FRITO-LAY
Vancouver Washington

Hydraulic Lift Area Petroleum Release

Monitoring Plan
Project Number 13003
Document Number 13003-MP

4808 NW Fruit Valley Road
Vancouver, Washington 98660

Submitted To:

Washington Department of Ecology
Olympia, Washington

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Prepared By:

Environmental Health Management, Inc.
P.O. Box 1746
Lake Oswego, OR 97035

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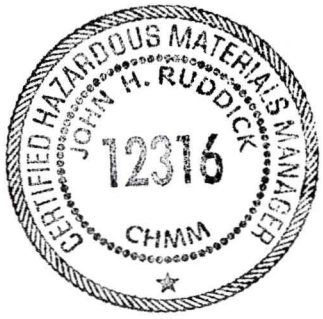
SECTION 1. CERTIFICATIONS

This plan has been prepared in accordance with accepted hydrogeologic practices.

Timothy O'Gara, LG, LHg.

This plan has been prepared in accordance with accepted environmental practices.



John H. Ruddick. Ph.D, CHMM

SECTION 2. INTRODUCTION

This plan describes procedures to assess ground water beneath the hydraulic lift area of Frito Lay's Vancouver, Washington plant site.

2.1 Purpose

This workplan is intended to advance and further previous work which identified and delineated hydrocarbon contamination in soil beneath the hydraulic lift. It was prepared in response to a request by the Washington Department of Ecology (Ecology) for further information regarding the release.

2.2 Background

In 1991, a hydraulic lift used to tip trucks to deliver loads of potatoes collapsed. Diesel fuel and hydraulic fluid were released. The bulk of the contamination was remediated by excavation in January, 2005. This work left some contamination in place at inaccessible locations beneath the lift. Further study has defined the nature and extent of the Diesel-range petroleum and related contaminants in soil. A single ground water sample showed high molecular weight (C21-C34) aliphatic hydrocarbons, however these were also detected in the field blank.

Residual petroleum-contaminated soil was detected to depths less than 5 feet below ground surface (bgs) near the south end of the lift. Physical removal of this soil was determined to cause meaningful disruption of plant operations while in-situ treatment was determined to potentially reduce soil load bearing capacity, risking lift failure. Frito Lay is electing to leave this contamination in place beneath existing pavement and implement an inspection and monitoring program until such time as the lift is relocated or rebuilt.

2.3 Executive Summary

This plan describes the design, installation, development, sampling and analysis of ground water monitoring wells at the Frito Lay hydraulic lift. It includes information on regional ground water conditions, chemical contaminants of concern, detailed methods and reporting procedures. The plan includes an initial sampling period of 18 months (6 quarterly sampling events), as requested by Ecology.

SECTION 3. SITE DESCRIPTION

3.1 Regional

Frito Lay is located in SW Vancouver, Washington near Vancouver Lake and the Columbia River (See **Figure 1**). The plant manufactures and distributes potato chips and other snack foods. The area surrounding Frito Lay is a mix of industrial, agricultural and residential land uses. The Burlington Northern/Santa Fe Railroad right of way is located to the east with Nalco Industrial and Support Terminals tank farms to the north. Geologic and hydrogeologic conditions are described below.

3.2 Hydraulic Lift Area

The hydraulic lift is located immediately west of the main processing building (see **Figure 2**). The lift includes a concrete approach ramp and a steel platform. The north end of the platform is connected to a massive concrete buttress by a hinge. Hydraulic rams connect the platform to similar foundations located near the center of the platform. Trailers of potatoes are loaded on the platform and detached from the tractor which is driven away. The platform is then tilted using the rams to raise the western end of the platform. This allows potatoes to cascade from the trailer onto a receiving conveyor. From there, the potatoes are routed to storage bins by a network of conveyors.

Support equipment, including conveyors, hydraulic pumps, transformers and controls are located between the platform and the processing building. The platform and support equipment reduce access between the lift and the building. The area around the lift is well paved. Process waste water conveyances, storm drains and other underground utilities are present nearby.

Soil contaminated with Diesel-range organics (DRO) remains in place beneath the south part of the platform. (Gasoline-range organics (GRO) were reported during cleanup activities in 2005 but were not detected in subsequent analyses.) The horizontal extent of residual DRO contamination is estimated at 500 square feet and is shown in **Figure 2** as brown hatching. The vertical extent of DRO is estimated at 10 feet below the ground surface.

Additional regional and site details have been previously reported.

SECTION 4. HYDROGEOLOGIC STUDY

4.1 Regional Conditions

According to USGS Professional Paper 1424-B (*Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*), the site is located within the Portland sub basin. It is underlain by Glacial Outburst Flood Sediments. The upper 15 feet of soil at this site is comprised of sandy silt to silt. These silts are absent within ¼ mile to the west due to the historic migrations of the Columbia River.

The Willamette Aquifer is found directly beneath the silts. The upper portions of the aquifer as it transitions from the overlying silts consists of fine to medium sands. Deeper in the aquifer there are interbeds of sands and gravels that are several tens of feet thick. The upper aquifer is reported to be up to 300 feet thick in this area.

The Willamette Confining Zone begins at approximately 275 feet below sea level and is up to 1,200 feet thick. This zone consists of clays and low energy sediments. Below the Confining Zone, at a depth of approximately 1,500 feet below sea level, is the underlying basalt that forms the basin bottom.

Ground water in this area is flowing west-northwest, roughly sub-parallel to the Columbia River.

4.2 Contaminants of Concern

The source of contamination at this site is a hydraulic oil spill and potential releases from a vehicle Diesel tank. Earlier soil sampling at this site has detected gasoline and Diesel range hydrocarbons as well as a heavier lube oil fraction in some cases.

Further speciation of soil samples detected volatile organic compounds associated with the gasoline detection and low levels of PAHs associated with the Diesel/oil detections. The intent of this project is to install two ground water monitoring wells to verify ground water conditions down gradient from the spill site. Given the fact that gasoline range hydrocarbons are more mobile than the longer chain Diesel range hydrocarbons, the contaminants of concern include volatile organic compounds that are associated with gasoline as well as the semi-volatile compounds that are associated with Diesel fuels and heavy oils.

The volatile organic compounds can be detected using EPA method 8260B and the Diesel and heavy oil range will be detected using EPA method 8270C to look for polyaromatic hydrocarbons (PAHs). Additionally, the initial sampling will include collecting TPH-Dx and TPH-Gx samples. After the initial sample round, the contaminants of concern can be limited to just the compounds that were detected in the samples.

4.3 Monitoring Wells

4.3.1 Location

The wells will be installed in a down gradient direction from the spill area, and away from the location of the earlier soil excavation. One well will be placed near ThermoFluids sample location 11 and one near sample location 10 (See **Figure 2**). Prior to installing the wells, underground utilities will be located and the surface concrete cored by others. EHM will investigate the possible existence wells east of the process building that may be useable for depth to water measurements.

4.3.2 Construction

The wells will be installed using the push probe method. The push probe sampler drives a five-foot sampler into the soil using hydraulic pressure. As the sampler is pushed into the ground, soil is allowed to enter the hollow center of the sampler. The center of the sampler is fitted with a lexan tube, which can be removed from the sampler after it has been extracted from the ground.

This allows for a continuous core of material to be removed from each location in five-foot sections. Any section of the core can be used for a sample by simply cutting the lexan sleeve at the appropriate location and placing the soil into clean jars that have been provided by the laboratory.

By collecting a complete core of the boring, a detailed lithologic column for the boring log will be obtained. No soil samples are planned to be collected. The soil cores will be used for lithologic description only.

Once the desired depth has been achieved, the well will be built by installing the well casing down through the center of the sample tube, and removing the tube from around the well casing. For this project, the well will be 2-inch diameter PVC with 0.010 slot openings on the lower 10 feet of casing. The casing will be pre-packed using a 10-20 sand. The interstitial space above the sand pack, and between the solid casing and the borehole wall will be backfilled with bentonite to allow for a good seal. It is expected that the well will be no more than 40 feet deep. The wells will use a flush mount completion so they won't be in the way of normal plant operations.

4.3.3 Lithology

As mentioned earlier, the upper soils at this site are silts down to a depth of approximately 15 feet. Below that is a fine sand that extends down to at least 30 feet below grade. The wells will be screened in this sand.

4.3.4 Development

Prior to collecting a water sample, each well will be pumped using a submersible pump until either the water is clear, or at least 10 well volumes have been removed. The water will be collected into a drum and stored at the site until the initial lab analysis is received. At that time, the water will be disposed of in an appropriate manner. During the January, 2010 site investigation, water was found at approximately 28 feet below grade. If the water is found at a similar depth during this installation, this would mean that approximately 12 gallons of water will be purged from each well during development.

4.3.5 Investigation Derived Waste.

In addition to the water that will be stored on site, soil that is generated from the probe sampling will also be stored in drums or buckets on site during the well installation process. If there is any indication of contamination detected during the drilling process, a sample of the soil will be collected for analysis. If contamination is confirmed, the soil will be removed off site to an appropriate location for landfilling.

SECTION 5. Ground Water Monitoring

5.1 Field Parameters

During a ground water monitoring event, each well will be opened and allowed to equilibrate as soon as the sampler is on site. As soon as the wells have equilibrated, a depth to water measurement will be collected and recorded in the field log book.

Once the depth to water has been collected, a clean submersible pump will be lowered into the well to purge out at least three well volumes of water. During the purging process, water temperature, pH, and electric conductivity will be measured and also

recorded in the field log book. When all these parameters have stabilized, the purge pump can be removed from the well to allow for sampling.

5.2 Sample Collection

Water samples will be collected from the well using a new disposable bailer and string at each well. Care will be taken to avoid agitation that could result in volatilization of contaminants. The water will be immediately placed in appropriate bottles that have been provided by the lab. During the initial sampling event, six 40-ml VOA vials, one 6 ounce plastic bottle, three 1-liter unpreserved amber glass bottles and three 1-liter amber glass bottles preserved with HCl will be filled to zero headspace. Each sample bottle will be labeled showing the sample location, time, and date of the sample. They will then be placed into a cooler and kept at approximately 4 degrees C. The water samples will be transported to the analytical laboratory under strict chain of custody protocol.

5.3 QA/QC

Because the water samples will be collected using a disposable bailer, there is no need for an equipment blank. Field QA/QC samples will include a temperature blank that will be included in the cooler to verify that the required temperature was met, and a trip blank. The trip blank will consist of three 1-liter amber bottles and three 40-ml VOA vials.

5.4 Analysis

As mentioned earlier, each water sample will be analyzed for volatile organic compounds according to EPA method 8260B and for polycyclic aromatic compounds (PAHs) that are found in Diesel and heavy oils using EPA Method 8270C. The initial samples will also be analyzed for gasoline and Diesel range hydrocarbons using the NWTPH-Gx and -Dx methods.

5.4.1 Chemical Analysis

Samples will be analyzed at Specialty Analytical, Inc. in Clackamas, Oregon. Petroleum hydrocarbon fractions will be quantified using Method NWTPH-Gx and NWTPH-Dx. Volatile constituents will be quantified using EPA Method 8011 (EDB and EDC by microextraction and Gas Chromatography) for EDB and EDC and EPA Method 8260b (Volatile Organic Compounds by GC/MS) for other GRO volatile organics. Semivolatile constituents will be quantified using EPA Method 8270-SIMM (Semivolatile Organic Compounds by GC - Selective Ion Monitoring Method) for polycyclic aromatic hydrocarbons (PAHs). Dissolved lead and cadmium will be determined on pre-filtered and acidified samples using EPA Method 6010b (ICP Metals)

If petroleum fractions are detected above MTCA Method A criteria, volatile petroleum hydrocarbon fractions (VPH) and/or extractable petroleum hydrocarbon fractions (EPH) analysis may be performed for comparison with MTCA Method B or C criteria.

5.5 Decontamination

There are several equipment pieces that will need to be decontaminated between samples. The water level meter will be rinsed off with distilled water between wells. The purge pump will need to be cleaned inside and out using Alconox in a bucket of water, followed

by a clean water rinse. To clean the internals of the pump, soapy water is pumped through the pump until it comes out the discharge line. This is followed by a clean water rinse that is continued until all the soap has been flushed from the pump and tubing. The outside of the pump, and the bottom 10 feet of tubing that may come into contact with well water will also be scrubbed with Alconox and water and rinsed with clean water.

5.6 Frequency

Six rounds of quarterly sampling will be performed. Following these events, Ecology will evaluate the results and determine if additional monitoring is warranted.

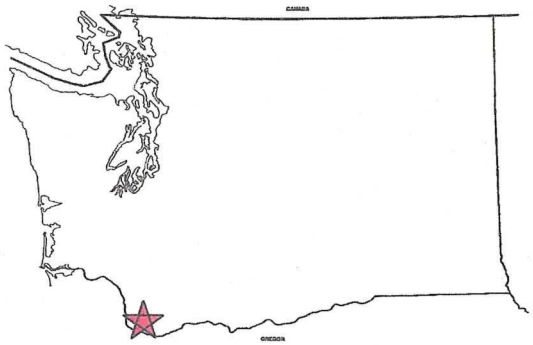
SECTION 6. HEALTH AND SAFETY

All sampling personnel will have completed a 40-hour HAZWOPER training course and have a current annual update certificate. Level D personal protective equipment will be used during sampling. Level D will include eye protection, impervious gloves (nitrile or latex) and hard hats. Push rig operators must wear steel-toed footwear. If operating in traffic areas, reflective safety vests or jackets must be worn. Splash suits or disposable coveralls are optional. Respiratory protection is not required.

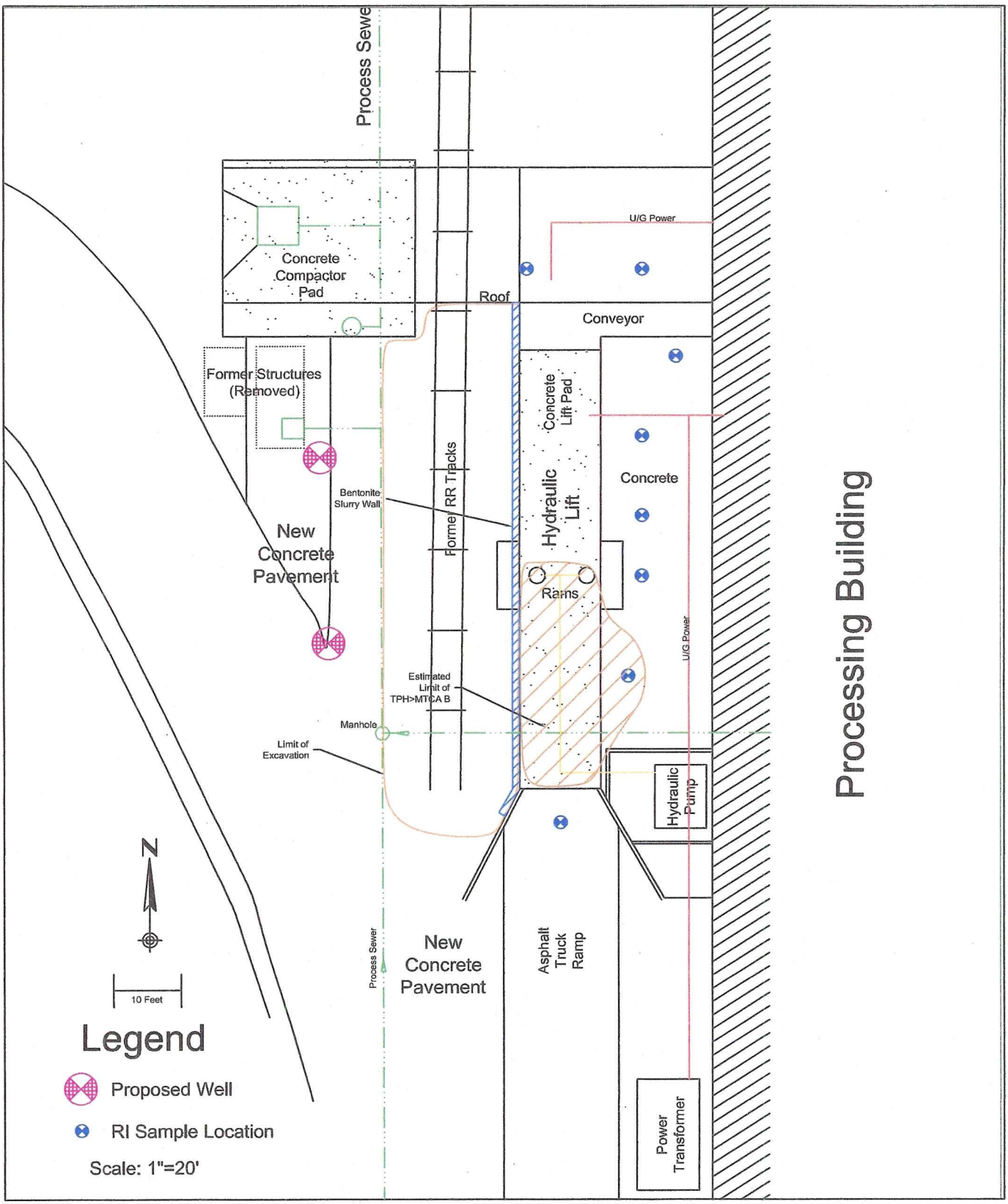
SECTION 7. REPORTING

Analytical results and field data will be summarized in a data table. Graphics will include well construction logs and location maps. The results will be presented in a formal report and entered into Ecology's EIM database.

SECTION 8. FIGURES



ENVIRONMENTAL HEALTH MANAGEMENT, Inc PO BOX 1746 Lake Oswego, Oregon 97035 (503) 287-4620	DRAWN BY: KIM APPROVED BY: JHR DATE: 3/26/09 JOB NO.: 13003	FRITO LAY – Vancouver Hydraulic Lift Area Location Map	FIGURE 1



ENVIRONMENTAL HEALTH MANAGEMENT, Inc
PO BOX 1746
Lake Oswego, Oregon 97035
(503) 287-4620

DRAWN BY:	KIM
APPROVED BY:	JHR
DATE:	12/21/2010
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FRITO-LAY, VANCOUVER, WA
Hydraulic Lift Area
Propose Well Locations

FIGURE 2