketone (MIBK)	2100		460
		cis-1,3-Dichloropropene	ND		460
		trans-1,3-Dichloropropene	ND		460
		Toluene	13000		460
		1,1,2-Trichloroethane	ND		460
		Dibromochloromethane (THM3)	ND		460
		Tetrachloroethene (PCE)	610		460
		Chlorobenzene	ND		460
		Ethylbenzene	2400		460
		m,p-Xylene	5000		460
		Styrene	740		460
		o-Xylene	1100		460
		1,1,2,2-Tetrachloroethane	ND		460
		1,3-Dichlorobenzene	ND		460
		1,4-Dichlorobenzene	ND		460
		1,2-Dichlorobenzene	ND		460
		1,2,4-Trichlorobenzene	ND		460
		Naphthalene	ND		460

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2100305-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	460
		Tertiary Butyl Alcohol (TBA)	ND	3600
		Ethyl tert-Butyl Ether (ETBE)	ND	460
		Tert-Amyl Methyl Ether (TAME)	ND	460

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	20.2	102	70-130
4-Bromofluorobenzene	20.8	96	70-130

Date Sampled:	10/02/12	Date Analyzed:	10/26/12	QC Batch: B011383
Date Received:	10/03/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2100305-05	**HW-23**	Gasoline	61000	(1)b	13000
		Propylene	4200		440
		Dichlorodifluoromethane (F-12)	ND		440
		Chloromethane	ND		440
		Vinyl chloride	ND		440
		1,3-Butadiene	ND		440
		Chloroethane (CE)	ND		440
		Trichlorofluoromethane (F-11)	ND		440
		Acetone	ND		1700
		Isopropyl alcohol	2000		440
		1,1-Dichloroethene (1,1-DCE)	ND		440
		Trichlorotrifluoroethane (F-113)	ND		440
		Methylene chloride	610		440
		Carbon disulfide	ND		440
		trans-1,2-Dichloroethene	ND		440
		1,1-Dichloroethane (1,1-DCA)	ND		440
		Hexane	660		440
		2-Butanone	3200		440
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		440
		Ethyl Acetate	2700		440
		Chloroform (THM1)	ND		440
		Tetrahydrofuran	2200		440
		1,1,1-Trichloroethane (TCA)	ND		440
		1,2-Dichloroethane (EDC)	ND		440
		Cyclohexane	770		440
		Carbon tetrachloride	ND		260
		Benzene	670		440
		2,2,4-Trimethylpentane	ND		440
		Heptane	1200		440
		Trichloroethene (TCE)	ND		440
		1,2-Dichloropropane (DCP)	ND		440
		Methyl Isobutyl Ketone (MIBK)	ND		440
		cis-1,3-Dichloropropene	ND		440
		trans-1,3-Dichloropropene	ND		440
		Toluene	2100		440
		1,1,2-Trichloroethane	ND		440
		Dibromochloromethane (THM3)	ND		440
		Tetrachloroethene (PCE)	ND		440
		Chlorobenzene	ND		440
		Ethylbenzene	ND		440
		m,p-Xylene	800		440
		Styrene	ND		440
		o-Xylene	ND		440
		1,1,2,2-Tetrachloroethane	ND		440
		1,3-Dichlorobenzene	ND		440
		1,4-Dichlorobenzene	ND		440
		1,2-Dichlorobenzene	ND		440
		1,2,4-Trichlorobenzene	ND		440
		Naphthalene	ND		440

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2100305-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	440
		Tertiary Butyl Alcohol (TBA)	ND	3500
		Ethyl tert-Butyl Ether (ETBE)	ND	440
		Tert-Amyl Methyl Ether (TAME)	ND	440

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	22.4	113	70-130
4-Bromofluorobenzene	18.3	85	70-130

Date Sampled:	10/02/12	Date Analyzed:	10/26/12	QC Batch: B011383
Date Received:	10/03/12	Method:	EPA TO-15	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011383 - Air prep GC/MS										
Blank (B011383-BLK1)				Prepared: 10/24/12 Analyzed: 10/25/12						
Gasoline	ND	75	ppbv							
Propylene	ND	2.5	ppbv							
Dichlorodifluoromethane (F-12)	ND	2.5	ppbv							
Chloromethane	ND	2.5	ppbv							
Vinyl chloride	ND	2.5	ppbv							
1,3-Butadiene	ND	2.5	ppbv							
Chloroethane (CE)	ND	2.5	ppbv							
Trichlorofluoromethane (F-11)	ND	2.5	ppbv							
Acetone	ND	10	ppbv							
Isopropyl alcohol	ND	2.5	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	2.5	ppbv							
Trichlorotrifluoroethane (F-113)	ND	2.5	ppbv							
Methylene chloride	ND	2.5	ppbv							
Carbon disulfide	ND	2.5	ppbv							
trans-1,2-Dichloroethene	ND	2.5	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	2.5	ppbv							
Hexane	ND	2.5	ppbv							
2-Butanone	ND	2.5	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	2.5	ppbv							
Ethyl Acetate	ND	2.5	ppbv							
Chloroform (THM1)	ND	2.5	ppbv							
Tetrahydrofuran	ND	2.5	ppbv							
1,1,1-Trichloroethane (TCA)	ND	2.5	ppbv							
1,2-Dichloroethane (EDC)	ND	2.5	ppbv							
Cyclohexane	ND	2.5	ppbv							
Carbon tetrachloride	ND	1.5	ppbv							
Benzene	ND	2.5	ppbv							
2,2,4-Trimethylpentane	ND	2.5	ppbv							
Heptane	ND	2.5	ppbv							
Trichloroethene (TCE)	ND	2.5	ppbv							
1,2-Dichloropropane (DCP)	ND	2.5	ppbv							
Methyl Isobutyl Ketone (MIBK)	ND	2.5	ppbv							
cis-1,3-Dichloropropene	ND	2.5	ppbv							
trans-1,3-Dichloropropene	ND	2.5	ppbv							
Toluene	ND	2.5	ppbv							
1,1,2-Trichloroethane	ND	2.5	ppbv							
Dibromochloromethane (THM3)	ND	2.5	ppbv							
Tetrachloroethene (PCE)	ND	2.5	ppbv							
Chlorobenzene	ND	2.5	ppbv							
Ethylbenzene	ND	2.5	ppbv							
m,p-Xylene	ND	2.5	ppbv							

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011383 - Air prep GC/MS										
Blank (B011383-BLK1)				Prepared: 10/24/12 Analyzed: 10/25/12						
Styrene	ND	2.5	ppbv							
o-Xylene	ND	2.5	ppbv							
1,1,2,2-Tetrachloroethane	ND	2.5	ppbv							
1,3-Dichlorobenzene	ND	2.5	ppbv							
1,4-Dichlorobenzene	ND	2.5	ppbv							
1,2-Dichlorobenzene	ND	2.5	ppbv							
1,2,4-Trichlorobenzene	ND	2.5	ppbv							
Naphthalene	ND	2.5	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	2.5	ppbv							
Tertiary Butyl Alcohol (TBA)	ND	20	ppbv							
Ethyl tert-Butyl Ether (ETBE)	ND	2.5	ppbv							
Tert-Amyl Methyl Ether (TAME)	ND	2.5	ppbv							
Surrogate: Dibromofluoromethane	*ND*		*ppbv*	*3.31*			*70-130*			
Surrogate: 4-Bromofluorobenzene	*ND*		*ppbv*	*3.61*			*70-130*			

Notes and Definitions

(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 20,000 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 2,400 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 18,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 12,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2100305
CLIENT'S PROJECT NAME: BADLANDS
CLIENT'S PROJECT NUMBER: 1258312008.32100

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	SAME
ADDRESS:	2235 MERCURY WAY SANTA ROSA, CA	COMPANY NAME:	
CONTACT:	DAVE VOSSLER	ADDRESS:	
PHONE#:	707.523.1010	PHONE#:	
FAX #:		FAX #:	

TURNAROUND TIME (check one)			
MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___Y X N
GLOBAL ID: ___

COOLER TEMPERATURE
___ °C

COC
PAGE 1 OF 1

ITEM	CLIENT SAMPLE I.D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	ANALYSIS: EPA TO-15					COMMENTS	LAB SAMPLE #
1	HW-27	1007	2	1251	1304	10/2/12	VAPOR	X					2100305	-01
2	HW-26	306	6	1307	1320	↓	↓	X					↓	-02
3	HW-25	316	9	1335	1348	↓	↓	X					↓	-03
4	HW-24	301	4	1359	1412	↓	↓	X					↓	-04
5	HW-23	1015	75	1417	1430	↓	↓	X					↓	-05
6														
7														
8														
9														
10														

SIGNATURES

SAMPLED BY: RYAN CRAWFORD

RELINQUISHED BY: [signature] — SIGNATURE
10/2/12 — DATE
1550 — TIME
UPS

RECEIVED BY LABORATORY: [signature] — SIGNATURE
10-3-12 — DATE
1045 — TIME

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

November 02, 2012

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Dear Dave,

Enclosed you will find Analytical Sciences' final report 2101703 for your Cal Recycler Badlands project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 02, 2012

Laboratory Report

Dave Vossler
GHD, Inc.
2235 Mercury Way, Suite 150
Santa Rosa, CA 95407

Project Name: **Cal Recycler Badlands** **1258312008.32100**

Lab Project: **2101703**

This 14 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2101703-01	**HW-27**	Gasoline	230000	(1)b	14000
		Propylene	24000		460
		Dichlorodifluoromethane (F-12)	2200		460
		Chloromethane	ND		460
		Vinyl chloride	ND		460
		1,3-Butadiene	ND		460
		Chloroethane (CE)	ND		460
		Trichlorofluoromethane (F-11)	ND		460
		Acetone	4200		1800
		Isopropyl alcohol	8300		460
		1,1-Dichloroethene (1,1-DCE)	ND		460
		Trichlorotrifluoroethane (F-113)	ND		460
		Methylene chloride	4600		460
		Carbon disulfide	ND		460
		trans-1,2-Dichloroethene	ND		460
		1,1-Dichloroethane (1,1-DCA)	ND		460
		Hexane	4900		460
		2-Butanone	8800		460
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		460
		Ethyl Acetate	13000		460
		Chloroform (THM1)	ND		460
		Tetrahydrofuran	9600		460
		1,1,1-Trichloroethane (TCA)	ND		460
		1,2-Dichloroethane (EDC)	ND		460
		Cyclohexane	4400		460
		Carbon tetrachloride	ND		270
		Benzene	3000		460
		2,2,4-Trimethylpentane	1600		460
		Heptane	7300		460
		Trichloroethene (TCE)	ND		460
		1,2-Dichloropropane (DCP)	ND		460
		Methyl Isobutyl Ketone (MIBK)	1100		460
		cis-1,3-Dichloropropene	ND		460
		trans-1,3-Dichloropropene	ND		460
		Toluene	8500		460
		1,1,2-Trichloroethane	ND		460
		Dibromochloromethane (THM3)	ND		460
		Tetrachloroethene (PCE)	590		460
		Chlorobenzene	ND		460
		Ethylbenzene	1100		460
		m,p-Xylene	2100		460
		Styrene	ND		460
		o-Xylene	490		460
		1,1,2,2-Tetrachloroethane	ND		460
		1,3-Dichlorobenzene	ND		460
		1,4-Dichlorobenzene	ND		460
		1,2-Dichlorobenzene	ND		460
		1,2,4-Trichlorobenzene	ND		460
		Naphthalene	ND		460

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2101703-01	**HW-27**	Methyl tert-Butyl Ether (MTBE)	ND	460
		Tertiary Butyl Alcohol (TBA)	ND	3600
		Ethyl tert-Butyl Ether (ETBE)	ND	460
		Tert-Amyl Methyl Ether (TAME)	ND	460

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.0	96	70-130
4-Bromofluorobenzene	18.9	87	70-130

Date Sampled:	10/16/12	Date Analyzed:	10/30/12	QC Batch: B011383
Date Received:	10/17/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2101703-02	**HW-26**	Gasoline	300000	(1)	14000
		Propylene	23000		460
		Dichlorodifluoromethane (F-12)	1800		460
		Chloromethane	ND		460
		Vinyl chloride	ND		460
		1,3-Butadiene	ND		460
		Chloroethane (CE)	ND		460
		Trichlorofluoromethane (F-11)	ND		460
		Acetone	4800		1800
		Isopropyl alcohol	12000		460
		1,1-Dichloroethene (1,1-DCE)	ND		460
		Trichlorotrifluoroethane (F-113)	ND		460
		Methylene chloride	2300		460
		Carbon disulfide	ND		460
		trans-1,2-Dichloroethene	ND		460
		1,1-Dichloroethane (1,1-DCA)	ND		460
		Hexane	3100		460
		2-Butanone	8900		460
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		460
		Ethyl Acetate	20000		460
		Chloroform (THM1)	ND		460
		Tetrahydrofuran	11000		460
		1,1,1-Trichloroethane (TCA)	ND		460
		1,2-Dichloroethane (EDC)	ND		460
		Cyclohexane	3700		460
		Carbon tetrachloride	ND		270
		Benzene	3300		460
		2,2,4-Trimethylpentane	1200		460
		Heptane	6600		460
		Trichloroethene (TCE)	480		460
		1,2-Dichloropropane (DCP)	ND		460
		Methyl Isobutyl Ketone (MIBK)	1800		460
		cis-1,3-Dichloropropene	ND		460
		trans-1,3-Dichloropropene	ND		460
		Toluene	12000		460
		1,1,2-Trichloroethane	ND		460
		Dibromochloromethane (THM3)	ND		460
		Tetrachloroethene (PCE)	660		460
		Chlorobenzene	ND		460
		Ethylbenzene	2000		460
		m,p-Xylene	4000		460
		Styrene	550		460
		o-Xylene	820		460
		1,1,2,2-Tetrachloroethane	ND		460
		1,3-Dichlorobenzene	ND		460
		1,4-Dichlorobenzene	ND		460
		1,2-Dichlorobenzene	ND		460
		1,2,4-Trichlorobenzene	ND		460
		Naphthalene	ND		460

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2101703-02	**HW-26**	Methyl tert-Butyl Ether (MTBE)	ND	460
		Tertiary Butyl Alcohol (TBA)	ND	3600
		Ethyl tert-Butyl Ether (ETBE)	ND	460
		Tert-Amyl Methyl Ether (TAME)	ND	460

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.0	96	70-130
4-Bromofluorobenzene	18.8	87	70-130

Date Sampled:	10/16/12	Date Analyzed:	10/30/12	QC Batch: B011383
Date Received:	10/17/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2101703-03	**HW-25**	Gasoline	920	130
		Propylene	14	4.2
		Dichlorodifluoromethane (F-12)	ND	4.2
		Chloromethane	ND	4.2
		Vinyl chloride	ND	4.2
		1,3-Butadiene	ND	4.2
		Chloroethane (CE)	ND	4.2
		Trichlorofluoromethane (F-11)	ND	4.2
		Acetone	42	17
		Isopropyl alcohol	16	4.2
		1,1-Dichloroethene (1,1-DCE)	ND	4.2
		Trichlorotrifluoroethane (F-113)	ND	4.2
		Methylene chloride	ND	4.2
		Carbon disulfide	ND	4.2
		trans-1,2-Dichloroethene	ND	4.2
		1,1-Dichloroethane (1,1-DCA)	ND	4.2
		Hexane	ND	4.2
		2-Butanone	ND	4.2
		cis-1,2-Dichloroethene (c1,2-DCE)	ND	4.2
		Ethyl Acetate	ND	4.2
		Chloroform (THM1)	ND	4.2
		Tetrahydrofuran	ND	4.2
		1,1,1-Trichloroethane (TCA)	ND	4.2
		1,2-Dichloroethane (EDC)	ND	4.2
		Cyclohexane	ND	4.2
		Carbon tetrachloride	ND	2.5
		Benzene	ND	4.2
		2,2,4-Trimethylpentane	ND	4.2
		Heptane	ND	4.2
		Trichloroethene (TCE)	ND	4.2
		1,2-Dichloropropane (DCP)	ND	4.2
		Methyl Isobutyl Ketone (MIBK)	ND	4.2
		cis-1,3-Dichloropropene	ND	4.2
		trans-1,3-Dichloropropene	ND	4.2
		Toluene	5.2	4.2
		1,1,2-Trichloroethane	ND	4.2
		Dibromochloromethane (THM3)	ND	4.2
		Tetrachloroethene (PCE)	ND	4.2
		Chlorobenzene	ND	4.2
		Ethylbenzene	ND	4.2
		m,p-Xylene	ND	4.2
		Styrene	ND	4.2
		o-Xylene	ND	4.2
		1,1,2,2-Tetrachloroethane	ND	4.2
		1,3-Dichlorobenzene	ND	4.2
		1,4-Dichlorobenzene	ND	4.2
		1,2-Dichlorobenzene	ND	4.2
		1,2,4-Trichlorobenzene	ND	4.2
		Naphthalene	ND	4.2

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2101703-03	**HW-25**	Methyl tert-Butyl Ether (MTBE)	ND	4.2
		Tertiary Butyl Alcohol (TBA)	ND	33
		Ethyl tert-Butyl Ether (ETBE)	ND	4.2
		Tert-Amyl Methyl Ether (TAME)	ND	4.2

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.6	99	70-130
4-Bromofluorobenzene	21.5	99	70-130

Date Sampled:	10/16/12	Date Analyzed:	10/30/12	QC Batch: B011383
Date Received:	10/17/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2101703-04	**HW-24**	Gasoline	310000	(1)a	13000
		Propylene	21000		440
		Dichlorodifluoromethane (F-12)	2200		440
		Chloromethane	ND		440
		Vinyl chloride	ND		440
		1,3-Butadiene	ND		440
		Chloroethane (CE)	ND		440
		Trichlorofluoromethane (F-11)	ND		440
		Acetone	6000		1700
		Isopropyl alcohol	12000		440
		1,1-Dichloroethene (1,1-DCE)	ND		440
		Trichlorotrifluoroethane (F-113)	ND		440
		Methylene chloride	3100		440
		Carbon disulfide	ND		440
		trans-1,2-Dichloroethene	ND		440
		1,1-Dichloroethane (1,1-DCA)	ND		440
		Hexane	4500		440
		2-Butanone	12000		440
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		440
		Ethyl Acetate	24000		440
		Chloroform (THM1)	ND		440
		Tetrahydrofuran	13000		440
		1,1,1-Trichloroethane (TCA)	ND		440
		1,2-Dichloroethane (EDC)	ND		440
		Cyclohexane	5200		440
		Carbon tetrachloride	ND		260
		Benzene	4000		440
		2,2,4-Trimethylpentane	1600		440
		Heptane	8600		440
		Trichloroethene (TCE)	500		440
		1,2-Dichloropropane (DCP)	ND		440
		Methyl Isobutyl Ketone (MIBK)	2000		440
		cis-1,3-Dichloropropene	ND		440
		trans-1,3-Dichloropropene	ND		440
		Toluene	13000		440
		1,1,2-Trichloroethane	ND		440
		Dibromochloromethane (THM3)	ND		440
		Tetrachloroethene (PCE)	610		440
		Chlorobenzene	ND		440
		Ethylbenzene	2100		440
		m,p-Xylene	4100		440
		Styrene	450		440
		o-Xylene	870		440
		1,1,2,2-Tetrachloroethane	ND		440
		1,3-Dichlorobenzene	ND		440
		1,4-Dichlorobenzene	ND		440
		1,2-Dichlorobenzene	ND		440
		1,2,4-Trichlorobenzene	ND		440
		Naphthalene	ND		440

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2101703-04	**HW-24**	Methyl tert-Butyl Ether (MTBE)	ND	440
		Tertiary Butyl Alcohol (TBA)	ND	3500
		Ethyl tert-Butyl Ether (ETBE)	ND	440
		Tert-Amyl Methyl Ether (TAME)	ND	440

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	19.4	98	70-130
4-Bromofluorobenzene	20.1	93	70-130

Date Sampled:	10/16/12	Date Analyzed:	10/30/12	QC Batch: B011383
Date Received:	10/17/12	Method:	EPA TO-15	

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)		RDL (ppbv)
2101703-05	**HW-23**	Gasoline	150000	(1)c	13000
		Propylene	11000		440
		Dichlorodifluoromethane (F-12)	610		440
		Chloromethane	ND		440
		Vinyl chloride	ND		440
		1,3-Butadiene	ND		440
		Chloroethane (CE)	ND		440
		Trichlorofluoromethane (F-11)	ND		440
		Acetone	4100		1700
		Isopropyl alcohol	5000		440
		1,1-Dichloroethene (1,1-DCE)	ND		440
		Trichlorotrifluoroethane (F-113)	ND		440
		Methylene chloride	1600		440
		Carbon disulfide	ND		440
		trans-1,2-Dichloroethene	ND		440
		1,1-Dichloroethane (1,1-DCA)	ND		440
		Hexane	2000		440
		2-Butanone	9400		440
		cis-1,2-Dichloroethene (c1,2-DCE)	ND		440
		Ethyl Acetate	6300		440
		Chloroform (THM1)	ND		440
		Tetrahydrofuran	6100		440
		1,1,1-Trichloroethane (TCA)	ND		440
		1,2-Dichloroethane (EDC)	ND		440
		Cyclohexane	2400		440
		Carbon tetrachloride	ND		260
		Benzene	2200		440
		2,2,4-Trimethylpentane	960		440
		Heptane	4200		440
		Trichloroethene (TCE)	ND		440
		1,2-Dichloropropane (DCP)	ND		440
		Methyl Isobutyl Ketone (MIBK)	ND		440
		cis-1,3-Dichloropropene	ND		440
		trans-1,3-Dichloropropene	ND		440
		Toluene	7500		440
		1,1,2-Trichloroethane	ND		440
		Dibromochloromethane (THM3)	ND		440
		Tetrachloroethene (PCE)	570		440
		Chlorobenzene	ND		440
		Ethylbenzene	1200		440
		m,p-Xylene	2400		440
		Styrene	ND		440
		o-Xylene	520		440
		1,1,2,2-Tetrachloroethane	ND		440
		1,3-Dichlorobenzene	ND		440
		1,4-Dichlorobenzene	ND		440
		1,2-Dichlorobenzene	ND		440
		1,2,4-Trichlorobenzene	ND		440
		Naphthalene	ND		440

Volatile Hydrocarbons by GC/MS in Air

Lab#	Sample ID	Compound Name	Result (ppbv)	RDL (ppbv)
2101703-05	**HW-23**	Methyl tert-Butyl Ether (MTBE)	ND	440
		Tertiary Butyl Alcohol (TBA)	ND	3500
		Ethyl tert-Butyl Ether (ETBE)	ND	440
		Tert-Amyl Methyl Ether (TAME)	ND	440

Surrogates	Result (ppbv)	% Recovery	Acceptance Range (%)
Dibromofluoromethane	18.1	91	70-130
4-Bromofluorobenzene	26.5	122	70-130

Date Sampled:	10/16/12	Date Analyzed:	10/30/12	QC Batch: B011383
Date Received:	10/17/12	Method:	EPA TO-15	

Quality Assurance Report

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011383 - Air prep GC/MS										
Blank (B011383-BLK1)				Prepared: 10/24/12 Analyzed: 10/25/12						
Gasoline	ND	75	ppbv							
Propylene	ND	2.5	ppbv							
Dichlorodifluoromethane (F-12)	ND	2.5	ppbv							
Chloromethane	ND	2.5	ppbv							
Vinyl chloride	ND	2.5	ppbv							
1,3-Butadiene	ND	2.5	ppbv							
Chloroethane (CE)	ND	2.5	ppbv							
Trichlorofluoromethane (F-11)	ND	2.5	ppbv							
Acetone	ND	10	ppbv							
Isopropyl alcohol	ND	2.5	ppbv							
1,1-Dichloroethene (1,1-DCE)	ND	2.5	ppbv							
Trichlorotrifluoroethane (F-113)	ND	2.5	ppbv							
Methylene chloride	ND	2.5	ppbv							
Carbon disulfide	ND	2.5	ppbv							
trans-1,2-Dichloroethene	ND	2.5	ppbv							
1,1-Dichloroethane (1,1-DCA)	ND	2.5	ppbv							
Hexane	ND	2.5	ppbv							
2-Butanone	ND	2.5	ppbv							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	2.5	ppbv							
Ethyl Acetate	ND	2.5	ppbv							
Chloroform (THM1)	ND	2.5	ppbv							
Tetrahydrofuran	ND	2.5	ppbv							
1,1,1-Trichloroethane (TCA)	ND	2.5	ppbv							
1,2-Dichloroethane (EDC)	ND	2.5	ppbv							
Cyclohexane	ND	2.5	ppbv							
Carbon tetrachloride	ND	1.5	ppbv							
Benzene	ND	2.5	ppbv							
2,2,4-Trimethylpentane	ND	2.5	ppbv							
Heptane	ND	2.5	ppbv							
Trichloroethene (TCE)	ND	2.5	ppbv							
1,2-Dichloropropane (DCP)	ND	2.5	ppbv							
Methyl Isobutyl Ketone (MIBK)	ND	2.5	ppbv							
cis-1,3-Dichloropropene	ND	2.5	ppbv							
trans-1,3-Dichloropropene	ND	2.5	ppbv							
Toluene	ND	2.5	ppbv							
1,1,2-Trichloroethane	ND	2.5	ppbv							
Dibromochloromethane (THM3)	ND	2.5	ppbv							
Tetrachloroethene (PCE)	ND	2.5	ppbv							
Chlorobenzene	ND	2.5	ppbv							
Ethylbenzene	ND	2.5	ppbv							
m,p-Xylene	ND	2.5	ppbv							

Volatile Hydrocarbons by GC/MS in Air

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B011383 - Air prep GC/MS										
Blank (B011383-BLK1)				Prepared: 10/24/12 Analyzed: 10/25/12						
Styrene	ND	2.5	ppbv							
o-Xylene	ND	2.5	ppbv							
1,1,2,2-Tetrachloroethane	ND	2.5	ppbv							
1,3-Dichlorobenzene	ND	2.5	ppbv							
1,4-Dichlorobenzene	ND	2.5	ppbv							
1,2-Dichlorobenzene	ND	2.5	ppbv							
1,2,4-Trichlorobenzene	ND	2.5	ppbv							
Naphthalene	ND	2.5	ppbv							
Methyl tert-Butyl Ether (MTBE)	ND	2.5	ppbv							
Tertiary Butyl Alcohol (TBA)	ND	20	ppbv							
Ethyl tert-Butyl Ether (ETBE)	ND	2.5	ppbv							
Tert-Amyl Methyl Ether (TAME)	ND	2.5	ppbv							
Surrogate: Dibromofluoromethane	*3.39*		*ppbv*	*3.31*		*102*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*2.61*		*ppbv*	*3.61*		*72*	*70-130*			

Notes and Definitions

(1)c	The following additional compound was detected: Dimethyl Sulfide (c. 5,800 ppbv).
(1)b	The following additional compound was detected: Dimethyl Sulfide (c. 17,000 ppbv).
(1)a	The following additional compound was detected: Dimethyl Sulfide (c. 16,000 ppbv).
(1)	The following additional compound was detected: Dimethyl Sulfide (c. 13,000 ppbv).
RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 2101703
CLIENT'S PROJECT NAME: CalRecycle - Badlands
CLIENT'S PROJECT NUMBER: 12583120008.32100

CLIENT INFORMATION		BILLING INFORMATION	
COMPANY NAME:	GHD	CONTACT:	Same
ADDRESS:	2235 Mercury Way, Suite 150 Santa Rosa CA 95407	COMPANY NAME:	
CONTACT:	David J. Vossler	ADDRESS:	
PHONE#:	707-523-1010	PHONE#:	
FAX #:	707-527-7986	FAX #:	

TURNAROUND TIME (check one)

MOBILE LAB			
SAME DAY		24 HOURS	
48 HOURS		72 HOURS	
5 DAYS		NORMAL	X

GEOTRACKER EDF: ___Y X N
GLOBAL ID: ___

COOLER TEMPERATURE ___ °C

COC

PAGE 1 OF 1

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	Summa Canister Serial #	Regulator Serial #	Sample Start Time	Sample End Time	Date Sampled	Matrix	EPA TO-15					COMMENTS 2101703	LAB SAMPLE #
1	HW-27	3823	1	11:18:00	11:27:00	10-16-12	Air	X					manifold # on Top of Gauge	-01
2	HW-26	4293	6	11:33:00	11:43:00			X						-02
3	HW-25	4297	2	11:56:00	12:05:00			X						-03
4	HW-24	4643	75	12:10:00	12:18:00			X						-04
5	HW-23	4296	1	12:35:00	12:44:00			X					manifold # on Top of Gauge	-05
6														
7														
8														
9														
10														

SIGNATURES

SAMPLED BY: David J. Vossler

RELINQUISHED BY: [signature] — SIGNATURE
10/16/2012 — DATE
14:00 — TIME
Shipped UPS.

RECEIVED BY LABORATORY: [signature] — SIGNATURE
10-17-12 — DATE
1105 — TIME

110 Liberty Street
Petaluma, CA 94952

Appendix B: Complete 2012 Analytical Results Summary Table

Badlands Landfill

Landfill Gas Study - Well 27 TDA

Description	*11-Jul-12	24-Jul-12	7-Aug-12	21-Aug-12	4-Sep-12	18-Sep-12	2-Oct-12	16-Oct-12
Acetone	**7,200**	**16**	**16**	**50**	**7,900**	**7,200**	**5,100**	**4,200**
Isopropyl Alcohol	**17,000**	**35**	**37**	**52**	**17,000**	**14,000**	**12,000**	**8,300**
Benzene	**5,900**	**18**	**16**	**28**	**5,800**	**5,000**	**3,900**	**3,000**
2-Butanone (MEK)	**20,000**	**45**	**48**	**44**	**20,000**	**15,000**	**12,000**	**8,800**
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	**5.0**	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	**8,100**	**24**	**24**	**130**	**7,900**	**6,800**	**5,300**	**4,400**
Dibromochloromethane (THM3)	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane (F-12)	**3,900**	**15**	**17**	**64**	**3,500**	**3,000**	**2,500**	**2,200**
1,1-Dichloroethane (DCA)	ND	**2.1**	**2.1**	**6.0**	ND	ND	ND	ND
1,2-Dichloroethane (EDC)	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene (DCE)	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	**950**	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane (DCP)	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl Sulfide	**20,000**	**20,000**	**17,000**	**220**	**22,000**	**20,000**	**20,000**	**17,000**
Ethyl Acetate	**28,000**	**86**	**84**	**92**	**29,000**	**22,000**	**17,000**	**13,000**
Ethylbenzene	**2,600**	**13**	**9.4**	ND	**2,800**	**2,000**	**1,800**	**1,100**
Methylene Chloride	**10,000**	**33**	**32**	**67**	**9,700**	**7,900**	**5,500**	**4,600**
4-Methyl-2-Pantanone (MIBK)	**2,300**	**7.7**	**7.2**	ND	**2,400**	**1,700**	**1,500**	**1,100**
Heptane	**11,000**	**42**	**45**	**160**	**13,000**	**11,000**	**8,300**	**7,300**
Hexane	**8,800**	**29**	**26**	**140**	**9,200**	**8,700**	**6,100**	**4,900**
Napthalene	ND	ND	ND	ND	ND	ND	ND	ND
Propylene	**46,000**	**60**	**77**	**700**	**40,000**	**36,000**	**26,000**	**24,000**
Styrene	**1,200**	**6.6**	**4.4**	ND	**1,200**	ND	**580**	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethane (PCE)	**1,000**	**6.8**	**5.7**	ND	**1,100**	**900**	**1,400**	**590**
Tetrahydrofuran	**22,000**	**54**	**47**	**74**	**20,000**	**16,000**	**13,000**	**9,600**
Toluene	**17,000**	**61**	**50**	**8.2**	**17,000**	**14,000**	**12,000**	**8,500**
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane (TCA)	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane (TCE)	ND	**3.7**	**3.2**	ND	ND	ND	**500**	ND
Trichlorofluoromethane (F-11)	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichlorotrifluoroethane (F-113)	ND	ND	ND	ND	ND	ND	ND	ND
2,2,4-Trimethylpentane	**2,700**	**12**	**13**	**50**	**3,000**	**2,600**	**1,900**	**1,600**
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Butadiene	ND	ND	ND	**6.7**	ND	ND	ND	ND
m & p-Xylene	**5,600**	**27**	**20**	ND	**6,000**	**3,900**	**3,500**	**2,100**
o-Xylene	**1,100**	**5.9**	**4.3**	ND	**1,300**	**860**	**830**	**490**
TPH-G	**500000**	**2100**	**1900**	**3000**	**530000**	**400000**	**310000**	**230000**
MTBE	ND	ND	ND	ND	ND	ND	ND	ND
TBA	ND	ND	-	ND	ND	ND	ND	ND
DIPE	-	-	-	ND	-	-	-	-
ETBE	ND	ND	ND	ND	ND	ND	ND	ND
TAME	ND	ND	ND	ND	ND	ND	ND	ND
Fixed Gases Result (%)								
Helium	-	ND	ND	-	-	-	-	-
Hydrogen	**0.71**	**0.69**	**0.69**	**0.009** -	**0.68**		-	-
Carbon Disulfide	-	ND	ND	ND	ND	ND		ND
Ethene	ND	ND	ND	ND	ND	-	-	-
Ethane	ND	ND	ND	ND	ND	-	-	-
Acetylene	ND	ND	ND	ND	ND	-	-	-
Propane	ND	ND	ND	ND	ND	-	-	-
Oxygen	**2.1**	**3.2**	**2.7**	**22** -	**4.7**		-	-
Nitrogen	**17**	**22**	**19**	**80** -	**25**		-	-
Carbon Dioxide	**29**	**27**	**27**	**0.39** -	**28**		-	-
Carbon Monoxide	ND	ND	ND	ND	ND	-	-	-
Methane	**28**	**26**	**26**	**0.38** -	**27**		-	-

Notes:

*** GHD Inc. Sampling Events effective 7-11-2012**

ND = Not Detected

"-" = Constituent Not Tested

Bold = Analyte detected above laboratory reporting limit.

Appendix C: 2012 Photo Log

Photographic Documentation Log 2012

Description:

Horizontal well HW-23 well head configuration.

Location: WH-23

Date: 07/10/12

Description:

Horizontal well HW-24 well head configuration.

Location: WH-24

Date: 07/10/12

Description:

Horizontal well HW-25 well head configuration.

Location: WH-25

Date: 07/10/12

Description:

Horizontal well HW-26 well head configuration.

Location: WH-26

Date: 07/10/12

Description:

Horizontal well HW-27 well head configuration.

Location: WH-27

Date: 07/10/12

Description:

Field technician measuring and recording Landfill Gas flow, temperature, and atmospheric pressure using a manometer unit on well HW-26.

Location: WH-26

Date: 07/10/12

Description:

Picture of TDA well head with flow control valve set to 100% open.

Location: WH-27

Date: 7/24/12

Description:

Field technician taking Landfill Gas field analyzed sample with GEM unit.

Location: WH-25

Date: 07/10/12

Description:

This picture shows WH-25 well head assembly with sampling ports shown on the left of the well, opposite from the valve.

Location: WH-25

Date: 07/10/12

Description:

Laboratory analyzed Landfill Gas sample collection assembly with sample ports above and below the flange and sampler manifold with pressure gauge on the Summa canister.

Location: WH-27

Date: 07/24/12

Appendix D: Historical LFG Analytical Data

Badlands LFG Well Monitoring

Barometric Pressure 30

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0013	12:09	01/14/2002	43.40	56.60	0.00	0.00	0.60					
	13:26	02/14/2002	44.20	55.50	0.00	0.30	0.80					
		02/10/2005	61.30	38.40	0.30	0.00	2.60	0.50		20.60		
		02/15/2006	58.00	42.00	0.00	0.00	2.00	0.10		18.90		
		03/13/2006	56.00	43.00	0.10	0.00	2.80	0.10		18.90		
		04/28/2006	41.00	39.00	0.00	20.00	0.70	0.10		4.40		
		08/23/2006	73.00	27.00	0.00	0.00	0.95	0.00		0.00		
		11/30/2006	72.00	28.00	0.00	0.00	3.80	0.20		27.00		
		03/30/2007	65.00	35.00	0.00	0.00	5.00	0.00		0.00		
		04/26/2007	48.00	44.00	0.00	8.00	6.10	0.02		25.00		
		05/10/2007	71.50	39.80	0.00	0.00	6.00	0.20		26.70		
		11/15/2007	53.50	32.00	6.20	8.30	4.00	0.07		26.00		
		01/09/2008	57.00	42.70	0.00	0.00	3.20	0.30		32.70		
		02/11/2008	57.00	44.90	0.10	0.00	2.30	0.10		18.90		
		03/12/2008	78.40	21.00	0.40	0.00	2.00	0.50		42.20		
		04/21/2008	50.60	49.40	0.00	0.00	2.00	0.01		6.00		
		05/29/2008	60.00	40.00	0.00	0.00	2.00	0.03		16.40		
		06/22/2008	78.40	21.00	0.40	0.00	2.00	0.50		42.20		
		07/28/2008	80.90	43.20	0.00	0.00	1.50	0.09		28.40		
		08/20/2008	75.60	41.50	0.00	0.00	1.50	0.10		30.00		
		09/18/2008	78.60	20.90	0.00	0.50	3.00	0.03		16.40		
		10/22/2008	60.00	44.50	0.00	0.00	2.50	0.01		8.60		
		11/18/2008	74.50	24.50	0.00	0.00	2.40	0.02		12.20		
		12/31/2008	72.50	27.40	0.00	0.00	3.20	0.05		20.40		
		01/15/2009	60.00	43.10	0.00	0.00	1.10	0.02		13.40		
		02/25/2009	62.50	37.30	0.00	0.00	2.90	0.05	79.40	21.20		
		03/06/2009	55.00	45.00	0.00	0.00	2.50	0.07	82.00	25.10		
		04/30/2009	56.00	44.00	0.00	0.00	3.50	1.00	86.00	86.20		
		05/20/2009	57.00	44.40	0.00	0.00	3.50	0.20	101.00	38.50		
		06/10/2009	69.00	31.00	0.00	0.00	2.00	0.06	81.00	23.20		
		07/20/2009	60.00	43.50	0.00	0.00	2.00	0.10	90.00	25.08		
		09/01/2009	70.00	30.00	0.00	0.00	2.80	0.08	93.00	26.80		
		09/30/2009	80.30	40.90	0.00	0.00	6.00	0.10	87.00	20.90	21.2	
		11/25/2009	82.00	43.30	0.20	0.00	4.30	0.04	79.00	19.00		
		12/29/2009	75.00	73.00	0.00	0.00	5.50	0.10	71.00	30.00		
		01/21/2010	57.00	46.00	0.00	0.00	5.00	0.03	80.00	16.40		
		02/24/2010	57.00	41.30	0.00	0.00	5.50	0.01	69.00	9.50		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0013		03/15/2010	58.10	41.30	0.00	0.00	5.50	0.01	76.00	9.50		
		04/23/2010	57.00	43.00	0.00	0.00	4.70	0.02	98.00	13.40		
		05/06/2010	80.00	20.00	0.00	0.00	3.50	0.06	85.00	22.00		
		07/02/2010	57.00	44.10	0.00	0.00	4.20	0.30	92.00	51.90		
		07/27/2010	59.10	40.40	0.30	0.00	3.50	0.19	92.00	41.30		
		08/26/2010	80.00	20.00	0.00	0.00	6.40	0.04	97.00	19.00		
		09/22/2010	58.00	42.00	0.00	0.00	8.30	0.06	77.00	23.20		
BLH0014	12:32	01/14/2002	34.60	64.20	1.20	0.00	0.40					
	13:18	02/14/2002	38.70	61.30	0.00	0.00	0.60					
BLH0015	12:43	01/14/2002	22.30	45.70	8.30	23.70	0.10					
	13:15	02/14/2002	46.60	53.20	0.00	0.20	0.20					
BLH0016	12:16	01/14/2002	6.70	31.50	12.60	49.20	0.00					
	13:21	02/14/2002	10.00	39.20	10.20	40.60	0.30					
		02/10/2005	73.30	26.50	0.10	0.00	2.80	0.60		22.50		
		02/15/2006	59.00	41.00	0.00	0.00	2.00	0.10		18.90		
		03/13/2006	60.00	39.00	0.10	0.00	2.90	0.20		26.70		
		04/28/2006	29.00	32.00	0.00	38.00	0.40	0.00		0.00		
		08/23/2006	74.00	26.00	0.00	0.00	0.80	0.00		0.00		
		11/30/2006	70.00	30.00	0.00	0.00	3.80	0.05		13.00		
		03/30/2007	65.00	35.00	0.00	0.00	5.00	0.00		0.00		
		04/26/2007	52.00	42.00	0.00	6.00	6.50	0.40		38.00		
		05/10/2007	72.50	46.80	0.00	0.00	6.20	0.40		37.80		
		11/15/2007	55.50	30.70	5.80	8.00	4.00	0.08		28.00		
		01/09/2008	57.00	44.20	0.00	0.00	3.20	0.70		50.00		
		02/11/2008	57.00	46.10	0.20	0.00	2.30	0.10		18.90		
		03/12/2008	78.80	20.60	0.40	0.00	2.00	0.50		42.20		
		04/21/2008	49.70	50.30	0.00	0.00	2.00	0.06		14.00		
		05/29/2008	60.00	40.00	0.00	0.00	2.00	0.03		16.40		
		06/22/2008	78.80	20.60	0.40	0.00	2.00	0.50		42.20		
		07/28/2008	80.80	42.30	0.00	0.00	1.50	0.02		13.40		
		08/20/2008	77.80	43.20	0.00	0.00	1.50	0.03		16.40		
		09/18/2008	77.40	0.20	0.00	22.40	3.00	0.01		9.50		
		10/22/2008	60.00	42.70	0.00	0.00	2.50	0.55		63.60		
		11/18/2008	79.70	20.30	0.00	0.00	2.30	0.01		8.60		
		12/31/2008	71.00	20.60	0.00	0.00	2.50	0.05		20.40		
		01/15/2009	60.00	44.20	0.00	0.00	0.78	0.02		13.40		
		02/25/2009	65.10	34.80	0.00	0.00	3.00	0.05	83.10	21.20		
		03/06/2009	56.00	44.00	0.00	0.00	2.50	0.02	87.00	11.60		
		04/30/2009	56.00	43.40	0.00	0.60	3.50	0.05	88.00	19.30		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0016		05/20/2009	57.00	46.10	0.00	0.00	2.50	0.04	100.00	17.20		
		06/10/2009	68.00	32.00	0.00	0.00	2.00	0.03	86.00	16.40		
		07/20/2009	69.70	37.10	0.00	0.00	3.00	0.10	94.00	28.44		
		09/01/2009	70.00	30.00	0.00	0.00	3.00	0.03	89.00	16.40		
		09/30/2009	78.00	40.30	0.00	0.00	6.00	0.10	92.00	22.90	23.2	
		11/25/2009	82.60	44.90	0.10	0.00	4.30	0.05	83.00	21.20		
		12/29/2009	75.00	25.00	0.00	0.00	5.50	0.50	78.00	67.00		
		01/21/2010	57.00	46.00	0.00	0.00	5.00	0.05	87.00	21.20		
		02/24/2010	57.00	46.00	0.00	0.00	5.00	0.04	74.00	19.00		
		03/15/2010	56.70	46.00	0.00	0.00	5.00	0.04	77.00	19.00		
		04/23/2010	57.00	42.60	0.00	0.00	4.90	0.05	99.00	21.20		
		05/06/2010	82.00	18.00	0.00	0.00	3.60	0.05	90.00	21.00		
		07/02/2010	57.00	42.20	0.00	0.00	4.60	0.27	94.00	49.30		
		07/27/2010	59.00	39.30	0.50	0.00	3.80	0.21	94.40	43.40		
		08/26/2010	80.00	20.00	0.00	0.00	6.40	0.05	100.00	21.20		
		09/22/2010	59.00	41.00	0.00	0.00	8.30	0.06	85.00	23.20		
BLH0017	11:58	01/14/2002	8.10	40.20	10.60	41.10	0.00					
	13:30	02/14/2002	9.60	37.60	10.50	42.30	0.20					
		02/10/2005	68.80	30.30	0.20	0.00	1.80	0.60		10.70		
		02/15/2006	57.00	43.00	0.00	0.00	0.20	0.00		0.00		
		03/13/2006	36.00	34.00	3.00	35.00	0.09	0.00		0.00		
		04/28/2006	38.00	37.00	0.00	25.00	0.30	0.20		6.20		
		08/23/2006	71.50	28.50	0.00	0.00	0.90	0.00		0.00		
		11/30/2006	69.00	47.00	0.00	0.00	3.80	0.04		12.00		
		03/30/2007	64.00	36.00	0.00	0.00	5.00	0.00		0.00		
		04/26/2007	48.00	45.00	0.00	7.00	5.90	0.01		20.00		
		05/10/2007	59.20	50.80	0.00	0.00	6.00	0.20		26.70		
		11/15/2007	55.30	33.20	5.50	6.00	4.00	0.07		15.00		
		01/09/2008	57.00	43.80	0.10	0.00	3.20	0.05		13.40		
		02/11/2008	57.00	45.30	0.40	0.00	2.20	0.20		26.70		
		03/12/2008	77.10	22.50	0.30	0.00	2.00	0.50		42.20		
		04/21/2008	49.90	50.10	0.00	0.00	2.00	0.01		6.00		
		05/29/2008	60.00	40.00	0.00	0.00	1.80	0.01		6.30		
		06/22/2008	77.10	22.50	0.30	0.00	2.00	0.50		42.20		
		07/28/2008	77.40	43.40	0.00	0.00	2.25	0.02		8.80		
		08/20/2008	75.30	40.10	0.00	0.00	2.20	0.03		10.80		
		09/18/2008	78.60	21.30	0.00	0.10	3.00	0.02		8.80		
		10/22/2008	60.00	44.20	0.10	0.00	2.50	0.01		5.50		
		11/18/2008	74.40	25.20	0.00	0.00	2.30	0.91		52.60		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0017		12/31/2008	63.10	36.60	0.00	0.00	3.00	0.01		9.10		
		01/15/2009	60.00	44.00	0.00	0.00	1.00	0.01		6.30		
		02/25/2009	65.60	34.30	0.00	0.00	3.00	0.05	73.00	14.00		
		03/06/2009	55.00	45.00	0.00	0.00	2.50	0.05	73.00	14.00		
		04/30/2009	56.00	44.00	0.00	0.00	3.00	0.07	81.00	14.60		
		05/20/2009	57.00	45.50	0.00	0.00	2.50	0.05	94.00	12.30		
		06/10/2009	68.00	32.00	0.00	0.00	2.00	0.03	74.00	10.80		
		07/20/2009	60.00	43.60	0.00	0.00	2.50	0.10	86.00	15.31		
		09/01/2009	70.00	30.00	0.00	0.00	2.80	0.05	89.00	14.00		
		09/30/2009	73.80	40.40	0.00	0.00	6.00	0.10	80.00	14.00	14.9	
		11/25/2009	78.00	43.10	0.40	0.00	4.20	0.04	79.00	12.10		
		12/29/2009	72.80	26.00	0.00	0.00	5.20	0.05	75.00	13.60		
		01/21/2010	57.00	46.70	0.00	0.00	5.00	0.04	84.00	12.10		
		02/24/2010	57.00	31.80	0.00	0.00	5.50	0.90	63.00	57.60		
		03/15/2010	58.40	31.80	0.00	0.00	5.50	0.90	67.00	57.60		
		04/23/2010	57.00	42.50	0.80	0.00	4.70	0.03	101.00	9.60		
		05/06/2010	80.00	20.00	0.00	0.00	3.40	0.03	87.00	10.00		
		07/02/2010	57.00	48.30	0.00	0.00	4.20	0.30	112.00	33.20		
		08/26/2010	77.00	23.00	0.00	0.00	7.30	0.02		13.40		
		09/22/2010	57.00	43.00	0.00	0.00	8.50	0.02	77.00	13.40		
BLHW-10	13:57	01/31/2001	53.20	46.70	0.00	0.00	-4.10	1.22	80.00	30.00		
	15:26	02/09/2001	50.20	49.60	0.20	0.00	1.30	0.48	90.00	18.00	18	
	10:24	03/08/2001	44.70	53.00	0.00	2.30	-1.20	0.20	80.00	9.00	9	NOT FITTED
	10:04	04/19/2001	27.30	48.00	0.00	24.70	-1.10	-0.02	80.00	0.00	0	
	9:47	04/19/2001	28.80	48.00	0.00	23.20	-1.30	0.02	80.00	0.00	0	
	10:00	04/19/2001					-0.90		80.00	0.00	0	SP on well side of OP
		05/22/2001	53.00	47.00	0.00	0.00	0.70	0.00				
		06/06/2001					1.20					
		02/10/2005	38.80	36.90	0.20	25.10	2.50	0.35		17.00		
		02/15/2006	64.00	36.00	0.00	0.00	0.10	0.00		0.00		
		03/13/2006	56.00	40.00	0.00	3.00	0.00	0.00		0.00		
		04/28/2006	60.00	40.00	0.00	0.00	0.06	0.01		1.00		
		08/23/2006	66.30	33.70	0.00	0.00	0.37	0.03		5.00		
		11/30/2006	55.00	40.00	0.00	5.00	0.60	0.01		3.00		
		03/30/2007	60.00	40.00	0.00	0.00	0.05	0.03		4.60		
		04/26/2007	58.00	41.00	0.00	0.00	0.06	0.02		3.00	4	
		05/10/2007	60.90	38.90	0.00	0.00	1.00	0.20		2.40		
		06/13/2007	56.40	41.20	0.10	2.00	0.00	0.00		0.00		
		07/12/2007	32.80	34.10	0.00	33.10	1.50	0.16		12.20	8.6	

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-10		08/06/2007	33.80	33.90	0.00	32.10	3.00	1.00		30.40		
		11/15/2007	14.40	12.00	12.00	61.60	1.00	0.05		6.50	3	
		01/09/2008	44.70	34.40	0.00	20.80	0.30	0.01		9.10		
		02/11/2008	45.70	31.80	2.10	20.60	0.70	0.20		13.00		
		03/12/2008	52.80	35.30	0.20	10.50	0.30	0.10		9.20		
		04/21/2008	48.20	10.30	0.00	11.40	1.00	0.02		4.60		
		05/29/2008	42.00	34.00	0.00	24.00	3.90	0.85		28.00		
		06/22/2008	30.10	34.70	0.00	34.90	5.00	1.00		29.10		
		07/28/2008	32.70	29.70	0.00	0.00	4.00	0.90		28.90		
		08/20/2008	33.10	28.70	0.00	38.20	4.00	0.90		28.90		
		09/18/2008	26.50	27.30	0.10	46.10	6.80	1.50		37.25		
		10/22/2008	26.70	26.20	0.00	47.10	6.00	1.45		31.30		
		11/18/2008	31.00	27.80	0.00	41.20	2.10	0.39		16.30		
		12/31/2008	41.80	30.00	0.00	7.50	0.30	0.03		3.50		
		01/15/2009	44.60	32.10	0.00	23.20	0.33	0.02		4.30		
		02/25/2009	46.00	34.50	0.00	19.70	0.80	0.00	70.00	0.00		
		03/06/2009	45.00	34.00	0.00	21.00	0.30	0.01	71.00	3.00		
		04/30/2009	43.30	33.00	0.00	23.70	0.40	0.05	93.00	5.80		
		05/20/2009	39.80	33.10	0.00	27.10	0.50	0.02	105.00	3.70		
		06/10/2009	36.00	42.00	0.00	22.00	0.46	0.01	77.00	3.00		
		07/20/2009	41.00	32.30	0.00	26.70	1.00	0.01	100.00	6.08		
		09/01/2009	39.20	31.90	0.00	28.90	1.30	0.02	107.00	4.30	3	
		09/30/2009	4.40	12.30	0.00	84.00	0.70	0.00	83.00	8.00	2.6	
		11/25/2009	62.20	39.00	0.20	0.00	1.00	0.59	106.00	20.00		
		12/29/2009	37.90	31.50	0.00	30.00	1.80	0.90	82.00	28.90		
		01/21/2010	44.30	47.10	0.00	19.30	2.20	0.49	91.00	10.00		
		02/24/2010	46.10	47.10	0.00	19.30	2.20	0.49	79.00	10.00		
		03/15/2010	47.90	47.10	0.00	19.30	2.20	0.49	84.00	10.00		
		04/23/2010	39.20	31.90	0.00	28.80	2.00	0.45	99.00	9.60		
		05/06/2010	43.00	31.50	0.00	25.50	1.80	0.45	88.00	9.50	4.5	
		07/02/2010	42.50	36.10	0.00	21.10	0.30	0.19	100.00	6.00		
		07/27/2010	48.60	33.10	0.00	18.40	0.70	0.16	99.90	5.70		
		08/26/2010	48.30	33.10	0.00	18.00	0.80	0.20	97.00	6.30		
		09/22/2010	46.00	36.00	0.00	18.00	0.90	0.24	83.00	7.00		
BLHW-11	13:46	01/31/2001	43.00	49.00	0.00	7.80	-9.30	0.01	80.00	0.00		
	16:55	02/09/2001	43.70	51.50	0.00	4.80	3.80	0.02	80.00	0.00	0	
	11:51	02/14/2001	36.20	47.20	0.10	16.50	9.10	0.00	70.00	0.00	0	
		01/09/2008					-0.10					
		02/11/2008	54.50	45.10	0.20	0.10	0.00					

Barometric Pressure

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-11		03/12/2008	61.40	68.10	0.50	0.00	0.30					
		04/21/2008	51.50	48.20	0.20	0.10	0.60					
		06/22/2008	8.90	5.30	17.20		0.00	0.00		0.00		
		07/28/2008	0.60	0.70	18.70	19.90	3.50	0.01		0.00		
		02/25/2009	8.70	11.80	6.30	73.40			79.00			
		07/20/2009	6.50	9.40	12.70	73.60	9.50	0.00	94.00	0.00		
		04/23/2010	40.80	26.60	3.50	28.80	0.51	0.04	100.00	2.80		
BLHW-12		04/21/2008	38.40	28.90	0.90	32.10	0.10					
		07/28/2008	0.00	0.00	19.30	80.60	0.12	0.00		0.00		
		03/06/2009	44.00	51.70	0.00	4.30	1.00	0.15	79.00	36.70	26.8	
		04/30/2009	51.20	48.70	0.00	0.00	0.30	0.10	87.00	27.30		
		05/20/2009	50.90	50.70	0.00	0.00	0.70	0.08	88.00	24.40		
		06/10/2009	46.50	47.50	0.00	6.00	2.40	0.46	87.00	42.40	37.5	
		07/20/2009	44.80	45.10	0.00	10.00	2.00	0.40	93.00	39.00		
		09/01/2009	43.20	39.60	0.00	17.20	2.20	0.31	91.00	34.80	28.6	
		09/30/2009	46.60	42.20	0.20	11.00	1.50	0.30	93.00	32.70	23.5	
		11/25/2009	52.60	42.30	0.20	4.70	0.49	0.09	85.00	17.70		
		12/29/2009	48.00	39.50	0.00	14.10	0.72	0.05	83.00	13.60		
		01/21/2010	57.50	42.50	0.00	0.00	1.20	0.12	92.00	21.00		
		02/24/2010	54.90	42.60	0.00	2.40	0.40	0.12	83.00	21.00		
		03/15/2010	55.10	42.60	0.00	2.50	0.40	0.12	88.00	21.00		
		04/23/2010	56.00	44.00	0.00	0.00	1.00	0.13	98.00	21.90		
		05/06/2010	57.00	43.00	0.00	0.00	1.30	0.09	89.00	18.00	23.4	
		07/27/2010	51.20	40.10	0.00	8.40	0.70	0.06	92.20	15.60		
		08/26/2010	57.50	40.50	0.00	7.90	1.00	0.08	94.00	16.10		
		09/22/2010	46.00	42.00	0.00	12.00	1.00	0.09	87.00	18.80	14	
BLHW-18		02/15/2006	60.00	40.00	0.00	0.00	2.00	1.20		15.10		
		03/13/2006	60.00	40.00	0.00	0.00	2.70	1.70		7.00		
		04/28/2006	50.00	42.00	0.00	0.00	3.30	0.00		0.00	2.9	
		08/23/2006	67.50	33.50	0.00	0.00	1.00	0.95		29.00		
		11/30/2006	66.00	34.00	0.00	0.00	7.00	3.50		54.00		
		03/30/2007	63.00	37.00	0.00	0.00	3.50	0.50		20.60		
		04/26/2007	53.00	41.00	0.00	6.00	3.00	0.60		76.00		
		05/10/2007	66.00	34.00	0.00	0.00	3.50	0.50		70.10		
		06/13/2007	35.30	34.90	0.00	0.00	3.20	0.70		82.90		
		07/12/2007	60.00	40.00	0.00	0.00	2.50	0.45		63.60		
		08/06/2007	96.50	52.10	0.00	0.00	4.00	0.50		67.00		
		01/09/2008	55.50	43.40	0.00	0.20	3.20	0.40		57.90		
		02/11/2008	66.70	32.50	0.70	0.00	2.20	0.10		28.90		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-18		03/12/2008	70.50	28.50	0.40	0.00	2.50	0.40		57.70		
		04/21/2008	50.10	49.70	0.20	0.00	1.90	0.20		40.80		
		05/29/2008	56.00	44.00	0.00	0.00	2.40	0.25		47.40		
		06/22/2008	36.70	31.70	0.00	30.80	3.50	0.50		57.70		
		07/28/2008	65.90	43.70	0.00	0.00	2.20	0.19		41.30		
		08/20/2008	68.30	31.50	0.20	0.00	2.00	0.20		42.40		
		09/18/2008	65.50	34.40	0.00	0.10	4.50	0.25		47.40		
		10/22/2008	56.30	43.50	0.00	0.20	4.50	0.31		47.60		
		11/18/2008	59.10	40.90	0.00	0.00	3.80	0.23		41.30		
		12/31/2008	59.40	40.50	0.00	0.00	4.00	0.22		42.80		
		01/15/2009	56.70	43.10	0.00	0.00	3.80	0.18		40.20		
		02/25/2009	54.90	42.20	0.00	2.70	5.00	0.80	109.00	84.80		
		03/06/2009	52.40	41.30	0.00	6.30	5.50	0.40	110.00	60.00		
		04/30/2009	52.90	38.70	0.00	8.40	5.50	0.40	109.00	54.50		
		05/20/2009	54.10	40.40	0.00	5.30	6.20	0.30	114.00	47.20		
		06/10/2009	54.00	39.00	0.00	7.00	5.80	0.30	111.00	51.90		
		07/20/2009	57.20	38.50	0.00	3.80	5.50	0.30	115.00	50.20		
		09/01/2009	56.50	33.50	0.00	10.00	5.70	0.28	115.00	50.20		
		09/30/2009	54.30	34.70	0.00	10.90	8.00	0.50	111.00	64.50	60	
		11/25/2009	51.80	37.40	0.60	9.80	6.00	0.30	106.00	51.90		
		12/29/2009	47.10	35.70	0.00	15.80	6.50	0.40	108.00	60.00		
		01/21/2010	53.40	41.90	0.00	3.60	6.20	0.39	117.00	59.20		
		02/24/2010	49.40	27.90	0.10	12.20	5.60	0.30	110.00	51.90		
		03/15/2010	50.10	27.90	0.10	12.20	5.60	0.30	116.00	51.90		
		04/23/2010	51.00	38.60	0.00	10.00	5.90	0.30	102.00	51.90		
		05/06/2010	57.80	37.20	0.00	5.20	6.70	0.24	113.00	47.00		
		07/02/2010	55.40	42.00	0.20	2.40	6.70	0.29	112.00	51.10		
		07/27/2010	52.60	40.20	0.50	6.50	8.50	0.40	111.70	60.00		
		08/26/2010	51.00	36.00	0.00	12.30	9.40	0.40	125.00	60.00	51	
		09/22/2010	50.00	39.00	0.00	11.00	9.60	0.40	112.00	60.00	56.9	
BLHW-19		02/15/2006	61.00	39.00	0.00	0.00	3.10	3.30		25.10		
		03/13/2006	61.00	38.00	0.00	0.00	4.30	4.70		12.00		
		04/28/2006	58.00	42.00	0.00	0.00	2.50	1.50		35.00		
		08/23/2006	65.50	34.50	0.00	0.00	1.50	1.49		35.00		
		11/30/2006	64.00	36.00	0.00	0.00				0.00	46	
		03/30/2007	67.00	33.00	0.00	0.00	2.00	0.50		20.60		
		04/26/2007	54.00	4.00	0.00	5.00	1.50	0.40		60.00		
		05/10/2007	68.50	31.50	0.00	0.00	2.00	0.50		70.10		
		06/13/2007	66.50	33.50	0.00	0.00	1.30	0.30		54.30		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-19		07/12/2007	62.00	38.00	0.00	0.00	1.00	0.27		49.30		
		08/06/2007	64.20	35.50	0.00	0.00	1.50	0.50		67.00		
		01/09/2008	56.20	43.50	0.00	0.00	2.60	0.25		45.00		
		02/11/2008	62.80	36.40	0.40	0.00	2.00	0.10		28.90		
		03/12/2008	68.30	31.10	0.40	0.00	2.00	0.30		48.30		
		04/21/2008	51.70	48.20	0.10	0.00	1.50	0.20		40.80		
		05/29/2008	56.00	44.00	0.00	0.00	2.10	0.19		41.30		
		06/22/2008	51.10	39.30	0.00	15.80	3.00	0.50		57.70		
		07/28/2008	66.20	43.10	0.00	0.00	2.00	0.15		36.70		
		08/20/2008	68.20	31.50	0.00	0.30	1.70	0.13		34.20		
		09/18/2008	67.90	31.90	0.00	0.20	3.80	0.24		46.50		
		10/22/2008	57.20	42.40	0.10	0.30	3.80	0.20		38.10		
		11/18/2008	60.20	39.80	0.00	0.00	3.00	0.19		37.60		
		12/31/2008	59.30	40.50	0.00	0.00	3.50	0.20		40.80		
		01/15/2009	57.60	42.10	0.00	0.00	3.00	0.09		28.40		
		02/25/2009	56.20	42.50	0.00	1.00	5.00	0.70	110.00	79.30		
		03/06/2009	57.00	41.50	0.00	1.50	5.00	0.30	111.00	51.90		
		04/30/2009	60.00	38.50	0.00	1.50	4.50	0.30	113.00	47.20		
		05/20/2009	56.00	40.60	0.00	3.50	5.10	0.23	115.00	41.30		
		06/10/2009	56.00	40.00	0.00	4.00	4.90	0.25	111.00	47.40		
		07/20/2009	58.10	38.40	0.00	3.00	4.50	0.20	115.00	46.50		
		09/01/2009	57.00	37.00	0.00	6.00	4.90	0.25	116.00	47.40		
		09/30/2009	55.50	34.60	0.00	8.40	6.50	0.40	117.00	60.00	62.9	
		11/25/2009	55.10	38.20	0.40	6.30	5.20	0.32	114.00	53.60		
		12/29/2009	49.50	35.20	0.00	14.70	6.00	0.35	110.00	56.10		
		01/21/2010	51.90	40.80	0.00	6.40	5.50	0.30	119.00	51.90		
		02/24/2010	48.50	36.60	0.10	14.00	5.00	0.28	110.00	50.20		
		03/15/2010	49.90	36.60	0.10	14.00	5.00	0.28	108.00	50.20		
		04/23/2010	50.00	38.00	0.00	11.30	6.00	0.35	102.00	56.10		
		05/06/2010	52.20	36.00	0.00	11.00	7.10	0.30	113.00	51.00		
		07/02/2010	58.50	41.50	0.00	0.00	5.40	0.30	109.00	51.90		
		07/27/2010	52.10	39.20	0.40	8.10	7.30	0.40	109.00	60.00		
		08/26/2010	50.30	35.00	0.00	14.80	8.00	0.40	133.00	60.00	51	
		09/22/2010	47.00	37.00	0.00	16.00	8.50	0.36	113.00	56.90	50.2	
BLHW-20		02/15/2006	61.00	39.00	0.00	0.00	2.40	2.50		21.90		
		03/13/2006	62.00	37.00	0.00	0.00	3.20	4.10		11.00		
		04/28/2006	59.00	41.00	0.00	0.00	1.10	2.00		46.00		
		08/23/2006	67.50	32.50	0.00	0.00	1.00	2.00		41.10		
		11/30/2006	68.00	32.00	0.00	0.00	3.50	4.50		62.00		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-20		03/30/2007	66.00	34.00	0.00	0.00	1.50	0.30		15.90		
		04/26/2007	54.00	41.00	0.00	5.00	1.00	0.35		59.00		
		05/10/2007	67.00	33.00	0.00	0.00	1.40	0.40		62.70		
		06/13/2007	66.20	33.70	0.00	0.00	0.50	0.32		56.10		
		07/12/2007	63.00	37.00	0.00	0.00	0.40	0.21		43.40		
		08/06/2007	66.80	33.30	0.00	0.00	1.50	0.70		79.30		
		01/09/2008	52.50	41.50	0.00	5.90	2.20	0.50		64.50		
		02/11/2008	52.70	45.30	0.30	1.20	1.80	0.10		28.90		
		03/12/2008	64.50	35.10	6.10	0.00	1.50	0.49		64.50		
		04/21/2008	54.50	45.20	0.20	0.10	1.00	0.30		48.30		
		05/29/2008	55.00	45.00	0.00	0.00	1.80	0.37		57.70		
		06/22/2008	52.40	47.70	0.00	0.00	2.50	0.50		57.70		
		07/28/2008	60.10	45.50	0.00	0.00	1.80	0.37		57.70		
		08/20/2008	64.60	35.20	0.00	0.20	1.50	0.50		67.00		
		09/18/2008	61.00	38.50	0.00	0.50	2.50	0.41		60.70		
		10/22/2008	50.00	50.00	0.00	0.00	3.50	0.49		60.00		
		11/18/2008	58.20	41.70	0.00	0.00	2.60	0.49		60.30		
		12/31/2008	58.30	41.70	0.00	0.00	3.00	0.40		57.70		
		01/15/2009	60.00	48.80	0.00	0.00	3.80	0.33		54.50		
		02/25/2009	51.50	48.20	0.00	0.00	4.00	0.80	114.00	84.80		
		03/06/2009	50.00	50.00	0.00	0.00	4.00	0.72	114.00	80.40		
		04/30/2009	50.80	48.80	0.00	0.40	4.00	0.50	115.00	60.90		
		05/20/2009	49.60	50.30	0.00	0.00	4.70	0.48	117.00	59.70		
		06/10/2009	55.00	45.00	0.00	0.00	4.50	0.53	113.00	69.00		
		07/20/2009	53.00	46.90	0.00	0.00	4.00	0.40	117.00	58.40		
		09/01/2009	56.00	44.00	0.00	0.00	4.50	0.35	117.00	56.10		
		09/30/2009	58.80	34.40	0.10	0.00	6.00	0.60	113.00	70.70	74.7	
		11/25/2009	57.50	46.20	0.40	0.00	4.70	0.60	117.00	73.40		
		12/29/2009	50.40	42.90	0.00	6.30	5.50	0.62	113.00	74.70		
		01/21/2010	51.00	48.90	0.00	0.00	5.00	0.59	122.00	72.80		
		02/24/2010	50.70	48.90	0.00	0.00	4.90	0.58	114.00	72.20		
		03/15/2010	50.30	48.90	0.00	0.00	4.90	0.58	115.00	72.20		
		04/23/2010	50.00	43.90	0.00	0.00	5.90	0.62	101.00	74.70		
		05/06/2010	54.00	43.00	0.00	3.00	6.80	0.50	118.00	66.00		
		07/02/2010	51.10	48.60	0.00	0.00	4.40	0.40	116.00	60.00		
		07/27/2010	55.00	44.60	0.30	0.10	6.50	0.60	116.00	73.40		
		08/26/2010	50.20	42.30	0.40	7.30	8.00	0.55	141.00	80.30	60.1	
		09/22/2010	47.00	44.00	0.00	9.00	7.50	0.60	115.00	73.40	63.6	
BLHW-21		11/30/2006					0.80					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-21		03/30/2007	54.00	46.00	0.00	0.00	0.50	0.20		13.00		
		05/10/2007	60.40	39.60	0.00	0.00	1.00	0.20		44.30		
		06/13/2007	58.60	41.20	0.00	0.00	0.70	0.30		54.30		
		07/12/2007	56.00	44.00	0.00	0.00	0.60	0.23		45.50		
		08/06/2007	60.30	31.50	0.00	0.00	1.50	0.50		67.00		
		01/09/2008	57.00	53.40	0.20	0.00	2.40	0.25		45.00		
		02/11/2008	46.80	42.70	0.50	0.00	1.90	0.40		57.70		
		03/12/2008	70.60	29.10	0.10	0.00	1.80	0.31		48.30		
		04/21/2008	42.60	57.20	0.22	0.00	1.50	0.18		38.70		
		05/29/2008	55.00	45.00	0.00	0.00	2.00	0.13		34.20		
		06/22/2008	78.10	57.10	0.00	0.00	2.50	0.20		40.80		
		07/28/2008	69.30	50.00	0.00	0.00	2.00	0.14		35.50		
		08/20/2008	65.10	34.20	0.00	37.00	1.60	0.16		37.90		
		09/18/2008	69.90	29.80	0.00	0.30	3.50	0.26		48.30		
		10/22/2008	60.00	52.40	0.10	0.00	3.50	0.20		38.10		
		11/18/2008	67.70	32.30	0.00	0.00	2.90	0.23		41.30		
		12/31/2008	63.60	36.40	0.00	0.00	3.50	0.17		37.60		
		01/15/2009	60.00	51.60	0.00	0.00	2.70	0.12		32.80		
		02/25/2009	55.30	44.00	0.00	0.00	4.00	0.80	113.00	84.80		
		03/06/2009	48.00	52.00	0.00	0.00	4.00	0.32	114.00	53.60		
		04/30/2009	56.00	52.30	0.00	0.00	4.00	0.30	114.00	47.20		
		05/20/2009	57.00	54.00	0.00	0.00	5.00	0.30	115.00	47.20		
		06/10/2009	65.00	35.00	0.00	0.00	4.60	0.24	111.00	46.40		
		07/20/2009	55.00	49.80	0.00	0.00	4.50	0.20	117.00	46.50		
		09/01/2009	65.00	35.00	0.00	0.00	4.70	0.17	116.00	39.10		
		09/30/2009	66.70	44.40	0.00	0.00	6.00	0.40	117.00	57.70	61.4	
		11/25/2009	67.70		49.40	0.00	5.00	0.32	112.00	53.60		
		12/29/2009	64.00	35.00	0.00	0.00	5.90	0.32	112.00	53.60		
		01/21/2010	56.90	53.20	0.00	0.00	5.00	0.30	121.00	51.90		
		02/24/2010	51.20	48.40	0.00	4.70	4.70	0.26	114.00	48.30		
		03/15/2010	50.50	48.40	0.00	4.70	4.70	0.26	116.00	48.30		
		04/23/2010	50.00	50.00	0.00	0.00	6.20	0.32	122.00	53.60		
		05/06/2010	60.00	32.00	0.00	0.00	7.10	0.30	117.00	51.00		
		07/02/2010	57.00	48.60	0.00	0.00	5.60	0.38	117.00	58.40		
		07/27/2010	51.30	48.10	0.50	0.00	6.50	0.00	117.00	0.00	51.3	
		08/26/2010	66.20	33.40	0.50	0.00	7.00	0.28	133.00	50.20	55.8	
		09/22/2010	51.00	49.00	0.00	0.00	8.20	0.37	116.00	57.70	55.3	
BLHW-22		11/30/2006					0.70					
		03/30/2007	56.00	44.00	0.00	0.00	0.50	0.00		20.60		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-22		05/10/2007	61.30	38.10	0.60	0.00	0.60	0.20		44.30		
		06/13/2007	50.30	48.00	1.50	0.00	0.70	0.10		31.30		
		07/12/2007	60.00	40.00	0.00	0.00	0.30	0.13		34.20		
		08/06/2007	58.30	41.40	0.00	0.00	1.00	0.10		30.00		
		01/09/2008	43.70	43.50	0.10	11.70	1.40	0.25		45.00		
		02/11/2008	51.90	45.50	0.10	0.00	1.00	0.20		40.80		
		03/12/2008	60.20	69.20	0.30	0.00	0.80	0.20		40.80		
		04/21/2008	41.50	58.20	0.30	0.00	1.00	0.21		40.80		
		05/29/2008	57.00	43.00	0.00	0.00	1.70	0.29		51.10		
		06/22/2008	54.60	53.90	0.00	0.00	2.50	0.50		57.70		
		07/28/2008	62.70	51.90	0.00	0.00	1.70	0.27		49.30		
		08/20/2008	64.60	34.90	0.00	0.50	1.50	0.40		60.00		
		09/18/2008	62.70	37.20	0.00	0.10	3.10	0.41		60.70		
		10/22/2008	60.00	53.30	0.00	0.00	3.00	0.39		53.50		
		11/18/2008	59.30	40.60	0.00	0.00	2.30	0.39		53.80		
		12/31/2008	51.60	48.20	0.00	0.00	3.00	0.35		49.10		
		01/15/2009	60.00	54.00	0.00	0.00	2.60	0.23		45.50		
		02/25/2009	59.00	40.90	0.00	0.00	4.50	0.80	111.00	84.80		
		03/06/2009	44.00	56.00	0.00	0.00	3.50	0.55	115.00	70.30		
		04/30/2009	56.00	54.00	0.00	0.00	3.50	0.40	116.00	54.50		
		05/20/2009	57.00	55.30	0.00	0.00	4.00	0.36	116.00	51.70		
		06/10/2009	59.00	41.00	0.00	0.00	3.90	0.35	115.00	56.10	60	
		07/20/2009	55.00	53.40	0.00	0.00	4.00	0.30	118.00	55.30		
		09/01/2009	60.00	40.00	0.00	0.00	4.30	0.30	119.00	51.90		
		09/30/2009	63.80	50.10	0.20	0.00	5.50	0.60	115.00	68.00	70.9	
		11/25/2009	62.40	52.80	0.30	0.00	4.50	0.42	116.00	61.40		
		12/29/2009	54.80	45.00	0.00	0.00	5.50	0.39	113.00	59.20		
		01/21/2010	44.60	55.20	0.00	0.00	4.90	0.32	122.00	53.60		
		02/24/2010	50.10	49.60	0.00	4.10	4.10	0.30	115.00	51.90		
		03/15/2010	57.00	61.40	0.00	0.00	5.50	0.25	115.00	47.40		
		04/23/2010	51.20	48.80	0.00	0.00	5.50	0.35	120.00	56.10		
		05/06/2010	63.00	37.00	0.00	0.00	6.40	0.36	118.00	55.00		
		07/02/2010	57.00	50.30	0.00	0.00	4.60	0.16	116.00	37.90		
		07/27/2010	50.00	49.60	0.20	0.20	6.20	0.36	116.00	56.90		
		08/26/2010	62.90	37.00	0.40	0.00	7.20	0.32	132.00	53.60		
		09/22/2010	52.00	48.00	0.00	0.00	7.70	0.35	116.00	56.10		
BLHW-23		01/09/2008					-0.30					
		02/11/2008	0.30	0.30	20.80	78.70	-0.10					
		03/12/2008					0.42					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-23		04/21/2008	0.50	0.10	20.50	78.90	0.30					
		05/29/2008					0.12					
		06/22/2008	0.00	0.50	17.80	81.70		0.02				
		07/28/2008	0.40	3.80	17.30	73.40	0.10	0.00		0.00		
		08/20/2008	5.40	7.50	69.80	17.30	0.22	0.00		0.00		
		09/18/2008	0.70	0.20	19.60	79.50	0.14			0.00		
		10/22/2008	0.00	0.00	19.60	80.40	0.00					
		11/18/2008	0.40	0.10	19.80	79.60	0.44			0.00		
		12/31/2008	0.90	0.10	20.50	78.00	0.90					
		01/15/2009	0.10	0.00	19.50	80.30	0.22			0.00		
		02/25/2009	7.80	15.00	18.00	79.80	1.40					
		04/30/2009	0.40	0.90	18.90	79.80	0.05			0.00		
		05/20/2009	0.10	0.00	18.80	81.00	-0.06		101.00	0.00		
		06/10/2009					-0.07					
		07/20/2009	0.10	0.10	19.30	80.40	0.17		106.00	0.00		
		09/01/2009					-0.27					
		11/25/2009	41.90	51.20	0.40	6.20	6.20					
		12/29/2009	0.40	5.50	15.10	79.10	0.13					
		01/21/2010	31.10	46.90	0.00	21.60	0.25					
		02/24/2010	0.10	4.70	16.40	78.70	0.22					
		04/23/2010	44.90	53.10	0.00	1.80	0.10		101.00			
		05/06/2010					0.00					
		09/22/2010					0.17					
BLHW-24		01/09/2008					-0.30					
		02/11/2008	5.30	15.80	16.80	62.10	-0.10					
		03/12/2008	38.40	61.10	0.40	0.00	0.45					
		04/21/2008	1.60	4.20	19.50	74.60	0.30					
		05/29/2008					0.12					
		06/22/2008	16.60	41.90	6.10	39.10		0.00				
		07/28/2008	15.50	23.90	12.10	48.40	0.70	0.00		0.00		
		08/20/2008	44.30	54.80	0.00	0.90	0.31	0.00		0.00		
		09/18/2008	1.10	0.70	19.70	78.50	0.13			0.00		
		10/22/2008	2.00	2.30	18.80	76.90	0.06					
		11/18/2008	1.20	0.60	19.00	79.30	0.48			0.00		
		12/31/2008	12.00	15.10	15.70	0.00	0.00					
		01/15/2009	16.60	21.50	12.90	48.80	0.23			0.00		
		02/25/2009	0.70	18.40	18.00	79.30	1.80					
		04/30/2009	1.70	1.40	19.10	77.80	0.25			0.00		
		05/20/2009	0.60	0.30	18.90	80.10	-0.02		107.00	0.00		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-24		06/10/2009					-0.08					
		07/20/2009	5.30	8.80	15.80	70.00	0.17		110.00	0.00		
		09/01/2009					-0.25					
		09/30/2009	7.00	0.00	18.50	81.00	0.30					
		11/25/2009	21.00	24.80	11.90	42.00						
		12/29/2009	0.70	0.30	18.00	80.00	0.20					
		01/21/2010	0.30	0.20	20.00	79.40	0.01					
		02/24/2010	2.30	1.60	19.10	77.00	0.36					
		04/23/2010	40.00	60.00	0.00	0.00	0.08		101.00			
		05/06/2010					0.00					
BLHW-25		01/09/2008					-0.30					
		02/11/2008	4.60	11.70	17.90	65.30	-0.10					
		03/12/2008	40.80	57.50	1.60	0.00	0.49					
		04/21/2008	22.90	38.80	10.20	28.00	0.40					
		05/29/2008					0.11					
		06/22/2008	29.00	50.00	6.00	25.00		0.00				
		07/28/2008	18.60	30.90	10.50	39.90	0.07	0.00		0.00		
		08/20/2008	46.10	52.30	0.00	1.60	0.20	0.00		0.00		
		09/18/2008	1.50	2.10	19.30	77.10	0.12			0.00		
		10/22/2008	2.60	3.10	18.50	75.80	0.02					
		11/18/2008	1.60	1.30	18.60	78.40	0.44			0.00		
		12/31/2008	6.80	6.80	18.20	68.00	0.00					
		01/15/2009	15.90	16.60	14.20	52.90	0.13			0.00		
		02/25/2009	1.60	18.00	18.00	77.00	3.70					
		04/30/2009	1.00	0.50	19.40	79.10	0.30			0.00		
		05/20/2009	0.80	0.60	18.70	79.80	-0.04		108.00	0.00		
		06/10/2009					-0.12					
		07/20/2009	9.00	11.00	14.80	65.20	0.05		117.00	0.00		
		09/01/2009					-0.30					
		09/30/2009	1.10	0.10	18.90	80.00	0.30					
		11/25/2009	43.40	56.10	2.70	0.00	0.00					
		12/29/2009	0.60	0.20	18.90	20.00	0.07					
		01/21/2010	0.00	0.00	20.00	79.00	0.65					
		02/24/2010	0.80	0.20	19.90	79.60	0.34					
		04/23/2010	31.40	68.90	0.00	0.00	0.07		121.00			
		05/06/2010					0.00					
BLHW-26		01/09/2008					0.00					
		05/29/2008					0.30					
		09/18/2008	57.10	41.90	1.00	0.00	0.01			0.00		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-26		11/18/2008	52.20	46.50	1.40	0.00	0.62			0.00		
		12/31/2008	47.60	50.50	1.70	0.00	0.30					
		01/15/2009	60.00	58.60	0.00	0.00	1.30	0.28		50.20		
		02/25/2009	54.50	45.50	0.00	0.00	2.00	1.00		29.60		
		03/06/2009	45.00	55.00	0.00	0.00	1.80	0.52	103.00	68.40	60	
		04/30/2009	56.00	57.10	0.00	0.00	1.50	0.40	103.00	54.50		
		05/20/2009	57.00	58.20	0.00	0.00	1.70	0.40	105.00	54.50		
		06/10/2009	60.00	40.00	0.00	0.00	1.40	0.25	104.00	47.40		
		07/20/2009	60.00	54.80	0.00	0.00	1.50	0.30	106.00	51.93		
		09/01/2009	59.00	41.00	0.00	0.00	2.00	0.31	106.00	52.80	56.1	
		09/30/2009	36.90	33.50	7.00	23.00	2.00	0.30	110.00	47.40		
		11/25/2009	53.90	52.50	0.50	0.00	2.00	0.48	106.00	65.70		
		12/29/2009	52.00	47.00	0.00	0.00	2.20	0.50	105.00	67.00		
		01/21/2010	57.00	58.50	0.00	0.00	1.00	0.40	100.00	60.00		
		04/23/2010	57.00	56.90	0.00	0.00	4.90	0.85	109.00	87.40		
		05/06/2010	59.00	41.00	0.00	0.00	3.50	0.60	108.00	72.50		
		07/02/2010	57.00	57.00	0.00	0.00	5.20	1.25	109.00	106.00		
		07/27/2010	43.70	53.90	0.30	1.80	3.60	0.63	109.00	75.30	59.3	
		08/26/2010	47.70	52.10	0.00	0.00	2.60	0.30	108.00	51.90		
		09/22/2010	43.00	47.00	0.00	10.00	4.00	0.34	108.00	55.30	46.4	
BLHW-27		01/09/2008					-0.30					
		09/30/2009	6.00	8.30	16.90	68.80						
		01/21/2010	2.30	2.50	19.30	75.80	0.39					
		05/06/2010					-0.60					
		09/22/2010					0.04					
BLHW-28		05/06/2010	40.70	40.00	0.90	18.60	-0.10					
		09/22/2010					0.12					
BLHW-29		05/06/2010	54.50	45.00	0.50	0.00	-0.20					
		08/26/2010	47.10	52.50	0.00	7.00	0.70	0.11	100.00	18.90		
		09/22/2010	32.00	68.00	0.00	0.00	0.30	0.04	83.00	11.70		
BLHW-8	14:13	01/31/2001	56.10	43.90	0.00	0.00	-9.10	4.74	80.00	60.00		
	16:27	02/09/2001	53.10	46.90	0.00	0.00	3.80	3.20	80.00			
	12:08	03/08/2001	57.50	42.50	0.00	0.00	-0.60	0.36	80.00	16.00	16	NOT FITTED
	9:39	04/19/2001	52.20	47.80	0.00	0.00	-12.80	6.14	80.00	66.00	67	
	13:53	04/19/2001	51.70	48.30	0.00	0.00	-12.60	6.42	80.00	69.00	69	OP is backward
		05/21/2001	61.00	39.00	0.00	0.00	21.20	14.00		108.00	108	
		05/22/2001	61.00	39.00	0.00	0.00	28.00	19.00	94.00			
		05/24/2001	56.60	43.20	0.20		33.90	12.40		135.00	135	
		05/30/2001	54.00	46.00	0.00	0.00	8.80					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-8		06/04/2001	52.00	48.00	0.00	0.00	10.80					
		06/05/2001	49.00	51.00	0.00	0.00	9.70					
		06/06/2001	49.00	51.00	0.00	0.00	9.60					
		06/07/2001	47.50	52.50	0.00	0.00	9.70					
		02/10/2005	60.00	40.00	0.00	0.00	7.00	7.00		110.00		
		02/15/2006	59.00	41.00	0.00	0.00	7.00	7.00		13.50		
		03/13/2006	54.00	43.00	0.00	2.00	7.60	7.60		100.00		
		04/28/2006	21.00	62.00	0.00	15.00		4.10		50.00		
		08/23/2006	66.30	33.70	0.00	0.00	5.80			75.00		
		11/30/2006	58.00	42.00	0.00	0.00	13.00			140.00		
		03/30/2007	60.00	40.00	0.00	0.00	5.00					
		04/26/2007	57.00	43.00	0.00	0.00	1.00			150.00		
		05/10/2007	64.30	35.30	0.00	0.00	9.00	1.00		13.80		
		06/13/2007	4.60	38.10	0.20	0.00	9.00	1.00		99.10		
		07/12/2007	59.30	40.70	0.00	0.00	7.00	0.65		76.40		
		08/06/2007	54.30	41.40	0.00	3.30	9.00	1.00		94.80		
		11/15/2007					8.00	1.00		80.00		
		01/09/2008	58.30	41.50	0.00	0.20	4.70	0.30		48.30		
		02/11/2008	54.30	37.30	1.90	6.60	4.10	0.10		28.90		
		03/12/2008	74.30	25.20	0.30	0.00	4.00	0.30		48.30		
		04/21/2008	52.30	47.40	0.00	0.00	3.00	0.20		40.80		
		05/29/2008	57.00	43.00	0.00	0.00	3.60	0.27		49.30		
		06/22/2008	34.70	32.60	0.00	31.20	5.00	0.30		48.30		
		07/28/2008	73.20	41.50	0.00	0.00	4.00	0.21		43.40		
		08/20/2008	72.50	41.60	0.00	0.00	4.00	0.21		43.40		
		09/18/2008	71.20	28.40	0.00	0.40	6.50	0.41		60.71		
		10/22/2008	60.00	44.20	0.00	0.00	6.00	0.36		51.40		
		11/18/2008	69.20	30.80	0.00	0.00	5.80	0.23		41.30		
		12/31/2008	65.80	34.00	0.00	0.00	5.20	0.20		12.90		
		01/15/2009	60.00	42.60	0.00	0.00	5.00	0.24		46.40		
		02/25/2009	60.30	39.00	0.00	0.00	8.50	0.25	103.00	47.40		
		03/06/2009	56.00	44.00	0.00	0.00	8.00	0.60	105.00	73.40		
		04/30/2009	58.00	42.40	0.00	0.00	8.00	0.50	107.00	60.90		
		05/20/2009	57.00	44.50	0.00	0.00	8.00	0.60	106.00	66.80		
		06/10/2009	60.00	40.00	0.00	0.00	8.50	0.25	104.00	47.40		
		07/20/2009	60.00	41.30	0.00	0.00	8.00	0.50	107.00	67.00		
		09/01/2009	70.00	30.00	0.00	0.00	9.20	0.35	107.00	56.10		
		09/30/2009	60.40	37.00	0.00	9.90	11.00	0.60	104.00	75.80		
		11/25/2009	68.70	39.70	0.10	0.00	9.40	0.58	106.00	72.20		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-8		12/29/2009	63.00	35.00	0.00	0.00	9.50	0.50	104.00	67.00		
		01/21/2010	70.00	29.60	0.00	0.00	10.00	0.40	113.00	72.60		
		02/24/2010	67.80	29.60	0.00	0.00	9.70	0.30	75.00	62.80		
		03/15/2010	60.50	37.90	0.00	0.00	2.50	0.40	76.00	72.60		
		04/23/2010	61.60	38.90	0.00	0.00	9.90	0.40	102.00	72.60		
		05/06/2010	70.00	30.00	0.00	0.00	11.50	0.50	107.00	85.00		
		07/02/2010	58.20	41.30	0.20	0.30	9.80	0.40	108.00	72.60		
		07/27/2010	60.00	36.00	0.80	3.20	10.00	0.62	108.00	95.80		
		08/26/2010	62.50	37.60	0.00	0.00	10.00	0.52	107.00	87.70		
		09/22/2010	58.00	40.00	0.00	2.00	11.80	0.55	107.00	88.90		
BLHW-9	14:01	01/31/2001	60.70	39.30	0.00	0.00	-8.50	3.07	80.00	50.00		
	15:53	02/09/2001	56.90	43.10	0.00	0.00	3.00	1.10	90.00	28.00	28	
	12:58	02/14/2001	53.80	46.20	0.00	0.00	0.00	3.28	70.00	51.00	51	
	10:27	03/08/2001	48.80	51.10	0.10	0.00	-15.30	6.42	80.00	67.00	67	NOT FITTED
	13:57	04/19/2001	48.50	51.50	0.00	0.00	-22.50	9.94	80.00	82.00	82	OP is backward
	9:43	04/19/2001	49.60	50.40	0.00	0.00	-21.40	9.12	80.00	78.00	80	
		05/21/2001	63.00	37.00	0.00	0.00	20.20			100.00	100	
		05/22/2001	61.00	39.00	0.00	0.00	26.40	15.50	100.00			
		05/24/2001	55.30	44.60	0.20		32.10	13.90		124.00	124	
		05/30/2001	54.00	46.00	0.00	0.00	9.40					
		06/04/2001	52.20	47.40	0.40	0.00	12.60					
		06/05/2001	49.00	51.00	0.00	0.00	11.20					
		06/06/2001	49.00	51.00	0.00	0.00	11.20					
		02/10/2005	58.00	42.00	0.00	0.00	8.00	8.00		100.00		
		02/15/2006	55.00	45.00	0.00	0.00	6.00	6.00		95.00		
		03/13/2006	55.00	42.00	0.00	2.00	5.00	5.00		60.00		
		04/28/2006	57.00	43.00	0.00	0.00		2.70		35.00		
		08/23/2006	65.50	34.50	0.00	0.00	3.80			50.00		
		11/30/2006	57.00	43.00	0.00	0.00	7.00			90.00		
		03/30/2007	58.00	42.00	0.00	0.00	3.70					
		04/26/2007	57.00	43.00	0.00	0.00	4.50			80.00		
		05/10/2007	56.20	33.80	0.00	0.00	9.00	1.00		13.80		
		06/13/2007	47.70	21.70	0.50	0.00	9.00	1.00		99.10		
		07/12/2007	53.40	41.80	0.00	4.80	7.00	0.40		60.00		
		08/06/2007	47.80	39.60	0.00	12.10	9.00	0.50		67.00		
		11/15/2007	22.50	17.50	10.40	49.60	8.50	0.40		33.60		
		01/09/2008	47.50	37.50	0.10	14.00	4.50	0.17		37.60		
		02/11/2008	46.50	35.30	1.70	16.10	4.00	0.10		28.90		
		03/12/2008	59.40	39.10	0.20	0.30	3.80	0.18		38.70		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-9		04/21/2008	55.10	44.70	0.00	0.20	3.00	0.06		22.40		
		05/29/2008	60.00	40.00	0.00	0.00	3.50	0.11		31.40		
		06/22/2008	40.10	32.90	0.00	0.00	5.00	0.10		28.90		
		07/28/2008	61.90	39.20	0.00	0.00	3.90	0.07		25.10		
		08/20/2008	61.70	39.40	0.00	0.00	3.90	0.07		25.10		
		09/18/2008	57.80	37.40	0.00	4.80	6.50	0.21		43.50		
		10/22/2008	56.60	40.10	0.00	3.30	6.00	0.21		39.00		
		11/18/2008	52.30	38.60	0.00	9.10	5.60	0.22		40.40		
		12/31/2008	50.30	37.20	0.00	11.80	5.50	0.18		9.90		
		01/15/2009	56.00	38.60	0.00	5.40	5.00	0.17		39.10		
		02/25/2009	48.80	39.90	0.00	12.80	8.00	0.25	99.00	47.40		
		03/06/2009	47.80	37.80	0.00	14.40	8.50	0.25	100.00	47.40		
		04/30/2009	56.00	35.40	0.00	8.60	8.00	0.30	101.00	47.20		
		05/20/2009	49.60	36.30	0.00	14.20	8.00	0.32	104.00	48.80		
		06/10/2009	49.00	36.00	0.00	15.00	8.00	0.25	100.00	47.40		
		07/20/2009	50.90	33.70	0.00	15.60	9.00	0.40	102.00	59.20		
		09/01/2009	47.20	32.60	0.00	20.20	8.90	0.32	102.00	53.60	49.3	
		09/30/2009	23.00	23.00	0.10	55.70	6.50	0.30	100.00	46.50	26.8	
		11/25/2009	54.20	35.00	0.10	10.20	2.40	0.07	87.50	24.20		
		12/29/2009	49.00	34.00	0.00	16.40	3.20	0.06	75.00	23.20		
		01/21/2010	55.60	24.40	0.00	5.70	3.90	0.05	84.00	21.20		
		02/24/2010	56.10	24.40	0.00	5.70	3.80	0.05	74.00	21.20		
		03/15/2010	55.90	24.40	0.00	5.70	3.80	0.05	78.00	21.20		
		04/23/2010	52.00	35.30	0.00	12.40	3.20	0.06	101.00	23.20		
		05/06/2010	55.50	35.50	0.00	9.00	3.60	0.05	98.00	21.00		
		07/02/2010	50.40	38.50	0.00	11.10	3.60	0.20	100.00	42.40		
		07/27/2010	47.40	32.90	0.00	19.50	3.40	0.23	99.50	45.50	38.6	
		08/26/2010	34.30	21.90	3.90	40.70	0.60	0.00	92.00	0.00		
		09/22/2010	58.00	39.00	0.00	3.00	2.60	0.06	88.00	23.20		
BLLEACH1	14:45	01/31/2001	41.80	45.10	3.10	10.00	-8.70	0.00	80.00	0.00		
		07/12/2007	32.30	33.70	7.90	26.10		0.95		15.00	7.6	
		01/09/2008	0.20	0.00	20.60	79.30	4.50	0.50		0.00		
		02/11/2008	57.60	41.20	1.20	0.10	4.00					
		03/12/2008	18.90	11.70	15.10	53.50	4.00	0.01				
		04/21/2008	37.00	0.40	20.10	19.90	2.50	0.01		1.40		
		05/29/2008	15.00	12.00	13.00	60.00	4.30	0.00		0.00		
		06/22/2008	18.90	11.70	15.10	53.50	4.00	0.01		1.40		
		07/28/2008	0.70	0.40	20.10	19.90	2.50	0.01		1.40		
		08/20/2008	15.00	12.00	13.00	60.00	4.30	0.00		0.00		

Appendix E: Phase I and II Information

CONSTRUCTION ACTIVITY SUMMARY REPORT

BADLANDS SANITARY LANDFILL GAS COLLECTION PILOT STUDY

Riverside County, California

July 2008

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California Integrated Waste Management Board
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Construction Activity Summary Report

Badlands Sanitary Landfill Gas Collection Pilot Study

Riverside County, California

July 2008

The material and data in this report were prepared under the supervision and direction of the undersigned.

KENNEC

Julian Ibarra, P.E.

Sr. Project Professional

Joaquin Wright

Sr. Vice President

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Appendix E Photographs

1 INTRODUCTION

This report provides a summary of construction activities associated with a pilot study to assess the constructability and performance of Tire Derived Aggregate (TDA) used in lieu of gravel for horizontal landfill gas (LFG) collection wells. The pilot study is sponsored by the California Integrated Waster Management Board (CIWMB) in cooperation with Riverside County Waste Management Department. The project site is the Badlands Sanitary Landfill (Landfill) in Riverside County.

This report focuses on the horizontal LFG collection wells construction activities and also provides a summary of Landfill characteristics, which are intended to help the reader develop an understanding of the framework for LFG generation and control. A subsequent report will document the performance of the gas collection wells to allow comparison of TDA vs. gravel in this application.

2 BACKGROUND

2.1 Site Location and Description

The Badlands Sanitary Landfill (Landfill) is located in Riverside County at 31125 Ironwood Avenue, Moreno Valley, CA 92555 (Figures 1 and 2). The facility currently operates under Solid Waste Facility Permit 33-AA-0006 dated November 29, 2005 and Waste Discharge Requirements Order No. R8-2002-0085, dated October 25, 2002. The Landfill is designated as a Class III facility, as defined by California Code of Regulations (CCR) Title 27, Sections 20240 through 20260, which only accepts non-hazardous municipal solid waste (MSW). Non-hazardous MSW accepted at the Landfill includes general residential waste, mixed municipal, agricultural, commercial waste and construction/demolition waste. Special wastes, such as dead animals and empty pesticide and chemical containers that are triple-rinsed and punctured are also accepted at this site for disposal. No wastes containing greater than 50 percent moisture by weight are accepted (Joint Technical Document (JTD, 2005).

The Badlands Sanitary Landfill is situated within a range of low hills named "The Badlands," located about 1.2 miles northeast of the San Jacinto Fault Zone. The Fault Zone has uplifted and tilted the sedimentary strata to form The Badlands. Erosion of the uplifted strata has resulted in deeply cut terrain of narrow canyons and ridges with steep-sided hills. The elevations in the area range from approximately 2000 to 2400 feet above mean sea level (MSL).

The Landfill began operation in 1966 and was operated as a burn dump until 1970. The total acreage of the landfill property is 1,168.3 acres, including 246 acres as permitted landfill area. Within the landfill area 150 acres is currently being used for disposal.

The lowest proposed landfill elevation is 1,985 feet MSL and the maximum permitted elevation is 2,460 MSL, resulting in a maximum depth of waste of about 275 feet. The currently permitted maximum disposal rate is 4,000 tons per day. The design capacity of the Landfill is 30,386,332 cubic yards, which, based on current permits, should reach capacity in 2016 (JTD, 2005).

2.2 Climate and Hydrology

The Landfill climate is generally dry most of the year and is classified as semi-arid with mild seasonal changes in precipitation and temperature. The average mean precipitation from 1948 to 2000 is 17.76 inches and the annual pan evaporation rate averages 70.35 inches, as measured at the Western Region Climate Center in the City of Beaumont, California, which is

approximately 10 miles east of the Landfill. The temperature at the Landfill averages 93° F during the summer but can exceed 100° F during daytime hours and decrease to an average of 57° F at night. In the winter months the temperature averages 50° F with the highs averaging at 62° F and the lows averaging 39° F. Based on data from the Western Region Climate Center at March Air Reserve Base located 10 miles west of the Landfill, winds average 6 mph at the site with occasional strong gusts.

The Landfill is located in the northern half of the San Jacinto Unit of the Santa Ana River Basin. The San Jacinto Unit comprises 718 square miles of land, of which 492 square miles consists of mountains and hills and 226 square miles of valley floor. The northern and northeastern boundaries of the unit are made up of the prominent San Jacinto Mountains and the highly eroded San Timoteo Badlands. The hydrology in the San Timoteo Badlands is characterized by a southwesterly surface water runoff flow through intermittent streams and creeks that drain into the San Jacinto Valley. Surface water runoff within the Landfill flows primarily towards the south and drainage is limited to seasonal storms.

The San Timoteo Formation is the principal hydrologic unit at the Landfill. In 1989, groundwater was encountered at the site at depths ranging from 59 feet to 363 feet below the ground surface. In 1991 an engineering consultant, Converse, concluded that the alluvium overlying the San Timoteo Formation and lining the canyon bottoms is not a water-bearing unit on the site. It appears that there is at least a 500 feet thick zone of saturated, low-permeability San Timoteo Formation sediments of the lower San Timoteo Formation beds underlying the Landfill site. The unit cannot be defined as an aquifer because of its low transmissivity and storativity. These characteristics, relative to the major water-bearing units that surround the Landfill, diminish the importance of the site area as a productive source of water. Instead, the San Timoteo Formation at the site should be considered a saturated and unconfined water-bearing unit of marginal significance to area water resources. In 2003 the direction of the groundwater was found to vary under the landfill portion of the site from south-southeast, to northwest and to south-southwest (JTD, 2005).

2.3 Badlands Surface Water Drainage

The Drainage Plan (JTD, 2005) for the Landfill indicates surface water management features consist of ditches, berms, channels, pipes, and basins. There is only minor surface drainage run-on at the Landfill, due to the ridges surrounding the site. Any run-on that occurs is handled as on-site drainage, also known as non-contact surface water drainage, from the Landfill (i.e., run-off) and is controlled by lateral sheet flow, then intercepted by 15 to 20 foot wide benches located every 40 to 50 feet vertically on the final refuse side slopes. The benches are designed to reduce erosion caused by sheet

flow on the 3:1 horizontal to vertical side slopes of the Landfill. The run-off is directed to downdrains and channels within the site. The run-off discharges into an on-site retention/sedimentation pond located at the south end of the Landfill.

2.4 Containment System

Within the 150 acres of Landfill footprint, approximately 38 acres are unlined consistent with the requirements of Subtitle D (40 CCR) and 6 acres were constructed prior to the October 1993 Subtitle D requirements. Approximately 70 acres of lined area has been completed consistent with the requirements of Subtitle D and Title 27. As of 2002, the County was authorized to use an engineered alternative to the prescriptive liner design. The bottom liner system consists of, from top to bottom:

- 24-inch thick protective cover soil;
- 8-oz geotextile filter fabric;
- 12-inch thick leachate collection and removal system (LCRS) drainage layer;
- 60-mil thick high-density polyethylene (HDPE) geomembrane;
- Geosynthetic clay liner (GCL);
- 40-mil thick GCL hydration layer;
- 12-inch thick low permeability layer; and
- Prepared subgrade.

The side slope liner system consists of from top to bottom:

- 24-inch thick protective cover soil/leachate drainage layer;
- 60-mil thick HDPE geomembrane;
- Needle-punched, non-woven GCL; and
- Prepared subgrade.

2.5 Operations

The active landfill area typically consists of a working face that is 100 to 120 feet in length. Incoming waste is deposited at the active face. When a refuse layer exceeds a depth of approximately 3 feet, a landfill dozer is used to push and spread the refuse along the face. As the working face becomes

deeper, heavier trash compactors are used to compact the refuse. The target compacted waste density is 1400 pounds per cubic yard (JTD, 2005). Each waste lift is typically 10 to 20 feet thick. At the end of each operating day, the exposed waste is covered with at least 6 inches of compacted soil and/or alternative daily cover (ADC). A layer of intermediate cover soil at least 12 inches thick is placed on all surfaces of the fill where no additional refuse will be placed within 180 days.

Various State-approved ADC materials have been used at the Landfill, including biodegradable foam, tarps and processed greenwaste. Processed greenwaste is regularly used at an average of 350 to 400 tons per day. The greenwaste is processed at local facilities where it is ground into pieces less than 6-inches in size.

2.6 Landfill Gas Control and Recovery

The landfill gas collection system consists of vertical collection wells in the unlined portion of the landfill and a combination of vertical and horizontal collection wells in the lined portions. The collected LFG is used to power a 1.2 megawatt electrical generation plant. The power plant operates 14 hours per day, 5 days a week, since the landfill currently does not generate enough LFG to operate on a continuous basis. Also, a pilot study to recirculate LFG condensate and leachate was approved in 2002. Since that time, these liquids have been applied by gravity through one horizontal well located in one of the lined areas of Canyon 3.

Landfill gas condensate that is generated before the gas reaches the power plant drains by gravity though the gas collection pipes to a tank at the south end of the current landfill footprint. Condensate that is generated during the compression of LFG at the power plant is captured and pumped into a tank located in the power plant enclosure which is located northwest of the fee booth (Figure 3 Site Plan). The condensate that is collected at both locations is either used for dust control within the lined portion of the landfill, or injected into the interior of the landfill using a horizontal gas collection well.

Using a predictive model that uses historical records of trash tonnage and empirical values for the degradation rate of the trash in place, Riverside County has estimated the expected LFG generation rate for the site. According to the Badlands Sanitary Landfill Gas Production Curve (Appendix C), the projected LFG generation for 2008 is approximately 826 standard cubic feet per minute (scfm).

2.7 Project

The CIWMB is charged with promoting the use of recycled tires. One potential use of recycled tires is as a replacement for crushed rock (i.e., aggregate or gravel) in horizontal LFG collection wells. Aggregate is a

precious resource in most parts of California and its cost has increased as the supply has decreased. Therefore, use of recycled tires to replace the aggregate may have cost benefits, as well as the potential to reduce the environmental impact due to mining activities associated with gravel supplies and providing a productive re-use of recycled tires.

TDA is made by cutting recycled scrap tires into 1 to 12 inch pieces. TDA has many advantageous characteristics such as, very low density relative to typical soil or rock; good thermal insulation; high permeability; and vibration absorption (D.N. Humphrey, 2000). TDA's high permeability makes it a viable replacement candidate for conventional gravel in LFG horizontal collectors in sanitary Landfills.

Data to compare the performance and constructability of TDA versus gravel in this application is scarce. The CIWMB initiated this pilot study with the Riverside County Waste Management Department (County) at Badlands Sanitary Landfill in Riverside County, California to document construction techniques and allow data collection to assess performance characteristics relative to gravel in horizontal LFG collection wells. The Badlands Sanitary Landfill Gas Collection Pilot Study entailed the construction of three horizontal gas collection trenches backfilled with TDA and two horizontal gas collection trenches backfilled with conventional gravel.

2.8 Roles and Responsibilities

This project was completed using the County's general contractor Landfill Control, Inc. (Contractor) and County staff. The CIWMB provided all the TDA and conventional gravel material, as well as the valve assemblies required for additional gas monitoring locations. The CIWMB also provided on-site engineering support (KENNEC) during the installation. KENNEC acted as contractor to the CIWMB and was responsible for overseeing the delivery of all materials and documentation of construction activities including photos. The County provided design and construction management. The Contractor provided the labor and equipment required for the installation. All TDA material was purchased from Lakin Tire West (Lakin) from their facility in Santa Fe Springs, CA. All gravel material was supplied by CDG Materials, Inc.'s (CDG) plant in Riverside, CA. All material testing was performed by AllWest Geoscience (AllWest) using their laboratory in Corona, CA.

Allwest is a subcontractor to Kennec. All material testing was covered by the CIWMB.

3 PILOT STUDY DESIGN AND CONSTRUCTION

3.1 Horizontal Collector and Pilot Study Design

Five horizontal LFG collection wells (HW) were constructed for this project. Three wells were constructed using TDA as the backfill material around the perforated pipe and two wells were constructed using traditional gravel as the backfill material. The layout of the horizontal wells is shown on Figure 4. Design data for each well was:

Well ID	Design Length (ft)	Drainage Backfill Materials
HW-23	650	2-4 inch gravel
HW-24	750	Type A TDA
HW-25	850	Type A TDA
HW-26	850	2-4 inch gravel
HW-27	950	Type A TDA

The typical trench design called for a depth of 4 ft and a width of 2 ft. The typical horizontal well detail is shown on Figure 5. The design called for the bottom 2 ft of each trench to be excavated into refuse. The TDA was specified to conform to Type A TDA (Appendix C) and the gravel was to be 2 to 4 inch diameter, clean, washed, and crushed in conformance with ASTM C131. As discussed in section 3.3, the TDA material installed varied between Type A and Type B specification. For both the TDA and gravel horizontal well installations, a 6-inch diameter HDPE, SDR 11, perforated pipe was placed on 6 inches of drainage material in the bottom of the trench, then surrounded and covered with 18 inches of drainage material. The 6-inch diameter pipe was installed in 40-ft long sections and joined with 4-ft sections of an 8 inch diameter HDPE, SDR 11, perforated expansion pipe. The 6-inch pipe fits inside the 8-inch pipe, allowing the 6-inch pipe pieces the ability to move and “creep” due to thermal expansion, shrinkage, and settling without compromising the functionality of the continuous pipe. The 8-inch expansion pipe acts like a slip coupling that prolongs the service life of the pipes. The perforations for both the 6-inch and 8-inch pipe were 1/8-inch wide by 1-inch long spaced at 1.5 inches on center with four rows of perforations at 90 degree intervals perpendicular to the pipe. The top of the drainage material was covered with a 10 oz. woven geotextile material prior to placement of clean cover soil to fill the remaining 2 ft of trench depth.

In addition to the standard trench, each horizontal well was designed to have a 10 ft by 10 ft by 4 ft deep pit incorporated somewhere along the extent of

the trench. The pit was detailed to have a 3-ft thick drainage layer with 1 ft of cover soil. The purpose of this trench was to provide the County with an exact surveyed location larger than the trench, to access the horizontal wells in case of any problems.

3.2 Construction

The TDA supplier, Lakin, began delivery of TDA on August 9, 2007 in preparation for the scheduled start of construction on Monday, August 13, 2007. High winds on the 13th delayed construction until Wednesday, August 15, 2007.

The Contractor used a Kobelco SK210 Excavator to dig the 2-ft wide by 4-ft deep trench. As described in the previous section, the design called for the trench excavation to be deep enough so that the pipe and drainage material were within the refuse layer. However, due to the varying depth to the top of waste, the actual trench depth did not always allow for the drainage material and pipe layers to be entirely within the refuse. All excavated material was loaded onto dump trucks and hauled to the active face for disposal. Once a trench was completed, the Contractor used a Deere 544 J Loader or a Deere 310G Backhoe to place 6 to 9 inches of drainage material at the bottom of the trench. For HW 23, 24 and 25, a 6-inch diameter perforated HDPE pipe was joined to an existing section of pipe and placed into the trench. For HW 26 and 27, a 90 degree elbow was placed at the beginning of the new section. The method of pipe placement varied: on slopes the pipe was placed by laborers and on flat decks the pipe was carried and placed with either a backhoe or forklift. The pipe was placed in 40-foot sections with a 4-foot section of 8-inch solid HDPE used as a join piece. All pipes were terminated with a standard HDPE cap. Once a pipe was in place, the loader or backhoe continued to place approximately 15 to 18 inches of drainage material in the trench to surround and cover the pipe, resulting in at least 24 inches of drainage material. Laborers were used to spread the drainage material inside the trench. Laborers then placed a geotextile material over the drainage material to act as a separator between the drainage material and cover soil. County scrapers provided the soil cover material. The cover soil was placed adjacent to the trenches a loader was then used to backfill the trench with the supplied cover soil. The County surveyed each trench in order to document the as-built conditions.

During construction some of the delivered TDA material, appeared to be out of specification. The material appeared to be much larger than the small Type A material specified for the project and even slightly larger than Type B material. After discussions between the various parties, it was discovered that Lakin was aware of the larger material being delivered and referred to it as “2-Pass Material.” 2-Pass TDA material is a term used by the supplier to indicate that the tires were passed through the shredding machine two times.

Neither the 2-Pass nor the 2-inch material would meet the specifications normally used for Type A or B TDA. Since the use of various sizes of TDA can be expected for landfill applications the CIWMB ultimately approved the use of the 2-Pass material but requested the delivery of a 50/50 mix material.

Backfilling of HW 24 and 25 would be completed using the 2-Pass material. HW 27 would be constructed using the 50/50 mix. The 50/50 mix would be comprised of 50 percent 2-Pass and 50 percent 2-inch material. Lakin could not physically mix the two materials together and when the two loads arrived they both unloaded differently from the walking floor trailers. The first truck unloaded the 50/50 mix material in two distinct stockpiles, one of the 2-Pass and the other of the 2-inch. The second truck unloaded the 50/50 mix material as one large stockpile with the 2-pass material on the bottom and the 2-inch material on top. Mixing for HW 27 occurred as the loader and backhoe moved the TDA from the stockpile and placed it into the trenches.

The two distinct categories of TDA, 2-pass and 50/50 2-inch mix are typical of material currently readily available from TDA producers. Placing these two types in the pilot study allows for further development of our understanding of the possible performance differences. In other TDA applications, the performance differences associated with permeability/void ratios between 2-pass, Type B, and 2-inch have been nominal.

Gravel delivery during the project was intermittent. Ultimately, all the gravel was supplied; however on the last roughly 50 ft of HW 26 the supply was depleted. This occurred on August 23, 2007 and CDG informed us they would not be able to make another delivery to the site until the following Monday. The County knew of a gravel stockpile onsite and after examining the material found it to be suitable. This gravel was slightly larger, 4-6 inch gravel rather than 2-4inch, but was the only readily available alternative. CDG agreed to deliver one truckload on Monday to replace the onsite stockpile.

Construction of all five horizontal wells was completed in eight working days (8/15/07 to 8/24/07).

The actual lengths for each of the wells and the drainage material placed are:

Well ID	Design Length (ft)	Drainage Backfill Materials
HW-23	800	2-4 inch gravel
HW-24	920	2-pass TDA
HW-25	800	2-pass TDA
HW-26	700	2-4 inch gravel
HW-27	715	50/50 mix of 2-pass and 2-inch TDA

The Badlands Sanitary Landfill Gas Collection Pilot Study used approximately 160 tons of TDA for approximately 2,435 feet of horizontal LFG collection well construction and 300 tons of gravel for approximately 1,500 feet of horizontal LFG collection well construction, or about 131 pounds per linear foot and about 400 pounds per linear foot, respectively.

The as-built configuration of the five wells is shown on Figure 4.

4 LABORATORY TESTING

Allwest Geosciences performed laboratory testing on TDA and gravel samples retrieved by KENNEC. KENNEC collected two samples of 2-pass TDA material, one sample of 2-inch TDA material, one sample comprised of 50 percent 2-pass TDA and 50 percent 2-inch TDA, and one sample of the gravel. Each sample was selected to be representative of the general composition of each stockpile. The laboratory testing consisted of a grain size analysis using ASTM C136 procedures and a Free Steel Analysis. The test results were compared to the Specifications for Type B TDA (Appendix C). The comparison shows the difference between specification of Type B and the 2-pass and 50/50 2-inch mixes installed in the project. The laboratory test results are provided in Appendix A.

5 SUMMARY

The construction of the horizontal gas wells were completed using traditional equipment and a conventional labor force. No specialized equipment or tools was required to install the TDA. The TDA material was readily available and delivered on time, whereas gravel deliveries were frequently delayed or postponed. The Contractor commented that TDA material was cleaner to work with versus the washed gravel material and the TDA produced very little dust compared to the gravel when placing material in the trenches.

According to the County, it will be at least one year until the horizontal landfill gas collection pipes are functioning. At that time, performance comparisons and recommendations can be made.

A comprehensive report on the performance of the pilot study gas collection wells will be developed when LFG extraction and gas composition data from the pilot study is available.

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LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

Appendix A

Lab Test Data

ALLWEST GEOSCIENCE Inc.
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Corona, CA 92880
Phone: (951) 284-7100
Fax: (951) 284-7111
E-Mail: corp_office@allwestg.com

Sieve Analysis

Sample: # 5 Analysis : CAL
Date: 8/16/2007 Date: 9/28/2007
Taken By: KENNEC Checked:

Notes: CIWMB,River Side County,Bad Lands Land Fill,2-Pass Material

Tare (g):
Tare+Shreds (g):
Shreds (g): 20466.6 Shreds (lbs): 45.1

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	1542.24	1542.24	18924.40	92.5	100
8"	203.2	0	1542.24	18924.40	92.5	75-100
3"	76.2	6078.24	7620.48	12846.16	**62.8**	**0-50**
1 1/2"	38.1	10206	17826.48	2603.52	12.7	0-25
3/4"	19.05	2313.36	20139.84	290.16	1.4	
3/8"	9.53	231.4	20371.24	58.76	0.3	
#4	4.75	45.66	20416.90	13.10	0.1	0-1
Pan	N/A	13.1	20430.00	0.00	0.0	

Wt Total	20430.0
Wt Lost	36.64
% Lost	0.179

Free Steel (g)	7.800	
Free Steel %	0.038	1% max.
Longest Shred (in):	**41**	**18 in. max.**
No. shred >18 in. long:	5	
Wt. Shreds >18 in. long:	2630.9	
% Wt shreds>18 in. of total:	12.9	
No. shreds>12 in. long:	13	
Wt shreds>12 in. long:	1950.48	
% Wt shreds>12 in of total:	**9.5**	**10% max.**
Sidewall shreds (ea):	**2**	**Zero**
Wt shreds >2" wire exposed	589.68	
% Wt shreds >2" wire exposed	2.89	10% max
Wt shreds >1" wire exposed	3538.08	
% Wt shreds >1" wire exposed	17.32	25% max.

Definitions:
1. "Free Steel" is metal fragments that are not at least partially encased in rubber.
2. "Sidewall Shreds" are pieces with both sidewalls attached.

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E-Mail: corp_office@allwestg.com

Sieve Analysis

Sample: 6
Date: 8/16/2007
Taken By: J.I. - Kennec

Analysis : JRC
Date: 10/1/2007
Checked:

Notes: CIWMB, Riverside County, Badlands Landfill - From Lakin Delivery
2" material (TYPE A TDA - 3" Max Size)

Tare (g):
Tare+Shreds (g):
Shreds (g): 11022.5 Shreds (lbs): 24.3

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	0	0.00	11022.48	100.0	100
8"	203.2	0	0.00	11022.48	100.0	75-100
3"	76.2	0	0.00	11022.48	**100.0**	**0-50**
1 1/2"	38.1	1089.64	1089.64	9932.58	90.1	0-25
3/4"	19.05	7801.92	8891.56	2130.66	19.3	
3/8"	9.53	1859.76	10751.32	270.90	2.5	
#4	4.75	205	10956.32	65.90	0.6	0-1
Pan	N/A	65.9	11022.22	0.00	0.0	

Wt Total	11022.2
Wt Lost	0.26
% Lost	0.002

Free Steel (g)	27.000	
Free Steel %	0.245	1% max.
Longest Shred (in):	**3**	**18 in. max.**
No. shred >18 in. long:	0	
Wt. Shreds >18 in. long:	0.0	
% Wt shreds>18 in. of total:	0.0	
No. shreds>12 in. long:	0	
Wt shreds>12 in. long:	0	
% Wt shreds>12 in of total:	**0.0**	**10% max.**
Sidewall shreds (ea):	**0**	**Zero**
Wt shreds >2" wire exposed	317.52	
% Wt shreds >2" wire exposed	2.88	10% max
Wt shreds >1" wire exposed	1224.72	
% Wt shreds >1" wire exposed	11.11	25% max.

Definitions:
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Sieve Analysis

Sample: # 7 Analysis : CAL
Date: 8/20/2007 Date: 9/27/2007
Taken By: J.I(Kennec) Checked:

Notes: CIWMB,Bad Lands Land Fill,River Side County,L Lakin Tire,2-Inch & 2 -Pass TDA

Tare (g): 0
Tare+Shreds (g):
Shreds (g): 18189.4 Shreds (lbs): 40.1

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	0	0.00	18189.36	100.0	100
8"	203.2	0	0.00	18189.36	100.0	75-100
3"	76.2	9117.72	9117.72	9071.64	**49.9**	**0-50**
1 1/2"	38.1	3261.28	12379.00	5806.68	31.9	0-25
3/4"	19.05	4435.28	16814.28	1371.40	7.5	
3/8"	9.53	1088.64	17902.92	282.76	1.6	
#4	4.75	188.84	18091.76	93.92	0.5	0-1
Pan	N/A	93.92	18185.68	0.00	0.0	

Wt Total 18185.7
Wt Lost 3.68
% Lost 0.020

Free Steel (g)	15.400	
Free Steel %	0.085	1% max.
Longest Shred (in):	**30**	**18 in. max.**
No. shred >18 in. long:	5	
Wt. Shreds >18 in. long:	5806.0	
% Wt shreds>18 in. of total:	31.9	
No. shreds>12 in. long:	12	
Wt shreds>12 in. long:	7847.2	
% Wt shreds>12 in of total:	**43.2**	**10% max.**
Sidewall shreds (ea):	**5**	**Zero**
Wt shreds >2" wire exposed	2358.72	
% Wt shreds >2" wire exposed	12.97	10% max
Wt shreds >1" wire exposed	5488.56	
% Wt shreds >1" wire exposed	30.18	25% max.

Definitions:
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2. "Sidewall Shreds" are pieces with both sidewalls attached.

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Sieve Analysis

Sample: # 8 Analysis : CAL
Date: 8/20/2007 Date: 9/28/2007
Taken By: J.I(Kennec) Checked:

Notes: CIWMB,Bad Lands Land Fill,River Side County,Lakin Tire,2-Pass Material(TDA)

Tare (g): 0
Tare+Shreds (g):
Shreds (g): 20366.6 Shreds (lbs): 44.6

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	3946.32	3946.32	16420.32	80.6	100
8"	203.2	0	3946.32	16420.32	80.6	75-100
3"	76.2	6441.12	10387.44	9979.20	**49.0**	**0-50**
1 1/2"	38.1	7484.4	17871.84	2434.98	12.0	0-25
3/4"	19.05	2222.64	20094.48	212.34	1.0	
3/8"	9.53	185.44	20279.92	26.90	0.1	
#4	4.75	13.8	20293.72	13.10	0.1	0-1
Pan	N/A	13.1	20306.82	0.00	0.0	

Wt Total	20306.8
Wt Lost	59.82
% Lost	0.294

Free Steel (g)	0.700	
Free Steel %	0.003	1% max.
Longest Shred (in):	**36**	**18 in. max.**
No. shred >18 in. long:	7	
Wt. Shreds >18 in. long:	5216.4	
% Wt shreds>18 in. of total:	25.7	
No. shreds>12 in. long:	18	
Wt shreds>12 in. long:	3039.12	
% Wt shreds>12 in of total:	**15.0**	**10% max.**
Sidewall shreds (ea):	**0**	**Zero**
Wt shreds >2" wire exposed	2948.4	
% Wt shreds >2" wire exposed	14.52	10% max
Wt shreds >1" wire exposed	5715.36	
% Wt shreds >1" wire exposed	28.15	25% max.

Definitions:
1. "Free Steel" is metal fragments that are not at least partially encased in rubber.
2. "Sidewall Shreds" are pieces with both sidewalls attached.

SIEVE ANALYSIS

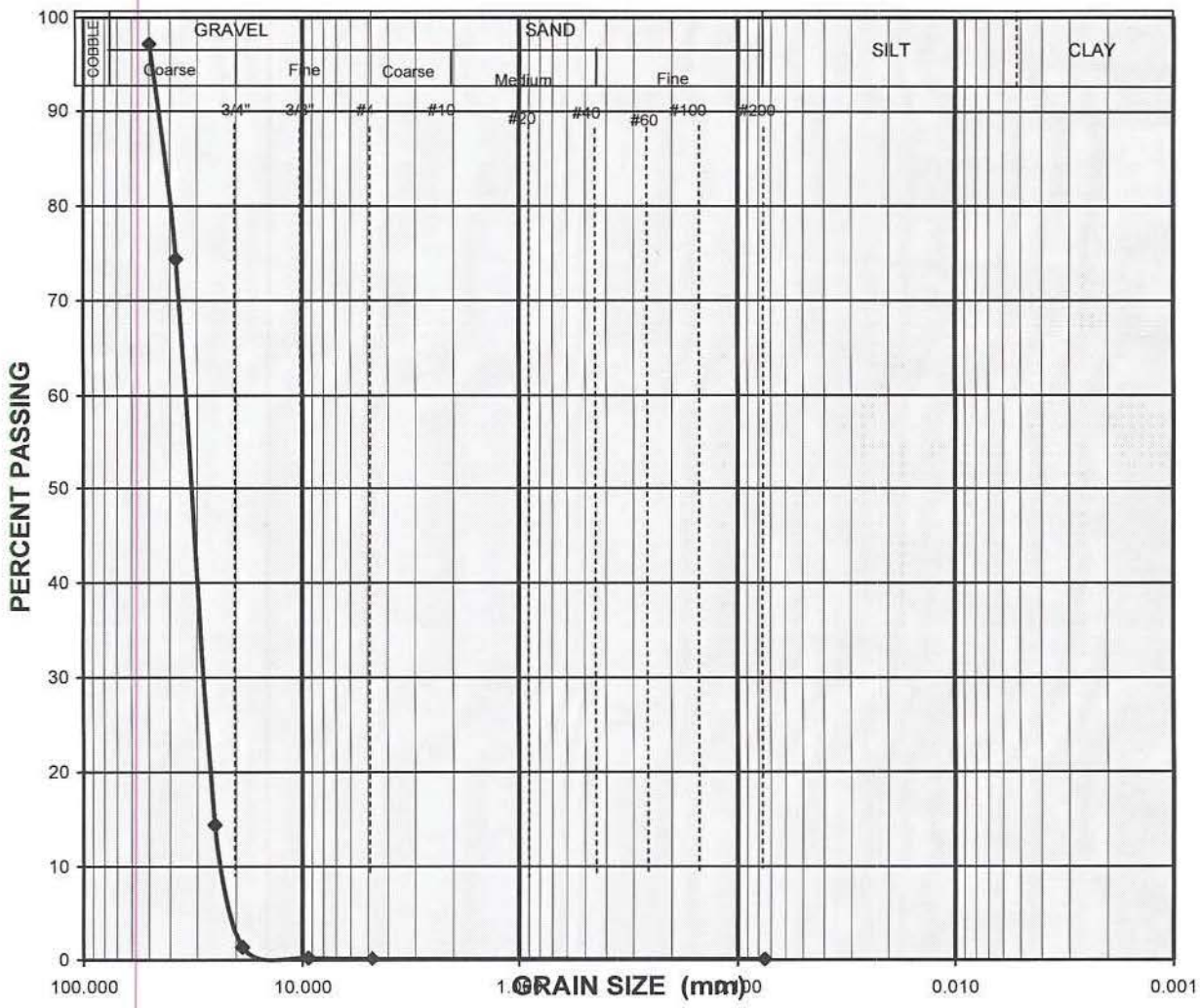
Client: Kennec
Site: Badlands Landfill
Tech: JRC

Project No. 02-3441MT-01
Date: 01/03/08

Sample CDG#1
Material 2" Gravel

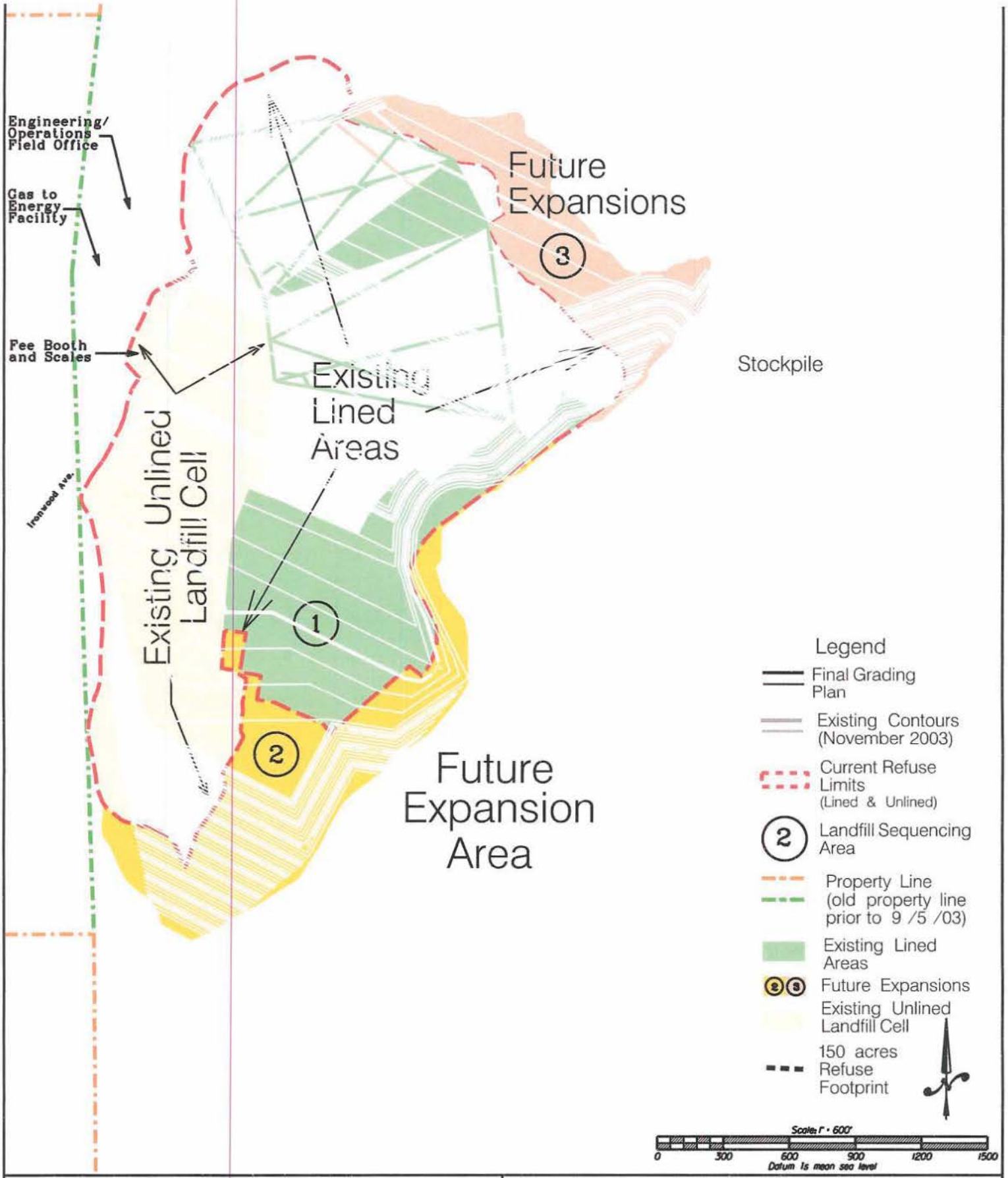
Test Specification: ASTM C136

Sieve	Mesh Opening (mm)	Percent Passing (%)
2 in	50.00	97 %
1 1/2 in	37.50	74 %
1 in	25.00	14 %
3/4 in	18.75	1 %
3/8 in	9.38	0 %
No. 4	4.75	0 %
No. 200	0.075	0



Appendix B

Reference Drawings



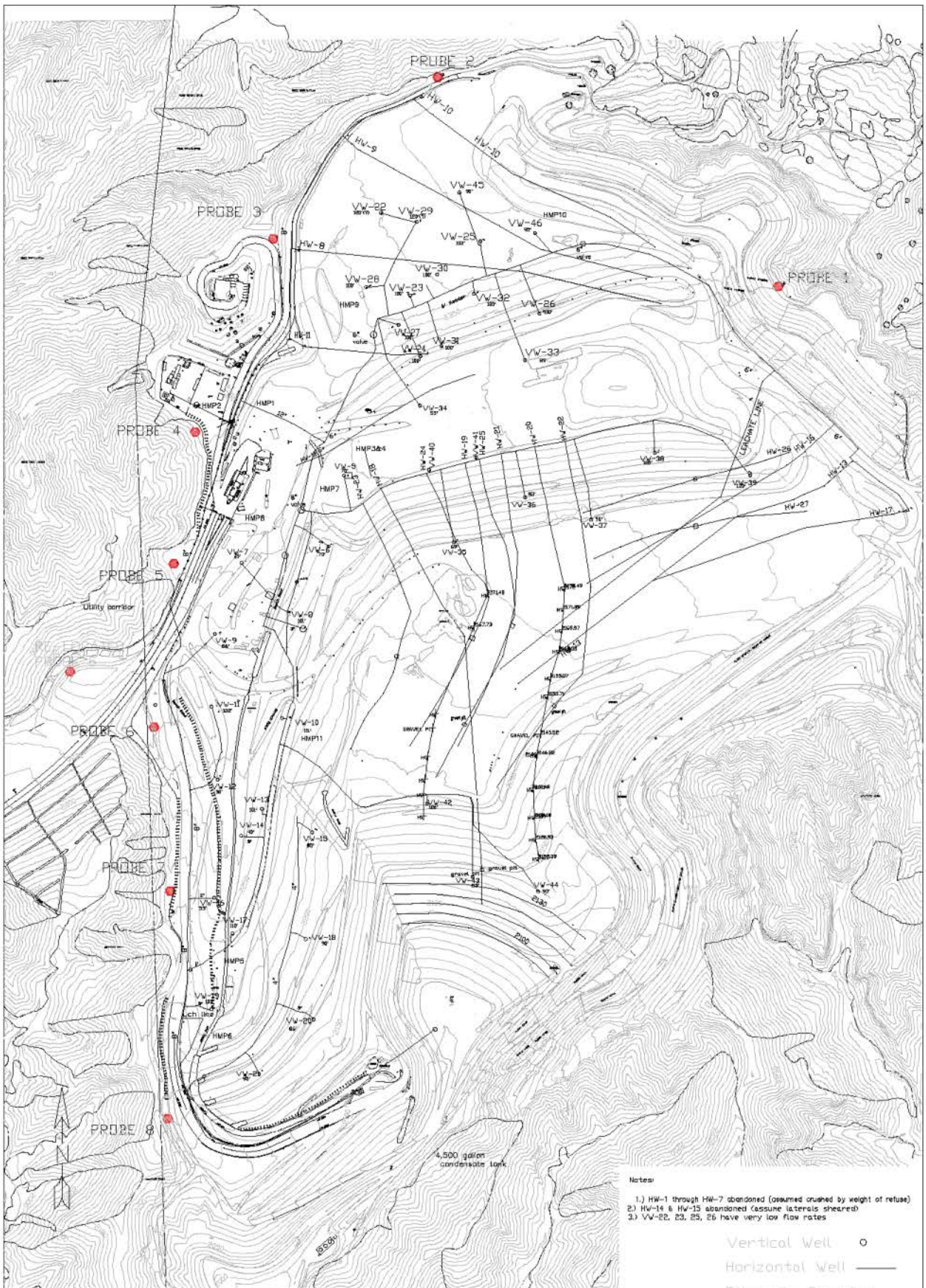
Riverside County
Waste Management Department

Badlands Sanitary Landfill

Landfill Sequencing

Figure 8

File Directory: sites/badlands/RDSI/2003-RDSI/F-08-FillSequencing.dgn		Date: October 2004	
Design by: EZ	Drawn by: MWM	Photo Date: Nov. 03	Scale: 1"=600'



Notes:

1.) HW-1 through HW-7 abandoned (assumed crushed by weight of refuse)
2.) HW-14 & HW-15 abandoned (assume laterals sheared)
3.) VW-22, 23, 25, 26 have very low flow rates

Vertical Well ○
Horizontal Well ——
Property Boundary (outside the map) ——
Footprint ——
HDPE Header ——
Probe ⬢

NO.	REVISIONS	BY	APPROVED	DATE
1	Entire gas collection system update	Mark Hunt		2/7/05
2	HW wells 21,22	Noah Rau		4/25/06
3	2007 Phase 3 Construction Update	Noah Rau		11/01/07

SCALE:	DESIGNED BY:	
NODE: wmln5	DRAWN BY:	NMR
DIRECTORY: environ/sites/badlands/	CHECKED BY:	MH
DIRECTORY: gassysm/2007	DATE:	7 September 2007
FILE: 0907_gas_ system.dwg	DATE OF PHOTOGRAPHY:	2006
	PEN TABLE: /fs_usr3/tables/nofill.pen	

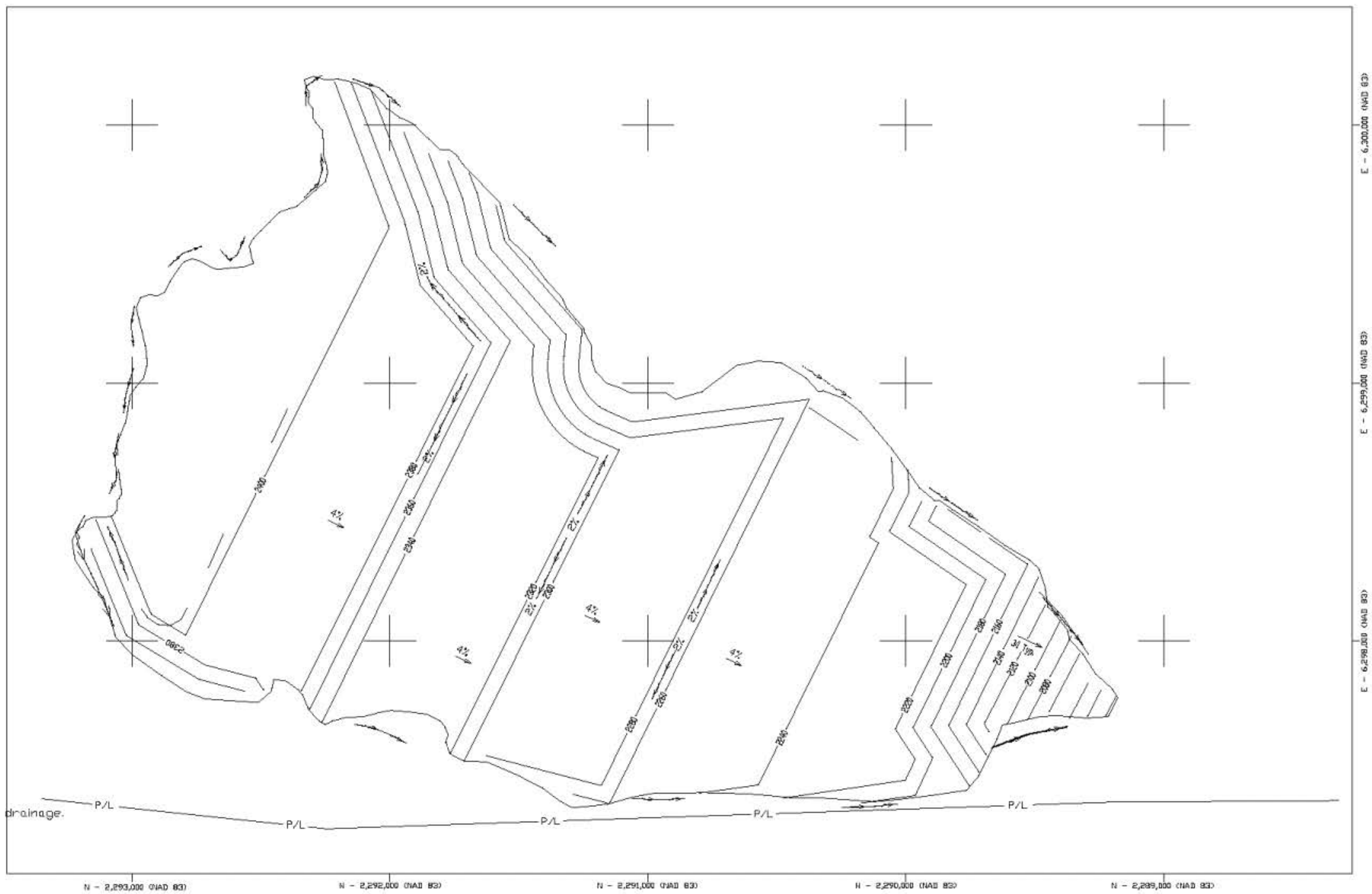
Hans W. Kemkamp, General Manager/Chief Engineer

0 150 300 450 600 750

Datum is mean sea level

Badlands Sanitary Landfill
Gas Collection System
& Probe Location Map

Figure 3



LEGEND

- Watershed Limits
- Final Fill Grade
- Limits of Fill
- Existing Topography
- Drainage Path

NOTES:

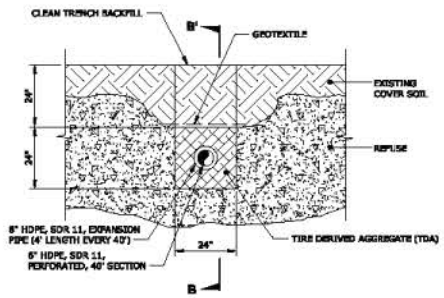
1) Finished terraces on 4% slope.
2) Faces on 3: 1 (H: V) slope.
3) 2% cross slope on benches for drainage.

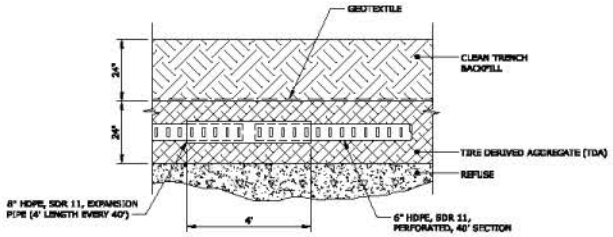
NO.	REVISIONS	BY	APPROVED	DATE		
					DESIGNED BY:	FM
					DRAWN BY:	MWM & FM
					CHECKED BY:	ICG
					DATE:	6 Sep 91
					DATE OF PHOTOGRAPHY:	Feb 95
					PEN/QUEUE:	nofillpen/v89bw

Riverside County
Waste Resources Management District
Robert A. Nelson, Chief Executive Officer
Scale: 1" = 200'
0 200 400 600 800 1000
Datum is mean sea level Contour interval is 20 feet

Badlands Sanitary Landfill
Report of Disposal Site Information
Grading Plan

SCALE:	1"=200'
NODE:	wmlfs
DIRECTORY:	/usr3/sites/badlands
DIRECTORY:	/rdsi
FILE:	ba9507rdsi.dgn
SHEET	OF





SECTION B-B'

NOTES:
A. WELL PIPE AND GRAVEL CROSS SECTION SHALL BE PLACED BELOW THE COVER SOIL AND WITHIN TRASH.
B. PERFORATION SHALL BE: ¼" WIDE X 1" LONG AT 1.5" O.C. INTERVALS; 4 ROWS OF SLOTS AT 90 DEG INTERVALS; PERPENDICULAR TO THE PIPE; AND COMPLETELY PENETRATE THE THICKNESS OF THE PIPE.

SECTION A/01

TYPICAL LANDFILL GAS HORIZONTAL WELL CROSS SECTION

GEOTEXTILE SPECIFICATIONS

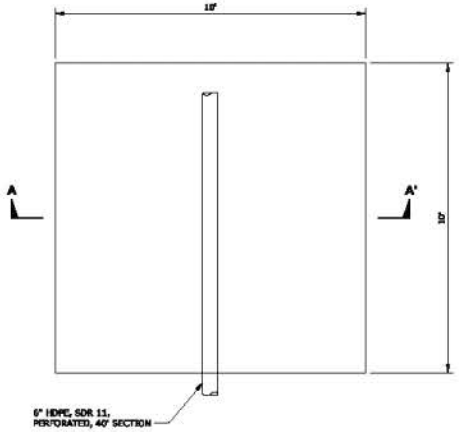
1. THE GEOTEXTILE SHALL BE OF WOVEN NEEDLE-PUNCHED, POLYESTER FABRIC, TREVIRIA SPUNBOUND TYPE TYPE 1135 OR APPROVED EQUAL.

2. THE GEOTEXTILE FIBERS SHALL BE UNIFORM IN THICKNESS AND SURFACE TEXTURE.

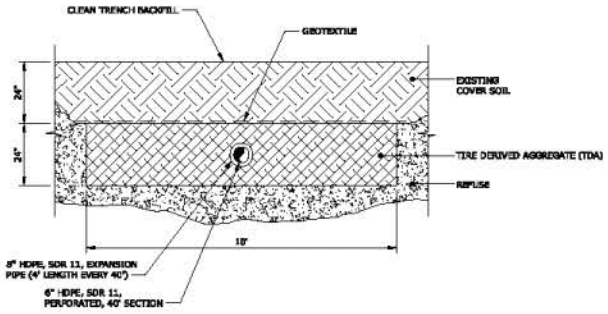
3. THE GEOTEXTILE SHALL BE FREE OF ANY CHEMICAL TREATMENT OR COATING THAT REDUCES PERMEABILITY AND SHALL BE INERT TO CHEMICALS COMMONLY FOUND IN SOILS.

4. THE GEOTEXTILE SHALL BE A MINIMUM OF 125 MILS THICK AND CONFORM TO THE MINIMUM PHYSICAL PROPERTIES LISTED BELOW:

PHYSICAL PROPERTY	TEST METHOD	RESULTS
FABRIC WEIGHT	ASTM D-3776	10 OZ/CY
GRAB TENSILE STRENGTH	ASTM D-4632	305 LB.
GRAB ELONGATION	ASTM D-4632	60 LB.
MULLEN BURST STRENTH	ASTM D-3786	510 PSI.
TRAPEZOID STRENGTH	ASTM D-4533	100 LB.



NOTES:
A. WELL PIPE AND GRAVEL CROSS SECTION SHALL BE PLACED BELOW THE COVER SOIL AND WITHIN TRASH.
B. THE LOCATION OF THE AGGREGATE PIT WILL BE STAKED IN THE FIELD BY THE COUNTY PRIOR AND AFTER CONSTRUCTION.



SECTION A-A'

SECTION B/01

TYPICAL LANDFILL GAS HORIZONTAL WELL AGGREGATE PIT AND GEOTEXTILE SPCIFICATIONS CROSS SECTION

REFERENCE NOTES:
1. DETAILS WERE TAKEN FROM HARD COPY DRAWINGS PROVIDED BY RIVERSIDE COUNTY - BADLANDS SANITARY LANDFILL 2007 PHASE 3 - GAS COLLECTION SYSTEM, TYPICAL HORIZONTAL WELL DETAILS SHEET 3 OF 9, 2 APRIL 2007.

REV	DATE	REVISION DESCRIPTION	DRAWN BY	DESIGNED BY	DESIGNED BY	APPROVED BY
-	1/28/08	DATE OF COMPLETION	JPV	JA	JMV	BMV
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

KENNEDY/JENKS
912 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL DOUTHITT 916.786.0320
PROJECT NUMBER: 0245-0214-2701.003

KENNEDY
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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD
31125 IRONWOOD ROAD
MORENO VALLEY, RIVERSIDE COUNTY, CALIFORNIA

BADLANDS LANDFILL
DETAILS

F3
DRAWING NO.

REDUCTION SCALE CHECK
SCALE = 1"

Appendix C

Reference Documentation

Vol. $CH_4 = M L_o k (e^{-kt})$

Badlands

Assume 4 years to reach maximum gas production after placement of refuse

L_o ($Ft.^3$ CH_4/Lb. refuse)	1.9
k ($year^{-1}$)	0.013
Collection efficiency	68 %
CH_4 Conc.	45 %
L_o	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)
1966	5,000	5,000	24,700,000	13,435,900
1967	5,000	10,000	24,700,000	13,290,607
1968	5,000	15,000	24,700,000	13,143,413
1969	7,500	22,500	37,050,000	19,491,439
1970	7,500	30,000	37,050,000	19,264,832
1971	7,500	37,500	37,050,000	19,035,260
1972	10,000	47,500	49,400,000	25,070,245
1973	10,000	57,500	49,400,000	24,756,085
1974	12,500	70,000	61,750,000	30,547,269
1975	12,500	82,500	61,750,000	30,144,226
1976	15,000	97,500	74,100,000	35,683,092
1977	15,000	112,500	74,100,000	35,186,700
1978	20,000	132,500	98,800,000	46,245,084
1979	20,000	152,500	98,800,000	45,565,795
1980	25,000	177,500	123,500,000	56,097,022
1981	30,000	207,500	148,200,000	66,270,653
1982	35,000	242,500	172,900,000	76,079,728
1983	40,000	282,500	197,600,000	85,517,167
1984	50,000	332,500	247,000,000	105,084,185
1985	55,000	387,500	271,700,000	113,573,018
1986	70,000	457,500	345,800,000	141,943,462
1987	75,000	532,500	370,500,000	149,255,757
1988	93,000	625,500	459,420,000	181,526,388
1989	112,498	737,998	555,740,120	215,233,081
1990	127,825	865,823	631,455,500	239,548,031
1991	98,889	964,712	488,511,660	181,395,316
1992	48,290	1,013,002	238,552,600	86,637,794
1993	71,084	1,084,086	351,154,960	124,636,578
1994	94,686	1,178,772	467,748,840	162,111,234
1995	97,513	1,276,285	481,714,220	162,873,572
1996	115,732	1,392,017	571,716,080	188,401,374
1997	211,163	1,603,180	1,043,145,220	334,691,624
1998	449,871	2,053,051	2,222,362,740	693,481,190
1999	403,106	2,456,157	1,991,343,640	603,635,788
2000	503,387	2,959,544	2,486,731,780	731,338,639
2001	500,483	3,460,027	2,472,386,020	704,492,849
2002	469,705	3,929,732	2,320,342,700	639,655,791
2003	455,549	4,385,281	2,250,412,060	599,240,008
2004	545,930	4,931,211	2,696,894,200	692,466,331
2005	876,849	5,808,060	4,331,634,060	1,070,451,143
2006	675,978	6,484,038	3,339,331,320	792,615,935
2007	675,978	7,160,016	3,339,331,320	759,575,902
2008	675,978	7,835,994	3,339,331,320	726,103,545
2009	675,978	8,511,972	3,339,331,320	692,193,207
2010	675,978	9,187,950	3,339,331,320	657,839,156
2011	675,978	9,863,928	3,339,331,320	623,035,587
2012	675,978	10,539,906	3,339,331,320	587,776,618
2013	675,978	11,215,884	3,339,331,320	552,056,289
2014	675,978	11,891,862	3,339,331,320	515,868,566
2015	675,978	12,567,840	3,339,331,320	479,207,330
2016	675,978	13,243,818	3,339,331,320	442,066,387
2017	675,978	13,919,796	3,339,331,320	404,439,460
2018	675,978	14,595,774	3,339,331,320	366,320,190
2019	675,978	15,271,752	3,339,331,320	327,702,134
2020	675,978	15,947,730	3,339,331,320	288,578,766
2021	675,978	16,623,708	3,339,331,320	248,943,473
2022	675,978	17,299,686	3,339,331,320	208,789,558
2023	675,978	17,975,664	3,339,331,320	168,110,235
2024	675,978	18,651,642	3,339,331,320	126,898,628
2025	675,978	19,327,620	3,339,331,320	85,147,772
2026	675,978	20,003,598	3,339,331,320	42,850,613

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
	316953	312859	308818	304829	300892	297006	293170	289383	285646	281956	278315	274720	271172	267669	264212	260800	257431	254106	250824	247585	244387	241230	238115	235039	232004
		316953	312859	308818	304829	300892	297006	293170	289383	285646	281956	278315	274720	271172	267669	264212	260800	257431	254106	250824	247585	244387	241230	238115	235039
			316953	312859	308818	304829	300892	297006	293170	289383	285646	281956	278315	274720	271172	267669	264212	260800	257431	254106	250824	247585	244387	241230	238115
				475429	469288	463227	457244	451339	445509	439755	434075	428469	422935	417472	412080	406758	401504	396318	391200	386147	381159	376236	371377	366580	361846
					475429	469288	463227	457244	451339	445509	439755	434075	428469	422935	417472	412080	406758	401504	396318	391200	386147	381159	376236	371377	366580
						475429	469288	463227	457244	451339	445509	439755	434075	428469	422935	417472	412080	406758	401504	396318	391200	386147	381159	376236	371377
							633905	625718	617636	609659	601785	594012	586340	578767	571292	563913	556629	549440	542344	535339	528424	521599	514862	508213	501649
								633905	625718	617636	609659	601785	594012	586340	578767	571292	563913	556629	549440	542344	535339	528424	521599	514862	508213
									792382	782147	772045	762074	752231	742515	732925	723459	714115	704891	695787	686800	677930	669173	660531	651999	643578
										792382	782147	772045	762074	752231	742515	732925	723459	714115	704891	695787	686800	677930	669173	660531	651999
											950858	938577	926454	914488	902677	891018	879510	868150	856937	845869	834944	824160	813515	803008	792637
												950858	938577	926454	914488	902677	891018	879510	868150	856937	845869	834944	824160	813515	803008
													1267811	1251436	1235273	1219318	1203569	1188024	1172680	1157534	1142583	1127826	1113259	1098880	1084687
														1267811	1251436	1235273	1219318	1203569	1188024	1172680	1157534	1142583	1127826	1113259	1098880
															1584764	1564295	1544091	1524147	1504462	1485030	1465850	1446917	1428229	1409782	1391574
																1901716	1877154	1852909	1828977	1805354	1782036	1759020	1736301	1713875	1691739
																	2218669	2190013	2161727	2133806	2106247	2079043	2052190	2025684	1999521
																		2535622	2502872	2470545	2438636	2407139	2376049	2345360	2315068
																			3169527	3128590	3088182	3048295	3008924	2970061	2931700
																				3486480	3441449	3397000	3353124	3309816	3267067
																					4437338	4380026	4323454	4267613	4212493
																						4754291	4692885	4632272	4572442
																							5895321	5819177	5744018
																								7131309	7039202
																									8102896
Vol. CH_4 (Ft^3)/Yr.	316953	629812	938630	1401936	1859258	2310673	2914734	3510993	4258027	4995413	5881751	6756641	7937184	9102479	10569677	12334876	14394230	16743938	19697202	22929276	27070462	31475115	36963907	43617795	51157330

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
LFG Flow (CFM)*	1	2	3	4	5	7	8	10	12	14	17	19	23	26	30	35	41	48	57	66	78	90	106	125	147
mmbtu/hr	23,838	47,368	70,595	105,440	139,836	173,787	219,219	264,064	320,249	375,708	442,370	508,171	596,960	684,603	794,951	927,713	1,082,598	1,259,321	1,481,437	1,724,524	2,035,984	2,367,261	2,780,076	3,280,519	3,847,571
gross power (kWh)	2	4	7	10	13	16	20	24	30	35	41	47	55	63	74	86	100	117	137	160	189	219	257	304	356

Vol. $CH_4 = M\ L_o\ k\ (e^{-kt})$

Assume 4 years to rea

L_o (Ft.^{3} CH_4/Lb. refuse)	1.9
k (year^{-1})	0.013
Collection efficiency	68 %
CH_4 Conc.	45 %
L_o	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1966	5,000	5,000	24,700,000	13,435,900	229007	226049	223130	220248	217403	214595	211823	209087	206387	203721	201090	198493	195929	193398	190901	188435	186001	183599
1967	5,000	10,000	24,700,000	13,290,607	232004	229007	226049	223130	220248	217403	214595	211823	209087	206387	203721	201090	198493	195929	193398	190901	188435	186001
1968	5,000	15,000	24,700,000	13,143,413	235039	232004	229007	226049	223130	220248	217403	214595	211823	209087	206387	203721	201090	198493	195929	193398	190901	188435
1969	7,500	22,500	37,050,000	19,491,439	357172	352559	348005	343511	339074	334694	330371	326104	321893	317735	313631	309580	305582	301635	297739	293894	290098	286351
1970	7,500	30,000	37,050,000	19,264,832	361846	357172	352559	348005	343511	339074	334694	330371	326104	321893	317735	313631	309580	305582	301635	297739	293894	290098
1971	7,500	37,500	37,050,000	19,035,260	366580	361846	357172	352559	348005	343511	339074	334694	330371	326104	321893	317735	313631	309580	305582	301635	297739	293894
1972	10,000	47,500	49,400,000	25,070,245	495169	488774	482461	476229	470079	464007	458014	452098	446259	440495	434806	429190	423647	418175	412774	407442	402180	396986
1973	10,000	57,500	49,400,000	24,756,085	501649	495169	488774	482461	476229	470079	464007	458014	452098	446259	440495	434806	429190	423647	418175	412774	407442	402180
1974	12,500	70,000	61,750,000	30,547,269	635266	627061	618962	610967	603076	595287	587598	580009	572518	565123	557824	550619	543507	536488	529558	522719	515967	509303
1975	12,500	82,500	61,750,000	30,144,226	643578	635266	627061	618962	610967	603076	595287	587598	580009	572518	565123	557824	550619	543507	536488	529558	522719	515967
1976	15,000	97,500	74,100,000	35,683,092	782399	772294	762319	752473	742754	733161	723691	714344	705118	696011	687021	678148	669389	660743	652209	643785	635470	627262
1977	15,000	112,500	74,100,000	35,186,700	792637	782399	772294	762319	752473	742754	733161	723691	714344	705118	696011	687021	678148	669389	660743	652209	643785	635470
1978	20,000	132,500	98,800,000	46,245,084	1070678	1056849	1043199	1029725	1016425	1003297	990339	977548	964922	952459	940157	928014	916028	904197	892518	880991	869612	858380
1979	20,000	152,500	98,800,000	45,565,795	1084687	1070678	1056849	1043199	1029725	1016425	1003297	990339	977548	964922	952459	940157	928014	916028	904197	892518	880991	869612
1980	25,000	177,500	123,500,000	56,097,022	1373600	1355859	1338347	1321061	1303998	1287156	1270531	1254121	1237923	1221934	1206152	1190574	1175196	1160018	1145035	1130246	1115648	1101238
1981	30,000	207,500	148,200,000	66,270,653	1669888	1648320	1627031	1606016	1585273	1564798	1544587	1524638	1504946	1485508	1466321	1447383	1428688	1410236	1392021	1374042	1356295	1338777
1982	35,000	242,500	172,900,000	76,079,728	1973695	1948203	1923040	1898203	1873686	1849485	1825598	1802019	1778744	1755770	1733093	1710708	1688613	1666803	1645275	1624025	1603049	1582344
1983	40,000	282,500	197,600,000	85,517,167	2285166	2255652	2226518	2197760	2169374	2141355	2113698	2086397	2059450	2032850	2006594	1980677	1955095	1929843	1904918	1880314	1856028	1832056
1984	50,000	332,500	247,000,000	105,084,185	2893834	2856458	2819564	2783147	2747201	2711718	2676694	2642122	2607997	2574312	2541063	2508243	2475847	2443869	2412304	2381147	2350393	2320035
1985	55,000	387,500	271,700,000	113,573,018	3224870	3183218	3142104	3101521	3061462	3021921	2982890	2944363	2906334	2868796	2831743	2795169	2759067	2723431	2688256	2653535	2619262	2585432
1986	70,000	457,500	345,800,000	141,943,462	4158085	4104380	4051368	3999041	3947390	3896406	3846081	3796405	3747371	3698971	3651196	3604037	3557488	3511540	3466185	3421417	3377226	3333606
1987	75,000	532,500	370,500,000	149,255,757	4513385	4455091	4397550	4340752	4284687	4229347	4174721	4120801	4067577	4015041	3963183	3911995	3861468	3811594	3762364	3713770	3665803	3618456
1988	93,000	625,500	459,420,000	181,526,388	5669829	5596598	5524313	5452962	5382532	5313012	5244390	5176654	5109793	5043796	4978651	4914347	4850874	4788221	4726377	4665332	4605075	4545596
1989	112,498	737,998	555,740,120	215,233,081	6948285	6858542	6769958	6682518	6596207	6511012	6426916	6343907	6261970	6181091	6101257	6022454	5944669	5867888	5792100	5717290	5643446	5570556
1990	127,825	865,823	631,455,500	239,548,031	7998240	7894936	7792966	7692313	7592960	7494891	7398088	7302535	7208216	7115116	7023218	6932507	6842968	6754585	6667344	6581229	6496227	6412323
1991	98,889	964,712	488,511,660	181,395,316	6268627	6187663	6107744	6028857	5950989	5874127	5798257	5723368	5649446	5576478	5504453	5433358	5363182	5293912	5225536	5158044	5091423	5025663
1992	48,290	1,013,002	238,552,600	86,637,794		3061129	3021592	2982566	2944043	2906018	2868485	2831436	2794865	2758767	2723135	2687964	2653246	2618977	2585151	2551762	2518803	2486271
1993	71,084	1,084,086	351,154,960	124,636,578			4506053	4447854	4390406	4333700	4277727	4222476	4167939	4114107	4060969	4008518	3956745	3905640	3855195	3805402	3756252	3707737
1994	94,686	1,178,772	467,748,840	162,111,234				6002197	5924673	5848151	5772617	5698059	5624463	5551819	5480112	5409332	5339466	5270502	5202429	5135235	5068909	5003439
1995	97,513	1,276,285	481,714,220	162,873,572					6181402	6101564	6022757	5944968	5868183	5792391	5717577	5643730	5570836	5498884	5427861	5357755	5288555	5220249
1996	115,732	1,392,017	571,716,080	188,401,374						7336314	7241559	7148028	7055706	6964575	6874621	6785830	6698185	6611672	6526277	6441984	6358780	6276651
1997	211,163	1,603,180	1,043,145,220	334,691,624							13385737	13212849	13042194	12873742	12707467	12543339	12381331	12221415	12063565	11907754	11753955	11602142
1998	449,871	2,053,051	2,222,362,740	693,481,190								28517567	28149238	27785666	27426790	27072550	26722884	26377735	26037044	25700753	25368805	25041145
1999	403,106	2,456,157	1,991,343,640	603,635,788									25553108	25223068	24897290	24575720	24258303	23944986	23635716	23330440	23029108	22731667
2000	503,387	2,959,544	2,486,731,780	731,338,639										31909975	31497830	31091009	30689441	30293061	29901800	29515592	29134373	28758077
2001	500,483	3,460,027	2,472,386,020	704,492,849											31725889	31316122	30911647	30512396	30118302	29729299	29345319	28966299
2002	469,705	3,929,732	2,320,342,700	639,655,791												29774855	29390287	29010686	28635988	28266129	27901048	27540682
2003	455,549	4,385,281	2,250,412,060	599,240,008													28877499	28504521	28136360	27772955	27414243	27060164
2004	545,930	4,931,211	2,696,894,200	692,466,331														34606799	34159822	33718619	33283114	32853233
2005	876,849	5,808,060	4,331,634,060	1,070,451,143															55583934	54866020	54157378	53457888
2006	675,978	6,484,038	3,339,331,320	792,615,935																42850613	42297160	41750855
2007	675,978	7,160,016	3,339,331,320	759,575,902																	42850613	42297160
2008	675,978	7,835,994	3,339,331,320	726,103,545																		42850613
2009	675,978	8,511,972	3,339,331,320	692,193,207																		
2010	675,978	9,187,950	3,339,331,320	657,839,156																		
2011	675,978	9,863,928	3,339,331,320	623,035,587																		
2012	675,978	10,539,906	3,339,331,320	587,776,618																		
2013	675,978	11,215,884	3,339,331,320	552,056,289																		
2014	675,978	11,891,862	3,339,331,320	515,868,566																		
2015	675,978	12,567,840	3,339,331,320	479,207,330																		
2016	675,978	13,243,818	3,339,331,320	442,066,387																		
2017	675,978	13,919,796	3,339,331,320	404,439,460																		
2018	675,978	14,595,774	3,339,331,320	366,320,190																		
2019	675,978	15,271,752	3,339,331,320	327,702,134																		
2020	675,978	15,947,730	3,339,331,320	288,578,766																		
2021	675,978	16,623,708	3,339,331,320	248,943,473																		
2022	675,978	17,299,686	3,339,331,320	208,789,558																		
2023	675,978	17,975,664	3,339,331,320	168,110,235																		
2024	675,978	18,651,642	3,339,331,320	126,898,628																		
2025	675,978	19,327,620	3,339,331,320	85,147,772																		
2026	675,978	20,003,598	3,339,331,320	42,850,613																		
				Vol. CH4 (Ft^3)/Yr.	56765216	59093174	62835988	68026603	73329383	79718585	92074688	119403031	143413945	173471606	202956959	230110449	256015872	287316005	339189005	377658698	415631522	453113894

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
LFG Flow (CFM)*	163	170	181	196	211	229	265	343	412	499	584	662	736	826	975	1,086	1,195	1,303
mmbtu/hr	4,269,343	4,444,430	4,725,929	5,116,318	5,515,143	5,995,679	6,924,988	8,980,368	10,786,242	13,046,895	15,264,505	17,306,734	19,255,095	21,609,196	25,510,593	28,403,920	31,259,877	34,078,947
gross power (kWh)	395	412	438	474	511	555	641	832	999	1208	1413	1602	1783	2001	2362	2630	2894	3155

$$\text{Vol. } CH_4 = M\, L_o\, k\, (e^{-kt})$$

Assume 4 years to rea

L_o (Ft.^{3} CH_4/Lb. refuse)	1.9
k (year^{-1})	0.013
Collection efficiency	68 %
CH_4 Conc.	45 %
L_o	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1966	5,000	5,000	24,700,000	13,435,900	181227	178887	176576	174296	172044	169822	167629	165464	163327	161217	159135	157080	155051	153048	151071	149120	147194	145293
1967	5,000	10,000	24,700,000	13,290,607	183599	181227	178887	176576	174296	172044	169822	167629	165464	163327	161217	159135	157080	155051	153048	151071	149120	147194
1968	5,000	15,000	24,700,000	13,143,413	186001	183599	181227	178887	176576	174296	172044	169822	167629	165464	163327	161217	159135	157080	155051	153048	151071	149120
1969	7,500	22,500	37,050,000	19,491,439	282652	279002	275398	271841	268330	264864	261443	258067	254733	251443	248196	244990	241826	238702	235619	232576	229572	226607
1970	7,500	30,000	37,050,000	19,264,832	286351	282652	279002	275398	271841	268330	264864	261443	258067	254733	251443	248196	244990	241826	238702	235619	232576	229572
1971	7,500	37,500	37,050,000	19,035,260	290098	286351	282652	279002	275398	271841	268330	264864	261443	258067	254733	251443	248196	244990	241826	238702	235619	232576
1972	10,000	47,500	49,400,000	25,070,245	391858	386797	381801	376870	372002	367197	362455	357773	353152	348591	344089	339645	335258	330928	326653	322434	318270	314159
1973	10,000	57,500	49,400,000	24,756,085	396986	391858	386797	381801	376870	372002	367197	362455	357773	353152	348591	344089	339645	335258	330928	326653	322434	318270
1974	12,500	70,000	61,750,000	30,547,269	502725	496232	489823	483496	477251	471087	465003	458997	453069	447217	441441	435739	430111	424556	419072	413660	408317	403043
1975	12,500	82,500	61,750,000	30,144,226	509303	502725	496232	489823	483496	477251	471087	465003	458997	453069	447217	441441	435739	430111	424556	419072	413660	408317
1976	15,000	97,500	74,100,000	35,683,092	619161	611164	603270	595478	587787	580195	572702	565305	558003	550796	543682	536660	529729	522887	516133	509467	502887	496391
1977	15,000	112,500	74,100,000	35,186,700	627262	619161	611164	603270	595478	587787	580195	572702	565305	558003	550796	543682	536660	529729	522887	516133	509467	502887
1978	20,000	132,500	98,800,000	46,245,084	847293	836350	825548	814885	804360	793971	783716	773594	763602	753740	744004	734395	724910	715547	706305	697182	688178	679289
1979	20,000	152,500	98,800,000	45,565,795	858380	847293	836350	825548	814885	804360	793971	783716	773594	763602	753740	744004	734395	724910	715547	706305	697182	688178
1980	25,000	177,500	123,500,000	56,097,022	1087015	1072975	1059117	1045437	1031935	1018606	1005450	992464	979645	966992	954503	942175	930006	917994	906137	894433	882881	871478
1981	30,000	207,500	148,200,000	66,270,653	1321486	1304418	1287570	1270940	1254525	1238321	1222327	1206540	1190957	1175574	1160391	1145403	1130609	1116007	1101592	1087364	1073320	1059457
1982	35,000	242,500	172,900,000	76,079,728	1561907	1541734	1521821	1502165	1482763	1463612	1444708	1426049	1407630	1389449	1371503	1353789	1336304	1319044	1302008	1285191	1268592	1252207
1983	40,000	282,500	197,600,000	85,517,167	1808393	1785037	1761981	1739224	1716760	1694587	1672700	1651095	1629770	1608720	1587942	1567432	1547188	1527204	1507479	1488009	1468790	1449819
1984	50,000	332,500	247,000,000	105,084,185	2290070	2260492	2231296	2202477	2174030	2145950	2118233	2090875	2063869	2037212	2010900	1984928	1959290	1933985	1909005	1884349	1860011	1835987
1985	55,000	387,500	271,700,000	113,573,018	2552039	2519077	2486541	2454425	2422724	2391433	2360545	2330057	2299962	2270256	2240934	2211990	2183420	2155220	2127383	2099906	2072784	2046012
1986	70,000	457,500	345,800,000	141,943,462	3290550	3248049	3206098	3164689	3123814	3083467	3043641	3004330	2965527	2927224	2889417	2852097	2815260	2778899	2743007	2707578	2672608	2638089
1987	75,000	532,500	370,500,000	149,255,757	3571721	3525589	3480053	3435105	3390738	3346943	3303715	3261044	3218925	3177350	3136312	3095804	3055819	3016350	2977391	2938936	2900977	2863508
1988	93,000	625,500	459,420,000	181,526,388	4486886	4428934	4371730	4315266	4259530	4204515	4150210	4096606	4043695	3991467	3939914	3889027	3838796	3789215	3740274	3691965	3644280	3597211
1989	112,498	737,998	555,740,120	215,233,081	5498607	5427588	5357486	5288290	5219987	5152566	5086016	5020326	4955484	4891480	4828302	4765940	4704384	4643623	4583646	4524445	4466008	4408325
1990	127,825	865,823	631,455,500	239,548,031	6329502	6247751	6167056	6087403	6008779	5931170	5854564	5778947	5704307	5630631	5557907	5486122	5415264	5345321	5276281	5208134	5140866	5074467
1991	98,889	964,712	488,511,660	181,395,316	4960752	4896680	4833435	4771007	4709385	4648560	4588519	4529255	4470756	4413012	4356014	4299752	4244217	4189400	4135290	4081879	4029158	3977118
1992	48,290	1,013,002	238,552,600	86,637,794	2454158	2422461	2391173	2360289	2329803	2299712	2270009	2240690	2211750	2183183	2154985	2127152	2099678	2072559	2045790	2019367	1993285	1967540
1993	71,084	1,084,086	351,154,960	124,636,578	3659848	3612578	3565919	3519862	3474400	3429525	3385229	3341506	3298348	3255747	3213696	3172188	3131217	3090774	3050854	3011450	2972555	2934161
1994	94,686	1,178,772	467,748,840	162,111,234	4938816	4875027	4812061	4749909	4688560	4628003	4568229	4509226	4450986	4393497	4336751	4280739	4225449	4170874	4117003	4063829	4011341	3959531
1995	97,513	1,276,285	481,714,220	162,873,572	5152825	5086272	5020578	4955733	4891726	4828545	4766180	4704621	4643856	4583877	4524672	4466232	4408547	4351607	4295402	4239923	4185161	4131106
1996	115,732	1,392,017	571,716,080	188,401,374	6195583	6115561	6036574	5958606	5881646	5805679	5730694	5656677	5583616	5511499	5440313	5370047	5300688	5232225	5164646	5097940	5032096	4967102
1997	211,163	1,603,180	1,043,145,220	334,691,624	11452291	11304374	11158369	11014249	10871990	10731569	10592961	10456144	10321094	10187788	10056204	9926319	9798112	9671561	9546645	9423342	9301631	9181492
1998	449,871	2,053,051	2,222,362,740	693,481,190	24717717	24398467	24083339	23772282	23465243	23162169	22863009	22567714	22276232	21988515	21704515	21424182	21147470	20874332	20604722	20338594	20075904	19816606
1999	403,106	2,456,157	1,991,343,640	603,635,788	22438068	22148261	21862197	21579827	21301105	21025983	20754414	20486353	20221754	19960573	19702765	19448286	19197095	18949148	18704403	18462820	18224356	17988973
2000	503,387	2,959,544	2,486,731,780	731,338,639	28386642	28020004	27658101	27300873	26948258	26600198	26256634	25917507	25582760	25252336	24926180	24604237	24286452	23972772	23663142	23357513	23055830	22758044
2001	500,483	3,460,027	2,472,386,020	704,492,849	28592174	28222881	27858358	27498544	27143376	26792796	26446744	26105161	25767990	25435175	25106657	24782383	24462297	24146345	23834475	23526632	23222765	22922823
2002	469,705	3,929,732	2,320,342,700	639,655,791	27184970	26833853	26487270	26145164	25807477	25474151	25145130	24820359	24499783	24183347	23870998	23562683	23258351	22957949	22661427	22368736	22079824	21794644
2003	455,549	4,385,281	2,250,412,060	599,240,008	26710659	26365568	26025132	25688995	25357200	25029689	24706409	24387305	24072321	23761407	23454508	23151572	22852550	22557389	22266041	21978456	21694585	21414381
2004	545,930	4,931,211	2,696,894,200	692,466,331	32428906	32010058	31596621	31188523	30785696	30388072	29995584	29608165	29225750	28848274	28475674	28107886	27744848	27386499	27032779	26683627	26338985	25998795
2005	876,849	5,808,060	4,331,634,060	1,070,451,143	52767433	52085896	51413162	50749117	50093648	49446645	48807999	48177601	47555346	46941127	46334842	45736388	45145663	44562567	43987003	43418873	42858081	42304532
2006	675,978	6,484,038	3,339,331,320	792,615,935	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569	34354051	33910339	33472357	33040033
2007	675,978	7,160,016	3,339,331,320	759,575,902	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569	34354051	33910339	33472357
2008	675,978	7,835,994	3,339,331,320	726,103,545	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569	34354051	33910339
2009	675,978	8,511,972	3,339,331,320	692,193,207	42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569	34354051
2010	675,978	9,187,950	3,339,331,320	657,839,156		42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569
2011	675,978	9,863,928	3,339,331,320	623,035,587			42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969
2012	675,978	10,539,906	3,339,331,320	587,776,618				42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328
2013	675,978	11,215,884	3,339,331,320	552,056,289					42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724
2014	675,978	11,891,862	3,339,331,320	515,868,566						42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235
2015	675,978	12,567,840	3,339,331,320	479,207,330							42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943
2016	675,978	13,243,818	3,339,331,320	442,066,387								42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927
2017	675,978	13,919,796	3,339,331,320	404,439,460									42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270
2018	675,978	14,595,774	3,339,331,320	366,320,190										42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056
2019	675,978	15,271,752	3,339,331,320	327,702,134											42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368
2020	675,978	15,947,730	3,339,331,320	288,578,766												42850613	42297160	41750855	41211607	40679323	40153915	39635292
2021	675,978	16,623,708	3,339,331,320	248,943,473													42850613	42297160	41750855	41211607	40679323	40153915
2022	675,978	17,299,686	3,339,331,320	208,789,558														42850613	42297160	41750855	41211607	40679323
2023	675,978	17,975,664	3,339,331,320	168,110,235															42850613	42297160	41750855	41211607
2024	675,978	18,651,642	3,339,331,320	126,898,628																42850613	42297160	41750855
2025	675,978	19,327,620	3,339,331,320	85,147,772																	42850613	42297160
2026	675,978	20,003,598	3,339,331,320	42,850,613																		42850613
					Vol. CH4 (Ft^3)/Yr.	490112149	526632539	562681237	598264334	633387846	668057706	702279776	736059837	769403601	802316700	834804699	866873086	898527283	929772639	960614433	991057880	1021108123	1050770240

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
LFG Flow (CFM)*	1,409	1,514	1,618	1,720	1,821	1,921	2,019	2,116	2,212	2,307	2,400	2,492	2,583	2,673	2,762	2,849	2,936	3,021
mmbtu/hr	36,861,606	39,608,324	42,319,567	44,995,791	47,637,450	50,244,990	52,818,850	55,359,467	57,867,270	60,342,683	62,786,123	65,198,004	67,578,734	69,928,714	72,248,343	74,538,011	76,798,107	79,029,011
gross power (kWh)	3413	3667	3918	4166	4411	4652	4891	5126	5358	5587	5814	6037	6257	6475	6690	6902	7111	7318

$$\text{Vol. } CH_4 = M\ L_o\ k\ (e^{-kt})$$

Assume 4 years to rea

L_o (Ft.^{3} CH_4/Lb. refuse)	1.9
k (year^{-1})	0.013
Collection efficiency	68 %
CH_4 Conc.	45 %
L_0	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)	
1966	5,000	5,000	24,700,000	13,435,900	
1967	5,000	10,000	24,700,000	13,290,607	
1968	5,000	15,000	24,700,000	13,143,413	
1969	7,500	22,500	37,050,000	19,491,439	
1970	7,500	30,000	37,050,000	19,264,832	
1971	7,500	37,500	37,050,000	19,035,260	
1972	10,000	47,500	49,400,000	25,070,245	
1973	10,000	57,500	49,400,000	24,756,085	
1974	12,500	70,000	61,750,000	30,547,269	
1975	12,500	82,500	61,750,000	30,144,226	
1976	15,000	97,500	74,100,000	35,683,092	
1977	15,000	112,500	74,100,000	35,186,700	
1978	20,000	132,500	98,800,000	46,245,084	
1979	20,000	152,500	98,800,000	45,565,795	
1980	25,000	177,500	123,500,000	56,097,022	
1981	30,000	207,500	148,200,000	66,270,653	
1982	35,000	242,500	172,900,000	76,079,728	
1983	40,000	282,500	197,600,000	85,517,167	
1984	50,000	332,500	247,000,000	105,084,185	
1985	55,000	387,500	271,700,000	113,573,018	
1986	70,000	457,500	345,800,000	141,943,462	
1987	75,000	532,500	370,500,000	149,255,757	
1988	93,000	625,500	459,420,000	181,526,388	
1989	112,498	737,998	555,740,120	215,233,081	
1990	127,825	865,823	631,455,500	239,548,031	
1991	98,889	964,712	488,511,660	181,395,316	
1992	48,290	1,013,002	238,552,600	86,637,794	
1993	71,084	1,084,086	351,154,960	124,636,578	
1994	94,686	1,178,772	467,748,840	162,111,234	
1995	97,513	1,276,285	481,714,220	162,873,572	
1996	115,732	1,392,017	571,716,080	188,401,374	
1997	211,163	1,603,180	1,043,145,220	334,691,624	
1998	449,871	2,053,051	2,222,362,740	693,481,190	
1999	403,106	2,456,157	1,991,343,640	603,635,788	
2000	503,387	2,959,544	2,486,731,780	731,338,639	
2001	500,483	3,460,027	2,472,386,020	704,492,849	
2002	469,705	3,929,732	2,320,342,700	639,655,791	
2003	455,549	4,385,281	2,250,412,060	599,240,008	
2004	545,930	4,931,211	2,696,894,200	692,466,331	
2005	876,849	5,808,060	4,331,634,060	1,070,451,143	
2006	675,978	6,484,038	3,339,331,320	792,615,935	
2007	675,978	7,160,016	3,339,331,320	759,575,902	
2008	675,978	7,835,994	3,339,331,320	726,103,545	
2009	675,978	8,511,972	3,339,331,320	692,193,207	
2010	675,978	9,187,950	3,339,331,320	657,839,156	
2011	675,978	9,863,928	3,339,331,320	623,035,587	
2012	675,978	10,539,906	3,339,331,320	587,776,618	
2013	675,978	11,215,884	3,339,331,320	552,056,289	
2014	675,978	11,891,862	3,339,331,320	515,868,566	
2015	675,978	12,567,840	3,339,331,320	479,207,330	
2016	675,978	13,243,818	3,339,331,320	442,066,387	
2017	675,978	13,919,796	3,339,331,320	404,439,460	
2018	675,978	14,595,774	3,339,331,320	366,320,190	
2019	675,978	15,271,752	3,339,331,320	327,702,134	
2020	675,978	15,947,730	3,339,331,320	288,578,766	
2021	675,978	16,623,708	3,339,331,320	248,943,473	
2022	675,978	17,299,686	3,339,331,320	208,789,558	
2023	675,978	17,975,664	3,339,331,320	168,110,235	
2024	675,978	18,651,642	3,339,331,320	126,898,628	
2025	675,978	19,327,620	3,339,331,320	85,147,772	
2026	675,978	20,003,598	3,339,331,320	42,850,613	
					Vol. CH4 (Ft^3)/Yr.

LFG Flow (CFM)*

mmbtu/hr

gross power (kWh)

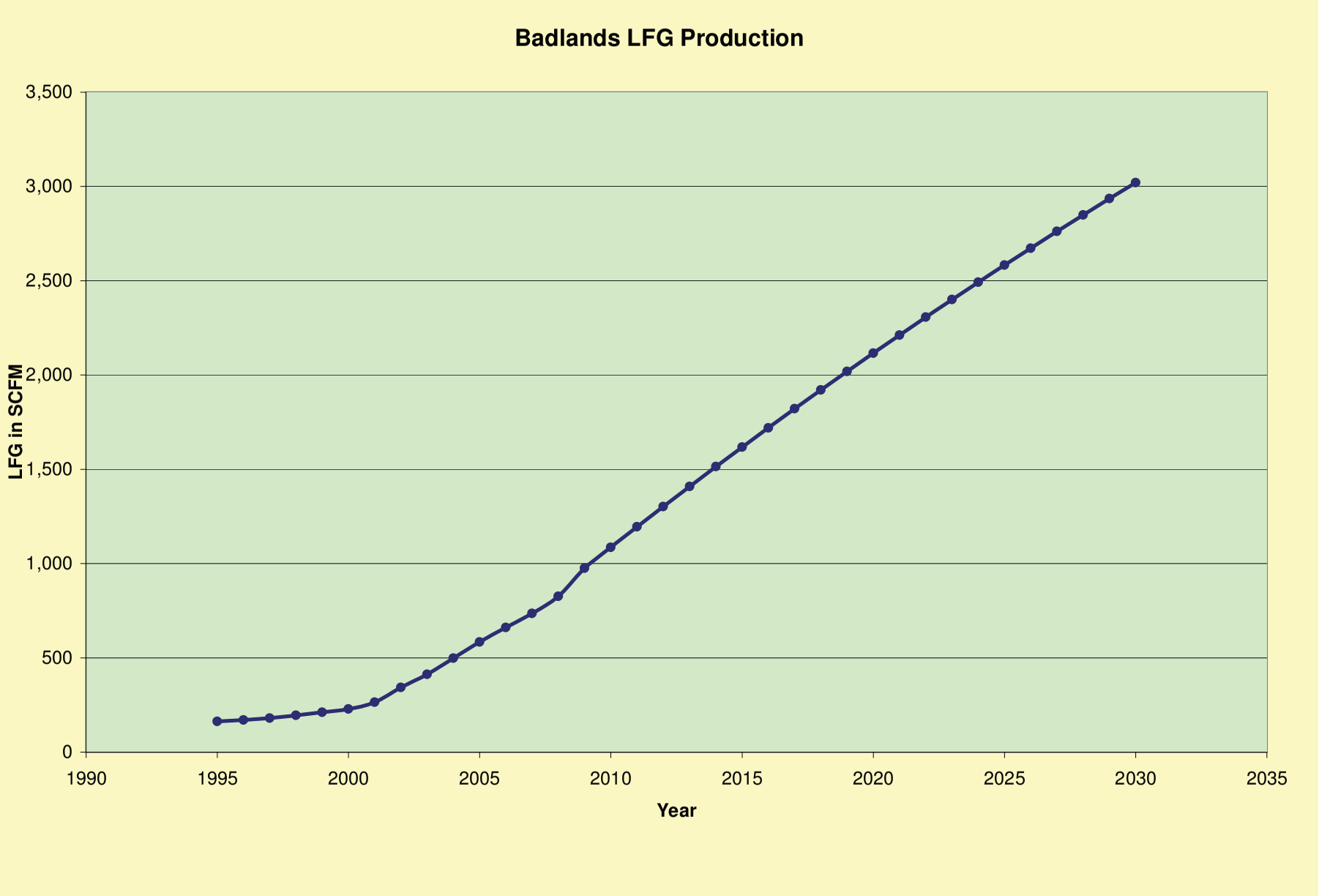
Vol. $CH_4 = M\ L_o\ k\ (e^{-kt})$

Assume 4 years to rea

L_o (Ft.^{3} CH_4/Lb. refuse)	1.9
k (year^{-1})	0.013
Collection efficiency	68 %
CH_4 Conc.	45 %
L_0	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)	
1966	5,000	5,000	24,700,000	13,435,900	
1967	5,000	10,000	24,700,000	13,290,607	
1968	5,000	15,000	24,700,000	13,143,413	
1969	7,500	22,500	37,050,000	19,491,439	
1970	7,500	30,000	37,050,000	19,264,832	
1971	7,500	37,500	37,050,000	19,035,260	
1972	10,000	47,500	49,400,000	25,070,245	
1973	10,000	57,500	49,400,000	24,756,085	
1974	12,500	70,000	61,750,000	30,547,269	
1975	12,500	82,500	61,750,000	30,144,226	
1976	15,000	97,500	74,100,000	35,683,092	
1977	15,000	112,500	74,100,000	35,186,700	
1978	20,000	132,500	98,800,000	46,245,084	
1979	20,000	152,500	98,800,000	45,565,795	
1980	25,000	177,500	123,500,000	56,097,022	
1981	30,000	207,500	148,200,000	66,270,653	
1982	35,000	242,500	172,900,000	76,079,728	
1983	40,000	282,500	197,600,000	85,517,167	
1984	50,000	332,500	247,000,000	105,084,185	
1985	55,000	387,500	271,700,000	113,573,018	
1986	70,000	457,500	345,800,000	141,943,462	
1987	75,000	532,500	370,500,000	149,255,757	
1988	93,000	625,500	459,420,000	181,526,388	
1989	112,498	737,998	555,740,120	215,233,081	
1990	127,825	865,823	631,455,500	239,548,031	
1991	98,889	964,712	488,511,660	181,395,316	
1992	48,290	1,013,002	238,552,600	86,637,794	
1993	71,084	1,084,086	351,154,960	124,636,578	
1994	94,686	1,178,772	467,748,840	162,111,234	
1995	97,513	1,276,285	481,714,220	162,873,572	
1996	115,732	1,392,017	571,716,080	188,401,374	
1997	211,163	1,603,180	1,043,145,220	334,691,624	
1998	449,871	2,053,051	2,222,362,740	693,481,190	
1999	403,106	2,456,157	1,991,343,640	603,635,788	
2000	503,387	2,959,544	2,486,731,780	731,338,639	
2001	500,483	3,460,027	2,472,386,020	704,492,849	
2002	469,705	3,929,732	2,320,342,700	639,655,791	
2003	455,549	4,385,281	2,250,412,060	599,240,008	
2004	545,930	4,931,211	2,696,894,200	692,466,331	
2005	876,849	5,808,060	4,331,634,060	1,070,451,143	
2006	675,978	6,484,038	3,339,331,320	792,615,935	
2007	675,978	7,160,016	3,339,331,320	759,575,902	
2008	675,978	7,835,994	3,339,331,320	726,103,545	
2009	675,978	8,511,972	3,339,331,320	692,193,207	
2010	675,978	9,187,950	3,339,331,320	657,839,156	
2011	675,978	9,863,928	3,339,331,320	623,035,587	
2012	675,978	10,539,906	3,339,331,320	587,776,618	
2013	675,978	11,215,884	3,339,331,320	552,056,289	
2014	675,978	11,891,862	3,339,331,320	515,868,566	
2015	675,978	12,567,840	3,339,331,320	479,207,330	
2016	675,978	13,243,818	3,339,331,320	442,066,387	
2017	675,978	13,919,796	3,339,331,320	404,439,460	
2018	675,978	14,595,774	3,339,331,320	366,320,190	
2019	675,978	15,271,752	3,339,331,320	327,702,134	
2020	675,978	15,947,730	3,339,331,320	288,578,766	
2021	675,978	16,623,708	3,339,331,320	248,943,473	
2022	675,978	17,299,686	3,339,331,320	208,789,558	
2023	675,978	17,975,664	3,339,331,320	168,110,235	
2024	675,978	18,651,642	3,339,331,320	126,898,628	
2025	675,978	19,327,620	3,339,331,320	85,147,772	
2026	675,978	20,003,598	3,339,331,320	42,850,613	
					Vol. CH4 (Ft^3)/Yr.

LFG Flow (CFM)*
mmbtu/hr
gross power (kWh)


Badlands LFG Production
LFG in SCFM
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
Year

Yearly Landfilled Tons Summary

Location selected: **(Badlands)**

Daterange selected: 01/01/1966 - 10/24/2007

Badlands

	Days	IN County	Min	Max	Avg	OUT of County	Min	Max	Avg	Total Landfilled	Min	Max	Avg
1989	76	**32,448.69**	87.87	674.65	426.96	**0.00**	0.00	0.00	0.00	**32,448.69**	87.87	674.65	426.96
1990	307	**127,824.96**	38.32	870.81	416.37	**0.00**	0.00	0.00	0.00	**127,824.96**	38.32	870.81	416.37
1991	307	**98,889.44**	49.73	622.37	322.12	**0.00**	0.00	0.00	0.00	**98,889.44**	49.73	622.37	322.12
1992	308	**48,289.53**	34.02	351.16	156.78	**0.00**	0.00	0.00	0.00	**48,289.53**	34.02	351.16	156.78
1993	307	**71,084.25**	28.32	733.14	231.54	**0.00**	0.00	0.00	0.00	**71,084.25**	28.32	733.14	231.54
1994	308	**94,655.54**	39.43	487.12	307.32	**0.00**	0.00	0.00	0.00	**94,655.54**	39.43	487.12	307.32
1995	307	**97,513.29**	19.48	953.91	317.63	**0.00**	0.00	0.00	0.00	**97,513.29**	19.48	953.91	317.63
1996	308	**115,731.91**	38.91	887.42	375.75	**0.00**	0.00	0.00	0.00	**115,731.91**	38.91	887.42	375.75
1997	308	**211,162.87**	16.79	1,672.32	685.59	**0.00**	0.00	0.00	0.00	**211,162.87**	16.79	1,672.32	685.59
1998	308	**449,871.15**	16.05	2,838.34	1,460.62	**0.00**	0.00	0.00	0.00	**449,871.15**	16.05	2,838.34	1,460.62
1999	308	**403,105.95**	375.46	3,252.45	1,308.79	**0.00**	0.00	0.00	0.00	**403,105.95**	375.46	3,252.45	1,308.79
2000	307	**503,387.14**	66.13	2,525.24	1,639.70	**0.00**	0.00	0.00	0.00	**503,387.14**	66.13	2,525.24	1,639.70
2001	307	**500,482.51**	66.24	2,508.79	1,630.24	**0.00**	0.00	0.00	0.00	**500,482.51**	66.24	2,508.79	1,630.24
2002	309	**469,705.38**	-6.86	2,191.79	1,520.08	**0.00**	0.00	0.00	0.00	**469,705.38**	-6.86	2,191.79	1,520.08
2003	309	**455,549.43**	-21.58	2,236.71	1,474.27	**3.62**	0.00	2.20	0.01	**455,553.05**	-21.58	2,236.71	1,474.28
2004	311	**545,930.02**	0.00	2,988.21	1,755.40	**36.24**	0.00	2.10	0.12	**545,966.26**	0.00	2,989.70	1,755.52
2005	309	**876,849.16**	0.00	4,001.96	2,837.70	**419.10**	0.00	24.49	1.36	**877,268.26**	0.00	4,004.25	2,839.06
2006	308	**675,978.40**	-0.23	4,007.83	2,194.74	**125.94**	0.00	21.66	0.41	**676,104.34**	0.00	4,007.97	2,195.14
2007	230	**466,385.74**	354.33	2,954.07	2,027.76	**62.46**	0.00	17.94	0.27	**466,448.20**	354.38	2,956.59	2,028.04

Total for Badlands

	5,542	**6,244,845.36**	-21.58	4,007.83	1,126.82	**647.36**	0.00	24.49	0.12	**6,245,492.72**	-21.58	4,007.97	1,126.94

Daterange found: 10/02/1989 - 09/29/2007

*** NOTE: The IN and OUT-of-County totals, for the date range selected, are NOT FINALIZED, and may change later.
The Total-Landfilled values are final.

Yearly Landfilled Tons Summary

Location selected: **(Badlands)**

Daterange selected: 01/01/1966 - 10/24/2007

	Days	IN County	Min	Max	Avg	OUT of County	Min	Max	Avg	Total Landfilled	Min	Max	Avg
Report Total:	5,542	**6,244,845.36**	-21.58	4,007.83	1,126.82	**647.36**	0.00	24.49	0.12	**6,245,492.72**	-21.58	4,007.97	1,126.94

Location found: **(Badlands)**

Daterange found: 10/02/1989 - 09/29/2007

*** NOTE: The IN and OUT-of-County totals, for the date range selected, are NOT FINALIZED, and may change later.
The Total-Landfilled values are final.

MATERIAL SPECIFICATIONS FOR USE OF TIRE DERIVED AGGREGATE (TDA) IN CIVIL ENGINEERING APPLICATIONS

Prepared by:
Dana N. Humphrey, Ph.D., P.E.
University of Maine

Revised: July 13, 2001

Revised to replace tire shred with TDA: January 25, 2005

TDA, General. The material shall be made from scrap tires which shall be shredded into the sizes specified herein. They shall be produced by a shearing process. TDA produced by a hammer mill will not be allowed. The TDA shall be free of all contaminants such as oil, grease, gasoline, diesel fuel, etc., that could leach into the groundwater or create a fire hazard. In no case shall the TDA contain the remains of tires that have been subjected to a fire because the heat of a fire may liberate liquid petroleum products from the tire that could create a fire hazard when the shreds are placed in a fill. The TDA shall be free from fragments of wood, wood chips, and other fibrous organic matter. The TDA shall have less than 1% (by weight) of metal fragments that are not at least partially encased in rubber. Metal fragments that are partially encased in rubber shall protrude no more than 25 mm (1 in.) from the cut edge of the TDA on 75% of the pieces (by weight) and no more than 50 mm (2 in.) on 90% of the pieces (by weight). The gradation shall be measured in accordance with AASHTO T-27, "Standard Method for Sieve Analysis of Fine and Coarse Aggregate", except that the minimum sample size shall be 12 kilograms (30 pounds).

TDA, Type A. Type A TDA shall have a maximum dimension, measured in any direction, of 203 mm (8 in.). In addition, Type A TDA shall have 100% passing the 102 mm (4 in.) square mesh sieve, a minimum of 95% passing (by weight) the 75 mm (3 in.) square mesh sieve, a minimum of 50% passing (by weight) the 38 mm (1.5 in.) square mesh sieve, and a maximum of 5% passing (by weight) the No. 4 sieve.

TDA, Type B. A minimum of 90 percent (by weight) shall have a maximum dimension, measured in any direction, of 300 mm (12 in.) and 100 percent shall have a maximum dimension, measured in any direction, of 450 mm (18 in.). At least one side wall shall be severed from the tread of each tire. A minimum of 75% (by weight) shall pass the 203 mm (8 in.) square mesh sieve, a maximum of 50% (by weight) shall pass the 76 mm (3-in.) square mesh sieve, a maximum of 25% (by weight) shall pass the 38 mm (1.5-in.) square mesh sieve, and a maximum of 1% (by weight) shall pass the No. 4 sieve (4.75 mm; 0.187 in.).

Appendix D

Daily Report Summaries

Material Delivery Log

Client: CIWMB
Site: Badlands Landfill-Riverside County
Project: TDA vs. Gravel in a LFG Trench
Date: October 31, 2007

TDA Delivery Log from Lakin Tire West, Inc.				
#	Date	Trailer Number	Material Weight (weighed tons)	Notes
1	8/9/2007	L-28	25.10	2 Pass
2	8/10/2007	L-28	25.18	2 Pass
3	8/10/2007	L-26	24.88	2 Pass
4	8/14/2007	L-28	25.02	2 Pass
5	8/14/2007	L-24	24.79	2 Pass
6	8/15/2007	L-24	25.30	50/50 Mix-2 Pass and 2 Inch
7	8/16/2007	L-4	22.11	50/50 Mix-2 Pass and 2 Inch
8	8/20/2007	*	25.00	50/50 Mix-2 Pass and 2 Inch
Total Material Delivered			124.97	2 Pass TDA
Total Material Delivered			72.41	50/50 Mix-2 Pass and 2 Inch TDA
Total Material Delivered			197.38	All TDA

*Scale house lost the delivery ticket but this material was the last TDA delivered

Gravel Delivery from CDG Materials Inc.				
#	Date	Ticket Number	Material Weight (tons, T&T)	Notes
1	8/16/2007	118278	25.00	2 inch rock
2	8/16/2007	118668	25.00	3 inch rock
3	8/17/2007	118281	25.00	2 inch rock
4	8/17/2007	118985	25.00	2 inch rock
5	8/21/2007	118292	25.00	2-3 inch rock
6	8/21/2007	115141	25.00	2-3 inch rock
7	8/21/2007	119072	25.00	2-3 inch rock
8	8/22/2007	115143	25.00	1.5 inch rock
9	8/23/2007	Lost Ticket	25.00	1.5 inch rock
10	8/23/2007	115146	25.00	1.5 inch rock
11	8/23/2007	115145	25.00	1.5 inch rock
12	8/27/2007	119178	25.00	1.5 inch rock
Total Material Delivered			300.00	All Gravel

Summary of Daily Construction Activities

Wednesday, August 15, 2007

Julian Ibarra was the CIWMB onsite representative from KENNEC
Met with Riverside County engineer, Noah Rau at site; Mr. Rau provided a tour of the site and it's facilities and
It was estimated by the County that 235 tons of TDA would be needed for 2,400 LF of HW trenching.

It was estimated by the County that 300 tons of gravel would be needed for 1,750 LF of HW trenching

Lakin Tire West, Inc. (Lakin) began delivery of TDA (6 loads) in early August and by August 15th 125 tons of 2 pass TDA material and 25 tons of a 50/50 2-pass and 2-inch mix had been delivered.
CDG Materials Inc. (CDG) was scheduled to begin delivery of 2-inch gravel today; however CDG was unable to provide any material until Thursday.

Stockpiled TDA (Location A) was observed and appeared to be larger than the specification for Type A TDA. In telephone discussions with CIWMB (Stacey Patenaude) I was informed that Lakin was aware of the material not meeting specification and that the TDA backfill at Badlands Landfill would not be Type A. The TDA backfill material was to be either entirely 2-pass material or a 50/50 mix of 2-pass and 2-inch material.
KENNEC will obtain samples of the delivered TDA material on Thursday.

Construction of the 3 horizontal LFG trenches (#23, #24 and #25) began at toe of slope adjacent to the Alternative Haul Route, at tie-in locations for each of the pipes. The method of construction was the same for all installations, only the drainage backfill material changed.
Method:

1. Excavator dug the trench;
2. Loader placed a 6 to 9 inch layer of drainage material (TDA or Gravel);
3. Laborer placed pipe;
4. Loader placed the remaining, 9 to 12 inches drainage material over the pipe;
5. Laborer placed geotextile and
6. Loader placed the remaining soil backfill material.
7. Each trench had a 10'x10' pit installed along the horizontal well; the corners of the pit were surveyed.

The immediate goal for the day was to complete as much of the installation so that the Alternative Haul Route could be utilized for daily operations and Active Landfill Area could be moved to the Temporary Landfill Area.

By the end of the day;
HW-24 had approximately 200-feet trenched with 150-feet filled with 2-pass TDA material.
HW-25, which was originally designated as a gravel trench, became a TDA trench due to the lack of gravel onsite. Approximately 300-feet of HW-25 was filled with 2-pass TDA material and completed up to the toe of slope near the Active Landfill Area.

Further installation would continue once daily operations were moved to the Temporary Landfill Area.

Thursday, August 16, 2007
Julian Ibarra was the CIWMB onsite representative from KENNEC
Senior Engineering Technician Art Fuentes was the Riverside County onsite representative.

KENNEC obtained samples of the 2-pass and 2-inch TDA material in 15-gallon containers. These will be delivered to AllWest's Corona, CA laboratory for analysis.

Lakin delivered one truck with a 50/50 mix of 2-inch and 2-pass material. The material was unloaded in a manner that created two distinct stockpiles of different materials.

In a telephone conversation with CDG, they were only able to supply two trucks with 25 tons each of gravel. The trucks arrived onsite at 12:15pm.
As a result of the limited gravel delivery the Contractor will be constructing HW-23 with the intention of using as much gravel as needed to completely fill the trench and have the Alternative Haul Route open for daily operations.

By the end of the day;
HW-23 was trenched to the edge of the Primary Haul Route, with construction complete under the Alternative Haul Route. The initial gravel bedding was placed as well as pipe but further installation was on hold until more gravel material was available onsite.
HW-24 was completed to the toe of slope/edge of the Primary Haul Route.
HW-25 was completed to the toe of slope/edge of the Primary Haul Route.
The Alternative Haul Route was available for daily operations.

Friday, August 17, 2007
Samples of 2-Pass and 2-Inch TDA were delivered to AllWest laboratory in Corona, CA.

Art Fuentes was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.

CDG was able to deliver two more trucks with 25 tons of gravel each to the site. As of 8/17/07 100 tons of gravel had been delivered.

Daily landfill operations had been moved to the Temporary Landfill Area and the Contractor began continued construction of HW-25 and HW-24.

Upon observation of the TDA stockpiled (Location B) the 2-pass material appeared to be larger than what was previously (Location A), including pieces as large as a quarter tire.

By the end of the day;
HW-25 was completely installed and surveyed by Riverside County.
HW-24 had approximately 150 feet of additional installation completed from the toe of slope.

Monday, August 20, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.

Contractor continued construction of HW-24 and began construction of HW-23.

Lakin had one truck deliver a load of the 50/50 TDA mix material. The truck had the bottom half loaded with the large 2-pass material and the top half with the smaller 2-inch material; the resulting stockpile ended up as a pile of 2-pass material covered with the smaller 2-inch material.

In discussions with the CIWMB, it was decided that HW's-24 and 25 would use the 2-Pass TDA Material and HW-27 would use the 50/50 TDA mix material.

In a telephone conversation with CDG, two trucks were supposed deliver gravel with the remaining quantities to be delivered by 8/23/07; the two trucks did not show up.

KENNEC collected 3 more samples of material to be delivered to AllWest. The samples included a 50/50 2-Pass and 2-inch TDA mix, a 2-Pass TDA only and a gravel sample.

By the end of the day;
HW-24 was completed and surveyed by Riverside County
HW-23 was completed to just past the Primary Haul Route

Tuesday, August 21, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra and Erik Korsmo were the CIWMB onsite representatives from KENNEC.

Contractor continued construction of HW-23 and began construction of HW-27 (TDA).

CDG delivered three trucks of gravel (75 tons) to the site in the morning and said that they would deliver three more trucks on Wednesday (8/222/07) morning.

HW-27 was constructed using the 50/50 TDA Material mix. The method of placement was to use the smaller 2-inch material on the bottom and fill the trench with the larger 2-pass material. A more accurate ratio representation would be 25/75 2-inch TDA to 2-pass TDA material.

By the end of the day;
HW- 23 was completed.
HW-27 was approximately 75% completed.

Wednesday, August 22, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.

Daily operations resumed at the Active Landfill Area via the Primary Haul Route.

Contractor continued the excavation and construction of HW-27 and began excavation of HW-26 (gravel).

CDG delivered two trucks (50 tons) of gravel to the site today.

There still appears to be a lot of TDA remaining and when they're finished with HW-27 it appears as though 40 tons of TDA will be remaining. This is 40 tons of the large 2-pass material and the delivery (25 tons) from Lakin on 8/20/07 was an additional order for the 50/50 mix material.

On this day the Contractor crew supervisor was not consistently present during the day and left the site prior to his crew completing work for the day. Without direct supervision the crew became less efficient and had poorer performance. Mr. Rau (County) had to frequently watch over and correct their actions; such as using dirty TDA material from the close in proximity stockpiles (Location C) rather than driving to the further stockpiles (Location B). The crew was also about to leave exposed refuse at the close of business. Mr. Rau's ensured that these actions were corrected.

By the end of the day;
HW-27 was completed.
HW-26 had approximately 200 feet completed.

T**hursday, August 23, 2007**
Noah Rau was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.
JP Javier was another CIWMB onsite representative from KENNEC.

Contractor continued the excavation and construction of HW-26. By 10:00am the onsite gravel supply was depleted. In a conversation with CDG, two trucks were to be delivered today and by 11:20am the first truck arrived with 25 tons of gravel. However, the driver was unaware of a second truck. KENNEC attempted to contact CDG and after multiple attempts it was verified that a second truck would be delivered. The second truck arrived onsite at 1:00pm with the second 25 tons of gravel. The completion of HW-26 was held up because of the lack of gravel material onsite.
Once again the gravel supply was depleted prior to completing the last 40-feet of trench. The County knew of a small stockpile of similar gravel onsite and gave the Contractor the approval to use that material. The material was slightly larger (approximately 3-4 inch gravel) and dirtier but CDG would not be able to supply any more gravel until the following Monday (8/27/07).
CDG agreed to supply one truck (25 tons) of gravel to the site on Monday to replace the County's stockpile.

The Contractor installed a 90-degree elbow to the eastern end of both HW-26 and HW-27's pipe.

By the end of the day;
HW-26 was completed
The project was completed but there were some discussions about using TDA in the construction of vertical wells onsite. KENNEC provided the specifications and details for what was required in a vertical well with TDA and Mr. Rau was to discuss this alternative with County Supervisor, Mark Hunt.

Appendix E

Photographs

Photographic Documentation Log

Project Name: Badlands
Project No: C045.004.0701

Location: Riverside County, CA	Location: Riverside County
Description: Trench	Description: Trench
Date: August, 2007	Date: August 2007
Location: Riverside county	Location: Riverside County
Description: Trench	Description: Trench
Date: August 2007	Date: August 2007
Location: Riverside County	Location: Riverside County
Description: Trench	Description: Trench
Date: August 2007	Date: August 2007

Photographic Documentation Log

Project Name: Badlands
Project No: C045.004.0701

Location: Riverside County	Location:
Description: Trench	Description
Date: August 2007	Date
Location: Riverside County	Location: Riverside County
Description: Trench	Description: Trench
Date: August 15, 2007	Date: August 15, 2007
Location: Riverside County	Location: Riverside County
Description: Trench with Gravel	Description: Trench with Gravel
Date: August 20 2007	Date: August 20 2007

Photographic Documentation Log

Project Name: Badlands
Project No: C045.004.0701

Location: Riverside County	Location: Riverside County
Description: Trench with Gravel	Description: Trench with Large Shred
Date: August 20 2007	Date: August 21, 2007
Location: Riverside County	Location: Riverside County
Description: Trenches	Description: Gravel size
Date: August 21, 2007	Date: August 22, 2007
Location: Riverside County	Location: Riverside County
Description: Trench with piping connection	Description: Trench gravel fill
Date: August 22, 2007	Date: August 22, 1007

Photographic Documentation Log

Project Name: Badlands
Project No: C045.004.0701

Location: Riverside County	Location: Riverside County
Description: Trench with gravel	Description: Trench
Date: August 23, 2007	Date: August 23, 2007
Location: Riverside County	Location: Riverside County
Description: Trench	Description: Trench
Date: August 23, 2007	Date: August 23, 2007
Location:	Location
Description	Description
Date	Date

FIGURES

DATE OF ISSUE	1/30/08
REV. DATE	–
DRAWN BY	JPJ
DESIGNED BY	–
CHECKED BY	JI
APPROVED BY	BMY
PROJECT NUMBER: C045.004.0701.003	

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

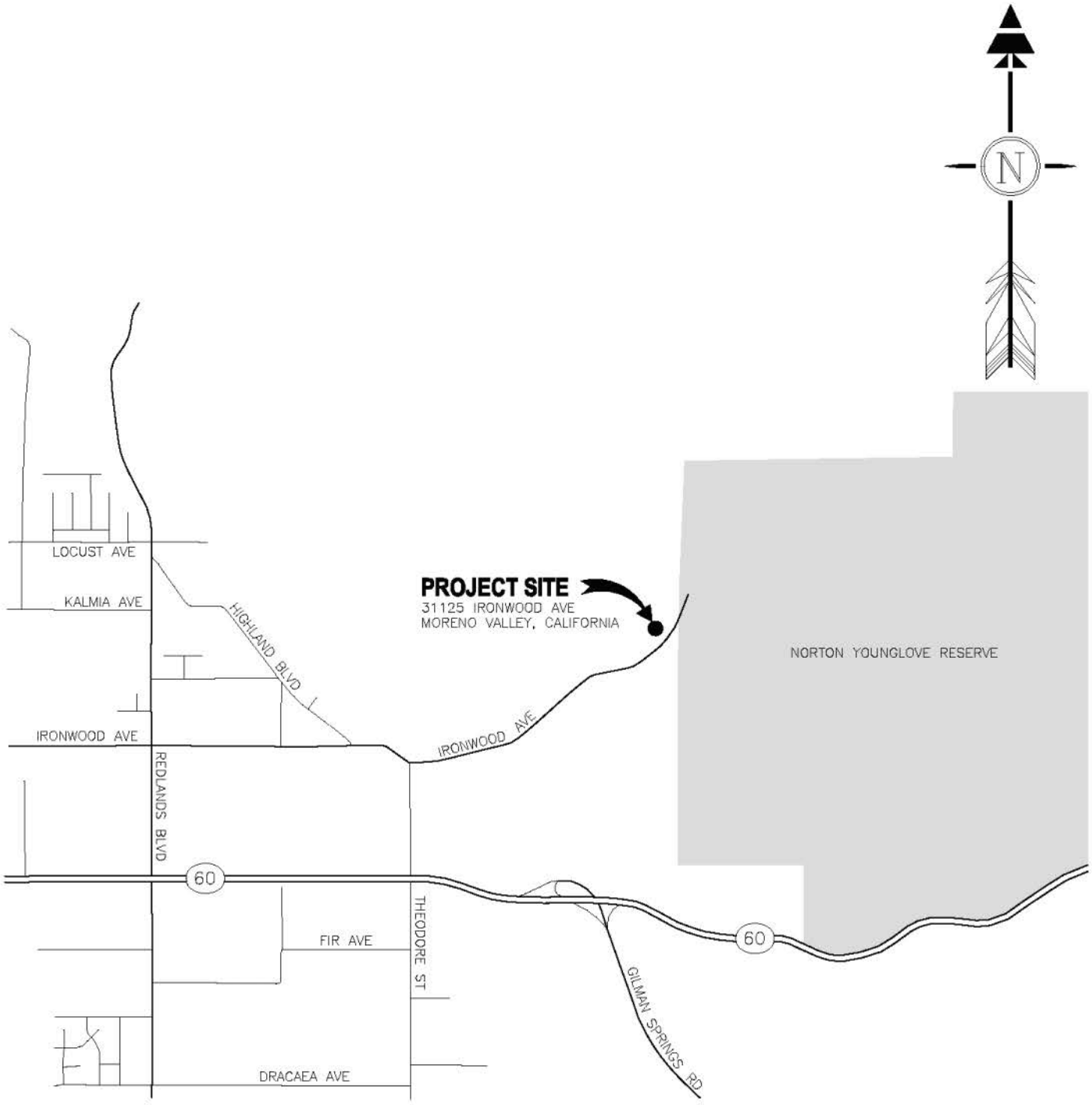
BADLANDS LANDFILL

SITE LOCATION MAP

1

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052



DATE OF ISSUE	1/29/08
REV. DATE	–
DRAWN BY	JPJ
DESIGNED BY	–
CHECKED BY	JI
APPROVED BY	BMY
PROJECT NUMBER: C045.004.0701.003	

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

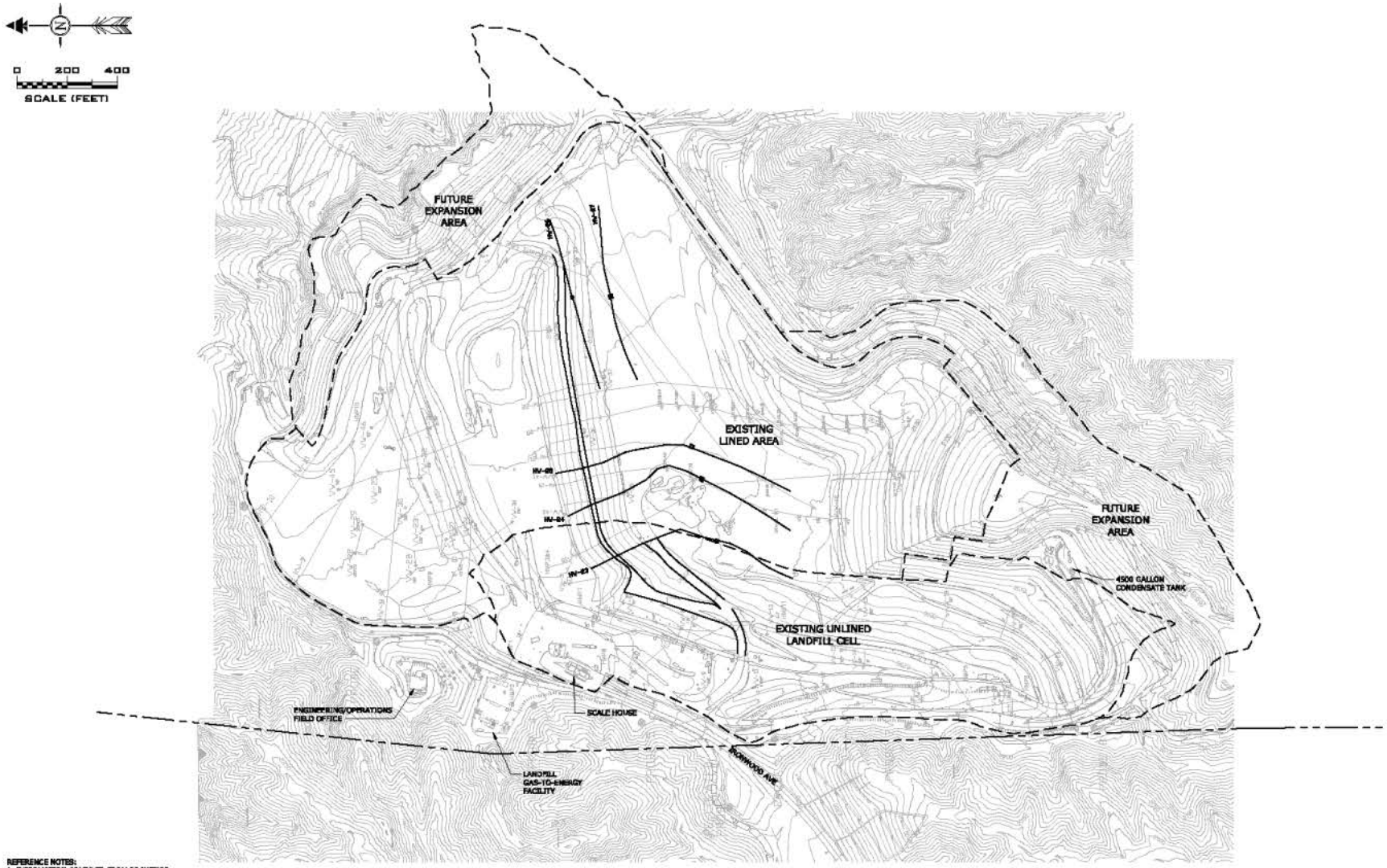
BADLANDS LANDFILL

VICINITY MAP

2

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052



REFERENCE NOTES:
1. INFORMATION COMPILED FROM DRAWINGS PROVIDED BY RIVERSIDE COUNTY:
- BADLANDS SANITARY LANDFILL, SEQUENCING FIGURE 8, OCTOBER 2004
- BADLANDS SANITARY LANDFILL, GAS COLLECTION SYSTEM AND PROBE LOCATION MAP FIGURE 3, SEPTEMBER 2007
2. TOPOGRAPHY SHOWN NOT REPRESENTATIVE OF ACTUAL TOPOGRAPHY AT THE TIME HORIZONTAL WELLS CONSTRUCTION.

REV	DATE	REVISION DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
-	1/28/08	DATE OF COMPILATION	JPV	JA	JAM	SMY
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

KENNEDY, INC.
813 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL ROSTRON 916.886.9545
PROJECT NUMBER: C2161.0274.01.002

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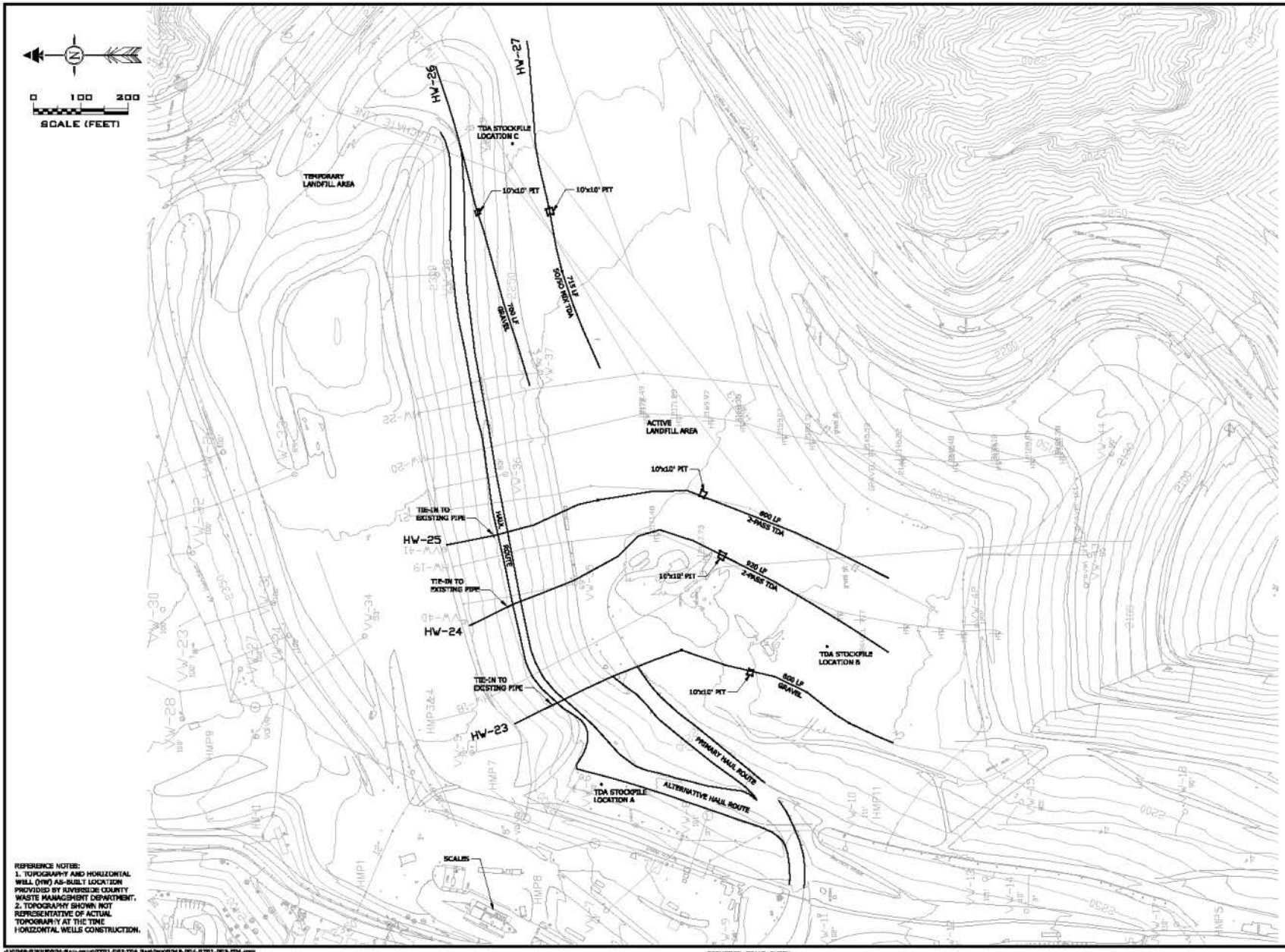
CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

BADLANDS LANDFILL
SITE PLAN

3
FIGURE NO.

REDUCTION SCALE CHECK
SCALE - 1"



REFERENCE NOTES:
1. TOPOGRAPHY AND HORIZONTAL WELL (HW) AS-BUILT LOCATION PROVIDED BY RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT.
2. TOPOGRAPHY SHOWN NOT REPRESENTATIVE OF ACTUAL TOPOGRAPHY AT THE TIME HORIZONTAL WELLS CONSTRUCTION.

REV	DATE	REVISION DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
-	1/28/08	DATE OF COMPILATION	JPV	JF	JAM	SMY
-	"	"	"	"	"	"
-	"	"	"	"	"	"
-	"	"	"	"	"	"
-	"	"	"	"	"	"

KENNEDY, INC.
813 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678

PROJECT CONTACT: MICHAEL ROSTEN 916.966.9345
PROJECT NUMBER: C2161.0212.01.002

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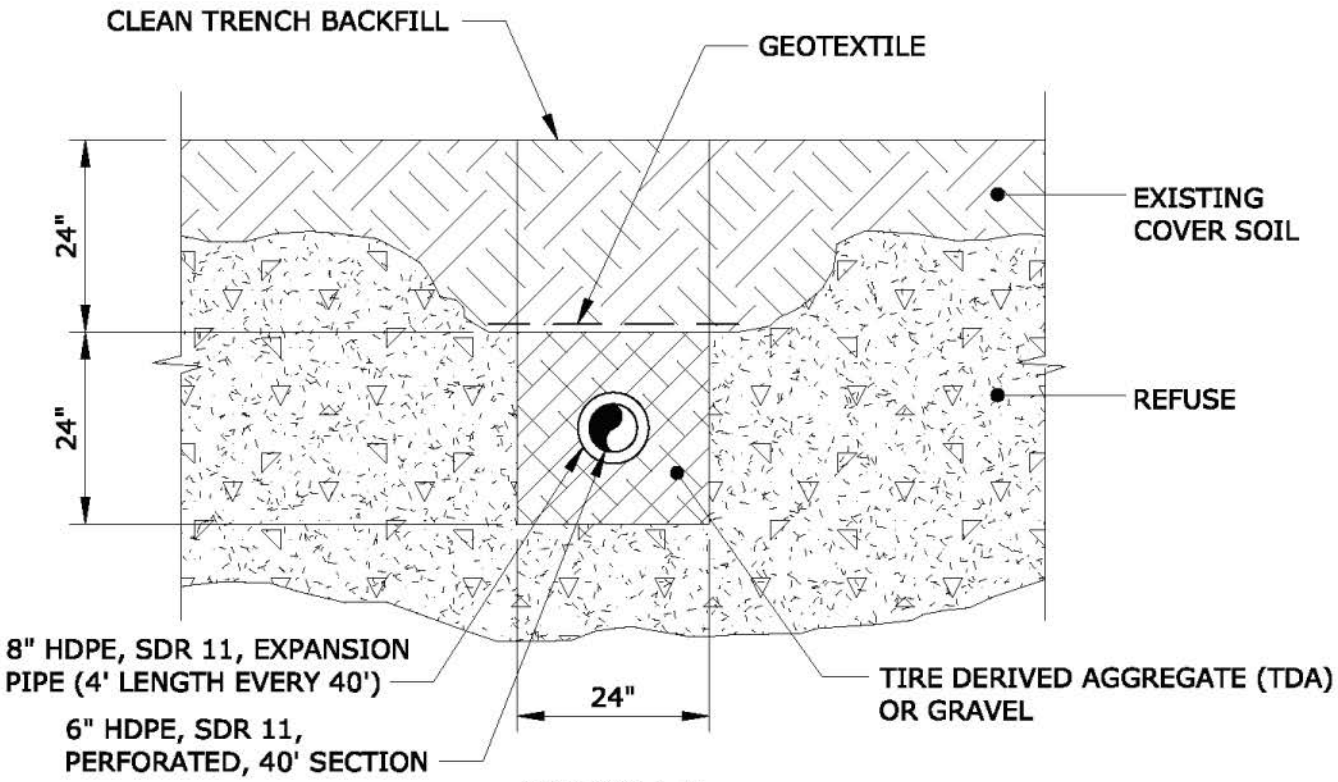
CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

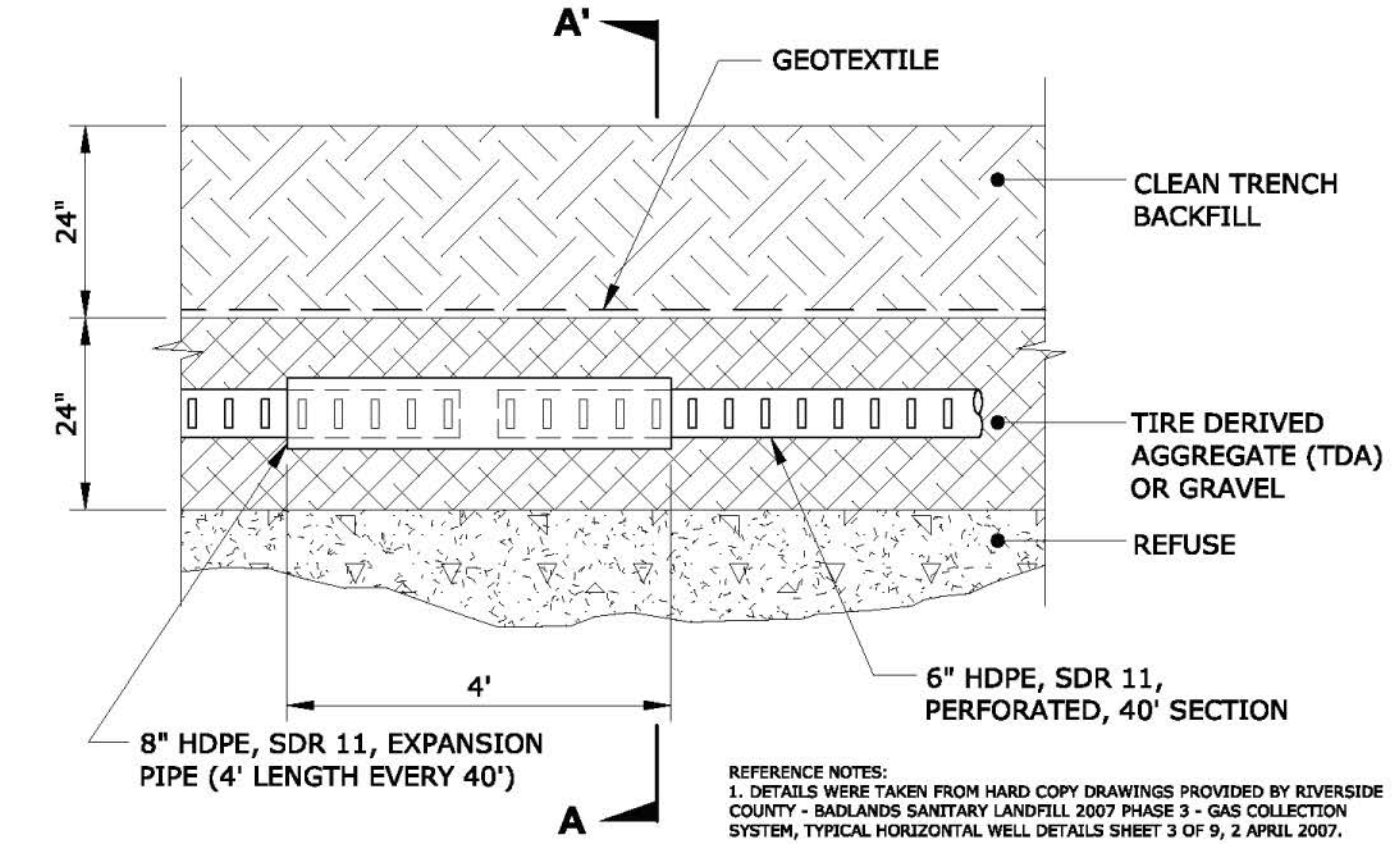
BADLANDS LANDFILL
CONSTRUCTION AREA SITE PLAN

4
FIGURE NO.

REDUCTION SCALE CHECK
SCALE = 1"



SECTION A-A'



REFERENCE NOTES:
1. DETAILS WERE TAKEN FROM HARD COPY DRAWINGS PROVIDED BY RIVERSIDE COUNTY - BADLANDS SANITARY LANDFILL 2007 PHASE 3 - GAS COLLECTION SYSTEM, TYPICAL HORIZONTAL WELL DETAILS SHEET 3 OF 9, 2 APRIL 2007.

DATE OF ISSUE	1/29/08
REV. DATE	–
DRAWN BY	JPJ
DESIGNED BY	–
CHECKED BY	JI
APPROVED BY	BMY
PROJECT NUMBER: C045.004.0701.003	

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

BADLANDS LANDFILL

HORIZONTAL GAS COLLECTION WELL SECTIONS

5

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052

BADLANDS LANDFILL TDA GAS COLLECTION PILOT ANALYSIS

Prepared for:

CALRECYCLE

1001 I Street
Sacramento, CA 95814

Prepared by:

KENNEC
EARTH ENGINEERING & SCIENCE™

751 4th St.
Santa Rosa, CA 95404

Date: July 29, 2011

Kennec Project No. C045.117

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3 LANDFILL GAS 3-7
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5 RESULTS 5-1
6 CONCLUSION 6-6

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Figure 2 Vicinity Map
Figure 3 Badlands Landfill Site Plan
Figure 4 Construction Area Site Plan

Appendix

Appendix A Figures
Appendix B Phase I Information
Appendix C Analytical Data
Appendix D Historic Analytical LFG Data
Appendix E Photo Log

Acronyms and Abbreviations

Act	California Tire Recycling Act
CALRECYCLE	Department of Resources Recycling and Recovery
CCR	California Code of Regulations
CEAs	Civil Engineering Applications
CIWMB	California Integrated Waste Management Board
EPA	Environmental Protection Agency
LEA	Local Enforcement Agency
LFG	Landfill Gas
LGMCP	Landfill Gas Monitoring and Control Plan
KENNEC	Kennec, Inc.
ND	Non Detection
NMOCs	Non-Methane Organic Compounds
MSW	Municipal Solid Waste
PLA	Permitted Landfill Area
PTE	Passenger Tire Equivalents
QA	Quality Assurance
QC	Quality Control
RCWMD	Riverside County Waste Management Department
State	State of California
SWFP	Solid Waste Fill Permit
TDA	Tire Derived Aggregate
VOCs	Volatile Organic Compounds

Executive Summary

In April 2009, Kennec, Inc. (KENNEC) was retained by CALRECYCLE to provide sampling and monitoring of a Tire Derived Aggregate (TDA) Gas collection system as Phase II of a pilot study located at the Badlands Landfill. The purpose of Phase II of the pilot study was to compare the performance of LFG collection through horizontal collection wells constructed with both TDA and traditional gravel media.

For Phase II of the pilot study, two landfill gas wells monitored and sampled; one with traditional aggregate and the other with Tire Derived Aggregate, denoted as HW-26 and HW-27 respectively. The LFG sampling and monitoring of these two wells were performed over a four month period (March through June 2011), with monthly sampling.

Over the four sampling events it was determined that the analytical data varied greatly between the two different well types and by each successive sampling event. While the volatile organics and sulfur compounds seem to be within range of the historic data for the landfill; Oxygen, Nitrogen, Carbon Dioxide, and Methane values are much higher than the historic data, especially for HW-27, the TDA constructed well. Analytical values obtained for HW-26, the aggregate trench, appear to be consistent overall with historic data.

As for HW-27 (TDA Trench), the analytical values obtained from the lab were not consistent with the site's overall historic data, except for HW-23, HW-24, and HW-25. It is believed that the analytical values obtained on HW-23, HW-24, and HW-25 are not theoretically possible and therefor erroneous. While the volatile organics and sulfur compounds seem to be within range of the historic data for the Landfill; Oxygen, Nitrogen, Carbon Dioxide, and Methane values are much higher than expected or theoretical for the first three sampling events. The analytical results for the last sampling event for HW-27 were in range of the site's historic data, with some of the analytical constituents having concentrations less than HW-26.

Given the variability of the analytical data especially for HW-27, it is possible that the sampling canister was drawing in excess oxygen from the LFG system making the results not theoretically possible. The disparity in the analytical data for HW-26 and HW-27 does not currently allow for a clear correlation to be made on how the material type (i.e., aggregate verses TDA) is affecting LFG quality.

Therefore, it recommended that Phase II of the pilot study be continued for five more months in order to see if the analytical data falls within the site's historic values and are theoretical possible. As well, when the other TDA wells come on line (e.g. 3 more) it is recommended that they are added to the Phase II sampling program, in an effort to verify that TDA trenches perform as well or better than the traditional aggregate trenches.

1 INTRODUCTION

In April 2009, Kennec, Inc. (KENNEC) was retained by CALRECYCLE to provide sampling and monitoring of a TDA Gas collection system as Phase II of a pilot project located at the Badlands Landfill. The first phase of the pilot project was initiated in April 2007, where five horizontal landfill gas (LFG) collection wells/trenches were constructed to assess the constructability and performance of tire derived aggregate (TDA) used in place of gravel (aggregate) for horizontal LFG collection wells or trenches. Phases I and II of the pilot study are sponsored by CalRecycle in cooperation with Riverside County Waste Management Department.

Of the five horizontal wells, three were constructed using TDA as the backfill material around the perforated pipe and the other wells were constructed using traditional gravel as the backfill material. Phase II of the Pilot Project will only be assessing the quality of LFG produced from two wells, HW-26 and HW-27, aggregate and TDA constructed, respectively. KENNEC, a contractor to CalRecycle, was responsible for the documentation and oversight of the installation of these five wells. Information about Phase I of the pilot study is presented in Appendix B.

The purpose of Phase II of the pilot study was to compare the performance of LFG collection through horizontal collection wells constructed with both TDA and traditional gravel media. Phase II of the Pilot Project could not be initiated until a number of the horizontal collection wells were covered with sufficient waste material so that LFG extraction could safely begin.

2 BACKGROUND

The Badlands Landfill, which has been in operation since 1966, is owned and operated by the Riverside County Waste Management Department (RCWMD) and defined as a Class III sanitary landfill facility, as determined from Title 27, Sections 20240 Through 20260 of the California Code of Regulations (CCRs).

The landfill is located at 31125 Ironwood Avenue (see Appendix A, Figure 2), just northeast of the jurisdictional boundary of the City of Moreno Valley and north of Highway 60, westerly of the City of Beaumont, in an unincorporated area of Riverside County, California.

Of the 1,168 acres of the current landfill property, 246 acres are currently permitted for facilitating disposal of municipal solid waste (MSW) (see Appendix A, Figure 3). The 246-acre Permitted Landfill Area (PLA) encompasses:

- A 150-acre landfill disposal footprint area;
- A 40-acre borrow area;
- A 1.3-acre sedimentation basin;
- An approved Waste Recycling Park (WRP);
- Other disturbed areas utilized for access roads, maintenance facilities, office building, and various other ancillary facilities; and
- A few undisturbed areas.

The Badlands Landfill is currently operating under Solid Waste Fill Permit (SWFP) No. 33-AA-0006/05-11, issued by the Riverside County Environmental Health Department, which is the Local Enforcement Agency (LEA). The landfill is currently permitted to receive a maximum of 4,000 tons of MSW per day.

The local services area for the Badlands Landfill is generally considered to include the City of Moreno Valley and surrounding cities and unincorporated communities. The landfill accepts residual waste from the Robert A. Nelson Transfer Station/Materials Recovery Facility, which primarily serves the City of Riverside. As a regional disposal facility, the landfill is also permitted to receive waste from the cities and unincorporated communities of the Coachella Valley in the eastern portion of Riverside County, California.

3 LANDFILL GAS

Landfill Gas, generally characterized by Methane, Carbon Dioxide, Hydrogen Sulfide and Sulfides, is produced through bacterial decomposition, volatilization and chemical reactions. Most landfill gas is produced by bacterial decomposition that occurs when organic waste solids, food (e.g., meats and vegetables), garden waste (e.g., leaf and yard waste), wood and paper products, are broken down by bacteria naturally present in the waste and surrounding soils. Volatilization generates landfill gas when certain wastes change from a liquid or solid into a vapor. Chemical reactions occur when different waste materials are mixed together during disposal operations. Additionally, moisture plays a large role in the speed of decomposition. Generally, the more moisture, the more landfill gas is generated, both during the aerobic and anaerobic conditions.

Landfill Gas Production and Composition

In general, there are four phases of bacterial decomposition that a landfill goes through in its lifetime. The composition of gas produced changes with each of the four phases of decomposition. Landfills can often accept waste over a 20-to-30-year period, allowing for the waste in the landfill to be undergoing several phases of decomposition at once. This means that waste in one area of the landfill might be in a different phase of decomposition than more recently buried waste in another area.

During the last two phases of decomposition where anaerobic conditions prevail, the composition of landfill gas is approximately fifty-percent methane and fifty-percent carbon dioxide with trace amounts (less than a percent) of nitrogen, oxygen, hydrogen sulfide, hydrogen, and non-methane organic compounds (NMOCs). The more organic waste and moisture present in a landfill, the more landfill gas is produced by the bacteria during decomposition. The more chemicals disposed in a landfill, the more likely volatile organic compounds and other gases will be produced.

Factors Affecting Landfill Gas Production

The quantity of Landfill Gas produced depends on the rate of decomposition, which in turn is affected by moisture content of the waste, temperature, soil cover permeability, amount of precipitation, composition of the wastes, refuse particle size, compaction, and landfilling practices. Moisture content is critical for the survival and growth of bacteria in a landfill. Ideal moisture content for decomposition is considered one that approaches saturation. Biological reactions can be retarded if moisture content drops below forty

percent and essentially stops when moisture content is below twenty-percent. Therefore, in very dry climates, methanogenic decomposition will have a very small chance of occurring. In addition, Methane (CH_4) can only be produced in a landfill when Oxygen (O_2) is no longer present.

Landfill Gas System

The Badlands Landfill currently employs an active gas control system for the mitigation and treatment of landfill gas. An active gas management system removes gases from the landfill by creating a vacuum, which promotes gas flow from the gas collection system though header lines to a flare, where methane and non-methane organic compounds (NMOCs) are treated.

The most efficient header design from an engineering and maintenance perspective is considered the “loop design’ with integrated shutout valves spaced throughout the header system. The loop design allows for the active system to operate more efficiently should the header line become clogged in some location requiring that section to be isolated and shut down for repair. The loop design allows for redundancy and ease of operation.

The major components of the active gas collection system at the Badlands landfill include:

- Vertical gas collection wells;
- Horizontal gas collection systems,
- Gas collection header lines;
- Blower;
- Condensate collection system; and
- Gas treatment system (flare).

Landfill Gas System Operation and Maintenance

Active landfill gas control systems continuously require routine balancing of the well field to ensure for proper operations. Systems need to be routinely inspected for settlement and leaks. Extraction wells need to be checked routinely for leachate/condensate buildup. Header lines need to be checked for condensate buildup that may inhibit the flow of landfill gas. Failure to properly maintain and operate a passive or active gas control system can result in a point discharge to ambient air; lead to the onset of odors and landfill gas migration due to poor collection efficiencies; or worse a landfill fire.

4 SAMPLING METHODOLOGY AND APPROACH

The Badlands Landfill currently employs a Landfill Gas Monitoring and Control Plan (LGMCP) in accordance with local and state regulations (e.g., Title 29, Section 1150.1). All monitoring and sampling activities for Part II of the Pilot Project were performed in accordance with the site's LGMCP. Although independent of the existing compliance monitoring program, KENNEC performed monitoring and sampling of LFG with coordination from the Badlands Landfill personnel.

KENNEC monitored and sampled landfill gas emissions as well as evaluated the hydraulic efficiency of the horizontal LFG wells monthly for four months. For this second phase of the pilot project, two wells were monitored and sampled, WH-26 and WH-27, which are aggregate and TDA trenches, respectively.

The efficiency of the various horizontal collection wells was evaluated using field equipment (i.e., GEM™ unit), which measures temperature, pressure, Carbon Dioxide, and Methane. In order to assess the quality of gas being produced, LFG samples were collected in evacuated specially coated stainless steel canisters (i.e., SilcoCan™). See Appendix E for a photo log showing the sampling events.

LFG samples were then delivered to AccuLabs, Inc., a certified third party lab located in Arcadia California. Samples were tested for volatile organics (EPA-T015), volatile sulfur compounds, and fixed gases. A summary of the analytical results along with the lab results is presented in Appendix C.

Specific goals related to the monitoring and sampling of LFG include:

- Monitor pressures at the well head as well as the pressures at the header side of the horizontal trench;
- Monitor the flow rates at the well head and header side of the horizontal trench; and
- Monitor gas quality from the LFG flow rates.

5 RESULTS

This section presents the results of the LFG sampling and monitoring activities for Phase II of the pilot study at Badlands Landfill. Table 5.1 shows a summary of the analytical results for HW-26 and HW-27, with aggregate and TDA, respectively for the first two sampling events. Table 5.2 shows a summary of the analytical results for HW-26 and HW-27, with aggregate and TDA, respectively for the last two sampling events.

Table 5.1: Analytical Summary for HW-26 and HW-27 for first two sampling events.

	March 1, 2011		April 13, 2011	
Description	**HW-26**	**HW-27**	**HW-26**	**HW-27**
Acetone	9975	4070	8948	4986
Benzene	10020	2430	5395	4133
Benzyl Chloride	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
2-Butanone (MEK)	17800	5530	16240	7098
Carbon Disulfide	ND	ND	ND	70.7
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	462	118	1032	826
Chloroform	ND	ND	ND	ND
Chloromethane	192	316	315	173
1,2-Dibromoethane (EDB)	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	22.5	5.85	1.42	1.13
Dichlorodifluoromethane (F-12)	5530	1290	5119	3455
1,1-Dichloroethane	1240	212	1173	675
1,2-Dichloroethane	1480	1010	878	1759
1,1-Dichloroethene	ND	ND	ND	ND
cis-1,2-Dichloroethene	531	70.2	474	350

	March 1, 2011		April 13, 2011	
Description	**HW-26**	**HW-27**	**HW-26**	**HW-27**
trans-1,2-Dichloroethene	276	ND	157	89.8
1,2-Dichloropropane	435	ND	228	103
cis-1,3-Dichloropropene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane (F-114)	263	63.6	174	111
Ethylbenzene	4430	1000	2608	1433
4-Ethyltoluene	159	42.4	128	87
Hexachloro-1,3-butadiene	ND	ND	ND	ND
Methylene Chloride	8020	4720	4366	8512
4-Methyl-2-Pantanone (MIBK)	263	937	4131	1772
2-Hexanone (MBK)	ND	ND	ND	ND
Styrene	3010	612	1201	613
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethane (PCE)	1950	617	1087	892
Toluene	27420	7180	12160	8481
1,2,4-Trichlorobenzene	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2,-Trichloroethane	ND	ND	ND	ND
Trichloroethane (TCE)	639	308	241	385
Trichlorofluoromethane (F-11)	593	240	203	563
1,1,2-Trichlorotrifluoroethane (F-113)	ND	ND	ND	25.8
1,2,4-Trimethylbenzene	196	70.8	37.4	41.5
1,3,5-Trimethylbenzene	145	40	35.3	30.3
Vinyl Acetate	ND	ND	ND	ND
Vinyl Chloride	149	23	145	102
m & p-Xylene	6110	2030	4128	2498
o-Xylene	716	418	405	420
Hydrogen Sulfide	7.26	ND	18.6	ND
Carbonyl Sulfide	ND	ND	ND	ND
Methanethiol (Methy Marcaptan)	8.39	10.5	8.74	26.8
Ethanethoil (Ethyl Mercaptan)	ND	ND	ND	ND
Dimethyl Sulfide	18.6	4.23	9.22	7.87
Carbon Disulfide	0.048	0.018	0.057	0.047
Isopropyl Mercaptan	ND	ND	ND	ND

	March 1, 2011		April 13, 2011	
Description	**HW-26**	**HW-27**	**HW-26**	**HW-27**
n-Propyl Mercaptan	ND	ND	ND	ND
Disulfide dimethyl	0.661	0.312	0.311	0.742
Oxygen	0.46	15.1	0.65	5.08
Nitrogen	5.58	65.6	28.1	18.9
Carbon Dioxide	52.9	11.9	41.8	47.5
Methane	40.3	6.79	28.7	27.9

Note: ND represents a Non Detection by the Analytical Laboratory.

Table 5.2: Analytical Summary for HW-26 and HW-27 for last two sampling events.

	May 19, 2011		June 15, 2011	
Description	**HW-26**	**HW-27**	**HW-26**	**HW-27**
Acetone	4993	ND	3092	3213
Benzene	5037	102	6167	6145
Benzyl Chloride	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
2-Butanone (MEK)	9062	306	6150	8460
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	317	15.6	329	939
Chloroform	ND	ND	ND	ND
Chloromethane	127	ND	142	184
1,2-Dibromoethane (EDB)	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	2.91	ND	18.2	ND
Dichlorodifluoromethane (F-12)	2361	101	2821	3408
1,1-Dichloroethane	404	15.8	423	710
1,2-Dichloroethane	1781	42	2039	2889
1,1-Dichloroethene	ND	ND	ND	ND

	May 19, 2011		June 15, 2011	
Description	**HW-26**	**HW-27**	**HW-26**	**HW-27**
cis-1,2-Dichloroethene	331	ND	439	300
trans-1,2-Dichloroethene	62.9	ND	94.5	77.6
1,2-Dichloropropane	276	ND	171	136
cis-1,3-Dichloropropene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane (F-114)	92.5	ND	122	122
Ethylbenzene	2160	ND	2819	2215
4-Ethyltoluene	51.5	ND	251	65.4
Hexachloro-1,3-butadiene	ND	ND	ND	ND
Methylene Chloride	3574	361	2428	9086
4-Methyl-2-Pantanone (MIBK)	2065	27.6	2130	2584
2-Hexanone (MBK)	ND	ND	ND	ND
Styrene	982	ND	1707	996
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethane (PCE)	962	ND	1286	1218
Toluene	12660	142	14490	12780
1,2,4-Trichlorobenzene	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2,-Trichloroethane	ND	ND	ND	ND
Trichloroethane (TCE)	643	ND	646	606
Trichlorofluoromethane (F-11)	37.3	32	37.4	65.8
1,1,2-Trichlorotrifluoroethane (F-113)	ND	ND	ND	ND
1,2,4-Trimethylbenzene	63.3	ND	186	99.5
1,3,5-Trimethylbenzene	45.6	ND	115	61.7
Vinyl Acetate	ND	ND	ND	ND
Vinyl Chloride	46.7	ND	65.4	92.4
m & p-Xylene	3769	ND	4856	3979
o-Xylene	928	ND	721	784
Hydrogen Sulfide	11.2	ND	3.66	ND
Carbonyl Sulfide	0.018	ND	ND	ND
Methanethiol (Methy Marcaptan)	5.35	ND	0.682	ND
Ethanethoil (Ethyl Mercaptan)	ND	ND	ND	ND
Dimethyl Sulfide	5.1	0.607	4.23	5.18
Carbon Disulfide	0.021	ND	0.019	0.036

	May 19, 2011		June 15, 2011	
Description	**HW-26**	**HW-27**	**HW-26**	**HW-27**
Isopropyl Mercaptan	ND	ND	ND	ND
n-Propyl Mercaptan	ND	ND	ND	ND
Disulfide dimethyl	0.104	ND	0.344	0.906
Oxygen	3.55	19.2	1.28	1.18
Nitrogen	29.5	78.2	10.7	10.5
Carbon Dioxide	41.2	1.15	59.8	60.2
Methane	24.5	0.775	27.1	26.5

Note: ND represents a Non Detection by the Analytical Laboratory.

As can be seen from the results summarized in Table 5.1 and 5.2, the analytical data varies greatly between the two different well types and by each successive sampling event. While the volatile organics and sulfur compounds seem to be within range of the historic data for the landfill; Oxygen, Nitrogen, Carbon Dioxide, and Methane values are much higher than the historic data, especially for HW-27, the TDA constructed well. Analytical values obtained for HW-26, the aggregate trench, appear to be consistent overall with historic data. Historic values, especially for Oxygen, for the wells WH-23, HW-24, and HW-25 are extremely high as compared to all other wells. These values are not theoretical possible and therefore are considered erroneous. Historic LFG data for the Badlands Landfill can be found in Appendix D.

It should be noted that measurements taken in the field on HW-26 and HW-27 (especially HW-27) with the GEM unit, correlated more closely (e.g., Oxygen and Methane.) with the historic data than did the analytical results for the laboratory, especially for Methane.

A complete summary of the analytical data along with the lab reports for each sampling event are presented in Appendix C.

6 CONCLUSION

Four monthly sampling and monitoring events were performed at the Badlands Landfill (March through June 2011) in order to determine if TDA has an influence on the quality of gas being produced as compared to traditional aggregate.

As seen in the results section, analytical and field observations for HW-26 (aggregate trench), fit historic data for most of the landfill, except for HW-23, HW-24, and HW-25. It is believed that the analytical values obtained on HW-23, HW-24, and HW-25 are not theoretically possible and therefor erroneous. This is believed to be a result of site personnel not using the activated carbon filters at the time of sampling; therefor the VOCs in the gas sample threw off the instrument readings.

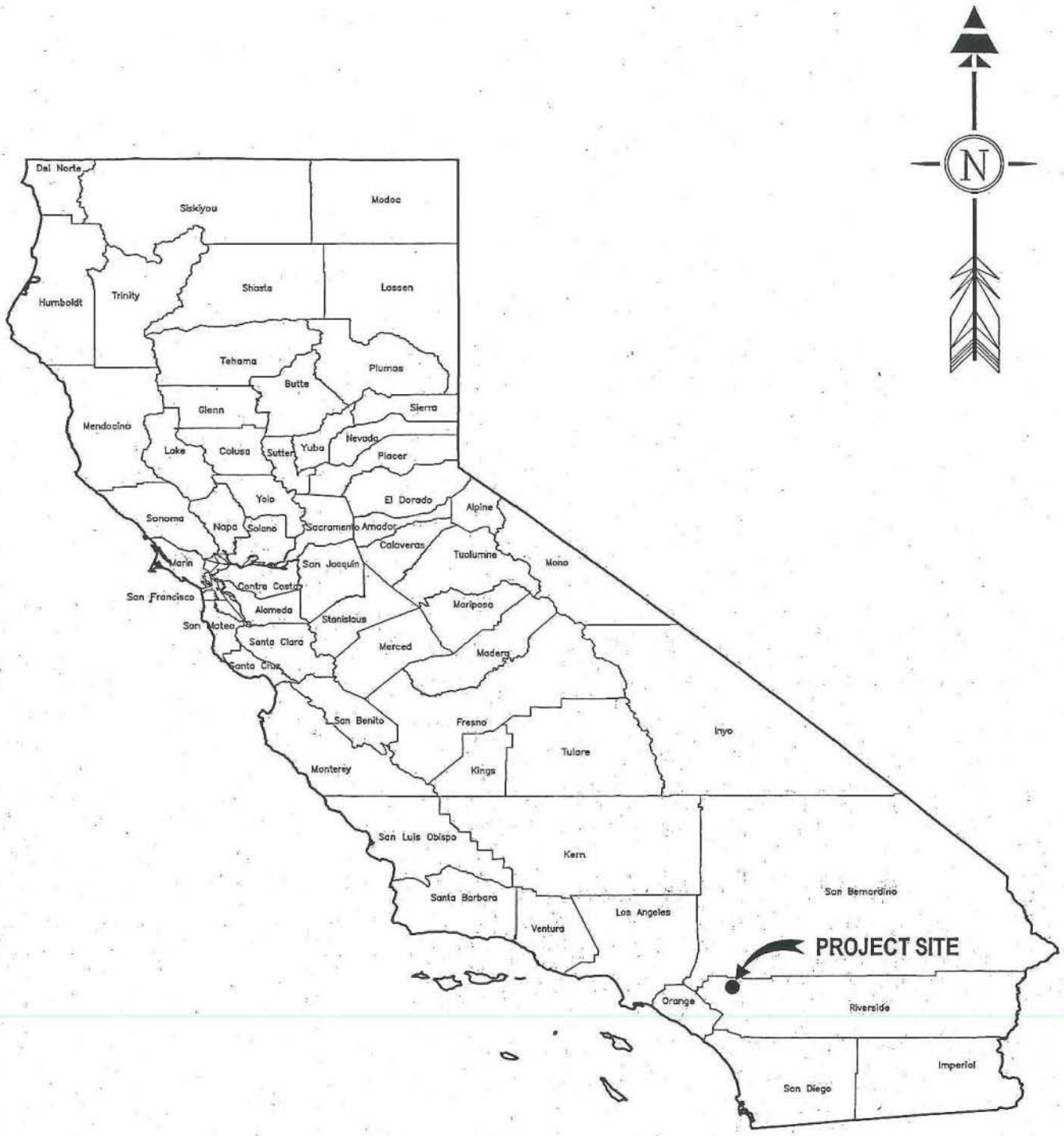
As for HW-27 (TDA Trench), the analytical values obtained from the lab are not consistent with the site's overall historic data. While the volatile organics and sulfur compounds seem to be within range of the historic data for the Landfill; Oxygen, Nitrogen, Carbon Dioxide, and Methane values are much higher than expected or theoretical for the first three sampling events. It was noted that HW-27 valve was difficult to move and therefore a competent connection to the sampling container was questionable. Also, the flange installed at HW-27 was custom built by site personnel and had a questionable nominal diameter (assumed to be 2.5 inches), as no as-built of the well header were located at the time of producing this report. Another discrepancy for HW-27, is the geometry of the piping (i.e. diameters) is not consistent. HW-27 has 6-inch diameter piping before the sampling port and then changes to 4-inch diameter on the backside, throttling the flow rate. The analytical results for the last sampling event for HW-27 were in range of the site's historic data, with some of the analytical constituents having concentrations less than HW-26.

Given the variability of the analytical data especially for HW-27, it is possible that the sampling canister was drawing in excess oxygen from the LFG system making the results not theoretically possible. As mentioned, the last sampling event for HW-27 had analytical values that were in range with historic site values. It is not known whether the system was corrected before the last sampling event. Unfortunately, the disparity in the analytical data for HW-26 and HW-27 does not currently allow for a clear correlation to be made on how the material type (i.e., aggregate verses TDA) is affecting LFG quality.

However, given the limited about of sampling data, KENNEC is positive that continued monitoring will show that a trench constructed of TDA will perform the same as its aggregate counterpart or better.

Therefore, it recommended that Phase II of the pilot study be continued for five more months in order to see if the analytical data falls within the site's historic values and are theoretical possible. As well, when the other TDA wells come on line (e.g. 3 more) it is recommended that they are added to the Phase II sampling program, in an effort to verify that TDA trenches perform as well or better than the traditional aggregate trenches.

Appendix A
Figures



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DESIGNED BY	–
CHECKED BY	JL
APPROVED BY	BMY
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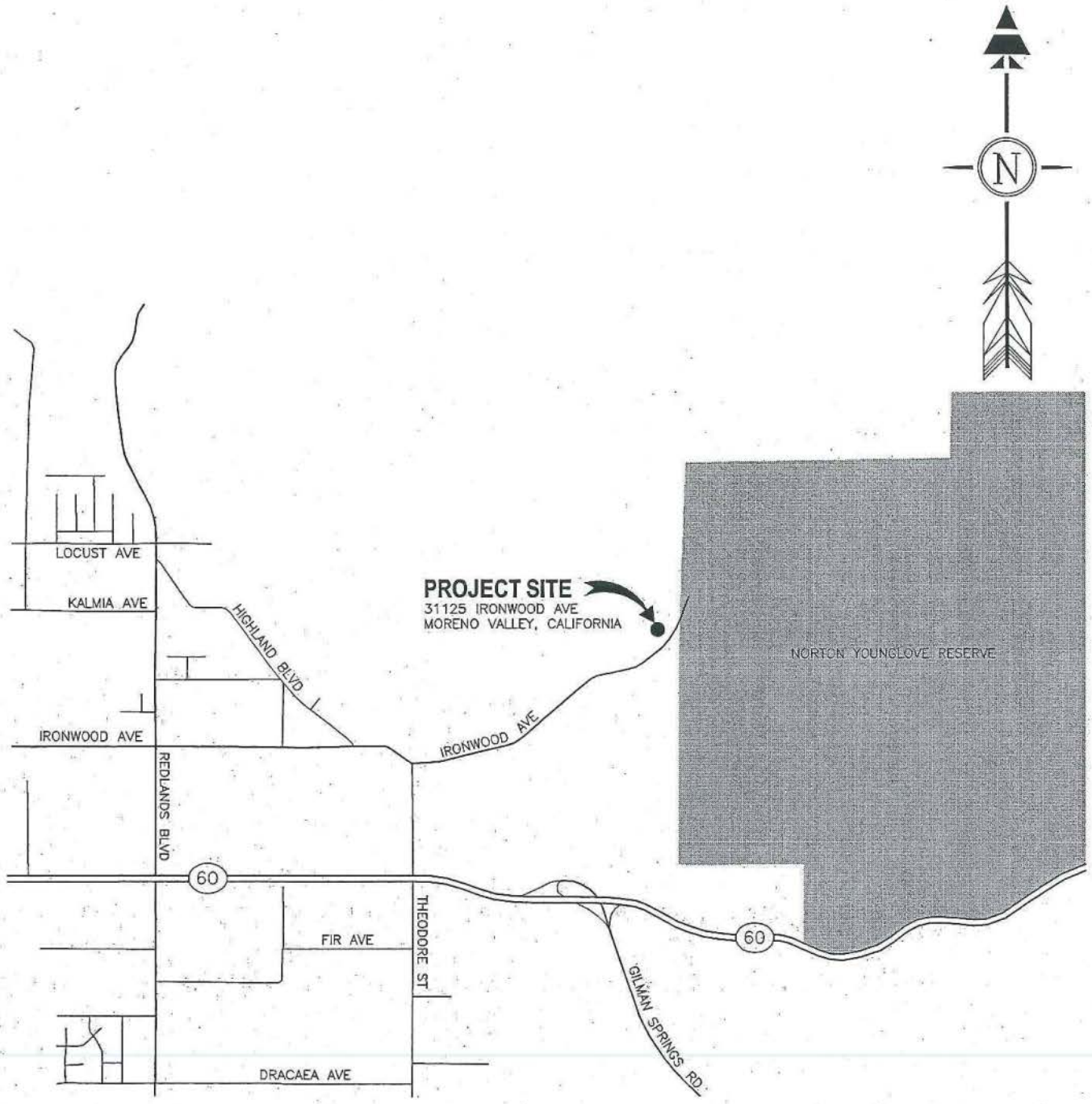
CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

BADLANDS LANDFILL
SITE LOCATION MAP

1

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052



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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

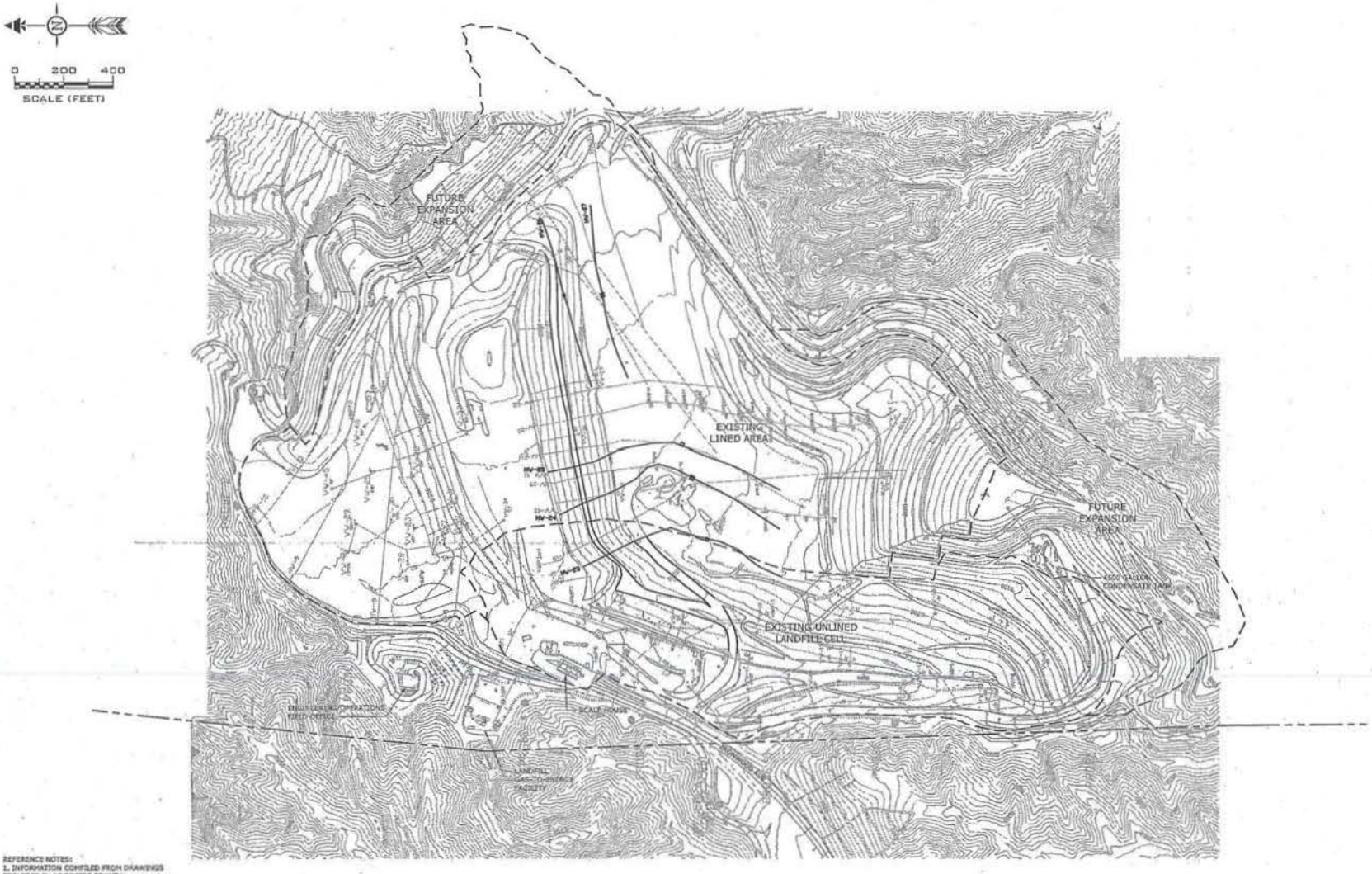
BADLANDS LANDFILL

VICINITY MAP

2

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052



REFERENCE NOTES:
1. INFORMATION COMPILED FROM DRAWINGS PROVIDED BY RIVERSIDE COUNTY:
- BADLANDS SANITARY LANDFILL, SEQUENCING FIGURE 6, OCTOBER 2004
- BADLANDS SANITARY LANDFILL, GAS COLLECTION SYSTEM AND PROBE LOCATION MAP FIGURE 3, SEPTEMBER 2007
2. TOPOGRAPHY SHOWN NOT REPRESENTATIVE OF ACTUAL TOPOGRAPHY AT THE TIME HORIZONTAL WELLS CONSTRUCTION.

REV	DATE	REVISION DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
-	1/28/08	DATE OF COMPLETION	JFF	JJ	JBF	EMT
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

KENNEC INC.
613 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
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PROJECT NUMBER: CH2.004.0701.003

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

BADLANDS LANDFILL
SITE PLAN

3
FIGURE NO.

REDUCTION SCALE CHECK
SCALE = 1"

REFERENCE NOTES:
1. TOPOGRAPHY AND HORIZONTAL WELL (HW) AS-BUILT LOCATION PROVIDED BY RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT.
2. TOPOGRAPHY SHOWN NOT REPRESENTATIVE OF ACTUAL TOPOGRAPHY AT THE TIME HORIZONTAL WELLS CONSTRUCTION.

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1	1/26/09	DATE OF COMPLETION	JPU	JS	JMR	DWD

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KENNEC INC.
919 HARBLAND POINTE DR., SUITE 250, RIVERVILLE, CA 92519

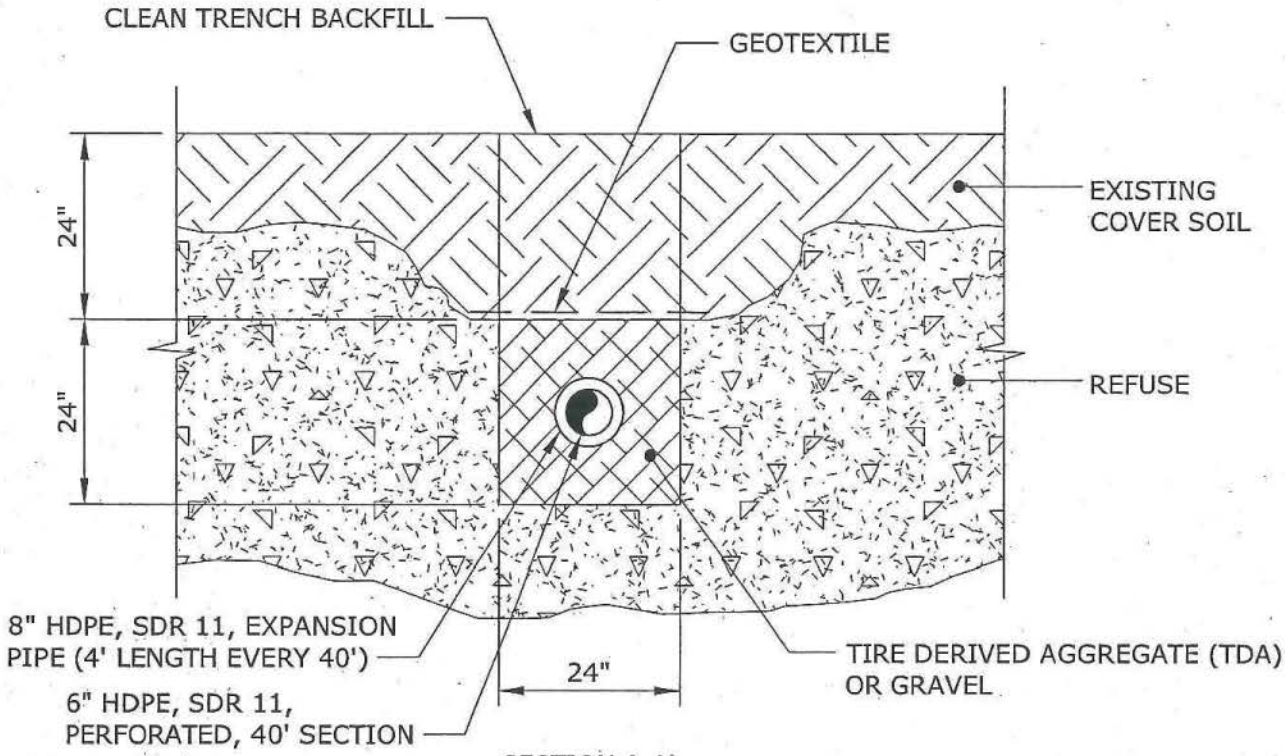
PROJECT CONTACT: MICHAEL VICTORIN 916.899.3050
PROJECT NUMBER: 0045.004.0701.003

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

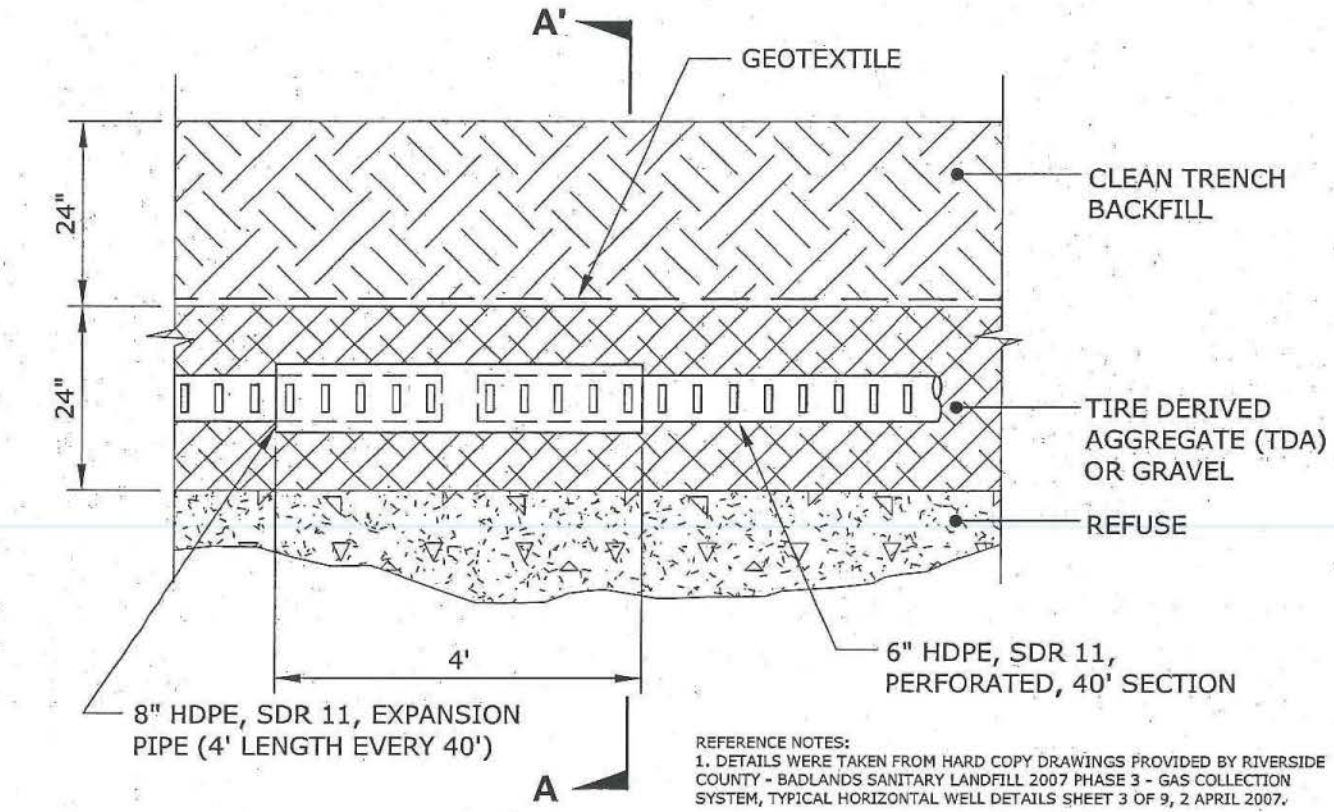
BADLANDS LANDFILL
CONSTRUCTION AREA SITE PLAN

4
FIGURE NO.

REDUCTION SCALE CHECK
SCALE = 1"



SECTION A-A'



REFERENCE NOTES:
1. DETAILS WERE TAKEN FROM HARD COPY DRAWINGS PROVIDED BY RIVERSIDE COUNTY - BADLANDS SANITARY LANDFILL 2007 PHASE 3 - GAS COLLECTION SYSTEM, TYPICAL HORIZONTAL WELL DETAILS SHEET 3 OF 9, 2 APRIL 2007.

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

BADLANDS LANDFILL

HORIZONTAL GAS COLLECTION WELL SECTIONS

5

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052

Appendix B
Phase I Information

ALLWEST GEOSCIENCE Inc.
1751 Jenks Drive
Corona, CA 92880
Phone: (951) 284-7100
Fax: (951) 284-7111
E-Mail: corp_office@allwestg.com

Sieve Analysis

Sample: #5
Date: 8/16/2007
Taken By: KENNEC

Analysis: CAL
Date: 9/28/2007
Checked:

Notes: CIWMB,River Side County,Bad Lands Land Fill,2-Pass Material

Tare (g):
Tare+Shreds (g):
Shreds (g): 20466.6 Shreds (lbs): 45.1

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	1542.24	1542.24	18924.40	92.5	100
8"	203.2	0	1542.24	18924.40	92.5	75-100
3"	76.2	6078.24	7620.48	12846.16	62.8	0-50
1 1/2"	38.1	10206	17826.48	2603.52	12.7	0-25
3/4"	19.05	2313.36	20139.84	290.16	1.4	
3/8"	9.53	231.4	20371.24	58.76	0.3	
#4	4.75	45.66	20416.90	13.10	0.1	0-1
Pan	N/A	13.1	20430.00	0.00	0.0	

Wt Total	20430.0
Wt Lost	36.64
% Lost	0.179

Free Steel (g)	7.800	
Free Steel %	0.038	1% max.
Longest Shred (in)	41	18 in. max.
No. shred >18 in. long	5	
Wt. Shreds >18 in. long	2630.9	
% Wt shreds>18 in. of total	12.9	
No. shreds>12 in. long	13	
Wt shreds>12 in. long	1950.48	
% Wt shreds>12 in of total	9.5	10% max.
Sidewall shreds (ea)	2	Zero
Wt shreds >2" wire exposed	589.68	
% Wt shreds >2" wire exposed	2.89	10% max
Wt shreds >1" wire exposed	3538.08	
% Wt shreds >1" wire exposed	17.32	25% max.

Definitions:
1. "Free Steel" is metal fragments that are not at least partially encased in rubber.
2. "Sidewall Shreds" are pieces with both sidewalls attached.

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Fax: (951) 284-7111
E-Mail: corp_office@allwestg.com

Sieve Analysis

Sample: 6
Date: 8/16/2007
Taken By: J.I. - Kenneo

Analysis: JRC
Date: 10/1/2007
Checked:

Notes: CIWMB, Riverside County, Badlands Landfill - From Lakin Delivery
2" material (TYPE A TDA - 3" Max Size)

Tare (g):
Tare+Shreds (g):
Shreds (g): 11022.5 Shreds (lbs): 24.3

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	0	0.00	11022.48	100.0	100
8"	203.2	0	0.00	11022.48	100.0	75-100
3"	76.2	0	0.00	11022.48	100.0	0-50
1 1/2"	38.1	1089.64	1089.64	9932.58	90.1	0-25
3/4"	19.05	7801.92	8891.56	2130.66	19.3	
3/8"	9.53	1859.76	10751.32	270.90	2.5	
#4	4.75	205	10956.32	65.90	0.6	0-1
Pan	N/A	65.9	11022.22	0.00	0.0	

Wt Total	11022.2
Wt Lost	0.26
% Lost	0.002

Free Steel (g)	27.000	
Free Steel %	0.245	1% max.
Longest Shred (in):	3	18 in. max.
No. shred >18 in. long:	0	
Wt. Shreds >18 in. long:	0.0	
% Wt shreds>18 in. of total:	0.0	
No. shreds>12 in. long:	0	
Wt shreds>12 in. long:	0	
% Wt shreds>12 in of total:	0.0	10% max.
Sidewall shreds (ea):	0	Zero
Wt shreds >2" wire exposed	317.52	
% Wt shreds >2" wire exposed.	2.88	10% max
Wt shreds >1" wire exposed	1224.72	
% Wt shreds >1" wire exposed	11.11	25% max.

Definitions:
1. "Free Steel" is metal fragments that are not at least partially encased in rubber.
2. "Sidewall Shreds" are pieces with both sidewalls attached.

ALLWEST GEOSCIENCE Inc.
1751 Jenks Drive
Corona, CA 92880
Phone: (951) 284-7100
Fax: (951) 284-7111
E-Mail: corp_office@allwestg.com

Sieve Analysis

Sample: #7
Date: 8/20/2007
Taken By: J.I(Kennec)

Analysis : CAL
Date: 9/27/2007
Checked:

Notes: CIWMB,Bad Lands Land Fill,River Side County,L Lakin Tire,2-Inch & 2 -Pass TDA

Tare (g): 0
Tare+Shreds (g):
Shreds (g): 18189.4 Shreds (lbs): 40.1

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	0	0.00	18189.36	100.0	100
8"	203.2	0	0.00	18189.36	100.0	75-100
3"	76.2	9117.72	9117.72	9071.64	49.9	0-50
1 1/2"	38.1	3261.28	12379.00	5806.68	31.9	0-25
3/4"	19.05	4435.28	16814.28	1371.40	7.5	
3/8"	9.53	1088.64	17902.92	282.76	1.6	
#4	4.75	188.84	18091.76	93.92	0.5	0-1
Pan	N/A	93.92	18185.68	0.00	0.0	

Wt Total 18185.7
Wt Lost: 3.68
% Lost 0.020

Free Steel (g):	15.400	
Free Steel %:	0.085	1% max.
Longest Shred (in):	30	18 in. max.
No. shred >18 in. long:	5	
Wt. Shreds >18 in. long:	5806.0	
% Wt shreds>18 in. of total:	31.9	
No. shreds>12 in. long:	12	
Wt shreds>12 in. long:	7847.2	
% Wt shreds>12 in of total:	43.2	10% max.
Sidewall shreds (ea):	5	Zero
Wt shreds >2" wire exposed	2358.72	
% Wt shreds >2" wire exposed	12.97	10% max.
Wt shreds >1" wire exposed	5488.56	
% Wt shreds >1" wire exposed	30.18	25% max.

Definitions:
1. "Free Steel" is metal fragments that are not at least partially encased in rubber.
2. "Sidewall Shreds" are pieces with both sidewalls attached.

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1751 Jenks Drive
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Phone: (951) 284-7100
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E-Mail: corp_office@allwestg.com

Sieve Analysis

Sample: #8
Date: 8/20/2007
Taken By: J.I(Kennec)

Analysis: CAL
Date: 9/28/2007
Checked:

Notes: CIWMB,Bad Lands Land Fill,River Side County,Lakin Tire,2-Pass Material(TDA)

Tare (g): 0
Tare+Shreds (g):
Shreds (g): 20366.6 Shreds (lbs): 44.6

Sieve (in)	(mm)	Wt (gm)	Wt Ret (gm)	Wt Pass (gm)	% Pass	Specification
12"	304.8	3946.32	3946.32	16420.32	80.6	100
8"	203.2	0	3946.32	16420.32	80.6	75-100
3"	76.2	6441.12	10387.44	9979.20	49.0	0-50
1 1/2"	38.1	7484.4	17871.84	2434.98	12.0	0-25
3/4"	19.05	2222.64	20094.48	212.34	1.0	
3/8"	9.53	185.44	20279.92	26.90	0.1	
#4	4.75	13.8	20293.72	13.10	0.1	0-1
Pan	N/A	13.1	20306.82	0.00	0.0	

Wt Total	20306.8
Wt Lost	59.82
% Lost	0.294

Free Steel (g)	0.700	
Free Steel %	0.003	1% max.
Longest Shred (in):	36	18 in. max.
No. shred >18 in. long:	7	
Wt. Shreds >18 in. long:	5216.4	
% Wt shreds>18 in. of total:	25.7	
No. shreds>12 in. long:	18	
Wt shreds>12 in. long:	3039.12	
% Wt shreds>12 in of total:	15.0	10% max.
Sidewall shreds (ea):	0	Zero
Wt shreds >2" wire exposed	2948.4	
% Wt shreds >2" wire exposed	14.52	10% max.
Wt shreds >1" wire exposed	5715.36	
% Wt shreds >1" wire exposed	28.15	25% max.

Definitions:
1. "Free Steel" is metal fragments that are not at least partially encased in rubber.
2. "Sidewall Shreds" are pieces with both sidewalls attached.

SIEVE ANALYSIS

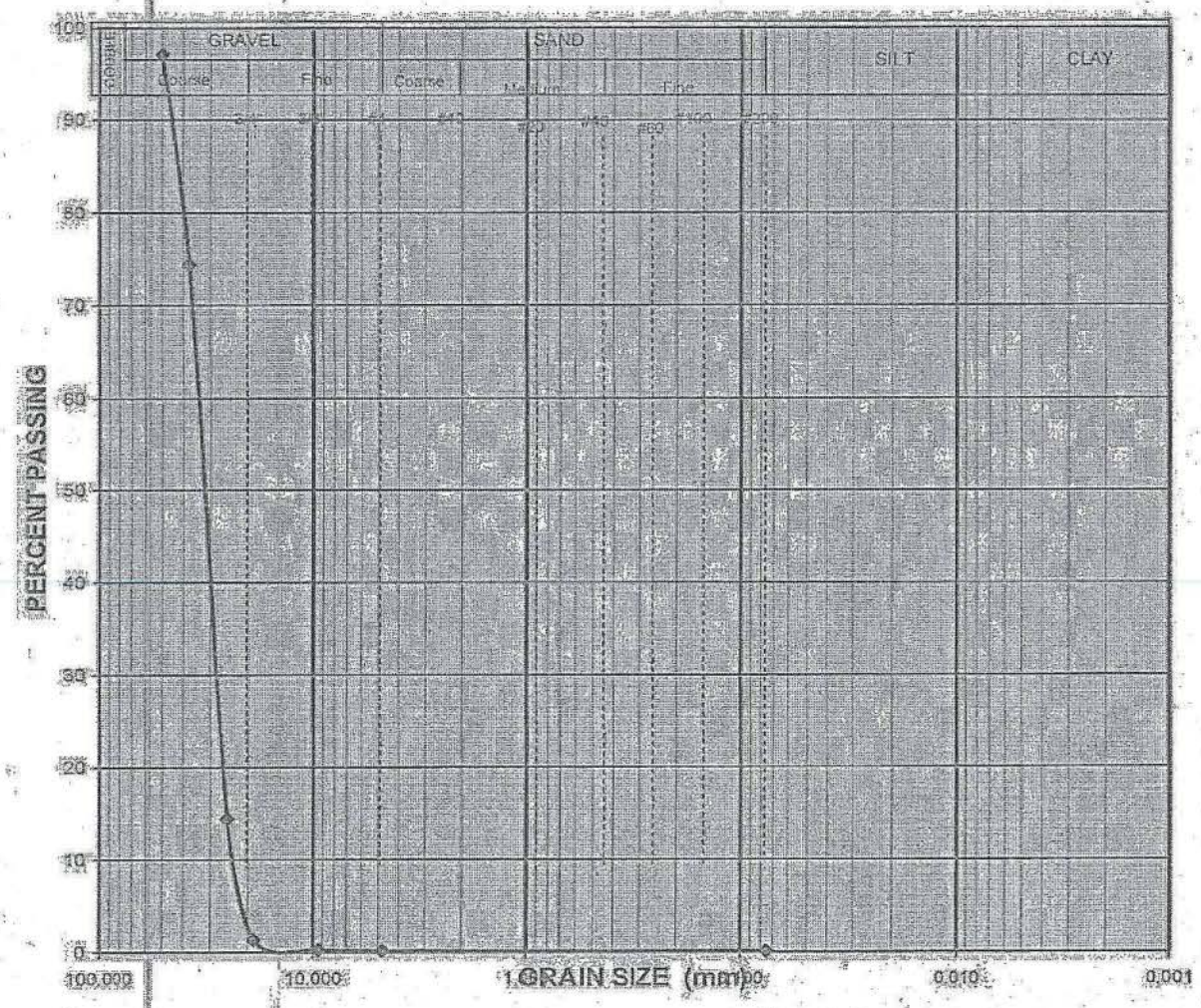
Client: Kennec
Site: Badlands Landfill
Tech: JRC

Project No. 02-3441MT-01
Date: 01/03/08

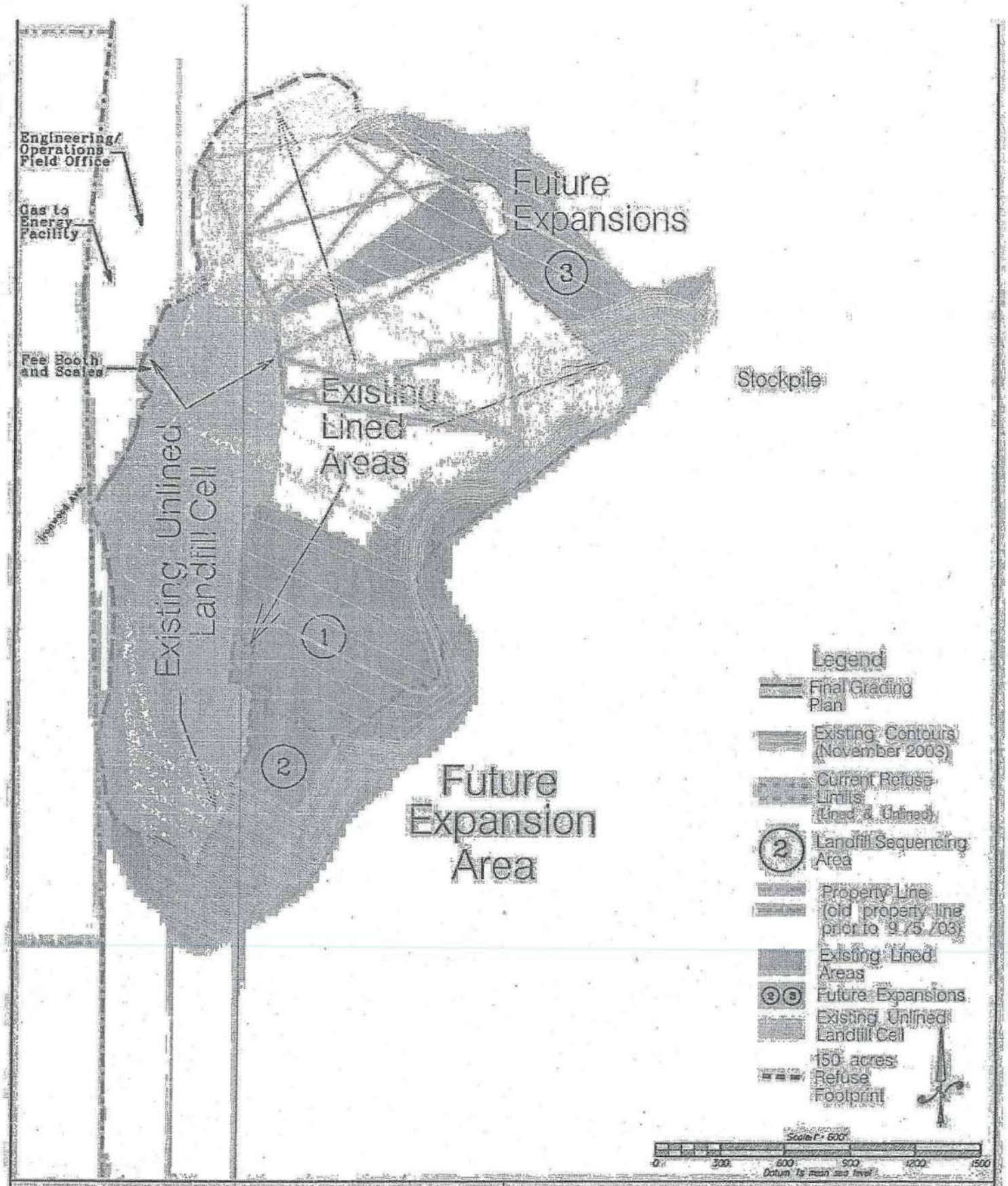
Sample: CDG#1
Material: 2" Gravel

Test Specification: ASTM C136

Sieve	Mesh Opening (mm)	Percent Passing (%)
2 in	50.00	97 %
1 1/2 in	37.50	74 %
1 in	25.00	14 %
3/4 in	18.75	1 %
3/8 in	9.38	0 %
No. 4	4.75	0 %
No. 200	0.075	0



ALLWEST GEOSCIENCE Inc.



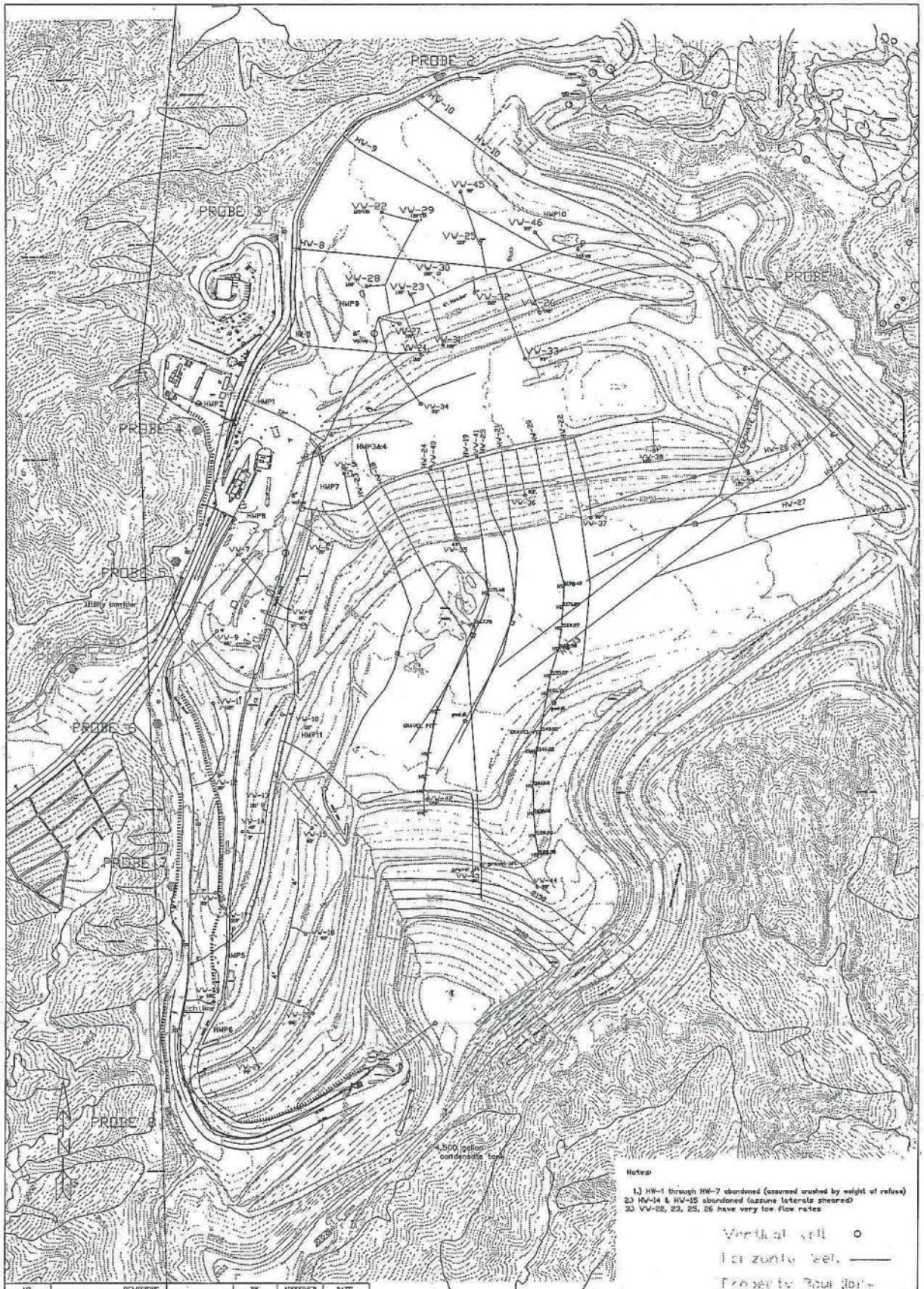
Riverside County
Waste Management Department

Badlands Sanitary Landfill

Landfill Sequencing

Figure 8

File Directory: sites/badlands/BDSL/2003-BDSL/F-08-FillSequencing.dgn		Date: October 2004	
Design by: EK	Drawn by: MWM	Photo Date: Nov. 03	Scale: 1"=600'



NO.	REVISIONS	BY	APPROVED	DATE
1	Entire gas collection system update	Mark Hurt		2/7/05
2	HW wells 21,22	Noah Rau		4/25/06
3	2007 Phase 3 Construction Update	Noah Rau		11/01/07

SCALED:	DESIGNED BY:	
MODED: wmin5	DRAWN BY:	KNR
DIRECTORY: environ/sites/badlands	COMPUTED BY:	MH
DIRECTORY: gassysm/2007	DATE:	7 September 2007
FILE: 0907_gas_ system	DATE OF PHOTOGRAPHY:	2006
	PEN TABLE:	/fs_usr3/tables/notill.pen

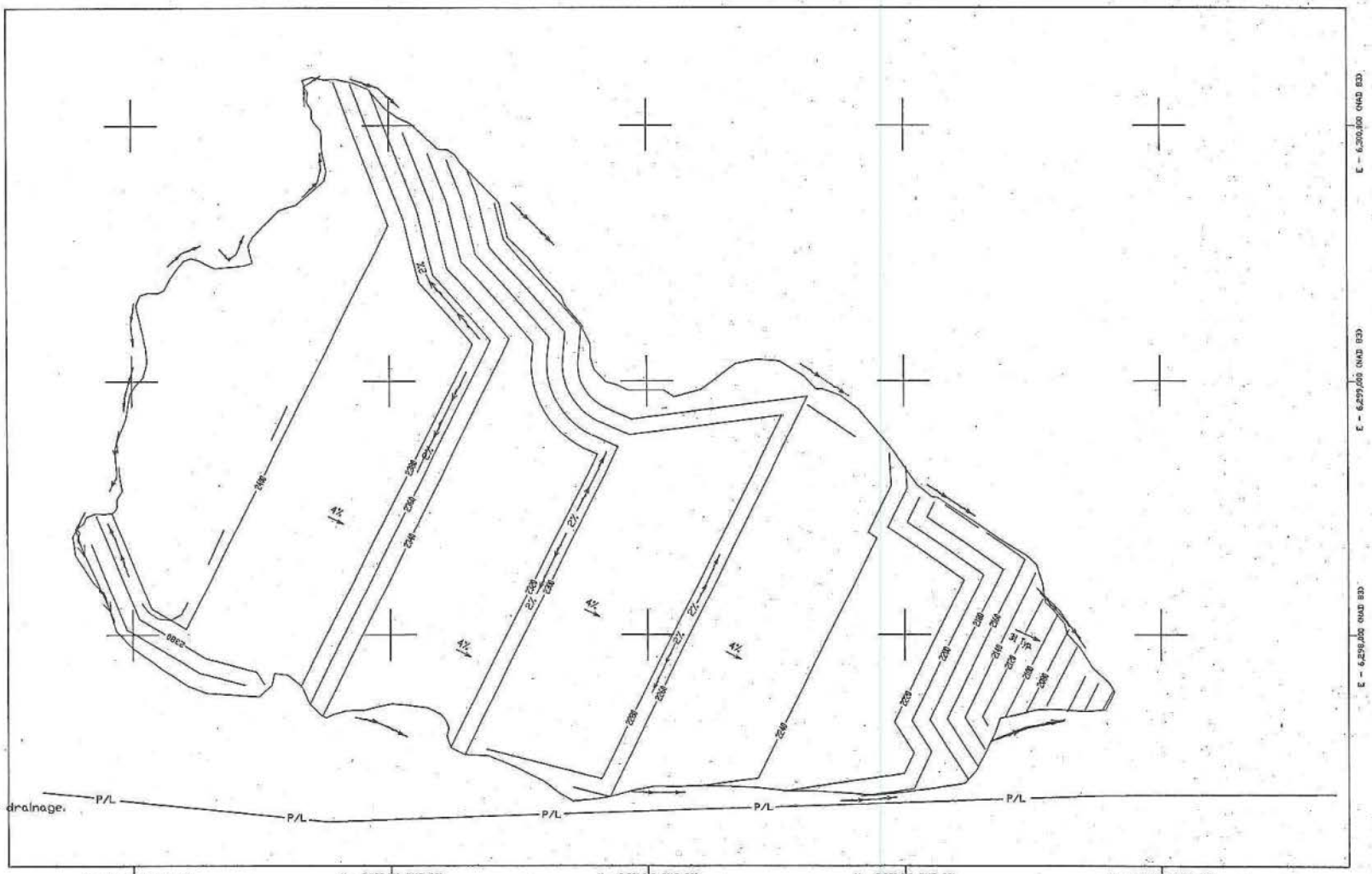
Hans V. Kemkamp, General Manager/Chief Engineer

0 150 300 450 600 750

Datum is mean sea level

Badlands Sanitary Landfill
Gas Collection System
& Probe Location Map

Figure 3



LEGEND

- Watershed Limits
- Final Fill Grade
- Limits of Fill
- Existing Topography
- Drainage Path

NOTES:

1) Finished terraces on 4% slope.
2) Faces on 3: 1 (H: V) slope.
3) 2% cross slope on benches for drainage.

NO.	REVISIONS	BY	APPROVED	DATE

DESIGNED BY:	FM
DRAWN BY:	HVM & FM
CHECKED BY:	TCG
DATE:	6 Sep 91
DATE OF PHOTOGRAPHY:	Feb 95
PEN/QUEUE:	nofill.pen/v85pw

Riverside County Waste Resources Management District

Robert A. Nelson, Chief Executive Officer

Scale: 1" = 200'.

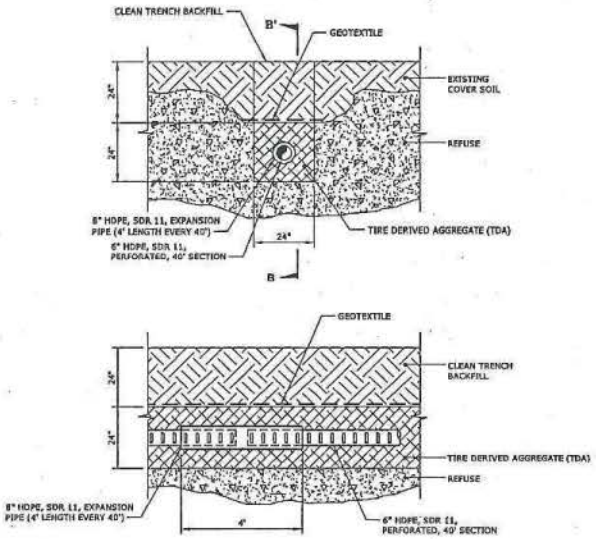
0 200 400 600 800 1000

Datum is mean sea level Contour Interval is 20 feet

Badlands Sanitary Landfill
Report of Disposal Site Information

Grading Plan

SCALE:	1"=200'
MODE:	wmfs
DIRECTORY:	/usr3/sites/badlands
DIRECTORY:	/rdsl
FILE:	ba9507rdsl.dgn
SHEET:	OF



SECTION B-B'

NOTES:
A. WELL PIPE AND GRAVEL CROSS SECTION SHALL BE PLACED BELOW THE COVER SOIL AND WITHIN TRASH.
B. PERFORATION SHALL BE: ¼" WIDE X 1" LONG AT 1.5" O.C. INTERVALS; 4 ROWS OF SLOTS AT 90 DEG INTERVALS; PERPENDICULAR TO THE PIPE; AND COMPLETELY PENETRATE THE THICKNESS OF THE PIPE.

SECTION A-01

TYPICAL LANDFILL GAS HORIZONTAL WELL CROSS SECTION

GEOTEXTILE SPECIFICATIONS

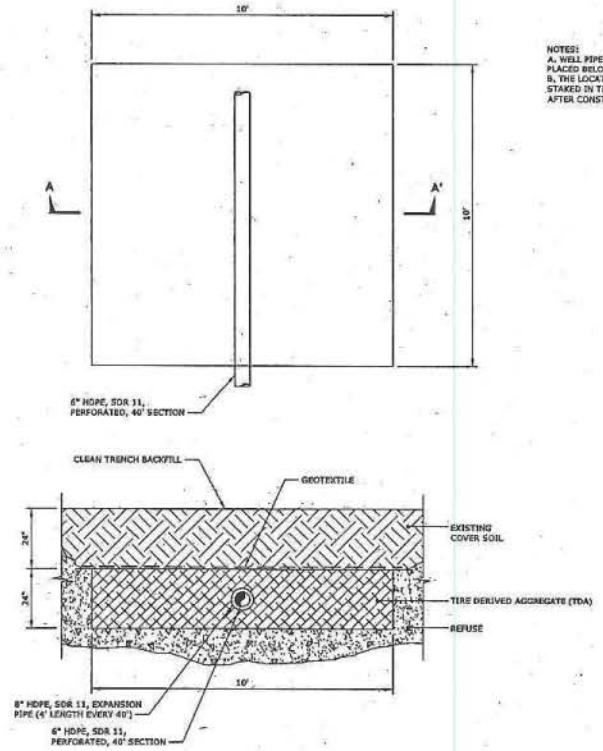
1. THE GEOTEXTILE SHALL BE OF WOVEN NEEDLE-PUNCHED, POLYESTER FABRIC, TREVIRIA SPUNBOUND TYPE TYPE 1135 OR APPROVED EQUAL.

2. THE GEOTEXTILE FIBERS SHALL BE UNIFORM IN THICKNESS AND SURFACE TEXTURE.

3. THE GEOTEXTILE SHALL BE FREE OF ANY CHEMICAL TREATMENT OR COATING THAT REDUCES PERMEABILITY AND SHALL BE INERT TO CHEMICALS COMMONLY FOUND IN SOILS.

4. THE GEOTEXTILE SHALL BE A MINIMUM OF 125 MILS THICK AND CONFORM TO THE MINIMUM PHYSICAL PROPERTIES LISTED BELOW:

PHYSICAL PROPERTY	TEST METHOD	RESULTS
FABRIC WEIGHT	ASTM D-3776	10 OZ/CY
GRAB TENSILE STRENGTH	ASTM D-4632	305 LB.
GRAB ELONGATION	ASTM D-4632	60 LB.
MULLEN BURST STRENTH	ASTM D-3786	510 PSI.
TRAPEZOID STRENGTH	ASTM D-4533	100 LB.



NOTES:
A. WELL PIPE AND GRAVEL CROSS SECTION SHALL BE PLACED BELOW THE COVER SOIL AND WITHIN TRASH.
B. THE LOCATION OF THE AGGREGATE PIT WILL BE STAKED IN THE FIELD BY THE COUNTY PRIOR AND AFTER CONSTRUCTION.

SECTION A-A'

SECTION B-01

TYPICAL LANDFILL GAS HORIZONTAL WELL AGGREGATE PIT AND GEOTEXTILE SPCIFICATIONS CROSS SECTION

REFERENCE NOTES:
1. DETAILS WERE TAKEN FROM HARD COPY DRAWINGS PROVIDED BY RIVERSIDE COUNTY - BADLANDS SANITARY LANDFILL 2007 PHASE 3 - GAS COLLECTION SYSTEM, TYPICAL HORIZONTAL WELL DETAILS SHEET 3 OF 9, 2 APRIL 2007.

NO.	DATE	REVISION DESCRIPTION	DRAWN BY	DESIGNED BY	CHECKED BY	APPROVED BY
-	1/29/08	DATE OF CONSTRUCTION	JPV	JA	JPP	BWP
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

KENNEC INC.
913 HIGHLAND POINTE DR., SUITE 150, ROSEVILLE, CA 95678

PROJECT CONTACT: MICHAEL WATSON 916.899.9012
PROJECT NUMBER: CD43.004.0701.003

KENNEC
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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD
31125 IRONWOOD ROAD
MORENO VALLEY, RIVERSIDE COUNTY, CALIFORNIA

BADLANDS LANDFILL
DETAILS

F3
DRAWING NO.

REDUCTION SCALE CHECK
SCALE = 1"

PRINTED: JAN 29, 2008-2:12pm

Vol. $CH_4 = M L_o k (e^{-kt})$

Badlands

Assume 4 years to reach maximum gas production after placement of refuse

L_o (Ft^3 CH_4/Lb. refuse)	1.5
k (year^{-1})	0.013
Collection efficiency	98 %
CH_4 Conc.	45 %
L_o	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (ft^3 CH_4)	Yield (ft^3 CH_4)
1966	5,000	5,000	24,700,000	13,436,990
1967	5,000	10,000	24,700,000	13,260,607
1968	5,000	15,000	24,700,000	13,143,413
1969	7,500	22,500	37,050,000	19,491,459
1970	7,500	30,000	37,050,000	19,264,832
1971	7,500	37,500	37,050,000	19,035,260
1972	10,000	47,500	49,400,000	25,070,946
1973	10,000	57,500	49,400,000	24,784,085
1974	12,500	70,000	61,750,000	30,847,269
1975	12,500	82,500	61,750,000	30,144,228
1976	15,000	97,500	74,100,000	35,683,092
1977	15,000	112,500	74,100,000	35,186,700
1978	20,000	132,500	98,800,000	46,245,984
1979	20,000	152,500	98,800,000	45,565,795
1980	25,000	177,500	123,500,000	56,097,022
1981	30,000	207,500	148,200,000	66,270,653
1982	35,000	242,500	172,900,000	76,078,328
1983	40,000	282,500	197,600,000	85,517,147
1984	50,000	332,500	247,000,000	105,084,195
1985	55,000	387,500	271,700,000	112,573,018
1986	70,000	457,500	345,800,000	141,943,462
1987	75,000	532,500	370,500,000	149,266,757
1988	83,000	625,500	409,400,000	161,526,388
1989	112,454	737,998	555,740,120	215,233,081
1990	127,825	865,823	631,455,500	239,548,031
1991	99,889	964,712	496,511,660	181,355,316
1992	48,290	1,013,002	238,552,600	86,637,794
1993	71,084	1,084,086	351,154,960	124,626,578
1994	94,688	1,178,772	467,748,640	162,111,234
1995	97,513	1,276,285	481,714,220	160,873,572
1996	115,732	1,392,017	571,716,080	186,491,374
1997	211,163	1,603,180	1,043,145,220	334,881,624
1998	449,871	2,053,051	2,222,362,740	693,481,190
1999	403,106	2,456,157	1,991,543,640	603,635,788
2000	503,287	2,959,544	2,486,731,780	731,336,639
2001	500,493	3,460,037	2,472,386,020	704,492,849
2002	469,705	3,929,742	2,320,242,700	638,855,791
2003	455,549	4,385,291	2,250,412,060	599,240,008
2004	545,930	4,931,211	2,696,894,200	692,466,331
2005	876,849	5,808,060	4,331,634,660	1,070,451,143
2006	676,578	6,484,638	3,339,331,320	792,815,935
2007	675,978	7,160,616	3,339,331,320	759,575,902
2008	675,978	7,836,594	3,339,331,320	726,193,545
2009	675,978	8,511,572	3,339,331,320	692,193,257
2010	675,978	9,187,550	3,339,331,320	657,839,156
2011	675,978	9,863,528	3,339,331,320	623,035,587
2012	675,978	10,539,506	3,339,331,320	587,776,618
2013	675,978	11,215,484	3,339,331,320	552,056,289
2014	675,978	11,891,462	3,339,331,320	515,868,566
2015	675,978	12,567,440	3,339,331,320	479,207,330
2016	675,978	13,243,418	3,339,331,320	442,066,567
2017	675,978	13,919,396	3,339,331,320	404,439,460
2018	675,978	14,595,374	3,339,331,320	366,320,190
2019	675,978	15,271,352	3,339,331,320	327,702,134
2020	675,978	15,947,330	3,339,331,320	288,576,766
2021	675,978	16,623,308	3,339,331,320	248,943,473
2022	675,978	17,299,286	3,339,331,320	208,789,558
2023	675,978	17,975,264	3,339,331,320	168,110,205
2024	675,978	18,651,242	3,339,331,320	126,898,528
2025	675,978	19,327,220	3,339,331,320	85,147,772
2026	675,978	20,003,198	3,339,331,320	42,850,613

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Vol. CH4 (Ft³/Yr.	318953	629812	938630	1401936	1859258	2310673	2914734	3510993	4259027	4995413	5861751	6756641	7837184	8902479	10069977	12334876	14394230	16743938	19857202	22929278	27070462	31475115	36983907	43617793	51157330

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
LFG Flow (CFM)*	1	2	3	4	5	7	8	10	12	14	17	19	23	26	30	35	41	48	57	66	78	90	106	125	147
mmbtu/hr	23,838	47,068	70,595	105,449	139,638	173,787	219,219	264,064	320,249	375,708	443,370	508,171	589,960	664,603	794,951	927,713	1,082,598	1,259,321	1,481,437	1,724,524	2,035,984	2,367,281	2,780,076	3,269,519	3,847,571
gross power (kWh)	2	4	7	10	13	16	20	24	30	35	41	47	55	63	74	86	100	117	137	160	189	219	257	304	356

$Vol.\ CH_4 = M\ L_o\ k\ (e^{-kt})$

L_o (Ft^3 CH_4/Lb refuse)	1.8
k (year^{-1})	0.013
Collection efficiency	58 %
CH_4 Conc.	45 %
L_0	2,500 ft^3/ton

Assume 4 years to rea

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)
1966	5,000	5,000	24,700,000	13,435,900
1967	5,000	10,000	24,700,000	13,290,607
1968	5,000	15,000	24,700,000	13,143,413
1969	7,500	22,500	37,050,000	19,491,439
1970	7,500	30,000	37,050,000	19,264,832
1971	7,500	37,500	37,050,000	19,035,260
1972	10,000	47,500	49,400,000	25,070,245
1973	10,000	57,500	49,400,000	24,756,065
1974	12,500	70,000	61,750,000	30,547,269
1975	12,500	82,500	61,750,000	30,144,226
1976	15,000	97,500	74,100,000	35,683,092
1977	15,000	112,500	74,100,000	35,186,700
1978	20,000	132,500	98,800,000	46,245,084
1979	20,000	152,500	98,800,000	45,565,795
1980	25,000	177,500	123,500,000	56,097,022
1981	30,000	207,500	148,200,000	66,270,553
1982	35,000	242,500	172,900,000	76,079,728
1983	40,000	282,500	197,600,000	85,517,167
1984	50,000	332,500	247,000,000	105,084,185
1985	55,000	387,500	271,700,000	113,573,018
1986	70,000	457,500	345,800,000	141,943,452
1987	75,000	532,500	370,500,000	149,255,757
1988	93,000	625,500	459,420,000	181,520,368
1989	112,498	737,998	555,740,120	215,233,081
1990	127,825	865,823	631,455,500	239,548,031
1991	98,889	964,712	488,511,660	181,395,316
1992	48,290	1,013,002	238,552,600	86,637,794
1993	71,084	1,084,086	351,154,960	124,636,578
1994	94,686	1,178,772	467,748,840	162,111,234
1995	97,513	1,276,285	481,714,220	162,873,572
1996	115,732	1,392,017	571,716,080	188,401,374
1997	211,163	1,603,180	1,043,145,220	334,691,524
1998	449,871	2,053,051	2,222,362,740	693,481,190
1999	403,106	2,456,157	1,991,343,640	603,635,768
2000	503,387	2,959,544	2,486,731,780	731,338,539
2001	500,483	3,460,027	2,472,386,020	704,492,845
2002	469,705	3,929,732	2,320,342,700	639,655,791
2003	455,549	4,385,281	2,250,412,060	599,240,008
2004	545,930	4,931,211	2,696,894,200	692,466,331
2005	876,849	5,808,060	4,331,634,060	1,070,451,143
2006	675,978	6,484,038	3,339,331,320	792,615,935
2007	675,978	7,160,016	3,339,331,320	759,575,902
2008	675,978	7,835,994	3,339,331,320	726,163,545
2009	675,978	8,511,972	3,339,331,320	692,193,207
2010	675,978	9,187,950	3,339,331,320	657,839,156
2011	675,978	9,863,928	3,339,331,320	623,635,587
2012	675,978	10,539,906	3,339,331,320	587,776,618
2013	675,978	11,215,884	3,339,331,320	552,656,289
2014	675,978	11,891,862	3,339,331,320	515,888,566
2015	675,978	12,567,840	3,339,331,320	479,207,330
2016	675,978	13,243,818	3,339,331,320	442,066,357
2017	675,978	13,919,796	3,339,331,320	404,439,460
2018	675,978	14,595,774	3,339,331,320	366,320,190
2019	675,978	15,271,752	3,339,331,320	327,702,134
2020	675,978	15,947,730	3,339,331,320	288,578,766
2021	675,978	16,623,708	3,339,331,320	248,943,473
2022	675,978	17,299,686	3,339,331,320	208,789,558
2023	675,978	17,975,664	3,339,331,320	168,110,235
2024	675,978	18,651,642	3,339,331,320	126,898,628
2025	675,978	19,327,620	3,339,331,320	85,147,772
2026	675,978	20,003,598	3,339,331,320	42,850,613

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
1966	229007	226049	223130	220248	217403	214595	211823	209087	206387
1967	232004	229007	226049	223130	220248	217403	214595	211823	209087
1968	235039	232004	229007	226049	223130	220248	217403	214595	211823
1969	357172	352559	348005	343511	339074	334694	330371	326104	321893
1970	361846	357172	352559	348005	343511	339074	334694	330371	326104
1971	366580	361846	357172	352559	348005	343511	339074	334694	330371
1972	495169	488774	482461	476229	470079	464007	458014	452098	446259
1973	501649	495169	488774	482461	476229	470079	464007	458014	452098
1974	635266	627061	618962	610967	603076	595287	587598	580009	572518
1975	643579	635266	627061	618962	610967	603076	595287	587598	580009
1976	782399	772294	762319	752473	742754	733161	723691	714344	705118
1977	792637	782399	772294	762319	752473	742754	733161	723691	714344
1978	1070678	1056849	1043199	1029725	1016425	1003297	990339	977548	964922
1979	1084687	1070678	1056849	1043199	1029725	1016425	1003297	990339	977548
1980	1373600	1355859	1338347	1321061	1303996	1287156	1270531	1254121	1237923
1981	1669888	1646320	1627031	1606016	1585273	1564798	1544587	1524636	1504946
1982	1973695	1948203	1923040	1898203	1873686	1849485	1826590	1802018	1778744
1983	2265166	2255652	2228518	2197760	2169374	2141355	2113698	2086387	2059450
1984	2893834	2856458	2819564	2783147	2747201	2711718	2676694	2642122	2607997
1985	3224870	3183218	3142104	3101521	3061462	3021921	2982890	2944363	2906334
1986	4158085	4104380	4051368	3999041	3947390	3896406	3846081	3796405	3747371
1987	4513365	4455091	4397550	4340752	4284687	4229347	4174721	4120801	4067577
1988	5669629	5596596	5524313	5452962	5382532	5313012	5244390	5176654	5109793
1989	6948285	6858542	6769958	6682518	6596207	6511012	6426916	6343907	6261970
1990	7998240	7894936	7792966	7692313	7592960	7494891	7398088	7302535	7208218
1991	6268627	6187653	6107744	6028857	5950989	5874127	5798257	5723368	5649446
1992		3061129	3021592	2982566	2944043	2906018	2868485	2831496	2794665
1993			4506053	4447854	4390406	4333700	4277727	4222476	4167909
1994				6002197	5924673	5848151	5772617	5698059	5624463
1995					6161402	6101564	6022757	5944968	5868183
1996						7336314	7241559	7148028	7055706
1997							13385737	13212849	13042194
1998								28517567	28149238
1999									25553108
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Year	2004	2005	2006	2007	2008	2009	2010	2011	2012
1966	203721	201090	198493	195929	193398	190901	188435	186001	183589
1967	206387	203721	201090	198493	195929	193398	190901	188435	186001
1968	209087	206387	203721	201090	198493	195929	193398	190901	188435
1969	317735	313631	309580	305582	301635	297739	293894	290098	286351
1970	321893	317735	313631	309580	305582	301635	297739	293894	290098
1971	326104	321893	317735	313631	309580	305582	301635	297739	293894
1972	440495	434806	429190	423647	418175	412774	407442	402180	396986
1973	446259	440495	434806	429190	423647	418175	412774	407442	402180
1974	565123	557824	550619	543507	536488	529558	522719	515967	509303
1975	572518	565123	557824	550619	543507	536488	529558	522719	515967
1976	696011	687021	678148	669389	660743	652209	643785	635470	627262
1977	705118	696011	687021	678148	669389	660743	652209	643785	635470
1978	952459	940157	928014	916028	904197	892518	880991	869612	858380
1979	964922	952459	940157	928014	916028	904197	892518	880991	869612
1980	1221934	1206152	1190574	1175196	1160018	1145035	1130246	1115848	1101238
1981	1485508	1466321	1447363	1428688	1410236	1392021	1374042	1356295	1338777
1982	1755770	1733093	1710708	1688613	1666803	1645275	1624025	1603049	1582344
1983	2032850	2006594	1980677	1955095	1929843	1904918	1880314	1856028	1832056
1984	2574312	2541063	2508243	2475847	2443859	2412304	2381147	2350353	2320035
1985	2868796	2831743	2795169	2759067	2723431	2688256	2653535	2619262	2585432
1986	3698971	3651196	3604037	3557488	3511540	3466165	3421417	3377228	3333608
1987	4015041	3963183	3911995	3861469	3811594	3762384	3713770	3665803	3618456
1988	5043798	4978551	4914347	4850874	4788221	4726377	4665332	4605075	4545598
1989	6181091	6101257	6022454	5944669	5867886	5792100	5717280	5643446	5570558
1990	7115116	7023218	6932507	6842968	6754585	6667344	6581229	6496227	6412323
1991	5576478	5504453	5433358	5363182	5293912	5225536	5158044	5091423	5025663
1992	2758767	2723135	2687964	2653246	2618977	2585151	2551762	2518803	2486271
1993	4114107	4060969	4008518	3956745	3905640	3855195	3805402	3756252	3707737
1994	5551819	5480112	5409332	5339466	5270502	5202429	5135235	5068909	5003439
1995	5792391	5717577	5643730	5570836	5498884	5427861	5357755	5288555	5220249
1996	6964575	6874521	6785630	6698185	6611672	6526277	6441984	6358780	6275651
1997	12873742	12707467	12543339	12381331	12221415	12063565	11907754	11753955	11602142
1998	27785666	27426790	27072550	26722884	26377735	26037044	25700753	25368805	25041145
1999	25223088	24897290	24575720	24258303	23944986	23635716	23330440	23029108	22731687
2000	31909975	31497830	31091009	30689441	30293061	29901800	29515592	29134373	28758077
2001		31725889	31316122	30911647	30512396	30118302	29729299	29345319	28966299
2002			29774655	29390287	29010686	28635988	28266129	27901048	27540682
2003				28877499	28504521	28136360	27772935	27414243	27060164
2004					34606799	34159822	33718619	33283114	32853233
2005						55583934	54866920	54157378	53457888
2006							42850613	42297160	41758055
2007								42850613	42297160
2008									42850613
Vol. CH4 (Ft^3)/Yr.	173471606	202956959	230110449	256015872	287316005	339189005	377658898	415831522	453113884

	1995	1996	1997	1998	1999	2000	2001	2002	2003
LFG Flow (CFM)'	163	170	181	186	211	229	265	343	412
mmbtu/hr	4,269,343	4,444,430	4,725,929	5,116,218	5,515,143	5,995,679	6,924,986	8,980,368	10,788,242
gross power (kWh)	395	412	438	474	511	555	641	832	999

	2004	2005	2006	2007	2008	2009	2010	2011	2012
LFG Flow (CFM)'	499	584	662	736	826	975	1,086	1,195	1,303
mmbtu/hr	13,046,895	15,264,505	17,306,734	19,255,095	21,609,196	25,510,593	28,403,920	31,259,877	34,078,947
gross power (kWh)	1208	1413	1602	1783	2001	2362	2630	2894	3155

Vol. CH_4=M L_o k (e^{-kt})

L_o (Ft^3 CH_4/Lb. refuse)	1.9
k ($year^{-1}$)	0.013
Collection efficiency	48 %
CH_4 Conc.	45 %
L_o	2,600 ft^3/ton

Assume 4 years to rea

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)
1966	5,000	5,000	24,700,000	13,435,900
1967	5,000	10,000	24,700,000	13,290,607
1968	5,000	15,000	24,700,000	13,143,413
1969	7,500	22,500	37,050,000	19,491,439
1970	7,500	30,000	37,050,000	19,284,832
1971	7,500	37,500	37,050,000	19,035,260
1972	10,000	47,500	49,400,000	25,870,245
1973	10,000	57,500	49,400,000	24,756,085
1974	12,500	70,000	61,750,000	30,547,269
1975	12,500	82,500	61,750,000	30,144,226
1976	15,000	97,500	74,100,000	35,880,092
1977	15,000	112,500	74,100,000	35,186,700
1978	20,000	132,500	98,800,000	46,245,084
1979	20,000	152,500	98,800,000	45,565,795
1980	25,000	177,500	123,500,000	56,097,022
1981	30,000	207,500	148,200,000	66,270,653
1982	35,000	242,500	172,900,000	76,078,728
1983	40,000	282,500	197,600,000	85,517,167
1984	50,000	332,500	247,000,000	105,084,185
1985	55,000	387,500	271,700,000	113,573,016
1986	70,000	457,500	345,800,000	141,943,462
1987	75,000	532,500	370,500,000	149,255,757
1988	93,000	625,500	459,420,000	181,528,088
1989	112,498	737,998	555,740,120	215,333,061
1990	127,825	865,823	631,455,500	235,548,031
1991	98,889	964,712	488,511,660	181,395,316
1992	48,290	1,013,002	238,552,600	86,637,794
1993	71,084	1,084,086	351,154,960	124,836,578
1994	94,686	1,178,772	467,748,840	162,111,234
1995	97,513	1,276,285	481,714,220	162,873,572
1996	115,732	1,392,017	571,716,080	188,401,374
1997	211,163	1,603,180	1,043,145,220	334,881,624
1998	449,871	2,053,051	2,222,362,740	693,481,190
1999	403,106	2,456,157	1,991,343,640	603,635,768
2000	503,387	2,959,544	2,486,731,780	731,338,839
2001	500,483	3,460,027	2,472,386,020	704,492,849
2002	469,705	3,929,732	2,320,342,700	639,655,791
2003	455,549	4,385,281	2,250,412,060	599,240,008
2004	545,930	4,931,211	2,696,894,200	632,466,331
2005	876,849	5,808,060	4,331,634,060	1,070,451,143
2006	675,978	6,484,038	3,339,331,320	792,615,835
2007	675,978	7,160,016	3,339,331,320	759,575,902
2008	675,978	7,835,994	3,339,331,320	726,103,545
2009	675,978	8,511,972	3,339,331,320	692,183,207
2010	675,978	9,187,950	3,339,331,320	657,839,156
2011	675,978	9,863,928	3,339,331,320	623,035,587
2012	675,978	10,539,906	3,339,331,320	587,776,818
2013	675,978	11,215,884	3,339,331,320	552,056,289
2014	675,978	11,891,862	3,339,331,320	515,868,566
2015	675,978	12,567,840	3,339,331,320	479,207,330
2016	675,978	13,243,818	3,339,331,320	442,066,987
2017	675,978	13,919,796	3,339,331,320	404,439,460
2018	675,978	14,595,774	3,339,331,320	366,320,190
2019	675,978	15,271,752	3,339,331,320	327,702,134
2020	675,978	15,947,730	3,339,331,320	288,578,766
2021	675,978	16,623,708	3,339,331,320	248,943,473
2022	675,978	17,299,686	3,339,331,320	208,789,558
2023	675,978	17,975,664	3,339,331,320	168,110,235
2024	675,978	18,651,642	3,339,331,320	126,898,628
2025	675,978	19,327,620	3,339,331,320	85,147,772
2026	675,978	20,003,598	3,339,331,320	42,850,613

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
1966	181227	178887	176576	174296	172044	169822	167629	165464	163327
1967	183599	181227	178887	176576	174296	172044	169822	167629	165464
1968	186001	183599	181227	178887	176576	174296	172044	169822	167629
1969	282652	279002	275398	271841	268330	264864	261443	258067	254733
1970	286351	282652	279002	275398	271841	268330	264864	261443	258067
1971	290098	286351	282652	279002	275398	271841	268330	264864	261443
1972	391858	386797	381801	376870	372002	367197	362455	357773	353152
1973	396986	391858	386797	381801	376870	372002	367197	362455	357773
1974	502725	496232	489823	483496	477251	471087	465003	458997	453069
1975	509303	502725	496232	489823	483496	477251	471087	465003	458997
1976	619161	611164	603270	595478	587787	580195	572702	565305	558003
1977	627262	619161	611164	603270	595478	587787	580195	572702	565305
1978	847293	836350	825548	814885	804360	793971	783716	773594	763602
1979	858380	847293	836350	825548	814885	804360	793971	783716	773594
1980	1087015	1072975	1059117	1045437	1031935	1018606	1005450	992464	979645
1981	1321486	1304418	1287570	1270940	1254525	1238321	1222327	1206540	1190957
1982	1561907	1541734	1521821	1502165	1482763	1463612	1444708	1426049	1407630
1983	1808393	1785037	1761981	1739224	1716760	1694587	1672700	1651095	1629770
1984	2290070	2260492	2231296	2202477	2174030	2145950	2118233	2090875	2063869
1985	2552039	2519077	2486541	2454425	2422724	2391433	2360545	2330057	2299962
1986	3290550	3248049	3206098	3164689	3123814	3083467	3043641	3004330	2965527
1987	3571721	3525589	3480053	3435105	3390738	3346943	3303715	3261044	3218925
1988	4486886	4428934	4371730	4315268	4259530	4204515	4150210	4096606	4043695
1989	5498607	5427588	5357486	5288290	5219987	5152566	5086016	5020326	4955484
1990	6329502	6247751	6167056	6087403	6008779	5931170	5854564	5778947	5704307
1991	4960752	4896680	4833435	4771007	4709385	4648560	4588519	4529255	4470756
1992	2454158	2422461	2391173	2360289	2329803	2299712	2270009	2240690	2211750
1993	3659848	3612578	3565919	3519862	3474400	3429525	3385228	3341506	3298348
1994	4938816	4875027	4812061	4749909	4688560	4628003	4568229	4509228	4450986
1995	5152825	5086272	5020578	4955733	4891726	4828545	4766180	4704621	4643856
1996	6195583	6115561	6036574	5958606	5881646	5805679	5730694	5656677	5583616
1997	11452291	11304374	11158369	11014249	10871990	10731569	10592961	10456144	10321094
1998	24717717	24398467	24083339	23772282	23465249	23162189	22863009	22567714	22276232
1999	22438068	22148261	21862197	21579827	21301105	21025983	20754414	20486353	20221754
2000	28386642	28020004	27658101	27300873	26948258	26600198	26256634	25917507	25582760
2001	28592174	28222881	27858358	27498544	27143376	26792796	26446744	26105161	25767990
2002	27184970	26833853	26487270	26145164	25807477	25474151	25145130	24820359	24499783
2003	26710659	26365666	26025132	25688995	25357200	25029688	24706409	24387305	24072321
2004	32428906	32010058	31596621	31188523	30785696	30388072	29995584	29608165	29225750
2005	52767433	52085896	51413162	50749117	50093648	49446645	48807999	48177601	47555346
2006	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943
2007	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927
2008	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270
2009	42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056
2010		42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368
2011			42850613	42297160	41750855	41211607	40679323	40153915	39635292
2012				42850613	42297160	41750855	41211607	40679323	40153915
2013					42850613	42297160	41750855	41211607	40679323
2014						42850613	42297160	41750855	41211607
2015							42850613	42297160	41750855
2016								42850613	42297160
2017									42850613
2018									
2019									
2020									
2021									
2022									
2023									
2024									
2025									
2026									
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Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
1966	161217	159135	157080	155051	153048	151071	149120	147194	145293
1967	163327	161217	159135	157080	155051	153048	151071	149120	147194
1968	165464	163327	161217	159135	157080	155051	153048	151071	149120
1969	251443	248196	244990	241826	238702	235619	232576	229572	226607
1970	254733	251443	248196	244990	241826	238702	235619	232576	229572
1971	258067	254733	251443	248196	244990	241826	238702	235619	232576
1972	348591	344089	339645	335258	330928	326653	322434	318270	314159
1973	353152	348591	344089	339645	335258	330928	326653	322434	318270
1974	447217	441441	435739	430111	424556	419072	413660	408317	403043
1975	453069	447217	441441	435739	430111	424556	419072	413660	408317
1976	550796	543682	536660	529729	522887	516133	509467	502887	496391
1977	558003	550796	543682	536660	529729	522887	516133	509467	502887
1978	753740	744004	734395	724910	715547	706305	697182	688178	679289
1979	763602	753740	744004	734395	724910	715547	706305	697182	688178
1980	966992	954503	942175	930006	917994	906137	894433	882881	871478
1981	1175574	1160391	1145403	1130609	1116007	1101592	1087364	1073320	1059457
1982	1389449	1371503	1353789	1336304	1319044	1302008	1285191	1268592	1252207
1983	1608720	1587942	1567432	1547188	1527204	1507479	1488009	1468790	1449819
1984	2037212	2010900	1984928	1959290	1933984	1909005	1884349	1860011	1835987
1985	2270256	2240934	2211990	2183420	2155220	2127383	2099906	2072784	2046012
1986	2927224	2889417	2852097	2815260	2778899	2743007	2707578	2672608	2638089
1987	3177350	3136312	3095804	3055819	3016350	2977391	2938936	2900977	2863508
1988	3991467	3939914	3889027	3838796	3789215	3740274	3691965	3644280	3597211
1989	4891480	4828302	4765940	4704384	4643623	4583648	4524445	4466008	4408325
1990	5630631	5557907	5486122	5415264	5345321	5276281	5208134	5140866	5074467
1991	4413012	4356014	4299752	4244217	4189400	4135290	4081679	4029158	3977118
1992	2183185	2154985	2127152	2099678	2072559	2045790	2019367	1993285	1967540
1993	3255747	3213696	3172188	3131217	3090774	3050854	3011450	2972555	2934161
1994	4393497	4336751	4280739	4225449	4170874	4117003	4063829	4011341	3959531
1995	4583877	4524672	4466232	4408547	4351607	4295402	4239923	4185161	4131106
1996	5511499	5440313	5370047	5300688	5232225	5164646	5097940	5032096	4967102
1997	10187788	10056204	9926319	9798112	9671561	9546645	9423342	9301631	9181492
1998	21988515	21704515	21424182	21147470	20874332	20604722	20338594	20075903	19816605
1999	19960573	19702765	19448288	19197095	18949148	18704403	18462820	18224356	17988973
2000	25252336	24926180	24604237	24286452	23972772	23663142	23357513	23055830	22758044
2001	25435175	25106657	24782383	24462297	24146345	23834475	23526632	23222765	22922823
2002	24183347	23870998	23562083	23258351	22957949	22661427	22368736	22079824	21794644
2003	23761407	23454506	23151572	22852550	22557389	22266041	21978456	21694585	21414381
2004	28848274	28475674	28107886	27744846	27386499	27032779	26683627	26338985	25998795
2005	46941127	46334842	45736388	45145663	44562567	43987003	43418873	42858081	42304532
2006	36661235	36187724	35720328	35258969	34803569	34354051	33910339	33472357	33040033
2007	37140943	36661235	36187724	35720328	35258969	34803569	34354051	33910339	33472357
2008	37626927	37140943	36661235	36187724	35720328	35258969	34803569	34354051	33910339
2009	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569	34354051
2010	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969	34803569
2011	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328	35258969
2012	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724	35720328
2013	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235	36187724
2014	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943	36661235
2015	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927	37140943
2016	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270	37626927
2017	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056	38119270
2018	42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368	38618056
2019		42850613	42297160	41750855	41211607	40679323	40153915	39635292	39123368
2020			42850613	42297160	41750855	41211607	40679323	40153915	39635292
2021				42850613	42297160	41750855	41211607	40679323	40153915
2022					42850613	42297160	41750855	41211607	40679323
2023						42850613	42297160	41750855	41211607
2024							42850613	42297160	41750855
2025								42850613	42297160
2026									42850613
Vol. CH4 (Ft^3)/Yr.	802316700	834804699	866873086	898527283	929772639	960614433	991057880	1021108123	1050770240

	2013	2014	2015	2016	2017	2018	2019	2020	2021
LFG Flow (CFM)*	1,409	1,514	1,618	1,720	1,821	1,921	2,019	2,116	2,212
mmbtu/hr	36,861,606	39,608,324	42,319,567	44,995,791	47,637,450	50,244,990	52,818,650	55,359,467	57,867,270
gross power (kWh)	3413	3667	3918	4166	4411	4652	4891	5128	5358

	2022	2023	2024	2025	2026	2027	2028	2029	2030
LFG Flow (CFM)*	2,307	2,400	2,492	2,583	2,673	2,762	2,849	2,936	3,021
mmbtu/hr	60,342,683	62,786,123	65,198,004	67,578,734	69,928,714	72,248,343	74,536,011	76,798,107	79,029,011
gross power (kWh)	5587	5814	6037	6257	6475	6690	6902	7111	7318

Vol. $CH_4 = M\ L_o\ k\ (e^{-kt})$

Assume 4 years to rep

L_o (Ft^3 CH_4/Lb. refuse)	1.0
k (year^{-1})	0.013
Collection efficiency	60 %
CH_4 Conc	45 %
L_o	2,600 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)	
1966	5,000	5,000	24,700,000	13,435,900	
1967	5,000	10,000	24,700,000	13,290,807	
1968	5,000	15,000	24,700,000	13,147,413	
1969	7,500	22,500	37,050,000	19,491,430	
1970	7,500	30,000	37,050,000	19,284,832	
1971	7,500	37,500	37,050,000	19,095,260	
1972	10,000	47,500	49,400,000	25,070,245	
1973	10,000	57,500	49,400,000	24,756,085	
1974	12,500	70,000	61,750,000	30,547,269	
1975	12,500	82,500	61,750,000	30,144,226	
1976	15,000	97,500	74,100,000	35,683,092	
1977	15,000	112,500	74,100,000	35,186,700	
1978	20,000	132,500	98,800,000	46,245,064	
1979	20,000	152,500	98,800,000	45,565,795	
1980	25,000	177,500	123,500,000	56,097,022	
1981	30,000	207,500	148,200,000	66,279,653	
1982	35,000	242,500	172,900,000	76,079,728	
1983	40,000	282,500	197,600,000	85,517,187	
1984	50,000	332,500	247,000,000	105,684,185	
1985	55,000	387,500	271,700,000	113,573,018	
1986	70,000	457,500	345,800,000	141,943,462	
1987	75,000	532,500	370,500,000	149,255,757	
1988	93,000	625,500	459,420,000	181,626,388	
1989	112,495	737,995	555,740,120	215,233,051	
1990	127,825	865,823	631,455,550	239,548,031	
1991	98,689	964,712	486,511,660	181,395,316	
1992	48,290	1,013,002	238,552,600	85,637,754	
1993	71,064	1,084,066	351,154,950	124,636,578	
1994	94,685	1,178,772	467,748,840	162,111,234	
1995	97,513	1,276,285	481,714,220	162,873,572	
1996	115,732	1,392,017	571,716,080	188,491,374	
1997	211,163	1,603,180	1,042,145,220	334,491,624	
1998	449,871	2,053,051	2,222,362,740	693,481,190	
1999	403,106	2,456,157	1,991,343,640	603,635,788	
2000	603,387	2,959,544	2,486,731,780	731,338,639	
2001	500,483	3,460,027	2,472,386,020	704,492,849	
2002	469,705	3,929,732	2,320,342,700	639,455,731	
2003	455,549	4,385,281	2,250,412,060	599,240,069	
2004	545,930	4,931,211	2,696,894,200	692,466,331	
2005	876,849	5,808,060	4,331,534,060	1,070,451,143	
2006	675,976	6,484,036	3,339,331,320	792,615,935	
2007	675,976	7,160,016	3,339,331,320	759,575,992	
2008	675,976	7,835,994	3,339,331,320	726,103,645	
2009	675,976	8,511,972	3,339,331,320	692,193,287	
2010	675,976	9,187,950	3,339,331,320	657,838,166	
2011	675,976	9,863,928	3,339,331,320	623,035,587	
2012	675,976	10,539,906	3,339,331,320	587,776,618	
2013	675,976	11,215,884	3,339,331,320	552,056,289	
2014	675,976	11,891,862	3,339,331,320	515,868,566	
2015	675,976	12,567,840	3,339,331,320	479,207,330	
2016	675,976	13,243,818	3,339,331,320	442,066,287	
2017	675,976	13,919,796	3,339,331,320	404,439,440	
2018	675,976	14,595,774	3,339,331,320	366,320,190	
2019	675,976	15,271,752	3,339,331,320	327,702,134	
2020	675,976	15,947,730	3,339,331,320	288,578,756	
2021	675,976	16,623,708	3,339,331,320	248,943,473	
2022	675,976	17,299,686	3,339,331,320	208,789,556	
2023	675,976	17,975,664	3,339,331,320	168,110,030	
2024	675,976	18,651,642	3,339,331,320	126,898,608	
2025	675,976	19,327,620	3,339,331,320	85,147,772	
2026	675,976	20,003,598	3,339,331,320	42,850,613	
					Vol. CH_4 (Ft^3/Yr.

LFG Flow (CFM)*
metafuhr
gross power (kWh)

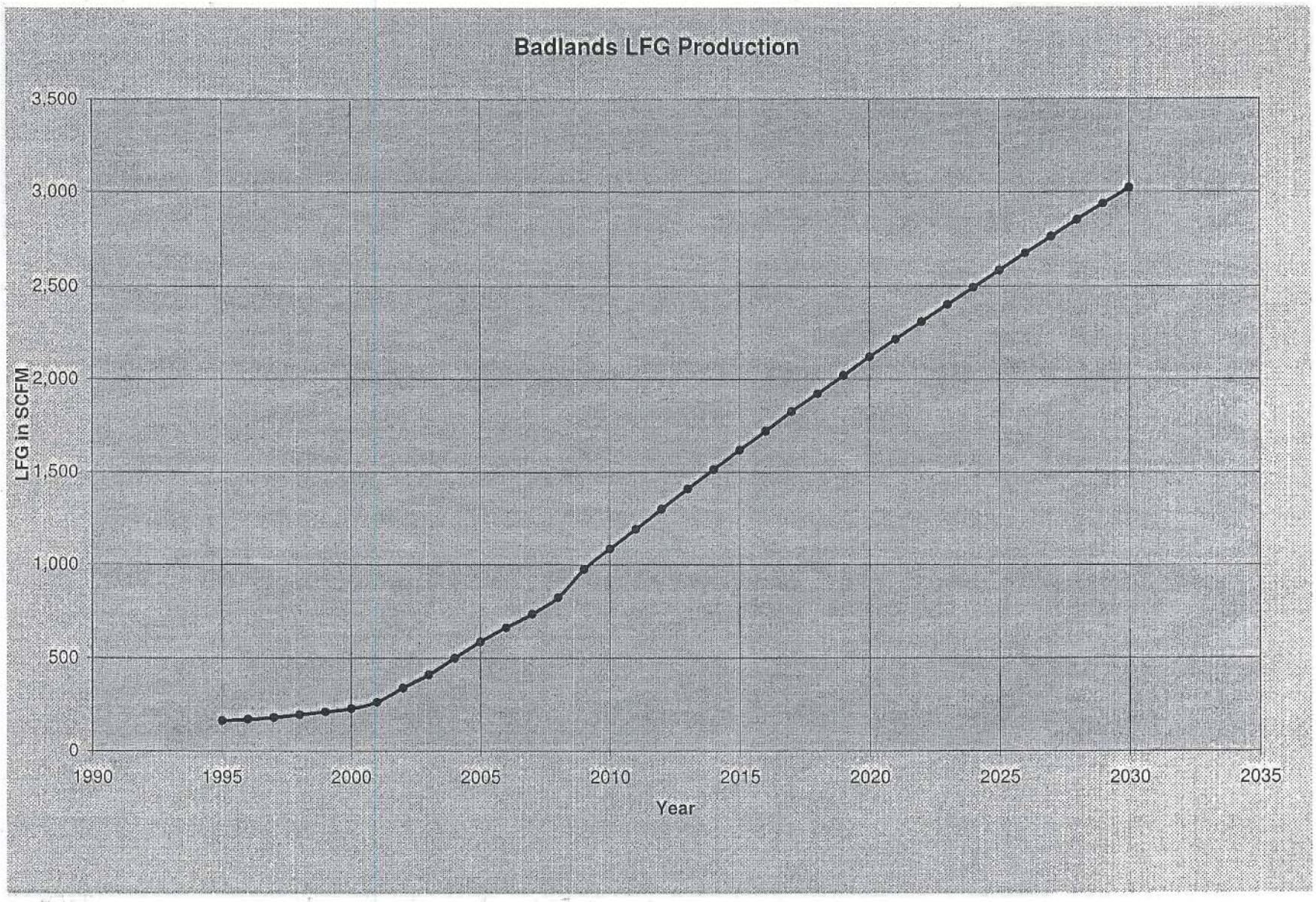
$$\text{Vol. } CH_4 = M\, L_o\, k\, (e^{-kt})$$

Assume 4 years to rea

L_o (Ft^3 CH_4/Lb. refuse)	1.8
k (year^{-1})	0.013
Collection efficiency:	68 %
CH_4 Conc.	45 %
L_o	2,500 ft^3/ton

Year	Tonnage Placed	Cumulative Tonnage	CH_4 Potential (Ft^3 CH_4)	Yield (Ft^3 CH_4)	
1966	5,000	5,000	24,700,000	12,435,900	
1967	5,000	10,000	24,700,000	13,290,607	
1968	5,000	15,000	24,700,000	13,140,413	
1969	7,500	22,500	37,050,000	19,461,439	
1970	7,500	30,000	37,050,000	19,264,832	
1971	7,500	37,500	37,050,000	19,035,260	
1972	10,000	47,500	49,400,000	25,070,245	
1973	10,000	57,500	49,400,000	24,766,085	
1974	12,500	70,000	61,750,000	30,547,269	
1975	12,500	82,500	61,750,000	30,144,236	
1976	15,000	97,500	74,100,000	35,663,092	
1977	15,000	112,500	74,100,000	35,186,780	
1978	20,000	132,500	98,800,000	46,245,084	
1979	20,000	152,500	98,800,000	45,585,795	
1980	25,000	177,500	123,500,000	56,897,622	
1981	30,000	207,500	148,200,000	66,270,653	
1982	35,000	242,500	172,900,000	76,079,728	
1983	40,000	282,500	197,600,000	85,517,167	
1984	50,000	332,500	247,000,000	105,064,185	
1985	55,000	387,500	271,700,000	113,573,018	
1986	70,000	457,500	345,800,000	141,943,462	
1987	75,000	532,500	370,500,000	149,255,757	
1988	83,000	615,500	409,420,000	161,524,366	
1989	112,498	727,998	555,740,120	215,233,081	
1990	127,825	855,823	631,455,500	239,548,031	
1991	99,889	964,712	488,511,660	181,595,316	
1992	49,290	1,013,002	238,552,600	86,637,794	
1993	71,084	1,084,086	351,154,960	124,636,578	
1994	94,686	1,178,772	467,748,840	162,111,234	
1995	97,513	1,276,285	481,714,220	162,873,572	
1996	115,732	1,392,017	571,716,080	188,401,374	
1997	211,163	1,603,180	1,043,145,220	334,691,624	
1998	449,871	2,053,051	2,222,362,740	693,481,190	
1999	403,108	2,456,157	1,991,343,640	603,635,786	
2000	503,387	2,959,544	2,486,731,780	731,338,639	
2001	500,483	3,460,027	2,472,386,020	704,492,849	
2002	469,795	3,929,732	2,320,342,700	639,655,751	
2003	455,549	4,385,281	2,250,412,060	599,240,008	
2004	545,930	4,931,211	2,696,594,200	692,466,331	
2005	876,849	5,808,060	4,331,534,060	1,070,451,143	
2006	675,978	6,484,038	3,339,331,320	792,615,935	
2007	675,978	7,160,016	3,339,331,320	759,575,902	
2008	675,978	7,835,994	3,339,331,320	725,103,645	
2009	675,978	8,511,972	3,339,331,320	690,193,267	
2010	675,978	9,187,950	3,339,331,320	657,839,166	
2011	675,978	9,863,928	3,339,331,320	625,035,887	
2012	675,978	10,539,906	3,339,331,320	587,776,618	
2013	675,978	11,215,884	3,339,331,320	552,056,289	
2014	675,978	11,891,862	3,339,331,320	515,868,566	
2015	675,978	12,567,840	3,339,331,320	479,207,320	
2016	675,978	13,243,818	3,339,331,320	442,066,367	
2017	675,978	13,919,796	3,339,331,320	404,439,460	
2018	675,978	14,595,774	3,339,331,320	366,320,190	
2019	675,978	15,271,752	3,339,331,320	327,702,134	
2020	675,978	15,947,730	3,339,331,320	288,576,766	
2021	675,978	16,623,708	3,339,331,320	248,943,473	
2022	675,978	17,299,686	3,339,331,320	208,788,558	
2023	675,978	17,975,664	3,339,331,320	168,110,235	
2024	675,978	18,651,642	3,339,331,320	126,898,626	
2025	675,978	19,327,620	3,339,331,320	85,147,772	
2026	675,978	20,003,598	3,339,331,320	42,850,615	
					Vol. CH4 (Ft³)/Yr.

LFG Flow (CFM)*
mmbtu/hr
gross power (kWh)


Badlands LFG Production
LFG in SCFM
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
Year

Riverside County
Waste Management Department

Yearly Landfilled Tons Summary

Location selected: (Badlands)

Daterange selected: 01/01/1966 - 10/24/2007

Badlands

	Days	IN County	Min	Max	Avg	OUT of County	Min	Max	Avg	Total Landfilled	Min	Max	Avg
1989	76	32,448.69	87.87	674.65	426.96	0.00	0.00	0.00	0.00	32,448.69	87.87	674.65	426.96
1990	307	127,824.96	38.32	870.81	416.37	0.00	0.00	0.00	0.00	127,824.96	38.32	870.81	416.37
1991	307	98,889.44	49.73	622.37	322.12	0.00	0.00	0.00	0.00	98,889.44	49.73	622.37	322.12
1992	308	48,289.53	34.02	351.16	156.78	0.00	0.00	0.00	0.00	48,289.53	34.02	351.16	156.78
1993	307	71,084.25	28.32	733.14	231.54	0.00	0.00	0.00	0.00	71,084.25	28.32	733.14	231.54
1994	308	94,655.54	39.43	487.12	307.32	0.00	0.00	0.00	0.00	94,655.54	39.43	487.12	307.32
1995	307	97,513.29	19.48	953.91	317.63	0.00	0.00	0.00	0.00	97,513.29	19.48	953.91	317.63
1996	308	115,731.91	38.91	887.42	375.75	0.00	0.00	0.00	0.00	115,731.91	38.91	887.42	375.75
1997	308	211,162.87	16.79	1,672.32	685.59	0.00	0.00	0.00	0.00	211,162.87	16.79	1,672.32	685.59
1998	308	449,871.15	16.05	2,838.34	1,460.62	0.00	0.00	0.00	0.00	449,871.15	16.05	2,838.34	1,460.62
1999	308	403,105.95	375.46	3,252.45	1,308.79	0.00	0.00	0.00	0.00	403,105.95	375.46	3,252.45	1,308.79
2000	307	503,387.14	66.13	2,525.24	1,639.70	0.00	0.00	0.00	0.00	503,387.14	66.13	2,525.24	1,639.70
2001	307	500,482.51	66.24	2,508.79	1,630.24	0.00	0.00	0.00	0.00	500,482.51	66.24	2,508.79	1,630.24
2002	309	469,705.38	-6.86	2,191.79	1,520.08	0.00	0.00	0.00	0.00	469,705.38	-6.86	2,191.79	1,520.08
2003	309	455,549.43	-21.58	2,236.71	1,474.27	3.62	0.00	2.20	0.01	455,553.05	-21.58	2,236.71	1,474.28
2004	311	545,930.02	0.00	2,988.21	1,755.40	36.24	0.00	2.10	0.12	545,966.26	0.00	2,989.70	1,755.52
2005	309	876,849.16	0.00	4,001.96	2,837.70	419.10	0.00	24.49	1.36	877,268.26	0.00	4,004.25	2,839.06
2006	308	675,978.40	-0.23	4,007.83	2,194.74	125.94	0.00	21.66	0.41	676,104.34	0.00	4,007.97	2,195.14
2007	230	466,385.74	354.33	2,954.07	2,027.76	62.46	0.00	17.94	0.27	466,448.20	354.38	2,956.59	2,028.04

Total for Badlands

	5,542	6,244,845.36	-21.58	4,007.83	1,126.82	647.36	0.00	24.49	0.12	6,245,492.72	-21.58	4,007.97	1,126.94

Daterange found: 10/02/1989 - 09/29/2007

*** NOTE: The IN and OUT-of-County totals, for the date range selected, are NOT FINALIZED, and may change later.
The Total-Landfilled values are final.

Yearly Landfilled Tons Summary

Location selected: (Badlands)

Daterange selected: 01/01/1966 - 10/24/2007

	Days	IN County	Min	Max	Avg	OUT of County	Min	Max	Avg	Total Landfilled	Min	Max	Avg
Report Total:	5,542	6,244,845.36	-21.58	4,007.83	1,126.82	647.36	0.00	24.49	0.12	6,245,492.72	-21.58	4,007.97	1,126.94
Location found:	(Badlands)												
Daterange found:	10/02/1989 - 09/29/2007												

*** NOTE: The IN and OUT-of-County totals, for the date range selected, are NOT FINALIZED, and may change later.
The Total-Landfilled values are final.

MATERIAL SPECIFICATIONS FOR USE OF TIRE DERIVED AGGREGATE (TDA) IN CIVIL ENGINEERING APPLICATIONS

Prepared by:
Dana N. Humphrey, Ph.D., P.E.
University of Maine

Revised: July 13, 2001

Revised to replace tire shred with TDA: January 25, 2005

TDA, General. The material shall be made from scrap tires which shall be shredded into the sizes specified herein. They shall be produced by a shearing process. TDA produced by a hammer mill will not be allowed. The TDA shall be free of all contaminants such as oil, grease, gasoline, diesel fuel, etc., that could leach into the groundwater or create a fire hazard. In no case shall the TDA contain the remains of tires that have been subjected to a fire because the heat of a fire may liberate liquid petroleum products from the tire that could create a fire hazard when the shreds are placed in a fill. The TDA shall be free from fragments of wood, wood chips, and other fibrous organic matter. The TDA shall have less than 1% (by weight) of metal fragments that are not at least partially encased in rubber. Metal fragments that are partially encased in rubber shall protrude no more than 25 mm (1 in.) from the cut edge of the TDA on 75% of the pieces (by weight) and no more than 50 mm (2 in.) on 90% of the pieces (by weight). The gradation shall be measured in accordance with AASHTO T-27, "Standard Method for Sieve Analysis of Fine and Coarse Aggregate", except that the minimum sample size shall be 12 kilograms (30 pounds).

TDA, Type A. Type A TDA shall have a maximum dimension, measured in any direction, of 203 mm (8 in.). In addition, Type A TDA shall have 100% passing the 102 mm (4 in.) square mesh sieve, a minimum of 95% passing (by weight) the 75 mm (3 in.) square mesh sieve, a minimum of 50% passing (by weight) the 38 mm (1.5 in.) square mesh sieve, and a maximum of 5% passing (by weight) the No. 4 sieve.

TDA, Type B. A minimum of 90 percent (by weight) shall have a maximum dimension, measured in any direction, of 300 mm (12 in.) and 100 percent shall have a maximum dimension, measured in any direction, of 450 mm (18 in.). At least one side wall shall be severed from the tread of each tire. A minimum of 75% (by weight) shall pass the 203 mm (8 in.) square mesh sieve, a maximum of 50% (by weight) shall pass the 76 mm (3-in.) square mesh sieve, a maximum of 25% (by weight) shall pass the 38 mm (1.5-in.) square mesh sieve, and a maximum of 1% (by weight) shall pass the No. 4 sieve (4.75 mm; 0.187 in.).

KENNEC

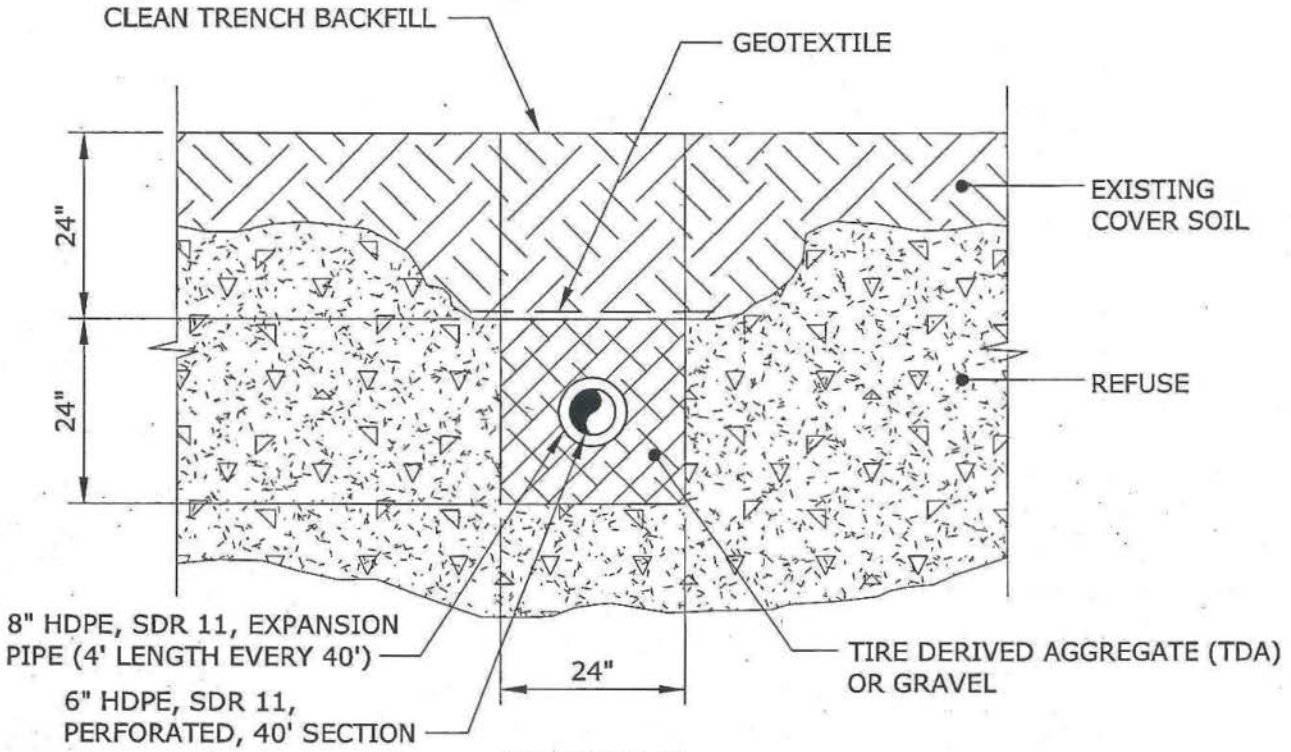
Material Delivery Log

Client: CIWMB
Site: Badlands Landfill-Riverside County
Project: TDA vs. Gravel in a LFG Trench
Date: October 31, 2007

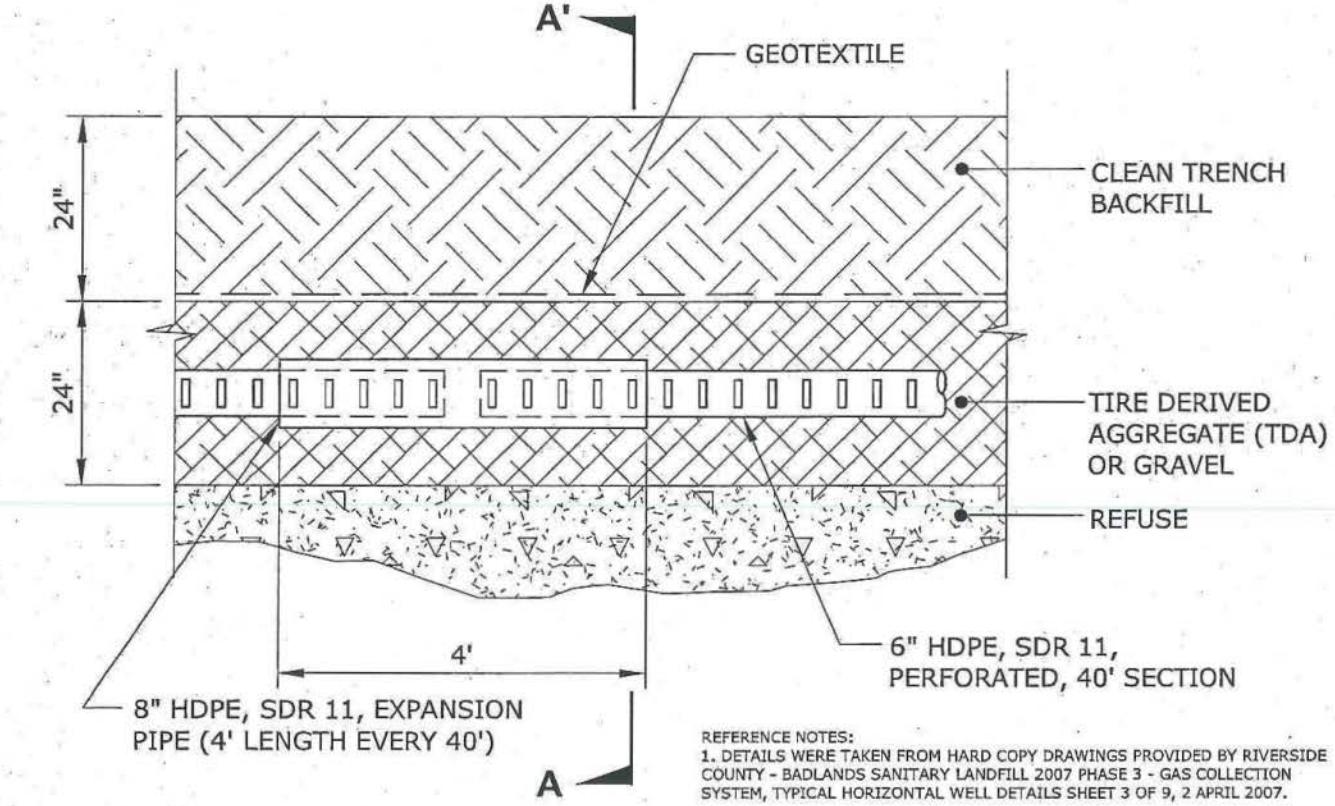
TDA Delivery Log from Lakin Tire West, Inc.				
#	Date	Trailer Number	Material Weight (weighed tons)	Notes
1	8/9/2007	L-28	25.10	2 Pass
2	8/10/2007	L-28	25.18	2 Pass
3	8/10/2007	L-26	24.88	2 Pass
4	8/14/2007	L-28	25.02	2 Pass
5	8/14/2007	L-24	24.79	2 Pass
6	8/15/2007	L-24	25.30	50/50 Mix-2 Pass and 2 Inch
7	8/16/2007	L-4	22.11	50/50 Mix-2 Pass and 2 Inch
8	8/20/2007	*	25.00	50/50 Mix-2 Pass and 2 Inch
Total Material Delivered			124.97	2 Pass TDA
Total Material Delivered			72.41	50/50 Mix-2 Pass and 2 Inch TDA
Total Material Delivered			197.38	All TDA

*Scale house lost the delivery ticket but this material was the last TDA delivered

Gravel Delivery from CDG Materials Inc.				
#	Date	Ticket Number	Material Weight (tons, T&T)	Notes
1	8/16/2007	118278	25.00	2 inch rock
2	8/16/2007	118668	25.00	3 inch rock
3	8/17/2007	118281	25.00	2 inch rock
4	8/17/2007	118985	25.00	2 inch rock
5	8/21/2007	118292	25.00	2-3 inch rock
6	8/21/2007	115141	25.00	2-3 inch rock
7	8/21/2007	119072	25.00	2-3 inch rock
8	8/22/2007	115143	25.00	1.5 inch rock
9	8/23/2007	Lost Ticket	25.00	1.5 inch rock
10	8/23/2007	115146	25.00	1.5 inch rock
11	8/23/2007	115145	25.00	1.5 inch rock
12	8/27/2007	119178	25.00	1.5 inch rock
Total Material Delivered			300.00	All Gravel



SECTION A-A'



REFERENCE NOTES:
1. DETAILS WERE TAKEN FROM HARD COPY DRAWINGS PROVIDED BY RIVERSIDE COUNTY - BADLANDS SANITARY LANDFILL 2007 PHASE 3 - GAS COLLECTION SYSTEM, TYPICAL HORIZONTAL WELL DETAILS SHEET 3 OF 9, 2 APRIL 2007.

DATE OF ISSUE	1/29/08
REV. DATE	–
DRAWN BY	JPJ
DESIGNED BY	–
CHECKED BY	JI
APPROVED BY	BMY
PROJECT NUMBER: C045.004.0701.003	

KENNEC

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CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD

BADLANDS LANDFILL

HORIZONTAL GAS COLLECTION WELL SECTIONS

5

FIGURE NO.

KENNEC INC.
915 HIGHLAND POINTE DR., SUITE 250, ROSEVILLE, CA 95678
PROJECT CONTACT: MICHAEL YACYSHYN 916.899.9052

Summary of Daily Construction Activities

Wednesday, August 15, 2007

Julian Ibarra was the CIWMB onsite representative from KENNEC
Met with Riverside County engineer, Noah Rau at site; Mr. Rau provided a tour of the site and it's facilities and
It was estimated by the County that 235 tons of TDA would be needed for 2,400 LF of HW trenching.

It was estimated by the County that 300 tons of gravel would be needed for 1,750 LF of HW trenching

Lakin Tire West, Inc. (Lakin) began delivery of TDA (6 loads) in early August and by August 15th 125 tons of 2 pass TDA material and 25 tons of a 50/50 2-pass and 2-inch mix had been delivered.
CDG Materials Inc. (CDG) was scheduled to begin delivery of 2-inch gravel today; however CDG was unable to provide any material until Thursday.

Stockpiled TDA (Location A) was observed and appeared to be larger than the specification for Type A TDA. In telephone discussions with CIWMB (Stacey Patenaude) I was informed that Lakin was aware of the material not meeting specification and that the TDA backfill at Badlands Landfill would not be Type A. The TDA backfill material was to be either entirely 2-pass material or a 50/50 mix of 2-pass and 2-inch material.
KENNEC will obtain samples of the delivered TDA material on Thursday.

Construction of the 3 horizontal LFG trenches (#23, #24 and #25) began at toe of slope adjacent to the Alternative Haul Route, at tie-in locations for each of the pipes. The method of construction was the same for all installations, only the drainage backfill material changed.
Method:

1. Excavator dug the trench;
2. Loader placed a 6 to 9 inch layer of drainage material (TDA or Gravel);
3. Laborer placed pipe;
4. Loader placed the remaining, 9 to 12 inches drainage material over the pipe;
5. Laborer placed geotextile and
6. Loader placed the remaining soil backfill material.
7. Each trench had a 10'x10' pit installed along the horizontal well; the corners of the pit were surveyed.

The immediate goal for the day was to complete as much of the installation so that the Alternative Haul Route could be utilized for daily operations and Active Landfill Area could be moved to the Temporary Landfill Area.

By the end of the day;
HW-24 had approximately 200-feet trenched with 150-feet filled with 2-pass TDA material.
HW-25, which was originally designated as a gravel trench, became a TDA trench due to the lack of gravel onsite. Approximately 300-feet of HW-25 was filled with 2-pass TDA material and completed up to the toe of slope near the Active Landfill Area.

Further installation would continue once daily operations were moved to the Temporary Landfill Area.

Thursday, August 16, 2007
Julian Ibarra was the CIWMB onsite representative from KENNEC
Senior Engineering Technician Art Fuentes was the Riverside County onsite representative.

KENNEC obtained samples of the 2-pass and 2-inch TDA material in 15-gallon containers. These will be delivered to AllWest's Corona, CA laboratory for analysis.

Lakin delivered one truck with a 50/50 mix of 2-inch and 2-pass material. The material was unloaded in a manner that created two distinct stockpiles of different materials.

In a telephone conversation with CDG, they were only able to supply two trucks with 25 tons each of gravel. The trucks arrived onsite at 12:15pm.
As a result of the limited gravel delivery the Contractor will be constructing HW-23 with the intention of using as much gravel as needed to completely fill the trench and have the Alternative Haul Route open for daily operations.

By the end of the day;
HW-23 was trenched to the edge of the Primary Haul Route, with construction complete under the Alternative Haul Route. The initial gravel bedding was placed as well as pipe but further installation was on hold until more gravel material was available onsite.
HW-24 was completed to the toe of slope/edge of the Primary Haul Route.
HW-25 was completed to the toe of slope/edge of the Primary Haul Route.
The Alternative Haul Route was available for daily operations.

Friday, August 17, 2007
Samples of 2-Pass and 2-Inch TDA were delivered to AllWest laboratory in Corona, CA.

Art Fuentes was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.

CDG was able to deliver two more trucks with 25 tons of gravel each to the site. As of 8/17/07 100 tons of gravel had been delivered.

Daily landfill operations had been moved to the Temporary Landfill Area and the Contractor began continued construction of HW-25 and HW-24.

Upon observation of the TDA stockpiled (Location B) the 2-pass material appeared to be larger than what was previously (Location A), including pieces as large as a quarter tire.

By the end of the day;
HW-25 was completely installed and surveyed by Riverside County.
HW-24 had approximately 150 feet of additional installation completed from the toe of slope.

Monday, August 20, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.

Contractor continued construction of HW-24 and began construction of HW-23.

Lakin had one truck deliver a load of the 50/50 TDA mix material. The truck had the bottom half loaded with the large 2-pass material and the top half with the smaller 2-inch material; the resulting stockpile ended up as a pile of 2-pass material covered with the smaller 2-inch material.

In discussions with the CIWMB, it was decided that HW's-24 and 25 would use the 2-Pass TDA Material and HW-27 would use the 50/50 TDA mix material.

In a telephone conversation with CDG, two trucks were supposed deliver gravel with the remaining quantities to be delivered by 8/23/07; the two trucks did not show up.

KENNEC collected 3 more samples of material to be delivered to AllWest. The samples included a 50/50 2-Pass and 2-inch TDA mix, a 2-Pass TDA only and a gravel sample.

By the end of the day;
HW-24 was completed and surveyed by Riverside County
HW-23 was completed to just past the Primary Haul Route

Tuesday, August 21, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra and Erik Korsmo were the CIWMB onsite representatives from KENNEC.

Contractor continued construction of HW-23 and began construction of HW-27 (TDA).

CDG delivered three trucks of gravel (75 tons) to the site in the morning and said that they would deliver three more trucks on Wednesday (8/222/07) morning.

HW-27 was constructed using the 50/50 TDA Material mix. The method of placement was to use the smaller 2-inch material on the bottom and fill the trench with the larger 2-pass material. A more accurate ratio representation would be 25/75 2-inch TDA to 2-pass TDA material.

By the end of the day;
HW- 23 was completed.
HW-27 was approximately 75% completed.

Wednesday, August 22, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.

Daily operations resumed at the Active Landfill Area via the Primary Haul Route.

Contractor continued the excavation and construction of HW-27 and began excavation of HW-26 (gravel).

CDG delivered two trucks (50 tons) of gravel to the site today.

There still appears to be a lot of TDA remaining and when they're finished with HW-27 it appears as though 40 tons of TDA will be remaining. This is 40 tons of the large 2-pass material and the delivery (25 tons) from Lakin on 8/20/07 was an additional order for the 50/50 mix material.

On this day the Contractor crew supervisor was not consistently present during the day and left the site prior to his crew completing work for the day. Without direct supervision the crew became less efficient and had poorer performance. Mr. Rau (County) had to frequently watch over and correct their actions; such as using dirty TDA material from the close in proximity stockpiles (Location C) rather than driving to the further stockpiles (Location B). The crew was also about to leave exposed refuse at the close of business. Mr. Rau's ensured that these actions were corrected.

By the end of the day;
HW-27 was completed.
HW-26 had approximately 200 feet completed.

Thursday, August 23, 2007
Noah Rau was the Riverside County onsite representative.
Julian Ibarra was the CIWMB onsite representative from KENNEC.
JP Javier was another CIWMB onsite representative from KENNEC.

Contractor continued the excavation and construction of HW-26. By 10:00am the onsite gravel supply was depleted. In a conversation with CDG, two trucks were to be delivered today and by 11:20am the first truck arrived with 25 tons of gravel. However, the driver was unaware of a second truck. KENNEC attempted to contact CDG and after multiple attempts it was verified that a second truck would be delivered. The second truck arrived onsite at 1:00pm with the second 25 tons of gravel. The completion of HW-26 was held up because of the lack of gravel material onsite.
Once again the gravel supply was depleted prior to completing the last 40-feet of trench. The County knew of a small stockpile of similar gravel onsite and gave the Contractor the approval to use that material. The material was slightly larger (approximately 3-4 inch gravel) and dirtier but CDG would not be able to supply any more gravel until the following Monday (8/27/07).
CDG agreed to supply one truck (25 tons) of gravel to the site on Monday to replace the County's stockpile.

The Contractor installed a 90-degree elbow to the eastern end of both HW-26 and HW-27's pipe.

By the end of the day;
HW-26 was completed
The project was completed but there were some discussions about using TDA in the construction of vertical wells onsite. KENNEC provided the specifications and details for what was required in a vertical well with TDA and Mr. Rau was to discuss this alternative with County Supervisor, Mark Hunt.

Appendix C
Analytical Data

Badlands Landfill

Landfill Gas Study - Well 26 Aggregate

	1-Mar-11	13-Apr-11	19-May-11	15-Jun-11
Description	Sample	Sample	Sample	Sample
Acetone	9975	8948	4993	3092
Benzene	10020	5395	5037	6167
Benzyl Chloride	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
2-Butanone (MEK)	17800	16240	9062	6150
Carbon Disulfide	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	462	1032	317	329
Chloroform	ND	ND	ND	ND
Chloromethane	192	315	127	142
1,2-Dibromoethane (EDB)	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	22.5	1.42	2.91	18.2
Dichlorodifluoromethane (F-12)	5530	5119	2361	2821
1,1-Dichloroethane	1240	1173	404	423
1,2-Dichloroethane	1480	878	1781	2039
1,1-Dichloroethene	ND	ND	ND	ND
cis-1,2-Dichloroethene	531	474	331	439
trans-1,2-Dichloroethene	276	157	62.9	94.5
1,2-Dichloropropane	435	228	276	171
cis-1,3-Dichloropropene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane (F-114)	263	174	92.5	122
Ethylbenzene	4430	2608	2160	2819
4-Ethyltoluene	159	128	51.5	251
Hexachloro-1,3-butadiene	ND	ND	ND	ND
Methylene Chloride	8020	4366	3574	2428
4-Methyl-2-Pantanone (MIBK)	263	4131	2065	2130
2-Hexanone (MBK)	ND	ND	ND	ND
Styrene	3010	1201	982	1707
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethane (PCE)	1950	1087	962	1286
Toluene	27420	12160	12660	14490
1,2,4-Trichlorobenzene	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2,-Trichloroethane	ND	ND	ND	ND

Badlands Landfill

Landfill Gas Study - Well 26 Aggregate

	1-Mar-11	13-Apr-11	19-May-11	15-Jun-11
Description	Sample	Sample	Sample	Sample
Trichloroethane (TCE)	639	241	643	646
Trichlorofluoromethane (F-11)	593	203	37.3	37.4
1,1,2-Trichlorotrifluoroethane (F-113)	ND	ND	ND	ND
1,2,4-Trimethylbenzene	196	37.4	63.3	186
1,3,5-Trimethylbenzene	145	35.3	45.6	115
Vinyl Acetate	ND	ND	ND	ND
Vinyl Chloride	149	145	46.7	65.4
m & p-Xylene	6110	4128	3769	4856
o-Xylene	716	405	928	721
Hydrogen Sulfide	7.26	18.6	11.2	3.66
Carbonyl Sulfide	ND	ND	0.018	ND
Methanethiol (Methy Marcaptan)	8.39	8.74	5.35	0.682
Ethanethoil (Ethyl Mercaptan)	ND	ND	ND	ND
Dimethyl Sulfide	18.6	9.22	5.1	4.23
Carbon Disulfide	0.048	0.057	0.021	0.019
Isopropyl Mercaptan	ND	ND	ND	ND
n-Propyl Mercaptan	ND	ND	ND	ND
Disulfide dimethyl	0.661	0.311	0.104	0.344
Oxygen	0.46	0.65	3.55	1.28
Nitrogen	5.58	28.1	29.5	10.7
Carbon Dioxide	52.9	41.8	41.2	59.8
Methane	40.3	28.7	24.5	27.1

Badlands Landfill

Landfill Gas Study - Well 27 TDA

	1-Mar-11	13-Apr-11	19-May-11	15-Jun-11
Description	Sample	Sample	Sample	Sample
Acetone	4070	4986	ND	3213
Benzene	2430	4133	102	6145
Benzyl Chloride	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
2-Butanone (MEK)	5530	7098	306	8460
Carbon Disulfide	ND	70.7	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	118	826	15.6	939
Chloroform	ND	ND	ND	ND
Chloromethane	316	173	ND	184
1,2-Dibromoethane (EDB)	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	5.85	1.13	ND	ND
Dichlorodifluoromethane (F-12)	1290	3455	101	3408
1,1-Dichloroethane	212	675	15.8	710
1,2-Dichloroethane	1010	1759	42	2889
1,1-Dichloroethene	ND	ND	ND	ND
cis-1,2-Dichloroethene	70.2	350	ND	300
trans-1,2-Dichloroethene	ND	89.8	ND	77.6
1.2-Dichloropropane	ND	103	ND	136
cis-1,3-Dichloropropene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane (F-114)	63.6	111	ND	122
Ethylbenzene	1000	1433	ND	2215
4-Ethyltoluene	42.4	87	ND	65.4
Hexachloro-1,3-butadiene	ND	ND	ND	ND
Methylene Chloride	4720	8512	361	9086
4-Methyl-2-Pantanone (MIBK)	937	1772	27.6	2584
2-Hexanone (MBK)	ND	ND	ND	ND
Styrene	612	613	ND	996
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethane (PCE)	617	892	ND	1218
Toluene	7180	8481	142	12780
1,2,4-Trichlorobenzene	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2,-Trichloroethane	ND	ND	ND	ND

Badlands Landfill

Landfill Gas Study - Well 27 TDA

	1-Mar-11	13-Apr-11	19-May-11	15-Jun-11
Description	Sample	Sample	Sample	Sample
Trichloroethane (TCE)	308	385	ND	606
Trichlorofluoromethane (F-11)	240	563	32	65.8
1,1,2-Trichlorotrifluoroethane (F-113)	ND	25.8	ND	ND
1,2,4-Trimethylbenzene	70.8	41.5	ND	99.5
1,3,5-Trimethylbenzene	40	30.3	ND	61.7
Vinyl Acetate	ND	ND	ND	ND
Vinyl Chloride	23	102	ND	92.4
m & p-Xylene	2030	2498	ND	3979
o-Xylene	418	420	ND	784
Hydrogen Sulfide	ND	ND	ND	ND
Carbonyl Sulfide	ND	ND	ND	ND
Methanethiol (Methy Marcaptan)	10.5	26.8	ND	ND
Ethanethoil (Ethyl Mercaptan)	ND	ND	ND	ND
Dimethyl Sulfide	4.23	7.87	0.607	5.18
Carbon Disulfide	0.018	0.047	ND	0.036
Isopropyl Mercaptan	ND	ND	ND	ND
n-Propyl Mercaptan	ND	ND	ND	ND
Disulfide dimethyl	0.312	0.742	ND	0.906
Oxygen	15.1	5.08	19.2	1.18
Nitrogen	65.6	18.9	78.2	10.5
Carbon Dioxide	11.9	47.5	1.15	60.2
Methane	6.79	27.9	0.775	26.5

Analytical Report

March 1, 2011

AccuLabs, Inc. Tel.: (626) 447-1888 • (626) 447-1826
Fax: (626) 447-1841
118 La Porte Street Unit C&D Arcadia, CA 91006

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client Name / Address: Scs Field Services

Project Name / Number / Location: Moreno Valley Badlands landfill

Project Manager: Carl Cortez

Phone:

Cell:

Sampler: Efrain Lopez

Fax:

E-mail: ccortez@scseng.com

ANALISIS REQUIRED: VOCs by EPA TO15; Sulfate scan by ASTM-D5504; Fixed Gases by ASTM-D1946

Client Sample ID / Description	Laboratory ID	**Sample Matrix	Container Type	# of Containers	Sampling Date	Sampling Time	VOCs by EPA TO15	Sulfate scan by ASTM-D5504	Fixed Gases by ASTM-D1946								Special Instructions / Preservatives If Any
H27	11030001-01	Gas	6L S.C	1	3-1	1206	X	X	X								End Time 1:25 pm
H26	-02	Gas	6L S.C	1	3-1	1212	X	X	X								End Time 1:25 pm

Relinquished by: Company: SCS Field Services
Print: Efrain Lopez Date: 3-1-11
Sign: [signature] Time: 305 pm

Received by: Company: SCS - FS
Print: E. MARTINEZ Date: 3-1-11
Sign: [signature] Time: 1518

Relinquished by: Company: SCS - FS
Print: E. MARTINEZ Date: 3-1-11
Sign: [signature] Time: 1605

Received by: Company: AccuLabs, INC.
Print: JUDY HSUE Date: 3-1-11
Sign: [signature] Time: 16:05

Client's P.O. Number:

** ABBREVIATIONS
A- Air
AQ - Aqueous
C - Composite
DW - Drinking Water
G - Grab
NA - Nonaqueous
S - Soil
SL - Sludge
WW - Waste Water
W - Water
GW - Ground Water

Turnaround Time: (Check)
Same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ Normal ✓

Sample Integrity: (Check)
Intact ____ Temperature ____

Note: Payment for service is due within 30 days from the date of invoice.
Samples will be disposed of after 30 days from the date of issuing the final report.

White - Accompany Lab Report to Client Canary - Client's Copy Pink - Lab's Chrono File

Environmental Consultants

3900 Kilroy Airport Way
Suite 100
Long Beach, CA 90806-6816

562 426-9544
FAX 562 492-6210
www.scsfieldservices.com

SCS FIELD SERVICES

TRANSMITTAL LETTER

TO: Kennec, Inc.
751 Fourth Street
Santa Rosa, CA 95404

DATE: 3/17/11

ATTENTION: Joaquin Wright

PROJECT: **Badlands LF LFG Sampling**

WE TRANSMIT BY:

☐ COURIER ☐ MAIL ☐ UPS FEDERAL EXPRESS ☐ FAX

THE FOLLOWING:

FOR YOUR:

☐ APPROVAL INFORMATION ☑ USE
☐ FILE ☐ REVIEW ☐ PER YOUR REQUEST

REMARKS:

Lab analysis of LFG sampling event on 3-1-11 by AccuLAbs

BY: _____
Carl Cortez
Project Manager

AccuLabs, Inc.

Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H26	AccuLabs ID: 11-03-0001-02
Sample Site: Badlands Landfill,	Date Sampled: 03/01/11	Date Reported: 03/04/11
Moreno Valley, CA	Date Received: 03/02/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11030001	0.63	200	**9975**	100	03/02/11	03/02/11
Benzene	TO-15	11030001	0.17	50	**10020**	100	03/02/11	03/02/11
Benzyl Chloride	TO-15	11030001	0.50	1	ND	1	03/02/11	03/02/11
Bromodichloromethane	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
Bromoform	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
Bromomethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
2-Butanone (MEK)	TO-15	11030001	0.56	200	**17800**	100	03/02/11	03/02/11
Carbon Disulfide	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
Carbon Tetrachloride	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11
Chlorobenzene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
Chloroethane	TO-15	11030001	0.30	5	**462**	10	03/02/11	03/02/11
Chloroform	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11
Chloromethane	TO-15	11030001	0.18	5	**192**	10	03/02/11	03/02/11
1,2-Dibromoethane (EDB)	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
Dibromochloromethane	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
1,2-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
1,3-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
1,4-Dichlorobenzene	TO-15	11030001	0.20	0.5	**22.5**	1	03/02/11	03/02/11
Dichlorodifluoromethane (F-12)	TO-15	11030001	0.18	100	**5530**	100	03/02/11	03/02/11
1,1-Dichloroethane	TO-15	11030001	0.21	5	**1240**	10	03/02/11	03/02/11
1,2-Dichloroethane	TO-15	11030001	0.19	5	**1480**	10	03/02/11	03/02/11
1,1-Dichloroethene	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11
cis-1,2-Dichloroethene	TO-15	11030001	0.19	5	**531**	10	03/02/11	03/02/11
trans-1,2-Dichloroethene	TO-15	11030001	0.20	5	**276**	10	03/02/11	03/02/11
1,2-Dichloropropane	TO-15	11030001	0.17	5	**435**	10	03/02/11	03/02/11
cis-1,3-Dichloropropene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
trans-1,3-Dichloropropene	TO-15	11030001	0.14	0.5	ND	1	03/02/11	03/02/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11030001	0.19	10	**263**	10	03/02/11	03/02/11
Ethylbenzene	TO-15	11030001	0.17	50	**4430**	100	03/02/11	03/02/11
4-Ethyltoluene	TO-15	11030001	0.21	5	**159**	10	03/02/11	03/02/11
Hexachloro-1,3-butadiene	TO-15	11030001	0.26	0.5	ND	1	03/02/11	03/02/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H26	AccuLabs ID: 11-03-0001-02
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11030001	0.23	200	**8020**	100	03/02/11	03/02/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11030001	0.57	20	**263**	10	03/02/11	03/02/11
2-Hexanone (MBK)	TO-15	11030001	0.53	2	ND	1	03/02/11	03/02/11
Styrene	TO-15	11030001	0.16	50	**3010**	100	03/02/11	03/02/11
1,1,2,2-Tetrachloroethane	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
Tetrachloroethene (PCE)	TO-15	11030001	0.21	50	**1950**	100	03/02/11	03/02/11
Toluene	TO-15	11030001	0.22	50	**27420**	100	03/02/11	03/02/11
1,2,4-Trichlorobenzene	TO-15	11030001	0.26	0.5	ND	1	03/02/11	03/02/11
1,1,1-Trichloroethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
1,1,2-Trichloroethane	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11
Trichloroethene (TCE)	TO-15	11030001	0.19	5	**639**	10	03/02/11	03/02/11
Trichlorofluoromethane(F-11)	TO-15	11030001	0.17	10	**593**	10	03/02/11	03/02/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11030001	0.19	1	ND	1	03/02/11	03/02/11
1,2,4-Trimethylbenzene	TO-15	11030001	0.17	5	**196**	10	03/02/11	03/02/11
1,3,5-Trimethylbenzene	TO-15	11030001	0.18	5	**145**	10	03/02/11	03/02/11
Vinyl Acetate	TO-15	11030001	0.20	1	ND	1	03/02/11	03/02/11
Vinyl Chloride	TO-15	11030001	0.17	2	**149**	10	03/02/11	03/02/11
m & p-Xylene	TO-15	11030001	0.33	100	**6110**	100	03/02/11	03/02/11
o-Xylene	TO-15	11030001	0.19	5	**716**	10	03/02/11	03/02/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	122.2	70-130

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Ellis Hsue

Ellis Hsue
Laboratory Director

AccuLabs, Inc.

Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	*Sample Info*	*Report Info*
Project ID: Kennec-Badlands Landfill	Sample ID: H26	AccuLabs ID: 11-03-0001-02
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11030001	0.010	5.0	**7.26**	100	03/02/11	03/02/11	1.00	7.26
Carbonyl sulfide	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11030001	0.005	1.0	**8.39**	100	03/02/11	03/02/11	0.708	5.94
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.548	0
Dimethyl Sulfide	D 5504-01	11030001	0.005	1.0	**18.6**	100	03/02/11	03/02/11	0.548	10.2
Carbon Disulfide	D 5504-01	11030001	0.005	0.010	**0.048**	1	03/02/11	03/02/11	0.447	0.021
Isopropyl Mercaptan	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
Disulfide dimethyl	D 5504-01	11030001	0.005	0.10	**0.661**	10	03/02/11	03/02/11	0.362	0.239
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**23.7**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	120.3	70-130

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Project Info	Sample Info	Sample Info
Project ID: Kennec-Badlands Landfill	Sample ID: H26	AccuLabs ID: 11030001-02
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11030001	0.1	0.1	**0.46**	1	ASTM D-1946	03/02/11	03/02/11	
Nitrogen	%	11030001	0.1	0.1	**5.58**	1	ASTM D-1946	03/02/11	03/02/11	
Carbon Dioxide	%	11030001	0.01	0.01	**52.9**	1	ASTM D-1946	03/02/11	03/02/11	
Methane	%	11030001	0.001	0.001	**40.3**	1	ASTM D-1946	03/02/11	03/02/11	
Methane	ppmV	11030001	0.3	1.0	**403280**	1	EPA TO-3	03/02/11	03/02/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H26 Duplicate	AccuLabs ID: 11-030001-02-Dup.
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

*Duplicate Analysis

Analyte	ASTM Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	*TRS Factor*	Duplicate TRS as H_2S	Primary TRS as H_2S	RPD (0-20)%
Hydrogen sulfide	D 5504-01	11030001	0.01	5.0	**6.46**	100	7.26	1.00	6.46	7.26	12
Carbonyl sulfide	D 5504-01	11030001	0.005	0.01	ND	1	ND	0.567	0	0	
Methanethiol (Methyl Mercaptan)	D 5504-01	11030001	0.005	1.0	**7.84**	100	8.39	0.708	5.55	5.94	6.8
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11030001	0.005	0.01	ND	1	ND	0.548	0	0	
Dimethyl Sulfide (Methyl Sulfide)	D 5504-01	11030001	0.005	1.0	**17.2**	100	18.6	0.548	9.43	10.2	7.6
Carbon Disulfide	D 5504-01	11030001	0.005	0.01	**0.043**	1	0.048	0.447	0.019	0.021	11
Isopropyl Mercaptan	D 5504-01	11030001	0.005	0.01	ND	1	ND	0.447	0	0	
n-Propyl Mercaptan	D 5504-01	11030001	0.005	0.01	ND	1	ND	0.447	0	0	
Disulfide dimethyl	D 5504-01	11030001	0.005	0.10	**0.607**	10	0.661	0.362	0.220	0.239	8.5
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*									**21.7**	**23.7**	8.7

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	124.6 / 120.3 Duplicate / Primary	70-130

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Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H26 Duplicate	AccuLabs ID: 11030001-02-Dup
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

* Duplicate Analysis

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Duplicate Result	DF	Method	Primary Result	Date Pre'd & Tested	RPD (0-20)%
Oxygen	%	11030001	0.1	0.1	**0.45**	1	ASTM D-1946	0.46	03/02/11	2.0
Nitrogen	%	11030001	0.1	0.1	**5.20**	1	ASTM D-1946	5.58	03/02/11	7.1
Carbon Dioxide	%	11030001	0.01	0.01	**53.7**	1	ASTM D-1946	52.9	03/02/11	1.5
Methane	%	11030001	0.001	0.001	**39.6**	1	ASTM D-1946	40.3	03/02/11	1.8
Methane	ppmV	11030001	0.3	1.0	**392720**	1	EPA TO-3	403280	03/02/11	2.7

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H27	AccuLabs ID: 11-03-0001-01
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11030001	0.63	200	**4070**	100	03/02/11	03/02/11
Benzene	TO-15	11030001	0.17	50	**2430**	100	03/02/11	03/02/11
Benzyl Chloride	TO-15	11030001	0.50	1	ND	1	03/02/11	03/02/11
Bromodichloromethane	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
Bromoform	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
Bromomethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
2-Butanone (MEK)	TO-15	11030001	0.56	200	**5530**	100	03/02/11	03/02/11
Carbon Disulfide	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
Carbon Tetrachloride	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11
Chlorobenzene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
Chloroethane	TO-15	11030001	0.30	5	**118**	10	03/02/11	03/02/11
Chloroform	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11
Chloromethane	TO-15	11030001	0.18	5	**316**	10	03/02/11	03/02/11
1,2-Dibromoethane (EDB)	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
Dibromochloromethane	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
1,2-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
1,3-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
1,4-Dichlorobenzene	TO-15	11030001	0.20	0.5	**5.85**	1	03/02/11	03/02/11
Dichlorodifluoromethane (F-12)	TO-15	11030001	0.18	10	**1290**	10	03/02/11	03/02/11
1,1-Dichloroethane	TO-15	11030001	0.21	5	**212**	10	03/02/11	03/02/11
1,2-Dichloroethane	TO-15	11030001	0.19	5	**1010**	10	03/02/11	03/02/11
1,1-Dichloroethene	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11
cis-1,2-Dichloroethene	TO-15	11030001	0.19	0.5	**70.2**	1	03/02/11	03/02/11
trans-1,2-Dichloroethene	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11
1,2-Dichloropropane	TO-15	11030001	0.17	0.5	ND	1	03/02/11	03/02/11
cis-1,3-Dichloropropene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
trans-1,3-Dichloropropene	TO-15	11030001	0.14	0.5	ND	1	03/02/11	03/02/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11030001	0.19	1	**63.6**	1	03/02/11	03/02/11
Ethylbenzene	TO-15	11030001	0.17	5	**1000**	10	03/02/11	03/02/11
4-Ethyltoluene	TO-15	11030001	0.21	0.5	**42.4**	1	03/02/11	03/02/11
Hexachloro-1,3-butadiene	TO-15	11030001	0.26	0.5	ND	1	03/02/11	03/02/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H27	AccuLabs ID: 11-03-0001-01
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11030001	0.23	200	**4720**	100	03/02/11	03/02/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11030001	0.57	20	**937**	10	03/02/11	03/02/11
2-Hexanone(MBK)	TO-15	11030001	0.53	2	ND	1	03/02/11	03/02/11
Styrene	TO-15	11030001	0.16	5	**612**	10	03/02/11	03/02/11
1,1,2,2-Tetrachloroethane	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11
Tetrachloroethene (PCE)	TO-15	11030001	0.21	5	**617**	10	03/02/11	03/02/11
Toluene	TO-15	11030001	0.22	50	**7180**	100	03/02/11	03/02/11
1,2,4-Trichlorobenzene	TO-15	11030001	0.26	0.5	ND	1	03/02/11	03/02/11
1,1,1-Trichloroethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11
1,1,2-Trichloroethane	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11
Trichloroethene (TCE)	TO-15	11030001	0.19	5	**308**	10	03/02/11	03/02/11
Trichlorofluoromethane(F-11)	TO-15	11030001	0.17	10	**240**	10	03/02/11	03/02/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11030001	0.19	1	ND	1	03/02/11	03/02/11
1,2,4-Trimethylbenzene	TO-15	11030001	0.17	0.5	**70.8**	1	03/02/11	03/02/11
1,3,5-Trimethylbenzene	TO-15	11030001	0.18	0.5	**40.0**	1	03/02/11	03/02/11
Vinyl Acetate	TO-15	11030001	0.20	1	ND	1	03/02/11	03/02/11
Vinyl Chloride	TO-15	11030001	0.17	1	**23.0**	1	03/02/11	03/02/11
m & p-Xylene	TO-15	11030001	0.33	100	**2030**	100	03/02/11	03/02/11
o-Xylene	TO-15	11030001	0.19	5	**418**	10	03/02/11	03/02/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	109.3	70-130

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Project Info	*Sample Info*	*Report Info*
Project ID: Kennec-Badlands Landfill	Sample ID: H27	AccuLabs ID: 11-03-0001-01
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11030001	0.010	0.050	ND	1	03/02/11	03/02/11	1.00	0
Carbonyl sulfide	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11030001	0.005	1.0	**10.5**	100	03/02/11	03/02/11	0.708	7.43
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.548	0
Dimethyl Sulfide	D 5504-01	11030001	0.005	1.0	**4.23**	100	03/02/11	03/02/11	0.548	2.32
Carbon Disulfide	D 5504-01	11030001	0.005	0.010	**0.018**	1	03/02/11	03/02/11	0.447	0.008
Isopropyl Mercaptan	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
Disulfide dimethyl	D 5504-01	11030001	0.005	0.10	**0.312**	10	03/02/11	03/02/11	0.362	0.113
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**9.87**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	107.7	70-130

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Laboratory Director

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Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	*Sample Info*	*Sample Info*
Project ID: Kennec-Badlands Landfill	Sample ID: H27	AccuLabs ID: 11030001-01
Sample Site: Badlands Landfill,	Date Sampled: 03/01/11	Date Reported: 03/04/11
Moreno Valley, CA	Date Received: 03/02/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11030001	0.1	0.1	**15.1**	1	ASTM D-1946	03/02/11	03/02/11	
Nitrogen	%	11030001	0.1	0.1	**65.6**	1	ASTM D-1946	03/02/11	03/02/11	
Carbon Dioxide	%	11030001	0.01	0.01	**11.9**	1	ASTM D-1946	03/02/11	03/02/11	
Methane	%	11030001	0.001	0.001	**6.79**	1	ASTM D-1946	03/02/11	03/02/11	
Methane	ppmV	11030001	0.3	1.0	**67980**	1	EPA TO-3	03/02/11	03/02/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	*Sample Info*	*Report Info*
Project ID: Kennec-Badlands Landfill	Sample ID: H27-Duplicate	AccuLabs ID: 11-03-0001-01-Dup
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11030001	0.63	200	**4260**	100	4070	03/02/11	4.6
Benzene	TO-15	11030001	0.17	50	**2660**	100	2430	03/02/11	9.0
Benzyl Chloride	TO-15	11030001	0.50	1	ND	1	ND	03/02/11	
Bromodichloromethane	TO-15	11030001	0.20	0.5	ND	1	ND	03/02/11	
Bromoform	TO-15	11030001	0.20	0.5	ND	1	ND	03/02/11	
Bromomethane	TO-15	11030001	0.21	0.5	ND	1	ND	03/02/11	
2-Butanone (MEK)	TO-15	11030001	0.56	200	**6080**	100	5530	03/02/11	9.5
Carbon Disulfide	TO-15	11030001	0.20	0.5	ND	1	ND	03/02/11	
Carbon Tetrachloride	TO-15	11030001	0.19	0.5	ND	1	ND	03/02/11	
Chlorobenzene	TO-15	11030001	0.21	0.5	ND	1	ND	03/02/11	
Chloroethane	TO-15	11030001	0.30	5	**123**	10	118	03/02/11	4.1
Chloroform	TO-15	11030001	0.23	0.5	ND	1	ND	03/02/11	
Chloromethane	TO-15	11030001	0.18	5	**284**	10	316	03/02/11	11
1,2-Dibromoethane (EDB)	TO-15	11030001	0.18	0.5	ND	1	ND	03/02/11	
Dibromochloromethane	TO-15	11030001	0.20	0.5	ND	1	ND	03/02/11	
1,2-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	ND	03/02/11	
1,3-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	ND	03/02/11	
1,4-Dichlorobenzene	TO-15	11030001	0.20	0.5	**6.31**	1	5.85	03/02/11	7.6
Dichlorodifluoromethane (F-12)	TO-15	11030001	0.18	10	**1270**	10	1290	03/02/11	1.6
1,1-Dichloroethane	TO-15	11030001	0.21	5	**209**	10	212	03/02/11	1.4
1,2-Dichloroethane	TO-15	11030001	0.19	5	**1050**	10	1000	03/02/11	4.9
1,1-Dichloroethene	TO-15	11030001	0.23	0.5	ND	1	ND	03/02/11	
cis-1,2-Dichloroethene	TO-15	11030001	0.19	0.5	**72.1**	1	70.2	03/02/11	2.7
trans-1,2-Dichloroethene	TO-15	11030001	0.20	0.5	ND	1	ND	03/02/11	
1,2-Dichloropropane	TO-15	11030001	0.17	0.5	ND	1	ND	03/02/11	
cis-1,3-Dichloropropene	TO-15	11030001	0.21	0.5	ND	1	ND	03/02/11	
trans-1,3-Dichloropropene	TO-15	11030001	0.14	0.5	ND	1	ND	03/02/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11030001	0.19	1	**62.9**	1	63.6	03/02/11	1.1
Ethylbenzene	TO-15	11030001	0.17	5	**1050**	10	1010	03/02/11	3.9
4-Ethyltoluene	TO-15	11030001	0.21	0.5	**44.0**	1	42.4	03/02/11	3.7
Hexachloro-1,3-butadiene	TO-15	11030001	0.26	0.5	ND	1	ND	03/02/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: H27-Duplicate	AccuLabs ID: 11-03-0001-01-Dup
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: 03/01/11	Date Reported: 03/04/11
	Date Received: 03/02/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11030001	0.23	200	**4760**	100	4720	03/02/11	0.8
4-Methyl-2-Pentanone (MIBK)	TO-15	11030001	0.57	20	**914**	10	937	03/02/11	2.5
2-Hexanone (MBK)	TO-15	11030001	0.53	2	ND	1	ND	03/02/11	
Styrene	TO-15	11030001	0.16	2	**633**	10	612	03/02/11	3.4
1,1,2,2-Tetrachloroethane	TO-15	11030001	0.18	0.5	ND	1	ND	03/02/11	
Tetrachloroethene (PCE)	TO-15	11030001	0.21	5	**628**	10	617	03/02/11	1.8
Toluene	TO-15	11030001	0.22	50	**7410**	100	7180	03/02/11	3.2
1,2,4-Trichlorobenzene	TO-15	11030001	0.26	0.5	ND	1	ND	03/02/11	
1,1,1-Trichloroethane	TO-15	11030001	0.21	0.5	ND	1	ND	03/02/11	
1,1,2-Trichloroethane	TO-15	11030001	0.23	0.5	ND	1	ND	03/02/11	
Trichloroethene (TCE)	TO-15	11030001	0.19	5	**324**	10	308	03/02/11	5.1
Trichlorofluoromethane(F-11)	TO-15	11030001	0.17	10	**238**	10	240	03/02/11	0.8
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11030001	0.19	1	ND	1	ND	03/02/11	
1,2,4-Trimethylbenzene	TO-15	11030001	0.17	0.5	**72.2**	1	70.8	03/02/11	2.0
1,3,5-Trimethylbenzene	TO-15	11030001	0.18	0.5	**40.6**	1	40.0	03/02/11	1.5
Vinyl Acetate	TO-15	11030001	0.20	1	ND	1	ND	03/02/11	
Vinyl Chloride	TO-15	11030001	0.17	1	**22.1**	1	23.0	03/02/11	4.0
m & p-Xylene	TO-15	11030001	0.33	100	**2110**	100	2030	03/02/11	3.9
o-Xylene	TO-15	11030001	0.19	5	**431**	10	418	03/02/11	3.1

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	110.7 / 109.3	70-130

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Project Info	*Sample Info*	*Report Info*
Project ID: Kennec-Badlands Landfill	Sample ID: Method Blank	AccuLabs ID: 03022011-FG-MB
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: NA	Date Reported: 03/04/11
	Date Received: NA	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11030001	0.1	0.1	**20.9**	1	ASTM D-1946	03/02/11	03/02/11	
Nitrogen	%	11030001	0.1	0.1	**79.1**	1	ASTM D-1946	03/02/11	03/02/11	
Carbon Dioxide	%	11030001	0.01	0.01	ND	1	ASTM D-1946	03/02/11	03/02/11	
Methane	%	11030001	0.001	0.001	ND	1	ASTM D-1946	03/02/11	03/02/11	
Methane	ppmV	11030001	0.3	1.0	ND	1	EPA TO-3	03/02/11	03/02/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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< II > Daily QC Data Summaries

<AL-11030001> - Badlands Landfill

(1) LCS/LCSD Studies – VOCs, Sulfur Scan and Fixed Gases
(2) Internal Duplicate Sample Analyses – VOCs, Sulfur Scan and Fixed Gases
(3) Method Blank Results – VOCs, Sulfur Scan and Fixed Gases

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Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Date Prepared: 03/02/11	AccuLabs Batch ID: 03022011-VOC-TO15 Full Scan
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Analyzed: 03/02/11	Date Reported: 03/04/11
Client Name: SCS Field Services	Sample Matrix: Air	Reporting Units: ppbV

Laboratory Control Standards (LCS/LCSD) Studies for VOC Test by EPA TO-15 Method

LCS IDs: AL-03022011-LCS & LCSD-QC for VOCs by EPA TO-15-Cryogenic GC/MS

Test Parameter	Blank Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Acetone	0	10.0	10.0	100	10.1	101	70-130	1.0	20	10.0	03/02/11
Benzene	0	10.0	12.0	120	11.8	118	70-130	1.6	20	0.50	03/02/11
Benzyl Chloride	0	10.0	8.82	88	8.89	89	70-130	0.8	20	0.50	03/02/11
Bromodichloromethane	0	10.0	11.9	119	12.0	120	70-130	0.8	20	2.00	03/02/11
Bromoform	0	10.0	10.2	102	10.3	103	70-130	1.0	20	2.00	03/02/11
Bromomethane	0	10.0	10.4	104	10.5	105	70-130	1.0	20	2.00	03/02/11
Carbon Disulfide	0	10.0	10.1	101	10.2	102	70-130	1.0	20	2.00	03/02/11
Carbon Tetrachloride	0	10.0	11.3	113	11.4	114	70-130	0.9	20	0.50	03/02/11
Chlorobenzene	0	10.0	11.2	112	11.3	113	70-130	0.5	20	0.50	03/02/11
Chloroethane	0	10.0	7.57	76	7.61	76	70-130	0.5	20	2.00	03/02/11
Chloroform	0	10.0	9.79	98	9.98	100	70-130	1.9	20	0.50	03/02/11
Chloromethane	0	10.0	8.34	83	8.79	88	70-130	5.3	20	2.00	03/02/11
cis-1,2-Dichloroethene	0	10.0	10.1	101	10.3	103	70-130	2.0	20	2.00	03/02/11
cis-1,3-Dichloropropene	0	10.0	12.1	121	12.0	120	70-130	0.8	20	2.00	03/02/11
Cyclohexane	0	10.0	8.38	84	8.26	83	70-130	1.4	20	2.00	03/02/11
Dibromochloromethane	0	10.0	10.6	106	10.7	107	70-130	0.9	20	2.00	03/02/11
Dichlorodifluoromethane(F12)	0	10.0	10.3	103	10.7	107	70-130	3.8	20	4.00	03/02/11
Ethanol	0	10.0	10.7	107	10.8	108	70-130	0.9	20	2.00	03/02/11
Ethyl Acetate	0	10.0	12.1	121	12.3	123	70-130	1.2	20	2.00	03/02/11
Ethylbenzene	0	10.0	11.1	111	10.9	109	70-130	1.8	20	2.00	03/02/11
1,1,1-Trichloroethane	0	10.0	11.7	117	11.7	117	70-130	0.3	20	2.00	03/02/11
1,1,2,2-Tetrachloroethane	0	10.0	9.77	98	9.80	98	70-130	0.3	20	2.00	03/02/11
1,1,2-Trichloroethane	0	10.0	11.5	115	11.4	114	70-130	1.4	20	2.00	03/02/11
1,1,2-Trichlorotrifluoroethane (F113)	0	10.0	10.9	109	10.6	106	70-130	2.8	20	4.00	03/02/11
1,1-Dichloroethane	0	10.0	10.2	102	10.3	103	70-130	1.0	20	2.00	03/02/11
1,1-Dichloroethene	0	10.0	11.6	116	11.9	119	70-130	2.3	20	2.00	03/02/11
1,2,4-Trichlorobenzene	0	10.0	11.4	114	11.9	119	70-130	4.4	20	2.00	03/02/11
1,2,4-Trimethylbenzene	0	10.0	8.90	89	8.98	90	70-130	0.9	20	2.00	03/02/11
1,2-Dibromoethane (EDB)	0	10.0	11.6	116	11.6	116	70-130	0.2	20	0.50	03/02/11
1,2-Dichlorobenzene	0	10.0	11.6	116	11.8	118	70-130	1.5	20	0.50	03/02/11
1,2-Dichloroethane	0	10.0	10.3	103	10.4	104	70-130	1.1	20	0.50	03/02/11
1,2-Dichloropropane	0	10.0	10.2	102	10.1	101	70-130	1.0	20	0.50	03/02/11
1,2-Dichlorotetrafluoroethane (F114)	0	10.0	10.5	105	11.0	110	70-130	4.7	20	4.00	03/02/11
1,3,5-Trimethylbenzene	0	10.0	9.12	91	9.25	93	70-130	1.4	20	2.00	03/02/11
1,3-Butadiene	0	10.0	10.7	107	10.6	106	70-130	0.9	20	2.00	03/02/11
1,3-Dichlorobenzene	0	10.0	12.5	125	12.8	128	70-130	1.7	20	0.50	03/02/11
1,4-Dichlorobenzene	0	10.0	12.4	124	12.7	127	70-130	2.3	20	0.50	03/02/11
1,4-Dioxane	0	10.0	11.5	115	11.2	112	70-130	2.7	20	0.50	03/02/11
2-Butanone (MEK)	0	10.0	12.0	120	12.0	120	70-130	0.7	20	0.50	03/02/11
2-Hexanone(MBK)	0	10.0	7.74	77	7.56	76	70-130	2.4	20	8.00	03/02/11
4-Ethyltoluene	0	10.0	9.57	96	9.6	96	70-130	0.3	20	0.50	03/02/11
Hexachlorobutadiene	0	10.0	11.8	118	12.0	120	70-130	1.8	20	2.00	03/02/11
Hexane	0	10.0	12.5	125	12.6	126	70-130	0.2	20	2.00	03/02/11
Isopropyl alcohol	0	10.0	7.67	77	7.64	76	70-130	0.4	20	2.00	03/02/11
m- & p-Xylenes	0	20.0	22.0	110	21.9	110	70-130	0.5	20	2.00	03/02/11
Methyl Isobutyl Ketone (MIBK)	0	10.0	8.01	80	7.85	79	70-130	2.0	20	8.00	03/02/11
Methyl t-Butyl Ether(MTBE)	0	10.0	10.2	102	10.4	104	70-130	1.9	20	2.00	03/02/11
Methylene chloride	0	10.0	12.0	120	11.9	119	70-130	0.4	20	2.00	03/02/11
n-Heptane	0	10.0	8.19	82	8.03	80	70-130	2.0	20	2.00	03/02/11
o-Xylene	0	10.0	11.0	110	11.2	112	70-130	1.7	20	4.00	03/02/11
Propylene	0	10.0	8.15	82	8.35	84	70-130	2.4	20	2.00	03/02/11
Styrene	0	10.0	11.2	112	11.4	114	70-130	1.3	20	2.00	03/02/11
Tetrachloroethene (PCE)	0	10.0	10.5	105	10.6	106	70-130	0.9	20	2.00	03/02/11
Tetrahydrofuran	0	10.0	11.6	116	11.7	117	70-130	0.7	20	2.00	03/02/11
Toluene	0	10.0	10.1	101	9.97	100	70-130	1.3	20	2.00	03/02/11
trans-1,2-Dichloroethene	0	10.0	12.8	128	12.9	129	70-130	1.1	20	2.00	03/02/11
trans-1,3-Dichloropropene	0	10.0	11.4	114	11.3	113	70-130	0.5	20	2.00	03/02/11
Trichloroethene (TCE)	0	10.0	10.7	107	10.9	109	70-130	1.9	20	2.00	03/02/11
Trichlorofluoromethane (F11)	0	10.0	10.6	106	11.1	111	70-130	4.6	20	0.50	03/02/11
Vinyl Acetate	0	10.0	12.1	121	12.3	123	70-130	1.6	20	4.00	03/02/11
Vinyl chloride	0	10.0	7.07	71	7.25	73	70-130	2.5	20	0.50	03/02/11

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	95.2	70-130
4-Bromofluorobenzene (LCSD)	94.3	70-130

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Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Date Prepared: 03/02/11	AccuLabs Batch ID: 03022011-Sulfur Scan-TRS-QC
Sample Site: Badlands Landfill	Date Analyzed: 03/02/11	Date Reported: 03/04/11
Moreno Valley, CA	Sample Matrix: Air	Reporting Units: ppbv
Client Name: SCS Field Services		

Laboratory Control Standards (LCS/LCSD) Studies for Sulfur Full Scan by ASTM D 5504-01 / SCAQMD370.91

LCS IDs: AL-03022011-TRS-Sulfur Scan-LCS & LCSD

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Dup. Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Hydrogen Sulfide	0	500	458	92	454	91	70-130	0.9	20	5	03/02/11
Carbonyl Sulfide	0	500	490	98	493	99	70-130	0.6	20	2	03/02/11
Methanethiol	0	500	475	95	464	93	70-130	2.3	20	2	03/02/11
Dimethyl sulfide	0	500	485	97	477	95	70-130	1.7	20	2	03/02/11
Carbon Disulfide	0	500	505	101	487	97	70-130	3.6	20	2	03/02/11
Dimethyl disulfide	0	500	470	94	454	91	70-130	3.5	20	2	03/02/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	99.6	80-120
4-Bromofluorobenzene (LCSD)	103	80-120

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Laboratory Director

AccuLabs, Inc.

Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: Method Blank	AccuLabs ID: 03022011-MB
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: NA	Date Reported: 03/04/11
	Date Received: NA	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Acetone	TO-15	11030001	0.63	2	ND	1	03/02/11	03/02/11	
Benzene	TO-15	11030001	0.17	0.5	ND	1	03/02/11	03/02/11	
Benzyl Chloride	TO-15	11030001	0.50	1	ND	1	03/02/11	03/02/11	
Bromodichloromethane	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11	
Bromoform	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11	
Bromomethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
2-Butanone (MEK)	TO-15	11030001	0.56	2	ND	1	03/02/11	03/02/11	
Carbon Disulfide	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11	
Carbon Tetrachloride	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11	
Chlorobenzene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
Chloroethane	TO-15	11030001	0.30	0.5	ND	1	03/02/11	03/02/11	
Chloroform	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11	
Chloromethane	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11	
1,2-Dibromoethane (EDB)	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11	
Dibromochloromethane	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11	
1,2-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11	
1,3-Dichlorobenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11	
1,4-Dichlorobenzene	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11	
Dichlorodifluoromethane (F-12)	TO-15	11030001	0.18	1	ND	1	03/02/11	03/02/11	
1,1-Dichloroethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
1,2-Dichloroethane	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11	
1,1-Dichloroethene	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11	
cis-1,2-Dichloroethene	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11	
trans-1,2-Dichloroethene	TO-15	11030001	0.20	0.5	ND	1	03/02/11	03/02/11	
1,2-Dichloropropane	TO-15	11030001	0.17	0.5	ND	1	03/02/11	03/02/11	
cis-1,3-Dichloropropene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
trans-1,3-Dichloropropene	TO-15	11030001	0.14	0.5	ND	1	03/02/11	03/02/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11030001	0.19	1	ND	1	03/02/11	03/02/11	
Ethylbenzene	TO-15	11030001	0.17	0.5	ND	1	03/02/11	03/02/11	
4-Ethyltoluene	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
Hexachloro-1,3-butadiene	TO-15	11030001	0.26	0.5	ND	1	03/02/11	03/02/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

AccuLabs, Inc.

Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Sample ID: Method Blank	AccuLabs ID: 03022011-MB
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: NA	Date Reported: 03/04/11
	Date Received: NA	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Methylene Chloride	TO-15	11030001	0.23	2	ND	1	03/02/11	03/02/11	
4-Methyl-2-Pentanone (MIBK)	TO-15	11030001	0.57	2	ND	1	03/02/11	03/02/11	
2-Hexanone(MBK)	TO-15	11030001	0.53	2	ND	1	03/02/11	03/02/11	
Styrene	TO-15	11030001	0.16	0.5	ND	1	03/02/11	03/02/11	
1,1,2,2-Tetrachloroethane	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11	
Tetrachloroethene (PCE)	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
Toluene	TO-15	11030001	0.22	0.5	ND	1	03/02/11	03/02/11	
1,2,4-Trichlorobenzene	TO-15	11030001	0.26	0.5	ND	1	03/02/11	03/02/11	
1,1,1-Trichloroethane	TO-15	11030001	0.21	0.5	ND	1	03/02/11	03/02/11	
1,1,2-Trichloroethane	TO-15	11030001	0.23	0.5	ND	1	03/02/11	03/02/11	
Trichloroethene (TCE)	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11	
Trichlorofluoromethane(F-11)	TO-15	11030001	0.17	1	ND	1	03/02/11	03/02/11	
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11030001	0.19	1	ND	1	03/02/11	03/02/11	
1,2,4-Trimethylbenzene	TO-15	11030001	0.17	0.5	ND	1	03/02/11	03/02/11	
1,3,5-Trimethylbenzene	TO-15	11030001	0.18	0.5	ND	1	03/02/11	03/02/11	
Vinyl Acetate	TO-15	11030001	0.20	1	ND	1	03/02/11	03/02/11	
Vinyl Chloride	TO-15	11030001	0.17	2	ND	1	03/02/11	03/02/11	
m & p-Xylene	TO-15	11030001	0.33	1	ND	1	03/02/11	03/02/11	
o-Xylene	TO-15	11030001	0.19	0.5	ND	1	03/02/11	03/02/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	95.4	80-120

AccuLabs, Inc.

Ellis Hsue

Ellis Hsue
Laboratory Director

AccuLabs, Inc.

Air Toxic • Contaminated Soil • Water and Wastewater • Industrial and Hazardous Waste • Chemical Consultation

Project Info	*Sample Info*	*Report Info*
Project ID: Kennec-Badlands Landfill	Sample ID: Method Blank	AccuLabs ID: 03022011-S-MB
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Sampled: NA	Date Reported: 03/04/11
	Date Received: NA	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11030001	0.010	0.050	ND	1	03/02/11	03/02/11	1.00	0
Carbonyl sulfide	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.708	0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.548	0
Dimethyl Sulfide	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.548	0
Carbon Disulfide	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
Isopropyl Mercaptan	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.447	0
Disulfide dimethyl	D 5504-01	11030001	0.005	0.010	ND	1	03/02/11	03/02/11	0.362	0
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**0**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	93.6	70-130

AccuLabs, Inc.

Ellis Hsue

Ellis Hsue
Laboratory Director

< III > Supporting Document

<AL-11030001> - Bedlands Landfill

(1) Tracking Record of Applied Summa Canisters and Flow Controllers
(2) Copy of Chain of Custody

Summa Canister and Flow Controller Tracking Log (with Vacuum Readings)

for SCS Engineers, Badland Landfill

Measured and checked on February 28, 2011
by: Leando Montreal, BS, Laboratory Technician

<A> Silonite Summa Canister: Two Sets

AccuLabs Canister Log #	ENTECH Serial Number	Before Shipment in Labs (" Hg)	At the end of sampling period at the Field (" Hg)	Upon sample Receipt in the Labs (" Hg)	Comment / Field / Laboratory Sample ID
		February 28, 2011	March 01,2011	March 01,2011	
(1) AL-SC-073	ENTECH-S/N-7369	< -30.0	NA	-2.0"Hg	H26/ AI-10030001-02
(2) AL-SC-098	ENTECH-S/N-7394	< -30.0	NA	-1.5"Hg	H27/ AI-10030001-01

<B> Flow Controller Assembly: Two Sets

(1) AL-FCA-023

(2) AL-FCA-034

Analytical Report

April 13, 2011

AccuLabs, Inc. Tel.: (626) 447-1888 • (626) 447-1826 Fax: (626) 447-1841
118 La Porte Street Unit C&D Arcadia, CA 91006

CHAIN OF CUSTODY RECORD

Client Name / Address: SCS Field Services

Project Manager: Carl Cortez

Sampler: Efrain Lopez

Project Name / Number / Location: Badlands Landfill 07211045.00, Moreno Valley

Phone:

Cell:

Fax:

E-mail: ccortez@scseng.com

ANALISIS REQUIRED

Client Sample ID / Description	Laboratory ID	**Sample Matrix	Container Type	# of Containers	Sampling Date	Sampling Time	VOCS by EPA TO15	Sulfate Scan by ASTM-D5504	Fixed Gases by ASTM-D1946									Special Instructions / Preservatives If Any
H-26		Gas	6L SC	1	4-13	11:59	X	X	X			1104	0002			-01		
H-27		Gas	6L SC	1	4-13	11:58	X	X	X							-02		

Relinquished by: Efrain Lopez Company: SCS - Field Services
Print: Efrain Lopez Date: 4-13-11
Sign: [signature] Time: 3:10pm

Received by: Judy Hsue Company: AccuLabs, INC.
Print: Judy Hsue Date: 4/13/11
Sign: Judy Hsue Time: 3:10 PM

Relinquished by: Company:
Print: Date:
Sign: Time:

Received by: Company:
Print: Date:
Sign: Time:

Client's P.O. Number:

** ABBREVIATIONS

A- Air, AQ - Aqueous, C - Composite, DW - Drinking Water, G - Grab, NA - Nonaqueous, S - Sloil, SL - Sludge, WW - Waste Water, W - Water, GW - Ground Water

Turnaround Time: (Check)
Same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ Normal ✓

Sample Integrity: (Check)
Intact ____ Temperature ____

Note: Payment for service is due within 30 days from the date of invoice.
Samples will be disposed of after 30 days from the date of issuing the final report.

White - Accompany Lab Report to Client Canary - Client's Copy Pink - Lab's Chrono File

LETTER OF TRANSMITTAL

3900 Kilroy Airport Way
Suite 100
Long Beach, CA 90806-6816

562 426-9544
FAX 562 492-6210
www.scsfieldservices.com

SCS FIELD SERVICES

TO Kennec, Inc.
751 Fourth St.
Santa Rosa, CA 95404

DATE 4/26/11
JOB NO. 07211045.00 TK2
ATTENTION Mr. Joaquin Wright
Re:

WE ARE SENDING YOU

☒ Attached ☐ Under separate cover via

☐ Shop drawings ☐ Prints
☐ Copy of letter ☐ Change order
the following items: ☐ Plans ☐ Samples
☐ Specifications ☐

COPIES	DATE	DESCRIPTION
1	4/26	Original Copy - Analytical Report - Badlands LF, County of Riverside

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐
☐ FOR BIDS DUE _____ 19 ____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

COPY TO

SIGNED:

AccuLabs, Inc.

Air Toxic-Ambient and Landfill • Contaminated Soil • Industrial and Hazardous Waste • Groundwater and Wastewater • Chemical Consultation

Date: April 19, 2011

Mr. Carlos Cortez, Project Manager
Mr. Philip Carrillo, Project Professional
SCS Field Services, Inc.
10300 Fourth Street, Ste. 150
Rancho Cucamonga, CA 91730

RE: Regarding AccuLabs Report & Work Order Numbers: AL-11040002
<Ref to Invoice Number: SCSFS-Inv-Y2011-005-Badlands Landfill–March, 2011/
/ SCS Project ID: 07211045.00 for Kennec – Badlands Landfill, Moreno, CA>

Dear Mr. Cortez and Mr. Carrillo:

Enclosed were the original copy of the analytical report and the second copy of invoice (The original copy of invoice was sent to Ms. Leticia Moreno's attention) for the sampling event in April 13, 2011 regarding your "Kennec - Badlands Landfill" project. The data package was arranged with the analytical results, the daily QC data summaries and the supporting document.

Thank you for the opportunity to provide analytical and environmental service to SCS. Please feel free to call me at (626) 447-1888 or 447-1826 if I can be of further assistance to you.

Sincerely,
AccuLabs, Inc.

Ellis Hsue
Laboratory Director

118 La Porte Street, Unit C&D Arcadia, CA 91016 • Mailing Address P.O. Box 92314 City of Industry, CA 91745-2314
Tel.: (626) 447-1888 • (626) 447-1826 • Fax: (626) 447-1841

< I > Analytical Results

<AL-11040002> - Bedlands Landfill

(1) VOCs Full Scan – EPA TO15
(2) Sulfur Scan with Hydrogen Sulfide by ASTM D-5504
(3) Fixed Gases with Methane by ASTM D-1946

< II > Daily QC Data Summaries

<AL-11040002> - Badlands Landfill

(1) LCS/LCSD Studies – VOCs, Sulfur Scan and Fixed Gases
(2) Internal Duplicate Sample Analyses – VOCs, Sulfur Scan and Fixed Gases
(3) Method Blank Results – VOCs, Sulfur Scan and Fixed Gases

AccuLabs, Inc.

Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: 7211045.00	Date Prepared: 04/13/11	AccuLabs Batch ID: 04132011-VOC-TO15 Full Scan
Sample Site: Badlands Landfill	Date Analyzed: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Sample Matric Air	Reporting Units: ppbV
Client Name: SCS Field Services		

Laboratory Control Standards (LCS/LCSD) Studies for VOC Test by EPA TO-15 Method

LCS IDs: AL-04132011-LCS & LCSD-QC for VOCs by EPA TO-15-Cryogenic GC/MS

Test Parameter	Blank Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Acetone	0	10.0	10.9	109	11.8	118	70-130	8.4	20	10.0	04/13/11
Benzene	0	10.0	10.8	108	10.8	108	70-130	0.5	20	0.50	04/13/11
Benzyl Chloride	0	10.0	9.90	99	10.9	109	70-130	9.3	20	0.50	04/13/11
Bromodichloromethane	0	10.0	11.4	114	11.9	119	70-130	4.7	20	2.00	04/13/11
Bromoform	0	10.0	11.3	113	11.8	118	70-130	3.9	20	2.00	04/13/11
Bromomethane	0	10.0	10.9	109	11.4	114	70-130	4.0	20	2.00	04/13/11
Carbon Disulfide	0	10.0	10.8	108	10.9	109	70-130	0.5	20	2.00	04/13/11
Carbon Tetrachloride	0	10.0	10.9	109	11.6	116	70-130	6.3	20	0.50	04/13/11
Chlorobenzene	0	10.0	10.6	106	10.8	108	70-130	1.7	20	0.50	04/13/11
Chloroethane	0	10.0	11.2	112	11.6	116	70-130	3.1	20	2.00	04/13/11
Chloroform	0	10.0	10.7	107	10.9	109	70-130	2.5	20	0.50	04/13/11
Chloromethane	0	10.0	11.2	112	11.7	117	70-130	4.7	20	2.00	04/13/11
cis-1,2-Dichloroethene	0	10.0	10.6	106	10.8	108	70-130	1.6	20	2.00	04/13/11
cis-1,3-Dichloropropene	0	10.0	11.1	111	11.4	114	70-130	2.8	20	2.00	04/13/11
Cyclohexane	0	10.0	11.0	110	11.2	112	70-130	1.8	20	2.00	04/13/11
Dibromochloromethane	0	10.0	11.7	117	12.0	120	70-130	2.3	20	2.00	04/13/11
Dichlorodifluoromethane(F12)	0	10.0	10.9	109	11.8	118	70-130	7.3	20	4.00	04/13/11
Ethanol	0	10.0	10.9	109	11.3	113	70-130	3.7	20	2.00	04/13/11
Ethyl Acetate	0	10.0	10.8	108	11.0	110	70-130	2.1	20	2.00	04/13/11
Ethylbenzene	0	10.0	11.2	112	11.5	115	70-130	2.7	20	2.00	04/13/11
1,1,1-Trichloroethane	0	10.0	10.9	109	11.7	117	70-130	7.2	20	2.00	04/13/11
1,1,2,2-Tetrachloroethane	0	10.0	9.99	100	10.5	105	70-130	5.2	20	2.00	04/13/11
1,1,2-Trichloroethane	0	10.0	11.4	114	11.7	117	70-130	2.7	20	2.00	04/13/11
1,1,2-Trichlorotrifluoroethane (F113)	0	10.0	10.6	106	10.7	107	70-130	1.4	20	4.00	04/13/11
1,1-Dichloroethane	0	10.0	10.7	107	10.9	109	70-130	1.3	20	2.00	04/13/11
1,1-Dichloroethene	0	10.0	10.8	108	11.1	111	70-130	2.6	20	2.00	04/13/11
1,2,4-Trichlorobenzene	0	10.0	8.60	86	9.67	97	70-130	12	20	2.00	04/13/11
1,2,4-Trimethylbenzene	0	10.0	9.91	99	10.5	105	70-130	5.3	20	2.00	04/13/11
1,2-Dibromoethane (EDB)	0	10.0	12.0	120	12.2	122	70-130	1.3	20	0.50	04/13/11
1,2-Dichlorobenzene	0	10.0	9.51	95	10.3	103	70-130	7.5	20	0.50	04/13/11
1,2-Dichloroethane	0	10.0	11.1	111	12.0	120	70-130	7.4	20	0.50	04/13/11
1,2-Dichloropropane	0	10.0	11.4	114	11.6	116	70-130	1.7	20	0.50	04/13/11
1,2-Dichlorotetrafluoroethane (F114)	0	10.0	11.3	113	12.0	120	70-130	5.8	20	4.00	04/13/11
1,3,5-Trimethylbenzene	0	10.0	10.2	102	10.6	106	70-130	3.9	20	2.00	04/13/11
1,3-Butadiene	0	10.0	11.1	111	11.7	117	70-130	5.2	20	2.00	04/13/11
1,3-Dichlorobenzene	0	10.0	10.4	104	11.1	111	70-130	6.3	20	0.50	04/13/11
1,4-Dichlorobenzene	0	10.0	10.1	101	10.8	108	70-130	6.2	20	0.50	04/13/11
1,4-Dioxane	0	10.0	9.65	97	11.1	111	70-130	14	20	0.50	04/13/11
2-Butanone (MEK)	0	10.0	10.4	104	10.6	106	70-130	1.6	20	0.50	04/13/11
2-Hexanone(MBK)	0	10.0	10.1	101	11.2	112	70-130	11	20	8.00	04/13/11
4-Ethyltoluene	0	10.0	10.7	107	11.1	111	70-130	3.7	20	0.50	04/13/11
Hexachlorobutadiene	0	10.0	9.5	95	10.2	102	70-130	7.1	20	2.00	04/13/11
Hexane	0	10.0	10.6	106	10.5	105	70-130	1.5	20	2.00	04/13/11
Isopropyl alcohol	0	10.0	10.6	106	11.9	119	70-130	11	20	2.00	04/13/11
m- & p-Xylenes	0	20.0	22.4	112	23.3	116	70-130	3.8	20	2.00	04/13/11
Methyl Isobutyl Ketone (MIBK)	0	10.0	10.4	104	11.4	114	70-130	9.7	20	8.00	04/13/11
Methyl t-Butyl Ether(MTBE)	0	10.0	10.4	104	10.7	107	70-130	2.9	20	2.00	04/13/11
Methylene chloride	0	10.0	10.9	109	11.0	110	70-130	1.4	20	2.00	04/13/11
n-Heptane	0	10.0	11.3	113	11.5	115	70-130	1.9	20	2.00	04/13/11
o-Xylene	0	10.0	11.7	117	12.3	123	70-130	4.4	20	4.00	04/13/11
Propylene	0	10.0	10.8	108	11.2	112	70-130	4.2	20	2.00	04/13/11
Styrene	0	10.0	11.7	117	11.9	119	70-130	2.3	20	2.00	04/13/11
Tetrachloroethene (PCE)	0	10.0	11.1	111	11.3	113	70-130	2.0	20	2.00	04/13/11
Tetrahydrofuran	0	10.0	10.7	107	10.9	109	70-130	1.7	20	2.00	04/13/11
Toluene	0	10.0	11.0	110	11.2	112	70-130	1.3	20	2.00	04/13/11
trans-1,2-Dichloroethene	0	10.0	10.7	107	10.7	107	70-130	0.5	20	2.00	04/13/11
trans-1,3-Dichloropropene	0	10.0	11.3	113	11.8	118	70-130	4.4	20	2.00	04/13/11
Trichloroethene (TCE)	0	10.0	11.1	111	11.4	114	70-130	2.2	20	2.00	04/13/11
Trichlorofluoromethane (F11)	0	10.0	11.0	110	12.0	120	70-130	8.7	20	0.50	04/13/11
Vinyl Acetate	0	10.0	12.6	126	12.7	127	70-130	0.9	20	4.00	04/13/11
Vinyl chloride	0	10.0	11.3	113	11.7	117	70-130	3.6	20	0.50	04/13/11

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	111.8	70-130
4-Bromofluorobenzene (LCSD)	116.3	70-130

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Ellis Haue

Ellis Haue
Laboratory Director

AccuLabs, Inc.

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Date Prepared: 04/13/11	AccuLabs Batch ID: 01132011-Sulfur Scan-TRS-QC
Sample Site: Badlands Landfill	Date Analyzed: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Sample Matrix: Air	Reporting Units: ppbv
Client Name: SCS Field Services		

Laboratory Control Standards (LCS/LCSD) Studies for Sulfur Full Scan by ASTM D 5504-01 / SCAQMD370.91

LCS IDs: AL-041322011-TRS-Sulfur Scan-LCS & LCSD

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Dup. Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Hydrogen Sulfide	0	500	443	89	445	89	70-130	0.5	20	5	04/13/11
Carbonyl Sulfide	0	500	489	98	491	98	70-130	0.4	20	2	04/13/11
Methanethiol	0	500	482	96	469	94	70-130	2.7	20	2	04/13/11
Dimethyl sulfide	0	500	471	94	468	94	70-130	0.6	20	2	04/13/11
Carbon Disulfide	0	500	512	102	493	99	70-130	3.8	20	2	04/13/11
Dimethyl disulfide	0	500	466	93	452	90	70-130	3.1	20	2	04/13/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	92.8	80-120
4-Bromofluorobenzene (LCSD)	95.6	80-120

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Laboratory Director

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Date Prepared: 04/13/11	AccuLabs Batch ID: 04132011-EPA3C-QC
Sample Site: Badlands Landfill	Date Analyzed: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Sample Matrix: Air	Reporting Units: ppbv
Client Name: SCS Field Services		

Laboratory Control Standards (LCS/LCSD) Studies for Methane and Fixed Gases Test by EPA TO-3

LCS IDs: AL-04132011-QC for EPA 3CM/ASTM D-1946

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	QC Limit	% RPD	QC Limit	R.L. % & ppmV	Date Analyzed
Carbon Dioxide (%)	0	5.015	4.964	99	4.983	99	80-120	0.4	20	0.01	04/13/11
Oxygen (%)	0	5.074	5.062	100	5.032	99	80-120	0.6	20	0.1	04/13/11
Nitrogen (%)	0	5.027	5.083	101	5.040	100	80-120	0.8	20	0.1	04/13/11
Methane-TCD (%)	0	4.000	4.174	104	4.127	103	80-120	1.1	20	0.001	04/13/11
Carbon Monnoxide (%)	0	5.000	5.0	101	5.0	101	80-120	0.2	20	0.1	04/13/11
Methane-FID (ppmV)	0	40000	41640	104	41690	104	80-120	0.1	20	1.0	04/13/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Ellis Hsue
Laboratory Director

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 04132011-FG-MB
Sample Site: Badands Landfill	Date Sampled: NA	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: NA	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11040002	0.1	0.1	**20.9**	1	ASTM D-1946	04/13/11	04/13/11	
Nitrogen	%	11040002	0.1	0.1	**79.1**	1	ASTM D-1946	04/13/11	04/13/11	
Carbon Dioxide	%	11040002	0.01	0.01	ND	1	ASTM D-1946	04/13/11	04/13/11	
Methane	%	11040002	0.001	0.001	ND	1	ASTM D-1946	04/13/11	04/13/11	
Methane	ppmV	11040002	0.3	1.0	ND	1	EPA TO-3	04/13/11	04/13/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 04132011-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Acetone	TO-15	11040002	0.63	2	ND	1	04/13/11	04/13/11	
Benzene	TO-15	11040002	0.17	0.5	ND	1	04/13/11	04/13/11	
Benzyl Chloride	TO-15	11040002	0.50	1	ND	1	04/13/11	04/13/11	
Bromodichloromethane	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11	
Bromoform	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11	
Bromomethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
2-Butanone (MEK)	TO-15	11040002	0.56	2	ND	1	04/13/11	04/13/11	
Carbon Disulfide	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11	
Carbon Tetrachloride	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11	
Chlorobenzene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
Chloroethane	TO-15	11040002	0.30	0.5	ND	1	04/13/11	04/13/11	
Chloroform	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11	
Chloromethane	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11	
1,2-Dibromoethane (EDB)	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11	
Dibromochloromethane	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11	
1,2-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11	
1,3-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11	
1,4-Dichlorobenzene	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11	
Dichlorodifluoromethane (F-12)	TO-15	11040002	0.18	1	ND	1	04/13/11	04/13/11	
1,1-Dichloroethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
1,2-Dichloroethane	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11	
1,1-Dichloroethene	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11	
cis-1,2-Dichloroethene	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11	
trans-1,2-Dichloroethene	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11	
1,2-Dichloropropane	TO-15	11040002	0.17	0.5	ND	1	04/13/11	04/13/11	
cis-1,3-Dichloropropene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
trans-1,3-Dichloropropene	TO-15	11040002	0.14	0.5	ND	1	04/13/11	04/13/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11040002	0.19	1	ND	1	04/13/11	04/13/11	
Ethylbenzene	TO-15	11040002	0.17	0.5	ND	1	04/13/11	04/13/11	
4-Ethyltoluene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
Hexachloro-1,3-butadiene	TO-15	11040002	0.26	0.5	ND	1	04/13/11	04/13/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 04132011-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Methylene Chloride	TO-15	11040002	0.23	2	ND	1	04/13/11	04/13/11	
4-Methyl-2-Pentanone (MIBK)	TO-15	11040002	0.57	2	ND	1	04/13/11	04/13/11	
2-Hexanone(MBK)	TO-15	11040002	0.53	2	ND	1	04/13/11	04/13/11	
Styrene	TO-15	11040002	0.16	0.5	ND	1	04/13/11	04/13/11	
1,1,2,2-Tetrachloroethane	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11	
Tetrachloroethene (PCE)	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
Toluene	TO-15	11040002	0.22	0.5	ND	1	04/13/11	04/13/11	
1,2,4-Trichlorobenzene	TO-15	11040002	0.26	0.5	ND	1	04/13/11	04/13/11	
1,1,1-Trichloroethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11	
1,1,2-Trichloroethane	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11	
Trichloroethene (TCE)	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11	
Trichlorofluoromethane(F-11)	TO-15	11040002	0.17	1	ND	1	04/13/11	04/13/11	
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11040002	0.19	1	ND	1	04/13/11	04/13/11	
1,2,4-Trimethylbenzene	TO-15	11040002	0.17	0.5	ND	1	04/13/11	04/13/11	
1,3,5-Trimethylbenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11	
Vinyl Acetate	TO-15	11040002	0.20	1	ND	1	04/13/11	04/13/11	
Vinyl Chloride	TO-15	11040002	0.17	2	ND	1	04/13/11	04/13/11	
m & p-Xylene	TO-15	11040002	0.33	1	ND	1	04/13/11	04/13/11	
o-Xylene	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	106.9	70-130

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Ellis Hsue

Ellis Hsue
Laboratory Director

AccuLabs, Inc.

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 04132011-S-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11040002	0.010	0.050	ND	1	04/13/11	04/13/11	1.00	0
Carbonyl sulfide	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.708	0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.548	0
Dimethyl Sulfide	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.548	0
Carbon Disulfide	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
Isopropyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
Disulfide dimethyl	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.362	0
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**0**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	86.1	70-130

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Laboratory Director

< III > Supporting Document

<AL-11040002> - Bedlands Landfill

(1) Tracking Record of Applied Summa Canisters and Flow Controllers
(2) 2nd Copy of Chain of Custody

Summa Canister and Flow Controller Tracking Log (with Vacuum Readings)

for SCS Engineers, Badland Landfill

Measured and checked on April 11 & April 13, 2011
by: Leando Montreal, BS, Laboratory Technician

<A> Silonite Summa Canister: Two Sets

AccuLabs Canister Log #	ENTECH Serial Number	Before Shipment in Labs (" Hg)	At the end of sampling period at the Field (" Hg)	Upon sample Receipt in the Labs (" Hg)	Comment / Field / Laboratory Sample ID
		April 11, 2011	April 13, 2011	April 13, 2011	
(1) AL-SC-051	ENTECH-S/N-7040	< -30.0	-1	-2	AL-11040002-01/ H-26
(2) AL-SC-076	ENTECH-S/N-7372	< -30.0	0	-1	AL-11040002-02/ H-27

<B> Flow Controller Assembly: Two Sets Calibrated for 2-hrs Sampling

AL- 023A Sampling Tee with Vacuum Gauge, in-line Filter and Restrictor (Calibrated at 54.0 ccm)

AL- 024A Sampling Tee with Vacuum Gauge, in-lineFilter andRestrictor (Calibrated at 54.3 ccm)

AccuLabs, Inc. Tel.: (626) 447-1888 • (626) 447-1826
Fax: (626) 447-1841
118 La Porte Street Unit C&D Arcadia, CA 91006

CHAIN OF CUSTODY RECORD

Client Name / Address: SCS Field Services

Project Name / Number / Location: Badlands Landfill 07211045.00, Moreno Valley

Project Manager: Carl Cortez

Phone:

Cell:

Sampler: Efrain Lopez

Fax:

E-mail: ccortez@scseng.com

ANALISIS REQUIRED

Client Sample ID / Description	Laboratory ID	**Sample Matrix	Container Type	# of Containers	Sampling Date	Sampling Time	VOCs by EPA TO15	Sulfate Scan by ASTM-D3534	Fixed Gases by ASTM-D1946								Special Instructions / Preservatives If Any
H-26		Gas	6L SC	1	4-13	11:59	X	X	X			1104	0002		-01		
H-27		Gas	6L SC	1	4-13	11:58	X	X	X						-02		

Relinquished by: Company: SCS - Field Services
Print: Efrain Lopez Date: 4-13-11
Sign: [signature] Time: 3:10 pm

Received by: Company: AccuLabs, INC.
Print: Judy Hsue Date: 4/13/11
Sign: Judy Hsue Time: 3:10 PM

Client's P.O. Number:

Relinquished by: Company:
Print: Date:
Sign: Time:

Received by: Company:
Print: Date:
Sign: Time:

** ABBREVIATIONS

A - Air
AQ - Aqueous
C - Composite
DW - Drinking Water
G - Grab
NA - Nonaqueous
S - Sloil
SL - Sludge
WW - Waste Water
W - Water
GW - Ground Water

Turnaround Time: (Check)
Same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ Normal ✓

Sample Integrity: (Check)
Intact ____ Temperature ____

Note: Payment for service is due within 30 days from the date of invoice.
Samples will be disposed of after 30 days from the date of issuing the final report.

White - Accompany Lab Report to Client Canary - Client's Copy Pink - Lab's Chrono File

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Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: Kennec-Badlands Landfill	Date Prepared: 03/02/11	AccuLabs Batch ID: 03022011-EPA3C-QC
Sample Site: Badlands Landfill, Moreno Valley, CA	Date Analyzed: 03/02/11	Date Reported: 03/04/11
Client Name: SCS Field Services	Sample Matrix: Air	Reporting Units: ppbv

Laboratory Control Standards (LCS/LCSD) Studies for Methane and Fixed Gases Test by EPA TO-3

LCS IDs: AL-03022011-QC for EPA 3CM/ASTM D-1946

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	QC Limit	% RPD	QC Limit	R.L. % & ppmV	Date Analyzed
Carbon Dioxide (%)	0	5.000	4.847	97	4.815	96	80-120	0.7	20	0.01	03/02/11
Oxygen (%)	0	5.000	5.540	111	5.557	111	80-120	0.3	20	0.1	03/02/11
Nitrogen (%)	0	5.000	5.554	111	5.547	111	80-120	0.1	20	0.1	03/02/11
Methane-TCD (%)	0	4.010	3.852	96	3.835	96	80-120	0.4	20	0.001	03/02/11
Carbon Monnoxide (ppmV)	0	5.000	4.902	98	4.872	97	80-120	0.6	20	50	03/02/11
Methane-FID (ppmV)	0	40100	38516	96	38340	96	80-120	0.5	20	1.0	03/02/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Ellis Hsue
Laboratory Director

< I > Analytical Results

<AL-11030001> - Bedlands Landfill

(1) VOCs Full Scan – EPA TO15
(2) Sulfur Scan with Hydrogen Sulfide by ASTM D-5504
(3) Fixed Gases with Methane by ASTM D-1946

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-04-0002-02
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11040002	0.63	200	**4986**	100	04/13/11	04/13/11
Benzene	TO-15	11040002	0.17	50	**4133**	100	04/13/11	04/13/11
Benzyl Chloride	TO-15	11040002	0.50	1	ND	1	04/13/11	04/13/11
Bromodichloromethane	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
Bromoform	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
Bromomethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
2-Butanone (MEK)	TO-15	11040002	0.56	200	**7098**	100	04/13/11	04/13/11
Carbon Disulfide	TO-15	11040002	0.20	0.5	**70.7**	1	04/13/11	04/13/11
Carbon Tetrachloride	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11
Chlorobenzene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
Chloroethane	TO-15	11040002	0.30	5	**826**	10	04/13/11	04/13/11
Chloroform	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11
Chloromethane	TO-15	11040002	0.18	5	**173**	10	04/13/11	04/13/11
1,2-Dibromoethane (EDB)	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
Dibromochloromethane	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
1,2-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
1,3-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
1,4-Dichlorobenzene	TO-15	11040002	0.20	0.5	**1.13**	1	04/13/11	04/13/11
Dichlorodifluoromethane (F-12)	TO-15	11040002	0.18	100	**3455**	100	04/13/11	04/13/11
1,1-Dichloroethane	TO-15	11040002	0.21	5	**675**	10	04/13/11	04/13/11
1,2-Dichloroethane	TO-15	11040002	0.19	5	**1759**	10	04/13/11	04/13/11
1,1-Dichloroethene	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11
cis-1,2-Dichloroethene	TO-15	11040002	0.19	5	**350**	10	04/13/11	04/13/11
trans-1,2-Dichloroethene	TO-15	11040002	0.20	0.5	**89.8**	1	04/13/11	04/13/11
1,2-Dichloropropane	TO-15	11040002	0.17	5	**103**	10	04/13/11	04/13/11
cis-1,3-Dichloropropene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
trans-1,3-Dichloropropene	TO-15	11040002	0.14	0.5	ND	1	04/13/11	04/13/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11040002	0.19	10	**111**	10	04/13/11	04/13/11
Ethylbenzene	TO-15	11040002	0.17	50	**1433**	100	04/13/11	04/13/11
4-Ethyltoluene	TO-15	11040002	0.21	0.5	**87.0**	1	04/13/11	04/13/11
Hexachloro-1,3-butadiene	TO-15	11040002	0.26	0.5	ND	1	04/13/11	04/13/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-04-0002-02
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11040002	0.23	200	**8512**	100	04/13/11	04/13/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11040002	0.57	200	**1772**	100	04/13/11	04/13/11
2-Hexanone (MBK)	TO-15	11040002	0.53	2	ND	1	04/13/11	04/13/11
Styrene	TO-15	11040002	0.16	5	**613**	10	04/13/11	04/13/11
1,1,2,2-Tetrachloroethane	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
Tetrachloroethene (PCE)	TO-15	11040002	0.21	5	**892**	10	04/13/11	04/13/11
Toluene	TO-15	11040002	0.22	50	**8481**	100	04/13/11	04/13/11
1,2,4-Trichlorobenzene	TO-15	11040002	0.26	0.5	ND	1	04/13/11	04/13/11
1,1,1-Trichloroethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
1,1,2-Trichloroethane	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11
Trichloroethene (TCE)	TO-15	11040002	0.19	5	**385**	10	04/13/11	04/13/11
Trichlorofluoromethane(F-11)	TO-15	11040002	0.17	10	**563**	10	04/13/11	04/13/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11040002	0.19	1	**25.8**	1	04/13/11	04/13/11
1,2,4-Trimethylbenzene	TO-15	11040002	0.17	0.5	**41.5**	1	04/13/11	04/13/11
1,3,5-Trimethylbenzene	TO-15	11040002	0.18	0.5	**30.3**	1	04/13/11	04/13/11
Vinyl Acetate	TO-15	11040002	0.20	1	ND	1	04/13/11	04/13/11
Vinyl Chloride	TO-15	11040002	0.17	2	**102**	10	04/13/11	04/13/11
m & p-Xylene	TO-15	11040002	0.33	100	**2498**	100	04/13/11	04/13/11
o-Xylene	TO-15	11040002	0.19	5	**420**	10	04/13/11	04/13/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	114.2	70-130

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Project Info	*Sample Info*	*Report Info*
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-04-0002-02
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11040002	0.010	0.1	ND	1	04/13/11	04/13/11	1.00	0
Carbonyl sulfide	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11040002	0.005	1.0	**26.8**	100	04/13/11	04/13/11	0.708	19.0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.548	0.0
Dimethyl Sulfide	D 5504-01	11040002	0.005	1.0	**7.87**	100	04/13/11	04/13/11	0.548	4.31
Carbon Disulfide	D 5504-01	11040002	0.005	0.010	**0.047**	1	04/13/11	04/13/11	0.447	0.02
Isopropyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
Disulfide dimethyl	D 5504-01	11040002	0.005	0.10	**0.742**	10	04/13/11	04/13/11	0.362	0.27
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**23.6**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	87.9	70-130

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Project Info	Sample Info	Sample Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11040002-02
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11040002	0.1	0.1	**5.08**	1	ASTM D-1946	04/13/11	04/13/11	
Nitrogen	%	11040002	0.1	0.1	**18.9**	1	ASTM D-1946	04/13/11	04/13/11	
Carbon Dioxide	%	11040002	0.01	0.01	**47.5**	1	ASTM D-1946	04/13/11	04/13/11	
Methane	%	11040002	0.001	0.001	**27.9**	1	ASTM D-1946	04/13/11	04/13/11	
Methane	ppmV	11040002	0.3	1.0	**277740**	1	EPA TO-3	04/13/11	04/13/11	

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11-04-0002-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11040002	0.63	200	**4978**	100	4986	04/13/11	0.2
Benzene	TO-15	11040002	0.17	50	**4228**	100	4133	04/13/11	2.3
Benzyl Chloride	TO-15	11040002	0.50	1	ND	1	ND	04/13/11	
Bromodichloromethane	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
Bromoform	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
Bromomethane	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
2-Butanone (MEK)	TO-15	11040002	0.56	200	**7400**	100	7098	04/13/11	4.2
Carbon Disulfide	TO-15	11040002	0.20	0.5	**71.4**	1	70.7	04/13/11	1.0
Carbon Tetrachloride	TO-15	11040002	0.19	0.5	ND	1	ND	04/13/11	
Chlorobenzene	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
Chloroethane	TO-15	11040002	0.30	5	**866**	10	826	04/13/11	4.7
Chloroform	TO-15	11040002	0.23	0.5	ND	1	ND	04/13/11	
Chloromethane	TO-15	11040002	0.18	5	**180**	10	173	04/13/11	4.0
1,2-Dibromoethane (EDB)	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
Dibromochloromethane	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
1,2-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
1,3-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
1,4-Dichlorobenzene	TO-15	11040002	0.20	0.5	**1.07**	1	1.13	04/13/11	5.5
Dichlorodifluoromethane (F-12)	TO-15	11040002	0.18	100	**3596**	100	3455	04/13/11	4.0
1,1-Dichloroethane	TO-15	11040002	0.21	5	**675**	10	675	04/13/11	0.0
1,2-Dichloroethane	TO-15	11040002	0.19	5	**1821**	10	1759	04/13/11	3.5
1,1-Dichloroethene	TO-15	11040002	0.23	0.5	ND	1	ND	04/13/11	
cis-1,2-Dichloroethene	TO-15	11040002	0.19	5	**370**	10	350	04/13/11	5.6
trans-1,2-Dichloroethene	TO-15	11040002	0.20	0.5	**97.5**	1	89.8	04/13/11	8.2
1,2-Dichloropropane	TO-15	11040002	0.17	5	**109**	10	103	04/13/11	5.7
cis-1,3-Dichloropropene	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
trans-1,3-Dichloropropene	TO-15	11040002	0.14	0.5	ND	1	ND	04/13/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11040002	0.19	10	**120**	10	111	04/13/11	7.8
Ethylbenzene	TO-15	11040002	0.17	50	**1494**	100	1433	04/13/11	4.2
4-Ethyltoluene	TO-15	11040002	0.21	0.5	**91.9**	1	87.0	04/13/11	5.5
Hexachloro-1,3-butadiene	TO-15	11040002	0.26	0.5	ND	1	ND	04/13/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11-04-0002-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11040002	0.23	200	**8677**	100	8512	04/13/11	1.9
4-Methyl-2-Pentanone (MIBK)	TO-15	11040002	0.57	200	**1771**	100	1772	04/13/11	0.1
2-Hexanone (MBK)	TO-15	11040002	0.53	2	ND	1	ND	04/13/11	
Styrene	TO-15	11040002	0.16	20	**740**	10	613	04/13/11	19
1,1,2,2-Tetrachloroethane	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
Tetrachloroethene (PCE)	TO-15	11040002	0.21	5	**905**	10	892	04/13/11	1.4
Toluene	TO-15	11040002	0.22	50	**8750**	100	8481	04/13/11	3.1
1,2,4-Trichlorobenzene	TO-15	11040002	0.26	0.5	ND	1	ND	04/13/11	
1,1,1-Trichloroethane	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
1,1,2-Trichloroethane	TO-15	11040002	0.23	0.5	ND	1	ND	04/13/11	
Trichloroethene (TCE)	TO-15	11040002	0.19	5	**394**	10	385	04/13/11	2.3
Trichlorofluoromethane(F-11)	TO-15	11040002	0.17	10	**562**	10	563	04/13/11	0.2
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11040002	0.19	1	**26.0**	1	25.8	04/13/11	0.8
1,2,4-Trimethylbenzene	TO-15	11040002	0.17	0.5	**45.4**	1	41.5	04/13/11	9.0
1,3,5-Trimethylbenzene	TO-15	11040002	0.18	0.5	**32.7**	1	30.3	04/13/11	7.6
Vinyl Acetate	TO-15	11040002	0.20	1	ND	1	ND	04/13/11	
Vinyl Chloride	TO-15	11040002	0.17	1	**105**	10	102	04/13/11	2.9
m & p-Xylene	TO-15	11040002	0.33	100	**2692**	100	2498	04/13/11	7.5
o-Xylene	TO-15	11040002	0.19	5	**487**	10	420	04/13/11	15

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	119.7 / 114.2	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27 Duplicate	AccuLabs ID: 11040002-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

* Duplicate Analysis

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Duplicate Result	DF	Method	Primary Result	Date Pre'd & Tested	RPD (0-20)%
Oxygen	%	11040002	0.1	0.1	**5.01**	1	ASTM D-1946	5.08	04/13/11	1.4
Nitrogen	%	11040002	0.1	0.1	**19.0**	1	ASTM D-1946	18.9	04/13/11	0.5
Carbon Dioxide	%	11040002	0.01	0.01	**46.9**	1	ASTM D-1946	47.5	04/13/11	1.3
Methane	%	11040002	0.001	0.001	**27.7**	1	ASTM D-1946	27.9	04/13/11	0.7
Methane	ppmV	11040002	0.3	1.0	**275650**	1	EPA TO-3	277740	04/13/11	0.8

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-04-0002-01
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11040002	0.63	200	**8948**	100	04/13/11	04/13/11
Benzene	TO-15	11040002	0.17	50	**5395**	100	04/13/11	04/13/11
Benzyl Chloride	TO-15	11040002	0.50	1	ND	1	04/13/11	04/13/11
Bromodichloromethane	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
Bromoform	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
Bromomethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
2-Butanone (MEK)	TO-15	11040002	0.56	200	**16240**	100	04/13/11	04/13/11
Carbon Disulfide	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
Carbon Tetrachloride	TO-15	11040002	0.19	0.5	ND	1	04/13/11	04/13/11
Chlorobenzene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
Chloroethane	TO-15	11040002	0.30	5	**1032**	10	04/13/11	04/13/11
Chloroform	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11
Chloromethane	TO-15	11040002	0.18	5	**315**	10	04/13/11	04/13/11
1,2-Dibromoethane (EDB)	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
Dibromochloromethane	TO-15	11040002	0.20	0.5	ND	1	04/13/11	04/13/11
1,2-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
1,3-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
1,4-Dichlorobenzene	TO-15	11040002	0.20	0.5	**1.42**	1	04/13/11	04/13/11
Dichlorodifluoromethane (F-12)	TO-15	11040002	0.18	100	**5119**	100	04/13/11	04/13/11
1,1-Dichloroethane	TO-15	11040002	0.21	5	**1173**	10	04/13/11	04/13/11
1,2-Dichloroethane	TO-15	11040002	0.19	5	**878**	10	04/13/11	04/13/11
1,1-Dichloroethene	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11
cis-1,2-Dichloroethene	TO-15	11040002	0.19	5	**474**	10	04/13/11	04/13/11
trans-1,2-Dichloroethene	TO-15	11040002	0.20	5	**157**	10	04/13/11	04/13/11
1,2-Dichloropropane	TO-15	11040002	0.17	5	**228**	10	04/13/11	04/13/11
cis-1,3-Dichloropropene	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
trans-1,3-Dichloropropene	TO-15	11040002	0.14	0.5	ND	1	04/13/11	04/13/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11040002	0.19	10	**174**	10	04/13/11	04/13/11
Ethylbenzene	TO-15	11040002	0.17	50	**2608**	100	04/13/11	04/13/11
4-Ethyltoluene	TO-15	11040002	0.21	5	**128**	10	04/13/11	04/13/11
Hexachloro-1,3-butadiene	TO-15	11040002	0.26	0.5	ND	1	04/13/11	04/13/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-04-0002-01
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11040002	0.23	200	**4366**	100	04/13/11	04/13/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11040002	0.57	200	**4131**	100	04/13/11	04/13/11
2-Hexanone(MBK)	TO-15	11040002	0.53	2	ND	1	04/13/11	04/13/11
Styrene	TO-15	11040002	0.16	5	**1201**	10	04/13/11	04/13/11
1,1,2,2-Tetrachloroethane	TO-15	11040002	0.18	0.5	ND	1	04/13/11	04/13/11
Tetrachloroethene (PCE)	TO-15	11040002	0.21	5	**1087**	10	04/13/11	04/13/11
Toluene	TO-15	11040002	0.22	50	**12160**	100	04/13/11	04/13/11
1,2,4-Trichlorobenzene	TO-15	11040002	0.26	0.5	ND	1	04/13/11	04/13/11
1,1,1-Trichloroethane	TO-15	11040002	0.21	0.5	ND	1	04/13/11	04/13/11
1,1,2-Trichloroethane	TO-15	11040002	0.23	0.5	ND	1	04/13/11	04/13/11
Trichloroethene (TCE)	TO-15	11040002	0.19	5	**241**	10	04/13/11	04/13/11
Trichlorofluoromethane(F-11)	TO-15	11040002	0.17	10	**203**	10	04/13/11	04/13/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11040002	0.19	1	ND	1	04/13/11	04/13/11
1,2,4-Trimethylbenzene	TO-15	11040002	0.17	0.5	**37.4**	1	04/13/11	04/13/11
1,3,5-Trimethylbenzene	TO-15	11040002	0.18	0.5	**35.3**	1	04/13/11	04/13/11
Vinyl Acetate	TO-15	11040002	0.20	1	ND	1	04/13/11	04/13/11
Vinyl Chloride	TO-15	11040002	0.17	1	**145**	10	04/13/11	04/13/11
m & p-Xylene	TO-15	11040002	0.33	100	**4128**	100	04/13/11	04/13/11
o-Xylene	TO-15	11040002	0.19	5	**405**	10	04/13/11	04/13/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	116.7	70-130

AccuLabs, Inc.

Ellis Hsue

Ellis Hsue
Laboratory Director

AccuLabs, Inc.

Air Toxic ● Contaminated Soil ● Water and Wastewater ● Industrial and Hazardous Waste ● Chemical Consultation

Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-04-0002-01
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11040002	0.010	5.000	**18.6**	100	04/13/11	04/13/11	1.00	18.6
Carbonyl sulfide	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11040002	0.005	1.0	**8.74**	100	04/13/11	04/13/11	0.708	6.19
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.548	0
Dimethyl Sulfide	D 5504-01	11040002	0.005	1.0	**9.22**	100	04/13/11	04/13/11	0.548	5.05
Carbon Disulfide	D 5504-01	11040002	0.005	0.010	**0.057**	1	04/13/11	04/13/11	0.447	0.03
Isopropyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	04/13/11	04/13/11	0.447	0
Disulfide dimethyl	D 5504-01	11040002	0.005	0.10	**0.311**	10	04/13/11	04/13/11	0.362	0.11
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**30.0**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	100.8	70-130

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Ellis Hsue
Laboratory Director

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Project Info	*Sample Info*	*Sample Info*
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11040002-01
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11040002	0.1	0.1	**0.65**	1	ASTM D-1946	04/13/11	04/13/11	
Nitrogen	%	11040002	0.1	0.1	**28.1**	1	ASTM D-1946	04/13/11	04/13/11	
Carbon Dioxide	%	11040002	0.01	0.01	**41.8**	1	ASTM D-1946	04/13/11	04/13/11	
Methane	%	11040002	0.001	0.001	**28.7**	1	ASTM D-1946	04/13/11	04/13/11	
Methane	ppmV	11040002	0.3	1.0	**284980**	1	EPA TO-3	04/13/11	04/13/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26-Duplicate	AccuLabs ID: 11-04-0002-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11040002	0.63	200	**7932**	100	8948	04/13/11	12
Benzene	TO-15	11040002	0.17	50	**5613**	100	5395	04/13/11	4.0
Benzyl Chloride	TO-15	11040002	0.50	1	ND	1	ND	04/13/11	
Bromodichloromethane	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
Bromoform	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
Bromomethane	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
2-Butanone (MEK)	TO-15	11040002	0.56	200	**16500**	100	16240	04/13/11	1.6
Carbon Disulfide	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
Carbon Tetrachloride	TO-15	11040002	0.19	0.5	ND	1	ND	04/13/11	
Chlorobenzene	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
Chloroethane	TO-15	11040002	0.30	5	**876**	10	1032	04/13/11	16
Chloroform	TO-15	11040002	0.23	0.5	ND	1	ND	04/13/11	
Chloromethane	TO-15	11040002	0.18	5	**304**	10	315	04/13/11	3.6
1,2-Dibromoethane (EDB)	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
Dibromochloromethane	TO-15	11040002	0.20	0.5	ND	1	ND	04/13/11	
1,2-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
1,3-Dichlorobenzene	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
1,4-Dichlorobenzene	TO-15	11040002	0.20	0.5	**1.27**	1	1.42	04/13/11	11
Dichlorodifluoromethane (F-12)	TO-15	11040002	0.18	100	**4415**	100	5119	04/13/11	15
1,1-Dichloroethane	TO-15	11040002	0.21	5	**1040**	10	1173	04/13/11	12
1,2-Dichloroethane	TO-15	11040002	0.19	5	**774**	10	878	04/13/11	13
1,1-Dichloroethene	TO-15	11040002	0.23	0.5	ND	1	ND	04/13/11	
cis-1,2-Dichloroethene	TO-15	11040002	0.19	5	**393**	10	474	04/13/11	19
trans-1,2-Dichloroethene	TO-15	11040002	0.20	5	**146**	10	157	04/13/11	7.3
1,2-Dichloropropane	TO-15	11040002	0.17	5	**211**	10	228	04/13/11	7.7
cis-1,3-Dichloropropene	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
trans-1,3-Dichloropropene	TO-15	11040002	0.14	0.5	ND	1	ND	04/13/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11040002	0.19	10	**206**	10	174	04/13/11	17
Ethylbenzene	TO-15	11040002	0.17	50	**2697**	100	2608	04/13/11	3.4
4-Ethyltoluene	TO-15	11040002	0.21	5	**125**	10	128	04/13/11	2.4
Hexachloro-1,3-butadiene	TO-15	11040002	0.26	0.5	ND	1	ND	04/13/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26-Duplicate	AccuLabs ID: 11-04-0002-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11040002	0.23	200	**4040**	100	4366	04/13/11	7.8
4-Methyl-2-Pentanone (MIBK)	TO-15	11040002	0.57	200	**4108**	100	4131	04/13/11	0.6
2-Hexanone (MBK)	TO-15	11040002	0.53	2	ND	1	ND	04/13/11	
Styrene	TO-15	11040002	0.16	20	**1264**	10	1201	04/13/11	5.1
1,1,2,2-Tetrachloroethane	TO-15	11040002	0.18	0.5	ND	1	ND	04/13/11	
Tetrachloroethene (PCE)	TO-15	11040002	0.21	5	**1059**	10	1087	04/13/11	2.6
Toluene	TO-15	11040002	0.22	50	**12110**	100	12160	04/13/11	0.4
1,2,4-Trichlorobenzene	TO-15	11040002	0.26	0.5	ND	1	ND	04/13/11	
1,1,1-Trichloroethane	TO-15	11040002	0.21	0.5	ND	1	ND	04/13/11	
1,1,2-Trichloroethane	TO-15	11040002	0.23	0.5	ND	1	ND	04/13/11	
Trichloroethene (TCE)	TO-15	11040002	0.19	5	**224**	10	241	04/13/11	7.3
Trichlorofluoromethane(F-11)	TO-15	11040002	0.17	10	**178**	10	203	04/13/11	13
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11040002	0.19	1	ND	1	ND	04/13/11	
1,2,4-Trimethylbenzene	TO-15	11040002	0.17	0.5	**38.5**	1	37.4	04/13/11	2.9
1,3,5-Trimethylbenzene	TO-15	11040002	0.18	0.5	**37.0**	1	35.3	04/13/11	4.7
Vinyl Acetate	TO-15	11040002	0.20	1	ND	1	ND	04/13/11	
Vinyl Chloride	TO-15	11040002	0.17	1	**127**	10	145.0	04/13/11	13
m & p-Xylene	TO-15	11040002	0.33	100	**4302**	100	4128	04/13/11	4.1
o-Xylene	TO-15	11040002	0.19	5	**417**	10	405	04/13/11	2.9

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	110.7 / 109.3	70-130

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Ellis Hsue

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Laboratory Director

AccuLabs, Inc.

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26 Duplicate	AccuLabs ID: 11-040002-01-Dup.
Sample Site: Badlnds Landfill	Date Sampled: 04/13/11	Date Reported: 04/18/11
Moreno Valley, CA	Date Received: 04/13/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

*Duplicate Analysis

Analyte	ASTM Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	*TRS Factor*	Duplicate TRS as H_2S	Primary TRS as H_2S	RPD (0-20)%
Hydrogen sulfide	D 5504-01	11040002	0.01	5.0	**17.0**	100	**18.6**	1.00	17.0	18.6	9.0
Carbonyl sulfide	D 5504-01	11040002	0.005	0.010	ND	1	ND	0.567	0	0	
Methanethiol (Methyl Mercaptan)	D 5504-01	11040002	0.005	1.0	**7.41**	100	**8.74**	0.708	5.25	6.19	16
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11040002	0.005	0.010	ND	1	ND	0.548	0	0	
Dimethyl Sulfide (Methyl Sulfide)	D 5504-01	11040002	0.005	1.0	**8.48**	100	**9.22**	0.548	4.65	5.053	8.4
Carbon Disulfide	D 5504-01	11040002	0.005	0.010	**0.051**	1	**0.057**	0.447	0.023	0.025	11
Isopropyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	ND	0.447	0	0	
n-Propyl Mercaptan	D 5504-01	11040002	0.005	0.010	ND	1	ND	0.447	0	0	
Disulfide dimethyl	D 5504-01	11040002	0.005	0.10	**0.286**	10	**0.311**	0.362	0.104	0.113	8.4
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*									**27.0**	**30.0**	10

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	84.7 /100.8 Duplicate / Primary	70-130

AccuLabs, Inc.

Ellis Hsue
Laboratory Director

Analytical Report

May 19, 2011

AccuLabs, Inc. Tel.: (626) 447-1888 • (626) 447-1826
Fax: (626) 447-1841
118 La Porte Street Unit C&D Arcadia, CA 91006

CHAIN OF CUSTODY RECORD

Client Name / Address: SCS Field Services

Project Name / Number / Location: Badlands Landfill 07211045.00 Moreno Valley

Project Manager: Carl Cortez

Phone:

Cell:

Sampler: Efrain Lopez

Fax:

E-mail: ccortez@scseng.com

ANALISIS REQUIRED

Client Sample ID / Description	Laboratory ID	**Sample Matrix	Container Type	# of Containers	Sampling Date	Sampling Time	VOCs by EPA TO15	Sulfate Scan by ASTM-D5504	Fixed Gases by ASTM-D1946								Special Instructions / Preservatives If Any
H27	11050009-01	Gas	6L SC	1	5-19-11	11am	X	X	X								
H26	-02	Gas	6L SC	1	5-19-11	11:05am	X	X	X								

Relinquished by: Company: SCS Field Services
Print: Efrain Lopez Date: 5-19-11
Sign: [signature] Time: 2:04 pm

Received by: Company: AccuLabs, INC.
Print: Judy Hsue Date: 5/19/11
Sign: [signature] Time: 2:04 PM

Client's P.O. Number:

Relinquished by: Company:
Print: Date:
Sign: Time:

Received by: Company:
Print: Date:
Sign: Time:

** ABBREVIATIONS

A- Air, AQ - Aqueous, C - Composite, DW - Drinking Water, G - Grab, NA - Nonaqueous, S - Soil, SL - Sludge, WW - Waste Water, W - Water, GW - Ground Water

Turnaround Time: (Check)
Same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ Normal ✓

Sample Integrity: (Check)
Intact ____ Temperature ____

Note: Payment for service is due within 30 days from the date of invoice.
Samples will be disposed of after 30 days from the date of issuing the final report.

White - Accompany Lab Report to Client Canary - Client's Copy Pink - Lab's Chrono File

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-05-0009-02
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11050009	0.63	200	**4993**	100	05/19/11	05/19/11
Benzene	TO-15	11050009	0.17	50	**5037**	100	05/19/11	05/19/11
Benzyl Chloride	TO-15	11050009	0.50	1	ND	1	05/19/11	05/19/11
Bromodichloromethane	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Bromoform	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Bromomethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
2-Butanone (MEK)	TO-15	11050009	0.56	200	**9062**	100	05/19/11	05/19/11
Carbon Disulfide	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Carbon Tetrachloride	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11
Chlorobenzene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
Chloroethane	TO-15	11050009	0.30	5	**317**	10	05/19/11	05/19/11
Chloroform	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11
Chloromethane	TO-15	11050009	0.18	5	**127**	10	05/19/11	05/19/11
1,2-Dibromoethane (EDB)	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
Dibromochloromethane	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
1,2-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
1,3-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
1,4-Dichlorobenzene	TO-15	11050009	0.20	0.5	**2.91**	1	05/19/11	05/19/11
Dichlorodifluoromethane (F-12)	TO-15	11050009	0.18	100	**2361**	100	05/19/11	05/19/11
1,1-Dichloroethane	TO-15	11050009	0.21	5	**404**	10	05/19/11	05/19/11
1,2-Dichloroethane	TO-15	11050009	0.19	50	**1781**	100	05/19/11	05/19/11
1,1-Dichloroethene	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11
cis-1,2-Dichloroethene	TO-15	11050009	0.19	5	**331**	10	05/19/11	05/19/11
trans-1,2-Dichloroethene	TO-15	11050009	0.20	0.5	**62.9**	1	05/19/11	05/19/11
1,2-Dichloropropane	TO-15	11050009	0.17	5	**276**	10	05/19/11	05/19/11
cis-1,3-Dichloropropene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
trans-1,3-Dichloropropene	TO-15	11050009	0.14	0.5	ND	1	05/19/11	05/19/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11050009	0.19	1	**92.5**	1	05/19/11	05/19/11
Ethylbenzene	TO-15	11050009	0.17	50	**2160**	100	05/19/11	05/19/11
4-Ethyltoluene	TO-15	11050009	0.21	0.5	**51.5**	1	05/19/11	05/19/11
Hexachloro-1,3-butadiene	TO-15	11050009	0.26	0.5	ND	1	05/19/11	05/19/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-05-0009-02
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11050009	0.23	200	**3574**	100	05/19/11	05/19/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11050009	0.57	200	**2065**	100	05/19/11	05/19/11
2-Hexanone (MBK)	TO-15	11050009	0.53	2	ND	1	05/19/11	05/19/11
Styrene	TO-15	11050009	0.16	5	**982**	10	05/19/11	05/19/11
1,1,2,2-Tetrachloroethane	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
Tetrachloroethene (PCE)	TO-15	11050009	0.21	5	**962**	10	05/19/11	05/19/11
Toluene	TO-15	11050009	0.22	50	**12660**	100	05/19/11	05/19/11
1,2,4-Trichlorobenzene	TO-15	11050009	0.26	0.5	ND	1	05/19/11	05/19/11
1,1,1-Trichloroethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
1,1,2-Trichloroethane	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11
Trichloroethene (TCE)	TO-15	11050009	0.19	5	**643**	10	05/19/11	05/19/11
Trichlorofluoromethane(F-11)	TO-15	11050009	0.17	1	**37.3**	1	05/19/11	05/19/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11050009	0.19	1	ND	1	05/19/11	05/19/11
1,2,4-Trimethylbenzene	TO-15	11050009	0.17	0.5	**63.3**	1	05/19/11	05/19/11
1,3,5-Trimethylbenzene	TO-15	11050009	0.18	0.5	**45.6**	1	05/19/11	05/19/11
Vinyl Acetate	TO-15	11050009	0.20	1	ND	1	05/19/11	05/19/11
Vinyl Chloride	TO-15	11050009	0.17	2	**46.7**	1	05/19/11	05/19/11
m & p-Xylene	TO-15	11050009	0.33	100	**3769**	100	05/19/11	05/19/11
o-Xylene	TO-15	11050009	0.19	5	**928**	10	05/19/11	05/19/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	118.9	70-130

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Laboratory Director

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-05-0009-02
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11050009	0.010	5.0	11.2	100	05/19/11	05/19/11	1.00	11
Carbonyl sulfide	D 5504-01	11050009	0.005	0.010	0.018	1	05/19/11	05/19/11	0.567	0.0
Methanethiol (Methyl Mercaptan)	D 5504-01	11050009	0.005	1.0	5.35	100	05/19/11	05/19/11	0.708	3.8
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.548	0.0
Dimethyl Sulfide	D 5504-01	11050009	0.005	1.0	5.10	100	05/19/11	05/19/11	0.548	2.79
Carbon Disulfide	D 5504-01	11050009	0.005	0.010	0.021	1	05/19/11	05/19/11	0.447	0.01
Isopropyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
Disulfide dimethyl	D 5504-01	11050009	0.005	0.10	0.104	10	05/19/11	05/19/11	0.362	0.04
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ppMv:										17.8

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	96.4	70-130

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Project Info	Sample Info	Sample Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11050009-02
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11050009	0.1	0.1	**3.55**	1	ASTM D-1946	05/19/11	05/19/11	
Nitrogen	%	11050009	0.1	0.1	**29.5**	1	ASTM D-1946	05/19/11	05/19/11	
Carbon Dioxide	%	11050009	0.01	0.01	**41.2**	1	ASTM D-1946	05/19/11	05/19/11	
Methane	%	11050009	0.001	0.001	**24.5**	1	ASTM D-1946	05/19/11	05/19/11	
Methane	ppmV	11050009	0.3	1.0	**244940**	1	EPA TO-3	05/19/11	05/19/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26-Duplicate	AccuLabs ID: 11-05-0009-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11050009	0.63	200	**5300**	100	4993	05/19/11	6.0
Benzene	TO-15	11050009	0.17	50	**5020**	100	5037	05/19/11	0.3
Benzyl Chloride	TO-15	11050009	0.50	1	ND	1	ND	05/19/11	
Bromodichloromethane	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Bromoform	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Bromomethane	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
2-Butanone (MEK)	TO-15	11050009	0.56	200	**9530**	100	9062	05/19/11	5.0
Carbon Disulfide	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Carbon Tetrachloride	TO-15	11050009	0.19	0.5	ND	1	ND	05/19/11	
Chlorobenzene	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
Chloroethane	TO-15	11050009	0.30	5	**294**	10	317	05/19/11	7.5
Chloroform	TO-15	11050009	0.23	0.5	ND	1	ND	05/19/11	
Chloromethane	TO-15	11050009	0.18	5	**119**	10	127	05/19/11	6.5
1,2-Dibromoethane (EDB)	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
Dibromochloromethane	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
1,2-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
1,3-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
1,4-Dichlorobenzene	TO-15	11050009	0.20	0.5	**2.88**	1	2.91	05/19/11	1.0
Dichlorodifluoromethane (F-12)	TO-15	11050009	0.18	100	**2325**	100	2361	05/19/11	1.5
1,1-Dichloroethane	TO-15	11050009	0.21	5	**384**	10	404	05/19/11	5.1
1,2-Dichloroethane	TO-15	11050009	0.19	5	**1772**	10	1781	05/19/11	0.5
1,1-Dichloroethene	TO-15	11050009	0.23	0.5	ND	1	ND	05/19/11	
cis-1,2-Dichloroethene	TO-15	11050009	0.19	5	**355**	10	331	05/19/11	7.0
trans-1,2-Dichloroethene	TO-15	11050009	0.20	0.5	**63.6**	1	62.9	05/19/11	1.1
1,2-Dichloropropane	TO-15	11050009	0.17	5	**304**	10	276	05/19/11	9.7
cis-1,3-Dichloropropene	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
trans-1,3-Dichloropropene	TO-15	11050009	0.14	0.5	ND	1	ND	05/19/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11050009	0.19	10	**91.4**	10	92.5	05/19/11	1.2
Ethylbenzene	TO-15	11050009	0.17	50	**2147**	100	2160	05/19/11	0.6
4-Ethyltoluene	TO-15	11050009	0.21	0.5	**57.8**	1	51.5	05/19/11	12
Hexachloro-1,3-butadiene	TO-15	11050009	0.26	0.5	ND	1	ND	05/19/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26-Duplicate	AccuLabs ID: 11-05-0009-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11050009	0.23	200	**3610**	100	3574	05/19/11	1.0
4-Methyl-2-Pentanone (MIBK)	TO-15	11050009	0.57	200	**1992**	100	2065	05/19/11	3.6
2-Hexanone (MBK)	TO-15	11050009	0.53	2	ND	1	ND	05/19/11	
Styrene	TO-15	11050009	0.16	20	**983**	10	982	05/19/11	0.1
1,1,2,2-Tetrachloroethane	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
Tetrachloroethene (PCE)	TO-15	11050009	0.21	5	**1007**	10	962	05/19/11	4.6
Toluene	TO-15	11050009	0.22	50	**12770**	100	12660	05/19/11	0.9
1,2,4-Trichlorobenzene	TO-15	11050009	0.26	0.5	ND	1	ND	05/19/11	
1,1,1-Trichloroethane	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
1,1,2-Trichloroethane	TO-15	11050009	0.23	0.5	ND	1	ND	05/19/11	
Trichloroethene (TCE)	TO-15	11050009	0.19	5	**658**	10	643	05/19/11	2.3
Trichlorofluoromethane(F-11)	TO-15	11050009	0.17	10	**39.4**	10	37.3	05/19/11	5.5
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11050009	0.19	1	ND	1	ND	05/19/11	
1,2,4-Trimethylbenzene	TO-15	11050009	0.17	0.5	**65.4**	1	63.3	05/19/11	3.3
1,3,5-Trimethylbenzene	TO-15	11050009	0.18	0.5	**46.6**	1	45.6	05/19/11	2.2
Vinyl Acetate	TO-15	11050009	0.20	1	ND	1	ND	05/19/11	
Vinyl Chloride	TO-15	11050009	0.17	1	**51.5**	10	46.7	05/19/11	9.8
m & p-Xylene	TO-15	11050009	0.33	100	**3735**	100	3769	05/19/11	0.9
o-Xylene	TO-15	11050009	0.19	5	**916**	10	928	05/19/11	1.3

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	117.4 118.9	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26 Duplicate	AccuLabs ID: 11-05-0009-02-Dup.
Sample Site: Badlnds Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

*Duplicate Analysis

Analyte	ASTM Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	TRS Factor	Duplicate TRS as H_2S	Primary TRS as H_2S	RPD (0-20)%
Hydrogen sulfide	D 5504-01	11050009	0.01	5.0	10.1	100	11.2	1.00	10.1	11.2	10
Carbonyl sulfide	D 5504-01	11050009	0.005	0.010	0.019	1	0.018	0.567	0.011	0.010	5.4
Methanethiol (Methyl Mercaptan)	D 5504-01	11050009	0.005	1.0	5.38	100	5.35	0.708	3.81	3.79	0.6
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11050009	0.005	0.010	ND	1	ND	0.548	0	0	
Dimethyl Sulfide (Methyl Sulfide)	D 5504-01	11050009	0.005	1.0	5.92	100	5.10	0.548	3.24	2.79	15
Carbon Disulfide	D 5504-01	11050009	0.005	0.010	0.023	1	0.021	0.447	0.010	0.009	9.1
Isopropyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	ND	0.447	0	0	
n-Propyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	ND	0.447	0	0	
Disulfide dimethyl	D 5504-01	11050009	0.005	0.10	0.109	10	0.104	0.362	0.039	0.038	4.7
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ppMv:									17.2	17.8	3.6

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	98.1 / 96.4 Duplicate / Primary	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26 Duplicate	AccuLabs ID: 11050009-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

* Duplicate Analysis

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Duplicate Result	DF	Method	Primary Result	Date Pre'd & Tested	RPD (0-20)%
Oxygen	%	11050009	0.1	0.1	**3.37**	1	ASTM D-1946	3.55	05/19/11	5.2
Nitrogen	%	11050009	0.1	0.1	**29.9**	1	ASTM D-1946	29.5	05/19/11	1.3
Carbon Dioxide	%	11050009	0.01	0.01	**41.1**	1	ASTM D-1946	41.2	05/19/11	0.2
Methane	%	11050009	0.001	0.001	**23.5**	1	ASTM D-1946	24.5	05/19/11	4.2
Methane	ppmV	11050009	0.3	1.0	**235120**	1	EPA TO-3	244940	05/19/11	4.1

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-05-0009-01
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11050009	0.63	2	ND	1	05/19/11	05/19/11
Benzene	TO-15	11050009	0.17	2	**102**	4	05/19/11	05/19/11
Benzyl Chloride	TO-15	11050009	0.50	1	ND	1	05/19/11	05/19/11
Bromodichloromethane	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Bromoform	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Bromomethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
2-Butanone (MEK)	TO-15	11050009	0.56	8	**306**	4	05/19/11	05/19/11
Carbon Disulfide	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Carbon Tetrachloride	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11
Chlorobenzene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
Chloroethane	TO-15	11050009	0.30	0.5	**15.6**	1	05/19/11	05/19/11
Chloroform	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11
Chloromethane	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
1,2-Dibromoethane (EDB)	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
Dibromochloromethane	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
1,2-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
1,3-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
1,4-Dichlorobenzene	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
Dichlorodifluoromethane (F-12)	TO-15	11050009	0.18	4	**101**	4	05/19/11	05/19/11
1,1-Dichloroethane	TO-15	11050009	0.21	0.5	**15.8**	1	05/19/11	05/19/11
1,2-Dichloroethane	TO-15	11050009	0.19	0.5	**42.0**	1	05/19/11	05/19/11
1,1-Dichloroethene	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11
cis-1,2-Dichloroethene	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11
trans-1,2-Dichloroethene	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11
1,2-Dichloropropane	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11
cis-1,3-Dichloropropene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
trans-1,3-Dichloropropene	TO-15	11050009	0.14	0.5	ND	1	05/19/11	05/19/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11050009	0.19	1	ND	1	05/19/11	05/19/11
Ethylbenzene	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11
4-Ethyltoluene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
Hexachloro-1,3-butadiene	TO-15	11050009	0.26	0.5	ND	1	05/19/11	05/19/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-05-0009-01
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11050009	0.23	8	**361**	4	05/19/11	05/19/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11050009	0.57	2	**27.6**	1	05/19/11	05/19/11
2-Hexanone(MBK)	TO-15	11050009	0.53	2	ND	1	05/19/11	05/19/11
Styrene	TO-15	11050009	0.16	0.5	ND	1	05/19/11	05/19/11
1,1,2,2-Tetrachloroethane	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
Tetrachloroethene (PCE)	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
Toluene	TO-15	11050009	0.22	2	**142**	4	05/19/11	05/19/11
1,2,4-Trichlorobenzene	TO-15	11050009	0.26	0.5	ND	1	05/19/11	05/19/11
1,1,1-Trichloroethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11
1,1,2-Trichloroethane	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11
Trichloroethene (TCE)	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11
Trichlorofluoromethane(F-11)	TO-15	11050009	0.17	1	**32.0**	1	05/19/11	05/19/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11050009	0.19	1	ND	1	05/19/11	05/19/11
1,2,4-Trimethylbenzene	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11
1,3,5-Trimethylbenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11
Vinyl Acetate	TO-15	11050009	0.20	1	ND	1	05/19/11	05/19/11
Vinyl Chloride	TO-15	11050009	0.17	2	ND	1	05/19/11	05/19/11
m & p-Xylene	TO-15	11050009	0.33	1	ND	1	05/19/11	05/19/11
o-Xylene	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	116.0	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-05-0009-01
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11050009	0.010	0.050	ND	1	05/19/11	05/19/11	1.00	0
Carbonyl sulfide	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.708	0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.548	0
Dimethyl Sulfide	D 5504-01	11050009	0.005	0.040	**0.607**	4	05/19/11	05/19/11	0.548	0.33
Carbon Disulfide	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
Isopropyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
Disulfide dimethyl	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.362	0
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ***ppMv:***										0.33

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	93.6	70-130

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Project Info	Sample Info	Sample Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11050009-01
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11050009	0.1	0.1	**19.2**	1	ASTM D-1946	05/19/11	05/19/11	
Nitrogen	%	11050009	0.1	0.1	**78.2**	1	ASTM D-1946	05/19/11	05/19/11	
Carbon Dioxide	%	11050009	0.01	0.01	**1.15**	1	ASTM D-1946	05/19/11	05/19/11	
Methane	%	11050009	0.001	0.001	**0.775**	1	ASTM D-1946	05/19/11	05/19/11	
Methane	ppmV	11050009	0.3	1.0	**7743**	1	EPA TO-3	05/19/11	05/19/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11-05-0009-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11050009	0.63	2	ND	1	ND	05/19/11	
Benzene	TO-15	11050009	0.17	2	**103**	4	102	05/19/11	1.0
Benzyl Chloride	TO-15	11050009	0.50	1	ND	1	ND	05/19/11	
Bromodichloromethane	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Bromoform	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Bromomethane	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
2-Butanone (MEK)	TO-15	11050009	0.56	8	**280**	4	306	05/19/11	8.9
Carbon Disulfide	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Carbon Tetrachloride	TO-15	11050009	0.19	0.5	ND	1	ND	05/19/11	
Chlorobenzene	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
Chloroethane	TO-15	11050009	0.30	0.5	**14.9**	1	15.6	05/19/11	4.6
Chloroform	TO-15	11050009	0.23	0.5	ND	1	ND	05/19/11	
Chloromethane	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
1,2-Dibromoethane (EDB)	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
Dibromochloromethane	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
1,2-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
1,3-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
1,4-Dichlorobenzene	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
Dichlorodifluoromethane (F-12)	TO-15	11050009	0.18	4	**86.5**	4	101	05/19/11	15
1,1-Dichloroethane	TO-15	11050009	0.21	0.5	**15.0**	1	15.8	05/19/11	5.2
1,2-Dichloroethane	TO-15	11050009	0.19	0.5	**41.6**	1	42.0	05/19/11	1.0
1,1-Dichloroethene	TO-15	11050009	0.23	0.5	ND	1	ND	05/19/11	
cis-1,2-Dichloroethene	TO-15	11050009	0.19	0.5	ND	1	ND	05/19/11	
trans-1,2-Dichloroethene	TO-15	11050009	0.20	0.5	ND	1	ND	05/19/11	
1,2-Dichloropropane	TO-15	11050009	0.17	0.5	ND	1	ND	05/19/11	
cis-1,3-Dichloropropene	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
trans-1,3-Dichloropropene	TO-15	11050009	0.14	0.5	ND	1	ND	05/19/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11050009	0.19	1	ND	1	ND	05/19/11	
Ethylbenzene	TO-15	11050009	0.17	0.5	ND	1	ND	05/19/11	
4-Ethyltoluene	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
Hexachloro-1,3-butadiene	TO-15	11050009	0.26	0.5	ND	1	ND	05/19/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11-05-0009-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 05/19/11	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: 05/19/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11050009	0.23	8	**350**	4	361	05/19/11	3.1
4-Methyl-2-Pentanone (MIBK)	TO-15	11050009	0.57	2	**28.3**	1	27.6	05/19/11	2.5
2-Hexanone (MBK)	TO-15	11050009	0.53	2	ND	1	ND	05/19/11	
Styrene	TO-15	11050009	0.16	20	ND	10	ND	05/19/11	
1,1,2,2-Tetrachloroethane	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
Tetrachloroethene (PCE)	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
Toluene	TO-15	11050009	0.22	2	**141**	4	142	05/19/11	0.7
1,2,4-Trichlorobenzene	TO-15	11050009	0.26	0.5	ND	1	ND	05/19/11	
1,1,1-Trichloroethane	TO-15	11050009	0.21	0.5	ND	1	ND	05/19/11	
1,1,2-Trichloroethane	TO-15	11050009	0.23	0.5	ND	1	ND	05/19/11	
Trichloroethene (TCE)	TO-15	11050009	0.19	0.5	ND	1	ND	05/19/11	
Trichlorofluoromethane(F-11)	TO-15	11050009	0.17	1	**30.1**	1	32.0	05/19/11	6.1
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11050009	0.19	1	ND	1	ND	05/19/11	
1,2,4-Trimethylbenzene	TO-15	11050009	0.17	0.5	ND	1	ND	05/19/11	
1,3,5-Trimethylbenzene	TO-15	11050009	0.18	0.5	ND	1	ND	05/19/11	
Vinyl Acetate	TO-15	11050009	0.20	1	ND	1	ND	05/19/11	
Vinyl Chloride	TO-15	11050009	0.17	1	ND	1	ND	05/19/11	
m & p-Xylene	TO-15	11050009	0.33	1	ND	1	ND	05/19/11	
o-Xylene	TO-15	11050009	0.19	0.5	ND	1	ND	05/19/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.E ND

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	118.2 / 116.0	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00 Sample Site: Badlands Landfill Moreno Valley, CA Client Name: SCS Field Services	Date Prepared: 05/19/11 Date Analyzed: 05/19/11 Sample Matrix: Air	AccuLabs Batch ID: 05192011-VOC-TO15 Full Scan Date Reported: 05/23/11 Reporting Units: ppbV

Laboratory Control Standards (LCS/LCSD) Studies for VOC Test by EPA TO-15 Method

LCS IDs: AL-05192011-LCS & LCSD-QC for VOCs by EPA TO-15-Cryogenic GC/MS

Test Parameter	Blank Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Acetone	0	10.0	11.9	119	12.0	120	70-130	1.5	20	2.00	05/19/11
Benzene	0	10.0	10.6	106	10.9	109	70-130	3.2	20	0.50	05/19/11
Benzyl Chloride	0	10.0	10.2	102	10.7	107	70-130	4.7	20	1.00	05/19/11
Bromodichloromethane	0	10.0	11.8	118	12.1	121	70-130	2.6	20	0.50	05/19/11
Bromoform	0	10.0	11.2	112	11.7	117	70-130	4.9	20	0.50	05/19/11
Bromomethane	0	10.0	11.4	114	11.3	113	70-130	0.2	20	0.50	05/19/11
Carbon Disulfide	0	10.0	10.4	104	10.3	103	70-130	0.9	20	0.50	05/19/11
Carbon Tetrachloride	0	10.0	11.5	115	11.6	116	70-130	1.5	20	0.50	05/19/11
Chlorobenzene	0	10.0	10.2	102	10.2	102	70-130	0.7	20	0.50	05/19/11
Chloroethane	0	10.0	11.7	117	11.8	118	70-130	0.9	20	0.50	05/19/11
Chloroform	0	10.0	10.8	108	10.8	108	70-130	0.5	20	0.50	05/19/11
Chloromethane	0	10.0	11.7	117	11.9	119	70-130	1.5	20	0.50	05/19/11
cis-1,2-Dichloroethene	0	10.0	10.4	104	10.3	103	70-130	0.4	20	0.50	05/19/11
cis-1,3-Dichloropropene	0	10.0	11.1	111	11.3	113	70-130	2.0	20	0.50	05/19/11
Cyclohexane	0	10.0	10.8	108	11.1	111	70-130	2.8	20	0.50	05/19/11
Dibromochloromethane	0	10.0	12.0	120	11.8	118	70-130	1.5	20	0.50	05/19/11
Dichlorodifluoromethane(F12)	0	10.0	11.5	115	11.3	113	70-130	2.3	20	2.00	05/19/11
Ethanol	0	10.0	11.6	116	11.8	118	70-130	1.7	20	0.50	05/19/11
Ethyl Acetate	0	10.0	10.6	106	10.9	109	70-130	2.2	20	0.50	05/19/11
Ethylbenzene	0	10.0	10.7	107	10.8	108	70-130	1.2	20	0.50	05/19/11
1,1,1-Trichloroethane	0	10.0	11.4	114	11.7	117	70-130	2.3	20	0.50	05/19/11
1,1,2,2-Tetrachloroethane	0	10.0	9.90	99	10.6	106	70-130	7.0	20	0.50	05/19/11
1,1,2-Trichloroethane	0	10.0	11.4	114	11.4	114	70-130	0.7	20	0.50	05/19/11
1,1,2-Trichlorotrifluoroethane (F113)	0	10.0	10.3	103	10.1	101	70-130	1.8	20	2.00	05/19/11
1,1-Dichloroethane	0	10.0	10.4	104	10.5	105	70-130	0.2	20	0.50	05/19/11
1,1-Dichloroethene	0	10.0	10.9	109	10.8	108	70-130	1.0	20	0.50	05/19/11
1,2,4-Trichlorobenzene	0	10.0	8.85	89	9.4	94	70-130	6.2	20	0.50	05/19/11
1,2,4-Trimethylbenzene	0	10.0	10.0	100	10.5	105	70-130	5.2	20	0.50	05/19/11
1,2-Dibromoethane (EDB)	0	10.0	12.1	121	11.9	119	70-130	1.4	20	0.50	05/19/11
1,2-Dichlorobenzene	0	10.0	9.39	94	9.72	97	70-130	3.5	20	0.50	05/19/11
1,2-Dichloroethane	0	10.0	11.8	118	12.2	122	70-130	3.2	20	0.50	05/19/11
1,2-Dichloropropane	0	10.0	11.1	111	11.6	116	70-130	4.0	20	0.50	05/19/11
1,2-Dichlorotetrafluoroethane (F114)	0	10.0	11.8	118	11.8	118	70-130	0.2	20	2.00	05/19/11
1,3,5-Trimethylbenzene	0	10.0	10.3	103	10.8	108	70-130	5.2	20	0.50	05/19/11
1,3-Butadiene	0	10.0	11.9	119	12.1	121	70-130	1.6	20	0.50	05/19/11
1,3-Dichlorobenzene	0	10.0	10.3	103	10.7	107	70-130	3.2	20	0.50	05/19/11
1,4-Dichlorobenzene	0	10.0	9.93	99	10.3	103	70-130	3.8	20	0.50	05/19/11
1,4-Dioxane	0	10.0	11.1	111	11.2	112	70-130	0.9	20	0.50	05/19/11
2-Butanone (MEK)	0	10.0	10.2	102	10.4	104	70-130	1.6	20	2.00	05/19/11
2-Hexanone(MBK)	0	10.0	11.6	116	12.0	120	70-130	3.6	20	2.00	05/19/11
4-Ethyltoluene	0	10.0	10.3	103	11.0	110	70-130	7.4	20	0.50	05/19/11
Hexachlorobutadiene	0	10.0	9.44	94	9.91	99	70-130	4.9	20	0.50	05/19/11
Hexane	0	10.0	10.1	101	10.1	101	70-130	0.2	20	0.50	05/19/11
Isopropyl alcohol	0	10.0	11.7	117	12.0	120	70-130	2.2	20	2.00	05/19/11
m- & p-Xylenes	0	20.0	22.0	110	22.3	112	70-130	1.5	20	1.00	05/19/11
Methyl Isobutyl Ketone (MIBK)	0	10.0	11.4	114	11.9	119	70-130	4.1	20	2.00	05/19/11
Methyl t-Butyl Ether(MTBE)	0	10.0	10.4	104	10.3	103	70-130	0.8	20	2.00	05/19/11
Methylene chloride	0	10.0	10.6	106	10.6	106	70-130	0.5	20	2.00	05/19/11
n-Heptane	0	10.0	11.3	113	11.9	119	70-130	4.7	20	0.50	05/19/11
o-Xylene	0	10.0	11.3	113	11.8	118	70-130	4.1	20	0.50	05/19/11
Propylene	0	10.0	10.7	107	10.6	106	70-130	0.8	20	0.50	05/19/11
Styrene	0	10.0	11.3	113	11.8	118	70-130	4.1	20	0.50	05/19/11
Tetrachloroethene (PCE)	0	10.0	10.9	109	11.0	110	70-130	0.4	20	0.50	05/19/11
Tetrahydrofuran	0	10.0	10.4	104	10.7	107	70-130	2.9	20	0.50	05/19/11
Toluene	0	10.0	10.8	108	10.9	109	70-130	1.0	20	0.50	05/19/11
trans-1,2-Dichloroethene	0	10.0	10.4	104	10.3	103	70-130	0.2	20	0.50	05/19/11
trans-1,3-Dichloropropene	0	10.0	11.5	115	11.7	117	70-130	1.9	20	0.50	05/19/11
Trichloroethene (TCE)	0	10.0	11.2	112	11.3	113	70-130	1.0	20	0.50	05/19/11
Trichlorofluoromethane (F11)	0	10.0	12.0	120	11.9	119	70-130	0.4	20	2.00	05/19/11
Vinyl Acetate	0	10.0	9.76	98	9.73	97	70-130	0.3	20	1.00	05/19/11
Vinyl chloride	0	10.0	11.8	118	11.8	118	70-130	0.0	20	2.00	05/19/11

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	114.5	70-130
4-Bromofluorobenzene (LCSD)	119.9	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00 Sample Site: Badlands Landfill Moreno Valley, CA Client Name: SCS Field Services	Date Prepared: 05/19/11 Date Analyzed: 05/19/11 Sample Matric Air	AccuLabs Batch ID: 05192011-EPA3C-QC Date Reported: 05/23/11 Reporting Units: ppbv

Laboratory Control Standards (LCS/LCSD) Studies for Methane and Fixed Gases Test by EPA TO-3

LCS IDs: AL-05192011-QC for EPA 3CM/ASTM D-1946

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	QC Limit	% RPD	QC Limit	R.L. % & ppmV	Date Analyzed
Carbon Dioxide (%)	0	5.015	5.373	107	5.424	108	80-120	0.9	20	0.01	05/19/11
Oxygen (%)	0	5.074	5.416	107	5.377	106	80-120	0.7	20	0.1	05/19/11
Nitrogen (%)	0	5.027	4.908	98	4.864	97	80-120	0.9	20	0.1	05/19/11
Methane-TCD (%)	0	4.000	4.168	104	4.177	104	80-120	0.2	20	0.001	05/19/11
Carbon Monoxide (%)	0	5.000	5.158	103	5.127	103	80-120	0.6	20	0.1	05/19/11
Methane-FID (ppmV)	0	40000	41031	103	41082	103	80-120	0.1	20	1.0	05/19/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Ellis Hsua
Laboratory Director

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Project Info	Sample Info	Report Info
Project ID: 7211045.00 Sample Site: Badlands Landfill Moreno Valley, CA Client Name: SCS Field Services	Date Prepared: 05/19/11 Date Analyzed: 05/19/11 Sample Matrix: Air	AccuLabs Batch ID: 05192011-Sulfur Scan-TRS-QC Date Reported: 05/23/11 Reporting Units: ppbv

Laboratory Control Standards (LCS/LCSD) Studies for Sulfur Full Scan by ASTM D 5504-01 / SCAQMD370.91

LCS IDs: AL-051922011-TRS-Sulfur Scan-LCS & LCSD

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Dup. Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Hydrogen Sulfide	0	15	13.4	89	15.1	101	70-130	12	20	5	05/19/11
Carbonyl Sulfide	0	10	9.67	97	10.6	106	70-130	9.2	20	2	05/19/11
Methanethiol	0	10	11.2	112	11.5	115	70-130	2.6	20	2	05/19/11
Dimethyl sulfide	0	10	11.8	118	11.9	119	70-130	0.8	20	2	05/19/11
Carbon Disulfide	0	10	11.9	119	12.3	123	70-130	3.3	20	2	05/19/11
Dimethyl disulfide	0	10	12.0	120	12.6	126	70-130	4.9	20	2	05/19/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	95.4	70-130
4-Bromofluorobenzene (LCSD)	94.5	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 05192011-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Acetone	TO-15	11050009	0.63	2	ND	1	05/19/11	05/19/11	
Benzene	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11	
Benzyl Chloride	TO-15	11050009	0.50	1	ND	1	05/19/11	05/19/11	
Bromodichloromethane	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11	
Bromoform	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11	
Bromomethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
2-Butanone (MEK)	TO-15	11050009	0.56	2	ND	1	05/19/11	05/19/11	
Carbon Disulfide	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11	
Carbon Tetrachloride	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11	
Chlorobenzene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
Chloroethane	TO-15	11050009	0.30	0.5	ND	1	05/19/11	05/19/11	
Chloroform	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11	
Chloromethane	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11	
1,2-Dibromoethane (EDB)	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11	
Dibromochloromethane	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11	
1,2-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11	
1,3-Dichlorobenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11	
1,4-Dichlorobenzene	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11	
Dichlorodifluoromethane (F-12)	TO-15	11050009	0.18	2	ND	1	05/19/11	05/19/11	
1,1-Dichloroethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
1,2-Dichloroethane	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11	
1,1-Dichloroethene	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11	
cis-1,2-Dichloroethene	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11	
trans-1,2-Dichloroethene	TO-15	11050009	0.20	0.5	ND	1	05/19/11	05/19/11	
1,2-Dichloropropane	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11	
cis-1,3-Dichloropropene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
trans-1,3-Dichloropropene	TO-15	11050009	0.14	0.5	ND	1	05/19/11	05/19/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11050009	0.19	2	ND	1	05/19/11	05/19/11	
Ethylbenzene	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11	
4-Ethyltoluene	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
Hexachloro-1,3-butadiene	TO-15	11050009	0.26	0.5	ND	1	05/19/11	05/19/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 05192011-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Methylene Chloride	TO-15	11050009	0.23	2	ND	1	05/19/11	05/19/11	
4-Methyl-2-Pentanone (MIBK)	TO-15	11050009	0.57	2	ND	1	05/19/11	05/19/11	
2-Hexanone(MBK)	TO-15	11050009	0.53	2	ND	1	05/19/11	05/19/11	
Styrene	TO-15	11050009	0.16	0.5	ND	1	05/19/11	05/19/11	
1,1,2,2-Tetrachloroethane	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11	
Tetrachloroethene (PCE)	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
Toluene	TO-15	11050009	0.22	0.5	ND	1	05/19/11	05/19/11	
1,2,4-Trichlorobenzene	TO-15	11050009	0.26	0.5	ND	1	05/19/11	05/19/11	
1,1,1-Trichloroethane	TO-15	11050009	0.21	0.5	ND	1	05/19/11	05/19/11	
1,1,2-Trichloroethane	TO-15	11050009	0.23	0.5	ND	1	05/19/11	05/19/11	
Trichloroethene (TCE)	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11	
Trichlorofluoromethane(F-11)	TO-15	11050009	0.17	2	ND	1	05/19/11	05/19/11	
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11050009	0.19	2	ND	1	05/19/11	05/19/11	
1,2,4-Trimethylbenzene	TO-15	11050009	0.17	0.5	ND	1	05/19/11	05/19/11	
1,3,5-Trimethylbenzene	TO-15	11050009	0.18	0.5	ND	1	05/19/11	05/19/11	
Vinyl Acetate	TO-15	11050009	0.20	1	ND	1	05/19/11	05/19/11	
Vinyl Chloride	TO-15	11050009	0.17	2	ND	1	05/19/11	05/19/11	
m & p-Xylene	TO-15	11050009	0.33	1	ND	1	05/19/11	05/19/11	
o-Xylene	TO-15	11050009	0.19	0.5	ND	1	05/19/11	05/19/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	119.1	70-130

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Project Info	*Sample Info*	*Report Info*
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 05192011-S-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11050009	0.010	0.050	ND	1	05/19/11	05/19/11	1.00	0
Carbonyl sulfide	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.708	0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.548	0
Dimethyl Sulfide	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.548	0
Carbon Disulfide	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
Isopropyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.447	0
Disulfide dimethyl	D 5504-01	11050009	0.005	0.010	ND	1	05/19/11	05/19/11	0.362	0
*Total Reduced Sulfur (TRS) as Hydrogen Sulfide in **ppMv**:*										**0**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	89.2	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 05192011-FG-MB
Sample Site: Badands Landfill	Date Sampled: NA	Date Reported: 05/23/11
Moreno Valley, CA	Date Received: NA	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11050009	0.1	0.1	**20.8**	1	ASTM D-1946	05/19/11	05/19/11	
Nitrogen	%	11050009	0.1	0.1	**79.1**	1	ASTM D-1946	05/19/11	05/19/11	
Carbon Dioxide	%	11050009	0.01	0.01	ND	1	ASTM D-1946	05/19/11	05/19/11	
Methane	%	11050009	0.001	0.001	ND	1	ASTM D-1946	05/19/11	05/19/11	
Methane	ppmV	11050009	0.3	1.0	ND	1	EPA TO-3	05/19/11	05/19/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

AccuLabs, Inc.

Ellis Hsue
Laboratory Director

Analytical Report

June 15, 2011

AccuLabs, Inc. Tel.: (626) 447-1888 • (626) 447-1826
Fax: (626) 447-1841
118 La Porte Street Unit C&D Arcadia, CA 91006

CHAIN OF CUSTODY RECORD

Client Name / Address: SCS Field Services

Project Manager: Carl Cortez

Sampler: Efrain Lopez

Project Name / Number / Location: Badlands landfill 07211045.00 Moreno Valley

Phone:

Cell:

Fax:

E-mail: ccortez@scseng.com

ANALISIS REQUIRED

Client Sample ID / Description	Laboratory ID	**Sample Matrix	Container Type	# of Containers	Sampling Date	Sampling Time	VOCs by EPA T015	Sulfate Sam by ASTM-D5504	Fixed Gases by Astm-D1946								Special Instructions / Preservatives If Any
H-27	11060005-01	Gas	6L S.C	1	6-15-11		X	X	X								
H-26	-02	Gas	6L S.C	1	6-15-11		X	X	X								

Relinquished by: Company: SCS-FS
Print: Efrain Lopez Date: 6-15-11
Sign: [signature] Time: 3:10 pm

Received by: Company: AccuLabs, INC.
Print: JUDY HSUE Date: 6-15-11
Sign: [signature] Time: 3:10PM

Client's P.O. Number:

Relinquished by: Company:
Print: Date:
Sign: Time:

Received by: Company:
Print: Date:
Sign: Time:

** ABBREVIATIONS
A - Air, AQ - Aqueous, C - Composite, DW - Drinking Water, G - Grab, NA - Nonaqueous, S - Sloil, SL - Sludge, WW - Waste Water, W - Water, GW - Ground Water

Turnaround Time: (Check)
Same day ____ 72 hours ____
24 hours ____ 5 days ____
48 hours ____ Normal ✓

Sample Integrity: (Check)
Intact ____ Temperature ____

Note: Payment for service is due within 30 days from the date of invoice.
Samples will be disposed of after 30 days from the date of issuing the final report.

White - Accompany Lab Report to Client Canary - Client's Copy Pink - Lab's Chrono File

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Date Prepared: 06/15/11	AccuLabs Batch ID: 06152011-VOC-TO15 Full Scan
Sample Site: Badlands Landfill	Date Analyzed: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Sample Matrix: Air	Reporting Units: ppbV
Client Name: SCS Field Services		

Laboratory Control Standards (LCS/LCSD) Studies for VOC Test by EPA TO-15 Method

LCS IDs: AL-06152011-LCS & LCSD-QC for VOCs by EPA TO-15-Cryogenic GC/MS

Test Parameter	Blank Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Acetone	0	10.0	11.3	113	11.5	115	70-130	1.5	20	2.00	06/15/11
Benzene	0	10.0	10.6	106	10.8	108	70-130	1.6	20	0.50	06/15/11
Benzyl Chloride	0	10.0	9.46	95	9.68	97	70-130	2.3	20	1.00	06/15/11
Bromodichloromethane	0	10.0	11.5	115	11.7	117	70-130	1.5	20	0.50	06/15/11
Bromoform	0	10.0	10.2	102	10.5	105	70-130	3.6	20	0.50	06/15/11
Bromomethane	0	10.0	10.3	103	10.4	104	70-130	1.2	20	0.50	06/15/11
Carbon Disulfide	0	10.0	9.27	93	9.21	92	70-130	0.6	20	0.50	06/15/11
Carbon Tetrachloride	0	10.0	10.6	106	10.8	108	70-130	2.1	20	0.50	06/15/11
Chlorobenzene	0	10.0	9.39	94	9.43	94	70-130	0.4	20	0.50	06/15/11
Chloroethane	0	10.0	11.2	112	11.4	114	70-130	1.5	20	0.50	06/15/11
Chloroform	0	10.0	9.53	95	9.64	96	70-130	1.1	20	0.50	06/15/11
Chloromethane	0	10.0	11.2	112	11.4	114	70-130	1.3	20	0.50	06/15/11
cis-1,2-Dichloroethene	0	10.0	9.57	96	9.48	95	70-130	0.9	20	0.50	06/15/11
cis-1,3-Dichloropropene	0	10.0	10.9	109	11.0	110	70-130	0.7	20	0.50	06/15/11
Cyclohexane	0	10.0	11.2	112	11.4	114	70-130	1.2	20	0.50	06/15/11
Dibromochloromethane	0	10.0	10.7	107	10.8	108	70-130	0.5	20	0.50	06/15/11
Dichlorodifluoromethane(F12)	0	10.0	10.0	100	10.1	101	70-130	1.2	20	2.00	06/15/11
Ethanol	0	10.0	9.04	90	8.98	90	70-130	0.7	20	0.50	06/15/11
Ethyl Acetate	0	10.0	10.1	101	10.3	103	70-130	1.4	20	0.50	06/15/11
Ethylbenzene	0	10.0	10.2	102	10.3	103	70-130	1.0	20	0.50	06/15/11
1,1,1-Trichloroethane	0	10.0	10.9	109	11.2	112	70-130	2.3	20	0.50	06/15/11
1,1,2,2-Tetrachloroethane	0	10.0	9.82	98	10.2	102	70-130	3.7	20	0.50	06/15/11
1,1,2-Trichloroethane	0	10.0	10.9	109	11.0	110	70-130	0.8	20	0.50	06/15/11
1,1,2-Trichlorotrifluoroethane (F113)	0	10.0	8.88	89	8.89	89	70-130	0.1	20	2.00	06/15/11
1,1-Dichloroethane	0	10.0	9.59	96	9.52	95	70-130	0.7	20	0.50	06/15/11
1,1-Dichloroethene	0	10.0	10.2	102	10.3	103	70-130	0.2	20	0.50	06/15/11
1,2,4-Trichlorobenzene	0	10.0	7.23	72	7.50	75	70-130	3.7	20	0.50	06/15/11
1,2,4-Trimethylbenzene	0	10.0	9.39	94	9.70	97	70-130	3.2	20	0.50	06/15/11
1,2-Dibromoethane (EDB)	0	10.0	11.2	112	11.3	113	70-130	0.2	20	0.50	06/15/11
1,2-Dichlorobenzene	0	10.0	8.41	84	8.63	86	70-130	2.6	20	0.50	06/15/11
1,2-Dichloroethane	0	10.0	11.5	115	11.9	119	70-130	3.2	20	0.50	06/15/11
1,2-Dichloropropane	0	10.0	11.5	115	11.6	116	70-130	0.9	20	0.50	06/15/11
1,2-Dichlorotetrafluoroethane (F114)	0	10.0	10.6	106	10.7	107	70-130	1.5	20	2.00	06/15/11
1,3,5-Trimethylbenzene	0	10.0	9.68	97	9.95	100	70-130	2.8	20	0.50	06/15/11
1,3-Butadiene	0	10.0	10.8	108	11.0	110	70-130	2.0	20	0.50	06/15/11
1,3-Dichlorobenzene	0	10.0	9.26	93	9.41	94	70-130	1.6	20	0.50	06/15/11
1,4-Dichlorobenzene	0	10.0	8.8	88	9.05	91	70-130	2.8	20	0.50	06/15/11
1,4-Dioxane	0	10.0	10.6	106	10.7	107	70-130	0.6	20	0.50	06/15/11
2-Butanone (MEK)	0	10.0	9.77	98	9.78	98	70-130	0.1	20	2.00	06/15/11
2-Hexanone(MBK)	0	10.0	11.7	117	12.0	120	70-130	2.5	20	2.00	06/15/11
4-Ethyltoluene	0	10.0	10.0	100	10.3	103	70-130	3.0	20	0.50	06/15/11
Hexachlorobutadiene	0	10.0	8.05	81	8.31	83	70-130	3.2	20	0.50	06/15/11
Hexane	0	10.0	9.46	95	9.46	95	70-130	0.0	20	0.50	06/15/11
Isopropyl alcohol	0	10.0	9.25	93	9.37	94	70-130	1.3	20	2.00	06/15/11
m- & p-Xylenes	0	20.0	20.8	104	21.2	106	70-130	2.1	20	1.00	06/15/11
Methyl Isobutyl Ketone (MIBK)	0	10.0	11.8	118	12.1	121	70-130	2.5	20	2.00	06/15/11
Methyl t-Butyl Ether(MTBE)	0	10.0	9.10	91	8.99	90	70-130	1.2	20	2.00	06/15/11
Methylene chloride	0	10.0	10.1	101	10.1	101	70-130	0.5	20	2.00	06/15/11
n-Heptane	0	10.0	12.2	122	12.3	123	70-130	1.1	20	0.50	06/15/11
o-Xylene	0	10.0	10.8	108	11.1	111	70-130	2.7	20	0.50	06/15/11
Propylene	0	10.0	10.0	100	10	100	70-130	0.1	20	0.50	06/15/11
Styrene	0	10.0	10.5	105	10.8	108	70-130	3.4	20	0.50	06/15/11
Tetrachloroethene (PCE)	0	10.0	10.2	102	10.3	103	70-130	0.2	20	0.50	06/15/11
Tetrahydrofuran	0	10.0	10.3	103	10.3	103	70-130	0.2	20	0.50	06/15/11
Toluene	0	10.0	10.7	107	10.6	106	70-130	0.5	20	0.50	06/15/11
trans-1,2-Dichloroethene	0	10.0	9.47	95	9.45	95	70-130	0.2	20	0.50	06/15/11
trans-1,3-Dichloropropene	0	10.0	11.0	110	11.1	111	70-130	1.5	20	0.50	06/15/11
Trichloroethene (TCE)	0	10.0	10.9	109	10.9	109	70-130	0.4	20	0.50	06/15/11
Trichlorofluoromethane (F11)	0	10.0	10.4	104	10.6	106	70-130	2.2	20	2.00	06/15/11
Vinyl Acetate	0	10.0	11.7	117	11.7	117	70-130	0.2	20	1.00	06/15/11
Vinyl chloride	0	10.0	11.1	111	11.2	112	70-130	0.7	20	2.00	06/15/11

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	119.1	70-130
4-Bromofluorobenzene (LCSD)	122.3	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00 Sample Site: Badlands Landfill Moreno Valley, CA Client Name: SCS Field Services	Date Prepared: 06/15/11 Date Analyzed: 06/15/11 Sample Matrix: Air	AccuLabs Batch ID: 06152011-EPA3C-QC Date Reported: 06/20/11 Reporting Units: ppbv

Laboratory Control Standards (LCS/LCSD) Studies for Methane and Fixed Gases Test by EPA TO-3

LCS IDs: AL-06152011-QC for EPA 3CM/ASTM D-1946

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Result	LCSD % Recovery	QC Limit	% RPD	QC Limit	R.L. % & ppmV	Date Analyzed
Carbon Dioxide (%)	0	5.015	5.287	105	5.115	102	80-120	3.3	20	0.01	06/15/11
Oxygen (%)	0	5.074	5.303	105	5.266	104	80-120	0.7	20	0.1	06/15/11
Nitrogen (%)	0	5.027	5.391	107	5.381	107	80-120	0.2	20	0.1	06/15/11
Methane-TCD (%)	0	4.000	3.997	100	3.973	99	80-120	0.6	20	0.001	06/15/11
Carbon Monoxide (%)	0	5.010	5.130	102	5.071	101	80-120	1.2	20	0.1	06/15/11
Methane-FID (ppmV)	0	40000	39962	100	39720	99	80-120	0.6	20	1.0	06/15/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00 Sample Site: Badlands Landfill Moreno Valley, CA Client Name: SCS Field Services	Date Prepared: 06/15/11 Date Analyzed: 06/15/11 Sample Matrix: Air	AccuLabs Batch ID: 06152011-Sulfur Scan-TRS-QC Date Reported: 06/20/11 Reporting Units: ppbv

Laboratory Control Standards (LCS/LCSD) Studies for Sulfur Full Scan by ASTM D 5504-01 / SCAQMD370.91

LCS IDs: AL-06152011-TRS-Sulfur Scan-LCS & LCSD

Test Parameter	Sample Result	Amount Spiked	LCS Result	LCS % Recovery	LCSD Dup. Result	LCSD % Recovery	Spike QC Limit	% RPD	RPD QC Limit	R.L. ppbV	Date Analyzed
Hydrogen Sulfide	0	100	97.5	98	97.0	97	70-130	0.5	20	5	06/15/11
Carbonyl Sulfide	0	100	91.6	92	94.2	94	70-130	2.8	20	2	06/15/11
Methanethiol	0	100	85.5	86	83.3	83	70-130	2.6	20	2	06/15/11
Dimethyl sulfide	0	100	81.9	82	84.4	84	70-130	3.0	20	2	06/15/11
Carbon Disulfide	0	100	105	105	106	106	70-130	0.9	20	2	06/15/11
Dimethyl disulfide	0	100	84.3	84	82.7	83	70-130	1.9	20	2	06/15/11

Key:MDL= Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene (LCS)	105.5	70-130
4-Bromofluorobenzene (LCSD)	103.9	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-06-0005-01
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11060005	0.63	200	**3213**	100	06/15/11	06/15/11
Benzene	TO-15	11060005	0.17	50	**6145**	100	06/15/11	06/15/11
Benzyl Chloride	TO-15	11060005	0.50	1	ND	1	06/15/11	06/15/11
Bromodichloromethane	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Bromoform	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Bromomethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
2-Butanone (MEK)	TO-15	11060005	0.56	200	**8460**	100	06/15/11	06/15/11
Carbon Disulfide	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Carbon Tetrachloride	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11
Chlorobenzene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
Chloroethane	TO-15	11060005	0.30	5	**939**	10	06/15/11	06/15/11
Chloroform	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11
Chloromethane	TO-15	11060005	0.18	0.5	**184**	1	06/15/11	06/15/11
1,2-Dibromoethane (EDB)	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
Dibromochloromethane	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
1,2-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
1,3-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
1,4-Dichlorobenzene	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Dichlorodifluoromethane (F-12)	TO-15	11060005	0.18	100	**3408**	100	06/15/11	06/15/11
1,1-Dichloroethane	TO-15	11060005	0.21	5	**710**	10	06/15/11	06/15/11
1,2-Dichloroethane	TO-15	11060005	0.19	50	**2889**	100	06/15/11	06/15/11
1,1-Dichloroethene	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11
cis-1,2-Dichloroethene	TO-15	11060005	0.19	5	**300**	10	06/15/11	06/15/11
trans-1,2-Dichloroethene	TO-15	11060005	0.20	0.5	**77.6**	1	06/15/11	06/15/11
1,2-Dichloropropane	TO-15	11060005	0.17	0.5	**136**	1	06/15/11	06/15/11
cis-1,3-Dichloropropene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
trans-1,3-Dichloropropene	TO-15	11060005	0.14	0.5	ND	1	06/15/11	06/15/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11060005	0.19	1	**122**	1	06/15/11	06/15/11
Ethylbenzene	TO-15	11060005	0.17	50	**2215**	100	06/15/11	06/15/11
4-Ethyltoluene	TO-15	11060005	0.21	0.5	**65.4**	1	06/15/11	06/15/11
Hexachloro-1,3-butadiene	TO-15	11060005	0.26	0.5	ND	1	06/15/11	06/15/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-06-0005-01
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11060005	0.23	200	**9086**	100	06/15/11	06/15/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11060005	0.57	200	**2584**	100	06/15/11	06/15/11
2-Hexanone(MBK)	TO-15	11060005	0.53	2	ND	1	06/15/11	06/15/11
Styrene	TO-15	11060005	0.16	5	**996**	10	06/15/11	06/15/11
1,1,2,2-Tetrachloroethane	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
Tetrachloroethene (PCE)	TO-15	11060005	0.21	50	**1218**	100	06/15/11	06/15/11
Toluene	TO-15	11060005	0.22	50	**12780**	100	06/15/11	06/15/11
1,2,4-Trichlorobenzene	TO-15	11060005	0.26	0.5	ND	1	06/15/11	06/15/11
1,1,1-Trichloroethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
1,1,2-Trichloroethane	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11
Trichloroethene (TCE)	TO-15	11060005	0.19	5	**606**	10	06/15/11	06/15/11
Trichlorofluoromethane(F-11)	TO-15	11060005	0.17	1	**65.8**	1	06/15/11	06/15/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11060005	0.19	1	ND	1	06/15/11	06/15/11
1,2,4-Trimethylbenzene	TO-15	11060005	0.17	0.5	**99.5**	1	06/15/11	06/15/11
1,3,5-Trimethylbenzene	TO-15	11060005	0.18	0.5	**61.7**	1	06/15/11	06/15/11
Vinyl Acetate	TO-15	11060005	0.20	1	ND	1	06/15/11	06/15/11
Vinyl Chloride	TO-15	11060005	0.17	2	**92.4**	1	06/15/11	06/15/11
m & p-Xylene	TO-15	11060005	0.33	100	**3979**	100	06/15/11	06/15/11
o-Xylene	TO-15	11060005	0.19	5	**784**	10	06/15/11	06/15/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	119	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11-06-0005-01
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11060005	0.010	0.050	ND	1	06/16/11	06/16/11	1.00	0
Carbonyl sulfide	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.708	0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.548	0
Dimethyl Sulfide	D 5504-01	11060005	0.005	1.0	**5.18**	100	06/16/11	06/16/11	0.548	2.84
Carbon Disulfide	D 5504-01	11060005	0.005	0.010	**0.036**	1	06/16/11	06/16/11	0.447	0.02
Isopropyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
Disulfide dimethyl	D 5504-01	11060005	0.005	0.10	**0.906**	10	06/16/11	06/16/11	0.362	0.33
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ppMv:										**3.18**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	107	70-130

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Project Info	Sample Info	Sample Info
Project ID: 7211045.00	Sample ID: H27	AccuLabs ID: 11060005-01
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11060005	0.1	0.1	**1.18**	1	ASTM D-1946	06/15/11	06/15/11	
Nitrogen	%	11060005	0.1	0.1	**10.5**	1	ASTM D-1946	06/15/11	06/15/11	
Carbon Dioxide	%	11060005	0.01	0.01	**60.2**	1	ASTM D-1946	06/15/11	06/15/11	
Methane	%	11060005	0.001	0.001	**26.5**	1	ASTM D-1946	06/15/11	06/15/11	
Methane	ppmV	11060005	0.3	1.0	**264950**	1	EPA TO-3	06/15/11	06/15/11	

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11-06-0005-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11060005	0.63	200	**3369**	100	3213	06/15/11	4.7
Benzene	TO-15	11060005	0.17	50	**5966**	100	6145	06/15/11	3.0
Benzyl Chloride	TO-15	11060005	0.50	1	ND	1	ND	06/15/11	
Bromodichloromethane	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Bromoform	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Bromomethane	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
2-Butanone (MEK)	TO-15	11060005	0.56	200	**7487**	100	8460	06/15/11	12
Carbon Disulfide	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Carbon Tetrachloride	TO-15	11060005	0.19	0.5	ND	1	ND	06/15/11	
Chlorobenzene	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
Chloroethane	TO-15	11060005	0.30	5	**876**	10	939	06/15/11	6.9
Chloroform	TO-15	11060005	0.23	0.5	ND	1	ND	06/15/11	
Chloromethane	TO-15	11060005	0.18	0.5	**168**	1	184	06/15/11	9.1
1,2-Dibromoethane (EDB)	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
Dibromochloromethane	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
1,2-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
1,3-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
1,4-Dichlorobenzene	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Dichlorodifluoromethane (F-12)	TO-15	11060005	0.18	100	**3074**	100	3408	06/15/11	10
1,1-Dichloroethane	TO-15	11060005	0.21	5	**750**	10	710	06/15/11	5.5
1,2-Dichloroethane	TO-15	11060005	0.19	50	**2595**	100	2889	06/15/11	11
1,1-Dichloroethene	TO-15	11060005	0.23	0.5	ND	1	ND	06/15/11	
cis-1,2-Dichloroethene	TO-15	11060005	0.19	5	**327**	10	300	06/15/11	8.6
trans-1,2-Dichloroethene	TO-15	11060005	0.20	0.5	**86.6**	1	77.6	06/15/11	11
1,2-Dichloropropane	TO-15	11060005	0.17	0.5	**136**	1	136	06/15/11	0.0
cis-1,3-Dichloropropene	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
trans-1,3-Dichloropropene	TO-15	11060005	0.14	0.5	ND	1	ND	06/15/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11060005	0.19	1	**108**	1	122	06/15/11	12
Ethylbenzene	TO-15	11060005	0.17	50	**2112**	100	2215	06/15/11	4.8
4-Ethyltoluene	TO-15	11060005	0.21	0.5	**65.1**	1	65.4	06/15/11	0.5
Hexachloro-1,3-butadiene	TO-15	11060005	0.26	0.5	ND	1	ND	06/15/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11-06-0005-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

*Duplicate Test Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11060005	0.23	200	**7764**	100	9086	06/15/11	16
4-Methyl-2-Pentanone (MIBK)	TO-15	11060005	0.57	200	**2252**	100	2584	06/15/11	14
2-Hexanone (MBK)	TO-15	11060005	0.53	2	ND	1	ND	06/15/11	
Styrene	TO-15	11060005	0.16	20	**957**	10	996	06/15/11	4.0
1,1,2,2-Tetrachloroethane	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
Tetrachloroethene (PCE)	TO-15	11060005	0.21	50	**1203**	100	1218	06/15/11	1.2
Toluene	TO-15	11060005	0.22	50	**11520**	100	12780	06/15/11	10
1,2,4-Trichlorobenzene	TO-15	11060005	0.26	0.5	ND	1	ND	06/15/11	
1,1,1-Trichloroethane	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
1,1,2-Trichloroethane	TO-15	11060005	0.23	0.5	ND	1	ND	06/15/11	
Trichloroethene (TCE)	TO-15	11060005	0.19	5	**563**	10	606	06/15/11	7.4
Trichlorofluoromethane(F-11)	TO-15	11060005	0.17	1	**72.8**	1	65.8	06/15/11	10
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11060005	0.19	1	ND	1	ND	06/15/11	
1,2,4-Trimethylbenzene	TO-15	11060005	0.17	0.5	**95.3**	1	99.5	06/15/11	4.3
1,3,5-Trimethylbenzene	TO-15	11060005	0.18	0.5	**60.5**	1	61.7	06/15/11	2.0
Vinyl Acetate	TO-15	11060005	0.20	1	ND	1	ND	06/15/11	
Vinyl Chloride	TO-15	11060005	0.17	1	**94.5**	1	92.4	06/15/11	2.2
m & p-Xylene	TO-15	11060005	0.33	100	**3866**	100	3979	06/15/11	2.9
o-Xylene	TO-15	11060005	0.19	5	**759**	10	784	06/15/11	3.2

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	111 / 119	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27 Duplicate	AccuLabs ID: 11-06-0005-01Dup.
Sample Site: Badlnds Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

*Duplicate Analysis

Analyte	ASTM Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	*TRS Factor*	Duplicate TRS as H_2S	Primary TRS as H_2S	RPD (0-20)%
Hydrogen sulfide	D 5504-01	11060005	0.01	0.1	ND	1	ND	1.00	0	0	
Carbonyl sulfide	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.567	0	0	
Methanethiol (Methyl Mercaptan)	D 5504-01	11060005	0.005	0.0	ND	1	ND	0.708	0	0	
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.548	0	0	
Dimethyl Sulfide (Methyl Sulfide)	D 5504-01	11060005	0.005	1.0	**5.14**	100	**5.18**	0.548	2.82	2.84	0.8
Carbon Disulfide	D 5504-01	11060005	0.005	0.010	**0.043**	1	**0.036**	0.447	0.019	0.016	18
Isopropyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.447	0	0	
n-Propyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.447	0	0	
Disulfide dimethyl	D 5504-01	11060005	0.005	0.10	**0.992**	10	**0.906**	0.362	0.359	0.328	9.1
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ppMv :									**3.20**	**3.18**	0.4

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	101 / 107 Duplicate / Primary	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H27-Duplicate	AccuLabs ID: 11060005-01-Dup
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

* Duplicate Analysis

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Duplicate Result	DF	Method	Primary Result	Date Pre'd & Tested	RPD (0-20)%
Oxygen	%	11060005	0.1	0.1	**1.23**	1	ASTM D-1946	1.18	06/15/11	4.1
Nitrogen	%	11060005	0.1	0.1	**10.8**	1	ASTM D-1946	10.5	06/15/11	2.8
Carbon Dioxide	%	11060005	0.01	0.01	**59.9**	1	ASTM D-1946	60.2	06/15/11	0.5
Methane	%	11060005	0.001	0.001	**27.0**	1	ASTM D-1946	26.5	06/15/11	1.9
Methane	ppmV	11060005	0.3	1.0	**269590**	1	EPA TO-3	264950	06/15/11	1.7

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	*Sample Info*	*Report Info*
Project ID: 7211045.00	Sample ID: H26-Duplicate	AccuLabs ID: 11-06-0005-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

***Duplicate Test** Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Acetone	TO-15	11060005	0.63	200	**3231**	100	3092	06/15/11	4.4
Benzene	TO-15	11060005	0.17	50	**6187**	100	6167	06/15/11	0.3
Benzyl Chloride	TO-15	11060005	0.50	1	ND	1	ND	06/15/11	
Bromodichloromethane	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Bromoform	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Bromomethane	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
2-Butanone (MEK)	TO-15	11060005	0.56	200	**5543**	100	6150	06/15/11	10
Carbon Disulfide	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
Carbon Tetrachloride	TO-15	11060005	0.19	0.5	ND	1	ND	06/15/11	
Chlorobenzene	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
Chloroethane	TO-15	11060005	0.30	5	**318**	10	329	06/15/11	3.4
Chloroform	TO-15	11060005	0.23	0.5	ND	1	ND	06/15/11	
Chloromethane	TO-15	11060005	0.18	0.5	**137**	1	142	06/15/11	3.6
1,2-Dibromoethane (EDB)	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
Dibromochloromethane	TO-15	11060005	0.20	0.5	ND	1	ND	06/15/11	
1,2-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
1,3-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
1,4-Dichlorobenzene	TO-15	11060005	0.20	0.5	**19.3**	1	18.2	06/15/11	5.9
Dichlorodifluoromethane (F-12)	TO-15	11060005	0.18	100	**2709**	100	2821	06/15/11	4.1
1,1-Dichloroethane	TO-15	11060005	0.21	5	**472**	10	423	06/15/11	11
1,2-Dichloroethane	TO-15	11060005	0.19	50	**1982**	100	2039	06/15/11	2.8
1,1-Dichloroethene	TO-15	11060005	0.23	0.5	ND	1	ND	06/15/11	
cis-1,2-Dichloroethene	TO-15	11060005	0.19	5	**437**	10	439	06/15/11	0.5
trans-1,2-Dichloroethene	TO-15	11060005	0.20	0.5	**96.9**	1	94.5	06/15/11	2.5
1,2-Dichloropropane	TO-15	11060005	0.17	0.5	**170**	1	171	06/15/11	*0.6*
cis-1,3-Dichloropropene	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
trans-1,3-Dichloropropene	TO-15	11060005	0.14	0.5	ND	1	ND	06/15/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11060005	0.19	1	**120**	1	122	06/15/11	1.7
Ethylbenzene	TO-15	11060005	0.17	50	**2834**	100	2819	06/15/11	0.5
4-Ethyltoluene	TO-15	11060005	0.21	5	**264**	10	251	06/15/11	5.0
Hexachloro-1,3-butadiene	TO-15	11060005	0.26	0.5	ND	1	ND	06/15/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	*Sample Info*	*Report Info*
Project ID: 7211045.00	Sample ID: H26-Duplicate	AccuLabs ID: 11-06-0005-02-Dup
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

***Duplicate Test** Analyte	EPA Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	Date Analyzed	RPD (0-20)%
Methylene Chloride	TO-15	11060005	0.23	200	**2709**	100	2428	06/15/11	11
4-Methyl-2-Pentanone (MIBK)	TO-15	11060005	0.57	200	**2192**	100	2130	06/15/11	2.9
2-Hexanone (MBK)	TO-15	11060005	0.53	2	ND	1	ND	06/15/11	
Styrene	TO-15	11060005	0.16	20	**1800**	10	1707	06/15/11	5.3
1,1,2,2-Tetrachloroethane	TO-15	11060005	0.18	0.5	ND	1	ND	06/15/11	
Tetrachloroethene (PCE)	TO-15	11060005	0.21	5	**1283**	10	1286	06/15/11	0.2
Toluene	TO-15	11060005	0.22	50	**13010**	100	14490	06/15/11	11
1,2,4-Trichlorobenzene	TO-15	11060005	0.26	0.5	ND	1	ND	06/15/11	
1,1,1-Trichloroethane	TO-15	11060005	0.21	0.5	ND	1	ND	06/15/11	
1,1,2-Trichloroethane	TO-15	11060005	0.23	0.5	ND	1	ND	06/15/11	
Trichloroethene (TCE)	TO-15	11060005	0.19	5	**622**	10	646	06/15/11	3.8
Trichlorofluoromethane(F-11)	TO-15	11060005	0.17	1	**41.2**	1	37.4	06/15/11	9.7
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11060005	0.19	1	ND	1	ND	06/15/11	
1,2,4-Trimethylbenzene	TO-15	11060005	0.17	0.5	**191**	1	186	06/15/11	2.7
1,3,5-Trimethylbenzene	TO-15	11060005	0.18	0.5	**118**	1	115	06/15/11	2.6
Vinyl Acetate	TO-15	11060005	0.20	1	ND	1	ND	06/15/11	
Vinyl Chloride	TO-15	11060005	0.17	1	**70.9**	1	65.4	06/15/11	8.1
m & p-Xylene	TO-15	11060005	0.33	100	**4997**	100	4856	06/15/11	2.9
o-Xylene	TO-15	11060005	0.19	5	**763**	10	721	06/15/11	5.7

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	113 / 109	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26 Duplicate	AccuLabs ID: 11-06-0005-02-Dup.
Sample Site: Badlnds Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

*Duplicate Analysis

Analyte	ASTM Method	Batch	MDL	RL	Duplicate Result	DF	Primary Result	*TRS Factor*	Duplicate TRS as H_2S	Primary TRS as H_2S	RPD (0-20)%
Hydrogen sulfide	D 5504-01	11060005	0.01	5.0	**3.48**	100	**3.66**	1.00	3.48	3.66	5.0
Carbonyl sulfide	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.567	0	0	
Methanethiol (Methyl Mercaptan)	D 5504-01	11060005	0.005	1.0	**0.843**	100	**0.818**	0.708	0.60	0.58	3.0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.548	0	0	
Dimethyl Sulfide (Methyl Sulfide)	D 5504-01	11060005	0.005	1.0	**4.22**	100	**4.23**	0.548	2.31	2.32	0.2
Carbon Disulfide	D 5504-01	11060005	0.005	0.010	**0.019**	1	**0.019**	0.447	0.008	0.008	0.0
Isopropyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.447	0	0	
n-Propyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	ND	0.447	0	0	
Disulfide dimethyl	D 5504-01	11060005	0.005	0.10	**0.338**	10	**0.344**	0.362	0.122	0.125	1.8
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ppMv:									**6.52**	**6.69**	2.6

Key: MDL = Method Detection Limit RL = Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	103 / 102 Duplicate / Primary	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-06-0005-02
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Acetone	TO-15	11060005	0.63	200	**3092**	100	06/15/11	06/15/11
Benzene	TO-15	11060005	0.17	50	**6167**	100	06/15/11	06/15/11
Benzyl Chloride	TO-15	11060005	0.50	1	ND	1	06/15/11	06/15/11
Bromodichloromethane	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Bromoform	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Bromomethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
2-Butanone (MEK)	TO-15	11060005	0.56	200	**6150**	100	06/15/11	06/15/11
Carbon Disulfide	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
Carbon Tetrachloride	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11
Chlorobenzene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
Chloroethane	TO-15	11060005	0.30	5	**329**	10	06/15/11	06/15/11
Chloroform	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11
Chloromethane	TO-15	11060005	0.18	0.5	**142**	1	06/15/11	06/15/11
1,2-Dibromoethane (EDB)	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
Dibromochloromethane	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11
1,2-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
1,3-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
1,4-Dichlorobenzene	TO-15	11060005	0.20	0.5	**18.2**	1	06/15/11	06/15/11
Dichlorodifluoromethane (F-12)	TO-15	11060005	0.18	100	**2821**	100	06/15/11	06/15/11
1,1-Dichloroethane	TO-15	11060005	0.21	5	**423**	10	06/15/11	06/15/11
1,2-Dichloroethane	TO-15	11060005	0.19	50	**2039**	100	06/15/11	06/15/11
1,1-Dichloroethene	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11
cis-1,2-Dichloroethene	TO-15	11060005	0.19	5	**439**	10	06/15/11	06/15/11
trans-1,2-Dichloroethene	TO-15	11060005	0.20	0.5	**94.5**	1	06/15/11	06/15/11
1,2-Dichloropropane	TO-15	11060005	0.17	0.5	**171**	1	06/15/11	06/15/11
cis-1,3-Dichloropropene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
trans-1,3-Dichloropropene	TO-15	11060005	0.14	0.5	ND	1	06/15/11	06/15/11
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11060005	0.19	1	**122**	1	06/15/11	06/15/11
Ethylbenzene	TO-15	11060005	0.17	50	**2819**	100	06/15/11	06/15/11
4-Ethyltoluene	TO-15	11060005	0.21	5	**251**	10	06/15/11	06/15/11
Hexachloro-1,3-butadiene	TO-15	11060005	0.26	0.5	ND	1	06/15/11	06/15/11

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-06-0005-02
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Result	DF	Date Prepared	Date Analyzed
Methylene Chloride	TO-15	11060005	0.23	200	**2428**	100	06/15/11	06/15/11
4-Methyl-2-Pentanone (MIBK)	TO-15	11060005	0.57	200	**2130**	100	06/15/11	06/15/11
2-Hexanone (MBK)	TO-15	11060005	0.53	2	ND	1	06/15/11	06/15/11
Styrene	TO-15	11060005	0.16	5	**1707**	10	06/15/11	06/15/11
1,1,2,2-Tetrachloroethane	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11
Tetrachloroethene (PCE)	TO-15	11060005	0.21	5	**1286**	10	06/15/11	06/15/11
Toluene	TO-15	11060005	0.22	50	**14490**	100	06/15/11	06/15/11
1,2,4-Trichlorobenzene	TO-15	11060005	0.26	0.5	ND	1	06/15/11	06/15/11
1,1,1-Trichloroethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11
1,1,2-Trichloroethane	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11
Trichloroethene (TCE)	TO-15	11060005	0.19	5	**646**	10	06/15/11	06/15/11
Trichlorofluoromethane(F-11)	TO-15	11060005	0.17	1	**37.4**	1	06/15/11	06/15/11
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11060005	0.19	1	ND	1	06/15/11	06/15/11
1,2,4-Trimethylbenzene	TO-15	11060005	0.17	0.5	**186**	1	06/15/11	06/15/11
1,3,5-Trimethylbenzene	TO-15	11060005	0.18	0.5	**115**	1	06/15/11	06/15/11
Vinyl Acetate	TO-15	11060005	0.20	1	ND	1	06/15/11	06/15/11
Vinyl Chloride	TO-15	11060005	0.17	2	**65.4**	1	06/15/11	06/15/11
m & p-Xylene	TO-15	11060005	0.33	100	**4856**	100	06/15/11	06/15/11
o-Xylene	TO-15	11060005	0.19	5	**721**	10	06/15/11	06/15/11

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	109	70-130

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Project Info	*Sample Info*	*Report Info*
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11-06-0005-02
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11060005	0.010	5.0	**3.66**	100	06/16/11	06/16/11	1.00	3.66
Carbonyl sulfide	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.567	0.0
Methanethiol (Methyl Mercaptan)	D 5504-01	11060005	0.005	0.1	**0.682**	10	06/16/11	06/16/11	0.708	0.48
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.548	0
Dimethyl Sulfide	D 5504-01	11060005	0.005	1.0	**4.23**	100	06/16/11	06/16/11	0.548	2.32
Carbon Disulfide	D 5504-01	11060005	0.005	0.010	**0.019**	1	06/16/11	06/16/11	0.447	0.0
Isopropyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
Disulfide dimethyl	D 5504-01	11060005	0.005	0.10	**0.344**	10	06/16/11	06/16/11	0.362	0.12
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ppMv:										**6.59**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	102	70-130

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Project Info	*Sample Info*	*Sample Info*
Project ID: 7211045.00	Sample ID: H26	AccuLabs ID: 11060005-02
Sample Site: Badlands Landfill	Date Sampled: 06/15/11	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: 06/15/11	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11060005	0.1	0.1	**1.28**	1	ASTM D-1946	06/15/11	06/15/11	
Nitrogen	%	11060005	0.1	0.1	**10.7**	1	ASTM D-1946	06/15/11	06/15/11	
Carbon Dioxide	%	11060005	0.01	0.01	**59.8**	1	ASTM D-1946	06/15/11	06/15/11	
Methane	%	11060005	0.001	0.001	**27.1**	1	ASTM D-1946	06/15/11	06/15/11	
Methane	ppmV	11060005	0.3	1.0	**271330**	1	EPA TO-3	06/15/11	06/15/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	*Sample Info*	*Report Info*
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 06152011-FG-MB
Sample Site: Badands Landfill	Date Sampled: NA	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: NA	Reporting Units: % & ppmV
Client Name: SCS Field Services	Sample Matrix: Air	

Nitrogen, Oxygen, Carbon Dioxide and Methane by ASTM D-1946

Analyte	Units	Batch	MDL	RL	Sample Result	DF	Method	Date Prepared	Date Analyzed	Qualifiers
Oxygen	%	11060005	0.1	0.1	**20.6**	1	ASTM D-1946	06/15/11	06/15/11	
Nitrogen	%	11060005	0.1	0.1	**79.2**	1	ASTM D-1946	06/15/11	06/15/11	
Carbon Dioxide	%	11060005	0.01	0.01	ND	1	ASTM D-1946	06/15/11	06/15/11	
Methane	%	11060005	0.001	0.001	ND	1	ASTM D-1946	06/15/11	06/15/11	
Methane	ppmV	11060005	0.3	1.0	ND	1	EPA TO-3	06/15/11	06/15/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. between MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 06152011-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppbV
Client Name: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Acetone	TO-15	11060005	0.63	2	ND	1	06/15/11	06/15/11	
Benzene	TO-15	11060005	0.17	0.5	ND	1	06/15/11	06/15/11	
Benzyl Chloride	TO-15	11060005	0.50	1	ND	1	06/15/11	06/15/11	
Bromodichloromethane	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11	
Bromoform	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11	
Bromomethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
2-Butanone (MEK)	TO-15	11060005	0.56	2	ND	1	06/15/11	06/15/11	
Carbon Disulfide	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11	
Carbon Tetrachloride	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11	
Chlorobenzene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
Chloroethane	TO-15	11060005	0.30	0.5	ND	1	06/15/11	06/15/11	
Chloroform	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11	
Chloromethane	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11	
1,2-Dibromoethane (EDB)	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11	
Dibromochloromethane	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11	
1,2-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11	
1,3-Dichlorobenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11	
1,4-Dichlorobenzene	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11	
Dichlorodifluoromethane (F-12)	TO-15	11060005	0.18	2	ND	1	06/15/11	06/15/11	
1,1-Dichloroethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
1,2-Dichloroethane	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11	
1,1-Dichloroethene	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11	
cis-1,2-Dichloroethene	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11	
trans-1,2-Dichloroethene	TO-15	11060005	0.20	0.5	ND	1	06/15/11	06/15/11	
1,2-Dichloropropane	TO-15	11060005	0.17	0.5	ND	1	06/15/11	06/15/11	
cis-1,3-Dichloropropene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
trans-1,3-Dichloropropene	TO-15	11060005	0.14	0.5	ND	1	06/15/11	06/15/11	
1,2-Dichlorotetrafluoroethane(F-114)	TO-15	11060005	0.19	2	ND	1	06/15/11	06/15/11	
Ethylbenzene	TO-15	11060005	0.17	0.5	ND	1	06/15/11	06/15/11	
4-Ethyltoluene	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
Hexachloro-1,3-butadiene	TO-15	11060005	0.26	0.5	ND	1	06/15/11	06/15/11	

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 06152011-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppbV
Client ID: SCS Field Services	Sample Matrix: Air	

Volatile Organic Compounds by EPA TO-15 Method

Analyte	EPA Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	Qualifiers
Methylene Chloride	TO-15	11060005	0.23	2	ND	1	06/15/11	06/15/11	
4-Methyl-2-Pentanone (MIBK)	TO-15	11060005	0.57	2	ND	1	06/15/11	06/15/11	
2-Hexanone(MBK)	TO-15	11060005	0.53	2	ND	1	06/15/11	06/15/11	
Styrene	TO-15	11060005	0.16	0.5	ND	1	06/15/11	06/15/11	
1,1,2,2-Tetrachloroethane	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11	
Tetrachloroethene (PCE)	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
Toluene	TO-15	11060005	0.22	0.5	ND	1	06/15/11	06/15/11	
1,2,4-Trichlorobenzene	TO-15	11060005	0.26	0.5	ND	1	06/15/11	06/15/11	
1,1,1-Trichloroethane	TO-15	11060005	0.21	0.5	ND	1	06/15/11	06/15/11	
1,1,2-Trichloroethane	TO-15	11060005	0.23	0.5	ND	1	06/15/11	06/15/11	
Trichloroethene (TCE)	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11	
Trichlorofluoromethane(F-11)	TO-15	11060005	0.17	2	ND	1	06/15/11	06/15/11	
1,1,2-Trichlorotrifluoroethane(F-113)	TO-15	11060005	0.19	2	ND	1	06/15/11	06/15/11	
1,2,4-Trimethylbenzene	TO-15	11060005	0.17	0.5	ND	1	06/15/11	06/15/11	
1,3,5-Trimethylbenzene	TO-15	11060005	0.18	0.5	ND	1	06/15/11	06/15/11	
Vinyl Acetate	TO-15	11060005	0.20	1	ND	1	06/15/11	06/15/11	
Vinyl Chloride	TO-15	11060005	0.17	2	ND	1	06/15/11	06/15/11	
m & p-Xylene	TO-15	11060005	0.33	1	ND	1	06/15/11	06/15/11	
o-Xylene	TO-15	11060005	0.19	0.5	ND	1	06/15/11	06/15/11	

Key: MDL = Method Detection Limit RL = Reporting Limit J = Trace Conc. Bet. MDL and RL M.B. = Method Blank T.B. = Trip Blank F.B. = Field Blank E.B. = Equipment Blank

System Monitoring Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	114	70-130

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Project Info	Sample Info	Report Info
Project ID: 7211045.00	Sample ID: Method Blank	AccuLabs ID: 06162011-S-MB
Sample Site: Badlands Landfill	Date Sampled: NA	Date Reported: 06/20/11
Moreno Valley, CA	Date Received: NA	Reporting Units: ppMv
Client Name: SCS Field Services	Sample Matrix: Air	

Total Sulfur and Sulfur Specification by Modified AQMD 307.91 / ASTM D 5504-01

Analyte	ASTM Method	Batch	MDL	RL	Sample Result	DF	Date Prepared	Date Analyzed	*TRS Factor*	Sulfur as H_2S
Hydrogen sulfide	D 5504-01	11060005	0.010	0.050	ND	1	06/16/11	06/16/11	1.00	0
Carbonyl sulfide	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.567	0
Methanethiol (Methyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.708	0
Ethanethiol (Ethyl Mercaptan)	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.548	0
Dimethyl Sulfide	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.548	0
Carbon Disulfide	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
Isopropyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
n-Propyl Mercaptan	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.447	0
Disulfide dimethyl	D 5504-01	11060005	0.005	0.010	ND	1	06/16/11	06/16/11	0.362	0
Total Reduced Sulfur (TRS) as Hydrogen Sulfide in ***ppMv*** *:*										**0**

Key: MDL = Method Detection Limit RL= Reporting Limit J= Trace Conc. between MDL and RL M.B.= Method Blank T.B.= Trip Blank F.B.= Field Blank E.B.= Equipment Blank

System Monitorind Compound	Surrogate % Recovery	QC Limit %
4-Bromofluorobenzene	102	70-130

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Appendix D
Historic Analytical LFG Data

Badlands LFG Well Monitoring

Barometric Pressure 30

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0013	12:09	01/14/2002	43.40	56.60	0.00	0.00	0.60					
	13:26	02/14/2002	44.20	55.50	0.00	0.30	0.80					
		02/10/2005	61.30	38.40	0.30	0.00	2.60	0.50		20.60		
		02/15/2006	58.00	42.00	0.00	0.00	2.00	0.10		18.90		
		03/13/2006	56.00	43.00	0.10	0.00	2.80	0.10		18.90		
		04/28/2006	41.00	39.00	0.00	20.00	0.70	0.10		4.40		
		08/23/2006	73.00	27.00	0.00	0.00	0.95	0.00		0.00		
		11/30/2006	72.00	28.00	0.00	0.00	3.80	0.20		27.00		
		03/30/2007	65.00	35.00	0.00	0.00	5.00	0.00		0.00		
		04/26/2007	48.00	44.00	0.00	8.00	6.10	0.02		25.00		
		05/10/2007	71.50	39.80	0.00	0.00	6.00	0.20		26.70		
		11/15/2007	53.50	32.00	6.20	8.30	4.00	0.07		26.00		
		01/09/2008	57.00	42.70	0.00	0.00	3.20	0.30		32.70		
		02/11/2008	57.00	44.90	0.10	0.00	2.30	0.10		18.90		
		03/12/2008	78.40	21.00	0.40	0.00	2.00	0.50		42.20		
		04/21/2008	50.60	49.40	0.00	0.00	2.00	0.01		6.00		
		05/29/2008	60.00	40.00	0.00	0.00	2.00	0.03		16.40		
		06/22/2008	78.40	21.00	0.40	0.00	2.00	0.50		42.20		
		07/28/2008	80.90	43.20	0.00	0.00	1.50	0.09		28.40		
		08/20/2008	75.60	41.50	0.00	0.00	1.50	0.10		30.00		
		09/18/2008	78.60	20.90	0.00	0.50	3.00	0.03		16.40		
		10/22/2008	60.00	44.50	0.00	0.00	2.50	0.01		8.60		
		11/18/2008	74.50	24.50	0.00	0.00	2.40	0.02		12.20		
		12/31/2008	72.50	27.40	0.00	0.00	3.20	0.05		20.40		
		01/15/2009	60.00	43.10	0.00	0.00	1.10	0.02		13.40		
		02/25/2009	62.50	37.30	0.00	0.00	2.90	0.05	79.40	21.20		
		03/06/2009	55.00	45.00	0.00	0.00	2.50	0.07	82.00	25.10		
		04/30/2009	56.00	44.00	0.00	0.00	3.50	1.00	86.00	86.20		
		05/20/2009	57.00	44.40	0.00	0.00	3.50	0.20	101.00	38.50		
		06/10/2009	69.00	31.00	0.00	0.00	2.00	0.06	81.00	23.20		
		07/20/2009	60.00	43.50	0.00	0.00	2.00	0.10	90.00	25.08		
		09/01/2009	70.00	30.00	0.00	0.00	2.80	0.08	93.00	26.80		
		09/30/2009	80.30	40.90	0.00	0.00	6.00	0.10	87.00	20.90	21.2	
		11/25/2009	82.00	43.30	0.20	0.00	4.30	0.04	79.00	19.00		
		12/29/2009	75.00	73.00	0.00	0.00	5.50	0.10	71.00	30.00		
		01/21/2010	57.00	46.00	0.00	0.00	5.00	0.03	80.00	16.40		
		02/24/2010	57.00	41.30	0.00	0.00	5.50	0.01	69.00	9.50		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0013		03/15/2010	58.10	41.30	0.00	0.00	5.50	0.01	76.00	9.50		
		04/23/2010	57.00	43.00	0.00	0.00	4.70	0.02	98.00	13.40		
		05/06/2010	80.00	20.00	0.00	0.00	3.50	0.06	85.00	22.00		
		07/02/2010	57.00	44.10	0.00	0.00	4.20	0.30	92.00	51.90		
		07/27/2010	59.10	40.40	0.30	0.00	3.50	0.19	92.00	41.30		
		08/26/2010	80.00	20.00	0.00	0.00	6.40	0.04	97.00	19.00		
		09/22/2010	58.00	42.00	0.00	0.00	8.30	0.06	77.00	23.20		
BLH0014	12:32	01/14/2002	34.60	64.20	1.20	0.00	0.40					
	13:18	02/14/2002	38.70	61.30	0.00	0.00	0.60					
BLH0015	12:43	01/14/2002	22.30	45.70	8.30	23.70	0.10					
	13:15	02/14/2002	46.60	53.20	0.00	0.20	0.20					
BLH0016	12:16	01/14/2002	6.70	31.50	12.60	49.20	0.00					
	13:21	02/14/2002	10.00	39.20	10.20	40.60	0.30					
		02/10/2005	73.30	26.50	0.10	0.00	2.80	0.60		22.50		
		02/15/2006	59.00	41.00	0.00	0.00	2.00	0.10		18.90		
		03/13/2006	60.00	39.00	0.10	0.00	2.90	0.20		26.70		
		04/28/2006	29.00	32.00	0.00	38.00	0.40	0.00		0.00		
		08/23/2006	74.00	26.00	0.00	0.00	0.80	0.00		0.00		
		11/30/2006	70.00	30.00	0.00	0.00	3.80	0.05		13.00		
		03/30/2007	65.00	35.00	0.00	0.00	5.00	0.00		0.00		
		04/26/2007	52.00	42.00	0.00	6.00	6.50	0.40		38.00		
		05/10/2007	72.50	46.80	0.00	0.00	6.20	0.40		37.80		
		11/15/2007	55.50	30.70	5.80	8.00	4.00	0.08		28.00		
		01/09/2008	57.00	44.20	0.00	0.00	3.20	0.70		50.00		
		02/11/2008	57.00	46.10	0.20	0.00	2.30	0.10		18.90		
		03/12/2008	78.80	20.60	0.40	0.00	2.00	0.50		42.20		
		04/21/2008	49.70	50.30	0.00	0.00	2.00	0.06		14.00		
		05/29/2008	60.00	40.00	0.00	0.00	2.00	0.03		16.40		
		06/22/2008	78.80	20.60	0.40	0.00	2.00	0.50		42.20		
		07/28/2008	80.80	42.30	0.00	0.00	1.50	0.02		13.40		
		08/20/2008	77.80	43.20	0.00	0.00	1.50	0.03		16.40		
		09/18/2008	77.40	0.20	0.00	22.40	3.00	0.01		9.50		
		10/22/2008	60.00	42.70	0.00	0.00	2.50	0.55		63.60		
		11/18/2008	79.70	20.30	0.00	0.00	2.30	0.01		8.60		
		12/31/2008	71.00	20.60	0.00	0.00	2.50	0.05		20.40		
		01/15/2009	60.00	44.20	0.00	0.00	0.78	0.02		13.40		
		02/25/2009	65.10	34.80	0.00	0.00	3.00	0.05	83.10	21.20		
		03/06/2009	56.00	44.00	0.00	0.00	2.50	0.02	87.00	11.60		
		04/30/2009	56.00	43.40	0.00	0.60	3.50	0.05	88.00	19.30		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0016		05/20/2009	57.00	46.10	0.00	0.00	2.50	0.04	100.00	17.20		
		06/10/2009	68.00	32.00	0.00	0.00	2.00	0.03	86.00	16.40		
		07/20/2009	69.70	37.10	0.00	0.00	3.00	0.10	94.00	28.44		
		09/01/2009	70.00	30.00	0.00	0.00	3.00	0.03	89.00	16.40		
		09/30/2009	78.00	40.30	0.00	0.00	6.00	0.10	92.00	22.90	23.2	
		11/25/2009	82.60	44.90	0.10	0.00	4.30	0.05	83.00	21.20		
		12/29/2009	75.00	25.00	0.00	0.00	5.50	0.50	78.00	67.00		
		01/21/2010	57.00	46.00	0.00	0.00	5.00	0.05	87.00	21.20		
		02/24/2010	57.00	46.00	0.00	0.00	5.00	0.04	74.00	19.00		
		03/15/2010	56.70	46.00	0.00	0.00	5.00	0.04	77.00	19.00		
		04/23/2010	57.00	42.60	0.00	0.00	4.90	0.05	99.00	21.20		
		05/06/2010	82.00	18.00	0.00	0.00	3.60	0.05	90.00	21.00		
		07/02/2010	57.00	42.20	0.00	0.00	4.60	0.27	94.00	49.30		
		07/27/2010	59.00	39.30	0.50	0.00	3.80	0.21	94.40	43.40		
		08/26/2010	80.00	20.00	0.00	0.00	6.40	0.05	100.00	21.20		
		09/22/2010	59.00	41.00	0.00	0.00	8.30	0.06	85.00	23.20		
BLH0017	11:58	01/14/2002	8.10	40.20	10.60	41.10	0.00					
	13:30	02/14/2002	9.60	37.60	10.50	42.30	0.20					
		02/10/2005	68.80	30.30	0.20	0.00	1.80	0.60		10.70		
		02/15/2006	57.00	43.00	0.00	0.00	0.20	0.00		0.00		
		03/13/2006	36.00	34.00	3.00	35.00	0.09	0.00		0.00		
		04/28/2006	38.00	37.00	0.00	25.00	0.30	0.20		6.20		
		08/23/2006	71.50	28.50	0.00	0.00	0.90	0.00		0.00		
		11/30/2006	69.00	47.00	0.00	0.00	3.80	0.04		12.00		
		03/30/2007	64.00	36.00	0.00	0.00	5.00	0.00		0.00		
		04/26/2007	48.00	45.00	0.00	7.00	5.90	0.01		20.00		
		05/10/2007	59.20	50.80	0.00	0.00	6.00	0.20		26.70		
		11/15/2007	55.30	33.20	5.50	6.00	4.00	0.07		15.00		
		01/09/2008	57.00	43.80	0.10	0.00	3.20	0.05		13.40		
		02/11/2008	57.00	45.30	0.40	0.00	2.20	0.20		26.70		
		03/12/2008	77.10	22.50	0.30	0.00	2.00	0.50		42.20		
		04/21/2008	49.90	50.10	0.00	0.00	2.00	0.01		6.00		
		05/29/2008	60.00	40.00	0.00	0.00	1.80	0.01		6.30		
		06/22/2008	77.10	22.50	0.30	0.00	2.00	0.50		42.20		
		07/28/2008	77.40	43.40	0.00	0.00	2.25	0.02		8.80		
		08/20/2008	75.30	40.10	0.00	0.00	2.20	0.03		10.80		
		09/18/2008	78.60	21.30	0.00	0.10	3.00	0.02		8.80		
		10/22/2008	60.00	44.20	0.10	0.00	2.50	0.01		5.50		
		11/18/2008	74.40	25.20	0.00	0.00	2.30	0.91		52.60		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLH0017		12/31/2008	63.10	36.60	0.00	0.00	3.00	0.01		9.10		
		01/15/2009	60.00	44.00	0.00	0.00	1.00	0.01		6.30		
		02/25/2009	65.60	34.30	0.00	0.00	3.00	0.05	73.00	14.00		
		03/06/2009	55.00	45.00	0.00	0.00	2.50	0.05	73.00	14.00		
		04/30/2009	56.00	44.00	0.00	0.00	3.00	0.07	81.00	14.60		
		05/20/2009	57.00	45.50	0.00	0.00	2.50	0.05	94.00	12.30		
		06/10/2009	68.00	32.00	0.00	0.00	2.00	0.03	74.00	10.80		
		07/20/2009	60.00	43.60	0.00	0.00	2.50	0.10	86.00	15.31		
		09/01/2009	70.00	30.00	0.00	0.00	2.80	0.05	89.00	14.00		
		09/30/2009	73.80	40.40	0.00	0.00	6.00	0.10	80.00	14.00	14.9	
		11/25/2009	78.00	43.10	0.40	0.00	4.20	0.04	79.00	12.10		
		12/29/2009	72.80	26.00	0.00	0.00	5.20	0.05	75.00	13.60		
		01/21/2010	57.00	46.70	0.00	0.00	5.00	0.04	84.00	12.10		
		02/24/2010	57.00	31.80	0.00	0.00	5.50	0.90	63.00	57.60		
		03/15/2010	58.40	31.80	0.00	0.00	5.50	0.90	67.00	57.60		
		04/23/2010	57.00	42.50	0.80	0.00	4.70	0.03	101.00	9.60		
		05/06/2010	80.00	20.00	0.00	0.00	3.40	0.03	87.00	10.00		
		07/02/2010	57.00	48.30	0.00	0.00	4.20	0.30	112.00	33.20		
		08/26/2010	77.00	23.00	0.00	0.00	7.30	0.02		13.40		
		09/22/2010	57.00	43.00	0.00	0.00	8.50	0.02	77.00	13.40		
BLHW-10	13:57	01/31/2001	53.20	46.70	0.00	0.00	-4.10	1.22	80.00	30.00		
	15:26	02/09/2001	50.20	49.60	0.20	0.00	1.30	0.48	90.00	18.00	18	
	10:24	03/08/2001	44.70	53.00	0.00	2.30	-1.20	0.20	80.00	9.00	9	NOT FITTED
	10:04	04/19/2001	27.30	48.00	0.00	24.70	-1.10	-0.02	80.00	0.00	0	
	9:47	04/19/2001	28.80	48.00	0.00	23.20	-1.30	0.02	80.00	0.00	0	
	10:00	04/19/2001					-0.90		80.00	0.00	0	SP on well side of OP
		05/22/2001	53.00	47.00	0.00	0.00	0.70	0.00				
		06/06/2001					1.20					
		02/10/2005	38.80	36.90	0.20	25.10	2.50	0.35		17.00		
		02/15/2006	64.00	36.00	0.00	0.00	0.10	0.00		0.00		
		03/13/2006	56.00	40.00	0.00	3.00	0.00	0.00		0.00		
		04/28/2006	60.00	40.00	0.00	0.00	0.06	0.01		1.00		
		08/23/2006	66.30	33.70	0.00	0.00	0.37	0.03		5.00		
		11/30/2006	55.00	40.00	0.00	5.00	0.60	0.01		3.00		
		03/30/2007	60.00	40.00	0.00	0.00	0.05	0.03		4.60		
		04/26/2007	58.00	41.00	0.00	0.00	0.06	0.02		3.00	4	
		05/10/2007	60.90	38.90	0.00	0.00	1.00	0.20		2.40		
		06/13/2007	56.40	41.20	0.10	2.00	0.00	0.00		0.00		
		07/12/2007	32.80	34.10	0.00	33.10	1.50	0.16		12.20	8.6	

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-10		08/06/2007	33.80	33.90	0.00	32.10	3.00	1.00		30.40		
		11/15/2007	14.40	12.00	12.00	61.60	1.00	0.05		6.50	3	
		01/09/2008	44.70	34.40	0.00	20.80	0.30	0.01		9.10		
		02/11/2008	45.70	31.80	2.10	20.60	0.70	0.20		13.00		
		03/12/2008	52.80	35.30	0.20	10.50	0.30	0.10		9.20		
		04/21/2008	48.20	10.30	0.00	11.40	1.00	0.02		4.60		
		05/29/2008	42.00	34.00	0.00	24.00	3.90	0.85		28.00		
		06/22/2008	30.10	34.70	0.00	34.90	5.00	1.00		29.10		
		07/28/2008	32.70	29.70	0.00	0.00	4.00	0.90		28.90		
		08/20/2008	33.10	28.70	0.00	38.20	4.00	0.90		28.90		
		09/18/2008	26.50	27.30	0.10	46.10	6.80	1.50		37.25		
		10/22/2008	26.70	26.20	0.00	47.10	6.00	1.45		31.30		
		11/18/2008	31.00	27.80	0.00	41.20	2.10	0.39		16.30		
		12/31/2008	41.80	30.00	0.00	7.50	0.30	0.03		3.50		
		01/15/2009	44.60	32.10	0.00	23.20	0.33	0.02		4.30		
		02/25/2009	46.00	34.50	0.00	19.70	0.80	0.00	70.00	0.00		
		03/06/2009	45.00	34.00	0.00	21.00	0.30	0.01	71.00	3.00		
		04/30/2009	43.30	33.00	0.00	23.70	0.40	0.05	93.00	5.80		
		05/20/2009	39.80	33.10	0.00	27.10	0.50	0.02	105.00	3.70		
		06/10/2009	36.00	42.00	0.00	22.00	0.46	0.01	77.00	3.00		
		07/20/2009	41.00	32.30	0.00	26.70	1.00	0.01	100.00	6.08		
		09/01/2009	39.20	31.90	0.00	28.90	1.30	0.02	107.00	4.30	3	
		09/30/2009	4.40	12.30	0.00	84.00	0.70	0.00	83.00	8.00	2.6	
		11/25/2009	62.20	39.00	0.20	0.00	1.00	0.59	106.00	20.00		
		12/29/2009	37.90	31.50	0.00	30.00	1.80	0.90	82.00	28.90		
		01/21/2010	44.30	47.10	0.00	19.30	2.20	0.49	91.00	10.00		
		02/24/2010	46.10	47.10	0.00	19.30	2.20	0.49	79.00	10.00		
		03/15/2010	47.90	47.10	0.00	19.30	2.20	0.49	84.00	10.00		
		04/23/2010	39.20	31.90	0.00	28.80	2.00	0.45	99.00	9.60		
		05/06/2010	43.00	31.50	0.00	25.50	1.80	0.45	88.00	9.50	4.5	
		07/02/2010	42.50	36.10	0.00	21.10	0.30	0.19	100.00	6.00		
		07/27/2010	48.60	33.10	0.00	18.40	0.70	0.16	99.90	5.70		
		08/26/2010	48.30	33.10	0.00	18.00	0.80	0.20	97.00	6.30		
		09/22/2010	46.00	36.00	0.00	18.00	0.90	0.24	83.00	7.00		
BLHW-11	13:46	01/31/2001	43.00	49.00	0.00	7.80	-9.30	0.01	80.00	0.00		
	16:55	02/09/2001	43.70	51.50	0.00	4.80	3.80	0.02	80.00	0.00	0	
	11:51	02/14/2001	36.20	47.20	0.10	16.50	9.10	0.00	70.00	0.00	0	
		01/09/2008					-0.10					
		02/11/2008	54.50	45.10	0.20	0.10	0.00					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-11		03/12/2008	61.40	68.10	0.50	0.00	0.30					
		04/21/2008	51.50	48.20	0.20	0.10	0.60					
		06/22/2008	8.90	5.30	17.20		0.00	0.00		0.00		
		07/28/2008	0.60	0.70	18.70	19.90	3.50	0.01		0.00		
		02/25/2009	8.70	11.80	6.30	73.40			79.00			
		07/20/2009	6.50	9.40	12.70	73.60	9.50	0.00	94.00	0.00		
		04/23/2010	40.80	26.60	3.50	28.80	0.51	0.04	100.00	2.80		
BLHW-12		04/21/2008	38.40	28.90	0.90	32.10	0.10					
		07/28/2008	0.00	0.00	19.30	80.60	0.12	0.00		0.00		
		03/06/2009	44.00	51.70	0.00	4.30	1.00	0.15	79.00	36.70	26.8	
		04/30/2009	51.20	48.70	0.00	0.00	0.30	0.10	87.00	27.30		
		05/20/2009	50.90	50.70	0.00	0.00	0.70	0.08	88.00	24.40		
		06/10/2009	46.50	47.50	0.00	6.00	2.40	0.46	87.00	42.40	37.5	
		07/20/2009	44.80	45.10	0.00	10.00	2.00	0.40	93.00	39.00		
		09/01/2009	43.20	39.60	0.00	17.20	2.20	0.31	91.00	34.80	28.6	
		09/30/2009	46.60	42.20	0.20	11.00	1.50	0.30	93.00	32.70	23.5	
		11/25/2009	52.60	42.30	0.20	4.70	0.49	0.09	85.00	17.70		
		12/29/2009	48.00	39.50	0.00	14.10	0.72	0.05	83.00	13.60		
		01/21/2010	57.50	42.50	0.00	0.00	1.20	0.12	92.00	21.00		
		02/24/2010	54.90	42.60	0.00	2.40	0.40	0.12	83.00	21.00		
		03/15/2010	55.10	42.60	0.00	2.50	0.40	0.12	88.00	21.00		
		04/23/2010	56.00	44.00	0.00	0.00	1.00	0.13	98.00	21.90		
		05/06/2010	57.00	43.00	0.00	0.00	1.30	0.09	89.00	18.00	23.4	
		07/27/2010	51.20	40.10	0.00	8.40	0.70	0.06	92.20	15.60		
		08/26/2010	57.50	40.50	0.00	7.90	1.00	0.08	94.00	16.10		
		09/22/2010	46.00	42.00	0.00	12.00	1.00	0.09	87.00	18.80	14	
BLHW-18		02/15/2006	60.00	40.00	0.00	0.00	2.00	1.20		15.10		
		03/13/2006	60.00	40.00	0.00	0.00	2.70	1.70		7.00		
		04/28/2006	50.00	42.00	0.00	0.00	3.30	0.00		0.00	2.9	
		08/23/2006	67.50	33.50	0.00	0.00	1.00	0.95		29.00		
		11/30/2006	66.00	34.00	0.00	0.00	7.00	3.50		54.00		
		03/30/2007	63.00	37.00	0.00	0.00	3.50	0.50		20.60		
		04/26/2007	53.00	41.00	0.00	6.00	3.00	0.60		76.00		
		05/10/2007	66.00	34.00	0.00	0.00	3.50	0.50		70.10		
		06/13/2007	35.30	34.90	0.00	0.00	3.20	0.70		82.90		
		07/12/2007	60.00	40.00	0.00	0.00	2.50	0.45		63.60		
		08/06/2007	96.50	52.10	0.00	0.00	4.00	0.50		67.00		
		01/09/2008	55.50	43.40	0.00	0.20	3.20	0.40		57.90		
		02/11/2008	66.70	32.50	0.70	0.00	2.20	0.10		28.90		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-18		03/12/2008	70.50	28.50	0.40	0.00	2.50	0.40		57.70		
		04/21/2008	50.10	49.70	0.20	0.00	1.90	0.20		40.80		
		05/29/2008	56.00	44.00	0.00	0.00	2.40	0.25		47.40		
		06/22/2008	36.70	31.70	0.00	30.80	3.50	0.50		57.70		
		07/28/2008	65.90	43.70	0.00	0.00	2.20	0.19		41.30		
		08/20/2008	68.30	31.50	0.20	0.00	2.00	0.20		42.40		
		09/18/2008	65.50	34.40	0.00	0.10	4.50	0.25		47.40		
		10/22/2008	56.30	43.50	0.00	0.20	4.50	0.31		47.60		
		11/18/2008	59.10	40.90	0.00	0.00	3.80	0.23		41.30		
		12/31/2008	59.40	40.50	0.00	0.00	4.00	0.22		42.80		
		01/15/2009	56.70	43.10	0.00	0.00	3.80	0.18		40.20		
		02/25/2009	54.90	42.20	0.00	2.70	5.00	0.80	109.00	84.80		
		03/06/2009	52.40	41.30	0.00	6.30	5.50	0.40	110.00	60.00		
		04/30/2009	52.90	38.70	0.00	8.40	5.50	0.40	109.00	54.50		
		05/20/2009	54.10	40.40	0.00	5.30	6.20	0.30	114.00	47.20		
		06/10/2009	54.00	39.00	0.00	7.00	5.80	0.30	111.00	51.90		
		07/20/2009	57.20	38.50	0.00	3.80	5.50	0.30	115.00	50.20		
		09/01/2009	56.50	33.50	0.00	10.00	5.70	0.28	115.00	50.20		
		09/30/2009	54.30	34.70	0.00	10.90	8.00	0.50	111.00	64.50	60	
		11/25/2009	51.80	37.40	0.60	9.80	6.00	0.30	106.00	51.90		
		12/29/2009	47.10	35.70	0.00	15.80	6.50	0.40	108.00	60.00		
		01/21/2010	53.40	41.90	0.00	3.60	6.20	0.39	117.00	59.20		
		02/24/2010	49.40	27.90	0.10	12.20	5.60	0.30	110.00	51.90		
		03/15/2010	50.10	27.90	0.10	12.20	5.60	0.30	116.00	51.90		
		04/23/2010	51.00	38.60	0.00	10.00	5.90	0.30	102.00	51.90		
		05/06/2010	57.80	37.20	0.00	5.20	6.70	0.24	113.00	47.00		
		07/02/2010	55.40	42.00	0.20	2.40	6.70	0.29	112.00	51.10		
		07/27/2010	52.60	40.20	0.50	6.50	8.50	0.40	111.70	60.00		
		08/26/2010	51.00	36.00	0.00	12.30	9.40	0.40	125.00	60.00	51	
		09/22/2010	50.00	39.00	0.00	11.00	9.60	0.40	112.00	60.00	56.9	
BLHW-19		02/15/2006	61.00	39.00	0.00	0.00	3.10	3.30		25.10		
		03/13/2006	61.00	38.00	0.00	0.00	4.30	4.70		12.00		
		04/28/2006	58.00	42.00	0.00	0.00	2.50	1.50		35.00		
		08/23/2006	65.50	34.50	0.00	0.00	1.50	1.49		35.00		
		11/30/2006	64.00	36.00	0.00	0.00				0.00	46	
		03/30/2007	67.00	33.00	0.00	0.00	2.00	0.50		20.60		
		04/26/2007	54.00	4.00	0.00	5.00	1.50	0.40		60.00		
		05/10/2007	68.50	31.50	0.00	0.00	2.00	0.50		70.10		
		06/13/2007	66.50	33.50	0.00	0.00	1.30	0.30		54.30		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-19		07/12/2007	62.00	38.00	0.00	0.00	1.00	0.27		49.30		
		08/06/2007	64.20	35.50	0.00	0.00	1.50	0.50		67.00		
		01/09/2008	56.20	43.50	0.00	0.00	2.60	0.25		45.00		
		02/11/2008	62.80	36.40	0.40	0.00	2.00	0.10		28.90		
		03/12/2008	68.30	31.10	0.40	0.00	2.00	0.30		48.30		
		04/21/2008	51.70	48.20	0.10	0.00	1.50	0.20		40.80		
		05/29/2008	56.00	44.00	0.00	0.00	2.10	0.19		41.30		
		06/22/2008	51.10	39.30	0.00	15.80	3.00	0.50		57.70		
		07/28/2008	66.20	43.10	0.00	0.00	2.00	0.15		36.70		
		08/20/2008	68.20	31.50	0.00	0.30	1.70	0.13		34.20		
		09/18/2008	67.90	31.90	0.00	0.20	3.80	0.24		46.50		
		10/22/2008	57.20	42.40	0.10	0.30	3.80	0.20		38.10		
		11/18/2008	60.20	39.80	0.00	0.00	3.00	0.19		37.60		
		12/31/2008	59.30	40.50	0.00	0.00	3.50	0.20		40.80		
		01/15/2009	57.60	42.10	0.00	0.00	3.00	0.09		28.40		
		02/25/2009	56.20	42.50	0.00	1.00	5.00	0.70	110.00	79.30		
		03/06/2009	57.00	41.50	0.00	1.50	5.00	0.30	111.00	51.90		
		04/30/2009	60.00	38.50	0.00	1.50	4.50	0.30	113.00	47.20		
		05/20/2009	56.00	40.60	0.00	3.50	5.10	0.23	115.00	41.30		
		06/10/2009	56.00	40.00	0.00	4.00	4.90	0.25	111.00	47.40		
		07/20/2009	58.10	38.40	0.00	3.00	4.50	0.20	115.00	46.50		
		09/01/2009	57.00	37.00	0.00	6.00	4.90	0.25	116.00	47.40		
		09/30/2009	55.50	34.60	0.00	8.40	6.50	0.40	117.00	60.00	62.9	
		11/25/2009	55.10	38.20	0.40	6.30	5.20	0.32	114.00	53.60		
		12/29/2009	49.50	35.20	0.00	14.70	6.00	0.35	110.00	56.10		
		01/21/2010	51.90	40.80	0.00	6.40	5.50	0.30	119.00	51.90		
		02/24/2010	48.50	36.60	0.10	14.00	5.00	0.28	110.00	50.20		
		03/15/2010	49.90	36.60	0.10	14.00	5.00	0.28	108.00	50.20		
		04/23/2010	50.00	38.00	0.00	11.30	6.00	0.35	102.00	56.10		
		05/06/2010	52.20	36.00	0.00	11.00	7.10	0.30	113.00	51.00		
		07/02/2010	58.50	41.50	0.00	0.00	5.40	0.30	109.00	51.90		
		07/27/2010	52.10	39.20	0.40	8.10	7.30	0.40	109.00	60.00		
		08/26/2010	50.30	35.00	0.00	14.80	8.00	0.40	133.00	60.00	51	
		09/22/2010	47.00	37.00	0.00	16.00	8.50	0.36	113.00	56.90	50.2	
BLHW-20		02/15/2006	61.00	39.00	0.00	0.00	2.40	2.50		21.90		
		03/13/2006	62.00	37.00	0.00	0.00	3.20	4.10		11.00		
		04/28/2006	59.00	41.00	0.00	0.00	1.10	2.00		46.00		
		08/23/2006	67.50	32.50	0.00	0.00	1.00	2.00		41.10		
		11/30/2006	68.00	32.00	0.00	0.00	3.50	4.50		62.00		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-20		03/30/2007	66.00	34.00	0.00	0.00	1.50	0.30		15.90		
		04/26/2007	54.00	41.00	0.00	5.00	1.00	0.35		59.00		
		05/10/2007	67.00	33.00	0.00	0.00	1.40	0.40		62.70		
		06/13/2007	66.20	33.70	0.00	0.00	0.50	0.32		56.10		
		07/12/2007	63.00	37.00	0.00	0.00	0.40	0.21		43.40		
		08/06/2007	66.80	33.30	0.00	0.00	1.50	0.70		79.30		
		01/09/2008	52.50	41.50	0.00	5.90	2.20	0.50		64.50		
		02/11/2008	52.70	45.30	0.30	1.20	1.80	0.10		28.90		
		03/12/2008	64.50	35.10	6.10	0.00	1.50	0.49		64.50		
		04/21/2008	54.50	45.20	0.20	0.10	1.00	0.30		48.30		
		05/29/2008	55.00	45.00	0.00	0.00	1.80	0.37		57.70		
		06/22/2008	52.40	47.70	0.00	0.00	2.50	0.50		57.70		
		07/28/2008	60.10	45.50	0.00	0.00	1.80	0.37		57.70		
		08/20/2008	64.60	35.20	0.00	0.20	1.50	0.50		67.00		
		09/18/2008	61.00	38.50	0.00	0.50	2.50	0.41		60.70		
		10/22/2008	50.00	50.00	0.00	0.00	3.50	0.49		60.00		
		11/18/2008	58.20	41.70	0.00	0.00	2.60	0.49		60.30		
		12/31/2008	58.30	41.70	0.00	0.00	3.00	0.40		57.70		
		01/15/2009	60.00	48.80	0.00	0.00	3.80	0.33		54.50		
		02/25/2009	51.50	48.20	0.00	0.00	4.00	0.80	114.00	84.80		
		03/06/2009	50.00	50.00	0.00	0.00	4.00	0.72	114.00	80.40		
		04/30/2009	50.80	48.80	0.00	0.40	4.00	0.50	115.00	60.90		
		05/20/2009	49.60	50.30	0.00	0.00	4.70	0.48	117.00	59.70		
		06/10/2009	55.00	45.00	0.00	0.00	4.50	0.53	113.00	69.00		
		07/20/2009	53.00	46.90	0.00	0.00	4.00	0.40	117.00	58.40		
		09/01/2009	56.00	44.00	0.00	0.00	4.50	0.35	117.00	56.10		
		09/30/2009	58.80	34.40	0.10	0.00	6.00	0.60	113.00	70.70	74.7	
		11/25/2009	57.50	46.20	0.40	0.00	4.70	0.60	117.00	73.40		
		12/29/2009	50.40	42.90	0.00	6.30	5.50	0.62	113.00	74.70		
		01/21/2010	51.00	48.90	0.00	0.00	5.00	0.59	122.00	72.80		
		02/24/2010	50.70	48.90	0.00	0.00	4.90	0.58	114.00	72.20		
		03/15/2010	50.30	48.90	0.00	0.00	4.90	0.58	115.00	72.20		
		04/23/2010	50.00	43.90	0.00	0.00	5.90	0.62	101.00	74.70		
		05/06/2010	54.00	43.00	0.00	3.00	6.80	0.50	118.00	66.00		
		07/02/2010	51.10	48.60	0.00	0.00	4.40	0.40	116.00	60.00		
		07/27/2010	55.00	44.60	0.30	0.10	6.50	0.60	116.00	73.40		
		08/26/2010	50.20	42.30	0.40	7.30	8.00	0.55	141.00	80.30	60.1	
		09/22/2010	47.00	44.00	0.00	9.00	7.50	0.60	115.00	73.40	63.6	
BLHW-21		11/30/2006					0.80					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-21		03/30/2007	54.00	46.00	0.00	0.00	0.50	0.20		13.00		
		05/10/2007	60.40	39.60	0.00	0.00	1.00	0.20		44.30		
		06/13/2007	58.60	41.20	0.00	0.00	0.70	0.30		54.30		
		07/12/2007	56.00	44.00	0.00	0.00	0.60	0.23		45.50		
		08/06/2007	60.30	31.50	0.00	0.00	1.50	0.50		67.00		
		01/09/2008	57.00	53.40	0.20	0.00	2.40	0.25		45.00		
		02/11/2008	46.80	42.70	0.50	0.00	1.90	0.40		57.70		
		03/12/2008	70.60	29.10	0.10	0.00	1.80	0.31		48.30		
		04/21/2008	42.60	57.20	0.22	0.00	1.50	0.18		38.70		
		05/29/2008	55.00	45.00	0.00	0.00	2.00	0.13		34.20		
		06/22/2008	78.10	57.10	0.00	0.00	2.50	0.20		40.80		
		07/28/2008	69.30	50.00	0.00	0.00	2.00	0.14		35.50		
		08/20/2008	65.10	34.20	0.00	37.00	1.60	0.16		37.90		
		09/18/2008	69.90	29.80	0.00	0.30	3.50	0.26		48.30		
		10/22/2008	60.00	52.40	0.10	0.00	3.50	0.20		38.10		
		11/18/2008	67.70	32.30	0.00	0.00	2.90	0.23		41.30		
		12/31/2008	63.60	36.40	0.00	0.00	3.50	0.17		37.60		
		01/15/2009	60.00	51.60	0.00	0.00	2.70	0.12		32.80		
		02/25/2009	55.30	44.00	0.00	0.00	4.00	0.80	113.00	84.80		
		03/06/2009	48.00	52.00	0.00	0.00	4.00	0.32	114.00	53.60		
		04/30/2009	56.00	52.30	0.00	0.00	4.00	0.30	114.00	47.20		
		05/20/2009	57.00	54.00	0.00	0.00	5.00	0.30	115.00	47.20		
		06/10/2009	65.00	35.00	0.00	0.00	4.60	0.24	111.00	46.40		
		07/20/2009	55.00	49.80	0.00	0.00	4.50	0.20	117.00	46.50		
		09/01/2009	65.00	35.00	0.00	0.00	4.70	0.17	116.00	39.10		
		09/30/2009	66.70	44.40	0.00	0.00	6.00	0.40	117.00	57.70	61.4	
		11/25/2009	67.70		49.40	0.00	5.00	0.32	112.00	53.60		
		12/29/2009	64.00	35.00	0.00	0.00	5.90	0.32	112.00	53.60		
		01/21/2010	56.90	53.20	0.00	0.00	5.00	0.30	121.00	51.90		
		02/24/2010	51.20	48.40	0.00	4.70	4.70	0.26	114.00	48.30		
		03/15/2010	50.50	48.40	0.00	4.70	4.70	0.26	116.00	48.30		
		04/23/2010	50.00	50.00	0.00	0.00	6.20	0.32	122.00	53.60		
		05/06/2010	60.00	32.00	0.00	0.00	7.10	0.30	117.00	51.00		
		07/02/2010	57.00	48.60	0.00	0.00	5.60	0.38	117.00	58.40		
		07/27/2010	51.30	48.10	0.50	0.00	6.50	0.00	117.00	0.00	51.3	
		08/26/2010	66.20	33.40	0.50	0.00	7.00	0.28	133.00	50.20	55.8	
		09/22/2010	51.00	49.00	0.00	0.00	8.20	0.37	116.00	57.70	55.3	
BLHW-22		11/30/2006					0.70					
		03/30/2007	56.00	44.00	0.00	0.00	0.50	0.00		20.60		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-22		05/10/2007	61.30	38.10	0.60	0.00	0.60	0.20		44.30		
		06/13/2007	50.30	48.00	1.50	0.00	0.70	0.10		31.30		
		07/12/2007	60.00	40.00	0.00	0.00	0.30	0.13		34.20		
		08/06/2007	58.30	41.40	0.00	0.00	1.00	0.10		30.00		
		01/09/2008	43.70	43.50	0.10	11.70	1.40	0.25		45.00		
		02/11/2008	51.90	45.50	0.10	0.00	1.00	0.20		40.80		
		03/12/2008	60.20	69.20	0.30	0.00	0.80	0.20		40.80		
		04/21/2008	41.50	58.20	0.30	0.00	1.00	0.21		40.80		
		05/29/2008	57.00	43.00	0.00	0.00	1.70	0.29		51.10		
		06/22/2008	54.60	53.90	0.00	0.00	2.50	0.50		57.70		
		07/28/2008	62.70	51.90	0.00	0.00	1.70	0.27		49.30		
		08/20/2008	64.60	34.90	0.00	0.50	1.50	0.40		60.00		
		09/18/2008	62.70	37.20	0.00	0.10	3.10	0.41		60.70		
		10/22/2008	60.00	53.30	0.00	0.00	3.00	0.39		53.50		
		11/18/2008	59.30	40.60	0.00	0.00	2.30	0.39		53.80		
		12/31/2008	51.60	48.20	0.00	0.00	3.00	0.35		49.10		
		01/15/2009	60.00	54.00	0.00	0.00	2.60	0.23		45.50		
		02/25/2009	59.00	40.90	0.00	0.00	4.50	0.80	111.00	84.80		
		03/06/2009	44.00	56.00	0.00	0.00	3.50	0.55	115.00	70.30		
		04/30/2009	56.00	54.00	0.00	0.00	3.50	0.40	116.00	54.50		
		05/20/2009	57.00	55.30	0.00	0.00	4.00	0.36	116.00	51.70		
		06/10/2009	59.00	41.00	0.00	0.00	3.90	0.35	115.00	56.10	60	
		07/20/2009	55.00	53.40	0.00	0.00	4.00	0.30	118.00	55.30		
		09/01/2009	60.00	40.00	0.00	0.00	4.30	0.30	119.00	51.90		
		09/30/2009	63.80	50.10	0.20	0.00	5.50	0.60	115.00	68.00	70.9	
		11/25/2009	62.40	52.80	0.30	0.00	4.50	0.42	116.00	61.40		
		12/29/2009	54.80	45.00	0.00	0.00	5.50	0.39	113.00	59.20		
		01/21/2010	44.60	55.20	0.00	0.00	4.90	0.32	122.00	53.60		
		02/24/2010	50.10	49.60	0.00	4.10	4.10	0.30	115.00	51.90		
		03/15/2010	57.00	61.40	0.00	0.00	5.50	0.25	115.00	47.40		
		04/23/2010	51.20	48.80	0.00	0.00	5.50	0.35	120.00	56.10		
		05/06/2010	63.00	37.00	0.00	0.00	6.40	0.36	118.00	55.00		
		07/02/2010	57.00	50.30	0.00	0.00	4.60	0.16	116.00	37.90		
		07/27/2010	50.00	49.60	0.20	0.20	6.20	0.36	116.00	56.90		
		08/26/2010	62.90	37.00	0.40	0.00	7.20	0.32	132.00	53.60		
		09/22/2010	52.00	48.00	0.00	0.00	7.70	0.35	116.00	56.10		
BLHW-23		01/09/2008					-0.30					
		02/11/2008	0.30	0.30	20.80	78.70	-0.10					
		03/12/2008					0.42					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-23		04/21/2008	0.50	0.10	20.50	78.90	0.30					
		05/29/2008					0.12					
		06/22/2008	0.00	0.50	17.80	81.70		0.02				
		07/28/2008	0.40	3.80	17.30	73.40	0.10	0.00		0.00		
		08/20/2008	5.40	7.50	69.80	17.30	0.22	0.00		0.00		
		09/18/2008	0.70	0.20	19.60	79.50	0.14			0.00		
		10/22/2008	0.00	0.00	19.60	80.40	0.00					
		11/18/2008	0.40	0.10	19.80	79.60	0.44			0.00		
		12/31/2008	0.90	0.10	20.50	78.00	0.90					
		01/15/2009	0.10	0.00	19.50	80.30	0.22			0.00		
		02/25/2009	7.80	15.00	18.00	79.80	1.40					
		04/30/2009	0.40	0.90	18.90	79.80	0.05			0.00		
		05/20/2009	0.10	0.00	18.80	81.00	-0.06		101.00	0.00		
		06/10/2009					-0.07					
		07/20/2009	0.10	0.10	19.30	80.40	0.17		106.00	0.00		
		09/01/2009					-0.27					
		11/25/2009	41.90	51.20	0.40	6.20	6.20					
		12/29/2009	0.40	5.50	15.10	79.10	0.13					
		01/21/2010	31.10	46.90	0.00	21.60	0.25					
		02/24/2010	0.10	4.70	16.40	78.70	0.22					
		04/23/2010	44.90	53.10	0.00	1.80	0.10		101.00			
		05/06/2010					0.00					
		09/22/2010					0.17					
BLHW-24		01/09/2008					-0.30					
		02/11/2008	5.30	15.80	16.80	62.10	-0.10					
		03/12/2008	38.40	61.10	0.40	0.00	0.45					
		04/21/2008	1.60	4.20	19.50	74.60	0.30					
		05/29/2008					0.12					
		06/22/2008	16.60	41.90	6.10	39.10		0.00				
		07/28/2008	15.50	23.90	12.10	48.40	0.70	0.00		0.00		
		08/20/2008	44.30	54.80	0.00	0.90	0.31	0.00		0.00		
		09/18/2008	1.10	0.70	19.70	78.50	0.13			0.00		
		10/22/2008	2.00	2.30	18.80	76.90	0.06					
		11/18/2008	1.20	0.60	19.00	79.30	0.48			0.00		
		12/31/2008	12.00	15.10	15.70	0.00	0.00					
		01/15/2009	16.60	21.50	12.90	48.80	0.23			0.00		
		02/25/2009	0.70	18.40	18.00	79.30	1.80					
		04/30/2009	1.70	1.40	19.10	77.80	0.25			0.00		
		05/20/2009	0.60	0.30	18.90	80.10	-0.02		107.00	0.00		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-24		06/10/2009					-0.08					
		07/20/2009	5.30	8.80	15.80	70.00	0.17		110.00	0.00		
		09/01/2009					-0.25					
		09/30/2009	7.00	0.00	18.50	81.00	0.30					
		11/25/2009	21.00	24.80	11.90	42.00						
		12/29/2009	0.70	0.30	18.00	80.00	0.20					
		01/21/2010	0.30	0.20	20.00	79.40	0.01					
		02/24/2010	2.30	1.60	19.10	77.00	0.36					
		04/23/2010	40.00	60.00	0.00	0.00	0.08		101.00			
		05/06/2010					0.00					
BLHW-25		01/09/2008					-0.30					
		02/11/2008	4.60	11.70	17.90	65.30	-0.10					
		03/12/2008	40.80	57.50	1.60	0.00	0.49					
		04/21/2008	22.90	38.80	10.20	28.00	0.40					
		05/29/2008					0.11					
		06/22/2008	29.00	50.00	6.00	25.00		0.00				
		07/28/2008	18.60	30.90	10.50	39.90	0.07	0.00		0.00		
		08/20/2008	46.10	52.30	0.00	1.60	0.20	0.00		0.00		
		09/18/2008	1.50	2.10	19.30	77.10	0.12			0.00		
		10/22/2008	2.60	3.10	18.50	75.80	0.02					
		11/18/2008	1.60	1.30	18.60	78.40	0.44			0.00		
		12/31/2008	6.80	6.80	18.20	68.00	0.00					
		01/15/2009	15.90	16.60	14.20	52.90	0.13			0.00		
		02/25/2009	1.60	18.00	18.00	77.00	3.70					
		04/30/2009	1.00	0.50	19.40	79.10	0.30			0.00		
		05/20/2009	0.80	0.60	18.70	79.80	-0.04		108.00	0.00		
		06/10/2009					-0.12					
		07/20/2009	9.00	11.00	14.80	65.20	0.05		117.00	0.00		
		09/01/2009					-0.30					
		09/30/2009	1.10	0.10	18.90	80.00	0.30					
		11/25/2009	43.40	56.10	2.70	0.00	0.00					
		12/29/2009	0.60	0.20	18.90	20.00	0.07					
		01/21/2010	0.00	0.00	20.00	79.00	0.65					
		02/24/2010	0.80	0.20	19.90	79.60	0.34					
		04/23/2010	31.40	68.90	0.00	0.00	0.07		121.00			
		05/06/2010					0.00					
BLHW-26		01/09/2008					0.00					
		05/29/2008					0.30					
		09/18/2008	57.10	41.90	1.00	0.00	0.01			0.00		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-26		11/18/2008	52.20	46.50	1.40	0.00	0.62			0.00		
		12/31/2008	47.60	50.50	1.70	0.00	0.30					
		01/15/2009	60.00	58.60	0.00	0.00	1.30	0.28		50.20		
		02/25/2009	54.50	45.50	0.00	0.00	2.00	1.00		29.60		
		03/06/2009	45.00	55.00	0.00	0.00	1.80	0.52	103.00	68.40	60	
		04/30/2009	56.00	57.10	0.00	0.00	1.50	0.40	103.00	54.50		
		05/20/2009	57.00	58.20	0.00	0.00	1.70	0.40	105.00	54.50		
		06/10/2009	60.00	40.00	0.00	0.00	1.40	0.25	104.00	47.40		
		07/20/2009	60.00	54.80	0.00	0.00	1.50	0.30	106.00	51.93		
		09/01/2009	59.00	41.00	0.00	0.00	2.00	0.31	106.00	52.80	56.1	
		09/30/2009	36.90	33.50	7.00	23.00	2.00	0.30	110.00	47.40		
		11/25/2009	53.90	52.50	0.50	0.00	2.00	0.48	106.00	65.70		
		12/29/2009	52.00	47.00	0.00	0.00	2.20	0.50	105.00	67.00		
		01/21/2010	57.00	58.50	0.00	0.00	1.00	0.40	100.00	60.00		
		04/23/2010	57.00	56.90	0.00	0.00	4.90	0.85	109.00	87.40		
		05/06/2010	59.00	41.00	0.00	0.00	3.50	0.60	108.00	72.50		
		07/02/2010	57.00	57.00	0.00	0.00	5.20	1.25	109.00	106.00		
		07/27/2010	43.70	53.90	0.30	1.80	3.60	0.63	109.00	75.30	59.3	
		08/26/2010	47.70	52.10	0.00	0.00	2.60	0.30	108.00	51.90		
		09/22/2010	43.00	47.00	0.00	10.00	4.00	0.34	108.00	55.30	46.4	
BLHW-27		01/09/2008					-0.30					
		09/30/2009	6.00	8.30	16.90	68.80						
		01/21/2010	2.30	2.50	19.30	75.80	0.39					
		05/06/2010					-0.60					
		09/22/2010					0.04					
BLHW-28		05/06/2010	40.70	40.00	0.90	18.60	-0.10					
		09/22/2010					0.12					
BLHW-29		05/06/2010	54.50	45.00	0.50	0.00	-0.20					
		08/26/2010	47.10	52.50	0.00	7.00	0.70	0.11	100.00	18.90		
		09/22/2010	32.00	68.00	0.00	0.00	0.30	0.04	83.00	11.70		
BLHW-8	14:13	01/31/2001	56.10	43.90	0.00	0.00	-9.10	4.74	80.00	60.00		
	16:27	02/09/2001	53.10	46.90	0.00	0.00	3.80	3.20	80.00			
	12:08	03/08/2001	57.50	42.50	0.00	0.00	-0.60	0.36	80.00	16.00	16	NOT FITTED
	9:39	04/19/2001	52.20	47.80	0.00	0.00	-12.80	6.14	80.00	66.00	67	
	13:53	04/19/2001	51.70	48.30	0.00	0.00	-12.60	6.42	80.00	69.00	69	OP is backward
		05/21/2001	61.00	39.00	0.00	0.00	21.20	14.00		108.00	108	
		05/22/2001	61.00	39.00	0.00	0.00	28.00	19.00	94.00			
		05/24/2001	56.60	43.20	0.20		33.90	12.40		135.00	135	
		05/30/2001	54.00	46.00	0.00	0.00	8.80					

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-8		06/04/2001	52.00	48.00	0.00	0.00	10.80					
		06/05/2001	49.00	51.00	0.00	0.00	9.70					
		06/06/2001	49.00	51.00	0.00	0.00	9.60					
		06/07/2001	47.50	52.50	0.00	0.00	9.70					
		02/10/2005	60.00	40.00	0.00	0.00	7.00	7.00		110.00		
		02/15/2006	59.00	41.00	0.00	0.00	7.00	7.00		13.50		
		03/13/2006	54.00	43.00	0.00	2.00	7.60	7.60		100.00		
		04/28/2006	21.00	62.00	0.00	15.00		4.10		50.00		
		08/23/2006	66.30	33.70	0.00	0.00	5.80			75.00		
		11/30/2006	58.00	42.00	0.00	0.00	13.00			140.00		
		03/30/2007	60.00	40.00	0.00	0.00	5.00					
		04/26/2007	57.00	43.00	0.00	0.00	1.00			150.00		
		05/10/2007	64.30	35.30	0.00	0.00	9.00	1.00		13.80		
		06/13/2007	4.60	38.10	0.20	0.00	9.00	1.00		99.10		
		07/12/2007	59.30	40.70	0.00	0.00	7.00	0.65		76.40		
		08/06/2007	54.30	41.40	0.00	3.30	9.00	1.00		94.80		
		11/15/2007					8.00	1.00		80.00		
		01/09/2008	58.30	41.50	0.00	0.20	4.70	0.30		48.30		
		02/11/2008	54.30	37.30	1.90	6.60	4.10	0.10		28.90		
		03/12/2008	74.30	25.20	0.30	0.00	4.00	0.30		48.30		
		04/21/2008	52.30	47.40	0.00	0.00	3.00	0.20		40.80		
		05/29/2008	57.00	43.00	0.00	0.00	3.60	0.27		49.30		
		06/22/2008	34.70	32.60	0.00	31.20	5.00	0.30		48.30		
		07/28/2008	73.20	41.50	0.00	0.00	4.00	0.21		43.40		
		08/20/2008	72.50	41.60	0.00	0.00	4.00	0.21		43.40		
		09/18/2008	71.20	28.40	0.00	0.40	6.50	0.41		60.71		
		10/22/2008	60.00	44.20	0.00	0.00	6.00	0.36		51.40		
		11/18/2008	69.20	30.80	0.00	0.00	5.80	0.23		41.30		
		12/31/2008	65.80	34.00	0.00	0.00	5.20	0.20		12.90		
		01/15/2009	60.00	42.60	0.00	0.00	5.00	0.24		46.40		
		02/25/2009	60.30	39.00	0.00	0.00	8.50	0.25	103.00	47.40		
		03/06/2009	56.00	44.00	0.00	0.00	8.00	0.60	105.00	73.40		
		04/30/2009	58.00	42.40	0.00	0.00	8.00	0.50	107.00	60.90		
		05/20/2009	57.00	44.50	0.00	0.00	8.00	0.60	106.00	66.80		
		06/10/2009	60.00	40.00	0.00	0.00	8.50	0.25	104.00	47.40		
		07/20/2009	60.00	41.30	0.00	0.00	8.00	0.50	107.00	67.00		
		09/01/2009	70.00	30.00	0.00	0.00	9.20	0.35	107.00	56.10		
		09/30/2009	60.40	37.00	0.00	9.90	11.00	0.60	104.00	75.80		
		11/25/2009	68.70	39.70	0.10	0.00	9.40	0.58	106.00	72.20		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-8		12/29/2009	63.00	35.00	0.00	0.00	9.50	0.50	104.00	67.00		
		01/21/2010	70.00	29.60	0.00	0.00	10.00	0.40	113.00	72.60		
		02/24/2010	67.80	29.60	0.00	0.00	9.70	0.30	75.00	62.80		
		03/15/2010	60.50	37.90	0.00	0.00	2.50	0.40	76.00	72.60		
		04/23/2010	61.60	38.90	0.00	0.00	9.90	0.40	102.00	72.60		
		05/06/2010	70.00	30.00	0.00	0.00	11.50	0.50	107.00	85.00		
		07/02/2010	58.20	41.30	0.20	0.30	9.80	0.40	108.00	72.60		
		07/27/2010	60.00	36.00	0.80	3.20	10.00	0.62	108.00	95.80		
		08/26/2010	62.50	37.60	0.00	0.00	10.00	0.52	107.00	87.70		
		09/22/2010	58.00	40.00	0.00	2.00	11.80	0.55	107.00	88.90		
BLHW-9	14:01	01/31/2001	60.70	39.30	0.00	0.00	-8.50	3.07	80.00	50.00		
	15:53	02/09/2001	56.90	43.10	0.00	0.00	3.00	1.10	90.00	28.00	28	
	12:58	02/14/2001	53.80	46.20	0.00	0.00	0.00	3.28	70.00	51.00	51	
	10:27	03/08/2001	48.80	51.10	0.10	0.00	-15.30	6.42	80.00	67.00	67	NOT FITTED
	13:57	04/19/2001	48.50	51.50	0.00	0.00	-22.50	9.94	80.00	82.00	82	OP is backward
	9:43	04/19/2001	49.60	50.40	0.00	0.00	-21.40	9.12	80.00	78.00	80	
		05/21/2001	63.00	37.00	0.00	0.00	20.20			100.00	100	
		05/22/2001	61.00	39.00	0.00	0.00	26.40	15.50	100.00			
		05/24/2001	55.30	44.60	0.20		32.10	13.90		124.00	124	
		05/30/2001	54.00	46.00	0.00	0.00	9.40					
		06/04/2001	52.20	47.40	0.40	0.00	12.60					
		06/05/2001	49.00	51.00	0.00	0.00	11.20					
		06/06/2001	49.00	51.00	0.00	0.00	11.20					
		02/10/2005	58.00	42.00	0.00	0.00	8.00	8.00		100.00		
		02/15/2006	55.00	45.00	0.00	0.00	6.00	6.00		95.00		
		03/13/2006	55.00	42.00	0.00	2.00	5.00	5.00		60.00		
		04/28/2006	57.00	43.00	0.00	0.00		2.70		35.00		
		08/23/2006	65.50	34.50	0.00	0.00	3.80			50.00		
		11/30/2006	57.00	43.00	0.00	0.00	7.00			90.00		
		03/30/2007	58.00	42.00	0.00	0.00	3.70					
		04/26/2007	57.00	43.00	0.00	0.00	4.50			80.00		
		05/10/2007	56.20	33.80	0.00	0.00	9.00	1.00		13.80		
		06/13/2007	47.70	21.70	0.50	0.00	9.00	1.00		99.10		
		07/12/2007	53.40	41.80	0.00	4.80	7.00	0.40		60.00		
		08/06/2007	47.80	39.60	0.00	12.10	9.00	0.50		67.00		
		11/15/2007	22.50	17.50	10.40	49.60	8.50	0.40		33.60		
		01/09/2008	47.50	37.50	0.10	14.00	4.50	0.17		37.60		
		02/11/2008	46.50	35.30	1.70	16.10	4.00	0.10		28.90		
		03/12/2008	59.40	39.10	0.20	0.30	3.80	0.18		38.70		

Well I.D.	Time	Date	CH4 %	CO2 %	O2 %	Balance	Static Press	Diff Press	Temp	Ref. Flow	Adj. Flow	Comments
BLHW-9		04/21/2008	55.10	44.70	0.00	0.20	3.00	0.06		22.40		
		05/29/2008	60.00	40.00	0.00	0.00	3.50	0.11		31.40		
		06/22/2008	40.10	32.90	0.00	0.00	5.00	0.10		28.90		
		07/28/2008	61.90	39.20	0.00	0.00	3.90	0.07		25.10		
		08/20/2008	61.70	39.40	0.00	0.00	3.90	0.07		25.10		
		09/18/2008	57.80	37.40	0.00	4.80	6.50	0.21		43.50		
		10/22/2008	56.60	40.10	0.00	3.30	6.00	0.21		39.00		
		11/18/2008	52.30	38.60	0.00	9.10	5.60	0.22		40.40		
		12/31/2008	50.30	37.20	0.00	11.80	5.50	0.18		9.90		
		01/15/2009	56.00	38.60	0.00	5.40	5.00	0.17		39.10		
		02/25/2009	48.80	39.90	0.00	12.80	8.00	0.25	99.00	47.40		
		03/06/2009	47.80	37.80	0.00	14.40	8.50	0.25	100.00	47.40		
		04/30/2009	56.00	35.40	0.00	8.60	8.00	0.30	101.00	47.20		
		05/20/2009	49.60	36.30	0.00	14.20	8.00	0.32	104.00	48.80		
		06/10/2009	49.00	36.00	0.00	15.00	8.00	0.25	100.00	47.40		
		07/20/2009	50.90	33.70	0.00	15.60	9.00	0.40	102.00	59.20		
		09/01/2009	47.20	32.60	0.00	20.20	8.90	0.32	102.00	53.60	49.3	
		09/30/2009	23.00	23.00	0.10	55.70	6.50	0.30	100.00	46.50	26.8	
		11/25/2009	54.20	35.00	0.10	10.20	2.40	0.07	87.50	24.20		
		12/29/2009	49.00	34.00	0.00	16.40	3.20	0.06	75.00	23.20		
		01/21/2010	55.60	24.40	0.00	5.70	3.90	0.05	84.00	21.20		
		02/24/2010	56.10	24.40	0.00	5.70	3.80	0.05	74.00	21.20		
		03/15/2010	55.90	24.40	0.00	5.70	3.80	0.05	78.00	21.20		
		04/23/2010	52.00	35.30	0.00	12.40	3.20	0.06	101.00	23.20		
		05/06/2010	55.50	35.50	0.00	9.00	3.60	0.05	98.00	21.00		
		07/02/2010	50.40	38.50	0.00	11.10	3.60	0.20	100.00	42.40		
		07/27/2010	47.40	32.90	0.00	19.50	3.40	0.23	99.50	45.50	38.6	
		08/26/2010	34.30	21.90	3.90	40.70	0.60	0.00	92.00	0.00		
		09/22/2010	58.00	39.00	0.00	3.00	2.60	0.06	88.00	23.20		
BLLEACH1	14:45	01/31/2001	41.80	45.10	3.10	10.00	-8.70	0.00	80.00	0.00		
		07/12/2007	32.30	33.70	7.90	26.10		0.95		15.00	7.6	
		01/09/2008	0.20	0.00	20.60	79.30	4.50	0.50		0.00		
		02/11/2008	57.60	41.20	1.20	0.10	4.00					
		03/12/2008	18.90	11.70	15.10	53.50	4.00	0.01				
		04/21/2008	37.00	0.40	20.10	19.90	2.50	0.01		1.40		
		05/29/2008	15.00	12.00	13.00	60.00	4.30	0.00		0.00		
		06/22/2008	18.90	11.70	15.10	53.50	4.00	0.01		1.40		
		07/28/2008	0.70	0.40	20.10	19.90	2.50	0.01		1.40		
		08/20/2008	15.00	12.00	13.00	60.00	4.30	0.00		0.00		

Appendix E
Photo Log

Description:

Field technicians measuring gas quantity and quality using a Gem unit on WH-27, the trench with TDA. The weather was dry with little wind.

Location: WH-27

Date: 03/1/11

Description:

Well Head 26 configuration. This well was constructed with aggregate.

Location: WH-26

Date: 03/1/11

Description:

Picture of stainless steel sampling canister or SilcoCan Cansiter. Pressure for the canister started out with about 20 psi and ended with about 5 psi before the sample was captured.

Location: WH-27

Date: 03/1/11

Description:

Field technicians along with landfill personnel taking LFG sample at WH-27, the TDA trench.

Location: WH-27

Date: 03/1/11

Description:

Field technicians preparing canister for delivery to the analytical lab for analysis.

Location: WH-27

Date: 03/1/11

Description:

This picture shows WH-27 and trench assembly, with sampling performed at the far end. The pipe up to the sampling well is 6-inch high density polyethylene (HDPE).

Location: WH-27

Date: 03/1/11

Description:

This picture shows WH-27 well head assembly. Sampling ports are shown on the right of the well, opposite from the valve. The flange was custom made by landfill personnel and has a 2.5-inch orifice. The diameter of the pipe leading to the sampling ports is a 6-inchs. While the connection pipe after the sampling port is down sized to 4-inches.

Location: WH-27

Date: 03/1/11

Description:

Another view of WH-27 and the flange assembly.

Location: WH-27

Date: 03/1/11

Description:

Technician assembling the canisters for delivery to the analytical lab for analyses.

Location: WH-27

Date: 03/1/11

Description:

Field technicians closing valve after sampling was performed.

Location: WH-27

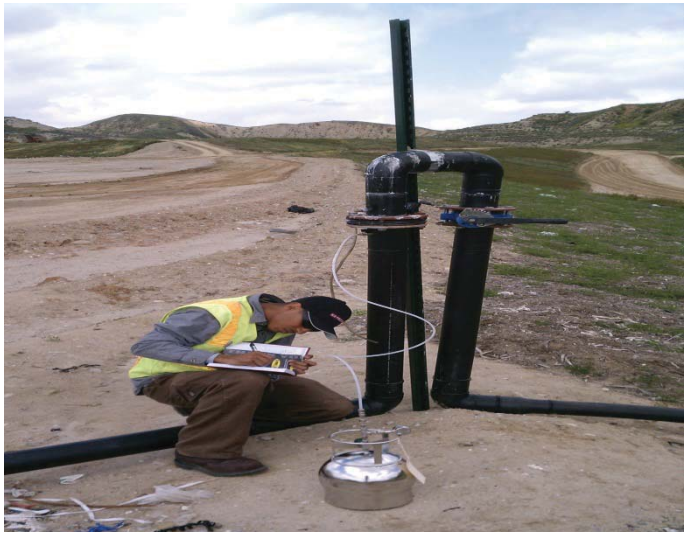
Date: 03/1/11

Description:

Technician shutting the valve in order to take the LFG sample on WH-27. Second sampling event.

Location: WH-27

Date: 04/13/11



Description:

Technician hooking up canister to take sample on WH-27.

Location: WH-27

Date: 04/13/11

Description:

Technician taking pressure readings and preparing canister to take sample at WH-26, the aggregate trench.

Location: WH-26

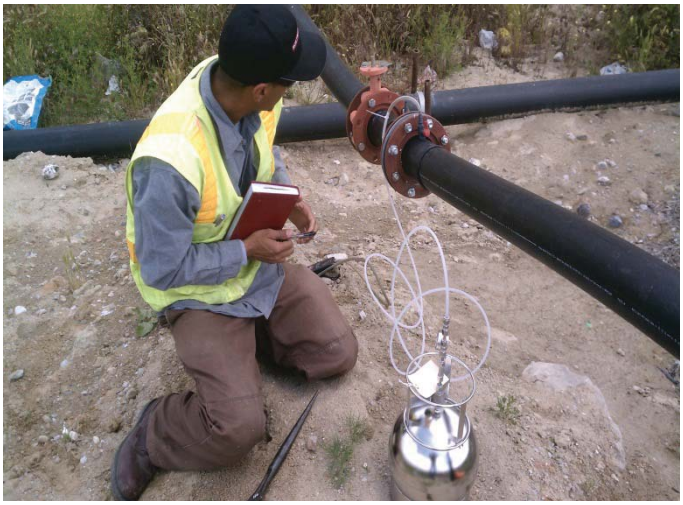
Date: 04/13/11

Description:

Technician taking active pressure at WH-26, the aggregate trench.

Location: WH-26

Date: 04/13/11



Description:

Technician hooking up canister to take LFG sample at WH-26.

Location: WH-26

Date: 04/13/11

Description:

The picture shows the canister hooked up to HW-26, taking the LFG sample.

Location: WH-26

Date: 04/13/11

Description:

Technician completing sample at WH-27.

Location: WH-27

Date: 04/13/11

Description:

Technician disassembling the sampling canister at WH-27, the TDA trench.

Location: WH-27

Date: 04/13/11

Description:

Technician preparing canisisters for delivery to analytical lab.

Location: WH-27

Date: 04/13/11

Description:

Technician using the filed meter (GEM) to observe flow rate and taking preliminary data on Oxygen and Methane readings

Location: HW-27

Date: 04/13/11

Description:

Technician taking field readings at WH-26, the aggregate trench.

Location: HW-26

Date: 04/13/11

Description:

Technician and site personnel taking field readings at HW-27.

Location: HW-27

Date: 05/19/11

Description:

Technician field readings of HW-27 and preparing to connect canister.

Location: HW-27

Date: 05/19/11

Description:

Technician field readings of HW-27 and preparing to connect canister for taking the LFG sample.

Location: HW-27

Date: 06/15/11

Description:

Canister taking sample of LFG at HW-26, the aggregate trench.

Location: HW-26

Date: 06/15/11

Description:

Canister taking sample of LFG at HW-27, the TDA trench.

Location: HW-26

Date: 06/15/11