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REMEDIAL DESIGN

WORK PLAN ADDENDUM 01

for
Well Installation in the Jameco Unit

at the
Peninsula Boulevard Groundwater Plume Superfund Site
Hempstead, New York

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REMEDIAL DESIGN WORK PLAN ADDENDUM 01
TABLE OF CONTENTS

Section No. Page No.

LIST OF FIGURES

LIST OF ACRONYMS

APP	Accident Prevention Plan
bgs	below ground surface
CSM	Conceptual Site Model
DO	Dissolved Oxygen
DPW	Department of Public Works
EPA	United States Environmental Protection Agency
fpd	feet per day
Ft/ft	feet/foot
LIAWC	Long Island American Water Company
MCL	Maximum Contaminant Level
NAD	North American Datum
NAVD	North American Vertical Datum
ORP	Oxidation-Reduction Potential
PID	Photoionization Detector
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RDWP	Remedial Design Work Plan
SOP	Standard Operating Procedure
TCL	Target Compound List
Tetra Tech	Tetra Tech, Inc.
TO	Task Order
UFP	Uniform Federal Policy
UGA	Upper Glacial Aquifer
USACE	United States Army Corps of Engineers
USCS	United Soil Classification System
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This Remedial Design Work Plan Addendum (RDWP Addendum) has been prepared by Tetra Tech, Inc. (Tetra Tech) to supplement the May 2012 RDWP for Task Order 0002 (TO 0002) issued by the Kansas City District of the United States Army Corps of Engineers (USACE) under Contract Number W912DQ-11-D-3011 for Pre-Design and Remedial Design at the Peninsula Boulevard Groundwater Plume Superfund Site, CERCLIS ID NYN000204407 (the Site). The purpose of this RDWP Addendum is to describe the installation of monitoring wells into the Jameco Gravel Formation of the Magothy-Jameco Aquifer. These wells will be used to evaluate the potential presence of groundwater contaminants associated with the Site in this aquifer. This RDWP Addendum is based on the May 2012 RDWP and the Jameco Aquifer White Paper issued by Tetra Tech in August 2012. The Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) and Accident Prevention Plan (APP), included as Appendices A and B, respectively, to the RDWP, will be modified accordingly.

1.1 Site Description

The Site consists of the area within and around a groundwater plume identified during a series of site investigations and limited interim removal activities at the former Grove Cleaners site conducted between 1991 and 2001. The Site is located in the Village of Hewlett (Town of Hempstead, Nassau County, New York) with Valley Stream and Lynbrook, along the Route 27 corridor, located to the north; East Rockaway and Hewlett Harbor to the east; Woodsburgh and Hewlett Bay Park to the south; and Woodmere to the west. John F. Kennedy International Airport is located approximately three miles to the west of the Site. A map of the Site Location is provided as Figure 1.

A detailed description of the Site, as well as a summary of the Site history, is provided in the May 2012 RDWP.

1.2 Physical Setting

A detailed description of the physical setting of the Site is provided in the May 2012 RDWP. The following description of the geology and hydrogeology at the Site is summarized from the May 2012 RDWP and the August 2012 White Paper.

The Peninsula Boulevard Groundwater Plume Superfund Site is located at the western portion of Long Island, New York, and lies within the Atlantic Coastal Plain Physiographic province. Pleistocene deposits lie atop the gently dipping Cretaceous bedrock. Overlying bedrock is the Raritan Formation, consisting of the Lloyd Sand Member and the upper Raritan Clay member, and above that are the Magothy Formation and Matawan Group (Magothy-Matawan).

Overlying the Magothy-Matawan group within the vicinity of the Site is the Jameco Gravel Formation (Jameco). The Jameco is the earliest of the Pleistocene deposits in the region. The thickness of this unit is highly variable due to its origin as a channel fill deposit. Above the Jameco is a blue-grey clay layer, the Gardiners Clay, which forms a confining layer over the Jameco and the Magothy-Matawan group at specific areas of Long Island, particularly nearest to the Site. This clay layer is estimated to be approximately 80 feet thick toward the southern extent of the Site boundary, thinning to approximately 65 feet toward the northern Site boundary. Approximately 0.5 to 1 mile north of the Site, the UGA directly overlies the Jameco.

The Pleistocene deposits above the Gardiners Clay form the Upper Glacial Aquifer (UGA), the shallowest aquifer on Long Island. The UGA consists primarily of coalescing sheets of sand and gravel, forming an outwash plain that extends southward from the terminal moraines to the Atlantic shore. In the vicinity of the Site, the UGA includes a thin layer of marine clay (as indicated by the presence of marine shells and plant remains), locally referred to as the "20-foot clay." The surficial and shallow subsurface materials within the boundary of the Site include a combination of pavement, gravel subgrade, and re-worked native soils covering the ground surface. Where present, fill materials typically extend to a depth of approximately one foot below ground surface (bgs).

On a regional basis, the groundwater regime in this area of Long Island is dominated by a groundwater divide located approximately 2,000 feet south of Peninsula Boulevard, along a low ridge trending southwest to northeast. Groundwater in the UGA north of the divide exhibits flow with both northerly and westerly components. This depth-dependent variability in flow direction within the UGA is supported by water level data collected from wells completed in the shallow unconfined and deeper semi-confined intervals of the UGA. South of the divide, groundwater flow within the UGA appears to trend southward toward Macy Channel.

In this area of Long Island, the Jameco, despite its limited extent, is a waterbearing zone of primary importance because of hydraulic conductivity values on the order of 200 feet per day (fpd). The Long Island American Water Company (LIAWC) Plant #5 Well Field adjacent to the Site utilizes the Jameco as its source aquifer. Given the similar hydraulic properties of the UGA and Jameco, there is the potential for significant hydraulic connection between the two units, with data from a broader area of Long Island indicating that to be the case. Data obtained as a result of supplemental remedial investigation (RI) activities indicate that the Gardiners Clay acts as a confining unit in the localized area of the Site and the LIAWC Plant #5 Well Field. However, as stated previously, the UGA directly overlies the Jameco north of the Site.

The Jameco Aquifer ranges in thickness from zero to approximately 200 feet and is located within the 100- to 550-foot bgs depth range, depending on location. It contains dark gray and brown, fine to coarse sand and gravel with thin silt and clay layers. This aquifer is locally contaminated by saltwater intrusion (USEPA, 2012). Salt water intrusion into the Magothy-Jameco Aquifer system has been identified to the south of the Site. A deep wedge of salt water intrusion, toward the bottom of the Magothy-Jameco Aquifer system, may extend as far north as Hewlett Bay, two miles south of the Site (Perlmutter and Geraghty, 1963).

The direction of groundwater flow in the unconfined portion of the UGA in the vicinity of the Site is to the north-northwest, towards Doxey Brook Drain and Motts Creek, with an estimated horizontal hydraulic gradient of approximately 0.004 feet/foot (ft/ft). The direction of groundwater flow in the semi-confined portion of the UGA under the Site is to the north-northeast, towards the eastern portion of Doxey Brook Drain. The estimated horizontal hydraulic gradient is approximately 0.003 ft/ft.

Based on United States Geological Survey (USGS) and Nassau County Department of Public Works (DPW) data, the potentiometric surface in the Magothy-Jameco Aquifer system has an elevation (head differential) of nearly 50 feet over the span of approximately 5 miles north to south. Based on head differential and the 5-mile distance, the groundwater flow in the Magothy-Jameco Aquifer is generally toward the south and southwest at nearly 0.0033 ft/ft (Nassau County DPW, 2005). This flow direction is opposite that of the UGA in the vicinity of the Site.

2.0 OBJECTIVES

The RI indicated that groundwater flow from the area of the Site is to the north-northwest, in the direction of the LIAWC Plant #5 Well Field. This cluster of 43 active wells (and numerous inactive wells) is located just northwest of the plume delineated by the RI. The active wells are all screened in the Magothy-Jameco Aquifer system at depths to approximately 160 feet bgs, and contribute to the LIAWC system through a common suction unit that prevents access to individual wells.

The objective of this well installation and sampling is to evaluate the potential presence of groundwater contaminants associated with the Site in the Jameco unit. To achieve this objective, three monitoring wells will be installed into the Jameco and sampled using low-flow techniques. The proposed monitoring well locations, shown on Figure 2, are based on the groundwater gradient within the Jameco-Magothy unit, and are upgradient of the Site (Well 1), located within the southern end of the plume, where PCE was detected near the top of the Gardiner's Clay Well 2), and downgradient of the Site (Well 3). Well locations are positioned to provide adequate hydrogeologic coverage beneath the Site (in the Jameco Aquifer) based on the current understanding of horizontal and vertical groundwater gradients.

2.1 Field Investigation

Three monitoring wells are anticipated to be installed to an approximate maximum depth of 180 feet bgs. If stratigraphic data indicates, different screen depths may be considered to meet data collection needs after discussion with USACE. The borehole will be advanced utilizing a roto-sonic drill rig with various well casing diameters. The proposed well design is provided as Figure 3.

Tetra Tech will complete administrative tasks, subcontractor procurement and management, and mobilization as described in the May 2012 RDWP.

Underground Utility Location

Prior to the start of any drilling activities, a mark-out will be requested from the local utility companies to identify any utilities which may be buried within or near the proposed well locations. Tetra Tech or their subcontractor will contact "Dig Safely New York" at 811 or 1-800-272-4480 at least two (2) working days (not counting the day of the call) but not more than ten (10) working days before the start of field work.

A 10-foot radius around each proposed well location will be cleared using subsurface geophysical equipment prior to beginning drilling activities. If subsurface utilities are identified within this radius that prevent borehole advancement/well installation (e.g., the location and number of utilities does not allow for a clear 3-foot by 3-foot area), the location will be moved, and the revised location will be checked again for subsurface utilities. Additionally, each location will be "soft cleared" to at least 5 feet bgs, using hand-clearing or vacuum methods, to reduce the potential for encountering a subsurface utility.

Well Installation

Based on the geology discussed above, it is imperative to install any monitoring well in the Jameco Aquifer using a telescoping installation technique, in order to prevent any potential contaminant in the upper aquifers from migrating vertically into the Jameco Aquifer as a result of the well installation.

The boreholes will be advanced using a roto-sonic drill capable of handling up to 12-inch well casing. Soil sampling will be continuous using the sonic vibratory technique. The recovered material will be encased in plastic sleeves, and laid out sequentially for physical and chemical analysis.

Initially, an outer 12-inch carbon steel casing will be advanced from the ground surface to the mid-point of the "20-foot clay" in order to isolate the UGA units, so that there will be no hydrogeologic communication at that location between the shallow UGA unit through the clay unit and to the deeper UGA during the well installation (Figure 3). The actual depth of the well casing will be determined in the field by the on-site Tetra Tech geologist. Based on prior activities and the conceptual site model (CSM) for the Site, the top of the 20-foot clay unit is approximately 30 feet bgs with a general thickness of 20 feet (i.e., bottom of clay is approximately 50 feet bgs). This outer casing will terminate approximately midway way through the "20-foot clay," and will be grouted with three feet of bentonite seal. The bentonite seal will be emplaced utilizing a tremie pipe to ensure complete coverage and to prevent the possibility of bridging. The casing will then be flushed/purged (emptied) of soil particles, cuttings and groundwater which potentially may be contaminated.

The borehole will then be advanced into the top of the Gardiner's Clay (approximately 75 feet bgs based on prior activities/CSM) through the bentonite seal using a 9-inch carbon steel casing (Figure 3). This secondary casing will be advanced to, and penetrate 15 to 20 feet into the top of the Gardiner's Clay, with an estimated casing end length of 90 feet and again sealed with 3 feet of bentonite seal. This casing will then be flushed.

A temporary carbon steel inner casing of 7-inches will then be installed from ground surface to the planned depth of the well, approximately 180 feet bgs (Figure 3). The actual depth will be determined in the field by the on-site Tetra Tech geologist in consultation with USACE since the Gardiner's Clay unit varies in thickness north to south across the Site. A 4-inch casing is proposed as the final well diameter.

As discussed above, prior to each sequential casing installation, the installed casing will be flushed and pumped to limit vertical migration of groundwater and entrained soil. Well purging or flushing of each well casing component is required to remove particles and static water within the well casing to its sealed depth. The act of flushing will minimize the possibility of contaminant entrainment in the casing interval. The flushing methodology will require the use of an adequate pump and related equipment and capture device to house the water and sediments for subsequent holding and eventual disposal. Water quality field screening for turbidity and conductivity will demonstrate that the flushing water is free of suspended solids.

During advancement of the borehole, continuous samples will be collected in plastic sleeves and laid out sequentially for characterization. The soils will be visually evaluated and documented for gradation changes, composition, and other related lithologic characteristics based on the United Soil Classification System (USCS) and modified Burmeister classifications. The soil classification will be used to determine the final depth of the well screen interval(s). Drill cuttings will be screened using a photoionization detector (PID). One soil sample (at least 1,000 grams) will be collected from the plastic sealed core from the planned screened interval at each well location. The soil samples will be submitted to an off-site laboratory for grain size analyses (ASTM D422D).

Monitoring wells will be constructed using 10 feet of 4-inch diameter stainless steel wire-wound screen (0.020-inch slot) and 4-inch diameter stainless steel riser pipe. The screen length will penetrate the Jameco Aquifer below the bottom of the Gardiner's Clay unit. Based on location-specific geology, the length of the screen may require modification (to be determined by the on-site Tetra Tech geologist in consultation with USACE personnel).

A slurry of #1 Morie sand will be tremied down the annulus of the borehole to an elevation of 3 to 5 feet above the top of the screen interval to form a filter sand pack. The construction of the wells will be completed by setting a 1- to 2-foot thick choke sand seal and a 3- to 5-foot thick bentonite seal above the sand packs. As the temporary casing is withdrawn, grouting with a cement-bentonite mix to the surface will be done using a tremie pipe. The wells will be completed with flush-mounted surfaces, consisting of a manhole, apron and locking j-plug.

The three newly installed wells will be pre-pumped (and developed) to remove sediment from the casing and settle the filter pack. Development will be conducted as specified in the May 2012 Work Plan and SOP #7 of the QAPP.

The coordinate system utilized for the survey of the new wells will be New York State Plane North American Datum 83/92 (NAD 83/92) for horizontal control and North American Vertical Datum 88 (NAVD 88) for vertical elevations (to 0.01 foot vertical). The surveyor will obtain horizontal location and vertical elevations for the wells, and data for the wells will include the vertical elevation of the concrete pad, ground surface, outer casing, and innermost casing.

Groundwater Level Measurement / Sampling

Groundwater sampling of the Jameco wells will occur as follows:

One round of sampling will be conducted to determine the potential for Site plume impacts to the Jameco Aquifer. Synoptic groundwater elevation measurements will be collected from the three wells prior to sampling. Groundwater elevations will be measured from the surveyed inner casing measuring point using an electronic interface probe. All data will be recorded in a field logbook and/or on field forms (as described in the UFP-QAPP), and subsequently presented in tabular form.

Groundwater purging operations and subsequent groundwater sample collection will be conducted in accordance with the United States Environmental Protection Agency (EPA) Region 2 Low Stress Method (EPA R2, 1998) and USACE Standard Operating Procedure for Groundwater Low-Flow Purging (USACE, 2002), using an adjustable-rate bladder pump or submersible pump equipped with dedicated Teflon-lined tubing, a water-quality meter, and a flow-through cell. The well's static water level measurement will be recorded using an electronic water level indicator prior to sampling. After the water level is recorded, groundwater will be purged from each monitoring well to begin the sample collection process. The purged groundwater and well headspace will also be field screened using a PID prior to and during sampling.

During the purging operations, the pump speed will be adjusted to achieve minimal stabilized drawdown, to the extent practical. If drawdown cannot be stabilized, the pumping rate will be reduced to the minimum rate the equipment can maintain and continue to pump groundwater. Groundwater quality indicator parameters will be recorded approximately every five minutes during the groundwater purging process. The groundwater quality indicator parameters to be recorded include pH, temperature, specific conductivity, dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP).

Once the groundwater quality indicator parameters are considered to be stabilized within the limits specified in the applicable Standard Operating Procedure (SOP) (found in the May 2012 UFP-QAPP), a groundwater sample will be collected directly from the Teflon tubing into sample bottles. The groundwater samples will be analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs) [trace level]. The groundwater sample results will be compared to the applicable federal (EPA Maximum Contaminant Levels [MCLs]) and state (NYSDEC Water Quality Standards/Guidance Values - Class GA) as outlined in the UFP-QAPP.

Tetra Tech will follow the procedures presented in the May 2012 RDWP for obtaining laboratory services, preparation and shipment of samples, and sample management.

3.0 PROJECT ORGANIZATION

The organization structure for the project will be as described in the May 2012 RDWP.

4.0 PROJECT SCHEDULE

The overall baseline project schedule was provided in the May 2012 RDWP. Tetra Tech provides updates to the schedule to USACE periodically.

5.0 REFERENCES

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FIGURES