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June 7, 1993
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Ms. Susan L. Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94612

Subject: Minutes to Meeting held at Alameda County Health Care Services Agency
(ACHCSA) on May 19, 1993.

Dear Ms. Hugo:

On behalf of ARCO Products Company (ARCO), RESNA Industries, Inc. (RESNA) has prepared these minutes for the meeting held at your offices on May 19, 1993. This meeting was held for discussion of ARCO sites 374, 771, 2185, 6041, 6113, and 6148 located in Alameda County. In addition to yourself, attending the meeting were Ms. Eva Chu and Mr. Barney Chan of the ACHCSA, Mr. Michael Whelan of ARCO, Ms. Valli Voruganti, Mr. John Young, and Mr. Greg Barclay of RESNA.

Items discussed include the following: ongoing assessment and remediation at the above mentioned sites; offsite access problems; updates and changes in remediation schedules; and other issues concerning these sites. Specific topics discussed for each site are included in the following minutes to the meeting.

Attending the entire meeting were Ms. Susan Hugo of the ACHCSA, Mr. Michael Whelan of ARCO, and Ms. Valli Voruganti, Mr. John Young, and Mr. Greg Barclay of RESNA. Ms. Eva Chu was present for the discussion of ARCO Station 6041, and Mr. Barney Chan was present for the discussion of ARCO Station 2185. The meeting convened at approximately 2:15 p.m.

ARCO Station 6041, 7249 Village Parkway, Dublin, California.

The discussion started with Mr. Mike Whelan giving a brief overview of ARCO's 26 sites within Alameda County. Eleven sites are currently in remediation and it is expected that seven more sites will be operational by the end of this year. Mr. Whelan discussed the lack of success with groundwater pump and treat systems and the recent success ARCO has had with air sparging in remediating hydrocarbon impacted groundwater, including recent closure of a site in San Francisco. Mr. Whelan discussed ARCO's approach to remediating sites by going after the source; i.e., removal of single walled tanks and product lines, hydrocarbon-impacted vadose zone soils, capillary fringe and saturated zone soils.

Mr. Whelan began discussion on ARCO Station 6041 by stating that Mr. Scott Seery of ACHCSA, had formerly managed this site. Currently, the site is managed by Ms. Chu, who oversees Dublin and Livermore areas. Ms. Chu confirmed this change in regulatory oversight. Mr. Whelan explained that at the previous meeting held for this site on September 30, 1992, Mr. Joel Coffman of RESNA and Mr. Seery had discussed possibly conducting a pump test. Ms. Valli Voruganti interjected that a work plan was submitted to ACHCSA on September 29, 1992 which proposed additional onsite assessment work, an aquifer pumping test and a vapor extraction test (VET) at the site. Ms. Voruganti continued that onsite vapor extraction and monitoring wells were installed, and a VET was conducted at the site during the last quarter 1992. Based on results of the VET, vapor extraction was evaluated to be a feasible soil remedial alternative (A 35-foot effective radius of influence for each vapor extraction well was observed; RESNA, January 29, 1993).

Mr. Whelan reiterated the lack of success that ARCO has experienced with pump and treat systems in effectively remediating groundwater on several ARCO sites, as opposed to the recent success of air sparging. Mr. Whelan then stated ARCO's desire to proceed with an air sparge test in lieu of a pumping test at this site. Ms. Voruganti continued that since sparging occurs at relatively low air pressures (5 to 15 psi) and the resulting sparge radii of influences are relatively small, it is essential that the location of the hydrocarbon source be identified prior to installation of a sparge well and subsequent performance of a sparge test.

Mr. John Young and Mr. Whelan stated ARCO's intention of evaluating a potential onsite source, and if appropriate, defining the onsite extent. It was proposed that this be accomplished by the use of a hydraulic continuous core probe placed at several points across the site. The drill rig will drive a two-inch diameter probe at several points (along the fill ends of the existing tanks and along the pump islands) across the site. Ms. Chu asked if the

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hydraulic probe drill rig is similar to a "Geoprobe" type drill rig. Mr. Young stated that the rig RESNA will be using is similar in method, however, the rig utilizes a larger diameter probe.

With ARCO's intent stated, Mr. Whelan added that ARCO will install air sparging wells as necessary in close proximity to the onsite source(s), as they are identified. Ms. Valli Voruganti then explained the field procedures followed in conducting an air sparge test on the sparge well and a combination VET and air sparge test to evaluate the sparge radius of influence, the feasibility of sparging, and to ensure that vapor extraction will capture the sparge off-gas. Ms. Chu asked if we would vent the sparge off-gas to the atmosphere during the test. Ms. Voruganti responded that an internal combustion engine (IC) engine will be utilized for abatement to comply with Bay Area Air Quality Management District (BAAQMD) regulations.

Ms. Chu asked about the offsite hydrocarbon groundwater plume, if any, and how ARCO was going to address it at the site. Mr. Young replied that monitoring wells MW-4 through MW-6 located downgradient, crossgradient and upgradient, have reported nondetectable (ND) levels of gasoline hydrocarbons. Well MW-2 has also been ND except for the most recent sampling event (reported levels of total petroleum hydrocarbons-as-gasoline (TPHg of 740 parts per billion [ppb])).

A discussion then developed on the groundwater gradient and flow direction across the site and across the other stations located on opposite corners. Ms. Voruganti presented a groundwater gradient map which depicted a easterly/southeasterly flow direction across the ARCO and Unocal sites. Ms. Chu said she had calculated a more southerly flow direction across the ARCO site, based on groundwater elevation data from wells located closely together near the tank complex. There was discussion on calculating flow direction. Mr. Whelan stated that by using all the wells onsite, including the three wells located near the perimeter of the site (MW-4 through MW-6), a more accurate interpretation of groundwater flow direction could be generated, as compared to a gradient interpretation based on select groundwater elevation data. ARCO used these perimeter wells to arrive at an easterly/southeasterly flow direction. As requested by Ms. Chu, ARCO will continue to collect monthly water levels to calculate groundwater flow direction and gradient.

In a discussion of the area around the ARCO station, historical data on dissolved TPHg and benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations in groundwater was discussed for each site. This information was provided by Ms. Chu. Ms. Voruganti mentioned that Unocal's monitoring well MW-1, located upgradient of ARCO's well MW-1, originally displayed much higher concentrations of TPHg and BTEX, however, these

concentrations began to decrease during the same time period as concentrations started to increase at the ARCO site. Ms. Chu asked if ARCO intends to put an onsite monitoring well upgradient of MW-1 to identify if hydrocarbon-impacted groundwater from the Unocal station has travelled offsite. Mr. Whelan responded with the understanding that usual regulatory approach was to require the upgradient principal responsible party (PRP) to determine the extent to which offsite impact has occurred. Mr. Barclay stated that since the onsite source(s) have not been verified on the ARCO site and a source has been identified upgradient of the ARCO site, another upgradient well on the ARCO site would likely not be the best strategy in defining ARCO's potential onsite source. Ms. Hugo asked if Unocal could place a well on the ARCO site to further delineate the extent of the Unocal plume. Mr. Whelan said that Unocal would probably not agree to this. Ms. Chu discussed further downgradient assessment must be implemented by Unocal since they are currently not controlling potential migration with a groundwater remediation system. Both Ms. Chu and Ms. Hugo discussed the possibility of Unocal installing a well in Village Parkway.

Ms. Chu asked if ARCO would place a well downgradient of the ARCO site. Both Mr. Whelan and Mr. Young discussed that ARCO currently has downgradient wells (MW-2, MW-4) at their property line and these wells have been nondetectable TPHg and BTEX with the exception of MW-2 during the last sampling event. In addition, Mr. Whelan brought up the fact that the former Mobil (now British petroleum [BP]) station does not have a well along the northern portion of their site, with the exception of AW-6 located in the northeastern portion of the site. Dissolved TPHg and BTEX concentrations in AW-6 have been much higher than the onsite wells on the ARCO station. Ms. Chu discussed fluctuating groundwater directions reported at the former Mobil site and the possibility of 2 or more water-bearing zones at this site. Ms. Voruganti and Mr. Barclay stated that the well construction and groundwater gradient should be reviewed if two or more water-bearing zones exist at that site. In addition, because groundwater is relatively shallow in this area, the possibility of underground utility trenches affecting groundwater flow was discussed. Ms. Chu stated that she will research blueprints with the City to determine where the nearest utilities are in relation to this area. Ms. Chu also discussed the need for addition hydrogeologic definition at the former Mobil site. Because of the apparent lack of data on the northern portion of the former Mobil site, and existing downgradient data reported on the ARCO site, further downgradient assessment by ARCO offsite is inappropriate at this time. Mr. Young reiterated that ARCO would like to address any potential onsite source before placing wells offsite.

Ms. Hugo and Ms. Chu further discussed the status of assessment and remedial work at the other sites located on the opposite corners (former Mobil [BP], Shell, Dutch Pride, and Unocal). All underground storage tanks (USTs) at these sites were removed and replaced.

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Currently Shell Oil is not an active station. At one time, an aquifer pump and recovery test was performed at the Shell site and was determined to be successful, however, no further action was taken. Quarterly monitoring is being performed at the Unocal and former Mobil sites, however, no additional assessment work is currently scheduled. Furthermore, Dutch Pride and the former Shell station are not performing quarterly monitoring. Ms. Chu said she is in the process of requiring Dutch Pride (a market located next to the former Shell station) to address remediation of impacted soil and groundwater due to the former UST located near MW-13. Ms. Hugo and Ms. Chu concurred that ACHCSA could require Unocal to look into migration control at their site. **Ms. Hugo said she would send RESNA the latest groundwater quarterly monitoring results from the Unocal and former Mobil Oil sites.**

Ms. Voruganti requested a delay of two months (from April 1994 to June 1994) in startup of an interim soil and groundwater remediation system at the site. This delay was requested as a result of sparge testing and additional onsite assessment work to be performed instead of the proposed aquifer pumping test. Ms. Chu and Ms. Hugo gave a verbal approval to the delay. At the request of Ms. Chu, a letter detailing revised schedules for completion of the intermediate phases of work leading to system startup will be submitted to ACHCSA, as soon as possible.

In summary, Mr. Whelan and Mr. Barclay stated that ARCO will identify potential onsite source(s) using a hydraulic continuous core probe and install and test air sparge wells in conjunction with vapor extraction to evaluate the feasibility of vapor extraction and sparging as interim soil and groundwater remedial alternatives. If additional offsite assessment downgradient of the ARCO site is necessary, additional information from work performed at the surrounding sites will be evaluated to determine PRPs. Following our discussion on ARCO Station 6041, in Dublin, Ms. Chu left the meeting.

ARCO Station 374, 6407 Telegraph Ave., Oakland, California.

Ms. Voruganti began by updating Ms. Hugo on the status of remediation work at the subject site. The landscaping plans for the site were approved in early May 1993, and are due for submittal to bid within the next few weeks. As agreed by ACHCSA, the contract shall be awarded and construction is scheduled to begin in early August 1993. System startup is scheduled for September 1993. A delay of approximately nine months in system startup was incurred as a result of the district being rezoned and the City of Oakland requiring additional permitting and landscaping at the site. Ms. Hugo mentioned that she had spoken to Mr. Bill Quesada, who indicated that the City of Oakland will be willing to work with RESNA, to expedite permitting related to installation of remediation systems (for example by submittal of drawings with the remedial action plan). Ms. Voruganti and Mr. Whelan stressed that it has been ARCO's approach to have their consultants communicate with local agencies regarding permitting issues that may arise prior to final design. This was the case for this site, however due to redistricting and rezoning, a new set of permits were needed at the final stage, and hence additional delays were incurred. ARCO is continuing with quarterly monitoring.

ARCO Station 771, 899 Rincon Ave., Livermore, California.

Discussion about this site began by Mr. Whelan asking Ms. Hugo if she has received any information regarding site access for well installation from the owner of the property immediately adjacent to the ARCO site. Ms. Hugo said she had not received permission from the offsite owner to allow ARCO to install wells. She said she would draft and send a letter to the offsite property owner regarding this issue. As requested, RESNA will provide information on the offsite property owner (name and address) to Ms. Hugo as soon as possible. Mr. Whelan noted that three written requests for offsite access had already been made and to date access has not been gained. Mr. Whelan also informed Ms. Hugo that the property owner had previously spoken with Mr. Coffman of RESNA and Ms. Hugo concerning this matter. Ms. Hugo said if she does not have any success with the offsite owner she will refer the matter to the RWQCB. Mr. Whelan and Ms. Voruganti explained that offsite wells installed downgradient and cross gradient of the site have reported nondetectable concentrations of TPHg and BTEX in groundwater since installation in January 1993.

Ms. Voruganti stated that the vapor extraction system (VES) for interim soil remediation was installed on schedule in March 1993. Startup of the interim VES has not been initiated due to a 20-foot increase in groundwater elevation in the on- and offsite vapor extraction

and monitoring wells. The available screen interval for venting has been submerged as a result of the rise in groundwater elevations. Based on monthly groundwater monitoring, depth-to-water (DTW) in onsite wells has been decreasing at a rate of approximately 2 feet per month since March 1993. **If the current decrease in groundwater levels continue, Ms. Voruganti stated that startup of the VES can occur in early August 1993.**

ARCO Station 6113, 785 E. Stanley Blvd., Livermore, California.

Ms. Voruganti began by discussing the 40-foot increase in groundwater elevations observed in the onsite monitoring wells at the site since January 1993. Three relatively distinct, unsaturated hydrologic zones (shallow, middle, and deep) were previously identified at the site. These zones occur at approximate depths of 10 to 30 feet below grade surface (bgs), 30 to 50 feet bgs, and 50 feet bgs and below. With the exception of the shallow zone, all other zones have been flooded since groundwater levels have risen 40 feet (from 65 feet bgs to 25 feet bgs).

Ms. Voruganti showed Ms. Hugo the D-size Plans of the subgrade remediation-piping layout submitted earlier to ACHCSA (in December 1992) detailing the proposed shallow, middle and deep zone vapor extraction wells that will be used to remediate subsurface hydrocarbon-impacted soils. These wells were proposed based on the results of the VET performed at the site (a 40-, 30- and 175-foot effective radius of influence (R.O.I) was observed in the shallow, middle and deep zones, respectively). As a result of the rise in water levels, Mr. Whelan stated that as detailed in the December 1992 Work Plan, ARCO will proceed with installation of only the proposed shallow zone vadose wells. Based on the decrease in groundwater levels, additional vapor extraction wells will be installed at a later date in the middle and deeper zones. **Ms. Voruganti stated that a VES for interim remediation of hydrocarbon-impacted soils in the shallow zone is scheduled to be installed and operational by January 1994.**

Mr. Whelan explained that ARCO would like to proceed with air sparging at this site in lieu of an aquifer pump and recovery test that was proposed in a work plan submitted in December 1992. **A work plan for installation of the sparge wells and a remedial action plan (RAP) for interim soil and groundwater remediation will be submitted to ACHCSA by July 15, 1993.** Ms. Voruganti added that the date (s) for sparge well (s) and interim groundwater remediation system installation is dependent on observed decreases, if any, in groundwater elevations at the subject site. However, based on high VOC concentrations during the VET, the proposed Thermal/Cat-Ox treatment system will be fully utilized at startup by extracting from the proposed shallow vapor wells.

Ms. Hugo asked when a report would be submitted for the two offsite wells and one onsite well drilled earlier this year. Ms. Voruganti stated that as a result of the heavy rains in last quarter 1992 and first quarter 1993, and delays in procurement of product pumps, a three month delay was incurred in completion of the removal and replacement of product lines and on- and offsite well installation at the site. **Hence, the report detailing the offsite/onsite monitoring wells and the shallow vadose extraction wells installation will be submitted to the ACHCSA by August 15, 1993.**

Ms. Voruganti proceeded to show Ms. Hugo several graphs displaying the fluctuations in groundwater in the Livermore Valley.

ARCO Station 6148, 5131 Shattuck Ave., Oakland, California.

Mr. Young began discussing this site by reviewing the recent results of a subsurface investigation conducted in April 1993. Eleven test borings were drilled across the site using a hydraulic-probe drill rig to evaluate potential onsite source(s). One test boring was converted into a air sparge well in the vicinity of the operating service island. Ms. Voruganti and Mr. Young discussed the analytical results of the soils samples collected from these borings and results from the first quarterly groundwater monitoring event. These results indicate that vadose zone soils in the vicinity of the operating service islands have been impacted by low concentrations of gasoline hydrocarbons (ND to 20 ppm TPHg at depths of 9.5 to 12 feet bgs). Soil sample results also indicated that capillary fringe soils in the vicinity of the north service islands, the fill ends of the tank cluster, and downgradient of the north service islands in the vicinity of the former waste-oil tank have been impacted by gasoline hydrocarbons (ND to 740 ppm TPHg at depths of 14 to 18.5 feet below grade).

Mr. Young proposed that a vapor extraction, an air sparge and a combination vapor extraction and sparge test be conducted at this site in lieu of an aquifer pump and recovery test. The VET will address the feasibility of remediation of the vadose zone soils, while the air sparge and combination sparge and vent test will address the feasibility of remediation of impacted groundwater by sparging the primary source for hydrocarbons (the capillary-fringe soils) in conjunction with vapor extraction at the site. Ms. Hugo asked where the locations of the vapor extraction and sparge well(s) would be. Ms. Voruganti stated that to avoid installation of additional observation wells, a sparge and two vapor extraction wells will be installed in the southeastern portion of the site, in the vicinity of existing monitoring wells MW-1 through MW-3. The existing monitoring wells will serve as observation wells for the VET, sparge and combination sparge and vent tests. The final location of these wells, and the field procedures that will be followed during the tests will be detailed in the

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forthcoming work plan. Mr. Young stated that a report of findings for the April 1993 test borings as well as a work plan for the proposed vapor extraction and sparge well (s) installation, the VET and sparge tests will be submitted to ACHCSA in late June 1993, approximately six weeks ahead of schedule. An earlier deadline for the report and work plan had been set for August 1, 1993.

Based on results of the VET, sparge and combination sparge and vent tests, an interim soil and groundwater remediation system will be designed. Ms. Voruganti requested a delay of 60 days in the startup of the systems, from April 1994 to June 1994. Ms. Hugo gave verbal approval for the requested 60 day delay in systems startup.

Following final discussion on ARCO Station 6148, Mr. Barney Chan joined the meeting to discuss site developments at ARCO Station 2185 in Oakland.

ARCO Station 2185, 9800 E. 14th St., Oakland, California.

Discussion about this site began by Mr. Young and Ms. Voruganti reviewing previous assessment work conducted to date on the site. Results of previous assessments indicate that the primary source of hydrocarbons at the site occur in the recently submerged capillary fringe soils (now saturated zone soils) in the vicinity of the USTs and service islands. The capillary fringe soils are now submerged due to the recent heavy rains and resultant rise in groundwater elevation. A VET conducted at the site in June 1991 indicated that vapor extraction is not a feasible soil remedial alternative due to the less permeable vadose zone soils underlying the site.

Ms. Voruganti explained the results of an aquifer pumping test that was conducted in late February - early March 1993. Monitoring well MW-3 was used as the pumping well. Drawdown within the pumping well was approximately 3.5 feet at a pumping rate of 6.5 gallons per minute. Drawdown in observation wells varied from 0.5 to 0.1 feet, based on distance from the pumping well.

Mr. Young discussed the installation of offsite monitoring well (MW-7) downgradient/crossgradient of the site. The well was installed in the sidewalk within CALTRANS right-of-way. Mr. Whelan discussed the two month delay associated with CALTRANS approval of the offsite monitoring well. Preliminary results of water samples collected from the offsite monitoring well indicated a benzene concentration of 0.83 parts per billion (ppb), below the maximum contaminant level (MCL) limit in drinking water.

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Mr. Whelan stated that the remediation schedule deadlines established in the September 30, 1992 meeting called for submittal of a RAP for interim soil and groundwater remediation to the ACHCSA by June 1, 1993. However, the lack of sufficient drawdown seen in the observation wells during the pumping test would not allow for all of the hydrocarbon-impacted capillary fringe and saturated zone soils to be exposed, without installation of numerous groundwater recovery wells. Mr. Young stated that further groundwater modeling of the pumping test results could be used to determine if pumping is a technically and economically feasible method. Ms. Voruganti and Mr. Whelan stated that even if modeling indicates pumping is feasible with the installation of numerous recovery wells and drawdown can be sustained, it still may be very difficult to target cleanup of the source with sparging and vapor extraction. This is based on impacted clayey soils being saturated, thus making venting unfeasible unless the soils were given a chance to dry. Keeping a sustained drawdown that will allow for adequate drying of the soils is not feasible due to the high probability of additional rainfall or system shutdown as a result of malfunction of process equipment and instrumentation. The pumping test showed that the wells recovered almost instantaneously after pumping. Sparging the capillary fringe alone would not be feasible since the vadose zone soils are less permeable to vapor extraction and therefore, the sparge off-gas cannot be captured.

Based on the above discussions, RESNA and ARCO stressed that a delay in submittal of the RAP is necessary to formulate an effective approach to remediation. Mr. Chan asked if injection of hydrogen peroxide or some type of bioremediation has been addressed. Mr. Young said that a feasibility study of available soil and groundwater remedial alternatives could be performed to determine a viable method for remediation of impacted soils and groundwater. Mr. Whelan asked if alternative points of compliance can be used to determine viable remedial approaches for this site. Mr. Chan stated that this approach could be possible and may apply to this site, but more information would be necessary to evaluate this further.

Ms. Voruganti said she would draft a letter listing several remedial approaches that will be evaluated in a feasibility study for this site. Based on ARCO and ACHCSA approval, a detailed feasibility study will then be conducted on a few of the selected remedial approaches. Ms. Voruganti requested a six month delay to present a feasibility study, RAP or other alternatives. Ms. Hugo and Mr. Chan gave verbal approval of the delay, and said they would await RESNA's letter explaining remedial approaches to be evaluated in a feasibility study. Based on the previous June 1, 1993 RAP deadline, a six month delay would project an early December 1993 deadline for the feasibility study, given a 30-day review process by ACHCSA.

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Upon conclusion of discussion for this site, the meeting adjourned at approximately 5:15 p.m.

If you have any questions or comments concerning these minutes to the meeting, please call us at (408) 264-7723.

Sincerely,

RESNA Industries Inc.



John C. Young
Project Manager

cc: Michael Whelan, ARCO Products Company
Chris Winsor, ARCO Products Company
John Meck, ARCO Legal Dept.
Eva Chu, ACHCSA
Barney Chan, ACHCSA
Valli Voruganti, RESNA
Greg Barclay, RESNA