



July 14, 2010

Mr. Ken Harris
Interim Assistant Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 West Fourth Street; Suite 200
Los Angeles, California 90013

RE: TENTATIVE CLEANUP AND ABATEMENT ORDER NO. RB4-2010-XXX

Dear Mr. Harris:

I trust that this letter finds you well. Recognizing that the Tentative Cleanup and Abatement Order (TCAO) you have recently issued has a thirty-day response window for Shell Oil US (hereinafter referred to as "Shell") to provide comments, I wanted to take this opportunity, on behalf of the clients we represent within the Carousel Housing Tract, to immediately address our preliminary concerns relating to the TCAO. Providing you with these concerns will allow the Regional Board to make corrections and issue addendums swiftly without significant delay. As I am sure you can understand, the initial data referred to in the TCAO creates an immediate concern for the health, safety and welfare of the people living in the Carousel Housing Tract.

First, I must mention that our team of experts, along with URS/Shell and the Regional Board staff, have reported significantly more data sets than are presented in the TCAO. This additional evidence, along with the data sets referred to in the TCAO, indicates the contamination of the 55 acre site in Carson (hereinafter referred to as the "Kast Site") requires *at a minimum* serious immediate abatement of the petroleum and other chemicals of concern to protect the health and safety of the community. It should also be noted that there are serious issues of instances where Shell has under-reported significant facts or data to the Regional Board. By way of example, Monitoring Well No. 3 is reported to have 3.4 feet of standing crude oil accumulation on the groundwater surface. When Shell's consultants, with our experts observing, measured the well in May 2010, 10 feet of standing crude oil was present in Monitoring Well No. 3. The significance in the difference between 3.4 feet and 10 feet of standing oil in a monitoring well would likely alter many of the Regional Board's assumptions and direction referred to in the TCAO. Based upon this finding alone, the Regional Board should add that a Municipal Water

Supply Well (California Water Service Company – Dominguez) is located approximately 500 feet west of the Kast Site, and that the location within Kast Site contains up to 10 feet of crude oil on the water surface. I am not sure how this was overlooked.

I am primarily concerned with two significant themes played out in the TCAO: 1) The TCAO treats the 55 acre Kast Site as 285 subdivided parcels rather than a single operable unit (hereinafter referred to as “Operable Unit”); and 2) The TCAO seeks to only remediate 10 feet below grade. Based on the evidence and data found in the field, we strongly believe that such tentative conclusions regarding this remediation direction is improper and faulty.

The term, “Operable Unit,” is defined as “a group of one or more clean-up sites that have similar characteristics, such as contaminants, industrial processes, or location.” In the case of the Carousel neighborhood, the contaminants, the processes, and the location are all the same. Thus, the subdivided parcels at the site should be considered one Operable Unit for risk assessment purposes.

Section 11 (a) of the TCAO recognizes there is no consistent trend in the vertical distribution of contaminants. The lack of a consistent contaminant horizon from one boring to the next, will make it nearly impossible to effectively remediate a property without significant additional assessment of the site and/or removal of the existing above-ground structures. Contaminant depths vary across small distances, and therefore, data collected from a front and back yard have no bearing on what is occurring beneath a house. The lack of a consistent vertical profile of contamination makes it necessary that any remedial effort to be consistent, conservative, and able to handle the worst case situation. We know the depth of the tank bottoms left in place by Shell is approximately 15 feet below surface grade. We also know portions of the oil tank side wall concrete is strewn all over the 55 acres at depths ranging from 7 feet to 10 feet down. Moreover, we know that Shell left significant levels of contaminants below the surface of the Kast Site. Why then is the Regional Board only looking at the top 10 feet for remediation? And why is the Regional Board parceling out the 55 acre site that was used as a single site by Shell and is now contaminating the Carousel Housing Tract as a single site? There is no way, that the Regional Board would view a current site that was to be developed as a housing tract based on contaminants that would be below each individual home.

Proper removal of the concrete will require complete excavation of the entire tract. It is critical that the concrete be removed because much contamination below the concrete is serving as a continued source for VOC emission and SVOC migration and human contact with these contaminants.

Target cleanup goals logically drive the selection process for the most appropriate technology. The most appropriate technologies should be selected based on the levels of restoration required to remediate soil and groundwater, the extent of demonstrated success in achieving same or similar levels of restoration for the contaminants, and the timeframe required to implement the remediation.

USEPA's Remediation Technologies Screening Matrix and Reference Guide, Version 4.0 should be consulted to screen alternative approaches. USEPA's reference guide provides a "yellow pages" of remediation technologies. It is intended to be used to screen and evaluate candidate cleanup technologies for contaminated sites in order to assist remedial project managers in selecting an appropriate remedial alternative. To reduce data collection efforts and to focus the remedial evaluation steps, information on widely used and presumptive remedies is provided by USEPA.

Presumptive remedies, as established by the USEPA, are preferred technologies for common categories of sites, based on historical patterns of remedy selection and USEPA's scientific and engineering evaluation of performance data on technology implementation. Use of presumptive remedies allows the Regional Board to focus on one or two alternatives: decreasing the site characterization data needs and focusing the remedial evaluation steps, resulting in less time, which is a prime consideration of the property owners who have been affected.

The reference guide allows:

- Screening for treatment technologies;
- Distinguishing between emerging and mature technologies; and
- Assigning a relative probability of success based on available performance data, field use, and engineering judgment.

All levels of remediation technologies are included in USEPA's guide. The final selection of a technology requires site-specific treatability studies. The criteria that should be applied in identifying possible technologies applicable to the site include the ability of the technology option to achieve a high level of remediation for both non-halogenated VOCs and SVOCs. The following technologies are potential candidates identified from EPA's screening matrix:

1. Bioventing
2. Enhanced Bioremediation
3. Thermal Treatment
4. Incineration

5. Thermal Desorption
6. Dual Phase Extraction
7. Bioreactors
8. Advanced Oxidative Processes
9. Granulated Activated Carbon/Liquid Phase Activated Carbon
10. Separation
11. Passive/Reactive Treatment Walls
12. Excavation and Off-site Disposal

Further, the soil gas underneath the Carousel Tract contains methane concentrations greater than 50% by volume. As the Regional Board is aware, the lower explosive limit for methane is 5.1% by volume. Therefore, there currently exists a clear and present danger that an uncontrolled fire or explosion may occur at the Carousel Subdivision at any moment.

The situation will be exacerbated as more excavations and associated activities are carried out by Shell and its environmental contractor URS in response to the proposed TCAO. It follows that before the contemplated cleanup work is initiated, a thorough fire and explosion risk assessment needs to be performed by a qualified professional for the purpose of protecting the community from a catastrophic event. To do otherwise is to ignore a very obvious hazard. As a contingent possibility, a controlled venting of soil gas from methane "hotspots" could alleviate some of the danger from fire and explosion.

Extensive literature links the deposition of petroleum in the subsurface environment to methanogenesis. For the Regional Board's consideration, eight (8) of the most relevant documents have been included that describe the process of methane formation from the presence of petroleum. By tracking carbon isotope ratios through fermentation and methanogenesis in the soil, Landemeyer, 1996 concluded that methane distribution was consistent with the regions of highest BTEX concentrations in the oil.

Multiple studies show that following an initial lag period for establishing methanogenic conditions, petroleum hydrocarbons escalated in degradation to methane formation (Brauner 2001, Chapelle 2002, Salminen 2006). A 2001 assessment of petroleum hydrocarbon plume behavior in a natural environment produced laboratory results that were consistent with methanogenesis in an iron-reducing zone (Skubal 2001). Once iron-reducing conditions have been established and methanogenesis occurs regularly, a second significant source of methane can be attributed to carbon dioxide reduction based on the equivalence of carbon dioxide and non-degraded petroleum (Roling 2003).

One study reported the rapid degradation of benzene in petroleum to methane in a methanogenically adapted zone, which suggests that longer persistence of petroleum in the ground yields increasingly threatening methane concentrations (Weiner 1998, Jones 2008). The most critical problem resulting from deposition of petroleum in subsurface environments is the contamination of groundwater, as methanogenesis is most prevalent at deeper elevations that are more likely to come into contact with flowing groundwater aquifers (Landemeyer 1996). The papers cited in this summary are included for reference.

Several studies demonstrate the formation of methane from crude oil degradation in a contaminated subsurface environment. The primary processes involved in the anaerobic breakdown of crude oil in contaminated regions are iron reduction and methanogenesis (Baedecker et al., 1993). It has been documented that the presence of crude oil in soil catalyzes an increase in carbon flow through microbial communities, breaking down the complex carbon structures found in the mixture (Duncan 1999).

In regions of elevated hydrocarbon flux, the transition from iron reduction to methanogenesis occurs most rapidly (Bekins 2005). The establishment of methanogenic reactions is based on a lag period, during which iron-reduction is the primary Terminal Electron-Accepting Process, and afterwards methane production continues at an accelerated rate (Townsend 2003, Cozzarelli 2001, Jones 2008). The primary zones in the subsurface where methane production occurs are in a region in the middle of the spill where separate-phase oil rests and below the directly impacted region in the middle 25-50% of the laterally migrating plume of contaminated groundwater (Bekins 2001, Bekins 1999).

In summary, there are significant misunderstandings and assumptions in the TCAO. We have a 55 acre property that is seriously contaminated that should have never been developed and subdivided for residential housing. Saying this, we have to work together to assure that the health, safety and welfare of the people living in the Carousel Housing Tract are adequately addressed today as well as in the future.

The TCAO is a good start, but unfortunately stops short of protecting the people living within the Carousel Housing Tract. For example, Section 9 indicates that the Regional Board approved a soil vapor extraction pilot test to evaluate the use for the technology to remediate VOC's. While this technology *may* remediate the VOCs, it will not remediate the heavier chain of hydrocarbons such as benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and chrysene. Therefore, contamination will still be present, and the residents will have to continue to live under these deplorable conditions.

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Unfortunately, the only viable solution to guarantee the health, safety and wellbeing of the people living within the Carousel Housing Tract is to treat the site as one Operable Unit, relocate the residents, remove the homes, remediate down to thirty (30) feet, install a vapor barrier, and rezone the 55 acres for industrial use only.

Lastly, I suggest that we meet to work through the initial concerns raised in this letter with the goal of getting the people of the Carousel Housing Tract some well overdue relief.

Please contact me at your earliest convenience in order to set up such a meeting.

Sincerely,

G I R A R D I | K E E S E



THOMAS V. GIRARDI

cta

cc: Sam Unger
Michael Leslie
Jeffrey Dinzter
Jerry Brown