



Permit SW-04/01

Permit Type: Industrial Waste Landfill Closure and Post Closure Care

Date of Issue: February 27, 2004

Last Modified: May 11, 2011

Expiration Date: May 11, 2041

Permittee: Motiva Enterprises, LLC
4550 Wrangle Hill Road
Delaware City, Delaware 19706

Pursuant to 7 Del. C., Chapter 60, Section 6003 and the *Delaware Regulations Governing Solid Waste*, Motiva Enterprises, LLC is hereby granted approval to close the Industrial Waste Landfill located within the boundary of the Delaware City refinery. All terms and conditions of this permit are enforceable by the Department of Natural Resources and Environmental Control.



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Environmental Scientist IV
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5/11/2011

Date



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5/11/2011

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I. GENERAL CONDITIONS

- A. Pursuant to Sections 4.2.3.2, 6.10 and 6.11 of the *Delaware Regulations Governing Solid Waste* (DRGSW), the Department of Natural Resources and Environmental Control (the Department) hereby modifies Permit SW-04/01 to specify closure and post-closure care of the Industrial Waste Landfill (IWL) operated by Motiva Enterprises, LLC (Motiva). The IWL is located on the grounds of the Delaware City Refinery located at 4550 Wrangle Hill Road, Delaware City, Delaware 19706.
- B. This permit applies to:
1. The IWL site formerly operated by Motiva, including environmental monitoring and landfill controls, and sited as shown in Figures 1.1 and 1.2 in both the Closure Plan, and the Post-Closure Plan
 2. Closure of the IWL.
 3. Environmental monitoring, recordkeeping, and reporting for the IWL.
 4. Post-closure care of the IWL once closure activities have been completed.
- C. This permit was issued in accordance with the following documents submitted by Motiva:
1. *Motiva Enterprises LLC Closure Plan, Industrial Waste Landfill*; Volumes I, and II (the Closure Plan); prepared for Motiva by URS on February 6, 2006 and last revised on November 23, 2010.
 2. *Motiva Enterprises LLC Post-Closure Plan, Industrial Waste Landfill*; Volume III (the Post-Closure Plan); prepared for Motiva by URS on February 6, 2006 and last revised on November 23, 2010.
 3. *Industrial Waste Landfill Post-Closure Groundwater Sampling and Analysis Plan*, (The GW-SAP), prepared for Motiva by URS October, 2007. The GW-SAP was submitted as Appendix C of the Post-Closure Plan.
 4. Other plans, standards, letters, procedures, and policy specifically referenced in this permit.

D. This permit is issued subject to the following general conditions:

1. Access to the IWL site by unauthorized persons shall be prevented by barriers, fences, and gates, or other suitable means. Representatives of the Department may inspect the IWL at any reasonable time.
2. Motiva shall conduct activities at the IWL in compliance with this permit and all applicable federal, state, county, and municipal environmental statutes, ordinances, and regulations.
3. Any transfer of this permit shall be done in compliance with the requirements of Section 4.1.8 of the DRGSW, including post-closure care financial assurance. Motiva shall not transfer this permit until they have established a valid Environmental Covenant in accordance with the requirements of Delaware Code Title 7, Chapter 79, Subchapter II. Until transfer of the permit has been completed, Motiva shall continue to maintain control of, and responsibility for the IWL in compliance with this permit and the DRGSW, including, but not limited to the requirements for financial assurance, closure, post-closure care, recordkeeping, reporting, monitoring and corrective actions.
4. Motiva shall maintain a readable, easily accessible copy of the most current version of this permit at the DCR Administration Building located on Wrangle Hill Road, or an alternate location approved by the Department. In addition, Motiva shall ensure that entities acting on the behalf of Motiva at the IWL during the post-closure care period have ready access to the permit.
5. Motiva shall ensure that any confined space entry at the IWL is done in accordance with 29 CFR Part 1910.146.

II. OPERATIONS

- A. General Operations: The IWL first began operation in August 1992 and was used by the refinery for disposal of nonhazardous solid waste until April 2004. Most routine landfill operations have ceased, with the exception of maintenance and monitoring. Motiva shall comply with the following interim operational requirements until the landfill enters into the post-closure care period.
- B. No wastes may be placed into the IWL unless done as part of closure activities approved by the Department.
- C. During closure, Motiva shall protect landfill control systems, including the liner system, final cover system, and leachate management systems. All activities conducted on or near the IWL must be done in a manner that does not damage these control systems.
- D. Motiva shall continue to operate and maintain the leachate collection/detection system during closure activities.

1. During closure, Motiva shall inspect all leachate collection/detection system flow-meters, pumps, controls, recording devices, and storage tanks weekly to check for leaks, ensure proper functioning and to record flows. Motiva shall maintain on-site records of these inspections and shall provide those records to the Department upon request.
 2. During closure, Motiva shall maintain the leachate monitoring system in good working order and capable of measuring flow and sampling the leachate.
 3. During closure of the IWL, Motiva will notify the Department within one (1) business day of the discovery of any malfunctions or damage to the leachate collection/detection system.
 4. During closure of the IWL, Motiva shall conduct visual monitoring of the landfill perimeter and adjacent stormwater channels for leachate and contaminated stormwater at least once each week.
- E. During closure, Motiva shall continue to manage stormwater to prevent the erosion of the waste and cover, minimize surface water run-on into the waste, and prevent the discharge of pollutants from the IWL into surface waters.
- F. During closure, Motiva shall continue to protect and maintain groundwater monitoring wells in accordance with the *Delaware Regulations Governing the Construction and Use of Wells*.
- G. Motiva shall prevent scavenging on the IWL during closure.

III. MONITORING

A. Leachate Monitoring.

1. Baseline leachate sampling: No later than October 2011, Motiva shall collect leachate samples from the leachate collection system and the leak detection system at the IWL. Leachate shall be analyzed for the parameters specified in IWL Table 1 and IWL Table 2.

IWL Table 1 Leachate Supplemental Parameters

1) Antimony	59) Methyl chloride (Chloromethane)	117) 3/4 Methylphenol (m/p-Cresol)
2) Arsenic	60) Methylene chloride (Dichloromethane)	118) 4-Chloro-3-methylphenol
3) Barium	61) Methyl iodide (Iodomethane)	119) 2-Naphthylamine
4) Beryllium	62) 4-methyl-2-pentanone	120) N-Nitrosodi-n-propylamine
5) Cadmium	63) Styrene	121) N-Nitrosodimethylamine
6) Chromium (Total)	64) 1,1,2,2-Tetrachloroethane	122) N-Nitrosodiphenylamine
7) Cobalt	65) 1,1,1,2-Tetrachloroethane	123) Naphthalene
8) Copper	66) Tetrachloroethene	124) Nitrobenzene
9) Lead, Total	67) Tetrahydrofuran	125) Benzo (b) fluoranthene
10) Magnesium	68) Toluene	126) 2-Nitrophenol
11) Mercury	69) 1,1,1-Trichloroethane	127) 4-Nitrophenol
12) Molybdenum	70) 1,1,2-Trichloroethane	128) Pentachlorophenol
13) Nickel	71) Trichloroethene	129) Phenanthrene
14) Silver	72) Trichlorofluoromethane	130) Phenol
15) Selenium	73) 1,2,3-Trichloropropane	131) Pyrene
16) Thallium	74) Vinyl Acetate	132) Pyridine
17) Tin	75) Vinyl chloride	133) 1,2,4-Trichlorobenzene
18) Vanadium	76) Tot. Xylenes	134) 2,4,6-Trichlorophenol (2,4,6 T)
19) Zinc	77) 3,3'-Dichlorobenzidene	135) Acrolein
20) Cyanide (Total)	78) 1,2-Diphenylhydrazine	136) o,p'-DDD
21) Sulfides	79) Acenaphthene	137) p,p'-DDD
22) Phenols (Total)	80) Anthracene	138) 4,4'-DDE
23) Acetone	81) Benzidine	139) 4,4'-DDT
24) Acetophenone	82) Benzo (a) anthracene	140) 2,4,5-T
25) Acrylonitrile	83) Benzo (a) pyrene	141) 2,4,5-TP (Silvex)
26) Benzene	84) Benzo (g,h,i) perylene	142) 2,4-D
27) Benzyl Alcohol	85) Benzo (k) fluoranthene	143) Aldrin
28) Bromochloromethane	86) 4-Bromophenyl phenyl ether	144) alpha-BHC
29) Bromoform	87) Butylbenzyl Phthalate	145) delta BHC
30) Bromomethane	88) Ideno (1,2,3-cd) pyrene	146) beta-BHC
31) Dibromochloromethane	89) Bis (2-chloroethoxy) methane	147) gamma BHC (Lindane)
32) Dichlorobromomethane	90) Bis (2-chloroethyl) ether	148) alpha Endosulfan
33) 2-Butanone	91) Bis (2-chloroisopropyl) ether	149) beta Endosulfan
34) Carbon disulfide	92) 2-Chloronaphthalene	150) Endosulfan Sulfate
35) Carbon tetrachloride	93) 2-Chlorophenol	151) 2,4,5 Trichlorophenol
36) Chlorobenzene	94) 4-Chlorophenyl Phenyl Ether	152) Chlordane
37) Chloroethane	95) Chrysene	153) Dieldrin
38) Chloroform	96) Di-n-Butylphthalate	154) Dimethoate
39) 1,2-Dibromo-3-chloropropane	97) Di-n-octyl Phthalate	155) Heptachlor
40) 1,2-Dibromoethane	98) Dibenz (a,h) anthracene	156) Heptachlor epoxide
41) 1,2-Dichlorobenzene (ortho)	99) 2,4-Dichlorophenol	157) Endrin
42) 1,3-Dichlorobenzene (meta)	100) Diethylphthalate	158) Endrin Aldehyde
43) 1,4-Dichlorobenzene (para)	101) 2,4-Dimethylphenol	159) Methoxychlor
44) trans-1,4-Dichloro-2-butene	102) Dimethylphthalate	160) PCB-1016
45) 1,1-Dichloroethane	103) 2-Methyl-4,6-Dinitrophenol	161) PCB-1221
46) 1,2-Dichloroethane	104) 2,4-Dinitrophenol	162) PCB-1232
47) 1,1-Dichloroethene	105) 2,4-Dinitrotoluene	163) PCB-1242
48) 1,2-Dichloroethene	106) 2,6-Dinitrotoluene	164) PCB-1248
49) cis-1,2-Dichloroethene	107) Bis(2-ethylhexyl)phthalate	165) PCB-1254
50) trans-1,2-Dichloroethene	108) Fluoranthene	166) PCB-1260
51) 1,2-Dichloropropane	109) Fluorene	167) Toxaphene
52) 1,3-Dichloropropane	110) Hexachlorobenzene	168) 2-Chloroethyl vinyl ether
53) cis-1,3-Dichloropropene	111) Hexachlorobutadiene	169) 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
54) trans-1,3-Dichloropropene	112) Hexachlorocyclopentadiene	
55) Diethyl Ether	113) Hexachloroethane	
56) Ethylbenzene	114) Isophorone	
57) 2-Hexanone (Methyl butyl ketone)	115) 2-Methylnaphthalene	
58) Methylene bromide (Dibromomethane)	116) 2-Methylphenol (o-Cresol)	

2. Annual leachate sampling: Annually, during October, Motiva shall collect leachate samples from the leachate collection system and the leak detection system. If liquid is not available in the leak detection system, Motiva will record that observation and include it in the reports required by this permit. Leachate shall be analyzed for the parameters specified in IWL Table 2.

IWL Table 2 (field and laboratory indicator parameters for annual leachate monitoring)

pH (field) (lab)	Chloride (lab)	Arsenic (lab)	Nickel (lab)
Specific conductance (field) (lab)	TOC- Total Organic Carbon (lab)	Barium (lab)	Potassium (lab)
Turbidity (field)	TOX- Total Organic Halogens (lab)	Calcium (lab)	Selenium (lab)
Temperature (field)	Total Alkalinity (lab)	Chromium (lab)	Sodium (lab)
Oxidation Reduction Potential (field)	Sulfate (lab)	Iron (lab)	Vanadium (lab)
Dissolved Oxygen (field)	TPH-GRO (lab)	Magnesium (lab)	COD (lab)
Total Dissolved Solids (field) (lab)	TPH-DRO (lab)	Manganese (lab)	BOD (lab)

3. Semi-annually, in April and October, Motiva shall measure the levels in the leachate collection sump and in the cleanouts at the upgradient end of all four (4) leachate collection pipes. Motiva shall report this information annually as part of the Annual Environmental Report specified in section IV.A.2 of this permit.
4. The action leakage rate (ALR) for the leak detection system in the IWL is 11,200 gallons in a week. Motiva shall compare the ALR with leachate flows in the leak detection system weekly (once each 7 days) and shall report and discuss any exceedances as part of the Periodic Environmental Monitoring report (permit condition IV.B.) and in the Annual Environmental Report (permit condition IV.A.2.b.(2)). The Department may require additional corrective measures in the event that flow rates in the leak detection system exceed the ALR after the final cover system has been in place for 24 months or if there is an indication of a release.

B. Surface Water Monitoring:

1. In the event that surface water accumulated on the temporary synthetic cover is not managed through the refinery wastewater treatment plant, Motiva shall monitor, sample and manage stormwater accumulated on top of the temporary surface cover (TSC) in accordance with “*Interim Cover Storm Water Discharge Management & Monitoring Plan*” dated May 2010, or as otherwise approved by the Department.
2. Motiva shall conduct visual monitoring of IWL surface water controls and channels and ponds serving the IWL in accordance with the requirements of this permit. Motiva shall record the results of these inspections and shall report surface water contaminated by leachate in accordance with section IV.C.1 of this permit (emergency reporting). In the event leachate is found to be contaminating surface water, Motiva shall initiate corrective measures and also promptly sample the impacted surface water and the

inlet/outlet at the receiving body of water/stormwater pond for leachate parameters specified in IWL Table 2.

C. Ground Water Monitoring. Motiva shall conduct groundwater monitoring as specified in the Industrial Waste Landfill Post-Closure Groundwater Sampling and Analysis Plan (GW-SAP) and in accordance with the requirements of this permit.

1. Semi-annually, during the April and October groundwater monitoring event, Motiva shall measure water elevations in the following monitoring wells (IWL Table 3):

IWL Table 3 (wells monitored for water elevations)

MW-1S	MW-5S	MW-10S	MW-1D
MW-2S	MW-6S	MW-11S	MW-13D
MW-3S	MW-8S	MW-12S	
MW-4S	MW-9S	MW-13S	

2. Semi-annually, during April and October, Motiva shall collect samples from the monitoring wells shown in IWL Table 4, below. Motiva shall record the field parameters shown in IWL Table 5. After field parameters have stabilized as specified by section 2.2.4 of the GW-SAP, Motiva shall collect samples for laboratory analysis as specified by IWL Table 6. Metal samples shall be field filtered only if turbidity exceeds 10 nephelometric turbidity units (NTU). All samples shall be collected in a manner that minimizes sample turbidity. All wells to be sampled shall be maintained as necessary so that they will produce low turbidity samples.

IWL Table 4 (wells monitored for field and indicator parameters)

MW-2S	MW-9S	MW-11S	MW-1D
MW-3S	MW-10S	MW-13S	MW-13D
MW-4S			

IWL Table 5 (field parameters for groundwater monitoring)

pH	Oxidation Reduction Potential (ORP)
Temperature	Turbidity
Dissolved Oxygen	Total Dissolved Solids
Specific conductance	

IWL Table 6 (laboratory parameters for groundwater monitoring)

pH	TPH-GRO	Arsenic	Nickel
Specific Conductance	TPH-DRO	Calcium	Potassium
Total Dissolved Solids	Chloride	Iron	Selenium
Total Alkalinity	Sulfate	Magnesium	Sodium
TOC - Total Organic Carbon		Manganese	Vanadium

3. The Department may observe the water sampling conducted by Motiva and may request split samples for analysis. Representatives of the Department may also enter the facility to collect groundwater samples for analysis by an independent laboratory.
- D. Analytical Procedures: The Permittees shall analyze all leachate, ground water and surface water samples required by this permit in accordance with the most current legal edition of EPA Publication Number SW 846. If SW 846 does not contain a test method for a required parameter, that parameter shall be tested according to methods described in the most recent edition of the EPA Publication *Methods of Chemical Analysis for Water and Wastes* or of *Standard Methods for Examination of Water and Wastewater*.

IV. REPORTING

- A. Annual reports. No later than March 31st, Motiva shall submit the following reports:
1. The Financial Assurance Demonstration: Motiva shall provide assurance that the financial costs associated with closure, post-closure care, and corrective action (if required) can be met. Motiva shall demonstrate financial assurance with a valid financial assurance mechanism in accordance with section 4.1.11.2 of the DRGSW and shall provide detailed and accurate cost estimates that have been adjusted for inflation for each cost estimate as applicable (closure, post-closure care, and corrective actions).
 2. The Annual Environmental Monitoring Report. Motiva shall submit one paper copy and two copies on electronic media (such as compact disc) or a combination of both as specified in this permit. Motiva shall include the following information in the Annual Environmental Monitoring Report:
 - a. The report shall include a dated title page, a page identifying the preparer including the signature and PG seal, and a detailed table of contents, including a section that detailed the contents of the electronic media submittal.
 - b. Narrative: Motiva shall include a discussion of findings, conclusions and recommendations based upon the environmental monitoring results. The narrative portion of the report shall address:
 - (1) Groundwater monitoring results, including whether the results indicate a contaminant release from the IWL to groundwater, and any corrective measures required or anticipated.
 - (2) Leachate and leak detection system monitoring results including a discussion of the performance of the final cover system, and liner system as indicated by the ALR, leachate flows, and the leachate level monitoring of the IWL. Motiva shall include a discussion of any corrective measures required or anticipated.

- (3) Surface water monitoring results, including whether the results indicate a contaminant release from the IWL to surface water, and any corrective measures required or anticipated.
 - (4) A discussion of any problems encountered during fieldwork, any deviations from the sampling procedures, and of any problems with QA/QC procedures.
 - (5) Recommendations for future environmental monitoring, changes and repairs to the monitoring network, and corrective actions.
- c. Tabulation of all data listed below from the past year and all preceding years (all years monitored) as specified below. Data submitted shall include:
- (1) Leachate collection system flow, leachate level measurements, and quality including field parameters. Motiva shall provide the last five years of this data on paper and all preceding years via electronic media.
 - (2) Leak detection system flow and quality including field parameters. Motiva shall provide the last five years of this data on paper and all preceding years via electronic media.
 - (3) Ground water elevation and quality data including field parameters. Motiva shall provide the last five years of this data on paper and all preceding years via electronic media.
 - (4) Rainfall data from the on-site weather data station, or other third-party sources of local weather data. Motiva shall provide this data via electronic media only.
- d. Graphical presentations (quality versus time plots) of data from preceding years for groundwater quality parameters specified in IWL Table 6 in section III.C.2 of this permit.
- e. Graphical presentation (quality versus time plots) of data from all preceding years for leachate and leak detection system liquid quality parameters specified in IWL Table 2 in section III.A.2 of this permit.
- f. Graphical presentations (flow rate or volume versus time plots) of data from all preceding years for leachate and leak detection system flows. Rainfall data shall also be plotted on each graph.
- g. Potentiometric maps for the surficial aquifer for the past year. These maps shall include an outline of the IWL and the Fly Ash Pond and show adjacent property boundaries,
- h. A drawing showing all monitoring locations required by this permit.

- i. Copies of field notes, laboratory data sheets, and chain-of-custody forms. Motiva shall submit these records via electronic media only.
3. The Annual Post-Closure Care Report: The reporting period for the IWL shall be from January 1st to December 31st of each year. Motiva shall provide this report in one paper copy plus one copy on electronic storage media acceptable to the Department and shall include the following information for the reporting period:
 - a. A narrative addressing the status of closure activities (until the IWL has been closed).
 - b. A narrative addressing Motiva's progress with establishing the environmental covenant required for the IWL, to include the estimated submittal date.
 - c. A list of any deficiencies or damages identified with the IWL control systems during the reporting period (including the cap, liner, stormwater controls, and leachate collection systems) and status of repairs or corrections required.
 - d. A discussion of activities during the past year relevant to operation and maintenance of the leachate collection system.
 - e. A listing of notices, warnings, citations, fines, penalties or other enforcement actions involving the IWL.
 - f. Deviations from the inspection, monitoring, or reporting requirements specified by this permit.
 - g. Copies of all inspection forms completed in accordance with the conditions of this permit (to be provided on electronic storage media only).
 - h. The report of the biennial leachate line cleaning, inspection and assessment, if done during the reporting period. Motiva shall include a discussion of the assessment with findings and recommendations. Motiva shall include a drawing showing the areas cleaned and inspected and a table showing design lengths versus actual lengths cleaned and inspected. Motiva shall also provide the actual visual record of inspection on electronic media (i.e. DVD).

B. Additional Reports:

1. Periodic Environmental Monitoring Data Submittal: Within 60 days after the completion of periodic sampling events for groundwater and leachate (as required in sections III.B and III.C of this permit), Motiva shall submit data on electronic storage media in a form acceptable to the Department and in accordance with the following requirements.
 - a. The electronic media submittal shall be accompanied by a signed cover letter

(paper). The cover letter shall state the monitoring events reported in the submittal, report any concerns the permittee has about the sampling event or the monitoring results (including ALR exceedances), and provide a table of contents for the information provided via electronic storage media.

- b. Motiva shall present periodic monitoring data delivered by way of electronic media on spreadsheets (i.e. Excel) and include historical data for groundwater quality and leachate quality. Motiva shall include year to date leachate quantity flows (both leachate collection and leak detection) along with historical data for comparison. Motiva shall present the quality and quantity data in tabular format by monitoring point and in graph format by monitoring point and indicator parameter.

C. Emergency Reporting:

1. Motiva shall notify the Department as soon as practical, and in no case longer than 24 hours after discovery of the following:
 - a. Fire, explosion, or any other incident at the IWL that may have an impact on human health or the environment.
 - b. Damage to the barrier layer of the final cover system or to the landfill liner system.
 - c. Leachate spills exceeding 10-gallons.
 - d. Surface water contaminated with leachate.
2. If any event listed in section IV.C.1 of this Permit occurs during business hours, Motiva shall report the event to the Department's Solid and Hazardous Management Branch (SHWMB) by telephone at 302-739-9403. At all other times, the report shall be made to the Department's toll-free 24-hour line at 1-800-662-8802.
3. Motiva shall submit a written notification to the Department within five business days following any event requiring "Emergency Reporting". The notification shall include the following:
 - a. Date and time of occurrence/discovery.
 - b. Date and time of reporting.
 - c. Agencies notified.
 - d. Materials and quantities involved.
 - e. Narrative describing how the incident occurred and the actions taken by Motiva and other response personnel.
 - f. Report of injuries/damage.
 - g. Proposal for follow-up or remedial actions required and schedule.

D. Assessment of Corrective Measures:

1. Motiva shall notify the Department within seven business days after verified analytical data has confirmed that a release has taken place. Confirmation samples shall be collected from the appropriate monitoring points within 14 days of receipt of written approval by the Department. These samples shall be analyzed under a priority schedule for the indicator parameters and any other parameters deemed appropriate by the Department. Motiva shall notify the Department of the results of the confirmation sampling within seven days of receipt of the results.
 2. If the confirmation sampling and analysis indicates that no release has taken place, no further action shall be taken by the Department, and monitoring of the sampling location(s) shall be returned to its/their normal monitoring schedule. If the confirmation or re-sampling round of sampling does indicate that a release has taken place, Motiva shall perform an assessment of corrective measures within 90-days of confirmation of the release. This assessment shall include:
 - a. Identification of the nature and extent of the release (which may require construction and sampling of additional wells, geophysical surveys or other measures).
 - b. Re-assessment of contaminant fate and potential contaminant receptors (wells and/or receiving streams).
 - c. Evaluation of feasible corrective measures to:
 - (1) Prevent exposure to potentially harmful levels of contaminants (exceeding performance standards).
 - (2) Reduce, minimize, or prevent further contaminant releases.
 - (3) Reduce, minimize, or prevent the off-site migration of contaminants.
- E. If Motiva is unable to comply with any of the reporting requirements listed within this permit, Motiva shall provide written notice and justification to the Department at least two (2) weeks prior to the reporting deadline for Departmental approval of the delay.
- F. Motiva shall report to the Department any intentional or accidental deviation from any approved plan within one (1) business day of the discovery of the deviation.
- G. Motiva shall report any complaints from the public regarding odor, dust or litter at the IWL. Motiva shall report this to the Solid & Hazardous Waste Management Branch and reporting may be via phone or email.

V. RECORDKEEPING

- A. General Recordkeeping and Maintenance: The following information must be recorded and maintained by Motiva until the end of the post-closure period. This information must be available for inspection in Delaware, with reasonable notice by representatives of the Department:

1. Monitoring, testing, and analytical data required by this permit and the DRGSW.
2. Copies of field notes, laboratory data sheets, and chain of custody forms for each sample analyzed.
3. Records of inspections required by this permit.
4. Repairs made on landfill control systems, including drawings showing the location of the repair.
5. Records of corrective actions required at the IWL.
6. A copy of the Closure Plan and the Post-Closure Plan for the IWL.
7. A copy of the Final Report for the closure of the IWL.
8. The Environmental Covenant required by this permit.
9. Post-Closure Care Contact Information as required by section VII. G of this permit.
10. Records of complaints received from the public concerning odors, dust, and litter at the IWL.

VI. CLOSURE

- A. Motiva shall close the IWL in accordance with the conditions of this permit, and the Closure Plan which includes the *Technical Specifications*, the *Construction Quality Assurance Plan* and the *Drawings* provided in the application. Revisions to these drawings, plans or specifications related to leachate detection/collection systems, waste containment system, stormwater management system, environmental monitoring system or the capping system, shall require Department approval in writing or by documentation in the minutes of the construction progress meeting or similar record approved by the Solid & Hazardous Waste Management Branch.
- B. Motiva shall initiate closure of the IWL within 60 days following issuance of the closure and post-closure care permit and shall complete installation of the final cover system within 12 months following the issuance of this permit, unless otherwise approved by the Department.
- C. Motiva shall store, handle and install all geosynthetic materials used for closure of the IWL in accordance with this permit and the manufacturer's guidelines.
- D. Construction Quality Assurance.

1. Prior to staff performing any CQA duties at the IWL, Motiva shall submit their qualifications and resumes to the Department in accordance with the requirements of the *Construction Quality Assurance Plan*.
2. Supporting Documents for Construction Quality Assurance. The CQA consultant shall maintain copies of the following documents on site and shall allow Department representatives to review these documents at any reasonable time:
 - a. Construction drawings, including field changes, and as-builts.
 - b. Change orders.
 - c. Daily and weekly logs maintained by CQA staff.
 - d. Daily CQC logs.
 - e. Records showing type, volume and source for each fill, granular drainage material or cover soil placed into the IWL as part of closure.
 - f. Manufacturer's certifications for geosynthetics used in the capping system.
 - g. Manufacturer's MQA Plans for geosynthetics to be used in the capping system and for the exposed liner repair as presented in the Closure Plan and in accordance with the requirements of this permit.
 - h. Manufacturer's specifications and guidelines regarding storage, handling, and installation of geosynthetics to be used in the capping system.
 - i. Records showing material deliveries (including lot and roll numbers) for all geosynthetics shipped to the site for use in the capping system and liner repair.
 - j. Records of conformance testing for all geosynthetics used in the capping system and for the exposed liner repair as presented in the Closure Plan and in accordance with the requirements of this permit.
 - k. Records of all fill and soils testing for the project.
 - l. Subgrade acceptance certifications.
 - m. Project photographs.
 - n. Calibration records for instruments used for CQA and CQC monitoring, to include nuclear density gages and tensiometers.
 - o. Applicable standards and procedures for any on-site laboratory involved in analyzing soils used in the project.
 - p. Field seam test results.
 - q. Survey stake inventory.
 - r. Sediment and stormwater inspection reports
3. Prior to installation of geosynthetic materials for the IWL, Motiva shall provide the qualifications of the installer, the installers key personnel (i.e. master seamer and site superintendent), and the Construction Quality Control Inspectors to the Department for its review.
4. Prior to installation of any prefabricated vertical drains (PVD's), Motiva shall provide the qualifications of the PVD Installer to the Department for its review. Motiva shall provide the qualifications for the PVD installer's superintendent and operator(s) to the Department for its review prior to those individuals doing any PVD work at the IWL.

5. PVD's shall not be installed unless the Construction Manager's representative is present and observing the installation.
 6. Material testing frequencies and acceptable values shall not be reduced or lowered without Department approval. This shall include all conformance and CQC testing of materials used in the capping system, the waste containment system, and the leachate management system.
- E. Motiva shall close the IWL in a manner that minimizes the need for further maintenance.
- F. Motiva shall close the IWL in a manner that controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of solid waste constituents and leachate.
- G. Prior to extending the existing leachate collection manhole (reference specification 02100, section 3.8), Motiva shall provide shop drawings, work plans, manufacturer installation guidelines/recommendations, quality control/assurance requirements and supporting calculations clarifying the suitability and operations of the materials, equipment and approach proposed to complete the work to the Department for its review. Motiva shall submit this package along with the Design Engineer's review and determination whether the proposal is adequate to ensure proper performance of the leachate collection system and protection of the liner system during closure and throughout the post-closure care period. Motiva shall not proceed with the leachate manhole extension without the approval of the Department.
- H. Motiva shall not allow the disposal of cleared or grubbed vegetative materials in or on the IWL during closure activities.
- I. During closure activities, Motiva shall take all necessary precautions to protect existing control systems in and around the IWL to include the liners and leachate collection systems, except that the existing TSC may be perforated and allowed to remain in place prior to placement of grading fill and the final cover system. Motiva shall report any damage to control systems in accordance with the reporting requirements of section IV.C.1 of this permit.
- J. Dust Control
1. Motiva shall conduct all closure activities at the IWL in a manner to prevent dust emissions from causing a condition of air pollution (injurious to human, plant, or animal life or unreasonably interfering with the enjoyment of life and property). Motiva shall inspect for visible dust leaving the facility at least once each day during activities that may cause dust emissions of concern.
 2. If fill or granular material used for closure activities is hauled to the site in trucks using public roads, Motiva shall require that all such vehicles be adequately tarped or

covered and shall monitor these vehicles upon entry. Motiva shall administer controls necessary to minimize visible particulate emissions resulting from improperly tarped vehicles operating on public roads.

3. Motiva shall implement controls as necessary to minimize tracking of soils or other materials onto public roads leading from the IWL. During activities that may result in drag-out of material from the IWL, the permittee shall inspect Landfill egress points at least once each day to identify if materials are being tracked onto public roads. In the event material is being tracked onto public roads, Motiva shall provide for street cleaning of that area on the day the problem is identified.
 4. Motiva shall document the observations and deficiencies found during these inspections using a form acceptable to the Department. Motiva shall report and maintain records of these inspections in accordance with the conditions of this permit.
- K. During closure, Motiva shall provide for immediate access to the SHWMB project officer to facilitate unannounced inspections of construction and CQA activities at the IWL.
- L. Final Report. No later than 60 days after completing closure activities, Motiva shall submit a final certification report for Department approval. The final report shall certify whether or not the closure of the IWL was completed in accordance with the requirements of this permit and the *Closure Plan*, including the *Technical Specifications* and the *Construction Quality Assurance Plan*. The final report shall be certified correct and sealed by the construction quality assurance engineer who must be a Professional Engineer registered in Delaware. The final report shall include:
1. A cover letter presenting the Final Report and signed by the permittee after their review.
 2. Title page to include date, facility, project name, responsible party (Motiva), and preparing firm.
 3. Signature page.
 4. Table of contents.
 5. Introductory narrative with project overview.
 6. Certification of adequate closure with assessments and conclusions for each major construction activity, including a determination if the work was done in accordance with the permit requirements and whether the work achieved the performance standard intended by the design. Major construction activities shall include at least the following: dewatering/stabilization of the IWL; earthwork and grading; leachate collection/detection system (including the manhole extension); stormwater management, final cap construction; and stormwater management.

7. A determination whether or not the materials used for capping, waste containment, and leak detection systems were manufactured, tested, transported, stored on site, installed and protected in accordance with the permit requirements.
 8. A determination whether or not specified qualifications were met throughout the project. This shall include specified qualifications for manufacturers, installers, master seamers, surveyors, testing laboratories, contractors CQC inspectors and CQA staff.
 9. Record drawings including detail drawings for control components.
 10. A topographic drawing (with a scale of 1 inch = 80 ft.) showing site contours, stormwater controls, stormwater flow directions, monitoring wells, the leak detection system and associated liquids collection and transport system, and the limits of waste of the IWL.
 11. A site drawing (with a scale of 1 inch = 200 feet) showing all environmental monitoring locations for the IWL, site boundaries, fence lines, stormwater controls, stormwater flow directions, stormwater monitoring locations (if required), and the limits of the property which will be regulated under the post-closure care permit and the Environmental Covenant.
 12. A site drawing showing all environmental monitoring locations for the IWL and the Fly Ash Ponds (permit SW-96/01), northern and western site boundaries, fence lines, outlines of the IWL and Fly Ash Pond 1&2 locations, stormwater controls, stormwater flow directions, stormwater monitoring locations (if required), and the limits of the properties (IWL and Fly Ash Ponds) which will be regulated under the post-closure care permits and the Environmental Covenant.
 13. A listing of key personnel involved with the project to include business contact information. This listing should include the Motiva representative for the project, the design engineer, the general contractor's representative on-site, the installer's representative on-site, master seamer, surveyor, and all staff providing CQC and CQA oversight. The list shall also include the business contact information for subcontractors responsible for PVD installation and for the leachate manhole extension.
 14. Supporting documents for Construction Quality Assurance (reference section VI.D of this permit) to include all CQA forms, logs, layout drawings, and meeting minutes. This information is to be provided on compact disc only and bookmarked by section.
 15. Project photographs. These are to be provided on compact disc, sorted by date and labeled to include a description of the material or activity pictured.
- M. Motiva shall provide one paper copy of the final report and include the items listed in condition VI.L. 1 – 13 of this permit. Motiva shall also provide two copies of the report

on compact disks and include all items required by condition VI.L. of this permit. At a minimum, the documents on compact discs must be tabbed and/or bookmarked by major section to facilitate searching and retrieval of information.

- N. Once the Department receives the final report, it will make a determination of closure in accordance with section 6.10.4.7 of the DRGSW. Motiva shall continue to provide financial assurance for closure in accordance with the requirements of the DRGSW until the Department certifies that closure has been completed in accordance with this permit.

VII. POST-CLOSURE CARE:

- A. After closure work has been completed as determined by the Department, the Motiva IWL shall enter into the post-closure care period in accordance with section 6.11 of the DRGSW. Throughout the post-closure care period, Motiva shall provide for post-closure care of the IWL in accordance with this permit and the DRGSW including the following minimum requirements:

1. Access.

- a. Motiva shall continue to control access to the IWL during the post-closure care period by the use of gates, security fence, or other means necessary to limit access to the IWL to authorized persons engaging in activities compatible with this permit. Motiva shall post and maintain signs at all access points identifying the operator (Motiva), stipulating that access is restricted and disclosing that the site is a closed landfill regulated under DNREC permit SW-04/01.
- b. Motiva shall inspect access controls, including the fences, gates and signage, at least quarterly. Motiva shall document observations made during the inspection using a form acceptable to the Department and shall promptly correct all deficiencies required to maintain compliance with this permit.

2. During the post-closure care period, Motiva shall protect landfill control systems from damage, including the landfill liner, the membrane cap, and the leachate collection and management systems.

3. Cap Maintenance.

- a. Motiva shall maintain the integrity and effectiveness of the capping system and shall make repairs as necessary to correct the effects of settling, subsidence, erosion, burrowing animals, and other damages to the cap. Except as allowed below, Motiva shall not remove or alter any portion of the cap without the written approval of the Department. The Permittees may make the following repairs to the cap as long as they do not damage landfill control systems or reduce the effectiveness of the cap:

- (1) Major repairs to the geomembrane or geonet require Department approval;

however, Motiva may initiate minor repairs to these materials after first providing notification to the Department. For the purpose of this permit, minor repairs are considered repairs to damaged areas of geomembrane or geonet measuring less than 2 feet in any direction. All minor repairs must be done in accordance with the original manufacturer's guidelines. Within 30 days of completion of the repair, Motiva shall provide a formal report certifying the method and quality of the work completed, qualifications of staff performing the repair, and whether or not the integrity of the cap has been compromised. The report shall be signed and sealed by a Professional Engineer registered in Delaware.

- (2) Motiva may, without written approval, disturb the top six inches of the cap (the topsoil) for maintenance, regrading or seeding as long as sediment and erosion controls are properly employed, only clean topsoil is used, and the thickness of the cap is not diminished upon completion of the work. For the purpose of this permit, clean topsoil means the natural, unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants, and which can perform as the vegetative layer on the landfill cap. Clean topsoil contains no trash, debris, or solid waste and cannot be from a state or federal cleanup site. Analytical testing of clean topsoil is not typically required unless its origins are unknown or there is reason to suspect contaminants may be present which may pose an increased risk to human health or the environment.
 - (3) Motiva may also fill in erosion rills, gullies and borrows of any depth (over undamaged geomembrane/geonet only) with clean soil/top soil and then seed to establish vegetation. For the purpose of this permit, clean soil means the natural, unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants, and which can perform as the rooting layer on the landfill cap. Clean soil contains no trash, debris, or solid waste and cannot be from a state or federal cleanup site. Analytical testing of clean soil is not typically required unless its origins are unknown or there is reason to suspect contaminants may be present which may pose an increased risk to human health or the environment.
- b. Until the IWL has been in the post-closure care period for 12 months, Motiva shall inspect the capping system on the landfill at least once each month and immediately after a rainfall exceeding 1 inch in a 24 hour period. After that, Motiva shall inspect the stormwater controls at least quarterly, and immediately after a rainfall of 2 inches or more in a 24 hour period. Motiva shall document observations made during the inspection using a form acceptable to the Department and shall promptly correct all deficiencies required to maintain compliance with this permit.

4. Stormwater Management.

- a. Motiva shall manage stormwater on the IWL to minimize the erosion of the cap and prevent the run-off of sediments. Motiva shall provide for, and maintain a permanent, long-lived vegetative cover on the IWL. Motiva shall prevent the accumulation of standing water on the Landfill. Motiva shall properly maintain stormwater conveyances on and around the IWL.
- b. Until the IWL has been in the post-closure care period for 12 months, Motiva shall inspect stormwater controls on and around the landfill at least once each month and after a rainfall of 1 inch or more in a 24 hour period. After that, Motiva shall inspect the stormwater controls at least quarterly, and immediately after a rainfall of 2 inches or more in a 24 hour period. Motiva shall document observations made during the inspection using a form acceptable to the Department and shall promptly correct all deficiencies required to maintain compliance with this permit.

5. Leachate Management.

- a. Motiva shall operate, protect and maintain the leachate collection/detection system, including all pumps, flow meters, recording devices, sample ports, cleanouts and force mains.
- b. Motiva shall operate the leachate collection system to maintain less than 12 inches of head on the liner. Motiva shall measure leachate head in a location acceptable to the Department following written procedures approved by the Department.
- c. The action leakage rate (ALR) for the leak detection system in the IWL is 11,200 gallons per week (7 days), and Motiva shall operate and maintain the leachate collection system so as to not exceed this leakage rate. The Department may require additional corrective measures in the event that flow rates in the leak detection system exceed the ALR after the final cover system has been in place for 24 months or if there is an indication of a contaminant release.
- d. Motiva shall notify the Department within 3 days of discovering inoperable pumps or flow meters and shall provide a schedule for repair or replacement via email at that time. Unless otherwise approved by the Department, Motiva shall repair or replace inoperable pumps or flow meters within 14 days of discovery.
- e. If damage to a leachate conveyance pipe is discovered, Motiva shall immediately cease using that line and complete repairs within 14 days of discovery.
- f. Motiva shall clean-up all leachate spills immediately.
- g. Until the leakage rates are below the ALR for 12 consecutive months, Motiva shall continue to inspect the all pumps, recording devices, flow meters, cleanouts,

and force mains at least once each week to ensure proper functioning and to record flows. Motiva shall document observations made during each inspection using a form acceptable to the Department. Motiva may reduce these inspections to once each month only after formal written concurrence from the Department.

- h. Motiva shall ensure that leachate collection pipes are inspected and cleaned once every two years. Motiva shall identify, assess and report all blockages encountered and shall identify any areas found to be inaccessible during the biennial inspections and cleanings. Motiva shall document the results of the inspection and cleaning and provide a written assessment in the Annual Post-Closure Care Report required by section IV.A.3 of this permit.

6. Pollution Control.

- a. Motiva shall take all necessary precautions to identify and prevent the discharge of pollutants from the IWL into surface water.
- b. Motiva shall take all practical steps to prevent leachate from contaminating surface water, including stormwater ponds and conveyances located off the lined areas of the landfill.
- c. Motiva shall inspect the IWL and adjacent stormwater channels for leachate at least once each month. Motiva shall document observations made during these inspections using a form acceptable to the Department.
- d. Motiva shall manage any surface water contaminated with leachate as wastewater. If leachate is found to be contaminating surface water, Motiva shall report this in accordance with section IV.C of this permit and shall initiate immediate corrective measures to stop the contamination and to manage the contaminated surface water as landfill wastewater. Motiva shall also initiate additional environmental sampling in accordance with section III.B.2 of this permit.
- e. In the event leachate is found to be contaminating surface water, Motiva shall conduct and record daily visual inspections of impacted/potentially impacted surface waters until they have completed the necessary corrective measures to remove the wastewater and prevent further contamination.

7. Maintenance and Preservation of Monitoring Wells.

- a. Motiva shall preserve and maintain all groundwater monitoring wells required by this permit. Motiva shall replace any well that can no longer be used to provide monitoring data required by this permit. Replacement and abandonment of groundwater monitoring wells shall be done in accordance with the applicable Delaware regulations.
- b. Motiva shall inspect each monitoring well at least once per quarter. Motiva shall

document observations made during the inspections using a form acceptable to the Department and shall promptly correct all deficiencies required to maintain compliance with this permit.

8. Litter.
 - a. Motiva shall provide for litter removal and general cleanliness of the entire IWL site during the post-closure care period.
 - b. Motiva shall inspect the IWL including its stormwater channels and on-site roads for litter at least quarterly. During each inspection, Motiva shall document observations and deficiencies using a form acceptable to the Department.
9. Odor.
 - a. Motiva shall maintain the landfill cap to prevent the generation and escape of landfill odors. Motiva shall control malodorous gaseous emissions from the landfill to the extent that there is no perceivable landfill odor beyond the property boundary.
 - b. Motiva shall inspect the IWL for landfill gas odors at least quarterly. During each inspection, Motiva shall document observations and deficiencies using a form acceptable to the Department.
- B. Motiva shall continue to monitor leachate in accordance with section III.A of this permit.
- C. Motiva shall continue to monitor groundwater in accordance with section III.C of this permit.
- D. If at any time during the post-closure care period there is evidence of a contaminant release from the IWL that presents a significant threat to human health or the environment, Motiva shall take action to mitigate the threat.
- E. Motiva shall not allow the disposal of solid wastes at the IWL during the post-closure care period. Disposal of solid waste at the IWL is strictly prohibited.
- F. Unless approved in advance by the Department or allowed by this permit, no activity shall be conducted on the IWL during the post-closure care period.
- G. Throughout the post-closure care period, Motiva shall provide a representative authorized to act on the behalf of the company in regulatory discussions or other matters arising from administration of this permit and who can act as the point of contact for emergencies involving the site. Motiva shall provide this information (the Post-Closure Contact Information) to the Department and to the owners of the Delaware City Refinery and report any changes to contact information within 10 business days. The information must include the person's name, title, phone number, email address, geographical address, and mailing address.

- H. Throughout the post-closure care period, Motiva shall maintain financial assurance for all remaining post-closure care obligations for the IWL in accordance with the requirements of the DRGSW. Motiva shall not use financial tests and guarantees for assuring funds for the IWL post-closure period or for corrective actions. Motiva shall provide proof of financial assurance annually in accordance with the requirements of section IV.A.1 of this permit.

VIII. Evaluating, Optimizing, or Ending Post-Closure Care

- A. Duration of Permit: Once issued, this permit shall remain valid and enforceable throughout the post-closure care period (reference DRGSW, section 6.11.1).
- B. At any time during the post-closure care period, the Department may reduce or eliminate any post-closure care permit requirements if Motiva can demonstrate that the requirement is no longer necessary for the protection of human health and the environment. The Permittees may request the reduction or elimination of specific permit requirements after completing a performance-based evaluation. Performance-based evaluations shall include data review, a discussion of the proposed change and the anticipated impacts, as well as a plan to evaluate the impacts resulting from the proposed change or termination.
- C. Requirements for Ending Post-Closure Care:
 - 1. Prior to the termination of the post-closure care period for the IWL, Motiva shall provide an Environmental Covenant to the Department for its review. The Environmental Covenant shall be prepared in accordance with section 6.11.5 of the DRGSW and the requirements of Delaware Code Title 7, Chapter 79, Subchapter II, and Motiva shall record the Environmental Covenant within 60 days of the Department's concurrence.
 - 2. Prior to the termination of the 30-year post-closure care permit, Motiva shall provide performance-based evaluations of each landfill control system. Performance-based evaluations shall include data review, a discussion of the proposed change and the anticipated impacts, as well as a plan to evaluate the impacts resulting from the proposed change or termination. Landfill control systems include those systems that manage leachate and landfill gas; that protect and monitor groundwater, stormwater, and landfill stability; and that provide for cap protection and maintenance.

Permit Synopsis

February 27, 2004: Permit SW-04/01 was issued to replace Permit SW-95/05. This permit regulates, in accordance with the *Delaware Regulations Governing Solid Waste*, Motiva Enterprises LLC's Industrial Waste Landfill on their property at 2000 Wrangle Hill Road, Delaware City, Delaware.

June 22, 2010: The permit was modified to add section III.C.3, monitoring, sampling and managing stormwater on the temporary surface cover of the landfill. A typographical error was corrected in section III.B.2.b, and the name of *Delaware Regulations Governing the Construction and Use of Wells* was corrected in section III.D. This permit modification is considered minor in accordance with section 4.1.7.4 of the *Delaware Regulations Governing Solid Waste*

May 11, 2011: The permit was modified to include closure and post-closure care requirements for the IWL. This permit modification is considered a major permit modification in accordance with section 4.1.7.3 of the *Delaware Regulations Governing Solid Waste*.

NCM:RH:tcg
Motiva/Solid Waste Files/Permits/RH11010IWL.doc