REMEDIAL ACTION PLAN FOR SOIL AND LANDFILL GAS MEDIA

FORMER BKK LANDFILL, CARSON DUMP
OPERABLE UNIT 2

340 EAST 192ND ST., 19202 SOUTH MAIN ST., and 19200 SOUTH MAIN ST., CITY OF CARSON, CALIFORNIA 90248

Prepared for:

THE DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Prepared by:

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Project No. 82241

June 2016

BURNS McDONNELL

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Secretary for
Environmental Protection

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Governor

FINAL REMEDIAL ACTION PLAN APPROVAL RECORD

Site Name: Victoria Golf Course/Former BKK Landfill, Carson Dump, Operable Unit 2

Site Location: 340 East 192nd Street and 419 East 192nd Street, 19200 S. Main Street and 19202 S. Main Street, Carson, California

County: Los Angeles

Regional Section: Brownfields and Environmental Restoration Program

This is to certify that the attached Remedial Action Plan for Soil and Soil Gas Media for the Victoria Golf Course/Former BKK Landfill, Carson Dump, Operable Unit 2 has been circulated for public comments and subsequently finalized as deemed appropriate. The proposed remedial action has been determined to be reasonable and feasible.

The undersigned hereby approve to adopt the attached as the final Remedial Action Plan for Soil and Soil Gas Media, Victoria Golf Course/Former BKK Landfill, Operable Unit 2.

Alice Gimeno-O'Brien
Regional Project Manager

6/15/16
Date

for DB

Douglas Bautista
Cleanup Program Unit Chief

6/15/16
Date

John Scandura
Branch Chief

6/15/16
Date

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ABBREVIATIONS AND ACRONYMS

AECs	areas of elevated concentrations
AOCs	areas of concern
APN	Assessor parcel numbers
AQMD	Air Quality Management District
ARARs	Applicable or Relevant and Appropriate Requirements
BAK	Ben A. Kazarian
bgs	below ground surface
BKK	Ben K. Kazarian
BKK Landfill or Landfill	former BKK Landfill, Carson Dump
BMP	best management practice
Cal Compact	former Cal Compact Landfill
CalEPA	State of California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeters per second
COC	chemical of concern
COPC	chemical of potential concern
County	County of Los Angeles
CPT	cone penetrometer test
CSM	Conceptual site model
DTSC	Department of Toxic Substance Control
ETSI	Enviro-Tox Services
FS	Feasibility Study
ft^2	square feet
Goodyear	The Goodyear Tire & Rubber Company
HERD	Human and Ecological Risk Division
HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient
HSAA	California Hazardous Substances Account Act
ICVB	irrigation control valve box
Initial 2006 RI Workplan	Final Remedial Investigation/Feasibility Study Workplan, Operable Unit 2, Former BKK Landfill, Carson Dump, December 15, 2006.
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District

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Leighton Consulting	Leighton Consulting, Inc.
LEL	lower explosive limit
LFG	Landfill gas
MCLs	California Maximum Contaminant Levels
mg/kg	micrograms per kilogram
mg/L	milligrams per liter
msl	mean sea level
NBAR	nonbinding allocation of responsibility
NCP	National Contingency Plan
NMOCs	non-methane organic compounds
NPV	net present value
OM&M	Operations, monitoring and maintenance plans
OSHA	Occupational Safety and Health Act
OU-1	Operable Unit 1
OU-2	Operable Unit 2
PCB	polychlorinated biphenyl
PEA	Preliminary Endangerment Assessment
PID	photo-ionization detector
PPE	personal protective equipment
ppmv	parts per million by volume
PRPs	potentially responsible parties
QA/QC	quality assurance/quality control
RAG	Remedial Action Goal
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RG	Remedial Goal
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	reasonable maximum exposure
RSL	regional screening level
SLERA	Screening Level Ecologic Risk Assessment
SOP	standard operating procedure
SVOC	semi-volatile organic compound
TBC	"to be considered"

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TOC	total organic carbon
TPH	total petroleum hydrocarbons
UCPT	ultra-violet induced fluorescence, cone penetration test
UEL	upper explosive limit
ug/L	micrograms per liter
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
v/v	percent volume in air
Victoria Golf Course	Victoria County Golf Course
Victoria Regional Park	Victoria Community Regional County Park
VOC	volatile organic compound
Workplans	Final Remedial Investigation/Feasibility Study Workplan, Operable Unit 2, Former BKK Landfill, Carson Dump, December 15, 2006. Revised Remedial Investigation/Feasibility Study Workplan Addendum, July 23, 2008. Remedial Investigation/Feasibility Study Additional Assessment Workplan, May 2010. Remedial Investigation/Feasibility Study Off-Site Groundwater Assessment Workplan, November 3, 2010.
yd^3	cubic yard
2008 Workplan Addendum	Revised Remedial Investigation /Feasibility Study (RI/FS) Workplan Addendum, July 23, 2008
2010 Additional Assessment Workplan	Remedial Investigation/Feasibility Study Additional Assessment Workplan, May 2010
2010 Off-site Groundwater Assessment Workplan	Remedial Investigation/Feasibility Study Off-Site Groundwater Assessment Workplan, November 3, 2010

EXECUTIVE SUMMARY

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell), with technical assistance from Leighton Consulting, Inc. (Leighton Consulting) has prepared this Remedial Action Plan (RAP) for a portion of the former BKK Landfill, Carson Dump (BKK Landfill or Landfill) known as Operable Unit 2 (OU-2), located in the northern portion of the City of Carson, County of Los Angeles, California. The purpose of this RAP is to comply with the applicable provisions of Federal and State laws. This RAP was developed in accordance with the Department of Toxic Substances Control (DTSC) guidance, EO-95-007-PP, Remedial Action Plan (RAP) Policy (DTSC 1995). The RAP is based on the findings and conclusion presented in the Final Remedial Investigation/Feasibility Study (RI/FS) for Soil and Soil Gas Media, including the Human Health Risk Assessment (HHRA) and Screening Level Ecologic Risk Assessment (SLERA) which were approved by DTSC on June 9, 2014.

The Former BKK Landfill is approximately bounded by East 192nd Street on the north, Avalon Boulevard on the east, Del Amo Boulevard on the southeast, a City of Los Angeles Public Utility Corridor on the south, and South Main Street on the west and northwest. The Landfill has been organized into two operable units due to development activities on OU-1, which lead to a determination by the DTSC to divide the former landfill into two operable units. Operable Unit 1 (OU-1) encompasses the southwestern portion of the Landfill and is separated from OU-2, the subject of this RAP, by the Dominguez Channel (RI Figure 1.0-2, *Vicinity Location Map*). The RAP has been prepared on behalf of the County of Los Angeles (County), the City of Los Angeles, The Goodyear Tire & Rubber Company, Watson Land Company, Shell Oil Company, the City of Bell, and the City of Carson in accordance with a Settlement Agreement and Consent Order (Consent Order) issued by the California Environmental Protection Agency's (CalEPA) DTSC, the lead agency for this investigation.

The BKK Landfill was operated by Ben A. Kazarian (BAK) Disposal Company, later Ben K. Kazarian (BKK) Company, as a permitted cut-and–cover landfill that accepted industrial and municipal waste from 1948 to 1959. The County of Los Angeles operating permit, Industrial Waste Disposal Permit No. 31, was issued on July 2, 1948, and by April of 1959, landfilling operations had ceased. Industrial Waste Disposal Permit No. 31 was terminated on November 22, 1960 following final grading that required a minimum of 2 feet of clean earth be placed over the waste. Pre-landfill elevations ranged from approximately 10 to 26 feet above mean sea level (msl); current site elevations range from approximately 10 feet to 40 feet msl. The BKK Landfill is located in a mixed recreational, commercial, residential, and industrial area. OU-2 land ownership consists of: the County of Los Angeles, Goodyear Tire & Rubber, Los Angeles County Flood Control District, Watson Land Company, and the City of Carson. It is currently

occupied by the Victoria County Golf Course (Victoria Golf Course), Victoria County Cricket Fields (Victoria Cricket Fields), a portion of Victoria Regional County Park (Victoria Regional Park), Goodyear Airship Flight Operations Center, MB Landscape Nursery, public rights-of-way, the Dominguez Channel, and the Dominguez Branch Channel.

OU-2 is approximately 271 acres in size, of which 180 acres were used for landfill purposes and received approximately 3.5 million cubic yards (yds^3) of waste. The RI identified 172 anthropogenic (human-made) chemicals of potential concern (COPCs) in one or more solid-, liquid-, or gas-phase samples that were evaluated as either soil cover, waste zone soil matrix (waste zone), native soil, ambient air, soil gas including landfill gas or LFG, surface water, leachate or groundwater environmental media at the site. The COPCs were identified through the methodical collection and analysis of more than 1,148 samples, not including samples collected for quality assurance/quality control (QA/QC) purposes Within the waste zone, 93 COPCs were detected, including 37 volatile organic compounds (VOCs), four aldehydes, 16 semi-volatile organic compounds (SVOCs), two polychlorinated biphenyls (PCBs), two chlorinated herbicides, five organochlorine pesticides, total petroleum hydrocarbons (TPH) (C8 to C43), 24 metals, cyanide, and hexavalent chromium. Leachate sample detections included 34 VOCs, 24 SVOCs, four aldehydes, one chlorinated herbicide, three organochlorine herbicide, two PCB cogeners, and 22 Title 22 metals. In nine surface water runoff samples, the following compounds were detected: 15 VOCs, two SVOCs, two aldehydes, one chlorinated herbicide, cyanide, and 25 Title 22 metals and secondary metals. Ninety-six COPCs were detected in the soil cover and include 30 VOCs, two aldehydes, 19 SVOCs, three PCBs, eight chlorinated herbicides, seven organochlorine pesticides, TPH (C8 to C43), cyanide, and 25 metals including hexavalent chromium (Cr-VI). Eighty-five COPCs were detected in the native soil samples. The COPCs included 40 VOCs, two aldehydes, 10 SVOCs, no PCBs, one chlorinated herbicide, five organochlorine pesticides, TPH (C19 to C40), 24 metals, cyanide, and chromium VI. In air media (soil gas, landfill gas) samples, seventy-nine COPCs (notably including methane, plus 68 VOCs, three aldehydes, five sulfides (notably hydrogen sulfide), carbon monoxide, and 1,4-dioxane) were detected in one or more of the 301 air media samples collected from the landfill gas wells, landfill perimeter soil gas wells and probes, and ambient air. A total of 82 volatile organic compounds (VOCs), 35 semi-volatile organic compounds (SVOCs), 25 metals, four aldehydes, nine organochlorine pesticides, eight chlorinated herbicides, four polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), perchlorate, cyanide, five sulfides, and carbon monoxide were detected in one or more of the RI samples (note that some chemicals are included in more than one classification group). From these COPCs, The HHRA identified seven chemicals of concern (COCs); antimony, arsenic, benzo(a)pyrene, lead, PCBs (Aroclor 1248 and 1254), and methane.

Except for groundwater, the RAP addresses all affected environmental media where a complete exposure pathway or potential exposure pathway for COPCs could result in potential human or ecologic health risks that exceed target risk levels as determined by the HHRA and SLERA prepared by Enviro-Tox Services (ETSI), based on RI data collected and analyzed by Leighton Consulting, as integral components of the RI/FS for OU-2. Potential threats to groundwater resources and potential groundwater response actions will be addressed separately. Sampling conducted under the RI Workplans was guided by the development of conceptual site models (CSMs) that depicted the potential sources of contamination, the potential release mechanisms, the potential migration pathways for impacted environmental media, and the potential routes of human and ecologic receptor exposure to potentially hazardous anthropogenic chemicals. The risk assessments were prepared in accordance with the DTSC-approved *Final Remedial Investigation/Feasibility Study Workplan*, Leighton Consulting, Inc., December 15, 2006 (Initial 2006 RI Workplan), and consider all COPCs and potential receptor populations, based on current land use, in the identification of COCs. The identified potential threats posed by COCs include; 1) adverse health effects associated with the inhalation, ingestion and direct contact with COCs in soil cover and waste materials, and 2) migration of hazardous levels of methane and /or VOCs into enclosed-space structures. These threats are addressed by the recommended response actions that were selected through an evaluation of appropriate remedial alternatives.

Risk-based Remedial Action Goals (RAGs or clean-up goals) for OU-2 were developed for potential exposure to COC-affected soil and waste zone materials up to a depth of either 10 feet below ground surface (bgs), or 15 feet bgs for potential residential receptors, and soil gas/LFG based on: identification of media-specific COPCs, evaluation of complete exposure pathways and exposure scenarios, toxicity assessments for the COPCs, and identification of target risk levels in accordance with USEPA and CalEPA/DTSC guidance.

Locations where potential exposure to media-specific COCs that exceed the site-specific RAGs and could result in unacceptable human health risks, or locations where levels of methane exceeded regulatory requirements for closed landfills were identified in the RI/FS as areas of elevated concentrations (AECs) (herein used interchangeably with areas of concern or AOCs). The AECs were evaluated for potential response action alternatives in the RI/FS in accordance with CERCLA and NCP methodology. The identified soil AECs that require a remedial response are sampling locations 34, 236, and UB-8/22. In addition to potential methane hazards and/or regulatory requirements, this RAP focuses on these three specific soil AECs.

The remedial response technologies and process options that passed the preliminary screening and were retained for further evaluation as remedial response alternatives included three waste zone material remedial alternatives, five soil remedial alternatives, and seven soil gas/LFG

remedial alternatives. Evaluation of the no-action alternative is required by the NCP and involves no additional activities, thereby providing a baseline for evaluating other remedial alternatives. Except for the no-action, soil excavation and off-site disposal, and local area methane control, all of the waste zone, soil and soil gas/LFG remedial alternatives were retained for proposed implementation, consideration with other alternatives, or for cost comparison to equally protective response actions. Combinations of alternatives are recommended as remedial response actions for each of the affected environmental media: two alternatives for the waste zone, three alternatives for soil and five alternatives for soil gas/LFG. The recommended alternatives are based on the detailed analyses and comparative analyses of the potential remedial response actions evaluated for OU-2.

The recommended overall remedy for the human and ecologic health risks identified by the RI, HHRA, and SLERA for soil including the waste zone soil matrix, and soil gas including landfill gas (LFG) environmental media and identified OU-2 COCs, consists of the implementation of four programs that are designed to contain hazardous chemicals in place:

1) Land use covenants/deed restrictions are recommended for each of the properties that comprise OU-2 to provide protection of human health and the environment from contaminated media because hazardous substances will remain at OU-2 at levels that are not suitable for unrestricted use of the land.
    - Prohibit construction for sensitive land uses, consisting of residential, day care facilities, hospitals, hospices, and new schools.
    - Comply with operations, monitoring and maintenance (OM&M) plans.
    - Require evaluation and consideration of potential health risks and potential fire/explosion hazards posed by landfill gas at the site, including the possible need for mitigation measures, with respect to construction of new buildings, or any intrusive land activity that may compromise the soil cap.
2) Property-Specific OM&M Plans
    - Prepare property-specific OM&M Plans that at a minimum contain best management practice (BMP) specifications and/or schedules for: soil cover inspection and maintenance with a focus on areas that are known or determined to have soil cover less than 3 feet thick; emergency response procedures for natural events that could degrade the soil cover (i.e., earthquakes, flooding); maintaining soil cover thickness and establishing physical properties of imported soil; providing for surface drainage to prevent soil erosion, and to eliminate standing water that could percolate into the waste zone; establishing soil and LFG sampling requirements to support excavation work; establishing acceptable guidance for landscape irrigation; identifying permitting and

notification requirements for managing excavations in accordance with Occupational Safety and Health Act (OSHA) standards; conducting regular surface monitoring per Air Quality Management District (AQMD) Rule 1150.1; conducting perimeter LFG monitoring in accordance with AQMD Rule 1150.1 for closed or inactive landfills; and conducting onsite building perimeter well/probe and vent riser monitoring.

3) OU-2 Perimeter Monitoring

- Conduct methane monitoring of the OU-2 perimeter along Avalon Boulevard, E. 192nd Street, and South Main Street utilizing wells MP-2, SV-1, MP-3, SV-2, MP-4, SV-3, MP-5, SV-10, IV-9C, IV-9B, IV-8C, IV-8B, IV-7A, VP-4, IV-34A, VP-5, SV-4, SV-5, IV-35, SV-6, SV-7, SV-8 and SV-9 per AQMD Rule 1150.1. The identified soil gas wells may change over time due to damage, monitoring needs, and/or AQMD requirements. Install and monitor a dual-nested, replacement soil gas/landfill gas perimeter compliance well, outside of the waste zone, between SV-11 and the residence at 18963 Milmore Avenue. Initially, sampling of these wells will be conducted on a quarterly schedule. The sampling frequency of individual wells will be adjusted accordingly per regulatory decision if methane concentrations exceed 5% v/v and methane mitigation measures will be implemented if methane concentrations remain at concentrations of 5% v/v or higher. Conversely, if methane concentrations demonstrate a significant and decreasing trend over time in specific areas of the OU-2, DTSC will consider whether monitoring in those specific areas may be reduced in frequency or discontinued.

4) Location-specific Remedial Response Actions for Soil AECs and Methane

- Isolate soil AEC location 236 by surface paving.
- Implement location-specific institutional controls for soil AEC locations 34, 236 and UB-8/22 (located outside of the landfilled area) and implement property-specific OM&M plans.
- Install methane alarms in all enclosed-space slab-on-grade OU-2 buildings.
- Conduct methane mitigation actions (such as methane barrier installation) at subsurface point source locations including, but not limited to, irrigation control valve boxes if methane accumulations exceed 1.25% in air.
- Conduct regular methane monitoring of building perimeter wells/probes at Victoria Golf Course (VGC-1A, VCC-2A, VGC-3A, SV-104 and SV-105) and sub-slab passive methane system probes and vent risers at Goodyear Operations Center and passive methane system vent risers at Victoria Golf Course and Victoria Regional Park Cricket Fields. Methane monitoring will increase and mitigation measures will be implemented if methane concentrations present an unacceptable health and safety risk. If methane

concentrations demonstrate a significant and decreasing trend over time in specific areas of the OU-2, DTSC will consider whether monitoring in those specific areas may be reduced in frequency or discontinued.

1.0 SITE BACKGROUND

The BKK Landfill is located on portions of Sections 5 and 6, Township 4 South, Range 13 West, within the United States Geological Survey (USGS), 7.5-minute series, Torrance Quadrangle (Photo-revised 1981), at approximately 118°16'12'' longitude and 33°51'10" latitude. The Landfill is approximately bounded by East 192nd Street on the north, Avalon Boulevard on the east, Del Amo Boulevard on the southeast, a City of Los Angeles Public Utility Corridor on the south, and South Main Street on the west and northwest. DTSC divided the Landfill into two geographically organized operable units. Operable Unit 1 (OU-1) encompasses the southwestern portion of the Landfill and is separated from OU-2 by the Dominguez Channel (RI Figure 1.0-2, *Vicinity Location Map*). The permitted acreage of the entire BKK Landfill, Carson Dump consisted of 353 acres, of which 271 acres comprise OU-2. However, only 180 acres of OU-2 were used for the burial of waste materials.

The Landfill was operated by Ben A. Kazarian (BAK) Disposal Company, later Ben K. Kazarian (BKK) Company, as a permitted cut-and-cover landfill that accepted industrial and municipal waste from 1948 to 1959. The Industrial Waste Disposal Permit No. 31, was issued on July 2, 1948, and by April, 1959, landfilling operations had ceased. Industrial Waste Permit No. 31 was terminated on November 22, 1960 following final grading that required a minimum of 2 feet of clean earth be placed over the waste. Pre-landfill elevations ranged from approximately 10 to 26 feet above mean sea level (msl); current site elevations range from approximately 10 feet to 40 feet msl.

The Landfill was permitted to accept Class II and III materials, including solids and liquids. The operating permit allowed the disposal of solid inert materials such as natural earth, rock, sand, gravel, paving fragments, concrete, brick, plaster, plaster products, steel mill slag, glass, asbestos fiber and its derivatives below 5 feet msl. Above 5 feet msl, solid material defined as ordinary household and commercial refuse and/or rubbish, garbage, other decomposable organic refuse, and scrap metal. Semi-liquid wastes, limited in quantity to 10 gallons for each cubic yard (yd^3) of non-liquid materials could also be deposited above 5 feet msl included, oil field rotary drilling mud, cleanings from petroleum production tanks, paint sludge from paint spray booths, acetylene sludge, sludge from auto wash racks and steam cleaning plants, mud and water from laundries, liquid latex wastes, ceramic, pottery and glaze wastes, lime and soda water, printers ink containing solvent.

Due to a January 1952 episode involving the release of liquid hydrocarbon wastes from the BKK Landfill, the County Engineer attempted to amend the landfill's operating permit on February 1, 1952, by adding three new conditions relating to management of liquid or semi-liquid waste

disposal at the entire dump site (County of Los Angeles, Office of County Engineer and Surveyor, February 1, 1952). Instead, in 1952, the Los Angeles RWQCB placed a restriction on the operational practices at the Landfill by adopting a motion stating in part that *"all solid, semi-liquid, or liquid wastes disposed of at the BAK Disposal Site shall be prevented from entering into Dominguez Channel and ultimately into the Los Angeles Harbor; that the operator shall provide adequate facilities to meet this requirement,"* (State of California, Regional Water Pollution Control Board No. 4, May 20, 1952). In August 1952, the lease agreement under which the landfill operated was amended to exclude "liquid or semi-liquid industrial waste, tank bottoms, sludge, or rotary mud" from acceptance or disposal at the BKK Landfill (Dominguez Estate Company, September 16, 1952). However, the December 2006 Wilson Geosciences, Inc. report describes an active liquid waste pit in the vicinity of the MB Landscape Nursery in 1956, suggesting that the practice of accepting liquid waste may have continued after the lease amendment. A detailed discussion of the operational practices of the BKK Landfill and the pre-landfill and post-landfill history of OU-2 and its immediate vicinity is presented in Sections 2.3 and 2.4 of the Final RI/FS.

The RAP for OU-2 is based on the results of the Final Remedial Investigation and Feasibility Study for Soil and Soil Gas Media (RI/FS) dated June 10, 2014 and encompasses surface water and soil run-off, the landfill soil cover and waste zone, and the underlying native soil. The RAP addresses all affected environmental media where a complete exposure pathway, or potential exposure pathway for chemicals of potential concern (COPCs), could result in potential human or ecologic health risks that exceed target risk levels as determined by the HHRA and SLERA. The risk assessments were prepared in accordance with the DTSC-approved *Final Remedial Investigation/Feasibility Study Workplan*, Leighton Consulting, Inc., December 15, 2006 (Initial 2006 RI Workplan), and consider all COPCs and potential receptor populations, based on current land use, in the identification of chemicals of concern (COCs). The identified potential threats posed by COPCs/COCs include; 1) adverse health effects with the inhalation, incidental ingestion and direct contact with COCs in soil cover and waste materials, and 2) migration of hazardous levels of methane and /or volatile organic compounds (VOCs) into enclosed-space structures. These threats are addressed by the recommended response actions that were selected through an evaluation of appropriate remedial alternatives. Collectively, the chemicals identified by the RI, HHRA and SLERA as OU-2 COPCs/COCs include VOCs, semi-volatile organic compounds (SVOCs), metals, aldehydes, organochlorine pesticides, chlorinated herbicides, polychlorinated biphenyls (PCBs), sulfides, total petroleum hydrocarbons (TPH) and the chemicals cyanide, perchlorate and carbon monoxide. The COCs that are specific to the affected environmental media are discussed in Section 4.0, *Risk Assessment Summary*. Groundwater will be addressed separately, at a later date, under a groundwater-specific RI/FS and RAP as agreed by DTSC.

2.0 REMEDIAL INVESTIGATION

2.1 Scope of the Remedial Investigation

The RI was designed to define the nature, magnitude, and extent of potentially hazardous substances at the BKK Landfill, OU-2, identify the chemical transport mechanisms and exposure pathways, and assess potential human and ecologic health risks to guide the evaluation and selection of appropriate remedial response actions. A comprehensive sampling and analysis program was undertaken, that included:

- 3 stratigraphic coreholes,
- 22 groundwater monitoring wells,
- 75 soil gas/landfill gas wells/probes,
- 123 direct-push soil sample borings,
- 111 hand-dug borings,
- 74 CPTs/UCPTs, and
- The methodical collection and analysis of more than 1,148 environmental media samples, not including samples collected for quality assurance/quality control (QA/QC) purposes.

The environmental media samples were collected under the supervision and oversight of a State of California licensed Professional Geologist (the Project Geologist) under DTSC-approved workplans that are collectively referred to as the Workplans:

- *Final Remedial Investigation/Feasibility Study Workplan,* (Initial 2006 RI Workplan) (Leighton Consulting, Inc., December 15, 2006).
- *Revised Remedial Investigation/Feasibility Study Workplan Addendum* (2008 Workplan Addendum) (Leighton Consulting, Inc., July 23, 2008).
- *Remedial Investigation/Feasibility Study Additional Assessment Workplan*, (Leighton Consulting, Inc., May 2010).
- *Remedial Investigation/Feasibility Study Off-Site Groundwater Assessment Workplan*, (Leighton Consulting, Inc., November 3, 2010).

Field implementation of the Initial 2006 RI Workplan began on December 20, 2006 and was completed on August 7, 2008, with the exception of on-going semi-annual

groundwater monitoring, soil gas monitoring at the northern boundary of OU-2, and quarterly methane monitoring of building perimeter probes and methane vent risers. Environmental media sampling included the collection of soil cover, waste zone soil matrix, soil gas, landfill gas, native soil, surface water, surface water run-off, leachate, and groundwater samples. For RI/FS/RAP purposes, *landfill gas* or *LFG* specifically refers to gas-phase samples collected from wells or probes installed within or directly above OU-2 waste cells. The use of *soil gas* includes LFG but within the context of the discussion can refer to samples obtained from wells or probes installed outside of the waste cells or landfill limits. Sampling locations were both grid-based and targeted (off-grid sampling) for delineation and evaluation of specific features or conditions of concern. All chemicals detected at OU-2 (including J-flagged detections) were considered COPCs and were included in a formal selection of COCs as discussed in Section 4.0 of the RAP.

The RI identified 172 anthropogenic (human-made) COPCs in one or more solid-, liquid-or gas-phase samples that were evaluated as either soil cover, waste zone soil matrix (waste zone), native soil, ambient air, soil gas, landfill gas, surface water, leachate or groundwater environmental media at OU-2. A total of 82 VOCs, 35 SVOCs (including 1,4-dioxane), 25 metals (including hexavalent chromium), four aldehydes, nine organochlorine pesticides, eight chlorinated herbicides, four PCBs (Aroclor-1016, Aroclor-1248, Aroclor-1254, and Aroclor-1260), TPH (as gasoline-, diesel- and oil-range petroleum hydrocarbons), perchlorate, cyanide, five sulfides, and carbon monoxide were detected in one or more of the RI samples. Some detected chemicals are included in more than one classification group.

The RI well installation and sampling locations are shown on RI Figure 3.1-1; *R.I. Sample and Well Locations* (topographic base, 1:500-scale), RI Figure 3.1-2; *R.I. Sample and Well Locations – Aerial Photo Base* (1:500-scale), RI Plate I; *R.I. Sample and Well Locations – Aerial Photo Base* (1:200-scale), and RI Plate II; *Sample and Well Locations* (topographic base, 1:200-scale).

Additional sampling details for the remedial investigation are provided in RI Table 3.1-1; *Remedial Investigation CPT/UCPT, Soil Boring, and Well/Probe Installations*; RI Table 3.1-2; *Remedial Investigation Samples Collected by Property*; RI Table 3.1-3; *Remedial Investigation Laboratory Methods and Analyte Summary*; and RI Table 3.1-4; *Remedial Investigation Sample Location Summary (feet bgs)*.

The locations of sampled media are shown on RI Figure 3.7-1; *CPT/UCPT Profile Locations,* RI Figure 3.9.1-1; *Soil Cover Sample Locations*, RI Figure 3.9.1-2; *Supplemental Soil Cover Sample Locations*, RI Figure 3.9.1-3; *Native Soil Sample Locations*, RI Figure 3.9.1-4; *Waste Zone Sample Locations*, RI Figure 3.9.1-5; *Soil Run-off Sample Locations*, RI Figure 3.9.1-6; *Soil Cover Physical Properties Sample Locations*; RI Figure 3.9.1-7; *Native Soil Physical Properties Sample Locations*, RI Figure 3.9.2-1; *Leachate Sample Locations*, RI Figure 3.9.2-2; *Groundwater Hydropunch Sample Locations*, RI Figure 3.9.2-3; *Surface Water Run-off Sample Locations*, and RI Figure 3.9.3-1; *Soil/Landfill Gas Sample Locations*.

2.2 Previous Investigations

Thirty-three limited subsurface investigations are known to have been conducted at the BKK Landfill between 1955 and 2001. Twenty of these investigations are either specific to, or pertain to OU-2, and are documented in the RI report. The majority of the investigations conducted between 1955 and 1988 were primarily for geotechnical purposes and often included methane level measurements by field meters. Over one hundred borings had been advanced into the BKK Landfill waste zone prior to the RI and the boring logs include basic descriptions of the material encountered during drilling. The waste materials described include wood, paper, newspapers, metal, glass, plastic, rubber, bricks, wire, rags, cans, tires, concrete, plaster, straw and oil, pottery, springs, shoes, water and vacuum cleaner hoses, carpet, roofing shingles, organics, china, and cardboard.

Investigations conducted after 1988 were generally for environmental purposes and included sampling and analysis of soil, soil gas/LFG, and/or groundwater samples by an analytical laboratory. The most significant investigations were conducted in 1997 and 2001 on behalf of the US Environmental Protection Agency (USEPA) and resulted in the collection of 14 groundwater samples, 12 soil samples, and 47 soil gas/LFG samples from OU-2. The available analytical results are presented in tables that are included in the RI report. The laboratory analyses identified the presence of VOCs and SVOCs in all three environmental media and the presence of VOCs, aldehydes and methane in soil gas/LFG. The combination of data collected between these two investigations was deemed sufficient by the USEPA and DTSC to determine that further investigation of the BKK Landfill was warranted.

2.3 Waste Zone Characterization and COPCs

The lateral limits of the OU-2 waste zone enclose an area of 180 acres and are adequately defined for site characterization and risk evaluation purposes (RI Figure 2.2-2, *Current Topography, OU-2*). In places, landfill materials appear to be gradational with the

overlying soil cover material suggesting that localized mixing during placement of the soil cover may have occurred. The base of the waste zone was typically well defined. The depth to the top of the waste zone ranged from 1.5 to 15 feet bgs and 27.5 to 11.5 feet above msl, and the base of the waste zone ranged from 10.5 to 36.5 feet bgs and 15.5 to -4.5 feet msl.

Assuming a waste zone area of 180 acres and an average waste zone thickness of 15 feet (RI Table 3.9.1-1, *Waste Zone Depths (feet)*) the volume of the waste zone is approximately 4,356,000 yd^3 and includes soil that was either co-deposited, mixed with waste materials, or used as daily soil cover (as distinguished from landfill cover). The percentage of soil in the waste zone could not be determined by the RI data. Based on field observations, a 20% soil and 80% waste mixture is a reasonable estimate. Using this assumption, the best estimate of the current volume of waste at OU-2 is approximately 3.5 million yd^3. However, alternate ratios of soil and waste mixture were used to calculate the waste zone volume and tonnage (Table 2.4-1, *OU-2 Waste Zone Volume and Tonnage Calculations*).

Table 2.3-1
OU-2 Waste Zone Volume and Tonnage Calculations*

Unit of Measure	Waste Zone: 180 acres - 15 feet thick			
	Waste & Soil-Matrix Combined (assuming 1 ton/yd^3)	**Waste Only** (assuming 0.6 ton/yd^3)		
		10% Soil Matrix	**20% Soil Matrix**	**40% Soil Matrix**
Waste Volume – yds^3	4,356,000	3,920,400	**3,484,800**	2,613,600
Waste Tonnage	4,356,000	2,352,240	**2,090,880**	1,568,160

Physical descriptions of the waste zone materials at OU-2 were recorded for 58 of the 64 sampling locations (RI Table 3.1-4, RI Figure 3.9.1-4) where landfill waste was encountered. Based on these descriptions, the solid waste materials encountered during the RI have been characterized and appear to primarily consist of municipal waste (RI Table 3.9.1-2, *Waste Material Description and Occurrence (feet)*). Of the 58 locations where physical descriptions were possible, industrial waste is suspected at only five locations where liquid-phase hydrocarbons, strong chemical or petroleum odors, hydrocarbon-saturated straw, or elevated concentrations of COPCs were present in soil-matrix samples or leachate.

The degree of waste decomposition is highly variable and is known to be primarily a function of moisture content and microbial activity in the waste zone. In many locations, the readily decomposable, cellulose-based waste materials were dry (paper, wood, plant material), and printed material was legible after 56 years of burial; the oldest legibly dated material was newsprint from 1952 collected at location 4.

Fifty-one soil-matrix waste zone samples were collected for laboratory analyses from 44 grid and off-grid sampling locations within the waste zone limits. Approximately one sample was collected per 85,000 yd^3 of combined waste zone volume (soil-matrix and waste). Ninety-three COPCs were detected in the waste zone soil-matrix samples (of which eight were J-flagged detections). The COPCs included 37 VOCs, four aldehydes, 16 SVOCs, two PCBs, two chlorinated herbicides, five organochlorine pesticides, TPH (C8 to C43), 24 metals, cyanide, and hexavalent chromium (RI Table 5.2-2, *Chemicals of Potential Concern*, RI Table 5.2.1-1, *Waste Zone Soil-Matrix Sample Analytical Results, Initial RI*, and RI Table 5.2.1-2, *Waste Zone Soil-Matrix Sample Analytical Results, Additional Assessment Workplan*).

The analytical results for waste zone samples that were collected within 10 feet of ground surface were included in the SLERA and HHRA evaluation of soil COPCs at Recreational Exposure Areas 1 and 2, and Commercial/Industrial Exposure Areas 1 and 2. The conclusions drawn from the results for these samples are included in the discussion of soil cover COPCs and COCs in Section 4.2. The analytical results for waste zone samples collected from below 10 feet bgs were utilized for characterization purposes only.

2.3.1 Leachate Characterization and COPCs

Twenty-four of the 96 COPCs detected in leachate samples (including J-flagged detections) exceeded their maximum contaminant level (MCL) or tap water regional screening level (RSL) for 1,4-dioxane (RI Table 5.2-2). Leachate was present at 25 of the 61 locations where the entire depth of the waste cell was investigated (RI Table 3.1-4, RI Table 5.3.1-1, *Leachate Water Sample Analytical Results, Initial RI*, RI Table 5.3.1-2, *Leachate Water (Solid Phase) Sample Analytical Results, Initial RI*, and RI Table 5.3.1-3, *Leachate Hydropunch Water Sample Analytical Results, Additional Assessment Workplan*, and RI Figure 3.9.2-1). The percentage of locations with leachate (approximately 40%) is unexpectedly low, given the post-closure land use irrigation requirements for Victoria County Golf Course (Victoria Golf Course), Victoria County Regional

Park (Victoria Regional Park) and Victoria County Cricket Fields (Victoria Cricket Fields), the Goodyear Airship Flight Operations Center grass-covered landing field, and the MB Landscape Nursery. The distribution of leachate is likely to be localized and discontinuous as a result of the trench and fill (cut-and-cover) method of disposal and the presence of undisturbed "spines" of native soils that were left between adjacent cut-and-cover trenches. The factors that could affect the occurrence of leachate include: the co-disposal of liquids with the waste materials, flooding of the waste cells during the large-scale flood events that occurred during the landfill operations, breaching of water-bearing sands by the cut-and-cover method of disposal, infiltration of irrigation and rainwater through the soil cover or drainage sumps associated with the construction of greens and sand traps, and infiltration of water from broken or leaking irrigation pipelines. RI field observations of soil cover moisture content and compaction support a conclusion that in general, irrigation water at OU-2 does not significantly penetrate the soil cover below a depth of 6 inches.

Leachate was not encountered at depths above 10 feet bgs at OU-2 and was not observed to be seeping through the sides of the landfill, such as the constructed silt/clay banks of the Dominguez Branch Channel that confine waste cells on either side of the flood control drainage. The shallowest leachate samples were collected from a depth of 12 to 16 feet bgs at locations 105 and 610.

2.3.2 Free Product Characterization and COPCs

Free-phase liquid hydrocarbons were observed at only two locations at OU-2. At location 105, free product was present as a black, viscous coating on straw that was recovered from the waste zone between 12 and 16 feet bgs (RI Table 3.9.1-2). Hydrocarbon sheen was observed on the leachate samples collected at location 105; however, a free-phase sample could not be obtained due to insufficient quantities of liquid hydrocarbon product.

At location 114, a floating pad of black, oily hydrocarbons, with a strong petroleum odor, separated from the leachate samples as they were being collected from depths between 21 and 25 feet bgs. Water-phase (leachate) and free-product samples were analyzed at this off-grid location. The leachate sample contained elevated concentrations of TPH at 540 milligrams per liter (mg/L) (mostly diesel and oil range C12 to C32), 19 VOCs (notably benzene at 360 micrograms per liter [ug/L]), five SVOCs (notably anthracene at 16,000 ug/L), 17 metals (notably

copper at 21 ug/L and arsenic at 19 J ug/L), two PCBs, one chlorinated herbicide, perchlorate at 360 ug/L, cyanide at 48 ug/L, and one organochlorine pesticide (RI Table 5.3.1-1). Nearly all of the chemicals detected in the free-product sample were detected in the leachate sample. The chemicals detected in the free-product sample (referred to as "solid phase" by the analytical laboratory) include TPH at 21,000 milligrams per kilogram (mg/kg) (mostly diesel range C12 to C14), 17 VOCs (notably benzene at 2.1 mg/kg), four SVOCs (notably naphthalene at 41 mg/kg and two-methylnaphthalene at 55 mg/kg), two aldehydes, and three organochlorine pesticides (RI Table 5.3.1-2).

2.4 Soil Cover Characterization and COPCs

The soil cover was evaluated for its physical integrity, for physical properties with respect to transmissivity to air and water, and for the presence of COPCs. The evaluation of physical integrity included a visual investigation of the OU-2 soil cover, conducted as part of the Air Quality Management District (AQMD) Rule 1150.1 Instantaneous landfill Surface Monitoring event. A discussion of methane detected above the landfill as part of the landfill surface monitoring is discussed under section 2.9 of this report. The visual investigation did not identify areas of leachate seepage or exposed landfill debris, including the earthen banks of the Dominguez Branch Channel. Suspected landfill-affected soils were visually identified to be present at surface locations 299 and 300 where heavy equipment used in the retail mulching operation at MB Nursery inadvertently removed the soil cover in localized areas. The exposed, dark-colored, silt-clay soils were similar in texture and appearance to the organic soils associated with the waste zone, but did not contain COPCs in concentrations that could result in an unacceptable health risk through physical contact, ingestion or inhalation (Section 4.2). The MB Nursery repaired the breaches using sand and mulch materials as later observed by Leighton Consulting during subsequent visits.

Differential settlement of soil was visible at Victoria Regional Park, Victoria Cricket Fields, and the landing field for the Goodyear Airship Flight Operations Center. Fissures were only identified at a location west of the tennis courts and cricket field concession building where north-south oriented cracks displace the asphalt in East 192nd Street. Landfill gas was not detected from these fissures, which likely define the limits of the landfill cells in that area.

A total of 30 representative soil samples, collected from depths ranging from 0.5 to 13.5 feet bgs, were obtained for analysis of the physical properties of the soil cover

during the implementation of the Initial 2006 RI Workplan (RI Table 3.9.1-3, *Soil Cover Physical Property Analyses*). The predominant lithology of the soil cover is classified as sandy clay (CL–USCS). The results of the physical property analyses are consistent with field observations and measurements regarding limited water infiltration and leachate generation, the low concentrations of VOCs in ambient air samples collected above the soil cover, and the lack of measurable through-soil-cover methane and VOCs by field instrumentation.

Two hundred and fifty-eight soil cover samples were collected for chemical analysis from depths that range from 0.5 to 21.5 feet bgs (RI Table 3.1-4 and RI Figure 3.9.1-1). All but 10 of these samples were obtained from a depth of 10 feet bgs or less. Of the 273 samples collected from the upper 10 feet of soil, seven samples were deemed to be undisturbed native soil, seven samples were collected from the waste zone, and 11 soil samples were specifically collected at 0.5 to 1.0 feet bgs from the banks of the Dominguez Branch Channel to evaluate COPCs in areas deemed to be susceptible to erosion (RI Figure 3.9.1-5). Ninety-six COPCs were detected in the soil cover and include 30 VOCs, two aldehydes, 19 SVOCs, three PCBs, eight chlorinated herbicides, seven organochlorine pesticides, TPH (C8 to C43), cyanide, and 25 metals including hexavalent chromium (Cr-VI) (RI Table 5.2-2 and RI Table 5.2.3-1, *Soil Cover Sample Analytical Results, Initial RI*).

Following the Initial 2006 RI Workplan sampling, an additional 80 soil cover samples were collected under the 2008 Workplan Addendum to delineate the lateral and vertical extent of specific chemicals at sampling location B-120 for benzo(a)pyrene and formaldehyde (RI Figure 5.2.3-1a, *Location 120, Benzo(a)pyrene and Formaldehyde Concentrations in Upper 15 feet of Soil*), location B-117 for PCBs, 4,4'-DDE, and chromium (RI Figure 5.2.3-1b, *Location B-117, PCBs, 4,4-DDE, and Chromium Concentrations in Upper 5 feet of Soil*), location 236 for arsenic (RI Figure 5.2.3-1c, *Location 236, Arsenic Concentrations in Upper 10 feet of Soil*), location UB-8 for PCBs and lead (RI Figure 5.2.3-1d, *Location UB-8, PCB & Lead Concentrations in Upper 10 feet of Soil*), and location 34 for antimony, arsenic, and lead (RI Figure 5.2.3-1e, *Location 34, Antimony, Arsenic, and Lead Concentrations in Upper 5 feet of Soil*). These sampling locations are referred to in the RI/FS as *source locations*. In general, the vertical delineation sampling depths were 0.5 foot, 4 feet, and 8 feet bgs. The analytical results are presented in RI Table 5.2.3-2, *Soil Cover Sample Analytical Results, Workplan Addendum*. Except for location UB-8, elevated concentrations of the specific COPCs at each of these locations were not detected at concentrations of concern, appeared to be

limited to the immediate area of the original sample, and the *source locations* were determined to de minimis in volume.

2.5 Sediment and Surface Water Run-off Characterization and COPCs

Low-level concentrations, including J-flag values, of 15 VOCs, two SVOCs, 25 metals, two aldehydes, one chlorinated herbicide and cyanide, were detected in one or more of the nine surface water run-off samples that were collected and analyzed for the RI (RI Table 5.2-2, RI Table 5.3.7-1, *Surface Water Sample Analytical Results, Initial RI*, RI Figure 3.9.1-5, and RI Figure 3.9.2-3). None of the detected concentrations exceed their respective MCLs.

Sediment was not observed to have accumulated at the surface water run-off sampling locations and appreciable amounts of suspended sediment did not settle out from the collected water samples. Since sediment samples could not be collected, 11 shallow soil samples that appeared to be susceptible to erosion were collected from the banks of the Dominguez Branch Channel (RI Figure 3.9.1-5). Fifty-four COPCs were detected in the potential soil run-off samples. Low-level concentrations of 13 VOCs, 11 SVOCs, formaldehyde, three organochlorine pesticides and cyanide were detected in one or more of these samples. Five metals of concern were detected at concentrations above their site-specific background levels. The five metals; arsenic, zinc, mercury, and hexavalent chromium, were detected above background in only one of the 11 samples and lead was found in three of the 11 samples (RI Table 5.2.4-1, *Potential Sediment Run-off Sample Analytical Results, Initial RI*). The COPC concentrations detected in these samples would be highly diluted and/or degraded by the process of erosion, transport, and deposition. Sediment run-off from these soils is considered to represent an insignificant ecologic or human health risk.

2.6 Native Soil Characterization and COPCs

Native soils beneath the waste zone and adjacent to the landfill limits at OU-2 were evaluated for physical properties with respect to transmissivity to water and for the presence of COPCs (RI Table 3.9.1-4, *Upper Bellflower Native Soil Physical Property Analyses*). The BKK Landfill predates the use of engineered landfill liners. However, the siting of the landfill above naturally occurring, fine-grained sediments of the Dominguez watershed was a factor that was considered in the approval of the landfill operations in 1948. Ten undisturbed native soil samples from the Upper Bellflower hydrogeologic unit were obtained from depths between 24 and 41.5 feet bgs and analyzed for physical

properties as part of an evaluation of the vertical attenuation of contaminants beneath OU-2. The measured physical properties, including effective porosity and hydraulic conductivity, support the conclusion that silt and clay aquitards beneath the waste cells have retarded the mobility and migration of chemicals that were deposited at OU-2.

One hundred sixty native soil samples were collected for analysis from depths that range from 6 to 42 feet bgs (RI Figure 3.9.1-3). Seventy-four of the samples were collected from locations outside of the OU-2 waste limits (locations 7, 10, 22, 28, 33, 103, 108, 109, 116 to 119, 121 to 124, 130 to 133, SV-116, LW-UB-1 to LW-UB-8), and 86 samples were collected from beneath the waste cells (RI Table 3.1-4). Eighty-five COPCs were detected in the native soil samples. The COPCs included 40 VOCs, two aldehydes, 10 SVOCs, no PCBs, one chlorinated herbicide, five organochlorine pesticides, TPH (C19 to C40), 24 metals, cyanide, and chromium VI (RI Table 5.2-2, RI Table 5.2.2-1, *Native Soil Sample Analytical Results, Initial RI*, and RI Table 5.2.2-2, *Native Soil Sample Analytical Results, Additional Assessment Workplan*).

2.7 Soil Gas/Landfill Gas Characterization and COPCs

A total of 301 air media samples were collected and analyzed for COPCs under the Workplans. The samples were collected from 5 ambient air locations above the waste zone, 38 landfill gas wells installed within the waste cells, and 61 soil gas wells/probes installed outside of the landfill waste zone limits to evaluate potential lateral migration of landfill gas (RI Figure 3.9.3-1). Seventy-nine COPCs (including methane and J-flagged detections) were detected in one or more of the 301 air media samples collected from the landfill gas wells, landfill perimeter soil gas wells and probes, and ambient air (RI Table 5.2-2, RI Table 5.4.1-1, *Landfill Gas Sample Analytical Results, Initial RI*, RI Table 5.4.2-1, *Soil Gas Sample Analytical Results, Initial RI*, RI Table 5.4.2-2, *Soil Gas Sample Analytical Results, Initial RI Resample*, and RI Table 5.4.3-1, *Ambient Air Sample Analytical Results, Workplan Addendum*). The analytical results were used to evaluate indoor and outdoor air exposures for site workers, and indoor air exposures for residential receptors. The COPC health "risk drivers" include naphthalene, benzene, vinyl chloride, and hydrogen sulfide, depending on the specific exposure scenario.

Subsequent to the evaluation of the air media samples collected under the Initial 2006 RI Workplan, methane sampling of soil gas wells continues to be conducted. Additionally, the sampling of sub-slab methane monitoring probes installed beneath the Goodyear Airship Flight Operations Center maintenance/office/meeting room building (Goodyear maintenance building) and administrative/sales office were monitored as part of an on-

going quarterly to semi-annual monitoring program. The results are submitted by Goodyear to the City of Carson Department of Building and Safety. The analytical results for these on-going monitoring programs are consistent with previous monitoring and RI sampling results discussed in the following sections.

2.7.1 Methane

Large areas of OU-2 appear to have been subject to decomposition. However, the microbial degradation of the waste materials appears to be highly variable, and in some places has not occurred to a significant extent, as indicated by the presence of non-decomposed paper products. Methane generation by microbial degradation is primarily a function of moisture content in the waste zone with an optimum moisture content being 40 to 50 percent by weight.

Methane is considered to be non-toxic, but at certain concentrations is a hazard for combustion (fire/explosion) and as an oxygen deficient atmosphere. The flammability of methane is dependent on the presence of oxygen and is flammable in air at a concentration of 5-15% by volume (50,000 to 150,000 parts per million by volume [ppmv]).

Methane in Building Perimeter or Landfill Perimeter Monitoring Wells/Probes
Methane was detected in samples from six building perimeter soil gas wells/probes and one landfill perimeter soil gas well (SV-11) (installed in the waste zone) at concentrations that exceed a non-regulatory, RI screening level of 1.25% v/v (12,500 ppmv or 25% of the methane lower explosive limit [LEL] of 50,000 ppmv) as shown in Table 2.7.1-1, *Maximum Detections Exceeding 25% LEL (12,500 ppmv) in Building Perimeter or Landfill Perimeter Wells/Probes*.

Table 2.7.1-1
Maximum Methane Detections Exceeding 25% LEL (12,500 ppmv) in Building Perimeter or Landfill Perimeter Wells/Probes
By EPA 3C/ASTM D1946

OU-2 Location	Well / Probe	Methane Concentrations					
		PPMV	% LEL	Sample Depth (feet bgs)	PPMV	% LEL	Sample Depth (feet bgs)
Victoria Regional Park	SV-11*	16,500	33	5	13,000	26	12
18963 Milmore Ave	SV-122	<1,000	<2	6	13,000	26	12
VGC Club House	SV-104	198,000	396	6	313,000	626	14
	SV-105	<1,000	<2	4	384,000	768	14
	VGC-2A	303,000	606	9	27,900	56	15
	VGC-3A	79,000	158	9	68,400	137	15
Goodyear Maintenance Building	SV-119	12,000**	24	6	37,000	74	12

* SV-11, while previously used as a landfill perimeter well for purposes of the RI/FS, is actually installed in the waste zone

** Methane detection by Landtech Gem 2000 or RKI Eagle 4-gas meter

There is no regulatory threshold for methane concentrations in building perimeter monitoring wells/probes. The regulatory threshold for landfill perimeter monitoring wells is 5% v/v which is the methane LEL of 50,000 ppmv. Methane concentrations up to 16,500 ppmv were detected at landfill perimeter monitoring well SV-11, located adjacent to residences north of Victoria Regional Park. SV-11, as noted in the RI/FS, was actually installed within the waste zone but was utilized as a landfill perimeter well for purposes of the RI/FS. Methane concentrations for all wells/probes installed adjacent to the residential houses on Milmore Avenue are shown in RI Table 5.4.1-1; the methane monitoring wells/probe locations are shown on RI Figure 5.4.1-1, *Maximum Methane Soil Gas Concentrations*.

Building perimeter soil gas monitoring wells VGC-2A and VGC-3A, and soil gas monitoring probes SV-104 and SV-105, are installed around the Victoria Golf Course clubhouse, meeting room, and restaurant. Although concentrations of methane were detected at up to 384,000 ppmv, sub-slab methane barriers and monitoring probes were installed at the time the buildings were constructed and methane has never been detected inside any OU-2 buildings. If future monitoring

indicates continued unacceptable methane concentrations that pose a health and safety risk, a remedial response will be implemented.

Landfill Surface TOC Emissions

The AQMD Rule 1150.1 Instantaneous Landfill Surface Monitoring conducted under the Initial 2006 RI Workplan did not detect landfill gas as total organic carbon (TOC) (methane and VOCs) when measured at a distance of 3 inches or less above the soil cover surface by four-gas meter and photo ionization detector (PID) field instruments that were used to survey all of OU-2 on 25-foot centered transects. TOC emissions above the landfill surface exceeding 200 ppmv require mitigation according to AQMD regulations. Because landfill gas as TOC is typically comprised of 99 percent methane and less than one percent VOCs, *methane* is used interchangeably with *TOC* in this document within the context of AQMD Rule 1150.1 regulations. TOC was detected below the landfill surface at 19 point source locations which, at some locations, exceed the AQMD 1150.1 threshold for *enclosed space structures* of 1.25 % v/v (12,500 ppmv or 25% of the LEL for methane). The GPS coordinates and field meter measurements for these locations were recorded as an "area of concern" (AOC) when methane and/or VOCs were detected at any concentration by the field meters and each AOC was photographically documented (RI Table 3.10-1, *Soil Cover Survey Areas of Concern*, and RI Figure 3.10-2, *Landfill Soil Cover Investigation Features of Concern*, and RI Appendix F, *Soil Cover Inspection Photo Log)*. Below-ground TOC concentrations as methane exceeding 1.25 % v/v in enclosed-space structures were detected at seven locations consisting of six irrigation control valve boxes (ICVBs) and one irrigation drip line at Victoria Golf Course (RI Figure 3.10-2 and RI Table 3.10-1). All seven of these subsurface features were subsequently mitigated. No areas of concern (AOCs) for TOC emissions were detected during the soil cover investigation at the MB Nursery, the Goodyear Airship Flight Operations Center, or Victoria Regional Park.

Beginning in August 2012, Leighton Consulting or Burns & McDonnell have periodically measured methane emissions at the request of DTSC from four passive methane system vent risers installed at each of the Victoria Golf Course clubhouse cart wash/cart storage building, and Victoria Cricket Fields concession/restroom/storage building. Prior to February 19, 2014, methane sampling was conducted inside the vent risers by inserting the tubing into sample ports or the open end of the vent riser pipes. Methane has never been detected from inside the risers at the Cricket Field buildings but has been detected during four sampling

events ranging in concentrations of 3,500 ppmv to 12,000 ppmv from inside a singled paired set of the vent risers at the golf course clubhouse. AQMD and DTSC personnel visited Victoria Golf Course on January 29, 2014 to conduct methane sampling; however, access to the risers was not available. Based on the results of methane sampling previously reported by Leighton Consulting, AQMD issued a Notice to Comply to the County of Los Angeles on February 4, 2014. When Leighton resampled the vent risers on February 19, 2014 in accordance with AQMD sampling methodology (within 3-inches of the vent riser cap) methane concentrations were not detected in excess of the AQMD regulatory threshold of 200 ppmv. AQMD accepted the new results in response to the Notice to Comply.

2.7.2 Non-Methane Organic COPCs

The 79 COPCs that were detected in one or more of the 308 air media samples included 68 VOCs, three aldehydes, five sulfides (notably hydrogen sulfide), methane, carbon monoxide, and 1,4-dioxane (RI Table 5.4.1-1). Although the detected concentrations were generally orders-of-magnitude lower, the population of COPCs detected in the soil gas wells and probes installed outside of the waste zone was similar to the COPCs for landfill gas wells installed within the waste zone. The landfill gas wells were variously installed between the depths of 2 feet to 20 feet bgs in the OU-2 waste cells using 5-foot well screens. The landfill perimeter soil gas wells were installed between the depths of 4 feet and 18 feet bgs, using 1-foot to 2-foot well screens. The building perimeter soil gas probes were installed between the depths of 4 feet and 15 feet bgs, using 1.5-inch to 2.5-inch air-stone sample ports. Ambient air samples were collected by Summa canisters and personal airspace monitors with air sample intake approximately 18 inches above ground surface.

3.0 SUMMARY OF REMOVAL ACTIONS

The results of the RI, HHRA and SLERA did not identify environmental threats that constituted an immediate and substantial endangerment to human health or the environment and no interim or emergency response actions were taken as a result of this investigation. Other than the removal of fuel-impacted soil during clean-up activities associated with the removal of leaking underground storage tanks at the Goodyear Airship Flight Operations Center in 1994-1995, conducted under the oversight of the Los Angeles Regional Water Quality Control Board (LAWQCB), there have been no known removal actions of environmental media at OU-2.

4.0 RISK ASSESSMENT SUMMARY

4.1 Human Health Risk and Screening Level Ecologic Risk Assessments

A HHRA and SLERA were prepared by Enviro-Tox Services (ETSI) as integral components of the RI/FS for OU-2, and were based on RI data collected and analyzed by Leighton Consulting. Sampling conducted under the RI Workplans was guided by the development of conceptual site models (CSMs) that depicted the potential sources of contamination, the potential release mechanisms, the potential migration pathways for impacted environmental media, and the potential routes of human and ecologic receptor exposure to potentially hazardous anthropogenic (human-made) chemicals. The risk assessments were prepared in accordance with the DTSC-approved Initial 2006 RI Workplan and consider potential receptor populations based on current land use.

The purpose of the HHRA was to estimate the potential health risks and hazards that could be encountered by human receptors that may occupy or visit OU-2 under a Reasonable Maximum Exposure (RME) scenario. The RME scenario is the methodology recommended by the USEPA (U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, December 1989). The RME is defined as the maximum exposure (i.e., chemical intake) that is reasonably expected to occur as a result of human interaction with environmental media at a site.

Risk-based Remedial Action Goals (RAGs or clean-up goals) for OU-2 were developed for potential exposure to COC-affected soil and waste zone materials up to a depth of 10 feet bgs and soil gas/LFG based on identification of media-specific COPCs; evaluation of complete exposure pathways and exposure scenarios; toxicity assessments for the COCs, and identification of target risk levels in accordance with USEPA and CalEPA/DTSC guidance (RI/FS Section 6.0, Human Health Risk Assessment, and RI/FS Section 7.0, Screening Level Ecologic Risk Assessment).

The purpose of the SLERA was to develop a qualitative and/or quantitative appraisal of the potential effects a contaminated site might have on plants and animals other than people and domesticated species (CalEPA, DTSC, Human and Ecological Risk Division, July 4, 1996a). The results of the SLERA concluded that the COPCs/COCs in soil at OU-2 do not pose a significant health threat to ecological receptors.

The benchmark carcinogenic risk level identified by the DTSC in the PEA Guidance Manual (CalEPA, DTSC, June 1999) is 1 in one million (1E-06). However, USEPA has

established acceptable incremental carcinogenic risk levels to be within the risk range of 1 in 10,000 (1E-04) and 1E-06. Risks greater than 1E-04 are generally considered unacceptable. CalEPA has defined a risk of 1 in 100,000 (1E-05) as the "no significant level" for carcinogens under California's Safe Water and Toxic Enforcement Act (Proposition 65). Further, most California air districts use the 1E-05 risk level as the notification trigger level under California's AB 2588 Toxic Hot Spots Program. Thus, although agencies will exercise caution in determining whether risks within the range of 1E-04 and 1E-06 require additional investigation or some form of risk management, there is a general precedent that predicted carcinogenic risks that are on the low end of this range will generally be considered acceptable and not warrant further evaluation. Thus, in light of these acceptable risk ranges, estimated carcinogenic risk equal to, or lower than, 1E-06 are deemed to be acceptable for residential and recreational receptors. For commercial/industrial and construction workers, carcinogenic risk estimates equal or lower than 1E-05 are also considered to be acceptable.

Non-carcinogenic health effects are determined by estimating the ratio between the level of exposure and each of the chemical-specific reference doses. This ratio is known as the hazard quotient (HQ) for each evaluated exposure pathway, whereas the sum of all the HQs is defined as a hazard index (HI). The USEPA and DTSC consider an HI less than 1 an acceptable non-cancer health hazard. Risk-based RAGs were developed using a target HI of 1 for each of the COCs with non-carcinogenic effects. Health protective RAGs were developed for both the cancer and non-cancer endpoints for each COC, as appropriate.

4.2 Soil COCs (Soil Cover, Waste Zone Materials, and Native Soil)

The remedial action objectives (RAOs) for OU-2 soil cover, waste zone, and native soil are to prevent direct contact, inhalation, and incidental ingestion of COC-affected solid media exceeding health risk-based goals, mitigate potential risks of contact with the landfill contents, and limit contaminant loading to groundwater. The routes of exposure for the COCs in soil (direct contact, incidental ingestion, and inhalation of fugitive dust) are considered potentially complete when interaction between receptor populations and site soils occurs. The analytical results for all soil cover, waste zone, and native soil solid-media (soil) samples collected within 10 feet of ground surface, were utilized in the evaluation of human health risks for commercial and recreational exposure scenarios, assuming a complete route of exposure (RI Figure 6.5.1-1, *Soil Exposure Areas Evaluated*). Solid-media samples collected from, or immediately adjacent to, residential properties from the upper 15 feet of ground surface were utilized in the evaluation of

human health risks for a residential exposure scenario, assuming a complete route of exposure. All COPCs, including J-flagged detections, were used in the identification of soil cover, waste zone, and native soil solid-media COCs (henceforth collectively referred to as soil COPCs or soil COCs), and the development of chemical-specific RAGs for soil. Below a depth of 10 feet bgs for commercial and recreational scenarios, and 15 feet for residential scenarios, the exposure routes for direct contact and ingestion of waste zone materials for potential receptors, including leachate and free product, are considered incomplete.

No soil COPCs were detected at concentrations that result in the calculation of excess lifetime cancer risks greater than target levels of 1E-06, a non-cancer HI greater than 1, for samples used for the evaluation of residential exposure populations. COC-specific RAGs were therefore not developed for the residential exposure scenario.

Concentrations of six soil COCs exceed a COC-specific incremental target cancer risk of 1E-6 for recreational exposure populations or target cancer risk of 1E-5 for site workers and construction workers, and/or the non-cancer regulatory HI benchmark of 1.0. These chemicals; arsenic, antimony, benzo(a)pyrene, lead, and the PCBs Aroclor 1248 and 1254, are considered to be the OU-2 soil cover COCs (upper 10 feet of soil). One or more of these six soil COCs were identified at six discrete locations (22, 34, 236, 110, UB-8, SR-8) (RI Plate I) in the upper 10 feet of ground surface in the sampling conducted under the Initial 2006 RI Workplan. With the concurrence of DTSC, location 110 was eliminated as an AOC because the detected concentration of benzo(a)pyrene was similar to background levels in California. Benzo(a)pyrene was also eliminated as a COC because location 110 was the only location where the COC-specific incremental target cancer or non-cancer regulatory HI benchmark of 1 was exceeded. With the concurrence of DTSC, location SR-8 was also eliminated as an AOC because the detected concentration of arsenic was similar to the site background levels for arsenic and the sampling location was considered remote for potentially exposed populations.

Risk-based RAGs were developed for the remaining five COC "risk drivers" in the HHRA (RI/FS Section 6.0). At Recreational Exposure Area 1 (Victoria Golf Course), combinations of one or more of the five "risk driver" chemicals were identified at locations 22, 34, and UB-8 at unacceptable concentrations for commercial/industrial site worker and construction worker receptors, and both adult and child recreational receptors (although the concentrations of risk-drivers could not be replicated at location 34 during subsequent delineation sampling). At Commercial/ Industrial Exposure Area 2 (MB Nursery), arsenic was detected at location 236 at unacceptable concentrations for

commercial/industrial site worker and construction worker receptors (although the concentrations of risk-drivers could not be replicated at location 236 during subsequent delineation sampling). Except for location 236 where unacceptable concentrations of arsenic were detected between 6 inches and one foot bgs, all other detections of the "risk driver" chemicals were detected at depths of 4 feet bgs or deeper. The route of exposure for these chemicals is therefore, only realistically complete for commercial/industrial site worker and construction worker receptors performing soil excavations at depth, except for the location noted.

Following consultation with DTSC, a delineation soil sampling plan was approved and implemented under the 2008 Workplan Addendum that included the collection of additional samples at locations 34, 236, and UB-8 (RI Figure 5.2.3-1e, RI Figure 5.2.3-1c, and RI Figure 5.2.3-1d). The volume of arsenic-, antimony-, and lead-affected soil at location 34, and arsenic-affected soil at location 236 was determined to be *de minimis* because elevated, "risk-driver", concentrations for these COCs were not detected in the subsequent delineation soil samples (RI Table 5.2.3-2).

The soil samples collected and analyzed at locations 401 through 410 for delineation purposes around location UB-8 confirmed the presence of elevated concentrations of lead and PCBs (Aroclor 1248, 1254 and 1260) (RI Table 5.2.3-2). The risks presented by PCBs at depths between 0.5 and 4 feet bgs are acceptable for recreational users, commercial/industrial workers, and construction workers. Below a depth of 4 feet bgs, the risks presented by PCBs are acceptable for construction workers (RI Figure 5.2.3-1d).

The lateral extent of lead-affected soil at UB-8 and 401 through 405, and nearby location 22 (hereafter collectively referred to location UB-8/22), where concentrations of lead present a potential health risk to commercial/industrial workers and recreational adult/child users, collectively comprises an approximate 25,000 square feet (ft^2) area (approximately 0. 6 acres). This area also includes the soils that are affected by PCBs at UB-8 (RI Figure 5.2.3-1d). The elevated levels of lead and PCBs primarily occur between the depths of 6 to 8 feet bgs. These lead- and PCB-affected soils are located at Victoria Golf Course, adjacent to the property line for the LACFCD access road for the Dominguez Channel and coincide with the area of land between the pre-1966 and present-day location of the Dominguez Channel which did not receive landfill waste. The risk-based remedial goals that were developed in the Feasibility Study (FS) for these five soil COCs and the soil sampling locations requiring a remedial response are summarized below in Table 4.2-1, *Soil COCs and RAGs*.

Table 4.2-1
Soil Cover COCs and RAGs
Risk-Driver Chemical, and Occurrence Depth (feet bgs)

Initial 2007 RI Locations					
Sample Location	**Arsenic**	**Antimony**	**Lead**	**Aroclor 1248**	**Aroclor 1254**
22	---	---	6.5’	++	---
34	4’	4’	4’	---	---
236	0.5’	---	---	---	---
UB-8	---	---	4’-8’	4’-8’	---
2008 Workplan Addendum Delineation Locations at UB-8					
401-405,	---	---	0.5’-8’	---	8’
Recommended Soil RAGs	**10.81 mg/kg**	**108 mg/kg**	**80 mg/kg**	**1.7 mg/kg**	

--- ; analyte not reported above detection limit

++ ; analyte was detected but concentration did not exceed the recommended soil RAGs

The landfill soil cover cap in its present condition appears to be effectively containing soil COCs and also appears to effectively inhibit the migration of irrigation and rain water into the landfill cells, with minimal leachate generation. Breaching of the soil cover and waste zone by either man-made or natural causes could include exposure of waste by seismic events, soil excavation for utility installations and repair, erosion of the soil cover or banks of the Dominguez Branch Channel during significant rainfall events, irrigation system malfunctions, and the use of heavy equipment. Once exposed, a complete pathway would potentially exist for dermal contact, incidental ingestion, and inhalation of soil and/or waste zone COCs. If a route of exposure were complete for waste zone materials below a depth of 10 feet bgs, the detected COPC-specific concentrations of arsenic, benzene, and naphthalene would present an unacceptable cancer health risk for site workers and/or construction workers and a location analysis shows that locations 4, 15, 23, 26, 29, 105, 113, 114 and 610 would also present an unacceptable cancer or non-cancer health risk for site workers and/or construction workers. For these reasons, and because the predicted depth to the top of the waste zone is not precise, property-specific institutional and engineering controls that consider the applicable provisions of Occupational Safety and Health Act (OSHA) laws and regulations for site worker safety at hazardous waste sites are required.

4.3 Landfill Gas COCs

The RAOs for OU-2 LFG are to provide adequate protection to human health from inhalation, combustion, or explosion. Seventy-nine COPCs as non-methane organic compounds (NMOCs), including J-flagged values, were detected in soil gas/LFG samples analyzed from OU-2. The route of exposure to NMOC COPCs in soil gas/LFG is inhalation. The release mechanism for soil gas/LFG is volatilization of disposed chemicals in the waste zone. For gas-phase migration of COPCs to occur, there must be a concentration gradient to allow diffusion in the gaseous phase (diffusive flow), a pressure gradient (viscous flow through advection and/or convection transport processes) or a combination of both. The subsurface migration for LFG can occur vertically through permeable soil cover or penetration/degradation of the soil cover cap, and laterally through permeable site-boundary soils or along discrete preferential pathways such as utility trench backfill materials. If COPCs are released into ambient air, the transport/diffusion mechanism is wind.

Based on the analytical results for the RI air media samples and the subsequent monitoring of VOCs in wells installed adjacent to the residences at the northern OU-2 boundary, the route of exposure to NMOCs is considered complete for indoor and outdoor air. Potential health risks for exposure to COPC-affected air were evaluated for residents and full-time commercial/industrial site workers assuming a complete route of exposure for indoor and outdoor air. The health risk evaluation for the full-time commercial/industrial site worker population is used as a surrogate for construction worker and recreational receptor populations because full-time site workers are exposed to LFG for longer durations of time, and thus, would be at greater potential risk. An exposure assessment was conducted for the two exposure populations, as appropriate for the following five indoor air exposure scenarios: Commercial Industrial Area 1, Recreational Area Exposure Area 1, Recreational Exposure Area 2, Residential Exposure Area, and Avalon Boulevard Residential Exposure Area, and an outdoor air exposure scenario; OU-2 Landfill Limits.

Indoor Air Risks

To evaluate the potential indoor air NMOC health risks, the analytical results for the building perimeter soil gas probes and relevant landfill perimeter soil gas wells were used in the USEPA, Johnson and Ettinger, vapor intrusion model (2003), as modified by DTSC/HERD (2005), to predict the potential indoor air concentrations of COPCs. The model-predicted COPC concentrations were then used to evaluate for potential adverse human health effects for occupants of enclosed-space buildings at the Goodyear Airship

Flight Operations Center (Commercial/Industrial Exposure Area 1), Victoria Golf Course Clubhouse and related buildings (Recreational Exposure Area 1), Victoria Regional Park public-use buildings (Recreational Exposure Area 2), residences at Milmore Avenue and East 189th Street (Residential Exposure Area), and residences east of Avalon Boulevard (Avalon Boulevard Exposure Area) (RI Figure 6.5.1-2, *Vapor Intrusion Expose Areas Evaluated*). The exposure pathways are assumed to be complete. The calculated incremental cancer risks do not exceed the target risk level of 1E-6 for recreational and residential exposure populations, and the calculated incremental cancer risks do not exceed the target risk level of 1E-5 for site workers. The calculated hazard indices do not exceed the regulatory benchmark of 1 for any of the exposure scenarios. Thus, there are no recommended RAGs for indoor air exposure to NMOCs (VOCs) for on-site and off-site structures (buildings).

Outdoor Air Risks

For outdoor air receptors, the "through-soil-cover" migration of LFG NMOCs were determined by the USEPA LandGEM model-calculated emission rates for COPC concentrations detected in air media samples from the landfill interior soil gas wells. Using these model-estimated ambient air concentrations, the estimated average incremental cancer risk that may result from workers exposed to LFG while at OU-2 does not exceed the target risk level of 1E-6, nor does the health hazard index exceed the regulatory benchmark of 1 for commercial industrial site workers. Thus, there are no recommended RAGs for outdoor exposure to LFG NMOC (VOCs).

Methane Risks

Methane risks include the potential for fire and explosion when concentrations exceeding the methane LEL (5% v/v or 50,000 ppmv) accumulate in enclosed-space structures. Environmental risks include long-range degradation of the environment through methane emissions to the atmosphere. The AQMD has established 200 ppmv as the threshold for concentrations of methane above a landfill surface that require mitigation.

Methane has never been detected at concentrations exceeding the Waste Management District regulatory threshold of 5% v/v in landfill perimeter wells that act as offsite, subsurface, methane migration compliance points. Thus, a remedial response is not required based on current site conditions.

Methane has never been detected in any onsite structures designed for human entry/occupancy; however methane has been detected in excess of the methane LEL in

four building perimeter monitoring wells/probes installed adjacent to the Victoria Golf Course clubhouse, meeting room, and restaurant. Thus, sub-slab methane barriers, installed under these buildings and the Cricket Field concession/storage/restroom building when they were constructed, have effectively prevented methane entry. Methane has also not been detected in sub-slab methane mitigation system monitoring probes installed at the Goodyear property.

Landfill surface emissions of methane were not detected during the site-wide instantaneous landfill surface monitoring conducted during implementation of the Initial 2006 RI workplan. Methane has been detected at concentrations exceeding 1.25% v/v (12,500 ppmv or 25% of the methane LEL) inside several 10-inch diameter ICVBs a surface drain, and at one tree root irrigation drip line at Victoria Golf Course. These features have subsequently been mitigated. While not designed for occupancy, these ICVBs are occasionally accessed by maintenance workers at Victoria Golf Course and potentially represent a fire or explosion hazard if concentrations of 5% v/v methane were to accumulate and an ignition source was present.

Thus, the recommended RAGs for LFG are compliance with institutional and engineering controls that provide adequate protection to human health from inhalation, combustion, or explosion of LFG to site workers, construction workers, and site users when subsurface work (excavation) is conducted at OU-2 and to monitor and maintain the existing soil cover cap.

5.0 EFFECTS OF CONTAMINATION ON BENEFICIAL USES OF RESOURCES

The potential effects of OU-2 soil, waste zone, and soil gas contamination on the regional beneficial uses of groundwater will be addressed in a separate groundwater RI, FS, and RAP.

Post-closure ownership of the land comprising OU-2 includes public ownership by County of Los Angeles, Los Angeles County Flood Control District, and the City of Carson; and private ownership by Watson Land Company, and The Goodyear Tire & Rubber Company (RI Figure 2.2-3). The post-closure land uses include, and have included in the past, public recreation, public infrastructure, private recreation, landscape nursery, and vacant land (RI Figure 2.2-3).

The RI/FS human and ecologic health risk evaluations and the response action alternatives recommended in this RAP are based on the current recreational and commercial/industrial land uses and therefore, implementation of the recommended response actions is compatible with the continued productive and beneficial OU-2 land uses.

Because hazardous substances will remain at OU-2 at levels that are not suitable for unrestricted use of the land, Deed Restrictions (*Covenants to Restrict Use of Property – Environmental Restrictions*) are recommended for each of the properties that comprise OU-2 to provide protection of human health and the environment from contaminated media.

6.0 SUMMARY AND EVALUATION OF ALTERNATIVES

This summary and evaluation of remedial alternatives is based on the detailed analysis of alternatives that were evaluated in the FS. As stated in the FS, the USEPA Office of Emergency and Remedial Response has streamlined the RI/FS process for specific classes of sites. The municipal landfill class was addressed in *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, February 1991. Within this RI/FS framework, the NCP considers containment engineering controls a likely response action for landfills like OU-2, which are composed primarily of municipal waste but with some hazardous wastes that pose low-level, long-term threats and where the volume and heterogeneity of the waste makes treatment impractical. The NCP states that treatment should be considered only for delineated areas of highly toxic and/or mobile materials that pose potential principal threats. The FS and RAP adopt the term "areas of elevated concentrations" (AECs) where toxic and/or mobile chemicals of concern (COCs) are present at concentrations within a discrete geographic area that are higher than surrounding areas and that represent a potential human or ecological health risk as defined by the criteria in the DTSC-approved Initial 2006 RI Workplan. According to the NCP, institutional controls, such as land use covenants/deed restrictions, can be used to supplement containment engineering controls to prevent exposure if hazardous substances will remain at levels that are not suitable for unrestricted use of the land.

The broad remedial goal (RG) pertinent to waste zone materials, soil, and LFG, as prescribed in the OU-2 Consent Order, is to protect human health and the environment from contaminated media based on likely land uses. RAOs have been developed based on the project goals, the RI data, the HHRA and SLERA, and Applicable or Relevant and Appropriate Requirements (ARARs) (Table 6.0-1, *Remedial Action Objectives*).

Table 6.0-1
Remedial Action Objectives

Media of Concern	Objective
Waste zone	Protect the groundwater resources of the West Coast Basin by minimizing the potential for future contaminant loading to groundwater and, Prevent direct contact or mitigate the potential risks of contact with OU-2 landfill contents.
Soil	Prevent direct contact, inhalation, and ingestion of OU-2 soil COCs exceeding health risk-based goals.
Soil gas/Landfill gas	Provide adequate protection from inhalation, combustion, or explosion of soil gas/landfill gas from OU-2

6.1 Applicable or Relevant and Appropriate Requirements for OU-2

Remedial actions chosen for use at CERCLA municipal landfill sites must comply with the more stringent of all Federal or State of California ARARs and "to be considered (TBC)"criteria of environmental statutes, to the extent practicable. "Applicable Requirements" are those requirements promulgated under federal and state laws that specifically address a hazardous substance, pollutant, remedial action, location, or other circumstance at a CERCLA site. "Relevant and Appropriate Requirements" are those requirements that are not site specific, but which describe a hazardous substance, pollutant, remedial action, location, or other circumstance sufficiently similar to the circumstances at the site, such that the use is well-suited to the particular site. In addition to ARARs, non-promulgated policy, advisories, or guidance may be considered when developing remediation levels necessary to protect public health. These TBC criteria may be used in determining the necessary level of cleanup for protection of human health or the environment (U.S. Environmental Protection Agency, 1991).

ARARs fall into three general categories: (1) action-specific, (2) location-specific, and (3) chemical-specific. Action-specific ARARs are technology or activity based requirements or limitations on actions taken with respect to hazardous wastes. Location-specific ARARs are restrictions placed on concentrations of hazardous substances or the location of activities solely because of its geographical or physical sensitivity. Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of site-specific values.

Tables corresponding to each of the categories are presented in Appendix A1 (see Table 9.3.3-1, Table 9.3.3-2, and Table 9.3.3-3). The first column of these tables cites the legal authority or guidance; the second column summarizes its scope; the third column describes in what capacity the legal authority or guidance is applicable, relevant, or appropriate (or a TBC criteria) for OU-2; and the fourth column describes the referenced environmental media of concern.

6.2 Retained Remedial Response Alternatives

The remedial response technologies and process options that passed a preliminary screening for effectiveness, ability to implement, and cost were retained for further evaluation as remedial response alternatives as described in this section. Evaluation of the no-action alternative is required by the NCP and involves no additional activities, thereby providing a baseline for evaluating other remedial alternatives.

Waste Zone Material Remedial Alternatives:

A1, No-action

B1, Land use covenant/deed restrictions

B2, OM&M plans

Soil Remedial Alternatives:

D1, No-action

E1, Land use covenant/deed restrictions

E2, OM&M plans

F1, Soil AEC isolation

G1, Soil AEC excavation and disposal

Soil Gas/Landfill Gas Remedial Alternatives:

L1, No-action

M1, Land use covenant/deed restrictions

M2, OM&M plans

N1, OU-2 perimeter and soil cover methane monitoring

N2, Local area methane control

O1, Indoor air methane alarms

O2, Preferential methane migration pathway barriers

6.3 Development of Remedial Alternatives

A detailed evaluation of the remedial response alternatives listed in Section 6.2 are assessed against the evaluation criteria described in this section and compared against one another to identify key strengths and weaknesses of each alternative. Nine threshold and balancing evaluation criteria were developed under CERCLA and the NCP and California's HSAA for selecting a site remedy from the remedial response alternatives. The evaluation criteria and associated statutory considerations include two threshold criteria, five balancing criteria, and two modifying criteria. Modifying criteria are contingent upon the governmental agency and community comments.

6.3.1 Threshold Criteria

Overall Protection of Human Health and the Environment

This criterion evaluates the primary objective of the remedial action alternative and describes how each alternative achieves and maintains protection of human health and the environment. It addresses specifically how each remedial action alternative achieves protection over time, and how potential OU-2 human and ecologic risks are reduced. This criterion must be met for all remedial alternatives.

Compliance with ARARs and TBC Criteria

This criterion is intended to evaluate how each alternative complies with Federal and State ARARs and "to be considered" (TBC) criteria identified for OU-2, or if a waiver of these legal requirements is necessary and how it is justified. Evaluation of remedial alternatives by this criterion relies on the recommended cleanup goals (RAGs) presented in Sections 4.2 and 4.4. This criterion must be met for a remedial alternative to be eligible for consideration.

6.3.2 Balancing Criteria

Long-Term Effectiveness and Permanence

This criterion evaluates the magnitude of residual risk and the long-term effectiveness of an alternative to maintain protection of human health and the environment after the RAOs for OU-2 have been met. Included is an evaluation of the adequacy and reliability of controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. Three components of this criterion were considered for each alternative:

- Magnitude of remaining risks after cleanup
- Adequacy and reliability of controls
- Environmental impacts related to implementation of the alternative

Reduction of Toxicity, Mobility and/or Volume

This evaluation criterion addresses the effectiveness of the response action in reducing the toxicity, mobility and/or volume of hazardous substances left at a site. This criterion is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of the total volume of contaminated media. Six factors were considered for each alternative:

- The treatment processes to be used, and materials to be treated
- The amount of hazardous materials to be treated
- The estimated degree of expected reduction in toxicity, mobility or volume
- The degree to which the treatment is irreversible
- The type and quantity of treatment residuals expected to remain after treatment
- The degree to which the treatment reduces the inherent hazards posed by the principal threats at the Site.

Short-Term Effectiveness

This evaluation criterion evaluates the speed with which the remedy achieves protection and any potential adverse effects on human health and the environment during the construction and implementation phases of a remedial action until the RAOs are met. Four factors of this criterion were considered for each alternative:

- Protection of community health during the removal actions
- Protection of workers' health during the removal actions
- Time until removal response objectives are achieved
- Adverse impacts to the environment as a result of the removal activity

Ability to Implement

The ability to implement criterion addresses the technical and administrative feasibility of implementing a remedial action alternative and the availability of services and materials required during its implementation. This criterion involves analysis of seven factors:

- Administrative feasibility such as ability to obtain operating permits and implementation of institutional controls
- Technical feasibility with regard to construction and operation of the alternative
- The reliability of the technologies composing the alternative
- Availability of services and materials
- The ability to monitor the effectiveness of the remedy
- The ability to modify the technology during implementation, based on contingency monitoring
- The ease of undertaking additional remedial action, if needed

Cost

The cost criterion evaluates remedial action alternatives based on economic considerations, which consist primarily of cost estimates derived for each alternative and a comparison of the relative cost effectiveness of the various alternatives. The cost estimates are usually composed of capital cost and annual OM&M cost. Detailed cost estimates represent order-of-magnitude level estimates and their accuracy may be within -30 percent to +50 percent of the final project cost. Calculations of net present value (NPV), with and without a 3-percent annual inflation rate, were made for the large expenditure alternatives that were evaluated.

Capital cost for each remedial alternative was derived from literature sources, generic unit costs, local vendor and supplier quotes, previous studies, and engineering estimates. The estimates of capital cost for each alternative consist of direct (construction) and indirect (non-construction and overhead) cost. Direct cost includes expenditures for the equipment, labor, and materials necessary to perform remedial action. Indirect costs include engineering expenses such as design, project administration and construction supervision, legal fees and permit expenses, contingency allowances, startup and shutdown costs, other services that are not part of the actual remedial activities but are required to complete the

remedial action, and costs associated with loss of business as a result of the response actions. An itemized breakdown of the capital cost estimates for each remedial alternative by major cost components, when appropriate, is presented in the tables included in the discussions of remedial alternatives for each media.

Annual OM&M costs are comprised of the post-construction costs necessary to ensure the continued effectiveness of the removal action, including labor, maintenance materials, utilities, and purchased services. The estimates include OM&M costs that could be incurred even after the initial remedial activity is complete.

The cost of implementing land use covenants/deed restrictions has been assumed to be de-minimis for the purposes of the FS.

6.3.3 Modifying Criteria

State Acceptance
This criterion evaluates the technical and administrative issues and concerns that the oversight agency (DTSC) may have regarding each of the alternatives and ARARs.

Community Acceptance
This criterion is designed to evaluate the issues and concerns that the public (owners, community residents, and other interested parties) may have regarding each of the final candidate alternatives. A Fact Sheet will be prepared to encourage the community's involvement. Community concerns will be addressed in the Final Remedial Action Plan (RAP).

6.4 Waste Zone Remedial Alternatives Analysis

Detailed evaluations of each of the remedial alternatives for the waste zone are presented below. The evaluations are based on the nine criteria discussed in Section 6.3

6.4.1 Waste Zone Alternative A1, No-Action

Overall Protection of Human Health and the Environment
The no-action alternative serves as a baseline against which other remedial response alternatives can be evaluated. There would be no waste zone monitoring

or removal action under the no-action alternative and waste zone contaminants and materials would be left in place. Contaminants in the waste zone may pose a risk in excess of the target levels, if a waste zone exposure pathway for OU-2 site users were present.

Compliance with ARARs and TBC Criteria

The ARARs require at a minimum, maintenance of the soil cover cap and that action be undertaken where feasible. Therefore, the no-action alternative would not comply with the site ARARs and would not meet the OU-2 RAOs or RAGs.

Long-Term Effectiveness and Permanence

In the absence of the implementation of other waste zone response actions, the no-action alternative could potentially result in the exposure of on-site and off-site receptors to waste zone COPCs as a result of changed conditions such as differential settlement or erosion of the soil cover.

Reduction of Toxicity, Mobility or Volume

The effectiveness of the no-action alternative would be limited to waste zone COPC decomposition by natural processes.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of this alternative because no response action would be performed. In the short term, the landfill cap partially fulfills the RAGs by preventing contact with the waste zone and minimizing leachate generation, but this alternative does not mitigate the potential risks to site workers that may encroach upon the waste zone.

Ability to Implement

The ability to implement criterion is not applicable for the no-action alternative.

Cost

There are no removal or treatment costs associated with this alternative.

State Acceptance

The State is not likely to accept the no-action alternative because it does not comply with ARARs.

6.4.2 Waste Zone Alternative B1 & B2, Institutional Control - Land Use Covenants/Deed Restrictions and OM&M Plans

Overall Protection of Human Health and the Environment

The existing soil cover cap can effectively contain OU-2 COPCs in the waste zone with appropriate monitoring and maintenance. This remedial response alternative considers restricting sensitive land uses, consisting of residential, day care facilities, hospitals, hospices, and new schools, coupled with the implementation of OM&M plans for the existing cap with as-needed improvements if soil cover degradation is identified and where the existing cover does not meet minimum landfill cover requirements. Monitoring and maintenance of the existing soil cover cap would effectively prevent the exposure of potential receptors to COPCs directly related to OU-2 by ensuring the isolation of waste zone materials, by preventing the migration of gas-phase COPCs through the soil cover at concentrations that present an unacceptable health risk, and by minimizing the leaching of waste zone COPCs as a result of water infiltration. In addition, the OM&M plans would provide protection to on-site workers, site users, and ecologic receptors by determining the appropriate precautions required by OSHA prior to conducting excavation work.

Compliance with ARARs and TBC Criteria

In general, the existing soil cover cap exceeds 4 feet in thickness; the average thickness is 7 feet but ranges from 2 feet to 15 feet. This exceeds the 2 feet of soil cover that was required when the landfill was closed 1960. Localized restoration of the cap, when needed, will be addressed in the recommended OM&M plans that will be prepared for each property. Monitoring and maintenance of the soil cover cap meets the ARARs that govern post-closure landfills and meet the OU-2 RAOs and RAGs.

Long-Term Effectiveness and Permanence

Landfills by their nature present long-term human and environmental health risks and rely on natural decomposition of COPCs over time. Landfill caps that are adequately monitored for potential degradation and are repaired as needed, provide reliable, long-term protection to human health and the environment.

Reduction of Toxicity, Mobility or Volume

The effectiveness of land use covenants/deed restrictions and OM&M plans to reduce toxicity and volume, would be limited to the decomposition of waste zone

COPC by natural processes. An adequately monitored and maintained cap would immobilize the solid-phase waste zone COPCs, and limit the mobility, concentration, and migration rate of gas-phase and liquid-phase COPCs from the waste zone.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of this alternative because no removal action would be performed. In the short term, the landfill cap serves to partially accomplish the RAGs by preventing contact with the waste zone and by minimizing leachate generation. Upon implementation, which can be accomplished quickly, the OM&M plans would provide procedures to mitigate the potential risks to site workers that may encounter the waste zone when conducting excavations.

Ability to Implement

Land use covenants/deed restrictions can be readily implemented and are legally binding, recorded document that run with the property title. The technical and administrative implementation of OM&M plans for OU-2 is best achieved through the preparation of property-specific plans, prepared by each OU-2 property owner for their specific property use and maintenance requirements. Each property-specific soil cover monitoring and maintenance plan should, at a minimum, contain schedules for soil cover inspections, guidelines for responding to natural events that could degrade the soil cover (i.e., earthquakes, flooding), specifications for replacement soil when needed, guidelines for excavation work and soil spoils management, health and safety plans, and permit and notification requirements. Maintenance of the soil cover cap is easily implemented but may disrupt on-going recreational and business operations at OU-2 if significant maintenance is required, and appropriate low-permeable soil materials may be difficult to locate when needed. The necessary technical and health and safety expertise to construct these plans is readily available and elements of OM&M plans may have already been prepared by the various property owners and/or operators.

Cost

The costs to prepare and record land use covenants/deed restrictions and to create OM&M plans are lower than other response actions. The annual cost to implement such plans is dependent on infrastructure maintenance and improvement projects, and unanticipated natural alterations to the properties that

require a corrective action and is therefore, difficult to quantify. The costs to maintain the existing cap are cost effective as compared to other equally protective containment alternatives. Cost would be a function of the areal scale of the repair or improvement and would include temporary relocation of infrastructure, import of appropriate cover soils, soil compaction, site restoration, lost revenue, and loss of recreational enjoyment.

State Acceptance
In conjunction with other response actions, this alternative complies with applicable ARARs, RAOs, and RAGs.

6.5 Soil Remedial Alternatives Analysis

Detailed evaluations of each of the remedial alternatives for soil are presented below. The evaluations are based on the nine criteria discussed in Section 6.3. AECs for soil are locations 34, 236, and UB-8/22.

6.5.1 Soil Alternative D1, No-Action

Overall Protection of Human Health and the Environment
The no-action alternative serves as a baseline against which other response action alternatives can be evaluated. There would be no removal or response action under the no-action alternative and soil cover AECs would be left in place. COCs in the soil cover, specifically the AECs, may pose risks in excess of target levels, if an exposure pathway for OU-2 site users is present.

Compliance with ARARs and TBC Criteria
The ARARs require action to be undertaken where feasible; therefore, in light of the presence of feasible alternatives, the no-action alternative would not comply with the site ARARs and would not meet the OU-2 RAOs or RAG.

Long-Term Effectiveness and Permanence
In the absence of the implementation of other soil cover response alternatives, the no-action alternative could potentially result in the exposure of on-site and off-site receptors to unacceptable levels of COCs in OU-2 soil cover. Without soil monitoring and/or land use restrictions to limit the potential for exposure to soil COCs, the effectiveness of this alternative cannot be measured.

Reduction of Toxicity, Mobility or Volume

The effectiveness of the no-action alternative would be limited to decomposition of soil cover COCs by natural processes.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of this response alternative because no response action would be performed. The risks presented by COCs in soil would remain unmitigated.

Ability to Implement

The ability to implement criterion is not applicable for the no-action alternative.

Cost

There are no removal or treatment costs associated with this alternative.

State Acceptance

The no-action alternative does not address risks in excess of target levels posed by COCs in soil at AECs identified by the RI and the results of the HHRA and SLERA.

6.5.2 Soil Alternative E1 & E2, Land Use Covenants/Deed Restrictions and OM&M Plans

Overall Protection of Human Health and the Environment

This remedial response alternative considers restricting sensitive land uses consisting of residential, day care facilities, hospitals, hospices, and new schools,, coupled with the implementation of OM&M plans. Onsite workers can potentially be exposed to hazardous methane environments or unhealthful levels of VOCs while conducting subsurface excavations at depth. In general, the existing soil cover cap exceeds 4 feet in thickness; the average thickness is 7 feet but ranges from 2 feet to 15 feet. The recommended action-specific RAGs for exposure to landfill contaminants are to comply with OM&M plans that provide adequate protection to human health from dermal contact, ingestion, inhalation, and combustion or explosion due to the presence of methane for site workers, construction workers, and site users when subsurface work (excavation) is conducted below one foot of land surface at OU-2. Implementation of DTSC-approved OM&M plans would provide protection to workers, site users, and ecologic receptors by developing specifications, procedures and best management practices (BMPs) for conducting OU-2 excavations. The property-specific

OM&M plans would incorporate appropriate OSHA requirements for hazardous waste sites to mitigate exposure pathways and potential health risks for subsurface COCs in soil.

The existing soil cover cap, if inspected and maintained, can effectively contain OU-2 COPCs in the waste zone and COCs in soil at the identified AECs that would pose potential health risks if the exposure pathway were complete. Because there potentially are unidentified AECs, OM&M Plans that present operational and administrative controls for each of the properties are preferable to location-specific excavation restrictions that only address the previously identified AECs of COCs in soil (locations 34, 236, and UB-8/22).

Compliance with ARARs and TBC Criteria

Land use covenants/deed restrictions and OM&M plans comply with ARARs and meet the OU-2 RAOs and RAGs.

Long-Term Effectiveness and Permanence

Landfills by their nature present potential long term human and environmental health risks and rely on natural decomposition of COCs over time. Land use covenants/deed restrictions and OM&M plans are consistent with inherent potential long-term risks associated with landfills and are intended as a remedial action that provides reliable, long-term protection to human health and the environment.

Reduction of Toxicity, Mobility or Volume

The effectiveness of land use covenants/deed restrictions coupled with OM&M plans to reduce toxicity and volume would be limited to waste zone COPC decomposition by natural processes. Maintenance of the soil cover cap would immobilize the solid-phase COCs in soil and is consistent with the primary function of landfill caps which is the containment of waste zone COPCs.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of this alternative because no removal action would be performed. This alternative could be implemented quickly to partially comply with the RAG of mitigating the risks of COCs in soil.

Ability to Implement

Land use covenants/deed restrictions can be readily implemented and are a legally binding, recorded document that runs with the property title. The technical and administrative implementation of OM&M plans for OU-2 is best achieved through the preparation of property-specific plans, prepared by each OU-2 property owner for their specific property use and maintenance requirements. Each property-specific OM&M Plan should, at a minimum, contain schedules for soil cover inspections, guidelines for responding to natural events that could degrade the soil cover (i.e., earthquakes, flooding), specifications for replacement soil when needed, guidelines for excavation work and soil spoils management, health and safety plans, and permit and notification requirements. Each owner of OU-2 property will designate a contact, who will collect and submit the results of the monitoring programs specified by the property-specific OM&M plans, including descriptions of corrective actions taken, to be submitted in a common format. Monitoring and maintenance of the soil cover cap is easily implemented but may disrupt on-going recreational and business operations at OU-2 if significant maintenance is required, and appropriate low-permeable soil materials may be difficult to locate when needed. The necessary technical and health and safety expertise to construct these plans is readily available.

Cost

The costs to prepare and record land use covenants/deed restrictions and to create OM&M plans are lower compared to other remedial alternatives. The annual cost to implement such plans is dependent on infrastructure maintenance and improvement projects and unanticipated natural alterations to the properties that require a corrective action and is therefore, difficult to quantify. The costs to maintain the existing cap are cost effective as compared to other equally protective containment alternatives. Cost would be a function of the areal scale of the repair or improvement and include temporary relocation of obstructions, import of appropriate cover soils, soil compaction, site restoration, lost revenue, and loss of recreational enjoyment.

State Acceptance

In conjunction with other response actions, this alternative complies with applicable ARARs, RAOs, and RAGs.

6.5.3 Soil Alternative F1a & F1b, Soil AEC Isolation by Cover

Overall Protection of Human Health and the Environment

Isolation of the identified soil AECs is protective of human health and the environment by eliminating the direct exposure pathway. The methods of isolation considered under the FS were surface paving (response alternative F1a) and the addition of soil cover (response alternative F1b). The method selected would depend on location, site-use compatibility, and the presence of underground utilities. Implementation of this alternative would not affect other remedial alternatives selected to address potential health or hazards identified at OU-2.

Compliance with ARARs and TBC Criteria

Soil cover AEC isolation complies with ARARs for post-closure landfills and meets the OU-2 RAOs and RAGs.

Long-term Effectiveness and Permanence

Landfills by their nature present potential long-term human and environmental health risks and rely on natural decomposition of COCs over time. Isolation of AECs by pavement cover or soil cover is consistent with landfill objectives and provides reliable, long-term protection to human health and the environment, assuming that the isolation measures are adequately maintained. Changes in site-use that compromise or necessitate the removal of the isolating materials might require re-evaluation and implementation of an alternative response action.

Reduction of Toxicity, Mobility or Volume

There would be a reduction in mobility of COCs. Reduction of toxicity or volume of soil cover COCs would be limited to COC decomposition by natural processes.

Short-term Effectiveness

There would be no adverse effects on human health and the environment as a result of this alternative because no removal action would be performed. This alternative could be implemented quickly to partially comply with the RAG of mitigating the risks of COCs in soil.

Ability to Implement

The ability to implement the isolation of soil AECs as a remedial alternative and the selected isolation method is dependent on location, site-use, and the presence

of underground utilities. Isolation by paving (F1a) may be more appropriate where existing ground elevations need to be maintained to support property infrastructure such as buildings, vehicle parking, materials storage, and property access. Isolation by the addition of soil cover (F1b) may be more appropriate where existing topography or site-use can accommodate raised elevations; where landscaping variations are an important element of the current site-use, such as a golf course; or where access to underground utilities is required.

Cost

The cost of soil AEC isolation by surface pavement (F1a) is dependent on the areal extent and volume of paving materials and the temporary or permanent relocation of conflicting site features or infrastructure. For isolation by placement of addition of soil cover (F1b), the cost is dependent on the volume and transport distance of imported soil, site access, the temporary or permanent relocation of conflicting site features or infrastructure, and site restoration. A detailed cost estimate for each method of isolation is presented in RI Table 9.10.3-1, *Soil Isolation Costs for AECs*, and is summarized below in Table 6.4.3-1, *Soil AEC Isolation Cost Summary*. It is estimated that isolation by soil cover at location 34 would require 150 yds^3 of clean fill and cost approximately $60,000. Isolation by surface paving at location 236, covering an area of 25 square yards, would cost approximately $50,000. Isolation by soil cover at location UB-8/22 would require 3,000 yds^3 of clean fill and cost approximately $170,000. This alternative is more cost effective than equally protective alternatives such as soil excavation, removal, and disposal evaluated in Section 6.5.4.

Table 6.5.3-1
Soil AEC Isolation Cost Summary

Location	Isolation Method	Cost
34	Additional Soil Cover	~$60,000
236	Surface Paving	~$50,000
UB-8/22	Additional Soil Cover	~$170,000

State Acceptance

In conjunction with other response actions, this alternative complies with applicable ARARs, RAOs, and RAGs.

6.5.4 Soil Alternative G1a & G1b, Soil AEC Excavation and Disposal

Overall Protection of Human Health and the Environment

Excavation and off-site disposal of COC-affected soils (G1a) removes the source of contamination and is therefore an effective method of reducing the human health or ecologic risk for an intended site-use. This remedial response action is commonly utilized to achieve regulatory closure for unencumbered site-use, to remove an ongoing source of contamination that presents a threat to groundwater, or to eliminate the potential for direct exposure to contaminated soil or soil gas. For OU-2, removal of soil AECs would effectively mitigate the potential for exposure of on-site workers to unacceptable levels of soil COCs that were identified by the health risk assessment.

However, the partial removal of contaminated materials from one hazardous waste facility and disposal at a different hazardous waste facility is not encouraged, particularly when, as is the case at OU-2, the soil AECs do not pose an imminent threat to human health or the environment. In addition, excavation of hazardous materials would require mitigation of potential short-term ambient air health risks for COCs that volatize or are adhered to airborne dust particulates. A key consideration in the desirability and practicality of removal of soil AECs is the proximity of sensitive receptors at Victoria Regional Park, located immediately north of and partially within OU-2, and at the Towne Avenue Elementary School, located adjacent to OU-2 at the northwest corner of Avalon Boulevard and East 192nd Street.

Compliance with ARARs and TBC Criteria

Removal and off-site disposal (G1a) of contaminated soils that present a human or ecologic health risk generally complies with ARARs for most contaminated sites. For landfills, however, the partial removal of contaminated materials from one hazardous waste facility and disposal at a different hazardous waste facility is not encouraged, particularly when, as is the case at OU-2, the soil AECs do not pose an imminent threat to human health or the environment.

Long-Term Effectiveness and Permanence

Soil excavation and off-site disposal (G1a) is considered to be a reliable, effective and permanent solution for the mitigation of risks posed by the target COC-affected media for the area excavated. Soil excavation and on-site re-burial (G1b)

has long-term effectiveness but might not be permanent, without institutional or engineering controls.

Reduction of Toxicity, Mobility or Volume

Soil excavation and off-site disposal (G1a) reduces the volume, toxicity and mobility of COCs at the removal location. Off-site disposal without treatment, transfers the associated toxicity, volume and potential mobility to another facility. If the soil is reburied on-site without treatment (G1b), at depths where it would not be encountered in the future by site workers or construction workers, there is no overall reduction of toxicity or volume of COCs. The mobility of COCs in re-buried soil can be reduced by engineering controls such as liners and/or selection of burial locations that are lined by natural clay/silt barriers. Either on-site or off-site remedial treatment would result in the reduction of volume, toxicity or mobility of soil COCs at OU-2. The removal of soil AECs would have a negligible effect on the overall volume, mobility and toxicity of COCs remaining at OU-2 following the removal.

Short-Term Effectiveness

Excavation of contaminated materials potentially exposes those involved in the soil removal activities to short-term exposures to both solid-phase and gas-phase COCs. There is also an increased potential for exposure to COCs by site users and off-site receptors through airborne particulates and gas-phase VOCs, during excavation, soil stockpiling, soil load-out, and transport to an off-site facility in the event that on-site disposal cannot be accommodated. These increased health risks are expected to be small and can be controlled with engineering measures, worker training in the proper use of personal protective equipment (PPE), and air monitoring of the remediation activities.

During excavation, the primary health risk to the nearby community would be the inhalation of dust and organic vapor generated during the excavation, loading, and off-site transport of the contaminated soil. Equipment noise and offensive odors from excavated waste could cause community concerns. These potential health risks and nuisances could be substantially eliminated by implementation of dust and odor suppression measures, which would include wetting of surface soil, covering exposed soil with foam and plastic sheeting during periods of inactivity, and cessation of excavation activities during periods of significant wind activity. Load-out of trucks on a loading bay or clean asphalt pad would minimize the amount of soil being tracked off-site by truck tires. To reduce community

exposure to the soil being hauled from OU-2, the beds of the trucks could be covered, and truck routes could be established to minimize travel through residential areas. These measures would provide sufficient protection to the surrounding community during implementation of this remedial alternative.

Ability to Implement

The ability to implement a remedial excavation alternative is location-specific and depends on the areal extent, volume, and depth of the COC-affected soils and compatibility with current site-use and infrastructure. The recreational and commercial site-uses could be significantly interrupted. In addition, the presence of site infrastructure and major utilities, such as the 42-inch water main installed along the property boundary with the Dominguez Channel, would raise safety concerns and complicate the removal activities at UB-8/22.

Cost

The cost of an excavation response alternative is dependent on the areal extent, volume, depth, and location of the COC-affected soils and compatibility with current site-use and infrastructure. In addition, loss of revenue would be incurred by the business owners at OU-2. A detailed cost estimate for each method of isolation is presented in RI Table 9.10.4-1, *Soil Excavation and Disposal Costs for AECs*, and is summarized below in Table 6.5.4-1, *Soil AEC Excavation and Disposal Cost Summary*. The estimated costs for excavation and disposal of 100 yds^3 of soil at location 34, 10 yds^3 of soil at location 236, and 10,000 yds^3 at location UB-8/22 are approximately $60,000, $60,000, and $830,000, respectively. This alternative is not as cost effective as the less expensive but equally protective soil AEC isolation alternative evaluated in Section 6.5.3

Table 6.5.4-1
Soil AEC Excavation and Disposal Cost Summary

Location	Cost
34	$60,000
236	$60,000
UB-8/22	$830,000

State Acceptance

In conjunction with other response actions, this alternative complies with applicable ARARs, RAOs, and RAGs.

6.6 Landfill Gas Remedial Alternatives Analysis

Detailed evaluations of each of the remedial alternatives for landfill gas are presented below. The evaluations are based on the nine criteria discussed in Section 6.3

6.6.1 Landfill Gas Alternative L1, No-Action

Overall Protection of Human Health and the Environment

The no-action alternative serves as a baseline against which other response action alternatives can be evaluated. There would be no LFG monitoring or removal action under the no-action alternative and LFG levels would be left in place. Without monitoring, the hazards associated with methane accumulation cannot be evaluated and this alternative may not be protective of human health. In addition, the results of the RI suggest that new methane point-sources that require mitigation may occur in the future (the RI–identified point-sources were mitigated in 2012).

Compliance with ARARs and TBC Criteria

This alternative does not comply with the ARARs and does not meet the OU-2 RAOs or RAGs.

Long-Term Effectiveness and Permanence

In the absence of the implementation of other LFG response alternatives, the no-action alternative could potentially result in the exposure of site users, ecologic receptors, and off-site occupants of enclosed-space structures to toxic/hazardous levels of LFG.

Reduction of Toxicity, Mobility or Volume

The effectiveness of the no-action alternative would be limited to natural decomposition of organic materials in OU-2 waste cells with gradual depressurization and attenuation of LFG.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of the implementation of this alternative because no response action would be performed. However, in the absence of regular landfill surface monitoring and maintenance, a no-action alternative does not identify changes in site conditions that may require mitigation, does not mitigate the risks to site workers that could

be exposed to LFG when conducting excavations in the soil cover, and does not mitigate the methane hazards for some point-sources.

Ability to Implement

The ability to implement criterion is not applicable for the no-action alternative.

Cost

There are no removal or treatment costs associated with this alternative.

State Acceptance

The no-action alternative does not comply with ARARs that require methane monitoring of post-closure landfills, and does not comply with the OU-2 RAOs or RAGs because the concentrations of methane detected in enclosed-space infrastructure utility boxes may reoccur and present potential methane hazards.

6.6.2 Landfill Gas Alternative M1 & M2, Land Use Covenants/Deed Restrictions and OM&M Plans

Overall Protection of Human Health and the Environment

This remedial response alternative considers restricting sensitive land uses consisting of residential, day care facilities, hospitals, hospices, and new schools, and implementing OM&M plans to ensure continued monitoring and mitigation of gas-phase COPCs potentially migrating through the soil cover by maintaining, or improving as needed, the integrity of the soil cover cap through adequate soil cover thickness, low permeable soils, and soil cover compaction. Implementation of DTSC-approved OM&M plans would also provide protection to workers, site users, and ecologic receptors by developing specifications, procedures and BMPs for conducting OU-2 excavations. The property-specific OM&M plans would incorporate appropriate OSHA requirements for hazardous waste sites to mitigate exposure pathways and potential health risks for subsurface methane and gas-phase COCs in soil.

Compliance with ARARs and TBC Criteria

Land use covenants/deed restrictions and OM&M plans comply with ARARs and meet the OU-2 RAOs and RAGs.

Long-Term Effectiveness and Permanence

Landfills by their nature present long term human and environmental health risks and rely on natural decomposition of COCs over time. Land use covenants/deed restrictions and OM&M plans are consistent with managing the inherent long-term risks associated with landfills and are intended as a remedial action that provides reliable, long-term protection to human health and the environment.

Reduction of Toxicity, Mobility or Volume

The effectiveness of this alternative would be limited to natural decomposition of organic materials in OU-2 waste cells with gradual depressurization and attenuation of LFG. The OM&M plans would include monitoring and maintenance of the landfill cap which would minimize the migration of methane and gas-phase COCs from the waste zone into ambient air.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of the implementation of this alternative because no removal action would be performed. In the short term, the RAGs are partially achieved because exposure to unacceptable levels of COCs in ambient air can be mitigated by the monitoring and maintenance of the soil cover cap and monitoring the landfill perimeter, on-site building perimeter, and the indoor air of on-site structures with implementation of corrective measures if warranted. OM&M plans would also establish operational practices and procedures to mitigate the potential risks to site workers that may encounter the waste zone when conducting excavations and would provide mitigation procedures for potential methane point-sources, such as the enclosed-space ICVBs identified by the RI.

Ability to Implement

Land use covenants/deed restrictions can be readily implemented and are a legally binding, recorded document that runs with the property title. The technical and administrative implementation of OM&M plans for OU-2 is best achieved through the preparation of property-specific plans, prepared by each OU-2 property owner for their specific property use and maintenance requirements. Each property-specific OM&M plan should, at a minimum, contain schedules for soil cover inspections, guidelines for responding to natural events that could degrade the soil cover (i.e., earthquakes, flooding), specifications for replacement soil when needed, guidelines for excavation work and soil spoils management, health and safety plans, and permit and notification requirements. Monitoring and

maintenance of the soil cover cap is easily implemented but may disrupt on-going recreational and business operations at OU-2 if significant maintenance is required, and appropriate low-permeable soil materials may be difficult to locate when needed. The necessary technical and health and safety expertise to construct these plans is readily available.

Cost

The costs to prepare and record land use covenants/deed restrictions and to create OM&M plans are lower than other remedial alternatives. The annual cost to implement such plans is dependent on infrastructure maintenance and improvement projects, and unanticipated natural alterations to the properties that require a corrective action and is therefore, difficult to quantify. The costs to maintain the existing cap are cost-effective compared to other protective containment alternatives. Cost would be a function of the areal scale of the repair or improvement and include temporary relocation of obstructions, import of appropriate cover soils, soil compaction, site restoration, lost revenue, and loss of recreational enjoyment.

State Acceptance

In conjunction with other response actions, this alternative complies with applicable ARARs, RAOs, and RAGs.

6.6.3 Landfill Gas Alternative N1, OU-2 Perimeter and Soil Cover Methane Monitoring

Overall Protection of Human Health and the Environment

Landfill perimeter and building perimeter monitoring for methane is protective of on-site and off-site structures with respect to potential subsurface LFG migration and indoor air intrusion into enclosed-space structures through cracks or seams in on-grade slabs. When concentrations of methane exceeding the LEL are detected in perimeter soil gas monitoring wells, the implementation of LFG control measures is generally required. It was determined by the RI and subsequent indoor air health risk evaluations that, based on current site conditions, unacceptable human health risks are not posed by the off-site lateral migration of methane or VOCs. Implementation of the landfill perimeter methane monitoring alternative would not affect the use of other response alternatives at OU-2.

Compliance with ARARs and TBC Criteria

Monitoring of methane gas in onsite buildings and at the perimeter of a closed landfill is a requirement for post-closure landfills and meets the OU-2 RAOs and RAGs and complies with ARARs.

Long-Term Effectiveness and Permanence

Landfills by their nature present long-term methane risks as a result of the decomposition of organic materials in the waste zone. Monitoring of subsurface methane is a remedial action that provides reliable, long-term protection against potential off-site lateral migration of methane through permeable subsurface materials. Building perimeter and landfill perimeter monitoring for LFG is not a removal action and the risks, in the absence of additional response measures, are anticipated to either remain unchanged, increase in the event of increasing methane generation, or decline at a rate that approximates the natural degradation processes. OU-2 perimeter LFG monitoring is generally accepted as a reliable and effective method of site control, and the results over time, can be used as a basis to support additional or enhanced response actions, or a reduction of response actions.

Reduction of Toxicity, Mobility or Volume

The effectiveness of this alternative would be limited to natural decomposition of organic materials in OU-2 waste cells with gradual depressurization and attenuation of LFG.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of this alternative because no removal action would be performed. In the short term, the RAGs are partially achieved because exposure to unacceptable levels of COCs in ambient air can be prevented through monitoring and maintenance of the soil cover cap, where the landfill perimeter monitoring wells indicate that the surrounding off-site structures are not currently at risk, and building perimeter well monitoring and indoor methane monitoring indicate that the on-site structures are not currently at risk for methane hazards. This alternative does not however, mitigate the risks to site workers that could be exposed to LFG when conducting excavations in the soil cover and exposure to potential methane hazards associated with enclosed-space, below-ground on-site features (such as the ICVBs that were mitigated in 2012) in the absence of a monitoring and mitigation program.

Ability to Implement

The use of perimeter methane monitoring is readily implemented using the existing network of both pre-existing and RI-installed soil gas wells. Methane detection equipment is readily available and routine monitoring is anticipated to be continued. Perimeter methane monitoring can be conducted concurrently with additional LFG response actions if needed at some point in the future.

Cost

The annual cost for the monitoring of the building and landfill perimeter methane monitoring well/probes are cost effective as compared to other equally protective response action alternatives and relies on the use of field meters designed to detect methane. Additional costs include the maintenance and occasional replacement of soil gas wells/probes that are damaged or become flooded over time. The annual cost for the landfill and building perimeter methane monitoring program, assuming continuance of the quarterly monitoring protocol and stable or declining concentrations of methane, is estimated to be approximately $60,000, including potential soil gas well replacement over time.

State Acceptance

Landfill perimeter methane monitoring as a response action is a general requirement at post-closure landfills. Landfill perimeter monitoring is a remedial action that provides reliable, long-term protection against potential off-site lateral migration of methane through permeable subsurface materials. Building perimeter monitoring establishes if methane concentrations remain at levels that do not pose a health and safety risk to building occupants.

6.6.4 Landfill Gas Alternative N2, Local Area Methane Control

Overall Protection of Human Health and the Environment

The installation of local area methane extraction systems at the Victoria Golf Course clubhouse and residences adjacent to OU-2 at Victoria Regional Park would extract incremental levels of methane from the subsurface that could otherwise migrate beneath on-site and off-site structures. The accumulation of methane beneath buildings could pose a potential hazard if methane were to enter the overlying enclosed-space structures through the foundations of slab-on-grade type construction in concentrations that present a fire or explosion hazard. It is important to note that the RI evaluated this potential hazard and determined that

the conditions necessary for methane intrusion into indoor air at the residences adjacent to Victoria Regional Park and the OU-2 on-site buildings do not exist as discussed in greater detail below.

The maximum concentration of methane detected in soil gas probes and wells adjacent to the residential houses have not exceeded 13,000 ppmv (soil gas probe SV-123) which is far below the LEL of 50,000 ppmv for methane, thus establishing that explosive levels of methane are not migrating off-site and therefore no off-site methane hazard exists. Additionally, methane has never been detected at any concentration in the indoor air space of the enclosed-space structures at OU-2 and thus, these structures comply with the regulatory in-door air action level of 12,500 ppmv for methane. Sub-slab, polyethylene-sheeting, methane barriers were installed beneath the Victoria Golf Course club house and related buildings when originally constructed in 1966. Passive methane mitigation venting systems were installed at the Goodyear maintenance building constructed in 1979, the Goodyear administration/sales office which was reconstructed in 2008, and at the Victoria Cricket Fields concession shop/storage/restroom building and golf cart storage and wash bay building additions at Victoria Golf Course constructed in 2001. Each of these passive venting systems include a sub-slab methane barrier consisting of 6 mil (six thousandths of an inch), or thicker, polyethylene sheeting, horizontal perforated piping installed below the methane barrier to collect methane and, vertical risers that are connected to the horizontal perforated piping to transfer any methane accumulated below the sub-slab methane barrier to the atmosphere. All of the passive venting systems were constructed in accordance with building and safety code-approved designs and are effectively mitigating potential methane intrusion into these structures.

For site workers and site users at the Victoria Golf Course clubhouse, implementation of a local area methane control system(s) would be a redundant mitigation measure. For residents adjacent to OU-2 at Victoria Regional Park, where no hazardous levels of methane exists, there would be little additional safety value, based on current monitoring data.

Compliance with ARARs and TBC Criteria

This criterion is intended to evaluate how each alternative complies with Federal and State ARARs and TBC criteria identified for OU-2. CERCLA guidance documents establish that the evaluation of remedial alternatives by this criterion relies on the recommended cleanup goals (RAGs) which are presented in FS

Section 9.4. LFG conditions at OU-2 currently meet the RAGs for off-site methane migration, on-site indoor air intrusion, and landfill surface emissions. Previously identified landfill surface emissions exceeding 200 ppmv have been mitigated. Thus, the implementation of a methane extraction system(s) is not warranted at this time, based on current monitoring data.

Long-Term Effectiveness and Permanence

Landfills by their nature present long-term methane risks as a result of the decomposition of organic materials in the waste zone. The installation of a local area methane extraction system is a remedial action that provides long-term, incremental, additional protection for the intrusion of methane into enclosed-space features.

Implementation of local area methane control systems require the collection and thermal destruction of LFG using enclosed flare units that could create other health risks or hazards at OU-2 if the methane extraction systems are not designed, monitored, and implemented properly. A passive collection system would not recover sufficient methane to sustain a methane flare destruction unit.

A more costly active remediation system using positive pressure blowers might be required to achieve an appropriate radius of influence for the local area methane control system. However, active methane extraction systems that operate under positive pressure can result in the flow of oxygen through the soil cover as a result of the vacuum used to induce the flow of LFG into the treatment system. Introduction of oxygen into the waste zone has been known to cause subsurface landfill fires that can be difficult to extinguish.

Additionally, LFG typically contains a small percentage of VOCs that could be released to ambient air if not completely combusted by the flare unit. Hazardous byproducts are generated if activated carbon is not used to strip VOCs from the LFG, prior to combustion. Spent carbon, laden with VOCs, must be properly disposed or transported to a carbon regeneration facility.

Long-Term Air Quality Considerations

Local area methane control systems are implemented as a long-term remedy because landfills continue to generate methane over long periods of time, although at reducing concentrations as the organic materials deposited in the landfill continue to decompose. Here, the landfill has been closed for 53 years.

and the period of peak methane generation has likely passed, based on typical landfill gas-generation behavior, and based on existing soil vapor probe data from OU-2.

Because the concentration of extracted methane will likely be too low to sustain combustion without the addition of combustible fuel, this alternative will likely result in the long-term emission of greenhouse gasses primarily by the burning of commercial natural gas. It is anticipated that the fuel mixture will likely consist of more than 90 percent natural gas after the initial LFG pressures are depleted shortly after startup of the methane extraction system(s).

Reduction of Toxicity, Mobility or Volume

Local area methane extraction systems, as conceptually designed, will only reduce the concentration and volume of methane and VOCs within the localized area of influence of the extraction system, and will likely have little effect on the overall reduction of potential methane hazards, mobility or volume. Based on current monitoring data, the concentration of methane extracted at localized areas will not likely be sustainable due to anticipated rapid depletion of methane within the area of influence of the extraction system.

Short-Term Effectiveness

A local area methane extraction system would potentially expose workers involved in system installations to explosive levels of methane and potentially hazardous NMOCs. There is also an increased potential for short-term exposure to gas-phase VOCs by site users and by off-site receptors to airborne particulates during the installation of methane extraction wells, trenching for methane collection pipelines, stockpiling of excavated soil, and soil reuse activities. These increased health risks are expected to be small and can be controlled with administrative and engineering controls such as the creation of exclusion zones during installation, air monitoring, worker training, and proper use of PPE. The effectiveness of this measure to mitigate potential methane hazards in enclosed-space, on-site features would shortly follow start-up of the extraction system. However, based on current monitoring data, system efficiency will likely be low due to unsustainability of sufficient methane concentrations to operate the system without the addition of combustible fuel as natural gas. Adverse short-term impacts to the environment fare the same as the long-term adverse impacts to the environment (above).

Ability to Implement

A local area methane extraction system would employ vertical LFG extraction wells installed within the waste zone, or at strategically placed locations between the waste zone and the structures that the treatment system is intended to protect. Below ground headers would covey the LFG under a low positive pressure (vacuum) to a treatment compound with an enclosed flare thermal oxidizer. Extraction wells would be anticipated to be spaced 50 feet apart based on a relatively low 25-foot radius of influence. System design, permitting and building approvals could reasonably be expected to require a six-month time frame. Field installation could be accomplished within 90 days, depending on the utility tie-in locations for power and make-up natural gas. Materials needed for construction of the extraction system include a blower(s) and flare unit(s) which will likely need to be fabricated for the system design specifications. Installation, monitoring and maintenance would need to utilize personnel with relevant experience and training in methane remediation systems.

Cost

The cost for a single localized system including the design, installation, and maintenance of a methane extraction system is presented in RI Table 9.11.4-1, *Local Area Methane Control System Costs*, and are summarized below in Table 6.6.4-1, *Single, Localized Methane Control System Cost Summary*. Even for a single localized system, the costs would be significant and consist of $407,000 in construction costs and approximately $89,000 in OM&M and reporting costs. Assuming a 30-year life of project, OM&M costs would be expected to be approximately $2,670,000. NPV for 30 years OM&M and reporting, assuming a 5% interest rate, would be $1,369,000, but with 3% annual inflation, would be approximately $1,994,000. If systems were employed at both the Victoria Golf Course club house and residences adjacent to OU-2 at Victoria Regional Park, the cost presented in the table below would be double what is presented below. The implementation of this alternative is not cost effective as compared to other protective response alternatives.

Table 6.6.4-1 Single, Localized Methane Control System Cost Summary	
Description of Expenditure	**Approximate Estimated Cost**
Capital costs	$407,000
Annual OM&M & Reporting costs	$89,000
Projected 30 years OM&M costs	$2,670,000
Projected 30 years OM&M costs, (NPV @5%)	$1,369,000
Projected 30 years OM&M costs, (NPV @5%, annual inflation @3%)	$1,994,000

State Acceptance

Installation of a methane extraction system(s), while a generally accepted response action, is currently not warranted based on current monitoring data.

6.6.5 Landfill Gas Alternative O1, Indoor Air Methane Alarms

Overall Protection of Human Health and the Environment

The installation of indoor air methane alarms is protective of people that use the enclosed-space buildings in the event of elevated levels of methane in the buildings that presents a fire or explosion hazard. Although methane has been detected in some soil gas wells and probes installed around the Victoria Golf Course club house and related buildings and from vent risers from a sub-slab, passive, methane venting system at the golf cart storage building at Victoria Golf Course, methane has never been detected in on-site buildings. The installation of alarms would provide 24-hour monitoring in the event of methane breakthrough of the sub-slab barriers that were installed during construction of most enclosed-space buildings at OU-2.

Compliance with ARARs and TBC Criteria

The installation of indoor air methane alarms complies with ARARs for post-closure landfills and meets the OU-2 RAOs, and RAGs.

Long-Term Effectiveness and Permanence

Landfills by their nature present long-term methane hazards as a result of the decomposition of organic materials in the waste zone. The installation of indoor air methane alarms is a remedial action that provides reliable, long-term protection of humans in the event of intrusion of methane into enclosed-space

structures. The installation of methane alarms is not a removal action and the hazards remaining, in the absence of additional response measures, are anticipated to either remain unchanged, increase in the event of increasing methane generation, or decline at a rate that approximates the natural degradation processes. The monitoring results over time can be used as a basis to support additional or enhanced response actions or a reduction of response actions. Based on historical methane monitoring data for soil gas wells installed adjacent to the Victoria Golf Course clubhouse and related buildings, methane concentrations are anticipated to continue to decline as can be seen in the methane trend charts included in RI Appendix S, *Trend Analysis Summary - Methane Monitoring Results for Selected Wells*.

Reduction of Toxicity, Mobility or Volume

The effectiveness of this alternative would be limited to natural decomposition of organic materials in OU-2 waste cells with gradual depressurization and attenuation of LFG.

Short-Term Effectiveness

There would be no adverse effects on human health and the environment as a result of this alternative because no removal action would be performed. In the short term, the RAGs are partially accomplished because exposure to unacceptable levels of COCs in ambient air is currently mitigated by the landfill soil cap and the perimeter monitoring wells indicate that the surrounding area is not at risk for methane hazards.

Ability to Implement

The installation of indoor air methane alarms is technically feasible, the required equipment is readily available, and can be easily installed. The technical expertise required to install and maintain indoor methane alarms is also readily available. On-site personnel can be trained to perform routine system checks prior to entering enclosed-space structures and to implement appropriate safety procedures in response to the sounding of an alarm.

Cost

The costs for the installation and maintenance of methane alarms are presented in RI Table 9.11.5-1, *Methane Alarms with Remote Alarm Panel Costs*, and are summarized below in Table 6.6.5-1, *Indoor Air Methane Alarms Cost Summary*. The costs are anticipated to include $70,000 in capital costs and approximately

$7,000 in annual maintenance and reporting costs. Assuming a 50-year Life of Project, monitoring and OM&M costs would be expected to be approximately $350,000. NPV for 50 years monitoring, assuming a 5% interest rate, would be $128,000, but with 3% annual inflation, would be approximately $220,000. The installation of indoor air methane alarms is more cost effective than other more expensive protective response alternatives.

Table 6.6.5-1
Indoor Air Methane Alarms Cost Summary

Description of Expenditure	Approximate Estimated Cost
Capital costs	$70,000
Annual OM&M & Reporting costs	$7,000
Projected 50 years OM&M costs	$350,000
Projected 50 years OM&M costs, (NPV @5%)	$128,000
Projected 50 years OM&M costs, (NPV @5%, annual inflation @3%)	$220,000

State Acceptance

Installing methane alarms for the protection of occupants in enclosed-space structures as a partial response action is protective of public health and safety. In conjunction with other response actions, this alternative complies with applicable ARARs, RAOs, and RAGs.

6.6.6 Landfill Gas Alternative O2, Preferential Methane Migration Pathway Barriers

Overall Protection of Human Health and the Environment

The RAGs for TOC (methane and VOCs) emissions above the landfill surface are monitoring and maintenance of the existing landfill cap, mitigation of surface emissions exceeding 200 ppmv TOC, and mitigation of methane concentrations exceeding 1.25% v/v in below ground enclosed-space features. The installation of methane migration barriers or similar mitigation measures would provide protection to site workers and site-users, by preventing the migration of methane along permeable trench backfill materials and animal burrows, and/or preventing the accumulation of hazardous concentrations of methane in ICVBs that are installed above the water lines that they control. Implementation of this alternative

would not affect other health risks or hazards identified at OU-2. Presently, all known subsurface accumulations of TOC have been mitigated.

Compliance with ARARs and TBC Criteria

The 2007 RI instantaneous surface sampling for emission of TOC (methane and VOCs), was conducted in accordance with methods described in AQMD Rule 1150.1. TOC emissions were not detected when measured at a distance of 3 inches or less above the soil cover surface on 25-foot centered walking transects using four-gas meters and PID field instruments to survey the entire landfill area encompassed by OU-2. Sampling of all potential subsurface features that could act as either collection points or vents for LFG identified the now-mitigated below ground features where methane concentrations exceeded 1.25% v/v. Installation of preferential methane pathway barriers or similar mitigation measures for these point-source utility features complies with ARARs and TBCs for post-closure landfills and meets the OU-2 RAOs and RAGs. Implementation of this alternative would also address other potential landfill surface emissions of methane that are unrelated to utility trenches such as squirrel burrows.

Long-Term Effectiveness and Permanence

Landfills by their nature present potential long-term methane hazards as a result of the decomposition of organic materials in the waste zone. The installation of preferential pathway barriers or similar mitigation measures is a remedial action that provides reliable, long-term protection for the intrusion of methane into enclosed-space features. The installation of below ground methane barriers is not a removal action and the risks remaining, in the absence of additional methane response measures, are anticipated to either remain unchanged, increase in the event of increasing methane generation, or decline at a rate that approximates the natural degradation processes.

Reduction of Toxicity, Mobility or Volume

There would be no reduction of OU-2 methane volume or concentrations as a result of installing utility trench methane barriers or similar mitigation measures as a remedial response action. The methane migration, or mobility, in the affected preferential pathway would be blocked by the permeability barrier.

Short-Term Effectiveness

Excavation and/or placement of impermeable materials around existing utilities or within ICVBs where methane was detected at concentrations exceeding 1.25%

v/v would potentially expose workers involved in the barrier installations to explosive levels of methane and potentially hazardous NMOCs. There is also an increased potential for short-term exposure to gas-phase VOCs by site users and by off-site receptors to airborne particulates during excavation, soil stockpiling, and soil reuse. These increased potential health risks are expected to be small and can be controlled with engineering measures, air monitoring, worker training, and proper use of PPE. This measure would be immediately effective upon implementation for the mitigation of methane hazards in enclosed-space, on-site features.

Ability to Implement

The installation of below-ground methane barriers or similar mitigation measures is technically feasible and has already been accomplished on-site in areas where TOCs (methane and VOCs) have exceeded regulatory emission levels, primarily shallow, small-diameter, irrigation control valve boxes (ICVBs). Each utility trench barrier where excavation is required is anticipated to require less than one day for installation. Materials needed for backfill are bentonite and bentonite/sand mixtures. On-site personnel can be trained to perform these installations with air monitoring by qualified field technicians.

Cost

The cost is expected to be minimal, primarily consisting of the cost of labor to mitigate the accumulation of landfill gas in the shallow, small-diameter, ICVBs. The installation of methane migration barriers or similar mitigation measures is a more cost effective alternative compared to other more expensive but equally protective response alternatives.

State Acceptance

Installing below-ground utility trench preferential pathway barriers or similar mitigation measures for the protection of enclosed-space infrastructure features meets the OU-2 RAOs and RAGs.

6.7 Comparative Analysis of Response Action Alternatives

A comparative evaluation of the relative advantages and disadvantages of the media-specific remedial alternatives for the human and ecologic health risks identified at OU-2, relative to criteria evaluated in Sections 6.3 through 6.6, is presented in RI Table 9.12-1, *Comparative Analysis of Response Action Alternatives for OU-2*. Except for the no-action

and local area methane extraction alternatives, all of the waste zone, soil and LFG remedial alternatives presented in RI Table 9.12-1 were retained for implementation consideration with other alternatives or for cost comparison to equally protective response actions.

6.8 Recommended Remedial Alternatives

Combinations of alternatives are recommended as remedial response actions for each of the affected environmental media: two alternatives for the waste zone, four alternatives for soil and five alternatives for LFG. The recommended alternatives are based on the detailed analyses and comparative analyses of the remedial responses evaluated for OU-2. No additional investigations or feasibility studies are recommended for waste zone, soil and LFG media prior to the completion of the RAP.

6.8.1 Recommendations for Waste Zone

The OU-2 waste zone RAOs are to prevent direct contact with OU-2 landfill contents and minimize the potential for future contaminant loading to groundwater. The recommended RAGs to achieve the RAOs for the waste zone are to prevent contact or to mitigate the potential risks of contact with the waste zone and to minimize the volume of leachate. The recommended remedial alternatives to achieve the stated objectives are:

- Implement land use covenants/deed restrictions for OU-2 that restrict sensitive land uses, consisting of residential, day care facilities, hospitals, hospices, and new schools.

- Implement property-specific OM&M plans that provide methods and procedures to conduct regular, periodic inspections and maintenance of the existing soil cover cap to meet the above RAOs and RAGs with a focus on areas that are known or determined to have soil cover less than 3 feet thick, manage excavations in accordance with OSHA standards, and utilize BMPs to minimize the percolation of water into the waste zone, thereby minimizing the leaching of waste zone COPCs into groundwater.

6.8.2 Recommendations for Soil

The OU-2 RAOs for soil are to prevent direct contact, inhalation, and ingestion of contaminated OU-2 soil exceeding the risk-based goals for the COCs identified.

The recommended RAGs for the soil COCs are: arsenic, 10.18 mg/kg; antimony, 108 mg/kg; lead, 80 mg/kg for recreational exposure areas and 320 mg/kg for commercial/industrial exposure areas; and PCBs Aroclor 1248 and 1254, 1.7 mg/kg. There are four recommended remedial alternatives to achieve the stated objectives:

- Implement land use covenants/deed restrictions that restrict sensitive land uses, consisting of residential, day care facilities, hospitals, hospices, and new schools.

- Implement property-specific OM&M plans that provide methods and procedures to conduct regular, periodic inspections and maintenance of the existing soil cover cap to meet the above RAOs and RAGs with a focus on areas that are known or determined to have soil cover less than 3 feet thick, and manage excavations in accordance with OSHA standards.

- Isolate soil AEC location 236 through concrete surface paving.

- Implement location-specific institutional controls for soil AEC locations 34, 236 and UB-8/22 (located outside of the landfilled area) in the applicable OM&M plans.

6.8.3 Recommendations for Landfill Gas

The OU-2 RAOs for LFG are to provide adequate protection to human health from inhalation, combustion, or explosion of LFG from OU-2. The recommended RAGs for LFG are to monitor, inspect, and maintain the effectiveness of the existing landfill cap; to provide adequate protection of human health from inhalation, combustion, or explosion of LFG for site workers and site users when sub-surface work (excavation) is conducted; to prevent concentrations of methane that exceed the LEL of 5% v/v (50,000 ppmv) in landfill perimeter compliance wells, to prevent the accumulation of methane concentrations in enclosed-space, on-site structures exceeding 1.25% v/v (12,500 ppmv), and prevent emissions exceeding 200 ppmv TOC to ambient air above the landfill surface. There are six recommended remedial alternatives to achieve the stated objectives:

- Implement property-specific OM&M plans that: provide methods and procedures to monitor, inspect, and maintain the existing soil cover cap to meet the above RAOs and RAGs with a focus on areas that are known or

determined to have soil cover less than 3 feet thick, including regular surface inspection for soil cover breaches and monitoring per AQMD Rule 1150.1; minimize the migration of LFG COPCs through the soil cover to concentrations that pose an acceptable human and ecologic health risk; and manage/monitor excavations in accordance with OSHA standards.

- Conduct methane monitoring of the OU-2 perimeter along Avalon Boulevard E. 192nd Street and South Main Street per AQMD Rule 1150.1, utilizing selected Project 301 and RI-installed soil gas wells as compliance points that, from east to west, include: MP-2, SV-1, MP-3, SV-2, MP-4, SV-3, MP-5, SV-10, IV-9C, IV-9B, IV-8C, IV-8B, IV-7A, VP-4, IV-34A, VP-5, SV-4, SV-5, IV-35, SV-6, SV-7, SV-8 and SV-9. Wells IV-8B and IV-8C were installed in January 2009, to replace well IV-8A. The identified soil gas wells, shown on RI Figure 9.13.3, *Landfill Perimeter, Building Perimeter and Passive Methane System Monitoring Locations*, may change over time due to damage, monitoring needs, and/or AQMD requirements. Perimeter methane monitoring will not be conducted along Del Amo Blvd because there is no off-site, subsurface, methane pathway due to the presence of the clay-filled paleo-channel to a depth of 20 feet sub-sea along this boundary.

- Install and monitor a dual-nested, replacement soil gas/landfill gas compliance well, outside of the waste zone, between SV-11 and the residence at 18963 Milmore Avenue.

- Conduct methane monitoring of vent risers and building perimeter well/probes VGC-1A, VGC-2A, VGC-3A, SV-104 and SV-105 at Victoria Golf Course, sub-slab methane mitigation system probes and vent risers at the Goodyear Airship Flight Operations Center, and methane mitigation system vent risers at Victoria Cricket Fields.

- Install methane alarms in all enclosed-space, slab-on-grade OU-2 buildings including the Victoria Golf Course clubhouse, meeting room, restaurant, and maintenance building, the Victoria Cricket Fields concession building, and the maintenance building, administration/sales office and small administrative office at the Goodyear Airship Flight Operations Center.

- Conduct methane mitigation actions, such as methane barriers, at subsurface point source locations including, but not limited to, irrigation control valve boxes if methane accumulations exceed 1.25% in air.

6.9 Overall Remedy

The recommended overall remedy for the human and ecologic health risks identified by the RI, HHRA, and SLERA for soil including the waste zone soil matrix, and soil gas including landfill gas (LFG) environmental media and identified OU-2 COCs, consists of the implementation of four programs that are designed to contain hazardous chemicals in place:

1) Land Use Covenants/Deed Restrictions (*Covenants to Restrict Use of Property – Environmental Restrictions*) are recommended for each of the properties that comprise OU-2 to provide protection of human health and the environment from contaminated media because hazardous substances will remain at OU-2 at levels that are not suitable for unrestricted use of the land and shall:

    - Prohibit construction for sensitive land uses, consisting of residential, day care facilities, hospitals, hospices, and new schools.
    - Require compliance with operations, monitoring and maintenance (OM&M) plans.
    - Require evaluation and consideration of potential health risks and potential fire/explosion hazards posed by landfill gas at the site, including the possible need for mitigation measures, with respect to construction of new buildings, or any intrusive land activities that may compromise the soil cap.

2) Property-Specific OM&M Plans

    - Prepare property-specific OM&M Plans that at a minimum contain best BMP specifications and/or schedules for: soil cover inspection and maintenance with a focus on areas that are known or determined to have soil cover less than 3 feet thick; emergency response procedures for natural events that could degrade the soil cover (i.e., earthquakes, flooding); maintaining soil cover thickness and establishing physical properties of imported soil; providing for surface drainage to prevent soil erosion, and to eliminate standing water that could percolate into the waste zone; establishing soil and LFG sampling requirements to support excavation work; establishing acceptable guidance for landscape irrigation; identifying permitting and notification requirements for managing excavations in accordance with Occupational Safety and Health Act (OSHA) standards; conducting regular surface monitoring per Air Quality Management District (AQMD) Rule 1150.1; conducting perimeter LFG monitoring in accordance with

AQMD Rule 1150.1 for closed or inactive landfills; and conducting building perimeter well/probe and vent riser monitoring.

3) OU-2 Perimeter Monitoring

- Conduct methane monitoring of the OU-2 perimeter along Avalon Boulevard, E. 192nd Street, and South Main Street utilizing wells MP-2, SV-1, MP-3, SV-2, MP-4, SV-3, MP-5, SV-10, IV-9C, IV-9B, IV-8C, IV-8B, IV-7A, VP-4, IV-34A, VP-5, SV-4, SV-5, IV-35, SV-6, SV-7, SV-8 and SV-9 per AQMD Rule 1150.1. Install and monitor a dual-nested, replacement soil gas/landfill gas perimeter compliance well, outside of the waste zone, between SV-11 and the residence at 18963 Milmore Avenue. Initially, sampling of these wells will be conducted on a quarterly schedule. The sampling frequency of individual wells will be adjusted accordingly per regulatory decision if methane concentrations exceed 5% v/v and methane mitigation measures will be implemented if methane concentrations remain at concentrations of 5% v/v or higher.
- If methane concentrations demonstrate a significant and decreasing trend over time in specific areas of OU-2, DTSC will consider whether monitoring in those specific areas may be reduced in frequency or discontinued.

4) Location-specific Remedial Response Actions for Soil AECs and Methane.

- Isolate soil AEC location 236 by surface paving.
- Implement location-specific institutional controls for soil AEC locations 34, 236, and UB-8/22 (located outside of the landfilled area) in the applicable OM&M plans.
- Install methane alarms in all enclosed-space, slab-on-grade OU-2 buildings.
    - Conduct methane mitigation actions (such as methane barrier installation) at subsurface point source locations including, but not limited to, irrigation control valve boxes if methane accumulations exceed 1.25% in air.
    - Conduct regular methane monitoring of building perimeter wells/probes at Victoria Golf Course (VGC-1A, VGC-2A, VGC-3A, SV-104 and SV-105) and sub-slab passive methane system probes and vent risers at Goodyear Operations Center and passive methane system vent risers at Victoria Golf Course and Victoria Regional Park Cricket Fields. Methane monitoring will increase and mitigation measures will be implemented if methane concentrations present an unacceptable health and safety risk.

- If methane concentrations demonstrate a significant and decreasing trend over time in specific areas of the OU-2, DTSC will consider whether monitoring in those specific areas may be reduced in frequency or discontinued.

7.0 IMPLEMENTATION SCHEDULE

This implementation schedule is based on the overall remedy for the human and ecologic health risks identified by the RI, HHRA, and SLERA for soil, waste zone, and LFG environmental media and identified OU-2 COCs, and consists of the implementation of programs that are designed to contain hazardous chemicals in place as shown in Table 7.0-1, *Implementation Schedule*.

Table 7.0-1
Implementation Schedule

Task Description	Start Date / Duration
Submittal of Draft RAP	September 22, 2014
Public Notice	Following DTSC Approval of Draft RAP
Public Meeting	Subject to DTSC Request
Public Comment Period on Draft RAP	30 Days Following Public Notice
Final Approval of RAP	To Be Determined
Land Use Covenants/Deed Restrictions	45 Days from Final RAP Approval
Submit Draft OM&M Plans	45 Days from Final RAP Approval
OU-2 Perimeter LFG Monitoring	Quarterly
AQMD 1150.1 Landfill Surface Monitoring	Quarterly
Methane monitoring of building perimeter wells	Quarterly
Monitoring of Methane Vent Risers	Quarterly
Install/Monitoring LFG Well	TBD, Following Agreements with Stakeholders
Surface Pave Location 236	TBD, Following Agreements with Stakeholders
Install methane alarms in all enclosed-space, slab-on-grade OU-2 buildings	TBD
Methane mitigation actions at subsurface point source locations	As-needed

8.0 OM&M PLAN REQUIREMENTS

The preparation of property-specific OM&M Plans is recommended as a principal response option that meets many of the RGs for OU-2. At a minimum, the plan components should include analyses, specifications and/or schedules for the elements listed below as appropriate for each specific property comprising OU-2. OM&M Plans will be reviewed and approved by DTSC.

8.1 Hazard Analysis and Health and Safety Risks

A hazard analysis and identification of health and safety risks informs employees of sources of potential damage, harm or adverse health effects on something or someone under certain conditions specific to conducting work at a closed landfill and the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. Topics discussed will include:

- Landfill physical and chemical hazards evaluation
- Routes of exposure
- Chronic versus periodic exposures
- Employee training requirements and responsibilities
- PPE

8.2 Best Management Practices (BMPs)

BMPs will be developed that provide for a practice, or combination of practices, that is determined to be an effective and practicable means of preventing or reducing hazards and/or the level and amount of exposure to contamination or the spread of landfill COCs generated by routine tasks, events or occurrences. BMPs discussed will include:

- Site control measures
- Guidelines for use of heavy equipment
- Surface water run-off controls
- Airborne particulate control (fugitive dust)
- Accessing enclosed infrastructure features (vaults, boxes, drains)
- Excavations (see excavation section)
- Methane alarm system specifications, maintenance, and alarm response actions to be taken.

8.3 Emergency Response Plans

Emergency response procedures shall be developed for:

- Natural disasters including severe earthquakes, storms, or flood events
- Unintended exposure of waste zone materials
- Water main breaks
- LFG-fueled explosion or fire

8.4 Soil Cover Repair/Maintenance, Minimum Requirements:

Soil cover repair shall be conducted on an as-needed basis within the area of the historic landfill operations. The soil cover repair requirements shall specify:

- Minimum of 3 feet of soil covering the landfill waste limits consisting of at least an 18-inch clay/silt soil layer of low permeability (hydraulic conductivity of at least 1E-5 cm/sec) and at least a 6-inch surface soil layer suitable for vegetation growth.
- Less than 10 % of the total OU-2 surface area should be barren of vegetation cover.
- Topography adjustments to insure adequate drainage in order to prevent surface ponding of water and soil erosion.

8.5 Excavation Guidelines

Guidelines for conducting soil excavations that are protective of all site user populations and comply with federal and state OSHA laws and regulations for conducting work at hazardous waste sites shall be developed for each site-specific OM&M Plan. The guidelines shall include:

- Site worker training and responsibilities
- Identification and use of personal protective clothing and equipment
- Soil excavation standard operating procedures (SOPs)
- Access restrictions during construction activities
- Agency and public notification requirements and procedures
- A soil management plan that includes:
  - The identification, sampling, characterization, segregation and stockpiling of contaminated environmental media

- Decontamination procedures
- Procedures for the handling, storage, reuse and disposal of contaminated environmental media
- Air monitoring of excavations and soil stockpiles for VOCs and methane

8.6 Landfill Surface Methane Monitoring Guidelines

Landfill surface methane monitoring guidelines shall be developed. The guidelines shall specify:

- Conformance with current AQMD Rule 1150.1 Instantaneous Landfill Surface Monitoring requirements and monitoring frequency, over the entire landfill, with additional attention given to areas where the soil cover is known to be less than 3 feet thick.
- Visual inspection of soil cover integrity following significant local earthquakes, flooding, or storms.
- Methane monitoring and visual inspection of soil cover frequency and duration will be modified as warranted by site conditions and as authorized by DTSC and/or AQMD.

Appendix A1 ARARs

Table 9.3.1-1
Action-Specific ARARs and TBCs
Potential Federal ARARs for Landfill Sites

CITATION	SCOPE	COMMENT	APPLICABLE MEDIA
WASTE MANAGEMENT			
42 USC 9601 et. seq.	*CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act,1980* Provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.	**Potentially Applicable** to the environmental investigation and cleanup.	All environmental media
22 CCR 66264.117 - 120	*Post-Closure Care and Use of Property,* Establishes requirements for (117) post-closure care period and post-closure property use including allowable disturbances of the final landfill cover, (118) post-closure plan and plan amendment, (119) post-closure notices, and (120) Certificate of Completion of post-closure care.	**Relevant and Appropriate** to the preparation of post-closure Operation and Maintenance Plans	All environmental media and soil cover in particular
22 CCR 66264.310	*Closure and Post-closure Care,* Establishes requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, groundwater monitoring, and leak detection, gas control and treatment.	**Relevant and Appropriate** to design, construction, and O&M of landfill containment systems and to the design and implementation of a post-closure maintenance plan.	All environmental media
22 CCR 66264.552, 66264.553	*Corrective Action Waste Management Units,* Establishes that consolidation and placement into a corrective action management unit of remediation wastes generated as part of a corrective action does not constitute placement or land disposal of hazardous waste. Prohibits creation of an unacceptable risk to humans and the environment resulting from exposure. Establishes closure and other requirements. Establishes requirements for temporary tank and container	**Potentially Applicable** for the excavation and consolidation of outlying wastes into the central portion of the site to reduce area affected by wastes. The final cover and control systems containing consolidated wastes must meet the landfill closure ARARs.	Soil, waste, extracted liquid, and soil gas treatment residue.
22 CCR 66268.1, et seq.	*Land Disposal Restrictions,* Prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for the land disposal of hazardous wastes.	**Applicable** to excavated soil, extracted liquids, and other wastes exceeding threshold levels requiring treatment prior to disposal offsite. **Potentially Applicable** to onsite disposal, unless either RCRA corrective Action Management Unit/Superfund "Area of Contamination" approach is involved.	All environmental media
22 CCR 67450.3	*Transportable and Fixed Treatment Unit,* Describes substantive requirements for transportable and fixed treatment Soil Vapor Extraction units.	**Potentially Applicable** to landfill gas treatment unit and portable soil vapor extraction treatment units.	Landfill/soil gas.
27 CCR 20310 - 20377	*Criteria for All Waste Management Units, Facilities, and Disposal Sites – Siting and Design,* Establishes construction requirements for containment structures, including materials, testing, and hydraulic conductivity. Requires existing landfills to be fitted with subsurface barriers, as needed and feasible. Establish standards for construction of any subsurface barriers, including grout curtains and cutoff walls, leachate collection and removal systems, surface impounds, and for land treatment units.	**Potentially Relevant** if RAP alternatives include leachate collection, waste relocation, and on-site treatment cells.	Waste, soil, leachate, and water run-off.
27 CCR 20340	*Leachate Collection and Removal Systems – Siting and Design,* Requires leachate collection and removal system; design must ensure that there is no buildup of hydraulic head on liner, and that the fluid in the collection sump be kept at the minimum needed to ensure efficient pump operations.	**Potentially Relevant** to design, construction, and operation of leachate removal system and cover.	Liquid, cover.
27 CCR 20365	*Precipitation and Drainage Controls – Siting and Design* Requires cover to be graded to divert precipitation, prevent ponding, resist erosion, and control run-off and run- on.	**Applicable** to design, construction, and maintenance of the final landfill cover.	Soil, waste, surface water quality**.**

Table 9.3.1-1
Action-Specific ARARs and TBCs
Potential Federal ARARs for Landfill Sites

CITATION	SCOPE	COMMENT	APPLICABLE MEDIA
LANDFILL POST-CLOSURE REQUIREMENTS			
27 CCR 20919	*Landfill Gas Control - Active and Closed Disposal Sites,* *Establishes authority for requiring landfill gas monitoring and landfill gas control at closed disposal sites.*	**Applicable** to implementation of landfill gas monitoring and landfill gas control systems	Landfill/soil gas
27 CCR 20921 (a), (c)	*Landfill Gas Monitoring and Control - Active and Closed Disposal Sites,* *Requires that landfill gas shall be controlled such that* *(a) (1) The concentration of methane gas does not exceed 1.25 percent by volume in air within any portion of any on-site structure* *(a) (2) the concentration of methane gas migrating from the disposal site must not exceed 5 percent by volume in air at the disposal site permitted facility boundary.* *Trace gases shall be controlled to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds* *The gas monitoring and control program shall continue until it is demonstrated that there is no potential for gas migration beyond the disposal site permitted facility boundary or into on-site structures.*	**Applicable** to implementation and completion of landfill gas monitoring and landfill gas control systems	Landfill/soil gas
27 CCR 20923	*Landfill Gas Monitoring - Active and Closed Disposal Sites,* Requires monitoring system to be designed to detect gas migrating beyond landfill property boundary and into onsite structures and to account for: ⋐ Local soil and rock conditions ⋐ Hydrogeologic conditions. ⋐ Locations of buildings, structures, and waste area ⋐ Adjacent land use and inhabitable structures within 1,000 feet of disposal site property boundary. ⋐ Man-made pathways Nature, age and gas generation potential of waste	**Applicable** to the design, implementation and maintenance of the landfill gas monitoring system	Landfill/soil gas
27 CCR 20925	*Perimeter Monitoring Network - Active and Closed Disposal Sites,* Requires landfill gas monitoring network around waste deposit perimeter and disposal site boundary, unless certain conditions are met. Specifies location, spacing, depth, and construction of soil gas monitoring wells, including: ⋐ Location around perimeter ⋐ Spacing not to exceed 1,000 ft. ⋐ Probe at 5 to 10 ft. ⋐ Probe at mid-depth of waste ⋐ Probe at waste depth ⋐ Construction as specified.	**Applicable** to monitoring of soil gas.	Landfill/soil gas
27 CCR 20931	*Structure Monitoring - Active and Closed Disposal Sites,* Requires monitoring inside buildings and of onsite structures such as vaults where gases can buildup, both adjacent to and on top of waste deposit area. Requires that structures on top of waste be monitored continually.	**Applicable** to monitoring of soil gas adjacent and within buildings.	Landfill/soil gas
27 CCR 20932	*Monitoring Parameters - Active and Closed Disposal Sites,* Requires sampling of monitoring probes and onsite structures for methane and for trace gases that may pose acute or chronic exposure risk due to toxic or carcinogenic compounds.	**Applicable** to identification of soil gas and indoor air monitoring parameters, and to the sampling of soil gas and indoor air.	Landfill/soil gas

Table 9.3.1-1
Action-Specific ARARs and TBCs
Potential Federal ARARs for Landfill Sites

CITATION	SCOPE	COMMENT	APPLICABLE MEDIA
27 CCR 20933	*Monitoring Frequency - Active and Closed Disposal Sites,* Requires monitoring quarterly, or more frequently if gas migration is occurring or other factors are met	**Applicable** to the monitoring frequency for in-building and soil gas.	Landfill/soil gas
27 CCR 20934	*Reporting, Landfill Gas Monitoring Results - Active and Closed Disposal Sites Specifies the landfill gas monitoring reporting parameters*	**Applicable** to the implementation of the landfill gas monitoring program.	Landfill/soil gas
WATER QUALITY			
33 USC 1251 et. seq.	*Federal Clean Water Act, 1972,* The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1977. Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry and water quality standards for all contaminants in surface waters.	**Applicable** to discharges from site run-off or discharges of treated effluent from potential response actions.	Groundwater, surface water
23 CCR 13000 et. seq.	*Porter-Cologne Water Quality Control Act, 1969* Establishes the SWRCB and nine Regional Water Quality Control Boards as the principal state agencies with the responsibility for controlling water quality in California. Under the Act, water quality policy is established, water quality standards are enforced for both surface and ground water, and the discharges of pollutants from point and non-point sources are regulated. Authorizes the SWRCB to establish water quality principles and guidelines for long range resource planning including groundwater and surface water management programs. r.	**Applicable** to groundwater response requirements where groundwater quality is affected or threatened.	Groundwater, surface water
23 CCR 13304.1	*Porter-Cologne Water Quality Control Act,* Establishes that any groundwater cleanup system that commences operation after January 1, 2002, and is required to obtain a discharge permit from the Regional Board, shall treat the discharged water to standards approved by that Regional Board.	**Applicable** to discharge requirements for treated groundwater from a groundwater treatment system	Groundwater, surface water
23 CCR 13307	*Porter-Cologne Water Quality Control Act,* Establishes the joint authority of the SWRCB and DTSC to establish policies and procedures to oversee and supervise the activities of persons who are carrying out the investigation of, and cleaning up or abating the effects of, a discharge of hazardous substances which creates, or threatens to create a condition of contamination, pollution, or nuisance.	**Applicable** to remedial response actions and post-closure monitoring of groundwater	Groundwater, surface water
27 CCR 20080 (g)	*General Requirements – SWRCB* Establishes authority for requiring the development and implementation of a corrective action for discharges to water for Units (waste disposal facilities) that were closed, abandoned or inactive units on or before November 27, 1984.	**Applicable** to remedial response actions and post-closure monitoring of groundwater.	Groundwater, surface water
27 CCR 20405, 20415-20430	*Groundwater Monitoring,* Establishes general requirements for groundwater monitoring points and point of compliance, groundwater quality monitoring systems including background monitoring, and groundwater monitoring programs.	**Applicable** to post-closure monitoring of groundwater.	Groundwater, surface water

Table 9.3.1-1
Action-Specific ARARs and TBCs
Potential Federal ARARs for Landfill Sites

CITATION	SCOPE	COMMENT	APPLICABLE MEDIA
SWRCB Resolution 68-16	*"Statement of Policy with Respect to Maintaining High Quality of Waters in California",* Commonly referred to as the anti-degradation policy, this Resolution applies to discharging waste that might affect the existing quality of water it is discharged into and, in turn, affect its beneficial use. The policy requires that waste discharges to existing high quality waters meet best practical treatment or control of the discharges necessary to prevent pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the state.	**Applicable** to groundwater response requirements where groundwater quality is affected or threatened.	Groundwater, surface water.
SWRCB Resolution No. 88-63, LARWQCB Resolution 89-03	*"Sources of Drinking Water Policy";* Specifies that all surface and groundwater of the State of California are considered suitable, or potentially suitable, for municipal or domestic water supply with the following exceptions: (1) those water bodies with yields below 200 gallons per day, (2) total dissolved solids exceeding 3,000 mg/L (ppm), or (3) contamination that cannot reasonably be treated for domestic use by either best management practices or best economically achievable treatment practices.	**Applicable** to groundwater response requirements where groundwater quality is affected or threatened	Groundwater, surface water
SWRCB Resolution 92-49	*Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304,* Established policies and procedures for the oversight of investigations and cleanup activities resulting from discharges that affect or threaten water quality. This policy authorizes boards to oversee cleanup activities and to require cleanup of all waste discharges.	**Applicable** to groundwater response requirements where groundwater quality is affected or threatened	Groundwater, surface water
AIR QUALITY			
42 USC 7401 et. seq.	*Federal Clean Air Act, 1963,* The FCAA, last amended in 1990, forms the basis for the national air pollution control effort. Basic elements of the act include national ambient air quality standards for major air pollutants, hazardous air pollutants standards, state attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.	**Applicable** to emissions, including particulate matter, NO_x and CO emissions from the landfill or a potential landfill gas treatment unit.	Soil gas and landfill gas.
17 CCR 39000 - 44385	*California Clean Air Act, 1988,* Implements the FCAA and adopts ambient air quality standards more stringent than federal standards. Establishes specific statutory programs and authorizes the Air Resources Board (ARB) as the agency responsible for statewide programs with direct oversight of the local and regional districts.	**Applicable** to emissions, including particulate matter, NO_x and CO emissions from the landfill or a potential landfill gas treatment unit.	Soil gas and landfill gas
17 CCR 70200	*Ambient Air Quality Standards - Table of Standards,* Provides chemical-specific ambient air standards.	**Applicable** to emissions, including particulate matter, NO_x and CO emissions from the landfill or a potential landfill gas treatment unit.	Soil gas and landfill gas.
17 CCR 39000 (Rule 402)	*Nuisance - SCAQMD,* Prohibits discharge of air contaminants or other materials which cause injury, detriment, nuisance, or annoyance, which endanger comfort, repose, health or safety, or which cause or may cause injury or damage to business or property**.**	**Applicable** to drilling, excavation, cap, treatment systems, and exhaust from equipment.	Soil and waste. Implementation of remedial actions.
17 CCR 39000 (Rule 403)	*Fugitive Dust - SCAQMD,* Limits onsite activities so that the concentration of fugitive dust at the property line will not be visible. Requires use of best available control measures to minimize fugitive dust emissions.	**Applicable** to excavation of COC-affected soils and cap maintenance.	Soil and waste.
17 CCR 39000 (Rule 405)	*Solid Particulate Matter - SCAQMD,* Prohibits discharge of solid particulate matter exceeding specified weights and rates, including lead.	**Applicable** to excavation of COC-affected soils and wastes.	Soil and waste.

Table 9.3.1-1
Action-Specific ARARs and TBCs
Potential Federal ARARs for Landfill Sites

CITATION	SCOPE	COMMENT	APPLICABLE MEDIA
17 CCR 39000 (Rule 1150)	*Excavation of Landfill Site - SCAQMD,* Requires planning, including mitigation measures to prevent public nuisance.	Substantive requirements are **Relevant and Appropriate** to excavation.	Soil, VOCs and waste.
17 CCR 39000 (Rule 1150.1)	*Control of Gaseous Emissions from Municipal Solid Waste Landfills – SCAQMD,* Establishes requirements for active and inactive Municipal Solid Waste landfills to limit emissions to prevent public nuisance and possible detriment to public health through monitoring and collection and control of landfill gasses. Provides requirements for installing and sampling from subsurface refuse boundary sampling probes, integrated landfill surface sampling, instantaneous landfill surface sampling, landfill gas sampling from gas collection systems, and ambient air sampling at the property boundary.	**Applicable** to emissions, including particulate matter, NO_x and CO emissions from the landfill.	oil gas and landfill gas.
17 CCR 39000 (Rule 1166)	*VOC Emissions from Decontamination of Soil,* Imposes requirements for emissions from soils contaminated with VOCs at levels of 50 ppm or greater which are being treated or excavated, requires collection of VOCs or equivalent VOC-contaminated soil measure. Prohibits spreading of VOC-contaminated soil resulting in uncontrolled evaporation of VOCs to the atmosphere.	Substantive requirements are **Potentially Applicable** to excavation of soils and wastes.	Soil and waste.
17 CCR 41805.5	*Solid Waste Air Quality Assessment Test,* Requires that inactive landfills conduct an investigation to characterize LFG streams within and immediately above the landfill surface, monitor for specified air contaminants in the ambient air adjacent to the disposal site, and determine if there is subsurface LFG migration occurring beyond the landfill site perimeter.	Substantive requirements are **Potentially Applicable** to an inactive landfill.	Landfill gas.
17 CCR 38500 (Subchapter 10 – climate change, Article 4 – GHG reductions, Subarticle 6 - MSW Landfills, Sections 95460-95476)	*Methane Emissions from Municipal Solid Waste Landfills – CARB,* Establishes methane emission regulations approved June 25, 2009, pursuant to California Global Warming Solutions Act of 2006, AB 32 effective June 17, 2010. Landfills that ceased operation by January 1, 1977 are exempt from greenhouse gas emission regulations. Surface areas of MSW landfills that emit methane in excess of 500 ppmv must be remediated. Control devices (flares) must reduce methane by 99% or reduce the outlet methane concentration for lean burning engines to less than 300 ppmv, dry basis, corrected to 15% oxygen.	**Applicable** for approved methods for measuring/documenting surface methane emissions and stack emissions for active and passive methane systems.	Landfill gas.
Los Angeles County Title 26 Building Code Section 308(c)	*Los Angeles County Department of Public Works Landfill Gas Protection Policy, November 2002,* Standards for development on or within 1,000 ft of a landfill or adjacent to the site.	Substantive requirements are **Potentially Applicable** to any new structures on the Site.	Landfill gas.
TO BE CONSIDERED CRITERIA			
USEPA. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update. Sept 2008. http://www.epa.gov/region09/superfund/prg/index.html	Preliminary Remediation Goals (PRGs) are risk-based concentrations evaluated and established at a 1×10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for non-carcinogens.	PRGs are **TBC** soil screening criteria for the Site.	Soil, ambient air and tap water.
EPA Policy Memo, "Use of Area of Contamination Concept during RCRA Cleanups" (03/13/1996) http://yosemite.epa.gov/osw/rcra.nsf/documents/E6CAC7C42B27CE048525670F006BF350/$file/11954.pdf ; and National Contingency Plan (NCP), 55 Fed. Reg. 8758-8760 (03/08/1990)	Establishes that consolidation and in-situ treatment of hazardous waste within an "area of contamination" does not trigger land disposal restrictions or minimum technology requirements.	The policy is a **TBC** for alternatives involving excavation and consolidation of soils and waste.	Soil and waste.

Table 9.3.1-1
Action-Specific ARARs and TBCs
Potential Federal ARARs for Landfill Sites

CITATION	SCOPE	COMMENT	APPLICABLE MEDIA
EPA Technical Guidance Document, "Final Covers on Hazardous Waste Landfills and Surface Impoundments" http://nepis.epa.gov/Exe/ZyNET.exe/100019HC.PDF?ZyActionP=PDF&Client=EPA&Index=1986 Thru 1990&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C86THRU90%5CTXT%5C00000003%5C100019HC.txt&Query=&SearchMethod=1&FuzzyDegree=0&User=ANONYMOUS&Password=anonymous&QField=pubnumber%5E%22530SW89047%22&UseQField=pubnumber&IntQFieldOp=1&ExtQFieldOp=1&Docs=	These guidelines recommend a multilayer cover consisting of the following layers from top to bottom: Vegetation/soil: 60 cm (2ft.) Filter: (nominal thickness) Drainage: 30 cm (1ft.) Low permeability flexible membrane liner: 20 mil (min.) Low permeability soil: 60 cm (2ft.) Plus optional layers.	A **TBC** for the design, construction, and maintenance of the landfill cover.	Cap or landfill cover.
DTSC Advisory "Active Soil Gas Investigations" http://www.dtsc.ca.gov/LawsRegsPolicies/Policies/SiteCleanup/upload/SMBR_ADV_activesoilgasinvst.pdf	This advisory document establishes consistent methodologies to be used for decision making on active soil gas investigation sites.	A **TBC** for the remediation of soil gas during site activities.	Soil gas.
CRWQCB, Los Angeles Region - "Interim Guidance For Active Soil Gas Investigation" http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/ust/guidelines/03_0210_interim%20guidance%20for%20active%20soil%20gas%20investigations.pdf	This guidance document outlines a basic plan for soil gas remediation activities at active an active soil gas site.	A **TBC** for the design and implementation of a soil gas investigation.	Soil gas.
DTSC – School Property Evaluation And Cleanup Division "Advisory On Methane Assessment and Common Remedies At School Sites" http://www.dtsc.ca.gov/Schools/upload/SMBRP_SCHOOLS_Methane.pdf	This guidance document outlines site investigations and common remediation techniques for school site that have methane as primary chemical of concern. This document can also assist in other common soil gas contaminants.	A **TBC** for the design and implementation of a soil gas investigation at school sites.	Soil gas.

CCR	=	California Code of Regulations
CERCLA	=	Comprehensive Environmental Response, Compensation, and Liability Act, as (amended)
CFR	=	Code of Federal Regulations
EPA	=	United States Environmental Protection Agency
NCP	=	National Contingency Plan
NSPSs	=	New Source Performance Standards
RCRA	=	Resource Conservation and Recovery Act, as amended
RWQCB	=	Regional Water Quality Control Board
SCAQMD	=	South Coast Air Quality Management District
USCPCBPRGPPMTCB	=	United States Code Polychlorinated Biphenyls Preliminary Remediation Goal parts per million To Be Considered Criteria

Table 9.3.1-2
Location-Specific ARARs
Potential Federal ARARs for Landfill Sites

REQUIREMENT AND CITATION	SCOPE	COMMENT [1]	APPLICABLE MEDIA
40 CFR 264.18 (a)	*Hazardous Waste Storage and Disposal, Location Standards - Seismic Considerations* Stipulates that new facilities where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 61 meters (200 feet) of a fault which has Holocene displacement	Potentially **Relevant and Appropriate** for the preparation of a Post-Closure Emergency Response Plan (see 27 CCR 21130, 21132).	All environmental media and soil cover in particular
40 CFR 264.18 (b)	*Hazardous Waste Storage and Disposal, Location Standards - Floodplains* Stipulates that a facility located within a 100-year floodplain must be designed, constructed, operated and maintained to prevent washout or any hazardous waste by a 100-year flood	Potentially **Relevant and Appropriate** for the preparation of a Post- Closure Emergency Response Plan and Operations and Management Plan (see 27 CCR 21130 et. seq.).	All environmental media and soil cover in particular
16 USC 1531 et seq.; 50 CFR 222.101-224.105 & 401.1-453.06; California Fish and Game Code 2050-2098	*Endangered Species Act of 1973 and amendments and California Endangered Species Act* To provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of international treaties and conventions.	The law is **Relevant and Appropriate,** if the site and/or site activities are within critical habitat upon which endangered species or threatened species depends. Endangered or threatened species have not been observed at OU-2.	Soil, wastes, leachate (liquids), soil gas, groundwater and treatment residue.
Executive Order 11990, Protection of Wetlands http://www.epa.gov/wetlands/regs/eo11990.html	Wetland as defined by Executive Order 11990 Section 7. Not anticipated to be an issue.	The law is **Relevant and Appropriate,** if the site and/or site activities are within a wetland.	Soil, wastes, leachate (liquids), soil gas, groundwater and treatment residue.
16 USC 703-712	*Migratory Bird Treaty* Migratory birds must be protected from poisoning at hazardous waste sites.	The law is **Relevant and Appropriate,** if the site and/or site activities are within areas utilized by migratory birds.	Soil, wastes, leachate (liquids), soil gas, groundwater and treatment residue.
16 USC 661-668	*Protection and Conservation of Wildlife* Diversion, channeling, or other activity that modifies a stream or river and affects fish or wildlife.	The law is **Relevant and Appropriate,** if the site and/or site activities are within an area affecting stream or river.	Soil, wastes, leachate (liquids), soil gas, groundwater and treatment residue.
16 USC Section 1451 et seq	*Coastal Zone Management* Activities affecting coastal zone including lands there under and adjacent shore lands.	The law is **Relevant and Appropriate,** if the site and/or site activities are within a coastal zone.	Soil, wastes, leachate (liquids), soil gas, groundwater and treatment residue.
33 USC 1344 CDFG Code Sections 1600-1607	*Federal Clean Water Act, 1972* Regulates the discharge of dredge and fill material into waters of the United States, which includes wetlands and is administered by the U.S. Army Corps of Engineers (USACOE). The California Department of Fish and Game (CDFG) exercises jurisdiction over wetland and riparian resources associated with rivers, streams, and lakes.	Potentially **Relevant and Appropriate** to the discharge of fill material to the Dominguez Branch Channel	Soil

Table 9.3.1-3
Chemical-Specific ARARs
Potential Federal and State of California ARARs for Landfill Sites

REQUIREMENT AND CITATION	SCOPE	COMMENT [1]	APPLICABLE MEDIA
WATER QUALITY			
33 USC 1251-1387 and 40 CFR 122	*Clean Water Act and NPDES* Establishes the framework for regulations over the control of water pollution and restoration of water resources. Requirements for certain industrial and construction activities to ensure stormwater discharges to not contributed to a violation of surface water quality standards. Includes measures to minimize or eliminate pollutants in stormwater discharges and monitoring to show compliance.	Certain regulations stemming from the Clean Water Act are **Applicable** to water discharges and groundwater treatment remedies. Stormwater requirements are applicable to construction of treatment units, if any.	Landfill cover drainage control; surface water discharge, treated groundwater, leachate and run-off;
42 USC 300f-300j; 40 CFR 141.1-141.66; 22 CCR 64431, 64444, and 64449	*Drinking Water Standards* Establishes primary and secondary drinking water standards (Maximum Contaminant Levels) for drinking water supplies. Regulations establish enforceable, maximum permissible levels of biological, inorganic and organic contaminant concentrations for drinking water. Maximum Contaminant Levels (MCLs) are health-based standards. Federal regulations establish Maximum Contaminant Level Goals (MCLGs), health goals at which no known health effects would occur.	**Applicable** to groundwater degradation and contamination of water resources. Remedial actions should comply with relevant substantive requirements of the SIP.	Groundwater, surface water and leachate.
2001 California Ocean Plan Los Angeles Basin Water Quality Standards http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/oplans/cop2001.pdf	Establishes water quality objectives applicable to waters of the State, including groundwater. Establishes groundwater monitoring requirements for the saturated and unsaturated zones. Establishes beneficial uses of surface waters. Generally, incorporates state Maximum Contaminant Levels (MCLs) for groundwater contaminants in groundwater designated as drinking water supply; prohibits concentration of constituents in amounts that adversely affect designated beneficial use.	**Applicable** to contaminated perched-liquids and soil/waste contamination that threatens groundwater or surface water quality; groundwater; stormwater run-off.	Groundwater, surface water, storm water liquids.
AIR QUALITY			
42 USC 7401, et seq.; 40 CFR 50.1-50.16; 17 CCR 70200	Establish Ambient Air Quality Standards for ambient air to protect public health and welfare. Identifies standards for six pollutants.	**Applicable** to emissions, including particulate matter, NO_x and CO emissions from landfill gas treatment unit.	Soil gas and landfill gas.
40 CFR 61	Establishes emission standards for certain particularly hazardous air pollutants.	**Appropriate** for landfill gas treatment and soil vapor extraction emissions.	Soil gas and landfill gas.
40 CFR part 60.30-60.36	Establishes standards for new stationary sources of air emissions to ensure that they are designed, equipped, operated, and maintained to reduce emissions to a minimum. The emission control technology on which the NSPSs are based is the best demonstrated technology.	**Appropriate** for soil vapor extraction units and the landfill gas treatment units, depending on emission rates.	Landfill and treated soil gas.
27 CCR 20921 (a), (c)	*Landfill Gas Monitoring and Control - Active and Closed Disposal Sites,* Requires that landfill gas shall be controlled such that (a) (1) The concentration of methane gas does not exceed 1.25 percent by volume in air within any portion of any on-site structure and (a) (2) the concentration of methane gas migrating from the disposal site must not exceed 5 percent by volume in air at the disposal site permitted facility boundary. Trace gases shall be controlled to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds and (b) the gas monitoring and control program shall continue until it is demonstrated that there is no potential for gas migration beyond the disposal site permitted facility boundary or into on-site structures.	**Applicable** to implementation and completion of landfill gas monitoring and landfill gas control systems	Landfill/soil gas
WASTE DELINEATION AND MANAGEMENT			
15 USC 2601-2692; 40 CFR 761	*Toxic Substances Control Act* Regulates manufacture, processing, distribution, storage, and disposal of PCBs.	**Applicable** to the storage and disposal of liquid, wastes and soils contaminated with PCBs.	Liquids, wastes, soils.
42 USC 6901, et seq.; 22 CCR 66261.1-66261.126	*Resource Conservation and Recovery Act* Establishes criteria and methods for characterizing hazardous wastes.	**Applicable** to the characterization of contaminated soils, wastes, and liquids.	Soil, liquids, liquids treatment residue, waste, soil gas treatment residue.

Table 9.3.1-3
Chemical-Specific ARARs
Potential Federal and State of California ARARs for Landfill Sites

REQUIREMENT AND CITATION	SCOPE	COMMENT [(1)]	APPLICABLE MEDIA
MULTIPLE MEDIA			
USEPA. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table Update. Sept 2008. http://www.epa.gov/region09/superfund/prg/index.html	Establishes Preliminary Remediation Goals (PRGs) for residential/industrial soils, ambient air, and tap water. Toxicity and cancer slope factors are utilized to create the PRGs. PRGs are meant to be used as guidance for remediation not an ultimate standard. These goals may not take into account cumulative health effects of multiple chemicals.	**Appropriate** for preliminary evaluation of contaminated media, but site specific remediation goals will be developed through a Health Risk Assessment	Air, Soil, Tap Water
California Land Environmental Restoration and Reuse Act. Senate Bill #32. Chapter 764. Statutes 2001. http://www.calepa.ca.gov/brownfields/documents/2005/CHHSLsGuide.pdf	Establishes California Human Health Screening Levels (CHHSLs) for residential/industrial soils, indoor air, and soil gas. California Modified toxicity and cancer slope factors are utilized to create the CHHSLs. These values serve as reference numbers to help estimate the costs and extent of cleanup of contaminated sites. These screening levels may not take into account cumulative health effects of multiple chemicals.	**Appropriate** for preliminary evaluation of contaminated media, but site specific remediation goals will be developed through a Health Risk Assessment	Indoor Air, Shallow Soil Gas, Soil

Appendix 1 DTSC Statement of Reasons

Department of Toxic Substances Control

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STATEMENT OF REASONS FOR
VICTORIA GOLF COURSE/FORMER BKK CARSON LANDFILL
OPERABLE UNIT 2, REMEDIAL ACTION PLAN
FOR SOIL AND LANDFILL GAS MEDIA

Pursuant to California Health and Safety Code (HSC) section 25356.1 (d), the California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) has prepared this Statement of Reasons as part of the Remedial Action Plan for the Victoria Golf Course/Former BKK Carson Landfill, Operable Unit 2 for the Soil and Landfill Gas Media (RAP) located in Carson, California.

The RAP presents a summary of the Remedial Investigation/Feasibility Study and includes information on site history, environmental investigation data for soil and landfill gas media, and the proposed remedial action approach for the approximately 271 acre portion of the former BKK Carson Landfill (total approximately 353 acres), known as Operable Unit 2 or OU-2 (Project Site). The Project Site is located in Carson, California, northeast of the 405 Freeway, along 192nd Street, Avalon Boulevard, Main Street, and the Dominguez Channel. The RAP also provides a discussion of the feasible remedial alternatives that were evaluated in determining the remedial actions to be conducted at the Project Site for soil and landfill gas media. The RAP recommends a remedial alternative that will implement land use covenants/deed restrictions, property specific plans, landfill gas monitoring (perimeter and on-site), and location specific response actions for soil and landfill gas. This remedy will meet the objectives of protecting public health and the environment, and addresses the containment of the refuse and control/containment of the landfill gas (LFG) for the Project Site. The groundwater for the entire former BKK Carson Landfill, including the Dominguez Golf Course or Operable Unit 1 portion (located southwest of the 405 Freeway) will be addressed under a separate RAP in the future.

DTSC believes that the RAP complies with the law as specified in California Health and Safety Code, section 25356.1. Section 25356.1 (e) requires that RAPs "shall include the basis for the remedial actions selected." The RAP "shall also include an evaluation of the consistency of the selected remedial action with the requirements of the federal regulations and factors specified in subdivision (d)..." Subdivision (d) specifies six

factors against remedial alternatives in the RAP must be evaluated. The proposed remedial action is consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (the National Contingency Plan, "NCP"), the federal Superfund regulations. A brief summary of each factor follows.

1. Health and Safety Risks-Section 25356.1(d) (1)

   A Human Health Risk Assessment (HHRA) has been conducted on the soil cover, waste zone, native soil, and soil/landfill gas to evaluate the risks to human health at the Project Site. The HHRA identified six chemicals of concern (COCs); antimony, arsenic, lead, polychlorinated biphenyls (PCBs) (Aroclor 1248 and 1254), and methane. The HHRA evaluated potential exposures for commercial/industrial site worker and construction worker receptors, and adult and child recreational receptors. The identified potential threats posed by COCs include; 1) adverse health effects associated with the inhalation, ingestion and direct contact with COCs in soil cover and waste materials, and 2) migration of hazardous levels of methane and/or VOCs into enclosed-space structures. These potential threats are addressed by the recommended response actions and will be controlled by eliminating exposure pathways through proper containment, monitoring, and institutional controls as described in this RAP. Landfill gas monitoring is currently ongoing.

2. Beneficial Uses of the Site Resources-Section 25356.1 (d) (2)

   The Dominguez Flood Control Channel and the Dominguez Branch Flood Control Channel (concrete and clay lined) flow through the Project Site and are not impacted by the Project Site. Groundwater contamination was found in the shallow Bellflower geologic zone, which is not currently used for drinking water or industrial purposes. As was mentioned previously, groundwater contamination for the entire Former BKK Carson Landfill will be addressed in a future RAP.

3. Effect of the Remedial Actions on Groundwater Resources

   The recommended remedial actions for the Project Site do not address the groundwater as this will be addressed in a future RAP. However, the recommended remedial actions will be protective of the groundwater as they will minimize the infiltration of water through the landfill cap and reduce the generation of leachate.

4. Site-Specific Characteristics-Section 25356.1 (d) (4)

   Investigations for chemicals from the Project Site have been conducted to characterize the soil above and beneath the waste prism, and from soil/landfill gas.

The soil/landfill gas and integrity of the Project Site landfill cover will continue to be monitored and maintained, and institutional controls will be implemented as part of the recommended remedy. The groundwater for the entire former landfill, OU-1 and OU-2, will be further characterized and addressed in a future RAP.

5. Cost-Effectiveness of Alternative Remedial Action Measures-Section 25356.1 (d) (5)

   The proposed remedial action alternative is the most cost-effective alternative to meet the remedial objectives.

6. Potential Environmental Impacts of Remedial Actions-Section 25356.1 (d) (6)

   The proposed remedial alternative will not create any significant environmental impacts. A Notice of Exemption was prepared pursuant to the California Environmental Quality Act (CEQA) for the recommended remedial alternative.

Appendix 2 DTSC Administrative Record

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

Administrative Record for the Victoria Golf Course Site (Former BKK Landfill, Carson Dump), Operable Unit 2 Carson, California

Settlement Agreement and Consent Order HSA-CO 05/06-114 for Victoria Golf Course Site (Former BKK Carson Dump), Signed May 2006 and August 2006, between Department of Toxic Substances Control (DTSC) and Responsible Parties.

Correspondence dated July 27, 2006, Los Angeles County to DTSC: *Draft Remedial Investigation/Feasibility Study Workplan Pursuant to the Consent Order for the Victoria Golf Course Site (Former BKK Landfill, Carson Dump)*.

Correspondence dated September 20, 2006, Los Angeles County to DTSC: *Proposed Amendments to the Draft Remedial Investigation/Feasibility Study Workplan for the Victoria Golf Course Site (Former BKK Carson Dump) in Response to Comments by DTSC Staff.*

Correspondence dated September 28, 2006, DTSC to Los Angeles County: *DTSC Comments on Victoria Golf Course Site (Former BKK Landfill, Carson Dump) Draft Remedial Investigation/Feasibility Study Workplan, Operable Unit 2, Volumes 1 and 2.*

Correspondence dated December 5, 2006, Los Angeles County to DTSC: *Response to Comments Regarding the Draft Remedial Investigation/Feasibility Study Workplan for the Victoria Golf Course Site (Former BKK Landfill, Carson Dump).*

Final Remedial Investigation/Feasibility Study Workplan, Operable Unit 2, Former BKK Landfill, Carson Dump, City of Carson, California, Volume I and II, Prepared by: Leighton Consulting, December 15, 2006.

Correspondence dated December 19, 2006, DTSC to Los Angeles County: *Approval For Victoria Golf Course Site (Former BKK Landfill, Carson Dump) Remedial Investigation/Feasibility Study Workplan, Operable Unit 2, Volumes 1 and 2, dated December 2006.*

Recommended Addendum to Remedial Investigation/Feasibility Study Workplan, Former BKK Landfill, Carson Dump, Operable Unit 2, City of Carson, Sapphos Environmental, Inc., April 24, 2008.

Correspondence dated May 5, 2008, DTSC to Los Angeles County: *Comments on Recommended Addendum to Remedial Investigation/Feasibility Study Workplan for Victoria Golf Course Site (Former BKK Carson Dump), Operable Unit 2, Carson.*

Correspondence cover letter: *Revised Remedial Investigation/Feasibility Study Workplan Addendum for the Victoria Golf Course Site, Former BKK Landfill, Carson Dump, Submitted by Los Angeles County, Prepared by: Leighton Consulting, June 23, 2008.*

E-mail, July 3, 2008, DTSC internal: *Comments on Proposed Revised RI/FS Workplan Addendum-Victoria Golf Course Site (Former BKK Landfill).*
Meeting Agenda and Materials, July 7, 2008: *Status review and update RI/FS work*
Meeting Agenda and items, February 11, 2009: *Status, Results of Supplemental Sampling.*

Former Ben K. Kazarian Landfill, Carson Dump: *Methane Monitoring Data for the Victoria Golf Course Site, February 27, 2009.*

Meeting Agenda, March 3, 2009: *Review of potential off-site (groundwater) contamination sources.*

Correspondence dated November 5, 2009: DTSC to Los Angeles County, *Comments on the Human Health Risk Assessment and Screening Level Ecological Risk Assessment for the Draft Remedial Investigation/Feasibility Study Report for Victoria Golf Course Site/Former BKK Carson Dump, Operable Unit 2, Carson, California, May 29, 2009.*

Correspondence dated January 26, 2010: DTSC to Los Angeles County, *Comments on the Draft Remedial Investigation/Feasibility Study Report for Victoria Golf Course Site/Former BKK Carson Dump, Operable Unit 2, Carson, California, May 29, 2009.*

Correspondence dated May 19, 2010, Los Angeles County to DTSC: *Response to Comments on the Human Health Risk Assessment and Screening Level Ecological Risk Assessment for the Draft Remedial Investigation/Feasibility Study Report for the Victoria Golf Course Site [Former Ben K. Kazarian (BKK) Landfill, Carson Dump].*

Correspondence cover letter dated May 27, 2010, Los Angeles County to DTSC: *Additional Assessment Workplan for the Victoria Golf Course Site [Former Ben K. Kazarian (BKK) Landfill, Carson Dump].*

Remedial Investigation/Feasibility Study Additional Assessment Workplan, Former BKK Landfill, Carson Dump, Operable Unit 2, City of Carson, California, Prepared by: Leighton Consulting, May 2010.

E-mail, May 27, 2010, DTSC to Los Angeles County: *Victoria Golf Course Site (Former BKK Landfill)-Response to DTSC Comments* [for risk assessment work].

E-mail, June 2, 2010, DTSC to Los Angeles County: *Comments on Victoria Golf Course Additional Assessment Workplan.*

E-mail, June 8, 2010, DTSC to Leighton Consulting: *BKK OU-2 Investigation Depth.*

E-mail, June 8, 2010, Los Angeles County to DTSC: *Comments on Victoria Golf Course Additional Assessment Workplan.*

E-mail, June 8, 2010, Los Angeles County to DTSC: *Victoria Golf Course Site (Former BKK Landfill)-Response to DTSC Comments.*

E-mail, June 9, 2010, DTSC to Los Angeles County: *Comments on Victoria Golf Course Additional Assessment Workplan.*

E-mail, June 9, 2010, DTSC to Los Angeles County and reply back from Los Angeles County: *Victoria Golf Course Site (former BKK Landfill)-Response to DTSC Comments, Data from On-Site Supplemental Investigation at Victoria Golf Course Site [Former Ben K. Kazarian (BKK) Landfill, Carson Dump], Prepared by Leighton Consulting*.

Correspondence cover letter dated October 14, 2010, Los Angeles County to DTSC, *Remedial Investigation/Feasibility Study Off-Site Groundwater Assessment Workplan, Former BKK Landfill, Carson Dump, Operable Unit 2, City of Carson, California, Prepared by Leighton Consulting, November 3, 2010.*

Correspondence dated July 13, 2011, Los Angeles County to DTSC: *Response to DTSC Comments dated January 26, 2010 on the Draft Remedial Investigation/Feasibility Study for the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Correspondence dated August 25, 2011, DTSC to Los Angeles County: *Meeting, August 4, 2011 and Revised Draft Remedial Investigation Report for Victoria Golf Course Site/Former BKK Carson Landfill, Operable Unit 2, Carson, California.*

Correspondence dated September 1, 2011, Victoria Golf Course Site Consent Order.

Responsible Parties to DTSC: *Victoria Golf Course Site, Operable Unit 2.*

Correspondence dated September 22, 2011, DTSC to Consent Order Parties: *Response to September 1, 2011 Letter from Victoria Golf Course/Former BKK Carson Landfill Site Consent Order Parties.*

Correspondence dated September 30, 2011, Los Angeles County to DTSC: *Respondents' Attempt to Resolve Dispute with DTSC Under Section 6.27 of the Settlement Agreement and Consent Order, Docket No. HAS-CO 05/06-114 Relating to the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Correspondence dated October 12, 2011, DTSC to Los Angeles County: *Dispute Resolution Under Section 6.27 of the Settlement Agreement and Consent Order, Docket No. HAS-CO 05/06-114, Relating to the Victoria Golf Course Site/Former BKK Carson Landfill.*

Correspondence dated October 26, 2011, Los Angeles County to DTSC: *Respondents' Attempt to Resolve Dispute with DTSC Under Section 6.27 of the Settlement Agreement and Consent Order, Docket No. HAS-CO 05/16-114, Relating to the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Correspondence dated November 7, 2011, DTSC to Los Angeles County: *Comments to Revised Draft Remedial Investigation Report for the Victoria Golf Course Site/Former BKK Landfill, Carson Dump, Operable Unit 2, Carson, California, dated June 30 2011, Red-Line Version of Report Received on August 11, 2011.*

Memorandum dated January 30, 2012, DTSC internal: *Review of Remedial Investigation, Former BKK Landfill, Carson Dump, Operable Unit 2, City of Carson, California.*

Correspondence dated February 8, 2012, Los Angeles County to DTSC: *Follow-up to Technical Meeting Regarding a Consensus on the Action at the Victoria Golf Course Site (Former BKK Landfill, Carson Dump).*

E-mail, February 9, 2012, DTSC to Los Angeles County: *Victoria GC/BKK Carson.*

E-mail, March 1, 2012, Los Angeles County to DTSC: *Victoria GC/BKK Carson & MW-3.*

Correspondence dated March 2, 2012, Los Angeles County to DTSC: *Response to DTSC Comments dated November 7, 2011, on the Red-Line Version of the Revised Remedial Investigation Report for the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump), dated June 30, 2011.*

Correspondence dated March 22, 2012, Los Angeles County to DTSC: *Transmittal of Data Regarding Potential Off-Site Sources of Chlorinated Volatile Organic Compounds in Groundwater Up-Gradient of OU-2 of the Victoria Golf Course Site (Former BKK Landfill, Carson Dump).*

Correspondence dated May 24, 2012, DTSC to Los Angeles County: *DTSC Response to Responsible Parties' Response to Comments Letter Dated March 2, 2012 for the Revised Remedial Investigation Report, Victoria Golf Course Site/Former BKK Landfill Carson Dump, Operable Unit 2, Carson California, Dated June 30, 2011.*

Correspondence dated June 29, 2012, Los Angeles County to DTSC: *Response to DTSC Letter dated May 24, 2012, Regarding Additional Comments on Remedial*

Investigation Report for the Victoria Golf Course Site (Former BKK Landfill Carson Dump), OU-2.

Correspondence dated September 6, 2012, Los Angeles County to DTSC: *Draft Revised Feasibility Study Relating to Soil and Soil Gas Media for the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Correspondence dated October 25, 2012, DTSC to Los Angeles County: *Draft Revised Feasibility Study Relating to Soil and Soil Gas Media, Former BKK Landfill, Operable Unite 2 (Victoria Golf Course/BKK Carson Dump), City of Carson, California, dated September 6, 2012.*

Correspondence dated December 21, 2012, Los Angeles County to DTSC: *Response to DTSC Comments Dated October 25, 2012 on the Draft Revised Feasibility Study Relating to Soil and Soil Gas Media for the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Correspondence dated March 7, 2013, DTSC to Los Angeles County: *Dispute Resolution Termination for the Draft Remedial Investigation and Feasibility Study Reports, Victoria Golf Course Site/Former BKK Carson Landfill, Operable Unit 2, Carson, California.*

Correspondence dated May 3, 2013, Los Angeles County to DTSC: *Response to Letter dated March 7, 2013 Regarding Dispute Resolution Termination for the Draft Remedial Investigation and Feasibility Study Reports, Victoria Golf Course Site (Former BKK Carson Landfill), Operable Unit 2.*

Correspondence dated May 31, 2013, Los Angeles County to DTSC: *Revised Remedial Investigation and Feasibility Study for Soil and Soil Gas Media for the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Correspondence dated August 8, 2013, DTSC to Los Angeles County: *Response to Letter Dated May 3, 2013 on Dispute Resolution Termination for the Draft Remedial Investigation and Feasibility Study Reports, Victoria Golf Course Site/Former BKK Carson Landfill, Operable Unit 2, Carson, California.*

Correspondence dated September 24, 2013, Los Angeles County to DTSC: *Response to August 8, 2013 Letter Regarding Dispute Resolution Termination for the Draft Remedial Investigation and Feasibility Study Reports, Victoria Golf Course Site (Former BKK Carson Landfill), Operable Unit 2 and Coordination of Groundwater Issues at Operable Unit 1 and Operable Unit 2.*

Correspondence dated October 28, 2013, Los Angeles County to DTSC: *Response to August 8, 2013 Letter Regarding Dispute Resolution Termination for the Draft Remedial Investigation and Feasibility Study Reports, Victoria Golf Course Site (Former BKK*

Carson Landfill), Operable Unit 2 and Coordination of Groundwater Issues at Operable Unit 1 and Operable Unit 2.

Correspondence dated June 9, 2014, DTSC to Los Angeles County: *Review of Draft Revised Remedial Investigation and Feasibility Study for Soil and Soil Gas Media, Former BKK Landfill, Carson Dump, Operable Unit 2, Dated May 2014, Carson, California.*

Correspondence dated July 9, 2014, Los Angeles County to DTSC: *Final Remedial Investigation and Feasibility Study for Soil and Soil Gas Media for the Victoria Golf Course Site (Former Ben K. Kazarian (BKK) Landfill, Carson Dump).*

Final Remedial Investigation and Feasibility Study for Soil and Soil Gas Media, Former BKK Landfill, Carson Dump, Operable Unit 2, City of Carson, California, Prepared by: Leighton Consulting, June 2014.

Appendix 3 DTSC Response to Comments

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

RESPONSE TO COMMENTS

For Draft Remedial Action Plan
Victoria Golf Course/Former BKK Carson Landfill) Site, OU-2 Carson

1.0 Introduction

On February 26th, 2016, the Department of Toxic Substances Control (DTSC) announced the accepting of public comments for a proposed plan to enhance containment of contaminated soils and waste debris, and maintain a soil cover and monitor landfill gas, at the Victoria Golf Course Site (known as the former BKK Carson Landfill). The proposed plan, called a draft Remedial Action Plan (RAP) was developed specifically for the approximately 270-acre site located northeast of the 405 Freeway at 340 East 192nd Street in Carson, including the Victoria Golf Course, the Victoria Cricket Fields, a portion of the Victoria Regional Park, the Goodyear Airship Center, and the MB Landscape Nursery. In compliance with the California Environmental Quality Act (CEQA), DTSC prepared a Notice of Exemption (NOE), as the proposed RAP activities will not have a significant effect on human health and the environment.

DTSC held a 30-day public comment period that began February 26th, 2016 and ended March 28th, 2016. DTSC also hosted a public meeting to present the draft RAP and to accept public comments. The public meeting was held on March 10th, 2016, at the Victoria Community Regional Park, Multipurpose Room, 419 E. 192nd Street, in Carson. DTSC hereby responds to all public comments received during the 30 day public comment period as documented in this Response to Comments document.

The draft RAP, CEQA NOE, and other project documents are available for public review at:

Carson Regional Library	Department of Toxic Substances Control
151 East Carson Street	5796 Corporate Avenue
Carson, CA 90745-2703	Cypress, CA 90630-4732
(310) 830-0901	(714) 484-5337

In this Response to Comments, all comments are separated into the following sections:

Section 1: Introduction
Section 2: Public Comments Received Via E-Mail and U.S. Mail
Section 3: Public Comments Received at March 10th, 2016, Public Meeting

2.0 Public Comments Received Via E-mail and U.S. Mail

Comment 1: Comment Received via U.S. Mail - from Marian E. Cumberlander, 19903 Dunbrooke Avenue, Carson, CA 90746, (310) 532-9558.

Why is there no “soil testing” on properties located directly east of Victoria Park. This tract of houses were built on the same landfill adjacent to Victoria Park. As such, a sampling of soil from the houses across Avalon Blvd., between Elsmere Street and Turmont Avenue should also be soil tested for contaminants and other ills, to determine whether or not there are health risks for residents in this area.

DTSC Response:

The former BKK Carson landfill eastern boundary is Avalon Blvd. The residential neighborhood east of Avalon Blvd. was not part of the former BKK Carson landfill and DTSC does not have any documentation that indicates the neighborhood was part of any historic landfill. If DTSC believed that contaminated soil from the former BKK Carson landfill operations had migrated past Avalon Blvd., appropriate sampling would have been done. Since the 1980s, Los Angeles County has been monitoring the air and soil gas around closed landfills in the Carson area for unsafe levels of methane that may be coming from the former landfills. The former BKK Carson landfill will have continued landfill gas monitoring and soil cap monitoring and maintenance to ensure the public is not at risk from potential landfill gas emissions.

Comment 2: Comment Received via E-Mail-Linda Hembrick, 706 Howard Avenue, Carson, CA (310) 329-7836.

I am very concerned about the health of my family and myself due to increased landfill gas emissions or air plumes from direct exposure to contaminated soil.

1. Why now? If there have been “numerous” environmental investigations, why are you activating a “Remedial Action Plan”?
2. What safety measures will be given to residents to monitor emissions which may enter our homes and lungs?
3. What medical measures are available to residents?
4. Who is the direct DTSC contact who will answer questions and concerns?

DTSC Response:

Data reviewed by DTSC does not indicate an increase of landfill gas emissions or air plumes from contaminated soil from the former landfill. There is no direct exposure to contaminated soil because there is a soil cap over the former landfill. The former landfill is monitored for emissions every quarter to ensure the safety of the public.

1. The previous environmental investigations were not comprehensive sampling efforts to understand the full nature and extent of landfill contamination. The

previous investigations were focused on specific data, such as whether there was groundwater contamination. Because most of these investigations were focused, they did not give a complete picture of the types of contaminants, and the full extent of the landfill contamination. The environmental investigation that was completed before development of the current Remedial Action Plan was a Remedial Investigation (RI). This RI was a comprehensive environmental study that sampled and analyzed all aspects of potential contamination including air, landfill/soil gas, soil, and groundwater in order to get a complete picture of the landfill contamination. Because the RI indicated that some soil areas were a potential exposure concern to workers who dug into the former landfill, because hazardous wastes were remaining onsite beneath the golf course and other locations within the former landfill footprint, and because landfill gas emission monitoring was needed for the long-term, a Remedial Action Plan was developed to document and address these concerns.

2. Safety measures to ensure landfill gas emissions are not migrating from the former BKK Carson landfill to surrounding businesses and neighborhoods at unsafe levels will include the continued quarterly monitoring of landfill gas from the surface and perimeter boundary of the landfill. Landfill methane monitoring has been ongoing since the 1980s.
3. There are currently no medical measures available to residents. If data indicate a potential health concern for residents, DTSC will evaluate the need for appropriate measures.
4. The Department of Toxic Substances Control, Project Manager, available to answer questions and concerns about the landfill is:
   Alice Gimeno-O'Brien at (714) 484-5429 or e-mail:
   Alice.Gimeno-Obrien@dtsc.ca.gov. If the DTSC Project Manager can't be reached, contact DTSC Unit Chief, Douglas Bautista, at (714) 484-5442, or e-mail: Douglas.Bautista@dtsc.ca.gov, or DTSC Public Participation Specialist, Stacey Lear, at (714) 484-5354, or e-mail: Stacey.Lear@dtsc.ca.gov.

3.0 Public Comments Received at March 10th, 2016, Public Meeting

During the March 10th, 2016, public meeting, public comments were recorded by a certified short hand reporter to ensure comment accuracy.

Comment 3: Comment Received from Zac Gonzalez, Associate Planner, City of Carson

My name is Zac Gonzalez, and I'm an Associate Planner for the City of Carson. And I'm also on staff that works with the Environmental Commission for the City of Carson. And I just have some questions. I haven't reviewed your environmental documents yet, but I'm the staff that also worked on the Porsche project and reviewed the environmental documents. The concern that I have, and I don't know if your documents have addressed it, I haven't researched it yet. But this landfill site operated from 1948 to 1960. And you've identified in your map that you had an exhibit-I guess it's the map

right there to your right, that there was certain areas where you did testing and well monitoring. And there's a lot of residential areas east of Avalon and north of 192nd street. And the question that I have, how far north and east of those streets was testing done from the time you started testing until now to see, to monitor, whether there was any seepage of contamination to these residential areas? That's the first question that I have. The second question that I have is, do you have a slide or a graphic representation of a cross-section of the aquifer as it relates to the level and depth of contamination that was found on this site? Now I would like to see that. I'm sure the public would like to see that. I don't think it's what your-you know, these are very technical documents and presentations. So without graphic representation, it is hard to see. So that's what I, you know, would like to see as well. So basically those are my questions and then, you know-and I left my e-mail address.

And I just want to say that the Mayor of Carson is here, the Honorable Albert Robles.

DTSC Response:

For the first question regarding how far north and east of the landfill was sampled to determine whether contaminants have spread to adjacent neighborhoods, sampling was done in the yards of five homes north of the landfill. In addition, soil gas perimeter wells along the northern boundary, and along the eastern Avalon Boulevard boundary were installed, as well as the entire perimeter of the landfill sampled.

The second question was regarding the availability of graphic representation of a cross-section of the groundwater aquifer(s) relating to the level and depth of contamination found at the site. There are figures in the Remedial Investigation Report depicting this and the report is available to the public on-line and also at the Carson Library repository. The figures that are referenced in the draft RAP refer back to the Remedial Investigation/Feasibility Study Report. There are figures in the report that show the depths of the groundwater wells and the types of contamination at the varying depths, including the upper aquifer. All of the groundwater data is available in the Remedial Investigation report.