CORRECTIVE MEASURES PROPOSAL

FORMER COMMONWEALTH ALUMINUM FACILITY
2211 - 2307 EAST CARSON STREET
CARSON, CALIFORNIA

Prepared for

ProLogis Exchange CA (7) LLC
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1.0 INTRODUCTION

The former Commonwealth Aluminum facility located at 2211-2307 East Carson Street in Carson, California (Site) operated as an aluminum scrap recycling and rolling operation from approximately 1947 until March 31, 2006. At that time, operations ceased, and the Site has been decommissioned in accordance with a Final Facility Closure Plan (ERM 2006). The Closure Plan was reportedly verbally approved by the Los Angeles County Fire Department (LACFD) on June 27, 2006, and the facility closure activities were performed by Commonwealth Aluminum/Concast, Inc., dba Aleris Rolled Products (Aleris), under LACFD oversight. The LACFD approved the facility decommissioning activities conducted in accordance with the Facility Closure Plan in a November 30, 2006 letter, (a copy of which is included in Appendix A), and acknowledged that other regulatory agencies, including the California Regional Water Quality Control Board – Los Angeles Region (RWQCB), retained regulatory oversight for remaining Site issues. The Site location is shown on Figure 1.

The Site was acquired by ProLogis Exchange CA (7) LLC (ProLogis) on December 11, 2006, and ProLogis intends to redevelop the Site as a distribution warehouse facility.

Numerous soil and groundwater investigations conducted at the Site have shown that soils and groundwater have been impacted by prior manufacturing activities. The RWQCB provided regulatory oversight under the Spill, Leaks, Investigations, and Cleanup (SLIC) program (SLIC No. 0772) until June 27, 2007, when regulatory oversight was transferred to the State of California, Department of Toxic Substances Control (DTSC). Prior operations at the facility included the management of hazardous wastes pursuant to Conditional Authorization issued by DTSC. ProLogis and DTSC entered into an Agreement for Facility-Initiated Corrective Action (Agreement) on August 28, 2007 in order to complete Site closure.

As required by the Agreement, this Corrective Measures Proposal (CMP) has been prepared by Iris Environmental on behalf of ProLogis to compile and evaluate Site data, and to propose remedial activities, consistent with the findings of our evaluation, necessary to redevelop the Site for its intended use. The proposed Site development plan is shown on Figure 2.

The CMP includes several Site planning documents, including the Conceptual Site Model, a Health Risk Evaluation, Soil Management Plan, Dust Monitoring Plan, Transportation Plan, and Environmental Health and Safety Plan for remedial activities, all of which are included as Appendices to the CMP.

The CMP will be implemented upon receipt of DTSC approval.

2.0 SITE HISTORY

The Site consists of two parcels as shown on Figure 3. A gravel pit was excavated on the northeastern portion of the Site during World War II and this pit was used as a landfill from approximately 1947 through 1961. The landfill was commonly referred to as the California By-Products Landfill. Materials managed in the landfill included primarily inert materials, such as clean earth, rock, sand, and gravel, paving fragments, concrete, brick, plaster, dry mud cake from oil field sumps, and waste rock wool and rock wool shot, along with small quantities of rotary mud and other wastes incident to oil well drilling operations, and tank bottoms derived from storage of crude oil. Mixtures of cement and asbestos were also accepted at the landfill. The landfill was closed in 1960 and is currently paved and used by an adjacent operator as a truck trailer storage area.

In June 1990, a Solid Waste Assessment Test (SWAT) report for the former California By-Products Landfill was submitted to the RWQCB. In December 1993 the RWQCB confirmed that it had reviewed and approved the SWAT report and found the monitoring program for the Site sufficient for detecting a potential release from the former landfill. The landfill is inspected annually by the Los Angeles County Department of Health Services, Environmental Health Division (EHD) which serves as the Local Enforcement Agency (LEA) for the California Integrated Waste Management Board (CIWMB). Recent annual inspections have recorded no violations and have noted no conditions of concern.

The landfill will continue to be used as a trailer parking area, and paving will therefore be maintained over the landfill footprint in order to support this continued use. No corrective action measures are proposed for the landfill in this CMP. If any material is removed from the landfill, the removed material could potentially be classified as hazardous waste, and would require appropriate management. Therefore, before removal of any material from the landfill, a removal plan will be submitted to DTSC for review and approval. The landfill does not contain organic refuse and contains primarily inert materials, therefore, methane generation is not a management issue for the landfill. Despite the absence of methane generation, the City of Carson may require methane mitigation for any structures developed within 1,000 feet of the former landfill, in conformance with broadly applied local land use requirements. The design and approval of these City-required mitigation measures will be managed by the City of Carson. Although methane mitigation measures are not a component of the corrective action proposed for the Site, any mitigation measures required by the City and implemented at the Site during construction could provide added benefit to the future Site occupants with respect to indoor air quality.

According to the aerial photos for the Site, the western portion of the Site has been developed and used as a manufacturing facility since at least 1947. Owners/operators of the Site have

included Apex Smelting Company, Alflex Corporation, Barmet Aluminum Corporation, Commonwealth Aluminum, and Aleris. The Site is currently owned by ProLogis which purchased the Site from Aleris on December 11, 2006. Former Site operations consisted of aluminum scrap recycling and rolling process that fabricated various aluminum products for resale, administrative activities, raw material storage, secondary aluminum smelting, foundry, casting, hot rolling, coating, warehousing, and shipping.

Equipment decommissioning has been completed at the Site. Process equipment was dismantled and either scrapped, sold, or designated for re-use at other Aleris facilities. Waste materials were managed in accordance with the Final Facility Closure Plan (ERM 2006) as approved by the LACFD. Site decommissioning activities have been completed and approved by the LACFD, and the Site has been cleared of all equipment and materials. The buildings and Site features have been removed from the Site in accordance with a permit issued by the City of Carson, and concrete slabs are currently being removed and crushed on-site. ProLogis plans to reuse the crushed concrete on-site. As a component of Site demolition activities, stained/impacted concrete is being segregated pending future sampling and analysis. Any required sub-slab remedial efforts will be conducted once the DTSC approves the CMP.

3.0 REGULATORY HISTORY AND SITE INVESTIGATIONS

There have been multiple regulatory issues at the Site, and accordingly there have been numerous investigations and remediation activities. The following is a chronological review of these regulatory activities and investigations.

In 1987, on behalf of Barmet Aluminum Corporation (Barmet), Aqua Science installed three continuous vadose zone monitoring wells (CW, CE, and SE), and three combination groundwater and continuous vadose zone monitoring wells (N, S, and SE) at the Site in accordance with Los Angeles County Department of Public Works (LACDPW) underground storage tank (UST) guidelines. Although the USTs at the Site (two 20,000-gallon diesel, one 12,000-gallon diesel, and one-5,000 gallon unleaded gasoline) had been precision tested and found to be intact, soil samples collected during this effort showed the presence of elevated concentrations of petroleum hydrocarbons. Shallow soil sample concentrations as high as 6,000 milligrams per kilogram (mg/kg) gasoline and 646 mg/kg diesel were detected, but deeper soils did not appear to be significantly affected. Groundwater samples showed low levels of petroleum hydrocarbons. Overfill protection boxes were installed on all four tanks at the Site. A report of these findings was submitted to the LACDPW on February 10, 1988.

In May 1988, the LACDPW requested further vertical and horizontal delineation of the contamination adjacent to the 5,000-gallon gasoline tank, and also requested the development of a plan for remediation of the hydrocarbon-impacted area.

In March 1990, Thorne Environmental, Inc. (Thorne) concluded that based on tightness tests, the USTs at the Site were intact and had not leaked. Thorne also concluded that no further assessment of the UST area was required and recommended remediation of soils impacted by apparent surface spillage in the area of the tanks using either excavation or soil vapor extraction (SVE). Thorne reported that hydrocarbon materials found in deeper samples appeared to be originating from a source other than the USTs and that the characteristics of this heavier petroleum product appeared to resemble non-fuel hydrocarbons used in Site processes and stored/managed in underground sumps located in areas near the UST cluster. Barmet decided to address the heavier petroleum product detected during this investigation separately from the volatile petroleum hydrocarbon contamination associated with the USTs.

In June 1990, Woodward-Clyde Consultants (Woodward-Clyde), on behalf of Barmet, submitted a SWAT report for the former California By-Products Landfill to the RWQCB. The SWAT included the installation and sampling of four groundwater monitoring wells around the former landfill. One well (MW-3) was installed up-gradient and three wells (MW-1, MW-4, and MW-5) were installed down-gradient from the landfill. Soil samples collected from the

well borings and groundwater at each well was sampled during January 1990 and April 1990. According to this SWAT report, two pre-existing wells (S and MW-2), were used solely to obtain water level measurements. An addendum to the SWAT report was submitted to the RWQCB in November 1990 which reported the results of an additional two rounds of quarterly groundwater monitoring. During the SWAT sampling events, the up-gradient Well MW-3, showed concentrations of trichloroethylene (TCE) as high as 20 micrograms per liter (µg/l), above the Maximum Contaminant Level (MCL) of 5µg/l.

In September 1990, Park Environmental, Inc. (Park) prepared a workplan for LACDPW to conduct investigation and remediation of subsurface soils near the USTs at the Site. This plan was approved by the LACDPW on February 14, 1991. The planned remediation included the performance of annual integrity tests on the four fuel USTs and the installation and operation of a SVE system. The SVE system operated from August 30, 1991 to May 14, 1992 and consisted of vapor extraction from four existing vadose zone wells (SB-1, SB-2, SB-3, and CW) in the vicinity of the USTs. Park estimated total volatile constituents removed to be approximately 770 gallons. Park recommended termination of the vapor recovery system at the Site once asymptotic recovery rates were achieved (Park 1992).

In October 1990, Woodward-Clyde reported the installation of two additional monitoring wells at the Site. These wells (MW-6 and MW-7) were installed in an attempt to further delineate the source of elevated TCE concentrations detected in MW-3 during the SWAT groundwater investigation. Along with the newly installed monitoring wells, three groundwater wells, N, NE, and S, previously installed by Aquascience during their tank investigation work, were sampled for volatile organic compounds (VOCs). Groundwater samples collected from the newly installed wells showed no detectable concentrations of VOCs, but the groundwater samples from the existing wells showed the presence of relatively low concentration of VOCs.

In February 1991, Park submitted a workplan (dated November 1990) for the assessment of the lateral and vertical extent of the non-fuel petroleum hydrocarbon-impacted soil and groundwater at the Site. These non-fuel petroleum hydrocarbons were detected during Thorne's earlier work in conjunction with the fuel storage tanks at the Site. The LACDPW approved the workplan in March 1991, and Park reported the results of this investigation in October 1991. During this investigation, Park drilled six soil borings/monitoring wells; four around an underground sump which contained rolling oil (MW-2P through MW-5P). MW-6P was drilled down-gradient of the rolling oil sump, between the sump and MW-3, and MW-7P was drilled in an area where Thorne had previously detected the non-fuel petroleum hydrocarbons. Petroleum hydrocarbons were detected in soil samples collected from all soil borings drilled during this investigation. Total petroleum hydrocarbon (TPH) concentrations ranged from below reporting limits to over 19,710 mg/kg. Based on visual observation and comparison of laboratory chromatograms, petroleum hydrocarbons assessed during this

investigation were believed to be rolling oil. Park stated that these non-fuel petroleum hydrocarbons were not associated with the USTs present at the Site, and that the source of the petroleum hydrocarbons was believed to be the rolling oil sump. Park also reported that benzene, toluene, ethylbenzene, and xylene (BTEX) were not detected in the analyzed soil samples. Free product identified as rolling oil was found in five of the six monitoring wells installed during this investigation; MW-2P, MW-3P, MW-4P, MW-5P, and MW-6P, with thicknesses ranging from 1 to 21 inches. One groundwater well (MW-7P) was developed and sampled for TPH, BTEX, and chlorinated VOCs. Results of the analysis were below laboratory reporting limits for TPH, BTEX, and VOCs. Park recommended further assessment to determine the lateral and vertical extent of affected soils and the lateral extent of the rolling oil plume, the potential sources for chlorinated VOCs identified in previous investigations, and the initiation of a product recovery program using a hand bailing program.

In a November 14, 1991 letter to Barmet, the LACDPW stated that it had reviewed the report (Park 1991) documenting the Site assessment work and found it adequate. LADPW also stated that, given the extent of free product in groundwater wells at the Site, monthly product removal must be performed, and required further assessment to delineate the extent of groundwater plume and possible sources of contamination.

In January 1992, Park submitted a workplan to evaluate the extent of soil and groundwater contamination north of the rolling oil sump. Park proposed drilling four groundwater monitoring wells to delineate the extent of free product contamination. Park also proposed sampling of other existing groundwater monitoring wells to evaluate the potential source of chlorinated VOCs previously detected at the Site. The LACDPW approved the proposed workplan and Park reported the results of their investigation in a report dated April 13, 1992. Monitoring Wells MW-8P through MW-11P were installed to a total depth of 40 feet below ground surface (bgs). Soils were analyzed for total extractable petroleum hydrocarbons (TEPH) and for chlorinated VOCs. Non-fuel petroleum hydrocarbons were detected at significant concentrations in soil samples collected from MW-8P and MW-9P at depths between 20 and 27 feet bgs, but no petroleum hydrocarbons were detected in soils from MW-10P and MW-11P. Tetrachloroethylene (PCE) was detected in one soil sample from boring MW-9P at 23 feet bgs at a concentration of 145 micrograms per kilogram (µg/kg). The newly installed wells, along with existing Wells MW-3, MW-6, MW-7, and MW-8, were sampled and analyzed for TEPH and chlorinated VOCs. Groundwater in MW-9P contained 4.5 µg/l of PCE and 0.5 milligrams per liter (mg/l) TEPH. Park stated that the source of PCE identified in soils and groundwater was not identified during this investigation. Park also reported the results of the monthly free product recovery program that was initiated on December 23, 1991, and recommended the installation of a free product recovery system to replace hand bailing. Monitoring well locations are shown on Figure 3.

On February 3, 1992, the LACFD, Hazardous Waste Control Program, Emergency Operations Section responded to a complaint of the release of corrosive vapors at the Site. A drum of hydrochloric acid had been punctured by a fork lift, and the spilled acid reacted with metals on the ground releasing a cloud of vapor. During the investigation of this incident, it was discovered that Barmet was improperly managing hazardous wastes at the Site, and that numerous stockpiles which consisted of construction debris, soil, and small amounts of bag house dust containing elevated concentrations of lead and zinc were present at the Site, primarily in the area of the former landfill. A misdemeanor complaint was filed with the Municipal Court of the County of Los Angeles, which was resolved by Barmet paying a $40,000 fine. A Notice of Violation and Order to Comply dated April 28, 1992 was issued to Barmet by LACFD. Park, on behalf of Barmet, addressed this issue in a workplan submitted to the LACFD.

In a May 27, 1992 meeting with LACDPW, Barmet agreed to install and operate an automatic free product recovery system, to sample all monitoring wells on a quarterly basis (except clean perimeter wells and the wells containing free product) and analyze the samples by United States Environmental Protection Agency (EPA) Methods 601 and 602. In a December 7, 1994 letter, LADPW agreed to revise the groundwater monitoring program to semi-annual monitoring for Wells MW-1, MW-4, and MW-5, but quarterly monitoring was retained for MW-3.

On July 8, 1992, Park submitted a workplan for installation of an automatic product recovery system to the LACDPW. Park reported that Barmet had repaired a leaking sump which was contributing to the rolling oil present in the soil and groundwater. In this workplan, Park proposed the installation of two free product recovery wells for the sole purpose of recovering product. These wells along with one existing monitoring well (MW-6P) were proposed to be used as part of the automatic recovery system. The system was installed and began operation on August 18, 1992 (Park 1993). The system operated automatically until it was shut down during the fourth quarter of 1995 and manual product removal was resumed.

In August 1992 the LACDPW disapproved the termination of the vapor recovery system based on residual concentrations of petroleum hydrocarbons remaining in soil and soil vapor. In a September 9, 2002 meeting with LACDPW, Barmet, and Park, it was agreed that soil confirmation sampling demonstrated that the SVE operation was successful at all locations except in the area of the shallow extraction well CW near soil boring SB-11P (Park 1992). LACDPW required the installation of an additional 25-foot SVE well in the area of Well CW and to continue operation of the SVE system.

In June 1993, Park reported the results of the continued SVE operation at the Site, proposed to shut down the SVE system and requested Site closure with respect to volatile fuel

hydrocarbons in the vicinity of the USTs. On August 30, 1993, the LACDPW responded that it could not concur that the soil cleanup was complete and requested confirmation soil sampling for petroleum hydrocarbons in the soil. In a November 5, 1993 letter, Park documented the following:

- The SVE system had effectively remediated volatile fuel constituents in the soil, but that heavier hydrocarbons may remain in Site soils.
- Soil sampling was not feasible due to the high density of utilities and piping in the vicinity of the USTs.
- LACDPW will not issue a formal written Site closure without confirmation soil borings and acceptable results of soil analyses.
- In lieu of receiving written Site closure, Barmet could discontinue vapor extraction remediation with a "no further action" status. This status has the stipulation that since the USTs were to be removed by 1998, soil conditions would be assessed and remediated if required at that time.
- In the interim, Barmet will continue to conduct tank integrity tests annually and groundwater monitoring quarterly.
- This letter (included in Appendix A) along with Park's report (Park 1993), will serve to document the completed SVE remediation of the volatile fraction of fuel hydrocarbons associated with the USTs, and the future requirements for additional assessment.

In August 1993, Park reported on the abandonment/closure of two non-fuel USTs at the Site to the LACDPW. These features are also described as sumps in various documents. During the closure process, one of the tanks was found to have two compartments with a total capacity of 5,000 gallons. The other had a 6,500-gallon capacity, and both tanks contained paraffin oil. The contents were removed from the tanks, the tanks were pressure-washed, and the tanks were abandoned in place to preserve structural integrity of the plant building. Ten soil samples were collected from a depth of four feet below the tank bottoms. TPH was detected at concentrations as high as 41,000 mg/kg, ethylbenzene was detected at a maximum concentration of 770 µg/kg, toluene at a maximum concentration of 840 µg/kg, xylenes at a maximum concentration of 3,500 µg/kg, and PCE at a maximum concentration of 190 µg/kg.

In a Site Assessment Report dated August 27, 1993, Park reported that, during a routine inspection of the western portion of the Site, Barmet personnel noted areas of asphalt paving with surface deformation apparently caused by the expansion of underlying materials. These

areas of deformed asphalt reportedly ranged from small surface cracks to uplifted areas several feet in diameter and approximately 8 inches high at the center. Most of these areas were located in the northwestern portion of the Site, with one small area observed in the extreme southeast corner of the Site. In several of the uplifted areas, the asphalt was breached, and small amounts of a powdery blue material were visually observed. This material was analyzed and found to consist primarily of copper, zinc, and lead. Park developed a sampling grid with 50-foot spacing in the primary area of concern and 100-foot spacing throughout the remaining areas under investigation.

Fifty-four soil borings were drilled and samples collected at various depths. Results of analyses performed on these soil samples indicated that three borings contained total metals concentrations exceeding regulatory criteria for total metals, and significantly larger areas contained soils exceeding or potentially exceeding regulatory criteria for soluble metals concentrations. Park recommended submission of these findings to the LACFD for review and the performance of a health-based risk assessment (HBRA) to evaluate the current and future risk to human health, as well as to establish cleanup criteria, if required. The HBRA submitted to the LACFD in February 1994, concluded that the soil did not pose a significant health risk, and that the conservative approach of maintaining an asphalt cap on the portion of the Site which contained elevated metals concentrations was adequately protective. Park recommended excavation of the areas of asphalt paving showing upwelling and recapping with fresh asphalt. Park states in a subsequent report (Park December 1994) that the LACFD approved the HBRA.

In a December 8, 1993 letter to Barmet, the RWQCB confirmed that it had reviewed and approved the SWAT report submitted by Woodward-Clyde Consultants, and found the monitoring program for the Site capable of detecting a release from the former landfill.

In March 1994, the LACDPW stated that, based on the results reported in a quarterly groundwater monitoring report showing that TCE concentration in MW-3 had increased from the previous reporting period, further investigation must be performed to determine the source of the TCE contamination.

In March 1994, Park submitted a Site mitigation plan to the LACFD to address the stockpiled material located at the Site, which was the subject of a Notice of Violation and Order to Comply issued to Barmet in 1992. Park reported that the stockpiled material consisted of various mixtures of construction debris, soil, and small amounts of bag house dust that was mixed with the soil, which had created approximately 1,500 cubic yards of soil that was classified as hazardous waste primarily due to leachable (soluble) metals concentrations. The proposed mitigation plan reported that material exhibiting visual evidence of bag house dust had been identified and segregated, and transported to a facility in Beatty, Nevada for disposal.

Park proposed the separation of inert construction debris from the metals-impacted soils, followed by crushing and reusing on-site as base material under new paving installed over the impacted area. The remaining soils with elevated metals concentrations were proposed to be treated using a chemical fixation process and reused on-site. The mitigation plan was reportedly approved by the LACFD in April 1994.

In September 1994, Park submitted a plan to the LACDPW to assess the lateral extent of the chlorinated hydrocarbons in groundwater in the vicinity of MW-3. Park implemented the workplan after receiving a LACDPW approval letter dated December 7, 1994, and reported the results of their investigation in a June 6, 1995 report. Park collected eight HydroPunch groundwater samples. TCE concentrations ranged from below laboratory reporting limits to 30 µg/l, 1,1-dichloroethane (1,1-DCA) ranged from below laboratory reporting limits to 7.2 µg/l, 1,2-dichloroethane (1,2-DCA) concentrations ranged from below laboratory reporting limits to 5.6 µg/l, and 1,1-dichloroethene (1.1-DCE) concentrations ranged from below laboratory reporting limits to 26 µg/l. Park concluded that the results of this investigation indicated that the likely source of the detected chlorinated compounds was from an on-site source. They also stated that the detected chemical constituents were not currently used by Barmet, and there were no records of historic chlorinated VOC use at the Site. No likely source of the chlorinated VOCs was identified.

In a December 12, 1994 report, Park describes the mitigation steps taken at the Site to address the metals contamination under areas of uplifted asphalt. Park conducted a Site reconnaissance to visually assess the occurrence and lateral extent of deformed and broken asphalt throughout the facility. Each area of concern was excavated laterally to remove all compromised asphalt and vertically to a depth of approximately 18 to 24 inches below the ground surface. Excavation was continued until all contaminated soils were removed, based on visual observation. This excavated material was stockpiled on-site, and was treated using chemical fixation, along with another, larger treatment program which was conducted on metals-impacted soils located on the former landfill portion of the Site. The treated materials were used as on-site fill material under new asphalt paving.

In January 1995, Park reported the completion of mitigation activities at the Site to address the soils and debris stockpiles containing elevated metals concentrations located on the landfill portion of the Site. Mitigation activities included the clearing and grubbing of stockpiled materials and shallow surface soils, the segregation of coarse debris for recycling or off-site disposal, and the chemical stabilization of the remaining metals-impacted soils. Confirmation sampling of the treated soil confirmed that the remaining soluble metals concentrations did not exceed regulatory limits.

In a March 7, 1995 letter, LACFD indicated that it had completed the review of several reports submitted by Park on behalf of Barmet regarding the chemical treatment and stabilization of metals-impacted soils at the Site. The LACFD concurred with Barmet's consultant, Park, that the known heavy metals contamination had been satisfactorily mitigated for the current Site use. It also acknowledged that low concentrations of known metals, including undiscovered pockets of other contaminants may remain at the Site. For this reason, the LACFD required documentation that a deed notification had been filed with the County Recorder which would serve to notify future buyers of the existence of contaminated soils at the Site. A deed notification was filed on August 15, 1995 addressing both locations at the Site where materials with elevated metals concentrations were discovered and remediated to the satisfaction of the LACFD. A copy of the Deed Notification is included in Appendix A.

In July 1995, Barmet permanently closed the cluster of four fuel-containing USTs, designated as Tanks 1, 2, 3, and 4. Tank 1, with a capacity of 12,000 gallons, historically contained gasoline or rolling oil. At the time of closure, Tank 1 contained rolling oil. Tanks 2 and 3 had capacities of 20,000 and 25,000 gallons, respectively and were used for the storage of rolling oil. Tank 4 had a capacity of 30,000 gallons and had historically been used for storage of rolling oil or diesel fuel, and at the time of closure contained diesel fuel. The tanks were abandoned in place, due to their proximity to building structural supports. According to a report prepared by Park, stained soils observed above the USTs were excavated and removed, followed by removal of oily sludge from the tanks. The tanks were triple rinsed, and after cleaning, were filled with sand. Samples were collected from below the tanks by drilling vertically through the tank walls. Analytical results indicated that residual petroleum hydrocarbons were primarily located beneath Tank 3.

In a November 13, 1995 letter, the LACDPW approved the tank closure, and transferred regulatory oversight to the RWQCB. A copy of this letter is included in Appendix A.

In March 1996, Park submitted a report to the RWQCB containing the results of the previous HydroPunch investigation, along with the results of a soil gas survey performed at the Site. Twenty soil sampling probes were installed and soil gas samples were analyzed on-site for the presence of VOCs. TCE was detected in 7 of the 20 samples at concentrations ranging from 1 µg/l to 4 µg/l. PCE was detected in 6 of 20 samples at concentrations ranging from 1 µg/l to 11 µg/l. Freon 113 was detected in one sample at a concentration of 30 µg/l, 1,1-DCE was detected in one sample at a concentration of 27 µg/l, and cis-1,2-DCE was detected in one sample at 1 µg/l.

In August 1996, Park proposed the in-place closure of an air pollution control system blow-down pit at the Site. The closure plan included pressure cleaning the pit, triple rinsing, and the

removal of all rinsate for disposal. The pit was to be slurry filled with a mixture of sand and Portland cement. The LADPW approved the closure on September 16, 1996.

In November 1996, Park submitted a report to the RWQCB which contained the results of a HBRA performed for Site soil and groundwater containing chlorinated VOCs. In this report, Park stated that low concentrations of chlorinated VOCs are present throughout a significant portion of the Site, but due to Site conditions, remediation did not appear to be technically feasible. Park concluded that:

- Groundwater beneath the Site has been affected with chlorinated VOCs at generally low concentrations, but above current MCLs.
- Soils affected with chlorinated VOCs do not exceed action levels for soil remediation.
- It would not be technically or financially feasible to pursue groundwater remediation with the goal of attaining MCLs.
- Using Risk Based Corrective Action protocol, the carcinogenic risk and toxic hazard from chlorinated VOC-affected soil and groundwater are evaluated to be within acceptable limits.

In October 1997, the RWQCB, Underground Tank Section, notified Commonwealth Aluminum that the Underground Tanks Section was no longer able to review reports or oversee investigations in cases where non-fuel contamination was involved. The Commonwealth case was referred to the Site Cleanup Unit in the Regional Programs Section of the RWQCB. The Spills, Leaks, Investigations, and Cleanups (SLIC) program resumed oversight for the Site and established SLIC No. 0772 in 2004.

In April, 2004 Commonwealth reported to the RWQCB that, based on samples collected from underground sumps and monitoring wells at the Site, it appeared that a potential leak may exist from a Big Bliss cold mill process sump. Commonwealth stated that it had ceased operation of the Big Bliss in December of 2003, and expected to remove the oil from the process tank and sump associated with this equipment by the end of May 2004.

In March and June 2006, Aleris submitted a Facility Closure Plan to the LACFD. The facility ceased operations at the end of March 2006, and the Facility Closure Plan included Aleris' approach to completing closure of the facility. Aleris reportedly received verbal approval of this plan from LACFD on June 27, 2006. The LACFD approved the Site decommissioning in a November 30, 2006 letter.

In May 2006, ERM conducted a soil investigation at the Aleris facility. This investigation evaluated the presence of petroleum hydrocarbons, VOCs, and metals in soil, and VOCs in soil vapor, underlying the Site. This effort was targeted at areas of the Site other than those that had been the subject of previous investigations. ERM's investigation included the western and southern portions of the main manufacturing building at the Site and exterior areas to the north, east, and west of the building.

Historic Site sampling locations are shown on Figure 4.

In July, 2006 Iris Environmental, on behalf of ProLogis, performed a Phase II due diligence investigation at the Site. This investigation included the collection of soil vapor and groundwater samples at the Site to address identified data gaps. Soil vapor samples were collected in areas where historic data indicated the presence of chlorinated VOCs in the subsurface, and in areas where soil data collected by ERM in their prior soil investigation indicated the presence of VOCs in soils. Soil vapor samples were also collected along the perimeter of the former landfill. Samples were analyzed for methane and fixed gases and for VOCs using EPA Method TO-15. Groundwater samples were collected from both selected on-site groundwater monitoring wells and from HydroPunch sampling locations. Groundwater samples were analyzed for VOCs, total and dissolved metals, and tetrahydrothiophene compounds. Sampling locations are shown on Figure 5. Free-phase rolling-oil product was sampled from Well MW-5P, and analyzed for VOCs, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), Title 26 metals, aluminum, and total petroleum hydrocarbons as a hydrocarbon fingerprint scan. The Phase II Site Investigation Report was submitted to the RWQCB on September 14, 2006.

4.0 CURRENT SITE ENVIRONMENTAL CONDITIONS

Based on soil and groundwater data collected during the various investigations detailed in Section 3.0, the soil and groundwater have been impacted by previous operations at the Site. The current environmental conditions at the Site are discussed in the following sections.

4.1 Soil

4.1.1 Petroleum Hydrocarbons

The petroleum hydrocarbon contamination detected at the Site consists primarily of non-fuel petroleum hydrocarbons or "rolling oil". This material is present in the subsurface in an area of the former manufacturing facility near a storage sump that historically contained rolling oil. Operation of the equipment (Big Bliss cold mill process) which utilized this material ceased at the end of 2003. Aleris began removing free-phase product from several on-site wells in 1991, and through June 2007, approximately 937 gallons of product has been removed from the Site. Removal of free-phase product from select Site wells was performed on a monthly basis until Site wells were abandoned in July 2007. Product thickness in Well MW-5P was reported as more than 22 feet in 2004. The most recent free product recovery report shows a product thickness of 5.6 feet as measured on June 6, 2007 (PSI June 30, 2007).

The rolling oil used at the Site, NORPAR 15, is described by its manufacturer as "a normal paraffinic petroleum product of exceptionally high purity, characterized by low reactivity, low solvency, moderate volatility, relatively low viscosity, and mild odor". Product specifications show the composition of NORPAR 15 by weight percentage as normal tetradecane (C14H30) 33.2%, normal pentadecane (C15H23), 48.7%, normal hexadecane (C16H34) 15.6%, normal heptadecane (C17H36), 2.1%, normal octadecane (C18H38) 0.3 %, and normal nonadecane (C19H40) 0.1%. In addition, according to manufacturer's literature for NORPAR 15, it complies as a Technical White Mineral Oil (CFR 178.3620 (b)) and is an approved USDA H-1 Lubricant, permitted for direct addition to food for human consumption. NORPAR 15 product information is attached in Appendix C.

A sample of the rolling oil was collected from one of the Site monitoring wells (MW-5P) as part of the Phase II Site investigation performed by Iris Environmental. Free product from this well was analyzed for VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, PCBs using EPA Method 8082, Title 22 metals and aluminum using EPA Method 6010/7000, and a hydrocarbon fingerprint scan using EPA Method 8015 modified. The only constituents detected in these analyses above

the respective detection limits, other than hydrocarbons, were metals at low concentrations, with aluminum having the highest concentration at 2.4 mg/l. The hydrocarbon fingerprint scan for the free-product collected from the Site monitoring well showed that the majority of this product is in the $C_{12} - C_{22}$ range, consistent with the product specifications detailed above. Analytical results for the free-product collected from Well MW-5P are tabulated and attached in Appendix B (Tables B11 through B15).

Exploratory trenches were excavated in May 2007 in the portion of the Site thought to be most affected by rolling oil (Figure 6). These trenches were excavated to depths of up to 22 feet, and no free-phase petroleum hydrocarbons were observed in the soils, indicating that soils in the vicinity of the rolling oil sump are not saturated with rolling oil. Also, groundwater was encountered in one of the trenches, and only a slight sheen was observed on the accumulated groundwater in the trench. The lack of rolling oil-saturated soils and the sheen on the trench groundwater indicates that rolling oil in the subsurface is not as widespread as indicated by the presence of free-phase rolling oil in groundwater monitoring wells. The product thickness historically observed in the groundwater monitoring wells in the vicinity of the process sump is most likely attributable to the configuration of the groundwater monitoring wells, and potential preferential migration of rolling oil in the subsurface to the groundwater monitoring wells, with the wells acting as collection chambers, resulting in the product thicknesses observed in the wells.

Soils in the vicinity of a cluster of four USTs which formerly contained fuel petroleum hydrocarbons were contaminated, most likely from repeated overfilling of these tanks. Approximately 20 cubic yards of contaminated soils in the vicinity of the tank fill ports were excavated and hauled off-site for disposal. Residual petroleum hydrocarbons in the subsurface were treated using SVE, and hydrocarbon concentrations were reduced to a satisfactory level. The tanks were closed in place in 1995, but it is likely that some residual petroleum hydrocarbons remain in this area, primarily beneath Tank 3.

Two process sumps which had been used to store rolling oil were abandoned in place. These concrete, steel-lined sumps were pressure washed prior to abandonment. Soil samples collected at a depth of four feet below the sump floors show the presence of residual petroleum hydrocarbons as total volatile petroleum hydrocarbons (TVPH) at concentrations as high as 41,000 mg/kg.

The Site investigation performed by ERM (May 2006) also identified several areas of the Site with elevated concentrations of petroleum hydrocarbons. ERM's investigation confirmed the presence of petroleum hydrocarbons in the subsurface in areas known to

contain rolling oil, and in the vicinity of the closed fuel tanks. Most of the identified locations that were outside of these known contaminated areas are in shallow soils, generally at depths of 0.5 to 1.0 feet.

An evaluation of the petroleum hydrocarbon data in the context of the proposed commercial redevelopment is provided in Section 5.0.

4.1.2 Volatile Organic Compounds

Site soils have shown the presence of VOCs, although at relatively low concentrations. ERM (May 2006) reported that four chlorinated VOCs were detected in soil matrix samples collected during their investigation, PCE, TCE, 1,1,2,2-tetrachloroethane [1,1,2,2-PCA], and methylene chloride. ERM reported PCE detections in seven soil samples (collected from SB-2, SB-17, SB-22, SB-24, and SB-26) at concentrations ranging from 2.6 to 12 µg/kg, and TCE was detected in one soil sample from SB-24 at a concentration of 2.2 µg/kg. Methylene chloride was detected in one soil sample (SB-24) at a concentration of 110 µg/kg, and 1,1,2,1-PCA was detected in one soil sample (SB-25) at a concentration of 2.0 µg/kg. ERM also reported the presence of eleven non-chlorinated VOCs, with the highest concentrations occurring in one sample; SB-6C at 16 feet bgs. An evaluation of the VOC data in the context of the proposed commercial redevelopment is provided in Section 5.0. Soil vapor data is also available for the Site, and is discussed in Section 4.2 below.

4.1.3 Metals

Site soils were impacted with metals, most likely originating from manufacturing operations. These areas of metal contamination, generally located in the northwestern exterior portion of the Site, primarily contained elevated concentrations of lead, copper, zinc, and cadmium. The contaminated soils were partially remediated by excavation and chemical stabilization, along with other metals-containing soils that had historically accumulated on the landfill portion of the Site. A deed notification is in place for the Site which addresses this condition. The Site investigation performed by ERM (June 2006) also identified other isolated areas of the Site with elevated metals concentrations. An evaluation of the metals data in the context of the proposed commercial redevelopment is provided in Section 5.0.

4.2 Soil Vapor

4.2.1 Volatile Organic Compounds

Historic soil vapor testing has shown the presence of chlorinated VOCs in Site soils in the vicinity of a former chemical storage area. Soil vapor testing performed by ERM in May 2006 also indicated the presence of VOCs in areas of the Site, although at low concentrations. The VOC analyses were performed using EPA Method 8260B. The detection limit for certain compounds using this analytical method is higher than regulatory screening levels used to evaluate health risks potentially posed by VOCs. Iris Environmental analyzed several soil vapor samples, collected both in areas of historic detections of VOCs and in areas where ERM reported VOCs in soils, using EPA Method TO-15 to obtain data suitable for regulatory screening purposes. The results showed low concentrations of VOCs in soil vapors at the Site. ERM also reported the presence of TVPH in soil vapor. An evaluation of the soil vapor data in the context of the proposed commercial redevelopment is provided in Section 5.0.

4.2.2 Methane

As part of the July 2006 Phase II Site investigation, Iris Environmental collected soil vapor samples around the perimeter of the former landfill, and at the location of known rolling oil contamination in the subsurface. The highest concentration, 12% by volume in air, was detected directly over the area of the highest rolling oil impacts. The highest methane concentration detected adjacent to the former landfill was 0.08%. An evaluation of the soil vapor data in the context of the proposed commercial redevelopment is provided in Section 5.0.

4.3 Groundwater

4.3.1 Petroleum Hydrocarbons

Site groundwater has been impacted by petroleum hydrocarbons, primarily by rolling oil. PSI, in its most recent Free Product Recovery Report (June 30, 2007) indicated that 6 of the 14 groundwater monitoring wells and two product recovery wells contained measurable free-phase petroleum hydrocarbon as a light non-aqueous phase liquid (LNAPL). Data collected in June 2007 shows measured product thicknesses ranging from 0.2 feet in MW-2P to 5.6 feet in MW-5P. An evaluation of the petroleum hydrocarbon impacted groundwater in the context of the proposed commercial redevelopment is provided in Section 5.0.

4.3.2 Volatile Organic Compounds

Site groundwater has historically contained low concentrations of chlorinated VOCs, primarily in the vicinity of Well MW-3 to the north of the former manufacturing plant. Despite focused Site investigations (Park 1996), the source of the low concentration of chlorinated VOCs in the groundwater has not been identified. The groundwater data collected by Iris Environmental, both from selected existing groundwater monitoring wells and from HydroPunch investigations, confirmed that low concentrations of VOCs are present in groundwater underlying a limited portion of the Site. An evaluation of the VOC groundwater data in the context of the proposed commercial redevelopment is provided in Section 5.0.

4.3.3 Metals

Groundwater samples collected in July 2006 as part of the Phase II Site investigation were analyzed for both total and dissolved metals. Low concentrations of dissolved arsenic, molybdenum, nickel, and selenium were reported. An evaluation of the dissolved metals in groundwater in the context of the proposed commercial redevelopment is provided in Section 5.0.

5.0 DATA ANALYSIS AND HEALTH RISK EVALUATION

Site investigations have been conducted at the Site from 1987 until the present. Iris Environmental reviewed historical environmental reports provided by Aleris, and extracted and collated analytical data in order to evaluate Site conditions, and to assess whether remedial activities are warranted in order to redevelop the Site for its intended use as a commercial property. The collated Site data is included in Appendix B of this report. As part of the initial Site evaluation, these historic data, along with data collected by Iris Environmental during the July 2006 Phase II Site investigation were compared to appropriate human health screening levels. Soil results were compared to United States EPA Region IX commercial worker soil Preliminary Remediation Goals (PRGs 2004) and DTSC commercial worker soil California Human Health Screening Levels (CHHSLs 2004, revised January 2005). As no CHHSLs or PRGs have been developed for TPH in soil, these soil screening values were calculated following the methodology discussed in Section 5.1.1 below. Soil gas results were compared to DTSC commercial/industrial soil gas CHHSLs for buildings constructed with engineering fill below sub-slab gravel representative of typical current building construction (2004, revised January 2005). Groundwater data were compared to EPA MCLs and California Department of Health Services MCLs for drinking water. Drinking water standards were used only as points of comparison. Due to high[1] total dissolved solids (TDS) and petroleum hydrocarbons originating from the Site in the shallowest (perched) groundwater zone, groundwater at the Site is not a potential source of drinking water. Deeper groundwater has been impacted by VOCs and additional compounds from off-site facilities in the vicinity, and is accordingly not likely a potential source of drinking water.

At sites where multiple chemicals have been detected, a cumulative health risk evaluation may be necessary to address potential cumulative cancer risks and noncancer hazards, which can potentially exceed a level of concern even when exposure to any one chemical alone does not. Thus, to complement the initial screening evaluation described above, a cumulative risk evaluation was prepared in order to evaluate the potential cumulative health effects of all compounds detected in soil and soil gas at the Site. Note that data collected within the landfill area and the northwestern portion of the Site that will remain a parking area (as depicted on Figure 2) were not included in the cumulative health risk evaluation as these areas are under notification requirements if materials in these areas are disturbed.

[1] The mean and 95% upper confidence limit of the mean concentrations of TDS in all monitoring wells are 3,148 mg/l and 3,938 mg/l, respectively, greater than the 3,000 mg/l criteria customarily used to define groundwater as a drinking water resource (LARWQCB 1996).

Given that shallowest groundwater is encountered at depths of 25 feet bgs and is not used as a source of drinking water, the only potentially complete exposure pathway through which populations at the Site may be exposed to chemicals detected in groundwater would be through the inhalation of volatile constituents in groundwater that may migrate up through the soil column into indoor or ambient air. These potential exposures to Site groundwater via the indoor or outdoor vapor inhalation pathway are evaluated using Site soil gas data. The results of this evaluation are summarized briefly in Section 5.5 below. Details of the cumulative health risk evaluation are presented in Appendix D.

5.1 Soil

5.1.1 Petroleum Hydrocarbons

A review of the Site data shows that petroleum hydrocarbons have been widely detected in soils. Most of these detections are located in the portion of the Site known to contain free-phase rolling oil in the subsurface, near the location of the Big Bliss cold mill process or in the vicinity of closed USTs or sumps. The closed USTs at the Site include a cluster of four that formerly contained rolling oil along with diesel fuel and gasoline, and other tanks that were associated with a rolling mill. Soils in the vicinity of the four closed USTs were successfully remediated using vapor extraction, but some residual impacts likely remain directly beneath the tanks. In addition to former UST and sump locations there are some elevated TPH concentrations outside these areas. The highest TEPH (C8-C40) concentration, 49,000 mg/kg at 0.5 feet is located outside the areas of the former USTs and sumps, but appears to be limited to shallow depths, because the concentration of TEPH at 8 feet at this location is 54 mg/kg.

As noted above, no CHHSL or PRG values have been developed for exposure to TPH in soils. Thus, as requested by DTSC, screening values for TPH constituents detected at the Site were developed for TPH-gasoline, TPH-diesel and TPH-rolling oil. The approach used to calculate these screening values is discussed briefly below.

The TPH constituents detected at the Site consist primarily of petroleum hydrocarbons in three ranges: TPH-gasoline (C_5 to C_{10}), TPH-diesel (C_{11} to C_{18}), and TPH-rolling oil ($C_{>10}$ to C_{40}, with over 90% in the C_{14} to C_{19} range). In general, petroleum hydrocarbons are comprised of four major groups: alkanes, alkenes, cycloalkanes and aromatics. From a human health standpoint, the main chemicals of concern (COCs) that may be expected to be present in these TPH ranges, particularly TPH-volatile range hydrocarbons, are the volatile aromatics, which are characterized and evaluated as individual constituents (i.e., naphthalene, benzene, toluene, ethylbenzene, and

xylenes). The toxicity of the volatile component of the TPH range hydrocarbons is thus addressed by evaluating the detections of individual volatile compounds in soil gas[2] as well as soil. However, many other hydrocarbon constituents exist in TPH-gasoline, TPH-diesel and TPH-rolling oil ranges. The toxicity of the other constituents in the TPH-gasoline, TPH-diesel and TPH-rolling oil ranges was addressed using an indicator/surrogate approach as recommended by the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG 1997) with draft toxicity values recommended by the Human and Ecological Risk Division (HERD) of DTSC.

Risk-based screening levels (RBSLs) were developed per Cal/EPA guidance (2004) for TPH-gasoline, TPH-diesel and TPH-rolling oil in soil using the toxicity values recommended by DTSC, as described in Section D.4 of Appendix D. As the Site will be developed for commercial land-use, RBSLs were calculated for the future commercial worker scenario. RBSLs were also developed for the construction worker scenario in order to evaluate whether TPH concentrations detected in specific areas of the Site may potentially be above a level of concern for a construction worker who could be engaged in the redevelopment of the Site.

The RBSLs for exposure to TPH-gasoline, TPH-diesel and TPH-rolling oil in soil under the commercial worker scenario are 27,000 mg/kg, 37,000 mg/kg, and 52,000 mg/kg, respectively. The RBSLs for exposure to TPH-gasoline, TPH-diesel and TPH-rolling oil in soil under the construction worker scenario are 7,300 mg/kg, 9,500 mg/kg, and 14,000 mg/kg, respectively. In the health risk evaluation, the RBSLs for TPH-gasoline and TPH-rolling oil were used as surrogate values to evaluate TVPH and TEPH, respectively.

TPH concentrations in soils compared to the calculated TPH RBSLs are shown in Table 1. There are two samples (6AA and 6CC) where TPH was detected at concentrations greater than the RBSLs calculated for the commercial worker scenario. As the majority of the cumulative noncancer hazard for the commercial worker scenario (i.e. approximately 81%) is driven primarily by TPH, TPH concentrations in soils at depths less than 10 feet bgs were also compared to ½ the calculated TPH RBSLs for the commercial worker scenario. There are seven samples (SB-17, SB-14,

[2] Naphthalene was analyzed for and not detected at a detection limit of 1 µg/l during the May 2006 soil gas sampling event conducted by ERM; however, naphthalene was not included in the July 2006 soil gas sampling event, during which lower detection limits were achieved for all compounds because of a change in the analytic method. Given the relatively low magnitude and frequency of naphthalene detections in all soils at the Site (*i.e.*, naphthalene was detected at maximum and mean concentrations of 69 mg/kg and 0.861 mg/kg, respectively, in 10 of 81 samples for all soils, including depths greater than 10 feet bgs), it is unlikely that naphthalene would be widely detected in soil gas at the Site with detection limits lower than 1 µg/l. Additionally, because of the proximity of the Site to the landfill, the City of Carson will require installation of a vapor barrier system as part of Site improvements, effectively reducing the potential for vapor intrusion to indoor air at the Site.

6A, 6C, 6BB, 7A, and 7C) where TPH was detected at concentrations greater than both ½ the RBSLs calculated for the commercial worker scenario and the RBSLs calculated for the construction worker scenario. There are five additional samples (MW-8-P, MW-3-P, 7B, SB-6, and SB-12) where TPH was detected in concentrations greater than the RBSLs calculated for the construction worker scenarios. These samples and their locations are shown on Figure 7.

5.1.2 Volatile Organic Compounds

VOCs have historically been detected in Site soils at relatively low concentrations. These data are shown in Table 1. A comparison of concentrations detected with commercial worker PRGs and CHHSLs shows that these screening levels are exceeded at only one location (SB-6C at 16 feet), with 1,2,4-trimethylbenzene concentration at 290 mg/kg, 1,3,5-trimethylbenzene at 96 mg/kg, and naphthalene at 69 mg/kg. Figure 8 shows the location of this exceedance at the Site. As discussed in the cumulative risk evaluation presented in Appendix D and summarized in Section 5.5 below, only soil samples collected at depths less than or equal to 10 feet bgs were considered representative of soils to which future commercial workers may potentially be exposed. Thus, this sample would not be contacted under the future planned commercial land-use. Soil samples collected from the same location at 8 feet bgs and 22 feet bgs indicate that the impacted soils do not extend throughout the soil column in this area. Additionally, none of these VOCs were detected above the detection limit of 1 µg/l in a soil vapor sample collected from 15 feet bgs at this location by ERM during their 2006 Site investigation.

5.1.3 Metals

The range of metals concentrations in Site soils are summarized in Table 1. These data do not include data collected within the landfill portion of the Site and results for approximately 50 cubic yards of metals-containing soils that were excavated from the northwestern portion of the Site and subjected to a chemical stabilization process, along with the metals-containing soils that were located on the landfill portion of the Site. Although the maximum total lead concentration for soils located on the landfill surface was 2,440 mg/kg, the 90% upper confidence limit (UCL) concentration was 368 mg/kg. Confirmation sampling of the treated soils demonstrated that soluble lead concentrations were reduced to less than 1 mg/l, and these soils were determined to be suitable for use as on-site fill. Approximately 1,900 cubic yards of treated soils were placed on the landfill portion of the Site and paved with asphalt. These areas are the subject of a deed notification.

In the proposed Site redevelopment plan, the northwestern portion of the Site, along with the landfill will remain paved in order to provide a truck trailer storage area for an adjacent property owner under a lease agreement. No buildings will be constructed in these portions of the Site.

Site soil data in Table 1 includes metals concentrations for the remaining soils located in the northwestern portion of the Site along with metals concentration data collected more recently for soils in the remainder of the manufacturing portion of the Site (ERM 2006). Because the soils located in the northwestern portion of the Site will remain paved and will not be significantly disturbed during Site redevelopment (Figure 2), and no buildings will be constructed, the risk evaluation for metals in soils has been limited to the portions of the Site in which Site improvements will occur. These concentrations are compared to the commercial worker PRGs and CHHSLs in Table 1, and none of the reported concentrations exceed these regulatory screening levels with the exception of arsenic. However, as discussed in Appendix D, concentrations of arsenic detected at the Site are believed to be representative of background concentrations.

As discussed in the Site health risk evaluation (Appendix D), concentrations of selected metals may potentially pose health hazards to construction workers via inhalation of particulates during high dust generating activities. The Site-specific Environmental Health and Safety Plan (EHASP), prepared by the remediation contractor, will include appropriate measures to mitigate potential exposure to construction workers.

5.2 Soil Vapor

5.2.1 Volatile Organic Compounds

Although ERM conducted soil vapor sampling in their 2006 Site investigation, the collected samples were analyzed using EPA Method 8260B for VOCs and EPA Method 8015M for TVPH. Only one VOC compound, ethylbenzene, was detected at one location (SB-6C at 15 feet) at a concentration above the method detection limit. The concentration of ethylbenzene at this location was 1.9 µg/l; a concentration below the commercial/industrial soil gas CHHSL presented in Table 2. TVPH was detected at five locations (SB-6C, SB-12, SB-14, SB-15, and SB-21; all at 15 feet). The highest TVPH concentration detected was at SB-12 at a concentration of 1,500 µg/l and was above the commercial/industrial soil gas CHHSLs presented in Table 2. Detections of TVPH are further discussed in the health risk evaluation summarized in Section 5.5 below and found in Appendix D.

Chemical detections for soil gas samples collected during Iris Environmental's June 2006 Phase II sampling program are provided in Table 2. These data were evaluated

by comparing them to commercial/industrial soil gas CHHSLs for buildings constructed with engineering fill below sub-slab gravel representative of typical current building construction. The maximum detected concentrations of all VOCs detected in soil gas were below the respective commercial/industrial soil gas CHHSLs.

The only other soil gas data available for the Site was collected in 1996. Some of the locations sampled during this investigation indicated concentrations of VOCs above screening standards (see Appendix B). The area in which the highest concentrations were detected was selected as a sampling location for Iris Environmental's Phase II sampling program in order to evaluate current concentrations of VOCs in soil gas in this area. As discussed above, the current soil gas VOC conditions within this area are below screening levels. Note, however, that TVPH concentration at one location is above the screening level and is further evaluated and discussed in the health risk evaluation summarized in Section 5.5 below and found in Appendix D.

5.2.2 Methane

While we believe there have been previous data collection efforts, the only Site-specific methane data available to Iris Environmental for the Site is that collected during Iris Environmental's Phase II sampling in July 2006. These data are included in Table 2. All concentrations, with the exception of the sample collected from within the rolling oil-impacted area, were well below 0.5% (10% of the lower explosivity limit). Given the age of the landfill and the current methane conditions, methane does not appear to be of concern at the Site. As detailed in Section 6.1.1, remediation is proposed for petroleum hydrocarbons in the rolling oil-impacted area, which should simultaneously address the localized elevated methane concentrations.

5.3 Groundwater

5.3.1 Petroleum Hydrocarbons

The Phase II investigation conducted by Iris Environmental in July 2006 and the most recent Site groundwater monitoring report confirm that petroleum hydrocarbon impacts to groundwater are primarily limited to the area of the Site affected by rolling oil in the subsurface. Based on historic groundwater monitoring, the rolling oil appears to be highly immobile, because the extent of observed free product in the monitoring wells has not materially changed since monitoring was initiated in 1992.

5.3.2 Volatile Organic Compounds

VOCs have been historically detected in Site groundwater monitoring wells, generally at their highest concentrations in monitoring Well MW-3. The data collected during Iris Environmental's July 2006 sampling program confirmed the presence of VOCs in MW-3, as well as in the same region of the Site where a previous investigation (Park March 11, 1996) showed impacts to groundwater by chlorinated VOCs (the area surrounding MW-3). The data collected during groundwater monitoring performed by PSI in July 2006, was compared to California MCLs and EPA MCLs, and all values at all wells sampled were below screening levels. Data collected by PSI in June 2007 shows the TCE concentration at MW-3 as 0.0055 mg/l. The data collected by Iris Environmental in 2006 was compared to California MCLs and EPA MCLs. Table 3 presents summary statistics for the data collected, along with the California and EPA MCL screening values. The TCE concentration at MW-3 (0.0061 mg/l), and the TCE and 1,1-Dichloroethane concentrations at I-HP-2, 0.017 mg/l and 0.0077 mg/l, respectively, exceeded these screening levels. Figure 9 shows the sampling locations at which MCLs were exceeded.

5.3.3 Metals

Groundwater samples collected in July 2006 as part of the Phase II Site investigation were analyzed for both total and dissolved metals, and dissolved metals concentrations were compared with California and EPA MCLs. The respective MCL values, along with summary sampling data is shown in Table 3. The only exceedance of MCLs was for arsenic at sampling location I-HP-1, at a concentration of 0.017 mg/l (see Figure 9).

5.4 Free-Phase Petroleum – Rolling Oil

At the suggestion of the RWQCB, a sample of free-phase rolling oil petroleum was collected from monitoring well MW-5P during the Phase II Site investigation (Iris Environmental 2006), and analyzed for a wide array of constituents to evaluate its toxicity. Analytical results are included in Appendix B. The only constituents detected in these analyses above the respective detection limits were metals at low concentrations, with aluminum having the highest concentration at 2.4 mg/l.

5.5 Cumulative Risk Evaluation

At sites where multiple chemicals have been detected, a cumulative risk evaluation may be necessary to address potential cumulative cancer risks and noncancer hazards, which can potentially exceed a level of concern even when exposure to any one chemical alone does not. A health risk evaluation was prepared in order to complement the screening evaluation

discussed above and to evaluate the cumulative cancer risks and noncancer hazards for the redevelopment area of the Site (as depicted on Figure 2, Site Development Plans). The estimated cumulative cancer risks and noncancer hazard indexes (HIs) for future on-site commercial workers exposed to chemicals of potential concern (COPCs) in soils and soil gas are calculated using the methodology stated in Appendix D, and summarized briefly below.

5.5.1 Methodology

As described in Appendix D, all data collected during historical investigations, as described in Section 3.0 of the main report, were included in this evaluation, with the following exceptions: soil samples collected within the landfill area and the northwestern portion of the Site that will remain a parking area (as depicted on Figure 2); and soil vapor data collected in May 2006 by ERM (with the exception of TVPH data which is included in the health risk evaluation) and other prior investigations. In general, under the future planned commercial land use, including the development of the property for use as a distribution warehouse facility, soils down to a depth of 10 feet bgs could potentially be brought up and mixed with surface soils (Cal/EPA, 1992). Thus, only soil samples collected at depths less than or equal to 10 feet bgs were considered representative of soils to which future commercial workers may potentially be exposed. During the redevelopment phase, construction workers may come in contact with soils deeper than 10 feet bgs during the removal of subsurface structures (e.g., removal of underground storage tanks, etc.), thus, soil samples collected at all depths were considered representative of soils to which construction workers during the redevelopment phase may potentially be exposed.

The human populations that could potentially be impacted under future Site conditions were identified and included in the quantitative evaluation. Specifically, future on-site commercial workers were included in the cumulative risk evaluation. Although a landscape/maintenance worker is not explicitly quantitatively evaluated in the health risk evaluation, conclusions regarding potential exposures and risks to a future landscape/maintenance worker are discussed qualitatively within the context of the commercial worker evaluation.

Further, construction workers who may be exposed to chemicals detected at the Site during the redevelopment phase were included in the cumulative risk evaluation. Although the off-site resident and recreational user populations that also may be exposed to chemicals detected at the Site during the redevelopment phase are not explicitly quantitatively evaluated in the health risk evaluation, conclusions regarding potential exposures and risks to off-site residents and recreational users potentially exposed during the redevelopment phase are discussed qualitatively within the context of the construction worker evaluation.

All detected compounds were evaluated as COPC. The 95 percent upper confidence limit of the mean (95% UCL)[3] was used as the representative soil exposure point concentration (EPC) to evaluate direct exposures (i.e., soil ingestion and dermal contact) and to evaluate exposures to volatiles and particulates in outdoor air for the future commercial worker and construction worker scenarios. As a conservative approach, and as requested by DTSC, the maximum detected concentration of each COPC was also used for the future commercial worker scenario, in addition to the 95% UCL, as an EPC in order to develop an estimate of the range of potential concentrations and corresponding risks that may be encountered at the Site. Although risk assessment guidance states that risks should be based on average exposures, an evaluation of potential maximum risks was conducted here in order to avoid missing potential impacts at the Site that may be limited in area and that could potentially be masked by averaging concentrations across the entire redevelopment area. The maximum detected concentration of each COPC was not used as the EPC to evaluate the construction worker scenario, as a construction worker will likely work in multiple areas across the Site during the entire redevelopment phase (conservatively assumed to extend for 250 days, per DTSC's recommendation). Accordingly, the average concentration of chemicals across the entire redevelopment area is a more representative EPC for a construction worker exposed during the course of the Site redevelopment.

For compounds such as arsenic where risk-based screening levels are below background levels, a statistical evaluation may be performed in accordance with Cal/EPA guidance (1997) to determine whether arsenic concentrations at the Site are representative of background levels. A Site-wide background comparison for arsenic was conducted following the approach put forth by CalEPA (1997) for inorganic chemicals. As discussed in Appendix D, concentrations of arsenic detected at the Site are believed to be representative of background concentrations and thus were excluded from the cumulative risk evaluation.

The maximum detected concentration of each VOC detected in soil gas was used to estimate the concentration of volatiles in indoor air.

Cumulative cancer risk and noncancer hazard estimates were calculated using the methodology presented in the CHHSLs guidance document (Cal/EPA 2004). The methodology used to calculate cumulative cancer risks and noncancer hazards is discussed in more detail in Appendix D.

3 The 95% UCL estimate of the dataset was calculated using EPA ProUCL Version 3.00.02 (EPA, 2004a) statistical program. One-half the detection limit used as surrogate value for non-detects in the calculations. If the 95% UCL estimate is greater than the maximum detected concentration, then the maximum detected concentration is used as the representative EPC.

5.5.2 Results of the Cumulative Risk Evaluation

Potentially Exposed Populations Post-Redevelopment

Future Onsite Commercial Workers

As summarized in Table D-11 of Appendix D, the 95% UCL and maximum total cancer risks for future on-site commercial workers exposed to chemicals detected in soils are 6×10^{-7} and 2×10^{-6}, respectively.

As summarized in Table D-12 of Appendix D, the maximum total cancer risk for future on-site commercial workers exposed to chemicals detected in soil gas is 8×10^{-7}.

In summary, the cumulative potential cancer risks for the on-site commercial worker populations posed by the presence of all COPCs in soils and soil gas range from 1×10^{-6} to 3×10^{-6} which are equivalent to, and just above, respectively, the lower end of the risk management range of between 1×10^{-6} and 1×10^{-4} and below the typical commercial site "target" cancer risk of 1×10^{-5}.

As summarized in Table D-11 of Appendix D, the 95% UCL and maximum total noncancer HI for the future on-site commercial worker exposed to chemicals detected in soils are 0.7 and 3, respectively, which are below and above, respectively, the target HI of 1. Approximately 81% of the total noncancer HI (for both the 95% UCL and maximum) is attributed to TPH in soils, primarily TVPH and TEPH.

As summarized in Table D-12 of Appendix D, the maximum total noncancer HI for the future on-site commercial worker exposed to chemicals detected in soil gas is 1, equivalent to the target HI of 1. Approximately 99% of the maximum total noncancer HI is attributed to TVPH. The soil-gas CHHSL for TVPH presented in Table D-12 is based on the conservative assumption that the source of the vapor begins at 49 cm bgs (i.e., approximately 1.6 ft bgs). However, the maximum detected concentration of TVPH in soil gas was actually detected at 15 ft bgs. Based on the assumption that the source of TVPH vapors begins at 15 ft bgs, the attenuation factor, as shown on Table D-1, would decrease from 0.000535 to 0.000185 (the calculation sheets are provided in Attachment B), corresponding to a modified soil-gas CHHSL for TVPH of 3,000,000 $\mu g/m^3$. Thus, the maximum detected concentration of TVPH in soil gas detected at 15 ft bgs would result in a noncancer HI of 0.5 for TVPH and a maximum total noncancer HI for the future onsite commercial worker exposed to chemicals detected in soil gas of 0.5, below the target HI of 1.

In summary, the cumulative noncancer HIs for the on-site commercial worker populations posed by the presence of all COPCs in soils and soil gas range from 1 to 4, which are at and above, respectively, the target HI of 1. As noted above, the total

noncancer HI is attributed primarily to TPHs in on-site soils which are above RBSLs and ½ RBSLs at several localized areas. These localized areas are, in general, around former sumps. Aside from these localized areas of TPHs, the concentrations of chemicals in on-site soils would not pose an unacceptable risk to the health of future commercial populations who could be working on-site.

Future Onsite Landscape/Maintenance Workers

Overall, future on-site landscape/maintenance workers will have lower exposure to COPCs in soils and soil gas and therefore lower projected health risks than those projected for the future on-site commercial worker. Specifically, the total estimated cancer risk for a future landscape/maintenance worker is expected to be below the lower end of the risk management range of between 1×10^{-6} and $1\times10^{-4}$and below the target noncancer target HI of 1.

Potentially Exposed Populations During Redevelopment

Construction Workers

As summarized in Table D-13 of Appendix D, the 95% UCL total cancer risks for construction workers exposed to chemicals detected in soils is 1×10^{-5} which is well within the risk management range of between 1×10^{-6} and 1×10^{-4} and equivalent to the typical commercial site "target" cancer risk of 1×10^{-5}. Approximately 81% of the total cancer risk is attributed to total chromium which, per DTSC's request, is assumed to be comprised of hexavalent and trivalent chromium, at a ratio of 1:6 ratio. As hexavalent chromium is unlikely to be present in soils because there are no known on-site sources, the total cancer risk is likely an overestimate.

As summarized in Table D-13 of Appendix D, the 95% UCL total noncancer HI for the construction worker exposed to chemicals detected in soils is 13, which is above the target HI of 1. Approximately 27%, 8%, and 6% of the total noncancer HI is attributed to aluminum, cobalt, and nickel, respectively, primarily from the inhalation of particulates exposure pathway. Approximately 24% and 5% of the total noncancer HI is attributed to 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene, primarily from the inhalation of vapors in outdoor air exposure pathway.

It is important to emphasize that the noncancer HI estimated for the construction worker is likely to represent a significant overestimate of the actual projected HI for the construction worker. The reasons that the construction worker HI represents a significant overestimate are as follows:

1) The assessment assumes that the construction worker is exposed for 250 days, and that the level of dust present in the air during the entire 250-day period is 1

milligrams per cubic meter (mg/m^3). These two factors together represent a significant overestimate of exposure, because the development itself is expected to only take about 145 days, and it is typical that only approximately 25% of the build-out period requires dust-generating activities (e.g., soil grading). Further, a sustained dust level of 1 mg/m^3, even during the dust generating activities, is very conservative, as this level of dust would become quite a nuisance for workers.

2) The 95% UCL for the trimethylbenzenes are highly influenced by concentrations detected in one sample (SB-6C collected at 16 feet bgs) which was considerably higher than the concentrations detected in soils in any other locations across the entire redevelopment area. As the trimethylbenzenes were not detected above the laboratory reporting limit in the soil gas sample collected one foot above this one soil sample by ERM, the level of trimethylbenzenes in the volatile phase may be overestimated using the soil matrix concentrations.

For these reasons combined, the projected noncancer HIs for the metals and the trimethylbenzenes likely represent a significant overestimate of the actual HI for the construction worker who could be engaged in the redevelopment of the Site.

Off-Site Residents

The child resident is the more sensitive off-site receptor due to the higher intake relative to body weight than the adult resident, and thus health risks for the off-site resident potentially exposed during redevelopment activities will be discussed here in the context of the off-site child resident. Overall, off-site child residents will have lower exposure to COPCs in soils and therefore lower projected health risks than those projected for the future on-site construction worker. Specifically, health risks for the off-site child resident would be at least 0.15 times that of the on-site construction worker. Further, as dust controls and perimeter monitoring will be in place during the redevelopment phase to ensure that the dust levels do not exceed ambient air quality standards, actual exposures and health risks to off-site residents would be even lower and are expected to be well below the cancer risk management range of between 1×10^{-6} and $1\times10^{-4}$and noncancer target HI of 1.

Off-Site Recreational Users

The off-site child recreational user is the more sensitive receptor due to the higher intake relative to body weight than the off-site adult recreational user, thus health risks for the off-site recreational user will be discussed here in the context of the off-site child recreational user. Overall, off-site child recreational users will have lower exposure to COPCs in soils and therefore lower projected health risks than those projected for the future on-site construction worker. Specifically, health risks for the

off-site child recreational user would be at least 0.039 times that of the on-site construction worker. Further, as dust controls and perimeter monitoring will be in-place during the redevelopment phase to ensure that the dust levels do not exceed ambient air quality standards, actual exposures and health risks to off-site recreational users would be even lower and are expected to be well below the cancer risk management range of between 1×10^{-6} and $1\times10^{-4}$and noncancer target HI of 1.

6.0 SITE CLEANUP GOALS

6.1 Soil

6.1.1 Petroleum Hydrocarbons

As discussed in Section 5.1.1, RBSLs have been calculated for petroleum hydrocarbons as follows:

Petroleum Hydrocarbon Fraction	Commercial/Industrial RBSL (mg/kg)	Construction Worker RBSL (mg/kg)
TEPH (C_8-C_{40}) (rolling oil)	52,000	14,000
TPH (extractable – rolling oil)	52,000	14,000
TPH-gasoline (TPH-g)	27,000	7,300
TPH-diesel (TPH-d)	37,000	9,500
TVPH (C_6-C_{12})	27,000	7,300

These Site-specific RBSLs for petroleum hydrocarbons will be used to evaluate whether proposed corrective measures for the Site would result in post-remedial Site conditions that are protective and safe for planned commercial/industrial development of the Site. Further, these Site-specific RBSLs for petroleum hydrocarbons will be used to develop health-protective strategies for future Site construction workers during redevelopment activities.

A comparison of these screening values with Site data (Table 1) shows that the RBSLs for the commercial worker scenario are exceeded in two samples (6AA and 6CC) at one location under former process sumps that were closed in place (Figure 7). As the majority of the cumulative noncancer hazard for the future on-site commercial worker scenario (i.e. approximately 81%) is driven primarily by TPH, TPH concentrations in soils at depths less than 10 feet bgs were also compared to ½ the calculated TPH

RBSLs for the commercial worker scenario to account for cumulative health risks from TPHs in soils. There are seven samples (SB-17, 6A, 6C, 6BB, SB-14, 7A, and 7C) where TPHs were detected at concentrations greater than both ½ the RBSLs calculated for the commercial worker scenario and the RBSLs calculated for the construction worker scenario. These samples are primarily located in areas under former closed-in-place process sumps (samples 6A, 6C, 6BB, 7A, and 7C; Figure 7).

In order to ensure that post-remedial conditions are protective and safe for planned commercial/industrial development of the Site, one-half the respective RBSLs will be used as the target cleanup goal for the Site. Note, however, that determination of whether post-remedial conditions are protective and safe for planned commercial/industrial development of the Site will be based on a post-remedial health risk evaluation to assess whether health risks are below acceptable levels of concern.

There are five other samples (MW-8-P, MW-3-P, 7B, SB-6 and SB-12) where TPHs were detected in concentrations greater than the RBSLs calculated for the construction worker scenario. These samples are primarily located near the locations of former Site groundwater monitoring wells known to contain free-phase petroleum hydrocarbons, or in the vicinity of closed process sumps and USTs (See Figure 7). Construction worker health and safety issues will be addressed through the implementation of a Site-specific EHASP developed by the remediation contractor.

6.1.2 Volatile Organic Compounds

Regulatory screening levels are exceeded at only one location (SB-6C at 16 feet), with 1,2,4-trimethylbenzene concentration at 290 mg/kg, 1,3,5-trimethylbenzene at 96 mg/kg, and naphthalene at 69 mg/kg. The concentration of these chemicals at this one location will not require remediation, because the detections of elevated levels of VOCs is limited to one Site location, this detection occurs in deeper soils, and the City of Carson may require installation of methane mitigation measures such as a vapor barrier system as part of Site improvements.

6.1.3 Metals

Although Site arsenic concentrations are above regulatory screening levels, arsenic was not used at the facility, has never been considered a chemical of potential concern for the facility, and is not likely present in soils as a result of contamination from Site operations. Detected concentrations are also well within the range of typical background values for California soils (see Appendix D for detailed evaluation). Therefore, no cleanup goals are required for addressing arsenic in soils at the Site.

Additionally, all other metals concentrations are below commercial worker PRGs and CHHSLs, therefore no further remediation is proposed and no Site cleanup goals are required.

In addition, a Land Use Covenant (LUC) will be implemented to restrict the Site to commercial/industrial land uses, and will require the development and implementation of an EHASP if Site soils are disturbed in a manner that would generate significant dust over an extended period of time, such as future redevelopment of the Site. This Covenant will also require that the landfill and the northwestern portion of the Site, which are currently the subject of a deed notification, remain paved. The LUC will also include requirements for regular inspection and maintenance of these paved areas.

6.2 Soil Vapor

6.2.1 Volatile Organic Compounds

Since VOC concentrations detected in Site soil vapor are below CHHSLs no remediation is required and therefore no Site cleanup goals are necessary.

6.2.2 Methane

The elevated methane level detected in the vicinity of the free-phase rolling oil in the subsurface will be addressed in conjunction with petroleum hydrocarbon soil remediation proposed in Section 7.1. No additional remediation will be required and therefore Site cleanup goals are not required.

6.3 Groundwater

6.3.1 Petroleum Hydrocarbons

The remediation of soils identified as having TPH concentrations in excess of one-half the RBSLs, and the removal of soils saturated with rolling oil will remove the source of rolling oil impacts to Site groundwater, and no further remediation is proposed.

6.3.2 Volatile Organic Compounds

VOCs are present in groundwater underlying the Site, primarily in the location of monitoring Well MW-3 north of the former manufacturing facility. The VOC concentrations in groundwater in this area have steadily decreased over time, as evidenced by data generated during routine groundwater monitoring conducted at the Site since 1992, and current concentrations are near California and EPA MCLs. These data are summarized in Table 4 and depicted as a time series graph on Figure 10. As

reported in Section 3.0, Park performed sampling to delineate the extent and determine the source of the VOCs historically detected at the Site. Park concluded from the results of their investigation that the likely source of the detected chlorinated compounds was from an on-site source. However, they also stated that the detected chemical constituents were not currently used by Barmet, and there were no records of historic chlorinated hydrocarbon use at the Site. No likely source of the chlorinated hydrocarbons was identified at the time of the Park investigation, and these materials have reportedly not been used in recent Site operations.

Based on prior delineation efforts confirming that VOCs are present in Site groundwater at relatively low concentrations in a defined portion of the Site, that concentrations have steadily decreased under natural attenuation, and that groundwater monitoring has confirmed the presence of TCE breakdown products, the appropriate remedial strategy to address the VOCs is continued natural attenuation. Consequently, no remediation is proposed, and no cleanup goals are required.

6.3.3 Metals (Arsenic)

The arsenic concentration at I-HP-1, although above a drinking water regulatory screening level, does not warrant remediation. Arsenic was not used at the facility, has never been considered a chemical of potential concern for the facility, and is not likely present in groundwater as a result of contamination from Site operations. As it is restricted to a single sample, it may be a localized detection associated with naturally occurring arsenic in geologic formations underlying the area, and therefore no further remediation is proposed, and no cleanup goals are required.

7.0 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) has been developed for the Site and is included as Appendix E. The CSM includes text describing Site conditions along with figures and a cross section showing the known and suspected areas of contamination. Sampling locations, analytical results, and lithological information are also included in the CMP. Additionally, the CMP includes the proposed locations and extent of excavation required to remove soils in excess of Site-specific cleanup goals. The CSM was approved by the DTSC on September 24, 2007.

8.0 PROPOSED CORRECTIVE MEASURES

Iris Environmental has collected and collated historic Site data, as well as data collected in a July 2006 Phase II Site assessment, to evaluate the environmental conditions of the Site. The evaluation of this data has been used to develop a remedial strategy consistent with Site conditions and the proposed Site redevelopment as a commercial/industrial warehouse distribution facility. The implementation of the following corrective measures at the Site is warranted in order to achieve the selected cleanup goals to support redevelopment of the Site as a commercial/industrial warehouse facility.

8.1 Proposed Corrective Measures –Soils

The following corrective measures are proposed to address Site soils:

- The closed-in-place concrete sumps that contained rolling oil will be removed during Site remediation. Historical Site data indicate that soils beneath these sumps contain TVPH concentrations in excess of Site-specific RBSLs. In order to address potential "hot spots", soils in this area with concentrations greater than one-half the TVPH RBSL (27,000 mg/kg ÷ 2 = 13,500 mg/kg) will be excavated and managed for off-site disposal in accordance with a Site-specific Soil Management Plan (SMP) included as Appendix F of this document. Representative confirmation samples will be collected to confirm that soils with TVPH concentrations above 13,500 mg/kg have been removed in this area.

- Soils at sample locations outside the area of the closed-in-place sumps that have been identified as exceeding one-half the applicable TEPH RBSL, SB-14 and SB-17, will be excavated and removed. Confirmation samples will be collected to confirm that soils with TEPH concentrations above 26,000 mg/kg (52,000 mg/kg ÷ 2 = 26,000 mg/kg) have been removed.

- The cluster of four closed-in-place USTs will be removed during Site remediation, and impacted soils will be excavated, stockpiled, and managed for off-site disposal in accordance with the SMP. Representative confirmation samples will be collected and analyzed for TPH to confirm that residual levels are below one-half Site RBSLs.

- Three process sumps which were permitted as USTs at the time of facility closure will be removed during Site remediation in accordance with a removal permit issued by the LACDPW on April 26, 2007. Any impacted soils will be segregated and evaluated for off-site disposal using Site specific screening

levels, and confirmation sampling and analysis will be performed as required by conditions of the removal permit

- Accessible soils saturated with rolling oil that are encountered during the removal of subsurface concrete sumps and support structures during Site demolition or remediation activities will be excavated after the CMP has been approved.

- As the concrete building slab is removed during Site demolition, stained soils beneath the slab will be marked in the field, and these locations will be surveyed. Once the slab removal is completed and the CMP has been approved, the remediation program will be initiated. Soils with visible staining or showing impacts per field screening measurements will be excavated, stockpiled, and evaluated using Site-specific screening levels to assess suitability for re-use on Site. Analyses will include TPH and VOCs. Excavated soils will be managed in accordance with the Site-specific SMP.

- Concrete removed during Site demolition and remediation efforts will be inspected, and concrete with heavy visible staining will be segregated and crushed separately from visibly clean, un-impacted concrete. After crushing, the stained concrete will be sampled and analyzed for TPH, and evaluated using Site-specific soil TPH RBSLs for re-use on-site.

- A Soil Management Plan (SMP) has been developed for the Site which includes specific requirements for the management of Site soils identified for remedial excavation, or for evaluation during demolition/slab removal activities (Appendix F). The SMP will also provide a management structure for addressing the discovery of suspected soil contamination during on-going Site redevelopment activities. This plan will contain specific procedures to be followed by Site workers in the event that visual or olfactory evidence suggests that soils may be contaminated. The SMP will require the development of a Site-specific EHASP.

Implementation of the corrective measures described above will likely result in the excavation and off-site disposal of approximately 3300 cubic yards, or 195 truckloads, of soil as shown in Figures 11 and 12. The excavated soils will most likely be transported to either:

Chemical Waste Management
35251 Old Skyline Road
Kettleman Hills, California 93239
EPA Id. No. CAT000646117

or:

Thermal Remediation Solutions (TRS)
1211 West Gladestone Avenue
Azusa, California 91702

Site remediation will occur over an expected 90 day period, with trucking occurring as needed to manage excavated, contaminated soils. It is anticipated that no more than 25 trucks per day will be required at any one time.

8.2 Proposed Corrective Measure - LUC

A LUC will be implemented to restrict the Site to commercial/industrial land uses. The LUC will require the development and implementation of an EHASP if Site soils are disturbed in a manner that would generate significant dust over an extended period of time, such as future redevelopment of the Site. This LUC will also require that the landfill and the northwestern portion of the Site, which are currently the subject of a deed notification, remain paved, and will require the development and implementation of an EHASP if soils are disturbed in these areas. The Covenant will also include requirements for regular inspection and maintenance of these paved areas by both DTSC and by the LEA.

8.3 Proposed Corrective Measure – Groundwater Monitoring

There were 18 groundwater monitoring wells located either on-site or immediately adjacent to the Site that were included in the groundwater monitoring network for the Site. There were also two product recovery wells located near the process sump where rolling oil impacts have occurred. Specific wells were used to monitor the rolling-oil vicinity impacts, the VOC impacts, or potential former landfill impacts. During the most recent groundwater monitoring event, eight monitoring wells were sampled (MW-1, -3, -4, -5, -6, -7, -8, 10-P), six monitoring wells contained free-phase petroleum (MW-2-P, through MW-6-P, and MW-8-P), two were not sampled (MW-9-P, MW-11-P), and one could not be located (MW-7-P). MW-2 has not been included in the Site groundwater monitoring program but was used as part of the initial SWAT investigation groundwater evaluation.

Consistent with a June 29, 2007 DTSC authorization letter, fourteen of the eighteen Site groundwater monitoring wells and two product recovery wells were abandoned in order to accommodate Site redevelopment. Monitoring wells MW-1, MW-4, and MW-5 were retained, and MW-2 could not be located. Former groundwater monitoring well locations are shown on Figure 3.

There are an additional four groundwater monitoring wells located at the Site which were installed by Brown and Caldwell on behalf of Equillon Enterprises, dba Shell Oil Products US. These wells, installed to depths greater than 100 feet bgs, were installed as part of a regional

investigation associated with the Shell Carson Terminal, located at 20945 South Wilmington Avenue in Carson, approximately one mile from the Site. These wells are designated as CA-G-1, CA-S-1, CA-GSP-1 and CAR-GSP-6 (see Figure 3). These wells will be protected during Site redevelopment activities.

Iris Environmental proposes to reconfigure the groundwater monitoring network and monitoring program to reflect current and post-development conditions. A substantial reduction in both the network and monitoring program are warranted as explained below:

- Historical groundwater monitoring data has shown, based on the location of wells containing free-phase product, that the lateral extent of the rolling oil plume in the subsurface has not increased since groundwater monitoring began in 1992;

- Historical groundwater monitoring has shown no impacts to groundwater quality from the landfill which has been closed for 47 years; and

- Chlorinated VOC concentrations in localized Site groundwater have declined to concentrations near MCLs as shown by 15 years of monitoring data and groundwater monitoring data has confirmed the presence of TCE breakdown products which demonstrates that natural attenuation is occurring.

Once demolition and Site remediation activities have been completed, the need for installation of new monitoring wells will be evaluated and a new monitoring program will be proposed for DTSC's approval. This program may include the installation of a new upgradient groundwater monitoring well and annual monitoring of that well and the three remaining downgradient wells (MW-1, MW-4, and MW-5) for TPH and VOCs.

8.4 Proposed Corrective Measure – Landfill Operation and Maintenance Plan

An Operation and Maintenance Plan will be developed and will include the following elements:

- Groundwater monitoring program for the landfill.

- Maintenance and repair of asphalt paving over the landfill and the northwestern portion of the Site, currently the subject of the deed notification for the Site.

- Annual inspection of the landfill by the LEA.

- Annual inspection by DTSC to ensure compliance with conditions of the Site LUC.

9.0 ALTERNATIVE CORRECTIVE MEASURES ANALYSIS

A comparison of the selected Corrective Measures proposed for the Site and other alternative measures was conducted for the Site as described in the table below, and included three alternatives, (1) no further action, (2) implementation of land use covenant, and (3) implementation of proposed corrective measures.

9.1 No Further Action

No further action was evaluated as an alternative corrective measure for the Site, but was not considered a viable alternative based on the lack of protection to human health and the environment inherent in this alternative.

9.2 LUC

Although a LUC would provide improved protection to human health and the environment as compared to the no further action alternative, it does not provide any reduction in the volume of petroleum hydrocarbons remaining in Site soils, and as sole alternative, may not provide protection to human health and the environment. This alternative is therefore not considered to be a viable alternative.

9.3 Implementation of Proposed Corrective Measures

The proposed corrective measures, including the removal of soils with TPH concentrations greater than the Site-specific health-based concentrations, the implementation of a Soil Management Plan, the implementation of a land use covenant, and the implementation of an Operation and Maintenance Plan, including a continued groundwater monitoring program, are readily implementable, will result in a reduction in volume of petroleum hydrocarbons in Site soils, and will be protective of human health for the intended use of the Site. Therefore, the proposed corrective action measures are selected as the preferred alternative.

10.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

Table 5 presents a comparative analysis of the remedial alternatives considered, using the threshold and balancing criteria to select the proposed final remedy.

11.0 SUPPORTING PLANS

11.1 Soil Management Plan

A Soil Management Plan has been developed for Site remediation activities, and is included in Appendix F.

11.2 Dust Monitoring Plan

A Dust Management Plan has been developed for Site remediation activities, and is included in Appendix G.

11.3 Transportation Plan

A Transportation Plan has been developed for Site remediation activities, and is included in Appendix H.

11.4 Environmental Health and Safety Plan

An Environmental Health and Safety Plan has been developed by the remediation contractor for Site remediation activities, and is included in Appendix I.

12.0 PROJECT SCHEDULE

The following is a tentative project schedule:

Milestone	Target Date
Submission of Draft CMP to DTSC	October 11, 2007
Commencement of Public Notice Period	November 12, 2007
CMP Finalized; Remediation Implemented	December 18, 2007
Remediation Completed	March 15, 2008

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