City of Carson
Report to Mayor and City Council

November 19, 2013
Unfinished Business

SUBJECT: CONSIDER INFORMATION PRESENTED BY THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC HEALTH AND LOS ANGELES COUNTY FIRE DEPARTMENT RELATED TO THE ENVIRONMENTAL INVESTIGATION WITHIN THE CAROUSEL TRACT

Submitted by Jacquelyn Acosta
Acting City Manager

Approved by Jacquelyn Acosta
Acting City Manager

I. SUMMARY

This item is on the agenda at the request of Mayor Pro Tem Santarina to provide updates at all regularly scheduled City Council meetings related to the environmental investigation of the Carousel Tract. On November 6, 2013, the City Council also requested that a workshop be conducted on November 19, 2013 to provide representatives of the Los Angeles County Department of Public Health (LACDPH) an opportunity to discuss their current determination that there is not an immediate health threat from site conditions at the Carousel Tract (former Kast Tank Farm Property). The City Council also requested that the Los Angeles County Fire Department (LACFD) provide information on safety concerns related to methane gas. The Carousel Tract neighborhood was invited to attend this workshop (Exhibit No. 1).

II. RECOMMENDATION

REVIEW and CONSIDER information presented by representatives of the Los Angeles County Department of Public Health and Los Angeles County Fire Department.

III. ALTERNATIVES

TAKE another action as the City Council deems appropriate consistent with the requirements of law.

IV. BACKGROUND

On July 29, 2013, the City Council declared the existence of an emergency within the Carousel Tract and adopted City Council Resolution No. 13-081. An initial response was received from the Los Angeles County Fire Department on September 9, 2013 (Exhibit No. 2). In subsequent discussions, LACFD representatives indicated the Field Methane Screening Procedures approved by the Los Angeles Regional Water Control Board (Regional Board) in 2010

provided an appropriate response action if higher methane concentrations are detected (Exhibit No. 3). A respresentative of LACFD will participate in this workshop to provide information on their participation in the Carousel Tract environmental investigation.

During the October 15, 2013 City Council meeting, the resident of 24503 Panama Avenue raised concern with the levels of methane found during soil vapor testing and indoor air testing. Based on these concerns and others raised by Dr. Everett and Mr. Bowcock, the City Council expressed concern with potential safety issues resulting from high levels of methane in the Carousel neighborhood. Staff contacted the Regional Board to clarify the testing at 24503 Panama Avenue and obtained a Methane Source Characterization report prepared by URS (October 31, 2013) that showed a soil vapor sample collected from an interior sub-slab probe in a bedroom closet with a 14.72% methane concentration. Based on the analytical results, the report concluded that the source of methane in the sample is predominantly comprised of sewer gas (Exhibit No. 4).

On October 24, 2013, representatives of the LACDPH responded to the City Council Resolution No. 13-081 which declared an emergency within the Carousel Tract. This workshop provides an opportunity for representatives of the LACDPH to discuss their current determination that there is not an immediate health threat from site conditions at the Carousel Tract.

Community Outdoor Air Sampling and Analysis Report

On October 30, 2013, representatives of the Regional Board commented on the Community Outdoor Air Sampling and Analysis Report dated November 5, 2010, prepared by Geosyntec Consultants and URS Corporation on behalf of Shell Oil Products US (Shell) (Exhibit No. 5). The report concludes that the targeted chemicals of concern detected at the Carousel Tract are not significantly different from the concentrations detected east or west of the site. The Regional Board has directed Shell to collect additional air sampling from an isolated unpaved surface in the Carousel Tract. Shell is to submit a work plan and a revised Community Outdoor Air Sampling and Analysis Report by November 29, 2013.

Cleanup and Abatement Order

On March 11, 2011, the Regional Board issued Cleanup and Abatement Order (CAO) No. R4-2011-0046 directing Shell to investigate the Carousel Tract and provide remedial action to cleanup and abate the waste in the soil, soil vapor and groundwater associated with contamination from the former tank farm. On

October 31, 2013, the Regional Board issued a notice for the Proposed Draft Revised Cleanup and Abatement Order No. R4-2011-0046 (Draft Revised CAO) to include a description of the developer's role to decommission the reservoirs and conduct waste removal and grading activities. The Draft Revised CAO also explains the history of acquisitions and renaming of the original development company leading to the Dole Food Company, Inc. (Dole) being named as an additional responsible party (Exhibit No. 6). The notice was sent to Shell and Dole seeking comments and evidence to be submitted by 12:00 p.m. on December 6, 2013.

Revised Site-Specific Cleanup Goal Report

In accordance with the CAO, Shell submitted a Site-Specific Cleanup Goal Report dated February 22, 2013. On October 21, 2013, Shell submitted a Revised Site-Specific Cleanup Goal Report to the Regional Board to address certain deficiencies and comments addressed in the Regional Board's letter dated August 21, 2013. A copy of the report without technical exhibits was attached as Exhibit No. 2 to the November 6, 2012 City Council report. A full copy of the report may be viewed at http://geotracker.waterboards.ca.gov. Shell proposes to evaluate options that provide excavation in specified areas and does not include the removal of homes. The Regional Board, the Office of Environmental Health Hazard Assessment and the UCLA Expert Panel are currently evaluating the revised report. The Regional Board is anticipated to have a response by December 2013.

Additional Response to City Council Resolution

During the City Council meeting of October 15, 2013, Chris Aumais from the law firm of Girardi & Keese and Bob Bowcock from Integrated Resource Management, Inc. (IRM) discussed the current status of litigation and strategies for proceeding forward. The City Council directed staff to assist the City Attorney, Girardi & Keese and IRM in distributing letters to various state, county and local officals demanding consideration of an evacuation and to seek an opinion from the Attorney General's Office regarding the ability for the Los Angeles Regional Board to order an evacuation of the Carousel Tract. Mr. Bowcock advised that a meeting with the Attorney General is being scheduled to discuss the Carousel Tract and that letters will be prepared upon determining the appropriate strategy.

Timeline of Activities

A general timeline that tracks past and current activities of the Carousel Tract environmental investigation is included as Exhibit No. 7.

V. FISCAL IMPACT

None.

VI. EXHIBITS

1. Letter to Carousel Tract from Acting City Manager dated November 12, 2013. (pgs. 5-7)
2. Letter from Los Angeles County Fire Department dated September 9, 2013. (pg. 8)
3. Field Methane Screening Procedures dated November 5, 2010 (pgs. 9-14)
4. Methane Source Characterization report prepared by URS (October 31, 2013). (pgs. 15-25)
5. Letter from Regional Board to Shell dated October 30, 2013. (pgs. 26-31)
6. Proposed Draft Revised Cleanup and Abatement Order No. R4-2011-0046 dated October 31. 2013. (pgs. 32-53)
7. Carousel Tract Environmental Investigation Timeline. (pgs. 54-56)

Prepared by: Sheri Repp-Loadsman, Planning Officer

TO:Rev06-19-2013

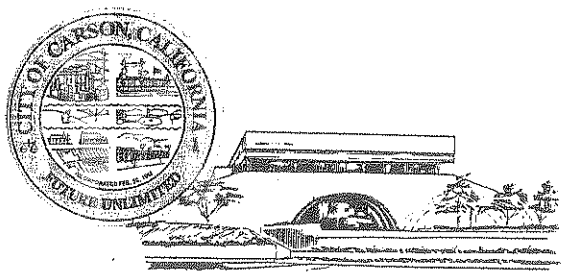
Reviewed by:

City Clerk	City Treasurer
Administrative Services	Public Works
Community Development	Community Services

Action taken by City Council

Date_____ Action_____

_____



CITY OF CARSON

November 13, 2013

Dear Carousel Tract Residents and Homeowners,

The Mayor and City Council cordially invite you to a City-sponsored workshop to discuss the role of the Los Angeles County Department of Public Health in the environmental investigation taking place in the Carousel neighborhood. The meeting will be held on **Tuesday, November 19, 2013, at 4:00 p.m.** at the Council Chambers, City Hall, 701 East Carson Street, Carson, CA, 90745.

The Los Angeles Regional Water Quality Control Board (Regional Board) oversees the investigation and cleanup activities in the Carousel Tract community to ensure that all environmental work is conducted in a thorough manner that is most protective of human health and the environment. The City Council conducted a workshop on July 18, 2013, to allow for a presentation by Mr. Sam Unger, Executive Director of the Los Angeles Regional Water Quality Control Board, explaining the process for developing a Remedial Action Plan that details how Shell Oil Products US (Shell) will go about cleaning residual oil and other wastes in soil and groundwater in the community that was caused by activities at the Former Kast Tank Farm property. On July 29, 2013, due to concerns raised at the workshop, the City Council declared the existence of an emergency within the Carousel Tract and adopted City Council Resolution No. 13-081. Letters were sent to the Governor, Attorney General, Los Angeles County Board of Supervisors and Mr. Sam Unger seeking immediate assistance to ensure that the residents of the Carousel Tract and surrounding community are protected.

In response to the City Council resolution, the Los Angeles County Department of Public Health reviewed information provided by the Regional Board and the environmental experts retained by Girardi & Keese. Their determination on this matter is included in the attached letter. This upcoming workshop will provide an opportunity for the Los Angeles County Department of Public Health to discuss their current determination that there is not an immediate health threat from site conditions at the Carousel Tract.

If you would like to submit questions prior to the City Council meeting, please contact Sheri Repp Loadsman, Planning Officer, at (310) 952-1773, or e-mail your questions to srepp@carson.ca.us.

Sincerely,

Jackie Acosta
Acting City Manager

Attachment

cc: Mayor and City Council
Mark Ridley-Thomas, Supervisor, Second District County of Los Angeles
L.A. County Department of Public Health
Sam Unger, LARWQCB
L.A. County Fire Department
Girardi & Keese

EXHIBIT NO 01

COUNTY OF LOS ANGELES
Public Health

JONATHAN E. FIELDING, M.D., M.P.H.
Director and Health Officer

CYNTHIA A. HARDING, M.P.H.
Chief Deputy Director

313 North Figueroa Street, Room 806
Los Angeles, California 90012
TEL (213) 240-8117 • FAX (213) 975-1273

www.publichealth.lacounty.gov

October 24, 2013

Jackie Acosta
Acting City Manager
701 E. Carson St.
P.O. Box 6234
Carson, CA 90749

ENVIRONMENTAL INVESTIGATION AT THE CAROUSEL TRACT IN THE CITY OF CARSON

This is in response to Resolution 13-081 adopted by your City Council on July 29, 2013. Los Angeles County Department of Public Health (DPH) shares your commitment to take necessary steps to ensure the protection of public health. We are working closely with the Los Angeles Regional Water Quality Control Board (RWQCB), the California Department of Toxic Substances Control (DTSC), and the California Office of Environmental Health Hazard Assessment (OEHHA) to assess conditions at the site and the associated health risks.

Although the levels of benzene, methane, and other petroleum hydrocarbons in site soils are elevated, the levels of these contaminants in indoor air and outdoor air do not differ significantly from levels in the overall Los Angeles air basin. Indoor air levels of petroleum hydrocarbons were also noted to be within published levels for indoor air quality nationwide. Contaminants in site soils do not present a hazard so long as subsurface soils remain undisturbed. Accordingly, none of the data collected to date, including the analysis provided by L. Everett & Associates, indicates an immediate health threat from site conditions at the Carousel Tract.

The State agencies are continuing the site investigation and are preparing a site-wide Human Health Risk Assessment (HHRA) to further evaluate potential health risks. Subsequently, a remedial plan will be adopted to ensure that contaminants in subsurface soils will not present a continuing or future risk to community residents. DPH will review the draft HHRA when it is released, and the subsequent remedial plans.

DPH will continue to work with the State agencies to provide public health guidance during the remediation process to ensure protection of the Carousel Tract community. If you have any questions or would like additional information, please contact me or Angelo J. Bellomo, Director of Environmental Health, at (626) 430-5374.

Sincerely,

Jonathan E. Fielding MD

Jonathan E. Fielding, M.D., M.P.H.
Director and Health Officer

JEF:cr
PH:1308:009

c: Board of Supervisors
Sachi A. Hamai, Executive Officer
Sharon Reichman
Greg Polk
Daryl L. Osby
Gail Farber

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294
(323) 881-6180

To: Sheri

DARYL L. OSBY
FIRE CHIEF
FORESTER & FIRE WARDEN

September 9, 2013

Ms. Jackie Acosta
Acting City Manager
P.O. Box 6234
Carson, CA 90749

Dear Ms. Acosta:

This communiqué is in response to your letter dated July 30, 2013, to the Board of Supervisors, requesting that the County of Los Angeles take appropriate steps to address and mitigate the environmental conditions within the Carousel Tract.

The Los Angeles Regional Water Board remains the lead agency overseeing assessment and mitigation of the Carousel Tract. The Fire Department will continue working with all involved agencies and use all necessary resources to ensure that we are informed of site conditions and can respond as needed.

If you have questions, please contact me at (323) 881-6180, or your staff may contact Deputy Chief John Todd, Prevention Services Bureau, at (323) 881-2461.

Very truly yours,

DARYL L. OSBY, FIRE CHIEF

DLO:mt

c: Sergio Vasquez
Monica Garcia
Randi Tahara
Joseph Charney
Susan Nissman
Rick Velasquez
Sussy Nemer
Sachi A. Hamai

CITY MANAGER
13 SEP 10 AM 10:13

SERVING THE UNINCORPORATED AREAS OF LOS ANGELES COUNTY AND THE CITIES OF:

AGOURA HILLS
ARTESIA
AZUSA
BALDWIN PARK
BELL
BELL GARDENS
BELLFLOWER
BRADBURY
CALABASAS
CARSON
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HIDDEN HILLS
HUNTINGTON PARK
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LA MIRADA
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PARAMOUNT
PICO RIVERA
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ROSEMEAD
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SANTA CLARITA
SIGNAL HILL
SOUTH E
SOUTH
TEMPLE
WALNUT
WEST HOLLYWO
WESTLAKE VILL
WHITTIER

EXHIBIT NO 02

8

URS

Technical Memorandum

Date: November 5, 2010

To: Teklewold Ayalew, Project Manager, Los Angeles Regional Water Quality Control Board

Reference: Former Shell Kast Property
Carson, California

Subject: Field Methane Screening Procedures

URS Corporation (URS) has prepared this Technical Memorandum (Tech Memo) in response to a request from the Regional Water Quality Control Board – Los Angeles Region (RWQCB) to describe field methane screening procedures being implemented while conducting the current Phase II residential investigation and other tasks at the Former Kast Property located in Carson, California (the Site). This Tech Memo summarizes methane monitoring activities, focusing on those performed during residential investigations, as presented in the project-specific Site Health and Safety Plan (HSP; URS, 2010a) and various Work Plans that govern the Site work.

Background

Methane is a colorless, odorless gas that is widely found in natural settings. Methane is a single carbon compound with a formula of CH_4 and a molecular weight of 16; it is therefore lighter than air. Methane is non-toxic and therefore not a long-term human health risk; however, it is combustible and can pose a risk of explosion when present in the atmosphere or indoor air at concentrations between 5% (termed the lower explosive limit, LEL) to 15% (termed the upper explosive limit, UEL). Soil acts as a natural flame arrestor, so methane within soil vapor in a soil matrix cannot explode (Eklund, 2010). Therefore, the LEL is not applicable to soil vapor.

Methane may occur due to thermogenic processes, commonly associated with oil fields, and can occur at high pressure at depth. This is the source of the natural gas that is used as an energy source and supplied to residences by local utilities (the Southern California Gas Company is the natural gas provider in the Carson area). Sulfur-containing mercaptan compounds are added to natural gas that is supplied by utilities so that leaks of that natural gas are apparent based on odor. This causes the characteristically unpleasant odor of supplied natural gas. Methane can also occur due to anaerobic microbial decomposition of organic materials such as vegetation, manure, material in sewer lines, municipal solid waste, and from decomposition or fermentation of petroleum hydrocarbons (Sepich, 2006, Eklund, 2010).

Thermogenic and microbial (also referred to as biogenic) methane differ in chemical properties. Microbial gas primarily consists of methane and carbon dioxide that are produced in roughly equal proportions, with only trace levels of other compounds. Thermogenic gas may contain methane and higher-order, longer-chain hydrocarbon compounds such as ethane, propane, butane, pentane, and possibly traces of hydrogen sulfide, and other compounds (Sepich, 2006). Thermogenic and biogenic methane may be distinguished based on their isotopic composition, and inferences may be drawn regarding the source of biogenic methane based on carbon isotope ratios along with presence of other compounds.

Methane was detected in Site soil vapor probes installed in city streets during the Phase I Site Investigation (URS, 2009a), during the Plume Delineation Investigation (URS, 2010b), and locally in sub-slab vapor probes installed beneath concrete slabs (patios, walkways, and floor slabs) during the Phase II residential property investigations (various Interim and Follow-up Residential Reports). Methane has been detected at depths of 5 feet or greater beneath the public streets at concentrations that exceed 5%. Maximum detected methane concentrations in soil vapor at depth in soil vapor probes installed in public streets were 59.7% at 5 feet bgs and 62.6% in 15 to 20-foot probes (URS, 2010b).

EXHIBIT NO 03

9

Indoor Air Methane Field Screening

Indoor air field screening for methane is conducted within homes as one of the first steps in the investigation of individual residential properties. The screening is conducted using procedures described in the RWQCB-approved *Work Plan for Phase II Site Characterization* prepared by URS Corporation dated September 21, 2009 (URS, 2009b).

The methane field screening assessment consists of monitoring accessible areas within the homes for methane using direct-reading field screening instruments to assess the potential for methane concentrations to be present near levels of safety concern (i.e., near the LEL of approximately 5% methane in air or 50,000 parts per million by volume (ppmv)). Two direct-reading instruments are used to conduct the methane screening: a Landtec GEM-2000 (Landtec) and a Photovac MicroFID flame ionization detector (FID). The Landtec measures percents of methane, carbon dioxide and oxygen, while the FID measures total volatile hydrocarbon concentrations, including methane, at very low concentrations. The FID is more sensitive than the Landtec and is used to measure methane concentrations less than 0.3% (3,000 ppmv).

The screening is conducted in enclosed areas where elevated gas concentrations are more likely to be found, particularly where piping or wiring comes into the house or the garage (for example under sinks, in closets, and at light switches and receptacles), and at noticeable cracks in the floor. Screening is also conducted in the vicinity of natural gas-fueled appliances, such as water heaters, furnaces, clothes dryers, ranges and cook tops, and gas fireplaces.

URS Response actions are based on the maximum methane concentrations detected during monitoring, and are as follows:

- If the maximum measured methane concentration in indoor air exceeds approximately 10% of the LEL (i.e., ~5,000 ppmv), the Los Angeles County Fire Department (LACFD) is notified immediately and the occupants of the house are asked to leave the dwelling until cleared for re-entry by the LACFD representative.
- If the maximum measured methane concentration is between approximately 2% and 10% of the LEL (i.e., ~1,000 to 5,000 ppmv), the indoor screening is repeated during the same visit, and a follow-up indoor air screening event should be scheduled (at the homeowner's/tenant's convenience) within the next two weeks. (See the 4th bullet for an exception to this response action.)
- If the maximum methane concentration is less than approximately 2% of the LEL (i.e., <~1,000 ppmv), no further methane monitoring will be conducted at this time. However, additional characterization activities will be conducted at the site as described in the Phase II Work Plan (URS, 2009b) and Phase II Work Plan Addendum (URS, 2010c), and further monitoring and evaluation of methane will be performed as that work proceeds.
- The methane field screening may identify potential leaks resulting from household utilities/ appliances. If a household utility leak of methane is found (based on methane readings associated with a gas appliance with or without presence of noticeable odors from natural gas odorants), the homeowner/tenant is notified and URS recommends that they contact the LACFD or the Southern California Gas Company (gas service provider). If the homeowner/tenant is represented by legal counsel in ongoing litigation against Shell, the onsite plaintiffs' counsel representative (usually Engineering and Environmental Contracting (EEC)) is notified, who is then responsible for notifying the homeowner/tenant. URS provides the recommendation that the homeowner/ tenant

contact the LACFD and/or Southern California Gas Company (gas service provider) to address this issue. If follow-up screening is recommended at a residence where the homeowner/tenant is represented by legal counsel, scheduling of the follow-up methane screening will be arranged through their legal counsel.

Methane Screening During Sub-Slab Probe Installation

Sub-slab soil vapor probes are installed and sampled in accordance with the *Interim Final – Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (DTSC, 2005a), *Assessment of Vapor Intrusion in Homes Near the Raymark Superfund Site Using Basement and Sub-Slab Air Samples* (USEPA, 2006), and *Advisory – Active Soil Gas Investigations* published by the RWQCB and Department of Toxic Substances Control (LARWQCB/DTSC, 2003).

When access is allowed by the owner, one sub-slab probe is installed through the floor slab within the house and one probe is installed through a patio, walkway or other concrete hardscape area in the front and back of the house (a probe may be installed in the garage as an alternative to placing one in the front of the house). The probes are installed by first drilling an approximately 1.5-inch diameter hole approximately 3 inches into the concrete using a roto-hammer drill. After clearing the hole of cuttings, a 3/8-inch diameter drill is used to drill through the remainder of the concrete, and the drill is hand pushed a few inches into the soil below the concrete. The probes consist of a 3/8-inch outside diameter stainless-steel tube with a compression fitting/valve at the top. The probes are open at the bottom and extend approximately 1.5 to 2 inches below the base of the concrete slab into the underlying sub-slab base material. Quick-set expanding cement is used to fill the annular space surrounding the tube.

During drilling to penetrate the concrete slab using the ⅜-inch diameter drill, the field crew continuously monitors for methane and organic vapors using a Landtec or 4-gas meter, FID, and photo-ionization detector (PID) just above the mouth of the hole and in the worker's breathing zone. If any of the following conditions of concern are encountered, the steps identified below are implemented immediately.

Condition of Concern:	Location:
Greater >10% LEL or 5,000 ppmv using a FID	Just above mouth of hole
Greater than 10 ppmv on the PID or 3 ppmv H_2S using the Landtec or 4-gas meter	Just above mouth of hole or in breathing zone
Greater than 2% LEL or 1,000 ppmv using a FID	In breathing zone

- If any of the above conditions are detected the hole is plugged with a tapered stopper fitted with an attached pressure gauge capable of measuring 0 to 3 inches of water column pressure (inWC), and the area is ventilated using a ducted fan with outlet outside the house.
- Pressure is monitored using the gauge attached to the tapered stopper:
  - If pressure is below 2.8 inWC (DTSC, 2005b) and none of the conditions of concern listed above persist for longer than 5 seconds, monitoring is continued using the Landtec or 4-gas meter and PID; cuttings generated from drilling the ⅜-inch diameter hole are vacuumed out using a portable vacuum, and installation of the sub-slab probe proceeds.

- If pressure is below 2.8 inWC, but any of the conditions of concern listed above are noted to persist for longer than 5 seconds, the stopper is kept in the hole, the area is ventilated, and the field crew continues to monitor while consulting with the Certified Industrial Hygienist (CIH) and Project Manager who will inform the owner or owner's representative and ask the residents to leave during probe installation.
- If pressure is above 2.8 inWC, the temporary plug will be removed and the hole filled with quick setting, expanding cement without installation of a sub-slab probe. The field crew will consult with the CIH and Project Manager who will inform the owner or owner's representative. Note that to date, this condition has not been encountered.

Methane Screening during Soil Vapor Sampling

Prior to and during purging and sampling of sub-slab vapor probes, the breathing zone in the vicinity of the probe is monitored for methane and total volatile organics using a FID and PID, respectively. Once the quick-set concrete is chipped out to expose the probe, monitoring is conducted immediately adjacent to the probe. Prior to purging before sampling, vapor pressure is monitored in the sub-slab probes to check for pressure. The probes are then purged, and purged air is collected into a Tedlar bag and field screened for VOCs using an FID and a PID; oxygen, carbon dioxide, hydrogen sulfide and LEL using a MultiRAE Plus, and helium using a helium detector. If the LEL or FID readings are elevated (i.e., indicating methane concentrations greater than approximately 1%), URS typically will collect a vapor sample specifically for methane speciation by Isotech Laboratories, Incorporated in Champagne, Illinois (Isotech). This analysis is used to evaluate the source of the methane (i.e. whether the origin is thermogenic or microbial) so that appropriate actions can be taken. In addition t

Methane concentrations in residential sub-slab soil vapor samples collected just below the base of concrete slabs are, with few exceptions, very low and rarely exceed 0.01% (i.e., 100 ppmv); the majority of residential sub-slab vapor samples did not have detectable methane concentrations. Methane has been detected at concentrations greater than 1% at only four residential sub-slab probe locations to date. Methane samples from these locations were speciated by Isotech. Samples from three of these locations were found to be thermogenic; indicating the presence of natural gas from utility line leaks. The sample collected from the fourth location is not of thermogenic origin, and carbon isotope analysis of this sample indicates that the methane is from a modern source of carbon such as a sewer leak rather than microbial decomposition of an ancient carbon source, such as petroleum hydrocarbons.

Methane was also detected at depth in Site soil vapor probes installed in city streets during the Phase I Site Investigation (URS, 2009a), during the Plume Delineation Investigation (URS, 2010b). Locally, methane has been detected at depths of 5 feet or greater at concentrations that exceed 5%, with a maximum detected methane concentration in soil vapor of 59.7% at 5 feet below ground surface (bgs) and 62.6% in 15 to 20-foot probes. An isotopic analysis of the methane from six sample locations in the streets was conducted. The results of this methane are consistent with fermentation of petroleum hydrocarbons, such as would occur due to anaerobic biological degradation of crude oil released into the subsurface (URS, 2010b).

Methane Screening During Borehole Installation

Residential boreholes are typically advanced using a hand auger, although an air knife rig or drilling rig may be used for other Site activities. During advancement of boreholes, direct-reading instruments, such as a PID, FID, and Landtec are used to monitor vapor concentrations in the worker breathing zone and just above the borehole for the occurrence of total organic vapors and methane for health and safety

purposes. The readings are conducted with a minimum frequency of every 5 to 10 minutes, in accordance with the Health and Safety Plan (HASP) (URS, 2010a). A final borehole vapor measurement is collected from just inside the mouth of the borehole and downhole after the borehole has reached total depth before backfilling. Headspace and downhole readings are recorded on the boring log for each boring.

The tables below summarize the action levels and health and safety response actions for organic vapors, including methane, during drilling operations.

Site Personnel Action Levels for Methane Based on FID Measurements

FID Reading**	Location	Duration	Response Action	Personal Protective Equipment
<500 ppm	Point of operations/ release source point	-----	Continuous monitoring	Minimum site PPE ensemble
>500 ppm	Point of operations/ release source point	> 1 minute	Monitor OBZ	Minimum site PPE ensemble
>500 ppm to 1,000 ppm	OBZ	> 1 minute	Continuous monitoring	Minimum site PPE ensemble
>1,000 ppm	OBZ	> 1 minute	Stop work; ventilate area	Minimum site PPE ensemble; contact CIH and Project Manager if elevated levels above 1,000 ppm persist

* FID is calibrated to methane or a correction factor is applied to FID readings per manufacturer's instructions
** Above background readings
OBZ Operator's Breathing Zone

Action Levels for Landtec or 4-gas Meter Measurements

LEL Reading	Location	Response Action
<10% LEL	Point of operations/ general work area	Continue site operations and continue periodic monitoring.
>10 - 20 % LEL	Point of operations/ general work area	Continue site operations and perform continuous monitoring.
>20% LEL	Point of operations/ general work area	Confirm initial reading. Shutdown operations, evaluate source, ventilate work area, contact the CIH and Project Manager.

References

DTSC, 2005a. Interim Final – Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air. Cal/EPA Department of Toxic Substances Control. 2005.

DTSC, 2005b. Advisory on Methane Assessment and Common Remedies at School Sites. School Property Evaluation and Cleanup Division, Cal/EPA Department of Toxic Substances Control, June 16, 2005.

Eklund, B., 2010. Proposed Regulatory Framework for Evaluating the Methane Hazard Due to Vapor Intrusion. Paper presented at Air and Waste Management Association Conference on Vapor Intrusion, September 29, 2010.

LARWQCB and DTSC, 2003. Advisory – Active Soil Gas Investigations. Los Angeles Regional Water Quality Control Board and Department of Toxic Substances Control. January 28, 2003.

Sepich, J., 2006. Hazard Assessment for Methane CVP (Concentration, Volume Pressure). Presented at the Sixth Annual Battelle Conference, Monterey, California, May 2006.

URS, 2009a. Final Phase I Site Investigation Report, Former Kast Property, Carson, California. Prepared for Shell Oil Products US, August 20, 2009.

URS, 2009b. Work Plan for Phase II Site Characterization, Former Kast Property, Carson, California. Prepared for Shell Oil Products US, September 21, 2009

URS, 2010a. Site Health and Safety Plan, Former Kast Property, Carson, California. Prepared for Shell Oil Products US, July 14, 2010.

URS, 2010b. Plume Delineation Report, Former Kast Property, Carson, California. Prepared for Shell Oil Products US, September 29, 2010.

USEPA, 2006. Assessment of Vapor Intrusion in Homes Near the Raymark Superfund Site Using Basement and Sub-Slab Air Samples. March 2006.

URS

Memorandum

Date: 31 October 2013

To: Douglas Weimer, Equilon Enterprises, LLC

From: Henry Kerfoot, URS Australia Pty Ltd

Subject: Methane Source Characterization
24503 Panama Avenue, Carson, California

1. Introduction

This Technical Memorandum has been prepared by URS for Equilon Enterprises, LLC, doing business as Shell Oil Products US (SOPUS), and presents an evaluation of soil vapor analytical results to characterize the source of methane detected in soil vapor at 24503 Panama Avenue in Carson, California. Soil vapor samples were collected as part of the site characterization being conducted at the former Kast Property (Site). Soil vapor sample P24503SVHM was collected on 10 October 2013. It was collected from an interior sub-slab probe in a bedroom closet in the home at 24503 Panama Avenue. The sample was analysed to evaluate the source of methane detected in the subsurface at this location. A description of the sub-slab soil vapor sampling methodology is provided in the Final Interim Report for the property.

In summary, the sample was analysed to determine its chemical composition and the isotopic composition of the methane. The data were then compared to known compositions of methane from various sources. Based on the analytical results, the source of the methane in sample P24503SVHM is predominantly decomposition of modern organic matter (*e.g.*, sewer gas).

2. Background and Approach

Typical sources of methane

Methane typically originates from decomposition of organic material, which can occur in a number of environments. These environments include relatively deep geologic formations typically associated with petroleum and natural gas as well as sewers, landfills, swamps, and others. This evaluation was conducted to differentiate thermogenic methane from methane generated through fermentation processes and for methane generated through fermentation, to differentiate the age of the source, i.e., whether the source of the methane is ancient or modern carbon. These are explained in more detail below.

- Methane from thermogenic processes. Methane can be formed deep underground from ancient organic matter at high pressures and temperatures, through a thermogenic process. Natural gas distributed by the local gas company for home energy use (e.g., heating and cooking) is derived from a thermogenic source. Consequently, if methane detected at the site is found to be thermogenic, it is likely a result of a leaking natural gas supply line.

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- Methane from fermentation. Methane is also generated as a result of fermentation of a carbon source at normal pressures and temperatures. This is often the case at municipal landfills, but biogenic methane is also found in natural conditions (e.g., swamp gas). The former Kast site has the potential for fermentation methane generated from petroleum hydrocarbon releases. The age of the methane source for these scenarios can also be evaluated. Methane that is generated by fermentation of a petroleum hydrocarbon source is characterized as having an ancient source, whereas methane generated from fermentation of recent organic matter (as in swamp gas or sewer gas) is characterized as being from a modern source.

Distinguishing Methane Sources – Isotopic Composition

Methane from different potential sources can differ in its isotopic composition. Generation of methane by thermogenic and fermentation processes results in methane with different relative amounts of the heavier isotopes of hydrogen and carbon, ^{2}H and ^{13}C. The microorganisms that produce methane in the fermentation process prefer lighter H and C isotopes, so that fermentation methane is depleted in the heavy isotopes when compared to methane formed through a thermogenic process.

Fermentation and thermogenic methane can be differentiated by plotting ^{2}H vs ^{13}C. Ideally, each methane type would fall within a characteristic zone, which can be used in evaluation of the source of the methane. However, the isotopic composition of the materials the methane is formed from, or processes in the soil such as oxidation of the methane, can alter the isotopic composition of the methane. These factors can result in variations in expected ^{2}H and ^{13}C content of the methane. Because of such variations, thermogenic and fermentation methane each are characterized by fairly broad but distinguishable ranges of values.

^{2}H and ^{13}C data are expressed in per mil (‰) as 'delta' (δ) values[1] relative to a standard: PeeDee Belemnite (PDB), a limestone, for ^{13}C and Venice Standard Mean Ocean Water (VSMOW) for ^{2}H. Because the ^{2}H and ^{13}C isotopic contents of methane are usually less than the standards, methane δ–^{2}H and δ–^{13}C values are usually less than zero.

The radioactive isotope of carbon, ^{14}C, can be used to evaluate the age of the carbon source for methane. Because natural gas methane is formed from geologically old carbon, it has negligible ^{14}C, while methane formed from modern carbon has over 100 per cent modern carbon (pmc) (100 pmc corresponds to the ^{14}C content that would be present in modern vegetation without above-ground nuclear testing in the 1960s.) Methane formed from modern carbon includes sewer /landfill gas as well as decaying buried vegetation. By contrast, while petroleum hydrocarbons such as crude oil can also decay through fermentation, the produced methane would have negligible ^{14}C content. So, ^{14}C data can help distinguish between methane formed from decomposition of modern organic matter and methane formed from decomposition of petroleum hydrocarbons. Mixtures of methane formed from petroleum hydrocarbons and modern carbon (*e.g.*, buried vegetation) can show intermediate values (Lundegard, et al, 2000).

However, ^{14}C data are not useful in differentiating between natural gas methane and fermentation methane from petroleum hydrocarbons. Other data must be used to help make this distinction.

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[1] δ–^{13}C (‰) = $1000 \times \{ (^{13}C / ^{12}C)_{sample} / (^{13}C / ^{12}C)_{standard} - 1 \}$
δ–^{2}H (‰) = $1000 \times \{ (^{2}H / ^{1}H)_{sample} / (^{2}H / ^{1}H)_{standard} - 1 \}$

Distinguishing Methane Sources - Other Parameters

Other parameters can also be used to differentiate methane based on how it was formed. Thermogenic production of methane in natural gas also produces other hydrocarbons (C_2 – C_{6+}) at concentrations that generally decline as the carbon number of the hydrocarbon increases (i.e., fewer long chained hydrocarbons than short chained hydrocarbons). Sewer gas and swamp gas are typically free of those longer chained compounds. Landfill gas composition is variable but usually has higher concentrations of C_{6+} hydrocarbons. Fermentation methane formed from decomposition of past releases of petroleum hydrocarbons could show concentrations of C_2 – C_6 hydrocarbons that increase with carbon number.

Fermentation methane is produced along with a nearly equal amount of carbon dioxide, while thermogenic formation of methane does not produce carbon dioxide. Because of that, fermentation gas typically has concentration ratios of carbon dioxide/methane of approximately 1 to 1.5, whereas the ratio is typically close to zero for thermogenic gas. However, the expected ratio can be altered by contact with water. Because carbon dioxide is significantly more water-soluble than methane, it can be preferentially dissolved, resulting in a lower than expected ratio. Conversely, weathering of methane through biodegradation (oxidation) can cause the ratio to be increased. Nevertheless, the ratio of carbon dioxide to methane can be a strong indicator of methane source.

Evaluation Approach

The above facts can be used cumulatively in assessment of the source of methane. Table 1 presents a listing of different isotopic and other characteristics associated with several different potential methane sources. Comparison of sample data to the parameters listed in Table 1 can be used to evaluate the source of methane.

Based on Table 1, ^{2}H and ^{13}C levels consistent with fermentation methane and ^{14}C of 100 pmc or more would be expected for methane from sewer gas, landfill gas, or decomposing buried vegetation, whereas decomposing petroleum would differ in having no ^{14}C. Decomposition of residual petroleum would also show C_2 – C_6 hydrocarbons with higher C_6 concentrations than the lighter hydrocarbons, while decomposing buried vegetation and sewer gas would not be expected to show those compounds and landfill gas would be expected to have higher C_{6+} concentrations. A ratio of concentrations of carbon dioxide to methane of 1 to 1.5 would be expected for landfill gas, sewer gas, decomposition of buried vegetation, and decomposition of petroleum products, whereas natural gas would have a ratio close to zero. A natural gas methane source would show ^{2}H and ^{13}C levels consistent with thermogenic methane and a ^{14}C level of approximately zero, as well as C_2 – C_6 concentrations that decrease with carbon number.

Of the parameters listed in Table 1, the isotope data are the least subject to influences from degradation and other subsurface processes. Of these isotopic parameters, the ^{14}C data are the least affected by these processes.

3. Methodology

Field Sample Collection and Analysis

The soil-vapor samples were collected in a Cali-Bond 5-layer bag and shipped to Isotech Laboratories in Champaign, Illinois for isotope and chemical analysis. Additional discussion of sample collection is contained in the Final Interim Report prepared for this property.

The samples were analysed for the following parameters:

- $\delta-^{13}C$ of methane
- $\delta-^{13}C$ of carbon dioxide
- $\delta-^{2}H$ of methane
- ^{14}C of methane
- Fixed gases (nitrogen, oxygen, argon, carbon dioxide, carbon monoxide, hydrogen, and helium)
- Light hydrocarbons (methane[CH_4], ethane [C_2H_6], propane [C_3H_8], *iso*-butane [C_4H_{10}], n-butane [C_4H_{10}], *iso*-pentane [C_5H_{12}], *n*-pentane [C_5H_{12}], and hexane plus [C_{6+}])

Chemical analysis was performed by gas chromatography using ASTM Method 1715 and isotope determinations were performed using the methods described in Coleman *et al.* (1995).

4. Results

Analytical results are summarized in Table 2. The laboratory reports from Isotech Laboratories for the vapor samples are presented in Attachment A.

The methane concentration of the P24503SVHM sample was 14.72% (v/v), the CO_2 concentration was 14.67%, and the C_2 (ethane) concentration was 0.0003%, with a methane $\delta-^{13}C$ value of -35.59 ‰ *vs* PDB, and a methane $\delta-^{2}H$ level of -368.8‰ *vs* VSMOW. The C_2 concentration was 0.0003% while the C_3 concentration was 0.0007%, and the C_4 concentration reported was 0.0001%, and C_5 and C_{6+} hydrocarbons were not detected.

5. Discussion

Based on the analytical results, the source of methane in the P24503SVHM sample is decaying modern organic matter with a potentially small contribution from ancient carbon. This conclusion is supported by the following data:

$\delta-^{13}C$ and $\delta-^{2}H$ Data: Figure 1 is a plot of the $\delta-^{2}H$ and $\delta-^{13}C$ results for the P24503SVHM sample with areas generally associated with methane produced by different processes depicted. The $\delta-^{2}H$ data fall below the range associated with fermentation methane and the $\delta-^{13}C$ data are slightly shifted towards less negative (heavier) values from the expected range for fermentation methane. The carbon dioxide $\delta-^{13}C$ value of -15.33‰ is consistent with some oxidation of the methane, and that could explain an increase (less negative) in the methane $\delta-^{13}C$ value. However, we do not have an explanation for the low $\delta-^{2}H$ value. However, these data are consistent with decomposition of organic matter such as vegetation, sewage, or petroleum hydrocarbons as the source of the methane, and not with natural gas as the source. These data do not tell whether the decomposing organic matter is vegetation, sewage or petroleum hydrocarbons and methane ^{14}C data can be used to address that question.

^{14}C Data: The ^{14}C level for sample P24503SVHM was 96.8 percent modern carbon. These results are consistent with a non-hydrocarbon source for the methane, such as sewage or vegetation (Table 1).

^{14}C and $\delta-^{2}H$ Data: Because ^{14}C can be used to differentiate between methane formed from old carbon and modern carbon and $\delta-^{2}H$ data can be used to differentiate between fermentation methane and thermogenic methane, a plot of the two can help in evaluation of the methane source. Figure 2 shows such a plot with the sample data plotted on it. For comparison purposes, Figure 2 also shows the approximate expected ranges of ^{14}C and $\delta-^{2}H$ results for thermogenic methane (i.e., natural gas), methane from decomposition of petroleum hydrocarbons, and methane from decomposition of modern organic matter. The data for the P24503SVHM sample falls in the area expected for decomposition of modern organic matter with a slight shift to the left.

$\delta-^{13}C$ and Methane/Ethane Ratio: Figure 3 shows the ethane/ methane ratio for the P24503SVHM sample, along with the anticipated ranges of the two parameters for methane from various sources based on Pizzino *et al.* [2007].The P24503SVHM sample results plot just above the expected range for fermentation methane in Figure 3.

CO_2 / CH_4 Ratio: The carbon dioxide/methane ratio of sample P24503SVHM was 1.00. This value is consistent with fermentation methane and well above the value expected for natural gas (thermogenic) methane.

C_2 – C_{6+} Hydrocarbon Concentrations: Concentrations of low molecular weight (C_2 – C_{6+}) hydrocarbons relative to the methane concentration can help in evaluation of potential methane sources. Ethane (C_2H_6) is commonly present in natural gas and can be used in assessing natural (thermogenic) gas as a methane source. Ethane was 0.0003% in sample P24503SVHM. Figure 4 shows the ratios of C_2, C_3, C_4, C_5 and C_{6+} hydrocarbons to methane in Southern California natural gas in red, with the sample data plotted next to them. Figure 4 shows that the sample P24503SVHM C_2 – C_{6+} concentration data differ from the natural gas sample. This is not consistent with a natural gas methane source and this result agrees with the $\delta-^{2}H$ data (Figure 1) and the ^{14}C and $\delta-^{2}H$ data (Figure 2). C_{6+} hydrocarbons were not detected by Isotech in sample P24503SVHM. This suggests a non-petroleum source of the methane.

Summary

Based on several lines of evidence, the data from sample P24503SVHM collected at this property are most consistent with decomposing modern organic matter, such as sewage or buried vegetation, as the predominant source of methane in the sample. This conclusion is based on the following analytical results and trends:

- Stable isotope ($\delta-^{13}C$ and $\delta-^{2}H$) data for the methane in the sample were consistent with fermentation methane from near-surface decomposition of organic matter (*e.g.*, sewer gas or decomposing vegetation) and not thermogenic methane (*e.g.*natural gas);
- The ^{14}C and ^{2}H data for the sample showed modern organic matter to be the carbon source for fermentation methane with a small contribution from ancient carbon, consistent with methane from fermentation of modern organic matter;
- The methane $\delta-^{13}C$ and the sample methane/ethane ratio are consistent with methane formed through fermentation and not thermogenic methane;
- The CO_2 /CH_4 ratio of 1.00 is consistent with methane from decomposition of organic matter and not consistent with a natural-gas methane source;

- Concentrations of ethane (C_2H_6) and other light hydrocarbons (C_2-C_5) were not consistent with a natural gas methane source and were consistent with decomposition of organic matter as the methane source; and
- C_{6+} hydrocarbons were not detected by Isotech in the sample, suggesting the absence of petroleum hydrocarbons.

6. References

Coleman, D.D.; Liu, C.; Hackley, K.C.; Pelphrey, S.R., 1995. "Isotopic identification of landfill methane", Environmental Geosciences, 95 – 103

Pizzino, L; D. Cinti; N. Voltattorni; A. Sciarra; F. Quattrochi, 2007. "Chemical and isotopic characterization of gas and water in a scientific borehole at Alban Hills: New insights about fluid recirculation and natural gas hazard", 29th Course of the International School of Geophysics, Erice, Italy, 25 – 30 September 2007.

Yours sincerely
URS Australia Pty Ltd

Henry Kerfoot
Principal

Attachments

Figures

Tables

Attachment A Laboratory Reports

URS

Figures

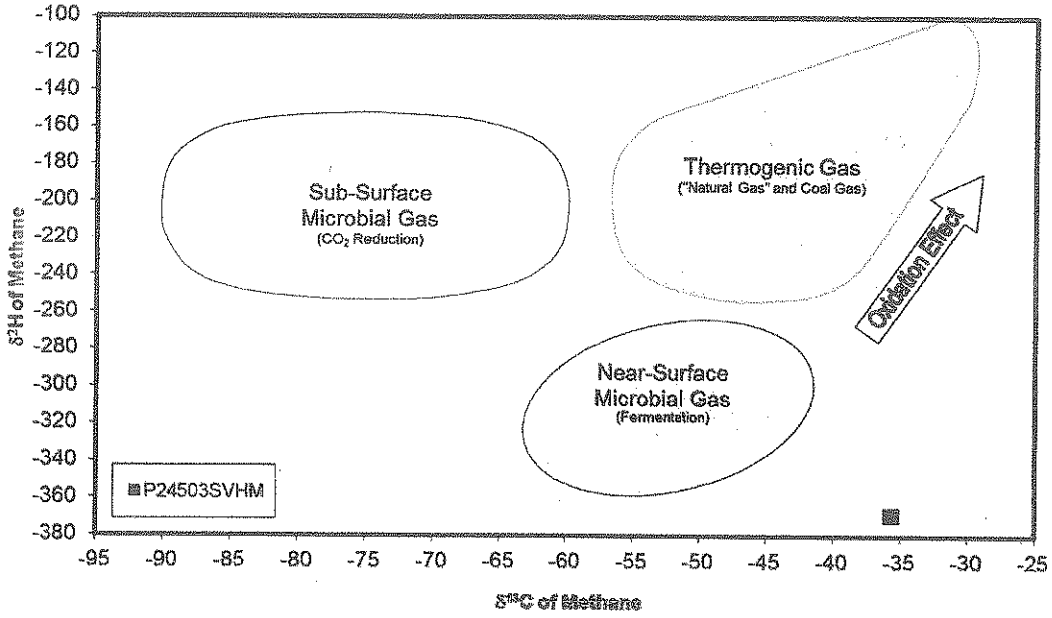

Figure 1 δ-^{2}H and δ -^{13}C Data for Sample P24503SVHM with Approximate Ranges of Methane from Various Potential Sources (after Coleman, *et al.*, 1995

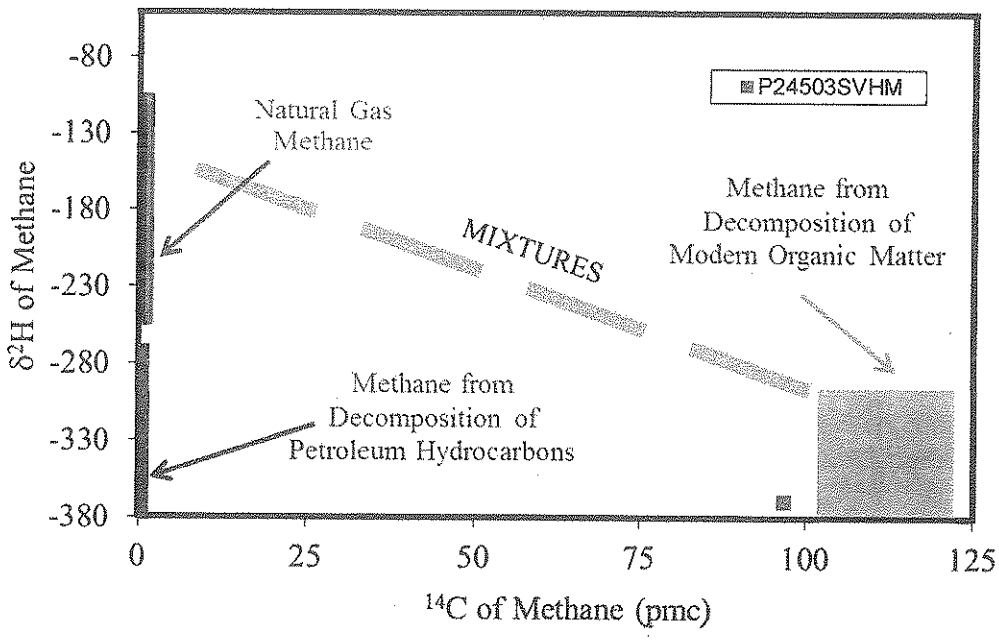

Figure 2 Methane ^{14}C and ^{2}H Data for Sample P24503SVHM, Along with Expected Ranges for Decomposing Modern Organic Matter, Decomposing Petroleum and Natural Gas

Figures

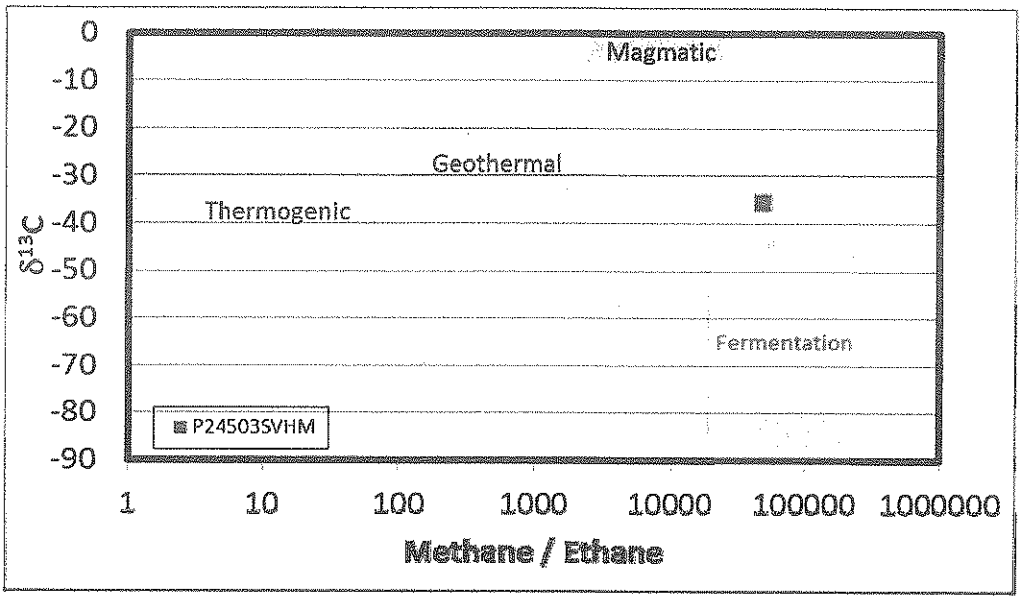

Figure 3 Methane ^{13}C Data and Methane/Ethane Ratio for Sample P24503SVHM and Characteristic Ranges for Different Types of Methane

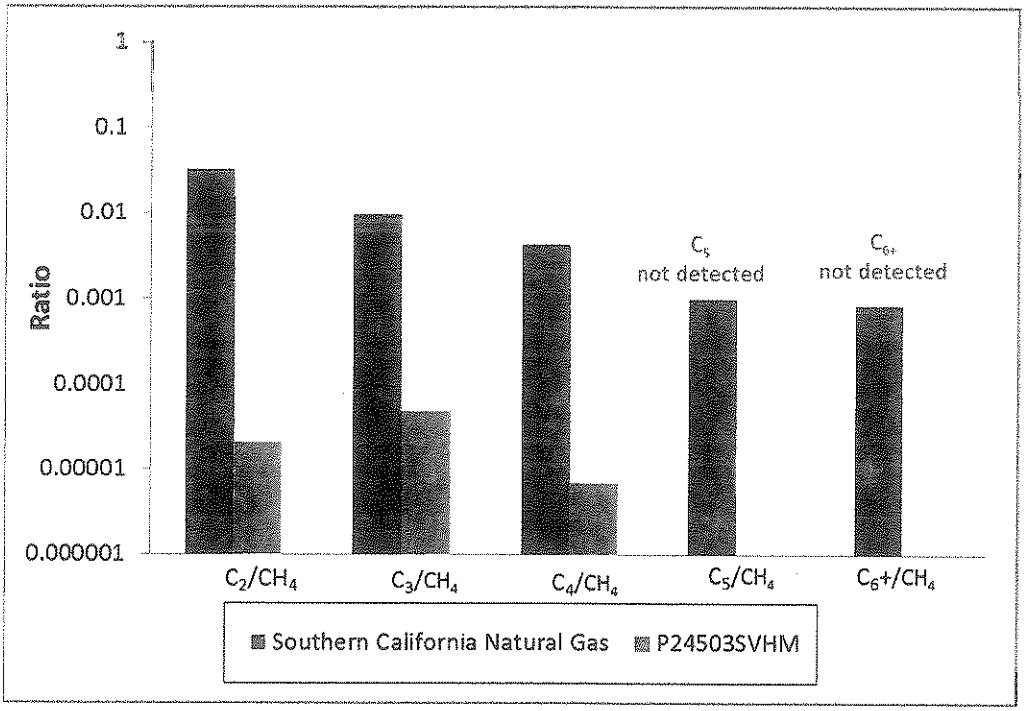

Figure 4 Ratios of $C_2 - C_{6+}$ Hydrocarbons to Methane (x 100) in Sample P24503SVHM and a Southern California Natural Gas Sample

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Tables

Table 1 Characteristics of Methane Isotopes and Other Parameters Used to Evaluate Potential Methane Sources

Source	^{13}C and ^{2}H (‰)[a]	^{14}C (pmc)	CO_2 / CH_4 ratio	Methane/Ethane Ratio
Landfill gas	F	≥100	1.0 – 1.5	>30000
Sewer gas	F	≥100	1.0 – 1.5	>30000
Buried vegetation	F	≥100	1.0 – 1.5	>30000
Decomposing petroleum	F	~0	1.0 – 1.5	>30000
Natural gas	T	~0	~0	5 - 100

NOTES
[a] F: Fermentation range; T: Thermogenic range

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Tables

Table 2 Summary of Results of Laboratory Analyses

Sample Name	CO_2 %	CH_4 %	C_2H_6 %	C_2H_4 %	C_3H_8 %	C_3H_6 %	iC_4H_{10} %	nC_4H_{10} %	iC_5H_{12} %	nC_5H_{12} %	C_6+ %	$\delta^{13}CO_2$ ‰	$\delta^{13}CH_4$ ‰	δ^2HC_1 ‰	$^{14}CH_4$ percent modern C
P24503SVHM	14.67	14.72	0.0003	nd	0.0007	nd	nd	0.0001	nd	nd	nd	-15.33	-35.59	-368.8	96.8

nd = not detected

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Attachment A Laboratory Reports

ISOTECH LABORATORIES INC.

ANALYSIS REPORT

Lab #:	387275	Job #:	23175	IS-63634
Sample Name/Number:	P24503SVHM			
Company:	URS Corporation			
Date Sampled:	10/10/2013			
Container:	Cali-5-Bond Bag			
Field/Site Name:	Former Kast Property			
Location:	Carson, CA			
Formation/Depth:				
Sampling Point:				
Date Received:	10/11/2013	Date Reported:	10/23/2013	

Component	Chemical mol. %	$\delta^{13}C$ ‰	δD ‰	^{14}C conc. pMC	Tritium TU
Carbon Monoxide	nd				
Helium	nd				
Hydrogen	nd				
Argon	0.794				
Oxygen	1.48				
Nitrogen	68.33				
Carbon Dioxide	14.67	-15.33			
Methane	14.72	-35.59	-368.8	96.8 ± 0.2	
Ethane	0.0003				
Ethylene	nd				
Propane	0.0007				
Propylene	nd				
Iso-butane	nd				
N-butane	0.0001				
Iso-pentane	nd				
N-pentane	nd				
Hexanes +	nd				

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 149
Specific gravity, calculated: 0.993

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

October 30, 2013

Douglas J. Weimer
Shell Oil Products US
Environmental Services Company
20945 S. Wilmington Avenue
Carson, CA 90810

SUBJECT: **REVIEW OF COMMUNITY OUTDOOR AIR SAMPLING AND ANALYSIS REPORT PURSUANT TO CALIFORNIA WATER CODE SECTION 13304**

SITE: **FORMER KAST PROPERTY TANK FARM LOCATED SOUTHEAST OF THE INTERSECTION OF MARBELLA AVENUE AND EAST 244TH STREET, CARSON, CALIFORNIA (SCP NO. 1230, SITE ID NO. 2040330, CAO NO. R4-2011-0046)**

Dear Mr. Weimer:

The California Regional Water Quality Control Board (Regional Board), Los Angeles Region, is the public agency with primary responsibility for the protection of groundwater and surface water quality for all beneficial uses within major portions of Los Angeles and Ventura Counties, including the above referenced site (Site).

The Regional Board has received and reviewed the documents titled, *Community Outdoor Air Sampling and Analysis Report* (Report) for Former Kast Property Tank Farm, dated November 5, 2010, prepared by Geosyntec Consultants (Geosyntec) and URS Corporation (URS) on behalf of Equilon Enterprises LLC, doing business as Shell Oil Products US (Shell), for the Site. The site characterization activities were performed across the Site including the collection of soil, soil vapor and groundwater samples from city streets and individual residential properties. On September 24, 2009, the Regional Board approved Phase II Site Characterization work plan which focused on collection of samples from individual residential properties, including (i) the screening of indoor air data for methane and (ii) the sampling of soil and sub-slab soil gas. The work plan also described interim response actions to be implemented if elevated concentrations of chemicals of potential concern (COCs) were detected in sub-slab soil gas at the residential properties. The interim response actions included collection of interior sub-slab soil gas or indoor air samples to evaluate the potential for vapor intrusion. In addition to outdoor air sampling conducted contemporaneously with indoor air sampling, a community outdoor air sampling program was conducted to evaluate concentrations of chemicals detected in outdoor air within and surrounding the community and to assess whether outdoor air chemical concentrations within the Site boundary were statistically similar to upwind and downwind locations.

SUMMARY OF TECHNICAL REPORT

Outdoor air samples were collected at four locations west of the Site boundary, four locations east of the Site boundary, and four locations on the Site. The sampling events were conducted concurrently with the USEPA national ambient air toxics 6-day sampling schedule. A statistical analysis was conducted on the

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target analytes of benzene, toluene, ethylbenzene, xylene (BTEX), naphthalene, tetrachloroethylene (PCE), trichloroethylene (TCE) in outdoor air data to evaluate if concentrations east or west of the Site were statistically different from concentrations within the Site boundary. The findings are as follows:

1. Concentrations of BTEX, naphthalene, PCE and TCE detected in western, eastern and on site areas are similar;

2. TCE concentration distribution found in the western (i.e., upwind) appears to be higher than the distribution for the Site; and

3. Concentration of target analytes detected on Site are statistically similar to air concentrations east and west of the Site.

Based on the statistical tests, the report concludes that the target analyte outdoor air concentrations detected on the Site are not significantly different from the concentrations detected east or west of the Site.

However, the memorandum dated September 10, 2013 (copy attached) issued by the Office of Environmental Health Hazard Assessment (OEHHA) disagrees with the report's conclusion. The Regional Board staff concurs with the findings as summarized below:

(i) on-site and down-wind volatile organic compounds (VOC) concentrations exceeded the up-wind concentrations 68% - 71% of the time, and

(ii) The average on-site and down-wind concentrations of benzene, ethylbenzene, xylenes, and PCE, exceeded the corresponding up-wind concentrations by 0.004 to 0.202 $\mu g/m^3$.

Therefore, the findings warrant further evaluation and Regional Board staff recommends collecting subsurface VOC emissions from an isolated unpaved surface area with an emission isolation flux chamber. Therefore, you are required to:

1. The Regional Board staff concurs with the findings of the statistical tests. You are required to address OEHHA's comments and submit a revised Community Outdoor Air Sampling and Analysis Report due **November 29, 2013**; and

2. Develop a work plan for an additional soil-vapor survey method using Flux Chamber Measurements. The work plan is due on **November 29, 2013**.

The above requirement constitutes an amendment to Cleanup and Abatement Order No. R4-2011-0046 originally dated March 11, 2011. All other aspects of Order No. R4-2011-0046 and amendments thereto, remain in full force and effect. Pursuant to section 13350 of the California Water Code, failure to comply with the requirements of Order No. R4-2011-0046 by the specified due date, including dates in this amendment, may result in civil liability administratively imposed by the Regional Board in an amount up to five thousand dollars ($5000) for each day of failure to comply.

Please note that, the Regional Board requires you to include a perjury statement in all reports submitted under the 13304 order. The perjury statement shall be signed by a senior authorized Shell Oil Products US representative (and not by a consultant). The statement shall be in the following format:

" I, [NAME], do hereby declare, under penalty of perjury under the laws of State of California, that I am [JOB TITLE] for Shell Oil Company that I am authorized to attest to the veracity of the information

contained in [NAME AND DATE OF REPORT] is true and correct, and that this declaration was executed at [PLACE], [STATE], on DATE]."

If you have any questions, please contact the project manager, Dr. Teklewold Ayalew at (213) 576-6739 (tayalew@waterboards.ca.gov), or Ms. Thizar Tintut-Williams, Site Cleanup Unit III Chief, at (213) 576-6723 (twilliams@waterboards.ca.gov).

Sincerely,

Samuel Unger

Samuel Unger, PE
Executive Officer

Attachment: OEHHA Memorandum dated September 10, 2013

cc: Janice Hahn, Honorable Congresswoman, US House of Representatives, California's 44th District
Mark Ridley-Thomas, Supervisor, Second District County of Los Angeles
Isadore Hall, III, Assembly member, 64th Assembly District
Jim Dear, Mayor of Carson
Sheri Repp-Loadsman, City of Carson
Ky Truong, City of Carson
Jennifer Fordyce, Office of Chief Counsel, State Water Resources Control Board
Robert Romero, Department of Toxic Substances Control
Jackie Acosta, Carson Acting City Manager
James Carlisle, Office of Environmental Health Hazard Assessment
Bill Jones, Los Angeles County Fire Department
Barry Nugent, Los Angeles County Fire Department
Shahin Nourishad, Los Angeles County Fire Department
Miguel Garcia, Los Angeles County Fire Department
Alfonso Medina, Los Angeles County Department of Health
Cole Landowski, Los Angeles County Department of Health
Angelo Bellomo, Los Angeles County Department of Health
Karen A. Lyons, Shell Oil Products US
Alison Abbott Chassin, Shell Oil Products US
Roy Patterson, URS Corporation
Chris Osterberg, URS Corporation
Michelle Vega, Edelman
Robert Ettinger, Geosyntec
Mark Grivetti, Geosyntec
Thomas V. Girardi, Girardi and Keese Lawyers
Robert W. Bowcock, Integrated Resources Management, LLC

Office of Environmental Health Hazard Assessment

George V. Alexeeff, Ph.D., D.A.B.T., Director
Headquarters • 1001 I Street • Sacramento, California 95814
Mailing Address: P.O. Box 4010 • Sacramento, California 95812-4010
Oakland Office • Mailing Address: 1515 Clay Street, 16th Floor • Oakland, California 94612

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

MEMORANDUM

TO: Teklewold Ayalew, Ph.D., P.G.
Engineering Geologist
Regional Water Quality Control Board
320 West 4th Street, Suite 200
Los Angeles, CA 90013

FROM: James C. Carlisle, D.V.M., M.S.
Staff Toxicologist
Air, Community, and Environmental Research Branch

DATE: September 10, 2013

SUBJECT: REVIEW OF COMMUNITY OUTDOOR AIR SAMPLING AND ANALYSIS REPORT FORMER KAST PROPERTY CARSON, CALIFORNIA
SWRCB#R4-09-17 OEHHA #880212-01

Document reviewed

- Community Outdoor Air Sampling And Analysis Report Former Kast Property, Carson, California, dated November 5, 2010

Data analysis

- The authors used ANOVA, t-test, and Mann-Whitney test to determine whether the null hypothesis (i.e. that there is no difference between the VOC concentrations detected at monitoring stations east of the site, west of the site or on-site) could be rejected at the 0.05 significance level. Values of p greater than 0.05 indicate that the null hypothesis cannot be rejected. The report goes on to state "...and therefore the populations are similar." Failure to reject the null hypotheses does not prove that the populations are similar, only that they have not been proven to be different. This type of analysis controls the Type 1 error rate (the probability of incorrectly concluding that there is a difference) but does not control the Type 2 error rate (the probability of incorrectly concluding that there is not a difference). Controlling the Type 1 error rate is appropriate when publishing a new scientific finding, since it is important to be quite sure that there is truly an effect of the variable under study before publishing it as a new finding.
- This is not appropriate in protecting public health, where the failure to detect a true effect is at least as significant a concern as falsely concluding that there is an effect. Therefore, OEHHA used a different approach.
- Also, the analyses apparently used a 2-tailed test. A 1-tailed test should be used since we are only concerned with increase in concentration, not a decrease.

- OEHHA analyzed the sampling data by date and area, focusing on benzene, ethylbenzene, naphthalene, o-Xylene, p/m-Xylene, tetrachloroethene, and toluene The goal of the analysis was to determine whether the VOC concentrations in the easterly samples or the on-site samples exceeded those on the west side of the site.
- OEHHA calculated mean concentrations for benzene, ethylbenzene, naphthalene, o-xylene, p/m-xylene, tetrachloroethene, and toluene at stations OA1-4, OA 5-8, and OA 6-14 for each of the four sampling periods.
- From each of the group means for OA 5-8 and OA 6-14, OEHHA subtracted the corresponding mean from group OA1-4 then tabulated the signs of the differences.
- OEHHA found that 38 out of 56 of the signs were positive, meaning that 68% of the time, the off-site or easterly mean exceeded the westerly mean. The (binomial) probability of 38 or more positive signs out of 56 comparisons by chance alone is 0.0052. If the July 31 sample date (when the wind direction was less consistent) is omitted, the off-site or easterly mean exceeded the westerly mean 71% of the time (P=0.004).
- The concentration differences are shown in the table below:

	Mean increment above upwind concentration ($\mu g/m^3$)	
	downwind	on-site
Benzene	0.053	0.029
Ethylbenzene	0.004	0.062
Naphthalene	-0.093	-0.082
o-Xylene	0.016	0.069
p/m-Xylene	0.073	0.202
Tetrachloroethene	0.012	0.073
Toluene	-0.137	3.868

- This table suggests that there may be an on-site source of benzene, ethylbenzene, xylenes, and tetrachloroethene, but not of naphthalene, with inconsistent results for toluene. The slight decrease in concentration of naphthalene could represent dispersion of an upwind source.

Conclusions

- Geosyntec concludes that "Based on the statistical evaluation, all tests (ANOVA, t-test and Mann-Whitney) show that the air concentrations within the Site boundary are not significantly different from the concentrations in the eastern boundary or the western boundary.
- While OEHHA agrees that the hypothesis tests employed do not show a statistically significant difference between the on-site concentrations and those east or west of the site, we do not believe that ≥95% certainty that there is a difference is the appropriate standard.
- OEHHA found that:
    - The on-site and down-wind VOC concentrations exceeded the up-wind concentrations 68% - 71% of the time, and
    - The average on-site and down-wind concentrations of benzene, ethylbenzene, xylenes, and tetrachloroethene, exceeded the corresponding up-wind concentrations by 0.004 to 0.202 $\mu g/m^3$.

Peer reviewed by

Hristo Hristov, MD, PhD

October 31, 2013

NOTICE OF OPPORTUNITY TO SUBMIT COMMENTS ON PROPOSED DRAFT ORDER IN THE MATTER OF CLEANUP AND ABATEMENT ORDER NO. R4-2011-0046 FORMER KAST PROPERTY TANK FARM (SCP NO. 1230, SITE ID NO. 2040330, FILE NO. 11-043);

Douglas J. Weimer
Shell Oil Products US
20945 S. Wilmington Ave.
Carson, CA 90810

Certified Mail
Return Receipt Requested
Claim No. 7012 3460 0001 6365 9018

David A. DeLorenzo
President and Chief Executive Officer
Dole Food Company, Inc.
P.O. Box 5132
Westlake Village, CA 91359-5132

Certified Mail
Return Receipt Requested
Claim No. 7012 3460 0001 6365 9025

Dear Mr. Weimer and Mr. DeLorenzo:

On March 11, 2011, the Regional Water Quality Control Board, Los Angeles Region (Regional Board) issued Cleanup and Abatement Order No. R4-2011-0046 (Order) requiring Shell Oil Company (Shell) to investigate and cleanup the Former Kast Tank Farm Property (Site) located southeast of the intersection of Marbella Avenue and East 244th Street, Carson, California. On July 28, 2010 in comments on the draft Order, the law firm of Morgan Lewis on behalf of Shell, requested that the Regional Board name Dole Food Company, Inc. (Dole) and Barclay Hollander Corporation (BHC) as responsible parties in the Order. At the time of issuance of the Order, the Regional Board declined to add Dole and BHC to the draft Order and issued the Order to Shell only. Subsequently, on April 22, 2011 the Regional Board issued an order pursuant to California Water Code section 13267 (13267 Order) requiring Dole to provide technical information about the Site. On September 15, 2011, the law firm of Gibson Dunn on behalf of Dole and BHC provided a detailed letter and attachments in response to the 13267 Order concluding that neither Dole nor BHC should be named as a responsible party in the Order.

The attached Proposed Draft Revised Cleanup and Abatement Order No. R4-2011-0046 (Proposed Draft Revised Order) contains revisions to the Order proposing to add Barclay Hollander Corporation, a wholly-owned subsidiary of Dole, as a responsible party to the Order based on information provided by Shell and Dole.

As of the date of this Proposed Draft Revised Order, Shell has completed many of the tasks required by the Order since its issuance on March 10, 2011. This Proposed Draft Revised Order does not include revisions deleting tasks already completed by Shell. The Regional Board's files include records documenting the activities associated with the Order.

EXHIBIT NO 06

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You are hereby provided the opportunity to submit comments and evidence on the Proposed Draft Revised Order to the Regional Board. Proposed revisions, other than minor editorial changes, are marked in underline/strikeout. The Regional Board is accepting comments and evidence related only to the proposed revisions to the Order, and, in particular, comments regarding the naming of additional responsible parties. Comments and evidence must be submitted by **12:00 pm (noon) on December 6, 2013**. Comments and evidence that are outside the scope of this notice or submitted after the deadline will not be considered or included in the record for this matter.

Please send comments and evidence related to the proposed revisions to the Order to: Teklewold Ayalew, Project Manager, by e-mail at tayalew@waterboards.ca.gov (If less than 15 megabytes in size or less), (213)576-6717 (fax), or by mail to Los Angeles Regional Water Quality Control Board, 320 W 4th Street, Suite 200, Los Angeles, California 90013. Please also indicate in the subject line "Comment Letter – Former Kast Property Tank Farm – Revised CAO."

The Executive Officer will consider the comments and evidence and determine whether to issue a Revised Order. You will be provided notice of the Executive Officer's decision.

Sincerely,

Paula Rasmussen
Assistant Executive Officer

Enclosure: Draft Revised Cleanup and Abatement Order No. R4-2011-0046

cc: Mailing List

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STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

CLEANUP AND ABATEMENT ORDER NO. R4-2011-0046
REQUIRING

SHELL OIL COMPANY
AND
BARCLAY HOLLANDER CORPORATION

TO CLEANUP AND ABATE WASTE
DISCHARGED TO WATERS OF THE STATE
PURSUANT TO CALIFORNIA WATER CODE SECTION 13304[1]
AT THE FORMER KAST PROPERTY TANK FARM,
CARSON, CALIFORNIA
OCTOBER 31, 2013
(FILE NO. 97-043)55=

Cleanup and Abatement Order No. R4-2011-0046 (Order) requires Shell Oil Company and Barclay Hollander Corporation, (hereinafter "Discharger") to assess, monitor, and cleanup and abate the effects of petroleum hydrocarbon compounds and other contaminants of concern discharged to soil and groundwater at the former Kast Property Tank Farm facility (hereinafter, the "Site") located southeast of the intersection of Marbella Avenue and East 244th Street, in Carson, California.

On March 11, 2011, the Regional Water Quality Control Board, Los Angeles Region (Regional Board) issued the Order requiring Shell Oil Company (Shell) to investigate and cleanup the Site. On July 28, 2010 in comments on the draft Order, the law firm of Morgan Lewis on behalf of Shell, requested that the Regional Board name Dole Food Company, Inc. (Dole) and its wholly-owned subsidiary Barclay Hollander Corporation (BHC) as responsible parties in the Order ("Morgan Lewis 2010 Letter"). At that time, the Regional Board declined to add Dole and BHC to the draft Order and issued the Order to Shell only. Subsequently, on April 22, 2011, the Regional Board issued an order pursuant to California Water Code section 13267 (13267 Order) requiring Dole to provide technical information about the Site. On September 15, 2011, the law firm of Gibson Dunn on behalf of Dole provided a detailed letter and attachments in response to the 13267 Order disputing that it and/or BHC should be named as responsible parties in the Order ("Gibson Dunn 2011 Letter"). For the reasons discussed below, the Order is hereby revised to add BHC, a wholly-owned subsidiary of Dole, as a responsible party in the Order based on information provided by Shell and Dole.

As of the date of this revised Order, Shell has completed many of the tasks required by the Order since its issuance on March 11, 2011. This Order is not being revised to delete tasks already

[1] Water Code section 13304 (a) states, in part: Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts.

completed by Shell but is being revised to add BHC as a responsible party and to make appropriate findings based on the information provided by Dole and Shell since issuance of the Order and to clarify that the Discharger is responsible for preparing draft environmental documentation. The Regional Board's files include records documenting the activities associated with this Order.

The Regional Board herein finds:

BACKGROUND

1. **Discharger:** ~~Shell Oil Company~~ Shell, previously Shell Company of California, is a Responsible Party due to its: (a) ownership of the former Kast Property Tank Farm, and (b) former operation of a petroleum hydrocarbon tank farm at the Site resulting in discharges of waste at the Site. Barclay Hollander Corporation (BHC) is a responsible party due to its (a) past ownership and/or as a successor to past owners of the Site, and (b) development of the property resulting in discharges of waste at the Site. Shell and BHC are hereafter referred to collectively as "Discharger". The actions of the Discharger have caused or permitted waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and have created a condition of pollution or nuisance.

2. **Location:** The Site is located southeast of the intersection of Marbella Avenue and East 244th Street in the City of Carson, California. The Site occupies approximately 44 acres of land and is bordered by the Los Angeles County Metropolitan Transportation Authority railroad right-of-way on the north, Lomita Boulevard on the south, Marbella Avenue on the west, and Panama Avenue on the east (Figure 1). The Site was previously owned by ~~the Discharger~~ Shell, who operated three oil storage reservoirs from the 1920s to the mid-1960s. The central and southern reservoirs each had a capacity of 750,000 barrels of oil and the northernmost reservoir had a capacity of 2,000,000 barrels of oil. The Site presently consists of the Carousel residential neighborhood and city streets.

3. **Groundwater Basin:** The Site is located on the Torrance Plain of the West Coast Groundwater Basin (Basin), in the southwestern part of the Coastal Plain of Los Angeles County. Beneath the Site, the first encountered groundwater is estimated at 54 feet below ground surface (bgs). The Basin is underlain by a series of aquifers, the deeper of which are used for drinking water production. These aquifers are with increasing depth, the Gage aquifer, Lynwood aquifer, and Silverado aquifer. The nearest municipal water supply well is located approximately 400 feet west of the Site. As set forth in the *Water Quality Control Plan for the Los Angeles Region* (the Basin Plan), adopted on June 13, 1994, the Regional Board has designated beneficial uses for groundwater (among which include municipal and domestic drinking water supplies) in the West Coast Basin and has established water quality objectives for the protection of these beneficial uses.

4. As detailed in the findings below, the Discharger's activities at the Site have caused or permitted the discharge of waste resulting in soil, soil vapor, and groundwater pollution, including discharges of waste to the waters of the state, and nuisance.

SITE HISTORY

5. **Property Ownership and Leasehold Information:** Based on information submitted to the Regional Board by the Discharger, the Site has the following property ownership and leasehold history:

   a. According to the Sanborn maps dated 1924 and 1925, the Site was owned and operated by "Shell Company of California (Kast Property)" beginning in approximately 1924 until the mid-1960s. The Site was used as a tank farm, which included three crude oil storage reservoirs, Reservoir Nos. 5, 6 and 7. Reservoir No.5, the center reservoir, had a capacity of 750,000 barrels of oil and was under lease to General Petroleum Corporation. Reservoir No. 6, the southernmost reservoir, had a capacity of 750,000 barrels of oil; and Reservoir No. 7, the northernmost reservoir, had a capacity of 2,000,000 barrels of oil. According to Sanborn map notations, the reservoirs had concrete-lined earth-slopes with frame roofs on wood posts, surrounded by earth levees averaging 20 feet in height with 7 foot wide walks on top. One oil pump house was depicted on the 1925 Sanborn map within the southern portion of the Site. Since construction, the Site was used as a crude oil storage reservoir.

   ~~b. In 1966, SOC sold the Site to Lomita Development Company, an affiliate of Richard Barclay and Barclay-Hollander Curci (BHC), with the reservoirs in place. The Pacific Soils Engineering Reports dated January 7, 1966; March 11, 1966; July 31, 1967; and June 11, 1968 documented that: 1) Lomita Development Company emptied and demolished the reservoirs, and graded the Site prior to it developing the Site as residential housing; 2) part of the concrete floor of the central reservoir was removed by Lomita Development Company from the Site; and 3) where the reservoir bottoms were left in place, Lomita Development Company made 8-inch wide circular trenches in concentric circles approximately 15 feet apart to permit water drainage to allow the percolation of water and sludge present in the reservoirs into the subsurface.~~

   ~~c. In phases between 1967 and 1969, Lomita Development Company developed the Site into one- and two-story single family residential parcels and sold the developed lots to individual homeowners.~~

   d. In 1965, Richard Barclay and Shell executed a Purchase Option Agreement, wherein Richard Barclay (or his nominee) agreed to purchase the Property, subject to a favorable engineering report and other restrictions. Richard Barclay was a principal in an entity known as Barclay-Hollander-Curci. In 1966, Lomita Development Company (Lomita), a California partnership, was designated as Mr. Barclay's "nominee" and purchased the Property from Shell with the reservoirs in place. Lomita explicitly agreed in writing to complete decommissioning of the reservoirs. In phases between 1967 and 1969, Lomita developed the Site into one- and two-story single family residential parcels and sold the developed lots to individual homeowners. In 1969, a group of companies, including Lomita, merged into a company known as Barclay Hollander Curci, Inc., which was then acquired by Castle & Cooke, Inc. and it became a wholly-owned subsidiary of Castle & Cooke, Inc. Barclay Hollander Curci, Inc. continued to sell parcels to residential

owners. Barclay Hollander Curci, Inc. was later renamed Barclay Hollander Corporation, Inc. (BHC). Castle & Cooke, Inc. merged with Flexi-Van Corporation in 1985, which in 1991, changed its name to Dole Food Company, Inc. BHC agreed to be responsible for the liabilities of Lomita and the other entities. BHC is currently a wholly-owned subsidiary of Dole, but has no assets.[2]

6. **Site Description and Activities:** According to information in the Regional Board's file on this Site, oil related operations at the Site began in 1923 and ended by the early 1960s. The Site was previously owned and operated by Shell Company of California, which was subsequently renamed Shell Oil Company, as a crude oil storage facility. The facility included equipment that pumped the oil to the nearby ~~SOC's~~ Shell refinery for processing from three concrete-lined oil storage reservoirs with a total capacity of 3.5 million barrels. In 1966, ~~SOC~~ Shell closed the Site and ~~SOC~~ sold the Site to Lomita ~~Development Company~~, an affiliate of Richard Barclay and Barclay-Hollander-Curci. Subsequently, Lomita ~~Development Company~~ developed the Site into the Carousel residential neighborhood, which contains 285 single-family homes.

In 1965, prior to the purchase of the property from Shell, Richard Barclay and/or Barclay Hollander Curci requested permission from Shell to remove the liquid waste and petroleum residue from the property and to begin to grade the property for development. Shell agreed to allow the activities with some conditions, including that "all work done by or for [Barclay Hollander Curci] be done in a good, lawful and workmanlike manner." After purchasing the property in 1966, Lomita, as the owner of the property, actively participated in the decommissioning and grading activities. Lomita conducted the waste removal and grading activities and obtained the required permits from the County. Available information indicates that by August 15, 1966 all three reservoirs had been fully cleaned out. The Pacific Soils Engineering Reports dated January 7, 1966; March 11, 1966; July 31, 1967; and June 11, 1968[3] documented that: (1) Lomita emptied and demolished the reservoirs, and graded the Site prior to it developing the Site as residential housing; (2) part of the concrete floor of the central reservoir was removed by Lomita from the Site; and (3) where the reservoir bottoms were left in place, Lomita made 8-inch wide circular trenches in concentric circles approximately 15 feet apart to permit water drainage to allow the percolation of water and sludge present in the reservoirs into the subsurface. Various documents from the soil engineer describe the process of removing water and sludge in the reservoirs, burying concrete and compacting the concrete and soil, and drilling holes in the concrete to allow for percolation into the groundwater. The County's grading permit required that concrete fill must be at least seven feet below grade. Boring logs indicated that soils beneath the concrete slab in Reservoir 7 were "highly oil stained" and that soils in the borings had a "petroleum odor, however the amount of actual oil contained in the soil is unknown."[4] One of the soil engineering reports also indicated that soil used to fill in the reservoirs and return the Property to its natural grade came from the berms surrounding each reservoir and surrounding the perimeter of the Property.[5] In 1967, Lomita began transferring title of individual parcels. In

[2] See Exhibit 76 to Gibson Dunn 2011 Letter.
[3] See Exhibits 31, 78, 36, and 42 to Gibson Dunn 2011 Letter.
[4] See Exhibit 78 to Gibson Dunn 2011 Letter, March 11, 1966 Report by Pacific Soils Engineering Inc.
[5] See Exhibit 31 and Declaration of Lee Volmer, attached to Gibson Dunn 2011 Letter.

1969, title to remaining parcels was granted by grant deed from Lomita to BHC. Then BHC began transferring title to the rest of the parcels.

6. **Chemical Usage:** Based on the Phase I Environmental Site Assessment (ESA) dated July 14, 2008 conducted by Shell Oil Products[6] (SOPUS) consultant, URS Corporation, the Site was used for the storage of crude oil in all three reservoirs on the property from at least 1924 to 1966. Subsequent records indicate that in the 1960s the reservoirs may also have been used for storage of bunker oil. Ongoing investigations indicate petroleum hydrocarbon compounds including volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) are impacted in the subsurface soil, soil vapor, and groundwater underlying the Site.

EVIDENCE OF DISCHARGES OF WASTE AND BASIS FOR ORDER

7. **Waste Discharges:** The following summarizes assessment activities associated with the Site:

   a. In 2007, under the regulatory oversight of the California Department of Toxic Substances Control (DTSC), an environmental investigation was initiated at the former Turco Products Facility (TPF). Soil vapor and groundwater were investigated in areas directly west of the Site and at locations in the northwestern portion of the Site. The DTSC-required investigation detected petroleum hydrocarbons, benzene, toluene, and chlorinated solvents in soil and soil vapor. A multi-depth soil vapor survey, which included soil vapor sampling on the Site at locations coincident with the former Kast Site footprints, detected benzene at concentrations up to 150 micrograms per liter (µg/l). Benzene was detected at TPF groundwater monitoring well MW-8, which has a northeast flow direction, at a concentration of 1,800 µg/l. Therefore, groundwater monitoring well MW-8 is located upgradient of the Kast Site. Chlorinated solvents were also detected at the Kast Site groundwater monitoring well MW-5.

   b. The *Final Phase I Site Characterization Report* dated October 15, 2009, which was prepared by URS Corporation on behalf of SOPUS showed that soil impacts consisted primarily of petroleum hydrocarbons spanning a wide range of carbon chains and including Total Petroleum Hydrocarbons (TPH) as gasoline (g), TPH as diesel (TPHd), TPH as motor oil (TPHmo), benzene, and naphthalene (See Tables 1, 2A, 2B, and 3).

      I. In June 2009, a subsurface investigation of public streets in the Carousel neighborhood consisting of ten cone penetrometer/rapid optical screening tools (CPT/ROST) was performed. The CPT/ROST logs indicated several locations within the Site with elevated hydrocarbon concentrations. The CPT/ROST logs also showed that the highest apparent soil impacts occurred at depths of 12 feet bgs, 36 feet bgs, and 40 feet bgs.

[6] Shell Oil Products US is the d/b/a for Equilon Enterprises LLC, which is wholly owned by Shell Oil Company.

II. A total of 228 soil samples were collected during the Phase I Site Characterization. The analytical data for soil samples collected from soil borings advanced on public streets across the Site (Figure 2) were as follows:

i. The highest detected concentration of TPH was 22,000 milligrams per kilogram (mg/kg) and TPHg, TPHd, and TPHmo were 8,800, 22,000, and 21,000 mg/kg, respectively;

ii. Benzene, ethylbenzene, toluene, and xylenes were detected in concentrations as high as 21,000 micrograms per kilogram (µg/kg), 32,000 µg/kg, 12,000 µg/kg, and 140,000 µg/kg, respectively;

iii. SVOCs were detected in concentrations as high as 47 mg/kg of naphthalene, 38 mg/kg of 1-methylnaphthalene, 63 mg/kg of 2-methylnaphthalne, 12 mg/kg phenanthrene, and 9.0 mg/kg pyrene; and

iv. Arsenic and lead were detected in concentrations as high as 53.2 mg/kg and 52.5 mg/kg, respectively.

III. Soil vapor samples collected from a 5-foot depth and greater below the public streets in the Carousel neighborhood indicated elevated benzene and methane (Figures 3 and 4). Benzene was detected at a maximum concentration of 3,800µg/l, which exceeds the California Human Health Screening Level (CHHSL) value of 0.036 µg/l for benzene set for shallow soil vapor in a residential area. Methane was also detected in concentrations as high as 59.7 % (by volume) that significantly exceed its lower explosive limit of 5% (by volume), posing a potential safety hazard.

c. Between September 2009 and February 2010, residential soil and sub-slab soil vapor sampling was conducted at 41 parcels (Figure 5 a – f; Tables 1 and 2) and the results were as follows:

I. Surface and subsurface soil (0 to 10 feet bgs) detected concentrations of chemicals of concern that significantly exceeded soil screening levels as follows:

i. VOCs - Benzene (14,000 µg/kg), tetrachloroethylene (PCE) (22,000 µg/kg), 1,2,4-trimethylbenzene (34,000 µg/kg), and 1,3,5-trimethylbenzene (14,000 µg/kg);

ii. SVOCs - Naphthalene (18 mg/kg), Benzo(a)pyrene (2.9 mg/kg), benzo(a)anthracene (0.1 mg/kg), chrysene (0.27 mg/kg), phenanthrene (0.28 mg/kg), and pyrene (0.19 mg/kg); and

iii. Lead was also detected at a maximum concentration of 307 mg/kg.

II. The highest detected concentration of TPHg was 5,000 mg/kg, TPHd was 33,000 mg/kg, and TPHmo was 41,000 mg/kg;

III. As of September 27, 2010, sub-slab soil vapor samples have been collected from 172 homes in the Carousel neighborhood. Additional data continues to be collected as part of the Phase II Site Characterization. The validated data from the first 41 homes detected benzene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, p/m-xylenes, toluene, and acetone, at a maximum concentration of 4,500 micrograms per cubic meter ($\mu g/m^3$), 2,200 $\mu g/m^3$, 1,000 $\mu g/m^3$, 1,100 $\mu g/m^3$, 5,200 $\mu g/m^3$, 700 $\mu g/m^3$, 270 $\mu g/m^3$, respectively.

d. Between November 19, 2009 and February 15, 2010, additional step-out soil and soil vapor sampling at the elevated soil vapor sampling locations were conducted in selected locations beneath the public streets at the Site. The measured concentrations for petroleum hydrocarbons in soil were as follows:

I. The highest detected concentrations of TPHg was 9,800 mg/kg, TPHd was 22,000 mg/kg, and TPHmo was 21,100 mg/kg;

II. The highest detected concentrations of benzene was 33,000 µg/kg, Ethylbenzene was 42,000 µg/kg, toluene was 11,000 µg/kg, and xylenes were 140,000 µg/kg, respectively;

III. SVOCs were detected in concentrations as high as 47 mg/kg of naphthalene, 33 mg/kg of 1-methylnaphthalene, 53 mg/kg of 2-methylnaphthalne, 6.1 mg/kg phenanthrene, and 3.9 mg/kg pyrene; and

IV. Arsenic and lead were detected in concentrations as high as 28.2 mg/kg and 13.6 mg/kg, respectively.

e. In July 2009, the installation of six on-site groundwater monitoring wells (Figure 6) were completed and quarterly groundwater monitoring was initiated. Groundwater was encountered at 53 feet bgs. Groundwater samples from five of the six wells contained concentrations of benzene at a maximum concentration of 140 µg/L and trichloroethylene (TCE) at a maximum concentration of 290 µg/L. One of the monitoring wells (MW-3) contains a free product or a light non-aqueous phase liquid (LNAPL) with a maximum measured thickness of 9.01 foot as of May 27, 2010.

8. Source Elimination and Remediation Status at the Site

a. The results of the initial soil and soil vapor investigation indicate the presence of elevated methane and benzene at concentrations exceeding the Lower Explosive Limit and the CHHSL for shallow soil vapor, at several locations beneath the public streets at the Site. On October 15, 2009, the Regional Board directed the Discharger to expeditiously design and implement an interim remedial action.

b. On May 12, 2010 the Regional Board approved SOPUS's proposed Soil Vapor Extraction (SVE) pilot test in order to evaluate the use of this technology as a remedial option for VOCs at the Site.

9. **Summary of Findings from Subsurface Investigations**

a. Regional Board staff have reviewed and evaluated numerous technical reports and records pertaining to the release, detection, and distribution of wastes on the Site and its vicinity. The Discharger has stored, used, and/or discharged petroleum hydrocarbon compounds at the Site. Elevated levels of TPH and other wastes have been detected in soil, soil vapor and groundwater beneath the Site.

b. The sources for the evidence summarized above include, but are not limited to:

I. Various technical reports and documents submitted by the Discharger or its representatives to Regional Board staff.

II. Site inspections conducted by Regional Board staff, as well as meetings, letters, electronic mails, and telephone communications between Regional Board staff and the Discharger and/or its representatives.

III. Subsurface drainage study for the Site reservoirs submitted by Girardi and Keese, the law firm retained by some of the residents of the Carousel neighborhood.

10. **Summary of Current Conditions Requiring Cleanup and Abatement**

a. Based on the Phase I ESA for the Site dated July 14, 2008 (prepared by URS Corporation) and the most recent information provided to the Regional Board by SOPUS: 1) SOC sold the Kast Site to Lomita ~~Development Company~~, an affiliate of Richard Barclay and Barclay-Hollander-Curci, in 1966 with the reservoirs in place; 2) the Pacific Soils Engineering Reports from 1966 to 1968 indicate that Lomita ~~Development Company~~ emptied and demolished the reservoirs, and constructed residential housing; 3) part of the concrete floor of the central reservoir was removed by Lomita ~~Development Company~~ from the Site; and 4) where the reservoir bottoms were left in place, Lomita ~~Development Company~~ made 8-inch wide circular trenches in concentric circles approximately 15 feet apart to permit water drainage to allow percolation of water and sludge present in the reservoirs into the subsurface.

b. There is no consistent trend in the vertical distribution of detected concentrations of petroleum hydrocarbon compounds that can be discerned from soil boring data to date. Although, the majority of the aforementioned highest detected TPH concentrations were obtained from the 2.5-foot depth samples, there were multiple locations where the highest concentrations were in the 5-foot or 10-foot samples. This may be due to the nature of previous development activities by Lomita ~~Development Company~~ at the Site (i.e., the construction and demolition of the former reservoirs and site grading in preparation for development of the residential tract).

c. On May 11, 2010, Environmental Engineering and Contracting, consultants hired by Girardi and Keese, conducted exploratory trenching in order to locate and identify the obstructions that have been frequently encountered during the advancement of shallow soil borings at many of the residential homes investigated to date. Regional Board staff observed the encountering of an approximately 8-inch thick concrete slab extending at the trench excavation termination depth of 9 feet, 2 inches. The Pacific Soils Engineering Report dated January 7, 1966 states that the reservoirs were lined with a "four inch blanket of reinforced concrete". These obstructions are presumed to be remnants of the concrete liners of the former reservoir.

d. Results from the 169 Interim Residential Sampling Reports submitted to the Regional Board through November 17, 2010 indicate that for surface and subsurface soil sampling (0 to 10 feet bgs), the cancer risk index estimate is between 0 and 10 for 107 residential parcels, between 10 and 100 for 60 parcels, and exceeded 100 for 2 parcels. In the area where the highest cancer index is documented, SVOCs (i.e. Benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene and chrysene), benzene, and ethylbenzene were the primary chemicals of potential concern (COPCs) contributing to the cancer risk index.

   For the Carousel neighborhood investigation, the Regional Board is using the most protective cancer risk screening levels recommended by the State and federal governments, which is one in one million (1×10^{-6}) additional risks. For screening purposes, the Regional Board routinely uses the most conservative (health-protective assumptions) risk based screening levels of 1×10^{-6} for the target chemical. This screening level is based on a target risk level at the lower end of the US Environmental Protection Agency (USEPA) risk management range of one-in-a-million risk (1×10^{-6}) for cancer risk and a hazard quotient of 1.

   The presence of a chemical at concentrations in excess of a CHHSL does not indicate that adverse impacts to human health are occurring or will occur, but suggests that further evaluation of potential human health concerns is warranted (Cal-EPA, 2005). It should also be noted that CHHSLs are not intended to "set … final cleanup or action levels to be applied at contaminated sites" (Cal-EPA, 2005).

e. Results from the 169 Interim Residential Sampling Reports submitted to the Regional Board through November 17, 2010 also indicate that for the sub-slab soil vapor data collected from the residential parcels, the cancer risk index estimate was between 0 and 10 for 147 parcels, between 10 and 100 for 20 parcels, and greater than 100 for 2 parcels. The two highest cancer risk index were estimated as 550 and 120. In most cases, benzene was the primary contributor to the cancer risk index estimate.

f. The Office of Environmental Health Hazard Assessment (OEHHA) performed a quantitative risk evaluation of TPH using surface and subsurface (0 to 10 feet bgs) soil TPH fractionation data for the 41 residential parcels (Table 3). Based on the risk calculation, OEHHA estimated maximum exposures for a child and compared

the resulting exposure estimates of reference dosages with that provided by DTSC interim guidance dated June 16, 2009. OEHHA concluded that aromatic hydrocarbons in the C-9 to C-32 range at five parcels exceeded their reference values for children (Exhibit 1).

g. The San Francisco Bay Regional Water Quality Control Board developed the Environmental Screening Level (ESL) as guidance for determining when concentration of TPH may present a nuisance and detectable odor. The ESL, based on calculated odor indexes, for residential land-use, is 100 mg/kg for TPHg and TPHd. The soil TPHg and TPHd data obtained from the Site were detected up to 9,800 mg/kg and 85,000 mg/kg, respectively, which exceed the ESL.

11. **Pollution of Waters of the State**: The Discharger has caused or permitted waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance. As described in this Order and the record of the Regional Board, the Discharger owned and/or operated the site in a manner that resulted in the discharges of waste. The constituents found at the site as described in Finding 8 constitute "waste" as defined in Water Code section 13050(d). The discharge of waste has resulted in pollution, as defined in Water Code section 13050(l). The concentration of waste constituents in soil and groundwater exceed water quality objectives contained in the Water Quality Control Plan for the Los Angeles Region (Basin Plan), including state-promulgated maximum contaminant levels. The presence of waste at the Site constitutes a "nuisance" as defined in Water Code section 13050(m). The waste is present at concentrations and locations that *"is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property . . . and [a]ffects at the same time an entire community or neighborhood, or any considerable number of persons,although the extent of the annoyance or damage inflicted upon individuals may be unequal."*

12. **Need for Technical Reports:** This Order requires the submittal of technical or monitoring reports pursuant to Water Code section 13267[7]. The Discharger is required to submit the reports because, as described in the Findings in this Order, the Discharger is responsible for the discharge of waste that has caused pollution and nuisance. The reports are necessary to evaluate the extent of the impacts on water quality and public health and to determine the scope of the remedy.

13. ~~Although requested by the Discharger, the Regional Board is declining to name additional potentially responsible parties (PRPs) to this Order at this time.~~ Substantial evidence indicates that the Discharger caused or permitted waste to be discharged into waters of state and is therefore appropriately named as a responsible party in this Order. Shell owned and operated the Site, then sold the property to the developers, leaving in place three reservoirs and residual petroleum hydrocarbons in at least one tank and in soil surrounding the reservoir. The residual petroleum hydrocarbons are still present at the Site and continue to cause pollution and nuisance as documented in this Order and the Regional Board files.

[7] Water Code section 13267 authorizes the Regional Board to require any person who has discharged, discharges, or is suspect of having discharged or discharging, waste to submit technical or monitoring program reports.

~~However, the~~ The Regional Board ~~will continue to~~ has investigated ~~whether~~ additional potentially responsible parties (including, but not limited to, Lomita Development Company, Richard Barclay, Barclay-Hollander-Curci, Dole Foods, Inc., Barclay Hollander Corporation and/or any of its successors) and has determined that Barclay Hollander Corporation caused or permitted the discharge of waste at the Site ~~and whether these or other parties should be named as additional responsible parties to this Order or a separate Order. The Regional Board may amend this Order or issue a separate Order in the future as a result of this investigation. Although investigation concerning additional PRPs is ongoing, the Regional Board desires to issue this Order as waiting will only delay remediation of the Site.~~ BHC and/or its predecessor purchased the Site with explicit knowledge of the presence of the petroleum reservoirs and the presence of residual petroleum hydrocarbons and conducted various activities, including partially dismantling the concrete in the reservoirs and grading the onsite materials, thereby spreading the waste. The residual petroleum hydrocarbons are still present at the Site and continue to cause pollution and nuisance as documented in this Order and the Regional Board files. BHC is a wholly-owned subsidiary of Dole. Including BHC as a responsible party in this Order is consistent with orders of the State Water Resources Control Board construing Water Code section 13304 naming former owners who had knowledge of the activities that resulted in the discharge and the legal ability to control the continuing discharge.[8] If the Regional Board becomes aware of any other responsible parties it will consider naming such persons in this Order.

14. ~~The Discharger~~ Shell, in a letter to the Regional Board dated May 5, 2010 (Exhibit 2), stated that it is considering a variety of potential alternatives that can be applied at specific parcels and in the public streets in order to avoid environmental impacts and avoid any significant risks to human health at this Site. ~~The Discharger~~ Shell also indicated that if it becomes necessary for residents to relocate temporarily to perform this work, ~~the Discharger~~ Shell will take appropriate steps to minimize any inconvenience and compensate them for any resulting expenses.

15. Issuance of this Order is being taken for the protection of the environment and as such is exempt from provisions of the California Environmental Quality Act (CEQA) (Pubic Resources Code section 21000 et seq.) in accordance with California Code of Regulations, title 14, sections 15061(b)(3), 15306, 15307, 15308, and 15321. This Order generally requires the Discharger to submit plans for approval prior to implementation of cleanup activities at the Site. Mere submittal of plans is exempt from CEQA as submittal will not cause a direct or indirect physical change in the environment and/or is an activity that cannot possibly have a significant effect on the environment. CEQA review at this time would be premature and speculative, as there is simply not enough information concerning the Discharger's proposed remedial activities and possible associated environmental impacts. If the Regional Board determines that implementation of any plan required by this Order will have a significant effect on the environment, the Regional Board will conduct the necessary and appropriate environmental review prior to Executive Officer approval of the applicable plan.

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[8] See, e.g., In the Matter of Wenwest, Inc., et al., State Water Board Order No. WQ 92-13; In the Matter of Arthur Spitzer, et al., State Water Board Order WQ 89-8; In the Matter of Stinnes-Western Chemical Corporation, State Water Board Order WQ 86-16; In the Matter of Zoecon Corporation, State Water Board Order WQ 86-2.

16. Pursuant to section 13304 of the California Water Code, the Regional Board may seek reimbursement for all reasonable costs to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action.

THEREFORE, IT IS HEREBY ORDERED, pursuant to California Water Code section 13304 and 13267, that the Discharger shall cleanup the waste and abate the effects of the discharge, including, but not limited to, total petroleum hydrocarbons (TPH) and other TPH-related wastes discharged to soil and groundwater at the Site in accordance with the following requirements:

1. **Complete Delineation of On- and Off-Site Waste Discharges**: Completely delineate the extent of waste in soil, soil vapor, and groundwater caused by the discharge of wastes including, but not limited to, TPH and other TPH-related waste constituents at the Site into the saturated and unsaturated zones. Assessment has been ongoing under Regional Board oversight, but assessment is not yet complete. If ongoing reinterpretation of new data derived from the tasks performed suggests that modification or expansion of the tasks approved by the Regional Board is necessary for complete assessment, the Discharger is required to submit a work plan addendum(a).

2. **Continue to Conduct Groundwater Monitoring and Reporting**:

   a. Continue the existing quarterly groundwater monitoring and reporting program previously required by the Regional Board, and

   b. As new wells are installed, they are to be incorporated into the existing groundwater monitoring and reporting program

3. **Conduct Remedial Action**: Initiate a phased cleanup and abatement program for the cleanup of waste in soil, soil vapor, and groundwater and abatement of the effects of the discharges, but not limited to, petroleum and petroleum-related contaminated shallow soils and pollution sources as highest priority.

   Shallow soils in this Order are defined as soils found to a nominal depth of 10 feet, where potential exposure for residents and/or construction and utility maintenance workers is considered likely (Ref. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities – CalEPA 1996).

   Specifically, the Discharger shall:

   a. Develop a pilot testing work plan, which includes 1) evaluation of the feasibility of removing impacted soils to 10 feet and removal of contaminated shallow soils and reservoir concrete slabs encountered within the uppermost 10 feet, including areas beneath residential houses; and 2) remedial options that can be carried out where site characterization (including indoor air testing) is completed; 3) plans for relocation of residents during soil removal activities, plans for management of excavated soil on-site, and plans to minimize odors and noise during soil removal. The Discharger is required to submit this Pilot Test Work Plan to the Regional Board for review and approval by the Executive Officer no later than 60 days after the date of issuance of this Order. Upon approval of the Pilot Test Work Plan by the Executive Officer, the

Discharger shall implement the Pilot Test Work Plan submit the Pilot Test Report that includes the findings, conclusions, and recommendations within 120 days of the issuance of the approval of the Pilot Test Work Plan.

b. Conduct an assessment of any potential environmental impacts of the residual concrete slabs of the former reservoir that includes: (1) the impact of the remaining concrete floors on waste migration where the concrete floors might still be present; (2) whether there is a need for the removal of the concrete; and (3) the feasibility of removing the concrete floors beneath (i) unpaved areas at the Site, (ii) paved areas at the Site, and (iii) homes at the Site. The Discharger is required to submit this environmental impact assessment of the residual concrete slabs to the Regional Board no later than 30 days after the completion of the Pilot Test.

c. Prepare a full-scale impacted soil Remedial Action Plan (RAP) for the Site. The Discharger is required to submit the RAP to the Regional Board for review and approval by the Executive Officer no later than 60 days after the date of the Executive Officer's approval of the Pilot Test Report.

I. The RAP shall include, at a minimum, but is not limited to:

i. A detailed plan for remediation of wastes in shallow soil that will incorporate the results from the Soil Vapor Extraction Pilot Test currently being performed.

ii. A plan to address any impacted area beneath any existing paved areas and concrete foundations of the homes, if warranted;

iii. A detailed surface containment and soil management plan;

iv. An evaluation of all available options including proposed selected methods for remediation of shallow soil and soil vapor; and

v. Continuation of interim measures for mitigation according to the Regional Board approved Interim Remediation Action Plan (IRAP).

vi. A schedule of actions to implement the RAP.

II. The RAP, at a minimum, shall apply the following guidelines and Policies to cleanup wastes in soil and groundwater. The cleanup goals shall include:

i. Soil cleanup goals set forth in the Regional Board's *Interim Site Assessment and Cleanup Guidebook, May 1996,* waste concentrations, depth to the water table, the nature of the chemicals, soil conditions and texture, and attenuation trends, human health protection levels set forth in *USEPA*

Regional Screening Levels (Formerly Preliminary Remediation Goals), for evaluation of the potential intrusion of subsurface vapors (soil vapor) into buildings and subsequent impact to indoor air quality, California Environmental Protection Agency's *Use of Human Heath Screening Levels (CHHSLS) in Evaluation of Contaminated Properties*, dated January 2005, or its latest version, and Total Petroleum Hydrocarbon Criteria Working Group, Volumes 1 through 5, 1997, 1998, 1999; Commonwealth of Massachusetts, Department of Environmental Protection, *Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of MADEP VPH/EPH approach*; MADEP 2002; Commonwealth of Massachusetts, Department of Environmental Protection, *Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology*; MADEP 2003; Commonwealth of Massachusetts, Department of Environmental Protection, Method for the Determination of *Air-Phase Petroleum Hydrocarbons (APH) Final*, MADEP 2008, Soil vapor sampling requirements are stated in the *DTSC Interim Guidance* and the Regional Board's *Advisory – Active Soil Gas Investigations*, dated January 28, 2003, or its latest version, DTSC's *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*, revised February 7, 2005, or its latest version, USEPA Risk Assessment Guidance for Superfund, Parts A through E; USEPA User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, 2003; USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, 2002; USEPA Supplemental Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites, 2002; CalEPA Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities, CalEPA DTSC, February 1997; CalEPA Use of the Northern and Southern California Polynuclear Aromatic Hydrocarbons (PAH) Studies in the Manufactured Gas Plant Site Cleanup Process, CalEPA DTSC, July 2009. Cleanup goals for all contaminant of concerns shall be based on residential (i.e., unrestricted) land use.

ii. Groundwater cleanup goals shall at a minimum achieve applicable Basin Plan water quality objectives, including California's Maximum Contaminant Levels or Action Levels for drinking water as established by the California Department of Public Health, and the State Water Resources Control Board's "Antidegradation Policy" (State Board Resolution No. 68-16), at a point of compliance approved by the Regional Board, and comply with other applicable implementation programs in the Basin Plan.

iii. The State Water Resources Control Board's "Antidegradation Policy",which requires attainment of background levels of water quality, or the highest level of water quality that is reasonable in the event that background levels cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of water, and not result in exceedence of water quality objectives in the Regional Board's *Basin Plan*.

iv. The State Water Resources Control Board's "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304" (State Board Resolution No. 92-49), requires cleanup to background or the best water quality which is reasonable if background levels cannot be achieved and sets forth criteria to consider where cleanup to background water quality may not be reasonable.

III. The Discharger shall submit site-specific cleanup goals for residential (i.e., unrestricted) land use for the Executive Officer's approval concurrent with the submittal date of the Pilot Test Report. The proposed site-specific cleanup goals shall include detailed technical rationale and assumptions underlying each goal.

IV. Upon approval of the RAP by the Executive Officer, the Discharger shall implement the RAP within 60 days of the issuance of the approval of the RAP.

d. Continue to conduct residential surface and subsurface soil and sub-slab soil vapor sampling under the current Regional Board approved work plan dated September 24, 2009. If the ongoing reinterpretation of new assessment data derived from the tasks described in the work plan suggests that modification or expansion of the tasks proposed in the RAP is necessary for complete cleanup, then the Discharger shall submit addenda to the September 24, 2009 work plan to the Regional Board for review and approval by the Executive Officer no later than 60 days of the date of issuance of this Order.

e. If the ongoing groundwater monitoring and investigation warrants, the Discharger shall:

I. Install new wells in order to complete the groundwater monitoring well network and to fully delineate the impacted groundwater plume, and

II. Prepare a detailed impacted groundwater RAP. The Regional Board will set forth the due date of the groundwater RAP at a later date.

4. **Public Review and Involvement:**

   a. Cleanup proposals and RAP submitted to the Regional Board for approval in compliance with the terms of this Order shall be made available to the public for a minimum 30-day period to allow for public review and comment. The Regional Board will consider any comments received before taking final action on a cleanup proposal and RAP.

   b. The Discharger shall encourage public participation. The Discharger is required to prepare and submit a Public Participation Plan for review and approval by the Executive Officer, with the goal of having the Regional Board provide the stakeholders and other interested persons with:

      I. Information, appropriately targeted to the literacy and translational needs of the community, about the investigation and remedial activities concerning the discharges of waste at the Site; and

      II. Periodic, meaningful opportunities to review, comment upon, and to influence investigation and cleanup activities at the Site.

   c. Public participation activities shall coincide with key decision making points throughout the process as specified or as directed by the Executive Officer of the Regional Board.

   d. The Discharger shall prepare draft environmental documentation evaluating the potential environmental impacts associated with the implementation of the RAP and submit to the Regional Board as directed by the Executive Officer.

5. **Time Schedule:** The Discharger shall submit all required technical work plans and reports by the deadlines stated in this Order, which are summarized in Table 4. As field activities at this Site are in progress, additional technical documents may be required and/or new or revised deadlines for the technical documents may be issued. Therefore, Table 4 may be updated as necessary. The Discharger shall continue any remediation or monitoring activities until such time as the Executive Officer determines that sufficient cleanup has been accomplished to fully comply with this Order..

6. The Regional Board's authorized representative(s) shall be allowed:

   a. Entry upon premises where a regulated facility or activity is located, conducted, or where records are stored, under the conditions of this Order;

   b. Access to copy any records that are stored under the conditions of this Order;

   c. Access to inspect any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

d. The right to photograph, sample, and monitor the Site for the purpose of ensuring compliance with this Order, or as otherwise authorized by the California Water Code.

7. **Contractor/Consultant Qualification:** A California licensed professional civil engineer or geologist, or a certified engineering geologist or hydrogeologist shall conduct or direct the subsurface investigation and cleanup program. All technical documents required by this Order shall be signed by and stamped with the seal of the above-mentioned qualified professionals.

8. This Order is not intended to permit or allow the Discharger to cease any work required by any other Order issued by this Regional Board, nor shall it be used as a reason to stop or redirect any investigation or cleanup or remediation programs ordered by this Regional Board or any other agency. Furthermore, this Order does not exempt the Discharger from compliance with any other laws, regulations, or ordinances which may be applicable, nor does it legalize these waste treatment and disposal facilities, and it leaves unaffected any further restrictions on those facilities which may be contained in other statues or required by other agencies.

9. The Discharger shall submit 30-day advance notice to the Regional Board of any planned changes in name, ownership, or control of the facility; and shall provide 30-day advance notice of any planned physical changes to the Site that may affect compliance with this Order. In the event of a change in ownership or operator, the Discharger also shall provide 30-day advance notice, by letter, to the succeeding owner/operator of the existence of this Order, and shall submit a copy of this advance notice to the Regional Board.

10. Abandonment of any groundwater well(s) at the Site must be approved by and reported to the Executive Officer of the Regional Board at least 14 days in advance. Any groundwater wells removed must be replaced within a reasonable time, at a location approved by the Executive Officer. With written justification, the Executive Officer may approve of the abandonment of groundwater wells without replacement. When a well is removed, all work shall be completed in accordance with California Department of Water Resources Bulletin 74-90, "California Well Standards," Monitoring Well Standards Chapter, Part III, Sections 16-19.

11. The Regional Board, through its Executive Officer or other delegate, may revise this Order as additional information becomes available. Upon request by the Discharger, and for good cause shown, the Executive Officer may defer, delete or extend the date of compliance for any action required of the Discharger under this Order. The authority of the Regional Board, as contained in the California Water Code, to order investigation and cleanup, in addition to that described herein, is in no way limited by this Order.

12. Any person aggrieved by this action of the Regional Board may petition the State Water Resources Control Board (State Water Board) to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day

following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

13. Failure to comply with the terms or conditions of this Order may result in imposition of civil liabilities, imposed either administratively by the Regional Board or judicially by the Superior Court in accordance with Sections 13268, 13308, and/or 13350, of the California Water Code, and/or referral to the Attorney General of the State of California.

14. None of the obligations imposed by this Order on the Discharger are intended to constitute a debt, damage claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations are imposed pursuant to the police powers of the State of California intended to protect the public health, safety, welfare, and environment.

Ordered by: _____ Date: _____

Samuel Unger
Executive Officer

ATTACHMENTS

FIGURES

Figure 1: Site Vicinity Map
Figure 2: Previous Exploration Location
Figure 3: Proposed Soil Vapor Sampling Locations
Figure 4: Benzene and Methane Concentrations in Soil Vapor
Figure 5a: Carousel Houses Tested as of March 15, 2010
Figure 5b: Residential Methane Screening Results as of March 15, 2010
Figure 5c: Summary of Results of Testing for Benzene Concentrations in Soil Vapor as of March 15, 2010
Figure 5d: Summary of Results of Testing for Non-Benzene Concentrations in Soil Vapor as of March 15, 2010
Figure 5e: Summary of Soil Sampling Results (0-10' Below Surface) as of March 15, 2010
Figure 5f: Methane Concentrations in Soil Vapor at 5 Feet Below Surface as of March 15, 2010
Figure 6: Proposed Groundwater Monitoring Well Locations

TABLES

Table 1: Data Summary from Phase I and Phase II Site Characterization for Soil and Soil Vapor
Table 2A: Summary of Soil Samples Analytical Results -VOCs, SVOCs, and TPH
Table 2B: Summary of Soil Vapor Analytical Results -VOCS and Fixed Gases
Table 3: Maximum Concentration of Aliphatic and Aromatic Hydrocarbons by Hydrocarbon Fractionations at Individual Properties
Table 4: Deadlines for Technical Work Plans and Reports

EXHIBITS

Exhibit 1: OEHHA's Memorandum dated May 19, 2010
Exhibit 2: Shell Oil Company Letter to the Regional Board dated May 5, 2010

Note: All Figures and Tables, except Table 4, were taken from technical reports prepared by SOPUS's consultant, URS Corporation

Carousel Tract Environmental Investigation Timeline

Date	Significant Actions/Reports	Notes
March 11, 2008	DTSC informed LARWQCB about former Shell Oil Company Tank Farm	
May 2008	LAWRQCB initiated an environmental investigation	
December 2008	LAWRQCB approved proposed work plan submitted by Shell to investigate contaminates of concern	
December 31, 2008	LARWQCB issued California Water Code § 13267 Investigative Order	
October 15, 2009	Shell submitted Final Phase I Site Characterization Report	
March 2011	LARWQCB issued Cleanup and Abatement Order No. R4-201100046	
February 22, 2013	Shell submitted *Site-Specific Cleanup Goal Report*	
May 2013	LAWRQCB issued a fact sheet providing information and advising of comment period for *Site-Specific Cleanup Goal Report*	30-day comment period ending June 24, 2013
June 24, 2013	City submitted comments to *Site-Specific Cleanup Goal Report*	Forwarded reports by Everett & Associates and Soil/Water/Air Protection Enterprise
July 18, 2013	City Council conducted workshop to allow presentation by Mr. Sam Unger, Executive Director of LARWQCB	Presentation by Dr. Lorene Everett and James T. Wells PhD raising concerns related to environmental conditions
July 29, 2013	City Council adopted Resolution No. 13-081 declaring the existence of an emergency in the Carousel Tract	
July 30, 2013	Letters sent to the Governor, Attorney General, Los Angeles County Board of Supervisors and Mr. Unger	Requested immediate assistance due to emergency conditions in Carousel Tract
July 31, 2013	City staff, Mr. Bob Bowcock, Dr. Everett and Mr. Wells met with representatives of Los Angeles County Fire Department and Los Angeles County Department of Public Health	City Council declaration of emergency conditions discussed and copies of Everett & Associates reports transmitted for review
August 21, 2013	LARWQCB sent detailed letter to Shell denying proposed site-	LARWQCB incorporated OEHHA Memorandum dated July 22,

EXHIBIT NO 07

Carousel Tract Environmental Investigation Timeline

Date	Significant Actions/Reports	Notes
	specific cleanup goals and requiring revisions to be submitted by October 21, 2013	2013 and UCLA Expert Panel Interim Report dated July 24, 2013
September 11, 2013	City letter to Mr. Sam Unger	Expressing appreciation from City Council and community for response to *Site-Specific Cleanup Goal Report*.
September 24, 2013	LARWQCB community open house CEQA scoping meeting	Request for input from community and public agencies related to evaluation of environmental impacts. Comment period ends on October 8, 2013
September 30 – October 10, 2013	LARWQCB Public Participation Specialist to conduct office hours at city hall	Opportunity for LARWQCB to meet with residents and community stakeholders
October 8, 2013	CEQA scoping comments due to LARWQCB from September 9 through October 8, 2013	Comment letters sent by City of Carson and Bob Bowcock/Barbara Post
October 10, 2013	City staff arranging for a meeting with LARWQCB, LACoFD, Los Angeles County Department of Public Health, OEHHA, Mr. Bowcock, Dr. Everett and Mr. Wells PhD.	Review of technical reports and discussion of public agencies responses and actions
October 21, 2013	Shell submitted a *Revised Site-Specific Cleanup Goal Report* to LARWQCB	Shell proposed to evaluate options that provide excavation in specific areas and does not include any further evaluation associated with the removal of homes.
October 24, 2013	Los Angeles County Department of Public Health Letter to City of Carson	Letter states there is not an immediate health threat from site conditions.
October 30, 2013	LARWQCB letter to Shell for review of *Community Outdoor Air Sampling and Analysis Report*	Based on statistical tests, LARWQCB concludes that outdoor air concentrations do not differ between the site and surrounding area. Shell is required to address OEHHA comments and to develop a work plan for an additional soil-vapor survey by November 29, 2013.

Carousel Tract Environmental Investigation Timeline

Date	Significant Actions/Reports	Notes
October 31, 2013	LARWQCB notice on *Proposed Draft Revised Cleanup and Abatement Order No. R4-2011-0046*	The proposed draft order names Dole Food Company, Inc. as an additional responsible party. Comments and evidence must be submitted by 12:00 p.m. on December 6, 2013.
November 12, 2013	Letter to Carousel Tract Owners and Occupants advising of November 19, 2013 City Council Workshop	