MOTIVA
ENTERPRISES LLC

October 18, 2013

State of Delaware
Department of Natural Resources and Environmental Control
Solid & Hazardous Waste Management Section
89 Kings Highway
Dover, Delaware 19901

Attention: Mr. Robert Hartman

Subject: Permit SW – 96/01, File Code: 02.F2
Submission of Post-Closure Plan, Revision 1
Revised as per DNREC comments
Former Fly Ash Pond 2
Delaware City Refinery
Delaware City, Delaware

Dear Mr. Hartman,

Please find attached the Post-Closure Plan, Revision 1, for the Former Fly Ash Pond 2 at the Delaware City Refinery. This Plan was prepared by URS Corporation on behalf of Motiva Enterprises LLC.

This Plan is being submitted in accordance with the requirements of Permit SW – 96/01, File Code: 02.F2 and has been revised to address your comments received in correspondence dated October 10, 2013.

If you have any questions, please contact Mr. Peter Dudko at 267.446.3351 or me at 410.392.0533

Sincerely,

Glenn Hardcastle
Motiva Enterprises LLC

Cc: Aaron Vahid, DCRC
Steve Nichols, Valero Energy Corp.

P. O. Box 74, Elk Mills, MD 21920 Phone: (410) 392-0533 Fax: (410) 392-2955 Overnight mail: 65 Mary Jane Lane, Elkton, MD 21921

October 18, 2013

State of Delaware
Department of Natural Resources and Environmental Control
Division of Waste and Hazardous Substances
Solid and Hazardous Waste Management Section
89 Kings Highway
Dover, Delaware 19901

Attention: Mr. Robert Hartman

Subject: Permit SW – 96/01, File Code: 02-E2
Submission of Post-Closure Plan, Revision 1
Former Fly Ash Pond 2
Delaware City Refinery
Delaware City, Delaware

Dear Mr. Hartman,

Please find attached the Post-Closure Plan (PCP), Revision 1, for the Former Fly Ash Pond 2 at the Delaware City Refinery. The Plan was prepared by URS Corporation on behalf of Motiva Enterprises LLC and is being submitted in accordance with the requirements of Permit SW – 96/01, Condition VI.D. This plan has been revised in response to your comments dated October 10, 2013.

Your comments are listed below followed by our response to address your concern.

"1. Include as part of the plan, a drawing of the site which shows access controls, environmental monitoring locations, the above ground storage tank locations, stormwater controls, stormwater flow directions and limits of the regulated property. Consider using the URS Drawing revised 9/10/12 and submitted in the FAP Closure Certification Report as Figure 5."

Figure 5 from the FAP Closure Certification Report has been included in the PCP as Figure 1.3. Text was added to the PCP to reference Figure 1.3.

"2. Groundwater and other monitoring may be reduced as part of ending/reducing post-closure care requirement; however, until such a reduction is discussed and approved, Motiva must continue to adhere to the monitoring schedule required by the current permit. Please revise your Groundwater Monitoring Plan to accommodate the current permit requirements."

The Groundwater Monitoring Program discussed in Section 5 of the PCP, and reflected on Table 5.1, has been revised for program compliance to the current permit (Closure Permit).

URS

"3. Please update your financial assurance estimates to include:
   a. Groundwater sampling required by the current permit. (1st row)
   b. Maintenance of monitoring wells. (2nd row)
   c. Leachate sampling as specified by the permit. (1st row)
   d. Maintenance of the leachate collection and storage system. (5th row)
   e. Periodic Inspections. (5th row)
   f. Maintenance of access controls. (5th row)
   g. The cost of establishing the environmental covenant. (8th row)
   h. Reporting costs." (1st row)

Table 5.1 has been revised to incorporate cost estimates for items listed above, either by expanding upon existing line items or adding new line items. The revised Table 5.1 has ten rows of line items. Items a. through h. above are addressed by the Table 5.1 row, as indicated above.

If you have any questions, please contact Ms. Sharon Roberts, URS, at 215-367-2490, Mr. Peter Dudko, URS, at 267.446.3351 or Mr. Glenn Hardcastle, Motiva, at 410.392.0533.

Sincerely,

Sharon H. Roberts
URS Corporation

Peter J. Dudko, P.E.
Certifying Engineer
Delaware License No. 9538

Cc: Glenn Hardcastle, Motiva
Aaron Vahid, DCRC
Steve Nichols, Valero Energy Corp.

335 Commerce Drive
Fort Washington, Pennsylvania 19034
Tel: 215.367.2500
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POST-CLOSURE PLAN
FORMER FLY ASH POND No. 2

Prepared for:

MOTIVA ENTERPRISES LLC
DELAWARE CITY REFINERY
DELAWARE CITY, DELAWARE

Prepared by:

335 Commerce Drive, Ste 300 Fort Washington, PA 19034
(215) 367-2500

September 20, 2013, Revision 1 – October 2013

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1.0 INTRODUCTION

This Post-Closure Plan has been prepared to address the post-closure care and monitoring care of the former Fly Ash Pond (FAP) No. 2 located at the Delaware City Refinery (Refinery) in Delaware City, Delaware (see Figure 1.1 – Site Vicinity Map). The location of FAP No. 2 within the Refinery is shown on Figure 1.2 – Site Plan. Closure construction was performed during the period between May 2010 and December 2010. The post-closure configuration of FAP No. 2 is shown on Figure 1.3 – Fly Ash Ponds Stormwater Flow Plan. The Closure Construction Certification Report was accepted by DNREC on August 21, 2013.

FAP No. 2 and the adjacent FAP No. 1 were permitted as non-hazardous industrial waste facilities under Solid Waste Permit SW-96/01 issued in August 1996. FAP Nos. 1 and 2 were closed in accordance with the requirements stated in Fly Ash Pond 1 & 2 Closure Permit SW-96/01, File Code: 20.B, dated May 29, 2009. As part of closure, all fly ash and other materials in FAP 1 were consolidated into FAP No. 2 so that post closure care of the former FAP No. 1 is not required. FAP No. 1 activities are described in this Plan only as needed and as they relate to FAP No. 2.

A separate Post-Closure Plan was submitted to DNREC with the Closure Plan in December 2006. This Plan reflects an update of the 2006 Post-Closure Plan.

This document presents the post-closure monitoring and care that commenced upon closure of FAP No. 2 and continues for a period of 30 years, unless otherwise determined by DNREC.

2.0 SCOPE

Post-closure monitoring and care will include analysis of groundwater samples collected from area monitoring wells for constituents addressed in Section 5.4, installation of additional groundwater monitoring wells (if post closure monitoring deems this to be necessary), and inspection and maintenance of the groundwater monitoring system, final cover system, associated surface water management system and operation/maintenance of the leak detection system (LDS) as long as unit yields leachate.

3.0 POST-CLOSURE UNIT DESCRIPTION

The Delaware City Refinery is located in New Castle County, Delaware approximately 1 mile northwest of Delaware City. FAP No. 2 serves as a long-term, post-closure unit and is located in the northwestern portion of the Refinery (see Figure 1.1). FAP No. 2 is configured as shown in Figure 1.2.

3.1 OPERATION AND OWNERSHIP HISTORY

FAP No. 2 began operation in 1984 and received fly ash solids as part of normal operation until 1996. The FAP was designed to serve as settling and polishing basin for a purge stream (fly ash) from Wellman-Lord stack gas pre-scrubbers that were located in the stack gas scrubber area of the Refinery. These pre-scrubbers were part of the flue gas scrubbing equipment for a power generating plant that utilized petroleum coke as a fuel source.

Ownership of the Delaware City Refinery transferred from Motiva Enterprises LLC (Motiva) to Premcor Refining Group Inc. (Premcor) in May 2004. The facility was then owned and operated by Valero Energy Corporation (which acquired The Premcor Refining Group on September 1, 2005) until June 2010, when the facility was purchased by PBF Energy Company. Motiva is currently responsible for the post-closure care of FAP No. 2.

3.2 FAP CONSTRUCTION AND SITE CONDITIONS

The closure of FAP No. 2 involved the following operations:

- Decanting of free water contained in FAP Nos. 1 and 2;
- Repair of damaged base liner materials in FAP No. 2 utilizing a geosynthetic clay liner;
- Installation of prefabricated vertical drains (wick drains) in FAP No. 2 (for dewatering of the existing fly ash. The wick drains have no permanent function relative to the closure system and do not require post closure monitoring);
- Installation of a temporary sand drainage/collection layer and temporary collection sumps to collect water discharged from the wick drains (no post closure monitoring required);
- Moisture conditioning of fly ash contained within FAP No. 1;
- Transportation and placement of moisture conditioned FAP No. 1 materials, including the FAP No. 1 liner materials, into FAP No. 2. Completely closing/removing FAP No. 1;

- Monitoring of settlement of FAP No. 2 under the increased load (task completed during the construction period, no further monitoring required);
- Construction of a grading/cushion soil layer atop the conditioned FAP No. 1 materials;
- Construction of an engineered geosynthetic capping system at FAP No. 2 consisting of (from bottom to top);
    - Geotextile cushion layer
    - HDPE geomembrane barrier layer
    - Single sided geocomposite drainage layer
    - 18-inch thick soil protective cover layer
    - 6 – inch thick vegetative layer (top soil)
- Grading of the FAP No. 1 Area was performed to allow for positive drainage and beneficial re-use of the former FAP No. 1 berm materials for other Motiva closure projects within the Delaware City Refinery;
- Construction of improved drainage features including enhanced surface drainage and an enhanced detention basin; and
- Installation of additional monitoring wells down gradient of FAP No. 2.

The construction work was performed from May 2010 to December 2010.

The FAP No. 2 has a bottom liner system that includes primary and secondary liners. A leak detection system (LDS) is situated between the two liners to monitor the performance of the primary (upper) liner and is equipped with three LDS collection pipes that are accessed by manholes located outside the FAP. Typical liner system cross-sections for FAP No. 2 are shown in Figure 3.1. Leachate is being collected and disposed of at the rate that it accumulates through the LDS and an above ground storage tank. Leachate is periodically removed from the tank into tanker trucks and transported to an offsite facility for treatment and disposal. Alternatively, leachate may be placed into the Refinery wastewater treatment system for treatment and discharge through a Refinery permitted NPDES Outfall. Leachate quantities initially increased after closure construction due to the addition of the wick drains, but the quantities have since significantly decreased.

4.0 ENVIRONMENTAL SETTING

4.1 REGIONAL SETTING

4.1.1 Climate

In general, New Castle County, Delaware experiences mild winters and warm to hot, humid summers. The coldest part of the year is December through February, with the average minimum temperature of 25°F occurring in January. The average maximum monthly temperature of 86°F occurs in July. The normal daily mean temperature ranges from 31°F in January to 76°F in July.

Precipitation is considered moderate, and is fairly evenly distributed; however, rainfall during the growing season is not uniform, with prolonged wet or dry periods occurring. The average monthly precipitation ranges from approximately 2.78 to 4.57 inches. The average annual precipitation in Delaware is approximately 43 inches. Snowfall averages approximately 21 inches annually, with the first and last frosts typically occurring in mid-October and mid-April, respectively.

The average annual precipitation of 43 inches yields approximately 2 million gallons per day per square mile (mgd/mi^2). According to the Water Resources Center from the University of Delaware (Mathers, 1972), approximately 60 percent of this amount is taken back into the atmosphere by evapotranspiration, leaving less than 0.8 mgd/mi^2 available for groundwater recharge and surface water discharge.

4.1.2 Regional Geology

The Delaware City Refinery facility lies within the Atlantic Coastal Plain physiographic province, approximately 12 miles south of the Piedmont physiographic province boundary, which is also known as the Fall Line. The Coastal Plain in this region consists of a wedge of unconsolidated sediments deposited on a seaward (southeasterly) sloping crystalline basement. The sediments underlying the Delaware City Refinery have been divided into eight geologic units ranging in age from recent (Quaternary) to more than 65 million years (Cretaceous).

The four most prevalent and pertinent units at the Refinery are the Colombia, Merchantville, and Potomac Formations, and the Riverine Deposits. The other four (Marshalltown, Mount Laurel, Englishtown, and Magothy) formations are locally rare, limited in vertical and lateral extent, and have little effect on the hydrology of the Refinery.

The typical sequence of deposits for the four most prevalent units found at the Refinery area is as follows:

- Riverine Silts and Clays (Pleistocene and Holocene);
- Columbia Formation (Pleistocene);
- Merchantville Formation (Cretaceous); and
- Potomac Formation (Cretaceous).

The regional geology is discussed in detail in the Phase II RCRA Facility Investigation Groundwater, by URS, May 2011.

4.1.3 Regional Hydrogeology

The major aquifers in the Refinery area of New Castle County are the Columbia and Potomac Formations. The Merchantville Formation, which in most of the area separates the Columbia and Potomac Formations, generally acts as an aquitard due to its fine-grained composition.

4.1.4 Regional Surface Water Hydrology

Local surface water bodies in the area of the Refinery flow to the Delaware River, as do the majority of surface water bodies in New Castle County. (Some surface water bodies in the western portions of the New Castle County drain to the Chesapeake Bay.) Stream flow is generally maintained through precipitation and groundwater discharge, particularly during periods of low precipitation.

The Delaware River adjacent to New Castle County is tidal. The high tide elevation has caused large areas surrounding the Delaware River and its tributaries to be marshlands and/or swamps due to the terrain's generally low elevations.

4.2 SITE ENVIRONMENTAL SETTING

The following sections describe the subsurface, surface water hydrologic, and hydrogeologic conditions in the vicinity of FAP No. 2 based on recent and historical investigations at the Refinery.

4.2.1 Site Geology

Based on previous investigations completed at the Refinery, the major subsurface strata underlying the area of FAP No. 2 are discussed in the following paragraphs (in descending order from the ground surface).

4.2.1.1 Riverine Silts and Clays (Pleistocene and Holocene)

Riverine deposits (composed of silts and clays) are not present in the FAP area.

4.2.1.2 Columbia Formation

Beneath the FAPs, the Columbia Formation extends from the surface to an average of 60 feet beneath the site. The sediments are composed predominately of poor to moderately sorted sands containing irregularly spaced clay, silt, gravel, and cobble lenses and is typically orange-brown in color. The formation gradually thickens to the east approaching a paleochannel.

4.2.1.3 Merchantville Formation

The Merchantville Formation is composed of marine-sediments characterized as silts, clays, and/or silts, fine sands, and are generally dark fray when unweathered and olive-brown to yellowish-brown when weathered, micaceous and commonly glauconitic. This formation is considered to be a semi-confining to confining unit which separates Quaternary and younger Cretaceous units from older Cretaceous units.

4.2.1.4 Potomac Formation

The Potomac Formation is encountered beneath the Merchantville Formation. The upper zone of this formation consists primarily variegated white, gray, red, purple, and yellow silts and clays with interbedded white, gray, and red-brown, moderately to well sorted fine sands.

4.2.2 Site Surface Water Hydrology

Surface water bodies in the vicinity of the Refinery consist of three readily discernible bodies (see Figure 1.1). These include:

- The Delaware River borders the eastern edge of the Refinery and exhibits tidal characteristics. The Delaware River is located approximately 8,000 feet east of FAP No. 1. It is not used as a source of drinking water, but is used as an industrial water source.
- Dragon Run Creek to the south and its unnamed tributaries. All are tributaries of the Delaware River. Dragon Run Creek is located approximately 8,500 feet south of FAP No. 2.
- Red Lion Creek to the north of the Refinery and its unnamed tributaries. All are tributaries of the Delaware River. Red Lion Creek is located approximately 3,500 feet north of FAP No. 2.

4.2.3 Site Groundwater

Groundwater conditions (water table and first confined aquifer) in the FAP area are monitored by means of a network of groundwater monitoring wells. The groundwater elevation in the water table (unconfined) aquifer ranges from approximately EL 20 to EL 26 feet NAVD88 in the vicinity of the ponds. The groundwater monitoring network is specified in Closure Permit SW-96/01. Annual and semi-annual environmental monitoring reports provide information regarding groundwater conditions in the FAP area.

5.0 POST-CLOSURE PLAN

Closure of FAP No. 2 is designed to isolate the pond contents (fly ash) from the surrounding environment and minimize leachate generation. Post-closure monitoring, inspection, and maintenance will minimize the potential for leachate migration into the groundwater resulting from an unlikely but potential breaching or failure of the leak detection/liner system or final cover system.

The post-closure activities required for FAP No. 2 will involve a continuation of the existing groundwater sampling and analysis plan (see Appendix A) and post-closure inspection and maintenance program. The following sections describe the legal and technical processes required to comply with the applicable parts of the DNREC regulations.

Groundwater monitoring will be conducted in accordance with the applicable Permit, including inspection of the groundwater monitoring wells for integrity and sample collection and analysis of parameters identified in the applicable Permit and summarized in Appendix A. The Closure Permit is the governing permit until the Post-closure Permit is issued. The Closure Permit stipulates semiannual groundwater quality monitoring during April and October each year. It is anticipated that the frequency of groundwater quality monitoring will be reduced as part of ending/reducing post-closure care requirements. Similar units in post-closure care have groundwater monitoring and inspection of the monitoring well network performed annually for the first five years post-closure and once per five years thereafter.

The FAP leak detection system will be operated to maintain less than 12 inches of liquid on the liner in the sump. The LDS system includes manholes 1, 2, and 3 monitoring ports and totalizers, collection sumps, leachate force mains, and the master flow meter. The LDS system flowmeters, valves, pumps, and totalizers will be inspected weekly. Inspections will be documented on the attached inspection checklist. The manholes, pumps, and collection pipes will be cleaned and video inspected once every two years in accordance with DNREC approval letter dated July 28, 2011 or as otherwise approved by DNREC.

Stormwater will be managed to mitigate the potential for erosion of the cap and limit the run-off of sediments. The vegetative cover was selected to be relatively maintenance free other than re-seeding of isolated areas, should they occur. Storm water conveyances on and around the FAP will be maintained to prohibit the accumulation of standing water on the FAP cover.

5.1 LIMITS OF WASTE MANAGEMENT AREA

A survey of the as-built final grades of FAP No. 2 is included as Figure 4 in the Closure Certification Report.

5.2 ENVIRONMENTAL COVENANT

Prior to the end of the post-closure care period, Motiva will provide an environmental covenant to DNREC for review in accordance with Title 7, Chapter 79, Subpart II of the Delaware code of regulations. Motiva will record the Environmental Covenant within 60 days of the Department's concurrence.

5.3 SITE MAINTENANCE

FAP No. 2 will be maintained throughout the post-closure period. The contact person during the post-closure period will be the Delaware City Refinery Environmental Manager, who can be reached by mail or telephone at the following location:

Delaware City Refining Company
4550 Wrangle Hill Road
Delaware City, DE 19706
(302) 834-6000

5.3.1 Security

The Refinery implements routine guard checks and other high-level security measures to control unauthorized entry within the Refinery's boundaries, including single and double-chain-link-fencing around the perimeter of the facility. Legitimate access to the FAP area can only be gained by passing through controlled gates reserved for employees and contractors/vendors performing functions associated with plant operations. The plant perimeter is patrolled and the fencing discourages public access to FAP area.

5.3.2 Inspection and Maintenance

The FAP No. 2 final cover system and surface water management system will be inspected for the items listed in the Post-Closure Inspection Checklist and Leak Detection System Inspections/Measurements (Appendix B). Inspections will be conducted by qualified personnel.

A written report of each inspection will be prepared and maintained at the Refinery. If any of the above items require repair or replacement, steps will be taken to correct the problem in a timely manner.

Any non-emergency maintenance cited as a result of inspections will be completed as soon as possible to preclude further damage and to reduce the need for emergency repairs. The non-emergency maintenance activities will include reseeding areas of insufficient vegetation, removal of any plants having a deep-root system including trees, and the backfilling/seeding of small washout rills/gullies due to erosion. Maintenance activities of any type will also be recorded in the inspection logs to provide documentation and continuity of records.

5.4 GROUNDWATER MONITORING

Groundwater monitoring will be continued during the post-closure period in accordance with the Groundwater Monitoring Network and Sampling and Analysis Plan presented in Appendix A.

5.5 STORM WATER MONITORING

Storm water runoff from the FAP No. 2 cap enters an adjacent ditch on Refinery property and is ultimately discharged through Storm Water Outfall 006 under the Refinery NPDES Permit 0000256. Storm water management is shown on Figure 1.3, Fly Ash Ponds Stormwater Flow Plan. The FAP surface cover, perimeter, and storm water ditches are inspected semi-annually and documented to verify no impact to storm water. In addition, runoff conveyance structures (and storm water if present) are inspected daily by the Refinery as part of the Refinery's Stormwater Pollution Prevention Plan and to monitor compliance with the NPDES Permit. Unusual conditions (e.g., visible sediment, unusual color, etc.) that could be potentially caused by FAP No. 2 will be reported to Motiva for investigation and corrective action as appropriate.

5.6 POST-CLOSURE LEACHATE CONTROL

Leachate generated during the post-closure period will either be treated onsite at the Refinery Waste Water Treatment Plant (WWTP) or transported for off-site treatment. As described in the FAP Closure Plan, negligible surface water is predicted to penetrate the final cover system and most of the liquids contained within the in-place fly ash material at the time of closure would be expected to be drained through the prefabricated vertical drain (PVD) system installed prior to placement of the final cover system. This condition will be evaluated by regular monitoring of leachate generation rates during the post-closure care period. The leak detection system and all appurtenances necessary to convey leachate generated within FAP No. 2 will be operated and maintained until the volume of leachate generated decreases to a level that such maintenance is

no longer warranted. Standard operating procedures for operation and maintenance of the FAP 2 LDS is attached in Appendix C.

5.7 ESTIMATED POST-CLOSURE COSTS

Costs associated with post-closure care monitoring and maintenance (M&M) consist of a number of items. All post-closure costs for a 30-year post-closure period are based on 2013 dollars and presented on Table 5.1.

5.8 POST-CLOSURE LAND USE

No plans exist at this time for use of the post-closure unit during the post-closure period. Any change in this plan will be submitted to DNREC as an addendum to the Post-Closure Plan.

6.0 CONTAMINANT MIGRATION

Evaluation of the expected post-closure performance of FAP No. 2 involves review of the potential exposure pathways. The critical or most severe pathway for potential exposure is a function of the contaminant concentration, toxicity characteristics, and mobility. In the case of FAP No. 2, the critical pathway for soluble contaminants is a hydrological route; for volatile contaminants, an airborne route; and for biologically accumulative materials, a biotic transport route through vegetation.

The following migration pathways have been reviewed:

- Groundwater contamination (drinking water);
- Surface water contamination (drinking water);
- Direct soil exposure (intrusion into surface soil due to construction activity or farming, and airborne soil particulates); and
- Vegetation uptake and consumption by wildlife.

The following four subsections discuss, in more detail, how the closure of FAP No. 2 will mitigate future contaminant migration.

6.1 GROUNDWATER

The potential for contaminant migration to groundwater is controlled by many factors, including geologic conditions, the amount of water available for transport, the driving gradient, and the chemical interaction of the contaminant(s) with the soil and/or water. The design features that mitigate the potential for leachate migration from FAP No. 2 include the FAP final cover system, stormwater controls, and the liner/leak detection system. Free water existing in the in-place fly ash materials after closure, which was minimized by the dewatering through the PVDs prior to closure, will drain to the leak detection system, thus, maintaining a low driving head of leachate. The cover system mitigates the potential for surface water infiltration, which reduces the potential for leachate generation. Potential for groundwater contamination will be reduced due to the limiting of infiltration into the in-place fly ash materials by the final cover system and the liner/leak detection system underlying the in-place fly ash materials.

6.2 SURFACE WATER CONTAMINATION

As shown on Figure 1.1, FAP No. 2 is located relative to the following surface water bodies:

- Delaware River, approximately 8,800 feet east of FAP No. 2;
- Dragon Run Creek, approximately 8,500 feet south of FAP No. 2;
- Red Lion Creek, approximately 3,500 feet north of FAP No. 2.

In the area immediately surrounding the Refinery, none of these surface water bodies are used as a source of drinking water.

After closure, rainfall/runoff is directed away from the area of FAP No. 2. The final cover system prevents runoff from contacting the in-place fly ash materials, thus, prohibiting any contamination.

6.3 DIRECT SOIL EXPOSURE AND VEGETATIVE UPTAKE

Installation of the final cover system precludes direct contact with in-place fly ash materials. The restrictions on land use at the area of the post-closure unit preclude direct soil exposure. In addition, site security procedures will prevent unauthorized personnel from entering the area.

The potential for uptake of contaminants by plants is mitigated by the final cover system, which separates the in-place fly ash materials from the surficial vegetative cover. The shallow-rooted cover vegetation further minimizes uptake potential.

6.4 AIRBORNE MIGRATION

The final cover system mitigates the potential for airborne migration of fly ash materials.

7.0 REFERENCES

1. DNREC, 2009, Fly Ash Pond 1 & 2 Closure Permit, Permit SW-96/01, File Code: 02, May 29, 2009.

2. DNREC, 2011, Cleaning and Inspection of Fly Ash Pond 2 Leak Detection System (LDS), July 28, 2011.

3. DNREC, 2013, Approval of Motiva Fly Ash Pond Closure, Construction Certification Report (revised 7/24/13), August 21, 2013.

4. GeoSystems Consultants, 1994, "Hydrogeological Study, Flyash Settler", Star Enterprise, Delaware City Refinery, Delaware City, Delaware, August 1994.

5. GeoSystems Consultants, 1995, "Geotechnical Considerations, Flyash Settler", Star Enterprise, Delaware City Refinery, Delaware City, Delaware, January 1995.

6. Mather, J.R., and Varrin, R.D., 1972, "The Groundwater Flow System in the Delmarva Peninsula," University of Delaware Water Resources Center, Research Project Technical Completion Report for OWRR Project No. A-004-Del, January 1972.

7. Woodward-Clyde Consultants, 1991a, "Geotechnical Investigation Report, Proposed Industrial Waste Landfill", Star Enterprise, Delaware City Refinery, Delaware City, Delaware, January 1991.

8. Woodward-Clyde Consultants, 1991b, "Hydrogeologic Investigation, Industrial Waste Landfill", Star Enterprise, Delaware City Refinery, Delaware City, Delaware, February 1991.

9. URS, 2006, Plans for Final Closure and Post-closure Care, Motiva Fly Ash Ponds, Delaware City Refinery, Delaware City, Delaware (volumes I through IV) (appended version of Closure Plan for Flyash Settlers, January 2003), December 29, 2006.

10. URS, 2007, Sampling and Analysis Plan Lining System and Subgrade Soils Fly Ash Pond No. 1, Delaware City Refinery, Delaware City, Delaware, November 8, 2007,

11. URS, 2008, Bench-Scale Crystallization Testing Plan for Fly Ash Pond No. 1 Motiva Fly Ash Ponds Delaware City Refinery Delaware City, Delaware, , February 19, 2008.

12. URS, 2011, Phase II RCRA Facility Investigation Groundwater, May 2011.

13. URS, 2013, Closure Certification Report, August 1, 2011 and revision dated July 24, 2013.

14. U.S. Environmental Protection Agency, Region 3, Annapolis Field Office, 1978, Technical Report No. 62, Report No. EPA-903-78-001, "A Water Quality Modeling Study of the Delaware Estuary", January 1978.

TABLES

Table 5.1
Post-Closure Cost Estimate
Former Fly Ash Pond No. 2
Delaware City Refinery, Delaware

	Cost			
	1st Year AFC*	2nd Year AFC*	During 3rd Year thru 30 Years AFC*	Prior to End of Post-Closure Period
Semiannual Groundwater Monitoring and Leachate Sampling. Reporting[a]	$ 27,000	$ 27,000	$ 27,000	
Monitoring Well Maintenance[b]	$ 5,000	$ 5,000	$ 5,000	
Maintenance of the Final Cover System[c]	$ 13,400	$ 13,400	$ 13,400	
Leachate Collection/Pumping/Treatment/Disposal[d]	$ 125,000	$ 110,000	$ 15,000	
Maintenance of the Subsurface Leak Detection System and the Above Ground Leachate Collection and Temporary Storage System[e]	$ 50,000	$ 50,000	$ 50,000	
Leak Detection System Cleanout & Video Inspection (biannual)[f]	$ 19,000	---	$ 9,500	
Post-Closure Permit Fee (annual)[g]	$ 7,000	$ 7,000	$ 7,000	
Establishment of the Environmental Covenant[h]	---	---	---	$ 10,000
Administrative Costs[i]	$ 20,000	$ 20,000	$ 20,000	
Contingency Cost[j]	$ 7,000	$ 7,000	$ 7,000	
Total Estimated Post-Closure Cost:	**$ 273,400**	**$ 239,400**	**$ 153,900**	**$ 10,000**

* = After Final Closure (AFC)

Costs listed in 2013 dollars.

Assumptions:

a = Semiannual sample collection of leachate and semiannual gauging and sample collection from permit-specific monitoring wells. Semiannual groundwater monitoring costs are estimated to be approximately $27,000 which includes semiannual labor, equipment, data analysis and reporting (two semiannual and one annual reports). It is anticipated that the Post-closure Permit will present a reduced frequency requirement for monitoring and reporting.

b = The useful life of well is estimated to be 15 years; for a 30-year post-closure period, this would require well replacement twice. Periodic maintenance and as-needed replaced is estimated at an annual cost of $5,000 per year.

c = Maintenance of the final cover system is estimated to be approximately $13,400 per year. The annual cost assumes cover maintenance ($5,000), repair of localized erosion ($4,000), cleaning of perimeter channels ($3,000), and nutrient management sampling and reporting ($1,400).

d = Based on volumes and costs from the first 1.5 years after closure and anticipated exponential decline in leachate generation during the post-closure care period. Approximate leachate treatment/disposal costs for the post-closure period are estimated as follows:
- During the 1st year after final closure: $125,000; 2nd year: $110,000 (projected).
- Estimated: 3rd year $80,000; 4th year $50,000; 5th year $30,000; 6th year $20,000; 7th year $15,000
- Estimated: $8th year $10,000; 10th year $5,000; 12th year $2,500; 14th year $1,000.
- Average cost per year from 3rd to 30 years $15,000.

e = Maintenance of the subsurface leak detection system and the above ground leachate collection and temporary storage system based on the Closure Permit requirement for daily totalizer readings and weekly system inspections. This includes periodic inspections and maintenance of access controls. It is anticipated that the Post-closure Permit will provide for a reduced frequency of readings/inspections based on reduced volume of leachate generation.

f = Leak detection system pipes cleanout and video inspection on a biannual schedule, with frequency reduced as negotiated based on reduced leachate volume in future years. Per event cost of $19,000 averaged to $9.500 per year for biannual cost. Includes removal of the pumps from the sumps and preparation of a confined space entry plan and permit. Includes disposal of fluids recovered from jet cleaning the sumps.

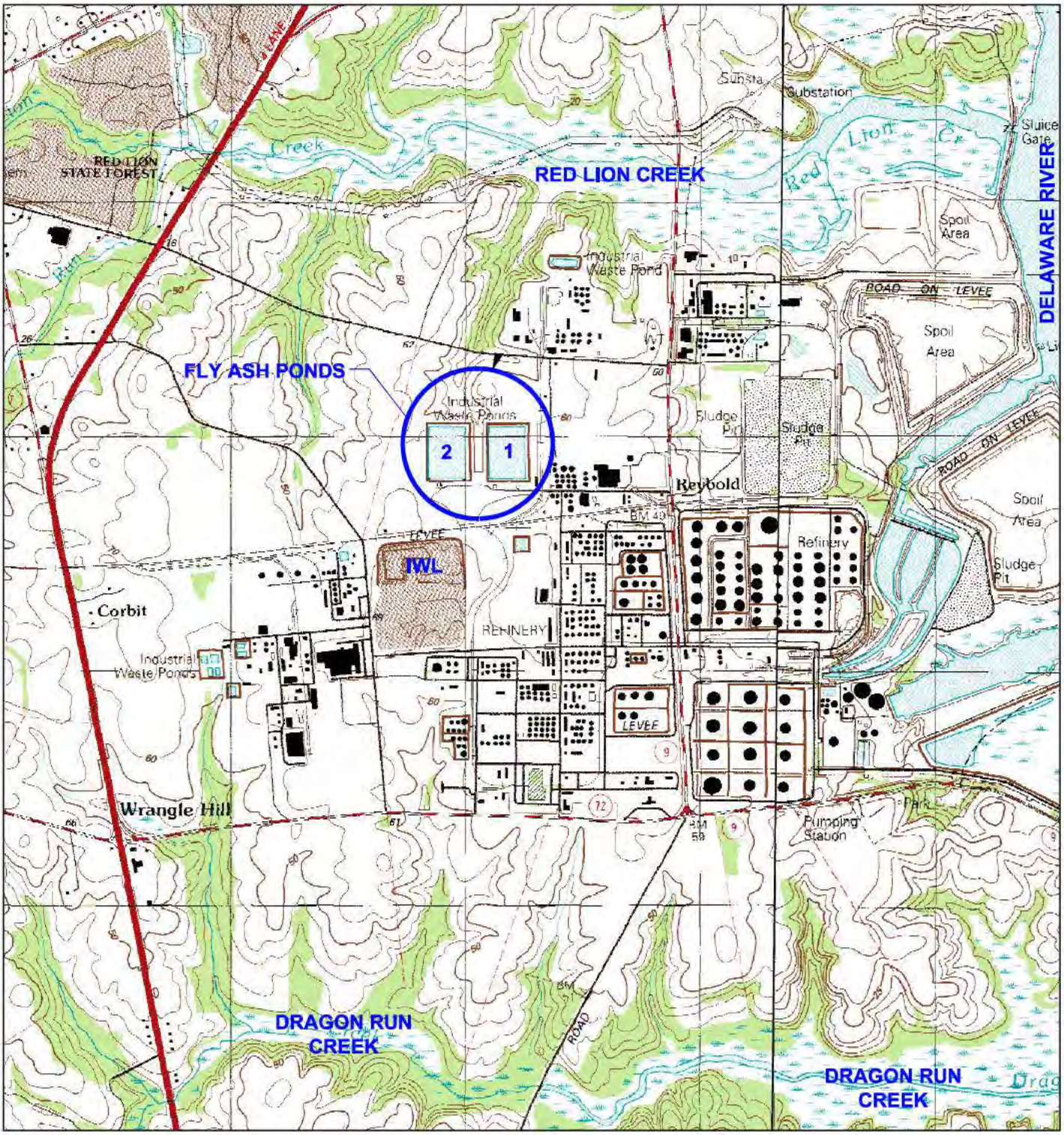
g = permit fees.

h = Cost of establishing the environmental covenant, to be prepared prior to the end of the post-closure period.

i = Administrative costs to maintain the financial assurance instrument.

j = The contingency cost includes minor work items that are not identified and potential unit cost/quantity changes.

FIGURES



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GRAPHIC SCALE: 1"=2000'

CONTOUR INTERVAL = 10 FEET

REFERENCE:

A PORTION OF USGS 7.5 MINUTE TOPOGRAPHIC MAPS, DELAWARE CITY AND ST. GEORGES QUADRANGLES, DELAWARE, 1993.

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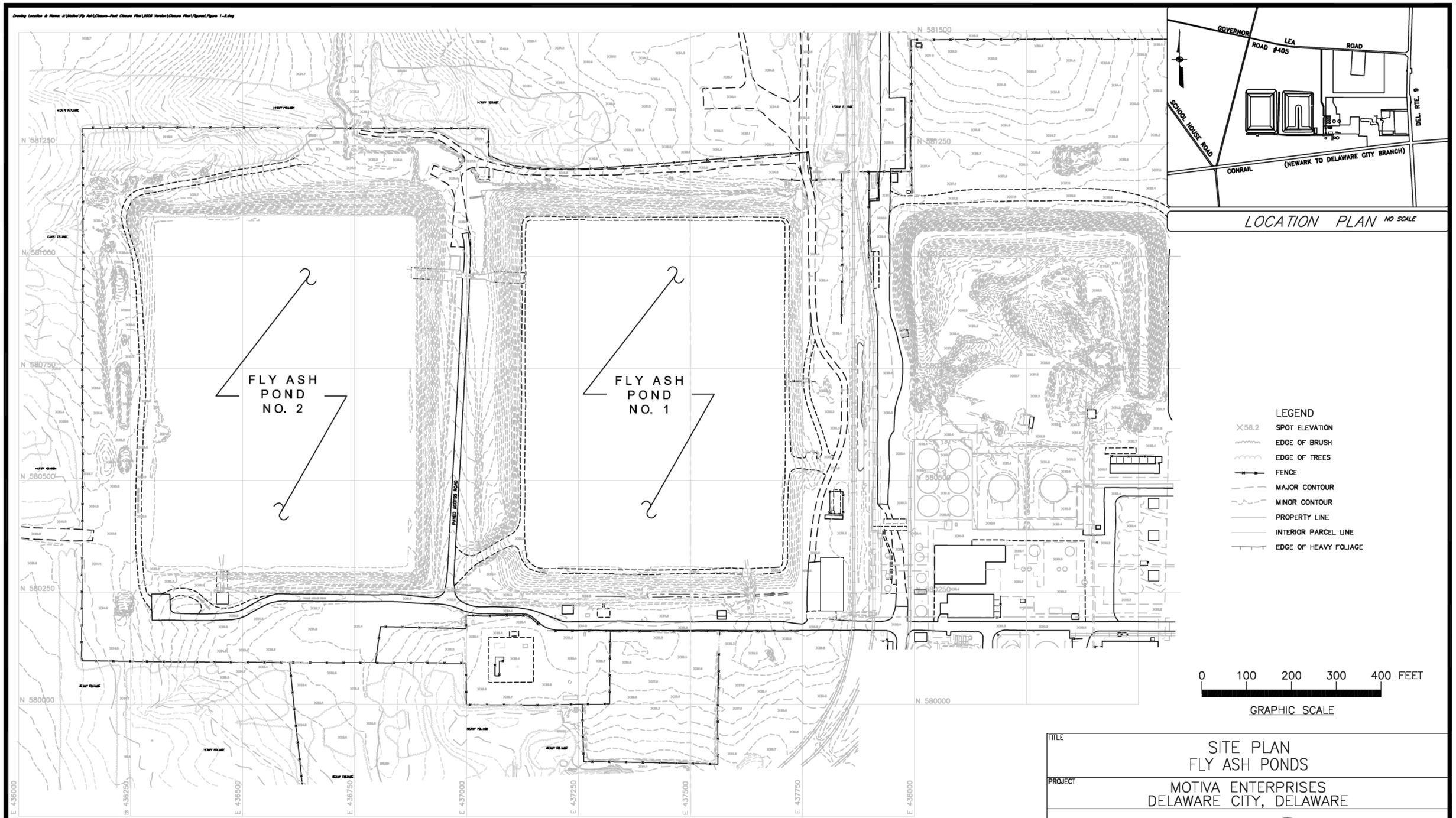
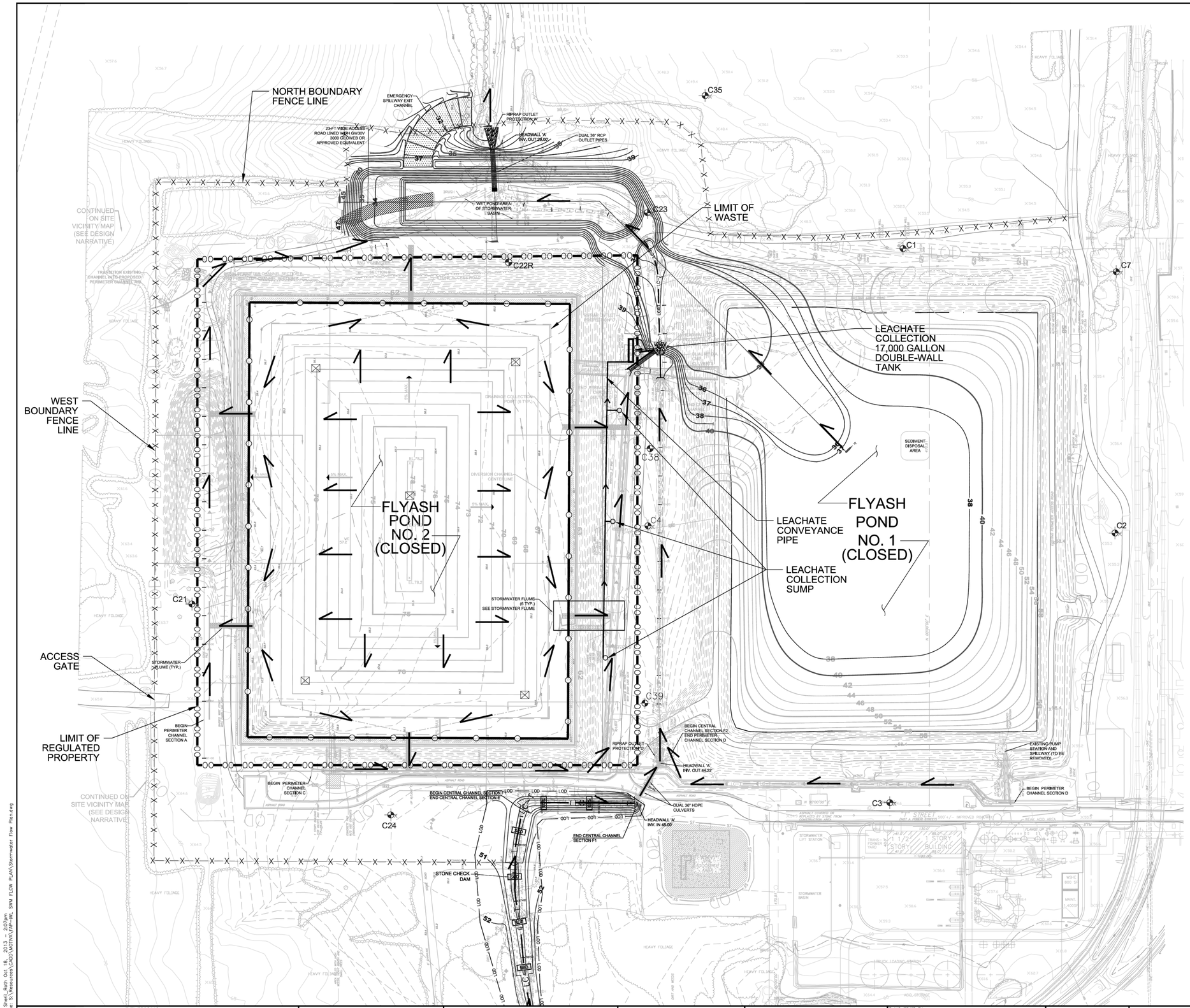
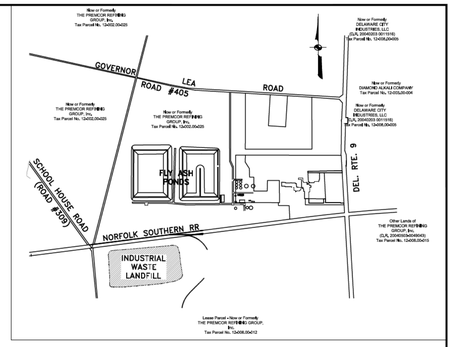
TITLE	SITE VICINITY MAP		
PROJECT	MOTIVA ENTERPRISES DELAWARE CITY, DELAWARE		
	URS		
SCALE AS SHOWN	DWN. BY TFP	JOB NO. 20242572	
DATE 11/16/06	APPR. BY JAC	FIG. NO. 1.1	



TITLE: SITE PLAN FLY ASH PONDS			
PROJECT: MOTIVA ENTERPRISES DELAWARE CITY, DELAWARE			
URS			
SCALE: AS SHOWN	DWN. BY: TFP	JOB NO.: 20242572	
DATE: 11/14/06	APPR. BY: JAC	FIG. NO.: 1.2	





VICINITY MAP

NOT TO SCALE

NOTES

1. THIS DRAWING IS PROVIDED TO DISPLAY THE GENERAL SHEET LAYOUT OF THE STORMWATER MANAGEMENT AND FINAL GRADING PLAN.
2. INFORMATION SHOWN HEREON REGARDING EXISTING FEATURES, GROUND TOPOGRAPHY AND PROPERTY/EASEMENT LINES BASED ON A COMPILATION OF GROUND SURVEYS COMPLETED BY VANDEMARK & LYNCH, INC., 4305 MILLER RD., PO BOX 2047, WILMINGTON, DE 19899, (302) 764-7635, MOST RECENTLY UPDATED ON 01/31/2008.

HORIZONTAL DATUM: VALERO/PREMCOR DELAWARE CITY PLANT
VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM 1929

BENCHMARK: PLANT CONTROL MONUMENT #208. LOCATION APPROXIMATELY 70' WEST OF WEST 6TH STREET AT THE CENTERLINE OF Q STREET EXTENDED AND 43.2' SOUTH OF A CHAIN LINK FENCE. ELEVATION = 65.35'

LEGEND

- X58.2 SPOT ELEVATION
- EDGE OF TREES
- FENCE
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- INTERIOR PARCEL LINE
- EDGE OF HEAVY FOLIAGE
- ABOVE-GROUND ELECTRIC LINE ALIGNMENT
- POLE SUPPORTING ELECTRIC LINE
- RAILROAD
- STORMWATER CULVERT
- UNPAVED ACCESS ROAD
- WETLAND BOUNDARY
- STORMWATER CONVEYANCE
- DELINEATED WETLAND
- INTERIM GRADING FILL BUFFER
- EXISTING LEACHATE COLLECTION AND DETECTION PIPING
- 72 PROPOSED FINAL GRADE (MINOR CONTOUR)
- 80 PROPOSED FINAL GRADE (MAJOR CONTOUR)
- SCD STONE CHECK DAM
- RIPRAP OUTLET PROTECTION
- LOD LIMIT OF DISTURBANCE
- MeC3 SOIL TYPE
- SOIL BOUNDARY
- ENVIRONMENTAL MONITORING LOCATION
- C22R MONITORING WELL
- LEACHATE COLLECTION SUMP
- X X X FENCE LINE
- LIMIT OF WASTE
- LIMIT OF REGULATED PROPERTY
- STORMWATER FLOW DIRECTION

REVISIONS

NO.	BY	CHKD	DATE	DESCRIPTION
1				
2				
3				
4				
5				
6	SMR	PJD	09/05/12	CERT REPORT FOR DNREC SUBMISSION

WARNINGS

0 0.5 1.0

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

IF THE SEAL ON THIS PLAN IS NOT RED OR RAISED THEN THIS PLAN MAY HAVE BEEN ALTERED AND RECOPIED. ORIGINAL SEALS ARE STAMPED IN RED INK OR EMBOSSED WITH A CRIMPING SEAL.

GRAPHIC SCALE
1 INCH = 80 FT
80 40 0 40 80
(IN FEET)

PLAN CERTIFIED BY:
URS
335 COMMERCE DRIVE, STE. 300
FORT WASHINGTON, PA. 19034
TEL: (215) 367-2500
FAX: (215) 367-1000

(Signature) / 2010 (Date)
PETER J. DUDKO
PROFESSIONAL ENGINEER DE LIC. NO. 9538

PLANS ISSUED BY:
URS
335 COMMERCE DRIVE, STE. 300
FORT WASHINGTON, PA. 19034
TEL: (215) 367-2500
FAX: (215) 367-1000

		DATE
DESIGNED BY:		09/05/12
DRAWN BY:	SMR	09/05/12
CHECKED BY:	PJD	
APPROVED BY:		
CLIENT APPROVED BY:		

DELAWARE CITY REFINERY
FLY ASH PONDS NOS. 1 AND 2

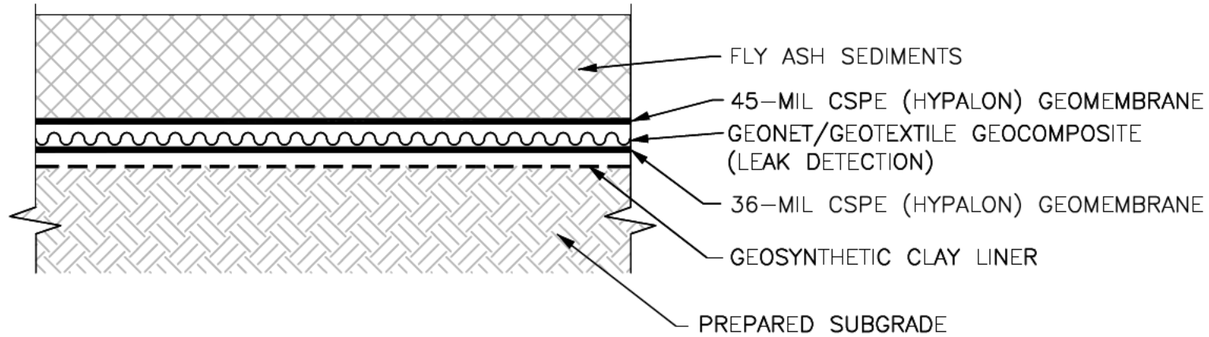
FLY ASH PONDS STORMWATER FLOW PLAN

JOB NO.	SCALE:
20240412.00106	1"=80'

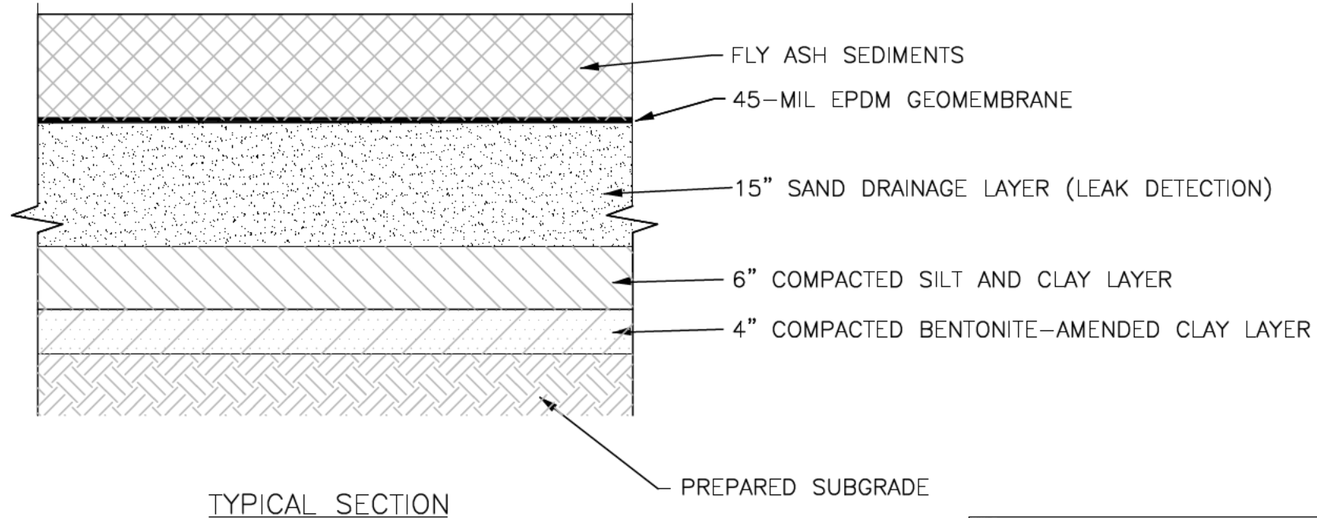
ORIGINAL DATE:	LAST REVISED:	REV
09/05/12	09/10/12	0

DRAWING NO.
FIGURE 1.3

Drawn By & Date/Time: Sherll, Beth Oct 18, 2013 - 2:07pm
Drawing Location & Name: S:\Resources\CADD\MOTIVA\PAP-WL SWM FLOW PLAN\Stormwater Flow Plan.dwg



TYPICAL SECTION
POND NO. 1 BOTTOM LINER SYSTEM
N.T.S.



TYPICAL SECTION
POND NO. 2 BOTTOM LINER SYSTEM
N.T.S.

NOTE:

LINER SYSTEM CROSS SECTIONS BASED ON INFORMATION PRESENTED IN REPORTS BY GEOSYSTEMS CONSULTANTS AND LANGAN ENGINEERING ASSOCIATES.

TITLE: TYPICAL LINER SYSTEM CROSS-SECTIONS FLY ASH PONDS		
PROJECT: MOTIVA ENTERPRISES DELAWARE CITY, DELAWARE		
URS		
SCALE: AS SHOWN	DWN. BY: TFP	JOB NO.: 20242572
DATE: 11/16/06	APPR. BY: JAC	FIG. NO.: 3.1

Drawing Location & Name: J:\Motiva\Fly Ash\Closure-Post Closure Plan\2006 Version\Closure Plan\Figures\Figure 3-1.dwg

APPENDIX A

APPENDIX A

GROUNDWATER MONITORING NETWORK AND SAMPLING AND ANALYSIS PLAN FORMER FLY ASH POND No. 2 MOTIVA ENTERPRISES LLC DELAWARE CITY REFINERY

Prepared for:

Motiva Enterprises LLC

Prepared by:

URS Corporation
335 Commerce Drive, Suite 300
Fort Washington, PA 19034
(215) 367-2500

URS Job No. 19999667

September 20, 2013, Revision 1 – October 2013

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FIGURES

Figure 1 Groundwater Field Sampling Log
Figure 2 Sample Chain-of-Custody Record
Figure 3 Sample Chain-of-Custody Seal

1.0 GROUNDWATER MONITORING NETWORK

The groundwater monitoring well network monitors groundwater upgradient and downgradient of the closed Fly Ash Pond (FAP) No. 2.

2.0 GROUNDWATER SAMPLING PROCEDURES

The following sections detail the procedures that will be employed during the groundwater sampling events conducted during the thirty-year post-closure care period, as specified in the Post-Closure Plan.

2.1 PRELIMINARY ACTIVITIES

This section presents the activities that take place prior to well purging and sampling.

2.1.1 Office Preparation

The following steps must be completed prior to the initiation of field activities:

- The laboratory will be notified of the upcoming sampling event so that they can prepare the appropriate type and number of sampling containers. The anticipated number of sampling sites, the list of analytical constituents, duplicate sample and quality assurance/quality control requirements will be specified to the laboratory by the project manager.

- All equipment needed to perform the groundwater sampling will be inspected to ensure proper operation and cleaned prior to use in the field.

- All forms used in the field, including the field book, field sampling log, and chain-of-custody forms, will be assembled.

- The sampling personnel will review the sampling protocols. In addition, the health and safety protocols will be reviewed.

2.1.2 Well Inspections

A well integrity inspection will be conducted before groundwater sampling begins. The well integrity inspection will take place at the time the depth to water measurements are being collected. The purpose of the well integrity inspection is to ensure that the physical condition of all monitoring wells is maintained at a level that ensures the integrity of the groundwater samples. Upon arrival at a monitoring well, the condition of the well and the surrounding area will be observed as follows:

- Condition of the concrete pad at the surface of the well.
- Erosion or ponding of surface water around the external protective casing.
- Subsidence of soils surrounding the concrete pad.
- Animal or insect activity in or around the well casing.
- Obstructions that hamper access to the well or obtaining samples from the well.
- Condition of lock on external protective casing.
- Well identification label/State Permit tag.
- Identification of any water in the annular space.
- Condition of internal and external well caps.
- Severe bends or cracks in external protective casing or PVC well casing.
- Evidence of dirt, grease, vegetation, airborne contamination or activities nearby which could contaminate the well or groundwater samples obtained from the well.

2.2 SITE MANAGEMENT

An experienced field geoscientist/environmental scientist will oversee all groundwater sampling activities. The field geoscientist/environmental scientist will also be responsible for noting the physical characteristics of the purged groundwater (color, odor, etc.) using the appropriate field form, maintaining field notes, obtaining samples, and ensuring that both decontamination and health and safety procedures are performed in the field.

2.3 GROUNDWATER SAMPLING

Groundwater samples will be collected to monitor the post-closure of the FAP.

2.3.1 Groundwater Sampling Field Equipment

Field equipment to be used during this task includes:

- Bladder pump or submersible Grundfos pump and control box;
- Battery or gasoline powered generator for source of electric power;
- Photoionization organic vapor detector and calibration kit;
- Water quality meter with flow through cell and calibrations kits;
- Water level meter and/or interface probe, as appropriate;
- Dedicated Teflon-lined polyethylene tubing;
- Decontamination equipment and fluids (e.g. deionized and tap water);
- Sample bottles, bottle labels, coolers, cooler shipping labels, custody seals, and chain-of-custody records;
- Field log book and sampling information logs;
- Field sampling data sheets for recording purge parameters, water level measurements, etc.;
- Required health and safety (PPE) clothing and equipment;
- Health and Safety Plan;
- First aid kit and fire extinguisher;
- Caution tape, traffic cones, traffic vests as necessary;
- Area-/Task-Specific Sampling Plan;
- Required Refinery Permits;
- Containers for containerizing purge water and equipment cleaning fluids;
- Paper towels, trash bags, small plastic bags, packing tape;
- Measuring tape and zip ties;
- Ice;
- Miscellaneous hand tools including snips and flush mount well cover wrench;
- Keys for well locks.

2.3.2 Water Level Measurements

Field meter probes will be decontaminated before and after use at each well. Prior to any field measurements, the integrity of each well shall be inspected. If there is any reason that the well cannot be measured or sampled, the reason should be noted in the field book. If during initial measurements, there are problems with obtaining measurements (i.e., blockage, etc.), the problem shall be noted in the field book. The issues will be discussed with the Project Manager, who will provide the appropriate notifications if the well cannot be sampled.

Synoptic water level measurements and total well depth measurements will be taken at all wells in the sampling program prior to any well purging or groundwater sampling. An electronic sounder, accurate to 0.01 feet, will be used to measure depth to water to the nearest 0.01 feet in each well. When using an electronic sounder, the probe is lowered down the well casing to the top of the water column; the graduated markings on the probe wire or tape are used to measure the depth to water from the marked

surveyed point on the rim of the PVC or steel well casing. Typically, the measuring device emits a constant tone when the probe is submerged in standing water and most electronic water level sounders have a visual indicator consisting of a small light bulb or diode that turns on when the probe encounters water. Total well depth will be measured the nearest 0.1 feet from the top of the well casing by lowering the weighted probe to the bottom of the well. Care will be taken to minimize disturbing sediments that may have accumulated at the bottom of the well.

Water-level sounding equipment will be cleaned before use in each well. Water levels will be measured in wells that have no known contamination or the least amount of known contamination first. Wells with anticipated higher levels of contamination will be measured last.

Depth to water measurements from wells that are not in the FAP monitoring network may also be used to obtain piezometric measurements to create a piezometric map. The measurements will be taken from the surveyed mark of known elevation on the PVC casing, and will be measured to the nearest 0.01-foot. The depth to the bottom of the well will also be measured. The tape and indicator probe will be rinsed with deionized water after use at each well. The water levels will be obtained on a single day, and as close in time as possible.

2.3.3 Calibration of Field Equipment

All field instrumentation shall be calibrated or verified under controlled conditions prior to field use utilizing manufacturer's recommended operating procedures. Daily performance checks shall be conducted prior to the start of each sampling day. Instrument calibration must be recorded in a field-sampling logbook or on a field instrument calibration sheet.

2.3.3.1 Water Quality Meter

A water quality meter is a multi-functional instrument capable of measuring pH, conductivity, dissolved oxygen, oxidation-reduction potential (ORP), turbidity, and temperature. Each parameter has its own set of calibration standards for initial calibration and for re-calibration of the instrument. The instrument is calibrated at the beginning of each workday, and the calibration is checked during the workday. Should a field calibration check fall outside the normal acceptance criteria, the instrument must be re-calibrated before taking any more measurements. If the instrument cannot be re-calibrated, the meter is returned to the manufacturer for service and/or recalibration. The pH is reported in standard pH units, conductivity is reported in millimhos (mmhos/cm), dissolved oxygen is reported in milligrams per liter (mg/L), ORP is reported in millivolts (mV), turbidity is reported in nephelometric turbidity units (NTUs), and temperature is reported in degrees Celsius (^{o}C).

2.3.3.2 Photoionization Detector

Prior to daily use, the photoionization detector (PID) is spanned against a zero gas and a 100-ppm isobutylene gas. Should a field check fall outside normal acceptance criteria, the meter is returned to the manufacturer for service and/or recalibration. Field conditions, such as changing humidity and temperature, may require the PID to be recalibrated. PID readings are to be reported in parts per million (ppm).

2.3.4 Sample Collection Procedures

All sampling, sample handling, and decontamination will be conducted with appropriate personal protection equipment based on the constituents known to exist in the groundwater (historical groundwater data).

Following the well integrity inspection and depth to water measurements at all wells, groundwater sampling will commence using the following procedures:

Sampling will begin at the well that is or is believed to be the least contaminated based on historical analytical data, its location as the most upgradient well, or the well farthest from a suspected source area. The wells will be sampled systematically from generally the least impacted to the most impacted.

The sample bottle shuttle from the laboratory will be opened and inspected to ensure that all the required sample containers are present and labeled.

Active exhausts from combustion engines (vehicles, generators, etc.) will be placed downwind of the well to minimize cross-contamination.

Wellhead organic vapor concentrations will be measured with a PID upon opening the wellhead and recorded. If the readings exceed the action levels presented in the HASP, frequent monitoring of the worker breathing zone will be performed and if continuous elevated concentrations are noted in the worker breathing zone, PPE requirements or sampling procedures may need to be adjusted.

The sampling will be performed using a bladder pump with dedicated disposable bladders and dedicated or disposable Teflon™ lined polyethylene tubing or another pump that can maintain low flow rates with minimal disturbance to the water column, such as a 2-inch diameter

Grundfos® submersible pump. Dedicated tubing will be used for each well to prevent cross-contamination.

A new bladder or dedicated bladder will be installed in the bladder pump prior to sampling each well. New or dedicated tubing will be attached to the pump. A clean tape measure will be attached to the pump using zip ties so that the pump intake can be set at the proper depth.

While the pump is being lowered into the well, the tubing and tape measure will be wiped with a paper towel saturated with deionized water. The pump will be lowered slowly to the target pump intake depth (discussed below) to minimize disturbance of the water column and sediment. Care will be taken not to lower the pump past the targeted intake depth to avoid disturbing sediments that may have settled at the bottom of the well.

The depth of the pump intake will be determined based on the length of the well screen, or lithologic characteristics, or suspected zones of contamination. The pump intake will be positioned at the point within the screened interval where the suspected highest concentration of potential contaminants is located, or, if not known, the middle of the screened interval. If there are no targeted zones of suspected contamination and the screen extends above the water table, the pump will be set at half the distance between the top of the water table and the bottom of the well screen.

A depth to water meter will be lowered into the well to monitor the water column drawdown during purging and sampling. The line of the depth to water meter will be wiped with a towel saturated with deionized water during insertion into the well.

The discharge tubing will be connected to a flow-through-cell water quality parameter meter to monitor water quality parameters and to determine when they have stabilized. A discharge line will also be attached to the flow-through cell and directed to a container for the collection of purge water. Purge water and decontamination water will be containerized and transported to the Refinery wastewater treatment plant (WWTP) for disposal upon approval by the WWTP Operator.

The pump will be started at a low flow rate (0.2 to 0.5 liters per minute) and will slowly increase in speed. The water level will be monitored to determine an appropriate flow rate to maintain a water column drawdown of less than 0.33 feet below the original pre-pump installation static water level. If the drawdown is greater than 0.33 feet, the flow rate will be reduced. A drawdown of less than 0.33 feet is the goal for determining the flow rate and may

be difficult to achieve due to the lithology or other factors. Therefore, site-specific adjustments to the flow rate may be required.

All wells will be purged prior to collecting groundwater samples. Water quality measurement readings will be recorded continually while purging from time zero (0) using a water measurement instrument equipped with a flow through cell. Water quality parameters are compared to the criteria below. Parameters have reached stabilization when three consecutive readings for all parameters meet the below requirements. Well purge is complete either when water quality parameters have stabilized or after five casing volumes have been purged from the well. However, for wells with large casing volumes, if water quality parameters have not stabilized after one hour, purging will cease and sampling may begin. This will be noted in the field logbook. Bladder pumps will be the primary well purging and groundwater sampling pumps used at the Refinery. Submersible pumps may also be used as an alternative to bladder pumps upon approval of the Project Manager.

Under some conditions including, but not necessarily limited to, limited analyte lists, the diameter and/or configuration of the well, well damage, depth to water, etc., other pump styles may be utilized upon approval of the Project Manager.

Water will be collected into a measured bucket to record the purge volume. Casing volumes will be calculated based on total well depth, static water level, and casing/screen diameter. One casing volume will be calculated as:

$$\mathbf{V = \pi d^2 h / 77.01}$$

Where:

V is the volume of one well casing of water (1 ft^3 = 7.48 gallons);

d is the inner diameter of the well casing (in inches);

h is the total depth of water in the well (in feet).

To obtain a groundwater sample that is representative of surrounding aquifer conditions, stable water quality parameter (temperature, pH, specific conductance, ORP, turbidity, and dissolved oxygen) measurements should be obtained, if possible. During purging, water level drawdown in the well will be maintained at less than 0.3 feet drawdown, if reasonable. Water quality parameters are considered stable if the following criteria are achieved for three consecutive readings:

- Specific Conductance readings are within ± 3%;
- pH varies by no more than ± 0.1 pH units;
- Dissolved Oxygen is ± 10%.
- Oxidation Reduction Potential (ORP) is ± 10 millivolts;
- Turbidity is ± 10% NTU (when turbidity is greater than 1 NTU); and
- Temperature range is no more than ± 3%;

The water in which measurements were taken will not be used to fill sample bottles.

Water quality parameter measurements will be taken at a minimum of every 5 to 6 minutes after flow starts. This volume is based on the time it takes purge water to replace one flow-through-cell volume and the time it takes to measure and record the data. Therefore, if purge rates and the ability to measure and record data allow it, the frequency of parameter measurements can increase accordingly. If water quality parameters have not stabilized after five well casing volumes or one hour, purging will cease, which will be noted in the logbook, and groundwater samples will be collected. The depth to water, water quality parameter measurements and purge volumes will be entered in the logbook and/or field data sheets.

If the turbidity of the sample exceeds 10 NTUs, one of the following will be performed:

- Collect the sample in a clean, unpreserved bottle supplied by the laboratory. The groundwater will then be field filtered though a 0.45 µm filter using a peristaltic pump. The sample is filtered into an acid preserved bottle, or the preservative is added after the filtering is completed, or,

- Fit the discharge line of the submersible pump with a 0.45 µm filter and then filter the sample into an acid preserved bottle, or the preservative can be added after the filtering is completed.

If a well dewaters (runs dry) during purging with some of the parameters not stabilized, or five

casing volumes have not been purged, that well will be allowed to recharge to 80% of the static water column. After the water level has recharged to 80% of the static water column, groundwater samples will be collected.

A well is allowed to be dewatered after the following steps are taken:

- If after a pumping rate has been established, the drawdown exceeds 0.3 ft, reduce the pump flow until drawdown has stabilized

- If drawdown has not stabilized and the flow rate is under 100 ml/min

Samples will be submitted for analysis of the following constituents:

- Total Dissolved Solids
- pH
- Specific Conductance
- Chloride
- Sodium
- Sulfate
- Iron
- Manganese
- Nickel
- Vanadium

Field duplicates will be filled in the same order stated above; the sampler will alternate between filling an actual groundwater sample bottle for a given analysis and filling the associated duplicate bottle for the same analysis. To ensure homogeneity, the sampler will alternately fill the actual groundwater sample bottle approximately a third of the way, then fill the field duplicate bottle approximately a third of the way until both the sample and the duplicate bottles are filled.

When field filtering is necessary (i.e., if turbidity measurements exceed 10 nephelometric turbidity units [NTUs]), the discharge line of the bladder pump will be fitted with a 0.45 µm in-line disposable filter. The filter will be rinsed following the manufacturers instructions, or if there are no instructions, a minimum of 0.5 to 1 liter of groundwater should pass through the filter before the sample is collected. The filtered sample will be directed into a laboratory prepared acid preserved bottle. If the sampling flow rate is not sufficient to push the water through the new filter, the groundwater will be pumped without a filter into a non-preserved,

clean sample container. A peristaltic pump using dedicated tubing will then be used to pump the sample through the filter into the sample container that will be submitted to the lab. The bladder pump flow rate will not be changed for the purpose of using an in-line filter. If pumping with the bladder pump through the filter at existing flow rates is impeded by a used and clogged filter, a new filter may be installed and rinsed to complete the sample collection process.

The sample bottles will be labeled with sample ID, date, sample collection time, name of sampler, analyses requested, and any other pertinent information. The samples will then be placed in the sample cooler and chilled with ice to >6°C, or preserved as applicable to the specific analyses. A laboratory provided temperature blank should be included in every sample cooler. The cooler will then be closed until the next sampling location is reached.

The groundwater field sampling log (Figure 1) and the chain-of-custody record (Figure 2) should be completed prior to mobilization to the next sampling location. These records and forms are discussed in more detail in Sections 2.6.1 and 2.6.3, respectively. If dedicated, the tubing and bladder used for each well will be stored in its own individual, labeled plastic bag for future use, or will be disposed at the Refinery's solid waste collection points. Dedicated tubing will not be stored in the well.

The monitoring well will be capped and locked following sampling, and all trash, tools, equipment, and decon and purge water will be removed from the area.

At the end of the day, the sample containers will be packed in the sample cooler in a manner to inhibit breakage. Additional ice will be added as needed to ensure that the samples remain chilled until arrival at the laboratory. The completed chain-of-custody form will be placed in a sealable watertight plastic bag to protect it from moisture, and will be placed in the cooler or provided to the laboratory courier if transported directly to the laboratory by the courier. Custody seals will be placed on the cooler, and the cooler will be sealed with packing tape if it is being sent via overnight courier. The cooler will be remanded to the overnight or laboratory courier for delivery to the laboratory.

2.4 SAMPLING FREQUENCY, ANALYTICAL CONSTITUENTS AND METHODS

Groundwater samples will be collected and submitted for analysis of the parameters stipulated in the post-closure permit. While the leak detection system is active, a sample of the leachate will be collected from the leak detection system in accordance with the post-closure permit. The leachate sample will be analyzed for the following constituents: total dissolved solids, pH,

specific conductance, chloride, sodium, sulfate, iron, manganese, nickel, and vanadium. Field parameters to be measured include dissolved oxygen, specific conductance, pH, turbidity, temperature, and oxidation reduction potential.

The samples will be analyzed in accordance with the appropriate analytical methods presented in the most current edition of USEPA Publication No. SW-846, *Test Methods for Evaluating Solid Waste – Physical/Chemical Methods*.

2.5 DISPOSAL OF RESDIUAL MATERIALS

In the process of collecting environmental samples at the Refinery, the URS sampling team will generate different types of potentially contaminated waste that include the following:

- Used personal protective equipment (PPE);
- Disposable sampling equipment;
- Decontamination fluids;
- Purged groundwater and excess groundwater collected from sample container filling.

Used PPE and disposable equipment will be double bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill.

Decontamination fluids that will be generated in the sampling field will consist of deionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will be sufficiently low to allow disposal at the WWTP.

As discussed previously, purged groundwater will be transported to the WWTP for proper disposal, upon acceptance by the WWTP operators.

2.6 SAMPLE DOCUMENTATION AND SHIPMENT

2.6.1 Field Notes

At a minimum, the following information will be recorded during the collection of each sample:

- Site Name and project number

- Name of contractor, subcontractor, and visitor personnel on site, including name(s) and organization(s)
- Descriptions of site activities, including dates and times of logbook entries and site entry and exit times
- Noteworthy events and discussions, including summaries of any meetings or discussions with contractors or federal agencies.
- Identification, location, and description of samples collected
- Sampler's name(s)
- Date and time of sample collection
- Type of sample collected
- Type of sampling equipment used
- Field instrument readings and calibration data
- Field observations and details relating to analysis or integrity of samples (i.e., weather conditions, noticeable odors, colors, etc.)
- Deviations from sampling plans, site safety plans, and QAPP procedures
- Changes in personnel and responsibilities with reasons for changes
- Levels of safety protection (i.e., PPE)
- Type of sample (groundwater)
- Preliminary sample descriptions (i.e., clear with strong hydrocarbon odor; turbid sample)

2.6.2 Sample Labeling

All sample bottles will be labeled in a clear and unique manner for proper identification in the field and for tracking in the laboratory. The samples will have pre-assigned unique numeric or alpha-numeric identification numbers. The sample bottles will be labeled with sample ID, date, sample collection time, name of sampler, analyses requested, and any other pertinent information.

Bottles will be ordered from the laboratory and sent to URS for inspection prior to any field activities, as described above.

2.6.3 Sample Chain-of-Custody Forms and Custody Seals

All sample shipments to the laboratory will be accompanied by a chain-of-custody form. A copy of the form is provided as Figure 2. COC form(s) will be completed and sent with the samples for each shipment. If multiple coolers are sent to a single laboratory on a single day, COC form(s) will be completed and sent with the samples in one of the coolers.

The chain-of-custody form will identify the contents of each shipment and document the custodial

integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secure area with restricted access to authorized personnel. At the time of shipment, the sampling team leader or designee will sign the chain-of-custody form in the "relinquished by" box and note date, time, and, if being shipped by common carrier, the airbill number.

The chain-of-custody will be filled out in ink. The chain-of-custody will include the following information:

- Project name;
- Unique sample number;
- Sample matrix;
- Number of bottles for each sample and analyte;
- Date of collection;
- Time of collection;
- Analysis requested;
- Preservatives used;
- Sampler's name;
- Sampler's signature and date;
- Sample bottle order number (if provided); and
- If appropriate, notes on unusual sample characteristics such as elevated PID readings, suspected high contaminant concentrations, evidence of off-gassing, etc. that may be important to laboratory personnel.

The sample numbers for all quality control samples, including duplicate samples and rinsate blanks, and laboratory QA samples (MS/MSD samples), will be documented on the COC form. Field quality control samples are discussed in Section 3.0. Once samples are packed in the cooler, a copy of the chain-of-custody is retained by the sampling team leader and filed. The remainder of the chain-of-custody is then placed in a sealable bag, and placed inside the cooler.

The shipping containers in which samples are stored (i.e., coolers) will be packed with ice or an approved alternate (i.e., blue ice), and will be sealed with self-adhesive custody seals and packing tape when the samples are not in custody as defined above. A copy of the seal is provided as Figure 3.

2.6.4 Packaging and Shipment

The following outlines the packaging procedures that will be followed for all samples:

- Seal the drain plug of the cooler to prevent melting ice from leaking out of the cooler.

- The bottom of the cooler should be lined with bubble wrap to prevent breakage during shipment.
- Check screw caps for tightness.
- Secure bottle/container tops with clear tape.
- Affix sample labels onto the containers with clear tape, if needed.
- Wrap all glass sample containers in bubble wrap to prevent breakage.
- Place samples in a sturdy cooler lined with a large plastic trash bag. Enclose the appropriate chain(s)-of-custody in a sealable watertight plastic bag affixed to the underside of the cooler lid.
- Fill empty space in the cooler with bubble wrap or other non-reactive material, such as vermiculite, to prevent movement and breakage during shipment.
- Ice used to cool samples will be sealed in sealable watertight plastic bags and placed on top and around the samples to chill them to the correct temperature.
- Each cooler will be securely taped shut with packing tape, and custody seals will be affixed to the front, right, and back of the cooler. The coolers will be labeled with appropriate DOT shipping labels.
- If shipping by common carrier, affix the correct shipping label (either next day service or Saturday service) to the top of the cooler. It is important to inform the laboratory if shipping samples for Saturday delivery.

3.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

As part of the quality assurance/quality control (QA/QC) program, QA/QC samples in addition to the groundwater samples will be collected. The QA/QC samples consist of duplicate samples, and field blanks, and trip blanks.

- Duplicate samples, taken at a frequency of one sample for every 20 samples collected, are intended to limit statistical bias in the summary data set. Acceptance criteria for duplicate sample results are generally ± 20% for groundwater samples.

- The field blank is designed to address cross contamination in the field due to deficient field cleaning procedures, or residual contamination on dedicated/disposable sampling equipment. This blank, taken at a frequency of one sample for every 20 samples collected, also addresses field preservation procedures, environmental site interference, and integrity of the blank water used during field cleaning. The sampling devices will be cleaned according to the procedures presented in Section 1.3. After the equipment has been cleaned, deionized water will be poured over or pumped through the piece of equipment. The water flowing off the equipment will be collected and preserved in the appropriate sample containers. The field blank is labeled, recorded, shipped and analyzed along with the groundwater samples.

FIGURE 1
GROUNDWATER SAMPLING LOG
DELAWARE CITY REFINERY, DE

INFORMATION:

Project Name: Motiva Enterprises LLC
Former FAP 2 Post-Closure
Project No.:
Address: 4550 Wrangle Hill Rd.
City, State: Delaware City, DE

Personnel:
Lab:

Well Start Time:
Well End Time:
Date:
Weather:
Temp.:

Well ID:

WELL DATA:

Location: Former FAP 2
Measuring Point: Top of PVC Casing
Total Well Depth:
Depth to Static Water Level:
Water Column:
Depth to Free-phase Hydrocarbon:
Thickness of Free-phase Hydrocarbon:

PID in Wellhead:
Screened Interval:
Well Volume (gal):
Conversion factor: 1 gal = 3.785 L

Casing Type:
Casing Diameter:
Screen Type:

WELL PURGING:

Purge Method:
Depth to Pump Intake:
Purge Start Time:
Purge Finish Time:
Duration (mins.):

DTW at completion:
Liters purged:
Conversion factor: 1 L = 0.264 gal

Effluent Quality:

FIELD PARAMETERS:

	pH (s.u.)	Spec. Cond. (mS/cm)	Turbidity (NTU)	D.O. (mg/L)	Temperature (°C)	TDS (g/L)	ORP (eV)	DTW (feet)	Purge Rate (mL/min)
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Time (mins.):									
Acceptance Criteria:	± 0.1 pH unit	± 3%	± 10% NTU (>10 NTU)	± 10%	± 3%		± 10 mV	± 0.01 ft.	
Previous Results:									

POST SAMPLING NOTES:

FIELD FILTERED -- YES NO

FIGURE 2

SAMPLE CHAIN-OF-CUSTODY RECORD

PROJECT SITE ADDRESS SAMPLERS (Printed Name & Signature)				NUMBER OF CONTAINERS								REMARKS
SOURCE CODE	IDENTIFICATION NUMBER	DATE	NAME									
Relinquished by: (Printed Name & Signature)		Date/ Time:	Received by: (Printed Name & Signature)	Relinquished by: (Printed Name & Signature)						Date/ Time:		Received by: (Printed Name and Signature)

FIGURE 3

SAMPLE CHAIN-OF-CUSTODY SEAL

CHAIN OF CUSTODY SEAL

URS Corporation
335 Commerce Drive
Fort Washington, PA 19034

Project Name _____ Project No. _____
Sampler (signature) _____
Date _____ Time _____

APPENDIX B

FORMER FLY ASH POND NO. 2 POST-CLOSURE INSPECTION CHECKLIST
Delaware City Refinery, Delaware

Checklist	Yes	No	Issue Observed	Corrective actions made on site?		Additional Corrective Actions Required?	
				Yes (Describe)	No	Yes (Describe)	No
SURFACE COVER INSPECTION ITEMS							
1) Evidence of surface cover disturbance by wind or "other" contributing factors?							
2) Evidence of damage to surface cover? (If yes, record location and attach a sketch map)							
3) Evidence of activities that might impact surface cover observed or anticipated based upon observations?							
4) Ponded water on surface cover?							
STORM WATER INSPECTION ITEMS							
1) Visual Inspection of FAP permeter idicates that storm water control system is in good condition?							
2) Visual inspection of FAP Stormwater Channels indicates that channels are in good condition?							
3) Visual confirmation that leachate is not seen along the landfill perimeter or stormwater channels?							
4) Evidence of leachate contaminated stormwater?							
OTHER ITEMS							
5) Evidence of damage to liner system? (If yes, record location and attach a sketch map)							
6) Evidence of spills from the FAP or leachate pipes?							
7) Evidence of leachate seeps from the FAP or leachate pipes?							
8) Sediment & erosion controls in good condition?							
9) New areas being eroded?							
10) FAP road in good condition?							
11) Litter present?							
12) Access to FAP area is controlled? Fences, gates, security?							

Inspected by: _____ Inspection Date: _____ Inspection Time: _____

Notes:
1. Comment on conditions, any maintenance/repairs made, and any maintenance/repairs required.
2. Identified issues requiring maintenance/repairs, not completed at time of inspection, will be scheduled for repair promptly.
3. If necessary, include drawings or sketches to assist describing findings or recommendations and attach them to this inspection record.
4. Follow-up investigations and actions addressing significant issues will be reported to DNREC within 30 days.

Former Fly Ash Pond No. 2 Leak Detection System
Delaware City Refinery
Inspections/Measurements

Recorded by: _____

----------FORMER FLY ASH POND No. 2----------

	POND 2 TOTALIZER READINGS				
Date					
Time					
Recorded by					
North (MH-3)					
Mid (MH-2)					
South (MH-1)					
Main Totalizer					
Weather Conditions (°F):					

	LDS AST READINGS				
Date					
Time					
LDS AST Level, daily (ft):					
LDS AST Level post vac (ft):					
Estimated Volume of Leachate in Tank (gal):					
Vac Truck Operations, no. of loads:					
Volume Removed, estimated (gal):					
Frac Tank Inspection					

	LDS SYSTEM INSPECTION				
	General Condition	**Corrective Action Needed?**		**Date Inspected**	**Inspected By**
		Yes	**No**		
LDS Pump & Controls Condition, North[1]					
LDS Pump & Controls Condition, Mid[1]					
LDS Pump & Controls Condition, South[1]					
Main Totalizer Condition					
Leachate Forcemain Piping Condition[2]					

1 = Inspection of sampling ports, valves, flow meter, totalizer, pump, and electronic controls.
2 = Visual inspection of piping for confirmation of no apparent damage or leaks observed.
3 = Visual inspection of overhead electrical lines for confirmation of no apparent damage or blown fuses.

FAP Inspection Comments
___ - load of leachate was pumped (approximately _____ gal) from FAP frac tank & hauled to _____.

APPENDIX C

URS

Appendix C
Standard Operating Procedures Plan
Operation and Maintenance of Leak Detection System
Former Fly Ash Pond No. 2
Delaware City Refinery

1.0 Introduction

Leachate handling procedures have been implemented by URS Corporation, on behalf of Motiva Enterprises LLC, for the Leak Detection System (LDS) at the former Fly Ash Pond No. 2 (FAP 2). This plan serves as a guide for managing leachate collected from the former FAP 2 LDS system in a manner that is protective of the environment and in accordance with Delaware Department of Natural Resources and Environmental Control (DNREC) regulations. The Plan includes preparation and handling leachate transportation by truck and treatment/disposal off site. The Plan will be updated as needed should the method of handling leachate or other details change.

2.0 Leak Detection System

The LDS consists of three primary near horizontal pipes located at the northern, central, and southern portions of the former FAP 2. These pipes are perforated allowing leachate to be drained from the consolidated materials and directed to one of three manhole sumps, depending on the location of the pipe. Each sump is equipped with a float-activated pump. When the leachate level in the sump rises, the float rises, and activates the pump. Leachate is pumped out of the sumps through a forcemain and discharged into an aboveground double-walled 18,000 gallon fractionation tank (frac tank) for temporary storage. Each sump is equipped with an individual totalizer to record the volume of collected leachate. In addition, a downstream totalizer records total leachate volumes from all three sumps in the forcemain prior to discharge into the tank. The frac tank is equipped with a sight glass to monitor the interstitial space between the tank walls and protect against a potential breach of the inner tank wall. Additionally, the tank is fitted with an automatic shut-off switch for overfill protection and surrounded by a portable berm spill guard.

Leachate from the former FAP 2 LDS system is pumped to the tank by automatic controls. Leachate is removed from the tank, when full, by loading to a transport truck for offsite disposal using the process and procedures described below.

2.1 Leachate Load to Tank Truck

- A qualified tank truck operator with the necessary site-specific training and certifications will access the refinery at the appropriate gate (as identified by Delaware City Refining Company (DCRC) Security) and drive to the former FAP 2. (Changes in site access are not considered to require future modification of this plan).
- Conduct safety meeting to review the project safe work plan and job safety analysis.
- Perform visually inspection of the truck to confirm vehicle safety compliance and capability to safely transport leachate.
- Position tank truck adjacent to frac tank for leachate loading.
- Position hose for transfer of leachate from frac tank to tank truck. Confirmation that the valves are securely connected.
- Documentation of volume of leachate within the frac tank prior to initiating transfer.
- Initiate and complete leachate transfer to tank truck.
- Document volume of leachate within tank truck.
- Document volume of leachate remaining within the frac tank, if any. Verify that the volume of leachate removed from the frac tank is equivalent to the amount transferred to the tank truck.
- Provide appropriate signatures, on behalf of Motiva (generator), on Bill of Lading or Manifest for offsite transport and disposal of leachate.
- Ensure the tank truck exits refinery through the appropriate gate and the driver is following the established Journey Management Plan (if applicable) before driving to the receiving facility for leachate treatment and disposal.
- Confirm proper receipt of leachate at offsite treatment and disposal facility. Retain documentation of Bill of Lading or Manifest signed as received by treatment / disposal facility.

Transporter (as of 2013): Clean Harbors Environmental Services and Eldredge, Inc.
Disposal facility (as of 2013): Clean Harbors Environmental Services, Bristol, Connecticut, and Clean Water Ltd, Dayton, Ohio.

Leachate loading to transport truck is a manned operation. Hose connections are monitored for leaks during loading to comply with spill prevention procedures (Section 5.0). Safety kill switches on the tank truck will be used to immediately stop the leachate loading, if needed.

Components of the LDS system: pumps, piping, flow meters, controls, recording devices, valves, sample ports, and storage tank are inspected for confirmation of operational integrity. Repairs are made, as needed.

2.2 LDS System Inspection

- Inspect the LDS flow meters, pumps, controls, recording devises, and storage tanks for leaks, to ensure proper functioning and to record flows.
- Check the sight glass that monitors the interstitial space between the inner and outer walls of the double-walled tank. Leachate in the site glass indicates a breach of the inner tank. If inner tank is breached, remove leachate from tank, remove the tank from service, and repair or replace frac tank.
- Confirm the functionality of the auto shut-off control.
- Evaluate the pump set levels to confirm the pump is deactivating at the set level.
- As needed and after rain events, evaluate any fluid contained within the spill control berm to determine it to be stormwater.
- Confirm operation of the heat tracing prior to winterizing the system.
- Inspection of the spill guard berm to confirm the spill guard integrity.

2.3 Reporting

- Notify DNREC upon discovery of any damage done to the LDS control systems.
- Maintain records of inspections onsite and make available for DNREC's review upon request.
- Record and report the quantity of leachate generated to DNREC on the permit-required basis.

2.4 Field Readings

- Record leachate volumes from LDS totalizers (three individual and one main).
- Record height of leachate in frac tank and calculate volume of leachate in frac tank.
- Document condition of frac tank, pumps, piping, and controls.

3.0 FAP 2 Line Cleaning & Inspection

The leak detection system including the sumps and accessible LDS collection pipes will be cleaned and inspected every other year, with the option to modify the frequency of cleaning/inspection as determined by DNREC, using a self-propelled high-pressure jetting system. An internal inspection of the LDS collection pipes will be performed by use of video surveys to determine conditions within the system. The results of the cleaning will be reported and a written assessment will be prepared of the condition of the leak detection system pipes, including potential clogging of the pipe perforations and the location, cause, and effects of blockages encountered.

4.0 Winterization

The FAP leachate management system is winterized to prevent leachate freezing. The piping is wrapped with heat trace and insulation. The heat trace has temperature regulator controls to activate the heat trace when ambient temperatures approaches freezing. The frac tank is installed with a circulation pump that is thermostat activated when temperature near the freezing point. Winterization of the system is checked periodically during freezing temperatures to ensure proper operation.

5.0 Spill Prevention and Secondary Containment

Leachate spill prevention includes regular inspections of the system components (piping, valves, tanks, couplings, ports, etc.) for confirmation of integrity. Components that exhibit evidence of excessive wear or compromised integrity are removed from service and repaired or replaced.

The frac tank is equipped with an automatic shut-off switch for overfill protection. The switch is triggered when the leachate levels reach a preset level in the tank. If this occurs, power is cut to the individual pumps preventing any further discharge of leachate to the frac tank. The automatic shut-off switch was calibrated upon installation and is checked periodically for confirmation of operational integrity.

All leachate loading operations are conducted with proper oversight to monitor the integrity of hoses, valves, couplings, and flow during the process. All lines are properly drained and stored prior to the tanker truck leaving the site.

6.0 Record Keeping and Reporting

The FAP 2 LDS and associated equipment, including flow meters, pumps, controls, and recording devices, are inspected by an operator for proper operation and leachate generated. The quantity of leachate generated is measured on a regular basis. If the quantity of flow exceeds the action leakage rate (ALR) as defined in the permit, DNREC will be notified and additional action taken. System malfunctions will be reported to DNREC upon discovery and repairs will be scheduled accordingly.

Appropriate records regarding leachate generation and management are maintained for inclusion in the system report and will be retained until of the end of the post-closure care period. If requested, records will be made available to DNREC for review within a reasonable period of time.

6.1 Non-routine Reporting

Non-routine reports and notifications (i.e., reports that do not have a specified schedule and are required as specified events dictate) will be prepared and submitted to DNREC as required by the permit.

Upon discovery of malfunction of the equipment, including pumps and totalizers, associated with the leak detection system, Motiva will:

- notify DNREC of the discovery of the malfunction,
- initiate repairs to the equipment, and
- submit a letter summarizing the equipment repair activities, including any follow-up or remedial actions required with an implementation schedule to DNREC.

If the flow from the leak detection system exceeds the action leakage rate (ALR), Motiva will:

- notify DNREC in writing and begin an investigation into the cause of the increased flow,
- investigate the source and character of the increased flow, and
- provide DNREC with a written report detailing the findings, recommendations, and an implementation schedule. Should the reason for the ALR be a result of a malfunction of equipment, including the pumps or totalizers, associated with the leak detection system then reporting requirements will be followed, as previously described.

6.2 Emergency Reporting

Motiva will immediately notify DNREC of discovery of a spill that exceeds 10 gallons of leachate or evidence that surface water has been contaminated with leachate. If any such event occurs during business hours, the event will be reported to the DNREC Solid and Hazardous Waste Management Branch (SHWMB) by telephone at 302-739-9403. At all other times, the report will be made to the Air and Waste Management Division toll-free 24-hour line at 1-800-662-8802. A written notification to DNREC will be submitted no later than five business days following any such event, which will include:

- Date and time of occurrence/discovery
- Date and time of reporting
- Agencies notified
- Materials and quantities involved
- Narrative describing how the incident occurred and the actions taken by response personnel
- Report of injuries/damage
- Proposal for follow-up or remediation actions required and schedule