SUPPLEMENTAL INVESTIGATION REPORT FOR TRUCK FILL STATION, WATER TANK, AND NORTHEAST SETTLING POND AREAS

DEFENSE FUEL SUPPORT POINT NORWALK
15306 NORWALK BOULEVARD
NORWALK, CALIFORNIA

Prepared for

Defense Energy Support Center
8725 John J. Kingman Road
Fort Belvoir, Virginia 22060-6222

November 30, 2009

Prepared by

PARSONS

100 WEST WALNUT STREET • PASADENA • CALIFORNIA 91124

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ABBREVIATIONS AND ACRONYMS

µg/kg	micrograms per kilogram
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
Calscience	Calscience Environmental Laboratories, Inc.
DESC	Defense Energy Support Center
DFSP	Defense Fuel Support Point
DigAlert	Underground Service Alert
DPT	direct-push technology
IDW	investigation-derived waste
JP	jet propellant
KMEP	Kinder Morgan Energy Partners, L.P.
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
mg/kg	milligrams per kilogram
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tert-butyl ether
PID	photoionization detector
PPE	personal protective equipment
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RWQCB	Regional Water Quality Control Board, Los Angeles Region
SFPP	Santa Fe Pacific Pipeline, L.P.
Site	Defense Fuel Support Point Norwalk facility
SubSurface	SubSurface Surveys & Associates, Inc.
SVES	soil vapor extraction system
TBA	tert-butyl alcohol
TFS	truck fill station
TPH	total petroleum hydrocarbons
TPHg	total petroleum hydrocarbons as gasoline
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

1 INTRODUCTION

This report presents the results of the supplemental investigation conducted in the truck fill station (TFS), water tank, and northeast former settling pond areas of the Defense Fuel Support Point (DFSP) Norwalk facility (site) located at 15306 Norwalk Boulevard, Norwalk, CA. This report has been prepared on behalf of the Defense Energy Support Center (DESC). The site location map is shown on Figure 1-1.

The DFSP Norwalk facility is a 50-acre facility consisting of 12 aboveground storage tanks that previously stored and distributed jet propellant (JP)-5 and JP-8. Aviation gasoline and JP-4 also were reportedly stored at the facility. Santa Fe Pacific Pipeline, L.P. (SFPP), an operating partner of Kinder Morgan Energy Partners, L.P. (KMEP), leases a 2-acre easement along the southern and eastern boundaries of DFSP for operation of its pipelines, which convey gasoline, diesel, and jet fuel. Within the southern easement lie three active KMEP pipelines, one of which is a 16-inch diameter pipeline, designated LS-1, that bends at the southeastern corner of the facility and continues northward within the eastern easement. An abandoned pipeline, likely owned or formerly operated by Golden West Pipeline, also runs along the eastern boundary of the site. The DESC has decommissioned the site, but KMEP pipelines continue to operate.

1.1 Objectives

The areas of investigation for this work include the TFS, water tank area located north of the TFS, and the former settling pond area located in the northeast corner of the site (Figure 1-2). The purpose of the supplemental soil investigation is to determine the current soil chemistry and distribution of contaminants in these areas. Additionally to assess the performance of the soil vapor extraction system (SVES) at the TFS and water tank areas.

One permanent groundwater monitoring well to be installed in the northeast corner of the property (designated as GMW-66) is being installed to confirm the closed groundwater plume south of this area. This well will also ensure that the groundwater plume does not migrate off-site to the north and east of the property and will be used as a side gradient monitoring well.

A review of all existing groundwater data, including forensic analytical data, from the TFS area was conducted to determine the area limits of the DESC groundwater plume and that of KMEP.

2 FIELD ACTIVITIES

This section discusses the field activities for the investigations that were conducted in accordance with the work plan[1]. Approval of the work plan was received from the Regional Water Quality Control Board (RWQCB)[2]. This effort is comprised of soil sampling and the installation of one groundwater monitoring well.

The investigation activities were conducted between September 3 and October 22, 2009. This investigation included direct-push technology (DPT) soil sampling at 19 locations (DPT-1 through DPT-19) and the installation of one groundwater monitoring well designated GMW-66. The boring logs for the DPT locations and groundwater monitoring well are included in Appendix A as well as the development log for the groundwater well.

The sampling procedures are discussed in the following sections. Prior to the start of this investigation, boring and well permit applications were obtained from the Los Angeles County Environmental Health Division and the City of Norwalk as required.

2.1 Geophysical Clearance

Underground Service Alert (DigAlert) was notified of our subsurface activities at least 48 hours before beginning field work. The planned sampling locations were clearly marked with white paint. DigAlert contacted all utility owners within the site vicinity and notified them of the subsurface investigation plans.

In addition to notifying DigAlert, each boring location and surrounding areas were surveyed using a combination of electromagnetic induction and ground-penetrating radar instruments to investigate and clear all boring locations for any subsurface obstructions (e.g., piping, utilities, metallic debris, etc.). SubSurface Surveys & Associates, Inc. (SubSurface) conducted the geophysical survey immediately prior to the start of the field investigation. The utility lines were clearly marked at each planned sampling location. None of the planned well locations were moved significantly as a result of interference with underground utility lines.

2.2 Soil Sampling

Nineteen soil borings (DPT-1 through DPT-19) were drilled and sampled at the site on September 3, 4, and 10, 2009. These borings were drilled utilizing a truck-mounted DPT drill rig provided and manned by Gregg Drilling. Borings DPT-1 through DPT-12 were located within and adjacent to the former TFS in the southern portion of the DFSP

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[1] Parsons, 2009, *Supplemental Investigation Work Plan for Truck Fill Station, Water Tank, and Northeast Settling Pond Areas, Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California*, dated July 16.

[2] RWQCB, 2009, *Workplan Approval - Supplemental Investigation Work Plan for Truck Fill Station, Water Tank, and Northeast Settling Pond Areas,Defense Fuel Support Point Norwalk, 15306 Norwalk Boulevard, Norwalk, California (SCP NO. 0286A, Site No. 16638)*, letter dated September 16.

facility (Figure 2-1). Borings DPT-13 through DPT-16 were located within the northeastern portion of the DFSP facility, in an area formerly containing a settling pond (Figure 2-2). Borings DPT-17, DPT-18, and DPT-19 were located adjacent to a water tank located immediately north of the TFS (Figure 2-3).

The DPT borings were initially cleared to a depth of 5 feet using a hand auger and post hole digger in an attempt to avoid possible underground utilities. The borings were then continuously sampled to depths up to 30 feet.

Soil samples were collected from the DPT borings using stainless steel drive samplers lined with new and unused acetate sleeves. Immediately following the collection of soil from these borings, the portion of the acetate sleeve representing the depth desired was cut, capped on each end with Teflon tape and plastic caps, labeled, placed in a sealable plastic bag (following EPA Method 5035 sampling techniques), and stored in an ice-cooled chest. The soil within the remaining portions of the acetate sleeve was used for lithologic descriptions.

The collected soil samples were prepared in accordance with EPA Method 5035. During this procedure, an Encore sampling device was used to sub-core the soil-filled acetate sleeve representing the sampling depth. The soil exposed at the deeper end of the sleeve was sub-cored. After retrieving the soil aliquots in the Encore samplers, they were capped, labeled, placed into sealable containers, and then placed within an ice-cooled chest.

Soil collected from the upper portion of the acetate sleeve was reviewed for classification by a California registered geologist. The soil descriptions included texture (grain size; using the Unified Soil Classification System), color (Munsell soil color system), general moisture content, and possible presence of contamination. A portion of this sample was also placed in a sealable bag for headspace measurements. The headspace of each bag was measured for volatile organic compounds (VOCs) using a photoionization detector (PID). The PID used during this investigation was calibrated immediately prior to the start of each field day. Soil descriptions and headspace measurements were recorded on Parsons' standard boring log forms. These boring logs are presented in Appendix A of this report.

Following the completion of DPT soil sampling, the open borings were filled from the surface with granular bentonite to within 2 to 4 inches of ground surface. The upper portion of each boring was capped with lawn, soil, or asphalt, depending on the initial surface condition.

Boring GMW-66 was drilled and sampled on September 8, 2009. The location of this boring is depicted on Figure 2-2. This boring was drilled using a Mobile B-62 hollow stem auger drill rig provided and manned by Gregg Drilling. This boring location was initially cleared to a depth of 6 feet using a hand auger and post hole digger. It was then sampled at five-foot intervals to its terminal depth of 40 feet.

Soil samples at GMW-66 were driven into stainless steel drive samplers lined with three 2-inch diameter by 6-inch long stainless steel tubes. Upon removal from the subsurface, the lower stainless steel tube was capped on each end with Teflon tape and plastic caps. The capped sample was labeled, placed in a sealable plastic bag, and then immediately

placed into an ice-cooled chest. Soil collected from the upper soil-filled tubes was reviewed for classification and the possible presence of staining and/or odor, similar to that conducted at the DPT sampling locations. The boring log for GMW-66 is presented in Appendix A.

2.3 Groundwater Monitoring Well Installation, Development, and Sampling

One groundwater monitoring well, designated GMW-66, was installed in the northeast corner of the site on September 8, 2009. Prior to installation of the well, a well installation permit was obtained from the Los Angeles County Environmental Health Division (permit number #0176).

Following soil sampling with 8-inch diameter augers, the boring was reamed to its terminal depth (40.5 feet) with 10-inch diameter augers. As noted in Section 2.2, soil samples were collected at 5-foot intervals between 5 and 40 feet prior to well installation. After completing drilling, the boring GMW-66 was converted to a groundwater monitoring well. The well was constructed with 4-inch diameter schedule 40 polyvinyl chloride (PVC) screen and solid schedule 40 PVC casing. It was screened with 0.02-inch slots between approximately 20 and 40 feet below ground surface (bgs). Solid PVC casing was placed from the top of the screen up to 0.5 feet bgs. Number 2/16 Monterey sand was placed in the annulus of the screened interval, between approximately 18 and 40.5 feet bgs. A 3.5-foot thick seal of bentonite chips was placed above the filter pack, between 14.5 feet and 18 feet bgs. A grout consisting of Portland cement with approximately 5 percent bentonite was placed from 2 feet to 14.5 feet bgs. A 12-inch-diameter, flush-mounted, traffic-rated well box was set in concrete above the grout. A diagram of the well construction is provided in Appendix A.

GMW-66 was developed on September 21, 2009, thirteen days after its installation. Prior to development, an electronic sounder was used to measure the depth to groundwater from the top of the well casings. The groundwater depth was 29.95 feet (below the top of the casing) immediately before development.

Development of GMW-66 was initiated by bailing with a 3-inch diameter by 10-foot long stainless steel bailer to remove sediment that collected during well installation. The well was then surged with a surge block for approximately 11 minutes in order to clean the PVC slots and adjoining sand pack. It was then bailed again until only minor quantities of sediment were visible. The well development was completed using a cleaned 2-inch diameter electric pump (Grundfos). The pump inlet was placed approximately 0.5 feet above the bottom of the well.

During development, groundwater monitoring well GMW-66 was pumped at a flow rate between 1.5 and 2.5 gallons per minute. Once this water began running clear, the water parameters were measured (pH, conductivity, turbidity, and temperature). Pumping ceased when these parameters stabilized. A summary of these measurements can be found in Appendix A on the well development log. Approximately 160 gallons of water (43 well volumes) were removed from GMW-66 during development.

Groundwater was sampled from GMW-66 on October 22, 2009 as part of the fourth quarter groundwater monitoring program. At least three well volumes were purged from the well prior to obtaining the groundwater sample using low flow sampling procedures.

2.4 Analytical Methods

Calscience Environmental Laboratories, Inc. (Calscience) analyzed all the samples collected during the investigation. Calscience is certified by the California Department of Health Services Environmental Accreditation Laboratory Program.

Soil samples from each sampling location and the groundwater samples were analyzed for the following compounds:

- Total petroleum hydrocarbons (TPH) as gasoline (TPHg) using USEPA Method 8015B (modified);
- TPH as JP-5 using USEPA Method 8015B (modified); and
- VOCs using USEPA Method 8260B (via 5035).

Copies of the completed soil and groundwater laboratory reports are provided in Appendix B and data validation reports in Appendix C.

2.5 Equipment Decontamination

All equipment that came into contact with potentially contaminated soil or water was carefully decontaminated to assure the quality of samples collected and prevent transference of impacted materials from the area sampled. Decontamination was conducted prior to and after each use of equipment. All sampling devices used were decontaminated according to USEPA Region IX recommended procedures. The acetate and stainless steel tubes used to hold the samples were new and unused.

The DPT drilling and sampling equipment used was decontaminated using the following procedures:

- Non-phosphate detergent and tap water wash,
- Initial tap water rinse, and
- Final distilled water rinse.

Sampling equipment used in conjunction with the DPT was decontaminated in the near vicinity of the areas being sampled. Due to the distance between DPT sampling locations, the decontamination area was set up on the side of the DPT rig.

Drill rig augers associated with the groundwater well installation arrived at the site cleaned. Following the completion of drilling, the augers were steam cleaned within a decontamination trailer. The soil sampling equipment used prior to well installation was decontaminated in a manner similar to that used for soil sampling with the DPT rig.

2.6 Field Variations from Work Plan

All field activities were conducted in general conformance with Parsons sampling work plan[3] and consultation with RWQCB[4]. The sampling locations were consistent with those proposed expect at the water tank area. The work plan scoped five borings in this area, but once the field project team was at the site, and the data was further reviewed, it was determined that three locations spread-out a bit further would provide adequate data to determine current soil chemistry.

No other field variations occurred during the investigations.

2.7 Investigation-Derived Waste Disposal

Different types of investigation-derived waste (IDW) were generated during the field activities that included the following:

- Used personal protective equipment (PPE),
- Disposable sampling equipment,
- Decontamination fluids, and
- Soil cuttings from the soil borings.

IDW was managed and disposed of in accordance with current Federal, State, and local requirements. IDW was labeled and stored in accordance with the requirements of the Los Angeles County Health Department.

Soil cuttings and decontamination water generated during field investigations were collected in properly labeled and sealed U.S. DOT approved 55-gallon drums. The soil drum filled while drilling and sampling DPT-1 through DPT-19 was placed in a single drum left near DPT-1. The soil generated during the installation of GMW-66 was left in drums adjacent to this well. Groundwater collected during development of GMW-66 was containerized in drums. At the end of the drilling activities, the drums were moved to the northwest area of the DESC property near the field office. Profiling of soil cuttings and waste water was done to ensure appropriate disposal. Proper arrangements were made to haul and dispose of the IDW drums.

Used PPE and disposable equipment was double bagged and placed in a municipal refuse dumpster at the park. These wastes are not considered hazardous and may be sent to a municipal landfill.

[3] Parsons, 2009.
[4] RWQCB, 2009.

3 INVESTIGATION RESULTS

This section discusses the results from the investigation.

3.1 Geology & Hydrogeology

DFSP Norwalk is located between the Montebello Forebay and the Downey Plain in the Central Basin pressure area. Approximately 50 to 60 feet of alluvium (primarily sand, gravel, silt, and clay) cover the underlying Lakewood Formation in this area. Alluvial sediments exposed in the area of the site include sand, gravel, silt, and clay. The Lakewood Formation is composed of marine and continental gravel, sand, silt, and clay deposits. The San Pedro Formation underlies the area, approximately 300 feet below grade, and consists of marine and continental gravel, sandy silt, silt, and clay deposits.

The ground surface within the areas of investigation is between approximately 75 and 78 feet above mean sea level[5]. Soil encountered during the investigation was comprised primarily of unconsolidated fine sand, silty fine sand, silt, and clay to a depth of 40.5 feet (deepest soil samples collected during this investigation). The boring logs are presented in Appendix A for those locations logged during this investigation.

Within the TFS area, silt was generally encountered between the surface and a depth of approximately 8 feet. Fine sand and silty fine sand were encountered between 8 and 28 feet bgs, with intermittently silt and/or clay between 18 and 26 feet bgs. Within the water tank area, fine sand and silty fine sand were generally encountered between the surface and 18 feet bgs. Silt was occasionally encountered within this depth interval between 5 and 14 feet bgs. Clay is encountered beneath this area between 18 and 23 feet bgs. Fine sand and silty fine sand are present between 23 and 26 feet bgs. Soils beneath the former northeast settling pond area are primarily comprised of silty fine sand to fine sandy silt between the surface and 3 feet bgs. This is underlain with fine sand to silty fine sand to a depth of 40.5 feet, with a intermittent silt layer between 23 and 29 feet.

The groundwater depths recorded during the field investigation varied in each area. Groundwater beneath the TFS was generally encountered between 28 and 29 feet bgs, with one anomalous groundwater depth of approximately 23.5 feet. Groundwater beneath the water tank area was encountered at approximately 23 feet bgs. Groundwater beneath the former northeast settling pond was encountered at a depth of approximately 29.5 feet.

The depth to groundwater in monitoring well GMW-66 during this investigation was 29.17 feet bgs in October 2008. This is consistent with the water depth in near-vicinity wells. Historical interpretations of groundwater flow have been generally to the northwest, with a hydraulic gradient of approximately 0.001 foot per foot. Groundwater flow direction in this northeast area was consistent with this and relatively flat to the northwest.

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5 United States Geological Survey (USGS), 1981 (photo revised from 1965), Whittier, California 7.5-Minute Quadrangle (1" = 2,000').

3.2 Data Quality Assurance/Quality Control

Soil samples were collected as part of this investigation. This section provides a summary of the quality assurance/quality control (QA/QC) review and a detailed review is provided in Appendix C.

The sampling program consisted of collection and analysis of 61 soil samples. These samples were collected between September 3 and 9, 2009. The soil samples were collectively analyzed for:

- VOCs by EPA Method 5030B/8260B,
- TPHg by EPA Method 5030B/8015 Modified, and
- TPH as JP-5 by EPA Method 3550C/8015 Modified.

Laboratory data were reviewed to evaluate compliance with the method and the quality of the data reported. This data review did not include recalculation or transcription error checking from the raw data. The following areas were covered in this review:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Surrogates
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicate (MS/MSD)
- Field Duplicates
- Data anomalies, and
- Case narrative, if necessary.

Data qualifiers were applied to analytical results during the data validation process, based on adherence to method protocols and QA/QC limits. All data were reviewed and found acceptable and usable based on compliance of quality control procedures as reported. Accordingly, data were used for project purposes with the addition of data qualifiers as discussed above and met data quality objectives.

3.3 Analytical Data

The purpose of this section is to present the results of the field investigation and to determine if sufficient data have been collected to adequately characterize the nature and extent of impacts at these areas. Table 3-1 summarizes the analytical soil data. Appendix B contains the laboratory reports for soil and groundwater results.

3.3.1 Soil

Laboratory soil samples were analyzed from DPT-1 through DPT-19 at various depths from 5 to 25 feet. The samples were analyzed for 71 target VOCs, TPHg, and TPH as JP-5. Soil results are summarized in Table 3-1.

Truck Fill Station. Soil results from the TFS show impacted soil still present throughout the area except along the western edge where TPH, benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds are below detection limits.

The results within the TFS show elevated impacted soil from 5 to 25 feet bgs. In addition, the area around the former pump house (located just south of the TFS) still contains impacted soil from 10 to 25 feet bgs. The highest concentration of TPHg (16,000 milligrams per kilogram (mg/kg)) and TPH as JP-5 (11,000 mg/kg) were detected at DPT-7 (which is located in the center of the TFS) at 25 feet bgs. Benzene was detected at 5 DPT locations from 10 to 25 feet bgs at a maximum concentration of 390 micrograms per kilogram (µg/kg) at DPT-4 at 25 feet bgs. Methyl-t-butyl ether (MTBE) and tert-butyl alcohol (TBA) were not detected above respective reporting limit in any of the soil samples analyzed. Soil results are presented on Figure 3-1 for TPHg, TPH as JP-5, and BTEX for the TFS area.

Water Tank Area. All three DPT locations had high concentrations of TPHg and TPH as JP-5, where the highest concentrations were detected at DPT-17 at 5 feet bgs of 14,000 mg/kg and 11,000 mg/kg, respectively. Benzene was detected at 2 DPT locations at 20 feet bgs at a maximum concentration of 3.1 µg/kg at DPT-17. MTBE and TBA were not detected above respective reporting limit in any of the soil samples analyzed. The area around the water tank still shows high petroleum impacted soil. Soil results are presented on Figure 3-2 for TPHg, TPH as JP-5, and BTEX for the water tank area.

Northeast Settling Pond Area. TPH at JP-5 was not detected in any of the soil samples analyzed and there was only one small detect of TPHg at 0.35 mg/kg. However, benzene was detected in three of the soil samples collected with a maximum concentration of 1.9 µg/kg. MTBE and TBA were not detected above respective reporting limit in any of the soil samples analyzed. Soil results are presented on Figure 3-3 for TPHg, TPH as JP-5, and BTEX for the northeast settling pong area.

3.3.2 Groundwater

Groundwater samples from GMW-66 were analyzed for 71 target VOCs, TPHg, and TPH as JP-5. All compounds analyzed for groundwater at GMW-66 were not detected above their respective reporting limits.

3.4 SVES Assessment

A site-wide soil gas monitoring and assessment was conducted in late 2008 and the summary report is attached as Appendix D. The assessment concluded that specific areas throughout the site where soil vapor extraction wells where located, including the TFS and water tank areas, clearly showed a substantial decrease in soil gas concentration. The result behind this decrease in concentration may be due to a combination of factors; where the most plausible reason being the effect of the SVESs.

3.5 TFS Area Groundwater and Forensic Data Assessment

A review of all existing groundwater analytical data, including forensic data, from the TFS area was conducted and is discussed in this section. Figure 2-1 shows the locations of each well and area discussed.

South of TFS:

GMW-04 currently has free product present (0.05 feet, October 2009). Historic data collected from this well confirms a presence of high concentrations of both TPH as gas and diesel since sampling began in July 1997. TPH concentrations noticeably increased in May 2007 and have remained elevated. Historically BTEX compounds have been detected in this well with an overall increasing trend noted for benzene. Ethylbenzene and xylene concentrations are variable. MTBE was detected for the first and only time in the April 2009 sample event.

MW-09 currently has free product present (0.04 feet, October 2009). This well consistently shows the presence of dissolved TPH as gas and fuel product since sampling began in July 1997. Historically, BTEX compounds have been detected in this well; although, concentrations have been reducing. Additionally, samples collected in October 2008/April 2009 have been non-detect for BTEX (please note: reporting limits for April 2009 results are elevated). High concentrations of MTBE and TBA (gasoline additives) are also present including the most recent samples collected.

Forensic analysis of free product samples collected from wells GMW-04 and MW-09 exhibit fundamentally different compositions. The free product collected from GMW-04 contained heavier hydrocarbons (e.g., C12-C15 chains) that are not present in MW-09. The percent composition of isoparaffins and naphthalenes found in sample MW-09 are twice that found in GMW-04; whereas, the percentage of aromatics found in MW-09 is half that found in GMW-04. Additionally, forensic analysis of GMW-04 confirmed the presence of ethylbenzene and xylenes while p-xylene (a minor component) was the only BTEX compound identified in free product collected from MW-09. Oxygenates were not detected in forensic results reported either in GMW-04 or MW-09. These differences between samples collected at GMW-04 and MW-09 suggest the presence of two different plumes.

Additionally, the forensic analysis of free product collected from GMW-04 indicates the substance is likely either JP-4 or a mixture of JP-4 and any of gas/kerosene/JP-5/other. Substantial biological degradation does not appear to have occurred to at least a portion of this fuel.

The forensic analysis of free product collected from MW-09 indicates the substance is likely either JP-4 or a mixture of JP-4 and any of gas/kerosene/JP-5/other. However, it appears this fuel has undergone substantial biological degradation.

In summary, the difference in composition between free product samples collected from GMW-05 and MW-09 seem to indicate the presence of two plumes. Historical data seem to indicate a second release of hydrocarbons around 2006-2007 further substantiating the presence of product which has undergone natural attenuation combined with a newer release of hydrocarbons. The older fuels present in the wells, i.e., JP-4/5 were used by DESC which never used MTBE/TBA as an additive.

West of TFS:

Historic analytical data collected from GMW-01 indicates a consistent presence of TPH as fuel product in groundwater, as well as, fluctuating presence of TPHg above detection. As indicated above, soil samples recently obtained from the west end of the TFS were clean and show no impacts of hydrocarbons. BTEX and MTBE have historically been detected in GMW-01; however, the concentrations show a decreasing trend and MTBE has not been encountered since early 2005.

North of TFS:

Historical data for MW-15 shows dissolved concentrations of TPHg, TPH as diesel, and TPH as fuel product present. There is a noticeable increase in concentrations observed in samples collected from this well beginning April 2002. It is not known if impacts in this well are from the TFS area or the water tank area known release(s). Small concentrations of BTEX and MTBE have been observed intermittently in samples collected from MW-15 with the most recent detections of MTBE and xylenes encountered in 2006. Prior to 2006, BTEX and MTBE were non-detect in all samples collected since November 2000.

Northeast of TFS:

Dissolved concentrations of TPHg and TPH as fuel product were initially observed above detection in GMW-14 in April 2004. Another isolated detection of both TPH as gas and diesel was observed in March 2006 and beginning November 2007 these hydrocarbons have been consistently observed in samples collected. BTEX compounds have been detected in isolated samples collected beginning in March 2006. MTBE and TBA (gasoline additives) are also present.

GMW-13 historically has not been impacted from dissolved TPH as fuel product. Dissolved TPH as gasoline and diesel were detected in July 1997; however, subsequent sampling of this well has shown both gas and diesel to be below detection. Low concentrations of BTEX were present in initial samples collected between November 1996 and May 1998; however, subsequent sampling has shown BTEX below detection. A couple low level detections of MTBE were observed in May 2001 and April 2003.

East of TFS:

Historic data collected from well GMW-03 indicates a lack of dissolved hydrocarbon presence until an isolated detection of TPH as gas and fuel product in November 2005 followed by consistent and increasing detections of fuel product beginning November 2007. Although, TPHg results have been non-detect (at reporting limits of up to 300 µg/L) in all samples with the exception of the isolated detection in November 2005, MTBE has been detected in this well at low concentrations in a few samples collected prior to and including January 2003; however, all samples have been non-detect since then. BTEX compounds have been historically non-detected with an isolated low level detection of benzene in April 2009.

4 SUMMARY AND RECOMMENDATIONS

The objectives of the soil and groundwater sampling at the TFS, water tank, and northeast settling pond areas were to:

- Determine the current soil chemistry and distribution of contaminants in these areas;
- Assess the performance of the SVES at the TFS and water tank areas;
- Confirm the closed groundwater plume in the northeast corner of the property;
- Ensure that the groundwater plume does not migrate off-site to the north and east of the property; and
- Review all existing groundwater data, including forensic analytical data, from the TFS area to determine the area limits of the DESC groundwater plume and that of KMEP.

The objectives of the investigations as outlined above were met by:

- Installing, developing, and collecting groundwater samples from one groundwater monitoring well;
- Conducting 19 DPT borings;
- Submitting 61 soil samples for laboratory analysis;
- Continuously logging and collecting soil samples from 19 borings to characterize site lithology;
- Performing a review of the SVES assessment conducted in late 2008; and
- Performing a review of all analytical groundwater and forensic data from the TFS area wells.

During the fourth quarter groundwater monitoring gauging event conducted in October 2009, groundwater level in the new groundwater monitoring well, GMW-66, was measured at 29.17 feet bgs. This is consistent with the water levels in the eastern site wells.

Summary of the findings and recommendations are provided below for each area of investigation:

Northeast Corner of the Site:

- **Soil:** For the soil in the northeast corner of the site at the former settling pond, based on the historical results from 1990-1992 and the small benzene detects in soil during this investigation, there appears to be something in the soil that has yet

to be identified. Since the exact area of the former settling pond is unknown, a GORE survey is proposed to identify hot-spot soil gas chemistry. Once Gore survey results have been evaluated, additional DPT borings will be conducted to define the impacted soil in this area. Once impacted soil area in the northeastern corner of the site has been delineated, remedial options will be evaluated and removal action selected and implemented.

- **Groundwater:** The groundwater results of this investigation from GMW-66 indicate that groundwater in the northeast corner of the site has not been impacted. Therefore, the groundwater plume south of this area has been fully defined and the closed plume contour depicted in the previous groundwater monitoring reports has been confirmed. This well, GMW-66, will be voluntarily monitored semiannually unless otherwise instructed by the RWQCB.

Truck Fill Station:

- **Soil**: Soil in the TFS area is still impacted with hydrocarbons and the impacted soil has not been fully defined. The soil impacts along the western edge of the TFS have been defined and no further soil investigation in this area is needed. However, the areas to the north, east, south of the TFS require additional soil investigation to define the impacted plume. Furthermore, soil around the former pump house located to the south of the TFS is highly impacted with hydrocarbons and will require additional soil investigation in all directions. The additional investigation will require step-out DPTs in these areas to delineate the impacted soil plume.

- **Groundwater**: The results of the groundwater and forensic analytical data evaluation conducted at the TFS area indicted high TPH impacts. Additionally, TPH concentrations have increased noticeably in the northern and northeastern wells that were reviewed. This seems to indicate dissolved phase hydrocarbons plume migration in this direction or an unknown source. The forensic results show different product samples but both contain a mixture of jet fuel and gasoline components. MTBE and TBA detects in the groundwater complicate addressing groundwater remediation in this area since DESC fuels handled at the site never contained these additives. The older fuels present in the wells, i.e., JP-4/5 can be addressed when the MTBE/TBA issue has been addressed.

- **Remedial Action**: The additional soil investigation proposed for the TFS area should identify any unknown source(s). Once the impacted soil area has been delineated and calculated, remedial options for soil can be evaluated and compared to ensure the optimal removal action is implemented. Groundwater remediation will be evaluated once the source(s) and soil impacts have been remediated and once the MTBE/TBA issue has been addressed.

Water Tank Area:

- **Soil**: Soil in the water tank area is still impacted with hydrocarbons and the impacted soil has not been fully defined. Further investigation is needed to conduct step-out DPTs in this area to delineate the impacted soil plume.

- **Remedial Action**: The additional soil investigation proposed for the water tank area will help to delineate and calculate the impacted soil area. Remedial options will be evaluated and compared to ensure the optimal removal action is implemented for impacted soil in the water tank area.

These phases of work at the TFS, water tank, and former settling pond in the northeast corner of the site will be carried out under an addendum DESC work plan and will be forthcoming.

TABLE

Table 3-1
Soil Analytical Summary Results
DFSP Norwalk

Location	Sample Depth	Sample Date	TPH as Gasoline	TPH as JP5	Benzene	Toluene	Ethyl-benzene	Total Xylene	MTBE	TBA
		Units	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Truck Fill Station										
DPT-1	10	03-Sep-09	< 0.30	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
	20	03-Sep-09	< 0.30	< 5	< 1.2	< 1.2	< 1.2	< 2.3	< 2.3	< 23
	25	03-Sep-09	< 0.28	< 5	< 1.4	< 1.4	< 1.4	< 2.9	< 2.9	< 29
DPT-2	15	03-Sep-09	< 0.21	< 5	< 0.96	< 0.96	< 0.96	< 1.9	< 1.9	< 19
	20	03-Sep-09	< 0.28	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
	25	03-Sep-09	< 0.27	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
DPT-3	15	03-Sep-09	< 0.23	< 5	< 0.93	< 0.93	< 0.93	< 1.9	< 1.9	< 19
	20	03-Sep-09	< 0.20	< 5	< 0.78	**1**	< 0.78	< 1.6	< 1.6	< 16
	25	03-Sep-09	< 0.27	< 5	< 1.2	< 1.2	< 1.2	< 2.3	< 2.3	< 23
DPT-4	5	03-Sep-09	**480**	**3100**	< 91	< 91	< 91	< 180	< 180	< 1800
	10	03-Sep-09	< 0.26	**15**	< 1.0	< 1.0	< 1.0	< 2.1	< 2.1	< 21
	15	03-Sep-09	< 0.27	< 5	< 1.1	< 1.1	< 1.1	< 2.1	< 2.1	< 21
	20	03-Sep-09	**850**	**640**	< 82	**86**	**480**	**270**	< 160	< 1600
	25	03-Sep-09	**11000**	**6100**	**390**	**3300**	**15000**	**51000**	< 180	< 1800
DPT-5	10	03-Sep-09	< 0.23	< 5	< 1.0	< 1.0	< 1.0	< 2.1	< 2.1	< 21
	15	03-Sep-09	< 0.27	< 5	< 1.1	**2.2**	< 1.1	< 2.2	< 2.2	< 22
	20	03-Sep-09	**2000**	**2800**	< 80	< 80	**1700**	**520**	< 160	< 1600
DPT-6	15	04-Sep-09	< 0.28	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
	20	04-Sep-09	**3100**	**8600**	< 100	< 100	**8800**	**5080**	< 210	< 2100
	25	04-Sep-09	**1.3**	< 5	< 87	< 87	< 87	< 170	< 170	< 1700
DPT-7	15	04-Sep-09	**26**	**15**	< 1.3	**2.4**	< 1.3	< 2.6	< 2.6	< 26
	20	04-Sep-09	**4400**	**2000**	< 440	< 440	**6600**	**4590**	< 880	< 8800
	25	04-Sep-09	**16000**	**11000**	< 1100	< 1100	**21000**	**24200**	< 2200	< 22000
DPT-8	10	04-Sep-09	**770**	**2700**	< 110	< 110	**240**	**< 220**	< 220	< 2200
	15	04-Sep-09	**870**	**2000**	< 110	< 110	**110**	**< 220**	< 220	< 2200
	20	04-Sep-09	**5.5**	**1000**	**1.5**	**5.1**	**0.99**	**< 1.9**	< 1.9	< 19
	25	04-Sep-09	**0.46**	< 5	**1.1**	**2.7**	< 0.78	< 1.6	< 1.6	< 16
DPT-9	10	04-Sep-09	**1.2**	< 5	**2**	**3.2**	**1.1**	**< 1.6**	< 1.6	< 16
	15	04-Sep-09	**8.2**	**39**	< 1.1	**5.6**	**1.6**	**< 2.2**	< 2.2	< 22
	20	04-Sep-09	**850**	**1200**	< 100	< 100	**270**	**< 210**	< 210	< 2100
	25	04-Sep-09	**9800**	**4300**	< 2000	< 2000	**20000**	**5800**	< 4100	< 41000
DPT-10	15	04-Sep-09	**240**	**490**	< 1.1	**4.2**	**9.1**	**15**	< 2.2	< 22
	20	04-Sep-09	**2800**	**3200**	< 420	< 420	**11000**	**13000**	< 830	< 8300
	25	04-Sep-09	**830**	**990**	< 110	< 110	**940**	**< 230**	< 230	< 2300
DPT-11	15	04-Sep-09	< 0.28	< 5	< 0.78	**1.2**	< 0.78	< 1.6	< 1.6	< 16
	20	04-Sep-09	**1900**	**1800**	< 86	< 86	**2700**	**320**	< 170	< 1700
	25	04-Sep-09	**1.2**	< 5	**1.2**	**1.2**	< 0.86	< 1.7	< 1.7	< 17
DPT-12	10	04-Sep-09	**540**	**1600**	< 97	< 97	< 97	< 190	< 190	< 1900
	15	04-Sep-09	**3500**	**5600**	< 96	< 96	< 96	< 190	< 190	< 1900
	20	04-Sep-09	**130**	**87**	**1.9**	**2.7**	**75**	**5.53**	< 1.6	< 16
	25	04-Sep-09	**0.57**	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22

Table 3-1
Soil Analytical Summary Results
DFSP Norwalk

Location	Sample Depth	Sample Date	TPH as Gasoline	TPH as JP5	Benzene	Toluene	Ethyl-benzene	Total Xylene	MTBE	TBA
		Units	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Northeast Corner										
DPT-13	5	10-Sep-09	< 0.27	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
	10	10-Sep-09	< 0.21	< 5	**1.9**	**0.92**	< 0.85	< 1.7	< 1.7	< 17
DPT-14	5	10-Sep-09	< 0.24	< 5	< 0.98	< 0.98	< 0.98	< 2.0	< 2.0	< 20
	10	10-Sep-09	< 0.23	< 5	< 0.92	< 0.92	< 0.92	< 1.8	< 1.8	< 18
DPT-15	5	10-Sep-09	< 0.28	< 5	< 1.2	< 1.2	< 1.2	< 2.3	< 2.3	< 23
	10	10-Sep-09	< 0.28	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
DPT-16	5	10-Sep-09	< 0.24	< 5	< 0.99	< 0.99	< 0.99	< 2.0	< 2.0	< 20
	10	10-Sep-09	< 0.23	< 5	**1.4**	< 0.98	< 0.98	< 2.0	< 2.0	< 20
GMW-66	5	08-Sep-09	**0.35**	< 5	< 1.1	**1.9**	< 1.1	< 2.1	< 2.1	< 21
	10	08-Sep-09	< 0.22	< 5	**0.94**	**1**	< 0.87	< 1.7	< 1.7	< 17
Water Tank Area										
DPT-17	5	10-Sep-09	**14000**	**11000**	< 1000	< 1000	< 1000	< 2000	< 2000	< 20000
	10	10-Sep-09	**5000**	**6800**	< 97	< 97	< 97	< 190	< 190	< 1900
	15	10-Sep-09	**7200**	**10000**	< 1100	< 1100	< 1100	< 2200	< 2200	< 22000
	20	10-Sep-09	**0.86**	**7**	**3.1**	**1**	**1.3**	**3.4**	< 1.9	< 19
	25	10-Sep-09	**370**	**200**	< 95	< 95	< 95	< 190	< 190	< 1900
DPT-18	15	10-Sep-09	**0.63**	< 5	< 1.0	< 1.0	< 1.0	< 2.1	< 2.1	< 21
	20	10-Sep-09	**160**	**23**	< 86	< 86	< 86	< 170	< 170	< 1700
DPT-19	10	10-Sep-09	**830**	**910**	< 86	**320**	< 86	568	< 170	< 1700
	15	10-Sep-09	**0.72**	< 5	< 1.1	< 1.1	< 1.1	< 2.2	< 2.2	< 22
	20	10-Sep-09	**0.45**	< 5	**1.2**	**0.84**	< 0.81	< 1.6	< 1.6	< 16