PROJECT NAVIGATOR, LTD.®

June 9, 2015

Project No. 01-114

Mr. Robert Senga, Unit Chief
Southern California Cleanup Operations Branch – Cypress Office
Attention: Mr. Safouh Sayed, Project Manager
Southern California Cleanup Operations Branch, Cypress
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630-4732

Ascon Landfill Site
Final Remedial Action Plan

Dear Mr. Sayed:

Enclosed please find two copies of the Final Remedial Action Plan for the Ascon Landfill Site located in Huntington Beach, California.

Please feel free to contact me if you have any questions at (310) 766-0116 or tzeier@projectnavigator.com.

Sincerely,

Tamara Zeier

Tamara Zeier, P.E.
Ascon Landfill Site Project Coordinator

TZ:tz

Enclosure: Ascon Landfill Site Final Remedial Action Plan, dated June 9, 2015

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# Final Remedial Action Plan

**ASCON LANDFILL SITE**
**HUNTINGTON BEACH, CALIFORNIA**

**June 9, 2015**

*Prepared for*


**Department of Toxic Substances Control**
5796 Corporate Avenue
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# FINAL REMEDIAL ACTION PLAN

**Ascon Landfill Site**

**Huntington Beach, California**

**THIS DOCUMENT WAS PREPARED UNDER THE DIRECTION AND SUPERVISION OF A QUALIFIED REGISTERED CALIFORNIA PROFESSIONAL ENGINEER**

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# TABLE OF CONTENTS

## Tables



## Figures

## Figures (continued)



## Appendices

# EXECUTIVE SUMMARY

## ES.1 Purpose of the Remedial Action Plan (RAP)

This Final Remedial Action Plan (RAP) describes the proposed remediation plan for the Ascon Landfill Site ("Site") located at 21641 Magnolia Street in Huntington Beach, California. The RAP was prepared by the Ascon Responsible Parties (RPs)[1] pursuant to the Imminent and Substantial Endangerment Determination and Consent Order 02/03-007 with the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), effective January 8, 2003, and the Imminent and Substantial Endangerment Determination and Order and Remedial Action Order 02/03-018, effective March 5, 2003, and in accordance with DTSC's Remedial Action Plan Policy (Document #: EO-95-007-PP).

Activities leading up to this RAP include historic records review; several Remedial Investigations (RI) to define the nature and extent of contamination; two Baseline Health Risk Assessments (BHRA) (ESE, 1997b; Geosyntec, 2007) to evaluate potential human health risks associated with the Site; and a Feasibility Study (FS) (ESE, 2000) and Revised Feasibility Study (RFS) (Project Navigator, Ltd., 2007) to evaluate several remedial action alternatives for the Site and present the rationale for selecting the preferred alternative.

The RPs worked with DTSC to collect additional data, conduct evaluation activities, and to complete the soil/waste RAP for the Site based on the then-existing preferred alternative from the initial FS of 2000. The RFS reflects additional information and data obtained during the implementation of the Environmental Impact Assessment Process launched after approval of the initial FS in 2001. The RFS reevaluated previously considered remedial action alternatives based on the new data and current practices in hazardous waste remediation, and evaluated additional remedial alternatives that had not been considered previously.

This RAP summarizes the results of the remedial investigations and feasibility studies and describes the process used to evaluate available remediation options. This RAP also summarizes an interim action (the 2010 - 2011 Interim Removal Measure) performed since the RFS. This interim action altered the Site and thereby necessitated modifications to the RFS-proposed remedial alternative. Therefore, this RAP describes the remedial action alternative ultimately selected to mitigate and control environmental impacts at the Site in its present configuration.

The RAP also includes a summary of DTSC's historical regulatory activities at the Site, called the Administrative Record (see **Appendix A**). The statutorily required Preliminary Non-Binding Allocation of Responsibility (NBAR) for the Site is presented in **Appendix B**.

The RAP was available for public review and comment and was revised, as necessary, following receipt of the public comments. The RAP is required by the California Health and Safety Code, Section 25356.1 and is based on Section 25350 and Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR §300.400).

[1] The ten RPs are Chevron U.S.A. Inc., Texaco Inc. (Chevron U.S.A Inc. and Texaco Inc. are now considered a single party as they are wholly-owned subsidiaries of Chevron Corp.), Conoco Inc., Phillips Petroleum Company (Conoco Inc. and Phillips Petroleum Company are now combined as ConocoPhillips Company), ExxonMobil Corp., Shell Oil Company, Atlantic Richfield Company (ARC), The Dow Chemical Company, TRW (now Northrop Grumman Systems Corporation), and Southern California Edison Company. Two of the RPs, Chevron and ConocoPhillips, created a limited liability corporation called Cannery Hamilton Properties, LLC ("CHP") to purchase the Site, and CHP is the current Site owner.

## ES.2 Site Description and Ownership

The Site is a vacant 38-acre parcel at the southwest corner of Hamilton Avenue and Magnolia Street in Huntington Beach, California (see **Figure 1-1**). Nearby land uses include a community park, high school, residential areas, light industrial operations, oil storage, a flood control channel, and a power generating plant (**Figure 1-2).**

The Site operated as an active disposal facility from approximately 1938 to 1984. In the early years of operation, much of the waste came from oil drilling operations and included drilling muds, wastewater brines, and other drilling wastes. Records indicate that from 1957 to 1971, other wastes were also received by Site operators and deposited onsite. From 1971 to 1984, material deposited onsite included presumably non-hazardous solid wastes such as asphalt, concrete, metal, soil, and wood.

Currently, the Site contains four visible impoundments and one liner-covered pit (see **Figure 1-3**). Several former pits and lagoons were, over the course of approximately 30 years, filled in or covered by imported soil and construction debris. These areas currently appear as solid ground with scattered vegetative or gravel covering. All of the wastes received at the Site were placed on top of the original ground surface and were contained by berms. As the wastes accumulated, the berms were raised such that much of the Site is now 10 to 20-feet above surrounding street level.

## ES.3 Contaminants Present and Their Distribution

The first Site investigation was conducted on the property in 1966. Since 1966, over 30 investigations of the property have been completed. Site investigators collected soil and waste materials from over 200 locations. The sampled materials consisted of soil, sediment, and waste material from the eight pits, five lagoons, former lagoon areas, the perimeter berm, and groundwater. The Remedial Investigation (RI) of 1997 (ESE, 1997a) presented the combined results from previous investigations of each of the primary waste types and environmental media. An additional soils and waste investigation, Pilot Study No. 3, was conducted in 2004 to further characterize the waste materials and their potential emissions and is documented in the DTSC-approved RFS (Project Navigator, Ltd., 2007). Groundwater impacts were evaluated during one sampling and monitoring event completed in 2002, four quarterly sampling events completed in 2004, and one event completed in 2006. These groundwater sample results are documented in the DTSC-accepted Groundwater RI, Revision 1.0 (Geosyntec, 2007). Additional biannual groundwater sampling events have been performed and documented since the Groundwater RI was submitted. Overall, the soil, waste, and groundwater sample results provide an extensive database for characterizing the wastes disposed of at the Site, and indicate if and/or how the wastes have impacted native soil and groundwater. These data, together with the knowledge gained from work performed during the prior interim action, define the contaminants present, as well as their vertical and lateral extent, and provide a basis for evaluating potential health risks of various options for the remedial action. The data indicate that the Site contains over one million cubic yards of waste and impacted materials and that impacts to soil and groundwater are contained within the Site boundaries.

## ES.4 Summary of Risk Assessments

A BHRA for soils (ESE, 1997b) was performed to identify and evaluate the potential risks to human and ecological receptors that could result from then-current conditions at the Site. The BHRA is a theoretical and conservative (or "worst-case") evaluation of the potential health impacts, assuming that exposure to contaminants occurs on a regular basis over an extended period of time.

The results of the BHRA, although conservative, indicated that, in an un-remediated condition of the time of BHRA preparation, there are estimated risks that exceed both cancer and non-cancer thresholds for some of the receptor and exposure scenarios evaluated. Remedial action was, therefore, deemed necessary.

The BHRA utilized screening modeling approaches in evaluating potential offsite exposures to chemicals detected at the Site. Therefore, a reevaluation of the risk assessment was conducted in 2002 to provide a more refined estimate of potential risks to offsite receptors using more detailed modeling and the latest toxicity values (Geosyntec, 2002). The reevaluation focused on refinement in three areas: (1) appropriate estimates of chemical concentrations in soil/waste based on the RI data, (2) calculation of emission fluxes from the lagoons, and (3) air dispersion modeling using the ISCST model. The results of the reevaluation indicated that estimated risks and non-cancer hazards were within the risk management range of $1x10^{-4}$ to $1x10^{-6}$ and below the threshold value (Hazard Index) of 1, respectively, for all offsite receptors. In addition to the reevaluation, perimeter air monitoring was conducted between August 2002 and December 2003 to evaluate the potential for offsite air impacts from the Site and to establish a baseline for comparison purposes for future remedial activities (Geosyntec, 2004). The results of the air monitoring indicated that measured concentrations would not pose a significant health risk or were generally within background levels for those chemicals commonly detected in air within the Los Angeles area. Notably, the chemical that contributed the most to the estimated offsite risk in the BHRA, 1,2-dichloroethane, was not detected in ambient air for all monitoring events.

Additional Site hazards and concerns determined in the Ascon BHRA to require mitigating measures include exposures to ecological receptors, potential inadequate soil bearing capacity, potential impacts to groundwater, physical hazards, potential horizontal movement of wastes, Pit F odors, and potential berm failure. Most of these potential concerns were assessed or decreased during Pilot Study No. 3, the Groundwater RI, the Emergency Action conducted in 2005 through early 2006 to strengthen the Hamilton berm, and the Interim Removal Measure (IRM) conducted in 2010 through 2011 to remove lagoon waste and further assess soil bearing capacity beneath Lagoons 1 and 2. Other BHRA-identified concerns will be addressed through implementation of the Site remedy.

A BHRA for groundwater was reported in the Groundwater RI, Revision 1.0 (Geosyntec, 2007), and indicated that cancer risk thresholds could potentially be exceeded for the future onsite hypothetical resident assumed by the risk assessment. However, the preferred alternative does not include plans to use the groundwater for any purpose or to develop the Site for residential use.

## ES.5 Proposed Remedial Alternatives

The FS (Environ, 2000) was performed to identify and evaluate remedial alternatives for the Site and was reported in a 2000 draft FS report and summarized in the 2007 RFS (Project Navigator, Ltd., 2007). The RFS was performed in accordance with DTSC requirements, as shown in **Figure 5-1**. The RFS first identified remedial action objectives and requirements for the Site. Next, various treatment technologies and remediation processes were reviewed for their applicability to the Ascon wastes. To evaluate the effectiveness of candidate technologies, focused, low volume treatability studies were conducted on specific wastes. Based on the technology reviews, the specific Ascon field-testing results, the conclusions of the 2000 FS report, and additional groundwater and soils investigations conducted from 2004 through 2007, six specific remedial alternatives were selected for detailed evaluation and comparison and are discussed in greater detail in the RFS. These alternatives were:

- Alternative 1 (Alt 1) - No Action
- Alternative 2 (Alt 2) - Limited Waste Removal
- Alternative 3 (Alt 3) - Protective Cap
- Alternative 4 (Alt 4) - Partial Source Removal with Protective Cap
- Alternative 5 (Alt 5) - Source Removal with Offsite Disposal and SIT (Slurry Injection Technology)
- Alternative 6 (Alt 6) - Source Removal with Offsite Disposal

Since the RFS, the Interim Removal Measure performed from July 2010 through March 2011 resulted in removal of approximately 70,000 cubic yards of tarry waste materials from Lagoons 1 and 2, and, to a lesser extent, from Lagoon 3. Also, the additional studies, knowledge, and experience gained since DTSC approval of the RFS have led to modifications and updates to the RFS-selected preferred alternative in addition to taking into account the significant changes to Site conditions. Furthermore, to enable an up-to-date comparative study between alternatives, the other remedial alternatives considered in the RFS have been modified and updated using the same studies, knowledge, and experience gained since the 2007

RFS and with post-IRM conditions. Therefore, the comparative analysis of the remedial alternatives in the feasibility study has also been revisited (i.e., updated) herein using the updated alternatives to assure that the reevaluation of alternatives was consistent with required review standards.

The alternatives are described below and include modifications resulting from updates in remedial technologies, updates in removal volumes, and updates to 2013 costs:

**Alternative 1: No Action** - Alt 1 consists of no action at the Site and is required to be evaluated as a baseline alternative under the NCP. If Alt 1 were implemented, no action would be taken to contain, treat, or remove the affected soils or any material at the Site. While the existing fencing at the Site would restrict entrance to the Site, direct contact with Site wastes could occur to workers and trespassers. The City easement/parcel[2] would continue to be impacted by waste materials. Long-term groundwater monitoring would occur. The cost for Alternative 1 would be limited to maintenance costs and the costs of long-term groundwater monitoring.

**Alternative 2: Limited Waste Removal** - Alt 2 would consist mainly of removal and offsite disposal of Pit F waste, covering the remaining lagoon materials with imported soils, and performance of long-term groundwater monitoring.

**Alternative 3: Protective Cap** – Alt 3 would mainly consist of the removal and offsite disposal of Pit F waste. In addition, waste materials found near the streets in the City parcel would be moved to within the Site property boundaries, the remainder of the material in the lagoons would remain onsite, Lagoon 4 and 5 materials would be held in place with sheet piling (i.e., a form of driven piling using sheets of steel to obtain a continuous barrier), and a protective cap would be constructed over the Site to protect human health and the environment. Long-term groundwater monitoring and cap maintenance would be performed.

**Alternative 4: Partial Source Removal with Protective Cap** – Alt 4 consists of the removal and offsite disposal of Pit F waste, moving waste materials found near the streets in the City parcel to within the Site property boundaries, the remainder of the material in the lagoons would remain onsite, holding the material in Lagoons 4 and 5 in place using cement mixed into the lagoon material (forming an internal buttress), and a protective cap to be built over the remaining Site materials to protect human health and the environment. Long-term groundwater monitoring and cap maintenance would be performed.

**Alternative 5: Source Removal with Offsite Disposal and Slurry Injection Technology (SIT)** – Alt 5 consists of removal and offsite disposal and/or deep well injection of all waste materials, including the wastes from Pit F and the impacted soils and drilling muds from the current lagoons, former lagoons, pits, and the perimeter berm. Soils and drilling muds would be excavated until chemical concentrations reached levels either protective of human health and the environment or to within background levels. After the removal of wastes, the property would be re-graded by using onsite, usable excavated material and/or imported soil. Long-term groundwater monitoring would be performed, if groundwater impacts remained.

**Alternative 6: Source Removal with Offsite Disposal** - Alt 6 consists of removing all waste materials from the Site and disposing them offsite. Long-term groundwater monitoring would be performed, if groundwater impacts remained.

The significant elements of the alternatives are summarized in **Table 5-1**. **Table 5-2** summarizes the present worth capital and Operations and Maintenance (O&M) costs, volumes of waste to be removed, volumes of import soils to be trucked in, estimated number of truck trips needed, and estimated duration of the construction for each alternative.

The long-term groundwater monitoring will include a contingency plan for containment of existing

[2] The Site presently includes an approximately 30-feet wide margin along Hamilton Avenue and an approximately 20-feet wide margin along Magnolia Street that are referred to as the City parcel, or City easement.

groundwater impacts.

Alternative 4, Partial Source Removal with Protective Cap, was selected as the preferred alternative, as discussed below.

## ES.6 Alternatives Evaluation

Each of the updated alternatives was evaluated, based on the first seven criteria of the nine NCP criteria (the remaining two criteria, State Acceptance and Community Acceptance, are to be evaluated as part of the final RAP/Environmental Impact Report [EIR] process).

1. Overall protection of human health and the environment.
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume through treatment.
5. Short-term effectiveness.
6. Implementability.
7. Cost.
8. State acceptance.
9. Community acceptance.

An acceptable alternative must meet Criteria 1 and 2, known as “threshold criteria,” in order to be carried further in the analysis. Criteria 3 through 7, known as “balancing criteria,” are evaluated to determine the best overall solution. After public comment, the DTSC may alter its preference on the basis of the last two “modifying” criteria, numbered 8 and 9 above.

Additionally, all Remedial Action Plans prepared or approved by the DTSC must consider the following 6 state factors.

1. Health and safety risks posed by conditions at the Site.
2. The effect of contamination upon beneficial resources.
3. The effect of alternative remedial action measures on groundwater resources.
4. Site-specific characteristics of the waste.
5. Cost effectiveness of alternative remedial action measures.
6. The potential environmental impacts of alternative remedial action measures.

**Alternative 1 (No Action)** fails to meet many of the criteria, including the two threshold criteria *of overall protection of human health and the environment* and *compliance with ARARs.*

**Alternative 2 (Limited Waste Removal)** also fails to meet the threshold criteria.

**Alternatives 3 and 4 (Protective Cap and Partial Source Removal with Protective Cap)** meet both of the threshold criteria and all the balancing criteria. Alternative 4 better meets Criterion 6, *implementability,* due to the less implementable sheet piling in Alternative 3.

**Alternatives 5 and 6 (Source Removal with Offsite Disposal and SIT and Source Removal with Offsite Disposal)** meet the two threshold criteria and score satisfactorily at meeting the balancing criteria. The area where these alternatives differ is the SIT option for deep well disposal. The SIT disposal was deemed low on *implementability*, and therefore Alt 5 was deemed less feasible than Alt 6. Alt 6 was deemed low on *short-term effectiveness* because the implementation of the remedy would cause the most disruption to the community in terms of truck traffic, odors, and prolonged schedule to completion. Cost for Alt 6 was also the highest of all alternatives.

*State acceptance* could only be known after the completion of the EIR, and *community acceptance* could not be evaluated until after the public comment period on the draft RAP and the Draft EIR.

Based on the final evaluation and comparison of the alternatives, Alternative 4 was recommended as the preferred remedial alternative for the Site. This RAP presents an update of the RFS Alternative 4, which takes into account work performed since DTSC approved the RFS, current remedial practices, and updated volumes and costs.

## ES.7 Opportunities for Public Involvement

As part of DTSC's Public Participation Plan for the Site, DTSC held a public meeting on September 12, 2013, at Edison High School (21400 Magnolia Street, Huntington Beach, California 92646) to discuss the draft RAP and the draft EIR, and to provide an opportunity for the public to comment. The public comment period remained open for a minimum of 30 days following the release of the draft RAP and draft EIR. The public meeting and comment period were announced through notices in the newspapers and through a Fact Sheet mailing. DTSC prepared a response to comments that documents and addresses public concerns and issues raised during the public comment period and modified the preferred remedy to accommodate public concerns, as appropriate.

Copies of the draft RAP and draft EIR were available at the two public repositories below and at the DTSC offices in Cypress (5796 Corporate Ave., Cypress, California, 90630).

Huntington Beach Central Park Main Library
7111 Talbert Avenue, Huntington Beach, CA
(714) 842-4481

Banning Avenue Library
9281 Banning Avenue, Huntington Beach, CA
(714) 375-5005

# 1.0 SITE BACKGROUND

This Final Remedial Action Plan (RAP) presents the proposed remediation plan for the Ascon Landfill Site located at 21641 Magnolia Street, Huntington Beach, California (herein referred to as the “Site”) (see **Figure 1-1**). The RAP was prepared by the Ascon Responsible Parties (RPs)[3] pursuant to the Imminent and Substantial Endangerment Determination and Consent Order 02/03-007 with the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), effective January 8, 2003, and the Imminent and Substantial Endangerment Determination and Order and Remedial Action Order 02/03-018, effective March 5, 2003, and in accordance with DTSC's Remedial Action Plan Policy (Document #: EO-95-007-PP).

The Site is an approximately 38-acre square parcel of land situated at the southwestern corner of the intersection of Hamilton Avenue and Magnolia Street, approximately ½ mile north of Huntington Beach State Park and the Pacific Ocean (see **Figure 1-2**). The Site is located within the City of Huntington Beach Southeast Coastal Redevelopment Project Area and is presently zoned for residential development per the Magnolia Pacific Specific Plan.

## 1.1 Site History

The Site was operated as a waste disposal facility from approximately 1938 through 1984. The waste brought to the Site was placed on top of the original ground surface and contained by berms. As the waste accumulated, the berms were raised such that much of the Site surface is now approximately 10 to 20-feet above the surrounding street level.

Five visible impoundments (referred to as Lagoons 1 through 5) are present at the Site, as well as one covered pit (referred to as Pit F), and several former pits and lagoons that are no longer visible. The approximate locations of the visible impoundments, the seven former pits, and other significant features, such as buildings, gates, and oil production facilities, are shown on **Figure 1-3**. A perimeter chain link fence with three locked vehicular gates encloses the Site.

From 1984 to 2002, the Site remained essentially unchanged. Beginning in 2002, the RPs undertook routine maintenance and housekeeping at the Site during the time that planning for future work was performed. In 2004, removal of oil production equipment and abandonment of an oil well from an approximately two-acre oil production site on the eastern portion of the Site was performed. In 2005 through early 2006, an Emergency Action was undertaken that consisted of material removal, berm strengthening, Site grading, and installation of best management practices for storm water control. In 2010 through early 2011, an Interim Removal Measure (IRM) was performed to remove most of the tarry materials from select lagoons. More information regarding the Emergency Action and the IRM is found in Section 3 of this RAP.

Along Magnolia St. and Hamilton Ave., the Site is partitioned by a setback approximately 20 feet from the fence line along Magnolia St. and approximately 30 feet from Hamilton Ave. This setback is property of the City of Huntington Beach (“City”) and is referred to herein as the City parcel. The balance of the Site is sometimes referred to as the Cannery Hamilton Properties, LLC (CHP)[4] parcel.

Site visits made by investigators during 1997 found old drums, vehicles, motorcycles, trailers, and miscellaneous debris scattered throughout the Site, most of which has now been removed. There was an unauthorized firewood operation on a portion of the Site in 1996 and 1997. There were also other indications of trespassers entering and possibly living at the Site. However, since CHP purchased the

[3] The ten RPs are Chevron U.S.A. Inc., Texaco Inc. (Chevron U.S.A Inc. and Texaco Inc. are now combined as Chevron Corp.), Conoco Inc., Phillips Petroleum Company (Conoco Inc. and Phillips Petroleum Company are now combined as ConocoPhillips Company), ExxonMobil Corp., Shell Oil Company, Atlantic Richfield Company (ARC), The Dow Chemical Company, TRW (now Northrop Grumman Systems Corporation), and Southern California Edison Company.

[4] Cannery Hamilton Properties, LLC (CHP), is the current owner of the Site. CHP is a Limited Liability Company whose only members are Chevron Environmental Management Company and ConocoPhillips.

property in 2003, Site security and regular maintenance have been significantly improved, which has reduced trespassing.

The following table indicates the presence of significant Site and adjacent features visible in aerial photographs taken during the indicated year.

| Year | 1928 | 1947 | 1953 | 1958 | 1959 | 1961 | 1967 | 1972 | 1976 | 1979 | 1983 | 1999 | 2002 | 2006 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Agricultural field to south | • | • | | | | | | | | | | | | | |
| Northern former lagoons | | | • | • | • | • | • | • | | | | | | | |
| Western oil production | | | | • | • | • | • | ? [5] | • | • | • | • | • | • | • |
| Eastern oil production | | • | • | • | • | • | • | ? | • | • | • | • | • | | |
| Southern former lagoon | | | | • | • | • | • | • | | | | | | | |
| Pit A | | | • | • | • | • | • | ? | | | | | | | |
| Pit B | | | • | • | • | • | • | ? | | | | | | | |
| Pit C | | | | • | • | | • | ? | | | | | | | |
| Pit D | | | | • | • | | • | ? | | | | | | | |
| Pit E | | | | • | • | • | • | ? | | | | | | | |
| Pit F | | | | • | • | • | • | ? | • | ? | • | • | • | • | • |
| Pit G | | | | • | • | | • | ? | • | ? | | | | | |
| Pit H | | | • | • | | | • | ? | | | | | | | |
| Flood control channel | | | | | | • | • | • | • | • | • | • | • | • | • |
| Residential to east | | | | | | | • | • | • | • | • | • | • | • | • |
| Lagoons 1-2 | | | | | | | | | | •[6] | • | • | • | • | |
| Lagoon 3 | | | | | | | | | | •[7] | • | • | • | • | •[8] |
| Lagoons 4-5 | | | | | | | | | | • | • | • | • | • | • |
| Offsite structures (northwest) | | | | | | | | | | | • | • | • | • | • |

Based on the review of the aerial photos, it appears that nearly the entire Site was used at some time for waste disposal. There is evidence that up to eight discrete disposal pits (Pits A through H) existed in the northwestern and southeastern portions of the Site. These pits, except for Pit F, appear to have been subsequently backfilled with construction debris and fill material, as have former lagoon areas. Some of the aerial photographs are shown in **Figure 1-4**, along with Site chronology and ownership information.

A separate landfill, the Cannery Street Disposal Site, was located north of the Site and operated by the County of Orange from 1957 to 1969. Aerial photographs taken in 1961 and 1967, during operation of the Cannery Street Disposal Site, show that the southern extent of the landfill was aligned with the northern extent of the east-west power transmission line right-of-way, creating a buffer of over 200 feet between the Ascon Landfill Site and the Cannery Street Disposal Site during all operating phases of both landfills.

## 1.2 Waste Characteristics

During the early years of operation, most of the waste disposed of on the Site came from oil drilling operations. Oil field wastes included drilling muds, wastewater brines, and other drilling wastes. Records show that from 1957 to 1971, other wastes were also disposed on the Site. From 1971 to 1984, inert solid wastes such as asphalt, concrete, metal, soil, and wood were disposed on the Site. The total number of waste types accepted at the Site is not known. Past investigators have summarized the types of wastes

[5] "?" signifies visual verification is uncertain.
[6] Lagoons 1, 2, and 3 appear as one lagoon in the 1979 aerial photo.
[7] Lagoons 1, 2, and 3 appear as one lagoon in the 1979 aerial photo.
[8] Much of the tarry material in the southern portion of Lagoon 3 was removed during the 2010-2011 Interim Removal Measure.

reportedly disposed of at the Site.

Radian (Radian, 1988) reviewed a report by Ecology and Environment, Inc. (July 1983) and concluded that the largest volume of wastes disposed at the Site was drilling mud and oil field wastes. Other wastes reportedly disposed of at the Site include the following:

- Chromic and sulfuric acids
- Aluminum slag
- Magnesium and potassium chloride
- Corrosive material (acid sludges)
- Mercaptans
- Styrene
- Styrene tars
- “Dion iso-styrene monomer (sic)” (Environ, 2000)
- Polyester resin fractions
- Phenolic wastes
- Synthetic rubber
- Fuel oil (unusable/out of specification)
- Oily wastes
- Construction and other debris (soil, concrete, asphalt, wood, metal, abandoned vehicles, etc.).

Chemical compounds confirmed by laboratory analysis to be present at the Site are discussed in Section 2.0.

## 1.3 Site Operation and Ownership

The Site was operated as a landfill by the Garrish Brothers from approximately 1938 to 1950 and by the Steverson Bros., Inc. from 1950 until 1984. In 1984, ASCON Properties, Inc. purchased the Site and began negotiations with the DTSC to clean it up as part of a land redevelopment effort. ASCON Properties was unsuccessful in its attempts to remediate and develop the property and filed for bankruptcy in 1989.

NESI Investment Group acquired ownership through a foreclosure sale in July 1990. During 1993, the NESI Investment Group filed for bankruptcy. In May 1993, Signal Mortgage Company acquired the Site through foreclosure. In 1995, Signal Mortgage Company entered into an agreement with a predecessor of California/Nevada Development, LLC (CND), Savannah Resources Corporation, to work with the DTSC on the Remedial Investigation/Feasibility Study (RI/FS) and RAP under a Voluntary Cleanup Agreement (VCA). However, following completion of the soil/waste RI/FS, CND withdrew from the VCA and had no further involvement with the Site. In 2003, CHP purchased the surface estate at the Site, but not the mineral rights. CHP remains the current surface owner today.

Ownership of the Ascon Landfill Site is divided into separate surface and subsurface mineral estates. CHP owns the surface estate, but others own the subsurface mineral estate (mineral estate owners or the “MEOs”). The MEOs hold title to the oil and gas resources underlying the Site. By law, surface estate ownership is subordinate to the rights of subsurface owners. The MEOs, through both their ownership of subsurface minerals, as well as oil and gas leases, easements, and surface leases, therefore, have access to and control over the surface to the extent necessary to initiate and/or maintain development of their mineral rights. Thus, unless effective land use restrictions are imposed on future uses and activities at the Site, any remedy will be in conflict with any rights of the MEOs. Neither CHP, any further owner of the surface estate, DTSC, nor the Ascon RP Group have control over the MEO’s exercise of their mineral rights.

DTSC has sent notice letters[9] to the MEOs regarding their potential liability as property owners at the Site with cleanup responsibility. DTSC has also indicated that a restrictive covenant will be required in the event a remedy not requiring complete removal of all waste at the Site is selected. The terms of any such restrictive covenant would likely prohibit all future uses of either the surface or the mineral estate that are incompatible with long-term maintenance and stability of the implemented remedy.

## 1.4 Agency Involvement

DTSC has directed the RI/FS process for the Site since DTSC began oversight in 1985. Because this RAP results from the more recent Revised Feasibility Study (RFS), and an earlier feasibility study had already been approved by DTSC, the context and rationale for the RFS and subsequent studies are discussed below.

In November 1995, Savannah Resources Corporation executed an agreement with Signal Mortgage Company, the owner of the property at that time, to prepare a RI/FS and a RAP in exchange for the option to jointly develop the Site with Signal Mortgage Company for residential use. CND entered into the VCA with DTSC in May 1996. The VCA required preparation of the RI/FS, RAP, and other associated response action documents, subject to DTSC oversight and approval. The initial Site Feasibility Study ("initial FS") for soil/waste was prepared by ENVIRON International Corporation (Environ) in 2000 under a contract with CND. The draft RI/FS documents for soil/waste were approved by DTSC on June 22, 2001.

In June 2001, DTSC notified 16 companies that they had cleanup responsibilities at the Site. Ten of these companies, identified at that time as the Cooperating Parties but now referred to as the RPs, entered into a Letter Agreement with DTSC to perform additional data collection and evaluation activities and to complete the soil/waste RAP for the Site based on the preferred remedy identified in the initial FS. In January 2003, nine of the ten RPs entered into an Imminent and Substantial Endangerment Determination and Consent Order, Docket No. I&SE CO 02/03-007, with DTSC to prepare a RI/FS for groundwater, complete the RAP for soil/waste and a RAP for groundwater, prepare California Environmental Quality Act (CEQA) documents (e.g., Environmental Impact Report [EIR]) and perform remedial design and implementation of the remedial actions approved in each RAP. In March 2003, the tenth RP, Exxon Mobil Corporation, entered into an Imminent and Substantial Endangerment Determination and Order and Remedial Action Order, Docket No. I&SE-RAO 02/03-018, with DTSC to perform the actions identified in I&SE CO 02/03-007 with the other nine RPs. The RPs are working together to complete these actions and have paid for, and will continue to pay for, all costs associated with these efforts, including the studies, interim actions, the final remedy, and DTSC oversight costs, subject to the possible identification of additional responsible parties at a later date.

During the finalization of the soil/waste RAP and preparations for an EIR (in 2003), it was determined that additional data were needed to complete the EIR process[10]. The DTSC allowed the RPs to supplement the initial FS for the soil/waste operable unit and evaluate additional remedial alternatives[11]. To address data gaps and the need for a more complete FS, the RFS was proposed in February 2004 with corresponding fieldwork outlined in Pilot Study No. 3 Waste Characterization, Emissions, and Excavation Testing Program Workplan of January 2004, and subsequent addenda. As Pilot Study No. 3 was nearly completed, DTSC and the RPs agreed to combine the Groundwater Feasibility Study with the RFS. The groundwater and soil/waste operable units are combined into one integrated RAP[12]. The Groundwater Remedial Investigation was submitted as a separate document on March 1, 2005, with a DTSC-approved revision dated June 14, 2007.

The RFS was completed on behalf of the RPs in 2007 to further identify and evaluate technically feasible, effective remedial action alternatives to protect public health and the environment. The RFS was prepared

[9] Letter from Thomas M. Cota, dated May 17, 2006.

[10] Letter from Thomas M. Cota to Ascon RPs, dated December 18, 2003.

[11] Letter from Thomas M. Cota to Ascon RPs, dated January 28, 2004.

[12] Letter from Ning-Wu Chang to Ascon RPs, dated December 29, 2004.

as defined by, and in conformance with, the requirements contained in Division 20 of the California Health and Safety Code, and Title 40 of the Code of Federal Regulations. The RFS reflects additional information and data uncovered during the implementation of the Environmental Impact Assessment Process launched after DTSC approval of the initial FS in 2001. The RFS reevaluated remedial action alternatives based on new data and prevailing acceptable practices in the field of hazardous waste remediation.

In 2009, it was determined that additional geotechnical data were needed in the area of Lagoons 1 and 2 to assist in remedy design. An Interim Removal Measure (IRM) was then performed under a Mitigated Negative Declaration (DTSC, 2009) to remove select tarry waste from the Site to enable a drilling program to assess native materials under Lagoons 1 and 2. The IRM work, performed from July 2010 through March 2011, is further explained in Section 3.

## 1.5 Climatology

The climate of the Huntington Beach area, like most of southern California, is controlled by the strength and position of a semi-permanent high-pressure cell over the eastern Pacific Ocean. This high-pressure cell creates a repetitive pattern of frequent early morning cloudiness, afternoon sunshine, daytime onshore breezes, and minor temperature fluctuations throughout the year.

Complete-year historic climate data are available for 30 years between 1961 and 1990 for the Newport Beach station located at 33° N, 1l7° W at an elevation of 9 feet above MSL (WorldClimate.com, 2012). According to these data, the annual average temperature for the area is 61.2° Fahrenheit (F) with an average monthly high temperature of 73.2° F, occurring in August, and an average monthly low temperature of 46.8° F in January. Rainfall occurs mostly from November through April as generally mid-latitude storms move through the area. An average of approximately 10.8 inches of rain falls each year. Summers are often dry, with the exception of occasional rainfall from thundershowers of tropical origin.

Local meteorological conditions generally conform to the regional pattern of onshore winds during the day, especially in summer, and weak offshore winds at night, especially in winter. Wind speed and direction are graphically shown in **Figure 1-5** by a wind rose covering the period from March through June 2004. Field observations indicate that the prevailing winds are onshore from the west and southwest with wind speeds averaging 4 to 6 miles per hour.

## 1.6 Topography

The Site is located in a low-lying coastal area that gently slopes to the south/southwest toward the Pacific Ocean. The surface topography of adjacent properties is generally flat with elevations ranging from 5 to 10 feet above mean sea level (MSL) (CDWR, 1967; USGS, 1965). The natural topography of the Site has been disturbed extensively over the years by the operation of the landfill and waste disposal activities described in Section 1.0. An earthen berm, approximately 10 to 20 feet high, has been constructed around much of the Site perimeter to contain surface impoundments and storage areas. Elevation ranges from approximately 5 feet above MSL at the southeastern corner to approximately 25 feet above MSL near the center of the Site. **Figure 1-6** presents the topographic contours for the Site at 1-foot intervals in March 2011 (after IRM).

## 1.7 Geology/Hydrogeology

The Site is located in the southwestern portion of the Coastal Plain geomorphology of Orange County, which is bordered by the Santa Ana Mountains on the east, the San Joaquin Hills to the southeast, and the Pacific Ocean to the south and west. A line of low hills or mesas and intervening valleys or gaps, associated with the Newport-Inglewood structural zone, are present across the Coastal Plain of Los Angeles and Orange Counties. This structural zone forms the hills, with the inland synclinal trough consisting of thick sequences of permeable and impermeable sediments that form the Orange County Ground Water Basin in this area.

The Site is located within the physiographic feature known as the Talbert or Santa Ana Gap. The Pacific Ocean is approximately ½ mile to the south; the Huntington Beach Mesa is approximately 1¼ miles to the northwest; the Santa Ana River and Newport Mesa are approximately 1¼ miles to the east. The Site is also within the northwest-trending Newport-Inglewood Fault Zone, immediately north of the "South Branch." Movement along the fault zone has resulted in complex stratigraphy in Pleistocene age or older sediments (CDWR, 1967).

The Santa Ana Gap was formed during the Pleistocene age sea-level retreat when the ancestral Santa Ana River eroded the uplifted mesas. At the end of the last ice age, the sea level rose and the gap was filled with approximately 170 feet of mixed alluvial and coastal sediments. These Holocene age sediments consist of two units: an upper unit approximately 70 feet thick, consisting of clay and silt with interbedded sands and peat beds, and a lower unit approximately 100 feet thick consisting of sand and gravel. These two Holocene-age units are believed to be present at the Site beneath the waste material, soil, and construction debris. These Holocene sediments unconformably overlie faulted marine and alluvial sediments of the Lower Pleistocene San Pedro Formation (CDWR, 1967).

The upper Holocene unit described above makes up the unconsolidated sediments immediately underlying the Site. The sediments are described by previous investigators as being composed of an upper silty-clay layer that ranges from 2 to 10 feet thick and a lower water-bearing sand unit (Radian, 1988). With the possible exception of the very western portion of the Site and the area east of Lagoons 1 and 2, the upper silty-clay layer was noted in nearly all of the borings drilled throughout the Site and, to some extent, may have significantly impeded the infiltration of contaminants into deeper zones.

In the vicinity of the Site, groundwater is found primarily in two hydrologic units: (1) a shallow sandy unit designated the Semiperched Aquifer, and (2) a deeper underlying sandy unit known as the Talbert Aquifer. Groundwater in the Semiperched Aquifer has been degraded regionally by high concentrations of total dissolved solids (primarily salts) from seawater intrusion and has no use as a potable water resource. The Talbert Aquifer occurs at a depth of about 70 feet below ground surface (bgs) and also has limited beneficial use due to saltwater intrusion.

The Site and its underlying aquifers are on the seaward side of the Talbert Water Injection Barrier, a line of wells along Ellis Avenue, an east-west street located approximately three miles to the north, that inject recycled potable water into the underlying aquifers to prevent seawater intrusion into the usable aquifers further inland. Due to the Site's location on the seaward side of this injection barrier, the underlying aquifers are not used as water resources, and there are no drinking water wells within 3 miles of the Site. Nevertheless, the groundwater beneath the Site is designated for beneficial use by the State Water Resources Control Board (SWRCB).

## 1.8 Surface Water

Offsite Surface Water. Major offsite surface water features in the area of the Site are the Pacific Ocean (½ mile south); Santa Ana River (1 mile east); inter-coastal marshes (1/4 mile south); and the Orange County Flood Control Channel System--Huntington Beach Flood Control Channel (adjacent and southwest). The Huntington Beach Flood Control Channel borders the Site at the southwest corner. Area storm water run-off enters the channel and then flows in a southeasterly direction, merges with the Talbert Flood Control Channel between Magnolia and Brookhurst Streets and then flows into the Pacific Ocean. The channel flow is connected to the coastal marsh system.

The Huntington Beach Flood Control Channel was constructed in approximately 1960 with earthen berms and an unlined bottom. The estimated elevation of the top of the berms is 10 feet above MSL and the estimated elevation of the bottom is one foot below MSL. Data collected in the 1980s and 1990s suggest that groundwater flow is away from the flood control channel (Radian, 1988 and ESE, 1997a). A tidal study conducted over a ten-day period in June 2003 showed that water levels in the flood control channel fluctuated with tides and were approximately 1½ to 6 feet above groundwater levels in Site monitoring wells located closest to the channel (Geosyntec, 2007). Data collected during the tidal study indicate that “losing stream” conditions occur in the channel and that water in the channel discharges to the shallow groundwater beneath the Site and then flows away from the channel. Thus, groundwater from beneath the Site does not discharge into the channel.

Onsite Surface Water. The Site is topographically higher than the surrounding area (see Section 1.6). An earthen berm surrounds much of the Site and prevents most surface water (i.e., storm water) from flowing offsite. Within the Site, storm water has historically collected in the lagoons. The potential for offsite surface water to flow onto the Site is low because the Site elevation ranges from approximately 2 to 20feet above the surrounding grade.

A Surface Water Management Plan was prepared and submitted to DTSC in January 2004 and has been implemented for the Site. In February 2006, after completion of the Emergency Action, the Site applied for coverage under the National Pollutant Discharge Elimination System General Permit No. CAS000001 (General Permit) from the California SWRCB for discharge of storm water associated with industrial activities at the Site. A Storm Water Pollution Prevention Plan (SWPPP) was prepared in accordance with the General Permit and was implemented and maintained to identify activities and materials that may affect storm water discharge quality and to identify and implement Site-specific best management practices (BMPs) to meet water quality standards in the General Permit.

As part of the Emergency Action completed in January 2006, a toe drain was installed at the toe of the berm along Hamilton Avenue to collect potential storm water runoff from the berm and any potential future seepage from the berm. The Site was also graded, and swales and detention basins were constructed in the fall of 2005 to collect storm water that falls onto the Site but is not collected in the lagoons.

# 2.0 SUMMARY OF THE REMEDIAL INVESTIGATIONS

## 2.1 Past Investigations and Reports

Since 1966, there have been over 30 investigations conducted at the Site. The primary scope of these investigations was to characterize the surface materials, subsurface wastes, soils, air, soil vapors, background soils, groundwater, and surface water. Some investigations focused on a characterization of surface soils or liquids, while others also included physical and chemical characterization of subsurface materials and groundwater. Additional recent studies focused on air quality, potential waste emissions, and groundwater quality.

## 2.2 Remedial Investigations

### 2.2.1 Remedial Investigation Report

The Remedial Investigation (RI) report (ESE, 1997a) presents the scope of work and results from 14 of the prior Site characterization investigations. The previous investigators collected soil and waste materials from over 200 onsite and offsite locations. The materials sampled from onsite locations consisted of soil, sediment, and waste material from the eight pits, five current lagoons, former lagoon areas, and the perimeter berm. The offsite locations were sampled for background, comparison purposes. Soil vapor and groundwater samples (onsite and offsite) were also collected and analyzed, as were water seeps and air samples.

### 2.2.2 Post-RI Studies

The following reports document several investigations conducted since the 1997 RI report:

- Technical Memorandum No. 1 Report of Findings (TM1ROF), February 1, 2003, by Project Navigator, Ltd. – This report contains soil and groundwater sampling data collected in 2002.
- Groundwater Remedial Investigation, Revision 1.0 (GWRI), June 14, 2007, by Geosyntec – This report documents the results of five groundwater sampling events and chemical analyses conducted during 2004 and 2006 and summarizes the 2002 groundwater data from Technical Memorandum No. 1. Also discussed are Site groundwater flow directions, effect of the adjacent flood control channel, occurrence of non-aqueous phase liquids (NAPL), and hydrogeology.
- Revised Feasibility Study (RFS), September 21, 2007, by Project Navigator, Ltd. – This report documents the results of Pilot Study No. 3 (PS3), which investigated potential waste characteristics, characterized potential waste emissions, and includes perimeter air data collected during investigative operations, including open trenching. The RFS also summarizes the results from various air and soil gas investigations conducted after 1997, as well as summarizes the Groundwater RI, Revision 1.0.
- South Coast Oil Corporation (SCOC) Area, Ascon Properties Area, and Well No. 80 Area Investigation Report - Addendum for the Site Remedial Investigation, February 11, 2008, by Project Navigator, Ltd. and Geosyntec – This report documents a soils investigation conducted in the three titled mineral estate (oil production) areas of the Site.
- Fence-Line Investigation Report, November 29, 2011, by Geosyntec and Project Navigator, Ltd. – This report documents a limited soils investigation at the fence-lines along Hamilton Avenue and Magnolia Street.
- Interim Groundwater Monitoring Reports, two reports per year, from September of 2007 through present (through September 2012 at the time of the preparation of the draft RAP) by Geosyntec – These 12 reports (Geosyntec, 2007b, 2008, 2008b, 2009b, 2009c, 2010, 2010b, 2011, 2011b, 2012, 2012b) document the findings of the ongoing interim groundwater program that will continue until the remedy is complete. This program consists of groundwater sampling and gauging from select groundwater monitoring wells to observe changes, if any, in groundwater conditions documented in the 2007 GWRI.

The inclusion of the data from the post-RI studies into the Site database more than quadrupled the number of soil data records and has brought the database to over 62,000 total data points regarding onsite soil and waste. These data have defined the types of impacts present, as well as their vertical and lateral extent.

There is consistency among the analytical findings of the different investigations over time. The data show that the impacts are contained within the current Site boundaries and provide a basis for evaluating potential health risks related to the impacts at the property. **Figure 2-1** shows the locations of borings from which the various types of samples were collected at the Site, which confirms that sampling locations are well distributed along the Site perimeter and throughout the interior. A summary of the significant soil sampling results is presented in **Table 2-1**. These results include detections from soil assessments to date.

An Emergency Action (2005 through early 2006) and the IRM (July 2010 through March 2011) also provided data and valuable information for remedy planning. Refer to Section 3.0 of this report for more information regarding the Emergency Action and the IRM.

Conclusions from all investigations are presented below for each of the Site features or media.

## 2.3 Impacted Soil and Waste

### 2.3.1 Waste Pits

The pits are of relatively limited areal extent, each less than 100 feet on a side. Pits A, B, and H were located in the northwest comer of the Site; Pits C, D, E, and G were located in the southeast comer of the Site. Pit F is located in the southeast corner of the Site (**Figure 1-3**).

Available records show that Pits A and B were used for disposal of oily wastes. Records show that Pits C and D were used for disposal of chromic and sulfuric acids, although testing done on samples from Pits C and D did not show elevated chromium or acidic waste. Oily wastes, possibly containing styrene, were placed in Pit E; styrene tar and synthetic rubber wastes were disposed in Pit F. Records regarding the types of wastes disposed of in Pits G and H are not available. Investigations show that material from Pit F appears to have migrated in the subsurface to an areal extent of approximately 1.1 acres, all within the Site fence line.

### 2.3.2 Current Lagoons

At the present time there are four visible lagoons at the Site (**Figure 1-3**). (There were previously five lagoons prior to completion of the IRM, which combined the footprint of Lagoons 1 and 2.) The other areas formerly occupied by lagoons have been filled in and covered over with imported soil and construction debris. The lagoons were used mainly for disposal of oil production wastes such as drilling mud, brines, and petroleum-contaminated soil. Most of the tarry materials that were contained within Lagoons 1 and 2 were excavated and disposed offsite during the IRM between July 2010 and March 2011, explained further in Section 3.0. Because of the IRM, Lagoons 1 and 2 have presently become a single open depression, referred to as Lagoon 1-2. Summaries of data from the analyses of the materials from Lagoons 1 and 2 are found in **Appendix C**, previously reported in the May 27, 2009, Technical Memorandum–Interim Removal Measure–Sampling of Lagoons 1 and 2, prepared by Geosyntec (Geosyntec, 2009). These data were used for the profiling of the lagoon material for the proper transportation and disposal of the material during the IRM.

### 2.3.3 Former Lagoon Areas

Historical aerial photographs of the Site indicate that at various times most of the Site was covered by lagoons (see **Figure 2-2**). For that reason, most of the Site that is not designated a pit, lagoon, or perimeter berm is designated as part of the former lagoons. The former lagoon areas received drilling muds, brines, and other oil production wastes. Samples were collected from the soil surface and subsurface to assess the degree of impacts within the former lagoon areas and to locate areas of greater adverse effects, if any exist. There is more Total Petroleum Hydrocarbon (TPH) in lagoon materials than found in the former lagoon areas. Much of the former lagoon area contains significant amounts of construction debris.

During the Emergency Action and the IRM, significant quantities of impacted soils and waste from the former lagoon areas were either removed from the Site along with lagoon tarry materials or relocated within the Site.

### 2.3.4 Perimeter Berm

Earthen berms, approximately 10 to 20 feet high, contain the pits, lagoons, and former lagoon areas. The outside slopes of the perimeter berm are covered with shrubs, scattered small trees, and other vegetation.

The central portion of the northern berm along Hamilton Avenue was reduced in height by up to approximately 8 feet in 2005 during the Emergency Action removal, explained further in Section 3.0.

The 2011 fence-line soils investigation demonstrated that the berms are effectively containing Site wastes (i.e., no significant impacts were found at the Site fence line adjacent to the Hamilton Avenue and Magnolia Street berms).

### 2.3.5 Construction Debris

It is apparent from an inspection of the Site, as well as from historical aerial photographs, that large quantities of construction debris, such as concrete rubble, asphalt, wood, and other construction wastes, have been disposed at the Site. Some of the previous investigations included inspections of the surface and subsurface to assess the type and estimate the volumes of these waste materials.

In January 1996, investigators excavated four test pits, each approximately 15 feet deep, five feet long, and five feet wide. The material removed from the test pits was visually examined. In 2004, seven additional trenches were excavated to further investigate the Site debris and potential emissions from open trenches. The volume of construction debris at the Site prior to the IRM was estimated at 69,000 cubic yards (PNL, 2007).

## 2.4 Groundwater

Data collected from 25 groundwater monitoring wells installed throughout the Site show that groundwater is present at shallow depths below ground surface. The groundwater elevations are near mean sea level (MSL), as expected from the Site's proximity to the Pacific Ocean and adjacent Huntington Beach Flood Control Channel. The adjacent street elevation is approximately 4 to 6 feet above MSL. Groundwater elevation has varied a few feet over time with seasonal variations. Monitoring well data show that the highest groundwater elevations occur in the southwest comer of the Site near the flood control channel at near 0 feet MSL, while lowest groundwater elevations occur in the northwest corner of the Site at approximately -5 feet MLS. A tidal study reported in July 2003 showed that the flood control channel recharges, or contributes to, groundwater at the southwestern corner of the Site, and that the Site does not contribute groundwater to the channel. The groundwater flow direction in the area of the Site adjacent to the flood control channel is generally toward the north or northeast (away from the channel) while groundwater flow across the Site is generally northward. In the southeastern portion of the Site, the groundwater flow direction, at times, has a slight component to the east. Groundwater elevation data for wells screened in the saturated aquifer in the area of the Site (i.e., the Semiperched Aquifer, or SPA) are summarized in **Table 2-2**. Groundwater monitoring well locations are shown in **Figure 2-3**.

As discussed in Section 1.7, the underlying aquifers beneath the Ascon Site are not used as a water resource due to seawater intrusion, and there are no drinking water wells within 3 miles of the Site. Salinity measured in groundwater confirms seawater impacts to groundwater under and the vicinity of the Ascon Site (Geosyntec, 2007). Groundwater general mineral data, as reported in the GWRI (Geosyntec, 2007), are summarized in **Table 2-3**.

The Groundwater Remedial Investigation, Revision 1.0 (Geosyntec, 2007), showed that waste impacts at the Site are limited to shallow waters. Of the hydrocarbon impacts detected in groundwater, only two compounds, benzene and 1,4-dichlorobenzene, had concentrations that exceeded drinking water standards, and only benzene exceeded the standards consistently and then only at one monitoring point located in the interior of the Site. The Site groundwater has elevated selenium, but these concentrations are not likely from waste impacts. Rather, they appear to result from selenium present in the flood channel water.

The series of Interim Groundwater Monitoring Reports documenting biannual groundwater sampling events since the 2007 Groundwater RI, Revision 1.0 demonstrate no significant changes to the known, limited waste impacts to groundwater. Groundwater chemical data are summarized in **Tables 2-4** through **2-6** and include results from analyses for Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), and metals.

## 2.5 Soil Vapor and Air

Soil vapor or air investigations were performed by investigators in 1988, 1997, 2002, 2003, 2004, and 2006. Air emission data were also collected as part of the two pilot tests conducted onsite in 1999 and during Pilot Study No. 3 conducted in 2004, as well as during the Emergency Action conducted in 2005 through January 2006, and during the Interim Removal Measure conducted in July 2010 through March 2011. The purpose of these investigations and collection of air data during fieldwork was to determine if detectable volatile components of waste materials at the Site were either being released into the atmosphere or migrating offsite in the subsurface in the vapor phase. The air sampling and daily perimeter air monitoring during the Emergency Action and Interim Removal Measure provided greater understanding of potential air impacts during field operations. While odors were observed at the Site perimeter and offsite at times, air-sampling results indicated that short-term chemical exposures to offsite recipients were below levels considered hazardous to human health and safety (Project Navigator, Ltd., 2006a, 2011). In 2004, samples of down-hole flux were also collected and analyzed to investigate chemical components of soil gas from various onsite borings.

During the 1988 and 1997 offsite soil gas investigations, no organic compounds were detected in the soil gas samples, except for methane and total petroleum hydrocarbon (TPH). Soil gas was investigated along Magnolia Street near Pit F in 2004 and at the Site's northwestern perimeter in 2006 to assess potential risk due to indoor air intrusion. The 2004 assessment showed that soil gas along the western side of Magnolia Street outside of the Site entrance was insignificant, and the 2006 investigation showed that soil gas levels in the northwestern portion of the Site were acceptable for a commercial scenario. Data summary tables from the Site's soil gas investigations and the down-hole flux assessment and a sampling location map are included in **Appendix D**.

Baseline air quality monitoring conducted at 24 locations throughout the Site in March 1999 (immediately prior to onsite pilot testing) yielded no detectable organic vapor measurements. Air monitoring and sampling conducted during onsite pilot testing in March 1999 detected minimal levels of organic vapors and dust. However, none of the measured levels approached or exceeded action levels determined to be protective of Site workers and the surrounding community and approved by DTSC. This air sampling also detected similar low concentrations of most of the target compounds at the upwind air sampling station, which collects air coming onto the Site (J&W, 1999a).

Baseline air monitoring conducted in October 1999 immediately prior to a second pilot testing program also yielded no detectable organic vapors as measured by field vapor meters. Air monitoring and sampling during onsite pilot testing in October 1999 detected minimal measurements of organic vapors and dust; however, most of the levels measured did not exceed the predetermined actions levels. The upwind air samples, representative of air coming onto the Site, exhibited similar low levels of the target compounds (J&W, 1999b).

Four additional perimeter air-sampling events were performed during 2002 and 2003. Data from these events again show that the Site, in its undisturbed state, is not adversely impacting air quality in excess of regional background levels (Geosyntec, 2004).

## 2.6 Biological Investigations

Biological surveys of the Site were conducted in July 1996, 2004 (Project Navigator, 2007), and in 2009 (DTSC, 2009). These surveys concluded that the Site is highly disturbed and does not generally support native plant communities. Two native plant communities including baccharis scrub and disturbed coastal salt marsh were found onsite. The dominant vegetation was ornamental and ruderal (weedy).

No sensitive wildlife species were observed onsite. Sensitive plant species were limited to two individuals of spiny rush (California Native Plant Society [CNPS] List 4—"Plant of Limited Distribution"), seen in 2004 but not in 2009, and many individuals of southern tarplant (CNPS List 1B—"Rare or Endangered in California and Elsewhere"). No additional sensitive plant or wildlife species are known or expected to occur within the Site.

# 3.0 SUMMARY OF INTERIM ACTIONS

## 3.1 Emergency Action

In July 2005, the RPs commenced an Emergency Action, under DTSC oversight, to strengthen the north berm (along Hamilton Avenue) and mitigate potential seepage through the north berm, consisting of removal of some of the drilling mud from the northernmost lagoons (Lagoons 4 and 5) and Site winterization work. The Emergency Action was deemed necessary following the record rainfall that occurred during the wet season of 2004 through 2005, the wettest season in the Site’s recorded history, which lead to approximately 3.8 million gallons of storm water being stored onsite, and subsequently treated, pumped, and discharged under permit to the Orange County Sanitation District, to mitigate the potential of an emergency due to the risk of potential failure of the north berm, and because of cracking in the north berm and ponded water at the base of the berm.

The primary objective of the Emergency Action was to strengthen the north berm by reducing the load on the berm, and to mitigate potential seepage along the northern edge of the Site. The following work was performed in the Emergency Action: removal of a significant portion of drilling mud from Lagoons 4 and 5, reshaping of the north berm to reduce the height and flatten the north (outboard) slope and installation of an under drain (toe drain) at the toe of the outboard slope of the north berm. The excavated drilling mud was mixed with Site soil to improve material handling characteristics and then transported by end-dump trucks to an approved disposal facility. Approximately 47,000 cubic yards of waste and soil were removed from the Site. In addition, a buttress constructed from onsite concrete debris was placed at the southern portion of Lagoon 4 to support the internal berm between Lagoons 3 and 4 after the removal of drilling mud from Lagoon 4. The Emergency Action was completed in January of 2006. Details regarding the Emergency Action are included in the Emergency Action Completion Report and the Emergency Action Completion Report Addendum (Project Navigator, Ltd., 2006a, 2006b).

## 3.2 Interim Removal Measure

From July 2010 through March 2011, the RPs conducted an Interim Removal Measure (IRM) to remove approximately 70,000 cubic yards of tarry waste materials from Lagoons 1, 2, and 3 in order to safely investigate the soils beneath Lagoons 1 and 2 via a drilling program. It was determined by the RPs and DTSC that geotechnical data from this drilling program were needed for remedy planning. The results of the investigation indicated that the deeper soils under these lagoon areas are similar to deeper soils elsewhere at the Site.

The removal of lagoon waste during implementation of the IRM is a principle reason for the need to update the RFS remedial alternatives and comparative analysis from the feasibility study in this RAP, in addition to other needed modifications, including updated remedial technologies, volumes, and costs. Details regarding the Interim Removal Measure are included in the Interim Removal Measure Completion Report (Project Navigator, Ltd., 2011). Summary tables of chemical data from analyses of the materials formerly in Lagoons 1 and 2 are found in **Appendix C**.

## 3.3 Other Interim Activities

In addition to the Emergency Action and IRM, several other activities have been implemented at the Site to provide protection for the public and Site workers. These actions include the following:

- Implementation of a storm water pollution prevention plan program and installation of storm water collection improvements, including collection swales and storm water detention basins. The swales and detention basins channel storm water that isn't already captured in the lagoons and reduce potential sediments in any storm water runoff. Storm water runoff, if any, is sampled and tested, with results reported to the Regional Water Quality Control Board (RWQCB) and DTSC. Site inspections are conducted during rain events and once per month during the wet season to ensure that storm water handling improvements (Best Management Practices) are operating correctly and that repairs are made as necessary.

- Maintenance of the chain-link security fence to prevent trespassers.
- Construction of separate fences around Pit F, Lagoons 1-2 and 3, and Lagoons 4 and 5 to provide extra barriers of protection around waste material.
- Installation of special locks on entrance gates to allow emergency access for police and fire department personnel.
- Posting of No Trespassing and Proposition 65 warning signs on the perimeter fence and the entrance gates, and hazardous waste signs at significant Site features.
- Installation of high-visibility posts along all access roads throughout the Site to assist emergency (i.e., fire and police) personnel for nighttime emergency access and to delineate “No Equipment Zones” that protect sensitive biological resources.
- Collection and removal of 55-gallon drums strewn throughout the Site (most of which contained drill cuttings or purge water from previous soil and groundwater investigations).
- Well destruction (abandonment) of Well No. 80 near Magnolia St. following the 2004 blow-out. The oil well was properly destroyed (abandoned), and contaminated soils and vegetation were removed and disposed offsite.
- Installation of a reinforced polypropylene cover, a high-density polyethylene cover, and a second reinforced polypropylene cover (three covers) over the original cover on Pit F in order to mitigate emissions and odors.
- Installation of new padlocks on the groundwater monitoring wells.
- Installation of flush-mount well boxes for groundwater monitoring wells located in Edison Park and in the Site entrance driveway from Hamilton Avenue.
- Implementation of regular Site security and status inspections to check for trespassers and make any necessary repairs.
- Inspections, as necessary, and treatment of ponded storm water, if any, by the Orange County Vector Control District to ensure against onsite flourishing of mosquitoes or vermin.
- Implementation of regular geotechnical inspections to verify that Site improvements made during the Emergency Action and the Interim Removal Measure are performing as designed.
- Annual weed abatement.

# 4.0 SUMMARY OF RISK ASSESSMENTS, REMEDIAL ACTION OBJECTIVES AND SITE CLEANUP LEVELS

This section summarizes the risk assessments conducted for the Site and presents the Remedial Action Objectives (RAOs) and Site Cleanup Levels for the Site based on the risk assessment findings.

Two Baseline Health Risk Assessments (BHRAs) were performed to identify and evaluate the potential risks to human and ecological receptors posed by Site conditions. One BHRA addressed potential risk due to onsite soils and was completed by ESE. This BHRA was submitted to DTSC in 1997 (ESE, 1997b), and DTSC approved it in June of 2001. The second BHRA addressed groundwater and was completed as a part of the Groundwater RI, Revision 1.0, prepared by Geosyntec (Geosyntec, 2007). This BHRA was approved by DTSC in July of 2007.

These BHRAs estimate risks during periods of inactivity at the Site (“baseline conditions”). Estimates of potential short-term health risks to human receptors and the environment during implementation of the remedy will be documented in a Health Risk Assessment (HRA) being prepared concurrently with the EIR and to be considered by DTSC in the EIR.

## 4.1 Baseline Health Risk Assessment Results

Potential incremental cancer risks and non-carcinogenic adverse health effects from exposure to soils and vapor emanating from groundwater during baseline conditions were estimated using methodology approved by both the USEPA and Cal/EPA. Estimated carcinogenic health risks were compared to agency benchmarks of increased average lifetime cancer risks ranging from one-in-ten-thousand to one-in-a-million ($1x10^{-4}$ to $1x10^{-6}$). Non-carcinogenic health risk estimates were compared to the benchmark Hazard Index (HI) of 1. Any estimated HI with a value equal to or less than 1 was considered to be acceptable.

As a part of the BHRA process, chemicals of potential concern (COPCs) were identified for soil and groundwater. The COPCs are those chemicals that have been detected at the Site, are attributable to the Site, and have the highest likelihood to pose human health risks. For the soils BHRA, a formal selection of COPCs was conducted based on the existing body of Site characterization data at that time and chemicals toxicity and prevalence. For groundwater, volatile organic chemicals detected at least once in Site groundwater were evaluated as COPCs.

The land uses surrounding the Site suggested at the time of the BHRA that reasonable future Site uses might include commercial, residential, or recreational use. Currently, the Site is zoned residential by the City of Huntington Beach. To address potential future residential land-use, a hypothetical onsite residential exposure scenario was included in the BHRA. Potential offsite receptors, under baseline conditions, included adult and child residents as well as workers employed in establishments west of the Site. Exposure pathways considered complete in the soils BHRA for onsite receptors were:

- Inhalation of COPCs in air from sub-surface volatilization
- Inhalation of COPCs in fugitive dust
- Incidental ingestion of COPCs in soil
- Direct dermal contact with COPCs in soil.

All offsite receptors were considered to have potential contact with Ascon-related chemicals only when those chemicals are transported offsite through air dispersion. Exposure pathways considered complete in the soils BHRA for offsite receptors were:

- Inhalation of COPCs in air from sub-surface volatilization
- Inhalation of COPCs in fugitive dust.

Direct exposure to chemicals in groundwater was considered an incomplete exposure pathway and was therefore not evaluated in the soil BHRA. Groundwater in the area is not being used as a potable water source and has limited beneficial use due to the presence of high dissolved solids. Drinking water in the area is obtained from municipal distribution lines. Thus, the drinking water potential exposure pathway is considered incomplete because there is no current or anticipated future exposure to groundwater through ingestion. However, indirect exposure to volatile chemicals in groundwater is possible through volatilization and inhalation. Therefore, the only exposure pathway considered complete in the groundwater BHRA is the vapor pathway. Hence, the COPCs for groundwater (see above) include only volatile chemicals.

The soils and groundwater BHRAs considered both the carcinogenic and non-carcinogenic health effects associated with chemical exposures based on dose-response criteria obtained from either the Cal/EPA's Cancer Potency Factors (DTSC, 1994) and Reference Exposure Levels (Cal/EPA, 2006), the US EPA's Integrated Risk Information System (IRIS; USEPA, 1996), or US EPA's Health Effects Assessment Summary Tables (USEPA, 1995).

The results of the soils BHRA indicated that potential exposures and estimated risks posed by the unremediated Site, in its then-present condition, exceeded the non-cancer benchmarks for all receptor and exposure scenarios[13], except for the onsite worker/trespasser receptor in the average exposure scenario. The hypothetical upper-bound incremental lifetime cancer risks (ILCRs) were at $1 \times 10^{-4}$ or higher for all receptors, except offsite adult residents and workers in the average exposure scenario, for which the ILCRs exceeded $1 \times 10^{-5}$. The BHRA is a theoretical and conservative (worst-case) evaluation of potential health impacts that assumes exposure occurs on a regular basis over an extended period of time. Therefore, potential risks are likely to be much lower than reported in the BHRA.

The soils BHRA conducted in 1997 utilized screening modeling approaches in evaluating potential offsite exposures to chemicals detected at the Site. In addition, toxicity values for some COPCs had changed from what was used in the 1997 assessment. Therefore, a reevaluation of the risk assessment was conducted in 2002 to provide a more refined estimate of potential offsite risks using more detailed modeling and the latest toxicity values (Geosyntec, 2002). The reevaluation focused on refinement in three areas: (1) appropriate values and source areas of chemical concentrations in soil/waste based on the RI data, (2) calculation of emission fluxes from the lagoons, and (3) air dispersion modeling using the ISCST model. The results of the reevaluation indicated that estimated incremental cancer risk and non-cancer hazards were lower than reported in the BHRA and were within the risk management range of $1 \times 10^{-4}$ to $1 \times 10^{-6}$ and below the threshold value (Hazard Index) of 1, respectively, for all offsite receptors. In addition to the reevaluation, perimeter air monitoring was conducted between August 2002 and December 2003 to evaluate the potential for offsite air impacts from the Site and to establish a baseline for comparison purposes for future remedial activities (Geosyntec, 2004). Both short-term (2-hour) and long-term 24-hour sampling were conducted in August 2002. In 2003, three rounds of 8-hour sampling were conducted. The results of the air monitoring indicated that measured concentrations would not pose a significant health risk or were generally within background levels for those chemicals commonly detected in air within the Los Angeles area. Notably, the chemical that contributed the most to the estimated offsite risk in the BHRA, 1,2-dichloroethane, was not detected in ambient air for all monitoring events.

The IRM work also reduced the long-term baseline risk associated with the Site in that the IRM removed most of the waste contained in Lagoons 1 and 2, which presented elevated concentrations of some COPCs. The removal of this waste therefore decreased the potential for long-term exposure of the surrounding community. The groundwater investigation and BHRA showed that the only potentially complete exposure pathway from groundwater is limited to inhalation of volatile chemicals from groundwater. The estimated risk from groundwater to a hypothetical resident living on the unremediated Site would be unacceptable, principally due to potential inhalation of benzene found in one well. Because there are no offsite groundwater impacts, groundwater does not pose a health risk to offsite residents.

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[13] Exposure scenarios considered in the BHRA include both average exposures and reasonable maximum exposures for the following receptors: offsite adult residents, offsite child residents, offsite workers, onsite workers and trespassers, hypothetical onsite adult residents, and hypothetical onsite child residents.

The groundwater investigation also showed that groundwater does not contribute to surface water (i.e., groundwater does not seep into the flood control channel). A tidal study conducted in 2003 as part of the Groundwater RI, Revision 1.0, confirmed that the flood control channel actually contributes to the groundwater beneath the Site.

## 4.2 Other Site Risks and Hazards Noted in BHRA

**Ecological Risk Characterization**
An ecological risk assessment, included as part of the soils BHRA report, concluded that potential risks to wildlife populations do not appear to be significant. Potentially at risk wildlife included birds attracted to the ponded surface water and tars in Lagoons 1 and 2. To address this potential, netting was installed in 2003 to keep birds out of these lagoons. The netting was removed prior to the fieldwork to remove tarry materials from these lagoons during the 2010-2011 IRM.

The ecological risk assessment determined that the Site provides little support of natural habitats that would serve as significant areas for the establishment of important species populations. Biological assessments at the Site in 2004, conducted as part of the Revised Feasibility Study (RFS) (Project Navigator, Ltd., 2007), and in 2009, conducted as part of the IRM Mitigated Negative Declaration, confirmed that no rare, threatened, or endangered wildlife species inhabit the Site. Observations subsequent to the BHRA revealed that the Site supports limited sensitive plant resources that include a significant population of southern tarplants and a small area of disturbed salt marsh vegetation.

**Horizontal Movement of Wastes**
Although there is no evidence of horizontal movement of waste from the Site, if such movement were to occur, there is no subsurface containment. One factor limiting the horizontal subsurface migration of waste from the Site is the high viscosity of the waste materials, which is unlikely to change and thereby unlikely to allow such horizontal migration.

Above ground containment is complete, and currently accomplished by the perimeter berm, discussed below.

**Potential Berm Failure**
In 2005, the berms at the Site were found not to be in compliance with the Uniform Building Code (UBC, 1997) requirements for the construction of fill slopes. The integrity of the berms had degraded over time due to rodent burrows, soil slumping, and rainfall. Failure of the berms could have potentially resulted in the release of waste materials offsite. A geotechnical assessment was performed by the RPs during the extreme rainfall received at the Site during the 2004-2005 winter/wet season, and determined that the northern berm was potentially weakened by the record heavy rainfall, and if the Site experienced a similar level of rainfall in the next rainy season, the northern berm might be unstable to below accepted safety standards. The geotechnical assessment concluded that there was a need for prompt, interim action to avoid a potential emergency condition to protect the public and the environment and to minimize the risk to public and private property prior to the 2005-2006 rainy season. Thus, the Emergency Action (see Section 3) was conducted at the Site in 2005 through early 2006 to strengthen the north berm and mitigate potential seepage from/through the north berm.

**Soil Bearing Capacity**
The 1997 soils BHRA indicated that the Site might not have adequate load bearing capacity to support the construction of buildings and that future uses of the Site may be restricted. Geotechnical assessment was conducted in accessible Site areas during the Pilot Study No. 3 in 2004 to ensure that the Site could support a protective cap (Project Navigator, Ltd., 2007). Additional geotechnical assessment was conducted in 2011 during the Interim Removal Measure in the Lagoon 1-2 and 3 areas, areas that had been inaccessible prior to the IRM. Future uses of the Site may be restricted due to the geotechnical nature of the waste and clays and due to the cap itself.

**Physical Hazards**
In order to address the potential for a trespasser to fall into one of the onsite lagoons at the Site, all lagoons and Pit F are presently behind fences and locked gates. However, potential trip and fall hazards relating to the construction debris dumped throughout the Site remain.

**Pit F Odors**
In the past, odors from Pit F have been detected by the adjacent community. Due to the close proximity to Pit F, residents living immediately east of the Site, across Magnolia Street, have occasionally noticed odors and have previously lodged complaints with the South Coast Air Quality Management District (SCAQMD).

## 4.3 Development of Remedial Action Objectives

The Remedial Action Objectives (RAOs) are goals specific to various media at the Site and are fundamental to the feasibility study process. The RAOs for the Site are as follows:

### 4.3.1 Exposure Prevention

A RAO is to prevent human and ecological exposure to onsite, impacted media. These media include the tarry liquids formerly in Lagoons 1-2 and 3, the waste in Pit F, other solid wastes throughout the Site (e.g., drilling muds, debris), and groundwater. With respect to groundwater, preventing exposure includes preventing ingestion, dermal contact, and inhalation of volatile chemicals released from groundwater.

### 4.3.2 Protection of Groundwater

In addition to reducing human health and ecological risk through preventing exposure, another RAO is to reduce risks to the environment by preventing migration of contaminants from onsite wastes to groundwater under the Site. Another RAO is to prevent the offsite migration of existing impacts to groundwater (i.e., contain onsite groundwater impacts that are greater than background levels and above relevant regulatory guidelines).

Several organic compounds and metals have been detected in shallow groundwater beneath the Site at concentrations greater than the California or Federal Maximum Contaminant Levels (MCLs) for drinking water. However, the groundwater beneath the Site contains high concentrations of total dissolved solids (TDS) in the Semiperched and Talbert Aquifers, mostly due to seawater intrusion. Current groundwater quality, in both the Semiperched and Talbert Aquifers beneath the Site, does not qualify as a drinking water resource, as defined by SWRCB Resolution No. 88-63, due to the elevated TDS and chloride concentrations. Thus, the shallow groundwater should not be considered a source of drinking water and is not considered a complete exposure pathway of concern. However, the Talbert Aquifer is utilized for drinking water in other areas of the regional groundwater basin and is included in the Regional Water Quality Control Board's “Water Quality Control Plan.” In this plan, the Talbert Aquifer is designated as having potential beneficial uses, even in the vicinity of the Ascon Site.

## 4.4 Proposed Soil Clean-up Levels

The results of the BHRA indicated that onsite and offsite exposures to soil and waste may result in an unacceptable risk. Therefore, Site-specific Risk-Based Concentrations (“RBCs”) for COPCs in soil were developed for the Site for use as Soil Cleanup Levels (SCLs) in the remedial planning process. RBCs are media-specific concentrations that are protective of human health under the designated land use. Soil RBCs developed for the Site express both a chemical concentration and an exposure route assumed in the derivation of the RBC; therefore, protectiveness may be achieved by reducing chemical concentrations or by reducing exposure by means other than chemical removal (such as capping an area or limiting access). RBCs for each COPC to be evaluated for remedial planning (discussed below) were developed assuming construction worker and commercial worker exposures to chemicals in soil via direct contact (incidental ingestion and dermal contact) and inhalation of dust or volatiles in outdoor air. These scenarios are considered the most relevant for the Site considering the likely land uses of the portion of the Site that will be addressed by the SCLs (City Parcel and perimeter road). As mentioned earlier, the majority of the Site will be covered with a cap, including a geomembrane and underlain by a landfill gas collection system, making impacted soil and waste materials inaccessible for contact, including VOC emissions. The RBCs will also ensure that uncapped areas of the Site (i.e., the City Parcel, perimeter road, and the SCOC area, provided the SCOC area is remediated prior to cap construction) do not present unacceptable health risks to receptors that may come in contact with soils in those areas. RBCs derived for onsite receptors are also considered to be protective of potential offsite exposures to VOCs or fugitive dust that may migrate from the uncapped areas of the Site (see **Appendix E** for further discussion). Soil SCLs for protection of groundwater were not derived due to the lack of potential for shallow groundwater beneath the Site to be used for drinking water as discussed in Section 4.3.2. Potential exposures to off-site groundwater will be addressed through monitoring and evaluation as discussed in Section 5.5.3, Proposed Groundwater Contingency Program.

For the soils BHRA, a formal selection of COPCs was conducted based on the existing body of Site characterization data at that time. During investigations subsequent to the soils BHRA, other chemicals were detected in soil and waste. In addition, as discussed earlier, the Site has changed significantly as a result of the Emergency Action and Interim Removal Measure, both of which included the removal of waste materials from the Site. To address these changes, the existing Site soil dataset was modified to only account for soils that are remaining in place. The maximum chemical concentrations in soil that are remaining in place were then compared to health-based values (USEPA 2012 Regional Screening Levels [RSLs]) in a conservative fashion, and those chemicals were identified as a COPC if the maximum was higher. The USEPA RSLs were used due to the more comprehensive list of chemicals addressed. Site-specific RBCs were then derived for each COPC considering methodologies based on Cal/EPA and USEPA risk assessment guidance and Cal/EPA specific toxicity criteria when available. These Site-specific RBCs will be used as the SCLs.

An important consideration in developing RBCs is the final disposition of impacted media as described with respect to remedial alternative selection. It is anticipated that soils in areas where RBCs will be used will be covered with some depth of import fill. For the purpose of developing RBCs to use as SCLs, RBCs were developed conservatively assuming COPCs may be present at the surface (0-ft Cover RBC). Alternative depth scenarios are also presented in **Appendix E.** The list of COPCs and their proposed RBCs are listed in **Table 4-1**. **Appendix E** presents the supporting documentation for the COPC selection and RBC derivation.

The RBCs computed for some constituents are less than background concentrations measured in local soils (e.g., arsenic). As such, these RBCs will not be achievable for the Site. Thus, any excavation of waste materials and soils will be vertically performed until the RBCs or background levels are achieved, or the maximum depth down to groundwater is reached, whichever condition is first met.

In addition to the RBCs, the City of Huntington Beach Soil Cleanup Standards should be considered, where applicable, as SCLs for the Site. These include maximum allowable concentrations of TPH of 500 and 1,000 mg/kg in residential and commercial soils, respectively[14].

[14] See City of Huntington Beach Specification No. 431-92, Soil Clean-Up Standard, Huntington Beach Fire Department.

# 5.0 SUMMARY AND EVALUATION OF ALTERNATIVES AND SELECTION OF THE REMEDY

The RFS, conditionally approved by DTSC in August 2007, screened alternatives for remediation of the Site. The stated objectives of the RFS were to evaluate remedial technologies available to address affected media at the Site, to evaluate and confirm the appropriateness of process options to implement those technologies, to assemble remedial alternatives and evaluate them against the National Contingency Plan ("NCP") nine criteria, and to recommend a preferred alternative.

At the time of the RFS, the affected media at the Site were soils and drilling muds in the former and current lagoons and in the pits, tarry wastes in Lagoons 1, 2, and 3, Pit F waste, Pit F-impacted soils, construction debris throughout the Site, and shallow groundwater beneath the Site.

The Interim Removal Measure performed from July 2010 through March 2011 resulted in removal of approximately 70,000 cubic yards of tarry waste materials from Lagoons 1 and 2, and, to a lesser extent, from Lagoon 3. This resulted in removing the majority of tarry wastes from these lagoons, one of the RFS-designated affected media at the Site. Also, the additional studies, knowledge, and experience gained since DTSC approval of the RFS have led to modifications and updates to the RFS-selected preferred alternative, in addition to taking into account the significant changes to Site conditions. Furthermore, to enable a comparative study between alternatives, the other remedial alternatives considered in the RFS have been modified and updated using the same studies, knowledge, and experience gained since the 2007 RFS and with post-IRM conditions. Therefore, the comparative analysis of the remedial alternatives in the feasibility study has also been revisited (i.e. updated) herein using the updated alternatives to assure that the reevaluation of alternatives was consistent with required review standards. Changes in approach and recommended removal volume due to the Interim Removal Measure work are incorporated into the proposed remedy for the Site (see Section 5.5.2).

The feasibility study approach used in the RFS is shown in **Figure 5-1**. First, remedial action objectives (RAOs) and Applicable or Relevant and Appropriate Requirements (ARARs) were defined for the Site. The volume of affected media and visible impoundments at the Site was estimated, and remedial methodologies for addressing affected media and wastes were evaluated. The remedial technologies judged inapplicable or ineffective were eliminated from further evaluation. Retained process options underwent screening to assess effectiveness, implementability, and cost. Treatability studies and pilot tests were performed as part of that evaluation process. The selected methods were then assembled into six potential remedial alternatives. A detailed evaluation of these remedial alternatives was performed using the nine criteria required by the NCP. Finally, based on a comparative analysis of the remedial alternatives, a preferred alternative was recommended for the Site.

The 2013 updates to the comparative analysis in the feasibility study were limited to 1) refinement of the remedial alternatives with current Site conditions and conceptual design results, including updated volumes, schedule durations, costs, and other project metrics of the various alternatives, 2) updating the potential remedial technologies to be employed to achieve the remedial objectives, and 3) re-evaluating the comparative evaluation of the alternatives. The update did not include new remedial alternatives.

## 5.1 Screening of Remedial Technologies

In identifying the remediation technology process options for the wastes at Ascon in the RFS, many of the retained processes, such as wastewater treatment and cap construction, were proven, "off-the-shelf" technologies or practices and did not require treatability testing or pilot testing. Other process options were viewed as requiring bench scale treatability testing, followed by onsite pilot testing to demonstrate their effectiveness on specific wastes at Ascon. These tests confirmed the effectiveness of those technologies. All of the technologies retained on the basis of effectiveness, implementability, and treatability/pilot testing were also screened based on relative cost.

These retained process options were assembled in the RFS into six remedial alternatives, including the No Action alternative required by the NCP process for use as a baseline. The alternatives were developed to encompass a wide range of remedial activities, from the No Action alternative to complete removal of all impacted media. These alternatives are named as follows, and the 2013 updates of these alternatives are described below:

- Alternative 1 – No Action
- Alternative 2 – Limited Waste Removal
- Alternative 3 – Protective Cap
- Alternative 4 – Partial Source Removal with Protective Cap
- Alternative 5 – Source Removal with Offsite Disposal and Slurry Injection Technology (SIT)
- Alternative 6 – Source Removal with Offsite Disposal.

## 5.2 Evaluation Criteria

The NCP mandates a detailed evaluation of remedial alternatives retained after the screening analysis. This involved assessing each of the remedial alternatives against nine NCP criteria and comparing the relative performance of the remedial alternatives against those criteria. The nine NCP evaluation criteria are:

1. ***Overall protection of human health and the environment:*** Whether an alternative provides adequate protection and eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. ***Compliance with Applicable or Relevant and Appropriate Requirements (ARARs):*** Whether the alternative meets state and federal environmental laws, regulations, and other requirements that pertain to the Site and, if not, whether a waiver is justified.
3. ***Long-term effectiveness and permanence:*** The ability of an alternative to maintain protection of human health and the environment over time, and the reliability of such protection.
4. ***Reduction of toxicity mobility and volume through treatment:*** An alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the volume of contaminated materials remaining.
5. ***Short-term effectiveness:*** How fast the alternative reaches the clean-up goal and the risks the alternative poses to workers, residents, and the environment during construction or implementation of the alternative.
6. ***Implementability:*** The technical and administrative feasibility of implementing the alternative, such as relative availability of goods and services. Also, whether the technology has been used successfully on other similar sites.
7. ***Cost:*** Estimated capital and operations, maintenance, and monitoring (OM&M) costs, as well as present worth costs.
8. ***State acceptance:*** Whether DTSC agrees with the analyses and recommendations of the RI/FS and the RAP.
9. ***Community acceptance:*** Evaluated after public comment period on the RAP.

An alternative must meet NCP Criteria 1 and 2, the “threshold criteria,” to be recommended. NCP criteria 3 through 7, the “balancing criteria,” are evaluated to determine the best overall solution. After public comment, DTSC may alter its preference on the basis of the “modifying” criteria.

## 5.3 Remedial Alternatives Considered

The significant elements of each updated alternative are described below.

### 5.3.1 Description of the Alternatives

*RFS Alternative 1: No Action*

The "No Action" alternative is retained as the baseline for alternative evaluation and screening. In Alternative 1, no containment or removal actions would be performed. Waste would remain on the City parcel (the narrow strip of land along Magnolia Street and Hamilton Avenue). The Site would remain as it is. The "No Action" alternative would continue to include a long-term groundwater monitoring program (all alternatives would contain a groundwater monitoring program). The Alternative 1 approximate cost of $13.8 million would include maintenance and monitoring over the next 30 years.

*RFS Alternative 2: Limited Waste Removal*

Alternative 2 would include removal of the Pit F waste with offsite disposal. The lagoon areas would be covered with acceptable soils to prevent direct exposure. Waste would remain on the City parcel, and the CHP Parcel and City Parcel would be deed restricted to prevent any inconsistent development or activities at the Site. Note that the 2007 RFS-presented Alternative 2 included the removal of tarry liquids from the lagoons, removal that was performed during the IRM.

Alternative 2 would remove approximately 2,250 cubic yards of waste from the Site and would be completed approximately five months from commencement. A total of approximately 9,600 cubic yards of soils would need to be imported onto the Site to cover the lagoon areas. The construction ("capital") cost would be approximately $6.9 million, and the Operations and Maintenance (O&M) costs would be approximately $19.3 million over 30 years. This brings the total present worth cost of Alternative 2 to approximately $26.23 million.

*RFS Alternative 3: Protective Cap*

Alternative 3 calls for a protective cap to cover the impacted soils and waste after select waste deposits are removed. To enable the construction of the cap, the waste and soils at the Site would need to be graded to reconsolidate[15] waste from the Site perimeter to the Site interior and to create appropriate slopes for storm water runoff and collection from the cap. Alternative 3 includes excavation and offsite disposal of up to 30,000 cubic yards of Site waste and soils, in addition to the removal of the Pit F waste (2,250 cubic yards), to allow for cap installation. The waste surfaces of Lagoons 4 and 5 would be reinforced to support the cap, and the lagoon waste would be held in place using sheet piling that would be driven into native soils underneath the lagoons. Impacted materials on the City parcel and in the areas of the perimeter maintenance road and storm water detention basins would be excavated to at least street level and then, if necessary, to a depth achieving the RBCs (**Table 4-1**), background concentrations, or until groundwater is reached. Pit wastes (Pits A - E, G, and H) would be excavated as needed to at least adjacent street elevation and deeper, if necessary, to make room for the storm water detention basins. The entire Site within the property boundaries (CHP parcel), except the perimeter maintenance road and storm water detention basins, would be capped[16], and a long-term groundwater-monitoring program would be maintained. The CHP Parcel would be deed restricted to prevent development and activities incompatible with the cap, but commercial or recreational uses would be allowed.

Alternative 3 would remove up to approximately 32,250 cubic yards of waste from the Site which would be completed approximately 11 months from commencement. A total of approximately 206,000 cubic yards of suitable soils would need to be imported onto the Site to construct the cap and backfill the non-capped areas. Capital cost would be approximately $36.9 million, and the O&M costs would be approximately $22 million over 30 years. The total present worth cost of Alternative 3 is therefore approximately $58.8 million.

[15] Reconsolidation of waste generally involves excavation of waste within an area and moving the waste to a different area. In this case, waste near the Site perimeter or above the final cap elevation would be reconsolidated to areas that would be under the cap.

[16] The top deck of the protective cap will include, at a minimum, from top to bottom, a vegetative cover soil layer, biotic layer, drainage layer, percolation barrier layer, a passive vapor collection system, and a foundation layer. The side slopes of the protective cap would be an evapotranspirative cap.

*RFS Alternative 4: Partial Source Removal with Protective Cap*

Alternative 4 was the RFS-recommended alternative and is similar to the protective cap of Alternative 3. To enable the construction of the cap, the waste and soils at the Site would need to be graded to reconsolidate waste from the Site perimeter to the Site interior and to create appropriate slopes for storm water runoff and collection from the cap. Alternative 4 includes excavation and offsite disposal of up to 30,000 cubic yards of Site waste and soils, in addition to the removal of the Pit F waste (approximately 2,250 cubic yards), to allow for cap installation. The waste surfaces of Lagoons 3, 4 and 5 would be reinforced, as needed, to support the cap, and the lagoon material in Lagoons 4 and 5 would be held in place using cement, mixed with waste, that would be left in place under the cap (i.e., an internal geotechnical buttress). Impacted materials on the City parcel and in the areas of the perimeter maintenance road and storm water detention basins would be excavated to at least street level and then, if necessary, to a depth achieving the RBCs (refer to **Table 4-1**), background concentrations, or until groundwater is reached. Pit wastes (Pits A - E, G, and H) would be excavated as needed to at least adjacent street elevation and deeper, if necessary, to make room for the storm water detention basins.

The capped areas could vary in elevation and size depending on the area and vertical extent of source reconsolidation or removal along the east and north sides of the Site. A long-term groundwater-monitoring program would be maintained, and the CHP Parcel would be deed restricted to prevent development and activities incompatible with the cap, but commercial or recreational uses would be allowed.

Alternative 4 would remove up to 32,250 cubic yards of waste from the Site which would be completed approximately 11 months from commencement. A total of approximately 206,000 cubic yards of suitable soils would need to be imported to construct the cap and backfill the non-capped areas. Construction cost would be approximately $36.6 million, and the O&M costs would be approximately $22 million over 30 years. Thus, the total present worth cost of Alternative 4 is approximately $58.6 million.

*RFS Alternative 5: Source Removal with Offsite Disposal and SIT (Slurry Injection Technology)*

Alternative 5 calls for complete removal of all Site waste through offsite disposal or slurry injection technology (pumping the waste deep underground into the fractured oil reservoir). After removal or injection of the waste, impacted groundwater at the Site would be removed or treated, if necessary, to meet the groundwater objectives after a post-remediation risk assessment is conducted. A groundwater-monitoring program would be maintained. If groundwater objectives are found to be unachievable following soils/waste removal, then the CHP Parcel would be deed restricted to prevent incompatible development and activities.

Alternative 5 would remove approximately 710,000 cubic yards of material from the Site, inject approximately 305,000 cubic yards of waste, which would be completed approximately 55 months (4.5 years) from commencement. A total of approximately 521,000 cubic yards of suitable soils would need to be imported to backfill the excavation and leave appropriately graded slopes. The construction or capital cost would be approximately $251.5 million, and the O&M costs, if O&M is needed for long-term groundwater monitoring, would likely be $10.4 million over 30 years. This brings the total present worth cost of Alternative 5 to approximately $262 million.

*RFS Alternative 6: Source Removal with Offsite Disposal*

Alternative 6 would remove and transport all onsite waste materials offsite for disposal.

Alternative 6 would remove approximately 1,010,000cubic yards of material from the Site and would be accomplished approximately 41 months from commencement. A total of approximately 521,000 cubic yards of suitable soils would need to be imported to backfill the excavation and leave appropriately graded slopes. The capital cost would be approximately $292 million, and the O&M costs, if O&M is needed for long-term groundwater monitoring, would likely be $10.4 million over 30 years. This brings the total present worth cost of Alternative 6 to approximately $302 million.

To enable comparisons, the significant elements of the alternatives are summarized in **Table 5-1**. Also, **Table 5-2** summarizes the present worth capital and O&M costs, volumes of waste to be removed, volume of import soils, estimated number of truck trips needed, and estimated duration of the construction for each alternative.

**Long-Term Groundwater Monitoring and Contingency Mitigation**
All remedial alternatives contain a groundwater-monitoring program. This long-term monitoring program will be similar to the Interim Groundwater Monitoring Program now in place, or, in the cases of Alternatives 1 and 2, potentially the same, with groundwater sampling and testing performed at a regular interval from wells generally near the Site perimeter. Because the status of certain monitoring wells will change during remedial construction, existing wells to be used, new wells to be installed, and other specifics for the long-term program will be identified during the development of an O&M Plan for the Site. Section 5.5.3 describes the proposed groundwater contingency program that outlines the means to verify future impacts to offsite groundwater, if any, and subsequent steps to remedy the impacts.

The RAP provides flexibility to accommodate modifications to the remedy based on updated information. Accordingly, remedy modifications, which could result from new data[17], could be made under the scope of the RAP. The IRM drilling program is an example of additional data collection incorporated into the recommended alternative.

## 5.4 Alternatives Analysis and Recommended Alternative

The purpose of the evaluation of relative performance of the alternatives is to select a preferred remedial alternative that will be most suitable for the Site, based on the NCP criteria. In the comparative analysis/evaluation, the remedial alternatives are weighed against each of the nine NCP criteria, and comparisons between alternatives are made to assist in screening out inferior alternatives and selecting a preferred alternative. The preferred alternative becomes the alternative that meets the threshold criteria (criteria 1 and 2 below, numbered for convenience in discussion) and best achieves a balance between the balancing criteria (criteria 3 through 7). The modifying criteria (number 8 and 9) are used to guide DTSC to project modifications, if needed. A summary of the evaluation follows.

### 5.4.1 Comparative Evaluation of the Alternatives

***1. Overall protection of human health and the environment:*** The capping and source removal alternatives (3 through 6) meet this criterion by minimizing or eliminating risks from direct contact with waste and impacted soils and by removing contaminant pathways to groundwater either through removal or isolation of waste from precipitation. Alternatives 1 and 2 fail this criterion because they do not provide adequate elimination of direct contact with the bulk of the waste and because percolation to groundwater is neither minimized nor prevented.

***2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs):*** Alternatives 3 through 6 will meet this criterion. Alternatives 1 and 2 fail the chemical ARAR criterion because they do not provide protection of air and groundwater as mandated by regulation. Because Alternatives 1 and 2 fail to meet either threshold criteria, they are screened out and not addressed further in the criteria analysis.

***3. Long-term effectiveness and permanence:*** Of the remaining alternatives, Alternatives 5 and 6 provide the highest degree of long-term effectiveness and permanence because all waste materials are removed from the Site or deep well injected. The capping Alternatives 3 and 4, through the use of an engineered and maintained cap, provide a lower, but significant, degree of long-term effectiveness and permanence. The cap will isolate waste and thereby protect against human exposure, percolating storm water and lateral migration. The cap would be maintained and regularly inspected to ensure effectiveness, and all elements of the selected alternative would be formally reviewed every five years by the DTSC to ensure protection of human health and the environment.

***4. Reduction of toxicity mobility and volume through Treatment:*** None of the alternatives treat significant quantities of waste to alter the waste's inherent toxicity, migration, or volume, but the cap

[17] New data collection may occur during the remedial design.

Alternatives 3 and 4 isolate the waste and thereby prevent migration of contaminants from the waste (i.e., mobility reduction). Alternatives 3 and 4 also result in a reduction of onsite volume, through removal and offsite disposal and/or treatment at a disposal facility. Alternatives 5 and 6 provide the highest degree of volume reduction through removal and offsite disposal and/or treatment.

***5. Short-term effectiveness:*** Alternatives 5 and 6 present the greatest short-term negative impacts in that all waste is excavated and removed, resulting in significant dust, noise, odors, and truck traffic, and more so than would result under Alternatives 3 or 4, which require the excavation of smaller volumes of waste. While chemical air emissions from onsite waste have been effectively controlled through vapor suppressants, experience has shown that odors will likely be associated with excavation of the waste. Also, the importing of fill soils for the cap construction of Alternatives 3 or 4, although significant in volume and with commensurate trucking, dust, and noise, is significantly less than the import needed for the Site-wide backfill of Alternatives 5 and 6 (i.e., short-term negative impacts are much more severe for Alternatives 5 and 6).

The duration of the clean-up operations for each alternative is listed in **Table 5-2**. The cap options (Alternatives 3 and 4) would take a fraction of the time to complete than would the removal alternatives (Alternatives 5 and 6). Alternative 5 would take the longest (approximately 4.5 years) due to the slow rate of deep well injection.

***6. Implementability:*** Alternative 5 is deemed to be the least implementable due to the permitting process for SIT, a technology relatively new to California that would necessitate the drilling of a new deep injection well. Alternative 6 also presents potential implementation issues in that the total removal of waste could strain transportation and landfill capacities because of the limited number of appropriate waste haulers available in California and due to the large volume of waste that would need to be disposed at appropriate landfills with limited capacities. Alternatives 3 and 4 use proven capping technologies and could be readily implemented, although Alternative 3 would be more difficult to implement than Alternative 4 due to potential difficulties associated with the sheet pile wall needed within Lagoons 4 and 5, the installation of which includes noise from driving the sheet piles and the possibility of breaching the native soils' natural containment of Site contaminants.

***7. Cost:*** Present worth costs, updated in 2013, are listed for each alternative in **Table 5-2**. Alternatives 3 and 4 are less costly than Alternatives 5 and 6, largely due to the cost of waste transportation and offsite disposal associated with Alternatives 5 and 6.

***8. State or Regulatory acceptance:*** The SIT component of Alternative 5 is expected to be unacceptable to regulatory bodies due to the need to drill a new deep well and use reservoir fracturing technology to inject the slurried waste. Regulatory acceptance for the other alternatives will be determined through the commenting and approval process.

***9. Community acceptance:*** The community has not yet been given the opportunity to formally respond to the alternatives. The community will be able to respond on the proposed RAP during the public comment period and at another public meeting specifically called for that purpose.

### 5.4.2 Recommended Alternative

Alternative 4, Partial Source Removal with Protective Cap, was the recommended remedial alternative of the RFS and continues to be the recommended alternative. The rationale for selecting Alternative 4 is as follows:

Between the complete removal alternatives (Alternatives 5 and 6), Alternative 6 is preferable due to the low implementability of SIT in Alternative 5, the sole distinguishing element, aside from the greater waste removal to offsite facilities under Alternative 6. Because Alternative 6 is preferable between Alternatives 5 and 6, Alternative 5 is not considered further.

The primary advantage of Alternative 4 over the other cap alternative, Alternative 3, is the greater feasibility of constructing the buttress in Lagoons 4 and 5, using cement mixed with the lagoon materials called for in Alternative 4, to hold the material that would remain in place in Lagoons 4 and 5, over the installation of sheet piling called for in Alternative 3. Because sheet piling in Lagoons 4 and 5 versus mixing material in Lagoons 4 and 5 with cement is the only significant difference between Alternatives 3 and 4, and Alternative 4 is preferable between them, Alternative 3 is not considered further.

The benefit of Alternative 4 over Alternative 6 is that Alternative 4 would provide the fastest and most cost-effective means to protect human health and the environment but with less impact to the environment, surrounding communities, and onsite workers from implementation than would result under Alternative 6. The primary benefit of Alternative 6 over Alternative 4 is that Alternative 6 would provide more long-term effectiveness and permanence through offsite disposal of all waste.

The disadvantage of Alternative 6 when compared to Alternative 4 is that any increase of long-term permanence and protection of human health and the environment would be achieved at a cost of significantly greater potential impacts to the community during implementation of the remedy. These impacts include potential emissions, odors, truck traffic, and noise, all of which would persist significantly longer under Alternative 6 than under Alternative 4. Alternative 6 also presents significantly greater economic cost than any other alternative.

The benefits of Alternative 4 over Alternative 6 are:

- Far fewer negative impacts result from implementation as compared to Alternative 6 (i.e., significantly less potential odors, emissions, dust, truck traffic, noise);
- Implementation of Alternative 4 can be completed much faster than Alternative 6 (approximately 2.5 years shorter time to implement Alternative 4 than Alternative 6);
- For hauling waste to offsite facilities, Alternative 4 will require approximately 124,500 fewer one-way truck trips than Alternative 6;
- For hauling import soils, Alternative 4 will require approximately 37,800 fewer import one-way truck trips than Alternative 6;
- Alternative 4 can be completed at a lower relative cost than Alternative 6 (implementation of Alternative 6 would cost approximately five times that of Alternative 4);
- Alternative 4 provides the greatest balance between short-term and long-term effectiveness.

Alternative 4 presents the most balanced, and therefore best, remedial solution, was selected as the preferred alternative, and is proposed by DTSC in the Ascon Landfill Site Environmental Impact Report as the Project under CEQA.

## 5.5 Proposed Site Remediation

### 5.5.1 Introduction

As presented in Section 5.4, Alternative 4 was selected as the most suitable remedial alternative for the Site because it best both meets the primary objective of protecting public health and the environment and minimizes negative impacts to the extent reasonably practical. Section 5.5.2 outlines the steps and components of the proposed remedy.

### 5.5.2 Components of the Proposed Remedy

This section describes the main components of the proposed remedy. A detailed Work Plan will be prepared for DTSC review and approval following approval of the RAP. The proposed remedy is depicted in **Figures 5-2 and 5-3**, which include proposed cap slopes and locations of the perimeter road and storm water detention basins. **Figure 5-3** presents a visualization of the completed preferred remedy. **Figure 5-4** shows profiles of the proposed cap. Also important, however, are the procedures that will provide protection to onsite workers and the community during implementation.

The following is a general implementation sequence for the field activities of the proposed remedy. A more detailed sequencing of activities will be generated during the remedial design process[18].

Step 1 – Mobilization & Site setup: Mobilize equipment (excavators, loaders, dump trucks, water tanks, foam applicators, etc.), materials, and construction personnel to the Site. Set up office trailers, staging areas, water supply, temporary utilities, and access roads. Abandon (i.e., destroy) onsite groundwater monitoring wells that cannot be protected during remedy implementation[19].

Step 2 – Vegetation and Debris Clearing: Remove vegetation from portions of the Site undergoing reconsolidation, waste removal, or cap construction. Stockpile, then break or crush[20] concrete debris. Remove debris and Site materials that are incompatible with the remedial design.[21]

Step 3 – Pit F Removal: Remove Pit F waste and dispose at an offsite location. Because of the odors potentially emitted by Pit F materials, Pit F will be excavated under a negative-pressure structure, or tent, with emissions treated to capture odors and VOC emissions. The excavation will be performed using slurry trench methods, where the waste is excavated from deep trenches that are filled with a slurry composed of water and non-hazardous emulsifiers. The slurry helps minimize odorous emissions by minimizing exposure of the waste to air. Generally, groundwater that infiltrates into the trenches would mix with the slurry; however, dewatering operations may occur when removing deeper Pit F materials located below the groundwater table. If dewatering is necessary, potentially impacted groundwater/slurry mixture would be disposed offsite if it cannot be treated prior to discharge.

Step 4 – Lagoon Strengthening in Lagoons 4 and 5: Construct an internal berm within Lagoons 4 and 5 on the northern and eastern boundaries of the lagoons to enable engineered slopes within the CHP parcel. This work will include the construction of a buttress composed of cement mixed with the lagoon materials to contain the remaining waste. The top of the buttress will be beneath the final cap surface and, hence, not visible.

Step 5 – Waste Reconsolidation: Remove waste from areas along Hamilton and Magnolia as shown in **Figure 5-2** and reconsolidate to the Site interior. The removal will include the following areas or items:

- Above street-level Site materials located on the City parcel;
- Impacted Site materials, if any, found below street-level within the City parcel that exceed the RBCs and exceed background concentrations of COPCs, and are found above the groundwater table;
- Impacted Site materials, if any, found below street level on the CHP parcel adjacent to the property line around the perimeter of the cap that exceed the RBCs and exceed background concentrations of COPCs, and are found above the groundwater table (to enable construction of a perimeter access road);
- Portions of pits, as needed, located near the Site perimeter (to enable construction of the storm water detention basins in the northwest and southeast corners of the Site);
- Portions of Lagoons 4 and 5, as needed, to achieve final cap elevations; and

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18 The order of steps or components of steps may change due to field and design considerations.

19 Groundwater monitoring wells will be installed as needed near the end of remedy implementation (see Step 7) to continue long-term groundwater monitoring.

20 The breaking and crushing of concrete debris, if needed, could occur during multiple steps of the remedy.

21 Proposed potential disposal locations for "green" waste and other non-impacted refuse include: Orange County's Frank R. Bowerman, Olinda Alpha, and Prima Deschecha landfills, Waste Management Azusa and El Sobrante landfills, Republic Sunshine Canyon landfill, and Los Angeles County Sanitation District Puente Hills landfill. Proposed potential disposal destinations for impacted materials include: Waste Management Kettleman Hills Facility (Kettleman City, California), McKittrick Facility (McKittrick, CA), Clean Harbors' Buttonwillow facility (Buttonwillow, California), US Ecology (Beatty, NV), Clean Harbors Environmental Services Aragonite and Grassy Mountain Facilities (UT), ECDC (UT), La Paz County Landfill (AZ), Copper Mountain Landfill (AZ), and South Yuma County Landfill (AZ). The mode of transportation to these facilities could include truck haulers (e.g., end dumps, bin haulers with sealed roll-off bins for Pit F waste) and, potentially, train (likely only if taken out of state). If by train, roll-off bins may be transferred in Alhambra or along a rail spur in Huntington Beach. If dewatering is necessary, transportation may include vacuum trucks for liquids.

- Other materials (soils, drilling mud, construction debris, etc.) present near the Site perimeter, as needed to achieve final cap elevations.

The reconsolidation will be accomplished through grading of the Site to create the appropriate slopes for cap construction and drainage for the completed cap per the design and grading plan. Any materials to be reconsolidated that are significantly impacted with VOCs[22] will be relocated to an agency-approved emissions control cell, or emissions treatment cell, located within the Lagoon 1-2 footprint[23], or disposed offsite[24]. Lagoon 4 and Lagoon 5 materials that are not to be reconsolidated (i.e., materials that are already located in areas to be capped and at an elevation under the final cap elevation) will be solidified or otherwise fortified, as needed, to create an acceptable foundation for cap construction. A contour map of the preliminary and approximate elevations after waste reconsolidation and cover construction is shown in **Figure 5-2**.

To assess whether the RBCs and City of Huntington Beach Soil Cleanup Standards have been met in the area of the perimeter access road around the cap and in the City parcel during fieldwork, COPC concentrations in soils will be measured at the excavation bottoms during remedy implementation, provided the excavation did not proceed down to groundwater. One confirmation sample will be collected for every 100 linear feet in the City Parcel and the area of the perimeter access road around the cap from the bottom of the excavation, anticipated to be approximately two feet below existing ground surface for the City parcel and approximately four feet below existing ground surface in the perimeter access road. The lateral excavation limits for the City parcel will be the fence line (i.e., along Hamilton Avenue and Magnolia Street for the northern and eastern extents), and the CHP parcel property line for the perimeter access road area. Soil samples will be collected and analyzed for VOCs, SVOCs, which include poly-aromatic hydrocarbons (PAHs), metals, pesticides, polychlorinated biphenyl compounds (PCBs), and TPH. Analytical results will be compared to the RBCs and to background concentration data for each COPC to determine if additional action is warranted.

During the waste reconsolidation step, the depth of excavation will be limited to no further than the depth to the groundwater table to minimize the potential for a pathway for waste to enter groundwater. Excavations that could potentially approach the groundwater table, aside from the deep Pit F excavation, are limited to areas outside the cap, specifically the City Parcel, the perimeter road, and the storm water detention basins.

Step 6 – Cap Installation: Construct cap over the Site interior (area to which all waste that is to remain onsite has been reconsolidated). The proposed cap will consist of an upper deck with a 3% gradient surrounded by side slopes along the Site perimeter with a 3H:1V (horizontal to vertical) gradient. The proposed upper deck cap will include, from top to bottom, a 2-foot thick vegetative cover soil layer; a geonet biotic layer, to prevent animals from burrowing into cap, placed at the mid depth of the vegetative cover soil layer; a geosynthetic drainage layer (may be nonwoven geotextile or geocomposite and strip composite, if necessary, as determined during final design); a geomembrane barrier layer (60 mil [0.060 inch] thick linear low density polyethylene [LLDPE] geomembrane), a vapor collection system, and a 2-foot thick foundation layer comprised of *in-situ* and/or import materials. The side slopes will be an evapotranspirative cap and will include, from top to bottom, a 4-foot thick vegetative cover soil layer, a geonet biotic layer placed one foot below the surface, and a 2-foot thick foundation

[22] Significant VOC impacts are defined as measurements of VOC of 50 ppm or more using a PID organic vapor analyzer, calibrated using hexane and measured at three inches from the soil surface, or the closest safe proximity to the soil surface.
[23] This emissions control cell will enable compliance with SCAQMD Rule 1166 while avoiding potentially extensive trucking of Site materials to offsite locations.
[24] Proposed potential disposal destinations for impacted materials include: Waste Management Kettleman Hills Facility (Kettleman City, California), McKittrick Facility (McKittrick, CA), Clean Harbors' Buttonwillow facility (Buttonwillow, California), US Ecology (Beatty, NV), Clean Harbors Environmental Services Aragonite and Grassy Mountain Facilities (UT), ECDC (UT), La Paz County Landfill (AZ), Copper Mountain Landfill (AZ), and South Yuma County Landfill (AZ).

layer comprised of *in-situ* and/or import materials. Cross-sections of the preliminary cover design are shown in **Figure 5-4**. The vapor collection system will treat vapors with granular activated carbon (GAC) filtration prior to release to the atmosphere. A storm water collection system will also be included in the design, and will be in compliance with the General Industrial NPDES Permit with the California SWRCB and the Site's Industrial SWPPP.

Step 7 – Final Field Work: Perform final Site grading, seeding for a vegetative surfaces, groundwater monitoring well construction, soil gas monitoring probe construction, and demobilization. To monitor the effectiveness of the cap to contain soil gas, soil gas monitoring probes along each side of the approximately square shaped cap will be installed, with soil gas collection screens at approximately 5-feet depth below street level (i.e., above groundwater level). The number and spacing of soil gas monitoring probes will comply with the April 1, 2011, amendment of SCAQMD Rule 1150.1, except that the shallow groundwater table at Ascon precludes the installation of multiple-depth probes starting at 10 feet below ground surface, requirements otherwise specified by the rule. These monitoring wells will be monitored following cap construction to check if soil gases have migrated from under the cap.

The details of the soil gas monitoring system will be provided in a remedial design package to be prepared subsequent to the final RAP approval. The system components will be maintained according to a written Operations and Maintenance (O&M) Plan. The O&M Plan for the proposed remedy will be developed after the remedial design plans are approved by DTSC.

Also, the specifics of the cap's vapor collection and treatment system will be determined in the design plans. An active vapor treatment system will operate for an initial approximately two-week startup period, after which the need for continued operation will be determined in consultation with DTSC and based on criteria set forth in the O&M Plan. Prior to discontinuing or adjusting to intermittent operation of the active vapor treatment system, the RPs will consult with DTSC regarding the plan to modify the operation of the system. If the system operation is discontinued, the vapor recovery system will remain in place as a passive system. The recovery system's passive operation will comply with the April 1, 2011, amendment of SCAQMD Rule 1150.1 requirements. The vapor collection and treatment system is planned to be located near the western perimeter of the Site (see **Figure 5-2**).

Step 8 – Final Administrative Work: Establish final Site condition, monitoring and maintenance requirements, including groundwater monitoring (see Step 9), soil gas monitoring, and operation of the vapor collection and treatment system, and document in the O&M Plan. Establish and implement administrative controls/restrictive covenants, as appropriate, to assure appropriate limitations on any future development and activities.

Step 9 – Groundwater Monitoring: A long-term groundwater-monitoring program will be established and documented in the O&M Plan that monitors perimeter groundwater for new detections and applies a contingency program, outlined below, to mitigate significant detections, if any. This long-term groundwater-monitoring program will ensure that attenuation continues to prevent offsite impacts, a condition that makes the active remediation of groundwater impacts under the proposed cap unnecessary.

### 5.5.3 Proposed Groundwater Contingency Program

As indicated in Section 2.4, known volatile chemical impacts to groundwater from Site wastes are limited to relatively few chemicals in shallow groundwater. These impacts are all located within the Site perimeter directly below or near the waste materials in those areas (i.e., the impacts do not occur offsite). To continue to monitor for potential offsite impacts, the long-term groundwater-monitoring program will monitor potential chemical impacts in groundwater at or near the Site perimeter. The long-term groundwater-monitoring program presently in effect, called the Interim Groundwater Monitoring Program, consists of gauging Site monitoring wells and sampling groundwater from selected monitoring wells on a semi-annual or annual basis. During the proposed long-term program, if any chemical concentrations in a perimeter, downgradient well are detected above background levels (i.e., above levels already present due to natural occurrence) or are above threshold limits (i.e., Maximum Contaminant Levels or vapor-risk values), steps will be taken to further assess and remedy the situation as appropriate and outlined in the tiered contingency program below (steps 1-6). However, before the tiered contingency program is initiated, the Site's groundwater data will be evaluated to assess background levels for the chemical of concern. Because of the presence of historic estuarine or marsh soil deposits and the intrusion of seawater in the shallow groundwater beneath the Site, relatively high concentrations of dissolved metals and general anions and cations occur in the shallow groundwater. These high concentrations are not related to landfill wastes. Currently, concentrations of selenium, chloride, and sulfate above MCLs are considered to be within background levels.

As the tiered contingency program is initiated, it will be performed as follows:

1. Groundwater impacts will continue to be monitored and sampled per the long-term monitoring plan to verify any exceedances, a verified exceedance being three consecutive sampling events with detections above the threshold limit.
2. If the detection exceeds the threshold limit for the three contiguous monitoring events and is not deemed to be within background levels, sampling will be performed at an accelerated schedule to test for trends (i.e., from biannual sampling to quarterly or monthly sampling for VOC impacts, or from annual to semi-annual sampling for metal impacts). If the detection is not increasing at the perimeter and the chemical is amenable to natural attenuation, sampling will be continued per the long-term monitoring program at more lengthy intervals.
3. If the exceedances increase with time, a local investigative program will be proposed to determine the extent of the impacts (e.g., lateral extent in groundwater, depth, area-specific changes in geology), the local area will be investigated, and, if necessary, recommendations will be made for mitigation methods. As part of this step, risk pathways will also be evaluated. If no risk pathway exists, then the monitoring will be continued at more lengthy intervals.
4. An approach for local remediation of groundwater will be proposed (recommendation from step 3) through process options retained in the RFS (see Table 9.2-2 of RFS) and listed under the general response actions of "Collection/Treatment/Disposal" and "*In Situ* Treatment," or through other appropriate means (e.g., natural attenuation study). The proposal will depend on the results of the local investigation and could include additional soil/waste removal, if necessary, or modification of the contingency program.
5. Selected remediation for local impacts will be implemented.
6. Continue monitoring per the long-term program and per any revised area-specific plan that more specifically addresses the remediated area (e.g., additional well(s), revised sampling schedule).

This tiered contingency program is charted in **Figure 5-5.** The long-term groundwater monitoring plan and groundwater contingency plan may be modified as the groundwater database is developed over time. Any modifications would be approved by DTSC.

### 5.5.4 Proposed Site Safety Procedures

#### *5.5.4.1 Air Monitoring During Implementation*

Air monitoring during construction operations is an important feature of the selected remedy to assess that the emissions and odor suppression efforts are effective. Air monitoring measures will be similar to those employed during the Interim Removal Measure and will be documented in the Air Monitoring Plan (AMP) to be prepared, and subsequently approved by DTSC, before the remedial action commences. The AMP will include, at a minimum, the monitoring and mitigation measures outlined below.

The objectives of the air-monitoring program are:

- Monitor potential onsite impacts to ambient air from excavation and grading of impacted materials at the Site;
- Determine if mitigation measures are necessary to meet SCAQMD permit conditions during the field work; and

- Monitor potential offsite impacts during the field activities and provide additional mitigation measures, as needed.

The focus of the air-monitoring program is to verify that field activities are conducted in a manner protective of the health of onsite workers and the public. Air monitoring for worker health and safety is addressed in Section 5.5.4.4 of this report and the Health and Safety Plan (HASP) that will be prepared for the project. This section presents the approach that will be used to collect air-monitoring data for the SCAQMD permit and to assess potential offsite impacts.

The AMP will be developed based on previous experience and data collected from the 2004 Pilot Study No. 3 (PNL, 2007), the Emergency Action conducted in 2005 through early 2006 (PNL, 2006a, c) and the Interim Removal Measure (PNL, 2011). Measured wind directions at the Site were generally consistent with those recorded during previous perimeter air monitoring events (Geosyntec, 2002, 2003a, b, 2004). The southwestern corner monitoring location is generally upwind of the Site and is considered a consistent background sampling location.

Air monitoring for the Emergency Action and Interim Removal Measure consisted of collecting real-time perimeter air quality measurements and time-integrated perimeter air samples for laboratory testing at several locations along the Site perimeter. Real-time perimeter air monitoring was conducted at each location using a “walk-around procedure” approximately every hour throughout each work day. Monitoring included measurements for volatile organic compounds (VOCs) using a photoionization detector (PID), particulate matter (i.e., dust) using a Dust Track monitor, and odors using worker perception (recorded according to the SCAQMD odor classification scale). Action levels, or thresholds, for real-time air measurements were established, above which the use of mitigation measures, such as the application of vapor suppressants or dust controls or modification of work practices, were implemented as needed. In addition, time-integrated samples were collected and sent to an offsite laboratory for VOCs, particulates as $PM_{10}$, polynuclear aromatic hydrocarbons (PAHs) and metals analyses. Particulates samples were collected from perimeter locations during the initial weeks of each phase of excavation and tested for PAHs and metals. The results of these samples indicated that no significant emissions of these constituents were occurring; therefore additional sampling was not required. VOC samples were collected for the duration of the projects.

The results of the Emergency Action and Interim Removal Measure perimeter air monitoring indicated that the emissions of VOCs, PAHs, particulates and metals were effectively controlled during excavation and waste handing activities. Vapor suppressants such as foam, water, and/or misters were consistently used to mitigate odors during the excavation activities. Findings from the Emergency Action are further documented in the Emergency Action Completion Report and Emergency Action Completion Report Addendum (PNL, 2006a, 2006b). Findings from the Interim Removal Measure are documented in the Interim Removal Measure Completion Report (PNL, 2011).

It is anticipated that potential air emissions resulting from final remedy construction activities will be similar to the previous response actions given that the majority of materials to be handled will be similar in nature. The location and frequency of air monitoring presented in this plan have been developed based on this information. For the Pit F excavation, where chemical composition is different than observed on the rest of the Site, excavation work will be conducted in a structure with negative pressure atmosphere and emissions treatment, minimizing potential impacts to ambient air.

Air monitoring will be conducted at the working areas and at designated upwind and downwind locations near the Site perimeter. Wind direction and velocity will be recorded throughout the duration of the field program with an onsite meteorological station.

The air monitoring program will include monitoring and testing for:

- Wind speed and direction monitoring;
- Continuous monitoring for particulates using a dust monitor;

- Continuous monitoring for total volatile organic hydrocarbons (VOCs) using Photoionization detectors (PIDs);
- Periodic ambient air sampling for VOCs using Summa canisters;
- Periodic ambient air sampling for PAHs and select metals on particulates collected using high volume air samplers; and
- Odors based on worker perception.

Four rounds of perimeter ambient air monitoring data for VOCs were collected at the Site over a year and a half (2002 to 2004) during times of inactivity (i.e., no field activities such as excavations) (Geosyntec, 2002, 2003a, 2003b, 2004). The concentrations detected were found to be generally within background concentrations observed in urban southern California. In addition, as mentioned above, ambient air monitoring was conducted during Pilot Study No.3 in 2004, the Emergency Action in 2005-2006 and the Interim Removal Measure in 2010-2011 that included intrusive activities with open excavations. These existing perimeter air monitoring data are used along with the comparison criteria identified in subsequent sections to evaluate potential impacts that the field activities may have on ambient air quality.

*5.5.4.1.1 Work Area Monitoring*

Real-time air monitoring will be conducted at several areas within the work area. These areas include:

- Safe proximity to excavator and/or loader and/or bulldozer bucket or equivalent;
- Downwind of the work area at perimeter; and
- An upwind location.

The purpose of the work area monitoring is to measure emissions from the potential source areas and to determine if mitigation measures are needed. Monitoring will be conducted for total nonmethane VOCs using a PID within safe proximity of the excavator or loader bucket, according to the anticipated SCAQMD Rule 1150/1166 permit, and downwind of the work area. In addition, dust will be monitored downwind of the work area. If action levels are exceeded in these areas, response actions will be undertaken such as stopping work and/or applying suppressants to reduce potential VOC and dust emissions to acceptable levels.

*5.5.4.1.2 Perimeter Monitoring*

Real-time and time-integrated monitoring is planned at five locations, including four downwind locations at the project perimeter between proposed working areas and sensitive offsite locations and one upwind location. The number of monitoring and/or sampling locations may be reduced during periods of lower excavation and grading activity onsite and if sampling results from the five locations indicate that concentrations are consistent with background or are below comparison criteria.

The purpose of the perimeter monitoring is to verify that elevated concentrations of VOCs and dust are not leaving the Site, as well as to mitigate unacceptable odors. The perimeter monitoring program includes odor monitoring, monitoring for total VOCs using a PID, monitoring for dust using a dust monitor, and periodic ambient air monitoring for VOCs using Summa canisters and PAHs and select metals using particulate samplers. If action levels based on real-time monitoring are exceeded at the perimeter, response actions will be undertaken such as stopping work, mitigating VOCs and dust in the work area, and/or expediting the VOC analysis using Summa canisters. It is anticipated that the expedited sample results will be available within four business days of collection including laboratory analysis and data validation.

The focus of the air-monitoring program is on the more volatile compounds that have been detected at the Site. For VOCs, both total VOC measurements via direct reading instruments and speciated samples for individual VOCs will be collected.

For nonvolatile chemicals such as the semi-volatile organic compounds (SVOCs) and metals, the primary mechanism of exposure via the air pathway is through inhalation of these chemicals adsorbed to particulates (dust particles). Therefore, the monitoring program focuses on real-time dust monitoring to address these classes of chemicals for the field activities. As was discussed above, chemical speciation of chemicals that may be adhered to dust (PAHs and metals) conducted during the Emergency Action and Interim Removal Measure indicated that the emissions of these chemicals were low. Therefore, the frequency of particulate collection and chemical speciation will be reduced when compared to the sampling frequency for VOCs.

A summary of the air monitoring approaches that will be used for the different classes of chemicals is presented in **Table 5-3**. For VOCs, **Table 5-3** presents the VOCs that were previously identified as COPCs in the risk assessment for the Site as well as the VOCs that were detected more frequently (>25%) during the Emergency Action and Interim Removal Measure. The standard EPA Method TO-15 target analyte list will be used for the analysis during final remedy implementation, which will include a more comprehensive list of analytes than those previously detected at the Site.

Comparison criteria will be used during this program to evaluate the ambient air TO-15 VOC and PAH and metals results. The comparison criteria will be based on values for the State of California Office of Environmental Health Hazard Assessment (OEHHA) reference exposure levels (RELs) and minimal risk levels (MRLs) from the Agency for Toxic Substances and Disease Registry (ATSDR) for chemicals that were detected at least once during the ambient air monitoring programs. MRLs are derived for acute (1 to 14 days), intermediate (>14 to 364 days), and chronic (365 days and longer). RELs are derived for acute (1 to 8 hours) and chronic (365 days and longer). Acute criteria and, in particular, the ATSDR intermediate MRLs are the most appropriate values for comparisons given the anticipated duration of the planned active excavation activities of approximately 11 months. Where intermediate values are not available, chronic values will be used as conservative comparison criteria. The RELs and MRLs are concentrations that are likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure and are set below levels that, based on current information, might cause adverse health effects in the people most sensitive to such substance-induced effects (ATSDR, 2005). Consequently, exposure to a level above the MRL or REL does not necessarily mean that adverse health effects will occur.

#### *5.5.4.2 Mitigation of Emissions and Odors During Implementation*

Constituents in the soil can potentially migrate via dispersion as dust (particulates) or vapors. Compliance with the requirements of the SCAQMD permits, the AMP, and the HASP will control and mitigate particulates and vapors that could otherwise be released during the construction. Special procedures and equipment will be ready for application at all times, as necessary, to mitigate odor, vapors, and/or dust.

#### *5.5.4.3 Traffic Control*

During major construction operations, trucks entering and exiting the Site will be required to follow a City-approved traffic plan to establish the trucking route, days and hours of truck operation, the maximum number of trucks per day, and various requirements to mitigate adverse impacts to the community. Traffic lane closures that will be necessary during stages of the proposed remedy will be performed in accordance with a City-approved traffic control plan.

#### *5.5.4.4 Worker Protection*

Remedy workers will be protected by adherence to the Health and Safety Plan (HASP) that will be prepared, and subsequently approved by DTSC, before the remedial action commences. The HASP will include the following elements, at a minimum:

- Designation of key personnel, including Project Manager and Project Safety Officer, and their responsibilities
- The mandate that all personnel working at the Site have stop-work authority, which applies to all work locations, employees and subcontractors. All personnel are authorized to stop work if there is an identified unsafe condition that could cause substantial harm or imminent danger to health and safety of project employees, the public or the environment.

- Protocols for performing air surveillance in work areas for VOCs, chlorinated compounds, methane, and dust. When field activities are performed in excavated areas where a hazardous atmosphere could reasonably exist, personnel will, at a minimum, apply these guidelines:
    - Perform atmospheric testing in the anticipated breathing zone of the work area to determine presence of potentially toxic vapors and dust.
    - Potentially toxic vapors will be evaluated using a photoionization detector (PID) calibrated to isobutylene and with an 11.7 ev lamp to enable detection of chlorinated compounds.
    - Level D PPE will be used if PID readings in the breathing zone are from 0 to 1 ppm. If PID readings in the breathing zone are from 1 to 5 ppm, level C PPE will be required. For PID readings in the breathing zone above 5 ppm, work activities will be stopped, and the excavation area will be abandoned. If, upon return, levels still exceed 5 ppm, work shall not be resumed in the short term, and implemented engineering controls will be required.
- Designation of chemicals that could potentially be found in soils and waste at the Site and their Material Safety Data Sheets (MSDSs), as available
- Designation of Site-specific potential safety hazards for workers, including potential exposure to chemicals, working with vehicles and heavy equipment, potential fire hazards, potential electrical hazards, temperature hazards, potential acoustic hazards, potential biological hazards, potential dust hazards, potential physical hazards, and the process to analyze these hazards and mitigate them
- Designation of appropriate safety measures when excavating and trenching in soil and waste
- Designation of appropriate hazard communications procedures
- Designation of training requirements for onsite workers
- Designation of work zones and access control
- Designation of personal protective equipment (PPE) to be worn for applicable work tasks and within specified work zones
- Medical surveillance program for onsite workers
- Designation of procedures for decontamination of equipment and PPE
- Designation of contingency plans to implement in case of emergencies such as spills or fires
- Workers will be provided access to portable toilet(s) with washing facilities in accordance with OSHA 29 CFR Part 1910.120 (n)(1) and 8 CCR Section 1524.
- Adequate illumination will be provided in all work areas, although this will likely not be needed because field activities are to be conducted during daylight hours.

#### *5.5.4.5 Community Relations*

Community relations outreach will ensure residents in adjacent neighborhoods are informed of current and upcoming remediation activities, and overall project process. A telephone number will be established to allow community members to obtain information and ask questions regarding the remediation activities on the property. DTSC will also provide updates on the DTSC Envirostor website to provide information to the community during remedy implementation. Community relations activities for Ascon will also include fact sheets and public meetings, as needed.

### 5.5.5 Permit Requirements and Implementation Plans

Prior to implementing the proposed remediation on the Site, several plans must be prepared and accepted by DTSC, including the Air Monitoring Plan and Health and Safety Plan noted above. Several permits are also anticipated to be required for the project to proceed, including a grading permit, SCAQMD Rule 1150/1166 permit, SCAQMD Permit to Operate vapor treatment system, Encroachment Permit, Coastal Development Permit, Notice of Intent to be filed for compliance with the General Construction NPDES Permit, and Haul Plan (Haul Plan is to seek approval of the haul truck route from the City of Huntington Beach).

These plans will be prepared and permits secured during the remedial design phase of the project and will be reviewed and approved by DTSC, SCAQMD, and the City of Huntington Beach, as appropriate.

#### 5.5.6 Implementation Schedule

The completion schedule duration for the proposed remedial action fieldwork is estimated to be approximately one year. The remediation time frame allows for some downtime due to rain or other delays. The remedial action fieldwork will begin after the final remedial design is completed and approved or a design/build approach is implemented, and after contracting and permitting are completed. The remedial design, contracting, and permitting are anticipated to be completed approximately one year after the EIR and RAP are approved, at which time the remedial action fieldwork can begin. This schedule can be implemented only after the EIR is completed and approved, and fieldwork can begin only after securing applicable approvals from DTSC and other agencies.

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# TABLES

## Table 2-1. Statistical Summary for Detected Compounds in Soil/Waste
## Ascon Landfill Site
## Huntington Beach, California

| CAS No. | Analyte | Total Samples | Number of Detections | Number of Non-Detects | Percent Detected (%) | Minimum Detected (mg/kg) | Maximum Detected (mg/kg) | Mean of Detected (mg/kg) |
|---|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | | |
| 7440-36-0 | Antimony | 242 | 46 | 196 | 19 | 0.18 | 11 | 4.6 |
| 7440-38-2 | Arsenic | 260 | 188 | 72 | 72 | 1.4 | 52 | 8.8 |
| 7440-39-3 | Barium | 261 | 260 | 1 | 100 | 5.9 | 1800 | 200 |
| 7440-41-7 | Beryllium | 241 | 121 | 120 | 50 | 0.11 | 1.2 | 0.63 |
| 7440-43-9 | Cadmium | 263 | 68 | 195 | 26 | 0.1 | 15 | 1.6 |
| 7440-47-3 | Chromium (Total) | 263 | 261 | 2 | 99 | 2.2 | 660 | 29 |
| 18540-29-9 | Chromium (VI) | 142 | 3 | 139 | 2 | 0.2 | 0.73 | 0.39 |
| 7440-48-4 | Cobalt | 232 | 229 | 3 | 99 | 1.1 | 19 | 7.9 |
| 7440-50-8 | Copper | 242 | 238 | 4 | 98 | 1.9 | 11000 | 81 |
| 7439-92-1 | Lead | 266 | 227 | 39 | 85 | 0.88 | 2560 | 79 |
| 7439-97-6 | Mercury | 217 | 126 | 91 | 58 | 0.019 | 37 | 0.42 |
| 7439-98-7 | Molybdenum | 232 | 61 | 171 | 26 | 0.21 | 44 | 2.9 |
| 7440-02-0 | Nickel | 243 | 240 | 3 | 99 | 1.5 | 380 | 20 |
| * | Organic lead | 102 | 19 | 83 | 19 | 0.036 | 1.9 | 0.39 |
| 7782-49-2 | Selenium | 261 | 43 | 218 | 16 | 0.2 | 75 | 6.6 |
| 7440-22-4 | Silver | 261 | 20 | 241 | 8 | 0.21 | 4.2 | 1.2 |
| 7440-28-0 | Thallium | 241 | 30 | 211 | 12 | 0.19 | 100 | 9.6 |
| 7440-62-2 | Vanadium | 234 | 231 | 3 | 99 | 2.9 | 78 | 38 |
| 7440-66-6 | Zinc | 244 | 242 | 2 | 99 | 7.9 | 2000 | 110 |
| **PCBs** | | | | | | | | |
| 12674-11-2 | PCB-1016 | 175 | 2 | 173 | 1 | 1.6 | 1.6 | 1.6 |
| 53469-21-9 | PCB-1242 | 192 | 1 | 191 | 1 | 4.2 | 4.2 | 4.2 |
| 12672-29-6 | PCB-1248 | 192 | 1 | 191 | 1 | 5.2 | 5.2 | 5.2 |
| 11097-69-1 | PCB-1254 | 194 | 3 | 191 | 2 | 0.015 | 6.1 | 3.1 |
| 11096-82-5 | PCB-1260 | 193 | 8 | 185 | 4 | 0.01 | 1.2 | 0.37 |
| **Pesticides** | | | | | | | | |
| 72-54-8 | 4,4'-DDD | 199 | 11 | 188 | 6 | 0.0017 | 0.017 | 0.006 |
| 72-55-9 | 4,4'-DDE | 201 | 15 | 186 | 7 | 0.0016 | 0.082 | 0.014 |
| 50-29-3 | 4,4'-DDT | 200 | 11 | 189 | 6 | 0.0022 | 0.026 | 0.0088 |
| 319-84-6 | alpha-BHC | 201 | 2 | 199 | 1 | 0.0027 | 0.017 | 0.0099 |
| 319-85-7 | beta-BHC | 200 | 7 | 193 | 4 | 0.0049 | 0.28 | 0.091 |
| 57-74-9 | Chlordane | 173 | 4 | 169 | 2 | 0.061 | 1.4 | 0.43 |
| 319-86-8 | delta-BHC | 200 | 2 | 198 | 1 | 0.0032 | 0.038 | 0.021 |
| 60-57-1 | Dieldrin | 201 | 4 | 197 | 2 | 0.0016 | 0.031 | 0.011 |
| 33213-65-9 | Endosulfan II | 201 | 1 | 200 | 0.5 | 0.011 | 0.011 | 0.011 |
| 1031-07-8 | Endosulfan sulfate | 201 | 2 | 199 | 1 | 0.0031 | 0.0043 | 0.0037 |

## Table 2-1. Statistical Summary for Detected Compounds in Soil/Waste
## Ascon Landfill Site
## Huntington Beach, California

| CAS No. | Analyte | Total Samples | Number of Detections | Number of Non-Detects | Percent Detected (%) | Minimum Detected (mg/kg) | Maximum Detected (mg/kg) | Mean of Detected (mg/kg) |
|---|---|---|---|---|---|---|---|---|
| 7421-93-4 | Endrin aldehyde | 174 | 6 | 168 | 3 | 0.0019 | 0.0034 | 0.0026 |
| 53494-70-5 | Endrin ketone | 171 | 4 | 167 | 2 | 0.002 | 0.003 | 0.0024 |
| 58-89-9 | gamma-BHC (Lindane) | 200 | 1 | 199 | 1 | 0.065 | 0.065 | 0.065 |
| 5103-74-2 | gamma-Chlordane | 27 | 1 | 26 | 4 | 0.017 | 0.017 | 0.017 |
| 76-44-8 | Heptachlor | 201 | 3 | 198 | 1 | 0.0021 | 0.029 | 0.011 |
| 1024-57-3 | Heptachlor epoxide | 201 | 3 | 198 | 1 | 0.0021 | 0.032 | 0.012 |
| 72-43-5 | Methoxychlor | 201 | 1 | 200 | 0.5 | 0.0053 | 0.0053 | 0.0053 |
| **SVOCs** | | | | | | | | |
| 105-67-9 | 2,4-Dimethylphenol | 251 | 1 | 250 | 0.4 | 39 | 39 | 39 |
| 91-57-6 | 2-Methylnaphthalene | 251 | 36 | 215 | 14 | 0.19 | 52 | 14 |
| 91-94-1 | 3,3'-Dichlorobenzidine | 251 | 1 | 250 | 0.4 | 0.082 | 0.082 | 0.082 |
| 83-32-9 | Acenaphthene | 277 | 5 | 272 | 2 | 0.11 | 2.3 | 1.2 |
| 208-96-8 | Acenaphthylene | 277 | 1 | 276 | 0.4 | 0.002 | 0.002 | 0.002 |
| 120-12-7 | Anthracene | 277 | 6 | 271 | 2 | 0.054 | 34 | 6.4 |
| 56-55-3 | Benz[a]anthracene | 277 | 8 | 269 | 3 | 0.0024 | 0.11 | 0.051 |
| 92-87-5 | Benzidine | 225 | 4 | 221 | 2 | 1.6 | 99 | 33 |
| 50-32-8 | Benzo(a)pyrene | 277 | 7 | 270 | 3 | 0.0047 | 1.2 | 0.19 |
| 205-99-2 | Benzo(b)fluoranthene | 277 | 8 | 269 | 3 | 0.0027 | 0.11 | 0.03 |
| 191-24-2 | Benzo(g,h,i)perylene | 277 | 7 | 270 | 3 | 0.0028 | 0.048 | 0.019 |
| 207-08-9 | Benzo(k)fluoranthene | 277 | 4 | 273 | 1 | 0.0032 | 0.14 | 0.04 |
| 65-85-0 | Benzoic Acid | 251 | 1 | 250 | 0.4 | 0.16 | 0.16 | 0.16 |
| 85-68-7 | Benzyl butyl phthalate | 251 | 1 | 250 | 0.4 | 0.63 | 0.63 | 0.63 |
| 117-81-7 | bis(2-Ethylhexyl)Phthalate | 251 | 27 | 224 | 11 | 0.13 | 460 | 19 |
| 218-01-9 | Chrysene | 277 | 17 | 260 | 6 | 0.0035 | 2.8 | 0.67 |
| 53-70-3 | Dibenz[a,h]anthracene | 277 | 2 | 275 | 1 | 0.5 | 1.7 | 1.1 |
| 132-64-9 | Dibenzofuran | 251 | 1 | 250 | 0.4 | 0.54 | 0.54 | 0.54 |
| 84-74-2 | di-n-Butyl Phthalate | 251 | 24 | 227 | 10 | 0.1 | 4.3 | 0.73 |
| 206-44-0 | Fluoranthene | 277 | 11 | 266 | 4 | 0.014 | 8.4 | 1.1 |
| 86-73-7 | Fluorene | 277 | 9 | 268 | 3 | 0.16 | 51 | 6.7 |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 277 | 5 | 272 | 2 | 0.0036 | 0.026 | 0.015 |
| 91-20-3 | Naphthalene | 549 | 128 | 421 | 23 | 0.0015 | 300 | 19 |
| 86-30-6 | n-Nitrosodiphenylamine | 251 | 1 | 250 | 0.4 | 0.68 | 0.68 | 0.68 |
| 85-01-8 | Phenanthrene | 277 | 43 | 234 | 16 | 0.0023 | 2400 | 180 |
| 108-95-2 | Phenol | 251 | 6 | 245 | 2 | 0.087 | 0.61 | 0.21 |
| 129-00-0 | Pyrene | 277 | 22 | 255 | 8 | 0.003 | 5.8 | 0.84 |

## Table 2-1. Statistical Summary for Detected Compounds in Soil/Waste
## Ascon Landfill Site
## Huntington Beach, California

| CAS No. | Analyte | Total Samples | Number of Detections | Number of Non-Detects | Percent Detected (%) | Minimum Detected (mg/kg) | Maximum Detected (mg/kg) | Mean of Detected (mg/kg) |
|---|---|---|---|---|---|---|---|---|
| **VOCs** | | | | | | | | |
| 71-55-6 | 1,1,1-Trichloroethane | 352 | 2 | 350 | 1 | 0.2 | 13 | 6.6 |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 350 | 2 | 348 | 1 | 0.0029 | 0.094 | 0.048 |
| 76-13-1 | 1,1,2-Trichloro-1,2,2-Trifluoroethane | 16 | 1 | 15 | 6 | 8.6 | 8.6 | 8.6 |
| 75-34-3 | 1,1-Dichloroethane | 327 | 1 | 326 | 0.3 | 0.7 | 0.7 | 0.7 |
| 75-35-4 | 1,1-Dichloroethene | 374 | 1 | 373 | 0.3 | 0.0043 | 0.0043 | 0.0043 |
| 87-61-6 | 1,2,3-Trichlorobenzene | 268 | 3 | 265 | 1 | 0.0011 | 0.0013 | 0.0012 |
| 120-82-1 | 1,2,4-Trichlorobenzene | 519 | 1 | 518 | 0.2 | 0.001 | 0.001 | 0.001 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 268 | 68 | 200 | 25 | 0.002 | 36 | 6.1 |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 268 | 1 | 267 | 0.4 | 0.0059 | 0.0059 | 0.0059 |
| 106-93-4 | 1,2-Dibromoethane (EDB) | 268 | 1 | 267 | 0.4 | 0.0061 | 0.0061 | 0.0061 |
| 95-50-1 | 1,2-Dichlorobenzene | 571 | 5 | 566 | 1 | 0.15 | 0.54 | 0.27 |
| 106-46-7 | 1,4-Dichlorobenzene | 571 | 1 | 570 | 0.2 | 0.23 | 0.23 | 0.23 |
| 107-06-2 | 1,2-Dichloroethane | 352 | 2 | 350 | 1 | 6.2 | 10 | 8.1 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 268 | 51 | 217 | 19 | 0.0012 | 15 | 2.5 |
| 78-93-3 | 2-Butanone | 72 | 20 | 52 | 28 | 0.004 | 5.2 | 0.46 |
| 591-78-6 | 2-Hexanone | 72 | 1 | 71 | 1 | 0.0034 | 0.0034 | 0.0034 |
| 106-43-4 | 4-Chlorotoluene | 268 | 2 | 266 | 1 | 0.58 | 1.2 | 0.89 |
| 67-64-1 | Acetone | 76 | 32 | 44 | 42 | 0.006 | 26 | 0.9 |
| 71-43-2 | Benzene | 355 | 71 | 284 | 20 | 0.0015 | 25 | 1.3 |
| 75-25-2 | Bromoform | 351 | 1 | 350 | 0.3 | 4.7 | 4.7 | 4.7 |
| 108-90-7 | Chlorobenzene | 377 | 3 | 374 | 1 | 0.002 | 6.6 | 2.2 |
| 67-66-3 | Chloroform | 353 | 3 | 350 | 1 | 9.6 | 25 | 17 |
| 100-41-4 | Ethylbenzene | 355 | 113 | 242 | 32 | 0.0018 | 550 | 15 |
| 98-82-8 | Isopropylbenzene | 269 | 91 | 178 | 34 | 0.00063 | 210 | 8.8 |
| 179601-23-1 | m,p-Xylenes | 271 | 55 | 216 | 20 | 0.0021 | 39 | 5.7 |
| 75-09-2 | Methylene chloride | 356 | 14 | 342 | 4 | 0.002 | 34 | 5.9 |
| 108-38-3 | m-Xylene | 20 | 4 | 16 | 20 | 0.56 | 27 | 7.3 |
| 104-51-8 | n-Butylbenzene | 268 | 26 | 242 | 10 | 0.0021 | 4.9 | 1.4 |
| 95-47-6 | o-Xylene | 291 | 55 | 236 | 19 | 0.0017 | 18 | 2.8 |
| 99-87-6 | p-Isopropyltoluene | 268 | 59 | 209 | 22 | 0.001 | 5.6 | 1.8 |
| 103-65-1 | Propylbenzene | 271 | 88 | 183 | 32 | 0.0007 | 28 | 2.7 |
| 106-42-3 | p-Xylene | 20 | 2 | 18 | 10 | 0.056 | 0.39 | 0.22 |
| 135-98-8 | sec-Butylbenzene | 268 | 82 | 186 | 31 | 0.0059 | 180 | 8.7 |
| 100-42-5 | Styrene | 326 | 16 | 310 | 5 | 0.0016 | 470 | 34 |
| 98-06-6 | tert-Butylbenzene | 268 | 1 | 267 | 0.4 | 0.0027 | 0.0027 | 0.0027 |
| 127-18-4 | Tetrachloroethene | 350 | 2 | 348 | 1 | 0.00053 | 0.0078 | 0.0042 |

**Table 2-1. Statistical Summary for Detected Compounds in Soil/Waste**
**Ascon Landfill Site**
**Huntington Beach, California**

| CAS No. | Analyte | Total Samples | Number of Detections | Number of Non-Detects | Percent Detected (%) | Minimum Detected (mg/kg) | Maximum Detected (mg/kg) | Mean of Detected (mg/kg) |
|---|---|---|---|---|---|---|---|---|
| 108-88-3 | Toluene | 355 | 97 | 258 | 27 | 0.00055 | 28 | 1.8 |
| 75-69-4 | Trichlorofluoromethane | 329 | 5 | 324 | 2 | 0.0098 | 15 | 3 |
| 1330-20-7 | Xylenes (Total) | 64 | 24 | 40 | 38 | 0.0039 | 26 | 5.1 |

Note: * CAS number not available

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| AW-1 | 6.23 | 8.69 | 3/15/2004[5] | - | - | - | - | - | - |
| | | | 6/7/2004 | 9.11 | -2.88 | -0.42 | - | - | 0.0 |
| | | | 9/7/2004 | 9.32 | -3.09 | -0.63 | - | - | - |
| | | | 12/7/2004 | 8.29 | -2.06 | 0.40 | - | - | 0.0 |
| | | | 12/4/2006 | 8.89 | -2.66 | -0.20 | - | - | 0.0 |
| | | | 9/24/2007 | 9.18 | -2.95 | -0.49 | - | - | 0.0 |
| | | | 3/17/2008 | 8.89 | -2.66 | -0.20 | - | - | 0.0 |
| | | | 9/22/2008 | 9.66 | -3.43 | -0.97 | - | - | 0.0 |
| | | | 3/23/2009 | 9.06 | -2.83 | -0.37 | - | - | 0.2 |
| | | | 10/12/2009 | 9.34 | -3.11 | -0.65 | - | - | 0.0 |
| | | | 3/1/2010 | 5.13 | 1.1 | 3.56 | - | - | 0.0 |
| | | | 9/27/2010 | 8.64 | -2.41 | 0.05 | - | - | 0.0 |
| | | | 3/7/2011 | 6.98 | -0.75 | 1.71 | - | - | 0.0 |
| | | | 9/26/2011 | 8.48 | -2.25 | 0.21 | - | - | 0.0 |
| | | | 3/19/2012 | 8.25 | -2.02 | 0.44 | - | - | 0.0 |
| | | | 9/10/2012 | 8.46 | -2.23 | 0.23 | - | - | 0.0 |
| | | | 3/18/2013 | 8.40 | -2.17 | 0.29 | - | - | 0.0 |
| AW-1A | 10.00 | 12.46 | 3/15/2004 | 12.51 | -2.51 | -0.05 | - | - | 3.1 |
| | | | 6/7/2004 | 13.13 | -3.13 | -0.67 | - | - | 0.0 |
| | | | 9/7/2004 | 13.07 | -3.07 | -0.61 | - | - | 0.0 |
| | | | 12/7/2004 | 12.08 | -2.08 | 0.38 | - | - | 0.0 |
| | | | 12/4/2006 | 12.54 | -2.54 | -0.08 | - | - | 0.0 |
| | | | 9/24/2007 | 12.86 | -2.86 | -0.40 | - | - | 0.0 |
| | | | 3/17/2008 | 12.54 | -2.54 | -0.08 | - | - | 0.1 |
| | | | 9/22/2008 | 13.34 | -3.34 | -0.88 | - | - | 0.0 |
| | | | 3/23/2009 | 12.78 | -2.78 | -0.32 | - | - | 0.1 |
| | | | 10/12/2009 | 13.02 | -3.02 | -0.56 | - | - | 0.0 |
| | | | 3/1/2010 | 10.43 | -0.43 | 2.03 | - | - | 0.0 |
| | | | 9/27/2010 | 12.35 | -2.35 | 0.11 | - | - | 0.0 |
| | | | 3/7/2011 | 11.31 | -1.31 | 1.15 | - | - | 0.0 |
| | | | 9/26/2011 | 12.20 | -2.20 | 0.26 | - | - | 0.0 |
| | | | 3/19/2012 | 12.00 | -2.00 | 0.46 | - | - | 0.0 |
| | | | 9/10/2012 | 12.19 | -2.19 | 0.27 | - | - | 0.0 |
| | | | 3/18/2013 | 12.12 | -2.12 | 0.34 | - | - | 0.0 |
| AW-2 | 5.62 | 8.08 | 6/7/2002 | 8.80 | -3.18 | -0.72 | - | - | - |
| | | | 8/9/2002 | 8.78 | -3.16 | -0.70 | - | - | - |
| | | | 10/7/2002 | 8.71 | -3.09 | -0.63 | - | - | - |
| | | | 6/26/2003 | 8.41 | -2.79 | -0.33 | - | - | 0.0 |
| | | | 10/14/2003 | 8.92 | -3.30 | -0.84 | - | - | 0.0 |
| | | | 11/12/2003 | 8.81 | -3.19 | -0.73 | - | - | 0.0 |
| | | | 12/29/2003 | 8.45 | -2.83 | -0.37 | - | - | 0.0 |
| | | | 3/15/2004 | 7.87 | -2.25 | 0.21 | - | - | 0.7 |
| | | | 6/7/2004 | 8.31 | -2.69 | -0.23 | - | - | 0.0 |
| | | | 9/7/2004 | 8.45 | -2.83 | -0.37 | - | - | 0.0 |
| | | | 12/7/2004 | 7.44 | -1.82 | 0.64 | - | - | 0.3 |
| | | | 12/4/2006 | 7.85 | -2.23 | 0.23 | - | - | 0.0 |
| | | | 9/24/2007 | 8.14 | -2.52 | -0.06 | - | - | 0.0 |
| | | | 3/17/2008 | 7.90 | -2.28 | 0.18 | - | - | 0.0 |
| | | | 9/22/2008 | 8.64 | -3.02 | -0.56 | - | - | 0.0 |
| | | | 3/23/2009 | 8.07 | -2.45 | 0.01 | - | - | 0.3 |
| | | | 10/12/2009 | 8.31 | -2.69 | -0.23 | - | - | 0.0 |
| | | | 3/1/2010 | 5.58 | 0.04 | 2.50 | - | - | 0.0 |
| | | | 9/27/2010 | 7.62 | -2.00 | 0.46 | - | - | 0.0 |
| | | | 3/7/2011 | 6.43 | -0.81 | 1.65 | - | - | 0.0 |
| | | | 9/26/2011 | 7.49 | -1.87 | 0.59 | - | - | 0.0 |
| | | | 3/19/2012 | 7.31 | -1.69 | 0.77 | - | - | 0.0 |
| | | | 9/10/2012 | 7.45 | -1.83 | 0.63 | - | - | 0.0 |
| | | | 3/18/2013 | 7.21 | -1.59 | 0.87 | - | - | 0.0 |
| AW-3 | 8.38 | 10.84 | 6/7/2002 | 11.87 | -3.49 | -1.03 | - | - | - |
| | | | 8/9/2002 | 11.97 | -3.59 | -1.13 | - | - | - |
| | | | 10/7/2002 | 11.92 | -3.54 | -1.08 | - | - | - |
| | | | 6/26/2003 | 11.43 | -3.05 | -0.59 | - | - | 0.0 |
| | | | 10/14/2003 | 11.96 | -3.58 | -1.12 | - | - | 0.0 |
| | | | 11/12/2003 | 11.90 | -3.52 | -1.06 | - | - | 0.0 |
| | | | 12/29/2003 | 11.61 | -3.23 | -0.77 | - | - | 0.0 |
| | | | 3/15/2004 | 10.99 | -2.61 | -0.15 | - | - | 0.5 |
| | | | 6/7/2004 | 11.10 | -2.72 | -0.26 | - | - | 0.0 |
| | | | 9/7/2004 | 11.54 | -3.16 | -0.70 | - | - | 0.0 |
| | | | 12/14/2004 | 10.46 | -2.08 | 0.38 | - | - | 0.0 |
| | | | 12/4/2006 | 11.17 | -2.79 | -0.33 | - | - | 0.0 |
| | | | 9/24/2007 | 11.50 | -3.12 | -0.66 | - | - | 0.0 |
| | | | 3/17/2008 | 11.10 | -2.72 | -0.26 | - | - | 0.0 |
| | | | 9/22/2008 | 11.93 | -3.55 | -1.09 | - | - | 2.8 |
| | | | 3/23/2009 | 11.29 | -2.91 | -0.45 | - | - | 0.0 |
| | | | 10/12/2009 | 11.71 | -3.33 | -0.87 | - | - | 0.0 |
| | | | 3/1/2010 | 8.83 | -0.45 | 2.01 | - | - | 0.0 |
| | | | 9/27/2010 | 10.91 | -2.53 | -0.07 | - | - | 0.0 |
| | | | 3/7/2011 | 9.71 | -1.33 | 1.13 | - | - | 0.0 |
| | | | 9/26/2011 | 10.75 | -2.37 | 0.09 | - | - | 0.0 |
| | | | 3/19/2012 | 10.61 | -2.23 | 0.23 | - | - | 0.0 |
| | | | 9/10/2012 | 10.70 | -2.32 | 0.14 | - | - | 0.0 |
| | | | 3/18/2013 | 10.73 | -2.35 | 0.11 | - | - | 0.0 |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data:  June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| AW-4 | 6.01 | 8.47 | 6/7/2002 | 8.10 | -2.09 | 0.37 | - | - | - |
| | | | 8/9/2002 | 8.35 | -2.34 | 0.12 | - | - | - |
| | | | 10/7/2002 | 7.85 | -1.84 | 0.62 | - | - | - |
| | | | 6/26/2003 | 8.11 | -2.10 | 0.36 | - | - | 0.0 |
| | | | 10/14/2003 | 8.73 | -2.72 | -0.26 | - | - | 0.0 |
| | | | 11/12/2003 | 8.58 | -2.57 | -0.11 | - | - | 0.0 |
| | | | 12/29/2003 | 8.05 | -2.04 | 0.42 | - | - | 0.0 |
| | | | 3/15/2004 | 7.51 | -1.50 | 0.96 | - | - | 0.7 |
| | | | 6/7/2004 | 7.02 | -1.01 | 1.45 | - | - | 0.0 |
| | | | 9/7/2004 | 7.79 | -1.78 | 0.68 | - | - | 0.0 |
| | | | 12/7/2004 | 7.25 | -1.24 | 1.22 | - | - | 0.0 |
| | | | 12/4/2006 | 7.68 | -1.67 | 0.79 | - | - | 0.0 |
| | | | 9/24/2007 | 8.41 | -2.40 | 0.06 | - | - | 24.2 |
| | | | 3/17/2008 | 8.18 | -2.17 | 0.29 | - | - | 0.0 |
| | | | 9/22/2008 | 9.46 | -3.45 | -0.99 | - | - | 3.7 |
| | | | 3/23/2009 | 8.51 | -2.50 | -0.04 | - | - | 0.0 |
| | | | 10/12/2009 | 8.54 | -2.53 | -0.07 | - | - | 0.0 |
| | | | 3/1/2010 | 6.26 | -0.25 | 2.21 | - | - | 0.0 |
| | | | 9/27/2010 | 7.79 | -1.78 | 0.68 | - | - | 0.0 |
| | | | 3/7/2011 | 7.10 | -1.09 | 1.37 | - | - | 0.0 |
| | | | 9/26/2011 | 7.71 | -1.70 | 0.76 | - | - | 0.0 |
| | | | 3/19/2012 | 7.85 | -1.84 | 0.62 | - | - | 0.0 |
| | | | 9/10/2012 | 7.61 | -1.60 | 0.86 | - | - | 0.0 |
| | | | 3/18/2013 | 7.81 | -1.80 | 0.66 | - | - | 0.0 |
| AW-4A | 7.32 | 9.78 | 3/15/2004 | 8.90 | -1.58 | 0.88 | - | - | 7.4 |
| | | | 6/7/2004 | 9.10 | -1.78 | 0.68 | - | - | 0.0 |
| | | | 9/7/2004 | 9.19 | -1.87 | 0.59 | - | - | 0.0 |
| | | | 12/7/2004 | 8.61 | -1.29 | 1.17 | - | - | 0.0 |
| | | | 12/4/2006 | 9.04 | -1.72 | 0.74 | - | - | 0.0 |
| | | | 9/24/2007 | 9.77 | -2.45 | 0.01 | - | - | 11.5 |
| | | | 3/17/2008 | 9.50 | -2.18 | 0.28 | - | - | 0.0 |
| | | | 9/22/2008 | 10.84 | -3.52 | -1.06 | - | - | 0.0 |
| | | | 3/23/2009 | 9.89 | -2.57 | -0.11 | - | - | 0.0 |
| | | | 10/12/2009 | 9.92 | -2.60 | -0.14 | - | - | 0.0 |
| | | | 3/1/2010 | 7.51 | -0.19 | 2.27 | - | - | 0.0 |
| | | | 9/27/2010 | 9.13 | -1.81 | 0.65 | - | - | 0.0 |
| | | | 3/7/2011 | 8.33 | -1.01 | 1.45 | - | - | 0.0 |
| | | | 9/26/2011 | 9.03 | -1.71 | 0.75 | - | - | 0.0 |
| | | | 3/19/2012 | 9.14 | -1.82 | 0.64 | - | - | 0.0 |
| | | | 9/10/2012 | 8.95 | -1.63 | 0.83 | - | - | 0.0 |
| | | | 3/18/2013 | 9.18 | -1.86 | 0.60 | - | - | 0.0 |
| AW-5 | 4.86 | 7.32 | 6/7/2002 | 7.45 | -2.59 | -0.13 | - | - | - |
| | | | 8/9/2002 | 7.61 | -2.75 | -0.29 | - | - | - |
| | | | 10/7/2002 | 7.20 | -2.34 | 0.12 | - | - | - |
| | | | 6/26/2003 | 7.08 | -2.22 | 0.24 | - | - | 0.8 |
| | | | 10/14/2003 | 7.69 | -2.83 | -0.37 | - | - | 0.0 |
| | | | 11/12/2003 | 7.56 | -2.70 | -0.24 | - | - | 0.0 |
| | | | 12/29/2003 | 7.11 | -2.25 | 0.21 | - | - | 0.0 |
| | | | 3/15/2004 | 6.60 | -1.74 | 0.72 | - | - | 0.6 |
| | | | 6/14/2004 | 6.79 | -1.93 | 0.53 | - | - | 0.0 |
| | | | 9/7/2004 | 6.82 | -1.96 | 0.50 | - | - | 0.0 |
| | | | 12/7/2004 | 6.68 | -1.82 | 0.64 | - | - | 0.0 |
| | | | 12/4/2006 | 6.65 | -1.79 | 0.67 | - | - | 0.0 |
| | | | 9/24/2007 | 7.53 | -2.67 | -0.21 | - | - | 0.0 |
| | | | 3/17/2008 | 7.41 | -2.55 | -0.09 | - | - | 0.0 |
| | | | 9/22/2008 | 9.06 | -4.20 | -1.74 | - | - | 4.1 |
| | | | 3/23/2009 | 7.76 | -2.90 | -0.44 | - | - | 0.0 |
| | | | 10/12/2009 | 7.79 | -2.93 | -0.47 | - | - | 0.0 |
| | | | 3/1/2010 | 5.60 | -0.74 | 1.72 | - | - | 0.0 |
| | | | 9/30/2010 | 7.15 | -2.29 | 0.17 | - | - | 0.0 |
| | | | 3/7/2011 | 6.41 | -1.55 | 0.91 | - | - | 0.0 |
| | | | 9/26/2011 | 7.01 | -2.15 | 0.31 | - | - | 0.0 |
| | | | 3/19/2012 | 7.24 | -2.38 | 0.08 | - | - | 0.0 |
| | | | 9/10/2012 | 6.91 | -2.05 | 0.41 | - | - | 0.0 |
| | | | 3/18/2013 | 7.17 | -2.31 | 0.15 | - | - | 0.0 |
| AW-8 | 5.78 | 8.24 | 6/7/2002 | 11.50 | -5.72 | -3.26 | - | - | - |
| | | | 8/9/2002 | 11.60 | -5.82 | -3.36 | - | - | - |
| | | | 10/7/2002 | 11.44 | -5.66 | -3.20 | - | - | - |
| | | | 6/26/2003 | 11.26 | -5.48 | -3.02 | - | - | 0.0 |
| | | | 10/14/2003 | 11.69 | -5.91 | -3.45 | - | - | 0.1 |
| | | | 11/12/2003 | 11.59 | -5.81 | -3.35 | - | - | 0.0 |
| | | | 12/29/2003 | 11.38 | -5.60 | -3.14 | - | - | 0.0 |
| | | | 3/15/2004 | 10.92 | -5.14 | -2.68 | - | - | 0.7 |
| | | | 6/7/2004 | 11.11 | -5.33 | -2.87 | - | - | 0.0 |
| | | | 9/7/2004 | 11.15 | -5.37 | -2.91 | - | - | 0.0 |
| | | | 12/7/2004 | 10.34 | -4.56 | -2.10 | - | - | 0.0 |
| | | | 12/4/2006 | 10.80 | -5.02 | -2.56 | - | - | 0.0 |
| | | | 9/24/2007 | 11.81 | -6.03 | -3.57 | - | - | 0.0 |
| | | | 3/17/2008 | 11.42 | -5.64 | -3.18 | - | - | 0.0 |
| | | | 9/22/2008 | 12.27 | -6.49 | -4.03 | - | - | 0.0 |
| | | | 3/23/2009 | 11.68 | -5.90 | -3.44 | - | - | 0.9 |
| | | | 10/12/2009 | 11.57 | -5.79 | -3.33 | - | - | 0.0 |
| | | | 3/1/2010 | 10.26 | -4.48 | -2.02 | - | - | 0.2 |
| | | | 9/27/2010 | 11.30 | -5.52 | -3.06 | - | - | 0.0 |
| | | | 3/7/2011 | 10.65 | -4.87 | -2.41 | - | - | 0.0 |
| 10 | 4.84 | 7.30 | 9/26/2011 | 10.56 | -5.72 | -3.26 | - | - | 0.2 |
| | | | 3/19/2012 | 10.55 | -5.71 | -3.25 | - | - | 0.0 |
| | | | 9/10/2012 | 10.42 | -5.58 | -3.12 | - | - | 0.0 |
| | | | 3/18/2013 | 10.53 | -5.69 | -3.23 | - | - | 0.0 |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data:  June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| B-2[3] | 24.54 | 27.00 | 6/7/2002 | NM | NA | NA | P/NM | NA | - |
| | | | 8/9/2002 | 28.99 | -4.45 | -1.99 | - | - | - |
| | | | 7/8/2002 | ND | NA | NA | 26.8 | NA | - |
| | | | 7/16/2002 | 28.99 | -4.45 | -1.99 | - | - | - |
| | | | 7/22/2002 | 28.99 | -4.45 | -1.99 | - | - | - |
| | | | 7/29/2002 | 29.06 | -4.52 | -2.06 | - | - | - |
| | | | 10/7/2002 | 29.05 | -4.51 | -2.05 | 28.8 | 0.25 | - |
| | | | 6/26/2003 | 31.15 | -6.61 | -4.15 | 28.34 | 2.81 | 0.0 |
| | | | 10/15/2003 | ND | NA | NA | 28.79 | NA | 0.0 |
| | | | 11/13/2003 | ND | NA | NA | 28.76 | NA | 0.0 |
| | | | 12/30/2003 | ND | NA | NA | 28.65 | NA | 0.0 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | 26.72 | -2.18 | 0.28 | 26.5 | 0.22 | 2.7 |
| | | | WD | - | - | - | - | - | - |
| B-4 | 18.84 | 21.30 | 6/7/2002 | 21.50 | -2.66 | -0.20 | - | - | - |
| | | | 8/9/2002 | 21.62 | -2.78 | -0.32 | - | - | - |
| | | | 10/7/2002 | 21.31 | -2.47 | -0.01 | - | - | - |
| | | | 6/26/2003 | 21.28 | -2.44 | 0.02 | - | - | 0.2 |
| | | | 10/14/2003 | 21.84 | -3.00 | -0.54 | - | - | 0.2 |
| | | | 11/12/2003 | 21.68 | -2.84 | -0.38 | - | - | 0.0 |
| | | | 12/29/2003 | 21.22 | -2.38 | 0.08 | - | - | 0.0 |
| | | | 3/15/2004 | 20.70 | -1.86 | 0.60 | - | - | 0.4 |
| | | | 6/7/2004 | 20.98 | -2.14 | 0.32 | - | - | 0.0 |
| | | | 9/7/2004 | 20.95 | -2.11 | 0.35 | - | - | 0.0 |
| | | | 12/7/2004 | 20.40 | -1.56 | 0.90 | - | - | 0.0 |
| | | | 12/4/2006 | 20.80 | -1.96 | 0.50 | - | - | 0.0 |
| | | | 9/24/2007 | NM | - | - | NM | - | NM |
| | | | 3/17/2008 | 23.60? | (?) | (?) | - | - | 0.0 |
| | | | 9/22/2008 | 22.78 | -3.94 | -1.48 | - | - | 0.6 |
| | | | 3/23/2009 | 21.72 | -2.88 | -0.42 | - | - | 0.0 |
| | | | 10/12/2009 | 21.78 | -2.94 | -0.48 | - | - | 0.0 |
| | | | 3/1/2010 | 19.57 | -0.73 | 1.73 | - | - | 0.0 |
| | | | 9/27/2010 | 20.97 | -2.13 | 0.33 | - | - | 0.0 |
| | | | 3/7/2011 | 20.30 | -1.46 | 1.00 | - | - | 0.0 |
| | | | 9/26/2011 | 20.89 | -2.05 | 0.41 | - | - | 0.0 |
| | | | 3/19/2012 | 20.97 | -2.13 | 0.33 | - | - | 0.0 |
| | | | 9/10/2012 | 20.83 | -1.99 | 0.47 | - | - | 0.0 |
| | | | 3/18/2013 | 21.05 | -2.21 | 0.25 | - | - | 0.0 |
| B-4A | 19.70 | 22.16 | 3/15/2004 | 21.60 | -1.90 | 0.56 | - | - | 15.6 |
| | | | 6/7/2004 | 21.77 | -2.07 | 0.39 | - | - | 16.2 |
| | | | 9/7/2004 | 21.86 | -2.16 | 0.30 | - | - | 21.4 |
| | | | 12/7/2004 | 21.32 | -1.62 | 0.84 | - | - | 20.1 |
| | | | 12/4/2006 | 21.72 | -2.02 | 0.44 | - | - | 23.2 |
| | | | 9/24/2007 | 22.53 | -2.83 | -0.37 | - | - | 118.0 |
| | | | 3/17/2008 | 22.28 | -2.58 | -0.12 | - | - | 2.7 |
| | | | 9/22/2008 | 23.66 | -3.96 | -1.50 | - | - | 23.0 |
| | | | 3/23/2009 | 22.61 | -2.91 | -0.45 | - | - | 19.5 |
| | | | 10/12/2009 | 22.68 | -2.98 | -0.52 | - | - | 25.8 |
| | | | 3/1/2010 | 20.50 | -0.80 | 1.66 | - | - | 22.7 |
| | | | 9/27/2010 | 21.90 | -2.20 | 0.26 | - | - | 24.4 |
| | | | 3/7/2011 | 21.22 | -1.52 | 0.94 | - | - | 23.1 |
| | | | 9/26/2011 | 21.81 | -2.11 | 0.35 | - | - | 24.7 |
| | | | 3/19/2012 | 21.84 | -2.14 | 0.32 | - | - | 15.2 |
| | | | 9/10/2012 | 21.69 | -1.99 | 0.47 | - | - | 29.5 |
| | | | 3/18/2013 | 21.94 | -2.24 | 0.22 | - | - | 1.4 |
| B-5 | 25.67 | 28.13 | 6/7/2002 | NM | NA | NA | 27.8 | NA | - |
| | | | 7/8/2002 | ND | NA | NA | 27.1 | NA | - |
| | | | 8/9/2002 | NM | NA | NA | P/NM | NA | - |
| | | | 10/7/2002 | NM | NA | NA | 28.36 | NA | - |
| | | | 6/26/2003 | ND | NA | NA | 28.23 | NA | 0.0 |
| | | | 10/22/2003 | ND | NA | NA | 28.51 | NA | NM |
| | | | 11/13/2003 | ND | NA | NA | 28.78 | NA | 43.4 |
| | | | 12/30/2003 | ND | NA | NA | 28.13 | NA | 1.6 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | ND | NA | NA | 27.27 | NA | 11.4 |
| | | | 12/4/2006 | ND | NA | NA | 29.84 | NA | 0.0 |
| | | | 9/24/2007 | NM | - | - | NM | - | NM |
| | | | 3/17/2008 | NM | - | - | NM | - | NM |
| | | | 9/22/2008 | NM | - | - | NM | - | NM |
| | | | 3/23/2009 | NM | - | - | NM | - | NM |
| | | | 10/12/2009 | NM | - | - | NM | - | NM |
| | | | 3/1/2010 | NM | - | - | NM | - | NM |
| | | | 9/27/2010 | NM | - | - | NM | - | NM |
| | | | 3/7/2011 | NM | - | - | NM | - | NM |
| | | | 9/26/2011 | NM | - | - | NM | - | NM |
| | | | 3/19/2012 | NM | - | - | NM | - | NM |
| | | | 3/18/2013 | NM | - | - | NM | - | NM |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| B-6 | 8.05 | 10.51 | 6/7/2002 | 11.27 | -3.22 | -0.76 | P | - | - |
| | | | 7/8/2002 | 11.42 | -3.37 | -0.91 | 11.41 | 0.01 | - |
| | | | 8/9/2002 | 11.44 | -3.39 | -0.93 | 11.43 | 0.01 | - |
| | | | 10/7/2002 | 11.35 | -3.30 | -0.84 | 11.34 | 0.01 | - |
| | | | 6/26/2003 | 10.86 | -2.81 | -0.35 | P | - | 33.0 |
| | | | 10/15/2003 | ND | NA | NA | 11.33 | NA | 93.7 |
| | | | 11/13/2003 | ND | NA | NA | 11.38 | NA | 91.9 |
| | | | 12/30/2003 | 11.02 | -2.97 | -0.51 | P | - | 86.4 |
| | | | 3/15/2004 | 10.18 | -2.13 | 0.33 | P | - | 45.9 |
| | | | 6/7/2004 | 10.79 | -2.74 | -0.28 | P | - | 17.3 |
| | | | 9/7/2004 | 10.88 | -2.83 | -0.37 | - | - | 25.9 |
| | | | 12/7/2004 | 9.91 | -1.86 | 0.60 | P | - | 92.0 |
| | | | 12/4/2006 | 10.38 | -2.33 | 0.13 | P | - | 157.0 |
| | | | 9/24/2007 | 10.93 | -2.88 | -0.42 | P | - | 42.3 |
| | | | 3/17/2008 | 10.45 | -2.40 | 0.06 | - | - | 49.5 |
| | | | 9/22/2008 | 11.25 | -3.20 | -0.74 | - | - | 17.7 |
| | | | 3/23/2009 | 10.62 | -2.57 | -0.11 | - | - | 188.0 |
| | | | 10/12/2009 | 11.04 | -2.99 | -0.53 | P | - | 28.2 |
| | | | 3/1/2010 | 8.43 | -0.38 | 2.08 | - | - | 27.9 |
| | | | 9/27/2010 | 10.15 | -2.10 | 0.36 | - | - | 19.6 |
| | | | 3/7/2011 | 9.06 | -1.01 | 1.45 | - | - | 13.2 |
| | | | 9/26/2011 | 9.97 | -1.92 | 0.54 | - | - | 0.5 |
| | | | 3/19/2012 | 9.99 | -1.94 | 0.52 | - | - | 1.2 |
| | | | 9/10/2012 | 10.03 | -1.98 | 0.48 | - | - | 7.2 |
| | | | 3/18/2013 | 9.94 | -1.89 | 0.57 | | | 4.6 |
| B-7 | 15.11 | 17.57 | 6/7/2002 | 18.30 | -3.19 | -0.73 | - | - | - |
| | | | 8/9/2002 | 18.40 | -3.29 | -0.83 | - | - | - |
| | | | 10/7/2002 | 18.29 | -3.18 | -0.72 | - | - | - |
| | | | 6/26/2003 | 17.98 | -2.87 | -0.41 | - | - | 0.0 |
| | | | 10/14/2003 | 18.46 | -3.35 | -0.89 | - | - | 0.0 |
| | | | 11/12/2003 | 18.34 | -3.23 | -0.77 | - | - | 0.0 |
| | | | 12/29/2003 | 17.95 | -2.84 | -0.38 | - | - | 0.0 |
| | | | 3/15/2004 | 17.38 | -2.27 | 0.19 | - | - | 0.6 |
| | | | 6/7/2004 | 17.73 | -2.62 | -0.16 | - | - | 1.3 |
| | | | 9/7/2004 | 17.85 | -2.74 | -0.28 | - | - | 0.0 |
| | | | 12/7/2004 | 16.95 | -1.84 | 0.62 | - | - | 0.1 |
| | | | 12/4/2006 | 17.41 | -2.30 | 0.16 | - | - | 0.0 |
| | | | 9/24/2007 | 17.96 | -2.85 | -0.39 | - | - | 0.0 |
| | | | 3/17/2008 | 17.60 | -2.49 | -0.03 | - | - | 0.0 |
| | | | 9/22/2008 | 18.48 | -3.37 | -0.91 | - | - | 9.6 |
| | | | 3/23/2009 | 17.78 | -2.67 | -0.21 | - | - | 0.7 |
| | | | 10/12/2009 | 18.06 | -2.95 | -0.49 | - | - | 15.4 |
| | | | 3/1/2010 | 15.34 | -0.23 | 2.23 | - | - | 0.2 |
| | | | 9/27/2010 | 17.23 | -2.12 | 0.34 | - | - | 12.3 |
| | | | 3/7/2011 | 16.23 | -1.12 | 1.34 | - | - | 0.0 |
| | | | 9/26/2011 | 17.07 | -1.96 | 0.50 | - | - | 0.0 |
| | | | 3/19/2012 | 16.97 | -1.86 | 0.60 | - | - | 0.0 |
| | | | 9/10/2012 | 17.05 | -1.94 | 0.52 | - | - | 0.0 |
| | | | 3/18/2013 | 17.11 | -2.00 | 0.46 | - | - | 0.0 |
| MW-4 | 22.23 | 24.69 | 6/7/2002 | 25.97 | -3.74 | -1.28 | - | - | - |
| | | | 8/9/2002 | 26.02 | -3.79 | -1.33 | - | - | - |
| | | | 10/7/2002 | 25.98 | -3.75 | -1.29 | - | - | - |
| | | | 6/26/2003 | 25.44 | -3.21 | -0.75 | - | - | 0.0 |
| | | | 10/14/2003 | 25.95 | -3.72 | -1.26 | - | - | 0.0 |
| | | | 11/12/2003 | 25.92 | -3.69 | -1.23 | - | - | 0.0 |
| | | | 12/29/2003 | 25.61 | -3.38 | -0.92 | - | - | 0.0 |
| | | | 3/15/2004 | 24.97 | -2.74 | -0.28 | - | - | 0.2 |
| | | | 6/7/2004 | 25.29 | -3.06 | -0.60 | - | - | 0.0 |
| | | | 9/7/2004 | 25.45 | -3.22 | -0.76 | - | - | 0.0 |
| | | | 12/7/2004 | 24.56 | -2.33 | 0.13 | - | - | 0.0 |
| | | | WD | - | - | - | - | - | - |
| MW-9 | 15.03 | 17.49 | 6/7/2002 | 17.68 | -2.65 | -0.19 | - | - | - |
| | | | 8/9/2002 | 17.80 | -2.77 | -0.31 | - | - | - |
| | | | 10/7/2002 | 17.50 | -2.47 | -0.01 | - | - | - |
| | | | 6/26/2003 | 17.43 | -2.40 | 0.06 | - | - | 0.3 |
| | | | 10/14/2003 | 17.99 | -2.96 | -0.50 | - | - | 0.0 |
| | | | 11/12/2003 | 17.82 | -2.79 | -0.33 | - | - | 0.2 |
| | | | 12/29/2003 | 17.31 | -2.28 | 0.18 | - | - | 0.0 |
| | | | 3/15/2004 | 16.67 | -1.64 | 0.82 | - | - | 0.9 |
| | | | 6/7/2004 | 17.05 | -2.02 | 0.44 | - | - | 0.0 |
| | | | 9/7/2004 | 17.15 | -2.12 | 0.34 | - | - | 1.7 |
| | | | 12/7/2004 | 16.37 | -1.34 | 1.12 | - | - | 2.7 |
| | | | 12/4/2006 | 16.78 | -1.75 | 0.71 | - | - | 10.1 |
| | | | 9/24/2007 | 17.53 | -2.50 | -0.04 | - | - | 625.0 |
| | | | 3/17/2008 | 17.24 | -2.21 | 0.25 | - | - | 2.7 |
| | | | 9/22/2008 | 18.33 | -3.30 | -0.84 | - | - | 12.6 |
| | | | 3/23/2009 | 17.56 | -2.53 | -0.07 | - | - | 2.5 |
| | | | 10/12/2009 | 17.63 | -2.60 | -0.14 | - | - | 0.1 |
| | | | 3/1/2010 | 15.03 | 0.00 | 2.46 | - | - | 0.0 |
| | | | 9/27/2010 | 16.80 | -1.77 | 0.69 | - | - | 0.0 |
| | | | 3/7/2011 | 15.95 | -0.92 | 1.54 | - | - | 0.0 |
| | | | 9/26/2011 | 16.64 | -1.61 | 0.85 | - | - | 0.0 |
| | | | 3/19/2012 | 16.70 | -1.67 | 0.79 | - | - | 0.0 |
| | | | 9/10/2012 | 16.60 | -1.57 | 0.89 | - | - | 0.0 |
| | | | 3/18/2013 | 16.76 | -1.73 | 0.73 | - | - | 0.0 |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| MW-13 | 6.83 | 9.29 | 6/7/2002 | 10.25 | -3.42 | -0.96 | - | - | - |
| | | | 8/9/2002 | 10.29 | -3.46 | -1.00 | - | - | - |
| | | | 10/7/2002 | 10.21 | -3.38 | -0.92 | - | - | - |
| | | | 6/26/2003 | 9.84 | -3.01 | -0.55 | - | - | 0.2 |
| | | | 10/14/2003 | 10.35 | -3.52 | -1.06 | - | - | 0.0 |
| | | | 11/12/2003 | 10.30 | -3.47 | -1.01 | - | - | 0.0 |
| | | | 12/29/2003 | 10.05 | -3.22 | -0.76 | - | - | 0.0 |
| | | | 3/15/2004 | 9.27 | -2.44 | 0.02 | - | - | 0.7 |
| | | | 6/7/2004 | 9.71 | -2.88 | -0.42 | - | - | 0.0 |
| | | | 9/7/2004 | 9.88 | -3.05 | -0.59 | - | - | 0.0 |
| | | | 12/7/2004 | 8.85 | -2.02 | 0.44 | - | - | 0.0 |
| | | | 12/4/2006 | 9.40 | -2.57 | -0.11 | - | - | 0.0 |
| | | | 9/24/2007 | 9.76 | -2.93 | -0.47 | - | - | 0.0 |
| | | | 3/17/2008 | 9.45 | -2.62 | -0.16 | - | - | 0.0 |
| | | | 9/22/2008 | 10.21 | -3.38 | -0.92 | - | - | 0.0 |
| | | | 3/23/2009 | 9.57 | -2.74 | -0.28 | - | - | 0.0 |
| | | | 10/12/2009 | 9.91 | -3.08 | -0.62 | - | - | 0.0 |
| | | | 3/1/2010 | 7.05 | -0.22 | 2.24 | - | - | 0.0 |
| | | | 9/27/2010 | 9.15 | -2.32 | 0.14 | - | - | 0.0 |
| | | | 3/7/2011 | 8.02 | -1.19 | 1.27 | - | - | 0.0 |
| | | | 9/26/2011 | 8.95 | -2.12 | 0.34 | - | - | 0.0 |
| | | | 3/19/2012 | 8.80 | -1.97 | 0.49 | - | - | 0.0 |
| | | | 9/10/2012 | 9.00 | -2.17 | 0.29 | - | - | 0.0 |
| | | | 3/18/2013 | 8.90 | -2.07 | 0.39 | - | - | 0.0 |
| MW-14 | 22.73 | 25.19 | 6/7/2002 | NM | NA | NA | 26.25 | NA | - |
| | | | 7/8/2002 | 26.75 | -4.02 | -1.56 | 26.47 | 0.28 | - |
| | | | 7/16/2002 | 26.62 | -3.89 | -1.43 | 26.61 | 0.01 | - |
| | | | 7/22/2002 | 26.63 | -3.90 | -1.44 | 26.62 | 0.01 | - |
| | | | 7/29/2002 | 26.63 | -3.90 | -1.44 | 26.62 | 0.01 | - |
| | | | 8/9/2002 | 26.64 | -3.91 | -1.45 | 26.63 | 0.01 | - |
| | | | 10/7/2002 | 26.44 | -3.71 | -1.25 | 26.46 | 0.2 | - |
| | | | 6/26/2003 | ND | NA | NA | 25.95 | NA | 142.0 |
| | | | 10/15/2003 | ND | NA | NA | 26.54 | NA | 161.0 |
| | | | 11/13/2003 | ND | NA | NA | 26.53 | NA | 172.0 |
| | | | 12/30/2003 | ND | NA | NA | 26.53 | NA | 150.0 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | ND | NA | NA | 24.98 | NA | 132.0 |
| | | | WD | - | - | - | - | - | - |
| MW-15 | 5.57 | 8.03 | 6/7/2002 | 8.80 | -3.23 | -0.77 | - | - | - |
| | | | 8/9/2002 | 8.79 | -3.22 | -0.76 | - | - | - |
| | | | 10/7/2002 | 8.71 | | -0.68 | - | - | - |
| | | | 6/26/2003 | 8.48 | -2.91 | -0.45 | - | - | 0.0 |
| | | | 10/14/2003 | 8.89 | -3.32 | -0.86 | - | - | 0.0 |
| | | | 11/12/2003 | 8.80 | -3.23 | -0.77 | - | - | 0.0 |
| | | | 12/29/2003 | 8.47 | -2.90 | -0.44 | - | - | 0.0 |
| | | | 3/15/2004 | 7.89 | -2.32 | 0.14 | - | - | 0.8 |
| | | | 6/7/2004 | 8.30 | -2.73 | -0.27 | - | - | 0.0 |
| | | | 9/7/2004 | 8.43 | -2.86 | -0.40 | - | - | 0.0 |
| | | | 12/7/2004 | 7.42 | -1.85 | 0.61 | - | - | 0.0 |
| | | | 12/4/2006 | 7.85 | -2.28 | 0.18 | - | - | 0.0 |
| | | | 9/24/2007 | 8.12 | -2.55 | -0.09 | - | - | 0.0 |
| | | | 3/17/2008 | 7.91 | -2.34 | 0.12 | - | - | 0.1 |
| | | | 9/22/2008 | 8.60 | -3.03 | -0.57 | - | - | 0.0 |
| | | | 3/23/2009 | 8.06 | -2.49 | -0.03 | - | - | 0.2 |
| | | | 10/12/2009 | 8.28 | -2.71 | -0.25 | - | - | 0.0 |
| | | | 3/1/2010 | 5.73 | -0.16 | 2.30 | - | - | 0.1 |
| | | | 9/27/2010 | 7.63 | -2.06 | 0.40 | - | - | 0.0 |
| | | | 3/7/2011 | 6.61 | -1.04 | 1.42 | - | - | 0.0 |
| | | | 9/26/2011 | 7.49 | -1.92 | 0.54 | - | - | 0.0 |
| | | | 3/19/2012 | 7.29 | -1.72 | 0.74 | - | - | 0.0 |
| | | | 9/10/2012 | 7.45 | -1.88 | 0.58 | - | - | 0.0 |
| | | | 3/18/2013 | 7.42 | -1.85 | 0.61 | - | - | 0.0 |
| NMW-1 | 21.28 | 23.74 | 6/7/2002 | 25.70 | -4.42 | -1.96 | - | - | - |
| | | | 8/9/2002 | 25.83 | -4.55 | -2.09 | - | - | - |
| | | | 10/7/2002 | 25.70 | -4.42 | -1.96 | - | - | - |
| | | | 6/26/2003 | 25.40 | -4.12 | -1.66 | - | - | 0.0 |
| | | | 10/14/2003 | 25.92 | -4.64 | -2.18 | - | - | 0.0 |
| | | | 11/12/2003 | 25.79 | -4.51 | -2.05 | - | - | 0.0 |
| | | | 12/29/2003 | 25.49 | -4.21 | -1.75 | - | - | 0.0 |
| | | | 3/15/2004 | 25.13 | -3.85 | -1.39 | - | - | 0.4 |
| | | | 6/7/2004 | 25.30 | -4.02 | -1.56 | - | - | 0.0 |
| | | | 9/7/2004 | 25.18 | -3.90 | -1.44 | - | - | 0.0 |
| | | | 12/7/2004 | 24.44 | -3.16 | -0.70 | - | - | 0.0 |
| | | | WD | - | - | - | - | - | - |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| NMW-2 | 17.35 | 19.81 | 6/7/2002 | 20.26 | -2.91 | -0.45 | - | - | - |
| | | | 8/9/2002 | 20.39 | -3.04 | -0.58 | - | - | - |
| | | | 10/7/2002 | 20.11 | -2.76 | -0.30 | - | - | - |
| | | | 6/26/2003 | 20.04 | -2.69 | -0.23 | - | - | 0.2 |
| | | | 10/14/2003 | 20.60 | -3.25 | -0.79 | - | - | 0.0 |
| | | | 11/12/2003 | 20.45 | -3.10 | -0.64 | - | - | 0.0 |
| | | | 12/29/2003 | 20.02 | -2.67 | -0.21 | - | - | 0.0 |
| | | | 3/15/2004 | 19.48 | -2.13 | 0.33 | - | - | 0.6 |
| | | | 6/7/2004 | 19.68 | -2.33 | 0.13 | - | - | 0.0 |
| | | | 9/7/2004 | 19.75 | -2.40 | 0.06 | - | - | 0.0 |
| | | | 12/7/2004 | 19.23 | -1.88 | 0.58 | - | - | 0.0 |
| 8 | 20.06 | 22.52 | 12/4/2006 | 22.10 | -2.04 | 0.42 | - | - | 0.0 |
| | | | 9/24/2007 | 23.02 | -2.96 | -0.50 | - | - | 0.0 |
| | | | 3/17/2008 | 22.78 | -2.72 | -0.26 | - | - | 0.0 |
| | | | 9/22/2008 | 24.21 | -4.15 | -1.69 | - | - | 0.0 |
| | | | 3/23/2009 | 23.08 | -3.02 | -0.56 | - | - | 0.0 |
| | | | 10/12/2009 | 23.13 | -3.07 | -0.61 | - | - | 0.0 |
| | | | 3/1/2010 | 21.05 | -0.99 | 1.47 | - | - | 0.0 |
| | | | 9/27/2010 | 22.40 | -2.34 | 0.12 | - | - | 0.0 |
| | | | 3/7/2011 | 21.74 | -1.68 | 0.78 | - | - | 0.0 |
| | | | 9/26/2011 | 22.33 | -2.27 | 0.19 | - | - | 0.0 |
| | | | 3/19/2012 | 22.38 | -2.32 | 0.14 | - | - | 0.0 |
| | | | 9/10/2012 | 22.29 | -2.23 | 0.23 | - | - | 0.0 |
| | | | 3/18/2013 | 22.47 | -2.41 | 0.05 | - | - | 0.0 |
| MW-16 | 7.01 | 9.47 | 8/9/2002 | 10.90 | -3.89 | -1.43 | - | - | - |
| | | | 10/7/2002 | 10.75 | -3.74 | -1.28 | - | - | - |
| | | | 6/26/2003 | 10.21 | -3.20 | -0.74 | - | - | 0.2 |
| | | | 10/14/2003 | 10.81 | -3.80 | -1.34 | - | - | 0.0 |
| | | | 11/12/2003 | 10.69 | -3.68 | -1.22 | - | - | 0.0 |
| | | | 12/29/2003 | 10.42 | -3.41 | -0.95 | - | - | 0.0 |
| | | | 3/15/2004 | 9.67 | -2.66 | -0.20 | - | - | 1.1 |
| | | | 6/7/2004 | 9.96 | -2.95 | -0.49 | - | - | 0.0 |
| | | | 9/7/2004 | 10.09 | -3.08 | -0.62 | - | - | 0.0 |
| | | | 12/7/2004 | 9.25 | -2.24 | 0.22 | - | - | 0.0 |
| | | | 12/4/2006 | 9.64 | -2.63 | -0.17 | - | - | 0.0 |
| | | | 9/24/2007 | 10.74 | -3.73 | -1.27 | - | - | 0.0 |
| | | | 3/17/2008 | 10.35 | -3.34 | -0.88 | - | - | 0.1 |
| | | | 9/22/2008 | 11.30 | -4.29 | -1.83 | - | - | 0.7 |
| | | | 3/23/2009 | 10.37 | -3.36 | -0.90 | - | - | 0.1 |
| | | | 10/12/2009 | 10.78 | -3.77 | -1.31 | - | - | 0.0 |
| | | | 3/1/2010 | 8.32 | -1.31 | 1.15 | - | - | 0.2 |
| | | | 9/27/2010 | 9.72 | -2.71 | -0.25 | - | - | 0.0 |
| | | | 3/7/2011 | 8.69 | -1.68 | 0.78 | - | - | 0.0 |
| 10 | 4.22 | 6.68 | 9/26/2011 | 7.05 | -2.83 | -0.37 | - | - | 0.1 |
| | | | 3/19/2012 | 7.25 | -3.03 | -0.57 | - | - | 0.0 |
| | | | 9/10/2012 | 7.00 | -2.78 | -0.32 | - | - | 0.0 |
| | | | 3/18/2013 | 7.18 | -2.96 | -0.50 | - | - | 0.0 |
| MW-17 | 5.17 | 7.63 | 8/9/2002 | 11.45 | -6.28 | -3.82 | - | - | - |
| | | | 10/7/2002 | 11.35 | -6.18 | -3.72 | - | - | - |
| | | | 6/26/2003 | 11.13 | -5.96 | -3.50 | - | - | 0.0 |
| | | | 10/14/2003 | 11.49 | -6.32 | -3.86 | - | - | 0.0 |
| | | | 11/12/2003 | 11.40 | -6.23 | -3.77 | - | - | 0.0 |
| | | | 12/29/2003 | 11.25 | -6.08 | -3.62 | - | - | 0.0 |
| | | | 3/15/2004 | 10.81 | -5.64 | -3.18 | - | - | 1.2 |
| | | | 6/7/2004 | 10.97 | -5.80 | -3.34 | - | - | 0.4 |
| | | | 9/7/2004 | 10.98 | -5.81 | -3.35 | - | - | 0.0 |
| | | | 12/7/2004 | 10.06 | -4.89 | -2.43 | - | - | 0.0 |
| | | | 12/4/2006 | 10.64 | -5.47 | -3.01 | - | - | 0.0 |
| | | | 9/24/2007 | 11.64 | -6.47 | -4.01 | - | - | 0.0 |
| | | | 3/17/2008 | 11.30 | -6.13 | -3.67 | - | - | 0.0 |
| | | | 9/22/2008 | 11.89 | -6.72 | -4.26 | - | - | 2.8 |
| | | | 3/23/2009 | 11.44 | -6.27 | -3.81 | - | - | 0.0 |
| | | | 10/12/2009 | 11.35 | -6.18 | -3.72 | - | - | 0.0 |
| | | | 3/1/2010 | 10.19 | -5.02 | -2.56 | - | - | 0.0 |
| | | | 9/27/2010 | 11.12 | -5.95 | -3.49 | - | - | 0.0 |
| | | | 3/7/2011 | 10.56 | -5.39 | -2.93 | - | - | 0.2 |
| 10 | 2.78 | 5.24 | 9/26/2011 | 9.03 | -6.25 | -3.79 | - | - | 0.0 |
| | | | 3/19/2012 | 9.02 | -6.24 | -3.78 | - | - | 0.0 |
| | | | 9/10/2012 | 8.90 | -6.12 | -3.66 | - | - | 0.0 |
| | | | 3/18/2013 | 8.98 | -6.20 | -3.74 | - | - | 0.0 |
| MW-18 | 2.93 | 5.39 | 8/9/2002 | 6.22 | -3.29 | -0.83 | - | - | - |
| | | | 10/7/2002 | 6.13 | -3.20 | -0.74 | - | - | - |
| | | | 6/26/2003 | 5.78 | -2.85 | -0.39 | - | - | 0.5 |
| | | | 10/14/2003 | 6.23 | -3.30 | -0.84 | - | - | 0.0 |
| | | | 11/12/2003 | 6.18 | -3.25 | -0.79 | - | - | 0.0 |
| | | | 12/29/2003 | 5.93 | -3.00 | -0.54 | - | - | 0.0 |
| | | | 3/15/2004 | 5.24 | -2.31 | 0.15 | - | - | 1.1 |
| | | | 6/7/2004 | 5.68 | -2.75 | -0.29 | - | - | 1.0 |
| | | | 9/7/2004 | 5.81 | -2.88 | -0.42 | - | - | 1.0 |
| | | | 12/7/2004 | 4.88 | -1.95 | 0.51 | - | - | 0.0 |
| | | | 12/4/2006 | 5.38 | -2.45 | 0.01 | - | - | 0.0 |
| | | | 9/24/2007 | 5.56 | -2.63 | -0.17 | - | - | 71.0 |
| | | | 3/17/2008 | 5.24 | -2.31 | 0.15 | - | - | 0.0 |
| | | | 9/22/2008 | 6.05 | -3.12 | -0.66 | - | - | 2.7 |
| | | | 3/23/2009 | 5.45 | -2.52 | -0.06 | - | - | 0.0 |
| | | | 10/12/2009 | 5.75 | -2.82 | -0.36 | - | - | 55.3 |
| | | | 3/1/2010 | 3.26 | -0.33 | 2.13 | - | - | 0.9 |
| | | | 9/27/2010 | 5.06 | -2.13 | 0.33 | - | - | 31.0 |
| | | | 3/7/2011 | 4.07 | -1.14 | 1.32 | - | - | 0.5 |
| | | | 9/26/2011 | 4.98 | -2.05 | 0.41 | - | - | 0.2 |
| | | | 3/19/2012 | 4.76 | -1.83 | 0.63 | - | - | 0.0 |
| | | | 9/10/2012 | 4.97 | -2.04 | 0.42 | - | - | 0.0 |
| | | | 3/18/2013 | 4.91 | -1.98 | 0.48 | - | - | 0.0 |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data:  June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| MW-19 | 2.74 | 5.20 | 3/15/2004 | 5.28 | -2.54 | -0.08 | - | - | 0.7 |
| | | | 6/7/2004 | 5.73 | -2.99 | -0.53 | - | - | 10.1 |
| | | | 9/7/2004 | 5.85 | -3.11 | -0.65 | - | - | 0.9 |
| | | | 12/7/2004 | 4.88 | -2.14 | 0.32 | - | - | 0.1 |
| | | | 12/4/2006 | 5.30 | -2.56 | -0.10 | - | - | 0.0 |
| | | | 9/24/2007 | 5.52 | -2.78 | -0.32 | - | - | 102.0 |
| | | | 3/17/2008 | 5.30 | -2.56 | -0.10 | - | - | 0.5 |
| | | | 9/22/2008 | 5.99 | -3.25 | -0.79 | - | - | 1.9 |
| | | | 3/23/2009 | 5.44 | -2.70 | -0.24 | - | - | 0.0 |
| | | | 10/12/2009 | 5.72 | -2.98 | -0.52 | - | - | 50.5 |
| | | | 3/1/2010 | 3.19 | -0.45 | 2.01 | - | - | 0.3 |
| | | | 9/27/2010 | 5.03 | -2.29 | 0.17 | - | - | 16.4 |
| | | | 3/7/2011 | 4.11 | -1.37 | 1.09 | - | - | 0.3 |
| | | | 9/26/2011 | 4.95 | -2.21 | 0.25 | - | - | 0.7 |
| | | | 3/19/2012 | 4.73 | -1.99 | 0.47 | - | - | 0.0 |
| | | | 9/10/2012 | 4.92 | -2.18 | 0.28 | - | - | 0.0 |
| | | | 3/18/2013 | 4.85 | -2.11 | 0.35 | - | - | 0.0 |
| MW-20 | 24.97 | 27.43 | 3/15/2004 | 26.42 | -1.45 | 1.01 | - | - | 0.8 |
| | | | 6/7/2004 | 26.62 | -1.65 | 0.81 | - | - | 0.0 |
| | | | 9/7/2004 | 27.03 | -2.06 | 0.40 | - | - | 0.0 |
| | | | 12/7/2004 | 26.11 | -1.14 | 1.32 | - | - | 0.0 |
| | | | WD | - | - | - | - | - | - |
| MW-21 | 19.16 | 21.62 | 9/24/2007 | 23.22 | -4.06 | -1.60 | - | - | 0.0 |
| | | | 3/17/2008 | 23.00 | -3.84 | -1.38 | - | - | 0.0 |
| | | | 9/22/2008 | 24.36 | -5.20 | -2.74 | - | - | 0.0 |
| | | | 3/23/2009 | 23.30 | -4.14 | -1.68 | - | - | 0.0 |
| | | | 10/12/2009 | 23.33 | -4.17 | -1.71 | - | - | 0.0 |
| | | | 3/1/2010 | 21.42 | -2.26 | 0.20 | - | - | 0.0 |
| | | | 9/27/2010 | 22.67 | -3.51 | -1.05 | - | - | 0.0 |
| | | | 3/7/2011 | 22.03 | -2.87 | -0.41 | - | - | 0.0 |
| | | | 9/26/2011 | 22.58 | -3.42 | -0.96 | - | - | 0.0 |
| | | | 3/19/2012 | 22.62 | -3.46 | -1.00 | - | - | 0.0 |
| | | | 9/10/2012 | 22.51 | -3.35 | -0.89 | - | - | 0.0 |
| | | | 3/18/2013 | 22.72 | -3.56 | -1.10 | - | - | 0.0 |
| MW-22 | 18.35 | 20.81 | 9/24/2007 | 21.73 | -3.38 | -0.92 | - | - | 0.0 |
| | | | 3/17/2008 | 22.23 | -3.88 | -1.42 | - | - | 0.0 |
| | | | 9/22/2008 | 22.14 | -3.79 | -1.33 | - | - | 0.0 |
| | | | 3/23/2009 | 21.47 | -3.12 | -0.66 | - | - | 0.0 |
| | | | 10/12/2009 | 21.92 | -3.57 | -1.11 | - | - | 0.0 |
| | | | 3/1/2010 | 19.27 | -0.92 | 1.54 | - | - | 0.0 |
| | | | 9/27/2010 | 21.06 | -2.71 | -0.25 | - | - | 0.0 |
| | | | 3/7/2011 | 19.90 | -1.55 | 0.91 | - | - | 0.0 |
| | | | 9/26/2011 | 20.91 | -2.56 | -0.10 | - | - | 0.0 |
| | | | 3/19/2012 | 20.73 | -2.38 | 0.08 | - | - | 0.0 |
| | | | 9/10/2012 | 20.92 | -2.57 | -0.11 | - | - | 0.0 |
| | | | 3/18/2013 | 20.89 | -2.54 | -0.08 | - | - | 0.5 |
| MW-23 | 7.44 | 9.90 | 9/24/2007 | 10.37 | -2.93 | -0.47 | - | - | 0.0 |
| | | | 3/17/2008 | 10.07 | -2.63 | -0.17 | - | - | 0.0 |
| | | | 9/22/2008 | 10.86 | -3.42 | -0.96 | - | - | 0.0 |
| | | | 3/23/2009 | 10.25 | -2.81 | -0.35 | - | - | 0.0 |
| | | | 10/12/2009 | 10.56 | -3.12 | -0.66 | - | - | 0.0 |
| | | | 3/1/2010 | 7.89 | -0.45 | 2.01 | - | - | 0.0 |
| | | | 9/27/2010 | 9.83 | -2.39 | 0.07 | - | - | 0.0 |
| | | | 3/7/2011 | 8.75 | -1.31 | 1.15 | - | - | 0.0 |
| | | | 9/26/2011 | 9.63 | -2.19 | 0.27 | - | - | 0.0 |
| | | | 3/19/2012 | 9.47 | -2.03 | 0.43 | - | - | 0.0 |
| | | | 9/10/2012 | 9.68 | -2.24 | 0.22 | - | - | 0.0 |
| | | | 3/18/2013 | 9.60 | -2.16 | 0.30 | - | - | 0.0 |
| P-1 | 24.96 | 27.42 | 8/26/2002 | 28.00 | -3.04 | -0.58 | - | - | - |
| | | | 9/18/2002 | 29.60 | -4.64 | -2.18 | 29.00 | 0.60 | - |
| | | | 9/30/2002 | 29.70 | -4.74 | -2.28 | 28.98 | 0.72 | - |
| | | | 10/7/2002 | 29.73 | -4.77 | -2.31 | 28.91 | 0.82 | - |
| | | | 6/26/2003 | 31.32 | -6.36 | -3.90 | 28.50 | 2.82 | 29.4 |
| | | | 10/15/2003 | ND | NA | NA | 28.88 | NA | 51.2 |
| | | | 11/13/2003 | ND | NA | NA | 28.86 | NA | 48.6 |
| | | | 12/30/2003 | ND | NA | NA | 28.53 | NA | 2.7 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | - | - | - | - | - | - |
| | | | WD | - | - | - | - | - | - |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| P-2 | 21.90 | 24.36 | 9/18/2002 | 25.90 | -4.00 | -1.54 | - | - | - |
| | | | 9/18/2002 | 25.67 | -3.77 | -1.31 | - | - | - |
| | | | 9/30/2002 | 25.81 | -3.91 | -1.45 | - | - | - |
| | | | 10/7/2002 | 25.71 | -3.81 | -1.35 | - | - | - |
| | | | 6/26/2003 | 26.29 | -4.39 | -1.93 | - | - | 0.0 |
| | | | 10/14/2003 | 25.78 | -3.88 | -1.42 | - | - | 0.0 |
| | | | 11/12/2003 | 25.69 | -3.79 | -1.33 | - | - | 0.0 |
| | | | 12/29/2003 | 25.30 | -3.4 | -0.94 | - | - | 0.0 |
| | | | 3/15/2004 | 24.52 | -2.62 | -0.16 | - | - | 0.2 |
| | | | 6/7/2004 | 24.97 | -3.07 | -0.61 | - | - | 0.0 |
| | | | 9/7/2004 | 25.09 | -3.19 | -0.73 | - | - | 0.0 |
| | | | 12/7/2004 | 24.29 | -2.39 | 0.07 | - | - | 0.0 |
| | | | WD | - | - | - | - | - | - |
| P-3 | 26.60 | 29.06 | 8/29/2002 | 30.90 | -4.30 | -1.84 | - | - | - |
| | | | 9/18/2002 | 30.50 | -3.90 | -1.44 | 29.80 | 0.70 | - |
| | | | 9/30/2002 | 30.52 | -3.92 | -1.46 | 29.90 | 0.62 | - |
| | | | 10/7/2002 | 30.10 | -3.50 | -1.04 | 29.77 | 0.33 | - |
| | | | 6/26/2003 | 29.64 | -3.04 | -0.58 | 29.46 | 0.18 | 68.3 |
| | | | 10/15/2003 | ND | NA | NA | 29.96 | NA | 63.1 |
| | | | 11/13/2003 | ND | NA | NA | 29.95 | NA | 57.7 |
| | | | 12/30/2003 | ND | NA | NA | 29.33 | NA | 23.3 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | ND | NA | NA | 28.43 | NA | 49.9 |
| | | | WD | - | - | - | - | - | - |
| P-4 | 25.18 | 27.64 | 9/18/2002 | 28.87 | -3.69 | -1.23 | - | - | - |
| | | | 9/30/2002 | 28.93 | -3.75 | -1.29 | - | - | - |
| | | | 10/7/2002 | 28.86 | -3.68 | -1.22 | - | - | - |
| | | | 6/26/2003 | 28.50 | -3.32 | -0.86 | - | - | 0.4 |
| | | | 10/15/2003 | 28.96 | -3.78 | -1.32 | P | - | 18.6 |
| | | | 11/12/2003 | 28.84 | -3.66 | -1.20 | - | - | 13.8 |
| | | | 12/29/2003 | 28.46 | -3.28 | -0.82 | - | - | 14.0 |
| | | | 3/15/2004 | 27.85 | -2.67 | -0.21 | P | - | 17.6 |
| | | | 6/7/2004 | 28.34 | -3.16 | -0.70 | P | - | 32.8 |
| | | | 9/7/2004 | ND | - | - | 28.34 | NM | 24.1 |
| | | | 12/7/2004 | 27.95 | -2.77 | -0.31 | 27.67 | 0.28 | 47.3 |
| | | | WD | - | - | - | - | - | - |
| P-5 | 27.55 | 30.01 | 8/29/2002 | 30.85 | -3.30 | -0.84 | - | - | - |
| | | | 9/18/2002 | 30.90 | -3.35 | -0.89 | - | - | - |
| | | | 9/30/2002 | 30.86 | -3.31 | -0.85 | 30.81 | 0.05 | - |
| | | | 10/7/2002 | 31.47 | -3.92 | -1.46 | 30.65 | 0.82 | - |
| | | | 6/26/2003 | 32.35 | -4.80 | -2.34 | 30.46 | 1.89 | 16.3 |
| | | | 10/15/2003 | ND | NA | NA | 30.99 | NA | 26.1 |
| | | | 11/13/2003 | ND | NA | NA | 31.02 | NA | 22.1 |
| | | | 12/30/2003 | ND | NA | NA | 30.02 | NA | 15.7 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | ND | NA | NA | 29.47 | NA | 27.5 |
| | | | 12/4/2006 | ND | NA | NA | 25.95 | NA | 35.8 |
| | | | 9/24/2007 | NM | - | - | NM | - | NM |
| | | | 3/17/2008 | NM | - | - | NM | - | NM |
| | | | 9/22/2008 | NM | - | - | NM | - | NM |
| | | | 3/23/2009 | NM | - | - | NM | - | NM |
| | | | 10/12/2009 | NM | - | - | NM | - | NM |
| | | | 3/1/2010 | NM | - | - | NM | - | NM |
| | | | 9/27/2010 | NM | - | - | NM | - | NM |
| | | | 3/7/2011 | NM | - | - | NM | - | NM |
| | | | 9/26/2011 | NM | - | - | NM | - | NM |
| | | | 3/19/2012 | NM | - | - | NM | - | NM |
| | | | 9/10/2012 | NM | - | - | NM | - | NM |
| | | | 3/18/2013 | NM | - | - | NM | - | NM |
| P-6 | 27.16 | 29.62 | 9/18/2002 | 30.30 | -3.14 | -0.68 | - | - | - |
| | | | 9/30/2002 | 30.44 | -3.28 | -0.82 | - | - | - |
| | | | 10/7/2002 | 30.40 | -3.24 | -0.78 | - | - | - |
| | | | 6/26/2003 | 30.17 | -3.01 | -0.55 | 30.10 | 0.07 | 115.0 |
| | | | 10/15/2003 | ND | NA | NA | 30.64 | NA | 88.7 |
| | | | 11/13/2003 | ND | NA | NA | 30.57 | NA | 82.6 |
| | | | 12/30/2003 | ND | NA | NA | 30.05 | NA | 169.0 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | 29.15 | -1.99 | 0.47 | 28.82 | 0.33 | 45.9 |
| | | | 12/4/2006 | ND | NA | NA | 29.55 | NA | 184.0 |
| | | | 9/24/2007 | NM | - | - | NM | - | NM |
| | | | 3/17/2008 | NM | - | - | NM | - | NM |
| | | | 9/22/2008 | NM | - | - | NM | - | NM |
| | | | 3/23/2009 | NM | - | - | NM | - | NM |
| | | | 10/12/2009 | NM | - | - | NM | - | NM |
| | | | 3/1/2010 | NM | - | - | NM | - | NM |
| | | | 9/27/2010 | WD[1] | - | - | - | - | - |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| P-8 | 21.99 | 24.45 | 9/18/2002 | 24.64 | -2.65 | -0.19 | - | - | - |
| | | | 9/30/2002 | 24.79 | -2.80 | -0.34 | - | - | - |
| | | | 10/7/2002 | 24.65 | -2.66 | -0.20 | - | - | - |
| | | | 6/26/2003 | 25.12 | -3.13 | -0.67 | 24.56 | 0.56 | 150.0 |
| | | | 10/15/2003 | 26.54 | -4.55 | -2.09 | 25.29 | 1.25 | 74.1 |
| | | | 11/13/2003 | 26.44 | -4.45 | -1.99 | 25.18 | 1.26 | 83.3 |
| | | | 12/30/2003 | ND | NA | NA | 24.38 | NA | 52.8 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | 26.97 | -4.98 | -2.52 | 23.80 | 3.17 | 79.5 |
| | | | 12/4/2006 | 29.04 | -7.05 | -4.59 | 24.50 | 4.54 | 45.7 |
| | | | 9/24/2007 | NM | - | - | NM | - | NM |
| | | | 3/17/2008 | NM | - | - | NM | - | NM |
| | | | 9/22/2008 | NM | - | - | NM | - | NM |
| | | | 3/23/2009 | NM | - | - | NM | - | NM |
| | | | 10/12/2009 | NM | - | - | NM | - | NM |
| | | | 3/1/2010 | NM | - | - | NM | - | NM |
| | | | 9/27/2010 | WD[1] | - | - | - | - | - |
| P-9 | 15.81 | 18.27 | 8/29/2002 | 18.70 | -2.89 | -0.43 | - | - | - |
| | | | 9/18/2002 | 17.98 | -2.17 | 0.29 | - | - | - |
| | | | 9/6/2002 | 18.48 | -2.67 | -0.21 | - | - | - |
| | | | 9/30/2002 | 18.22 | -2.41 | 0.05 | - | - | - |
| | | | 10/7/2002 | 18.10 | -2.29 | 0.17 | - | - | - |
| | | | 6/26/2003 | 18.06 | -2.25 | 0.21 | - | - | 1.9 |
| | | | 10/14/2003 | 18.64 | -2.83 | -0.37 | - | - | 2.5 |
| | | | 11/12/2003 | 18.47 | -2.66 | -0.20 | - | - | 2.8 |
| | | | 1/6/2004 | 18.32 | -2.51 | -0.05 | P | - | NM |
| | | | 3/15/2004 | 17.35 | -1.54 | 0.92 | P | - | 8.1 |
| | | | 6/7/2004 | ND | NA | NA | 17.70 | NA | 3.6 |
| | | | 9/7/2004 | 17.77 | -1.96 | 0.50 | - | - | 3.2 |
| | | | 12/7/2004 | 17.13 | -1.32 | 1.14 | P | - | 12.4 |
| | | | 12/4/2006 | ND | NA | NA | 17.57 | NA | 8.5 |
| | | | 9/24/2007 | NM | - | - | NM | - | NM |
| | | | 3/17/2008 | NM | - | - | NM | - | NM |
| | | | 9/22/2008 | NM | - | - | NM | - | NM |
| | | | 3/23/2009 | NM | - | - | NM | - | NM |
| | | | 10/12/2009 | ND | NA | NA | 18.30 | NA | 9.7 |
| | | | 3/1/2010 | NM | - | - | NM | - | NM |
| | | | 9/27/2010 | NM | - | - | NM | - | NM |
| | | | 3/7/2011 | NM | - | - | NM | - | NM |
| | | | 9/26/2011 | NM | - | - | NM | - | NM |
| | | | 3/19/2012 | NM | - | - | NM | - | NM |
| | | | 9/10/2012 | NM | - | - | NM | - | NM |
| | | | 3/18/2013 | NM | - | - | NM | - | NM |
| P-10 | 5.18 | 7.64 | 9/18/2002 | 8.81 | -3.63 | -1.17 | - | - | - |
| | | | 9/30/2002 | 9.00 | -3.82 | -1.36 | - | - | - |
| | | | 10/7/2002 | 8.85 | -3.67 | -1.21 | - | - | - |
| | | | 6/26/2003 | 8.47 | -3.29 | -0.83 | 14.65 | 0.3 [2] | 1.4 |
| | | | 10/15/2003 | NM | - | - | NM | - | NM |
| | | | 11/13/2003 | 8.67 | -3.49 | -1.03 | - | - | 82.7 |
| | | | 12/30/2003 | 8.16 | -2.98 | -0.52 | P | - | 2.7 |
| | | | 3/15/2004 | 7.57 | -2.39 | 0.07 | P | - | 18.4 |
| | | | 6/7/2004 | ND | NA | NA | 7.95 | NA | 0.7 |
| | | | 9/7/2004 | 8.10 | -2.92 | -0.46 | P | - | 0.0 |
| | | | 12/7/2004 | 7.11 | -1.93 | 0.53 | P | - | 1.8 |
| | | | 12/4/2006 | 7.58 | -2.40 | 0.06 | - | - | 0.6 |
| | | | 9/24/2007 | 7.68 | -2.50 | -0.04 | - | - | 189.0 |
| | | | 3/17/2008 | 7.50 | -2.32 | 0.14 | - | - | 0.1 |
| 9 | 6.63 | 9.09 | 9/22/2008 | 10.02 | -3.39 | -0.93 | - | - | 0.0 |
| | | | 3/23/2009 | 9.70 | -3.07 | -0.61 | 9.20 | 0.50 | 0.2 |
| | | | 10/12/2009 | 9.75 | -3.12 | -0.66 | - | - | 1.1 |
| | | | 3/1/2010 | 5.01 | 1.62 | 4.08 | - | - | 0.6 |
| | | | 9/27/2010 | 8.93 | -2.30 | 0.16 | - | - | 7.9 |
| | | | 3/7/2011 | 7.73 | -1.10 | 1.36 | - | - | 0.0 |
| | | | 9/26/2011 | 8.76 | -2.13 | 0.33 | - | - | 0.0 |
| | | | 3/19/2012 | 8.65 | -2.02 | 0.44 | - | - | 0.3 |
| | | | 9/10/2012 | 8.78 | -2.15 | 0.31 | - | - | 0.5 |
| | | | 3/18/2013 | 8.65 | -2.02 | 0.44 | - | - | 0.0 |
| GP-1 | 21.71 | 24.17 | 8/19/2002 | 26.35 | -4.64 | -2.18 | - | - | - |
| | | | 8/23/2002 | 26.30 | -4.59 | -2.13 | - | - | - |
| | | | 9/18/2002 | 26.06 | -4.35 | -1.89 | - | - | - |
| | | | 9/30/2002 | 26.15 | -4.44 | -1.98 | - | - | - |
| | | | 10/7/2002 | 26.06 | -4.35 | -1.89 | - | - | - |
| | | | 6/26/2003 | 25.86 | -4.15 | -1.69 | - | - | 16.5 |
| | | | 10/14/2003 | 26.36 | -4.65 | -2.19 | - | - | 4.7 |
| | | | 11/12/2003 | 26.26 | -4.55 | -2.09 | - | - | 2.8 |
| | | | 12/29/2003 | 25.97 | -4.26 | -1.80 | - | - | 0.0 |
| | | | 3/15/2004 | 25.40 | -3.69 | -1.23 | - | - | 3.8 |
| | | | 6/7/2004 | 25.62 | -3.91 | -1.45 | - | - | 2.1 |
| | | | 9/7/2004 | 25.61 | -3.90 | -1.44 | - | - | 0.0 |
| | | | 12/7/2004 | 24.96 | -3.25 | -0.79 | - | - | 9.2 |
| | | | WD | - | - | - | - | - | - |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| GP-2 | 24.03 | 26.49 | 8/19/2002 | 29.50 | -5.47 | -3.01 | 28.00 | 1.5 | - |
| | | | 8/23/2002 | 30.30 | -6.27 | -3.81 | 28.80 | 1.5 | - |
| | | | 9/18/2002 | 32.80 | -8.77 | -6.31 | 27.60 | 5.2 | - |
| | | | 9/30/2002 | 32.83 | -8.80 | -6.34 | 26.95 | 5.88 | - |
| | | | 10/7/2002 | 32.52 | -8.49 | -6.03 | 26.58 | 5.94 | - |
| | | | 6/27/2003 | ND | NA | NA | 25.25 | NA | 63.8 |
| | | | 10/15/2003 | ND | NA | NA | 25.84 | NA | 48.8 |
| | | | 11/13/2003 | ND | NA | NA | 25.48 | NA | 43.5 |
| | | | 12/30/2003 | ND | NA | NA | 25.13 | NA | 39.1 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | ND | NA | NA | 24.53 | NA | 99.4 |
| | | | WD | - | - | - | - | - | - |
| GP-3 | 20.01 | 22.47 | 8/19/2002 | 24.15 | -4.14 | -1.68 | - | - | - |
| | | | 8/23/2002 | 24.00 | -3.99 | -1.53 | - | - | - |
| | | | 9/18/2002 | 22.94 | -2.93 | -0.47 | - | - | - |
| | | | 9/30/2002 | 22.91 | -2.90 | -0.44 | - | - | - |
| | | | 10/7/2002 | 22.86 | -2.85 | -0.39 | - | - | - |
| | | | 6/26/2003 | 22.12 | -2.11 | 0.35 | 22.04 | 0.08 | 23.0 |
| | | | 10/15/2003 | ND | NA | NA | 22.80 | NA | 111.0 |
| | | | 11/13/2003 | ND | NA | NA | 22.76 | NA | 97.1 |
| | | | 12/30/2003 | ND | NA | NA | 22.51 | NA | 202.0 |
| 4 | | | 3/15/2004 | NM | - | - | NM | - | NM |
| 4 | | | 6/7/2004 | NM | - | - | NM | - | NM |
| 4 | | | 9/7/2004 | NM | - | - | NM | - | NM |
| | | | 12/8/2004 | ND | NA | NA | 21.11 | NA | 63.2 |
| | | | WD | - | - | - | - | - | - |
| GP-4 | 18.64 | 21.10 | 8/19/2002 | 20.80 | -2.16 | 0.30 | - | - | - |
| | | | 9/18/2002 | 21.49 | -2.85 | -0.39 | - | - | - |
| | | | 9/30/2002 | 21.51 | -2.87 | -0.41 | - | - | - |
| | | | 10/7/2002 | 21.41 | -2.77 | -0.31 | - | - | - |
| | | | 6/26/2003 | 21.37 | -2.73 | -0.27 | - | - | 13.2 |
| | | | 10/14/2003 | 21.93 | -3.29 | -0.83 | - | - | 14.0 |
| | | | 11/12/2003 | 21.83 | -3.19 | -0.73 | - | - | 9.6 |
| | | | 12/29/2003 | 21.37 | -2.73 | -0.27 | - | - | 3.6 |
| | | | 3/15/2004 | 20.81 | -2.17 | 0.29 | - | - | 4.7 |
| | | | 6/7/2004 | 20.98 | -2.34 | 0.12 | - | - | 0.0 |
| | | | 9/7/2004 | 21.13 | -2.49 | -0.03 | - | - | 10.9 |
| | | | 12/7/2004 | 20.48 | -1.84 | 0.62 | - | - | 0.0 |
| | | | WD | - | - | - | - | - | - |
| GP-12 | 16.23 | 18.69 | 8/23/2002 | 20.63 | -4.40 | -1.94 | - | - | - |
| | | | 8/29/2002 | 20.70 | -4.47 | -2.01 | - | - | - |
| | | | 9/6/2002 | 19.85 | -3.62 | -1.16 | - | - | - |
| | | | 9/18/2002 | 19.62 | -3.39 | -0.93 | - | - | - |
| | | | 9/30/2002 | 19.78 | -3.55 | -1.09 | - | - | - |
| | | | 10/7/2002 | 19.69 | -3.46 | -1.00 | - | - | - |
| | | | 6/26/2003 | 19.38 | -3.15 | -0.69 | - | - | 0.5 |
| | | | 10/14/2003 | 19.90 | -3.67 | -1.21 | - | - | 1.9 |
| | | | 11/12/2003 | 19.74 | -3.51 | -1.05 | - | - | 5.9 |
| | | | 12/29/2003 | 19.34 | -3.11 | -0.65 | - | - | 5.1 |
| | | | 3/15/2004 | 18.76 | -2.53 | -0.07 | - | - | 0.9 |
| | | | 6/7/2004 | 17.23? | (?) | (?) | - | - | 0.0 |
| 7 | 16.69 | 19.15 | 9/7/2004 | 19.46 | -2.77 | -0.31 | - | - | 9.5 |
| | | | 12/7/2004 | 18.56 | -1.87 | 0.59 | - | - | 2.6 |
| | | | 12/4/2006 | 18.70 | -2.01 | 0.45 | - | - | 2.0 |
| | | | 9/24/2007 | 19.26 | -2.57 | -0.11 | - | - | 0.0 |
| | | | 3/17/2008 | 18.90 | -2.21 | 0.25 | - | - | 0.0 |
| | | | 9/22/2008 | 19.77 | -3.08 | -0.62 | - | - | 0.0 |
| | | | 3/23/2009 | 19.09 | -2.40 | 0.06 | - | - | 0.0 |
| | | | 10/12/2009 | 19.35 | -2.66 | -0.20 | - | - | 0.0 |
| | | | 3/1/2010 | 15.96 | 0.73 | 3.19 | - | - | 0.0 |
| | | | 9/27/2010 | 18.50 | -1.81 | 0.65 | - | - | 0.0 |
| | | | 3/7/2011 | 17.19 | -0.50 | 1.96 | - | - | 0.1 |
| | | | 9/26/2011 | 18.36 | -1.67 | 0.79 | - | - | 0.0 |
| | | | 3/19/2012 | 18.30 | -1.61 | 0.85 | - | - | 0.0 |
| | | | 9/10/2012 | 18.31 | -1.62 | 0.84 | - | - | 0.0 |
| | | | 3/18/2013 | 18.42 | -1.73 | 0.73 | - | - | 0.0 |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data: June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| GP-21 | 16.30 | 18.76 | 9/18/2002 | 18.62 | -2.32 | 0.14 | - | - | - |
| | | | 9/30/2002 | 18.77 | -2.47 | -0.01 | - | - | - |
| | | | 10/7/2002 | 18.60 | -2.30 | 0.16 | - | - | - |
| | | | 6/26/2003 | 18.78 | -2.48 | -0.02 | - | - | 0.2 |
| | | | 10/14/2003 | 19.41 | -3.11 | -0.65 | - | - | 0.0 |
| | | | 11/12/2003 | 19.22 | -2.92 | -0.46 | - | - | 0.0 |
| | | | 12/29/2003 | 18.72 | -2.42 | 0.04 | - | - | 0.0 |
| | | | 3/15/2004 | 18.11 | -1.81 | 0.65 | - | - | 0.7 |
| | | | 6/7/2004 | 18.39 | -2.09 | 0.37 | - | - | 0.0 |
| | | | 9/7/2004 | 18.50 | -2.20 | 0.26 | - | - | 0.0 |
| | | | 12/7/2004 | 17.89 | -1.59 | 0.87 | - | - | 0.0 |
| | | | 12/4/2006 | 18.30 | -2.00 | 0.46 | - | - | 0.0 |
| | | | 9/24/2007 | 19.15 | -2.85 | -0.39 | - | - | 0.0 |
| | | | 3/17/2008 | 18.80 | -2.50 | -0.04 | - | - | 0.0 |
| 9 | 15.40 | 17.86 | 9/22/2008 | 18.75 | -3.35 | -0.89 | - | - | 0.0 |
| | | | 3/23/2009 | 17.79 | -2.39 | 0.07 | - | - | 0.3 |
| | | | 10/12/2009 | 17.92 | -2.52 | -0.06 | - | - | 0.0 |
| | | | 3/1/2010 | 15.49 | -0.09 | 2.37 | - | - | 0.0 |
| | | | 9/27/2010 | 17.06 | -1.66 | 0.80 | - | - | 0.0 |
| | | | 3/7/2011 | 16.31 | -0.91 | 1.55 | - | - | 0.0 |
| | | | 9/26/2011 | 16.94 | -1.54 | 0.92 | - | - | 0.0 |
| | | | 3/19/2012 | 17.03 | -1.63 | 0.83 | - | - | 0.0 |
| | | | 9/10/2012 | 16.84 | -1.44 | 1.02 | - | - | 0.0 |
| | | | 3/18/2013 | 17.14 | -1.74 | 0.72 | - | - | 0.0 |
| GP-22 | 15.85 | 18.31 | 9/18/2002 | 18.84 | -2.99 | -0.53 | - | - | - |
| | | | 9/30/2002 | 19.03 | -3.18 | -0.72 | - | - | - |
| | | | 10/7/2002 | 18.95 | -3.10 | -0.64 | - | - | - |
| | | | 6/26/2003 | 18.77 | -2.92 | -0.46 | - | - | 13.0 |
| | | | 10/14/2003 | 19.32 | -3.47 | -1.01 | - | - | 8.4 |
| | | | 11/12/2003 | 19.13 | -3.28 | -0.82 | - | - | 8.7 |
| | | | 12/29/2003 | 18.61 | -2.76 | -0.30 | - | - | 3.6 |
| | | | 3/15/2004 | 17.99 | -2.14 | 0.32 | - | - | 9.6 |
| | | | 6/7/2004 | 18.43 | -2.58 | -0.12 | - | - | 10.2 |
| | | | 9/7/2004 | 18.50 | -2.65 | -0.19 | - | - | 14.7 |
| | | | 12/7/2004 | 17.70 | -1.85 | 0.61 | - | - | 0.0 |
| | | | 12/4/2006 | 18.16 | -2.31 | 0.15 | - | - | 12.3 |
| | | | 9/24/2007 | 18.82 | -2.97 | -0.51 | - | - | 0.0 |
| | | | 3/17/2008 | 18.51 | -2.66 | -0.20 | - | - | 5.8 |
| | | | 9/22/2008 | 19.52 | -3.67 | -1.21 | - | - | 9.8 |
| | | | 3/23/2009 | 18.75 | -2.90 | -0.44 | - | - | 12.4 |
| | | | 10/12/2009 | 18.91 | -3.06 | -0.60 | - | - | 6.6 |
| | | | 3/1/2010 | 16.22 | -0.37 | 2.09 | - | - | 0.9 |
| | | | WD[1] | - | - | - | - | - | - |
| GP-23 | 24.88 | 27.34 | 9/18/2002 | 28.07 | -3.19 | -0.73 | - | - | - |
| | | | 9/30/2002 | 28.32 | -3.44 | -0.98 | - | - | - |
| | | | 10/7/2002 | 28.15 | -3.27 | -0.81 | - | - | - |
| | | | 6/26/2003 | 27.87 | -2.99 | -0.53 | - | - | 1.2 |
| | | | 10/14/2003 | 28.36 | -3.48 | -1.02 | - | - | 17.0 |
| | | | 11/12/2003 | 28.24 | -3.36 | -0.90 | - | - | 13.9 |
| | | | 12/29/2003 | 27.96 | -3.08 | -0.62 | - | - | 15.6 |
| | | | 3/15/2004 | 27.42 | -2.54 | -0.08 | - | - | 28.3 |
| | | | 6/7/2004 | 27.79 | -2.91 | -0.45 | - | - | 10.3 |
| | | | 9/7/2004 | 27.99 | -3.11 | -0.65 | - | - | 2.5 |
| | | | 12/7/2004 | 27.09 | -2.21 | 0.25 | - | - | 0.4 |
| | | | 12/4/2006 | 27.57 | -2.69 | -0.23 | - | - | 24.3 |
| | | | 9/24/2007 | 28.29 | -3.41 | -0.95 | - | - | 0.0 |
| | | | 3/17/2008 | 28.18 | -3.30 | -0.84 | - | - | 17.9 |
| | | | 9/22/2008 | 28.95 | -4.07 | -1.61 | - | - | 15.2 |
| | | | 3/23/2009 | 28.14 | -3.26 | -0.80 | - | - | 25.5 |
| | | | 10/12/2009 | 28.35 | -3.47 | -1.01 | - | - | 20.7 |
| | | | 3/1/2010 | 25.89 | -1.01 | 1.45 | - | - | 15.7 |
| | | | 9/27/2010 | 27.50 | -2.62 | -0.16 | - | - | 0.1 |
| | | | 3/7/2011 | 26.57 | -1.69 | 0.77 | - | - | 0.0 |
| | | | 9/26/2011 | 27.34 | -2.46 | 0.00 | - | - | 0.0 |
| | | | 3/19/2012 | 27.27 | -2.39 | 0.07 | - | - | 0.0 |
| | | | 9/10/2012 | 27.32 | -2.44 | 0.02 | - | - | 0.0 |
| | | | 3/18/2013 | 27.39 | -2.51 | -0.05 | - | - | 0.0 |

**Table 2-2**
Semi-Perched Aquifer Well Gauging Data:  June 2002 - March 2013
Ascon Landfill Site

| Groundwater Monitoring Well Number | Well Head Elevation-- Feet Above Mean Sea Level (ft MSL)[1] | Well Head Elevation-- Feet Above NAVD88 Datum | Date of Gauging Event | Depth to Water (ft below TOC) | Groundwater Elevation (ft above MSL) | Groundwater Elevation (ft above NAVD88) | Depth to Top of Product (ft below TOC) | Product Thickness (ft) | PID Reading (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| GP-24 | 26.32 | 28.78 | 9/18/2002 | 29.90 | -3.58 | -1.12 | - | - | - |
| | | | 9/30/2002 | 30.01 | -3.69 | -1.23 | - | - | - |
| | | | 10/7/2002 | 29.95 | -3.63 | -1.17 | - | - | - |
| 6 | 24.13 | 26.59 | 6/27/2003 | 27.15 | -3.02 | -0.56 | - | - | 8.8 |
| | | | 10/14/2003 | 27.65 | -3.52 | -1.06 | - | - | 8.4 |
| | | | 11/12/2003 | 27.51 | -3.38 | -0.92 | - | - | 0.5 |
| | | | 12/29/2003 | 27.15 | -3.02 | -0.56 | - | - | 5.3 |
| 7 | 27.49 | 29.95 | 3/15/2004 | 29.92 | -2.43 | 0.03 | - | - | 19.3 |
| | | | 6/7/2004 | 30.42 | -2.93 | -0.47 | - | - | 33.2 |
| | | | 9/7/2004 | 30.26 | -2.77 | -0.31 | - | - | 17.4 |
| | | | 12/7/2004 | 29.51 | -2.02 | 0.44 | - | - | 12.3 |
| | | | WD | - | - | - | - | - | - |
| GP-25 | 19.89 | 22.35 | 9/18/2002 | 23.43 | -3.54 | -1.08 | - | - | - |
| | | | 9/30/2002 | 23.55 | -3.66 | -1.20 | - | - | - |
| | | | 10/7/2002 | 23.40 | -3.51 | -1.05 | - | - | - |
| | | | 6/26/2003 | 23.31 | -3.42 | -0.96 | - | - | 0.0 |
| | | | 10/14/2003 | 23.85 | -3.96 | -1.50 | - | - | 0.0 |
| | | | 11/12/2003 | 23.72 | -3.83 | -1.37 | - | - | 0.0 |
| | | | 12/29/2003 | 23.33 | -3.44 | -0.98 | - | - | 0.0 |
| | | | 3/15/2004 | 23.79 | -3.90 | -1.44 | - | - | 0.4 |
| | | | 6/7/2004 | 22.96 | -3.07 | -0.61 | - | - | 0.3 |
| | | | 9/7/2004 | 23.04 | -3.15 | -0.69 | - | - | 0.0 |
| | | | 12/7/2004 | ND | NA | NA | 22 | NA | 325.0 |
| | | | WD | - | - | - | - | - | - |

Explanation:
ft Feet.
TOC Top of Casing.
MSL Mean Sea Level Based on Newport Bay Entrance Tidal Station.
- Not able to detect with interface probe.
P Only water detected with interface probe, however, product  visually observed  on interface probe after withddrawal from monitoring location. Data judged usable for contouring.
NM Not Measured.
NA Not applicable or unable to calculate.
ND Not Detected.  Only product detected by interface probe.
? Questionable measurement
WD Well Destroyed in 2005 During Emergency Action
WD[1] Well Destroyed in July 2010 prior to Interim Removal Measure.

Footnotes:
1 Surveying data based on NAVD88 datum with 2.46 foot conversion to derive MSL.
2 Bottom of product located at 14.95 feet below TOC.
3 4.5 feet of product was observed in well B-2 on September 22, 1988.
4 Monitoring location not monitored due to previous detections of product
5 Well AW-1 was located in April, 2004
6 Well casing re-surveyed on Febuary 3, 2004, after well casing was damaged .
7 Well casing re-surveyed on September 17, 2004, after well casing was repaired.
8 Well casing re-surveyed on March 21, 2008, due to anamolous groundwater elevation measurements collected during years 2006 and 2007.
9 Well casing re-surveyed on March 21, 2008, after casing was repaired.
10 Well casing re-surveyed on September 28, 2011, after well surface completion was modified.

Notes
A Wells AW-6 and AW-7 have been reported as being paved over during expansion of Hamilton Street.
B Table taken from Interim Groundwater Monitoring Report -- March 2013, Geosyntec Consultants, May 10, 2013.

**Table 2-3**
General Mineral Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Sample Date | Calcium (mg/l) | Magnesium (mg/l) | Potassium (mg/l) | Sodium (mg/l) | Chloride (mg/l) | Sulfate (mg/l) | Bicarbonate Alkalinity as CaCO3 (mg/l) | Alkalinity as CaCO3 (mg/l) | Specific Conductance (umhos/cm) | Total Dissolved Solids (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AW-1 | 04/22/04 | 430 | 240 | 56 | 3200 | 5200 | 1100 | 650 | 650 | 19000 | 10000 |
| AW-4A | 04/16/04 | 410 | 790 | 440 | 7400 | 13000 | 1900 | 350 | 350 | 36000 | 26000 |
| AW-5 | 04/19/04 | 420 J+ | 610 J- | 190 J | 5100 J+ | 8800 | 1600 | 500 | 500 | 26000 | 18000 |
| B-4A | 04/19/04 | 21 | 32 | 10 | 5600 | 10000 | 1600 | 490 | 490 | 31000 | 19000 |
| D4DA (B-4A Dup.) | 04/19/04 | 21 | 33 | 11 | 5900 | 11000 | 1600 | 480 | 480 | 31000 | 19000 |
| MW-9 | 04/16/04 | 390 | 770 | 280 | 6300 | 11000 | 1800 | 440 | 440 | 32000 | 23000 |
| MW-16 | 03/16/04 | 590 J- | 200 J+ | 28 | 1400 J | 3200 | 780 | 360 | 360 | 11000 | 6800 |
| MW-17 | 03/16/04 | 860 | 220 | 50 | 1800 | 5100 | 140 | 360 | 360 | 14000 | 8400 |
| MW-18 | 04/12/04 | 300 J- | 230 J- | 56 | 1000 J+ | 1400 | 1100 | 560 | 560 | 7000 | 4600 |
| MW-20 | 04/13/04 | 710 J- | 120 | 17 | 760 J- | 2700 | 46 | 180 | 180 | 8600 | 6600 |
| NMW-2 | 04/16/04 | 960 | 420 | 410 | 4700 | 9200 | 1600 | 540 | 540 | 28000 | 21000 |
| MCL | | -- | -- | -- | -- | 500 | 500 | -- | -- | 1,600 | 1,000 |

mg/l: milligrams per liter
umhos/cm: micro mhos per centimeter
Dup.: Duplicate
MCL: California Secondary Upper Maximum Contaminant Levels for drinking water
: Shade area indicates detected concentration above MCL
Table taken from Groundwater Remedial Investigation Report (Revision 1.0), Geosyntec Consultants, June 14, 2007.

J: estimated value
J+: estimated with a high bias
J-: estimated with a low bias

**Table 2-4**
VOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,2,4-Trimethylbenzene (ug/l) | 1,3,5-Trimethylbenzene (ug/l) | 1,3-Dichlorobenzene (ug/l) | 1,4-Dichlorobenzene (ug/l) | Benzene (ug/l) | Chlorobenzene (ug/l) | Chloromethane (ug/l) | Ethylbenzene (ug/l) | Isopropylbenzene (ug/l) | m,p-Xylenes (ug/l) | Naphthalene (ug/l) | n-Butylbenzene (ug/l) | n-Propylbenzene (ug/l) | o-Xylene (ug/l) | p-Isopropyltoluene (ug/l) | sec-Butylbenzene (ug/l) | Toluene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AW1 | Q1 | | 04/22/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/11/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/15/04 | **3.1** | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | **1.2** | <1 | <1 | <1 | <1 | <1 | <1 | **2.3** | <1 |
| | Q4_2006 | | 12/8/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/26/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/19/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | **1.0** | <1 |
| | Q3_2008 | X | 09/24/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/25/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/15/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/02/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/30/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/08/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/27/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/20/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/11/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/19/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| AW1A | Q1 | | 04/15/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/11/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/15/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/8/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| AW-2 | PNL | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| AW3 | PNL | | 06/15/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1 Dup | | 04/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/10/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | 1.3 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/5/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/26/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | 2.8 | <1 | <1 | <1 | 1 | <1 | <1 | 1.9 |
| | Q1_2008 | X | 03/19/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 Dup | X | 03/19/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/24/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/25/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 Dup | X | 03/25/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/15/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/02/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/27/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/09/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/28/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/21/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/12/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/20/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| AW-4 | PNL | | 06/15/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| AW4A | Q1 | | 04/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/15/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/12/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 Dup | | 12/12/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| AW5 | PNL | | 06/15/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/19/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | **43** | <1 | **35** | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | **30** | <1 | **8.2** | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | **37** | <1 | **9.1** | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | **7.9** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/13/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/27/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/19/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/25/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/26/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/16/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/03/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 Dup | X | 03/03/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/30/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/07/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 Dup | X | 03/07/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/26/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/19/12 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| | Q1_2012 Dup | X | 03/19/12 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| | Q3_2012 | X | 09/11/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/18/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 Dup | X | 03/18/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

## Table 2-4
VOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,2,4-Trimethylbenzene (ug/l) | 1,3,5-Trimethylbenzene (ug/l) | 1,3-Dichlorobenzene (ug/l) | 1,4-Dichlorobenzene (ug/l) | Benzene (ug/l) | Chlorobenzene (ug/l) | Chloromethane (ug/l) | Ethylbenzene (ug/l) | Isopropylbenzene (ug/l) | m,p-Xylenes (ug/l) | Naphthalene (ug/l) | n-Butylbenzene (ug/l) | n-Propylbenzene (ug/l) | o-Xylene (ug/l) | p-Isopropyltoluene (ug/l) | sec-Butylbenzene (ug/l) | Toluene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AW8 | Q3 | | 09/16/04 | <1 | <1 | <1 | 1.2 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/15/04 | <1 | <1 | <1 | 2 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/11/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/26/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/20/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/25/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/25/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/16/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/03/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/27/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/11/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/28/11 | <1 | <1 | <1 | 0.62 J | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/20/12 | <1 | <1 | <1 | < 1.0 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/10/12 | <1 | <1 | 1.6 | 5.3 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/18/13 | <1 | <1 | <1 | 0.91 J | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| B4 | PNL | | 06/14/02 | 15 | 2.9 | <2 | <2 | 61 | <2 | <5 | 16 | 6.8 | 7 | 20 | <5 | 6.7 | <2 | <2 | <5 | 3.1 |
| B4A | Q1 | | 04/19/04 | 12 | 3.2 | <1 | <1 | 10 | <1 | <1 | 7 | 2.3 | 5.3 | 7.5 | <1 | 2.6 | 1.4 | <1 | <1 | 1.6 |
| | Q1 Dup | | 04/19/04 | 18 | 5.1 | <1 | <1 | 16 | <1 | <1 | 11 | 3.6 | 7.8 | 12 | <1 | 4 | 1.6 | 1.3 | <1 | 2.4 |
| | Q2 | | 06/17/04 | 10 | 2.5 | <1 | <1 | 31 | <1 | <1 | 3.2 | 3.2 | 1.4 | 11 | <1 | 3.2 | 1.8 | <1 | <1 | <1 |
| | Q2 Dup | | 06/17/04 | 8.9 | 1.9 | <1 | <1 | 24 | <1 | 2 | 2.4 | 2.6 | <1 | 7.9 | <1 | 2.6 | 1.4 | <1 | <1 | <1 |
| | Q3 | | 09/15/04 | 12 | 1.4 | <1 | <1 | 46 | <1 | <1 | 11 | 4.1 | 6.2 | 12 | <1 | 3.7 | 16 | <1 | <1 | 3.9 |
| | Q4 | | 12/20/04 | 1.3 | <1 | <1 | <1 | 2.5 | <1 | <1 | <1 | 1.5 | <1 | <1 | <1 | 1.6 | <1 | <1 | <1 | <1 |
| | Q4 Dup | | 12/20/04 | <1 | <1 | <1 | <1 | 1.8 | <1 | <1 | <1 | 1.2 | <1 | <1 | <1 | 1.2 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/13/2006 | 34 | 7 | <1 | <1 | 70 | <1 | <1 | 41 | 8.8 | 32 | 30 | 1.8 | 8 | 30 | 1.7 | 1.6 | 28 |
| | Q3_2007 | X | 09/28/07 | 17 | 3.2 | <1 | <1 | 45 | <1 | <1 | 24 | 4.7 | 24 | 16 | <1 | 3.8 | 25 | <1 | <1 | 18 |
| | Q3_2008 | X | 09/26/08 | 17 | 3.6 | <1 | <1 | 47 | <1 | <1 | 25 | 5 | 28 | 16 | <1 | 4.2 | 30 | <1 | <1 | 18 |
| | Q3_2008 Dup | X | 09/26/08 | 17 | 3.4 | <1 | <1 | 54 | <1 | <1 | 26 | 5.2 | 30 | 16 | <1 | 4.4 | 32 | <1 | <1 | 20 |
| | Q3_2009 | X | 10/19/09 | 9.9 | 1.9 | <1 | <1 | 26 | <1 | <1 | 15 | 2.6 | 17 | 7.2 | <1 | 2.2 | 18 | 0.48 J | 0.44 J | 10 |
| | Q3_2009 Dup | X | 10/19/09 | 9.9 | 1.9 | <1 | <1 | 26 | <1 | <1 | 14 | 2.5 | 16 | 7.2 | <1 | 2.1 | 18 | 0.5 J | 0.43 J | 9.9 |
| | Q3_2010 | X | 09/28/10 | 0.52 J | <1 | <1 | <1 | 17 | <1 | <1 | 2.6 | 1.9 | 0.99 J | 1.9 | <1 | 1.4 | <1 | <1 | 0.37 J | 0.51 J |
| | Q3_2010 Dup | X | 09/28/10 | 0.71 J | <1 | <1 | <1 | 16 | <1 | <1 | 2.4 | 1.9 | 1.2 | 2.1 | <1 | 1.4 | <1 | <1 | 0.36 J | 0.45 J |
| | Q3_2011 | X | 09/29/11 | <1 | <1 | <1 | <1 | 7.2 | <1 | <1 | <1 | 0.86 J | <1 | <1 | <1 | 0.71 J | <1 | <1 | <1 | <1 |
| | Q3_2011 Dup | X | 09/29/11 | <1 | <1 | <1 | <1 | 8.8 | <1 | <1 | <1 | 0.96 J | <1 | <1 | <1 | 0.82 J | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/13/12 | 5.2 | 1.2 | <1 | <1 | 41 | <1 | <1 | 14 | 2.9 | 9.7 | 5.2 | 0.47 J | 2.5 | 9.6 | <1 | 0.56 J | 8.7 |
| | Q3_2012 Dup | X | 09/13/12 | 7.4 | 1.5 | <1 | <1 | 50 | <1 | <1 | 17 | 3.8 | 12 | 7.2 | 0.62 J | 3.3 | 12 | <1 | 0.70 J | 11 |
| B7 | PNL | | 06/15/02 | <8 | <8 | <8 | <8 | <4 | <8 | <20 | 10 | 300 | <8 | <20 | <20 | <8 | <8 | <8 | 24 | <8 |
| | Q1 | | 04/19/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | 1.7 | 92 | <1 | 1.3 | <1 | 1.9 | <1 | <1 | 6 | <1 |
| | Q2 | | 06/12/04 | <2 | <2 | <2 | <2 | <1 | <2 | <2 | 3.9 | 200 | <2 | <2 | <2 | 4.9 | <2 | <2 | 13 | <2 |
| | Q3 | | 09/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | 2.7 | 230 | <1 | 5.9 | <1 | 6 | <1 | <1 | 16 | <1 |
| | Q3 Dup | | 09/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | 2.9 | 200 | <1 | 8.8 | <1 | 5.6 | <1 | <1 | 15 | <1 |
| | Q4 | | 12/20/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | 3.4 | 200 | <1 | 15 | <1 | 7.3 | <1 | <1 | 19 | <1 |
| | Q4_2006 | | 12/13/2006 | <2 | <2 | <2 | <2 | <1 | <2 | <2 | 5.5 | 260 | <2 | 30 | <2 | 7.2 | <2 | <2 | 16 | <2 |
| | Q3_2007 | X | 09/27/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | 3.5 | 260 | <1 | 23 | <1 | 7.7 | <1 | <1 | 17 | <1 |
| | Q3_2007 Dup | X | 09/27/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | 230 | <1 | 20 | <1 | 7.2 | <1 | <1 | 15 | <1 |
| | Q3_2008 | X | 09/26/08 | <4 | <4 | <4 | <4 | <2 | <4 | <4 | <4 | 210 | <4 | 19 | <4 | 6.6 | <4 | <4 | 12 | <4 |
| | Q3_2009 | X | 10/19/09 | <4 | <4 | <4 | <4 | <2 | <4 | <4 | 4 | 180 | <4 | 29 | <4 | 7.3 | <4 | <4 | 11 | <4 |
| | Q3_2010 | X | 09/28/10 | <5 | <5 | <5 | <5 | 4.8 | <5 | <5 | 9.3 | 360 | <5 | 58 | <5 | 15 | <5 | <5 | 24 | <5 |
| | Q3_2011 | X | 09/29/11 | <5 | <5 | <5 | <5 | 21 | <5 | <5 | 380 | 580 | <5 | 69 | <5 | 19 | <5 | <5 | 30 | <5 |
| | Q1_2012 | X | 03/22/12 | < 10 | < 10 | < 10 | < 10 | < 5.0 | < 10 | < 10 | 6.8 J | 450 | < 10 | 34 | < 10 | 15 | < 10 | < 10 | 24 | < 10 |
| | Q3_2012 | X | 09/13/12 | <5 | <5 | <5 | <5 | <2.5 | <5 | <5 | 8.4 | 540 | <5 | 49 | <5 | 20 | <5 | <5 | 25 | <5 |
| | Q1_2013 | X | 03/21/13 | < 10 | < 10 | < 10 | < 10 | < 5.0 | < 10 | < 10 | 5.1 J | 380 | < 10 | 14 | < 10 | 11 | < 10 | < 10 | 16 | < 10 |
| GP01 | Q1 | | 04/20/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| GP12 | Q1 | | 04/21/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | 1.7 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/17/04 | <10 | <10 | <10 | <10 | <5 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| | Q4 | | 12/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/12/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| GP23 | Q1 | | 04/22/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/12/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/12/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| GP24 | Q1 | | 04/20/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | <1 |
| | Q2 | | 06/17/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/17/04 | <10 | <10 | <10 | <10 | <5 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| | Q4 | | 12/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

**Table 2-4**
VOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,2,4-Trimethylbenzene (ug/l) | 1,3,5-Trimethylbenzene (ug/l) | 1,3-Dichlorobenzene (ug/l) | 1,4-Dichlorobenzene (ug/l) | Benzene (ug/l) | Chlorobenzene (ug/l) | Chloromethane (ug/l) | Ethylbenzene (ug/l) | Isopropylbenzene (ug/l) | m,p-Xylenes (ug/l) | Naphthalene (ug/l) | n-Butylbenzene (ug/l) | n-Propylbenzene (ug/l) | o-Xylene (ug/l) | p-Isopropyltoluene (ug/l) | sec-Butylbenzene (ug/l) | Toluene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW04 | PNL | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | PNL Dup | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/13/04 | **1.7** | <1 | <1 | <1 | **0.53** | <1 | <1 | <1 | <1 | **3.4** | **1** | <1 | <1 | **1.2** | <1 | <1 | **2.3** |
| | Q4 | | 12/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW09 | PNL | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/15/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/11/04 | <1 | <1 | <1 | <1 | **0.53** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/14/04 | <1 | <1 | <1 | <1 | **3.2** | **2** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/8/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW13 | PNL | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/10/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/13/04 | **2** | <1 | <1 | <1 | **0.51** | <1 | <1 | <1 | <1 | **3.8** | <1 | <1 | <1 | **1.4** | <1 | <1 | **2.3** |
| | Q4 | | 12/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 Dup | | 12/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/7/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW15 | PNL | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | PNL Dup | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/15/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/10/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/7/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW16 | PNL | | 08/09/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 03/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/08/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/08/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/6/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/25/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/17/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/23/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/24/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/13/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/01/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/28/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/08/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/28/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/19/12 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| | Q3_2012 | X | 09/10/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/19/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW17 | PNL | | 08/09/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 03/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/08/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 Dup | | 06/08/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/08/04 | <1 J- | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/11/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/07/06 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW18 | PNL | | 08/09/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/12/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/6/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 Dup | | 12/6/2006 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/27/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/18/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/23/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/24/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/15/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/02/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/29/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/08/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/27/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/20/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/11/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/19/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

**Table 2-4**

VOC Concentrations in Groundwater

Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,2,4-Trimethylbenzene (ug/l) | 1,3,5-Trimethylbenzene (ug/l) | 1,3-Dichlorobenzene (ug/l) | 1,4-Dichlorobenzene (ug/l) | Benzene (ug/l) | Chlorobenzene (ug/l) | Chloromethane (ug/l) | Ethylbenzene (ug/l) | Isopropylbenzene (ug/l) | m,p-Xylenes (ug/l) | Naphthalene (ug/l) | n-Butylbenzene (ug/l) | n-Propylbenzene (ug/l) | o-Xylene (ug/l) | p-Isopropyltoluene (ug/l) | sec-Butylbenzene (ug/l) | Toluene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW19 | Q1 | | 04/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | **2.5** | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 Dup | | 09/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/05/06 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2007 | X | 09/25/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/18/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/23/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/24/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/13/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/02/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/29/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/08/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/28/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/20/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/11/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/19/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW20 | Q1 | | 04/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/09/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/13/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW-21 | Q3_2007 | X | 10/01/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/20/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/25/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/26/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/19/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/03/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/29/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/09/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/28/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/21/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/12/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/20/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW-22 | Q3_2007 | X | 10/01/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/18/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/24/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/25/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/15/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/02/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/29/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/08/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/28/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/21/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/12/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/20/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| MW-23 | Q3_2007 | X | 10/01/07 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2008 | X | 03/19/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2008 | X | 09/24/08 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2009 | X | 03/26/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2009 | X | 10/16/09 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2010 | X | 03/03/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2010 | X | 09/27/10 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2011 | X | 03/07/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2011 | X | 09/27/11 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2012 | X | 03/21/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3_2012 | X | 09/12/12 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q1_2013 | X | 03/20/13 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| NMW1 | PNL | | 06/14/02 | <2 | <2 | **2.2** | **5.6** | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <1 | <2 | <2 | <2 | <5 | <2 |
| | Q3 | | 09/15/04 | <1 | <1 | <1 | **1.3** | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/15/04 | <1 | <1 | <1 | **1.1** | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| NMW2 | PNL | | 06/14/02 | <2 | <2 | <2 | <2 | <1 | <2 | <5 | <2 | <2 | <2 | <5 | <5 | <2 | <2 | <2 | <5 | <2 |
| | Q1 | | 04/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q2 | | 06/12/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q3 | | 09/14/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4 | | 12/16/04 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| | Q4_2006 | | 12/11/06 | <1 | <1 | <1 | <1 | <0.5 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| **MCL** | | | | -- | -- | -- | 5 | 1 | 70 | -- | 300 | -- | 1750 | -- | -- | -- | 1750 | -- | -- | 150 |

ug/l: micrograms per liter

J-: estimated low bias

Dup: Duplicate

Only detected analytes shown. Detections shown in bold.

MCL: California Maximum Contaminant Level. MCL for xylene is sum of isomers.

: Shaded area indicates concentration detected above MCL.

Table taken from Interim Groundwater Monitoring Report -- March 2013, Geosyntec Consultants, May 10, 2013.

**Table 2-5**
SVOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,3-Dichlorobenzene (µg/l) | 1,4-Dichlorobenzene (µg/l) | 2,4-Dimethylphenol (ug/l) | 2-Methylphenol (ug/l) | Benzoic Acid (ug/l) | Bis (2-ethylhexyl) phthalate (ug/l) | Naphthalene (ug/l) | Nitrobenzene (ug/l) | Phenol (ug/l) | Acenaphthylene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AW1 | Q1 | | 04/22/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/11/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/8/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2007 | X | 09/26/07 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.94 | < 0.96 | <0.94 | <0.48 |
| | Q1_2008 | X | 03/19/08 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.96 | < 0.94 | <0.96 | <0.47 |
| | Q3_2008 | X | 09/24/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2009 | X | 03/25/09 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q3_2009 | X | 10/15/09 | < 2.4 | < 2.4 | <9.7 | <9.7 | <97 | < 24 | <4.9 | < 4.9 | <4.9 | <2.4 |
| | Q1_2010 | X | 03/02/10 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2010 | X | 09/30/10 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 U | < 1.0 | <1.0 | <0.50 |
| | Q1_2011 | X | 3/8/2011 | < 0.94 | < 0.94 | <3.8 | <3.8 | <38 | < 9.4 | <1.9 | < 1.9 | <1.9 | <0.94 |
| | Q3_2011 | X | 9/27/2011 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <0.99 | < 0.99 | <0.99 | <0.50 |
| | Q1_2012 | X | 3/20/2012 | < 0.48 | < 0.48 | < 1.9 | < 1.9 | < 19 | < 4.8 | < 0.97 | < 0.97 | < 0.97 | < 0.48 |
| | Q3_2012 | X | 10/11/2012 | < 0.48 | < 0.48 | <1.9 | <1.9 | <4.8 | < 4.8 | <0.97 | < 0.97 | <0.97 | <0.48 |
| | Q1_2013 | X | 3/19/2013 | <0.52 | <0.52 | <2.1 | <2.1 | <5.2 | <5.2 | <1.0 | <1.0 | <1.0 | <0.52 |
| AW1A | Q1 | | 04/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/11/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/8/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| AW-2 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| AW3 | PNL | | 06/15/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q1 Dup | | 04/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/10/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/13/04 | < 10 J | < 10 J | <20 J- | <10 J- | <20 J- | < 50 | <10 | < 20 J | <10 | <10 |
| | Q4 | | 12/14/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006[1] | | 12/5/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2007 | X | 09/26/07 | < 2.4 | < 2.4 | <9.5 | <9.5 | <95 | < 24 | <4.7 | < 4.7 | <4.7 | <2.4 |
| | Q1_2008 | X | 03/19/08 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q1_2008 Dup | X | 03/19/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2008 | X | 09/24/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2009 | X | 03/25/09 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2009 Dup | X | 03/25/09 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2009 | X | 10/15/2009 | < 2.5 | < 2.5 | <9.8 | <9.8 | <98 | < 25 | <4.9 | < 4.9 | <4.9 | <2.5 |
| | Q1_2010 | X | 3/2/2010 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.95 | < 0.95 | <0.95 | <0.47 |
| | Q3_2010 | X | 9/27/2010 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2011 | X | 3/9/2011 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q3_2011 | X | 09/28/11 | < 0.49 | < 0.49 | <1.9 | <1.9 | <19 | < 4.9 | <0.97 | < 0.97 | <0.97 | **0.14 J** |
| | Q1_2012 | X | 03/21/12 | < 0.50 | < 0.50 | < 2.0 | < 2.0 | < 20 | < 5.0 | < 1.0 | < 1.0 | < 1.0 | **0.52** |
| | Q3_2012 | X | 09/12/12 | < 0.50 | < 0.50 | <2.0 | <2.0 | <5.0 | < 5.0 | <1.0 | < 1.0 | <1.0 | **0.51** |
| | Q1_2013 | X | 03/20/13 | <0.99 | <0.99 | <3.9 | <3.9 | <9.9 | **32** | <2.0 | <2.0 | <2.0 | <0.99 |
| AW4 | PNL | | 06/15/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| AW4A | Q1 | | 04/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/15/04 | < 10 | < 10 | <20 J- | <10 J- | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/12/06 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q4_2006 Dup | | 12/12/06 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |

**Table 2-5**
SVOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,3-Dichlorobenzene (µg/l) | 1,4-Dichlorobenzene (µg/l) | 2,4-Dimethylphenol (ug/l) | 2-Methylphenol (ug/l) | Benzoic Acid (ug/l) | Bis (2-ethylhexyl) phthalate (ug/l) | Naphthalene (ug/l) | Nitrobenzene (ug/l) | Phenol (ug/l) | Acenaphthylene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AW5 | PNL | | 06/15/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/19/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/16/04 | < 10 | < 10 | <20 R | <10 R | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/13/06 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2007 | X | 09/27/07 | < 0.49 | < 0.49 | <1.9 | <1.9 | <19 | < 4.9 | <0.97 | < 0.97 | <0.97 | <0.49 |
| | Q1_2008 | X | 03/18/08 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2008 | X | 09/25/08 | < 0.49 | < 0.49 | <1.9 | <1.9 | <19 | < 4.9 | <0.97 | < 0.97 | <0.97 | <0.49 |
| | Q1_2009 | X | 03/26/09 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q3_2009 | X | 10/16/09 | < 0.49 | < 0.49 | <2.0 | <2.0 | <20 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q1_2010 [4] | X | 03/03/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2010 Dup | X | 03/03/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2010 | X | 09/30/10 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q1_2011 | X | 03/07/11 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2011 Dup | X | 03/07/11 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2011 | X | 9/26/2011 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q1_2012 | X | 3/19/2012 | < 0.50 | < 0.50 | < 2.0 | < 2.0 | < 20 | < 5.0 | < 1.0 | < 1.0 | < 1.0 | < 0.50 |
| | Q1_2012 Dup | X | 3/19/2012 | < 0.51 | < 0.51 | < 2.0 | < 2.0 | < 20 | < 5.1 | < 1.0 | < 1.0 | < 1.0 | < 0.51 |
| | Q3_2012 | X | 10/11/2012 | < 0.48 | < 0.48 | <1.9 | <1.9 | <4.8 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2013 | X | 3/18/2013 | <0.47 | <0.47 | <1.9 | <1.9 | <4.7 | <4.7 | <0.94 | <0.94 | <0.94 | <0.47 |
| | Q1_2013 Dup | X | 3/18/2013 | <0.47 | <0.47 | <1.9 | <1.9 | <4.7 | <4.7 | <0.93 | <0.93 | <0.93 | <0.47 |
| AW8 | Q3 | | 09/16/04 | < 10 | < 10 | <20 J- | <10 J- | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/13/06 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2007 | X | 09/26/07 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2008 | X | 03/20/08 | < 0.49 | < 0.49 | <2.0 | <2.0 | <20 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q3_2008 | X | 09/25/08 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.5 |
| | Q1_2009 | X | 03/25/09 | < 0.52 | < 0.52 | <2.1 | <2.1 | <21 | < 5.2 | <1.0 | < 1.0 | <1.0 | <0.52 |
| | Q3_2009 | X | 10/16/09 | < 1.2 | < 1.2 | <5.0 | <5.0 | <50 | < 12 | <2.5 | < 2.5 | <2.5 | <1.2 |
| | Q1_2010 [4] | X | 03/03/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2010 | X | 09/27/10 | < 0.47 | < 0.47 | <1.9 | <1.9 | **2.9 J** | < 4.7 | <0.95 | < 0.94 | <0.95 | <0.48 |
| | Q1_2011 | X | 03/11/11 | < 0.50 | **0.22 J** | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q3_2011 | X | 09/28/11 | **0.30 J** | **1.8** | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q1_2012 | X | 03/20/12 | < 4.8 | < 4.8 | < 19 | < 19 | < 190 | < 48 | < 9.7 | < 9.7 | < 9.7 | < 4.8 |
| | Q3_2012 | X | 9/10/2012 | **3.40** | **7.80** | <4.8 | <4.8 | <12 | < 12 | <2.4 | < 2.4 | <2.4 | <1.2 |
| | Q1_2013 | X | 3/18/2013 | <0.93 | <0.93 | <3.7 | <3.7 | <9.3 | **34** | <1.9 | <1.9 | <1.9 | <0.93 |
| B4 | PNL | | 06/14/02 | -- | -- | **230** | <50 | <100 | -- | <50 | -- | <10 | -- |
| B4A | Q1 | | 04/19/04 | < 10 | < 10 | **140** | **36** | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q1 Dup | | 04/19/04 | < 10 | < 10 | **97** | **29** | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/17/04 | < 25 | < 25 | **110** | **37** | <50 | < 120 | <25 | < 50 | <25 | <25 |
| | Q2 Dup | | 06/17/04 | < 40 | < 40 | **130** | <40 | <80 | < 200 | <40 | < 80 | <25 | <40 |
| | Q3 | | 09/15/04 | < 10 | < 10 | **192** | **652** | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/20/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 Dup | | 12/20/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/13/06 | < 47 | < 47 | **1500** | **2100** | <1900 | < 470 | <94 | < 94 | <94 | <47 |
| | Q3_2007 | X | 09/28/07 | < 49 | < 49 | **1000** | **1400** | <2000 | < 490 | <98 | < 98 | <98 | <49 |
| | Q3_2008 | X | 09/26/08 | < 39 | < 39 | **730** | **1200** | <1600 | < 390 | <78 | < 78 | <78 | <39 |
| | Q3_2008 Dup | X | 09/26/08 | < 24 | < 24 | **580** | **950** | <950 | < 240 | <48 | < 48 | <48 | <24 |
| | Q3_2009 | X | 10/19/09 | < 19 | < 19 | **590** | **770** | <770 | < 190 | **3.8 J** | < 38 | <38 | <19 |
| | Q3_2009 Dup | X | 10/19/09 | < 20 | < 20 | **640** | **830** | <800 | < 200 | **4.0 J** | < 40 | <40 | <20 |
| | Q3_2010 | X | 09/28/10 | < 4.8 | < 4.8 | **4.6 J** | **5.8 J** | <190 | < 48 | <9.6 | < 9.6 | <9.6 | <4.8 |
| | Q3_2010 Dup | X | 09/28/10 | < 4.9 | < 4.9 | **4.1 J** | **5.6 J** | <190 | < 49 | <9.7 | < 9.7 | <9.7 | <4.9 |
| | Q3_2011 | X | 09/29/11 | < 0.96 | < 0.96 | **4.8** | **4.7** | <38 | < 9.6 | <1.9 | < 1.9 | <1.9 | <0.96 |
| | Q3_2011 Dup | X | 09/29/11 | < 0.48 | < 0.48 | **5.0** | **4.8** | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q3_2012 | X | 09/13/12 | < 54.0 | < 54.0 | **320** | **780** | <540 | < 540 | <110 | < 110 | <110 | <54 |
| | Q3_2012 Dup | X | 09/13/12 | < 48.0 | < 48.0 | **250** | **570** | <480 | < 480 | <96 | < 96 | <96 | <48 |

**Table 2-5**
SVOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,3-Dichlorobenzene (µg/l) | 1,4-Dichlorobenzene (µg/l) | 2,4-Dimethylphenol (ug/l) | 2-Methylphenol (ug/l) | Benzoic Acid (ug/l) | Bis (2-ethylhexyl) phthalate (ug/l) | Naphthalene (ug/l) | Nitrobenzene (ug/l) | Phenol (ug/l) | Acenaphthylene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B7 | PNL | | 06/15/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/19/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/12/04 | < 10 | < 10 | <20 | <10 | **20** | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 Dup | | 09/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/20/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/13/06 | < 4.8 | < 4.8 | <19 | <19 | <190 | < 48 | **20** | < 9.5 | <9.5 | <4.8 |
| | Q3_2007 | X | 09/27/07 | < 0.94 | < 0.94 | <3.8 | <3.8 | <38 | < 9.4 | **13** | < 1.9 | <1.9 | <0.94 |
| | Q3_2007 Dup | X | 09/27/07 | < 0.96 | < 0.96 | <3.8 | <3.8 | <38 | < 9.6 | **14** | < 1.9 | <1.9 | <0.96 |
| | Q3_2008 | X | 09/26/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | **15** | < 0.95 | <0.95 | <0.48 |
| | Q3_2009 | X | 10/19/09 | < 5.0 | < 5.0 | <20 | <20 | <200 | < 50 | **17** | < 9.9 | <9.9 | <5 |
| | Q3_2010 | X | 09/28/10 | < 2.4 | < 2.4 | <9.4 | <9.4 | <94 | < 24 | **35** | < 4.7 | <4.7 | <2.4 |
| | Q3_2011 | X | 09/29/11 | < 4.8 | < 4.8 | <19 | <19 | <190 | < 48 | **48** | < 9.6 | <9.6 | <4.8 |
| | Q1_2012 | X | 03/22/12 | < 1.0 | < 1.0 | < 4.0 | < 4.0 | < 40 | < 10 | **35** | < 2.0 | < 2.0 | < 1.0 |
| | Q3_2012 | X | 09/13/12 | < 4.80 | < 4.80 | <19 | <19 | <48 | < 48 | **27** | < 9.6 | <9.6 | <4.8 |
| | Q1_2013 | X | 03/21/13 | <5.0 | <5.0 | <20 | <20 | <50 | <50 | **9.7 J** | <10 | <10 | <5.0 |
| GP01 | Q1 | | 04/20/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/17/04 | < 10 | < 10 | <20 J- | <10 J- | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| GP12 | Q1 | | 04/21/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/12/06 | < 4.7 | < 4.7 | <19 | <19 | <190 | < 47 | <9.5 | < 9.5 | <9.5 | <4.7 |
| GP23 | Q1 | | 04/22/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/12/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/12/06 | < 4.8 | < 4.8 | <19 | <19 | <190 | < 48 | <9.5 | < 9.5 | <9.5 | <4.8 |
| GP24 | Q1 | | 04/20/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/17/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| MW04 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | PNL Dup | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/09/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/13/04 | < 10 | < 10 | <20 J- | <10 J- | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/13/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| MW09 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/11/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/14/04 | < 10 | < 10 | <20 J- | <10 J- | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/14/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/8/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <.94 | < 0.94 | <0.94 | <0.47 |
| MW13 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/10/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/13/04 | < 10 J | < 10 J | <20 J- | <10 J- | <20 J- | < 50 | <10 | < 20 J | <10 | <10 |
| | Q4 | | 12/14/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 Dup | | 12/14/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <0.94 | <10 |
| | Q4_2006[2] | | 12/7/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <10 | <0.47 |

**Table 2-5**
SVOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,3-Dichlorobenzene (µg/l) | 1,4-Dichlorobenzene (µg/l) | 2,4-Dimethylphenol (ug/l) | 2-Methylphenol (ug/l) | Benzoic Acid (ug/l) | Bis (2-ethylhexyl) phthalate (ug/l) | Naphthalene (ug/l) | Nitrobenzene (ug/l) | Phenol (ug/l) | Acenaphthylene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW15 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | PNL Dup | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/10/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/14/04 | < 10 J | < 10 J | <20 J- | <10 J- | <20 J- | < 50 J | <10 | < 20 J | <10 | <10 |
| | Q4 | | 12/14/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006[2] | | 12/7/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| MW16 | PNL | | 08/09/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 03/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/08/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/08/04 | < 10 J | < 10 J | <20 J- | <10 J- | <20 J- | < 50 | <10 | < 20 J | <10 | <10 |
| | Q4 | | 12/11/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006[1] | | 12/6/2006 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.47 |
| | Q3_2007 | X | 9/25/2007 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.95 | < 0.95 | <0.95 | <0.47 |
| | Q1_2008 | X | 3/17/2008 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <0.99 | < 0.99 | <0.99 | <0.5 |
| | Q3_2008 | X | 9/23/2008 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2009 | X | 3/24/2009 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.5 |
| | Q3_2009 | X | 10/13/2009 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <0.99 | < 0.99 | <0.99 | <0.5 |
| | Q1_2010[4] | X | 3/1/2010 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.95 | < 0.95 | <0.95 | <0.47 |
| | Q3_2010 | X | 9/28/2010 | < 0.49 | < 0.49 | <2.0 | <2.0 | <20 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q1_2011 | X | 3/8/2011 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | 1.6 J | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2011 | X | 9/26/2011 | < 0.56 | < 0.56 | <2.2 | <2.2 | <22 | < 5.6 | <1.1 | < 1.1 | <1.1 | <0.56 |
| | Q1_2012 | X | 3/19/2012 | < 0.50 | < 0.50 | < 2.0 | < 2.0 | < 20 | < 5.0 | < 1.0 | < 1.0 | < 1.0 | < 0.50 |
| | Q3_2012 | X | 9/10/2012 | < 0.49 | < 0.49 | <2.0 | <2.0 | <4.9 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q1_2013 | X | 3/19/2013 | <0.49 | <0.49 | <2.0 | <2.0 | <4.9 | <4.9 | <0.99 | <0.99 | <0.99 | <0.49 |
| MW17 | PNL | | 08/09/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 03/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/08/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 Dup | | 06/08/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/08/04 | < 10 J | < 10 J | <20 J- | <10J- | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/11/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006[1] | | 12/7/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| MW18 | PNL | | 08/09/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/12/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/09/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/09/04 | < 10 J | < 10 J | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/13/04 | < 10 | < 10 | <20 J- | <10 J- | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006[1] | | 12/6/2006 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q4_2006 Dup[1] | | 12/6/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.95 | < 0.95 | <0.95 | <0.47 |
| | Q3_2007 | X | 9/27/2007 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.95 | < 0.95 | <0.95 | <0.47 |
| | Q1_2008 | X | 3/18/2008 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2008 | X | 9/23/2008 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2009 | X | 3/24/2009 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <0.99 | < 0.99 | <0.99 | <0.5 |
| | Q3_2009 | X | 10/15/2009 | < 0.49 | < 0.49 | <2.0 | <2.0 | <20 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q1_2010[4,6] | X | 3/2/2010 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | **1.4** |
| | Q3_2010 | X | 9/29/2010 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | 1.6 J | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q1_2011 | X | 3/8/2011 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2011 | X | 9/27/2011 | < 0.51 | < 0.51 | <2.0 | <2.0 | <20 | < 5.1 | <1.0 | < 1.0 | <1.0 | <0.51 |
| | Q1_2012 | X | 3/20/2012 | < 0.48 | < 0.48 | < 1.9 | < 1.9 | < 19 | < 4.8 | < 0.97 | < 0.97 | < 0.97 | < 0.48 |
| | Q3_2012 | X | 10/11/2012 | < 0.54 | < 0.54 | <2.2 | <2.2 | <5.4 | < 5.4 | <1.1 | < 1.1 | <1.1 | <0.54 |
| | Q1_2013 | X | 3/19/2013 | <0.48 | <0.48 | <1.9 | <1.9 | <4.8 | <4.8 | <0.96 | <0.96 | <0.96 | <0.48 |

**Table 2-5**
SVOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,3-Dichlorobenzene (µg/l) | 1,4-Dichlorobenzene (µg/l) | 2,4-Dimethylphenol (ug/l) | 2-Methylphenol (ug/l) | Benzoic Acid (ug/l) | Bis (2-ethylhexyl) phthalate (ug/l) | Naphthalene (ug/l) | Nitrobenzene (ug/l) | Phenol (ug/l) | Acenaphthylene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW19 | Q1 | | 04/13/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/09/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/09/04 | < 10 J | < 10 J | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 Dup | | 09/09/04 | < 10 J | < 10 J | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/13/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006[1] | | 12/5/2006 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2007 | X | 9/25/2007 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q1_2008 | X | 3/18/2008 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2008 | X | 9/23/2008 | < 0.49 | < 0.49 | <2.0 | <2.0 | <20 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q1_2009 | X | 3/24/2009 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <0.99 | < 0.99 | <0.99 | <0.5 |
| | Q3_2009 | X | 10/13/2009 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2010 [4,5] | X | 3/2/2010 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | **1.5** |
| | Q3_2010 | X | 9/29/2010 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | 2.1 J | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q1_2011 | X | 3/8/2011 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q3_2011 | X | 9/27/2011 | < 0.49 | < 0.49 | <1.9 | <1.9 | <19 | < 4.9 | <0.97 | < 0.97 | <0.97 | <0.49 |
| | Q1_2012 | X | 3/20/2012 | < 0.48 | < 0.48 | < 1.9 | < 1.9 | < 19 | < 4.8 | < 0.97 | < 0.97 | < 0.97 | < 0.48 |
| | Q3_2012 | X | 10/11/2012 | < 0.48 | < 0.48 | <1.9 | <1.9 | <4.8 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2013 | X | 3/19/2013 | <0.51 | <0.51 | <2.0 | <2.0 | <5.1 | <5.1 | <1.0 | <1.0 | <1.0 | <0.51 |
| MW20 | Q1 | | 04/13/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/09/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/13/04 | < 10 | < 10 | <20 | <10 | <20 J- | < 50 | <10 | < 20 | <10 | <10 |
| MW-21 | Q3_2007 | X | 10/01/07 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | **1.1** | <0.47 |
| | Q1_2008 | X | 03/20/08 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2008 | X | 09/25/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2009 | X | 03/26/09 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.5 |
| | Q3_2009[3] | X | 10/19/09 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | 1.9 J | <0.99 | < 0.99 | <0.99 | <0.5 |
| | Q1_2010 | X | 03/03/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q3_2010 | X | 09/29/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2011 | X | 03/09/11 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2011 | X | 9/27/2011 | < 0.49 | < 0.49 | <1.9 | <1.9 | <19 | < 4.9 | <0.97 | < 0.97 | <0.97 | <0.49 |
| | Q1_2012 | X | 3/21/2012 | < 0.49 | < 0.49 | < 1.9 | < 1.9 | < 19 | < 4.9 | < 0.97 | < 0.97 | < 0.97 | < 0.49 |
| | Q3_2012 | X | 9/12/2012 | < 0.48 | < 0.48 | <1.9 | <1.9 | <4.8 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2013 | X | 3/20/2013 | <0.48 | <0.48 | <1.9 | <1.9 | <4.8 | <4.8 | <0.95 | <0.95 | <0.95 | <0.48 |
| MW-22 | Q3_2007 | X | 10/01/07 | < 0.96 | < 0.96 | <1.9 | <1.9 | <19 | < 9.6 | <1.9 | < 1.9 | **4.3** | <0.96 |
| | Q1_2008 | X | 03/18/08 | < 0.95 | < 0.95 | <3.8 | <3.8 | <38 | < 9.5 | <1.9 | < 1.9 | <1.9 | <0.95 |
| | Q3_2008 | X | 09/24/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2009 | X | 03/25/09 | < 0.99 | < 0.99 | <4.0 | <4.0 | <40 | < 9.9 | <2.0 | < 2.0 | <2.0 | <0.99 |
| | Q3_2009 | X | 10/15/09 | < 2.5 | < 2.5 | <10 | <10 | <100 | < 25 | <5.1 | < 5.1 | <5.1 | <0.25 |
| | Q1_2010 [4] | X | 03/02/10 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | **1.1** |
| | Q3_2010 | X | 09/29/10 | < 0.96 | < 0.96 | <3.8 | <3.8 | <38 | < 9.6 | <1.9 | < 1.9 | <1.9 | **0.54 J** |
| | Q1_2011 | X | 3/8/2011 | < 0.95 | < 0.95 | <3.8 | <3.8 | <38 | < 9.5 | <1.9 | < 1.9 | <1.9 | <0.95 |
| | Q3_2011 | X | 9/28/2011 | < 0.97 | < 0.97 | <3.9 | <3.9 | <39 | < 9.7 | <1.9 | < 1.9 | <1.9 | **0.58 J** |
| | Q1_2012 | X | 3/21/2012 | < 0.50 | < 0.50 | < 2.0 | < 2.0 | < 20 | < 5.0 | < 1.0 | < 1.0 | < 1.0 | < 0.50 |
| | Q3_2012 | X | 9/12/2012 | < 0.48 | < 0.48 | <1.9 | <1.9 | <4.8 | < 4.8 | <0.96 | < 0.96 | <0.96 | **0.56** |
| | Q1_2013 | X | 3/20/2013 | <0.50 | <0.50 | <2.0 | <2.0 | <5.0 | <5.0 | <1.0 | <1.0 | <1.0 | <0.5 |
| MW-23 | Q3_2007 | X | 10/01/07 | < 0.49 | < 0.49 | <1.9 | <1.9 | <19 | < 4.9 | <0.98 | < 0.98 | <0.98 | <0.49 |
| | Q1_2008 | X | 03/19/08 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.95 | < 0.95 | <0.95 | <0.47 |
| | Q3_2008 | X | 09/24/08 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.96 | < 0.96 | <0.96 | <0.48 |
| | Q1_2009 | X | 03/26/09 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |
| | Q3_2009 | X | 10/16/09 | < 1.2 | < 1.2 | <5.0 | <5.0 | <50 | < 12 | <2.5 | < 2.5 | <2.5 | <1.2 |
| | Q1_2010 | X | 03/03/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2010 | X | 09/27/10 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q1_2011 | X | 03/07/11 | < 0.48 | < 0.48 | <1.9 | <1.9 | <19 | < 4.8 | <0.95 | < 0.95 | <0.95 | <0.48 |
| | Q3_2011 | X | 9/27/2011 | < 0.50 | < 0.50 | <2.0 | <2.0 | <20 | < 5.0 | <1.0 | < 1.0 | <1.0 | <0.50 |
| | Q1_2012 | X | 3/21/2012 | < 0.50 | < 0.50 | < 2.0 | < 2.0 | < 20 | < 5.0 | < 1.0 | < 1.0 | < 1.0 | < 0.50 |
| | Q3_2012 | X | 9/12/2012 | < 0.49 | < 0.49 | <1.9 | <1.9 | <4.9 | < 4.9 | <0.97 | < 0.97 | <0.97 | <0.49 |
| | Q1_2013 | X | 3/20/2013 | <1.2 | <1.2 | <4.9 | <4.9 | <12 | <12 | <2.4 | **4.7** | <2.4 | <1.2 |

**Table 2-5**
SVOC Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Sampling Event | Sample Date | 1,3-Dichlorobenzene (µg/l) | 1,4-Dichlorobenzene (µg/l) | 2,4-Dimethylphenol (ug/l) | 2-Methylphenol (ug/l) | Benzoic Acid (ug/l) | Bis (2-ethylhexyl) phthalate (ug/l) | Naphthalene (ug/l) | Nitrobenzene (ug/l) | Phenol (ug/l) | Acenaphthylene (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NMW1 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q3 | | 09/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/15/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| NMW2 | PNL | | 06/14/02 | -- | -- | <20 | <10 | <20 | -- | <10 | -- | <10 | -- |
| | Q1 | | 04/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q2 | | 06/12/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q3 | | 09/14/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4 | | 12/16/04 | < 10 | < 10 | <20 | <10 | <20 | < 50 | <10 | < 20 | <10 | <10 |
| | Q4_2006 | | 12/11/06 | < 0.47 | < 0.47 | <1.9 | <1.9 | <19 | < 4.7 | <0.94 | < 0.94 | <0.94 | <0.47 |

ug/l: micrograms per liter
Dup: Duplicate
Only detected analytes shown

J-: qualified with a low bias
J: qualified as estimated value
R: rejected due to low percent recovery in the LCS

U: estimated concentrations not detected at RL.
Analyte detected in equipment or field blank.

[1]: Di-n-butylphthalate reported as qualified non-detected because of detection in equipment blank (EB-1).
[2]: Bis(2-ethylhexyl)phthalate reported as qualified non-detected because of detection in equipment blank (EB-1).
[3]: Bis(2-ethylhexyl)phthalate reported as 1.9 J µg/L.
[4]: Isophorone reported at estimated concentrations (ug/L) below the reporting limit AW-5: 0.23J, AW-8: 0.29J, MW-16: 0.19J, MW-19: 0.094J and MW-22: 0.15J.
[5]: Flourene and 2-methylnaphthalene detected in well MW-19 at estimated concentrations below the reporting limit (0.13J ug/L 0.094J ug/L, respectively).
[6]: Flourene detected in well MW-18 at a estimated concentration of 0.094J which is below the reporting limit.
: Shaded area indicates concentration detected above maximum contaminant level.
Table taken from Interim Groundwater Monitoring Report -- March 2013, Geosyntec Consultants, May 10, 2013.

**Table 2-6**
Metal Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Monitoring Event | Sample Date | Antimony (ug/l) | Arsenic (ug/l) | Barium (ug/l) | Beryllium (ug/l) | Cadmium (ug/l) | Chromium (ug/l) | Cobalt (ug/l) | Copper (ug/l) | Lead (ug/l) | Mercury (mg/l) | Molybdenum (ug/l) | Nickel (ug/l) | Selenium (ug/l) | Silver (ug/l) | Thallium (ug/l) | Vanadium (ug/l) | Zinc (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AW1 | Q1 | | 04/22/04 | 2.5 | 3.8 | 72 | <0.5 J- | <1 | 2 | 1.8 | 11 | <1 | <0.0002 | 11 | 2.1 | 58 | <1 J- | <1 | <1 | <20 J- |
| | Q2 | | 06/11/04 | <2 | 2.6 | 67 | <0.5 | <1 | 1.7 | 1.5 | 5.3 | <1 | <0.0002 | 9.3 | 4.3 | 74 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/14/04 | <6 | 3 | 130 | <1.5 | <3 | <3 | <3 | <6 | <3 | <0.0002 | <3 | 5.5 | 31 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/15/04 | <4 | 4.7 | 57 | <1 | <2 | 2.2 | <2 | 11 | <2 | <0.0002 | 19 | 9.7 | 93 | <2 | <2 | <2 | <40 |
| AW1A | Q1 | | 04/15/04 | <2 | 1.2 | 100 | <0.5 | <1 | 1.1 | 1.7 | 4.5 | <1 | <0.0002 | 3.2 | <1 | 30 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/11/04 | <2 | <1 | 100 | <0.5 | <1 | <1 | 1.9 | 4.1 | <1 | <0.0002 | 1.2 | 4.6 | 62 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/14/04 | <6 | 5.8 | 82 | <1.5 | <3 | <3 | <3 | <6 | <3 | <0.0002 | 13 | 4 | 34 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/15/04 | <4 | 2.5 | 94 | <1 | <2 | <2 | <2 | 4 | <2 | <0.0002 | 6.6 | 2 | 36 | <2 | <2 | <2 | <40 |
| AW2 | PNL | | 06/14/02 | 11 | <25 | 10 | <4 | <5 | <5 | <10 | <10 | <25 | <0.0002 | <20 | <10 | <5 | <10 | <5 | <10 | <20 |
| | Q4_2006 | | 12/11/2006 | <4 | <2 | 110 | 16 | <2 | <4 | 2 | 6.3 | <2 | <0.0002J | 8.6 | 9.1 | 61 | <2 | <2 | <4 | <40 |
| AW3 | PNL | | 06/15/02 | <10 | <25 | 130 | <4 | <5 | 9.6 | <10 | <10 | <25 | <0.0002 | <20 | <10 | <5 | <10 | <5 | 16 | 25 |
| | Q1 | | 04/14/04 | <2 | <1 | 120 | <0.5 | <1 | 1.2 | 1.5 | 3.5 | <1 | <0.0002 | 2.9 | <1 | 49 | <1 | <1 | <1 | <20 |
| | Q1 Dup | | 04/14/04 | <2 | <1 | 120 | <0.5 | <1 | 1.2 | 1.5 | 3.7 | <1 | <0.0002 | 3 | <1 | 52 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/10/04 | <2 | <1 | 110 | <0.5 J- | <1 J- | 1.6 | 1.8 | 3 | <1 | <0.0002 R | 1.9 | 2.6 | 74 J- | <1 | <1 | 1.5 | <20 J- |
| | Q3 | | 09/13/04 | <2 | <1 | 100 | <0.5 | <1 | 2 | 1.2 | 2.5 | <1 | <0.0002 | 1.8 | 2 | 59 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/14/04 | <2 | <1 | 130 | <0.5 | <1 | 2.2 | 1.4 | 2.3 | <1 | <0.0002 | 7.8 | 2.1 | 63 J- | 1.3 | <1 | <1 | <20 J- |
| AW4 | PNL | | 06/15/02 | <20 | <25 | 90 | <8 | <10 | <10 | <20 | <20 | <25 | <0.0002 | <40 | <20 | <10 | <20 | <10 | <20 | <40 |
| AW4A | Q1 | | 04/16/04 | <2 | <1 | 100 | <0.5 J- | <1 | 2.6 | 3 | 13 | <1 | <0.0002 | 13 | 5.2 | 110 J- | <1 | <1 | <1 | <20 J- |
| | Q2 | | 06/16/04 | <2 | <1 | 100 | <0.5 | <1 | 2 | 2.5 | 13 | <1 | <0.0002 | 12 | 1.4 | 72 | <1 | <1 | <1 | 30 |
| | Q3 | | 09/15/04 | <6 | 3.1 | 100 | <1.5 | <3 | <3 | <3 | 7.8 | <3 | <0.0002 | 13 | 5.1 | 59 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/17/04 | <4 | 5.2 | 100 | <1 | <2 | <2 | <2 | 7.1 | <2 | <0.0002 | 17 | 5.4 | 120 | <2 | <2 | <2 | <40 |
| AW5 | PNL | | 06/15/02 | <10 | <25 | 72 | <4 | <5 | <5 | <10 | <10 | <25 | <0.0002 | 31 | <10 | <5 | <10 | <5 | 10 | 21 |
| | Q1 | | 04/19/04 | <2 | <1 | 71 J+ | <0.5 J- | <1 | 1.9 | 2.3 | 13 | <1 | <0.0002 | 10 J+ | <1 | 49 | <1 | <1 | <1 | <20 J- |
| | Q2 | | 06/14/04 | <2 | <1 | 53 | <0.5 | <1 | 1.4 | 1.6 | 7.1 | <1 | <0.0002 | 6.8 | 4.3 | 82 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/16/04 | <6 | <3 | 66 | <1.5 | <3 | <3 | <3 | <6 | <3 | <0.0002 | 6.3 | 5 | 73 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/17/04 | <4 | <2 | 60 | <1 | <2 | <2 | <2 | 5.9 | <2 | <0.0002 | 12 | 3.7 | 86 | <2 | <2 | <2 | <40 |
| AW8 | Q3 | | 09/16/04 | <6 | <3 | 130 | <1.5 | <3 | <3 | <3 | <6 | <3 | <0.0002 | <3 | <3 | 89 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/15/04 | <4 | <2 | 120 | <1 | <2 | <2 | <2 | 4.5 | <2 | <0.0002 | <2 | <2 | 98 | <2 | <2 | <2 | <40 |
| | Q3_2007 | X | 09/26/07 | <2 | 2.6 | 88 | <0.5 | <1 | <2 | 1.2 | 3.9 | <1 | <0.0002 UJ | 2 | 6 | 28 | <1 | <1 | <2 | <20 |
| | Q3_2008 | X | 09/25/08 | <4 | 4.1 | 150 | <1 | <2 | 7.1 | <2 | 18 | 14 | <0.0002 | <4 | 4.3 | 54 | <2 | <2 | <4 | <40 |
| | Q3_2009 | X | 10/16/09 | <2 | <1 | 120 | <0.5 | <1 | 3.3 | 3 | 4.7 | <1 | <0.0002 | 1.1 J | 8.2 | 92 | <1 | <1 | 1.2 J | <20 |
| | Q3_2010 | X | 09/27/10 | 0.36 J | 1.2 | 120 | 0.18 J | <1 | 1.4 J | 2 | 3.3 | 0.5 J | <0.0002 | 12 | 5.9 | 110 | <1 | <1 | 1.2 J | 4.9 J |
| | Q3_2011 | X | 09/28/11 | 0.33 J | <1 | 120 | 0.14 J | <1 | 1.4 J | 0.92 J | 4.1 | <1 | <0.0002 | 5.3 | <2 | <2 | <1 | 0.29 J | 0.82 J | 17 J |
| | Q3_2012 | X | 09/11/12 | <10 | 19 | 94 | <2.5 | <5 | <10 | 1.3 J | <10 | <5 | <0.0002 | 3.7 J | 7.5 J | 73 | <5 | <5 | <10 | <100 |
| B4 | PNL | | 06/14/02 | 12 | 9.4 | 1200 | <4 | <5 | 18 | <10 | 79 | 10 | <0.0002 | 84 | 97 | <5 | <10 | <5 | <10 | 73 |

## Table 2-6
Metal Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Monitoring Event | Sample Date | Antimony (ug/l) | Arsenic (ug/l) | Barium (ug/l) | Beryllium (ug/l) | Cadmium (ug/l) | Chromium (ug/l) | Cobalt (ug/l) | Copper (ug/l) | Lead (ug/l) | Mercury (mg/l) | Molybdenum (ug/l) | Nickel (ug/l) | Selenium (ug/l) | Silver (ug/l) | Thallium (ug/l) | Vanadium (ug/l) | Zinc (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B4A | Q1 | | 04/19/04 | <2 | <1 | 250 | <0.5 | <1 | 3.5 | 2.5 | 15 | <1 | <0.0002 | 7.6 | 3 | 90 | <1 | <1 | 1.6 | <20 |
| | Q1 Dup | | 04/19/04 | <2 | <1 | 250 | <0.5 | <1 | 3.4 | 2.5 | 16 | <1 | <0.0002 | 6.5 | 4 | 100 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/17/04 | <2 | 3 | 170 | <0.5 | <1 | 3.2 | 1.8 | 9.8 | <1 | <0.0002 | 16 | 2 | 97 | <1 | <1 | 4.9 | <20 |
| | Q2 Dup | | 06/17/04 | <2 | 2.7 | 180 | <0.5 | <1 | 3.1 | 1.8 | 9.9 | <1 | <0.0002 | 11 | 1.6 | 85 | <1 | <1 | 4.1 | <20 |
| | Q3 | | 09/15/04 | <6 | 16 | 340 | <1.5 | <3 | 3.9 | <3 | 6.1 | <3 | <0.0002 | 19 | 7.4 | 62 | <3 | <3 | 13 | <60 |
| | Q4 | | 12/20/04 | <4 | 2.3 | 210 | <1 | <2 | 2.9 | <2 | 5.4 | <2 | <0.0002 | <2 | <2 | 77 | <2 | <2 | 4.4 | <40 |
| | Q4 Dup | | 12/20/04 | <4 | 2.3 | 200 | <1 | <2 | 3.3 | <2 | 5.2 | <2 | <0.0002 | <2 | <2 | 70 | <2 | <2 | 4.8 | <40 |
| | Q4_2006 | | 12/13/2006 | <20 | 11 | 1200 | <5 | <10 | <20 | <10 | <20 | <10 | <0.0002 | 180 | <20 | 74 | <10 | <10 | 23 | <200 |
| | Q3_2007 | X | 09/28/07 | <2.0 | 3.8 | 560 | <0.50 | <1 | 8.1 | 3.3 | 6.1 | <1.0 | <0.0002 | 72 | 5 | 8.4 | <1 | <1 | 18 | <20 |
| | Q3_2008 | X | 09/26/08 | <4 | 6.5 | 440 | <1 | <2 | 12 | <2 | 49 | 15 | <0.0002 | 32 | 8.3 | 58 | <2 | <2 | 11 | <40 |
| | Q3_2008 Dup | X | 09/26/08 | <4 | 6.5 | 430 | <1 | <2 | 10 | <2 | 6 | <2 | <0.0002 | 32 | 6.6 | 59 | <2 | <2 | 12 | <40 |
| | Q3_2009 | X | 10/19/09 | <10 | 11 | 430 | <2.5 | <5 | 15 | 2.3 J | 5.7 J | <5 | <0.0002 | 13 | 14 | 53 | <5 | 1.4 J | 19 | <100 |
| | Q3_2009 Dup | X | 10/19/09 | <10 | 9.6 | 400 | <2.5 | <5 | 15 | 2.2 J | 5.6 J | <5 | <0.0002 | 11 | 14 | 55 | <5 | <5 | 21 | <100 |
| | Q3_2010 | X | 09/28/10 | <4 | 10 | 650 | <1 | <2 | 2.4 J | 0.65 J | 1.3 J | <2 | <0.00002 | 0.89 J | 6 | 41 | <2 | <2 | 8.8 | <40 |
| | Q3_2010 Dup | X | 09/28/10 | <10 | 10 | 750 | <2.5 | <5 | <10 | 0.56 J | <10 | <5 | <0.0002 | 1.6 J | 7.6 J | 41 | <5 | <5 | 8.7 J | <100 |
| | Q3_2011 | X | 09/29/11 | <2 | <1 | 540 | 0.18 J | <1 | 1.2 J | 0.56 J | 3.7 | <1 | <0.0002 | <2 | 0.93 J | <2 | <1 | <1 | 1.6 J | <20 |
| | Q3_2011 Dup | X | 09/29/11 | <2 | <1 | 470 | 0.18 J | <1 | 1.3 J | 0.57 J | 3.9 | <1 | <0.0002 | 1.4 J | 1.5 J | <2 | <1 | <1 | 1.5 J | <20 |
| | Q3_2012 | X | 09/13/12 | 0.77 J | 8.8 | 720 | <1 | <2 | 2.6 J | 0.64 J | 1.3 J | <2 | <0.0002 | 9.2 | 5.5 | 35 | <2 | <2 | 13 | <40 |
| | Q3_2012 Dup | X | 09/13/12 | 0.81 J | 8.7 | 710 | <1 | <2 | 2.6 J | 0.64 J | 1.5 J | <2 | <0.0002 | 9.3 | 5.1 | 33 | <2 | <2 | 13 | <40 |
| B7 | PNL | | 06/15/02 | <10 | <25 | 190 | <4 | <5 | 47 | <10 | 22 | <25 | <0.0002 | <20 | 53 | <5 | <10 | <5 | 11 | 84 |
| | Q1 | | 04/19/04 | <2 | <1 | 180 | <0.5 | <1 | 3.7 | 1.7 | 7.2 | <1 | <0.0002 | <1 | 2 | 73 | <1 | <1 | 6.8 | <20 |
| | Q2 | | 06/12/04 | <2 | <1 | 120 | <0.5 | <1 | 2.9 | 1.6 | 4 | <1 | <0.0002 | <1 | 5.7 | 88 | <1 | <1 | 7.2 | <20 |
| | Q3 | | 09/17/04 | <6 | <3 | 140 | <1.5 | <3 | 3.5 | <3 | <6 | <3 | <0.0002 | <3 | 5.5 | 68 | <3 | <3 | 3.3 | <60 |
| | Q3 Dup | | 09/17/04 | <6 | <3 | 140 | <1.5 | <3 | 3.5 | <3 | <6 | <3 | <0.0002 | <3 | 5.4 | 69 | <3 | <3 | 5.2 | <60 |
| | Q4 | | 12/20/04 | <4 | <2 | 150 | <1 | <2 | 2.8 | <2 | <4 | <2 | <0.0002 | <2 | <2 | 57 | <2 | <2 | 6.9 | <40 |
| | Q4_2006 | | 12/13/2006 | <2 | 1.6 | 180 | <0.5 | <1 | 3.2 | 1.8 | 4.3 | <1 | <0.0002R | <2 | 11 | 49 | <1 | <1 | 8.3 | <20 |
| | Q3_2007 | X | 09/27/07 | <2 | 1.6 | 160 | <0.5 | <1 | 3.2 | 1.2 | 2.9 | <1 | <0.0002 | <2 | <2 | 35 | <1 | <1 | 9 | <20 |
| | Q3_2007 Dup | X | 09/27/07 | <2 | <1 | 160 | <0.5 | <1 | 3.1 | 1.2 | 2.9 | <1 | <0.0002 | <2 | <2 | 33 | <1 | <1 | 7.8 | <20 |
| | Q3_2008 | X | 09/26/08 | <4 | 2.1 | 170 | <1 J | <2 | 8.3 | <2 | 12 | 2.4 J- | <0.0002 | <4 | 7 | 46 | <2 | <2 | 8.6 | <40 J - |
| | Q3_2009 | X | 10/19/09 | <4 | 4.8 | 150 | <1 | <2 | 7.7 | 1.8 J | 2.7 J | <2 | <0.0002 | 0.48 J | 9.5 | 39 | <2 | <2 | 14 | <40 |
| | Q3_2010 | X | 09/28/10 | <20 | <10 | 210 | <5 | <10 | <20 | <10 | <20 | <10 | <0.0002 | <20 | 8.5 J | 31 | <10 | <10 | 14 J | <200 |
| | Q3_2011 | X | 09/29/11 | <2 | <1 | 200 | <0.5 | <1 | 3.0 | 1.1 | 1.1 J | 0.26 J | <0.0002 | 1.3 J | <2 | <2 | <1 | <1 | 12 | <20 |
| | Q3_2012 | X | 09/13/12 | <4 | 6.8 | 120 | <1 | <2 | 3.0 J | 0.82 J | <4 | <2 | <0.0002 | <4 | 4.7 | 29 | <2 | <2 | 15 | <40 |
| GP01 | Q1 | | 04/20/04 | <2 | <1 | 110 | <0.5 | <1 | 2.2 | 3.8 | 18 | <1 | <0.0002 | 5.5 | <1 | 70 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/17/04 | <2 | <1 | 100 | <0.5 | <1 | 3.1 | 3.8 | 14 | <1 | <0.0002 | 5.9 | <1 | 95 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/17/04 | <10 | <5 | 170 | <2.5 | <5 | 7.5 | <5 | <10 | <5 | <0.0002 | 11 | 7.3 | 140 | <5 | <5 | <5 | <100 |
| | Q4 | | 12/17/04 | <4 | <2 | 98 | <1 | <2 J- | 2.8 | 2.8 | 7.3 | <2 | <0.0002 | 8 | 4.1 | 110 | <2 | <2 | <2 | <40 J- |
| GP12 | Q1 | | 04/21/04 | <2 | <1 | 90 | <0.5 | <1 | 2.6 | 1.5 | <2 | <1 | <0.0002 | <1 | 4.7 | 80 | <1 | <1 | 2.7 | <20 |
| | Q2 | | 06/16/04 | <2 | <1 | 82 | <0.5 | <1 | 3 | 1.4 | <2 | <1 | <0.0002 | <1 | 4 | 92 J- | <1 | <1 | 3.2 | <20 J- |
| | Q3 | | 09/17/04 | <2 | <1 | 25 | <0.5 | <1 | 1 | <1 | <2 | <1 | <0.0002 | <1 | 2.8 | 28 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/16/04 | <2 | 8.7 | 120 | <0.5 | <1 | 2.6 | 1.1 | <2 | <1 | <0.0002 | 2.4 | 4 | 60 | <1 | <1 | 3.3 | <20 |
| GP23 | Q1 | | 04/22/04 | <2 | <1 | 360 | <0.5 | <1 | 2.5 | 2 | 6.9 | <1 | <0.0002 | <1 | 3.6 | 82 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/12/04 | <2 | 1.3 | 370 | <0.5 | <1 | 3 | 1.9 | 4 | <1 | <0.0002 | <1 | 4.7 | 94 | <1 | <1 | 2.1 | <20 |
| | Q3 | | 09/16/04 | <6 | <3 | 640 | <1.5 | <3 | 5 | <3 | <6 | <3 | <0.0002 | <3 | 12 | 86 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/16/04 | <4 | <2 | 520 | <1 | <2 | 3.2 | <2 | <4 | <2 | <0.0002 | <2 | <2 | 60 | 2.1 | <2 | 2.6 | <40 |
| GP24 | Q1 | | 04/20/04 | <2 | 2.2 | 550 | <0.5 | <1 | 5.3 | 1.5 | <2 | <1 | <0.0002 | <1 | <1 | 43 | <1 | <1 | 7.4 | <20 J- |
| | Q2 | | 06/17/04 | <2 | 26 | 540 | <0.5 | <1 | 4.8 | 1.5 | 2.2 | <1 | <0.0002 | 5.4 | <1 | 54 | <1 | <1 | 11 | <20 |
| | Q3 | | 09/17/04 | <2 | 1.8 | 170 | <0.5 | <1 | 2 | <1 | <2 | <1 | <0.0002 | <1 | <1 | 17 | <1 | <1 | 2.7 | <20 |
| | Q4 | | 12/16/04 | <2 | 5.6 | 460 | <0.5 | <1 | 4.6 | 1.3 | <2 | <1 | <0.0002 | 1.5 | <1 | 39 | <1 | <1 | 6 | <20 |

**Table 2-6**
Metal Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Monitoring Event | Sample Date | Antimony (ug/l) | Arsenic (ug/l) | Barium (ug/l) | Beryllium (ug/l) | Cadmium (ug/l) | Chromium (ug/l) | Cobalt (ug/l) | Copper (ug/l) | Lead (ug/l) | Mercury (mg/l) | Molybdenum (ug/l) | Nickel (ug/l) | Selenium (ug/l) | Silver (ug/l) | Thallium (ug/l) | Vanadium (ug/l) | Zinc (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW04 | PNL | | 06/14/02 | <10 | <25 | 24 | <4 | <5 | <5 | <10 | 11 | <25 | <0.0002 | <20 | 28 | <5 | <10 | <5 | <10 | <20 |
| | PNL Dup | | 06/14/02 | 11 | <25 | 30 | <4 | <5 | <5 | <10 | <10 | <25 | <0.0002 | <20 | <10 | <5 | <10 | <5 | <10 | <20 |
| | Q1 | | 04/14/04 | <2 | <1 | 26 | <0.5 | <1 | <1 | <1 | <2 | <1 | <0.0002 | <1 | <1 | 12 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/09/04 | <2 | <1 | 31 | <0.5 | <1 | <1 | <1 | <2 | <1 | <0.0002 | <1 | <1 | 12 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/13/04 | <2 | <1 | 27 | <0.5 | <1 | <1 | <1 | <2 | <1 | <0.0002 | <1 | 1.2 | 13 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/13/04 | <2 | <1 | 30 | <0.5 | <1 | <1 | <1 | <2 | <1 | <0.0002 | <1 | <1 | 14 | <1 | <1 | <1 | <20 |
| MW09 | PNL | | 06/14/02 | <10 | <25 | 96 | <4 | <5 | <5 | <10 | 13 | <25 | <0.0002 | <20 | <10 | <5 | <10 | 7.4 | <10 | <20 |
| | Q1 | | 04/15/04 | <2 | <1 | 130 | <0.5 | <1 | 2.7 | 1.9 | 12 | <1 | <0.0002 | <1 | 3.5 | 82 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/11/04 | <2 | <1 | 140 | <0.5 J- | <1 J- | 2.5 | 2.7 | 9.3 | <1 | <0.0002 | <1 | 8.9 | 120 J- | <1 | <1 | <1 | <20 J- |
| | Q3 | | 09/14/04 | <6 | <3 | 180 | <1.5 | <3 | 3.2 | <3 | 8.7 | <3 | <0.0002 | <3 | 4.6 | 61 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/14/04 | <2 | <1 | 140 | <0.5 | <1 | 2.5 | 1.5 | 5.4 | <1 | <0.0002 | <1 | 5.2 | 110 | <1 | <1 | <1 | <20 |
| MW13 | PNL | | 06/14/02 | <10 | 5.6 | 78 | <4 | <5 | <5 | <10 | <10 | <25 | <0.0002 | <20 | <10 | <5 | <10 | <5 | <10 | <20 |
| | Q1 | | 04/14/04 | <2 | 2.3 | 92 | <0.5 | <1 | 1.4 | <1 | 9.5 | <1 | <0.0002 | 27 | 4.7 | 36 | <1 | <1 | 2 | <20 |
| | Q2 | | 06/10/04 | <2 | 5.4 | 170 | <0.5 | <1 | 3.1 | 1.6 | 5.8 | <1 | <0.0002 | 5.3 | 9.4 | 94 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/13/04 | <2 | 5.6 | 180 | <0.5 | <1 | 4.5 | 1.4 | 4.4 | <1 | <0.0002 | 2.5 | 3.7 | 67 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/14/04 | <2 | 11 | 180 | <0.5 | <1 | 6.5 | 1.1 | 2.8 | <1 | <0.0002 | 11 | 4.2 | 64 | <1 | <1 | <1 | <20 |
| | Q4 Dup | | 12/14/04 | <2 | 12 | 170 | <0.5 | <1 | 5.9 | <1 | 2.8 | <1 | <0.0002 | 10 | 3.9 | 63 | <1 | <1 | <1 | <20 |
| MW15 | PNL | | 06/14/02 | <20 | <25 | 110 | <8 | <10 | <10 | <20 | <20 | <25 | <0.0002 | <40 | <20 | <10 | <20 | <20 | <20 | <40 |
| | PNL Dup | | 06/14/02 | <20 | <25 | 100 | <8 | <10 | <10 | <20 | <20 | <25 | <0.0002 | <40 | <20 | <10 | <20 | <20 | <20 | <40 |
| | Q1 | | 04/15/04 | <2 | <1 | 140 | <0.5 | <1 | 2 | 1.7 | 9.4 | <1 | <0.0002 | 18 | <1 | 43 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/10/04 | <2 | <1 | 140 | <0.5 | <1 | 1.3 | 2.2 | 5.5 | <1 | <0.0002 | 2.3 | 4.6 | 73 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/14/04 | <6 | <3 | 140 J+ | <1.5 | <3 | 14 | <3 | <6 | <3 | <0.0002 | <3 | 7.6 | 33 | <3 | <3 | <3 | <60 J |
| | Q4 | | 12/14/04 | <2 | <1 | 140 | <0.5 | <1 | 2.1 | 1.7 | 5.2 | <1 | <0.0002 | 27 | 6.5 | 58 | <1 | <1 | <1 | <20 |
| MW16 | PNL | | 08/09/02 | <20 | <25 | 120 | <8 | <10 | <10 | <20 | <20 | <5 | <0.0002 | <40 | <20 | <10 | <20 | <10 | <20 | <40 |
| | Q1 | | 03/16/04 | <2 | <1 | 80 | <0.5 | <1 | <1 | 1.7 | 6.5 | <1 | <0.0002 | 2.7 | <1 | 19 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/08/04 | <2 | 1 | 23 | <0.5 | <1 | <1 | 2.2 | 14 | <1 | <0.0002 | 9.7 | 4.7 | 8.6 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/08/04 | <2 | <1 | 8.6 | <0.5 | <1 | <1 | 1.3 | 11 | <1 | <0.0002 | 4.5 | 3.1 | 3.8 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/11/04 | <2 | <1 | 6.2 | <0.5 | <1 | <1 | 1.4 | 22 | 5.3 | <0.0002 | 28 | 12 | 5.3 | <1 | <1 | <1 | 21 |
| | Q3_2007 | X | 09/25/07 | <2 | <1 | 85 | <0.5 | <1 | <2 | 1.2 | 4 | <1 | <0.0002 | <2 | 5 | 25 | <1 | <1 | <2 | <20 |
| | Q3_2008 | X | 09/23/08 | <2 | <1 | 21 | <0.5 | <1 | <2 | 1.2 | 12 | <1 | <0.0002 J | 6.1 | 3.5 | 6.2 | <1 | <1 | <2 | <20 J- |
| | Q3_2009 | X | 10/13/09 | <2 | 2.4 | 25 | <0.5 | <1 | <2 | 1.8 | 16 | <1 | <0.0002 | 7.8 | 12 | 8.5 | <1 | <1 | <2 | <20 |
| | Q3_2010 | X | 09/28/10 | <20 | <10 | 27 | <5 | <10 | <20 | 2.3 J | <20 | <10 | <0.0002 | 35 | 12 J | <20 | <10 | <10 | <20 | <200 |
| | Q3_2011 | X | 09/26/11 | <2 | <1 | 110 | <0.5 | <1 | <2 | 0.86 J | 2.6 | 0.57 J | <0.0002 | 3.7 | <2 | 7.8 | <1 | <1 | <2 | <20 |
| | Q3_2012 | X | 09/10/12 | <10 | <5 | 47 | <2.5 | <5 | <10 | 0.89 J | 76 | <5 | <0.0002 | 22 | 6.3 J | 4.5 J | <5 | <5 | <10 | <100 |
| MW17 | PNL | | 08/09/02 | <20 | <25 | 170 | <8 | <10 | <10 | <20 | <20 | <5 | <0.0002 | <40 | <20 | <10 | <20 | <10 | <20 | <40 |
| | Q1 | | 03/16/04 | <2 | <1 | 150 | <0.5 | <1 | <1 | 1.9 | 2.7 | <1 | <0.0002 | <1 | <1 | 30 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/08/04 | <2 | <1 | 140 | <0.5 | <1 | <1 | 2.2 | 3.3 | <1 | <0.0002 | <1 | <1 | 33 | <1 | <1 | <1 | <20 |
| | Q2 Dup | | 06/08/04 | <2 | <1 | 140 | <0.5 | <1 | <1 | 2.1 | 3.2 | <1 | <0.0002 | <1 | <1 | 33 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/08/04 | <2 | <3 | 160 | <0.5 | <1 | <1 | 1.6 | 2 | <1 | <0.0002 | <1 | 3.4 | 17 J- | <1 | <1 | <3 | <20 |
| | Q4 | | 12/11/04 | <2 | <1 | 180 | <0.5 | <1 | <1 | 1.3 | 13 | 4.7 | <0.0002 | <1 | <1 | 34 | <1 | <1 | <1 | 32 |
| MW18 | PNL | | 08/09/02 | <10 | <25 | 64 | <4 | <5 | <5 | <10 | <10 | <5 | <0.0002 | <20 | <10 | <5 | <10 | <5 | <10 | <20 |
| | Q1 | | 04/12/04 | <2 | 1.2 | 46 | <0.5 | <1 | <1 | <1 | 5.9 | <1 | <0.0002 | 1.5 | <1 | 14 | <1 | <1 | 1.2 | <20 |
| | Q2 | | 06/09/04 | <2 | 2.9 | 28 | <0.5 | <1 | <1 | <1 | 3.8 | <1 | <0.0002 | 8 | <1 | 13 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/09/04 | <2 | 2.9 | 24 | <0.5 | <1 | 1.1 | <1 | 2.1 | <1 | <0.0002 | 9.5 | 1.3 | 9.7 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/13/04 | <2 | 2 | 65 | <0.5 | <1 | <1 | <1 | 3.5 | <1 | <0.0002 | 2.4 | 1.9 | 19 | <1 | <1 | <1 | 21 |
| | Q3_2007 | X | 09/27/07 | <2 | 1.6 | 51 | <0.5 | <1 | <2 | <1 | 2.7 | <1 | <0.0002 | 9.6 | <2.0 | 15 | <1 | <1 | <2 | <20 |
| | Q3_2008 | X | 09/23/08 | <2 | 2.9 | 31 | <0.5 | <1 | <2 | <1 | 3.2 | <1 | <0.0002 | 17 | 2.1 | 12 | <1 | <1 | <2 | <20 |
| | Q3_2009 | X | 10/15/09 | <2 | 4.8 | 22 | <0.5 | <1 | <2 | 0.64 J | 1.6 J | 0.27 J | <0.0002 | 25 | 4 | 16 | <1 | <1 | 1.3 J | <20 |
| | Q3_2010 | X | 09/29/10 | <10 | 5.4 | 22 | <2.5 | <5 | <10 | 0.64 J | <10 | <5 | <0.0002 | 25 | <10 | 4.7 J | <5 | 1.1 J | <10 | <100 |
| | Q3_2011 | X | 09/27/11 | <2 | <1 | 64 | <0.5 | <1 | <2 | 0.36 J | 2.5 | <1 | <0.0002 | 3.1 | <2 | <2 | <1 | <1 | <2 | <20 |
| | Q3_2012 | X | 09/11/12 | 0.37 J | 5.4 | 56 | <0.5 | <1 | <2 | 0.40 J | 1.2 J | 0.21 J | <0.0002 | 11 | 3 | 18 | < 1 U | <1 | <2 | 6.8 J |
| MW19 | Q1 | | 04/13/04 | <2 | 5.9 | 44 | <0.5 | <1 | <1 | 1.1 | 3.7 | <1 | <0.0002 | 13 | 1 | 13 | <1 | <1 | 1.4 | <20 |
| | Q2 | | 06/09/04 | <2 | 7.3 | 46 | <0.5 | <1 | 1 | 1.8 | 3.4 | <1 | <0.0002 | 16 | <1 | 13 | <1 | <1 | 1.6 | <20 |
| | Q3 | | 09/09/04 | <2 | 7.1 | 26 | <0.5 | <1 | 1.1 | <1 | <2 | <1 | <0.0002 | 12 | <1 | 6.7 | <1 | <1 | <1 | <20 |

## Table 2-6
Metal Concentrations in Groundwater
Ascon Landfill Site

| Site Location | Event | Interim GW Monitoring Event | Sample Date | Antimony (ug/l) | Arsenic (ug/l) | Barium (ug/l) | Beryllium (ug/l) | Cadmium (ug/l) | Chromium (ug/l) | Cobalt (ug/l) | Copper (ug/l) | Lead (ug/l) | Mercury (mg/l) | Molybdenum (ug/l) | Nickel (ug/l) | Selenium (ug/l) | Silver (ug/l) | Thallium (ug/l) | Vanadium (ug/l) | Zinc (ug/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q3 Dup | | 09/09/04 | <2 | 5.5 | 30 | <0.5 | <1 | 1.1 | <1 | <2 | <1 | <0.0002 | 11 | <1 | 7.3 | <1 | <1 | <1 | <20 |
| | Q4 | | 12/13/04 | <2 | 8.8 | 49 | <0.5 | <1 | 2.2 | 1.3 | 18 | 6.6 | <0.0002 | 10 | 2.4 | 8.5 | <1 | <1 | 5.4 | 24 |
| MW20 | Q1 | | 04/13/04 | <2 | <1 | 1700 | <0.5 | <1 | <1 | 1.4 | 2.2 | <1 | <0.0002 | 1 | <1 | 20 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/09/04 | <2 | <1 | 1800 | <0.5 | <1 | <1 | 1.4 | 2.2 | <1 | <0.0002 | <1 | <1 | 19 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/16/04 | <6 | <3 | 2000 J+ | <1.5 | <3 | <3 | <3 | <6 | <3 | <0.0002 | <3 | 4.4 | 21 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/13/04 | <2 | <1 | 1900 | <0.5 | <1 | <1 | 1.2 | <2 | <1 | <0.0002 | <1 | 2.8 | 25 | <1 | <1 | <1 | <20 |
| MW-22 | Q3_2007 | X | 10/01/07 | <2 | 2.5 | 71 | <0.5 | <1 | <2 | <1 | <2.0 | <1 | <0.0002 UJ | 5.8 | <2.0 | 5 | <1 | <1 | <2 | <20 |
| | Q3_2008 | X | 09/24/08 | <4 | 3.7 | 61 | <1 | <2 | <4 | 3.2 | <4 | <2 | <0.0002 | <4 | <4 | 14 | <2 | <2 | <4 | <40 |
| | Q3_2009 | X | 10/15/09 | <2 | 2.2 | 66 | <0.5 | <1 | 1.2 J | 1.1 | 1.3 J | <1 | <0.0002 | 0.61 J | 4.5 | 36 | <1 | <1 | 1.4 J | <20 |
| | Q3_2010 | X | 09/29/10 | <10 | 10 | 150 | <2.5 | <5 | <10 | 1.5 J | <10 | <5 | <0.0002 | <10 | 5.9 J | 34 | <5 | <5 | <10 | <100 |
| | Q3_2011 | X | 09/28/11 | <2 | <1 | 66 | <0.5 | <1 | <2 | 0.66 J | 0.8 J | <1 | <0.0002 | <2 | <2 | <2 | <1 | <1 | 1.5 J | <20 |
| | Q3_2012 | X | 09/12/12 | <2 | 6.7 | 59 | <0.5 | <1 | 1.1 J | 0.64 J | 1.0 J | <1 | 0.00013 J- | <2 | 2.4 | 26 | <1 | <1 | 1.2 J | <20 |
| NMW1 | PNL | | 06/14/02 | <10 | <25 | 76 | <4 | <5 | <5 | <10 | <10 | <25 | <0.0002 | 46 | 14 | <5 | <10 | <5 | <10 | 31 |
| | Q3 | | 09/15/04 | <6 | <3 | 18 | <1.5 | <3 | <3 | <3 | 7.8 | <3 | <0.0002 | <3 | 4.6 | 59 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/15/04 | <4 | <2 | 160 | <1 | <2 | <2 | <2 | 4.8 | <2 | <0.0002 | <2 | <2 | 96 | <2 J- | <2 | <2 | <40 |
| NMW2 | PNL | | 06/14/02 | <30 | <25 | 97 | <12 | <15 | <15 | <30 | <30 | <25 | <0.0002 | <60 | <30 | <15 | <30 | <30 | <30 | <60 |
| | Q1 | | 04/16/04 | <2 | 3.4 | 140 | <0.5 | <1 | 1.6 | 2.8 | 12 | <1 | <0.0002 | 13 | <1 | 83 | <1 | <1 | <1 | <20 |
| | Q2 | | 06/12/04 | <2 | 2.3 | 110 | <0.5 | <1 | <1 | 2.5 | 5.2 | <1 | <0.0002 | 12 | <1 | 120 | <1 | <1 | <1 | <20 |
| | Q3 | | 09/14/04 | <6 | 7.4 | 130 | <1.5 | <3 | <3 | <3 | 7.1 | <3 | <0.0002 | 11 | <3 | 72 | <3 | <3 | <3 | <60 |
| | Q4 | | 12/16/04 | <8 | <4 | 150 | <2 | <4 | <4 | <4 | <8 | <4 | <0.0002 | 9.6 | <4 | 82 | 28 | <4 | <4 | <80 |
| **MCL** | | | | 6 | 10 | 1000 | 4 | 5 | 50 | -- | 1300 | 15 | 0.002 | -- | 100 | 50 | 100 | -- | -- | 5000 |

ug/l: micrograms per liter
mg/l: milligrams per liter
Dup: Duplicate
MCL: Maxiumum Contaminant Levels for drinking water. All MCLs reported are State of Californa starndards with the exception of the arsenic MCL which is a Federal standard. The MCL reported for each metal is the most conservative between the State and Federal MCL.
: Shade areas indicate concentration detected above MCL.
Table taken from Interim Groundwater Monitoring Report -- September 2012, Geosyntec Consultants, December 20, 2012.

J: estimated
J+: estimated with a high bias
J-: estimated with a low bias
UJ: estimated less than the detection limit
U: not detected at the reporting limit
R: rejected

## Table 4-1

## Summary of Chemicals of Potential Concern and Risk-Based Concentrations for Soil

## Ascon Landfill

## Huntington Beach, California

| Chemicals of Potential Concern | Construction Worker 0-ft Cover RBC (mg/kg) | Commercial Worker 0-ft Cover RBC (mg/kg) |
|---|---|---|
| **Metal** | | |
| Arsenic | **3.1E+02** | **1.6E+01** |
| Chromium (VI) | **1.6E+02** | **5.4E+01** |
| Copper | **1.0E+05** | **4.1E+04** |
| Lead | **1.6E+02** | **3.2E+02** |
| Thallium | **2.6E+01** | **1.0E+01** |
| **PCBs** | | |
| PCB-1260 | **6.3E+02** | **7.4E+00** |
| **Pesticides** | | |
| Chlordane | **1.1E+03** | **1.7E+01** |
| Dieldrin | **8.6E+01** | **1.1E+00** |
| Heptachlor epoxide | **2.5E+01** | **3.1E+00** |
| **SVOCs** | | |
| Benzidine | **2.7E+00** | **3.4E-02** |
| Benzo(a)pyrene | **4.4E+02** | **5.3E+00** |
| Bis(2-ethylhexyl) phthalate | **3.9E+04** | **5.7E+03** |
| Dibenz[a,h]anthracene | **3.1E+02** | **3.8E+00** |
| Phenanthrene | **5.5E+04** | **1.7E+04** |
| **VOCs** | | |
| Benzene | **1.1E+01** | **9.4E+00** |
| Ethylbenzene | **2.6E+02** | **2.0E+02** |
| Naphthalene | **2.9E+01** | **1.6E+02** |

Notes:

" NA " not applicable

0-foot cover assumes residual chemicals are present in surface soils. Exposure pathways include soil ingestion, dermal contact, inhalation of fugitive dust/vapors in outdoor air.

In addition to risk-based concentrations, regional background concentrations will be considered where appropriate

**Table 5-1**
Components of Remedial Alternatives
Ascon Landfill Site

| Components of Remedial Alternatives | Alt. 1<br>No Action | Alt. 2<br>Limited Waste Removal | Alt. 3<br>Protective Cap | Alt. 4<br>Partial Source Removal with Protective Cap | Alt. 5<br>Source Removal with Offsite Disposal and SIT | Alt. 6<br>Source Removal with Offsite Disposal |
|---|---|---|---|---|---|---|
| Deed Restriction(s) | | ● | ● | ● | ❍ | ❍ |
| Remove Waste from City Parcel | | | ● | ● | ● | ● |
| Remove Pit F Waste | | ● | ● | ● | ● | ● |
| Remove Lagoon 4 and 5 Wastes (Partial or Complete) | | | ❍ | ❍ | ● | ● |
| Remove Pits A-E, G, and H | | | ❍ | ❍ | ● | ● |
| Remove All Waste | | | | | ● | ● |
| Cap | | | ● | ● | | |
| Long-Term Groundwater Monitoring | ● | ● | ● | ● | ❍ | ❍ |

● = component

❍ = potential component, pending on design and field or post-remedy conditions

**Table 5-2**
Metrics of Remedial Alternatives
Ascon Landfill Site

| Metrics of Remedy Alternatives | Alt. 1<br>No Action | Alt. 2<br>Limited Waste Removal | Alt. 3<br>Protective Cap | Alt. 4<br>Partial Source Removal with Protective Cap | Alt. 5<br>Source Removal with Offsite Disposal and SIT | Alt. 6<br>Source Removal with Offsite Disposal |
|---|---|---|---|---|---|---|
| **Remedy Construction Cost ($ MM)** | $0 | $6.9 | $36.9 | $36.6 | $252 | $292 |
| **Operational and Maintenance ($ MM)** | $13.8 | $19.3 | $22.0 | $22.0 | $10.4 | $10.4 |
| **Total Present Worth Cost ($ MM)** | $13.8 | $26.2 | $58.8 | $58.6 | $262 | $303 |
| **Volume of Waste Removed (1,000cy)** [1,2] | 0 | 2.25 | 32.3 | 32.3 | 710 | 1,014 |
| **Volume of Import Soils (1,000cy)** | 0 | 9.6 | 205.8 | 205.8 | 521 | 521 |
| **Estimated # of One Way Truck Trips – Waste** | 0 | 290 | 4,830 | 4,830 | 90,400 | 129,340 |
| **Estimated # of One Way Truck Trips – Import** | 0 | 1160 | 24,700 | 24,700 | 62,500 | 62,500 |
| **Estimated Duration of Construction (months)** | 0 | 5 | 11 | 11 | 55 | 41 |

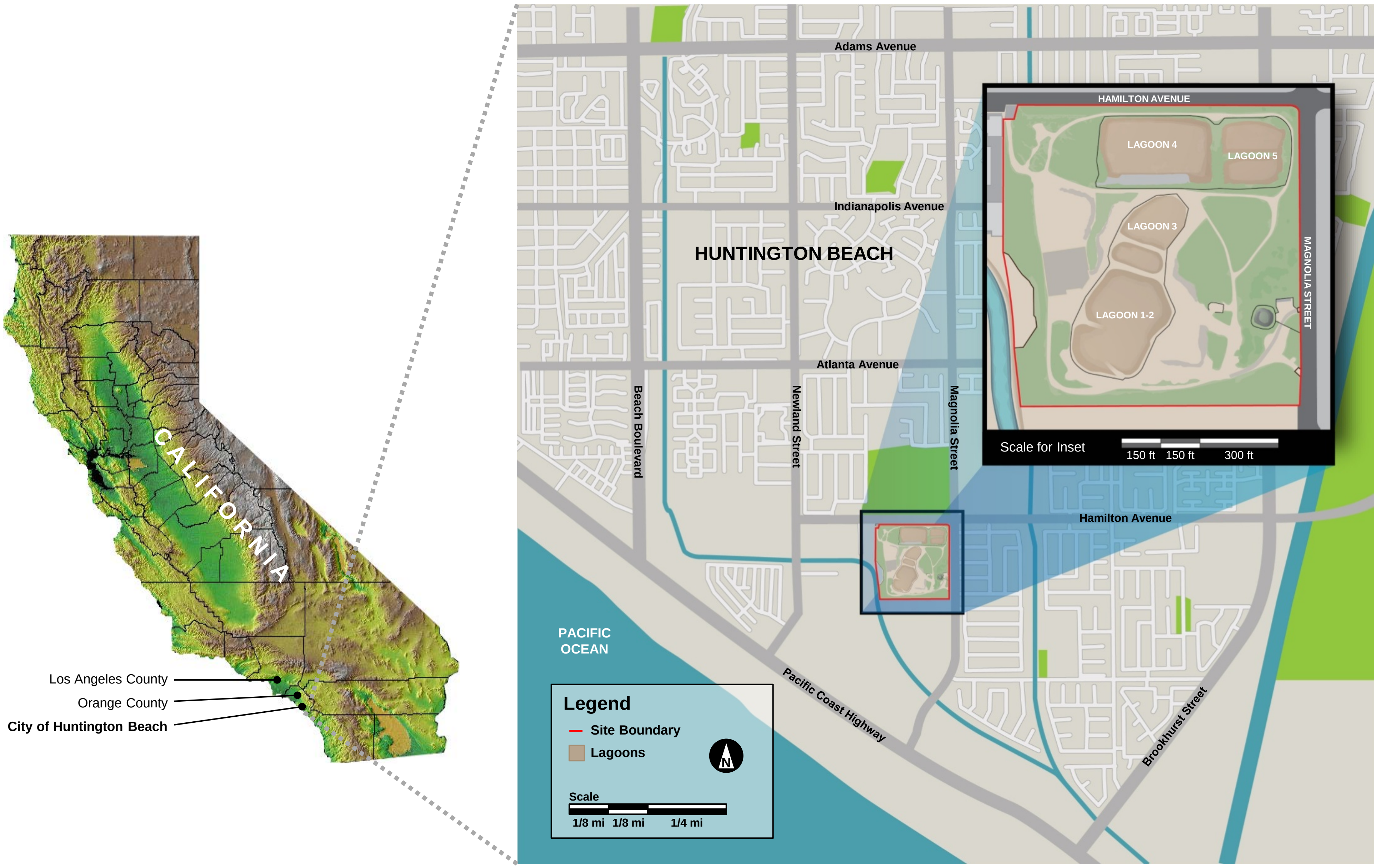
[1] For Alt. 3 and 4 - Includes the maximum volume of waste that would be disposed offsite. The minimum volume would be 2,250 cy.
[2] For Alt. 5 - Includes only solid material disposed offsite - not waste injected via slurry injection well(s).

## TABLE 5-3

## TARGET CHEMICALS
## AND AIR MONITORING METHODS
## ASCON LANDFILL SITE

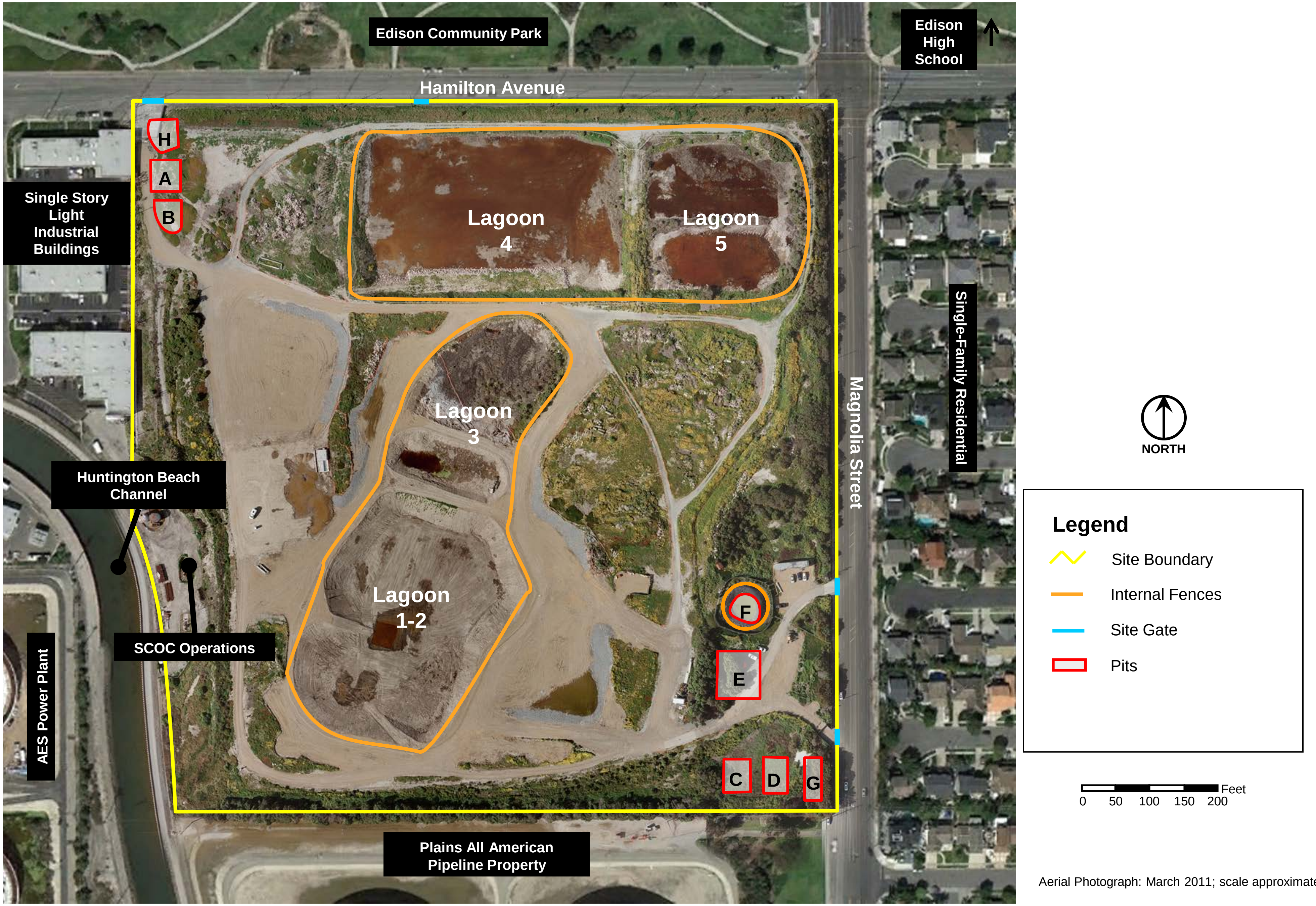
| Target Chemicals and Compound Class | Air Monitoring Method | | |
|---|---|---|---|
| | Real Time | Fixed Laboratory Testing | |
| | | Sample Collection | Test Method (Analytical Holding Times) |
| Volatile Organic Compounds (VOCs)<br><br>Examples:<br>Benzene<br>Ethylbenzene<br>m.p-Xylenes<br>Styrene<br>Toluene | Photoionization Detector (PID) | SUMMA Canister | EPA TO-15<br><br>(30 Days) |
| PAHs<br><br>Examples:<br>Flourene<br>Naphthalene | Dust Monitor | High Volume Sampler with PUF-XAD2® Cartridge | TO-13A<br><br>(7 Days) |
| Metals<br><br>Examples:<br>Arsenic<br>Lead | Dust Monitor | High Volume Sampler with Quartz Filter | EPA Method 6010B<br><br>(180 days) |
| Respirable Particulate Matter ($PM_{10}$) | Dust Monitor | High Volume Sampler with Quartz Filter | 40 CFR 50 |
| Odors | Worker Perception | None | – |

# FIGURES

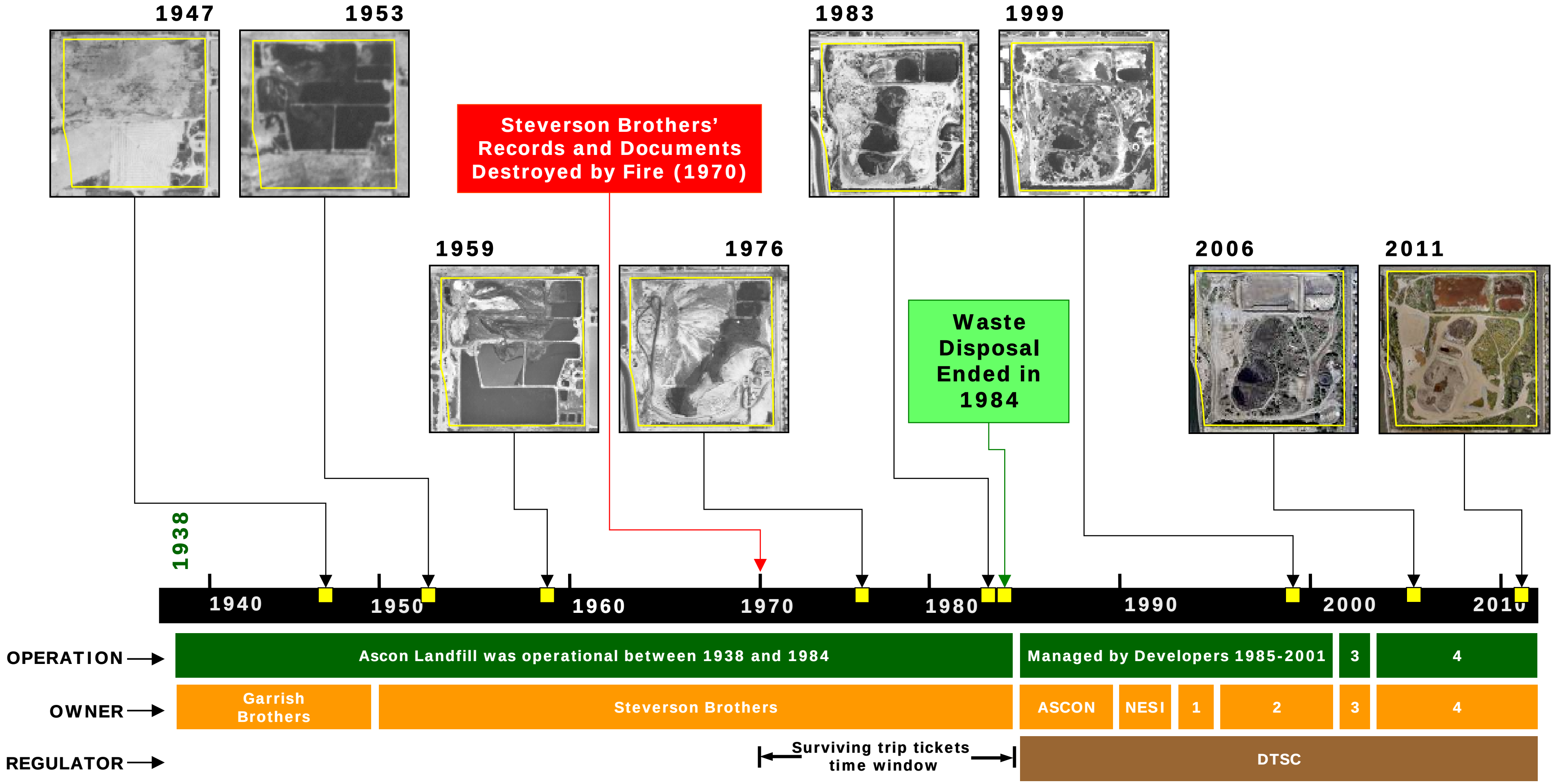



| Site Location Map | | Figure 1-1 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |


| Adjacent Land Uses | | Figure 1-2 |
| --- | --- | --- |
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |

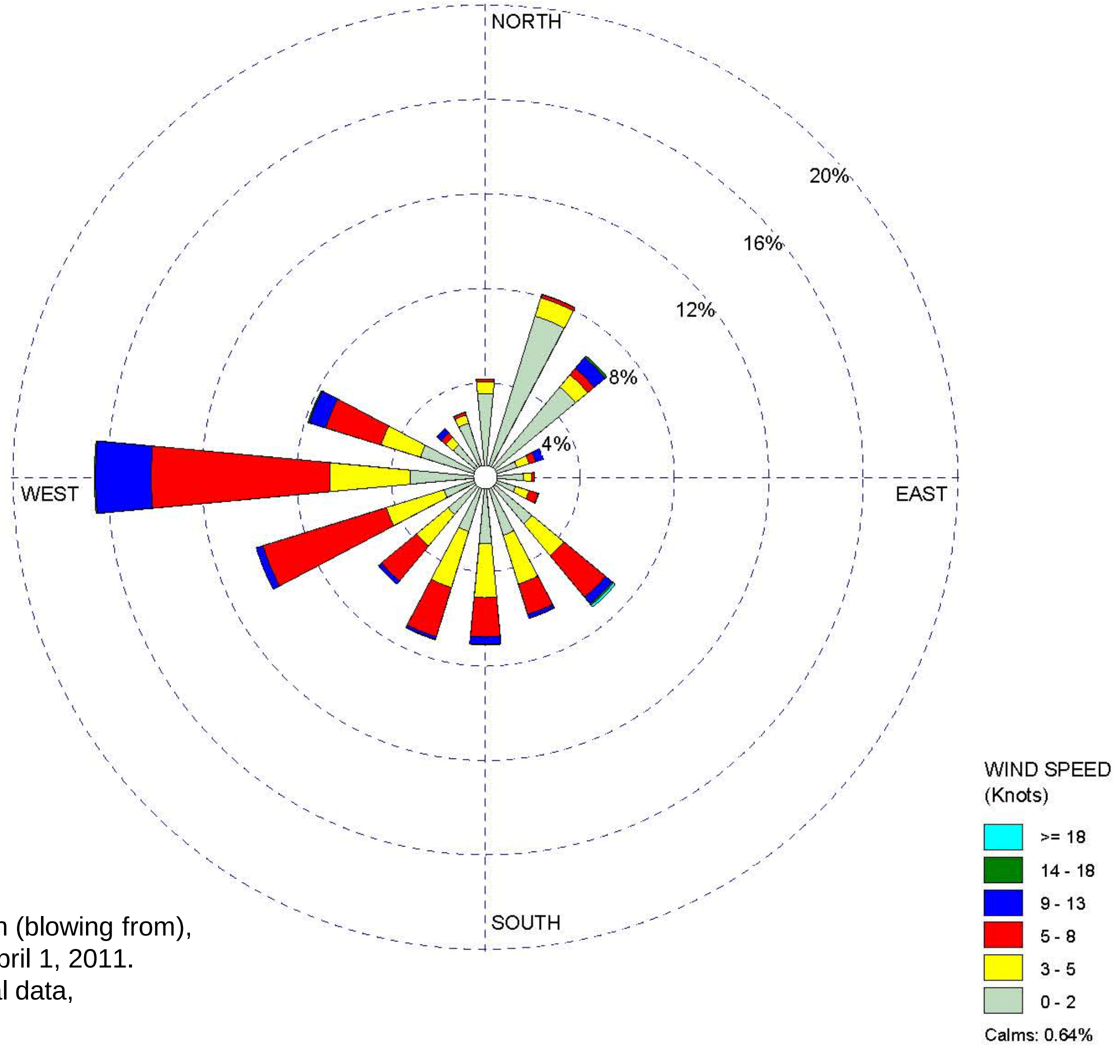



| Site Features | | Figure 1-3 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |




1. 1993-1995: Signal Mortgage Co.
2. 1995-2001: Signal Mortgage Co. & Savannah Resources Corp.
   – Agreement between companies to do RI/FS and RAP
3. 2001-2003: Beach Coast Properties '96 L.P. & Beach Coast Properties '98 L.P.
   – Ownership divided between two entities related to Signal Mortgage
4. May 2003 to Present: Cannery Hamilton Properties, LLC
   – LLC owned by Chevron and ConocoPhillips Company

| Site Timeline | | Figure 1-4 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |




Wind speed and direction (blowing from),
July 26, 2010, through April 1, 2011.
From IRM meteorological data,
Geosyntec Consultants

| **Wind Rose Diagram** | | **Figure 1-5** |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | PROJECT NAVIGATOR, LTD.® |


All elevations are approximate and in feet above mean sea level (NAVD88)

| Site Topography -- 2011 | | Figure 1-6 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |

N

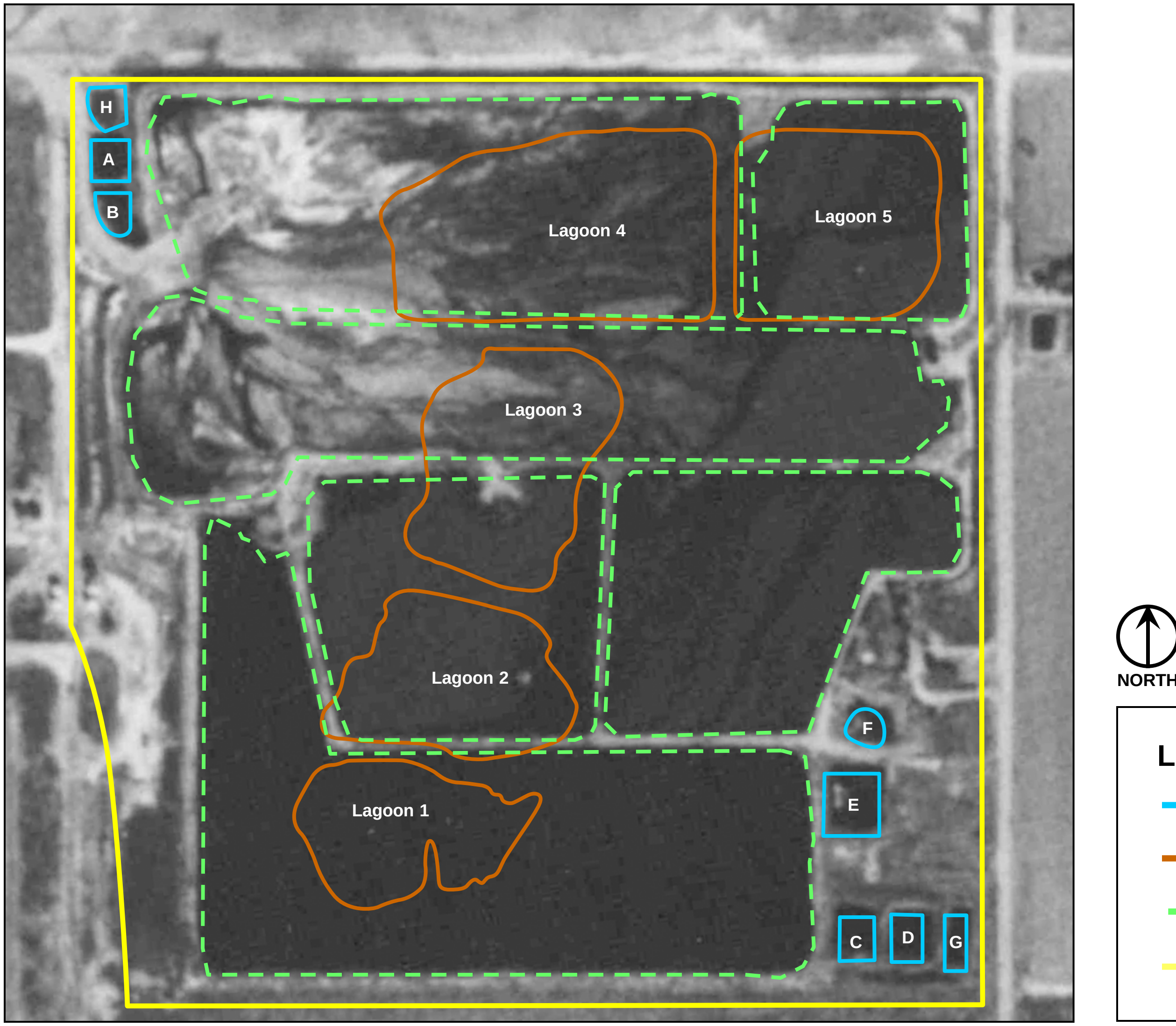
CHP Property Line

0 150' 300'

SCALE IN FEET

Aerial Photograph -- March, 2011, after completion of IRM activities
Map prepared by Geosyntec Consultants

| **Sample Location Map** | | **Figure 2-1** |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd. |

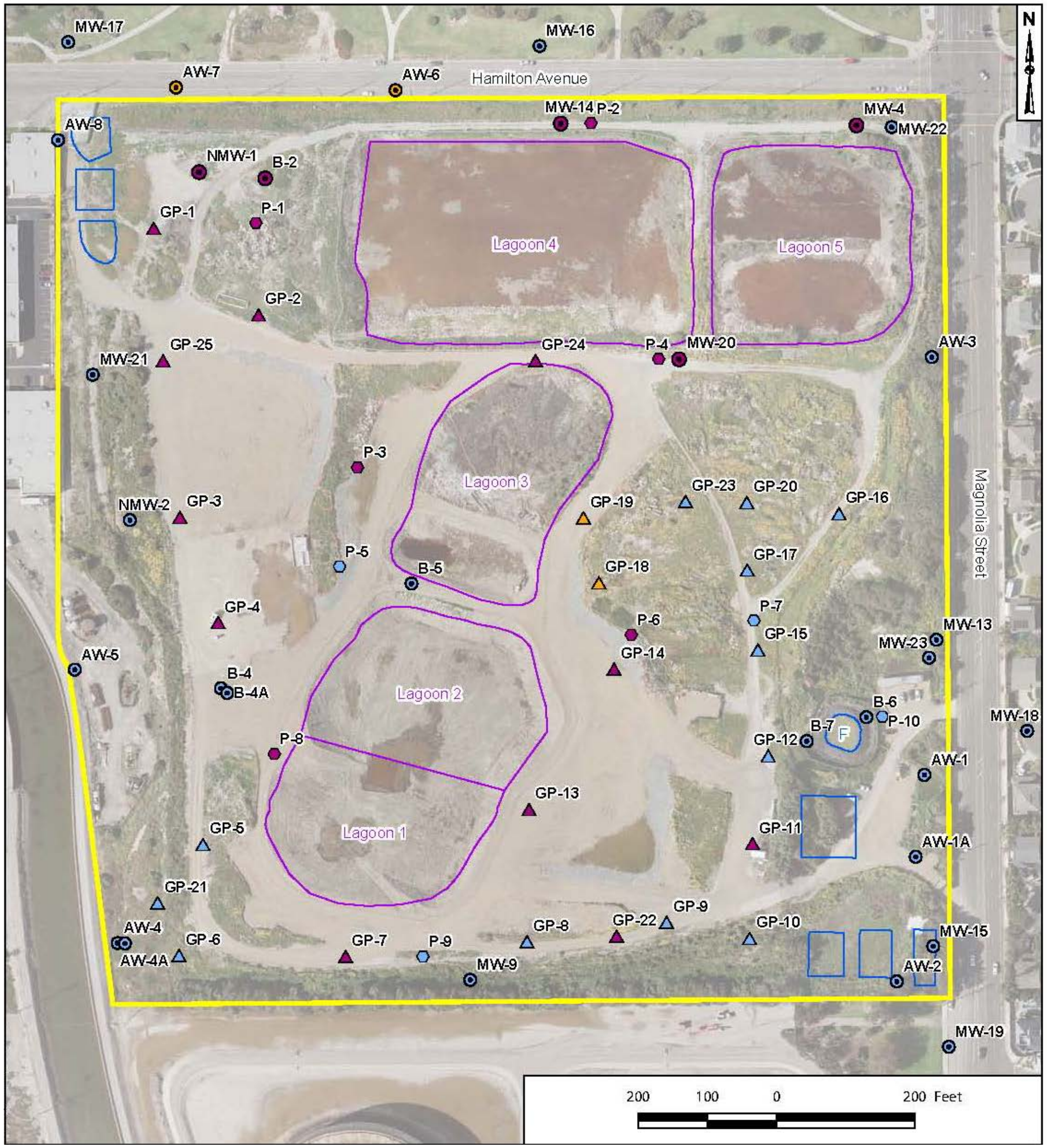



## Legend

- Pits
- Former Lagoon Borders (2004)
- Former Lagoon Borders (1958)
- Ascon Landfill Site Boundaries

0 100 200 400 600 800 Feet

| Site Aerial Photograph -- 1958 | | Figure 2-2 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |

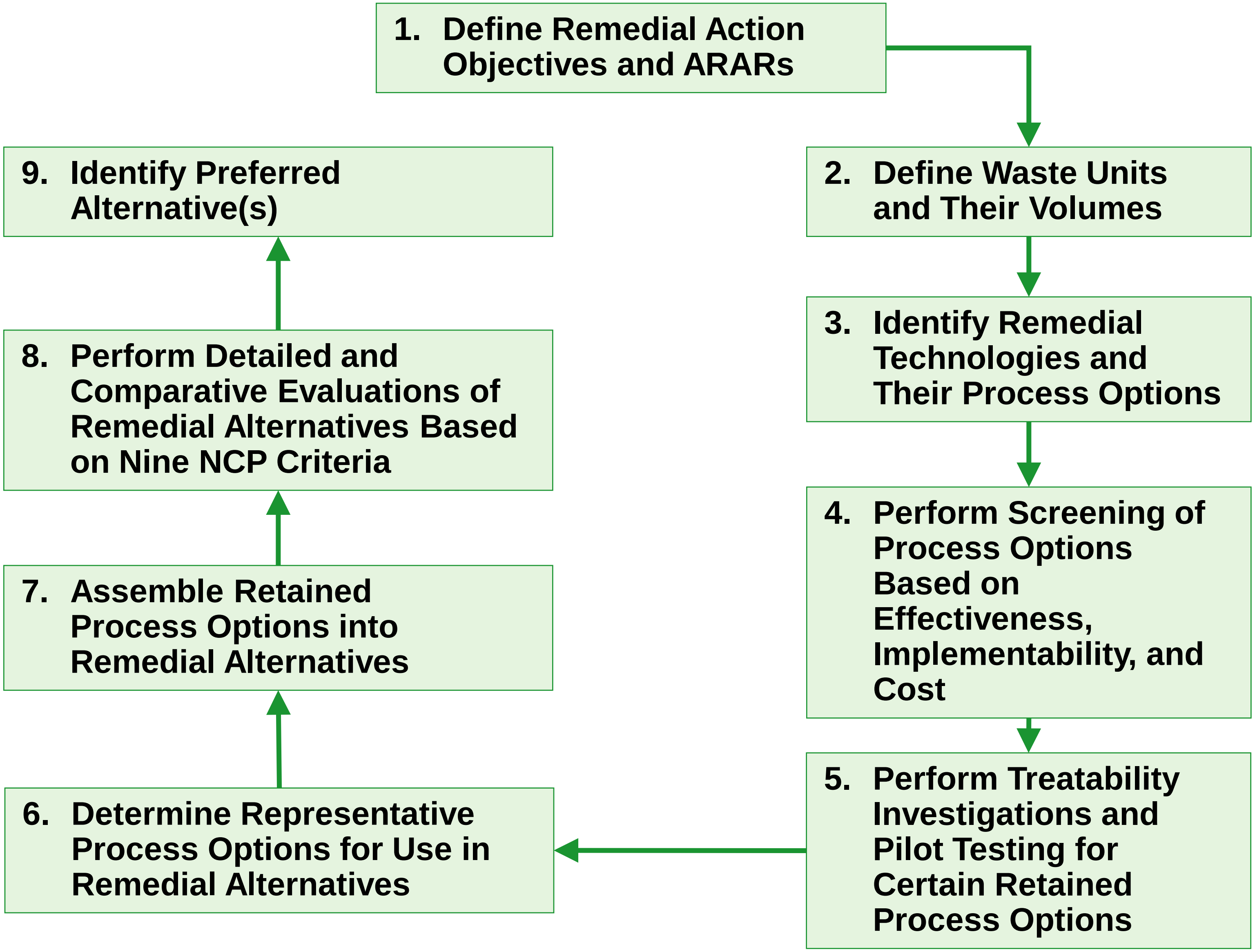



Legend

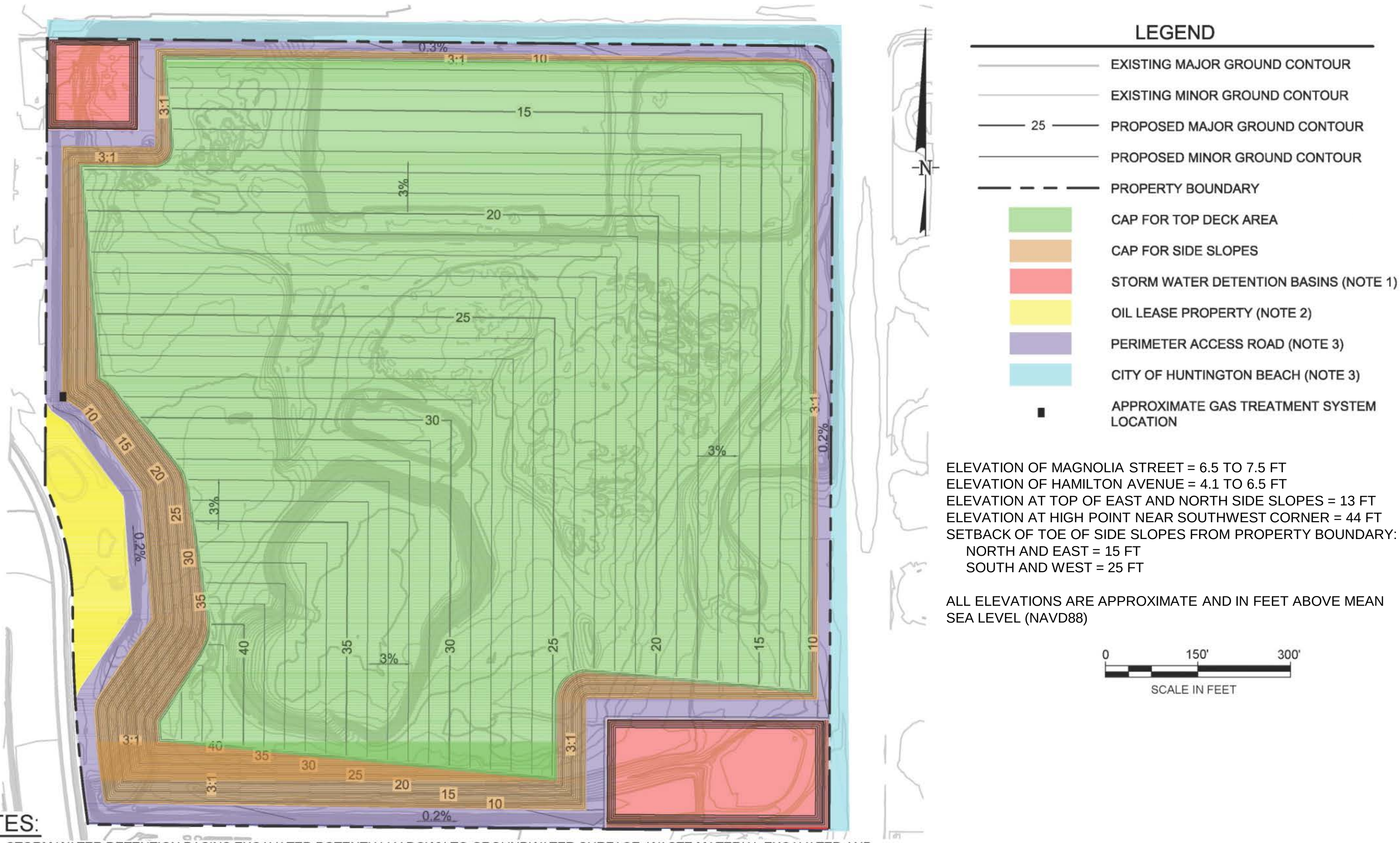
- Geoprobe Location
- Piezometer Location
- Well Location
- Covered Geoprobe
- Covered Well
- Properly Destroyed Geoprobe
- Properly Destroyed Piezometer
- Properly Destroyed Well
- Historical Pit
- Lagoon
- Site Boundary

Source: Interim Groundwater Monitoring Report – March 2013, Geosyntec Consultants, May 10, 2013

| Groundwater Monitoring Well Locations | | Figure 2-3 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | PROJECT NAVIGATOR, LTD.® |




| The Feasibility Study Process | | Figure 5-1 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd. |



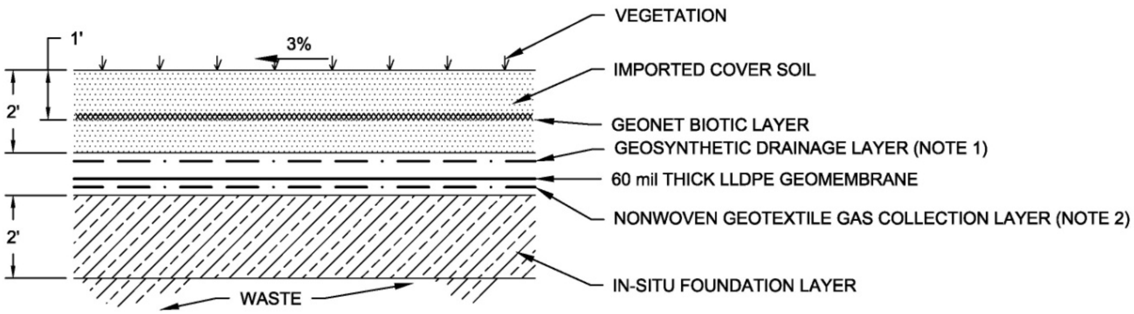

## NOTES:

1. STORM WATER DETENTION BASINS EXCAVATED POTENTIALLY DOWN TO GROUNDWATER SURFACE. WASTE MATERIAL EXCAVATED AND RECONSOLIDATED UNDER FINAL COVER.
2. OIL LEASE PROPERTY WASTE MATERIAL, RELATED TO ASCON OPERATIONS, IF PRESENT, EXCAVATED AND RECONSOLIDATED UNDER FINAL COVER OR DISPOSED OFF-SITE AT APPROVED DISPOSAL FACILITY (DEPENDING ON TIMING OF CLOSURE CONSTRUCTION AND LEASE STATUS).
3. PERIMETER ROAD AND CITY OF HUNTINGTON BEACH PARCEL WASTE MATERIAL EXCAVATED TO A MAXIMUM DEPTH OF GROUND WATER SURFACE AND RECONSOLIDATED UNDER FINAL COVER.

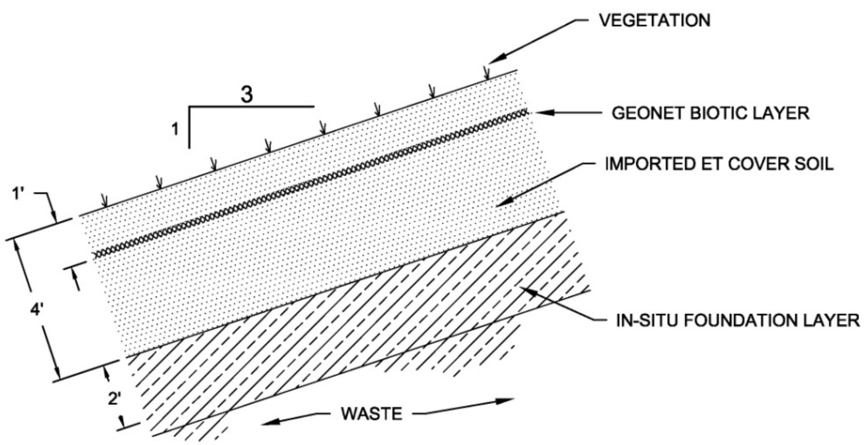
| | | |
|---|---|---|
| **Proposed Top of Final Cover** | | **Figure 5-2** |
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |


Simulated view of proposed remedy from northeast corner of intersection of Magnolia Street and Hamilton Avenue.

| | | |
|---|---|---|
| **Visualization of Preferred Remedy** | | **Figure 5-3** |
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | Project Navigator, Ltd.® |




PROFILE OF PROPOSED CAP FOR TOP DECK
(GEOMEMBRANE)



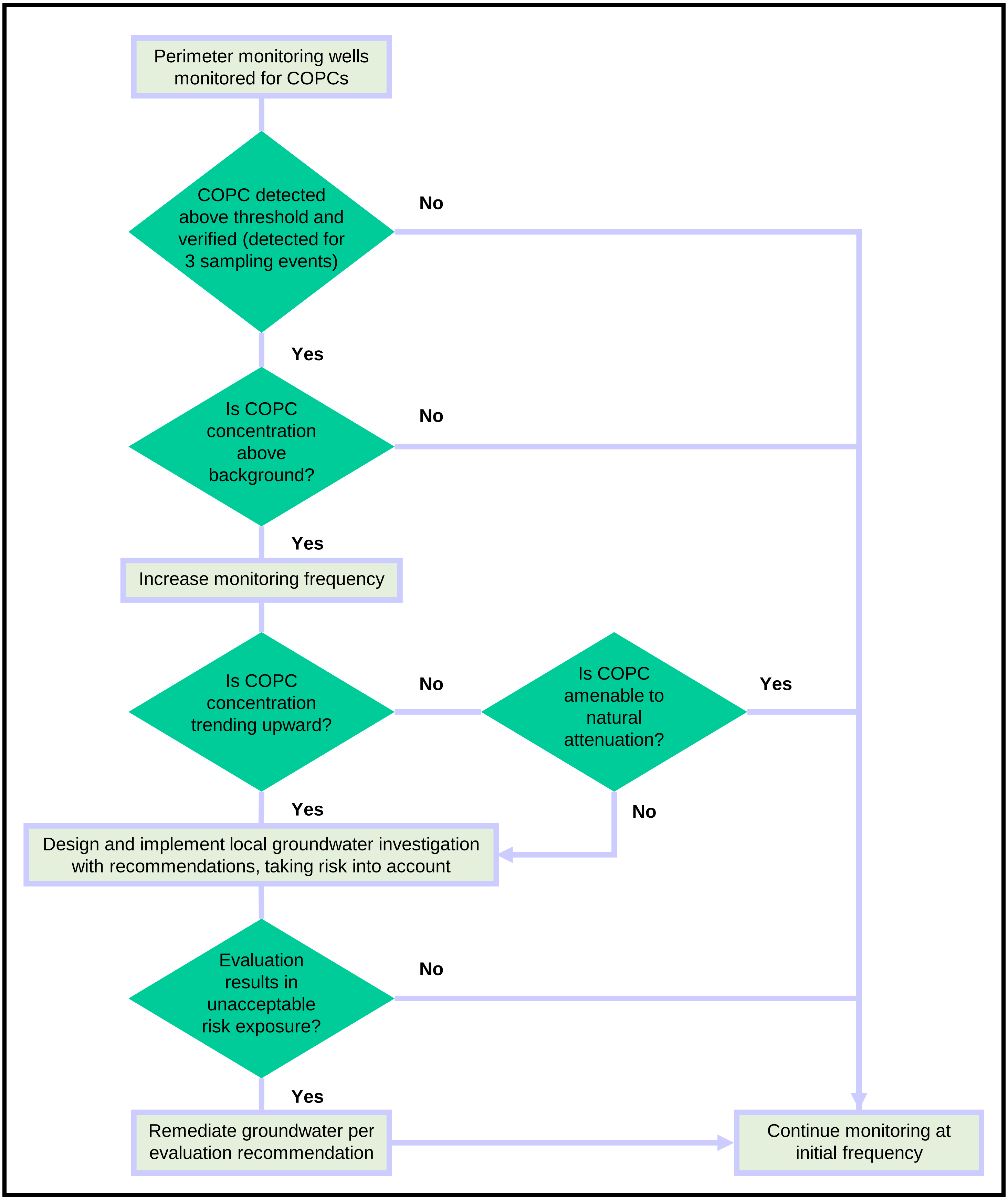

PROFILE OF PROPOSED CAP ON SIDE SLOPES
(EVAPOTRANSPIRATIVE)

NOTES:

1. DRAINAGE LAYER MATERIAL MAY BE NONWOVEN GEOTEXTILE OR GEOCOMPOSITE AND STRIP COMPOSITE, IF NECESSARY, AS DETERMINED DURING FINAL DESIGN.

2. GAS COLLECTION LAYER TO BE UNDERLAIN BY GEOCOMPOSITE STRIP AND PIPE NETWORK, TO COLLECT AND CONVEY GAS TO TREATMENT SYSTEM, AS DETERMINED DURING FINAL DESIGN.

| **Proposed Final Cover Profiles** | | **Figure 5-4** |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | PROJECT NAVIGATOR, LTD.® |




| Groundwater Contingency Program | | Figure 5-5 |
|---|---|---|
| Final Remedial Action Plan<br>Ascon Landfill Site, Huntington Beach, California | June 2015 | PROJECT NAVIGATOR, LTD. |

# APPENDICES

# APPENDIX A
# Administrative Record

Prepared by DTSC

# ADMINISTRATIVE RECORD

# ASCON LANDFILL SITE

# Huntington Beach, California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- Geosyntec Consultants, Interim Groundwater Monitoring Report – March 2012, May 1, 2012.
- Geosyntec Consultants, Interim Groundwater Monitoring Report – September 2012, December 20, 2012.
- Department of Toxic Substances Control (DTSC), Initial Study-(NOP- Notice of Preparation), April 4 to May 3, 2013 public review period.
- Department of Toxic Substances Control (DTSC), Fact Sheet (NOP), March 28, 2013.
- Department of Toxic Substances Control (DTSC), Newspaper notice (NOP), Huntington Beach Independent and HB Wave, April 4, 2013.
- Department of Toxic Substances Control (DTSC), Scoping Meetings, April 23 and May 1, 2013.
- Department of Toxic Substances Control (DTSC), Public comments on the Initial Study-NOP, May 3, 2013.
- Project Navigator, Ltd., Draft Remedial Action Plan, August 20, 2013.
- Department of Toxic Substances Control (DTSC), Draft EIR, August 29th – October 14th, 2013 public review period.
- Department of Toxic Substances Control (DTSC), Fact Sheet notice (Notice of Availability - NOA) August 28, 2013.
- Department of Toxic Substances Control (DTSC), Newspaper notice (NOA), Huntington Beach Independent and HB Wave, August 29, 2013.
- Department of Toxic Substances Control (DTSC), Public meeting, September 12, 2013.
- Department of Toxic Substances Control (DTSC), Comment letters 01 to 27, September 12, 2013.
- Department of Toxic Substances Control (DTSC), Transcript of the public meeting, September 12, 2013.
- Department of Toxic Substances Control (DTSC), June 2014 Fact Sheet, June 6, 2014.
- Department of Toxic Substances Control (DTSC), Recirculated Draft EIR (REIR), October 6, 2014 – November 21, 2014, public review period.
- Department of Toxic Substances Control (DTSC), Fact Sheet notice, Notice of Availability – NOA, October 3, 2014.
- Department of Toxic Substances Control (DTSC), Newspaper notice (NOA) Huntington Beach Independent and HB Wave, October 2, 2014.
- Department of Toxic Substances Control (DTSC), Public meeting, November 6, 2014.
- Department of Toxic Substances Control (DTSC), Comment letters 29 to 61 on the REIR, (Letter 28 is the Nov. 6 meeting transcript), November 21, 2014.

- Department of Toxic Substances Control (DTSC), Transcript of the public meeting, November 6, 2014.

- Department of Toxic Substances Control (DTSC), Final EIR, May 2015.

- Department of Toxic Substances Control (DTSC), Letter to Commenters, May 1, 2015.

- Department of Toxic Substances Control (DTSC), All comments on Draft EIR and REIR and DTSC responses (Chapter 2 of the Final EIR), May 2015.

# APPENDIX B
# Preliminary Non-Binding Allocation of Responsibility (NBAR)

The Ascon Landfill Site RP Group agrees to be responsible for 100% of the remediation costs for the Ascon Site, subject to the identification of additional responsible parties at a later date.

# APPENDIX C

## Summary Tables of Lagoon 1 and 2 Chemical Data

(Includes sample location map [Figure 2] and Tables 2 through 9 from the Technical Memorandum–Interim Removal Measure–Sampling of Lagoons 1 and 2, Geosyntec Consultants, May 27, 2009)


Legend

Lagoon Probing and Sample Location

Additional Lagoon Probing Location

Ascon Site Boundary

*(Depth of Lagoon Material in Feet)*

100 50 0 100 Feet

**Lagoons 1 and 2**
**Probing and Sampling Locations**

**Ascon Landfill Site,**
**Huntington Beach, CA**

Geosyntec consultants

Santa Barbara | May 2009

Figure 2

P:\GIS\SB0320\Projects\april2009\Fig02_lagoon1_2_sampling_locs.mxd April 7, 2009 MTP

Table 2
VOC Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| VOC | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| 1,1,1,2-Tetrachloroethane | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| 1,1,1-Trichloroethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,1,2,2-Tetrachloroethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | **2600** | < 990 |
| 1,1,2-Trichloroethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,1-Dichloroethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,1-Dichloroethylene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| 1,1-Dichloropropene | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,2,3-Trichlorobenzene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| 1,2,3-Trichloropropane | < 5300 | < 5200 | < 4800 | < 4900 | < 5100 | < 4600 | < 4900 | < 4500 | < 5100 | < 5000 |
| 1,2,4-Trichlorobenzene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| 1,2,4-Trimethylbenzene | **66000** | **1500** | **31000** | **53000** | **47000** | **64000** | **37000** | **40000** | **45000** | **50000** |
| 1,2-Dibromo-3-chloropropane | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | **3000** |
| 1,2-Dibromoethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,2-Dichlorobenzene | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,2-Dichloroethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,2-Dichloropropane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,3,5-Trimethylbenzene | **21000** | **12000** | **3500** | **21000** | **17000** | **23000** | **14000** | **7500** | **8100** | **16000** |
| 1,3-Dichlorobenzene | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,3-Dichloropropane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 1,4-Dichlorobenzene | **1800** | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 2,2-Dichloropropane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| 2-Chlorotoluene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| 4-Chlorotoluene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| 4-Isopropyltoluene | **12000** | **7700** | **7700** | **5200** | **5200** | **8800** | **9600** | **7800** | **13000** | **11000** |
| Benzene | **2600** | **8300** | **2100** | **3200** | **2800** | **4000** | **1900** | **3500** | **3000** | **2200** |
| Bromobenzene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Bromochloromethane | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Bromodichloromethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| Bromoform | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Bromomethane | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Carbon tetrachloride | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Chlorobenzene | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| Chloroethane | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Chloroform | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| Chloromethane | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| cis-1,2-Dichloroethene | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| cis-1,3-Dichloropropene | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| Dibromochloromethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | **6900** |
| Dibromomethane | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| Dichlorodifluoromethane | < 2100 | < 2100 | < 1900 | < 1900 | < 2000 | < 1800 | < 2000 | < 1800 | < 2000 | < 2000 |
| Ethylbenzene | **22000** | **48000** | **17000** | **16000** | **18000** | **19000** | **14000** | **14000** | **30000** | **28000** |
| Hexachlorobutadiene | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| Isopropylbenzene | **13000** | **18000** | **7300** | **11000** | **11000** | **9000** | **9300** | **6700** | **11000** | **6800** |
| m,p-Xylene | **32000** | **3200** | **5400** | **34000** | **29000** | **40000** | **18000** | **15000** | **20000** | **24000** |
| Methylene chloride | < 11000 | < 10000 | < 9600 | < 9700 | < 10000 | < 9200 | < 9800 | < 8900 | < 10000 | < 9900 |

Table 2
VOC Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| VOC | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| **Naphthalene** | **29000** | **110000** | **51000** | **25000** | **24000** | **40000** | **27000** | **24000** | 66000 | **33000** |
| **n-Butylbenzene** | < 2700 | **27000** | < 2400 | **7900** | **7400** | < 2300 | **10000** | < 2200 | < 2500 | < 2500 |
| **n-Propylbenzene** | **23000** | **37000** | **14000** | **22000** | **22000** | **17000** | **16000** | **12000** | **21000** | **12000** |
| **o-Xylene** | **17000** | **3500** | **1600** | **11000** | **10000** | **24000** | **8000** | **3300** | **10000** | **16000** |
| **sec-Butylbenzene** | **11000** | **18000** | **8300** | **6100** | **5700** | **7100** | **7800** | **6400** | **11000** | **8000** |
| **Styrene** | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| **tert-Butylbenzene** | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| **Tetrachloroethylene** | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| **Toluene** | **5500** | **1400** | < 960 | **4400** | **3900** | **10000** | < 980 | < 890 | **10000** | **9500** |
| **trans-1,2-Dichloroethylene** | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| **trans-1,3-Dichloropropene** | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| **Trichloroethylene** | < 1100 | < 1000 | < 960 | < 970 | < 1000 | < 920 | < 980 | < 890 | < 1000 | < 990 |
| **Trichlorofluoromethane** | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |
| **Vinyl chloride** | < 2700 | < 2600 | < 2400 | < 2400 | < 2600 | < 2300 | < 2500 | < 2200 | < 2500 | < 2500 |

Analysis by EPA Method 8260B
VOC:  Volatile Organic Compound
All results in µg/kg:  micrograms per kilogram
Detections indicated in **Bold**
dup:  Duplicate

Table 3
SVOC Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| SVOC | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| **1,2,4-Trichlorobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **1,2-Dichlorobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **1,2-Diphenylhydrazine/Azobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **1,3-Dichlorobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **1,4-Dichlorobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2,4,5-Trichlorophenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2,4,6-Trichlorophenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2,4-Dichlorophenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2,4-Dimethylphenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2,4-Dinitrophenol** | < 39000 | < 49000 | < 40000 | < 49000 | < 49000 | < 49000 | < 20000 | < 25000 | < 25000 | < 79000 |
| **2,4-Dinitrotoluene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2,6-Dinitrotoluene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2-Chloronaphthalene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2-Chlorophenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2-Methyl-4,6-dinitrophenol** | < 25000 | < 31000 | < 25000 | < 31000 | < 31000 | < 31000 | < 13000 | < 16000 | < 16000 | < 50000 |
| **2-Methylnaphthalene** | **26000** | **110000** | **44000** | **49000** | **32000** | **41000** | **25000** | **28000** | **43000** | **93000** |
| **2-Methylphenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2-Nitroaniline** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **2-Nitrophenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **3,3'-Dichlorobenzidine** | < 50000 | < 62000 | < 50000 | < 62000 | < 62000 | < 62000 | < 25000 | < 31000 | < 31000 | < 99000 |
| **4-Bromophenyl phenyl ether** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **4-Chloro-3-methylphenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **4-Chloroaniline** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **4-Chlorophenyl phenyl ether** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **4-Nitroaniline** | < 50000 | < 62000 | < 50000 | < 62000 | < 62000 | < 62000 | < 25000 | < 31000 | < 31000 | < 99000 |
| **4-Nitrophenol** | < 50000 | < 62000 | < 50000 | < 62000 | < 62000 | < 62000 | < 25000 | < 31000 | < 31000 | < 99000 |
| **Acenaphthene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Acenaphthylene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Aniline** | < 25000 | < 31000 | < 25000 | < 31000 | < 31000 | < 31000 | < 13000 | < 16000 | < 16000 | < 50000 |
| **Anthracene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Benzidine** | < 39000 | < 49000 | < 40000 | < 49000 | < 49000 | < 49000 | < 20000 | < 25000 | < 25000 | < 79000 |
| **Benzo(a)anthracene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Benzo(a)pyrene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Benzo(b)fluoranthene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Benzo(g,h,i)perylene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Benzo(k)fluoranthene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Benzoic acid** | < 50000 | < 62000 | < 50000 | < 62000 | < 62000 | < 62000 | < 25000 | < 31000 | < 31000 | < 99000 |
| **Benzyl alcohol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Bis(2-chloroethoxy)methane** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Bis(2-chloroethyl)ether** | < 10000 | < 12000 | < 10000 | < 12000 | < 13000 | < 12000 | < 5000 | < 6200 | < 6300 | < 20000 |
| **Bis(2-chloroisopropyl)ether** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Bis(2-ethylhexyl)phthalate** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Butyl benzyl phthalate** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Chrysene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |

Table 3
SVOC Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| SVOC | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **L1-E** | **L1-N** | **L1-S** | **L1-W** | **L1-W-dup** | **L2-E** | **L2-N** | **L2-S** | **L2-W** | **L2-W-dup** |
| **Dibenzo(a,h)anthracene** | < 25000 | < 31000 | < 25000 | < 31000 | < 31000 | < 31000 | < 13000 | < 16000 | < 16000 | < 50000 |
| **Dibenzofuran** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Diethylphthalate** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Dimethylphthalate** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Di-n-butylphthalate** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Di-n-octylphthalate** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Fluoranthene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Fluorene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Hexachlorobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Hexachlorobutadiene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Hexachlorocyclopentadiene** | < 50000 | < 62000 | < 50000 | < 62000 | < 62000 | < 62000 | < 25000 | < 31000 | < 31000 | < 99000 |
| **Hexachloroethane** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Indeno(1,2,3-c,d)pyrene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Isophorone** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **m-Nitroanaline** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Naphthalene** | < 20000 | **37000** | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | **14000** | < 40000 |
| **Nitrobenzene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **N-Nitroso-Di-n-propylamine** | < 15000 | < 19000 | < 15000 | < 19000 | < 19000 | < 19000 | < 7500 | < 9300 | < 9400 | < 30000 |
| **N-Nitrosodiphenylamine** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | **100000** | < 13000 | < 40000 |
| **p-Cresol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Pentachlorophenol** | < 50000 | < 62000 | < 50000 | < 62000 | < 62000 | < 62000 | < 25000 | < 31000 | < 31000 | < 99000 |
| **Phenanthrene** | < 20000 | **29000** | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Phenol** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |
| **Pyrene** | < 20000 | < 25000 | < 20000 | < 25000 | < 25000 | < 25000 | < 10000 | < 12000 | < 13000 | < 40000 |

Analysis by EPA Method 8270C
SVOC: Semi-Volatile Organic Compound
All results in µg/kg: micrograms per kilogram
Detections indicated in **Bold**
dup: Duplicate

Table 4
Metal Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| METAL | Sample Identification | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-S-repCS | L1-S-repTA | L1-W | L1-W-dupTA | L2-E | L2-E-repCS | L1-E-repTA | L2-N | L2-S | L2-W | L2-W-dupTA |
| Antimony | < 10 | < 100 | < 10 | -- | -- | < 10 | < 10 | 22 | -- | -- | < 10 | < 10 | < 10 | < 10 |
| Arsenic | 31 | 45 | 21 | -- | -- | 16 | 16 | 95 | -- | -- | 50 | 47 | 71 | 53 |
| Barium | 3100 | 640 | 2800 | -- | -- | 810 | 3900 | 650 | -- | -- | 3600 | 1100 | 460 | 990 |
| Beryllium | < 0.50 | < 5.0 | < 0.50 | -- | -- | < 0.50 | < 0.50 | < 0.50 | -- | -- | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Cadmium | 170 | 21 | 3.1 | -- | -- | 40 | 13 | 12 | -- | -- | 1.8 | 2.5 | 77 | 59 |
| Chromium | 280 | 220 | 100 | -- | -- | 45 | 59 | 120 | -- | -- | 120 | 150 | 160 | 120 |
| Cobalt | 2.5 | < 10 | 3.5 | -- | -- | 2.7 | 1.8 | 9.3 | -- | -- | 2.1 | 3.4 | 3.7 | 4.3 |
| Copper | 31 | 58 | 53 | -- | -- | 22 | 22 | 44 | -- | -- | 23 | 31 | 49 | 46 |
| Lead | 75 | 1400 | 1200 | 1560 | 950 | 90 | 92 | 3500 | 617 | 910 | 160 | 260 | 230 | 370 |
| Mercury | 0.58 | 2.5 | 1.2 | -- | -- | 0.62 | 0.23 | 0.57 | -- | -- | 0.39 | 0.18 | 0.27 | 0.29 |
| Molybdenum | 5 | < 20 | 3.5 | -- | -- | 5 | 3.8 | 3.8 | -- | -- | < 2.0 | 2.3 | 3.9 | 4 |
| Nickel | 35 | 32 | 26 | -- | -- | 46 | 39 | 35 | -- | -- | 23 | 32 | 55 | 59 |
| Selenium | < 2.0 | < 20 | < 2.0 | -- | -- | < 2.0 | < 2.0 | < 2.0 | -- | -- | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Silver | 39 | < 10 | 1.1 | -- | -- | 2.4 | 1.3 | 1.4 | -- | -- | < 1.0 | < 1.0 | 3.1 | 2.6 |
| Thallium | < 10 | < 100 | < 10 | -- | -- | < 10 | < 10 | < 10 | -- | -- | < 10 | < 10 | < 10 | < 10 |
| Vanadium | 23 | 23 | 21 | -- | -- | 20 | 29 | 27 | -- | -- | 19 | 25 | 20 | 52 |
| Zinc | 190 | 6800 | 520 | -- | -- | 130 | 110 | 1500 | -- | -- | 130 | 180 | 1100 | 1100 |

Analysis by EPA Method 6010B
repCS: Replicate analyses performed on sample by Calscience Laboratories
dup/repTA: Duplicate (dup) or replicate (rep) analyses performed on sample by Test America
All results in mg/kg: milligrams per kilogram
dup: Duplicate

Table 5
STLC / TCLP Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| METAL - STLC | Sample Identification | | | | | | | | | | | | | | STLC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-S-repCS | L1-S-repTA | L1-W | L1-W-dupTA | L2-E | L2-E-repCS | L2-E-repTA | L2-N | L2-S | L2-W | L2-W-dupTA | |
| Arsenic | 1.2 | 1 | 0.84 | -- | -- | 1 | 0.53 | 1.9 | -- | -- | 0.96 | 1.6 | 0.88 | 1.2 | 5 |
| Barium | 38 | 35 | 40 | -- | -- | 24 | 21 | 45 | -- | -- | 25 | 27 | 47 | 56 | 100 |
| Cadmium | < 0.10 | < 0.10 | < 0.10 | -- | -- | 2.5 | 0.88 | < 0.10 | -- | -- | < 0.10 | < 0.10 | < 0.10 | < 0.10 | 1 |
| Chromium | 13 | 11 | 3.8 | -- | -- | 2.4 | 1.2 | 2.8 | -- | -- | 2.9 | 3 | 5.4 | 4.4 | 5 |
| Lead | 1.2 | 2.6 | 26 | 26.2 | -- | 3 | 2 | 17 | 1.22 | -- | 3.6 | 0.18 | 0.25 | 0.24 | 5 |
| Mercury | NA | < 0.0020 | NA | -- | -- | NA | NA | NA | -- | -- | NA | NA | NA | NA | 0.2 |
| Nickel | NA | 0.33 | NA | -- | -- | NA | NA | NA | -- | -- | NA | NA | NA | NA | 20 |
| Zinc | NA | 18 | NA | -- | -- | NA | NA | NA | -- | -- | NA | NA | NA | NA | 250 |

| METAL - TCLP | Sample Identification | | | | | | | | | | | | | | TCLP Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-S-repCS | L1-S-repTA | L1-W | L1-W-dupTA | L2-E | L2-E-repCS | L2-E-repTA | L2-N | L2-S | L2-W | L2-W-dupTA | |
| Barium | 10 | 17 | 20 | -- | -- | 5.8 | 6.7 | 17 | -- | -- | 11 | 7.8 | 27 | 24 | 100 |
| Cadmium | <0.10 | <0.10 | <0.10 | -- | -- | 0.16 | 0.34 | <0.10 | -- | -- | <0.10 | <0.10 | <0.10 | <0.10 | 1 |
| Chromium | 0.49 | 0.32 | 0.19 | -- | -- | <0.10 | 0.13 | 0.19 | -- | -- | 0.21 | 0.18 | 0.36 | 0.26 | 5 |
| Lead | 1.1 | 3.7 | 19 | 2.5 | 12 | 0.52 | 0.67 | 16 | 0.67 | 3 | 0.18 | 0.35 | 0.76 | 0.42 | 5 |

Analysis by EPA Method 6010B/7470A
All results in mg/L: milligrams per liter
STLC: Soluble Threshold Limits Concentration
TCLP: Toxicity Characteristic Leaching Procedure
NA: Not Analyzed
repCS: Replicate analyses performed on sample by Calscience Laboratories
dup/repTA: Duplicate (dup) or replicate (rep) analyses performed on sample by Test America
Concentration above STLC or TCLP Limit

Table 6
Organochlorine Pesticide Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| Pesticide | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| 4,4'-DDD | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| 4,4'-DDE | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| 4,4'-DDT | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Aldrin | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| alpha-BHC | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| beta-BHC | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Chlordane, Total | < 1500 | < 3000 | < 1500 | < 1900 | < 1900 | < 3000 | < 1500 | < 3000 | < 3000 | < 3000 |
| delta-BHC | < 300 | < 600 | < 300 | < 370 | < 380 | < 600 | < 300 | < 600 | < 600 | < 600 |
| Dieldrin | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Endosulfan I | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Endosulfan II | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Endosulfan sulfate | < 300 | < 600 | < 300 | < 370 | < 380 | < 600 | < 300 | < 600 | < 600 | < 600 |
| Endrin | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Endrin aldehyde | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Endrin ketone | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| gamma-BHC (Lindane) | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Heptachlor | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Heptachlor epoxide | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Methoxychlor | < 150 | < 300 | < 150 | < 190 | < 190 | < 300 | < 150 | < 300 | < 300 | < 300 |
| Toxaphene | < 6000 | < 12000 | < 6000 | < 7500 | < 7500 | < 12000 | < 6000 | < 12000 | < 12000 | < 12000 |

Analysis by EPAMethod 8081A
All results in µg/kg:  micrograms per kilogram
dup:  Duplicate

Table 7
TPH Distribution Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| Hydrocarbon Distribution | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| C8 - C9 | 1500 | < 3500 | < 520 | < 1000 | 1600 | 790 | < 520 | < 1000 | 790 | < 520 |
| C10 - C11 | 2800 | 9700 | 1500 | < 1000 | 3600 | 2400 | < 520 | 1700 | 2400 | 1500 |
| C12 - C13 | 3800 | 19000 | 3500 | 2100 | 6400 | 5800 | 980 | 3700 | 5100 | 3500 |
| C14 - C15 | 4400 | 23000 | 4400 | 3200 | 7800 | 6300 | 1800 | 4500 | 5900 | 4500 |
| C16 - C17 | 4500 | 21000 | 5000 | 5100 | 7900 | 5700 | 3400 | 6600 | 5700 | 4900 |
| C18 - C19 | 3800 | 17000 | 4500 | 5700 | 6600 | 4500 | 4100 | 7400 | 4900 | 4300 |
| C20 - C21 | 2700 | 12000 | 3200 | 4400 | 4700 | 3400 | 3100 | 5600 | 3700 | 3200 |
| C22 - C23 | 2200 | 9600 | 2600 | 3800 | 3900 | 2700 | 2500 | 4200 | 3200 | 2400 |
| C24 - C25 | 1800 | 7600 | 2000 | 3300 | 3000 | 2300 | 2500 | 3600 | 2700 | 1800 |
| C26 - C27 | 2400 | 6700 | 2100 | 3900 | 4300 | 2700 | 3100 | 4300 | 3300 | 2400 |
| C28 - C29 | 1300 | 4100 | 1400 | 1800 | 1900 | 1300 | 1400 | 1900 | 1400 | 980 |
| C30 - C31 | 1800 | 4500 | 1800 | 2500 | 2300 | 1700 | 1900 | 2800 | 1900 | 1400 |
| C32 - C35 | 2300 | 4300 | 2400 | 2700 | 3200 | 2200 | 2400 | 3600 | 2200 | 1700 |
| C36 - C40 | 1600 | 3800 | 1600 | 2000 | 2800 | 1600 | 1700 | 2900 | 1800 | 1400 |
| C8 - C40 | 37000 | 140000 | 36000 | 42000 | 60000 | 44000 | 29000 | 53000 | 45000 | 34000 |

Analysis by EPA Method 8015B
TPH: Total Petroleum Hydrocarbons
C36-C40: Carbon Chain range
All results in mg/kg: milligrams per kilogram
dup: Duplicate

Table 8
Polychlorinated Biphenyl Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

| Polychlorinated Biphenyls | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| Aroclor 1016 | < 150 | < 140 | < 130 | < 150 | < 290 | < 150 | < 140 | < 150 | < 150 | < 150 |
| Aroclor 1221 | < 150 | < 140 | < 130 | < 150 | < 290 | < 150 | < 140 | < 150 | < 150 | < 150 |
| Aroclor 1232 | < 150 | < 140 | < 130 | < 150 | < 290 | < 150 | < 140 | < 150 | < 150 | < 150 |
| Aroclor 1242 | < 150 | 1000 | 780 | 680 | 1300 | 430 | 350 | 680 | 700 | 620 |
| Aroclor 1248 | < 150 | < 140 | < 130 | < 150 | < 290 | < 150 | < 140 | < 150 | < 150 | < 150 |
| Aroclor 1254 | < 150 | 360 | 410 | 790 | 1600 | 190 | 280 | < 150 | 360 | 270 |
| Aroclor 1260 | < 150 | < 140 | 200 | 430 | 840 | < 150 | < 140 | 980 | 150 | < 150 |

Analysis by EPA Method 8082
All results in µg/kg:  micrograms per kilogram
dup:  Duplicate

Table 9
pH, Bioassay, Paint Filter, and Specific Gravity Analysis Results - Lagoon Material
Samples Collected on January 28, 2009

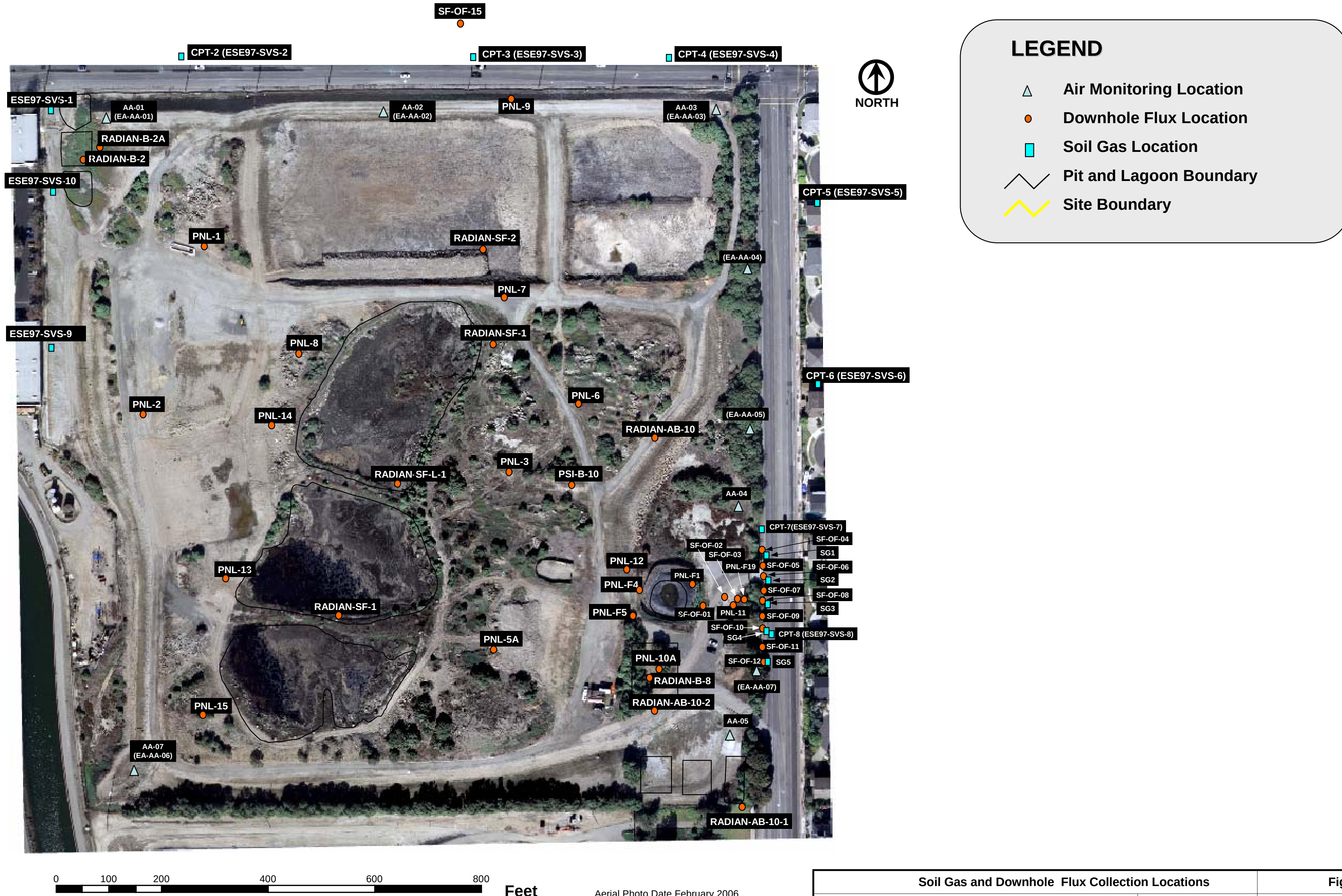
| Analysis | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1-E | L1-N | L1-S | L1-W | L1-W-dup | L2-E | L2-N | L2-S | L2-W | L2-W-dup |
| pH | 8.66 | 8.05 | 8.02 | 7.94 | NA | 8.14 | 7.99 | 7.99 | 8.22 | NA |
| Bioassay | Passed | Passed | Passed | Passed | NA | Passed | Passed | Passed | Passed | NA |
| Free Liquid (Paint Filter Test) | Not Present | Not Present | Not Present | Not Present | Not Present | Not Present | Not Present | Not Present | Not Present | Not Present |
| Specific Gravity | 1.38 | 1.14 | 1.41 | 1.26 | NA | 1.12 | 1.19 | 1.04 | 1.56 | NA |

"Passed" = LC50 > 750 mg/L: Less than 40% fathead minnows dead in 750 milligrams/liter concentration
NA: Not Analyzed
dup: Duplicate

# APPENDIX D

# Summary Tables of Soil Gas and Down-hole Flux Analyses

(Includes map of sample locations [Figure 1] from the Soil Vapor Technical Memorandum, Geosyntec Consultants, March 3, 2006, and soils gas and down-hole flux data, as indicated)




| Soil Gas and Downhole Flux Collection Locations | | Figure 1 |
|---|---|---|
| Ascon Landfill Site, Huntington Beach, California | March 3, 2006 | Project Navigator, Ltd. |

# Remedial Investigation (ESE, 1997)
# Soil Vapor Summary Tables

## Table 4.8-1
## Summary Statistics for Soil Gas (ppbV)

| Analyte (units ppbV unless otherwise noted) | No. of Samples Tested | No. of Samples with Detected Concentrations | Maximum Concentration | | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| **VOAs** | | | | | |
| 1-OCTENE | 1 | 1 | 5,820 | | NA |
| 2,2,4-TRIMETHYLPENTANE | 2 | 2 | 403,000 | | 1.4E+06 |
| 2,2,5-TRIMETHYLHEXANE | 1 | 1 | 823 | | NA |
| 2,3,4-TRIMETHYLPENTANE | 4 | 4 | 272,000 | | 8.5E+11 |
| 2-BUTANONE | 1 | 1 | 47 | | NA |
| 3-METHYLHEPTANE | 6 | 6 | 203,000 | | 1.6E+09 |
| 3-METHYLHEXANE | 1 | 1 | 1,900 | | NA |
| B-PINENE | 2 | 2 | 248 | | 514 |
| C-2 VOC | 3 | 3 | 12,000 | | 14,895 |
| C-3 VOC | 3 | 3 | 157,000 | | 240,505 |
| C10+ ALKENE | 2 | 2 | 27 | | 56 |
| C7 ALKANE | 8 | 8 | 219,000 | | 6.9E+08 |
| C8 ALKANE | 7 | 7 | 164,000 | | 7.0E+09 |
| C8 ALKENE | 3 | 3 | 816 | | 1,059 |
| C9 ALKANE | 3 | 3 | 201,000 | | 9.5E+31 |
| C9 ALKENE | 5 | 5 | 12,300 | | 600,772 |
| ISOBUTANE | 2 | 2 | 72,400 | | 97,375 |
| ISOHEPTANE + 2,3-DMP | 4 | 4 | 144,000 | | 4.6E+12 |
| METHANE | 11 | 11 | 5,880,000 | | 8.6E+06 |
| METHYLCYCLOHEXANE | 8 | 8 | 314,000 | | 2.8E+06 |
| METHYLCYCLOPENTANE | 2 | 2 | 250,000 | | 913,228 |
| N-BUTANE | 2 | 2 | 116,000 | | 155,853 |
| N-DECANE | 3 | 3 | 2,910 | | 4,273 |
| N-NONANE | 2 | 2 | 6,130 | | 8,256 |
| N-OCTANE | 2 | 2 | 9,400 | | 33,349 |
| N-PENTANE | 1 | 1 | 37 | | NA |
| N-UNDECANE | 1 | 1 | 22 | | NA |
| T-BUTYLBENZENE | 1 | 1 | 2,560 | | NA |
| TNMHC (AS C6) | 9 | 9 | 4,860,000 | | 1.1E+09 |
| TOLUENE | 2 | 2 | 2,380 | | 8,805 |
| TPH | 11 | 0 | 1,000 | * | 1,000 |
| TRICHLOROFLUOROMETHANE | 2 | 2 | 1,490 | | 5,342 |
| UNIDENTIFIED VOC | 4 | 4 | 874 | | 894 |
| XYLENES (TOTAL) | 1 | 1 | 5,530 | | NA |

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.
Source: ESE (1997).

## Table 4.8-2
## Summary Statistics for Soil Gas (µg/L)

| Analyte (units µg/L unless otherwise noted) | No. of Samples Tested | No. of Samples with Detected Concentrations | No. of Samples with Detected Concentrations Greater than the PRG | No. of Samples with the Detection Limit Greater than the PRG | Preliminary Remediation Goal (PRG) | Maximum Concentration | Upper 95% Confidence Limit |
|---|---|---|---|---|---|---|---|
| **VOAs** | | | | | | | |
| 1,1,1,2-TETRACHLOROETHANE | 11 | 0 | 0 | 11 | 0.00026 | 1.0 * | NA |
| 1,1,1-TRICHLOROETHANE | 11 | 0 | 0 | 0 | 1 | 1.0 * | NA |
| 1,1,2,2-TETRACHLOROETHANE | 11 | 0 | 0 | 11 | 3.3E-05 | 1.0 * | NA |
| 1,1,2-TRICHLOROETHANE | 11 | 0 | 0 | 11 | 0.00012 | 1.0 * | NA |
| 1,1,2-TRICHLOROTRIFLUOROETHANE (F | 11 | 0 | NA | NA | NA | 1.0 * | NA |
| 1,1-DICHLOROETHANE | 11 | 0 | 0 | 11 | 0.52 | 1.0 * | NA |
| 1,1-DICHLOROETHENE | 11 | 0 | 0 | 11 | 3.8E-05 | 1.0 * | NA |
| 1,2-DICHLOROETHANE | 11 | 0 | 0 | 11 | 7.4E-06 | 1.0 * | NA |
| BENZENE | 11 | 0 | 0 | 11 | 0.00023 | 1.0 * | NA |
| CARBON TETRACHLORIDE | 11 | 0 | 0 | 11 | 0.00013 | 1.0 * | NA |
| CHLOROETHANE | 11 | 0 | 0 | 0 | 10 | 1.0 * | NA |
| CHLOROFORM | 11 | 0 | 0 | 11 | 8.4E-05 | 1.0 * | NA |
| CIS-1,2-DICHLOROETHENE | 11 | 0 | 0 | 11 | 0.037 | 1.0 * | NA |
| DICHLORODIFLUOROMETHANE | 11 | 0 | 0 | 11 | 0.21 | 1.0 * | NA |
| DICHLOROMETHANE | 11 | 0 | NA | NA | NA | 1.0 * | NA |
| ETHYLBENZENE | 11 | 0 | 0 | 0 | 1.1 | 1.0 * | NA |
| TETRACHLOROETHENE | 11 | 0 | 0 | 11 | 0.0033 | 1.0 * | NA |
| TOLUENE | 11 | 0 | 0 | 11 | 0.4 | 1.0 * | NA |
| TRANS-1,2-DICHLOROETHENE | 11 | 0 | 0 | 11 | 0.073 | 1.0 * | NA |
| TRICHLOROETHENE | 11 | 0 | 0 | 11 | 0.0011 | 1.0 * | NA |
| TRICHLOROFLUOROMETHANE | 11 | 0 | 0 | 11 | 0.73 | 1.0 * | NA |
| VINYL CHLORIDE | 11 | 0 | 0 | 11 | 2.2E-05 | 1.0 * | NA |
| XYLENES (TOTAL) | 11 | 0 | 0 | 11 | 0.73 | 1.0 * | NA |

* = maximum concentration shown is maximum detection limit.
NA = not applicable or not available.

Source: ESE (1987).

# Pilot Study No. 3 (Project Navigator, 2007)
# Phase I Down-hole Flux Data

Table 6.  Summary of Phase I Downhole Flux Hydrocarbon Emission Data (ug/m2,min-1).

| COMPOUNDS | Method Blank | Blank 15-100DHF | Blank 12-100DHF | QC Blank MDL | PNL-1-15-DHF | PNL-1-15-DHF | PNL-2-15-DHF | PNL-2-15-DHF | PNL-3-21-DHF | PNL-3-21-DHF | PNL-5A-11-DHF | PNL-5A-11-DHF | PNL-6-15-DHF | PNL-6-15-DHF | PNL-6-15-RDHF | PNL-6-15-RDHF | PNL-7-21-DHF | PNL-7-21-DHF | PNL-7-21-DHF-D | PNL-7-21-DHF-D | PNL-8-6-DHF | PNL-8-6-DHF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (ppmv) | (ppmv) | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 |
| Methane | <0.5 | <0.8 | <0.8 | <160 | 21,000 | **4,206,720** | 600 | **120,192** | 240,000 | **48,076,800** | 380 | **76,122** | 56,000 | **11,217,920** | 35,000 | **7,011,200** | 170,000 | **34,054,400** | 180,000 | **36,057,600** | 370 | **74,118** |
| C2 as Ethane | <0.5 | <0.8 | <0.8 | <300 | 30 | **11,268** | ND | | 41 | **15,400** | ND | | 3.3 | **1,239** | ND | | 7.6 | **2,855** | 7.7 | **2,892** | ND | |
| C3 as Propane | <0.5 | <0.8 | <0.8 | <440 | 93 | **51,232** | ND | | 390 | **214,843** | ND | | ND | | ND | | 8.9 | **4,903** | 9.4 | **5,178** | ND | |
| C4 as n-Butane | <0.5 | <0.8 | <0.8 | <580 | 160 | **116,186** | ND | | 800 | **580,928** | ND | | 13 | **9,440** | 7.1 | **5,156** | 100 | **72,616** | 100 | **72,616** | ND | |
| C5 as n-Pentane | <0.5 | <0.8 | <0.8 | <720 | 140 | **126,202** | ND | | 530 | **477,763** | ND | | 13 | **11,719** | 8.1 | **7,302** | 140 | **126,202** | 140 | **126,202** | ND | |
| C6 as n-Hexane | <0.5 | <0.8 | <0.8 | <860 | 110 | **118,439** | ND | | 280 | **301,482** | ND | | 7.4 | **7,968** | 4.6 | **4,953** | 100 | **107,672** | 97 | **104,442** | ND | |
| C6+ as n-Hexane | 1.0 | <1.6 | <1.6 | <1,720 | 1,700 | **1,830,424** | 2.0 | **2,153** | 1,400 | **1,507,408** | 2.1 | **2,261** | 81 | **87,214** | 37 | **39,839** | 1,300 | **1,399,736** | 1,400 | **1,507,408** | 6.0 | **6,460** |
| | | | | | | | | | | | | | | | | | | | | | | |
| | (ug/m3) | (ug/m3) | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 |
| Chloroform | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Vinyl Chloride | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,3-Butadiene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | 140 | **43.8** | ND | | ND | | N/A | | 8.1 | **2.54** |
| Bromomethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Chloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Acetone | <5.0 | <2.0 | <2.1 | <0.66 | ND | | 45 | **14.1** | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Trichlorofluoromethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Acrylonitrile | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,1-Dichloroethene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Methylene Chloride | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | 78 | **24.4** | 28 | **8.8** | ND | | N/A | | 36 | **11.3** |
| Trichlorotrifluoroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Carbon Disulfide | <0.50 | <2.0 | <2.1 | <0.66 | ND | | 4.8 | | ND | | 2.1 | **0.657** | 36 | **11.3** | 13 | **4.07** | ND | | N/A | | 6.1 | **1.91** |
| t-1,2-Dichloroethene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,1-Dichloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Methyl tert butyl ether | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Vinyl Acetate | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 2-Butanone | <0.50 | <2.0 | <2.1 | <0.66 | ND | | 10 | | ND | | 8.2 | **2.57** | 69 | **21.6** | 33 | **10.3** | ND | | N/A | | 51 | **16.0** |
| c-1,2-Dichloroethene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Chloroform | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,2-Dichloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,1,1-Trichloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Benzene | <0.50 | <2.0 | <2.1 | <0.66 | 21,000 | **6,573** | ND | | 12,000 | **3,756** | 3.1 | **0.97** | 26 | **8.1** | 6.4 | **2.00** | 3,700 | **1,158** | N/A | | 22 | **6.89** |
| Carbon Tetrachloride | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,2-Dichloropropane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Bromodichloromethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Trichloroethene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| c-1,3-Dichloropropene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 4-Methyl-2-Pentanone | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| t-1,3-Dichloropropene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,1,2-Trichloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Toluene | <0.50 | <2.0 | <2.1 | <0.66 | 33,000 | **10,329** | ND | | 4,800 | **1,502** | 3.0 | **0.94** | 18 | **5.63** | ND | | 430 | **135** | N/A | | 13 | **4.07** |
| 2-Hexanone | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Dibromochloromethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,2-Dichloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Tetrachloroethene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Chlorobenzene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | 92 | **28.8** | 37 | **11.6** | ND | | N/A | | ND | |
| Ethylbenzene | <0.50 | <2.0 | <2.1 | <0.66 | 11,000 | **3,443** | ND | | 5,600 | **1,753** | 2.5 | **0.783** | 34 | **10.6** | 13 | **4.07** | 2,400 | **751** | N/A | | 100 | **31.3** |
| m/p-Xylene | <1.0 | <2.0 | <2.1 | <0.66 | 25,000 | **7,825** | ND | | 16,000 | **5,008** | 4.3 | **1.35** | ND | | ND | | 2,900 | **112** | N/A | | 190 | **59.5** |
| Bromoform | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| Styrene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| o-Xylene | <0.50 | <2.0 | <2.1 | <0.66 | 12,000 | **3,756** | ND | | 6,100 | **1,909** | 2.8 | **0.88** | ND | | ND | | 1,300 | **407** | N/A | | 32 | **10.0** |
| 1,1,2,2-Tetrachloroethane | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,3-Dichlorobenzene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,4-Dichlorobenzene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |
| 1,2-Dichlorobenzene | <0.50 | <2.0 | <2.1 | <0.66 | ND | | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | |

Note- Flux data shown in **Bold**
DH Flux (ug/m2,min-1) = (ug/m3)(0.001 m3/min)/(0.0032 m2) or (ug/m3)(0.313)
Conversion from ppmv to ug/m3; example; propane- (44 mol wt/25 ideal gas law constant)(ppmv)(1000 ug/1mg)

Table 6.  Summary of Phase I Downhole Flux Hydrocarbon Emission Data (ug/m2,min-1).

| **COMPOUNDS** | **PNL-8-18-DHF** | **PNL-8-18-DHF** | **PNL-9-15-DHF** | **PNL-9-15-DHF** | **PNL-9-21-BDHF** | **PNL-9-21-BDHF** | **PNL-10A-13-DHF** | **PNL-10A-13-DHF** | **PNL-11-12-DHF** | **PNL-11-12-DHF** | **PNL-11-12-DHF-D** | **PNL-11-12-DHF-D** | **PNL-12-15-DHF** | **PNL-12-15-DHF** | **PNL-12-15-RDHF** | **PNL-12-15-RDHF** | **PNL-13-12-DHF** | **PNL-13-12-DHF** | **PNL-14-21-DHF** | **PNL-14-21-DHF** | **PNL-15-12-DHF** | **PNL-15-12-DHF** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 |
| Methane | 47,000 | **9,415,040** | 6,600 | **1,322,112** | 0.9 | **180** | 1,700 | **340,544** | 5.8 | **1,162** | 6.1 | **1,222** | 750 | **150,240** | 140 | **28,045** | 1,200 | **240,384** | 170,000 | **34,054,400** | 1,600 | **320,512** |
| C2 as Ethane | 10 | **3,756** | ND | | ND | | ND | | ND | | ND | | ND | | ND | | ND | | 11 | **4,132** | ND | |
| C3 as Propane | 29 | **15,976** | ND | | ND | | ND | | ND | | ND | | ND | | ND | | ND | | 54 | **29,748** | ND | |
| C4 as n-Butane | 50 | **36,308** | ND | | ND | | ND | | ND | | ND | | ND | | ND | | 3.3 | **2,396** | 240 | **174,278** | 0.84 | **610** |
| C5 as n-Pentane | 47 | **42,368** | 9.3 | **8,383** | ND | | ND | | ND | | ND | | ND | | ND | | 4.8 | **4,327** | 240 | **216,346** | 1.1 | **992** |
| C6 as n-Hexane | 33 | **35,532** | 6.2 | **6,676** | ND | | ND | | ND | | ND | | ND | | ND | | 5.4 | **5,814** | 170 | **183,042** | ND | |
| C6+ as n-Hexane | 300 | **323,016** | 50 | **53,836** | ND | | 5.1 | **5,491** | 7.5 | **8,075** | 8.0 | **8,614** | 23 | **24,765** | 12 | **12,921** | 100 | **107,672** | 1,800 | **1,938,096** | 11 | **11,844** |
| | | | | | | | | | | | | | | | | | | | | | | |
| | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 |
| Chloroform | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Vinyl Chloride | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,3-Butadiene | ND | | ND | | ND | | 4.4 | **1.38** | ND | | N/A | | ND | | ND | | ND | | ND | | 13 | **4.1** |
| Bromomethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Chloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Acetone | ND | | ND | | ND | | 91 | **28.5** | 1,600 | **501** | N/A | | ND | | ND | | ND | | ND | | ND | |
| Trichlorofluoromethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Acrylonitrile | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,1-Dichloroethene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Methylene Chloride | 180 | **56.3** | 38 | **11.9** | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Trichlorotrifluoroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Carbon Disulfide | ND | | ND | | ND | | 13 | **4.07** | ND | | N/A | | ND | | ND | | ND | | ND | | 6.0 | **1.9** |
| t-1,2-Dichloroethene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,1-Dichloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Methyl tert butyl ether | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Vinyl Acetate | ND | | ND | | ND | | ND | | 25 | **7.8** | N/A | | ND | | ND | | ND | | ND | | ND | |
| 2-Butanone | 110 | **34.4** | 64 | **20.0** | 4.9 | **1.53** | 21 | **6.57** | 12 | **3.76** | N/A | | 9.2 | **2.88** | 6.2 | **1.94** | ND | | ND | | 14 | **4.4** |
| c-1,2-Dichloroethene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Chloroform | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,2-Dichloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,1,1-Trichloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Benzene | 9,000 | **2817** | 210 | **65.7** | ND | | 24 | **7.51** | 220 | **68.9** | N/A | | 57 | **17.8** | 22 | **6.89** | 580 | **182** | 8,900 | **2786** | 130 | **41** |
| Carbon Tetrachloride | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,2-Dichloropropane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Bromodichloromethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Trichloroethene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| c-1,3-Dichloropropene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 4-Methyl-2-Pentanone | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| t-1,3-Dichloropropene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,1,2-Trichloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Toluene | 5,300 | **1659** | 51 | **16.0** | ND | | 20 | **6.26** | 160 | **50.1** | N/A | | 15 | **4.70** | 7.2 | **2.25** | 1,300 | **407** | 710 | **222** | 86 | **27** |
| 2-Hexanone | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Dibromochloromethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,2-Dichloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Tetrachloroethene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Chlorobenzene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Ethylbenzene | 2,600 | **814** | 360 | **113** | ND | | 63 | **19.7** | 4,900 | **1,534** | N/A | | 230 | **72.0** | 120 | **37.56** | 940 | **294** | 8,200 | **2567** | 140 | **44** |
| m/p-Xylene | 4,300 | **1346** | 750 | **235** | ND | | 52 | **16.3** | ND | | N/A | | 98 | **30.7** | 51 | **15.96** | 2,200 | **689** | 10,000 | **3130** | 160 | **50** |
| Bromoform | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| Styrene | 280 | **88** | ND | | ND | | 5.2 | **1.63** | 1,100 | **344** | N/A | | ND | | ND | | ND | | ND | | ND | |
| o-Xylene | 2,100 | **657** | 120 | **37.6** | ND | | 27 | **8.5** | 11 | **3.44** | N/A | | 30 | **9.4** | 16 | **5.01** | 1,400 | **438** | 2,000 | **626** | 100 | **31** |
| 1,1,2,2-Tetrachloroethane | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,3-Dichlorobenzene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,4-Dichlorobenzene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |
| 1,2-Dichlorobenzene | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | ND | | ND | |

# Pilot Study No. 3 (Project Navigator, 2007)
# Phase VIII Pit F
# Down-hole Flux Data

Table 16. Summary of Phase VIII, Pit F Downhole Flux VOC Data.

| COMPOUNDS | Method Blank | Blank SF-BLK | Blank PNL-F75-1 | QC Blank MDL | PNL-F1 13-T | PNL-F1 13-T | PNL-F1 13-TR | PNL-F1 13-TR | PNL-F4 15-T | PNL-F4 15-T | PNL-F5 13.5-T | PNL-F5 13.5-T | PNL-F5 13.5-T-D | PNL-F5 13.5-T-D | PNL-F19 4-T | PNL-F19 4-T | PNL-F19 4-T-D | PNL-F19 4-T-D | PNL-F19 10-T | PNL-F19 10-T | PNL-F19 10-T-D | PNL-F19 10-T-D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (ppmv) | (ppmv) | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 | (ppmv) | ug/m2,min-1 |
| Methane | <0.5 | <0.59 | <0.78 | <156 | 21 | **4,207** | 7.8 | **1,562** | 1,200 | **240,384** | 59 | **11,819** | 59 | **11,819** | 4 | **881** | N/A | | 150 | **30,048** | 150 | **30,048** |
| C2 as Ethane | <0.5 | <0.59 | <0.78 | <292 | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | |
| C3 as Propane | <0.5 | <0.59 | <0.78 | <430 | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | |
| C4 as n-Butane | <0.5 | <0.59 | <0.78 | <566 | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | |
| C5 as n-Pentane | <0.5 | <0.59 | <0.78 | <703 | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | |
| C6 as n-Hexane | <0.5 | <0.59 | <0.78 | <840 | ND | | ND | | ND | | ND | | ND | | ND | | N/A | | ND | | ND | |
| C6+ as n-Hexane | 1.0 | <1.2 | <1.6 | <1,720 | 86 | **92,598** | 41 | **44,146** | 230 | **247,646** | 22 | **23,688** | 24 | **25,841** | 3.3 | **3,553** | N/A | | 37 | **39,839** | 40 | **43,069** |
| | | | | | | | | | | | | | | | | | | | | | | |
| | (ug/m3) | (ug/m3) | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 | (ug/m3) | ug/m2,min-1 |
| Chloroform | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Vinyl Chloride | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,3-Butadiene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | 6.0 | **1.9** | 6.3 | **2.0** | ND | | N/A | |
| Bromomethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Chloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Acetone | <5.0 | <6.0 | <19 | <5.9 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Trichlorofluoromethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Acrylonitrile | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,1-Dichloroethene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Methylene Chloride | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Trichlorotrifluoroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Carbon Disulfide | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | 7.3 | **2.3** | 7.0 | **2.2** | ND | | N/A | |
| t-1,2-Dichloroethene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,1-Dichloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Methyl tert butyl ether | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Vinyl Acetate | <1.0 | <1.2 | <3.9 | <1.2 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 2-Butanone | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | 4.6 | **1.4** | ND | | ND | | N/A | |
| c-1,2-Dichloroethene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Chloroform | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,2-Dichloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,1,1-Trichloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Benzene | <0.50 | <0.60 | <1.9 | <0.59 | 35,000 | **10,955** | 13,000 | **4,069** | 15,000 | **4,695** | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Carbon Tetrachloride | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,2-Dichloropropane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Bromodichloromethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Trichloroethene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| c-1,3-Dichloropropene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 4-Methyl-2-Pentanone | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| t-1,3-Dichloropropene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,1,2-Trichloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Toluene | <0.50 | <0.60 | <1.9 | <0.59 | 9,900 | **3,099** | 4,000 | **1,252** | 11,000 | **3,443** | ND | | N/A | | 11 | **3.4** | 11 | **3.4** | ND | | N/A | |
| 2-Hexanone | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Dibromochloromethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,2-Dichloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Tetrachloroethene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Chlorobenzene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Ethylbenzene | <0.50 | <0.60 | <1.9 | <0.59 | 91,000 | **28,483** | 45,000 | **14,085** | 250,000 | **78,250** | ND | | N/A | | 800 | **250** | 790 | **247** | 3,300 | **1,033** | N/A | |
| m/p-Xylene | <1.0 | <1.2 | <3.9 | <1.2 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Bromoform | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| Styrene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | 5.1 | **1.6** | 4.9 | **1.5** | ND | | N/A | |
| o-Xylene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,1,2,2-Tetrachloroethane | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,3-Dichlorobenzene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,4-Dichlorobenzene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |
| 1,2-Dichlorobenzene | <0.50 | <0.60 | <1.9 | <0.59 | ND | | ND | | ND | | ND | | N/A | | ND | | ND | | ND | | N/A | |

Note- Flux data shown in **Bold**

DH Flux (ug/m2,min-1) = (ug/m3)(0.001 m3/min)/(0.0032 m2) or (ug/m3)(0.313)

Conversion from ppmv to ug/m3; example; propane- (44 mol wt/25 ideal gas law constant)(ppmv)(1000 ug/1mg)

# Pit F Offsite Investigation Addendum
# Pilot Study No. 3
# Surface Flux and Soil Gas Data

(Taken from Pit F Offsite Investigation Addendum Report, Project Navigator, Ltd. and Geosyntec Consultants, January 31, 2005)

**Table 3**
**Soil Gas TO-15 VOC Results**
**Pit F Offsite Investigation**
**Ascon Landfill Site**

| Compound | SG-01 µg/m³ | SG-02 µg/m³ | SG-03 µg/m³ | SG-03A µg/m³ | SG-04 µg/m³ | SG-05 µg/m³ |
|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | <2.5 | <2.6 | **5.2** | **5.1** | <5.1 | <4.9 |
| 1,1,2,2-Tetrachloroethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,1,2-Trichloroethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,1-Dichloroethane | <2.5 | <2.6 | **4.2** | **6.3** | <5.1 | <4.9 |
| 1,1-Dichloroethene | <2.5 | <2.6 | <2.5 | **3.8** | <5.1 | <4.9 |
| 1,2,4-Trimethylbenzene | **16** | **8.6** | **11** | **21** | **7.3** | **5.7** |
| 1,2-Dibromoethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,2-Dichlorobenzene | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,2-Dichloroethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,2-Dichloropropane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,3,5-Trimethylbenzene | **6.1** | **4.3** | **5.2** | **9.2** | <5.1 | <4.9 |
| 1,3-Butadiene | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,3-Dichlorobenzene | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 1,4-Dichlorobenzene | <2.5 | <2.6 | <2.5 | **3.2** | <5.1 | <4.9 |
| 1,4-Dioxane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| 2-Butanone (MEK) | **86** | **13** | **43** | **49** | **7.2** | **33** |
| 2-Hexanone | **27** | **7.9** | **7.2** | **9.6** | <5.1 | <4.9 |
| 4-Ethyltoluene | **2.6** | <2.6 | <2.5 | **3.9** | <5.1 | <4.9 |
| 4-Methyl-2-pentanone | **5.8** | <2.6 | <2.5 | **4.1** | <5.1 | <4.9 |
| Acetone | **550** | **470** | **410** | **500** | **250** | **510** |
| Acrylonitrile | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| alpha-Pinene | **200** | **36** | **5.5** | **6.6** | **13** | **7.0** |
| Benzene | **6.8** | **6.7** | **7.0** | **8.7** | <5.1 | **8.8** |
| Bromodichloromethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Bromoform | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Bromomethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Carbon Disulfide | **12** | **4.1** | **16** | **20** | **5.5** | **93** |
| Carbon Tetrachloride | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Chlorobenzene | <2.5 | <2.6 | <2.5 | **4.5** | <5.1 | <4.9 |
| Chloroethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Chloroform | <2.5 | <2.6 | <2.5 | **2.6** | <5.1 | <4.9 |
| Chloromethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| cis-1,2-Dichloroethene | <2.5 | <2.6 | <2.5 | **2.6** | <5.1 | <4.9 |
| cis-1,3-Dichloropropene | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Cumene | <2.5 | <2.6 | <2.5 | **2.5** | <5.1 | <4.9 |
| Dibromochloromethane | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| d-Limonene | **20** | **13** | **11** | **14** | **8.6** | **6.7** |
| Ethylbenzene | **6.5** | **4.6** | **9.5** | **12** | **5.9** | <4.9 |
| *m,p*-Xylenes | **22** | **15** | **37** | **40** | **21** | **15** |
| Methyl tert-Butyl Ether | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Methylene chloride | **2.8** | <2.6 | <2.5 | **5.2** | <5.1 | <4.9 |
| Naphthalene | **5.8** | <2.6 | <2.5 | **9.3** | <5.1 | <4.9 |
| n-Hexane | **22** | **11** | **80** | **75** | **12** | **34** |
| n-Nonane | **5.8** | **4.8** | **5.7** | **7.5** | <5.1 | <4.9 |

| | SG-01 | SG-02 | SG-03 | SG-03A | SG-04 | SG-05 |
|---|---|---|---|---|---|---|
| **Compound** | **µg/m³** | **µg/m³** | **µg/m³** | **µg/m³** | **µg/m³** | **µg/m³** |
| o-Xylene | **8.6** | **6.3** | **18** | **20** | **9.5** | **5.1** |
| Styrene | <2.5 | <2.6 | <2.5 | **3.1** | <5.1 | <4.9 |
| Tetrachloroethene | <2.5 | <2.6 | **6.8** | **4.2** | <5.1 | <4.9 |
| Toluene | **22** | **19** | **13** | **15** | **11** | **33** |
| trans-1,2-Dichloroethene | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| trans-1,3-Dichloropropene | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |
| Trichloroethene | <2.5 | <2.6 | <2.5 | **3.9** | <5.1 | <4.9 |
| Trichlorofluoromethane | **3.0** | <2.6 | **3.0** | **4.4** | <5.1 | <4.9 |
| Trichlorotrifluoroethane | <2.5 | <2.6 | **34** | **31** | **21** | <4.9 |
| Vinyl Acetate | **43** | **30** | <4.9 | <5.0 | <10 | <9.7 |
| Vinyl Chloride | <2.5 | <2.6 | <2.5 | <2.5 | <5.1 | <4.9 |

# Supplemental Soil Vapor Investigation
# Sample Location Figure and Soil Gas Data

(Taken from the Supplemental Soil Vapor Investigation Report, Geosyntec Consultants, September 26, 2006)

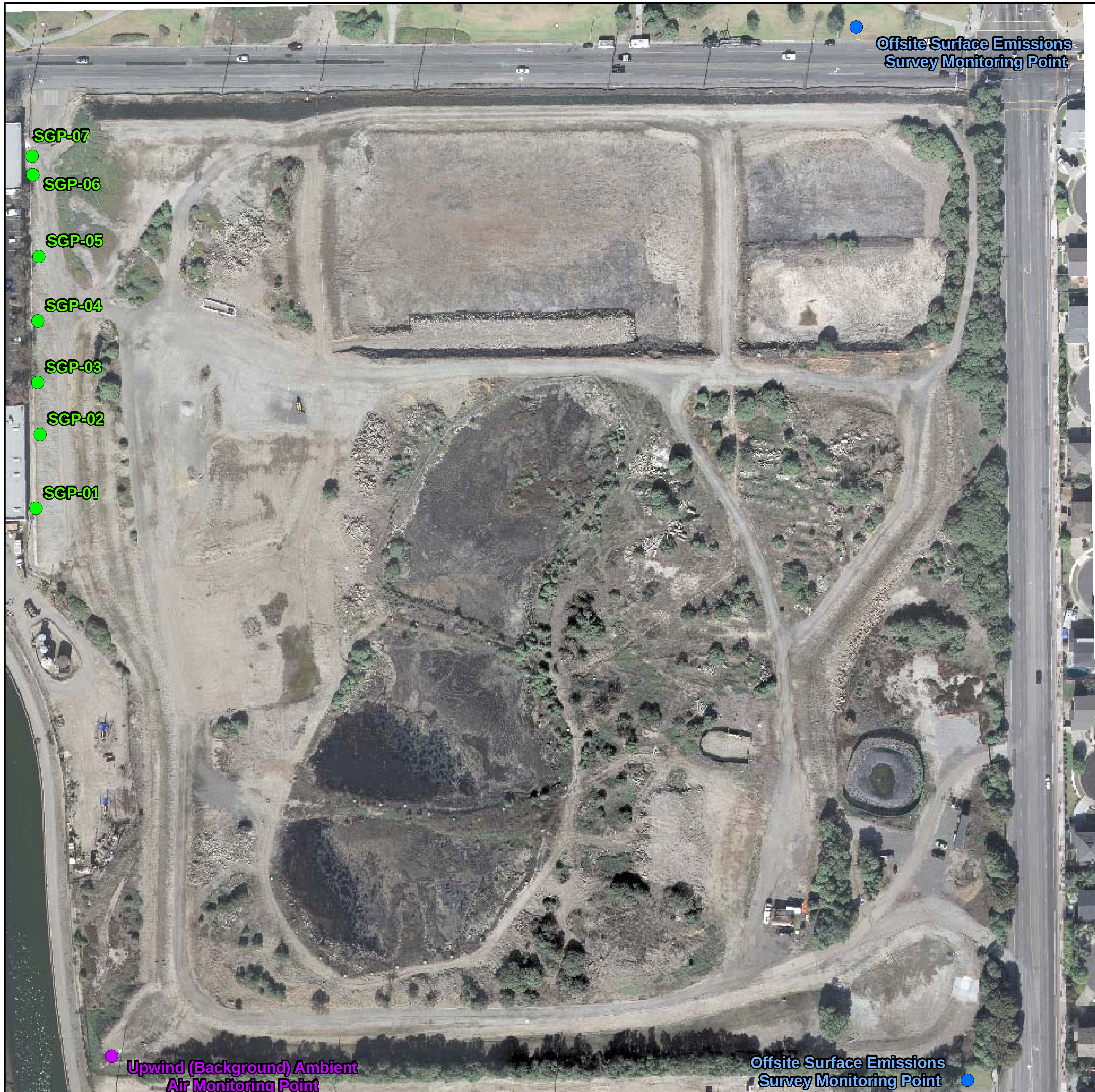



FIGURE 1
Soil Gas Probe and Surface Emission Background Monitoring Location Map

Ascon Landfill Site
Huntington Beach, California

Legend

- Soil Vapor Point
- Offsite Surface Emissions Survey Monitoring Point
- Upwind (Background) Ambient Air Monitoring Point

N

0 75 150 300 Feet

Note:
- Aerial photograph and topographic survey conducted on January 26, 2006 (1-foot contour interval).
- Topographic map is superimposed over aerial photography

| Date: September 2006 | Project No: SB0320 |
|---|---|

GeoSyntec Consultants

m:\gis\sb0202\projects\site survey b-size 20060210.mxd GWW 20060926

Table 3
Soil Gas Analytical Results
Ascon Soil Vapor Invesigation Addendum



| Sample | SGP-01 | SGP-02 | SGP-03 | SGP-04 | SGP-05A [1] | SGP-06A | SGP-06A-Dup | SGP-07A [1] | RBSL [2] |
|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 7/21/2006 | 7/20/2006 | 7/20/2006 | 7/20/2006 | 7/27/2006 | 7/27/2006 | 7/27/2006 | 7/27/2006 | |
| Units | µg/m$^3$ | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 |
| 1,1,1-Trichloroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,1,2,2-Tetrachloroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,1,2-Trichloroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,1,2-Trichlorotrifluoroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,1-Dichloroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,1-Dichloroethene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,2,4-Trimethylbenzene | **7.8** | **20** | **8.9** | **21** | **270** | **320** | **340** | **430** | 22000 |
| 1,2-Dibromoethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,2-Dichlorobenzene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,2-Dichloroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,2-Dichloropropane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,3,5-Trimethylbenzene | <5.7 | **8.2** | <5.6 | **9.2** | **78** | **100** | **110** | **120** | 22000 |
| 1,3-Butadiene | <5.7 | <6.3 | <5.6 | **51 M** | **40 M** | **32 M** | **28 M** | **46 M** | 220 |
| 1,3-Dichlorobenzene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,4-Dichlorobenzene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 1,4-Dioxane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| 2-Butanone (MEK) | **180** | **110** | **85** | **43** | **74** | **130** | **110** | **130** | 3200000 |
| 2-Hexanone | **29** | **56 M** | **17** | <6.2 | **51 M** | <19 | <25 | **84 M** | N/A |
| 4-Ethyltoluene | <5.7 | **10** | <5.6 | **9.1** | **61** | **71** | **73** | **95** | N/A |
| 4-Methyl-2-pentanone | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Acetone | **320** | **210** | **160** | **140 M** | **1300 M** | **1400 M** | **930 M** | **2300 M** | 960000 |
| Acrylonitrile | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| alpha-Pinene | <5.7 | <6.3 | <5.6 | **190** | **31** | **29** | **27** | **120** | N/A |
| Benzene | <5.7 | <6.3 | <5.6 | **46** | **180** | **260** | **270** | **280** | 3000 |
| Bromodichloromethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Bromoform | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Bromomethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Carbon Disulfide | **15** | **9.5** | <5.6 | **26** | **230** | **320** | **350** | **260** | 2000000 |
| Carbon Tetrachloride | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Chlorobenzene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Chloroethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Chloroform | <5.7 | **6.5** | <5.6 | <6.2 | <22 | <19 | <25 | <26 | 3600 |
| Chloromethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| cis-1,2-Dichloroethene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| cis-1,3-Dichloropropene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Dibromochloromethane | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Dichloromethane (Methylene Chloride) | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| d-Limonene | <5.7 | <6.3 | <5.6 | **18** | <22 | <19 | <25 | <26 | N/A |
| Ethylbenzene | <5.7 | **20** | **8.1** | **47** | **52** | **150** | **160** | **140** | 86000 |
| Isopropylbenzene (Cumene) | <5.7 | <6.3 | <5.6 | **15** | <22 | **55** | **63** | <26 | 1400000 |

Table 3
Soil Gas Analytical Results
Ascon Soil Vapor Invesigation Addendum

| Sample | SGP-01 | SGP-02 | SGP-03 | SGP-04 | SGP-05A (1) | SGP-06A | SGP-06A-Dup | SGP-07A (1) | RBSL (2) |
|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 7/21/2006 | 7/20/2006 | 7/20/2006 | 7/20/2006 | 7/27/2006 | 7/27/2006 | 7/27/2006 | 7/27/2006 | |
| Units | $\mu g/m^3$ | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 | µg/m3 |
| m,p-Xylenes | **16** | **54** | **34** | **50** | **160** | **280** | **310** | **400** | 24000000 |
| Methyl tert-Butyl Ether | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Naphthalene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| n-Hexane | <5.7 | **68** | <5.6 | **130** | **1500** | **1500** | **1500** | **2000** | N/A |
| n-Nonane | <5.7 | **72** | **6.6 M** | **59** | **34** | **57** | **67** | **39** | N/A |
| o-Xylene | <5.7 | **16** | **10** | **12** | **38** | **81** | **91** | **95** | 22000000 |
| Styrene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Tetrachloroethene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Toluene | **12** | **27** | **36** | **58** | **460** | **700** | **760** | **900** | 1300000 |
| trans-1,2-Dichloroethene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| trans-1,3-Dichloropropene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Trichloroethene | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Trichlorofluoromethane | <5.7 | <6.3 | <0.42 | <6.2 | <22 | <19 | <25 | <26 | N/A |
| Vinyl Acetate | **25** | **14 M** | **19** | **27 M** | <22 | <19 | <25 | <26 | 640000 |
| Vinyl Chloride | <5.7 | <6.3 | <5.6 | <6.2 | <22 | <19 | <25 | <26 | N/A |

**M:** Matrix interference; results may be biased high

(1) Leak detection tracer concentration exceeded screening threshold. Analytical results are estimates and the results may be biased low

(2) Risk-Based Screening Level. Calculated using DTSC vapor intrusion spreadsheet with commercial/industrial exposure assumptions and target risk of 1E-5 and target hazard quotient of 1.

# APPENDIX E
# DEVELOPMENT OF RISK-BASED CONCENTRATIONS

## Introduction

The results of the baseline human health risk assessment ("BHRA") for the Ascon Landfill Site ("Site") indicated that, in an un-remediated condition, there are estimated risks that exceed both cancer and noncancer thresholds for some receptor and exposure scenarios evaluated. Remedial action was deemed necessary at the Site based on these results. Therefore, Risk-based Concentrations ("RBCs") for soil were developed for use in the remedial planning process. RBCs for each chemical of potential concern ("COPC") were developed assuming construction worker and commercial worker exposures to COPCs in soil via direct contact (incidental ingestion and dermal contact) and inhalation of dust or volatiles in outdoor air. These scenarios are considered the most relevant for the Site where exposures to Site soils may occur in the future (e.g. City Parcel, perimeter road and SCOC area). The majority of the Site will be covered with a cap, including a geomembrane and underlain by a landfill gas collection system, making impacted soil and waste materials inaccessible for contact, including VOC emissions.

RBCs are media-specific concentrations that are protective of human health under the designated land use. Soil RBCs developed for the Site express both a chemical concentration and an exposure route; therefore, protectiveness may be achieved by reducing chemical concentrations and/or by reducing exposure by means other than chemical removal (such as capping an area, limiting access, administrative controls, or by waste stabilization). For the Ascon Landfill Site, the RBCs will be applied to residual chemical impacts in the City easement/parcel area and beneath the perimeter access roads that are planned to be built adjacent to the easement.

## Chemicals of Potential Concern

As discussed in the Revised Feasibility Study ("RFS") Report, not all chemicals detected at the Site were included in the BHRA. A formal selection of COPCs was conducted to identify those chemicals that could be responsible for more than 95 percent of the health risks. Additional Site data has been collected over the intervening years since the BHRA was published. In addition, impacted soils were removed during the Emergency Action and Interim Removal Measure. The revised data for the Site, accounting for the more recent changes, were evaluated to ensure that the appropriate chemicals were included for consideration in the RAP.

The updated dataset for the Site was compared to the USEPA Region Screening Levels (RSLs) (USEPA, 2012) for industrial land use to screen for the COPCs. All chemicals detected in at least one sample in the data set were considered in the COPC selection process. Chemicals were selected as COPCs when the maximum detected concentration in soil exceeded one tenth of its respective industrial soil RSL (mg/kg). By using $1/10^{th}$ of the value potential additive effects are addressed. The COPC screening is presented in **Table E-1**. Soil RBCs were derived for each selected COPC.

## Exposure Assessment

Soil RBCs were developed following United States Environmental Protection Agency (USEPA) and California Environmental Protection Agency (Cal-EPA) guidance documents (USEPA, 1989; 1991; 2002, 2009; Cal-EPA, 1999; 2011). Soil RBCs were developed for the following potential receptor groups:

- Future Construction Worker
- Future Commercial Worker

The following exposure routes were evaluated for future construction workers and commercial workers:

- Incidental ingestion of soils;
- Dermal contact with soils; and
- Inhalation of dust/vapors in outdoor air.

For the construction worker, potential exposures were assumed to occur in a utility trench as this represents a more conservative evaluation of potential exposure that may occur in the City easement/parcel area.

According to the USEPA Soil Screening Level guidance (USEPA, 2002), screening levels for VOCs for the onsite construction worker and the onsite commercial/industrial worker receptors are considered to be protective for potential offsite residential exposures. This is due to the more intensive exposure the onsite receptor is assumed to experience coupled with the significant dispersion and dilution that would occur in ambient air. For both VOCs and fugitive dust, offsite emissions are not expected to be significant given the limited areas of soil that may remain uncovered and the limited amount of VOC or dust generating activities that could occur (i.e., installing a utility). The perimeter road will have limited maintenance vehicle traffic but will be covered in gravel limiting any soil disturbance. In addition to the limited area that will remain uncovered, thus limiting dust emissions, air monitoring data conducted for particulate emissions during the extensive soil excavation work during the EA and IRM indicated that the fugitive dust pathway, even from impacted material disturbance, does not pose a significant offsite risk.

The exposure parameters used to derive the RBCs for the receptors and exposure pathways are presented in **Table E-2**. The following section presents the equations used for each pathway.

**Fate and Transport of Soil COPCs to Outdoor Air**

Fate and transport modeling was used to evaluate the indirect-exposure pathways: inhalation of vapor-phase COPCs from soil to outdoor air, as well as particulate-phase COPCs to outdoor air. Derivation of the COPC-specific volatilization factors (VFs) for the outdoor vapor inhalation pathway and the particulate emission factor (PEF) for the outdoor fugitive dust pathway are presented in **Table E-3**.

***Particulate-phase COPCs to Outdoor Air***

For the construction worker, fugitive dust can be generated during times of intrusive activities such as site grading with the use of heavy equipment. As a conservative exposure assumption, a PEF of $1\times10^{+6}$ $m^3/kg$ was used for the construction worker, which equates to a dust concentration of 1 $mg/m^3$ (Cal-EPA, 2011)[1]. A Cal-EPA default PEF of $1.3\times10^{+9}$ $m^3/kg$ was used for the commercial worker (Cal-EPA, 2011), see **Table E-3**. Soil physical properties are based on the values used in the derivation of the USEPA RSLs in the absence of site-specific information.

***Vapor-phase COPCs to Outdoor Air***

For the construction worker, VOC emissions from soil to outdoor air were estimated using the VF equations from the ASTM *Standard Guide For Provisional Risk-Based Corrective Action* (ASTM, 2004). The soil to outdoor air volatilization factor, $VF_{soil\text{-}OA}$, is the ratio of the outdoor air exposure point concentration ($EPC_{soil\text{-}OA}$) to the soil exposure point concentration ($EPC_{soil}$):

$$VF_{soil\text{-}OA} = \frac{EPC_{soil}}{EPC_{soil\text{-}OA}}$$

[1] The respirable dust concentration of 1 $mg/m^3$ is based on a maximum concentration of dust in air of 10 $mg/m^3$ recommended by the American Conference of Governmental Industrial Hygienists (ACGIH 2004, Threshold Limit Values and Biological Exposure Indices), and the assumption that 10 percent of the mass of particles are in the respirable $PM_{10}$ range.

The COPC-specific $VF_{soil\text{-}OA}$ for construction worker exposures was derived using the following equation (ASTM, 2004):

$$VF_{soil\text{-}OA} = \frac{DF_{amb}}{Pb} \times \left[ \frac{(3.14 \times T_{constW} \times K_{sw} \times Pb)}{(4 \times D_{eff} \times H')} \right]^{1/2} \times CF_1 \times CF_2$$

Where:

| | | |
|---|---|---|
| $VF_{soil\text{-}OA}$ | = | volatilization factor, soils to outdoor air ($m^3$-air/kg-soil); |
| $DF_{amb}$ | = | dispersion factor for outdoor air (cm/sec); |
| Pb | = | dry soil bulk density (1.5 g/$cm^3$); |
| $T_{constW}$ | = | averaging time for surface emission vapor flux ($3.2 \times 10^{+7}$ sec); |
| $K_{sw}$ | = | soil to water partition coefficient ($cm^3$-water/g-soil); |
| $D_{eff}$ | = | COPC-specific effective diffusion coefficient for vadose-zone soils ($cm^2$/sec); |
| H′ | = | COPC-specific Henry's law coefficient (unitless); |
| $CF_1$ | = | conversion factor ($1 \times 10^{+3}$ g/kg); and |
| $CF_2$ | = | conversion factor ($1 \times 10^{-6}$ $m^3/cm^3$). |

The following equation was used to estimate the soil to water partition coefficient, $K_{sw}$ (ASTM, 2004):

$$K_{sw} = \frac{\theta_w + \theta_a H' + PbK_d}{Pb}$$

Where:

| | | |
|---|---|---|
| $\theta_w$ | = | water-filled porosity (0.15 $cm^3$-water/$cm^3$-soil); |
| $\theta_a$ | = | air-filled porosity (0.28 $cm^3$-air/$cm^3$-soil); |
| H′ | = | COPC-specific Henry's law coefficient (unitless); |
| Pb | = | soil bulk density (1.5 g/$cm^3$); and |
| $K_d$ | = | soil-organic carbon distribution coefficient (where $K_d$ = fraction organic carbon [$f_{oc}$] × organic carbon partition coefficient [$K_{oc}$]) ($cm^3$/g). |

The following equation was used to estimate COPC-specific effective diffusion coefficients for vadose-zone soils, $D_{eff}$ (ASTM, 2004):

$$D_{eff} = D_{air} \frac{\theta_a^{3.33}}{\theta_T^{2}} + \frac{D_{water}}{H'} \frac{\theta_w^{3.33}}{\theta_T^{2}}$$

Where:

$D_{air}$ = COPC-specific diffusivity in air ($cm^2/sec$);
$D_{water}$ = COPC-specific diffusivity in water ($cm^2/sec$);
$\theta_a$ = air-filled porosity (0.28 $cm^3$-air/$cm^3$-soil);
$\theta_w$ = water-filled porosity (0.15 $cm^3$-water/$cm^3$-soil);
$\theta_T$ = total soil porosity (0.43 $cm^3$-air/$cm^3$-soil); and
$H'$ = COPC-specific Henry's law coefficient (unitless).

The following equation was used to estimate the dispersion factor for outdoor air, $DF_{amb}$, assuming a trench is 91 centimeters (cm) wide by 457 cm long by 183 cm deep (3 ft wide × 15 ft long × 6 ft deep) an estimate of what a typical trench size could be:

$$DF_{amb} = \frac{U_{air} \times W \times H}{A}$$

Where:

$U_{air}$ = outdoor air velocity in mixing zone (cm/sec);
$W$ = width of source-zone area (457 cm; assume length of trench = 15 ft);
$H$ = mixing zone height (183 cm; assume depth of trench = 6 ft); and
$A$ = source-zone area (assume 4 sidewalls and bottom area of trench = $2.4 \times 10^{+5} cm^2$).

The outdoor air velocity in the mixing zone, $U_{air}$, is estimated using the following equation:

$$U_{air} = \frac{ACH \times W_t}{3600}$$

Where:

ACH = air changes per hour (20 $hr^{-1}$);
$W_t$ = length of shortest side of trench (91 cm; assume width of trench = 3 ft); and
3600 = conversion (1 hr = 3600 seconds).

To develop the air exchange rate (ACH), a computational fluid dynamic (CFD) model was constructed to model air flow within the trench as defined above. CFD models have been used to evaluate air dispersion within urban canyon environments and can provide a more refined evaluation of potential air exchange within a trench. Using the CFD model (Ansys, 2011), air flow was calculated using the geometry of the trench and a reference velocity of 1.3 m/sec which is the lowest monthly average wind speed reported for Long Beach from the last several years (January 2009 to April 2011) (NCDC, 2011) at a height of 10 m. The CFD model was used to monitor the decrease in concentration of a tracer uniformly distributed in the trench. The model assumed an initial concentration of one in the trench and zero within the atmosphere. Convection and diffusion of the tracer out of the trench was evaluated and the reduction in the concentration in the trench over time was calculated.

The ACH was calculated following the calculation methods presented for the air exchange rate from ASTM (2011):

$$ACH = -\frac{\left[\ln(Ct_2) - \ln(Ct_1)\right]}{t_2 - t_1}$$

Where:

| | | |
|---|---|---|
| ACH | = | air exchange rate per hour ($hr^{-1}$); |
| $C_{t2}$ | = | final tracer concentration at time 2; |
| $Ct_1$ | = | initial tracer concentration at time 1; and |
| $t_2 - t_1$ | = | time interval of simulation (hr). |

An ACH of approximately 20 $hr^{-1}$ was calculated for the trench.

The derivation of COPC-specific $VF_{soil\text{-}OA}$ for the construction worker is presented in **Table E-3**.

For the commercial worker, an important consideration in developing RBCs for the Site is the final disposition of impacted media as described with respect to remedial alternative selection in the RAP. For the purpose of developing RBCs, two scenarios were evaluated for the commercial worker: (1) a scenario in which COPCs may be present at the surface (0-ft cover RBC); and (2) a remedial alternative scenario in which it was assumed either a 2-foot or 4-foot cover of soils is placed over impacted soils (2-ft cover RBC and 4-ft cover RBC). For the 2- and 4-ft cover scenarios, direct contact with COPCs in soil would not be possible, and the only potentially complete exposure pathway would be exposure to VOCs that have migrated from the subsurface to outdoor air.

For the 0-ft cover scenario, COPC-specific VFs were derived using the following equation (USEPA, 2002):

$$VF_0 = \frac{Q/C \times \left(10^{-4}\ \frac{m^2}{cm^2}\right) \times \left(3.14 \times D_A \times T\right)^{1/2}}{\left(2 \times Pb \times D_A\right)}$$

Where:

| | | |
|---|---|---|
| Q/C | = | inverse of the ratio of the geometric mean air concentration to the emission flux at center of the source (38.37 $g/m^2$-sec per $kg/m^3$ calculated for a 16-acre site in Los Angeles); |
| $D_A$ | = | COPC-specific apparent diffusivity ($cm^2$/sec); |
| T | = | exposure interval (commercial worker 25 years = $7.9\times10^8$ sec); and |
| Pb | = | dry soil bulk density (1.5 $g/cm^3$). |

And where:

$$D_A = \frac{\left(\frac{D_{air} \times \theta_a^{3.33}}{\theta_T^{2}}\right) + \left(\frac{D_{water} \times \theta_w^{3.33}}{H \times \theta_T^{2}}\right)}{(Pb \times Koc \times foc) + \theta_w + (\theta_a \times H)}$$

Where:

| | | |
|---|---|---|
| $D_{air}$ | = | COPC-specific vapor diffusion coefficient in air ($cm^2$/sec); |
| $D_{water}$ | = | COPC-specific molecular diffusion coefficient in water ($cm^2$/sec); |
| $\theta_a$ | = | soil air content (0.28 $cm^3$-air/$cm^3$-soil); |
| $\theta_w$ | = | soil water content (0.15 $cm^3$-water/$cm^3$-soil); |
| $\theta_T$ | = | total soil porosity (0.43 $cm^3$-air/$cm^3$-soil); |
| H | = | COPC-specific Henry's law coefficient (unitless); |
| Pb | = | dry soil bulk density (1.5 $g/cm^3$); |
| Koc | = | COPC-specific soil organic carbon partition coefficient ($cm^3$/g); and |
| foc | = | fraction organic carbon in soil (0.006 g/g; USEPA, 2002 default). |

The COPC-specific $VF_0$ for the commercial worker assuming no cover is presented in **Table E-3**.

A different algorithm was used for COPC-specific VFs assuming impacted soils are covered by a clean fill. Methods described in the USEPA Supplemental Soil Screening Level Guidance (USEPA, 2002) were used as described below to calculate emissions due to subsurface impacts. The emission flux per unit soil concentration from subsurface soils at a selected time is determined by:

$$J_{sub} = \rho_b \left(\frac{D_A}{\pi t}\right)^{1/2} \left[Exp\left(-\frac{d^2}{4D_A t}\right) - Exp\left(-\frac{(d+W)^2}{4D_A t}\right)\right] \times 10^4 cm^2/m^2 \qquad (1)$$

Where:

$J_{sub}$ = unit emission flux from subsurface soils at each time step ($g/m^2/sec$);
$\rho_b$ = dry bulk density ($g/cm^3$);
$D_A$ = apparent diffusivity ($cm^2/sec$);
t = elapsed time at the end of each time-step (sec);
d = depth to top of soil contamination (cm); and
W = thickness of subsurface contaminated soil (cm).

The cumulative mass emitted is calculated by integrating Equation (1) over the exposure time.

$$M_{sub} = \mathrm{A}_{\mathrm{sub}} \int J_{sub} \; dt \qquad (2)$$

Where:

$M_{sub}$ = cumulative unit mass emitted from undisturbed subsurface soils (g); and
$A_{sub}$ = areal extent of undisturbed subsurface soil contamination ($m^2$).

To ensure that the estimated total mass emitted does not exceed the total initial mass in soil, the mass emitted is limited to the following maximum value:

$$M_{Sub}^{T} = \rho_b \times \mathrm{A}_{\mathrm{Sub}} \times \mathrm{W} \times 10^{-2}\,\mathrm{m/cm} \times 10^{6}\,\mathrm{cm}^3/\mathrm{m}^3 \qquad (3)$$

The time-average unit emission flux is the total mass emitted divided by the area and time. Therefore, the VF can be estimated by:

$$\mathrm{VF} = \frac{\mathrm{Q/C}}{\left(\dfrac{M_{Sub}}{A_{Sub}\tau}\right)}$$

Where:

VF = volatilization factor ($m^3/kg$); and
Q/C = inverse of mean concentration at the center of a square source ($g/m^2$-sec per $kg/m^3$).

The depth of impact, W, was assumed to be 9.5 feet (ft) below ground surface (bgs) and the top of impact was assumed to be at 2 or 4 ft bgs dependent on the scenario. The depth of 9.5 ft was selected to represent the average depth to groundwater in the City easement and Perimeter road area. The COPC-specific VFs for the commercial worker assuming the presence of a 2-ft cover ($VF_2$) and a 4-ft cover ($VF_4$) are presented in **Table E-3**.

## Toxicity Criteria

Current cancer toxicity criteria (cancer slope factors and inhalation unit risk factors) were selected from the following sources in order of preference:

1) Cal-EPA Office of Environmental Health Hazard Analysis (OEHHA) Toxicity Criteria Database, online (Cal-EPA, 2013);
2) USEPA Integrated Risk Information System (IRIS) (USEPA, 2013);
3) USEPA RSLs for Chemical Contaminants at Superfund Sites (USEPA, 2012);
4) USEPA National Center of Environmental Assessment (USEPA, 2012);
5) Agency for Toxic Substances Disease Registry (reported in USEPA, 2012); and
6) Health Effects Assessment Summary Tables (reported in USEPA, 2012).

Noncancer toxicity criteria (reference doses and inhalation reference concentrations) were selected from the following sources in order of preference:

1) USEPA IRIS (USEPA, 2013); and
2) Cal-EPA OEHHA Toxicity Criteria Database, online (Cal-EPA, 2013).

The toxicity criteria used to derive the soil RBCs are presented in **Table E-4**.

RBCs were developed for individual COPCs such that the risk posed by an individual COPC is at the one-in-one hundred thousand ($10^{-5}$) cancer risk level for both construction and commercial worker scenarios, or was determined to have a noncancer hazard quotient (HQ) of 1. For lead, the USEPA adult lead model spreadsheet was used to derive soil lead RBCs of 160 mg/kg for a construction worker (see **Attachment 1**). For the commercial worker, the lead RBC was set as 320 mg/kg, the California Human Health Screening Level (CHHSL) established by Cal-EPA OEHHA (Cal-EPA, 2009a).

## Derivation of Soil RBCs

Derivation of the Soil RBCs requires an assumption on acceptable risk. Various demarcations of acceptable risk have been established by regulatory agencies. The NCP (40 CFR 300) indicates that lifetime incremental cancer risks posed by a site should not exceed a range of one in one million ($1\times10^{-6}$) to one hundred in one million ($1\times10^{-4}$) and noncarcinogenic chemicals should not be present at levels expected to cause adverse health effects (i.e., a Hazard Quotient [HQ] greater than 1). The California Hazardous Substances Account Act (HSAA) incorporates the NCP by reference, and thus also incorporates the acceptable risk range set forth in the NCP. The California Department of Toxic Substances Control (DTSC) considers the $1\times10^{-6}$ risk level as the generally accepted point of departure for risk management decisions for unrestricted land use and often determines the need for remedial action where the cancer risk exceeds the $1\times10^{-6}$ risk level for residential receptors and $1\times10^{-5}$ risk level for commercial receptors.

In the risk assessment, the direct contact (incidental ingestion and dermal contact) and outdoor air inhalation pathways were evaluated using exposure algorithms following USEPA and Cal-EPA risk assessment guidance and a target cancer risk of $10^{-5}$ and a target noncancer HQ of 1. These values are commonly used by Cal-EPA for worker exposure scenarios. Soil RBCs were developed for each COPC that was identified in **Table E-1**.

COPC-specific soil RBCs were derived first by calculating a unit cancer risk and a unit noncancer hazard using a unit soil concentration of 1 mg/kg for each COPC. In other words, cancer risks and noncancer hazards were estimated for a future commercial worker and a future construction worker exposed to soil concentrations of 1 mg/kg for each COPC via incidental soil ingestion, dermal soil contact, and outdoor air inhalation of vapors/dust. To calculate the unit cancer risk and unit noncancer hazard from exposure via incidental ingestion of soil, the following equations were used:

$$\text{Unit CR}_{ing} = \frac{EPC_{soil} \times IngR \times ABS \times EF \times ED \times CF \times CSF_o}{BW \times AT_c}$$

$$\text{Unit HQ}_{ing} = \frac{EPC_{soil} \times IngR \times ABS \times EF \times ED \times CF}{BW \times AT_{nc} \times RfD_o}$$

Where:

| | | |
|---|---|---|
| Unit $CR_{ing}$ | = | COPC-specific cancer risk, incidental ingestion; |
| Unit $HQ_{ing}$ | = | COPC-specific noncancer hazard quotient, incidental ingestion; |
| $EPC_{soil}$ | = | unit COPC exposure point concentration in soil (1 mg/kg); |
| IngR | = | ingestion rate of soil (mg/day); |
| ABS | = | percent absorption (assumed to be 100 percent); |
| EF | = | exposure frequency (days/year); |
| ED | = | exposure duration (years); |
| CF | = | conversion factor for soil ($10^{-6}$ kg/mg); |
| $CSF_o$ | = | oral cancer slope factor $(\text{mg/kg-day})^{-1}$; |
| $RfD_o$ | = | oral noncancer reference dose (mg/kg-day); |
| BW | = | body weight (kg); |
| $AT_c$ | = | averaging time (days), cancer: 25,550 days; and |

$AT_{nc}$ = averaging time (days), noncancer: ED x 365 days.

To calculate the unit cancer risk and unit noncancer hazard from exposure via dermal contact with soil, the following equations were used:

$$\text{Unit CR}_{derm} = \frac{EPC_{soil} \times SA \times AF \times EF \times ED \times CF \times DAF \times CSF_o}{BW \times AT_c}$$

$$\text{Unit HQ}_{derm} = \frac{EPC_{soil} \times SA \times AF \times EF \times ED \times CF \times DAF}{BW \times AT_{nc} \times RfD_o}$$

Where:

- Unit $CR_{derm}$ = COPC-specific cancer risk, dermal contact;
- Unit $HQ_{derm}$ = COPC-specific noncancer hazard quotient, dermal contact;
- $EPC_{soil}$ = unit COPC exposure point concentration in soil (1 mg/kg);
- SA = skin surface area exposed to soil per day ($cm^2$/day);
- AF = soil-skin adherence factor (mg/$cm^2$);
- EF = exposure frequency (days/year);
- ED = exposure duration (years);
- CF = conversion factor ($10^{-6}$ kg/mg);
- DAF = dermal absorption factor (unitless, COPC-specific);
- $CSF_o$ = oral/dermal cancer slope factor $(mg/kg\text{-}day)^{-1}$;
- $RfD_o$ = oral/dermal noncancer reference dose (mg/kg-day);
- BW = body weight (kg);
- $AT_c$ = averaging time (days), cancer: 25,550 days; and
- $AT_{nc}$ = averaging time (days), noncancer: ED x 365 days.

To calculate the unit cancer risk and unit noncancer hazard from exposure via outdoor air inhalation from soil, the following equations were used:

$$\text{Unit CR}_{inh} = EC_{inh,soil} \times IUR$$

$$\text{Unit HQ}_{inh} = \frac{EC_{inh,soil}}{RfC}$$

Where:

$$EC_{inh,soil} = \frac{EPC_{soil} \times EF \times ED \times ET}{AT_{c/nc} \times (PEF \text{ or } VF)}$$

Where:

| | | |
|---|---|---|
| Unit $CR_{inh}$ | = | COPC-specific cancer risk, outdoor inhalation; |
| Unit $HQ_{inh}$ | = | COPC-specific noncancer hazard quotient, outdoor inhalation; |
| $EC_{inh,soil}$ | = | Unit COPC exposure concentration in air ($mg/m^3$); |
| $EPC_{soil}$ | = | Unit COPC exposure point concentration in soil (1 mg/kg); |
| EF | = | exposure frequency (days/year); |
| ED | = | exposure duration (years); |
| ET | = | exposure time (8 hours/24 hours for workers); |
| IUR | = | inhalation unit risk $(\mu g/m^3)^{-1}$; |
| RfC | = | inhalation reference concentration ($mg/m^3$); |
| PEF | = | particulate emission factor for non-VOCs detected in soil ($m^3/kg$); |
| VF | = | volatilization factor for VOCs detected in soil ($m^3/kg$); |
| $AT_{c/nc}$ | = | averaging time (days), cancer: 25,550 days; and noncancer: ED x 365 days. |

Subsequently, the unit cancer risks and unit noncancer hazards are summed together across exposure routes to yield a cumulative risk for each COPC (e.g., unit $CR_{ing}$ + unit $CR_{derm}$ + unit $CR_{inh}$ = Cumulative Cancer Risk). Assuming a target cancer risk of $10^{-5}$ for a future commercial worker and a future construction worker, and a target noncancer HQ of 1, the RBCs were estimated using the following equations:

$$RBC_c = \frac{TR}{\text{Cumulative CR}}$$

$$RBC_{nc} = \frac{THQ}{\text{Cumulative HQ}}$$

Where:

| | | |
|---|---|---|
| $RBC_c$ | = | soil risk-based concentration for carcinogens (mg/kg); |
| TR | = | target cancer risk of $1 \times 10^{-5}$; |
| $RBC_{nc}$ | = | soil risk-based concentration for noncarcinogens (mg/kg); and |
| THQ | = | target hazard quotient of 1. |

The exposure parameters used to derive the RBCs are presented in **Table E-2**. Detailed calculations for the soil RBCs are presented in **Attachment 1** of this Appendix. The soil RBCs for future construction workers and future commercial workers are summarized in **Table E-5**.

## Summary and Limitations

RBCs for soil were developed for the Site for use in the remedial planning process. RBCs for each COPC were developed assuming future construction worker and commercial worker scenarios. These scenarios are considered the most relevant for the Site where exposures to Site soils may occur in the future (e.g. City easement/parcel). The majority of the Site will be capped thus precluding contact to potentially impacted soils. The summary of soil RBCs for each scenario is presented in **Table E-5**.

Because some inorganic compounds are naturally occurring in the environment, the presence of these chemicals in Site soils must be evaluated with respect to what would be expected to be naturally occurring. This is especially important for metals such as arsenic where RBCs are below levels typically found in southern California soils. In such cases a background evaluation should be conducted. In the case of arsenic, a background value of 12 mg/kg has been established by DTSC for Southern California soils (Cal-EPA 2007). Therefore this value is considered appropriate for the Ascon Site should arsenic concentrations be detected in post-remediation soils above RBC values. In addition to metals, carcinogenic polynuclear aromatic hydrocarbons (cPAHs) can be naturally occurring or present at ambient levels not associated with former site activities and above risk-based values. A background dataset and methodology has been developed by DTSC that can be used to evaluate the presence of cPAHs in soil (Cal-EPA DTSC, 2009b) and will be used in the post-remediation risk assessment as appropriate.

Furthermore, because of the unpredictable mixture of COPCs at the Site in any given area, a determination of the risk posed by chemicals remaining at the Site following remedial actions can only be accurately determined using soil confirmation data obtained following the remedial action (i.e., soil samples from the remedial excavation floor). Finally, Soil RBCs developed for the Site express both a chemical concentration and an exposure route assumed in the derivation of the RBC. Therefore protectiveness may be achieved by reducing chemical concentrations or by reducing exposure by means other than chemical removal (such as capping an area, limiting access, or by waste stabilization). Therefore, the final risk determination conducted for the Site should take into account these other considerations.

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**Tables**



**Attachments**

# TABLES

## Table E-1
## Screening for Soil Chemicals of Potential Concern
## Ascon Landfill
## Huntington Beach, California

| Matrix | Chemical | CAS Number | Maximum Detected Concentration (1) | Units | Industrial Soil RSL (mg/kg) | RSL × 0.1 | COPC? (2) |
|---|---|---|---|---|---|---|---|
| **Metal** | | | | | | | |
| Soil | Antimony | 7440-36-0 | 1.1E+01 | mg/kg | 4.1E+02 | 4.1E+01 | No |
| Soil | Arsenic | 7440-38-2 | 2.9E+01 | mg/kg | 1.6E+00 | 1.6E-01 | Yes |
| Soil | Barium | 7440-39-3 | 1.8E+03 | mg/kg | 1.9E+05 | 1.9E+04 | No |
| Soil | Beryllium | 7440-41-7 | 1.2E+00 | mg/kg | 2.0E+03 | 2.0E+02 | No |
| Soil | Cadmium | 7440-43-9 | 1.5E+01 | mg/kg | 8.0E+02 | 8.0E+01 | No |
| Soil | Chromium * | 7440-47-3 | 6.6E+02 | mg/kg | 1.5E+06 | 1.5E+05 | No |
| Soil | Chromium (VI) | 18540-29-9 | 7.3E-01 | mg/kg | 5.6E+00 | 5.6E-01 | Yes |
| Soil | Cobalt | 7440-48-4 | 1.9E+01 | mg/kg | 3.0E+02 | 3.0E+01 | No |
| Soil | Copper | 7440-50-8 | 1.1E+04 | mg/kg | 4.1E+04 | 4.1E+03 | Yes |
| Soil | Lead | 7439-92-1 | 1.8E+03 | mg/kg | 8.0E+02 | 8.0E+01 | Yes |
| Soil | Mercury | 7439-97-6 | 1.9E+00 | mg/kg | 4.3E+01 | 4.3E+00 | No |
| Soil | Molybdenum | 7439-98-7 | 8.6E+00 | mg/kg | 5.1E+03 | 5.1E+02 | No |
| Soil | Nickel | 7440-02-0 | 3.8E+02 | mg/kg | 2.0E+04 | 2.0E+03 | No |
| Soil | Selenium | 7782-49-2 | 7.5E+01 | mg/kg | 5.1E+03 | 5.1E+02 | No |
| Soil | Silver | 7440-22-4 | 4.2E+00 | mg/kg | 5.1E+03 | 5.1E+02 | No |
| Soil | Thallium | 7440-28-0 | 1.0E+02 | mg/kg | 1.0E+01 | 1.0E+00 | Yes |
| Soil | Vanadium | 7440-62-2 | 7.8E+01 | mg/kg | 5.2E+03 | 5.2E+02 | No |
| Soil | Zinc | 7440-66-6 | 2.0E+03 | mg/kg | 3.1E+05 | 3.1E+04 | No |
| **PCBs** | | | | | | | |
| Soil | Aroclor 1254 | 11097-69-1 | 1.5E-02 | mg/kg | 7.4E-01 | 7.4E-02 | No |
| Soil | PCB-1260 | 11096-82-5 | 2.1E-01 | mg/kg | 7.4E-01 | 7.4E-02 | Yes |
| **Pesticides** | | | | | | | |
| Soil | 4,4'-DDD | 72-54-8 | 1.1E-02 | mg/kg | 7.2E+00 | 7.2E-01 | No |
| Soil | 4,4'-DDE | 72-55-9 | 8.2E-02 | mg/kg | 5.1E+00 | 5.1E-01 | No |
| Soil | 4,4'-DDT | 50-29-3 | 2.6E-02 | mg/kg | 7.0E+00 | 7.0E-01 | No |
| Soil | Alpha-BHC | 319-84-6 | 2.7E-03 | mg/kg | 2.7E-01 | 2.7E-02 | No |
| Soil | Beta-BHC | 319-85-7 | 7.5E-02 | mg/kg | 9.6E-01 | 9.6E-02 | No |
| Soil | Chlordane | 57-74-9 | 1.4E+00 | mg/kg | 6.5E+00 | 6.5E-01 | Yes |
| Soil | Dieldrin | 60-57-1 | 3.1E-02 | mg/kg | 1.1E-01 | 1.1E-02 | Yes |
| Soil | Endosulfan II * | 33213-65-9 | 1.1E-02 | mg/kg | 3.7E+03 | 3.7E+02 | No |
| Soil | Endosulfan sulfate * | 1031-07-8 | 4.3E-03 | mg/kg | 3.7E+03 | 3.7E+02 | No |
| Soil | Endrin aldehyde * | 7421-93-4 | 3.4E-03 | mg/kg | 1.8E+02 | 1.8E+01 | No |
| Soil | Endrin ketone * | 53494-70-5 | 2.4E-03 | mg/kg | 1.8E+02 | 1.8E+01 | No |
| Soil | Gamma-BHC (Lindane) | 58-89-9 | 6.5E-02 | mg/kg | 2.1E+00 | 2.1E-01 | No |
| Soil | Heptachlor | 76-44-8 | 2.9E-02 | mg/kg | 3.8E-01 | 3.8E-02 | No |
| Soil | Heptachlor epoxide | 1024-57-3 | 3.2E-02 | mg/kg | 1.9E-01 | 1.9E-02 | Yes |
| Soil | Methoxychlor | 72-43-5 | 5.3E-03 | mg/kg | 3.1E+03 | 3.1E+02 | No |
| **SVOCs** | | | | | | | |
| Soil | 3,3'-Dichlorobenzidine | 91-94-1 | 8.2E-02 | mg/kg | 3.8E+00 | 3.8E-01 | No |
| Soil | Acenaphthene | 83-32-9 | 2.3E+00 | mg/kg | 3.3E+04 | 3.3E+03 | No |
| Soil | Acenaphthylene * | 208-96-8 | 2.0E-03 | mg/kg | 3.3E+04 | 3.3E+03 | No |
| Soil | Anthracene | 120-12-7 | 1.7E+00 | mg/kg | 1.7E+05 | 1.7E+04 | No |
| Soil | Benz(a)anthracene | 56-55-3 | 1.1E-01 | mg/kg | 2.1E+00 | 2.1E-01 | No |
| Soil | Benzidine | 92-87-5 | 1.7E+01 | mg/kg | 7.5E-03 | 7.5E-04 | Yes |
| Soil | Benzo(a)pyrene | 50-32-8 | 1.2E+00 | mg/kg | 2.1E-01 | 2.1E-02 | Yes |
| Soil | Benzo(g,h,i)perylene * | 191-24-2 | 4.8E-02 | mg/kg | 1.7E+04 | 1.7E+03 | No |
| Soil | Benzo(k)fluoranthene | 207-08-9 | 1.4E-01 | mg/kg | 2.1E+01 | 2.1E+00 | No |
| Soil | Benzo[b]fluoranthene | 205-99-2 | 1.1E-01 | mg/kg | 2.1E+00 | 2.1E-01 | No |
| Soil | Benzyl butyl phthalate | 85-68-7 | 6.3E-01 | mg/kg | 9.1E+02 | 9.1E+01 | No |
| Soil | Bis(2-ethylhexyl) phthalate | 117-81-7 | 2.0E+02 | mg/kg | 1.2E+02 | 1.2E+01 | Yes |
| Soil | Chrysene | 218-01-9 | 2.8E+00 | mg/kg | 2.1E+02 | 2.1E+01 | No |

**Table E-1**
**Screening for Soil Chemicals of Potential Concern**
**Ascon Landfill**
**Huntington Beach, California**

| Matrix | Chemical | CAS Number | Maximum Detected Concentration (1) | Units | Industrial Soil RSL (mg/kg) | RSL × 0.1 | COPC? (2) |
|---|---|---|---|---|---|---|---|
| Soil | Dibenz[a,h]anthracene | 53-70-3 | 1.7E+00 | mg/kg | 2.1E-01 | 2.1E-02 | Yes |
| Soil | Di-n-butyl phthalate | 84-74-2 | 4.3E+00 | mg/kg | 6.2E+04 | 6.2E+03 | No |
| Soil | Fluoranthene | 206-44-0 | 1.1E+03 | mg/kg | 2.2E+04 | 2.2E+03 | No |
| Soil | Fluorene | 86-73-7 | 2.1E+00 | mg/kg | 2.2E+04 | 2.2E+03 | No |
| Soil | Indeno(1,2,3-cd)Pyrene | 193-39-5 | 2.6E-02 | mg/kg | 2.1E+00 | 2.1E-01 | No |
| Soil | Phenanthrene * | 85-01-8 | 5.5E+04 | mg/kg | 1.7E+04 | 1.7E+03 | Yes |
| Soil | Phenol | 108-95-2 | 1.6E-01 | mg/kg | 1.8E+05 | 1.8E+04 | No |
| Soil | Pyrene | 129-00-0 | 5.8E+00 | mg/kg | 1.7E+04 | 1.7E+03 | No |
| **VOCs** | | | | | | | |
| Soil | 1,1,2,2-Tetrachloroethane | 79-34-5 | 2.9E-03 | mg/kg | 2.8E+00 | 2.8E-01 | No |
| Soil | 1,1-Dichloroethene | 75-35-4 | 4.3E-03 | mg/kg | 1.1E+03 | 1.1E+02 | No |
| Soil | 1,2,3-Trichlorobenzene | 87-61-6 | 1.3E-03 | mg/kg | 4.9E+02 | 4.9E+01 | No |
| Soil | 1,2,4-Trichlorobenzene | 120-82-1 | 1.0E-03 | mg/kg | 9.9E+01 | 9.9E+00 | No |
| Soil | 1,2,4-Trimethylbenzene | 95-63-6 | 1.8E+01 | mg/kg | 2.6E+02 | 2.6E+01 | No |
| Soil | 1,2-Dibromo-3-chloropropane | 96-12-8 | 5.9E-03 | mg/kg | 6.9E-02 | 6.9E-03 | No |
| Soil | 1,2-Dibromoethane (EDB) | 106-93-4 | 6.1E-03 | mg/kg | 1.7E-01 | 1.7E-02 | No |
| Soil | 1,2-Dichlorobenzene | 95-50-1 | 3.5E-01 | mg/kg | 9.8E+03 | 9.8E+02 | No |
| Soil | 1,3,5-Trimethylbenzene | 108-67-8 | 6.0E+00 | mg/kg | 1.0E+04 | 1.0E+03 | No |
| Soil | 2-Butanone | 78-93-3 | 4.3E+00 | mg/kg | 2.0E+05 | 2.0E+04 | No |
| Soil | 2-Hexanone | 591-78-6 | 3.4E-03 | mg/kg | 1.4E+03 | 1.4E+02 | No |
| Soil | 2-Methylnaphthalene | 91-57-6 | 4.7E+01 | mg/kg | 2.2E+03 | 2.2E+02 | No |
| Soil | Acetone | 67-64-1 | 9.5E-01 | mg/kg | 6.3E+05 | 6.3E+04 | No |
| Soil | Benzene | 71-43-2 | 1.3E+00 | mg/kg | 5.4E+00 | 5.4E-01 | Yes |
| Soil | Carbon disulfide | 75-15-0 | 1.3E+00 | mg/kg | 3.7E+03 | 3.7E+02 | No |
| Soil | Chlorobenzene | 108-90-7 | 2.0E-03 | mg/kg | 1.4E+03 | 1.4E+02 | No |
| Soil | Ethylbenzene | 100-41-4 | 1.0E+01 | mg/kg | 2.7E+01 | 2.7E+00 | Yes |
| Soil | Gamma-chlordane * | 5103-74-2 | 1.7E-02 | mg/kg | 6.5E+00 | 6.5E-01 | No |
| Soil | Isopropylbenzene | 98-82-8 | 5.9E+00 | mg/kg | 1.1E+04 | 1.1E+03 | No |
| Soil | m,p-Xylenes * | 179601-23-1 | 1.4E+01 | mg/kg | 2.5E+03 | 2.5E+02 | No |
| Soil | Methylene chloride | 75-09-2 | 6.1E-02 | mg/kg | 9.6E+02 | 9.6E+01 | No |
| Soil | m-Xylene | 108-38-3 | 6.5E-01 | mg/kg | 2.5E+03 | 2.5E+02 | No |
| Soil | Naphthalene | 91-20-3 | 1.7E+02 | mg/kg | 1.8E+01 | 1.8E+00 | Yes |
| Soil | n-Butylbenzene | 104-51-8 | 7.8E-01 | mg/kg | 5.1E+04 | 5.1E+03 | No |
| Soil | n-Propylbenzene | 103-65-1 | 8.1E+00 | mg/kg | 2.1E+04 | 2.1E+03 | No |
| Soil | o-Xylene | 95-47-6 | 2.2E+00 | mg/kg | 3.0E+03 | 3.0E+02 | No |
| Soil | p-Isopropyltoluene * | 99-87-6 | 5.3E+00 | mg/kg | 1.1E+04 | 1.1E+03 | No |
| Soil | p-Xylene | 106-42-3 | 5.6E-02 | mg/kg | 2.6E+03 | 2.6E+02 | No |
| Soil | sec-Butylbenzene * | 135-98-8 | 2.8E+01 | mg/kg | 5.1E+04 | 5.1E+03 | No |
| Soil | Styrene | 100-42-5 | 2.9E+01 | mg/kg | 3.6E+04 | 3.6E+03 | No |
| Soil | Tetrachloroethene | 127-18-4 | 7.8E-03 | mg/kg | 1.1E+02 | 1.1E+01 | No |
| Soil | Toluene | 108-88-3 | 3.3E+00 | mg/kg | 4.5E+04 | 4.5E+03 | No |
| Soil | Trichlorofluoromethane | 75-69-4 | 5.7E-02 | mg/kg | 3.4E+03 | 3.4E+02 | No |
| Soil | Xylenes (total) | 1330-20-7 | 2.2E+01 | mg/kg | 2.7E+03 | 2.7E+02 | No |

Notes: " -- " not available

RSLs - Regional Screening Levels (USEPA, 2012)

1 Selected as a chemical of potential concern (COPC) if the maximum Site-wide concentration exceeded 0.1 x Industrial RSL.

2 Based on data that is relevant for the proposed remedy (Alternative 4).

* RSL surrogates were used for the following compounds: Chromium III for Chromium; endosulfan for endosulfan II and endosulfan sulfate; endrin for endrin aldehyde and endrin ketone; acenaphthene for acenaphthylene; pyrene for benzo(g,h,i)perylene and phenanthrene; chlordane for gamma-chlordane; m-xylene for m,p-xylene; Isopropylbenzene for p-isopropyltoluene; n-butylbenzene for sec-butylbenzene

**Table E-2**
**Exposure Parameters**
**Ascon Landfill**
**Huntington Beach, California**

| Exposure Route | Parameter | | Units | Construction Worker | | Commercial Worker | |
|---|---|---|---|---|---|---|---|
| | | | | Value | Reference | Value | Reference |
| General | $EPC_{soil}$ | Unit Exposure Point Concentration, Soil | mg/kg | 1 | -- | 1 | -- |
| | EF | Exposure Frequency | days/year | 30 | prof judgment | 250 | USEPA 1991 |
| | EDa | Exposure Duration, adult | years | 1 | prof judgment | 25 | USEPA 1991 |
| | ET | Exposure Time | hrs/day | 8 | USEPA 2012 | 8 | USEPA 2012 |
| | BWa | Body Weight, adult | kilograms | 70 | USEPA 1989 | 70 | USEPA 1989 |
| | AT-C | Averaging Time (Cancer) | days | 25,550 | USEPA 1989 | 25,550 | USEPA 1989 |
| | AT-N | Averaging Time (Noncancer) | days | ED x 365 | USEPA 1989 | ED x 365 | USEPA 1989 |
| Ingestion | IngR | Ingestion Rate of Soil | mg/day | 330 | USEPA 2002 | 100 | USEPA 1991 |
| | CF | Conversion Factor | kg/mg | 1.0E-06 | -- | 1.0E-06 | -- |
| Dermal | SA | Surface Area Available for Contact | $cm^2$/day | 3,300 | USEPA 2002 | 3,300 | USEPA 2004 |
| | AF | Adherence Factor | $mg/cm^2$ | 0.3 | USEPA 2002 | 0.2 | USEPA 2004 |
| | AbsD | Dermal Absorption | unitless | chemical-specific | USEPA 2004 | chemical-specific | USEPA 2004 |
| | CF | Conversion Factor | kg/mg | 1.0E-06 | -- | 1.0E-06 | -- |
| Inhalation | $EPC_{soil\text{-}oa}$ | Soil to Outdoor Air Concentration | $mg/m^3$ | $EPC_{soil}$ ÷ (PEF or VF) | -- | $EPC_{soil}$ ÷ (PEF or VF) | -- |
| | PEF | Particulate Emission Factor | $m^3$/kg | see Table P-3 | USEPA 2002 | see Table P-3 | USEPA 2002 |
| | VF | Volatilization Factor | $m^3$/kg | chemical-specific | USEPA 2002 | chemical-specific | USEPA 2002 |

Notes:

na -- not available

Sources:


USEPA 1989. Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

USEPA 1991. RAGS. Vol I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

USEPA 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24.

USEPA 2004. RAGS. Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Interim Guidance. EPA/540/R-99/005

USEPA 2012. Regional Screening Levels for Chemical Contaminants at Superfund Sites. User's Guide. November.
URL: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm

## Table E-3
## Volatilization and Particulate Emission Factors
## Ascon Landfill Site
## Huntington Beach, California

| Parameter | Value | Units | Reference |
|---|---|---|---|
| Water-filled soil porosity (θw) | 1.5E-01 | (Lwater-Lsoil) | USEPA 2012 RSL default |
| Total soil porosity ($\theta_T$) | 4.3E-01 | (Lpore-Lsoil) | USEPA 2012 RSL default |
| Air-filled soil porosity (θa) | 2.8E-01 | (Lair-Lsoil) | USEPA 2012 RSL default |
| Soil bulk density (Pb) | 1.5 | $g/cm^3$ | USEPA 2012 RSL default |
| Fraction organic carbon in soil (foc) | 0.006 | unitless | USEPA 2012 RSL default |
| Exposure interval ($T_{commW}$) | 7.9E+08 | sec | 25 year exposure duration |
| Exposure interval ($T_{constW}$) | 3.2E+07 | sec | one year exposure duration |
| $Q/C_{commW}$ | 61.35 | $g/m^2$-s per $kg/m^3$ | Calculated for a 0.9-acre site in Los Angeles (USEPA 2002) |
| Ambient air velocity in mixing zone ($U_{air}$) | 5.1E-01 | cm/s | Based on an air exchange rate of 20 $hr^{-1}$, wind direction parallel to the short side of the trench (3 ft or 91 cm), professional judgment |
| Width of source-zone area (W) | 457 | cm | Assume length of trench = 4.57 meters |
| Mixing zone height (H) | 183 | cm | Assume depth of trench = 1.83 meters |
| Width of trench ($W_t$) | 91 | cm | Assume width of trench = 0.91 meters |
| Source-zone area (A) | 2.4E+05 | $cm^2$ | 4 sidewalls and bottom area of trench |
| Dispersion factor for ambient air ($DF_{amb}$) | 1.7E-01 | cm/s | Calculated (ASTM 2004) |
| Particulate Emission Factor, $PEF_{commW}$ | 1.3E+09 | ($m^3$/kg) | DTSC HERO HHRA Note Number 1 (Cal-EPA, 2011) |
| Particulate Emission Factor, $PEF_{constW}$ | 1.0E+06 | ($m^3$/kg) | DTSC HERO HHRA Note Number 1 (Cal-EPA, 2011) |

| CAS Number | Chemicals of Potential Concern | Diffusivity in Air (Dair) | Henry's Law Constant (H') | Diffusivity in Water (Dw) | Soil organic carbon partition coefficient (Koc) | Soil-water partition coefficient (Kd) | Apparent Diffusivity (Da) | Effective Diffusion Coefficient (Deff) | Soil-water partition coefficient (Ksw) | Commercial Worker 0-ft cover $VF_0$ ($m^3$/kg) | Commercial Worker 2-ft cover $VF_2$ ($m^3$/kg) | Commercial Worker 4-ft cover $VF_4$ ($m^3$/kg) | Construction Worker 0-ft cover $VF_{soil-OA}$ ($m^3$/kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 8.8E-02 | 2.3E-01 | 9.8E-06 | 5.9E+01 | 3.5E-01 | 2.1E-03 | 6.9E-03 | 5.0E-01 | 2.2E+03 | 1.5E+04 | 2.1E+04 | 1.3E+01 |
| 100-41-4 | Ethylbenzene | 7.5E-02 | 3.2E-01 | 7.8E-06 | 3.6E+02 | 2.2E+00 | 5.4E-04 | 5.9E-03 | 2.3E+00 | 4.4E+03 | 1.7E+04 | 2.3E+04 | 2.5E+01 |
| 91-20-3 | Naphthalene | 5.9E-02 | 2.0E-02 | 7.5E-06 | 2.0E+03 | 1.2E+01 | 5.0E-06 | 4.6E-03 | 1.2E+01 | 4.6E+04 | 1.2E+05 | 4.7E+05 | 2.6E+02 |

## Table E-4
## Toxicity Criteria
## Ascon Landfill
## Huntington Beach, California

| Chemicals of Potential Concern | Dermal ABS | Cancer Toxicity Criteria: Oral Cancer Slope Factor (mg/kg-day)$^{-1}$ | | Dermal Cancer Slope Factor (mg/kg-day)$^{-1}$ | | Inhalation Unit Risk (μg/m$^{3}$)$^{-1}$ | | Noncancer Toxicity Criteria: Oral Reference Dose (mg/kg-day) | | Dermal Reference Dose (mg/kg-day) | | Inhalation RfC or REL (mg/m$^{3}$) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | | | | | | | |
| Arsenic | 0.03 | 1.5E+00 | C | 1.5E+00 | C | 3.3E-03 | C | 3.0E-04 | I | 3.0E-04 | I | 1.5E-05 | C |
| Chromium (VI) | 0 | 5.0E-01 | J | NA | | 1.5E-01 | C | 3.0E-03 | I | NA | | 1.0E-04 | I |
| Copper | 0 | NC | | NC | | NC | | 4.0E-02 | H | NA | | NA | |
| Lead | 0 | NC | | NC | | NC | | NA | | NA | | NA | |
| Thallium | 0 | NC | | NC | | NC | | 1.0E-05 | X | NA | | NA | |
| **PCBs** | | | | | | | | | | | | | |
| PCB-1260 | 0.14 | 2.0E+00 | S | 2.0E+00 | S | 5.7E-04 | S | NA | | NA | | NA | |
| **Pesticides** | | | | | | | | | | | | | |
| Chlordane | 0.04 | 1.3E+00 | C | 1.3E+00 | C | 3.4E-04 | C | 5.0E-04 | I | 5.0E-04 | I | 7.0E-04 | I |
| Dieldrin | 0.10 | 1.6E+01 | C | 1.6E+01 | C | 4.6E-03 | C | 5.0E-05 | I | 5.0E-05 | I | 1.8E-04 | R |
| Heptachlor epoxide | 0.10 | 5.5E+00 | C | 5.5E+00 | C | 2.6E-03 | I | 1.3E-05 | I | 1.3E-05 | I | 4.6E-05 | R |
| **SVOCs** | | | | | | | | | | | | | |
| Benzidine | 0.10 | 5.0E+02 | C | 5.0E+02 | C | 1.4E-01 | C | 3.0E-03 | I | 3.0E-03 | I | 1.1E-02 | R |
| Benzo(a)pyrene | 0.13 | 2.9E+00 | C | 2.9E+00 | C | 1.1E-03 | C | NA | | NA | | NA | |
| Bis(2-ethylhexyl) phthalate | 0.10 | 3.0E-03 | C | 3.0E-03 | C | 2.4E-06 | C | 2.0E-02 | I | 2.0E-02 | I | 7.0E-02 | R |
| Dibenz[a,h]anthracene | 0.13 | 4.1E+00 | C | 4.1E+00 | C | 1.2E-03 | C | NA | | NA | | NA | |
| Phenanthrene ** | 0.13 | NC | | NC | | NC | | 3.0E-02 | I | 3.0E-02 | I | 1.1E-01 | R |
| **VOCs** | | | | | | | | | | | | | |
| Benzene | 0 | 1.0E-01 | C | NA | | 2.9E-05 | C | 4.0E-03 | I | NA | | 3.0E-02 | I |
| Ethylbenzene | 0 | 1.1E-02 | C | NA | | 2.5E-06 | C | 1.0E-01 | I | NA | | 1.0E+00 | I |
| Naphthalene | 0.13 | NC | | NC | | 3.4E-05 | C | 2.0E-02 | I | 2.0E-02 | I | 3.0E-03 | I |

Notes:

" ABS " absorption; " RfC " reference concentration; " REL " reference exposure level

** Toxicity criteria for pyrene were used as a surrogate

"NA" Not Applicable/Not Available; "NC: Noncarcinogenic chemical

Keys:

C = Cal-EPA 2013

H = Health Effects Assessment Summary Tables (HEAST). July. EPA 540/R-97-036-PB97-921199 as reported in USEPA 2012

I = Integrated Risk Information System Database, IRIS in USEPA 2013

J = New Jersey; reported in USEPA 2012

R = route-to-route extrapolation

S = reported in USEPA 2012

X = PPRTV Appendix; reported in USEPA 2012

# Table E-5
## Summary of Risk-Based Concentrations for Soil
## Ascon Landfill
## Huntington Beach, California

| Chemicals of Potential Concern | Construction Worker | | Commercial Worker | | | | |
|---|---|---|---|---|---|---|---|
| | **0-ft Cover RBC** (mg/kg) | Risk or Hazard | **0-ft Cover RBC** (mg/kg) | Risk or Hazard | **2-ft Cover RBC** (mg/kg) | **4-ft Cover RBC** (mg/kg) | Risk or Hazard |
| **Metal** | | | | | | | |
| Arsenic | **3.1E+02** | 1.0 | **1.6E+01** | 1E-05 | -- | -- | -- |
| Chromium (VI) | **1.6E+02** | 1E-05 | **5.4E+01** | 1E-05 | -- | -- | -- |
| Copper | **1.0E+05** | 1.0 | **4.1E+04** | 1.0 | -- | -- | -- |
| Lead | **1.6E+02** | NA | **3.2E+02** | NA | -- | -- | -- |
| Thallium | **2.6E+01** | 1.0 | **1.0E+01** | 1.0 | -- | -- | -- |
| **PCBs** | | | | | | | |
| PCB-1260 | **6.3E+02** | 1E-05 | **7.4E+00** | 1E-05 | -- | -- | -- |
| **Pesticides** | | | | | | | |
| Chlordane | **1.1E+03** | 1.0 | **1.7E+01** | 1E-05 | -- | -- | -- |
| Dieldrin | **8.6E+01** | 1E-05 | **1.1E+00** | 1E-05 | -- | -- | -- |
| Heptachlor epoxide | **2.5E+01** | 1.0 | **3.1E+00** | 1E-05 | -- | -- | -- |
| **SVOCs** | | | | | | | |
| Benzidine | **2.7E+00** | 1E-05 | **3.4E-02** | 1E-05 | -- | -- | -- |
| Benzo(a)pyrene | **4.4E+02** | 1E-05 | **5.3E+00** | 1E-05 | -- | -- | -- |
| Bis(2-ethylhexyl) phthalate | **3.9E+04** | 1.0 | **5.7E+03** | 1E-05 | -- | -- | -- |
| Dibenz[a,h]anthracene | **3.1E+02** | 1E-05 | **3.8E+00** | 1E-05 | -- | -- | -- |
| Phenanthrene | **5.5E+04** | 1.0 | **1.7E+04** | 1.0 | -- | -- | -- |
| **VOCs** | | | | | | | |
| Benzene | **1.1E+01** | 1E-05 | **9.4E+00** | 1E-05 | **6.5E+01** | **8.9E+01** | 1E-05 |
| Ethylbenzene | **2.6E+02** | 1E-05 | **2.0E+02** | 1E-05 | **8.1E+02** | **1.1E+03** | 1E-05 |
| Naphthalene | **2.9E+01** | 1.0 | **1.6E+02** | 1E-05 | **4.5E+02** | **1.7E+03** | 1E-05 |

Notes:

" -- " or " NA " not applicable

0-foot cover assumes residual chemicals are present in surface soils. Exposure pathways include soil ingestion, dermal contact, inhalation of fugitive dust/vapors in outdoor air.

2- or 4- foot cover scenarios assumes a 2- or 4- foot clean soil cover over residual chemicals. The only exposure pathway is inhalation of outdoor air vapors.

# ATTACHMENT 1

**Attachment 1, Table 1**

**Estimation of Unit Cancer Risk and Unit Noncancer Hazard**

**Incidental Ingestion of Soil: Future Commercial Worker, 0-Foot Cover**

**Ascon Landfill Site**

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Noncancer Intake (mg/kg-day) | Oral Reference Dose (mg/kg-day) | **Unit Hazard Quotient** | Cancer Intake (mg/kg-day) | Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$ | **Unit Cancer Risk** |
|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | |
| Arsenic | 1.0E+00 | 9.8E-07 | 3.0E-04 | **3.3E-03** | 3.5E-07 | 1.5E+00 | **5.2E-07** |
| Chromium (VI) | 1.0E+00 | 9.8E-07 | 3.0E-03 | **3.3E-04** | 3.5E-07 | 5.0E-01 | **1.7E-07** |
| Copper | 1.0E+00 | 9.8E-07 | 4.0E-02 | **2.4E-05** | 3.5E-07 | NC | **--** |
| Lead | 1.0E+00 | 9.8E-07 | NA | **--** | 3.5E-07 | NC | **--** |
| Thallium | 1.0E+00 | 9.8E-07 | 1.0E-05 | **9.8E-02** | 3.5E-07 | NC | **--** |
| **PCBs** | | | | | | | |
| PCB-1260 | 1.0E+00 | 9.8E-07 | NA | **--** | 3.5E-07 | 2.0E+00 | **7.0E-07** |
| **Pesticides** | | | | | | | |
| Chlordane | 1.0E+00 | 9.8E-07 | 5.0E-04 | **2.0E-03** | 3.5E-07 | 1.3E+00 | **4.5E-07** |
| Dieldrin | 1.0E+00 | 9.8E-07 | 5.0E-05 | **2.0E-02** | 3.5E-07 | 1.6E+01 | **5.6E-06** |
| Heptachlor epoxide | 1.0E+00 | 9.8E-07 | 1.3E-05 | **7.5E-02** | 3.5E-07 | 5.5E+00 | **1.9E-06** |
| **SVOCs** | | | | | | | |
| Benzidine | 1.0E+00 | 9.8E-07 | 3.0E-03 | **3.3E-04** | 3.5E-07 | 5.0E+02 | **1.7E-04** |
| Benzo(a)pyrene | 1.0E+00 | 9.8E-07 | NA | **--** | 3.5E-07 | 2.9E+00 | **1.0E-06** |
| Bis(2-ethylhexyl) phthalate | 1.0E+00 | 9.8E-07 | 2.0E-02 | **4.9E-05** | 3.5E-07 | 3.0E-03 | **1.0E-09** |
| Dibenz[a,h]anthracene | 1.0E+00 | 9.8E-07 | NA | **--** | 3.5E-07 | 4.1E+00 | **1.4E-06** |
| Phenanthrene | 1.0E+00 | 9.8E-07 | 3.0E-02 | **3.3E-05** | 3.5E-07 | NC | **--** |
| **VOCs** | | | | | | | |
| Benzene | 1.0E+00 | 9.8E-07 | 4.0E-03 | **2.4E-04** | 3.5E-07 | 1.0E-01 | **3.5E-08** |
| Ethylbenzene | 1.0E+00 | 9.8E-07 | 1.0E-01 | **9.8E-06** | 3.5E-07 | 1.1E-02 | **3.8E-09** |
| Naphthalene | 1.0E+00 | 9.8E-07 | 2.0E-02 | **4.9E-05** | 3.5E-07 | NC | **--** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

## Attachment 1, Table 2
## Estimation of Unit Cancer Risk and Unit Noncancer Hazard
## Dermal Contact with Soil: Future Commercial Worker, 0-Foot Cover
## Ascon Landfill Site

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Noncancer Intake (mg/kg-day) | Oral/Dermal Reference Dose (mg/kg-day) | **Unit Hazard Quotient** | Cancer Intake (mg/kg-day) | Oral/Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$ | **Unit Cancer Risk** |
|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | |
| Arsenic | 1.0E+00 | 1.9E-07 | 3.0E-04 | **6.5E-04** | 6.9E-08 | 1.5E+00 | **1.0E-07** |
| Chromium (VI) | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Copper | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Lead | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Thallium | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| **PCBs** | | | | | | | |
| PCB-1260 | 1.0E+00 | 9.0E-07 | NA | **--** | 3.2E-07 | 2.0E+00 | **6.5E-07** |
| **Pesticides** | | | | | | | |
| Chlordane | 1.0E+00 | 2.6E-07 | 5.0E-04 | **5.2E-04** | 9.2E-08 | 1.3E+00 | **1.2E-07** |
| Dieldrin | 1.0E+00 | 6.5E-07 | 5.0E-05 | **1.3E-02** | 2.3E-07 | 1.6E+01 | **3.7E-06** |
| Heptachlor epoxide | 1.0E+00 | 6.5E-07 | 1.3E-05 | **5.0E-02** | 2.3E-07 | 5.5E+00 | **1.3E-06** |
| **SVOCs** | | | | | | | |
| Benzidine | 1.0E+00 | 6.5E-07 | 3.0E-03 | **2.2E-04** | 2.3E-07 | 5.0E+02 | **1.2E-04** |
| Benzo(a)pyrene | 1.0E+00 | 8.4E-07 | NA | **--** | 3.0E-07 | 2.9E+00 | **8.7E-07** |
| Bis(2-ethylhexyl) phthalate | 1.0E+00 | 6.5E-07 | 2.0E-02 | **3.2E-05** | 2.3E-07 | 3.0E-03 | **6.9E-10** |
| Dibenz[a,h]anthracene | 1.0E+00 | 8.4E-07 | NA | **--** | 3.0E-07 | 4.1E+00 | **1.2E-06** |
| Phenanthrene | 1.0E+00 | 8.4E-07 | 3.0E-02 | **2.8E-05** | 3.0E-07 | NC | **--** |
| **VOCs** | | | | | | | |
| Benzene | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Ethylbenzene | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Naphthalene | 1.0E+00 | 8.4E-07 | 2.0E-02 | **4.2E-05** | 3.0E-07 | NC | **--** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

**Attachment 1, Table 3**

**Estimation of Unit Cancer Risk and Unit Noncancer Hazard**

**Inhalation of Outdoor Particulates/Vapors from Soil: Future Commercial Worker, 0-Foot Cover**

**Ascon Landfill Site**

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Noncancer Exposure Concentration ($EC_{inh,s}$) ($mg/m^3$) | Reference Concentration ($mg/m^3$) | **Unit Hazard Quotient** | Cancer Exposure Concentration ($EC_{inh,s}$) ($mg/m^3$) | Inhalation Unit Risk ($(\mu g/m^3)^{-1}$) | **Unit Cancer Risk** |
|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | |
| Arsenic | 1.0E+00 | 1.7E-10 | 1.5E-05 | **1.2E-05** | 6.2E-11 | 3.3E-03 | **2.0E-10** |
| Chromium (VI) | 1.0E+00 | 1.7E-10 | 1.0E-04 | **1.7E-06** | 6.2E-11 | 1.5E-01 | **9.3E-09** |
| Copper | 1.0E+00 | 1.7E-10 | NA | **--** | 6.2E-11 | NC | **--** |
| Lead | 1.0E+00 | 1.7E-10 | NA | **--** | 6.2E-11 | NC | **--** |
| Thallium | 1.0E+00 | 1.7E-10 | NA | **--** | 6.2E-11 | NC | **--** |
| **PCBs** | | | | | | | |
| PCB-1260 | 1.0E+00 | 1.7E-10 | NA | **--** | 6.2E-11 | 5.7E-04 | **3.5E-11** |
| **Pesticides** | | | | | | | |
| Chlordane | 1.0E+00 | 1.7E-10 | 7.0E-04 | **2.5E-07** | 6.2E-11 | 3.4E-04 | **2.1E-11** |
| Dieldrin | 1.0E+00 | 1.7E-10 | 1.8E-04 | **9.9E-07** | 6.2E-11 | 4.6E-03 | **2.8E-10** |
| Heptachlor epoxide | 1.0E+00 | 1.7E-10 | 4.6E-05 | **3.8E-06** | 6.2E-11 | 2.6E-03 | **1.6E-10** |
| **SVOCs** | | | | | | | |
| Benzidine | 1.0E+00 | 1.7E-10 | 1.1E-02 | **1.7E-08** | 6.2E-11 | 1.4E-01 | **8.7E-09** |
| Benzo(a)pyrene | 1.0E+00 | 1.7E-10 | NA | **--** | 6.2E-11 | 1.1E-03 | **6.8E-11** |
| Bis(2-ethylhexyl) phthalate | 1.0E+00 | 1.7E-10 | 7.0E-02 | **2.5E-09** | 6.2E-11 | 2.4E-06 | **1.5E-13** |
| Dibenz[a,h]anthracene | 1.0E+00 | 1.7E-10 | NA | **--** | 6.2E-11 | 1.2E-03 | **7.4E-11** |
| Phenanthrene | 1.0E+00 | 1.7E-10 | 1.1E-01 | **1.7E-09** | 6.2E-11 | NC | **--** |
| **VOCs** | | | | | | | |
| Benzene | 1.0E+00 | 1.0E-04 | 3.0E-02 | **3.4E-03** | 3.7E-05 | 2.9E-05 | **1.1E-06** |
| Ethylbenzene | 1.0E+00 | 5.2E-05 | 1.0E+00 | **5.2E-05** | 1.9E-05 | 2.5E-06 | **4.6E-08** |
| Naphthalene | 1.0E+00 | 5.0E-06 | 3.0E-03 | **1.7E-03** | 1.8E-06 | 3.4E-05 | **6.1E-08** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

$EPC_{soil\text{-}oa}$: soil to outdoor air exposure point concentration = $EPC_{soil}$ ÷ (PEF of $VF_{soil}$)

where PEF = particulate emission factor and $VF_{soil}$ = soil to outdoor air volatilization factor for VOCs ($kg/m^3$)

**Attachment 1, Table 4**

**Summary of Risk-Based Concentrations, Soil (0-ft Cover)**

**Commercial Worker Exposure Scenario**

**Ascon Landfill Site**

| Chemicals of Potential Concern | Based on Noncancer Effects | | | | | Based on Cancer Effects | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ingestion | Dermal | Inhalation | Unit Hazard | **$RBC_{NC}$ (mg/kg)** | Ingestion | Dermal | Inhalation | Unit Risk | **$RBC_{C}$ (mg/kg)** |
| **Metals** | | | | | | | | | | |
| Arsenic | 3.3E-03 | 6.5E-04 | 1.2E-05 | 3.9E-03 | **2.6E+02** | 5.2E-07 | 1.0E-07 | 2.0E-10 | 6.3E-07 | **1.6E+01** |
| Chromium (VI) | 3.3E-04 | -- | 1.7E-06 | 3.3E-04 | **3.0E+03** | 1.7E-07 | -- | 9.3E-09 | 1.8E-07 | **5.4E+01** |
| Copper | 2.4E-05 | -- | -- | 2.4E-05 | **4.1E+04** | -- | -- | -- | -- | **--** |
| Lead | -- | -- | -- | -- | **--** | -- | -- | -- | -- | **--** |
| Thallium | 9.8E-02 | -- | -- | 9.8E-02 | **1.0E+01** | -- | -- | -- | -- | **--** |
| **PCBs** | | | | | | | | | | |
| PCB-1260 | -- | -- | -- | -- | **--** | 7.0E-07 | 6.5E-07 | 3.5E-11 | 1.3E-06 | **7.4E+00** |
| **Pesticides** | | | | | | | | | | |
| Chlordane | 2.0E-03 | 5.2E-04 | 2.5E-07 | 2.5E-03 | **4.0E+02** | 4.5E-07 | 1.2E-07 | 2.1E-11 | 5.7E-07 | **1.7E+01** |
| Dieldrin | 2.0E-02 | 1.3E-02 | 9.9E-07 | 3.2E-02 | **3.1E+01** | 5.6E-06 | 3.7E-06 | 2.8E-10 | 9.3E-06 | **1.1E+00** |
| Heptachlor epoxide | 7.5E-02 | 5.0E-02 | 3.8E-06 | 1.2E-01 | **8.0E+00** | 1.9E-06 | 1.3E-06 | 1.6E-10 | 3.2E-06 | **3.1E+00** |
| **SVOCs** | | | | | | | | | | |
| Benzidine | 3.3E-04 | 2.2E-04 | 1.7E-08 | 5.4E-04 | **1.8E+03** | 1.7E-04 | 1.2E-04 | 8.7E-09 | 2.9E-04 | **3.4E-02** |
| Benzo(a)pyrene | -- | -- | -- | -- | **--** | 1.0E-06 | 8.7E-07 | 6.8E-11 | 1.9E-06 | **5.3E+00** |
| Bis(2-ethylhexyl) phthalate | 4.9E-05 | 3.2E-05 | 2.5E-09 | 8.1E-05 | **1.2E+04** | 1.0E-09 | 6.9E-10 | 1.5E-13 | 1.7E-09 | **5.7E+03** |
| Dibenz[a,h]anthracene | -- | -- | -- | -- | **--** | 1.4E-06 | 1.2E-06 | 7.4E-11 | 2.7E-06 | **3.8E+00** |
| Phenanthrene | 3.3E-05 | 2.8E-05 | 1.7E-09 | 6.1E-05 | **1.7E+04** | -- | -- | -- | -- | **--** |
| **VOCs** | | | | | | | | | | |
| Benzene | 2.4E-04 | -- | 3.4E-03 | 3.7E-03 | **2.7E+02** | 0.0E+00 | -- | 1.1E-06 | 1.1E-06 | **9.4E+00** |
| Ethylbenzene | 9.8E-06 | -- | 5.2E-05 | 6.2E-05 | **1.6E+04** | 3.8E-09 | -- | 4.6E-08 | 5.0E-08 | **2.0E+02** |
| Naphthalene | 4.9E-05 | 4.2E-05 | 1.7E-03 | 1.8E-03 | **5.7E+02** | -- | -- | 6.1E-08 | 6.1E-08 | **1.6E+02** |

Notes:

" -- " not applicable or not available

**Attachment 1, Table 5**
**Summary of Risk-Based Concentrations, Soil (2-ft Cover)**
**Future Commercial Worker: Inhalation of Outdoor Vapors from Soil**
**Ascon Landfill Site**

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Outdoor Air Concentration $EPC_{soil-oa}$ (mg/m$^3$) | Noncancer Exposure Concentration ($EC_{inh,s}$) (mg/m$^3$) | Reference Concentration (mg/m$^3$) | Unit Hazard Quotient | **$RBC_{NC}$ (mg/kg)** | Cancer Exposure Concentration ($EC_{inh,s}$) (mg/m$^3$) | Inhalation Unit Risk (µg/m$^3$)$^{-1}$ | Unit Cancer Risk | **$RBC_C$ (mg/kg)** |
|---|---|---|---|---|---|---|---|---|---|---|
| **VOCs** | | | | | | | | | | |
| Benzene | 1.0E+00 | 6.5E-05 | 1.5E-05 | 3.0E-02 | 5.0E-04 | **2.0E+03** | 5.3E-06 | 2.9E-05 | 1.5E-07 | **6.5E+01** |
| Ethylbenzene | 1.0E+00 | 6.0E-05 | 1.4E-05 | 1.0E+00 | 1.4E-05 | **7.3E+04** | 4.9E-06 | 2.5E-06 | 1.2E-08 | **8.1E+02** |
| Naphthalene | 1.0E+00 | 8.0E-06 | 1.8E-06 | 3.0E-03 | 6.1E-04 | **1.6E+03** | 6.5E-07 | 3.4E-05 | 2.2E-08 | **4.5E+02** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

$EPC_{soil-oa}$: soil to outdoor air exposure point concentration = $EPC_{soil} \div VF_{soil}$

where $VF_{soil}$ = soil to outdoor air volatilization factor for VOCs (kg/m$^3$)

**Attachment 1, Table 6**

**Summary of Risk-Based Concentrations, Soil (4-ft Cover)**

**Future Commercial Worker: Inhalation of Outdoor Vapors from Soil**

**Ascon Landfill Site**

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Outdoor Air Concentration $EPC_{soil\text{-}oa}$ ($mg/m^3$) | Noncancer Exposure Concentration ($EC_{inh,s}$) ($mg/m^3$) | Reference Concentration ($mg/m^3$) | Unit Hazard Quotient | **$RBC_{NC}$ (mg/kg)** | Cancer Exposure Concentration ($EC_{inh,s}$) ($mg/m^3$) | Inhalation Unit Risk ($(\mu g/m^3)^{-1}$) | Unit Cancer Risk | **$RBC_C$ (mg/kg)** |
|---|---|---|---|---|---|---|---|---|---|---|
| **VOCs** | | | | | | | | | | |
| Benzene | 1.0E+00 | 4.7E-05 | 1.1E-05 | 3.0E-02 | 3.6E-04 | **2.8E+03** | 3.9E-06 | 2.9E-05 | 1.1E-07 | **8.9E+01** |
| Ethylbenzene | 1.0E+00 | 4.3E-05 | 9.8E-06 | 1.0E+00 | 9.8E-06 | **1.0E+05** | 3.5E-06 | 2.5E-06 | 8.7E-09 | **1.1E+03** |
| Naphthalene | 1.0E+00 | 2.1E-06 | 4.8E-07 | 3.0E-03 | 1.6E-04 | **6.2E+03** | 1.7E-07 | 3.4E-05 | 5.9E-09 | **1.7E+03** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

$EPC_{soil\text{-}oa}$: soil to outdoor air exposure point concentration = $EPC_{soil} \div VF_{soil}$

where $VF_{soil}$ = soil to outdoor air volatilization factor for VOCs ($kg/m^3$)

**Attachment 1, Table 7**

**Estimation of Unit Cancer Risk and Unit Noncancer Hazard**

**Incidental Ingestion of Soil: Construction Worker**

**Ascon Landfill Site**

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Noncancer Intake (mg/kg-day) | Oral Reference Dose (mg/kg-day) | **Unit Hazard Quotient** | Cancer Intake (mg/kg-day) | Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$ | **Unit Cancer Risk** |
|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | |
| Arsenic | 1.0E+00 | 3.9E-07 | 3.0E-04 | **1.3E-03** | 5.5E-09 | 1.5E+00 | **8.3E-09** |
| Chromium (VI) | 1.0E+00 | 3.9E-07 | 3.0E-03 | **1.3E-04** | 5.5E-09 | 5.0E-01 | **2.8E-09** |
| Copper | 1.0E+00 | 3.9E-07 | 4.0E-02 | **9.7E-06** | 5.5E-09 | NC | **--** |
| Lead | 1.0E+00 | 3.9E-07 | NA | **--** | 5.5E-09 | NC | **--** |
| Thallium | 1.0E+00 | 3.9E-07 | 1.0E-05 | **3.9E-02** | 5.5E-09 | NC | **--** |
| **PCBs** | | | | | | | |
| PCB-1260 | 1.0E+00 | 3.9E-07 | NA | **--** | 5.5E-09 | 2.0E+00 | **1.1E-08** |
| **Pesticides** | | | | | | | |
| Chlordane | 1.0E+00 | 3.9E-07 | 5.0E-04 | **7.7E-04** | 5.5E-09 | 1.3E+00 | **7.2E-09** |
| Dieldrin | 1.0E+00 | 3.9E-07 | 5.0E-05 | **7.7E-03** | 5.5E-09 | 1.6E+01 | **8.9E-08** |
| Heptachlor epoxide | 1.0E+00 | 3.9E-07 | 1.3E-05 | **3.0E-02** | 5.5E-09 | 5.5E+00 | **3.0E-08** |
| **SVOCs** | | | | | | | |
| Benzidine | 1.0E+00 | 3.9E-07 | 3.0E-03 | **1.3E-04** | 5.5E-09 | 5.0E+02 | **2.8E-06** |
| Benzo(a)pyrene | 1.0E+00 | 3.9E-07 | NA | **--** | 5.5E-09 | 2.9E+00 | **1.6E-08** |
| Bis(2-ethylhexyl) phthalate | 1.0E+00 | 3.9E-07 | 2.0E-02 | **1.9E-05** | 5.5E-09 | 3.0E-03 | **1.7E-11** |
| Dibenz[a,h]anthracene | 1.0E+00 | 3.9E-07 | NA | **--** | 5.5E-09 | 4.1E+00 | **2.3E-08** |
| Phenanthrene | 1.0E+00 | 3.9E-07 | 3.0E-02 | **1.3E-05** | 5.5E-09 | NC | **--** |
| **VOCs** | | | | | | | |
| Benzene | 1.0E+00 | 3.9E-07 | 4.0E-03 | **9.7E-05** | 5.5E-09 | 1.0E-01 | **5.5E-10** |
| Ethylbenzene | 1.0E+00 | 3.9E-07 | 1.0E-01 | **3.9E-06** | 5.5E-09 | 1.1E-02 | **6.1E-11** |
| Naphthalene | 1.0E+00 | 3.9E-07 | 2.0E-02 | **1.9E-05** | 5.5E-09 | NC | **--** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

## Attachment 1, Table 8
## Estimation of Unit Cancer Risk and Unit Noncancer Hazard
## Dermal Contact with Soil: Construction Worker
## Ascon Landfill Site

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Noncancer Intake (mg/kg-day) | Oral/Dermal Reference Dose (mg/kg-day) | **Unit Hazard Quotient** | Cancer Intake (mg/kg-day) | Oral/Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$ | **Unit Cancer Risk** |
|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | |
| Arsenic | 1.0E+00 | 3.5E-08 | 3.0E-04 | **1.2E-04** | 5.0E-10 | 1.5E+00 | **7.5E-10** |
| Chromium (VI) | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Copper | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Lead | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Thallium | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| **PCBs** | | | | | | | |
| PCB-1260 | 1.0E+00 | 1.6E-07 | NA | **--** | 2.3E-09 | 2.0E+00 | **4.6E-09** |
| **Pesticides** | | | | | | | |
| Chlordane | 1.0E+00 | 4.6E-08 | 5.0E-04 | **9.3E-05** | 6.6E-10 | 1.3E+00 | **8.6E-10** |
| Dieldrin | 1.0E+00 | 1.2E-07 | 5.0E-05 | **2.3E-03** | 1.7E-09 | 1.6E+01 | **2.7E-08** |
| Heptachlor epoxide | 1.0E+00 | 1.2E-07 | 1.3E-05 | **8.9E-03** | 1.7E-09 | 5.5E+00 | **9.1E-09** |
| **SVOCs** | | | | | | | |
| Benzidine | 1.0E+00 | 1.2E-07 | 3.0E-03 | **3.9E-05** | 1.7E-09 | 5.0E+02 | **8.3E-07** |
| Benzo(a)pyrene | 1.0E+00 | 1.5E-07 | NA | **--** | 2.2E-09 | 2.9E+00 | **6.3E-09** |
| Bis(2-ethylhexyl) phthalate | 1.0E+00 | 1.2E-07 | 2.0E-02 | **5.8E-06** | 1.7E-09 | 3.0E-03 | **5.0E-12** |
| Dibenz[a,h]anthracene | 1.0E+00 | 1.5E-07 | NA | **--** | 2.2E-09 | 4.1E+00 | **8.9E-09** |
| Phenanthrene | 1.0E+00 | 1.5E-07 | 3.0E-02 | **5.0E-06** | 2.2E-09 | NC | **--** |
| **VOCs** | | | | | | | |
| Benzene | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Ethylbenzene | 1.0E+00 | -- | NA | **--** | -- | NC | **--** |
| Naphthalene | 1.0E+00 | 1.5E-07 | 2.0E-02 | **7.6E-06** | 2.2E-09 | NC | **--** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

**Attachment 1, Table 9**

**Estimation of Unit Cancer Risk and Unit Noncancer Hazard**

**Inhalation of Outdoor Particulates/Vapors from Soil: Construction Worker**

**Ascon Landfill Site**

| Chemicals of Potential Concern | Unit $EPC_{soil}$ (mg/kg) | Noncancer Exposure Concentration ($EC_{inh,s}$) ($mg/m^3$) | Reference Concentration ($mg/m^3$) | **Unit Hazard Quotient** | Cancer Exposure Concentration ($EC_{inh,s}$) ($mg/m^3$) | Inhalation Unit Risk ($(\mu g/m^3)^{-1}$) | **Unit Cancer Risk** |
|---|---|---|---|---|---|---|---|
| **Metals** | | | | | | | |
| Arsenic | 1.0E+00 | 2.7E-08 | 1.5E-05 | **1.8E-03** | 3.9E-10 | 3.3E-03 | **1.3E-09** |
| Chromium (VI) | 1.0E+00 | 2.7E-08 | 1.0E-04 | **2.7E-04** | 3.9E-10 | 1.5E-01 | **5.9E-08** |
| Copper | 1.0E+00 | 2.7E-08 | NA | **--** | 3.9E-10 | NC | **--** |
| Lead | 1.0E+00 | 2.7E-08 | NA | **--** | 3.9E-10 | NC | **--** |
| Thallium | 1.0E+00 | 2.7E-08 | NA | **--** | 3.9E-10 | NC | **--** |
| **PCBs** | | | | | | | |
| PCB-1260 | 1.0E+00 | 2.7E-08 | NA | **--** | 3.9E-10 | 5.7E-04 | **2.2E-10** |
| **Pesticides** | | | | | | | |
| Chlordane | 1.0E+00 | 2.7E-08 | 7.0E-04 | **3.9E-05** | 3.9E-10 | 3.4E-04 | **1.3E-10** |
| Dieldrin | 1.0E+00 | 2.7E-08 | 1.8E-04 | **1.6E-04** | 3.9E-10 | 4.6E-03 | **1.8E-09** |
| Heptachlor epoxide | 1.0E+00 | 2.7E-08 | 4.6E-05 | **6.0E-04** | 3.9E-10 | 2.6E-03 | **1.0E-09** |
| **SVOCs** | | | | | | | |
| Benzidine | 1.0E+00 | 2.7E-08 | 1.1E-02 | **2.6E-06** | 3.9E-10 | 1.4E-01 | **5.5E-08** |
| Benzo(a)pyrene | 1.0E+00 | 2.7E-08 | NA | **--** | 3.9E-10 | 1.1E-03 | **4.3E-10** |
| Bis(2-ethylhexyl) phthalate | 1.0E+00 | 2.7E-08 | 7.0E-02 | **3.9E-07** | 3.9E-10 | 2.4E-06 | **9.4E-13** |
| Dibenz[a,h]anthracene | 1.0E+00 | 2.7E-08 | NA | **--** | 3.9E-10 | 1.2E-03 | **4.7E-10** |
| Phenanthrene | 1.0E+00 | 2.7E-08 | 1.1E-01 | **2.6E-07** | 3.9E-10 | NC | **--** |
| **VOCs** | | | | | | | |
| Benzene | 1.0E+00 | 2.1E-03 | 3.0E-02 | **7.2E-02** | 3.1E-05 | 2.9E-05 | **8.9E-07** |
| Ethylbenzene | 1.0E+00 | 1.1E-03 | 1.0E+00 | **1.1E-03** | 1.6E-05 | 2.5E-06 | **3.9E-08** |
| Naphthalene | 1.0E+00 | 1.1E-04 | 3.0E-03 | **3.5E-02** | 1.5E-06 | 3.4E-05 | **5.1E-08** |

Notes:

" -- " not applicable; " $EPC_{soil}$ " unit soil exposure point concentration

$EPC_{soil\text{-}oa}$: soil to outdoor air exposure point concentration = $EPC_{soil}$ ÷ (PEF of $VF_{soil}$)

where PEF = particulate emission factor and $VF_{soil}$ = soil to outdoor air volatilization factor for VOCs ($kg/m^3$)

## Attachment 1, Table 10
## Summary of Risk-Based Concentrations, Soil
## Construction Worker Exposure Scenario
## Ascon Landfill Site

| Chemicals of Potential Concern | Based on Noncancer Effects | | | | | Based on Cancer Effects | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Ingestion | Dermal | Inhalation | Unit Hazard | **$RBC_{NC}$ (mg/kg)** | Ingestion | Dermal | Inhalation | Unit Risk | **$RBC_C$ (mg/kg)** |
| **Metals** | | | | | | | | | | |
| Arsenic | 1.3E-03 | 1.2E-04 | 1.8E-03 | 3.2E-03 | **3.1E+02** | 8.3E-09 | 7.5E-10 | 1.3E-09 | 1.0E-08 | **9.7E+02** |
| Chromium (VI) | 1.3E-04 | -- | 2.7E-04 | 4.0E-04 | **2.5E+03** | 2.8E-09 | -- | 5.9E-08 | 6.1E-08 | **1.6E+02** |
| Copper | 9.7E-06 | -- | -- | 9.7E-06 | **1.0E+05** | -- | -- | -- | -- | **--** |
| Lead | -- | -- | -- | -- | **--** | -- | -- | -- | -- | **--** |
| Thallium | 3.9E-02 | -- | -- | 3.9E-02 | **2.6E+01** | -- | -- | -- | -- | **--** |
| **PCBs** | | | | | | | | | | |
| PCB-1260 | -- | -- | -- | -- | **--** | 1.1E-08 | 4.6E-09 | 2.2E-10 | 1.6E-08 | **6.3E+02** |
| **Pesticides** | | | | | | | | | | |
| Chlordane | 7.7E-04 | 9.3E-05 | 3.9E-05 | 9.1E-04 | **1.1E+03** | 7.2E-09 | 8.6E-10 | 1.3E-10 | 8.2E-09 | **1.2E+03** |
| Dieldrin | 7.7E-03 | 2.3E-03 | 1.6E-04 | 1.0E-02 | **9.8E+01** | 8.9E-08 | 2.7E-08 | 1.8E-09 | 1.2E-07 | **8.6E+01** |
| Heptachlor epoxide | 3.0E-02 | 8.9E-03 | 6.0E-04 | 3.9E-02 | **2.5E+01** | 3.0E-08 | 9.1E-09 | 1.0E-09 | 4.1E-08 | **2.5E+02** |
| **SVOCs** | | | | | | | | | | |
| Benzidine | 1.3E-04 | 3.9E-05 | 2.6E-06 | 1.7E-04 | **5.9E+03** | 2.8E-06 | 8.3E-07 | 5.5E-08 | 3.7E-06 | **2.7E+00** |
| Benzo(a)pyrene | -- | -- | -- | -- | **--** | 1.6E-08 | 6.3E-09 | 4.3E-10 | 2.3E-08 | **4.4E+02** |
| Bis(2-ethylhexyl) phthalate | 1.9E-05 | 5.8E-06 | 3.9E-07 | 2.6E-05 | **3.9E+04** | 1.7E-11 | 5.0E-12 | 9.4E-13 | 2.3E-11 | **4.4E+05** |
| Dibenz[a,h]anthracene | -- | -- | -- | -- | **--** | 2.3E-08 | 8.9E-09 | 4.7E-10 | 3.2E-08 | **3.1E+02** |
| Phenanthrene | 1.3E-05 | 5.0E-06 | 2.6E-07 | 1.8E-05 | **5.5E+04** | -- | -- | -- | -- | **--** |
| **VOCs** | | | | | | | | | | |
| Benzene | 9.7E-05 | -- | 7.2E-02 | 7.2E-02 | **1.4E+01** | 5.5E-10 | -- | 8.9E-07 | 8.9E-07 | **1.1E+01** |
| Ethylbenzene | 3.9E-06 | -- | 1.1E-03 | 1.1E-03 | **9.2E+02** | 6.1E-11 | -- | 3.9E-08 | 3.9E-08 | **2.6E+02** |
| Naphthalene | 1.9E-05 | 7.6E-06 | 3.5E-02 | 3.5E-02 | **2.9E+01** | -- | -- | 5.1E-08 | 5.1E-08 | **2.0E+02** |

Notes:

" -- " not applicable or not available

**Attachment 1, Table 11**

**Calculation of Soil Screening Level for Lead, Construction Worker**

USEPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

| Exposure Variable | PRG Equation[1] 1* | PRG Equation[1] 2** | Description of Exposure Variable | Units | Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom | Using Equation 1, GSDi = Het | Using Equation 2, GSDi = Hom | Using Equation 2, GSDi = Het |
|---|---|---|---|---|---|---|---|---|
| $PbB_{fetal,\ 0.95}$ | X | X | 95th percentile PbB in fetus | ug/dL | 1 | 1 | 1 | 1 |
| $R_{fetal/maternal}$ | X | X | Fetal/maternal PbB ratio | -- | 0.9 | 0.9 | 0.9 | 0.9 |
| BKSF | X | X | Biokinetic Slope Factor | ug/dL per ug/day | 0.4 | 0.4 | 0.4 | 0.4 |
| $GSD_i$ | X | X | Geometric standard deviation PbB | -- | 1.8 | 1.8 | 1.8 | 1.8 |
| $PbB_0$ | X | X | Baseline PbB | ug/dL | 0.0 | 0.0 | 0.0 | 0.0 |
| $IR_S$ | X | | Soil ingestion rate (including soil-derived indoor dust) | g/day | 0.330 | 0.330 | -- | -- |
| $IR_{S+D}$ | | X | Total ingestion rate of outdoor soil and indoor dust | g/day | -- | -- | 0.330 | 0.330 |
| $W_S$ | | X | Weighting factor; fraction of $IR_{S+D}$ ingested as outdoor soil | -- | -- | -- | 1.0 | 1.0 |
| $K_{SD}$ | | X | Mass fraction of soil in dust | -- | -- | -- | 0.7 | 0.7 |
| $AF_{S,\ D}$ | X | X | Absorption fraction (same for soil and dust) | -- | 0.30 | 0.30 | 0.30 | 0.30 |
| $EF_{S,\ D}$ | X | X | Exposure frequency (same for soil and dust) | days/yr | 30 | 30 | 30 | 30 |
| $AT_{S,\ D}$ | X | X | Averaging time (same for soil and dust) | days/yr | 365 | 365 | 365 | 365 |
| **PRG** | | | **Preliminary Remediation Goal** | **ppm** | **1.6E+02** | **1.6E+02** | **1.6E+02** | **1.6E+02** |

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes $W_S$, $K_{SD}$).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same PRG.

***Equation 1, based on Eq. 4 in USEPA (1996).**

$$\text{PRG} = \frac{([PbB_{95}fetal/(R*(GSD_i^{1.645})])-PbB_0)*AT_{S,D}}{BKSF*(IR_{S+D}*AF_{S,D}*EF_{S,D})}$$

****Equation 2, alternate approach based on Eq. 4 and Eq. A-19 in USEPA (1996).**

$$\text{PRG} = \frac{([PbB_{fetal,0.95}/(R*(GSD_i^{1.645})])-PbB_0)*AT_{S,D}}{BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])}$$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil