Shell Oil Products US

February 6, 2006

Re: **Initial Site Conceptual Model (September 2005)**
Shell-branded Service Station
4226 First Street
Pleasanton, California

Dear Mr. Jerry Wickham :

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,
Shell Oil Products US

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Project Manager

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Shell Oil Products US
Initial Site Conceptual Model (September 2005)
Shell-branded Service Station
4226 First Street, Pleasanton, California

Explanation of abbreviations at bottom of table.

	DESCRIPTION	Data Tables	Graphics	Reference	Data Gaps	Work Necessary to fill data gap	Comments
Professional Certification	Dated, signed and stamped certification by Lee Dooley, California Certified Hydrogeologist.		Certification				
Regional Setting	**Geology/Stratigraphy** The site located is located near the southwestern edge of the Livermore Valley. The site area slopes to the north from the base of nearby hills (See topographic map). Arroyo Valle stream is located approximately 1,100 feet north of the site. A geologic map and geologic cross section (J-J) are provided from California Department of Water Resources (DWR) Bulletin 118-2. The site is mapped as being underlain by Younger Alluvial Fan Deposits (Qyf). These deposits are described in DWR Bulletin 118-2 as consisting of "unconsolidated, moderately sorted, permeable fine sand and silt, with gravel becoming more abundant toward fan heads and within canyons." The northwest trending Pleasanton Fault is located west of the site (See geologic cross section J-J) and may impact local stratigraphy. The alluvial fan deposits are underlain by northward dipping sand and gravel deposits of the Livermore Formation. Additional geologic cross sections are provided from the Zone 7 Well Master Plan. Section locations are shown on Figure 1.1-1. The site is located at the southern end of Section E-E'. The section shows a contact in the site area between flat lying alluvium (A-Zone) and underlying northerly dipping Livermore Formation (D-Zone). Water Well Drillers Reports obtained from DWR indicate that the site area is underlain by interlayered clay, sand, and gravel to depths greater than 250 feet bg (below grade).		Surficial geology map Geologic cross section J-J USGS topographic map Well field map and series of geologic cross sections	DWR Bulletin 118-2 Zone 7 Well Field Plan (10/03)	Depth to subsurface contact between Qyf and underlying Livermore Formation in site area	Additional boring(s) downgradient (northeast) of the site	See map and aerial photo in Site Geology
	Hydrogeology The site located on the western edge of the Amador subbasin of the Livermore Valley Groundwater Basin. The Amador subbasin is bounded on the east by the middle zone of the Livermore Fault and on the west by the Pleasanton Fault (See Regional Geologic Section J-J). Much of the groundwater of the Amador subbasin is derived from sandy gravel and sandy clayey gravel deposits that are up to 150 feet in thickness. Gravel pits occur throughout the central portion of the subbasin. Groundwater in the Amador subbasin occurs in both unconfined and confined conditions. In the shallower, unconfined aquifers, groundwater is first encountered generally about 30 to 50 feet bg. Deeper aquifers are encountered within sand and gravel deposits at a depth of approximately 90 to 100 feet bg (See Zone 7 Groundwater Contour Map). The Zone 7 contour map shows groundwater flow in both confined and unconfined aquifers toward the gravel pits in the center of the subbasin (See Zone 7 Groundwater Contour Map). A contour map from the Zone 7 Well Master Plan (Figure ES.2-2) shows a flow within the "deeper aquifer" to the west.		Zone 7 Groundwater Contour Map Subbasin map Figure ES.2-2 - Historic Composite Low Water Levels in the Deeper Aquifer	Zone 7 DWR Bulletin 118-2 Zone 7 Well Field Plan (10/03)	Location of Pleasanton Fault; impact on groundwater occurrence in site area	Perform additional literature survey; collect additional subsurface data both west and east of site.	See attached work plan and site area map

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	Groundwater Pumping The site is located on the southwestern edge of the Amador subbasin. Sand and gravel pit groundwater extraction areas are located greater than 1 mile north of the site in the central portion of the subbasin. The site appears to be outside the area of influence of any groundwater extraction wells (See well survey discussion below).		Zone 7 Groundwater Contour Map	Zone 7	None		Site not within influence of any pumping wells.
	Preferential Pathways Well Survey – In May 2004, Toxichem Management Systems, Inc. (Toxichem) obtain information from the Zone 7 Water District (Zone 7) and the DWR. A copy of Toxichem's well survey map and summary table are attached. The nearest wells identified were a well of "unknown" use (3S/1E-21B) and a municipal well (3S/1E-21B1) both located approximately 900 feet northeast of the site. Toxichem was unable to locate either well in the field and concluded that they were likely abandoned. In November 2005, Delta Environmental Consultants, Inc. (Delta) observed an old water tower building near the location of the two wells. A municipal well (3S/1E-16P1) was identified to be located >1,200 feet north of the site. Again, Toxichem could not field locate the well. In September 2005, Delta performed an additional well survey for the site area. A well location map was obtained from Zone 7. The map identified three wells approximately 1,000 feet northwest of the site (3S/1E-21C1, -21C3, and -21C4.) Well -21C1 was classified as a "supply well", -21C3 as "abandoned or unlocatable", and -21C4 as "other designated well." Delta was only able to field located Well -21C4. The well provides irrigation water for a small city park. Delta also located a similar well in Kottinger Park located approximately 800 feet east of the site. Utility Survey – Delta was unable to locate a map of underground utilities for the site area. Depth to groundwater beneath the site is >30 feet below grade (bg), thus underground utilities are not considered a vertical conduit to shallow groundwater. Analysis – No vertical conduits appear to be present in the site area that would result in movement of contaminants to groundwater.	Well survey data tables Sensitive receptor data table	Well survey map Well location aerial photograph Sensitive receptor location map	Toxichem (2004) Zone 7 Delta (2005)	None	.	
	Nearby Release Sites 76 Service Station, 4191 First Street, Pleasanton An operating 76-branded service station is located on the northwest side of First Street approximately 200 feet north of the site (see attached site area map and aerial photograph). On- and off-site soil and groundwater investigations have been performed for the 76 station (See site information). The site groundwater monitoring system consists of twelve monitoring wells (See attached map and Geotracker data). On March 17, 2005, depth to groundwater ranged from 72.54 to 94.66 feet below top of well casing (TOC). The average groundwater elevation in the area of the 76 station was 290 feet MSL. This compares with depth to groundwater beneath the Shell station on February 2, 2005 of 31.28 to 32.02 feet TOC and an average groundwater elevation of 340 feet MSL. The groundwater flow beneath and downgradient of the 76 station was toward the south and west on March 17, 2005. However, the distribution of contaminants dissolved in groundwater appears to be		Site map (Cambria, 2001), Location map and DTW data from Geotracker Site geologic cross sections; concentration maps Map and aerial photograph of site area	Geotracker Gettler-Ryan (2001) Delta (2005)	Hydrogeologic relationship between groundwater beneath the site and 76-branded station. Possibility of faulting in the site area.	Drilling of boring(s) between the two stations	See attached work plan

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	more indicative of flow to the north (See concentration maps). Groundwater flow beneath the Shell station is consistently to the northeast. Three hydrogeologic cross sections prepared by Gettler-Ryan, Inc. for the 76 station are provided. The sections show a series of sand and gravel beds dipping to the north beneath the 76 station (See Section B-B). These beds appear to meet the regional description of the Livermore Formation. In contrast, sand and gravel beds beneath the Shell station have been interpretted as nearly flat lying and likely representative of alluvium capping the Livermore Formation (See Site Geology below). It appears, based on available data, that the two sites monitor different but possibly interconnected sand and gravel aquifers.						
Site Setting	**Site Geology** A series of site maps are attached that show the location of borings and wells. Borings have found the site is underlain by interlayered silt, silty sand, gravelly sand, and silty gravel to the maximum depth explored of 100 feet bg (Boring SB-7). Two geologic cross sections prepared by Cambria Environmental Technology, Inc. (Cambria) are attached. The sections indicate that deposits beneath the site are nearly flat lying. An approximately 40-foot thick silt layer was encountered in Boring SB-7 from 59 to 99 feet bg. Silt was also encountered at a depth of 40 to 50 feet in Borings SB-1, SB-4, SB-5, SB-6, MW-1, MW-2, and MW-3.		Boring logs for S-A, S-B, S-C, S-D, and S-1 Boring logs for SB-1, SB-2, SB-3, and WA-1 Boring logs for SB-4 and SB-5 Borings logs for SB-6 and SB-7 Boring logs for MW-1, MW-2, and MW-3 Geologic Cross Sections A-A' and B-B'	Emcon Associates (1985) HartCrowser (1990) HartCrowser (1990) Cambria (1999) Cambria (1999) Cambria (date ?)	Extent of silt layer not defined	Drill additional boring(s) to define extent of silt layer	See attached work plan and area site map
	Groundwater Conditions Three groundwater monitoring wells (MW-1 through MW-3) have been installed on site. No off-site wells have been installed. Groundwater was encountered in the borings for Wells MW-1 and MW-3 at depths of 43 feet and 25 feet bg, respectively. Groundwater was not encountered during the drilling of the boring for Well MW-2 (See Boring Logs above). The total depths of the three wells are 58 feet, 48 feet, and 41.5 feet bg, respectively. Well MW-1 is screened from 37 feet to 58 feet bg; Well MW-2 from 26 feet to 46 feet bg; and Well MW-3 from 19 feet to 35 feet bg (See well construction details on boring logs). Depth to water in wells has historically been approximately 30 to 40 feet bg. Groundwater appears to be perched above the silt layer described above (site geologic section). This silt layer appears to prevent further downward migration of petroleum hydrocarbons and fuel oxygenates. Benzene, toluene, ethylbenzene, and xylene (BTEX compounds) and MTBE were not detected in any soil samples collected within the silt layer (see summary of soil analytical data, Boring SB-7). The silt layer is believed to separate perched groundwater beneath the site from deeper groundwater encountered beneath the 76-branded service station. A series of historic groundwater elevation contour maps are attached. Groundwater flow has ranged from north to northeast.	Groundwater depth and elevation data	Groundwater Elevation Contour Maps (historic)	Cambria; Toxichem; Delta; Blaine Tech	Relationship between perched groundwater beneath the site and deeper groundwater beneath the 76-branded station Water quality beneath perching silt layer	Drill additional boring (s) between the two stations Drill additional boring(s)	See attached work plan and area site map See attached work plan and area site plan

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	The most recent groundwater measurements were on November 19, 2005. Historic depth to groundwater and groundwater elevations are provided on the attached Blaine Tech Services report dated December 19, 2005. Groundwater flow was to the northeast (See Groundwater Contour Map for 4Q05).		August 5, 2005 November 22, 2005	Services			
	Source Area In September 1985, Emcon Associates drilled three soil borings in the vicinity of the former underground fuel storage tanks (S-B, S-C, and S-D). The four former fuel underground storage tanks (USTs) were originally located in the northern portion of the site. Total petroleum hydrocarbons as gasoline (TPH-G) was detected at 1,300 mg/kg in the 14- to 15.5-foot sample from boring S-B. In May 1986, the USTs were removed and the pit backfilled. Soil samples were collected beneath the ends of each of the former tanks. The maximum TPH-G detected was 240 mg/kg. New USTs were installed in front of the service station building (current location). In March 1990, Hart Crowser, Inc. advanced three additional soil borings (SB-1, SB-2, and SB-3). The boring for the destruction of Well S-1 was advanced 20 feet beyond the bottom of the well. This boring was designated WA-1. The highest concentrations of TPH-G were detected in two soil samples from boring WA-1; 30 feet bg (380 mg/kg) and 35 feet (290 mg/l). Analysis for for methyl tert-butyl ether (MTBE) was not performed. In December 1990, Hart Crowser, Inc. advanced Borings SB-4 and SB-5 downgradient (north) of the location of the former USTs. Petroleum hydrocarbons were only detected in one soil sample (SB-5 at 35 feet, TPH-G 820 ug/l). In September 1995, Weiss and Associates collected soil samples beneath four site dispensers and product piping. TPH-G was detected at 120 mg/kg beneath the eastern-most dispenser island. Approximately 40 cubic yards of impacted soil were removed. TPH-G was detected at less than 3 mg/kg in confirmation soil samples. Analysis for MTBE was not performed. In July 1998, Cambria collected a sample of the pea gravel backfill near the waste oil tank remote fill piping. No evidence of a release was found. In April 1999, Cambria advanced two soil borings (SB-6 and SB-7) to depths of 58 and 100 feet, respectively. TPH-G was only detected in the 40-foot sample of boring SB-7 (83 mg/kg). MTBE was not detected in any soil sample. The boring was converted to Well MW-1. In January 2000, Cambria installed Wells MW-2 and MW-3. TPH-G and MTBE were not detected in any soil sample. In January 2005, it was determined that a liquid had likely been poured into a second port on the waste oil tank which goes directly into the pea gravel surrounding the tank. An Unauthorized Release Report (URR) dated January 19, 2005 was submitted to the local Fire Prevention District and Alameda County Environmental Health Department. Total petroleum hydrocarbons as oil and grease were	Soil analytical data summary tables Soil analytical data summary tables Soil analytical data summary tables Soil analytical data summary tables	Soil boring locations map Weiss Associates report dated December 21, 1995 Cambria report dated September 22, 1998 Toxichem work plan dated March 16, 2005	Cambria report dated August 12, 1999	None		

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	detected in a sample of the pea gravel at 10,000 mg/kg. The impacted soil near the fill port was removed and transported off site for disposal. On June 10, 2005, Delta advanced a boring (WO-1) adjacent to the waste oil UST. Analysis of soil sample indicated that waste oil had not moved outside the UST backfill.		Delta report dated July 11, 2005				
	Dissolved plume A plume of dissolved petroleum hydrocarbons and MTBE exists in groundwater at a depth of approximately 30 feet beneath the site. The plume extends from the central portion of the site, off-site to the north-northeast. The highest concentrations of total petroleum hydrocarbons as gasoline (TPH-G), benzene, and MTBE have been detected in groundwater samples from Well MW-1 located on the downgradient (northern) edge of the property. The groundwater sample from Well MW-1 collected on November 22, 2005 contained TPH-G (1,760 ug/l), benzene (27.4 ug/l), and MTBE (1,160 ug/l). MTBE concentrations in Well MW-1 increased to a historic high. A MTBE time/concentration graph is attached.	Summary of groundwater analytical data Historic groundwater analytical data	Map of TPH-G, benzene, and MTBE Concentrations in Groundwater, August 5, 2005 November 22, 2005 MTBE concentration graph	Delta (July 2005) Delta (November 2005)	Downgradient extent of MTBE in shallow perched aquifer	Collect groundwater sample from downgradient of the site.	See attached work plan
	Remediation Approximately 40 cubic yards of petroleum hydrocarbon impacted soil were removed during the dispenser and product line upgrade activities in September 1995. Impacted soil was transported off site for disposal at a licensed landfill facility.		Weiss Associates report dated December 21, 1995		No remediation proposed at this time pending results of additional site assessment		
	Evaluation of potential impacts to water supply wells The potential for shallow groundwater containing MTBE to impact a water supply well appears to be low.		Zone 7 Well Location Aerial Photograph	Zone 7		None	Site outside of well capture zone.
	Work Plans						See attached work plan

Abbreviations
DWR = California Department of Water Resources
Zone 7 = Zone 7 Water District
MTBE = methyl tert-butyl ether
bg = below grade
mg/kg = milligrams per kilogram
ug/l = micrograms per liter