

APPENDIX Y

*Supplemental Water Quality Impact Evaluation and Groom
Properties HVOC Site Evaluation*



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Proj. No.: N0410C010
File Loc.: Folsom

Pete Connelly
Analytical Environmental Services
1801 7th Street, Suite 100
Sacramento, CA 95814

Dear Mr. Connelly:

**RE: SUPPLEMENTAL WATER QUALITY IMPACT EVALUATION, PROPOSED
GRATON RANCHERIA CASINO AND HOTEL, ROHNERT PARK,
CALIFORNIA**

1. INTRODUCTION

The proposed Graton Rancheria Casino and Hotel in Rohnert Park, California (the Site) is expected to be supplied by one or two groundwater supply wells installed to a depth of approximately 600 feet below ground surface and pumping at a combined rate of approximately 200 gallons per minute (gpm). The location of the Site and proposed water well are shown in Figure 1. An evaluation of drawdown impacts and regional/cumulative impacts associated with developing this water supply were presented in our report titled *Groundwater Study: Proposed Graton Rancheria Casino and Hotel, Rohnert Park, California*, dated January 2007 (the Groundwater Study, WorleyParsons Komex, 2007). This letter presents the methods and results of a supplemental evaluation of potential water quality impacts related to selected fuel leak incidents near the Site.

The question was raised by cooperating agencies whether groundwater pumping for the project might affect groundwater quality by spreading existing contamination in the Site area. In order to help evaluate the likelihood that groundwater pumping for the project could result in spreading impacts, Analytical Environmental Services has selected the two active fuel leak cases that are closest to the site (and expected to be indicative of the potential for impacts) for evaluation. These cases are the Tesoro Gas Station facility located at 5085 Redwood Drive and the Redwood Shell facility located 5060 Redwood Drive in Rohnert Park (Figure 1). Our scope of work was based on our proposal dated 5 January 2007 and focuses on evaluating the likelihood that project pumping will result in inducing migration of the contaminants present at these fuel leak case sites either laterally or vertically. The proposed evaluation is intended to address the need for evaluating the general likelihood of such impacts as part of the Environmental Impact Statement (EIS) for the project.



2. APPROACH

The objective of this study is to evaluate the likelihood that project-related pumping will induce the lateral or vertical spread of impacted groundwater at the selected sites to an extent that would not otherwise occur. Potential impacts associated with such contaminant migration could include degradation of groundwater-quality in new areas, spreading of contamination to water supply wells in the area (including the proposed project wells) and exposure of human receptors to contaminants (*e.g.*, by drinking impacted water or by breathing vapors that migrate through the ground surface and into buildings). In this report, we have evaluated the potential for degradation of groundwater quality in new areas due to the spread of contamination at a screening level using a weight-of-evidence approach. Our evaluation includes the following:

1. Hydrogeologic Evaluation.
 - a. We updated a conceptual hydrostratigraphic cross section prepared by Winzler & Kelly (2005) to better visualize the relationship between the potential screened interval of the project water supply well, other key wells considered in this evaluation, and the area of impacted groundwater (Figure 2).
 - b. We compared the hydrographs of shallow and deep groundwater level monitoring wells used by the California Department of Water Resources (DWR), City of Rohnert Park Well 24, and selected shallow monitoring wells at the selected LUFT sites to evaluate whether the shallow impacted groundwater would be expected to be effected by pumping for the project's proposed water supply well(s).
2. We reviewed the data available regarding the selected LUFT sites from the State's GeoTracker on-line database and/or provided to us by AES and discussed the sites with the oversight case worker at the County of Sonoma Department of Health Services (CSDHS). Based on the available data, we evaluated the extent of contamination and the status of work at the sites to the extent possible.
3. We reviewed information regarding an additional LUFT site in the area that has a 16-year history of investigation, monitoring and cleanup to assess whether municipal pumping near this site has caused migration of contamination.

3. DESCRIPTION OF THE FUEL LEAK INCIDENTS EVALUATED IN THIS REPORT

The locations of the selected LUFT sites, impacted domestic wells, the project Site boundary, and proposed supply well are shown in Figure 1. Also included is the location of the Royal Coach Chevron LUFT site, which is the site mentioned above as having a 16-year history of investigation, monitoring and cleanup, and therefore useful for evaluating the long term behavior of contaminants in this area of municipal pumping. The following information was compiled from review of documents retrieved by AES from the RWQCB case files for the LUFT sites and data obtained by WorleyParsons Komex from the State Geotracker on-line database.



3.1 Redwood Shell

Contamination at the Redwood Shell site was discovered in 1998. The primary contaminants are methyl tertiary-butyl ether (MTBE) and its breakdown product tertiary-butyl alcohol (TBA), which were detected at maximum concentrations of 116,000 micrograms per liter ($\mu\text{g/L}$) and 15,000 $\mu\text{g/L}$, respectively. The maximum concentrations of MTBE and TBA detected during the third quarter of 2006 were 4,300 and 25 $\mu\text{g/L}$, respectively. The case has been assigned the highest priority MTBE Threat Classification and is designated as a Class I MTBE cleanup site. The site has been evaluated by installing 16 monitoring wells to depths ranging from approximately 15 to 20 feet bgs (Cambria, 2006b). The vertical extent of groundwater impacts near the site were investigated by advancing nine cone penetrometer probes up to depths of approximately 100 feet at the site and to the south and southwest, and collecting groundwater grab samples at various depths. MTBE and TBA concentrations were found to attenuate with depth; however, in probes CPT-2, 4, 5 and 8 at concentrations of 180, 2.2, 8.1 and 1.2 $\mu\text{g/L}$, respectively, at depths ranging from 84 to 97 feet bgs. Each of these CPT probes is located on the Redwood Shell site. From the available data, it is not clear whether the vertical and lateral extent of contamination has been delineated.

MTBE and TBA from this site were reported to be detected in two shallow domestic wells, at 80 and 104 Wilfred Avenue (Figure 1). Based on well construction records obtained from DWR by WorleyParsons Komex, the well at 80 Wilfred Avenue is 90 feet deep and screened from 70 to 90 feet bgs, and the well at 104 Wilfred Avenue is 111 feet deep and screened from 91 to 111 feet bgs (Figure 2). These wells were installed in 1942 and 1952, respectively. MTBE was detected in a sample from the well at 80 Wilfred Avenue on one occasion in 2002 at a concentration of 1.9 $\mu\text{g/L}$, and in samples from the domestic well at 104 Wilfred Avenue between 2002 and May 2005 at concentrations ranging from 0.5 to 5.5 $\mu\text{g/L}$. Carbon treatment systems were installed at these wells in 2002. Since May of 2005, no contaminants have been detected in either well.

Interim remediation was implemented at the site by pumping groundwater from several of the monitoring wells. In 2003, five groundwater extraction wells were installed at the site to depths between 15 and 20 feet bgs and used to extract and treat MTBE-impacted groundwater as an interim remedial measure. The combined flow rate from these wells has varied from less than one to approximately 12 gpm (Cambria, 2006b). A groundwater contour map provided in the third quarter 2006 groundwater monitoring event indicates that shallow groundwater at the Redwood Shell site is hydraulically contained; however, it is not clear how far the capture zone for the wells extends laterally off-site or vertically. Influent MTBE concentrations have ranged from 7,200 to 130 $\mu\text{g/L}$, and a total of about 119 pounds of MTBE and 12 pounds of TBA are estimated to have been removed since 2003. Since November 2005, system influent concentrations have been below 1,000 $\mu\text{g/L}$. Mr. Cliff Ives, the CSDHS case worker for the site, indicated that after site characterization is complete, a Corrective Action Plan will be required for the site.

3.2 Tesoro Fuel Station

Contamination at the Tesoro Gas Station site was reported in 2003. The primary contaminants are gasoline hydrocarbons and MTBE, which was detected at maximum concentrations of 1,100 $\mu\text{g/L}$ (Edd Clark & Associates, 2006). The maximum concentration of MTBE detected during the second quarter



of 2006 was 510 µg/L. The case has been assigned the highest priority MTBE Threat Classification and is designated as a Class I MTBE cleanup site. The site has been evaluated by installing 6 monitoring wells to depths of approximately 20 feet bgs. In addition, several domestic wells west of the site have been sampled, but MTBE was not detected. From the available data, it is not clear whether the vertical and lateral extent of contamination has been delineated. Mr. Cliff Ives, the CSDHS case worker for the site, indicated that after site characterization is complete, a Corrective Action Plan will be required for the site.

3.3 Royal Coach Chevron

A fuel leak was reported at the Royal Coach Chevron site in 1988. The primary contaminants are gasoline hydrocarbons and MTBE, which were detected at maximum concentrations of 160,000 and 650 µg/L, respectively (Gettler-Ryan, 2006). The maximum concentration of gasoline hydrocarbons detected during the second quarter of 2006 was 3,900 µg/L. MTBE was detected at a concentration of 12 µg/L during the first quarter 2006 monitoring event in well MW-7; however, this well was not sampled during the second quarter. The site has been evaluated by installing 12 monitoring wells. WorleyParsons Komex was able to obtain information regarding the depths of only two of these wells, which were approximately 10 and 20 feet deep. In 2000, remediation was conducted at the site by excavating, treating and disposing impacted soil. A case closure request submitted in 2006 indicates that gasoline hydrocarbons at the site are decreasing by natural attenuation. Currently, the only action required at the site by CSDHS is groundwater monitoring. The site has not been assigned an MTBE threat or cleanup classification.

4. EVALUATION OF POTENTIAL IMPACTS

4.1 Hydrogeologic Setting

The locations of DWR monitoring wells, City of Rohnert Park wells, impacted domestic wells and the LUFT sites described previously are shown on Figure 1. The shallow groundwater flow direction near the Site in spring 2004 is reported to have been toward the west (Winzler & Kelly, 2005). The deeper groundwater flow direction at that time is reported to have been toward the west to south-southwest. The groundwater flow direction in the uppermost saturated zone at the Tesoro Gas Station site is reported to have varied between west-northwesterly to east-southeasterly between 2004 and 2006; however, it appears probable that the easterly groundwater flow directions resulted during mounding of groundwater near a storm drain line during recharge events (Edd Clark & Associates, 2006). The depth to groundwater reported in the State's Geotracker database for three LUFT sites reviewed ranges from about 1.5 to 16 feet below ground surface (bgs). Based on the available information, the three LUFT sites are upgradient to side-gradient relative to the proposed production well location for the hotel and casino project.

Figure 2 presents a hydrostratigraphic cross section near the Site, with the cased and screened intervals of these wells projected. This figure indicates that the area near the Site is underlain by a heterogeneous mixture of alluvial sediments that can be subdivided in general zones, but does not include laterally extensive aquitards (Winzler & Kelly, 2005). Hydrographs for selected DWR



monitoring wells, City of Rohnert Park municipal wells, and LUFT site monitoring wells are shown on Figures 3 and 4. Details regarding hydrogeologic conditions in the Site area are presented in the Groundwater Study (WorleyParsons Komex, 2007).

4.2 Well Hydrograph Evaluation

Figure 3 shows the hydrograph for State Well 6N/8W 15-J3, which is screened in the lower portion of the Shallow Zone from approximately 65 to 166 feet bgs. The hydrograph shows that water levels decreased steadily in this well as pumping by the City of Rohnert Park increased. The spring-to-fall seasonal water level fluctuations and overall decreasing water level in this well during 1974 through 1984 are similar to the hydrograph for well 6N/8W 15-R1 (Figure 3), but the amplitude of the seasonal fluctuation is lower in well 6N/8W 15-J3. Well 6N/8W 15-R1 is located a quarter mile south of well 6N/8W 15J3, is reported to be 1028 feet deep, and is characterized by DWR as a deep monitoring well. As discussed in greater detail in the Groundwater Study, the seasonal fluctuations in the hydrographs of these two wells are likely the result of municipal groundwater pumping, which is greatest during the summer and fall. Most of the City's wells are screened below depths of about 250 feet bgs, and the amplitude of seasonal drawdown from municipal pumping is greatest in deep well 6N/8W 15-R1. The lower amplitude of the seasonal water level change in shallow well 6N/8W 15-J3 indicates that the drawdown from municipal pumping at depths below 250 feet is attenuated in the Shallow Zone.

Figure 3 also presents the 1990 to 2006 hydrograph for well MW-6 at the Royal Coach Chevron LUFT site, which is completed in the uppermost portion of the Shallow Zone. Seasonal fluctuations in water levels are apparent in this well also, especially during time periods when water levels in this well were measured monthly or quarterly. For well MW-6, the amplitude of seasonal fluctuations is much lower than in well 6N/8W 15-J3, and the peak elevation occurs about 3 to 6 months earlier. This suggests that the seasonal water level fluctuations in Royal Coach Chevron MW-6 are the result of recharge during the rainy season, which takes several months to reach depths in the lower Shallow Zone where well 6N/8W 15-J3 is screened. Thus, the hydrograph of well 6N/8W 15-J3 could be influenced both by recharge from above and groundwater pumping from below.

The hydrograph of Rohnert Park Well 24 from 1990 to 2004 is shown on Figures 3 and 4. Rohnert Park Well 24 is screened between 258 and 582 feet bgs in the Upper and Lower Intermediate Zone and is approximately 300 feet from the proposed project water supply well location at the Site. The hydrograph for Rohnert Park Well 24 shows seasonal water level fluctuations that have a similar period to well 6N/8W 15-J3 but a greater amplitude. Figure 4 presents a detailed hydrograph comparison for the time period after 1990. Note that Rohnert Park Well 24 shows sharp downward spikes in water levels that are associated with pumping from this well. The hydrograph for Rohnert Park Well 41 is also included for comparison, and shows similar patterns. Significantly, the hydrographs for wells 6N/8W 15-J3 and Royal Coach Chevron MW-6 show little response during these pumping-related spikes. This finding suggests that pumping of Rohnert Park Well 24 has a muted affect on water levels in the lower Shallow Zone, and an insignificant effect on water levels in the uppermost portion of the saturated zone.

Figure 3 shows that pumping by the City of Rohnert Park decreased significantly beginning in 2003, and that water levels in wells 6N/8W 15-J3 and Rohnert Park Well 24 rebounded significantly beginning in 2004. 2006 groundwater levels in well 6N/8W 15-J3 were similar to levels in the



uppermost portion of the saturated zone (i.e., MW-6), indicating near-complete recovery from historical pumping. As in the past, the future groundwater levels in the Site area are expected to be influenced by the City of Rohnert Park's pumping and pumping by other groundwater users in the area. If there is a persistent reduction in local groundwater demand by the City of Rohnert Park and others, the observed rebound in groundwater levels may be expected to persist. The City of Rohnert Park's Water Supply Assessment indicates that the City's projected groundwater demand through 2025 will be 2,577 acre-feet per year, which lies between the 2003 and 2004 demand levels. The overall groundwater demand in the southern Santa Rosa Plain is expected to increase from 7,078 acre-feet per year in 2003 to 7,350 acre-feet per year in 2025 (Winzler & Kelly, 2005). Considering that the City's groundwater pumping will remain at the reduced levels of 2003 to 2004, and regional pumping will increase, it is reasonable to assume that vertical gradients between the Upper Intermediate Zone and the uppermost Shallow Zone will persist, but will be less than they were in 1990s when the water level difference between these two zones (as measured in 6N/8W 15-J3 and MW-6) was in the range of 40 to 45 feet.

4.3 Extent and Migration of Contamination

The section will focus on discussing MTBE contamination at the Redwood Shell site because the documented MTBE concentrations, vertical extent of contamination and impact to domestic water supply wells indicate it presents the greatest risk of contaminant mobilization by project pumping.

As discussed in Section 4.2, pumping at City of Rohnert Park Well 24 does not influence water levels in the uppermost portion of the Shallow Zone, and pumping related spikes were not evident in the lower Shallow Zone. Thus, it is unlikely that pumping for the proposed project will influence groundwater levels or induce changes to the lateral hydraulic gradients in the uppermost Shallow Zone, where the highest levels of contamination have been found. This finding applies to any shallow contamination incidents in the Site vicinity.

Based on the data reviewed, the vertical extent of contamination has not been completely defined, but extends to near 100 feet bgs and may be deeper. MTBE is highly soluble in groundwater and resists degradation, and therefore is a good tracer of groundwater flow. The vertical migration of MTBE at this site is driven by vertical hydraulic gradients generated by a combination of surface recharge, pumping of the nearby domestic water supply wells, and municipal pumping that has depressurized the lower Shallow, Intermediate and Deep Zones (as evidenced by the water level differences between the hydrographs of Shallow Zone, Upper Intermediate Zone, and Deep Zone wells on Figures 3 and 4). Thus, vertical gradients present during 1990 to 2005 tended to cause downward migration of contamination in the area.

The response of Shallow Zone and Intermediate Zone hydrographs to a reduction in pumping by the City of Rohnert Park, beginning in 2003, suggests that downward vertical gradients in the Shallow Zone and Upper Intermediate Zone have decreased. This is evidenced by the observation that 2006 groundwater levels in well 6N/8W 15-J3 were similar to levels in the uppermost portion of the Shallow Zone. However, information regarding the City of Rohnert Park's projected future groundwater demand indicates downward vertical gradients may be expected to persist, but will be less than they were in 1990s (Section 4.2). The analytical drawdown model presented in our Groundwater Study predicts that pumping from the proposed wells at the Site will result in additional drawdown of



approximately 5 feet near the Redwood Shell site, which is located about 1 mile from the proposed pumping wells. Thus, project pumping would cause an increase of about 12 percent in downward vertical gradients in the Shallow Zone, compared to values that existed in the 1990's (i.e., 5 feet compared to a range of 40 to 45 feet). (Note that 5 feet of additional drawdown would correspond to a greater percentage if the future water level difference between the lower Shallow Zone and uppermost Shallow Zone is less than water level difference observed in the 1990s.) Increased downward vertical gradients potentially result in increased downward vertical migration of contaminants.

However, similar to the spring-to-fall seasonal difference between the hydrographs for wells 6N/8W 15-J3 and 6N/8W 15R1 (Section 4.2), the induced drawdown effect can be expected to be less in the Shallow Zone than in the Intermediate or Deep Zone. This attenuation will be more pronounced if the proposed project well is screened more deeply than the surrounding City wells, which have their upper screened intervals in the Upper Intermediate Zone (e.g. if the new well is screened in the Lower Intermediate Zone or in the Deep Zone). The screened interval for the project well will be determined based on pump testing during the mitigation phase of the project and before the project water supply well is constructed, but for the purposes of this evaluation we have shown the screened interval on Figure 2 as being in the Lower Intermediate Zone.

4.4 Effectiveness of Cleanup

The potential for future migration of contamination depends largely on the timeliness and extent of remediation efforts undertaken at the LUFT sites by the responsible parties. At the Royal Coach Chevron site, investigation, cleanup and monitoring have been ongoing for over 16 years. The current accepted program relies on natural attenuation and monitoring. (Cambria, 2006a) Contamination from this site has not impacted any of the City of Rohnert Park's water supply wells, even though several wells are located nearby and have been pumped extensively.

The Redwood Shell site may present a greater threat due to its higher MTBE concentrations and history of vertical migration. Interim remedial actions may be providing some level of lateral hydraulic containment, but given the shallow depth of the wells it is doubtful that they are providing complete vertical containment. We understand that a Corrective Action Plan will be required for this site. In order to comply with State requirements, such a plan will need to address protection of water quality objectives, potential plume migration and take into consideration current and future groundwater demands (SWRCB, 1996; California Water Code section 13000 *et seq.*). We understand that a Corrective Action Plan will also be required for the Tesoro Gas Station Site.

5. CONCLUSIONS AND RECOMMENDATIONS

Pumping to supply the proposed hotel and casino project is unlikely to cause additional lateral migration of shallow contamination in the Site area. However, the project may cause increases in the vertical downward gradient and the associated downward migration of shallow contamination in the LUFT site area. The amount of the increases depends on the distance from the proposed pumping well and depth from which groundwater is pumped (deeper pumping will probably affect vertical gradients in the Shallow Zone to a lesser extent). Assuming no vertical attenuation of the drawdown effect from the



proposed pumping well, the additional drawdown from this well represents approximately 12 percent of the water level difference observed between the lower and uppermost Shallow Zone in the 1990s.

We anticipate that the responsible parties at the LUFT sites will be required to implement Corrective Action Plans adopted for their contamination sites. In order to comply with State requirements, these corrective action plans will need to address restoration of water quality objectives and control of plume migration, and will need to consider both current and future groundwater demand (SWRCB, 1996; California Water Code section 13000 *et seq.*), regardless of whether the proposed project water supply pumping is conducted.

We recommend that the potential for inducing vertical and lateral migration be more closely evaluated during the mitigation and well design phase of the proposed project. The pumping test conducted during the mitigation phase should include taking water level measurements in wells that are screened in the Lower Intermediate Zone, Upper Intermediate Zone and uppermost portion of the saturated zone to verify the conclusions based on historical well hydrographs, refine the drawdown model for the Site, and more closely evaluate the potential for contaminant migration using a typical wellhead protection approach. The design of the well(s) should be adjusted so as to reduce drawdown effects and induced gradients in the Upper Intermediate Zone. Finally, the tribe should review investigation and cleanup efforts at nearby contamination sites on an ongoing basis and provide comments to regulatory oversight agencies as appropriate.

6. REFERENCES

- California State Water Resources Control Board (SWRCB), 1996, State Water Resources Control Board Resolution No. 92-49 (As Amended on April 21 1994 and October 2, 1996), Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304. October 2.
- Cambria Environmental Technology, Inc. (Cambria), 2006a, Closure Request Addendum, Chevron Service Station #9-8893, 4990 Commerce Boulevard, Rohnert Park, California. August 7.
- Cambria Environmental Technology, Inc. (Cambria), 2006b, Groundwater Monitoring and Remediation Report – Third Quarter 2006, Shell-branded Service Station, 5060 Redwood Drive, Rohnert Park, California. September 14.
- Edd Clark & Associates, 2006, Report: Additional Soil and Groundwater Investigation, 5085 Redwood Drive, Rohnert Park, California. October 11.
- Gettler-Ryan, 2006, Special Event of June 9, 2006, Groundwater Monitoring & Sampling Report, Chevron Service Station #9-8893, 4990 Commerce Boulevard, Rohnert Park, California. July 13.
- Winzler & Kelly, 2005, City of Rohnert Park Final Water Supply Assessment. January.
- WorleyParsons Komex, 2007, Groundwater Study: Proposed Graton Rancheria Casino and Hotel, Rohnert Park, California. January.



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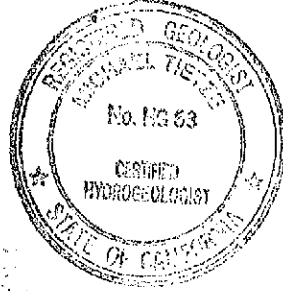
7. CLOSURE

Thank you for using WorleyParsons Komex for this important project. If you have any questions or require further information, please do not hesitate to contact us.

Sincerely,
WorleyParsons Komex

Michael Tietze, C.E.G., C.Hg.

Senior Hydrogeologist, Manager, Sacramento



Reviewed by:

Dennis Jamison, C., Hg.

Senior Hydrogeologist

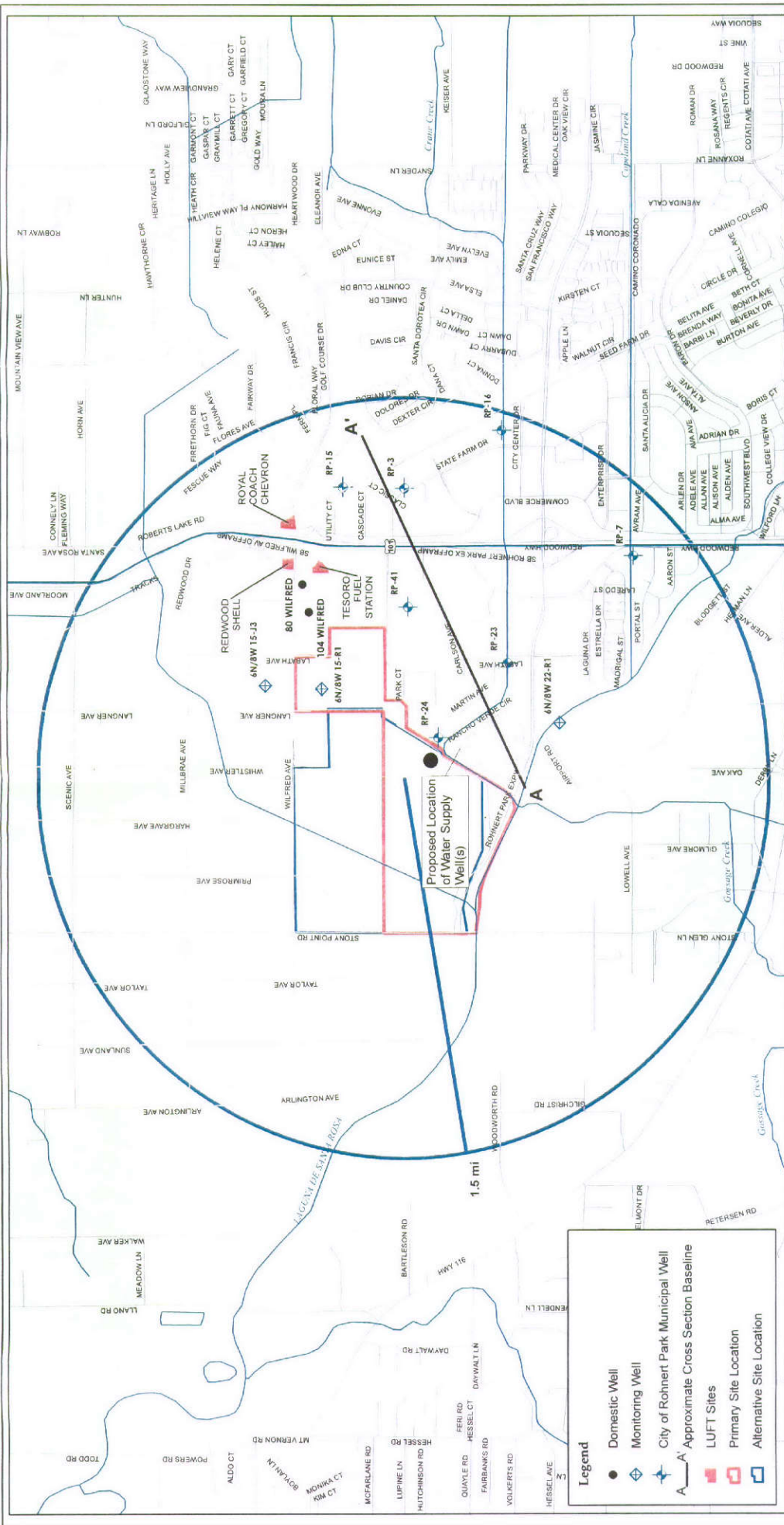
Attachments:

Figure 1 – Site Vicinity Map Showing Referenced Wells and LUFT Sites

Figure 2 – Cross Section

Figure 3 – Hydrographs 1974 to Present

Figure 4 – Hydrographs 1990 to Present



PROPOSED GRATON RANCHERIA

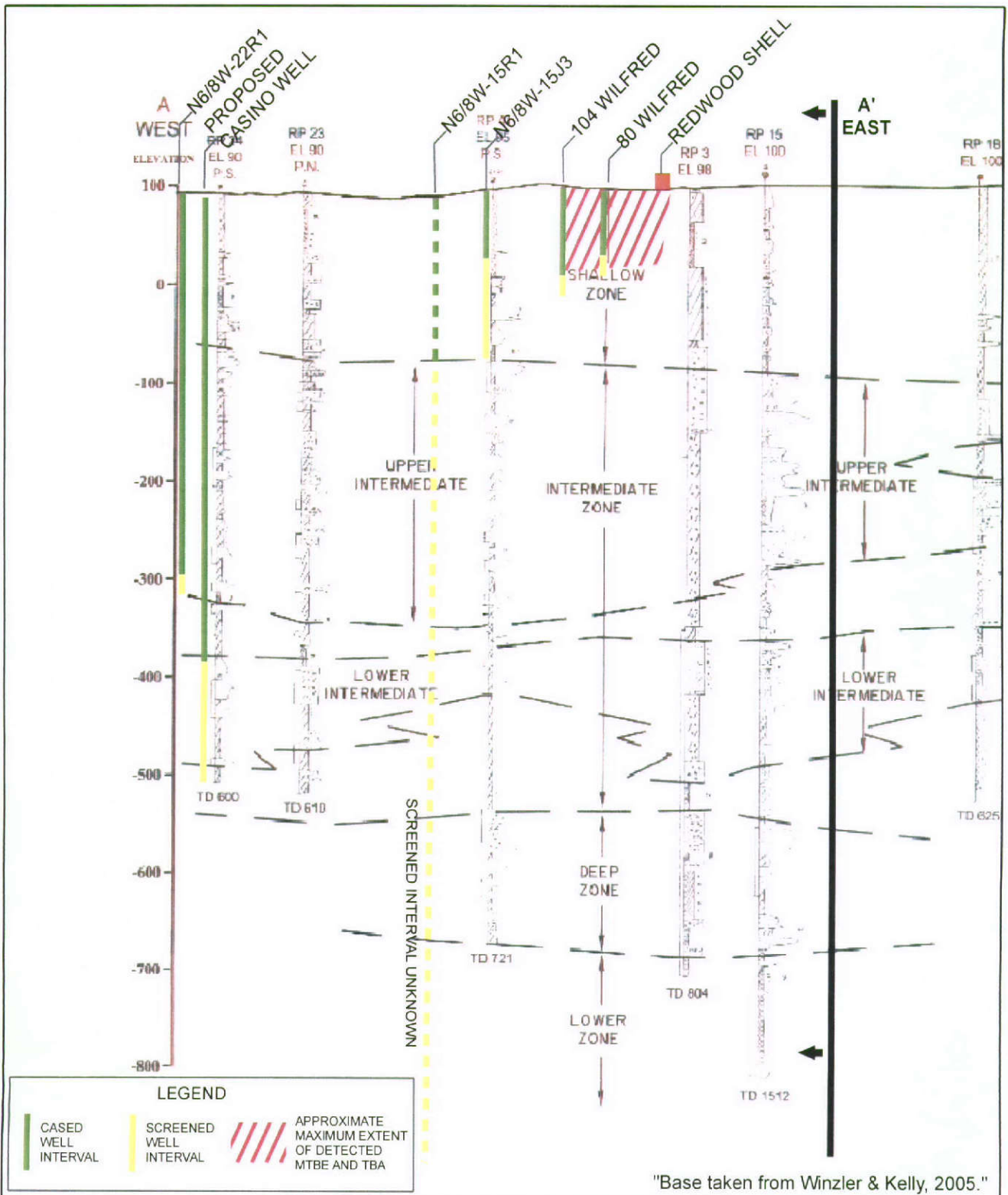
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SITE VICINITY MAP SHOWING REFERENCED WELLS AND LUFT SITES

SWL	AB	102005
NO410	1	

Source: USGS 7.5 Series, Colati, Two Rock, Sepastopol, and Santa Rosa Quadrangles. All well locations are approximate and not field verified. See Table 1 for well completion data.

0 0.375 0.75 1.5 Miles



PROPOSED GRATON RANCHERIA



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CROSS SECTION

SWL

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Figure 3 - Hydrographs 1974 to Present

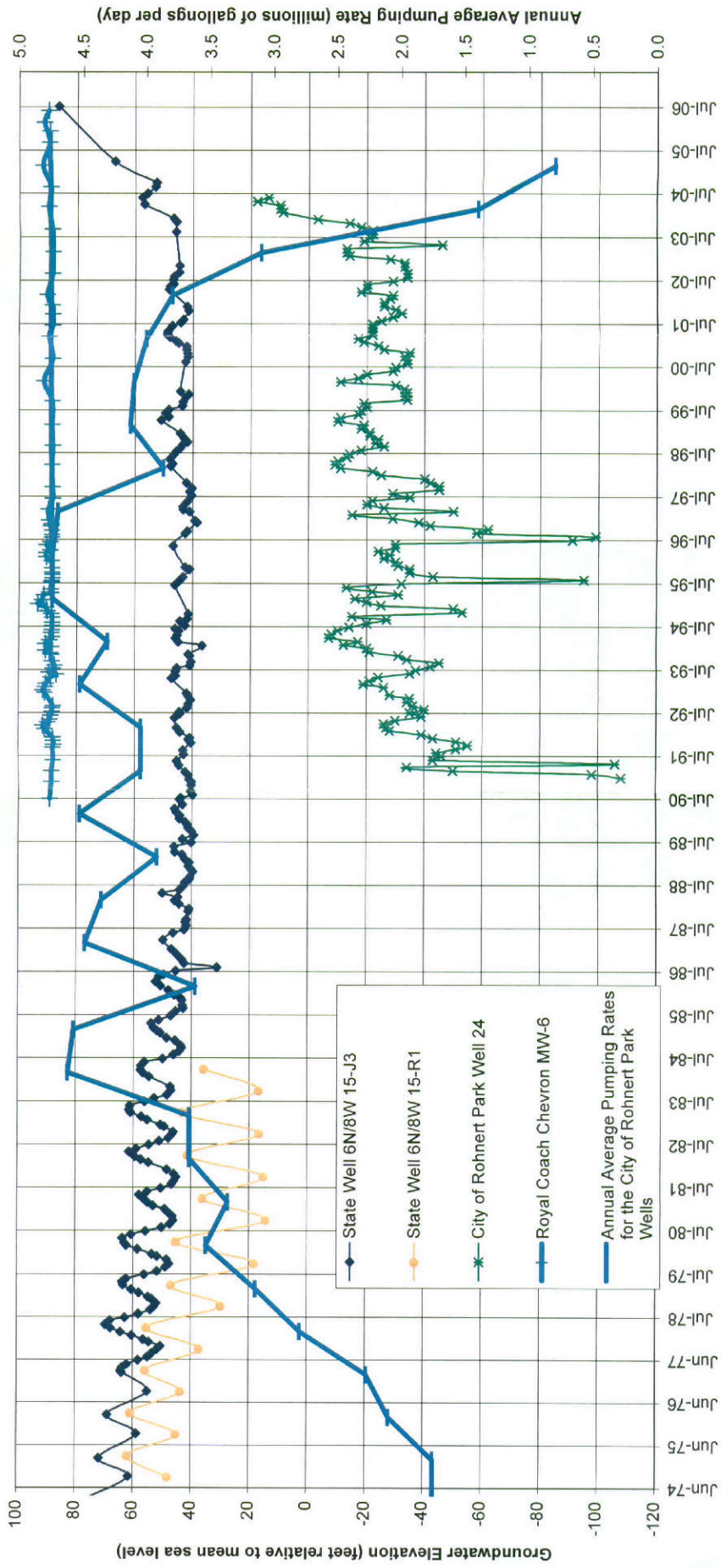
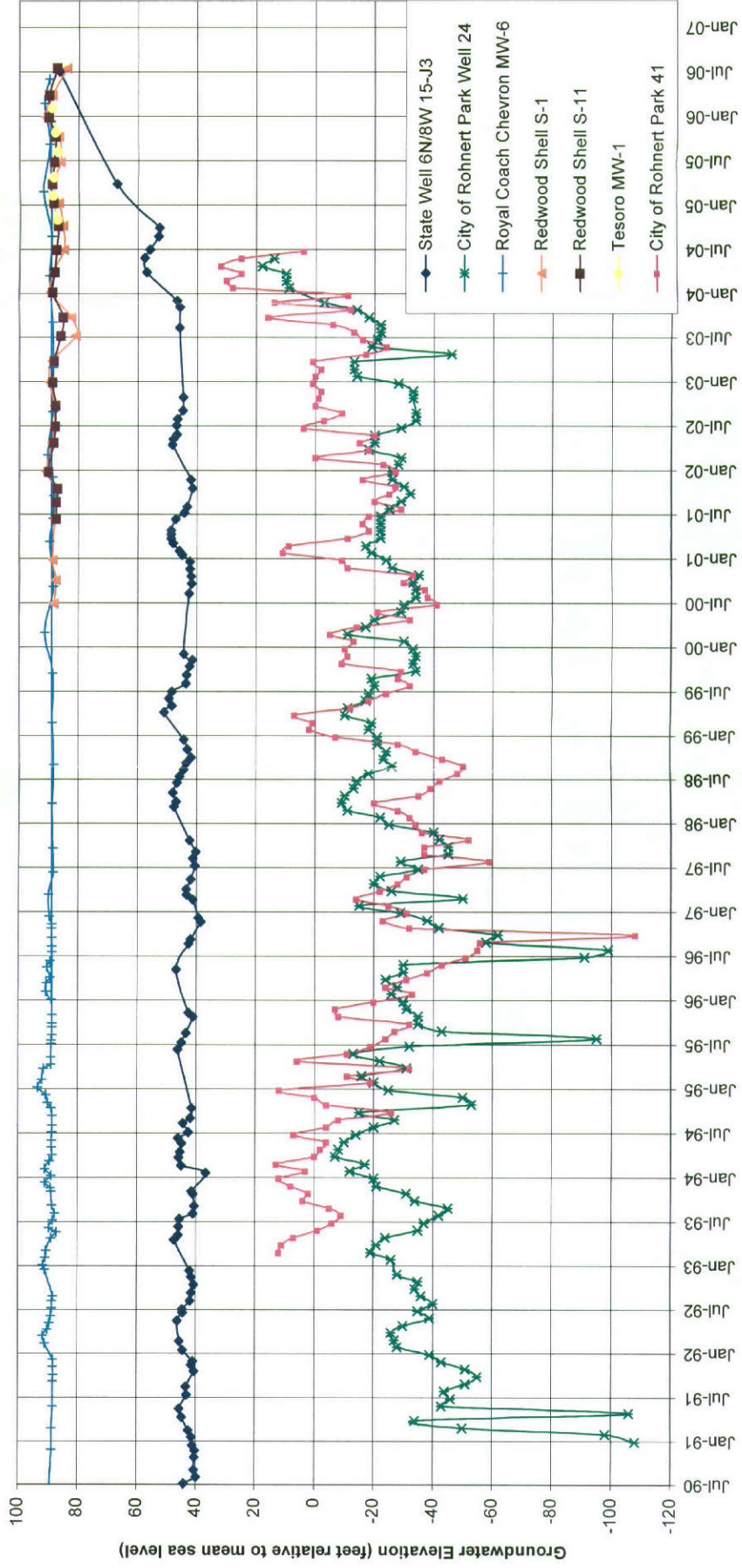


Figure 4 - Hydrographs 1990 to Present





MEMO

To: Chad Broussard	From: Pete Connelly
Phone: 916 447-3479	Date: 1/10/06
Re: Groom Properties HVOC site / 101 International site 6100 Redwood Drive, Rohnert Park, California	CC:

Urgent **For Review** **Please Comment** **Please Reply** **For Your Information**

On December 27, 2006, Pete Connelly from Analytical Environmental Services performed a file review at the Regional Water Quality Control Board (RWQCB) North Coast office located at 5550 Skylane Boulevard, Santa Rosa, California. Case files for the Groom Properties HVOC site (aka 101 International site) located at 6100 Redwood Drive (site), Rohnert Park California were reviewed. The purpose was to collect information from the case files in order to determine whether or not the site could pose a risk to groundwater quality on adjacent sites and to study possible environmental impacts associated with the Wilfred of Stony Point sites for the Graton Rancheria. Specifically, whether pumping groundwater from groundwater wells on the Wilfred or Stony Point sites would cause the HVOC contamination to spread in a lateral direction to nearby sites, thereby affecting groundwater quality on adjacent properties. The following paragraphs summarize information contained in the case files for the Groom Properties HVOC site (101 International) and a follow-up telephone conversation with the RWQCB case worker Colleen Hunt.

Site History

Investigation of soil and groundwater quality at 101 International Site began in 1989 following the removal of three underground storage tanks (USTs). Soil sampling at that time indicated a release of hydrocarbons into the soil and groundwater. Groundwater-monitoring wells were installed to determine the extent of impacts to groundwater at the site. During the preliminary investigations, groundwater samples from two of the three monitoring wells showed detectable levels of petroleum and halogenated hydrocarbons. Subsequently, three additional upgradient wells and four downgradient wells were installed to define the extent of groundwater contamination. Analytical results from the ten monitoring wells indicated the downgradient extent of contamination had been defined. The sampling results indicated that the concentration of trichloroethene (TCE) increased upgradient from the area of the removed gasoline tanks. This upgradient trend suggested a possible off-site source rather than the previously suspected source, the area of the removed USTs. The ground water gradient in this area is generally to the south-southwest therefore upgradient from the area of the removed tanks would be in a general north-northeast direction.

A passive soil gas survey was conducted at the site as well as the adjacent site to the north (5980 Redwood Drive) to determine the possible source of TCE. The results of the investigation indicated that the highest levels of TCE in soil gas were detected in an isolated area north of the most upgradient well, located on the 5980 Redwood Drive property (Groom Properties site). These data further suggest an off-site source for the TCE that was previously detected in the groundwater the 6100 Redwood Drive property (101 International).

A potential historic upgradient source of chlorinated hydrocarbon waste was identified. A sheet metal degreasing unit (using TCE as a solvent) was operated at a business formerly located at 5925 Redwood Drive. This property is located adjacent to and north (upgradient) of the 5980 Redwood Drive property (Groom Property), which is also upgradient of from the 101 International facility. In addition to the detection of TCE in the off-site area, elevated levels of aromatic hydrocarbons compounds such as Benzene, Toluene, Ethylene, and Xylene (BTEX) were detected in soil gas samples collected from a potential "hot spot" in the southwest and southern portion of the 6100 Redwood Drive site (101 International).

Two temporary well points were installed and sampled in September 1997 at the areas of positive soil gas results. Soil and groundwater samples from the well points did not contain detectable levels of volatile organic compounds (VOCs) indicating that the compounds detected in soil gas did not affect groundwater quality. On the basis of the distribution of TCE in groundwater and soil gas, the hydrogeologic conditions, and the identification of a potential upgradient off-site source of TCE, the conclusion was drawn that the site located at 6100 Redwood Drive was not the likely source of TCE in groundwater. The recommendation was made that the operator of the site (101 International) no longer be held responsible for investigation of the source of TCE releases affecting the site and surrounding properties. The RWQCB requested that 101 International, Inc further evaluate the VOCs and chlorinated hydrocarbons in the southern portion of the site and monitor the groundwater quality during summer (low) and winter (high) groundwater conditions.

The owner of the 101 International site complied with the RWQCB request. As a result, no additional groundwater monitoring activities are required for the 101 International site at this time. According to a December 2002 letter to the property owner from the RWQCB, the owner of the 101 International facility has been requested to keep the monitoring wells protected and undisturbed due to continued investigation of the TCE plume north of the site.

The Baseline Environmental Consulting March 1998 Groundwater Monitoring Report for 101 International provided information regarding stratigraphic and hydrogeologic conditions at the site. This information as well as groundwater levels were used to determine the groundwater gradient. The groundwater flow is generally to the south-southwest, away from the Wilfred or Stony Point sites. The flow direction has been consistent during the period of monitoring from May 1991 through March 1997. This persistent south-southwest gradient limits the potential for upgradient migration of contaminants in groundwater. Historical monitoring results over the four year sampling period has provided sufficient evidence that the identified plume of groundwater, affected by chlorinated hydrocarbons, is appropriately delineated and relatively stable with the exception of the northern margin of the plume.

The RWQCB has concluded that, according to the concentration distribution of TCE in groundwater, the direction of groundwater flow, and the results of a passive soil gas survey suggest TCE contamination in groundwater may be emanating from the property located at 5980 Redwood Drive (Groom Properties site).

In letters dated February 24, 2000 and May 1, 2000, the RWQCB has requested a work plan for TCE investigations at the property located at 5980 Redwood Drive (Groom Properties site). The owner of the property has not been cooperative with the RWQCB. The Groom Properties site is listed as an open case on the RWQCB Geo Tracker website. This website tracks sites that have documented soil/groundwater contamination and require some sort of remedial actions.

The RWQCB has the authority to proceed with a Clean-up and Abatement Order for the Groom Properties HVOC plume. The RWQCB issues these orders according to priority. Higher priority is given to cases that have the potential to negatively affect human health and the environment. The Groom Properties HVOC plume is not migrating towards public water wells, and therefore does not pose an unacceptable risk to human health or the environment. The Groom Properties HVOC plume is not a high priority case according to the RWQCB.

According to Colleen Hunt who is the RWQCB case worker, it is very likely that the source of TCE is originating from the Groom Properties site. Ms. Hunt has made intensive surveys of adjacent lands uses and historical activities on the neighboring properties. To date, no identified potential sources of TCE have been identified. The RWQCB will continue to request a work plan from the property owner.

Conclusion

According to information from the case files at the RWQCB and telephone conversations with a representative from the RWQCB, the Groom Properties HVOC plume is an open environmental case. The source of TCE is likely from a sheet metal degreasing unit (TCE as a solvent) that was operated at a business formerly located at 5925 Redwood Drive. The monitoring reports contain groundwater analytical results that show the down gradient extend of the TCE contamination is delineated and no additional sampling is required at the 101 International site. However, the upgradient extend has not been identified and the RWQCB has requested a work plan from the property owner (Groom Properties) to further delineate the TCE contamination. To date, there have been no additional sources of TCE contamination on adjacent properties. It can therefore be concluded that the likely source of TCE contamination that was detected in groundwater from the 101 International site is from the Groom Properties site located at 5980 Redwood Drive.

The historical analytical results from the four year sampling period has provided sufficient evidence that the identified plume of groundwater, affected by chlorinated hydrocarbons, is appropriately delineated and relatively stable with the exception of the northern margin of contamination. Additionally, the Groom Properties HVOC plume is located approximately 0.44 miles southeast of the southern most edge of Wilfred or Stony Point sites. The groundwater gradient in the area of the HVOC plume is generally to the south-southwest, away from the Wilfred or Stony Point sites. The flow direction has been consistent during

the period of monitoring from May 1991 through March 1997. This persistent south-southwest gradient limits the potential for upgradient migration of contaminants in groundwater. It is therefore not likely that the Groom Properties HVOC plume has affected groundwater quality on the Wilfred or Stony Point sites and pumping from Alternative A, B, C, D, or E is not likely to cause the lateral migration of contaminants.