Attachment 5
Closure Plan

A11 - CLOSURE AND POSTCLOSURE CARE PLANS

The administrative rules promulgated pursuant to Part 111, Hazardous Waste Management, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, (Act 451), R 299.9613 and Title 40 of the Code of Federal Regulations (CFR), Part 264, Subpart G, establishes requirements for the closure and, if necessary, postclosure care of hazardous waste management facilities. All references to 40 CFR citations specified herein are adopted by reference in R 299.11003. This license application template addresses requirements for the proper closure and, if necessary, postclosure care of the hazardous waste management units and the hazardous waste management facility for Petro-Chem in *Detroit*, Michigan. The information provided in this template was used to prepare the closure and postclosure care cost estimate provided in Template A12, "Closure and Postclosure Care Cost Estimates."

This template is organized as follows:

A11.A CLOSURE PLAN

A11.A.1 Closure Performance Standard

[R 299.961**3** and 40 CFR §264.111]

This Closure Plan is designed to ensure that the facility will be closed in a manner that achieves the following:

a. Minimizes the need for further maintenance; and

b. Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, postclosure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition byproducts to the groundwater, surface water, or atmosphere; and, as applicable

c. Complies with the unit-specific closure requirements for each of the following units:

☒ Use and management of containers R 299.9614 and 40 CFR 5264.178

☐ Tank systems R 299.9615 and 40 CFR 5264.197

A11.A.2 Unit-Specific Information
[R 299.9613 and 40 CFR §§264.112(b)(3) and (6)]

Table A11.A.1 Hazardous Waste Management Units Information

The following table identifies each hazardous waste management unit at the Petro-Chem facility subject to the closure requirements of this hazardous waste management facility operating license. The table also includes: each unit's maximum licensed hazardous waste inventory, a list of the waste codes managed in the unit, the anticipated date of closure (if known), and the estimated duration of closure activities once closure begins. Unit-specific methods for closure and detailed schedules are discussed in Section 11A.5 of this template.

Unit Designation	Maximum Inventory (Include Units)	Waste Codes of Hazardous Wastes Managed	Scheduled Closure Date
CMB Storage Areas	3,304 drums	See Appendix 1	Unknown
Container Staging/QC	392 drums	See Appendix 1	Unknown
Pumping Room	106 drums	See Appendix 2	Unknown
Lab Pack Area	86 drums	See Appendix 1	Unknown
CMB TK 001	6,000 gallons	See Appendix 2	Unknown
CMB TK 002	6,000 gallons	See Appendix 2	Unknown
Tank System 1	420,000 gal.	See Appendix 2	Unknown
Tank System 2	168,000 gal.	See Appendix 2	Unknown
Tank System 3	180,000 gal.	See Appendix 2	Unknown
1st Floor Operations (North Storage)	700 drums	See Appendix 1	Unknown

Unit Designation	Maximum Inventory (Include Units)	Waste Codes of Hazardous Wastes Managed	Scheduled Closure Date
Drum Dock 2	294 drums	N/A	Unknown
Drum Dock 3 (Truck Well)	300 drums	See Appendix 1	Unknown
Drum Dock 4 (Truck Well)	352 drums	See Appendix 1	Unknown
SBS Tote Storage Building	655 drums	See Appendix 1	Unknown
SBS Dock Storage Area	600 drums	See Appendix 1	Unknown
SBS Solids Area	147 drums	See Appendix 1	Unknown
72 Hr Truck Staging Pad	363 drums	See Appendix 1	Unknown

* drum = 55 gallon capacity

A11.A.3 Schedule of Final Facility Closure
[R 299.9613 and 40 CFR §264.112(b)(6)]

The Petro-Chem facility:

☐ Has not determined when the facility will close and does not anticipate completing final closure of the entire facility prior to expiration of the facility's hazardous waste operating license.

Closure Activity	Time Completed
Initiate Closure; Cease Acceptance of Waste	Immediate
Process Containers in Storage Areas or transfer compatible waste to tank systems	1 Week
Transfer other containers off-site for disposallrecycling	6 Weeks
Transfer bulk wastes off-site to cement kilnlincinerator	6 Weeks
Decontaminate and Remove Equipment in Pump Room	1 Week

Closure Activity	Time Completed
Decontaminate and Remove Equipment in Lab Pack Room	1 Week
Decontaminate Pumping Room	1 Week
Decontaminate Surfaces in Container Storage	2 Weeks
Decontaminate and Remove Pumps, Piping and Other Equipment	8 Weeks
Decontaminate and Remove Tanks	6 Weeks
Decontaminate Containment Area Surfaces	7 Weeks
Sample Containment Area Surfaces	2 Weeks
Obtain P. E. Certification of Closure Performance	7 Weeks
Prepare and Submit Closure Report to MDNRE	9 Weeks

A11.A.4 Notification and Time Allowed for Closure
[R 299.9613 and 40 CFR §§264.112(d)(2) and 264.113(a) and (b)]

Final closure activities will be initiated within 90 days of receipt of the final volume of hazardous wastes and completed within 180 days of receipt of the final volume of waste. The tasks and estimated time required for partial closure shall follow the schedule specified in Section 11A.3. The Director will be notified by the Petro-Chem facility 60 days before final closure begins. Final closure will be certified by both the Petro-Chem facility and an independent, qualified, registered professional engineer of the state of Michigan.

A11.A.4(a) Extensions for Closure Time
[R 299.9613 and 40 CFR §264.113(a) and (b)]

In the event that an extension for closure for the facility or any unit is necessary, the Petro-Chem facility will request an extension in accordance with the requirements of 40 CFR §264.113(a).

A11.A.5 Unit-Specific Closure Procedures

Unit-specific closure procedures are provided for each unit identified in Section A11.A.2 of this template.

A11.A.5(a) Closure of Container Storage Areas
[R 299.9614 and 40 CFR §264.178]

This section describes the procedures for closure of *all container storage areas.* The general closure requirement and specific closure procedures are discussed below.

A. General Closure Requirement

At closure, all hazardous waste and hazardous waste residues will be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues will be'decontaminated or removed.

B. Specific Closure Procedures

Specific procedures for inventory management, unit inspection, decontamination, sampling and analysis, and additional waste management are discussed below.

1. Inventory and Remedial Waste Management Procedures

   A physical inventory check of all containers in storage will be completed and verified with the Preview system. All lab pack and loose pack wastes will be depacked and consolidated as appropriate. All fuel type wastes will be blended into the appropriate Tank Systems for transportation off-site for energy recovery. All remaining containerized wastes will be shipped off-site for disposal and/or recycling.

2. Unit Inspection Procedures

   A detailed inspection of each containment pad and wall will be completed. The inspection will document the location of spills, contamination and migration pathways. A similar inspection of the exterior walls of each containment pad will also be documented

3. Decontamination Procedures

   After inventory removal, the container management unit floors will be decontaminated. A surface cleaning technique (hydroblasting) will be used to decontaminate the surfaces of the concrete floors. The wash water and debris from the treatment is collected and separated. The solid material is drummed for incineration or landfilling (in accordance with hazardous waste regulations), and the water is recycled or collected for eventual bulk transportation to a permitted RCRA facility for proper management. All waste shall be properly manifested, labeled, and shipped as required by hazardous waste regulations. These cleaning methods require a 3-man crew, high pressure pumps, and wash water holding tanks. Personnel operating the treatment equipment require additional personal protection equipment due to the inherent hazards in this cleaning method. Where appropriate, temporary run-off controls will be constructed to contain wash water.

   Following the surface treatment, a sample of the final water rinsate will be collected for analysis and comparison to the performance standards. In addition, concrete cores will be collected from the floors of the container management units. The samples will be collected at the density specified in the MDEQ guidance document, "Guidance Document for Verification of Soil Remediation", treating each unit as a "small site". Based on the square footage of each containment unit, the following numbers of sample locations are planned:

Container Management Unit	Approximate Area (sq. ft.)	Number of Samples
CMB Pump Room	2,430	5
Lab Pack Processing	2,500	6
Container Storage Buildings	19,900	15
SBS Container Storage Area	1,311	4
SBS Dock Storage	420	2
SBS Solids Area	512	2
Loading/Unloading Docks:		
Dock #2	3,300	7
Dock #3	770	3
Dock #4	1,400	4
TS1 Transfer Pad	1,720	5
TS2 Transfer Pad	2,440	6
TS3 Transfer Pad	1,300	4
TS4 Transfer Pad	2,720	6
72 Hr Truck Staging Pad	9,315	11

4. Sampling and Analysis Procedures

Sampling will be biased toward visibly stained locations, since these locations should represent the greatest possibility for discovering residual contamination. These cores will be analyzed for volatile organic compounds and semi-volatile organic compounds to demonstrate that the concrete has been decontaminated. The coring and sampling requires specialized equipment and a 2-man crew.

Soil samples will also be collected from beneath each of the concrete core locations using a stainless steel hand auger that will be decontaminated between sample locations. One sample will be collected from each location at the 0-1 foot depth below the concrete surface and transferred directly into appropriate containers and stored in ice packed coolers for transportation to the laboratory. Soil samples for VOC analysis will be preserved in the field with methanol per EPA Methods as stipulated in the MDEQ *Remediation and Redevelopment Division (RRD) Operational Memorandum No. 2.* The soil samples will be analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The results will be compared to the Generic Part 201 Cleanup Criteria. Any soils determined to be contaminated will be removed and

transported offsite to a treatment or disposal facility licensed to accept wastes described by the waste codes of the source of the contamination.

5. Additional Waste Management Procedures

Decontamination waste sand materials that cannot be decontaminated will be characterized, containerized and shipped off-site for disposal and/or recycling.

6. Other Control Procedures:

Prior to initiating decontamination procedures, the site will be 'prepped' to maintain run-on and run-off control. The facility connection to the Detroit sewer collection system will be closed to prevent unintended contaminated liquids to enter the system. All portable equipment to be decontaminated will be moved to an existing container management unit(s) prior to initiating the decontamination process to prevent run-off of rinsates. Plastic sheeting or other suitable barrier will be erected along the containment wall where necessary to contain any overspray within the secondary containment structure.

All portable/dismantled decontaminated equipment/structures will be moved to a decontaminated bermed containment area away from the decontamination areas to prevent run-on of contaminated liquid. All sheeting will be containerized and transported off-site as a hazardous waste. All barriers utilized will be decontaminated and transported off-site to a metal recycler or solid waste disposal facility.

The groundwater monitoring wells will be sampled prior to initiating the closure activities and following completion of all closure activities. The samples will be tested as per the Facility's approved groundwater monitoring program.

A11.A.5(b) Closure of Tank Systems
[R 299.9615 and 40 CFR §264.197]

This section describes the procedures for closure of *all tank systems*. The general closure requirement and specific closure procedures are discussed below,

A. General Closure Requirement

At closure of the tank system, the Petro-Chem facility will remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless 40 CFR §264.3(d) applies. If the Petro-Chem facility demonstrates that not all contaminated soils can be practicably removed or decontaminated, then the tank system will be managed in accordance with the closure and postclosure care requirements that apply to landfills.

B. Specific Closure Procedures

Specific procedures for inventory management, unit inspection, decontamination, sampling and analysis, and additional waste management are discussed below.

1. Inventory and Remedial Waste Management Procedures

   All flowable wastes from each tank and piping system will be transported off-site for energy recovery or incineration. Stormwater collected from the containment will be tested for possible pretreatment and discharge to the Detroit sewer collection system.

2. Unit Inspection Procedures

   A detailed inspection of each containment pad and wall will be completed. The inspection will document the location of spills, contamination and migration pathways. A similar inspection of the exterior walls of each containment pad will also be documented

3. Decontamination Procedures

   Tanks and associated piping will then be flushed with appropriate compatible cleaning solutions to reduce any liquid, solid or clinging waste residues. The resulting residues will either be collected into tanks with other compatible wastes and sent to a suitably permitted recycling facility, or transported off site to authorized facilities for reclamation, treatment and/or disposal at other authorized facilities consistent with the treatment standards for the hazardous or toxic constituents of the waste.

   The piping systems will then be detached from the tank. Specific components of the piping system may be reused in place or in similar service upon decontamination. The remaining components of the piping system will then either be decontaminated on site utilizing methods described in Table 1 of 40 CFR 268.45, using other appropriate decontamination methods, or transported off site for treatment and/or disposal. Residues of the decontamination will be collected either into on-site tankage or into containers for off site transfer for reclamation, treatment and/or disposal at authorized facilities based upon the treatment standards for the waste and its hazardous or toxic constituents. Piping system equipment not reused onsite or decontaminated to the requirements of this plan will be placed into containers and transported offsite to an authorized facility for reclamation, treatment and/or disposal.

   After removal of the tanks, piping, and auxiliary equipment, and before decontamination, the concrete containment structures will be visually inspected to identify any cracks, gaps, spills, stains, or damaged areas which may be present. This visual inspection will be documented in the Closure Certification with notations of any identified problems. Any cracks, gaps, or damaged areas with the potential to provide leakage pathways will be temporarily repaired by grouting or sealing before decontamination is performed in order to prevent potential release of contamination into the underlying soils. These temporarily repaired areas will be examined and sampled following decontamination.

   The secondary containment pads will be decontaminated using the same method for the container storage areas after all equipment and tanks have been removed.

   Contaminated equipment attached directly to the tanks may be reused on site on other tanks containing compatible wastes after decontamination. Tank interiors may be decontaminated by methods described in Table 1 of 40 CFR 268.45, or by appropriate washing using detergents compatible with the hazardous or toxic constituents. These operations will be performed within containment to prevent migration of hazardous

constituents to other tanks or structures or the environment. Tanks and attached equipment not decontaminated to the requirements of this plan will be rendered unusable by cutting into pieces and/or collapsing. The material will then be containerized, and transported off site for reclamation, treatment, storage or disposal at an authorized facility based upon the treatment standards for the hazardous waste or hazardous or toxic constituents. Decontaminated tanks may be returned to nonregulated service, be transferred off site for reuse, or be rendered unusable and transported off site for reclamation or disposal.

Waste residues will be removed from tanks and appurtenances by flushing and steam cleaning. Steam cleaning is a proven technique for decontaminating surfaces and mobilizing heavier liquids. Because the high operating temperatures may vaporize some volatile constituents, appropriate safety precautions (ventilation, vapor masks) and vapor recovery may be employed. The steam condensate will be collected for eventual transportation to a permitted RCRA facility. A sample of the final rinsate for each tank management unit will be retained for comparison to the performance standards.

At the time of closure, a determination will be made if the equipment will be sold for reuse or for scrap. If the equipment is destined for scrap, the tanks and appurtenances will be dismantled and cut up using appropriate cutting equipment. The dismantled equipment will be sold for scrap, although this potential benefit was not considered in the closure cost. At the time of closure, a scrap company will be selected and certifications will be obtained from the scrap dealer to verify that the equipment and materials have been appropriately recycled.

4. Sampling and Analysis Procedures

Sampling will be biased toward visibly stained locations, since these locations should represent the greatest possibility for discovering residual contamination. These cores will be analyzed for volatile organic compounds and semi-volatile organic compounds to demonstrate that the concrete has been decontaminated. The coring and sampling requires specialized equipment and a 2-man crew.

Soil samples will also be collected from beneath each of the concrete core locations using a stainless steel hand auger that will be decontaminated between sample locations. One sample will be collected from each location at the 0-1 foot depth below the concrete surface and transferred directly into appropriate containers and stored in ice packed coolers for transportation to the laboratory. Soil samples for VOC analysis. will be preserved in the field with methanol per EPA Methods as stipulated in the *MDEQ Remediation and Redevelopment Division (RRD) Operational Memorandum No. 2.* The soil samples will be analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The results will be compared to the Generic Part 201 Cleanup Criteria. Any soils determined to be contaminated will be removed and transported offsite to a treatment or disposal facility licensed to accept wastes described by the waste codes of the source of the contamination.

Any concrete to be removed will be broken up using dust suppression techniques such as water spray. Soils will be removed using normal construction equipment, including front end loaders and back hoes, and loaded into transportation vehicles until sampling and analysis, as described in demonstrates conformance with the closure performance standard. Spilled material will be manually cleaned up and returned to the loaded vehicles.

Equipment used to perform the decontamination, that has had contact with contaminated surfaces or soils, will be decontaminated in a manner to prevent the spread of hazardous waste and constituents. Tools, hoses and small equipment will be washed with water and detergents, and rinsed with water, inside containers to remove visible residues and soil. A temporary steel or plastic lined containment area will be installed to decontaminate large equipment, using water/detergent spray and water rinse until visible soils and residues are removed. The used wash and rinse waters will be collected into containers, tanks, or directly into transportation vehicles, and transported offsite treatment facilities licensed to accept the codes applicable to the waste contaminating the soil or debris.

The procedures used to remove waste residues from the Container Management Units will be used in the Tank Management Units. Following the concrete surface treatment, concrete cores will be collected from the floor of each tank management unit according to the following table.

Tank Management Unit	**Approximate Area (sq. ft.)**	**Number of Samples**
Tank System 1 *(PCPG West Tank Farm)*	6,510	8
Tank System 2 *(formerly* SBS *Tank Farm)*	3,900	6
Tank System 3 *(formerly* SDG *Waste Tank Farm)*	2,955	6
CMB Tanks 1 & 2	900	3

A11.A.6 Certification of Closure
[R 299.9613]

Within 60 days of completion of closure Petro-Chem will submit to the Director, by registered mail, a certification that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications in the approved closure plan. The certification will be signed by Petro-Chem and by an independent registered professional engineer. Documentation supporting the independent registered engineer's certification will be furnished to the Director in accordance with R 299.9613(3), including:

1. The results of all sampling and analysis;
2. Sampling and analysis procedures;
3. A map showing the location where samples were obtained;
4. Any statistical evaluations of sampling data;
5. A summary of waste types and quantities removed from the site and the destination of these wastes; and
6. If soil has been excavated, the final depth and elevation of the excavation and a description of the fill material used.

The Petro-Chem facility will maintain financial assurance for closure until the Director releases the Petro-Chem facility from the financial assurance requirements for closure under R 299.9703.

The certification must be worded as follows:
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A11.A.7 Postclosure Notices Filed
[R 299.9504(1)(c) and R 299.9508(1)(b) and 40 CFR, Section 270.14(b)(14)]

The applicant must provide documentation that the postclosure notices required under 40 CFR §264.119 have been filed for hazardous waste disposal units that have been closed at the facility.

A11.B POSTCLOSURE PLAN
[R 299.9613 and 40 CFR, Section 264.118]

A11.B.1 Applicability

Not applicable: Hazardous waste will not be left behind at closure. A survey plat, postclosure care, postclosure certifications, and other notices are not required.

APPENDIX I

Container Storage Waste Codes

Appendix I - US EPA Michigan Waste Codes

D001	F012	K046	K151	P050	P119	U033	U091	U148	U206	001K
D002	F019	K048	K156	P051	P120	U034	U092	U149	U207	002K
D003	F024	K049	K157	P054	P121	U035	U093	U150	U208	
D004	F025	K050	K158	P056	P122	U036	U094	U151	U209	001U
D005	F032	K051	K159	P057	P123	U037	U095	U152	U210	033U
D006	F034	K052	K161	P058	P127	U038	U096	U153	U211	070U
D007	F035	K060	K169	P059	P128	U039	U097	U154	U213	074U
D008	F037	K061	K170	P060	P185	U041	U098	U155	U214	124U
D009	F038	K062	K171	P062	P188	U042	U099	U156	U215	131U
D010	F039	K069	K172	P063	P189	U043	U101	U157	U216	139U
D011		K071	K176	P064	P190	U044	U102	U158	U217	150U
D012	K001	K073	P001	P065	P191	U045	U103	U159	U218	
D013	K002	K083	P002	P066	P192	U046	U105	U160	U219	
D014	K003	K084	P003	P067	P194	U047	U106	U161	U220	
D015	K004	K085	P004	P068	P196	U048	U107	U162	U221	
D016	K005	K086	P005	P069	P197	U049	U108	U163	U222	
D017	K006	K087	P006	P070	P198	U050	U109	U164	U223	
D018	K007	K088	P007	P071	P199	U051	U110	U165	U225	
D019	K008	K093	P008	P072	P201	U052	U111	U166	U226	
D020	K009	K094	P009	P073	P202	U053	U112	U167	U227	
D021	K010	K095	P010	P074	P203	U055	U113	U168	U228	
D022	K011	K096	P011	P075	P204	U056	U114	U169	U234	
D023	K013	K097	P012	P076	P205	U057	U115	U170	U235	
D024	K014	K098	PO13	P077		U058	U116	U171	U236	
D025	K015	K099	P014	P078	U001	U059	U117	U172	U237	
D026	K016	K100	PO15	P081	U002	U060	U118	U173	U238	
D027	K017	K101	P016	P082	U003	U061	U119	U174	U239	
D028	K018	K102	PO17	P084	U004	U062	U120	U176	U240	
D029	K019	K103	PO18	P085	U005	U063	U121	U177	U243	
D030	K020	K104	P020	P087	U006	U064	U122	U178	U244	
D031	K021	K105	P021	P088	U007	U066	U123	U179	U246	
D032	K022	K106	P022	P089	U008	U067	U124	U180	U247	
D033	K023	K111	P023	P092	U009	U068	U125	U181	U248	
D034	K024	K112	P024	P093	U010	U069	U126	U182	U249	
D035	K025	K113	P026	P094	U011	U070	U127	U183	U271	
D036	K026	K114	P027	P095	U012	U071	U128	U184	U277	
D037	K027	K115	P028	P097	U014	U072	U129	U185	U278	
D038	K028	K116	P029	P098	U015	U073	U130	U186	U279	
D039	K029	K117	P030	P099	U016	U074	U131	U187	U280	
D040	K030	K118	P033	P101	U017	U075	U132	U188	U328	
D041	K031	K123	P034	P102	U018	U076	U133	U189	U353	
D042	K032	K124	P036	P103	U019	U077	U134	U190	U359	
D043	K033	K125	P037	P104	U020	U078	U135	U191	U364	
	K034	K126	P038	P105	U021	U079	U136	U192	U367	
F001	K035	K132	P039	P106	U022	U080	U137	U193	U372	
F002	K036	K136	P040	P108	U023	U081	U138	U194	U373	
F003	K037	K141	P041	P109	U024	U082	U140	U196	U387	
F004	K038	K142	P042	P110	U025	U083	U141	U197	U389	
F005	K039	K143	P043	P111	U026	U084	U142	U200	U394	
F006	K040	K144	P044	P112	U027	U085	U143	U201	U395	
F007	K041	K145	P045	P113	U028	U086	U144	U202	U404	
F008	K042	K147	P046	P114	U029	U087	U145	U203	U409	
F009	K043	K148	P047	P115	U030	U088	U146	U204	U410	
F010	K044	K149	P048	P116	U031	U089	U147	U205	U411	
F011	K045	K150	P049	P118	U032	U090				

APPENDIX II

Tank Systems Waste Codes

Appendix 2 - US EPA Waste Codes - Tank System Waste Codes

D001	U001
D002	U002
D004	U031
D005	U031
D006	U056
D007	U125
D008	U154
D009	U140
D010	U009
D011	U220
D018	U239
D019	
D021	
D022	
D023	
D024	
D025	
D026	
D027	
D028	
D029	
D035	
D036	
D037	
D038	
D039	
D040	
D041	
D042	
D043	

F001
F002
F003
F004
F005