SFUND RECORDS CTR
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Department of Toxic Substances Control

Terry Tamminen
Agency Secretary
Cal/EPA

5796 Corporate Avenue
Cypress, California 90630

Arnold Schwarzenegger
Governor

October 14, 2004

Mr. Christopher Hansen, P.E., Vice President
Engineering and Environmental Programs
BKK Corporation
2210 South Azusa Avenue
West Covina, California 91792

Dear Mr. Hansen:

Thank you for your letter dated September 8, 2004 regarding the Department of Toxic Substances Control's (DTSC) actions at the Victoria Golf Course landfill in Carson, California. DTSC has scheduled a meeting at its Cypress office of potentially responsible parties (PRPs), including BKK Corporation, at 10:00 a.m. on November 5, 2004. We look forward to BKK's participation in this meeting and the information that they can provide to the parties in attendance.

I wish to take this opportunity to respond to statements in your letter for the record. You indicated that BKK has limited financial resources and there appears to be consensus among the United States Environmental Protection Agency (USEPA) and DTSC that BKK's remaining resources should be focused on postclosure care and remediation of the company's landfill site in West Covina. While DTSC has reviewed the company's confidential financial records, no consensus exists among the regulatory agencies that BKK's resources should only be directed to the West Covina site. As the operator of the defunct Victoria Golf Course landfill, BKK is a potentially responsible party pursuant to the federal Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and California Health and Safety Code (H&SC), Division 20, Chapter 6.8 (Hazardous Substance Account Act); and therefore BKK is potentially liable for this site's remediation costs.

You conveyed in your letter certain issues that BKK has with the Expanded Site Investigation conducted by DTSC in 1996. BKK alleges that during this investigation, DTSC created a conduit for future contaminant migration. Both DTSC and USEPA received several letters from BKK alleging this situation. DTSC does not agree with your allegations for the following reasons:

1. DTSC, as part of a cooperative agreement with USEPA, conducted groundwater and soil sampling using Hydropunch® via direct push technology (Cone Penetrometer Test [CPT]). USEPA provided oversight support to DTSC during field sampling events at the Victoria Golf Course landfill.

2. All CPT borings were 'back grouted' by pushing a hollow CPT rod to the terminal depth of the borehole. A 'sacrificial tip' was discarded at the terminal depth of the borehole. Grout was then pumped under pressure, using a 2L-4 Moyno pump, down the borehole. The CPT rod was incrementally removed as the grout filled the borehole. The borehole was grouted to the surface, allowed to cure overnight, and chips and grout were added to the top of the borehole to finish the procedure.

3. The landfill does not have an engineered liner or cover. The site is underlain by thick lenses of sandy silt and clay which can restrict downward migration of contaminants, but not necessarily prohibit movement. Because these lenses are discontinuous, communication for infiltration to the 200-foot and 400-foot aquifers downgradient and beneath the clay lenses is possible.

4. Records indicate that during some landfill operations, the surface was cut down to where wastes were disposed in direct contact with shallow groundwater. A number of government records from the 1950's raise concerns regarding the potential for transfer of pollution from the shallow and semi-perched water to the productive groundwater aquifers below.

Your letter also raised the question of additional PRPs for the Victoria Golf Course landfill. DTSC has already named the landfill operator, BKK Corporation, and current landowners of the former landfill property, as PRPs. If BKK or the other identified PRPs choose to identify additional PRPs for the Victoria Golf Course site that they feel should be named, they can do so pursuant to California Health and Safety Code section 25356.1.3. Pursuant to that section, the request should include, with appropriate documentation, the factual and legal basis for identifying additional parties for the Victoria Golf Course landfill. DTSC will review any information it receives and determine if there is a factual and legal basis for identifying other persons as PRPs for the site.

Finally, you requested a copy of USEPA's Expanded Site Inspection Report from October 2001. We have attached a summary excerpt from the report. The entire report can be obtained by contacting USEPA at 415-536-2009 or you can contact Julie

Johnson at DTSC's file room at 714-484-5337 to schedule an appointment to review or copy the entire report.

We hope this letter clarifies any questions or issues that you have on past activities on the Victoria Golf Course landfill. If you have any questions regarding this letter, please contact Alice Gimeno at (714) 484-5429.

Sincerely,

John Scandura, Chief
Office of Military Facilities
Southern California Operations Branch

Enclosure

cc: Ms. Dawn Richmond
Superfund Project Manager
United States Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105

Mr. Robert Elliott
Department of Toxic Substances Control
Office of Legal Counsel
1001 "I" Street
Sacramento, California 95814-2828

Ms. Stacey Lear
Public Participation Specialist
Cypress Office

Mr. Peter Weiner
Paul Hasting, Janofsky & Walker
55 Second Street, 24th Floor
San Francisco, California 94105

2001
Vol. 16

Expanded Site Inspection Report
Victoria Golf Course
Carson, California

EPA ID No.: CAD980818926
USACE Contract No.: DACA45-98-D0004, Task Order 16
Document Control No.: RFW20074.001.601.AAAV

October 22, 2001

Prepared for:
U.S. Environmental Protection Agency
Region IX

Prepared by:
Roy F. Weston, Inc.

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region IX, under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), has tasked Roy F Weston (WESTON) to conduct an expanded site inspection (ESI) of the Victoria Golf Course (VGC) site in Carson, Los Angeles County, California.

The site was identified as a potential hazardous waste site and entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on June 1, 1981 (CAD980818926). Preliminary assessments (PAs) were completed for the EPA on November 1, 1984, and November 10, 1988. A site inspection (SI) was completed for the EPA on September 8, 1989 (1). The purpose of these evaluations were to assess the threats(s), if any, posed to public health, welfare, or the environment by the site, and to determine if further investigation under CERCLA/SARA is warranted.

After reviewing existing information, the EPA decided that further investigation of the VGC site would be necessary to more completely evaluate the site using the EPA's Hazard Ranking System (HRS) criteria. The HRS assesses the relative threat associated with actual or potential releases of hazardous substances at the site. The HRS has been adopted by the EPA to help set priorities for further evaluation and eventual remedial action at hazardous waste sites. The HRS is the primary method of determining a sites eligibility for placement on the National Priorities List (NPL). The NPL identifies sites at which the EPA may conduct remedial response actions. This report summarizes the results of the ESI for the VGC site.

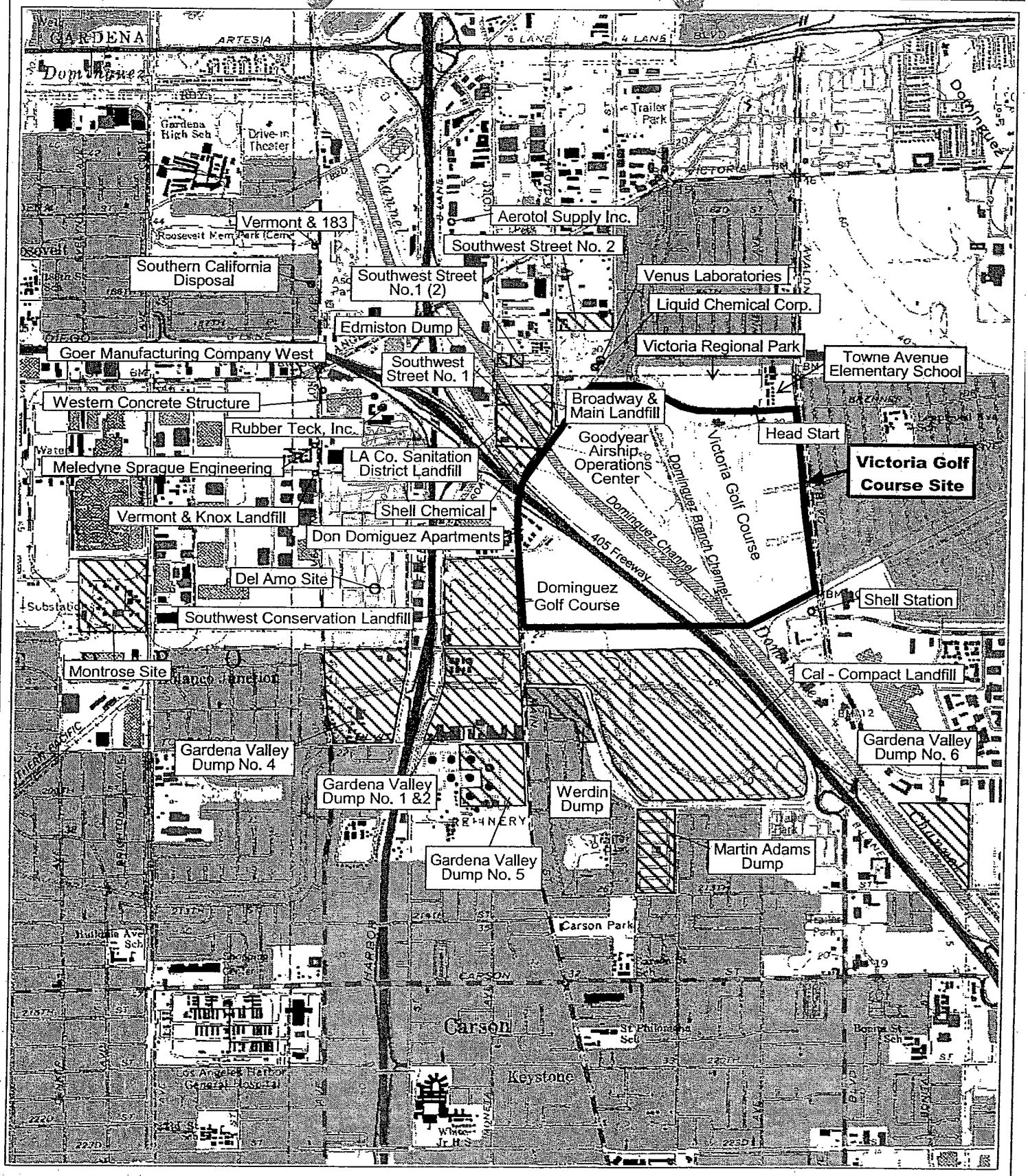
1.1 Apparent Problem

The apparent problems at the site, which contributed to EPA's determination that an ESI was necessary, are presented below.

A Class II landfill, which was permitted to accept inert solid fill (e.g., rock, concrete, and earth), household and commercial refuse (e.g., paper, wood, rubber, shrubbery, and paint sludge), garbage (e.g., animal and vegetable products), and liquids and semi-liquids (e.g., drilling muds and printer's ink), operated on a majority of the site from 1948 to 1959 (2). In addition, a public dump operated on the remaining portion of the site from 1953 to 1955 (3).

In December 1996 and January 1997, the California Department of Toxic Substances Control (DTSC) conducted Hydropunch™ soil and groundwater sampling efforts at the site. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and/or metals were detected at elevated concentrations in samples collected from three of the eight soil sampling locations. Several VOCs, including vinyl chloride, were detected in groundwater samples collected from beneath the southwest portion and immediately to the south of the site (4).

The VGC site has become a focus of public concern regarding the potential for the exposure of nearby teachers, students, and residents to methane and other contaminants migrating from the inactive landfill/dump via subsurface gas and outdoor ambient air. The Towne Avenue Elementary School is located to the north of the site immediately across 192nd Street (5, 6, 7, 8). Two temporary buildings utilized by a federally funded early childhood education program (i.e., Head Start) are also located to the north of the site. These two buildings are located to the west of Towne Avenue Elementary School in



Other Inactive Landfills and Hazardous Waste Sites

SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Torrance, CA, 1964, photorevised 1981.

DATE: 9/24/01

ROY F. WESTON INC.
1575 TREAT BLVD. SUITE 212
WALNUT CREEK, CA 94598

Scale in Feet

500 0 500 1000

N W E S

Figure 2-1
Site Location Map
Victoria Golf Course
Carson, CA

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2.4.2 California Department of Toxic Substances Control (DTSC)

In December 1996 and January 1997, the DTSC conducted Hydropunch™ soil and groundwater sampling efforts at the site. These efforts are described in Section 3.0 (Investigative Efforts) (4). In September 1998, the DTSC was one of the reviewing agencies that provided comments on an Environmental Impact Report that was prepared as part of a project to refurbish the golf course (Victoria Golf Course) that occupies a majority of the VGC site (21). In 1999, the DTSC Human and Ecological Risk Division (HERD) reviewed the work plan and results of an air sampling investigation that was conducted at the Towne Avenue Elementary School immediately to the north of the site. The HERD concluded that the preliminary results were generally consistent with the ambient concentrations of VOCs in the surrounding urban area (8, 22). In 2000, the Los Angeles Unified School District contracted IT Corporation to conduct a DTSC preliminary endangerment assessment (PEA) for the Towne Avenue Elementary School. Based on the results of the PEA, it was concluded that past activities at or near the school have impacted the environment, but pose a low risk and hazard to the adult staff and students at the school (23).

2.4.2 California Regional Water Quality Control Board (RWQCB)

Bryant A. Stirrat & Associates, under contract to BKK Corporation, submitted a proposal for a groundwater Solid Waste Assessment Test (SWAT) to the RWQCB, Los Angeles Region, in March 1988 (24).

2.4.3 County of Los Angeles

Since 1964, the County of Los Angeles Department of Parks and Recreation (DPR) has operated the golf course (Victoria Golf Course) that occupies a majority of the site (17). The most recent sampling activities initiated at the VGC site by the DPR occurred in 1999. In March 1999, the DPR retained Sapphos Environmental to prepare a screening-level health risk assessment for landfill gas emissions. The field work was performed by SCS Engineers. The purpose of the study was to evaluate the potential human health and safety risks from exposure to contaminants in landfill gas emissions as a result of the proposed Victoria Golf Course refurbishment project. Ten landfill gas samples were collected from the golf course, using temporary probes installed through the surface of the landfill. The samples were analyzed for VOCs using EPA Method TO-14 and for permanent gasses (e.g., methane) using EPA Method 3C. Based on the results of landfill gas generation and air dispersion modeling, it was concluded that the maximum carcinogenic risk and non-carcinogenic hazard index for a typical on-site residential receptor were less than regulatory thresholds and should not be considered a significant concern (23, 25).

Since the 1980s, the County of Los Angeles Department of Public Works, in cooperation with the City of Carson, has overseen the routine sampling of methane monitoring probes located throughout the city. Some of these probes are located on and in the vicinity of the VGC site (26, 27, 28, 29).

In October 2000, the County of Los Angeles Office of County Counsel, at the request of the EPA, retained SCS Engineers to conduct a soil vapor survey of the Victoria Regional Park, which is located to the north of the VGC site. Nineteen soil vapor survey points were installed in the eastern portion of the park. The samples were analyzed for fuel-related VOCs using EPA Method 8020. No analytes were detected above the detection limits of 0.020 μg/L-vapor for BTEX and 0.050 μg/L-vapor for MTBE (10).

3.1.2 Groundwater Sampling

In January 1997, the DTSC, as part of a cooperative agreement with EPA, conducted a Hydropunch™ groundwater sampling effort at the VGC site. Water table samples were collected from eight locations (GW-1, GW-2, GW-3, GW-5, GW-8, GW-9, and GW-10). Several VOCs (i.e., vinyl chloride, 1,1-dichloroethane [1,1-DCA], 1,2-dichloroethene [1,2-DCE], 1,2-dichloroethane [1,2-DCA], trichloroethene [TCE], and chlorobenzene) were detected in the samples collected beneath the southwest portion and immediately to the south of the site (sampling locations GW-1, GW-9, and GW-10). VOCs were not detected, or detected at concentrations below Contract Required Quantitation Limits (CRQLs), in the samples collected from the remaining five Hydropunch™ locations in the north and northeast portions of the site (GW-2, GW-3, GW-4, GW-5, and GW-8). Semivolatiles and metals were not detected at elevated levels at any of the eight groundwater sampling locations (4). Although VOCs were detected at elevated concentrations at the three groundwater sampling locations in the southwest portion of the site, relative to the reported concentrations for the remaining five sampling locations to the north and northeast, no site-specific water levels measurements were available to determine the direction of groundwater flow. In the absence of site-specific groundwater gradient data, as well as the presence of possible alternate contributors (i.e., the other inactive landfills in the area), the January 1997 DTSC sampling results were not sufficient to document a release to groundwater that is attributable, at least in part, to the VGC site.

3.2 Current Sampling

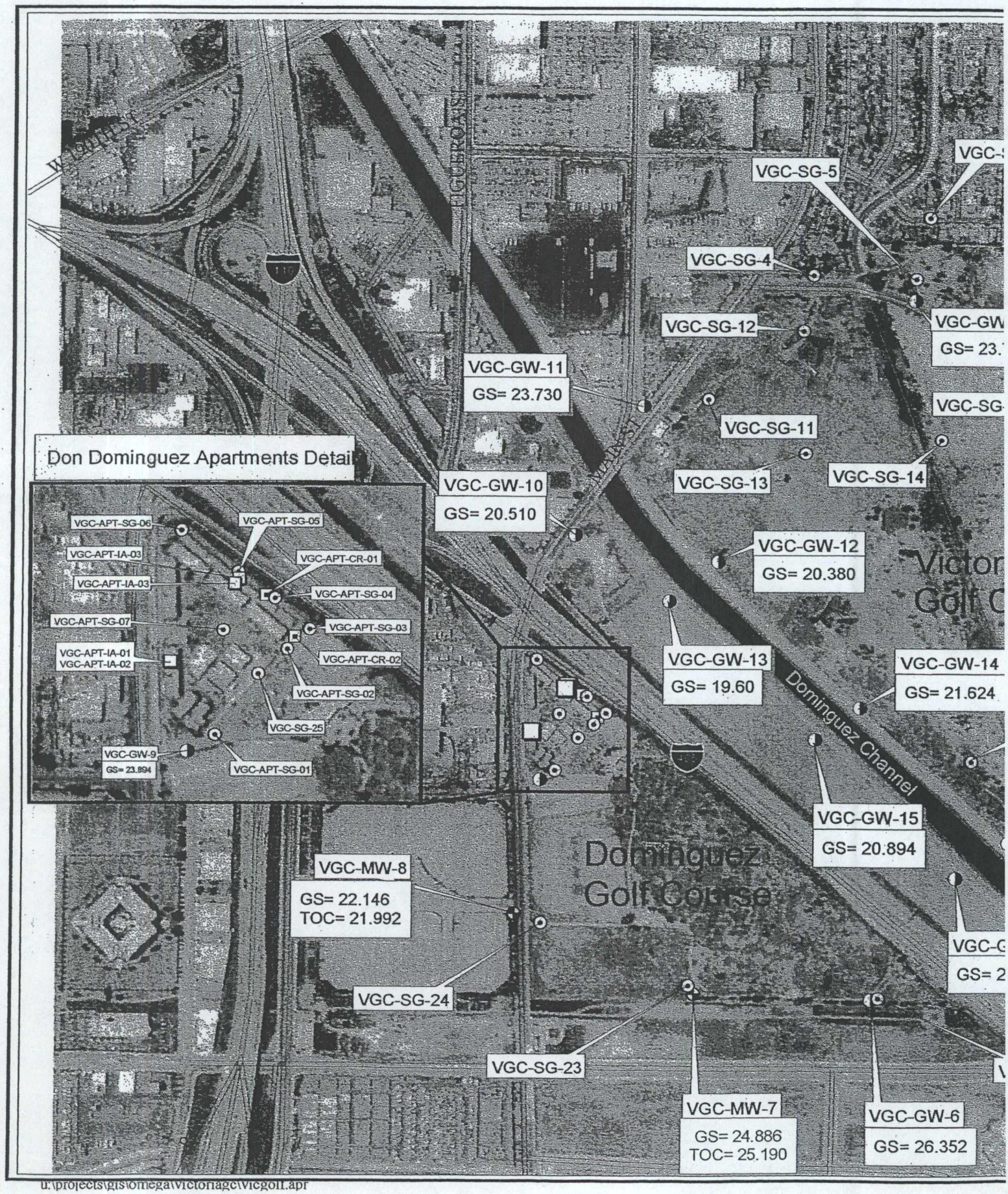
As tasked by the EPA, WESTON conducted an ESI sampling event at the VGC site in November and December 2000. Groundwater and soil gas samples were collected to support the HRS evaluation of the site. In addition, crawlspace air, indoor air, and ambient air samples were collected for risk assessment screening purposes. The EPA-approved sampling and analysis plan is presented in Appendix D. The sampling locations and analytical results for all samples are presented in Figure 3-1 and Appendix E. The groundwater and soil gas sampling efforts are discussed in detail below because the analytical data from these efforts were used to establish a release to groundwater and attribute the release, at least in part, to the VGC site.

3.2.1 Groundwater Sampling

3.2.1.1 Monitoring Well Sampling

In November and December 2000, WESTON installed and sampled four groundwater monitoring wells (MW-2, MW-5, MW-7, and MW-8). The as-built well construction diagrams are presented in Appendix F. As shown in Figure 3-1, MW-2 is located off site to the north and immediately across 192nd Street from the inactive landfill. MW-5 is located off site, immediately across the street that defines the southeast boundary of the site. MW-7 and MW-8 are located within 800 feet of one another along the site boundary lines that define the southwest corner of the site. All samples were analyzed for total metals using EPA Contract Laboratory Program Analytical Services (CLPAS) Method ILM04.1, and for VOCs using CLPAS Method ILM04.2.

Water level measurements collected from the four monitoring wells indicate that the site-specific direction of groundwater flow is toward the southwest. Based on this groundwater flow direction, MW-2 and MW-5 are designated as background wells in Table 3-1, with MW-2 located hydraulically upgradient of the site and MW-5 located hydraulically cross-gradient of the site.



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For HRS purposes, an analyte is considered to be present at a concentration significantly above background if one of the following two criteria is met: 1) the analyte is detected in the hydraulically downgradient sample when not detected in the background samples or 2) the analyte is reported at a concentration equal to or greater than three times the maximum background level in the hydraulically downgradient sample when detected in the background samples. No metals were detected at concentrations significantly above background levels during the December 2000 monitoring well groundwater sampling event. However, as shown in Table 3-1, several chlorinated VOCs (i.e., vinyl chloride, 1,1-DCE, trans-1,2-DCE, cis-1,2-DCE, TCE, and chlorobenzene) were reported at significantly increased concentrations in the two hydraulically downgradient monitoring wells. Data validation results (see Appendix E) indicate that the values presented in Table 3-1 satisfy all contract-required QA/QC acceptance criteria.

3.2.1.2 Cone Penetrometer Test (CPT) Groundwater Sampling

In November 2000, WESTON collected direct push, depth discreet CPT groundwater samples from 13 locations on and in the vicinity of the VGC site. The sampling forms are presented in Appendix G. As shown in Figure 3-1, CPT sample locations GW-1, GW-3, and GW-4 were located off site, immediately across 192nd Street to the north of the site and immediately across Avalon Boulevard to the east of the site. GW-10 and GW-11 were located along Main Street, which forms the northwest border of the site. The remaining eight CPT sample locations were located on site along the Dominguez Channel (GW-12, GW-13, GW-14, GW-15, GW-16, and GW-17), in the Don Dominguez Apartment complex (GW-9), and along the southern border of the site near the southwest corner (GW-6). The sample depths are presented in Table 3-2. All samples were analyzed for total metals using EPA CLPAS Method ILM04.1, and for VOCs using CLPAS Method ILM04.2.

As discussed previously in Section 3.2.1.1, water level measurements collected from four monitoring wells indicate that the site-specific direction of groundwater flow is toward the southwest. Based on this groundwater flow direction, GW-1, GW-3, GW-4, GW-10, and GW-11 are designated as background locations in Table 3-2, with GW-1, GW-3, and GW-4 located hydraulically upgradient of the site, and GW-10 and GW-11 located hydraulically cross-gradient of the site.

No metals were detected at concentrations significantly above background levels during the November 2000 CPT groundwater sampling event. However, as shown in Table 3-2, several chlorinated VOCs (i.e., vinyl chloride, 1,1-DCE, trans-1,2-DCE, cis-1,2-DCE, and 1,2-DCA) were detected at significantly increased concentrations in groundwater samples collected from beneath the inactive landfill. Data validation results (see Appendix E) indicate that the values presented in Table 3-2 satisfy all contract-required QA/QC acceptance criteria.

3.2.2 Soil Gas Sampling

In November 2000, WESTON collected soil gas samples from 37 locations on and in the vicinity of the VGC site. The sample locations are shown in Figure 3-1 and described in Table 3-3. Sample locations VGC-SG-1, VGC-SG-2, VGC-SG-3, VGC-SG-4, VGC-SG-5, VGC-SG-6, VGC-SG-7, VGC-HS-SG-01, VGC-HS-SG-02, VGC-HS-SG-03, VGC-HS-SG-04, VGC-SG-8, VGC-SG-16, VGC-SG-17, VGC-SG-9, VGC-SG-10, VGC-APT-SG-01, VGC-APT-SG-02, VGC-APT-SG-03, VGC-APT-SG-04, VGC-APT-SG-05, VGC-APT-SG-06, and VGC-APT-SG-07 are designated as background locations in Table 3-3 because they were located either on site and near the perimeter, or off site. All samples were analyzed for VOCs using EPA Method TO-14A. As shown in Table 3-3, vinyl chloride was detected at elevated concentrations in the samples collected from within the inactive landfill.

Table 3-2
Selected November 2000 ESI CPT Groundwater Sampling Results (μg/L)
(results significantly above background are bolded and underlined[1])

Boring ID	Sample Depth (ft bgs)	Sample No.	Sampling Date	Vinyl Chloride	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	1,2-DCA
Background CPT Sample Locations								
GW-1	57	VGC-GW-1	11/15/00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.8
GW-3	47	VGC-GW-3	11/17/00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
GW-4	57	VGC-GW-4	11/17/00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
GW-10	54 - 60	VGC-GW-10	11/21/00	ND (0.5)	ND (0.5)	ND (0.5)	0.9	4.8
GW-11	not recorded	VGC-GW-11	11/15/00	ND (20)	ND (20)	ND (20)	120	ND (20)
CPT Sample Locations Beneath the Inactive Landfill								
GW-12	not recorded	VGC-GW-12	11/15/00	**3.3**	**1.5**	**12**	39	0.6
GW-14	50 -60	VGC-GW-14	11/20/00	ND (0.5)	ND (0.5)	ND (0.5)	2.6	ND (0.5
GW-16	57 - 60	VGC-GW-16	11/21/00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.7
GW-13	39	VGC-GW-13	11/16/00	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
GW-15	64	VGC-GW-15	11/16/00	**23**	**3.8**	**22**	**800**	1.7
GW-17	57	VGC-GW-17	11/16/00	**2**	**2**	**2**	15	ND (1)
GW-9	57	VGC-GW-9	11/17/00	**14**	ND (5)	ND (5)	15	**43**
		VGC-GW-98	11/17/00	**11**	ND (3)	ND (3)	18	**49**
GW-6	46	VGC-GW-6	11/16/00	ND (20)	ND (20)	ND (20)	ND (20)	ND (20)

ND () = Analyte not detected above reported sample quantitation limit.

ft bgs = feet below ground surface

[1] = For HRS purposes, an analyte is considered to be present at a concentration significantly above background if one of the following two criteria is met: 1) the analyte is detected in the hydraulically downgradient sample when not detected in the background samples or 2) the analyte is reported at a concentration equal to or greater than three times the maximum background level in the hydraulically downgradient sample when detected in the background samples. In addition, the analytical data must be of known and documented quality. Data validation results (see Appendix E) indicate that the values presented in Table 3-2 satisfy all contract-required quality assurance/quality control acceptance criteria (i.e., none of the values presented in Table 3-2 were assigned a J-qualifier).

Table 3-3
Selected December 2000 ESI Soil Gas Sampling Results (ppb[v/v])
(results elevated above background levels are bolded and underlined)

VGC-APT-SG-02	Within Don Dominguez Apts. complex (on site, but in westernmost portion)	5 - 10	11/15/00	ND (0.20)
VGC-APT-SG-03	Within Don Dominguez Apts. complex (on site, but in westernmost portion)	5 - 10	11/15/00	ND (0.20)
VGC-APT-SG-04	Within Don Dominguez Apts. complex (on site, but in westernmost portion)	5 - 10	11/15/00	ND (0.20)
VGC-APT-SG-05	Within Don Dominguez Apts. complex (on site, but in westernmost portion)	5 - 10	11/15/00	ND (0.20)
VGC-APT-SG-06	Within Don Dominguez Apts. complex (on site, but in westernmost portion)	5 - 10	11/15/00	ND (0.20)
VGC-APT-SG-07	Within Don Dominguez Apts. complex (on site, but in westernmost portion)	5 - 10	11/15/00	ND (0.20)
On-site Soil Gas Sample Locations				
VGC-SG-11	Northwestern portion of site	5	11/14/00	**77**
		15	11/14/00	**82**
VGC-SG-12	Northwestern portion of site	5	11/09/00	ND (0.10)
		15	11/09/00	**1.6**
VGC-SG-13	Northwestern portion of site	5	11/14/00	**1,200**
		15	11/14/00	**69**
VGC-SG-14	North central portion of site	5	11/09/00	**1.1**
		15	11/09/00	ND (2.0)
VGC-SG-15	North central portion of site	10	11/09/00	ND (2.0)
		20	11/09/00	**46**
VGC-SG-18	Northeastern portion of site	5	11/09/00	**140**
		15	11/09/00	**0.84**
VGC-SG-26	Eastern central portion of site	5	11/10/00	**13**
		15	11/10/00	**1,400**
VGC-SG-19	Southeastern portion of site	5	11/10/00	ND (0.20)
		15	11/10/00	**310**
VGC-SG20	Southeastern portion of site	5	11/10/00	ND (10)
		10	11/10/00	**72**
VGC-SG-21	South central portion of site	5	11/10/00	**340**
		15	11/10/00	ND (9.9)

4.0 HAZARD RANKING SYSTEM FACTORS

4.1 Sources of Contamination

A Class II landfill, which was permitted to accept inert solid fill (e.g., rock, concrete, and earth), household and commercial refuse (e.g., paper, wood, rubber, shrubbery, and paint sludge), garbage (e.g., animal and vegetable products), and liquids and semi-liquids (e.g., drilling muds and printer's ink), operated on a majority of the site from 1948 to 1959 (2, 31, 32, 33, 34). In addition, a public dump operated on the remaining portion of the site from 1953 to 1955 (3). A review of historic aerial photographs indicates that the disposal area (landfill and public dump) covered approximately 325 acres (13).

4.2 Groundwater Pathway

4.2.1 Hydrogeological Setting

The VGC site is located in the West Coast Basin of the coastal plain of Los Angeles County. Hydrogeologic units in the West Coast Basin include aquifers and aquitards of varying composition and water-yielding properties. The following hydrogeologic units, in descending order, have been identified in the vicinity of the VGC site: the Upper Bellflower water bearing unit, which stratigraphically extends from a depth of approximately 20 feet bgs to a depth of approximately 90 feet bgs, and consists predominantly of clay, silt, and very fine sand; the Middle Bellflower (a.k.a., Bellflower Sand) water bearing unit, which extends from a depth of approximately 90 feet bgs to a depth of approximately 145 feet bgs, and consists of fine to coarse-grained sand; the Lower Bellflower aquitard, which extends from a depth of approximately 145 feet bgs to a depth of 170 feet bgs, and consists predominantly of silts; the Gage water bearing unit, which extends from a depth of approximately 170 feet bgs to a depth of 240 feet bgs, and consists of fine-grained sand; the Gage-Lynwood aquitard, which extends from a depth of approximately 240 feet bgs to 300 feet bgs, and consists predominantly of silt; the Lynwood water bearing unit, which extends from a depth of approximately 300 feet bgs to a depth of approximately 400 feet bgs, and consists of fine to course-grained sand; an unnamed aquitard, which extends from a depth of approximately 400 feet bgs to a depth of approximately 600 feet bgs; and the Silverado water bearing unit, which first occurs at a depth of approximately 600 feet bgs, and consists of fine to coarse-grained sand and gravels. All of the water bearing units (i.e., Upper Bellflower, Middle Bellflower, Gage, Lynwood, and Silverado) are designated as aquifers by the RWQCB. The two lowermost aquifers (i.e., Lynwood and Silverado) are the principal sources of municipal drinking water for the Los Angeles region (16, 35, 36, 37, 46).

Aquifer interconnection, for HRS purposes, is established between the Upper Bellflower, Middle Bellflower, Gage, Lynwood, and Silverado aquifers within 2 miles of the VGC site. Groundwater sampling data are available to establish interconnection between the Upper Bellflower, Middle Bellflower, Gage, and Lynwood aquifers. As shown in Figure 2-1, the Montrose Chemical Corporation site, which is listed on the NPL, is located approximately 1 mile west of the VGC site. As reported in the October 1992 Montrose Site Final Draft Remedial Investigation report, chlorobenzene and para-chlorobenzene sulfonic acid have been detected at elevated concentrations in monitoring wells screened solely in the Upper Bellflower, the Middle Bellflower, the Gage, and the Lynwood aquifers in the vicinity of the Montrose site. These two contaminants are associated with past dichlorodiphenyltrichloroethane (DDT) manufacturing operations at the Montrose site (37). Stratigraphic information is available in the June 1961 *State of California Department of Water Resources Bulletin 104, Planned Utilization of Groundwater Basins of the Coastal Plain of Los Angeles County* to establish interconnection between the Lynwood and Silverado aquifers. The VCG site is located approximately 1.75 miles northeast of the coastal area where merging of the Lynwood and Silverado aquifers is known to occur (36).

several other inactive landfills to the north, west, and south of the VGC site (14, 16, 45). In addition, groundwater flow direction in the area is variable. However, the documented release is still attributable, at least in part, to the VGC site. Background CPT groundwater samples GW-1, GW-10, and GW-11 were collected from locations in between the site and possible alternate contributors to the north and west (see Figures 2-1 and 3-1). Although cis-1,2-DCE was detected in off-site CPT sample GW-11 at 120 μg/L, this hazardous substance was detected in on-site sample GW-15 at 800 μg/L (see Table 3-2). In addition, it is unlikely that the Cal Compact Landfill, which is located immediately to the south of the VGC site, is an alternate contributor. Water level measurements collected from monitoring wells associated with the Cal Compact Landfill indicate that the groundwater flow direction beneath this inactive landfill is toward the south (46).

There are 21 municipal drinking water wells within 4 miles of the site that are part of blended systems that serve approximately 400,000 people (38, 39, 40, 41, 42, 43).

4.3 Surface Water Pathway

The Dominguez Channel flows from the northwest to the southeast, through the VGC site. A review of aerial photographs indicates that this channel was in place prior to the beginning of landfill operations. It was unlined until the early 1970s, at which time it was upgraded as part of a project to create a series of engineered storm drainage channels to drain the urbanized Torrance Plain. The upper reaches of the Dominguez Channel are currently concrete-lined, while the lower reaches are characterized by stone revetments and a clay-lined bottom. The portion of the channel that runs through and downstream of the VGC site is clay-lined. The channel discharges into the Los Angeles Harbor approximately 6 miles downstream of the site. The Los Angeles Harbor empties into San Pedro Bay, and San Pedro Bay opens into the Pacific Ocean. Although there are fisheries and sensitive environments associated with the Los Angeles Harbor, San Pedro Bay, and the Pacific Ocean; there do not appear to be any drinking water intakes or sensitive environments associated with the Dominguez Channel. In addition, there are a limited number of fish in the channel (13, 16, 17, 47, 48, 49).

4.4 Soil Exposure Pathway

There are limited existing soil sampling data from locations proximal to the structures that house the major receptors of concern for the soil exposure pathway (i.e., residences, schools, and daycare facilities). While the HRS does not allow for the use of soil gas sampling data to evaluate the soil exposure pathway, analytical data from previous soil gas sampling events at the Towne Avenue Elementary School, Victoria Regional Park, and Victoria Golf Course indicate that the potential for near surface soil contamination in these areas, as a result of landfill gas migration, is minimal (10, 23, 25). Analytical data from the November 2000 ESI soil gas sampling effort indicate that the same conclusion may be appropriate for the Head Start Center and the Don Dominguez Apartments (see Table 3-3).

4.5 Air Pathway

In 1999, outdoor air sampling was conducted at the Towne Avenue Elementary School, by EnSIGHT, LLC for the Los Angeles Unified School District, to determine whether landfill gases were likely to pose a significant increased health and safety risk to students or faculty. In addition, the study was designed to allow for a comparison with regional air quality data acquired from the CARB air quality monitoring program. Evacuated stainless steel SUMMA canisters were used to collect air samples at three outdoor locations (flag pole, playground, and southwest parking lot) over a 2-day period. The samples were analyzed for VOCs using EPA Method TO-14A and methane using EPA Method TO-3. The data suggested

cally downgradient of the site and/or in CPT groundwater samples collected from beneath the site (see Table 3-1 and Table 3-2). This release is attributable, at least in part, to the VGC site because vinyl chloride was detected at elevated concentrations in soil gas samples collected from 14 on-site locations in November 2000 (see Table 3-3). In addition, although there are several other inactive landfills in the vicinity of the site and groundwater flow direction in the area is variable, background CPT groundwater samples were collected from locations in between the site and possible alternate contributors.

- Underlying the VGC site are the following water bearing units, in descending order: Upper Bellflower, Middle Bellflower, Gage, Lynwood, and Silverado. All these units are designated as aquifers by the RWQCB. The two lowermost aquifers (Lynwood and Silverado) are first encountered beneath the VGC site at depths of approximately 300 feet bgs and 600 feet bgs, respectively. These two aquifers are the principal sources of municipal drinking water for the Los Angeles region. Aquifer interconnection, for HRS purposes, is established between the Upper Bellflower, Middle Bellflower, Gage, Lynwood, and Silverado aquifers within 2 miles of the VGC site.

- There are 21 municipal drinking water wells within 4 miles of the site that are part of blended systems that serve approximately 400,000 people.

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