1. INTRODUCTION

This document presents a combined semi-annual groundwater and waste disposal monitoring report for the Sunshine Canyon City Landfill (City Landfill) and Sunshine Canyon County Extension Landfill (County Landfill). The document presents the results of various environmental monitoring activities conducted at the City and County Landfills during the first semi-annual monitoring period of 2005.[1] The report was prepared for Browning-Ferris Industries of California, Inc. (BFI) by A-Mehr, Inc. (A-Mehr) for submittal to the California Regional Water Quality Control Board, Los Angeles Region (RWQCB) in reference to RWQCB File No. 58-076.

1.1 Background

Groundwater monitoring was first performed at the City Landfill in 1986 as part of the solid waste assessment test (SWAT) investigation for this facility (ETC, 1988a). Groundwater monitoring is currently conducted for the City Landfill in accordance with revised RWQCB Monitoring and Reporting Program (MRP) CI-2043 (RWQCB, 2003a), adopted for the facility in November of 2003. This represents the third semi-annual monitoring report submitted under this version of MRP CI-2043.

A baseline monitoring program was initiated for the County Landfill in 1994. A formal groundwater monitoring program was initiated for the facility in 1996 concurrent with the initial acceptance of waste. Groundwater monitoring is currently conducted for the County Landfill pursuant to revised RWQCB MRP CI-7059 (RWQCB, 2004b), adopted for the facility in August of 2004. This version of MRP CI-7059 allows for the submittal of combined groundwater monitoring reports, which address requirements of the City and County Landfills. This represents the second semi-annual monitoring report submitted under this version of MRP CI-7059.

1.2 Report Scope and Organization

The remainder of this report is organized in seven sections, as follows:

* Section 2, *General Site Information*, describes the site conditions within Sunshine Canyon pertinent to the facility's environmental monitoring programs;

[1] For purposes of this report, the first semi-annual monitoring period is defined as the period from January 1 to June 30, 2005 for the City and County Landfills.

* Section 3, *Groundwater Monitoring,* describes the current groundwater monitoring programs for the City and County Landfills, and presents the results of groundwater monitoring activities conducted during the first semi-annual monitoring period;

* Section 4, *Vadose Zone Monitoring*, describes the current vadose zone monitoring programs for the City and County Landfills, and summarizes the results of subdrain liquid, lysimeter, and soil gas monitoring activities conducted during the first semi-annual monitoring period;

* Section 5, *Surface Water Monitoring,* describes the current surface water monitoring programs for the City and County Landfills, and summarizes the results of stream water, seep water, storm water, and stream diversion monitoring activities conducted during the first semi-annual monitoring period;

* Section 6, *Leachate Monitoring*, describes the leachate monitoring programs for the City and County Landfills, and summarizes the results of leachate monitoring activities conducted during the first semi-annual monitoring period;

* Section 7, *Standard Observations,* describes the National Pollutant Discharge Elimination Permit System (NPDES) site inspections required for the City and County Landfills, and presents the results of the standard observations conducted during the first semi-annual monitoring period; and

* Section 8, *Waste Disposal and Water-Use Monitoring*, summarizes the results of waste disposal and water-use monitoring activities conducted at the City and County Landfills during the first semi-annual monitoring period.

The *Executive Summary*, presented at the front of the report, summarizes the significant findings from the first semi-annual monitoring period of 2005. It includes a discussion of the facilities' compliance records, actions planned or taken during the monitoring period to maintain compliance with the facilities' WDRs, corrective action measures undertaken during the semi-annual monitoring period, and any exceedances of site-specific water quality protection standards (WQPS). Figures, tables, references, and appendices are included at the end of the report. Table 1-1 presents a summary of the semi-annual reporting elements required for the City and County Landfills and provides a general index indicating where each reporting requirement is addressed in the combined report.

2. GENERAL SITE INFORMATION

This section of the report describes conditions within Sunshine Canyon related to the environmental monitoring programs at the City and County Landfills. The remainder of this section is organized in four parts, as follows:

* Site Description;
* Climate and Surface Water Hydrology;
* Hydrogeologic Setting; and
* Groundwater Geochemistry.

2.1 Site Description

The Sunshine Canyon Landfill is located at 14747 San Fernando Road, in Sylmar, California (Figure 2-1). The landfill property covers approximately 1,030 acres and includes two distinct waste management units. The County Landfill is located in the northern portion of the facility, within unincorporated Los Angeles County. The County Landfill is a Class III waste management unit and began accepting waste in 1996. The County Landfill is equipped with a composite liner and leachate collection and removal system.

The City Landfill is located in the southern portion of the facility and lies completely within the City of Los Angeles. The City Landfill is divided into two main parts. The City Landfill Unit I is a closed, unlined Class III municipal solid waste management unit, which began operations in 1958. Construction activities have been completed on the initial phase (Cell A) of a lined landfill extension designated as City Landfill Unit II. This Subtitle-D lined landfill extension occupies the area between City Landfill Unit I and the existing County Landfill, and began waste disposal operations in July 2005. The site layout is shown in Figure 2-2.

2.2 Climate and Surface Water Hydrology

Sunshine Canyon is located north of the San Fernando Valley at the eastern end of the Santa Susana Mountains. The climate in the vicinity of the site is dominated by the semi-permanent, high-pressure atmospheric conditions of the eastern Pacific zone. It is a Mediterranean climate characterized by mild winters, when most of the precipitation occurs, and warm dry summers (A-Mehr, 2002). The average annual precipitation in the area of Sunshine Canyon is approximately 22 inches. During the period from 1941 to 1995 the maximum annual precipitation was 55.8 inches; the minimum was 10.2 inches. The maximum expected 100-year, 24-hour storm is approximately 12 inches (A-Mehr, 2002).

The Sunshine Canyon Landfill is located within the 900-square-mile Los Angeles River Watershed Basin (LARWB). Surface water runoff originating in Sunshine Canyon exits through the mouth of the canyon, where it proceeds in a southerly direction.

2.3 Hydrogeologic Setting

The facility is underlain predominantly by marine sedimentary rocks of the late Miocene to early Pliocene Towsley Formation (the bedrock). The bedrock consists primarily of siltstone and fine-grained sandstone interbedded with lenses of coarse-grained sandstone and conglomerate. The bedrock ranges from relatively fresh to highly weathered, with the degree of weathering generally decreasing with increasing depth below ground surface.

The bedrock is locally overlain by younger sedimentary deposits consisting of alluvium, colluvium, and/or landslide debris (collectively referred to here as the alluvial deposits). The alluvial deposits occur primarily along the axis of the various sub-canyons that comprise Sunshine Canyon and consist of varying mixtures of unconsolidated sand, gravel, silt, and clay. The alluvial deposits are locally up to 30 feet thick (ETC, 1988b).

Groundwater beneath the site occurs in two main zones: 1) a shallow, unconfined water-bearing zone consisting of alluvial deposits and/or upper weathered portions of the bedrock (the shallow groundwater zone), and 2) a deeper, locally confined water-bearing zone consisting primarily of relatively fresh bedrock materials (the deep groundwater zone). The hydraulic conductivity of the bedrock (including both weathered and unweathered portions) ranges from 10^{-3} to 10^{-9} centimeters per second (cm/sec) with values increasing with increasing weathering and fracture density (ETC, 1988b). The hydraulic conductivity of the alluvial deposits is expected to be on the order of 100 to 200 feet per day (PRA, 1991, Freeze and Cherry, 1979).

2.4 Groundwater Geochemistry

Beneficial uses of groundwater resources beneath Sunshine Canyon are limited. Groundwater samples collected from monitoring wells screened in the shallow and deep groundwater zones exhibit natural total dissolved solids (TDS) concentrations that typically range from 1,000 to 6,500 milligrams per liter (mg/L). Because of their low production capabilities and poor natural water quality, the bedrock lithologies underlying Sunshine Canyon are generally considered to be non-water bearing (Brown, 1975).

Previous hydrogeologic investigations conducted for the Sunshine Canyon Landfill have documented a wide variance in the overall composition and quality of natural groundwater beneath the facility (e.g., ETC, 1888a, and A-Mehr, 2003a, 2005b). Sunshine Canyon has, in the past, been the site of extensive

oil exploration and production as evidenced by the former presence of numerous oil exploration and production wells (ETC, 1988a). Geologically, Sunshine Canyon is characterized by several east-west trending fault systems, which serve as large-scale crude oil traps. Upward seepage of crude oil along these faults and subsequent contact between groundwater and crude oil has been documented at numerous locations within Sunshine Canyon (PRA Group, 1991; ETC, 1988a&b; A-Mehr, 2003a).

The presence of shallow crude oil deposits coupled with the low permeability of the bedrock materials has resulted in extensive areas of reduced (poorly oxygenated) groundwater beneath Sunshine Canyon, with locally high concentrations of alkalinity, ammonia, and, in some cases, sulfide. In addition, pre-landfill monitoring has confirmed the presence of naturally-occurring groundwater with locally elevated concentrations of chloride, TOC, COD, and potassium (ETC, 1988a; A-Mehr, 2003a). The fact that many of these constituents are also present at high concentrations in site leachate adds significantly to the degree of complexity involved in the evaluation of groundwater monitoring data from the City and County Landfills.

3. GROUNDWATER MONITORING

This section of the report describes the groundwater monitoring programs for the City and County Landfills, and summarizes the results of groundwater monitoring activities conducted for these facilities during the first semi-annual monitoring period. The remainder of this section is organized in three parts, as follows:

* Program Description;
* Summary of Groundwater Monitoring Activities; and
* Summary of Groundwater Monitoring Results.

3.1 Program Description

Groundwater monitoring is currently conducted for the City and County Landfills pursuant to MRPs CI-2043 and CI-7059 (RWQCB, 2003a & 2004b). Table 3-1 lists the current groundwater monitoring points for the City and County Landfills. The location of each groundwater monitoring point is shown in Figure 3-1. The current indicator parameters, constituents of concern (COC),[2] and supplemental monitoring parameters for the City and County Landfills are shown in Table 3-2. Current concentration limits for the City Landfill are presented in Table 3-3.[3] Table 3-4 provides an overview of the current groundwater monitoring requirements for the City and County Landfill, and summarizes the data evaluation methods and notification/response criteria for the groundwater monitoring programs.

3.2 Summary of Groundwater Monitoring Activities

The groundwater monitoring activities conducted for the first semi-annual monitoring period were performed in accordance with standard site sampling protocol (BFI, 1993). Table 3-5 provides an overview of the groundwater field monitoring activities conducted for the City and County Landfills, and lists the date(s), sampling points, and field personnel for each groundwater monitoring event. Table 3-6 provides information regarding the field sample containers and preservatives used for groundwater sampling. Additional information regarding field sampling procedures and equipment is presented on the field information forms in Appendix A.

The groundwater analyses for the first semi-annual monitoring period were performed by Calscience Environmental Laboratories, Inc., in Garden Grove, California (Calscience). The analytical methods used by Calscience are shown in Table 3-7 and on the laboratory reports in

[2] The methods used to establish and update the COC lists for these facilities are discussed in Section 6 of this report.
[3] Concentration limits for the County Landfill are included in Appendix C.

Appendix B. Calscience is certified by the State of California to perform the groundwater analyses required for the City and County Landfills.

3.3 Summary of Groundwater Monitoring Results

3.3.1 Groundwater Flow Conditions

During the first semi-annual monitoring period, the depth to groundwater was measured at least quarterly in each of the current groundwater monitoring wells for the City and County Landfills. Table 3-8 summarizes the results of the quarterly depth-to-groundwater measurements made during the first semi-annual monitoring period.

Figures 3-2 and 3-3 present groundwater contour maps based on depth-to-groundwater measurements made for the City Landfill during the first and second quarters of 2005. The groundwater flow direction for the County Landfill is illustrated in Figure 3-1. Consistent with past results, shallow groundwater flow in the vicinity of both landfills is directed down-canyon and generally follows the surface topography. Table 3-9 presents the calculated groundwater gradient and flow velocities for the City and County Landfills.

Monitoring Wells MW-2A, MW-2B, and DW-4 comprise a multi-depth well cluster located approximately 240 feet up-canyon from the City Side Landfill extraction trench (Figure 3-2). These monitoring wells range in depth from 19.5 feet to 110 feet below surface (see Table 3-1) and provide information regarding vertical groundwater gradients beneath the Sunshine Canyon facility. Table 3-9 list calculated vertical gradients and related flow velocities based on quarterly depth to groundwater measurements collected at Monitoring Wells MW-2A, MW-2B, and DW-4 during the first semi-annual monitoring period of 2005.

3.3.2 Analytical Results for QA/QC Samples

Table 3-5 includes a listing of the quality assurance/quality control (QA/QC) field sampling activities conducted during the first semi-annual monitoring period. Table 3-10 lists the COC that were detected in trip blank, field blank, equipment blank, and method blank samples from the first semi-annual monitoring period. As shown in Table 3-10, there were several detections of methylene chloride, iron, boron, magnesium, and sodium in the QA/QC samples. Potassium, selenium, calcium, and chromium were also detected in two or more of the QA/QC samples from the first semi-annual monitoring period. P/m-xylenes, beryllium, copper, lead, thallium, and vanadium were each detected once in the QA/QC samples.

Table 3-11 summarizes the results of the field duplicate samples collected during the first semi-annual monitoring period. As shown in Table 3-11, the duplicate results indicate a relatively high degree of accuracy for most of the laboratory analyses.

3.3.3 Analytical Results for Groundwater Samples – County Landfill

The analytical results for groundwater samples collected at the County Landfill during the first semi-annual monitoring period are summarized in Tables 3-12A (indicator parameters) and 3-12B (supplemental parameters). The following paragraphs discuss the groundwater analytical results for the County Landfill.

Organic Compounds. As noted in Table 3-4, groundwater results from the County Landfill are screened for the presence of organic compounds at levels exceeding site concentration limits. As part of this screening process, the concentration limits for non-naturally occurring organic compounds were considered to be "tentatively exceeded" if a single groundwater sample from a particular well contained either two compounds above the laboratory's method detection limit (MDL), or one compound which exceeds the laboratory's practical quantitation limit (PQL). There were no significant VOC detections noted at County Landfill's groundwater monitoring wells during the first semi-annual monitoring period.

Inorganic Parameters. Consistent with MRP requirements, updated Shewart-CUSUM control charts were prepared for the County Landfill following the first and second quarter monitoring events of 2005. The updated Shewart-CUSUM control charts were prepared by Herst and Associates, Inc. (BFI's statistical consultant) and utilized the facility's current indicator parameters and an updated background window as prescribed in revised MRP CI-7059. Statistical evaluation reports, prepared by Herst and Associates, are presented in Appendix C.

As shown in Appendix C, the following statistical exceedances of site concentration limits were noted for the County Landfill as part of the first semi-annual monitoring period:

* Chloride at Monitoring Well MW-11 (first and second quarters);
* Total Dissolved Solids at Monitoring Well MW-11(first and second quarters); and
* Potassium at Monitoring Well MW-11(second quarter only).

During subsequent resampling activities at Monitoring Well MW-11, these analytes were again detected at concentrations exceeding site concentration limits. Given the lack of volatile organic compounds in groundwater samples from Monitoring Well MW-11, these statistical exceedances are considered likely to be the result of natural variation in groundwater geochemistry. There is currently no evidence suggesting that the exceedances at Monitoring Well MW-11 are the result of

landfill impacts. Consistent with MRP requirements, BFI is currently preparing an alternative source demonstration report for these statistical exceedances.

3.3.4 Analytical Results for Groundwater Samples – City Landfill

The analytical results for groundwater samples collected at the City Landfill during the first semi-annual monitoring period are summarized in Tables 3-12A (indicator parameters) and 3-12B (supplemental parameters). The following paragraphs discuss the groundwater analytical results for the City Landfill.

Organic Compounds. Based on monitoring conducted at the City Landfill through December 2004, the following parameter/well pairs have been confirmed in site groundwater and have therefore been moved from detection monitoring mode to tracking mode.

* 1,4-dioxane (dioxane) at Monitoring Wells MW-1, MW-5, MW-9, MW-13R, and the Extraction Trench; and

* Chlorobenzene, 1,4-dichlorobenzene (1,4-DCB), and cis-1,2-dichlorethene (cis-1,2-DCE) at Monitoring Well MW-9 and the Extraction Trench.

No significant changes in 1,4-dioxane concentrations were noted at these monitoring wells during this monitoring period. Similarly, the VOC concentrations in groundwater near Monitoring Well MW-9 and the Extraction Trench are similar to past monitoring events.

For the current monitoring period, groundwater results from the City Landfill were screened for the presence of "new" organic compounds at levels exceeding site concentration limits. As part of this screening process, the concentration limits for non-naturally occurring organic compounds were considered to be "tentatively exceeded" if a single groundwater sample from a particular well contained either two compounds above the laboratory's MDL, or one compound which exceeded the laboratory's PQL. During the screening activities for the first semi-annual monitoring period, the following "new" organic COC detections exceeded applicable concentration limits established for the City Landfill (See Table 3-3): 1,4-dioxane (dioxane) at Monitoring Well MW-2A and methyl-tert-butyl ether (MTBE) at Monitoring Well MW-9 and the Extraction Trench. In addition, several detections of constituents considered likely to be the result of field or laboratory cross-contamination were also noted.

* During this monitoring period, MTBE was detected at low concentrations in groundwater samples collected from Monitoring Well MW-9 and the Extraction Trench. During subsequent resampling activities (see Table 3-14), the initial detections of

MTBE were confirmed at both monitoring points. Based on the resampling results, MTBE has been moved from detection mode to tracking mode at Monitoring Well MW-9 and the Extraction Trench.

* 1,4-dioxane was detected in a groundwater sample collected from Monitoring Well MW-2A, which is located upgradient of the Extraction Trench and City Cutoff Wall. The presence of this compound was confirmed in two resamples collected from Monitoring Well MW-2A in June of 2005 (see Table 3-14). As a result, 1,4-dioxance at Monitoring Well MW-2A has been moved from detection mode to tracking mode.

* Low concentrations of carbon disulfide and methylene chloride were detected in one or more of the groundwater samples collected at the City Landfill during the first semi-annual monitoring period. These compounds were also detected in several of the QA/QC samples collected at the City and County Landfills during the first semi-annual monitoring period. In previous alternative source demonstrations (ASDs), detections of these compounds were shown to be the result of field and/or laboratory contamination (A-Mehr, 2003c&f). Given that these compounds have been addressed previously in ASDs submitted to the RWQCB, they have not been used in establishing the scope of subsequent resampling activities.

Inorganic Parameters. Inorganic groundwater monitoring data collected from the City Landfill during the first semi-annual monitoring period of 2005 were evaluated using the facility's approved statistical methods (A-Mehr, 2003b). Specifically, the groundwater results for each indicator parameter were compared to the statistically-derived concentration limits for the City Landfill, listed in Table 3-2. Consistent with MRP CI-2043, the statistically based concentration limits were updated prior to the first quarter of 2005. During the first quarter of 2005, a tentative statistical exceedances was noted for chemical oxygen demand (COD) at Monitoring Well DW-1. This exceedance was not confirmed during subsequent resampling (see Table 3-14). No other statistical exceedances were noted.

4. VADOSE ZONE MONITORING

This section of the report describes the current vadose zone monitoring programs for the City and County Landfills, and presents the results of subdrain liquid, lysimeter, and soil gas monitoring activities conducted during the first semi-annual monitoring period. The remainder of this section is organized in three parts, as follows:

* County Subdrain Liquid Monitoring;
* City Subdrain Liquid Monitoring;
* Lysimeter Monitoring; and
* Soil Gas Monitoring.

The vadose zone monitoring points for the City and County Landfill are described in Table 4-1 (for subdrain liquid and lysimeter monitoring) and Table 4-2 (for soil gas monitoring). The locations of the vadose zone monitoring points are shown in Figure 3-1 (subdrain liquid and lysimeter monitoring points), Figure 4-1 (County soil gas monitoring points), and Figure 4-2 (City soil gas monitoring points). Table 4-3 describes the vadose zone monitoring requirements for the City and County Landfills, and summarizes the current data evaluation methods and notification/response criteria for the vadose zone monitoring programs.

4.1 County Subdrain Liquid Monitoring

The subdrain liquid monitoring activities for the first semi-annual monitoring period were conducted in accordance with County MRP requirements and standard site sampling protocol (BFI, 1993). Table 4-4 provides an overview of the subdrain liquid field monitoring activities conducted during the first semi-annual monitoring period, and indicates the dates, sampling points, and field personnel for each subdrain liquid monitoring event. Table 3-6 provides information regarding field sampling containers and preservatives used for subdrain liquid sampling. Additional information regarding field sampling procedures and equipment is presented on the field information forms in Appendix A.

The subdrain liquid analyses for the first semi-annual monitoring period were performed by Calscience. The analytical methods used by Calscience are shown in Table 3-7 and on the Calscience's laboratory reports, presented in Appendix B. Calscience is certified by the State of California to perform the subdrain liquid analyses required for the County Landfill. The analytical results for subdrain liquid samples collected during the first semi-annual monitoring event are summarized in Tables 4-5A (volatile organic compounds [VOCs]) and 4-5B (non-VOC indicator parameter), 4-5C (supplemental parameters), and 4-5D (Appendix II inorganic parameters).

Consistent with previous monitoring events, there were again significant organic detections noted as part of the subdrain liquid monitoring activities conducted during the first semi-annual monitoring period. The significant findings regarding organic detections from the first semi-annual monitoring period are presented below.

* Consistent with previous monitoring events, detectable concentrations of VOCs were noted in liquid samples collected from Subdrains A, B, and C.[4] The VOCs detected and their associated concentrations are shown in Table 4-5A. The type and magnitude of VOC detections noted in Subdrains A, B, and C liquid samples are considered consistent with impacts to subdrain liquids by migrating landfill gas.

* As in previous events, there were minor sporadic detections of dichloro-difluoromethane (DCDFM) noted during the first semi-annual monitoring period at Subdrains E and F. DCDFM is a common constituent of landfill gas and its presence is not unexpected given the proximity of Subdrains E and F to the County Landfill waste footprint. The concentrations of DCDFM detected at Subdrains E and F ranged from 0.26 ug/L to 0.30 ug/L and are well below the action level set for this compound in groundwater by the California Department of Health Services (1,000 ug/L).

* Subdrain L drains a portion of the Phase IV disposal area which is characterized by crude oil seeps. This subdrain and its related piping were engineering to separate any floating crude oil from the Subdrain K subdrain liquid discharge and direct it to the condensate collection system. As expected, the Subdrain L discharge periodically contains very low but detectable concentrations of toluene, ethylbenzene, benzene, and xylenes. All concentrations of these crude oil-related compounds were below drinking water standards during the first semi-annual monitoring period.

* Trace concentrations of acetone and/or methylene chloride were detected in one or more of the subdrain liquid samples collected at the County Landfill during the first semi-annual monitoring period. These compounds were also detected in several of the QA/QC samples collected at the City and County Landfills during the first semi-annual monitoring period. In previous alternative source demonstrations (ASDs), detections of these compounds were shown to be the result of field and/or laboratory contamination (A-Mehr, 2003c&f).

[4] The liquids from Subdrains A, B, and C are collected prior to being discharged to the County Landfill sedimentation basin and are pumped to, and appropriately managed at, the County Landfill leachate treatment plant.

* Subdrain J was buried by storm-related debris for most of the semi-annual monitoring period and could be sampled only during the monthly monitoring event in June.

4.2 City Subdrain Liquid Monitoring

No subdrain liquid monitoring is currently required for the City Landfill. The closed portion of the City Landfill (City Unit I) is unlined and has no constructed subdrain system. The City Landfill Unit II has been constructed with a subdrain system, discharges from which will be formally monitored following the receipt of wastes in this disposal unit.

During February of 2005, subdrain liquids beneath Cell A of Unit II were collected for informational analyses. The sample was collected from a temporary riser located just east of the Main Access road (designated here as Subdrain M). Table 3-6 provides information regarding field sampling containers and preservatives used for the subdrain liquid sampling. Additional information regarding field sampling procedures and equipment is presented on the field information forms in Appendix A. The subdrain liquid analyses for the first semi-annual monitoring period were performed by Calscience. The analytical methods used by Calscience are shown in Table 3-7 and on the Calscience's laboratory reports, presented in Appendix B. Calscience is certified by the State of California to perform the subdrain liquid analyses required for the County Landfill.

The results of the analyses for the Subdrain M liquid sample are summarized in Table 4-6. As shown in Table 4-6, the Subdrain M liquid sample contained elevated concentrations of several VOCs, 1,4-dioxane, and several inorganic parameters which suggest likely landfill impacts. Given that the Subdrain M liquid sample was collected prior to the opening of Cell A of Unit II, the impacts observed in this liquid sample can not be related to this disposal unit. The similarity of the Subdrain M analytical results to the City Seep sample results (see Table 5-5) strongly suggests that the impacts to the Subdrain M liquid sample are related to migration of landfill fluids from the adjacent portions the unlined City Landfill Unit I.

4.3 Lysimeter Monitoring

Lysimeter monitoring is currently conducted only for the County Landfill. This section describes the results of lysimeter monitoring activities conducted for the County Landfill during the first semi-annual monitoring period. The County Landfill lysimeter monitoring point is described in Table 4-1 and its location is shown in Figure 4-1. The lysimeter monitoring program requirements are described in Table 4-3.

The lysimeter field monitoring activities conducted during the first semi-annual monitoring period are summarized in Table 4-4. During the first quarter (March) and second quarter (June) of 2005, BFI personnel accessed the Phase IV lysimeter riser and tested the riser for liquid accumulations. The riser was tested for the presence of fluids by lowering an electric sounder, attached to a 2-inch diameter teflon bailer, to the bottom of the riser. During both quarterly tests, the bailer was relatively dry indicating no significant liquid accumulations in the lysimeter. The collection of lysimeter liquid samples for laboratory analyses was therefore not required.

4.4 Soil Gas Monitoring

Soil gas monitoring is currently conducted at the City and County Landfills pursuant to the 1150.1 permit adopted for the Sunshine Canyon Landfill by the South Coast Air Quality Management District (SCAQMD). The soil gas monitoring data from these facilities are submitted to the SCAQMD in separate quarterly reports. In addition, the City and County MRPs both require that soil gas monitoring data from City and County Landfill perimeter probes be included in the semi-annual monitoring reports submitted to the RWQCB.

4.4.1 Summary of Soil Gas Monitoring Activities

Table 4-4 provides a listing of the soil gas field monitoring activities conducted for the City and County Landfills during the first semi-annual monitoring period. As indicated in Table 4-4, both weekly and monthly soil gas (methane) field measurements were made by RES Environmental Services, Inc. (RES) during the first quarter of 2005. Monthly measurements were made during the second quarter of 2005. On a quarterly basis, RES also collected gas samples for laboratory analysis from the perimeter gas probe at each facility exhibiting the highest field methane readings. The laboratory analyses were conducted by AtmAA, Inc. of Calabasas, California, a laboratory approved by the SCAQMD.

4.4.2 Summary of Soil Gas Monitoring Results

The results of the soil gas monitoring activities are summarized in Table 4-7 (monthly field readings), Table 4-8 (weekly field readings), and Table 4-9 (laboratory analyses). As shown in Tables 4-7 and 4-8, low concentrations of methane gas were detected at several of the City and County soil gas monitoring points during the first semi-annual monitoring period. Gas concentrations in excess of 5% methane were noted during the first semi-annual monitoring period at temporary soil gas monitoring probes GP-1T and GP-2T. All other field methane measurements made at the City and County Landfills during the first semi-annual monitoring period were below 5 percent. As in past monitoring events, low concentrations of several VOCs were detected in the soil gas samples selected for laboratory analysis (See Table 4-9).

5. SURFACE WATER MONITORING

This section of the report describes the current surface water monitoring programs for the City and County Landfills, and presents the results of the surface water, seep water, storm water, and stream diversion monitoring activities conducted during the first semi-annual monitoring period. The remainder of this section is organized in four parts, as follows:

* Stream Water Monitoring;
* Seep Water Monitoring;
* NPDES Storm Water Monitoring; and
* Stream Diversion Monitoring.

Table 5-1 describes the current surface water monitoring points for the City and County Landfills. The locations of the surface water monitoring points are shown in Figure 5-1. Table 5-2 provides an overview of the current surface water monitoring requirements and summarizes the data evaluation methods and notification/response criteria for the surface water monitoring programs.

5.1 Stream Water Monitoring

Stream water monitoring is currently performed only for the City Landfill. The stream water monitoring activities for the first semi-annual monitoring period were conducted in accordance with City MRP requirements and standard site sampling protocol (BFI, 1993). Table 5-3 provides an overview of the stream water monitoring activities conducted during the first semi-annual monitoring period, and lists the dates, sampling points, and field personnel for each monitoring event. Table 3-6 provides information regarding field sample containers and preservatives used for stream water monitoring. Additional information regarding field sampling procedures and equipment is presented on the field information forms in Appendix A. The stream water samples collected during the second quarter of 2005 were each analyzed for the facility's current indicator parameters (see Table 3-2). The stream water sample analyses were performed by Calscience using the methods shown in Table 3-7. Calscience's laboratory reports are presented in Appendix B.

The stream water monitoring results from the first semi-annual monitoring period are summarized in Table 5-4. During the second quarter of 2005, a detectable concentration of 2,2-dichloropropane was noted by the laboratory for the S-AR surface water sample. Given the unexpected presence of this compound, two resamples were collected from the S-AR sampling point during June of 2005. No 2,2-dichlorpropane was detected in either resample (Table 3-14).

5.2 Seep Water Monitoring

Table 5-3 provides an overview of the seep water field monitoring activities conducted during the first semi-annual monitoring period, and lists the dates, sampling points, and field personnel for each seep water monitoring event. Table 3-6 provides information regarding field sampling containers and preservatives used for seep water sampling. Additional information regarding field sampling procedures and equipment is presented on the field information forms in Appendix A.

5.2.1 Existing Seep

During March of 1997, a seep was identified by BFI during site maintenance activities along the north margin of the City Side Landfill. The approximate location of this seep, designated here as the "City Seep", is shown in Figure 5-1. Fluid from the City Seep is collected in a temporarily storage tank prior to being pumped to the County Landfill's leachate treatment plant for processing. Pursuant to MRP requirements, the volume of fluid collected from the City Seep is monitored on a monthly basis[5] and a sample of the seep water is collected for laboratory analysis on a quarterly basis. The seep water sample analyses for the first semi-annual monitoring period were performed by Calscience using the methods shown in Table 3-7. Calscience's laboratory reports are presented in Appendix B.

The analytical results for the quarterly "City Seep" water samples are summarized in Table 5-5. As is typical for this monitoring point, the "City Seep" samples collected during the first semi-annual monitoring event contained detectable concentrations of dioxane and select VOCs. The seep water results from the first semi-annual monitoring period are generally consistent with historical results, and continue to indicate an overall increasing trend for several inorganic and organic parameters in the seep water samples.

During this semi-annual monitoring period, the area of seepage associated with the existing "City Seep" was noted to have spread laterally and vertically. In particular, areas of moist cover soils and minor surface drainage were noted on some of the benches above the "City Seep" collection area. As a result, the City Seep collection system was expanded by construction several gravel filled trenches (drains) which serve to divert this increased seepage to the "City Seep" collection system. The increased seepage is likely due to the large amount of rainfall experienced at the site during the semi-annual monitoring period and/or the placement of soil stockpiles near this area.

[5] The volume of seep water collected and management of the collected seep water are discussed in Section 8.

5.2.2 New Seeps

The City and County Landfills were surveyed periodically for evidence of significant new leachate seeps as part of the facility's NPDES permit requirements. No new leachate seeps were identified at the County Landfill during the first semi-annual monitoring period.

5.3 NPDES Storm Water Monitoring

Storm water samples are collected for laboratory analysis on a periodic basis by BFI in accordance with the facility's current General Industrial NPDES Storm Water Permit. The results of the NPDES storm water monitoring activities are reported to the RWQCB in a separate annual report prepared by BFI. However, the MRPs for both facilities require that analytical results for the NPDES storm water samples be included in the routine semi-annual reports submitted to the RWQCB. Table 5-6 summarizes the results of the NPDES storm water field sampling activities conducted during the first semi-annual monitoring period. No exceedances of NPDES permit requirements were indicated by the results of the analyses shown in Table 5-6.

5.4 Stream Diversion Monitoring

During construction of the City Landfill Sedimentation Basin and Cell A, it has periodically been necessary to temporarily divert stream flow at several locations. As part of BFI's stream bed alteration permit obtained from the California Department of Fish and Game (CDF&G), BFI is required to perform monitoring of water quality at several locations within the various stream diversion areas. Although not specifically required by the City or County MRPs, the RWQCB has requested that the stream diversion monitoring results be tabulated and included in the semi-annual groundwater monitoring reports submitted to the RWQCB. The stream diversion monitoring results collected during the first semi-annual monitoring period are summarized in Table 5-7.

6. LEACHATE MONITORING

Leachate monitoring is required for the City and County Landfills on at least an annual basis, pursuant to MRP requirements. Annual leachate samples are collected during October and analyzed, at a minimum, for those constituents listed in Appendix II to 40CFR Part 258 (Appendix II constituents). The leachate sampling locations for the City and County Landfills are shown in Figure 3-1. The results of the annual leachate analyses are evaluated for the presence of Appendix II constituents that are not already part of the current COC lists. If any such "newly-detected" Appendix II constituents are detected in the annual sample, a leachate retesting event is scheduled for the following April. The April leachate retest sample is typically analyzed for only those "newly detected" constituents noted as part of the previous annual leachate event. Any of the newly detected parameters which are also detected in the April retest sample are subsequently added to that landfills COC list.

6.1 Leachate Retesting (April 2005)

The 2005 annual leachate retest for the County Landfill was conducted on April 13, 2005.[6] The leachate retest sample was collected by A-Mehr personnel and analyzed by Calscience. As shown in Table 6-1, the County Leachate was retested for acetonitrile. This VOC was noted detected in the resample and therefore will not be added to the facility's list of constituents of concern. The current COC lists for the City and County Landfills are included in Table 3-2.

6.2 Annual Leachate Testing

No annual leachate testing was required during this semi-annual monitoring period. Annual leachate sampling will be conducted for the City and County Landfills during October of 2005.

[6] No leachate retesting was required for the City Landfill during April of 2004.

7. STANDARD OBSERVATIONS

The City and County MRPs require that BFI conduct periodic site inspections as part of its current NPDES storm water permit. During the "wet season" (October to April), the inspections are to be made following each storm that produces significant runoff or, if no storm occurs during a particular month, on a monthly basis. During the "dry season" (May to September), these inspections are to be made on a quarterly basis. Pursuant to MRP requirements, each inspection is to include the following "standard observations":

* Evidence of surface water leaving or entering the unit, including an estimate of the size of the affected area and the estimated flow rate;
* Presence or absence of odors, including characterization, source, and distance of travel from the source;
* Evidence of erosion and/or exposed refuse
* Inspection of all storm water discharge locations for evidence of non-storm water discharges (during dry season) and integrity (during wet season);
* Evidence of ponded water at any point on the waste management facility (show affected areas on a map);
* Assessment of compliance with the facility's Storm Water Pollution Prevention Plan, including proper implementation of the terms of the General NPDES Storm Water Permit; and
* Inspection of integrity of all drainage systems.

The City and County MRPs also require that BFI provide a summary and "certification of completion" of all standard observations in accordance with the facility's NPDES requirements. Copies of the records of observations are to be included with the first semi-annual monitoring report of each year (i.e., the semi-annual report due on August 15 of each year).

During this semi-annual monitoring period, standard observations were made for the City and County Landfills on the following dates in 2005: February 17; March 4 and 7, April 28, May 9, and June 29. No significant issues were noted during these standard observations. Appendix D contains BFI's summary and certification of completion of the standard observations and records of observation from the first semi-annual monitoring period.

8. WASTE DISPOSAL AND ONSITE WATER-USE MONITORING

This section of the report addresses waste disposal and onsite water-use monitoring requirements at the City and County Landfills during the first semi-annual monitoring period. The remainder of this section is organized in six parts, as follows:

* Waste Disposal Quantities and Locations;
* Remaining Landfill Capacity;
* Waste Load Checking Program;
* New Seeps;
* Water Use, Generation, and Management; and
* Quality of Water Used Onsite.

8.1 Waste Disposal Quantities and Locations

The quantities of municipal solid waste deposited at the County Landfill are monitored daily. The monthly quantities of waste deposited at the County Landfill during the current semi-annual monitoring period are summarized in Table 8-1 along with the estimated volumes. The volumes have been calculated using a compacted waste density value of 1.3 cubic yards per ton of waste. Maps showing the approximate areas of waste disposal during the first and second quarters of 2005 are presented Appendix E.

City Landfill Unit I is currently closed. No wastes have been deposited at this facility since September of 1991. No wastes were received at the City Landfill Unit II during this semi-annual monitoring period.

8.2 Remaining Landfill Capacity

The remaining landfill capacity and life for the County Landfill are calculated on an annual basis using aerial survey data. Using data from an aerial survey performed on January 12, 2005, the estimated remaining landfill capacity for the County Landfill is approximately 2,965,000 cubic yards. At the maximum permitted disposal rate of 1,872,000 tons per year and an effective density of 1,450 pounds per cubic yard, the estimated remaining life is approximately 0.5 years from January 2005. BFI plans to reduce the intake of the County Landfill after the City Landfill Unit II begins operation in mid-2005, in order to extend the useful life of the County Landfill.

The existing City Landfill Unit I is closed. City Landfill Unit II is estimated to have 13,441,000 cubic yards of airspace capacity. At the maximum permitted disposal rate of 30,000 tons per week

or 1,560,000 tons per year, and an effective density of 1,450 pounds per cubic yard, the estimated life of the landfill is 6.2 years from the date of beginning operations.

8.3 Waste Load Checking Program

The County Landfill is currently permitted to accept Class III municipal solid waste. Waste disposal is monitored to confirm that waste types deposited at the landfill conform to the appropriate federal and state restrictions and the requirements contained in RWQCB Order 91-091. No unacceptable wastes were received at the City or County Landfills during the first semi-annual monitoring period.

8.4 New Seeps

No new leachate seeps were encountered at the City or County Landfills during the first semi-annual monitoring period. As discussed in Section 5.2 of this report, the area of seepage associated with the existing "City Seep" increased noticeably during the first semi-annual monitoring period of 2005. These areas of increased seepage were addressed by constructing several gravel drains which divert the seepage to the City Seep collection system.

8.5 Water Use, Generation, and Management

Table 8-2 lists the sources of water generated and/or used at the City and County Landfills during the first semi-annual monitoring period. Table 8-3 shows the volumes and sources of water used onsite at the City and County Landfills during the first semi-annual monitoring period. Table 8-4 shows the volumes and sources of water, which were managed offsite during the first semi-annual monitoring period.

8.6 Quality of Water Used Onsite

8.6.1 County Landfill

Pursuant to MRP requirements, samples of the water used at the County Landfill for dust control and irrigation were collected on a quarterly basis for laboratory analysis[7]. The quarterly water-use testing was conducted on samples collected from the effluent from Tank T-210B at the County Landfill leachate treatment plant. Each water-use sample was analyzed by Calscience for the parameters shown in Table 8-5. The analytical methods used by Calscience are shown in Table 3-7.

[7] No testing of potable water purchased from the City of Los Angeles Department of Water and Power was performed.

Table 8-5 summarizes the results of the water-use sample analyses conducted for the County Landfill during the first semi-annual monitoring period. Provision E.7 of RWQCB Order 91-091 establishes numerical limits for the onsite use of water at the County Landfill. In addition, revised MRP CI-7059 also specifies that waters used on site should meet current MCLs for VOC, nitrate, and heavy metals. As shown in Table 8-5, the following exceedances of water use limits were noted during the first semi-annual monitoring period:

* During the second quarter of 2005, the concentration of vinyl chloride in the County water-use sample was slightly above the drinking water limit. The concentration of vinyl chloride reported for this sample did not exceed the maximum concentrations limit specified in Provision E.7 of Order 91-091 (i.e., less than 9 ug/L). BFI is currently modifying the county water-use liquid treatment system in an attempt to lower the concentration of this VOC in the water-use samples.

* Nickel concentrations in the County Landfill water-use samples collected during the first semi-annual monitoring period were slightly above the MCL established for this metal in drinking water. Samples collected directly from the Subdrain A, B, and C outfalls contain nickel concentrations, which are consistently below the State MCLs, and therefore meet County Landfill water-use requirements. Based on additional investigation by BFI, evidence was found that indicates that the subdrain waters receive nickel from corroded surfaces within the storage tanks used to hold the subdrain liquids prior to its use for dust control. BFI has contacted a contractor and will repair the corrosion as soon as possible.

8.6.2 City Landfill

Pursuant to City MRP requirements, samples of the water used at the City Landfill for dust control and irrigation were collected on a quarterly basis for laboratory analysis. The quarterly City Landfill water-use analyses were conducted on samples collected from a sample port on the piping leading from the City Landfill treatment skid. The City Landfill water-use samples were analyzed by Calscience for the parameters shown in Table 8-6. The analytical methods used by Calscience are shown in Table 3-7.

Table 8-6 summarizes the results of the City Landfill water-use sample analyses conducted during the first semi-annual monitoring period. As shown in Table 8-6, there were no exceedances of water use limits noted for the City Landfill during the first semi-annual monitoring period.

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