HYDRODEC OF NORTH AMERICA, LLC

PCB Disposal by Non-Thermal Alternative Methods

June 16, 2017

PCB ALTERNATIVE TREATMENT PERMIT APPLICATION

PCB TREATMENT BY NON-THERMAL ALTERNATIVE METHODS
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SECTION 2 – Summary

Hydrodec of North America, LLC is submitting this application for an EPA Region 5 Operating Approval (renewal) under the Toxic Substances Control Act (TSCA) Section 761.60(e) for their non-thermal PCB destruction and hydro-treating of used transformer oil. Hydrodec separates PCBs from PCB-contaminated transformer oil by heating the contaminated material and passing the oil through two beds of catalyst with a scavenger gas to pull and break the PCB bonds. The system does not incinerate the PCBs but does destroy them on a molecular level.

This permit application follows the "Draft Guidelines for Permit Applications and Demonstration Test Plans for PCB Disposal by Non-Thermal Alternative Methods," (U.S. EPA, OTS, August 21, 1986). This application also includes a Demonstration Test Plan under separate cover.

The Hydrodec process can be classified as a "molecular separation" and is designated as "non-thermal" PCB disposal methods. Corresponding to these designations, the relevant performance standards for Hydrodec are:

- PCB equivalent "destruction and removal efficiency" (DRE) of greater than 99.9999% for the process, based on PCBs fed into the reactor and the PCBs released from the reactor
- The PCB level must be reduced to 1 ppm for it to be considered treated
- The spent filters and other by-products (except wastewater) must contain less than 2 ppm PCBs or be treated as though they contain the highest concentration amount of PCBs in the feed material
- Aqueous waste generated must contain less than 0.5 µg/l (ppb) PCBs for unrestricted use, or less than 3 ppb for discharge to a POTW or NPDES outfall, or be managed as though it contains the highest concentration of PCBs in feed material
- The process must be safe, and result in no adverse impact on either the public, employees or environment

The first Demonstration Test was completed at the Canton, Ohio site in October, 2009 and a second Demonstration Test was completed at the Canton, Ohio site in September 2016.

The Hydrodec "molecular separation" process possesses a unique combination of features that allow it to exceed other units used in the "re-refining" of used transformer oil. This permit application will therefore address both the non-thermal destruction of PCBs and the re-use of used naphthenic transformer oil.

Many used transformers have detectable amounts of PCB transformer oil in them. It has been demonstrated by Hydrodec that used transformer oil that contain PCBs can successfully be treated within Hydrodec's non-thermal treatment facility. It has also been demonstrated that the molecular destruction of the PCBs are broken down in the beginning of the process and not passed onto water washes or vented through any emission sources.

The Hydrodec site in Canton, Ohio has 3 skid mounted plants with 2 reactors per plant. The design production rate of re-refined transformer oil is 750 Kg/hr per reactor. PCB oil can be treated in either reactor of Plant 3. The production rate is not affected by the presence of PCB contaminated transformer oil in any amount. **[The current Authorization sets the flow parameter to 640 Kg/hr. We plan to prove that the technology is effective at 750 Kg/hr and request that the flow parameter be changed accordingly in the Authorization.]**

The Hydrodec system consists of two main parts: (a) the primary thermal unit (i.e. heater); and (b) the reactor. The heater is used to raise the temperature of the feed oil prior to going into the reactor. The oil is heated indirectly using a series of columns that are electric fed. The reactor consists of an upper and lower bed of catalyst that the oil passes through. This heated oil comes into contact with a "scavenger" that aids in the separation of PCB's and the oxidized characteristics of the oil as it passes through the catalyst beds, which remove impurities of the oil.

In summary, the "molecular separation" is not PCB incinerations. It is a system that thermally and chemically separates PCB's and other organic compounds from contaminated naphthenic transformer oil.

The following sections of this application fully describe the system and its supporting facility and present the procedures that will be followed in operating the system.

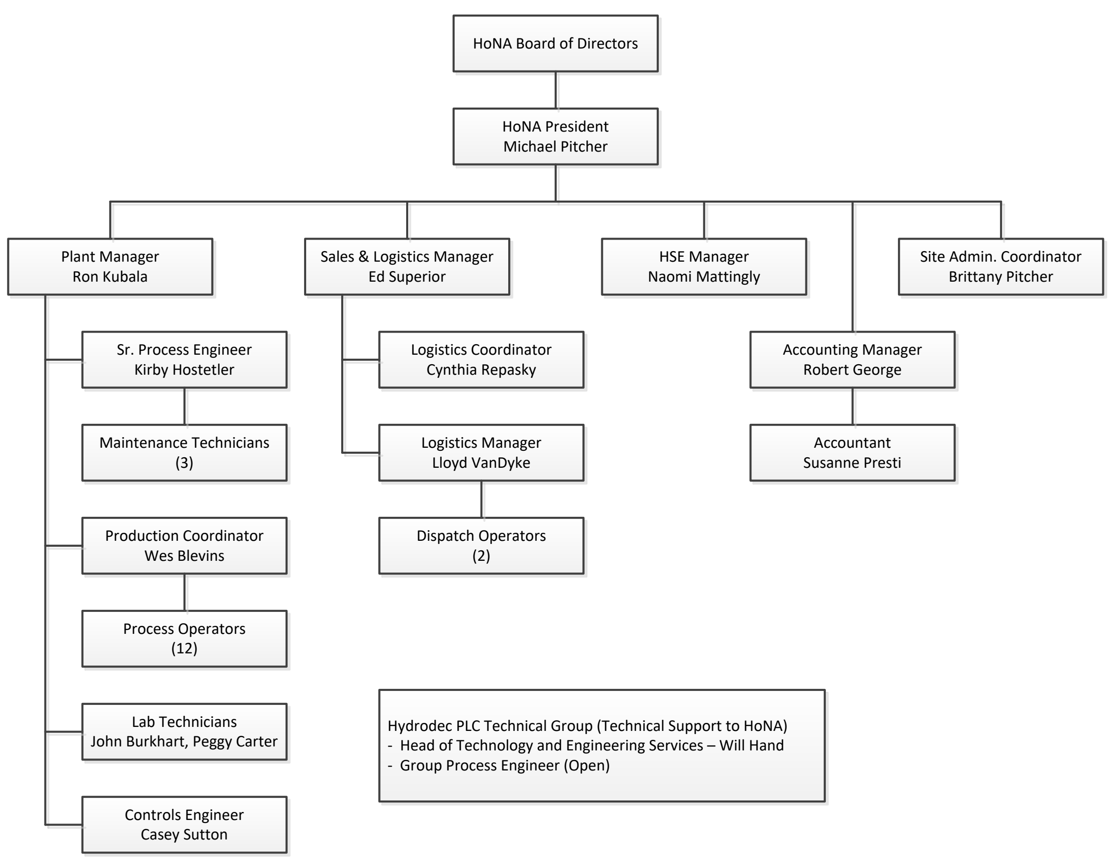
SECTION 3 – Project Organization

The Hydrodec facility has qualified operating staff of sufficient type, number and experience to adequately meet the demands of safely processing PCB contaminated transformer oil. All Hydrodec equipment is operated by Hydrodec personnel, with supplemental staffing from qualified subcontractors such as laboratories, remedial service contractors or technical contractors. Figure 3-1 provides the organizational chart for Hydrodec of North America, LLC.

Hydrodec has authorized the Plant Manager and the Production Coordinator to have overall responsibility for the process. The Senior Process Engineer is the lead resource for the unit, and is the principal technical resource for the unit. The Plant Manager, Production Coordinator and the Senior Process Engineer will review all test plans, operating data and any design changes that may be incorporated to improve the operation of the system. Normal operation of the system uses one Inside Operator and two Outside Operators per shift, who are supervised by the Production Coordinator. The Production Coordinator will have responsibility for the day-to-day operations, monitoring, recordkeeping, reporting, equipment maintenance, and personnel on-job training. The production Coordinator may also perform the duties of the Inside or Outside Operators to provide coverage for scheduled work breaks. All Plant Operators have environmental treatment equipment and chemical plant operation experience. These personnel are thoroughly trained by Hydrodec in operating the system, in the use of appropriate personal protective equipment, and in Hydrodec safety procedures.

The Quality Control Manager, Health, Safety & Environmental Manager, Controls Engineer, and Laboratory Technicians provide support services for operating the facility.

Figure 3.1 Hydrodec of North America, LLC Organization Chart



Project Team Member Assignment Description

The following is a brief description of the roles and responsibilities of our key team members. All field personnel will meet the minimum safety training requirements of the OSHA 1910.120 Hazardous Waste Operations and Emergency Response (HAZWHOPER) training standard, in addition to the information provided below.

Plant Manager, Ron Kubala

Mr. Kubala is responsible for numerous operational and oversight functions in the Hydrodec manufacturing operation. He provides interface between the site operations personnel, technology providers and various regulatory agencies. Mr. Kubala is a degreed chemical engineer and has over 35 years of engineering and plant management experience in the chemical industry, including 4 years treating PCB-containing transformer oil.

Senior Process Engineer/Maintenance Coordinator, Kirby Hostetler

Mr. Hostetler has a degree in Chemical Engineering and has worked at various levels in the chemical processing industry for 20 years. Mr. Hostetler verifies that the operating, monitoring, sampling, and record keeping plans are being followed. He performs periodic reviews of the data generated and is capable of understanding and critically evaluating these data. He has the authorization of management to stop or request alterations to the operation if the data quality is not acceptable. He manages capital improvement projects, utilizing in house and outside contractors. Mr. Hostetler has been involved in mechanical integrity and preventative maintenance during his career. He directs maintenance on the site such as; implementing preventative maintenance procedures, repairing equipment, welding, spare part procurement, and electrical maintenance. He also supervises specialty service contractors such as instrument calibration technicians, manufacturer's representatives, and other specialty services.

Production Coordinator, Wes Blevins

Mr. Blevins has been involved in chemical processing for 8 years with 4 years as an operator and 4 years as the Production Coordinator for Hydrodec. He is capable of independent plant operation and collection of process samples according to the approved sampling and analysis plan. He provides support, organization and guidance to operations. He also aids in the diagnostics and troubleshooting of the process and its support functions.

HSE Manager, Naomi Mattingly

The HSE Manager is responsible for regulatory compliance on the project. The HSE Manager continues to maintain contact with the operation to assure that the regulatory requirements are being met according to the plans and permits. Ms. Mattingly has an Associates Degree in Applied Science, Environmental Health and Safety Management and has been working in the environmental and safety field for over 15 years. She is an active member of the Stark County Safety Council and recently completed a PCB Management & Record Keeping Workshop..

William Hand (Quality Manager): Mr. Hand is a Chemist with 15 years of experience in the sampling and analysis of transformer oils, and over 10 years of experience in PCB destruction technology. He is also a member of the ASTM committee responsible for development and maintenance of Standard test methods for PCB analysis.

Onsite Laboratory, John Burkhart and Peggy Carter

Mr. Burkhart has been involved in laboratory analyses for 14 years. He has worked as a Laboratory Technician at Hydrodec for the last 7 years. Mrs. Carter has a BS in Chemistry and an MA in Business-Organizational Development. She has over 35 years experience as a chemist and has been a Laboratory Technician at Hydrodec since 2011. PCB analyses are performed in accord with the principles of ASTM D4059. Other analytical procedures are also performed using consensus methods from SW-846, EPA Methods, ASTM, or similar reference standards.

SECTION 4 – Process Engineering Description

4.1 General Description

The Hydrodec technology was developed specifically for the purpose of refining used oils and organic chemicals. It is as near to a closed loop near zero emission process for the complete treatment of PCBs as is available in the world at this point in time. The Canton facility consists of six reactor trains. The following provides a description of the Hydrodec process as it flows through one of these trains. Figure 4-1 provides a Process Flow diagram of the Hydrodec process as it applies to Plant 3. Figure 4-2 shows the relative location of Plant 3 within the main process building designated as Building F.

Figure 4-1
Process Flow Diagram

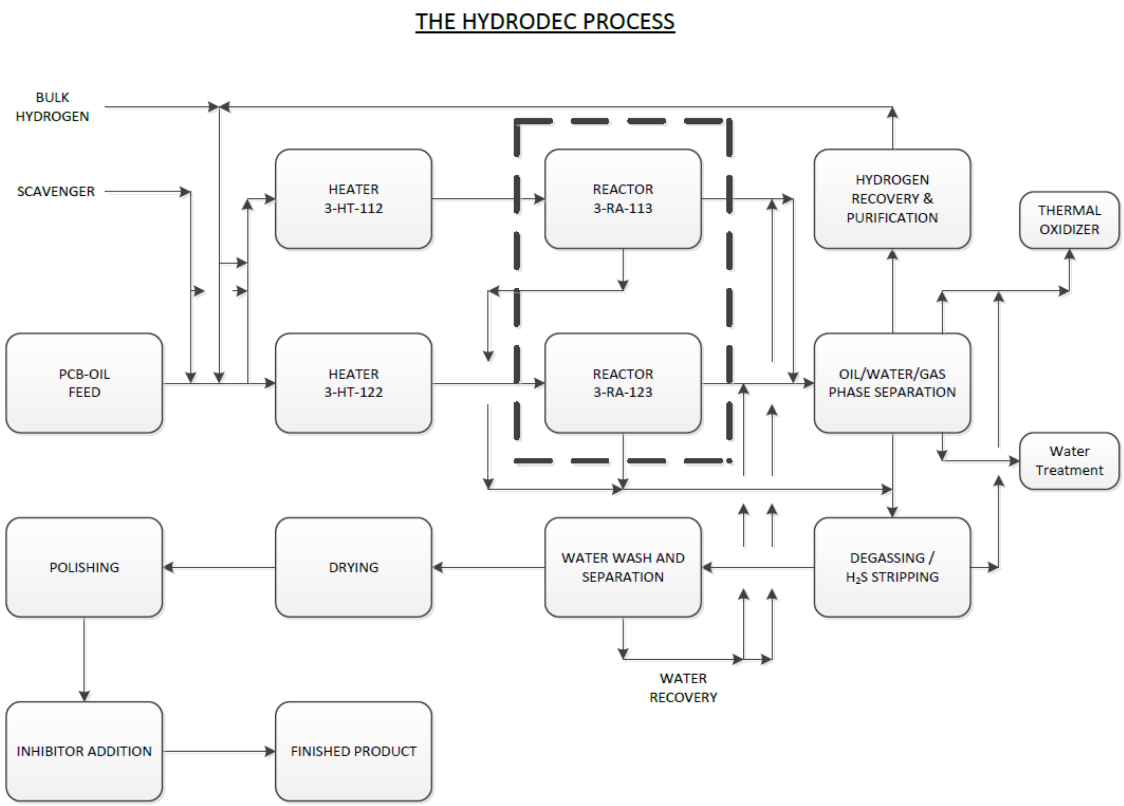
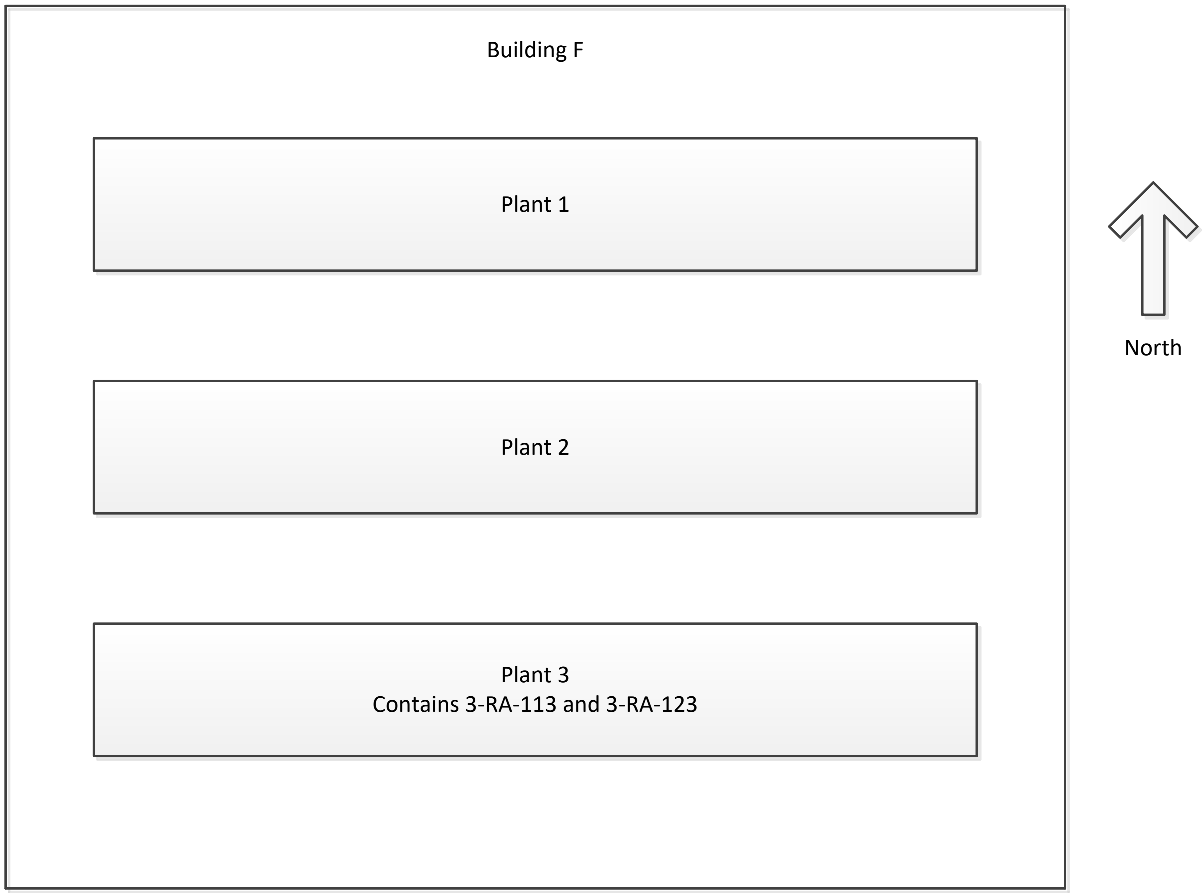


Figure 4.2
Building F



4.2 Hydrogenation

The PCB contaminated transformer oil requiring destruction is collected in feedstock tanks which feed an oil surge tank. From the feed oil surge tank it is introduced to the process at a defined pressure. The oil is pre-heated by passing it counter-current to a hot hydrogenation reactor effluent stream and through a heat exchanger. Fresh and recycled hydrogen, together with the scavenger, are then introduced.

The combined flow is heated to reaction temperature in a continuous direct contact finned electrical heater then enters the hydrogenation reactor at defined temperature and pressure. The reactor comprises a packed bed of a conventional hydro-treating catalyst. Plant 3 contains 2 hydrotreating reactors designated as 3-RA-113 and 3-RA-123. These reactors are identical in configuration and either can be used for treating PCB oil. No other reactors other than these 2 are used for processing PCB oil.

During reaction, nitrogen or sulfur, also present as heteroatoms in the mineral oil, are largely converted to ammonia and hydrogen sulfide. Aged oil oxidation products present in the feed oil are also hydrogenated with the oxygen being removed as water.

In addition to extraction of heteroatoms and hydrodechlorination of PCB compounds, and depending on the carrier oil composition, a small quantity of hydrogen can be consumed in hydrogenating, to a small degree, the oil itself. This results in the possible generation of some saturated light hydrocarbon vapors and liquids in the boiling range below that of the parent oil and these are subsequently separated out within the hydrotreating system.

4.3 Reactor Effluent

Product oil leaving the Reactor (reactor bottoms) passes first to a Heat Exchanger where it is cooled against incoming feed oil.

Product oil leaving Heat Exchanger passes to a let-down valve where the pressure is reduced ahead of a Low Pressure Separator. Overhead vapors from this separator contain dissolved non-condensable hydrocarbons along with trace H_2S. The vapors pass to a Low Pressure Caustic Scrubber for trace residual hydrocarbon condensation and H_2S removal prior to venting to a thermal oxidizer.

Once the oil exits the Low Pressure Separator, it is cooled via heat exchangers before being sent to the degassing process where H_2S and other gases are removed. The effluent from the degassing process is then washed with sufficient de-mineralized wash water to ensure that a liquid phase is present to dissolve and wash out the Scavenger Salt system while minimizing the quantity of aqueous effluent to be discharged from the plant. The washed oil product is then passed to a phase separator after which the final oil product is recovered for polishing. The aqueous phase containing the Scavenger Salt system is re-used as quench water for the reactor gases, before being passed to a Waste Water surge tank prior to off-site shipment.

4.4 Reactor Gases

Reactor gases contain primarily excess hydrogen and are recycled back to the reactor feed. As they exit the reactor, gases are water quenched and passed to a High Pressure Separator. Vapor from the High Pressure Separator passes to a High Pressure Vent Condenser where it is cooled. Condensate, which is mainly water and small quantities of condensable hydrocarbons, is combined with the reactor bottoms before final wash water injection and product oil recovery.

Non-condensable gases from the High Pressure Separator comprise mainly hydrogen, but also contain light hydrocarbons and some H_2S. These are passed to a High Pressure Caustic Scrubber where H_2S is removed and collected into the caustic solution. Scrubbed gases are then chilled in a chiller, partially re-heated, passed through a sub-micron coalescer then recompressed for recirculation.

Build up of non-condensable hydrocarbon gases (methane, ethane) carried in the recycle gases are removed from the system through a slow bleed of purge gas flow from the Low Pressure Separator, then topping up the recycle line with fresh hydrogen. Purged gases are passed to the Thermal Oxidation Unit for oxidation after which the product gases are released to the atmosphere.

4.5 Process Performance

The process described above has been in use successfully for the destruction of PCBs and production of high quality transformer oil at the Hydrodec facility located in Australia for a period in excess of ten years. The Australian facility reactor is identical in size and flow through as each reactor currently being operated in the Canton facility. The Canton processing plant has been in operation using the same technology since 2008, and has been processing PCB contaminated material since 2012.

Re-refining PCB contaminated transformer oil on a continuous process basis has yielded complete removal of PCB within the limits of detection using ISO 17025 certified laboratory analysis and with >99% recovery of the oil as re-refined transformer oils within the limits of accuracy of normal process mass balance measures. Results of the typical refining process relative to ASTM Standard D3487 for transformer oils are as follows.

Test Description	Test Method	Typical Values	ASTM D3487
Physical			
Aniline Point, (°C)	ASTM D611	73	63 min
Color	ASTM D1500	L0.5	0.5 max
Flash Point, (°C)	ASTM D92	153	145 min
Interfacial Tension @ 25°C, (mN/m)	ASTM D971	48	40 min
Pour Point, (°C)	ASTM D97	-57	-40 max
Relative Density @ 15°C/15°C	ASTM D1298	0.884	0.91 max
Viscosity @ 100°C, (cSt)	ASTM D445	2.36	3.0 max
Viscosity @ 40°C, (cSt)	ASTM D445	8.88	12.0 max
Viscosity @ 0°C, (cSt)	ASTM D445	56	76.0 max
Visual Examination	ASTM D1524	Clear and bright	
Electrical			
Breakdown Voltage, 2 mm gap, (kV)	ASTM D1816	54	35 min
Impulse Breakdown Voltage, (kV)	ASTM D3300	>200	145 min
Gassing Tendency, (µL/min)	ASTM D2300	Complies	+30 max
Power Factor @ 100°C, (%)	ASTM D924	0.038	0.30 max
Chemical			
Oxidation Stability, RPVOT (minutes)	ASTM D2112	298	195 min
Inhibitor Content (%)	ASTM D2668	0.29	0.30 max
Corrosive Sulfur	ASTM D1275	Not corrosive	Not corrosive
Water Content, (mg/kg)	ASTM D1533	15	35 max
Acid Number, (mg KOH/g)	ASTM D974	<0.01	0.03 max
PCB Content	ASTM D4059	Not detectable	Not detectable
Health Safety and Environment			
Polycyclic Aromatic Compounds, (wt %)	IP 346	<3.0	N/A
Modified Ames Assay	ASTM E1687	PASS	N/A

In addition, the oil produced by this process has been extensively tested by independent facilities and has been consistently demonstrated to be of comparable quality to other transformer oils in the market.

4.6 Emissions and By-Products

There are three exit points for materials from the process. These are the product oil, the wastewater and the oxidizer emission. In relative proportion the mass flow from each of these points is as follows

Product Oil - 90+%

Wastewater - <10%

Oxidizer Emission - <1%

The product oil has been shown non-detectable for all organochlorine chemicals.

4.6.1 Waste Water

Waste water is derived from the final oil wash and the water quench of the recycle gas. It has been shown free of chlorinated organic chemical but contains the scavenger salt system and trace product oil.

4.6.2 Oxidizer Emission

Process gaseous emissions are treated by a regenerative thermal oxidizer (RTO) with a greater than 99% destruction removal efficiency. Plant emissions and the RTO are covered under Ohio EPA air permit number P0117927.

SECTION 5 – Waste Description

This section describes the wastes for the Hydrodec, Canton site. As mentioned above, the Hydrodec technology does not incinerate PCB's but breaks them down at a molecular level rendering the oil and all wastes non-PCB.

5.1 Types of Waste

The Hydrodec process treats PCB contaminated transformer oils at the front end of the process. Once the oil is introduced to the process, it goes through a vertical heating unit and then into the reactors and has shown to be non-detect for PCB's after the reactor during the Demonstration Test. If the system needs to be shut-down for any reason, non-PCB contaminated "clean oil" is flushed through the system to remove any PCB contamination there might be. Sampling will be done prior to any work being done that would require the exposure to either heating elements or catalyst to safeguard employee interaction.

5.2 Waste Feed Rate

The feed rates, temperatures and pressures will vary depending on the levels of PCB's in the contaminated oil. See Figure 5.1 for a list of ranges that can be expected when operating with PCB contaminated oil. Flow rates shown are representative of one reactor.

Figure 5.1

Location	Parameter	Typical Range
Reactor Train	Oil Flow Rate	500-800kg/kr
Reactor Train	Reactor Temperature	280-330 DegC
Reactor Train	System Pressures	3400-3600 kpa
Reactor Train	Recycle Gas Flow	17.5-30 kg/hr
Reactor Train	Scavenger Flow	2-10 kg/hr
Reactor Train	Quench Water	30-100 kg/hr
Stage 2	System Pressure	2,600-3,400kpa

5.3 Composition of Wastes

There are three exit points for materials from the process. These are the product oil, the wastewater and the oxidizer emission. In relative proportion the mass flow from each of these points is as follows:

Product Oil - >90%

Wastewater - <10%

Oxidizer Emission - <1%

All testing completed thus far has showed non-detect for PCB's after the reaction point of the process.

SECTION 6 – Waste Handling and Disposal

There are three by-products to Hydrodec's re-refining process of used transformer oil. The first by-product is wastewater, which as stated above accounts for less than 10% of the process. Wastewater has been analyzed for PCB's following ASTM and EPA testing methods and has shown non-detect across the board. Current production rates generate approximately 2,500-3,000 gallons of wastewater per day. This wastewater is bulked into 5 – 4,000 gallon tanks and transported offsite for pretreatment prior to be discharged to a POTW. Light phase oil is skimmed from the wastewater, reclaimed and recycled. This oil skimming is performed on site, as needed, prior to transport offsite. Any oil coming in contact with wastewater has already been treated by the Hydrodec process and the oil contains less than 2 mg/kg PCB. Analytical testing has shown PCB content in the wastewater to be non-detect and these results have been communicated to the off-site treatment facility.

The second by-product is the Regenerative Thermal Oxidizer emissions covered by an Ohio EPA air permit.

The third by-product is PCB contaminated solids such as PPE, oil-dry, rags, lab bottles, wipes, etc. These materials are placed into 55-gallon steel drums and are transported to Wayne Disposal in Belleville, MI for proper management.

SECTION 7 – Sampling and Monitoring Plan

7.1 General Description

The Hydrodec technology was developed specifically for the purpose of refining used oils and organic chemicals. It is as near to a closed loop near zero emission process for the complete treatment of PCBs as is available in the world at this point in time. The Canton facility consists of six identical reactor trains. The following provides a description of the Sampling and Monitoring Plan that will be followed as part of the normal operation of the process. The objectives of the plan are:

1. To sample the appropriate process streams and measure the required parameters to evaluate system performance.
2. To monitor the rate and quantity of the used oil fed to the process.
3. To monitor the effectiveness of the process via the PCB concentration of the product oil after the reactor trains.

The same sampling and monitoring process that is currently used for the treatment of non-PCB oil is used for the treatment of PCB oil. Refer to Section 17 for additional information on the Demonstration Test.

7.2 Process Parameters to be Monitored

The major process parameters to be monitored are:

1. Used Oil, Scavenger, Hydrogen, and Quench Water Feed Rates
2. Individual Reactor Temperatures and Pressures
3. Feed and Product Oil Quality
4. Process Operating Conditions

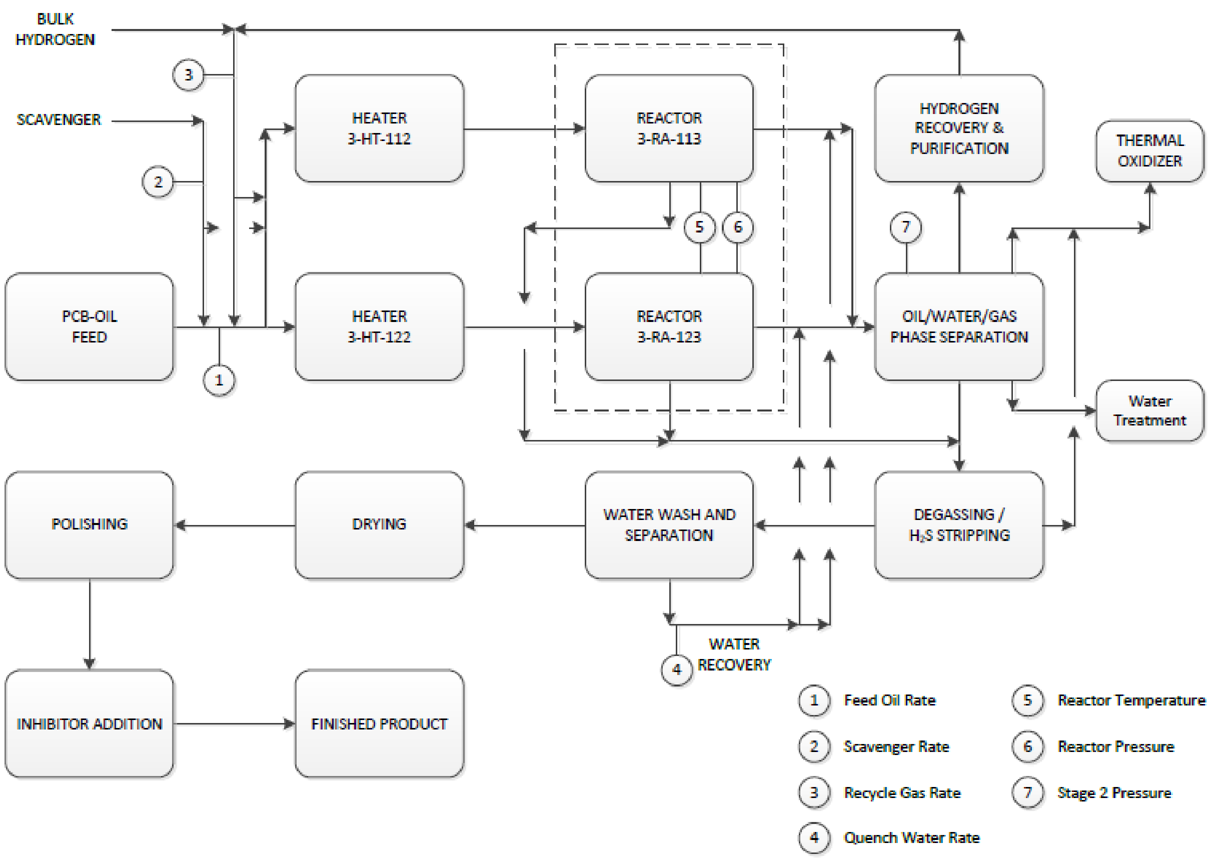
In addition, catalyst condition is monitored to determine when it is approaching end of life and the reactor is due for a catalyst change. This is accomplished by monitoring the differential pressure across the catalyst bed (indicative of physical plugging) and by monitoring the GC scans of reacted oil, which can indicate incomplete conversion of oxidation by-products in the oil and the beginning stages of catalyst deactivation.

These parameters are discussed in detail under Section 7.4 – Monitoring Methods.

7.3 Monitoring Locations

Figure 7.1 shows the location for monitoring the various process parameters. It should be noted that the Hydrodec process is composed of six (6) separate trains consisting of used oil, scavenger, hydrogen, and quench water pumps, heaters, and reactors. Two trains come together at the Gas/Liquid Separator at the beginning of Stage 2 of the process on each plant. The process removes PCBs in each of the reactors.

Figure 7.1
Monitoring Locations



7.4 Monitoring Methods

Monitoring is accomplished through a combination of sampling and analysis, direct observation, and recording of process operating parameters that are made by the operators during performance of their activities, limits are shown on the log sheets included in Appendix B.

The entire process and parameters are controlled via a Delta V Distributed Control System (DCS) via an Operator Interface Unit (OIU) in the Control Room.

7.4.1 Measurement of Feed Rates

The feed rates for the used oil, scavenger, hydrogen, and quench water are each measured using mass flow meters to ensure that the correct ratios of each input are being fed to the reactor to destroy PCBs. The reactor flow rate is controlled by a variable speed pump.

7.4.2 Measurement of Reactor Temperatures and Pressures

The individual reactor temperatures and pressures are measured using thermocouples and pressure indicators. These parameters are input at the OIU and controlled by the DCS. An operating range for each of these parameters has been established and the DCS will alarm and alert the operator to trouble-shoot or take a predetermined action if any of the parameters are not within the specified range.

7.4.3 Measuring Quality of Feed Oil and Product Oil

All incoming feedstock is sampled and analyzed to determine PCB concentration prior to unloading the oil to bulk storage and after combining several lots of feedstock to feed to the plant.

Product oil is sampled and analyzed for PCB concentration after each train recombines at Stage 2 of the process. Under normal operating conditions the product oil is expected to contain less than 2 ppm of PCB, and is then considered non-regulated under TSCA.

7.4.4 Monitoring Operating Conditions

The process parameters for each train are monitored continuously and recorded every 2 hours by an operator in the Control Room at the OIU. The operator log is included in Appendix B.

An outside operator also does visual inspections of each of the trains and other parts of the process during hourly inspections and while they are involved with other activities.

7.5 Monitoring Frequencies

The monitoring frequencies for the process parameters are shown in the monitoring plan for the process. All parameters are monitored continuously and the critical operating parameters are recorded every 2 hours in the operator log. The daily treated oil sample is collected at a point to final polishing.

7.6 Sampling Locations and Frequencies

Figure 7.2 summarizes the Sampling Plan for the Hydrodec PCB Project. The feed and treated oil are sampled and analyzed to determine PCB concentrations. This information is necessary to evaluate the performance of the process in terms of PCB removal.

Figure 7.2
Sampling Plan

Material	Frequency	Location	Parameters	PCB Analysis Method	PQL Used
PCB Feed Oil	Prior to Unloading	Tank Truck or Tote/Drum	PCB Screen	EPA Method 9079	< 500 ppm PCB
PCB Feed Oil	Prior to Unloading	Tank Truck or Tote/Drum	PCB Metals Halogens	ASTM D4059	< 2000 ppm PCB
PCB Feed Oil	After Unloading and Circulation	P-TK-734 or P-TK-735 (sample point)	PCB Metals/Sulfur	ASTM D4059	< 2000 ppm PCB
PCB Feed Oil	1 hour after the start of processing and at the end of processing	3-TK-005 (sample point)	PCB	ASTM D4059	< 500 ppm PCB
Treated Oil	Every 3 hours	Reactor Outlet Sample Point	PCB	ASTM D4059	< 2 ppm PCB

7.7 Sample Analysis Methods

The method used for analyzing PCB concentration in the samples is specified in Table 7-2.

PCB analysis is performed on all PCB material before unloading it in to PCB Storage Tanks, in order to ensure all material unloaded is within the limits specified by our Permit.

A PCB Screen (EPA Method 9079) is performed on incoming PCB material to determine if it is less than 500ppm. Material that returns a result of "<500" for this screen test is unloaded into the PCB Storage Tanks.

If the material does not show a "PASS" result for this screen test, a GC/ECD analysis using ASTM D4059 is completed in order to determine PCB concentration and ensure the material is less than 2000ppm before unloading.

Once the PCB oil is unloaded to the storage tanks and circulated, a GC/ECD analysis using ASTM D4059 is completed on the oil.

After the PCB Oil is blended at the blending tank, it is fed to the plant (3-TK-005) for processing, where scavenger, hydrogen, and quench water are also introduced to the reactor trains. Note that PCB oil has dedicated and segregated pumps, lines and tanks that are totally isolated from non-regulated feedstock. PCB and non-PCB oil do not meet until the blending tank – from this point on all oil is treated as containing the highest concentration of PCBs added until treatment has been demonstrated to be successful.

As shown in the Demonstration Test, the PCB concentration of the treated oil on the outlet of the reactor is < 2 ppm. Under normal operations, this sample is taken every 3 hours and analyzed via GC/ECD using ASTM D4059.

7.8 Acceptable Limits for Results

The purpose for the design of the Hydrodec process is to safely, effectively, and economically destroy PCBs from contaminated oils. When operating under this National TSCA approval, the treated oil is required to contain no more than 2 ppm PCBs to be considered a non-PCB material according to the administrative policies of EPA under TSCA.

SECTION 8 – Sampling Procedures

8.1 General Description

The samples are taken in accordance with Hydrodec's sampling procedure to ensure representative sampling

8.2 Sampling Equipment

Most samples for the Hydrodec process are taken using 2 oz glass bottles, further guidance on sampling containers is available in the sampling procedure.

8.3 Sampling Equipment Calibration and Maintenance

The sampling equipment does not require calibration or maintenance as new, clean bottles are used for each sample.

8.4 Sampling Procedures

Samples will be taken in accordance with Hydrodec's sampling procedure to ensure representative sampling. All samples will be analyzed using approved ASTM methodology to obtain the results.

When incoming PCB oil arrives on-site, samples will be taken from the outlet of the truck.

After unloading into the PCB storage tank, a sample will be taken from the outlet of the tank.

Samples of the blended PCB feed will be taken 1 hour after the commencement of processing, and at the end of PCB processing from the outlet of 3-TK-005.

Samples of treated oil will be collected every 3 hours from the reactor outlet sample port.

8.5 Sample Recovery, Storage, and Preservation

All samples will be analyzed on-site in the Hydrodec laboratory. Samples associated with PCB processing activities are stored in the laboratory for a minimum of 30 days from the date of collection and analysis. Due to the nature of PCB in oil samples, no preservation techniques are required.

8.6 Sample Transport and Custody

All samples taken for the Hydrodec process are labeled and logged using a unique identification number. All sampling activities are documented in the operations logbook, so that samples can be traced to specific operating conditions of the process. Each sample is logged in the Laboratory using a unique identification number, date, time, operator, location, testing criteria, and technician analyzing the sample.

SECTION 9 – Sample Analysis Procedures

9.1 General Description

The analysis of the PCB in the PCB oil and in the treated oil will be conducted in accordance with EPA guidance. The QAPP (Appendix A) provides a detailed discussion on the sample analysis procedures. The on-site Hydrodec lab will be used for operational evaluation and analysis of the samples.

SECTION 10 – Monitoring Procedures

10.1 General Description

This section provides a summary of the procedures used for monitoring the parameters that were presented in the sampling and monitoring plan in Section 7. Sampling and analysis is not discussed, as this was presented in Sections 8 and 9. Monitoring of catalyst condition and activity was discussed previously in Section 7.2 of this Application. The discussion of parameters is organized as follows:

1. Selection of the Key Parameters to be monitored,
2. Monitoring Instrumentation,
3. Data Recording,
4. Instrument Calibration and Maintenance

A brief description of the methods and apparatus, data reduction, data storage, equipment calibration and equipment maintenance procedures is also included.

10.2 Selection of Key Parameters to be Monitored

Section 7 presents the parameters that are routinely monitored to control the operation of the Hydrodec process. Of these, the key parameters that affect the treatment process efficiency are:

1. Used Oil and Hydrogen Feed Rates
2. Reactor Temperatures and Pressures
3. Reactor Oil Levels

Maintaining these parameters within specification under normal operating conditions will ensure PCB destruction efficiency remains at the demonstrated level.

There are obviously many more parameters that are monitored to ensure safe, productive operation of the unit. These compose the balance of the listed monitoring parameters.

PCB destruction in the process is dependent on the hydrogen pressure and flow rate, and the operating temperature. Scavenger flow rate is maintained in order to produce an excess of scavenger in the recycle gas stream, and is not linked to PCB destruction capability. Similarly, quench water flow rate is controlled at such a level to wash salts from the gas steam and maintain a target temperature in the downstream separation vessel, and is not linked to PCB destruction capability. Modelling of the effect of these parameters is provided in Appendix E.

10.2.1 Used Oil Feed Rate

Monitoring of this parameter ensures that a consistent, known quantity of PCBs is being fed to the reactors for destruction. This feed rate is the basis for all of the other feed rates into the process.

10.2.2 Scavenger Feed Rate

Monitoring of this parameter ensures that enough scavenger is fed to neutralize the by-products that are formed from the reaction used to destroy the PCBs. Keeping the scavenger level at the appropriate rate ensures against the over-concentration of harmful by-products that could lead to equipment damage in Stage 2 of the process. **[We are requesting that the current authorization permit condition of >5 kg/hr scavenger by removed in the new authorization.]**

10.2.3 Hydrogen Feed Rate

Since the Hydrodec process is based on a hydrogenation reaction, maintaining the necessary hydrogen feed to the reactors ensures that the reaction used to destroy the PCBs continues in an efficient manner as more PCBs are fed to the reactors.

10.2.4 Quench Water Feed Rate

Just as monitoring the scavenger feed rate is important to control production of by-products, the quench water feed rate is also important to cool and dilute the by-product stream from the reactors. This ensures that the mechanical integrity of the system is kept whole and also renders the by-product stream non-hazardous. **[We are requesting that the current authorization permit condition of >80 kg/hr quench water by removed in the new authorization.]**

10.2.5 Reactor Temperatures and Pressures

For the hydrogenation reaction to occur at optimum efficiency, reaction temperature and pressure must be maintained in the reactors.

The incoming oil is pre-heated by passing it counter-current to a hot hydrogenation reactor effluent stream through a heat exchanger. Hydrogen, along with scavenger, is then introduced into the process.

By feeding compressed hydrogen to the process, the reaction pressure, approximately 3600 Kpa (522 PSI), and the key input of excess hydrogen needed for the hydrogenation reaction is maintained.

The combined flow is heated to reaction temperature, approximately 300°C (572°F); in a continuous direct-contact finned electrical heater before it enter the reactor comprised of a packed bed of hydro-treating catalyst.

10.2.6 Reactor Oil Level

Maintaining a reactor oil level of 10% ensures that the reaction pressure and proper residence time is maintained in the reactor. This also prevents the oil flow from channeling through the reactor bed and ensuring that the oil has proper contact time with the catalyst.

10.3 Data Recording

Operating and monitoring data are recorded in multiple ways, including:

- the DCS's computer data management system graphical display,
- computer data management system electronic files, and
- operating data sheets and logbook filled out by the Plant Operators.

The DCS graphical display has multiple screens that depict both the overall current plant status, and individual units such as the reactor trains and Stage 2 of the process. The operator can quickly move between each display. These present value data from the DCS are constantly being stored in the computer data management system.

The DCS data management system is primarily used to provide operators with trend information for quicker and better diagnosis of operating changes. The Plant Operator can access trend information on the majority of the electronically monitored parameters. These charts can represent time scales for the past hour, or be expanded to multiple days.

As part of routine operation of the plant, a Plant Operator manually records certain operating parameters on log sheets, typically every 2 hours, or when a major parameter changes significantly. This produces two valuable results: 1) a permanent record of the major operating variables as backup to the electronic or printed data, and 2) a documented critical check of these parameters at least once per hour by the operators that causes their reflection on short term trends in plant operating status. These log sheets are reviewed by management to ensure completion and for long term trending of certain process variables to assist in preventative maintenance activities. The log sheets are stored on site.

10.4 Instrument Calibration and Maintenance

All electronic instruments are factory calibrated. They receive a functional check when first installed to verify they are operating properly and responding within the appropriate range. During shutdowns or as needed, these instruments are field checked to verify accurate response, and if necessary then field of factory calibrated if the response is not within range.

If an instrument fails or requires field calibration, an instrument technician is available as a resource. Alternatively, a failed instrument can be replaced with a unit from a spare parts inventory and the defective unit sent to the factory for repair or re-calibration.

SECTION 11 – Quality Assurance Plan

This section summarizes the Quality Assurance Plan (QAP) implemented during normal operation. The QAP includes the following:

- A plan to ensure that monitoring data meet specific quality objectives;
- A plan to routinely evaluate the quality of the data; and
- A plan to routinely evaluate the quality of chemical laboratory analysis.

When applied to sampling and chemical analysis, the QAP has the more specific objectives of (1) ensuring that the analytical results correspond to the to the materials at the time the sample was taken; (2) estimating the level of quality of each analytical system without requiring excessive precision, accuracy, and sensitivity determination; (3) assisting in the early recognition of deficiencies that might affect data quality; (4) enabling the laboratory to take actions to ensure data validity; and (5) enhancing the utility of all data considered in the decision-making process by requiring simultaneous expression of limitations on data quality. For the complete QAP see Appendix A.

SECTION 12 – Data Reporting and Recordkeeping

Hydrodec of North America, LLC generates multiple types of records during the operation of re-refining PCB contaminated transformer oil. These include:

- PCB receiving, storage and disposal records,
- Laboratory reports from sample analysis,
- Process monitoring data, and
- Maintenance and inspection records.

12.1 Annual Report of PCB Disposal Activity

As required by TSCA regulations, Hydrodec will collect sufficient data from the operations to prepare the required annual report. This minimum content of this report, as per 40 CFR 761.180(b)(3), will be as follows:

i. The name, address, and EPA identification number of the facility covered by the annual report for the calendar year.
ii. A list of the numbers of all signed manifests of PCB waste initiated or received by the facility during that year.
iii. The total weight in kilograms of bulk PCB waste, PCB waste in PCB Article Containers, and PCB waste in PCB Containers in storage at the facility at the beginning of the calendar year, received or generated at the facility, transferred to another facility, or disposed of at the facility during the calendar year. The information must be provided for each of these categories, as appropriate.
iv. The total number of PCB Article Containers, and the total number of PCB Containers in storage at the facility at the beginning of the calendar year, received or generated at the facility, transferred to another facility, or disposed of at the facility during the calendar year. The information must be presented for each of these categories as appropriate.
v. The total weight in kilograms of each of the following PCB categories: bulk PCB waste, PCB waste in PCB Article Containers, and PCB waste in PCB Containers remaining in storage for disposal at the facility at the end of the calendar year.
vi. The total number of PCB Article Containers and the total number of the PCB Containers remaining in storage for disposal at the facility at the end of the calendar year.

The total weight of material treated by Hydrodec will be reported as material disposed at the facility. Since Hydrodec does not process PCB Capacitors or PCB Transformers, reference to these data reporting requirements has been deleted.

Two principle documents will provide the information required to prepare this annual report, the feed log sheets and the PCB disposal manifests for waste accepted by Hydrodec. In addition to these, Hydrodec will use tank level data to determine the end of year inventory of PCB residuals if the operation goes over the end of the year time frame.

12.2 Operational Records

The analytical laboratory will provide regular reports on the PCB level of the treated oil.

Operating and monitoring data are recorded in multiple ways, including:

1. the computer data management system graphical display,
2. computer data management system electronic and disc files,
3. operating data sheets filled out by the Plant Operators, and
4. Laboratory test reports for PCB monitoring.

The graphical display has multiple screens that depict both overall plant current status, and individual units such as heaters and reactor units. The operator can quickly move between each display. These present value date from the graphical display are constantly being stored in the computer data management system.

The main purpose of the PC data management system is to provide the operators with trend information for quicker and better diagnosis of operating changes. The Plant Operator can call up trend information on the majority of the electronically monitored parameters. These charts can represent time scales for the past hour or be expanded to multiple days. They can also be printed to facilitate the operators review and troubleshooting.

The data management system can print routine reports of key operating parameters. Also, each day, week and month summary information can be printed or electronically logged and backed up.

As part of routine operation of the plant, the Plant Operator manually records certain operating parameters on log sheets, typically every 2 hours, or when a major parameter changes significantly. This produces two valuable results: 1) a permanent record of the major operating variables as backup to the electronic or printed data, and 2) a documented critical check of these parameters at least once every 2 hours by the operators in a fashion that causes their reflection on short term trends in plant operating status.

During normal operations the Plant Operators and maintenance personnel make routine inspections and perform preventative and corrective maintenance procedures.

12.3 Example Data Sheets

The operators log data on data sheets that will also be maintained as part of the operating records. Approximately once every 2 hours an entry is made on the operating data log (see Appendix B). This includes principal operating parameters such as heater temperatures, product temperature, carrier gas inlet/outlet temperatures and pressure readings.

12.4 Recordkeeping for PCBs Received

Hydrodec will follow the previously described procedures for determining the quantity of PCB's fed to the plant. This amounts to a reliance on the shift logs and the feed characterization data from the oil. Shipping manifests will also be kept to document the quantity of PCB's received. This will be in addition the operator logs and feed characteristic data. Furthermore, at the time of material receipt at the facility, it will be logged into an inventory system to manage the onsite quantity of materials.

12.5. Recordkeeping for PCB's Transferred

PCB transfer records will be maintained through disposal manifests to account for PCB shipments offsite.

12.6 Location of Records

All of these printed reports, electronic files, sample analysis reports, completed data sheets, completed inspection and maintenance sheets, and the operations log books will be maintained at the site. This will allow for use of historic data by the operations staff, as well as for data review by regulatory personnel.

SECTION 13 – Inspection Procedures

The inspection program described in this section is intended to provide a mechanism to prevent and detect system malfunctions, equipment deterioration, and operator errors. The program is designed to provide early warning of the potential for such events so that corrective and preventative actions may be taken in a timely manner.

The entire process and parameters are controlled via a Delta V Distributed Control System (DCS) via an Operator Interface Unit in the Control Room. The DCS alerts operators of problems with the waste feed/cutoff system, regenerative thermal oxidizer, and process alarms. Outside Operators also conduct inspections every 2 hours of processes for the early detection of problems or malfunctions of the facility. The fire extinguishing system is automatic, and monitored by a third party.

Appendix G summarizes Hydrodec's Mechanical Integrity Program for ensuring the processing equipment is inspected and maintained in a manner to prevent catastrophic failure.

Specific changes were made to the materials of construction of the equipment that failed on December 1, 2013 at the Hydrodec facility. Specifically, the heater shell failed due to High Temperature Hydrogen Attack (HTHA) of the ASTM A234 WPB carbon steel that the heater shell was fabricated from. At the specific recommendation of our engineering consulting company (Zeton) that designed and built the new Hydrodec hydrotreating plants, the material of construction of the heater shell and ancillary equipment was changed to Type 316L stainless steel. This type of stainless steel is resistant to HTHA at the temperature and partial pressure of hydrogen that are typical of the Hydrodec process. Appexdix G addresses inspection methods and intervals for the Hydrodec processing equipment.

SECTION 14 – Spill Prevention Control and Countermeasures Plan

This section describes the Spill Prevention Control and Countermeasures Plan (SPCC), see APPENDIX D. The objectives of the SPCC Plan are to (1) minimize spills of oil and hazardous materials; (2) contain and clean any spills that do occur; and (3) control run-off from potentially contaminated waste handling. These objectives are achieved through a combination of equipment design, operating practices, and routine inspections and maintenance procedures.

14.1 Spill Prevention

The main focus of spill prevention is on stored liquids. Significantly less risk exists for offsite transport for solids. Consequently this program focus is on the liquids used or generated by the site.

Drummed Waste Handling and Processing – Drums will be carefully handled to prevent damage or rupture. Any leaking drums will be placed in overpacks. Drums will be kept closed except when being sampled, decanted, or emptied. Drums will be staged in double-row lots with ample aisle space between lots to permit access to and inspection of individual drums. Normally drums will not be stacked. If stacked, they will not be stacked more than two tiers high, and pallets or sheets of plywood will be placed between the tiers.

Bulk Solid and Sludge Waste Handling and Processing – Bulk and loose solid waste will be carefully handled to avoid spilling.

Liquid – Oil will be accumulated in tanks within the system. These are closed metal tanks with secondary containment provided by the concrete containment and dead sumps. Care will be taken to prevent overfilling the tanks, trucks or containers and to ensure that liquids do not spill during transfer.

Valve settings will be properly set, hose connections will be checked, and a technician will remain at a tank when it is being filled. These operating procedures are designed to prevent spills and overfilling.

14.2 Spill Containment

Although every precaution will be taken to prevent spills of oil and hazardous materials, the potential for such spills exist. Therefore, the used oil units and supplementary handling units will be equipped with as necessary with secondary containment to contain spills.

14.3 Spill Cleanup and Rainwater Disposition

Each containment area is provided with a small sump to facilitate the use of a pump to remove accumulated liquids should they be observed.

14.4 Recordkeeping and Reporting

The procedures and schedules for inspecting equipment and containment systems will be those contained in the presented in the SPCC Plan.

Major spills, resulting in a reportable quantity of hazardous substance (as defined in 40 CFR 117) outside of the containment systems, will be reported to the National Response Center and other appropriate authorities.

SECTION 15 – Health and Safety Plan

This section describes the procedures to be followed to protect employees and the environment during normal operations.

15.1 Purpose and Scope

This Health and Safety Plan (HASP) is intended to prescribe minimum procedural and equipment requirements for worker protection. The plan is designed to comply with established policies and procedures and applicable labor regulations. All Hydrodec site personnel, site visitors, and subcontractors' personnel are subject to the provisions of this directive. This plan is consistent with the provisions of the Hydrodec Health and Safety manual.

15.2 Key Personnel and Responsibilities

Clear lines of authority shall be established for enforcing compliance with the following health and safety procedures, consistent with industry policies and procedures. Designated Hydrodec personnel are responsible for implementation of the HASP. This includes supervision, maintaining contamination control, enforcing safe work practices and decontamination procedures, and ensuring proper use of personal protective equipment. These lines of authority are shown on the organization chart in Section 3.

15.3 Medical Surveillance

15.3.1 Examination Requirements

All site personnel shall have successfully completed a pre-placement or periodic in-service medical examination prior working with PCB contaminated transformer oil. The evaluation shall include, at a minimum:

- A review of medical, personal, family, and occupational histories.
- Physical examination of employees
- Clinical tests;
    - Audiometry
    - Blood chemistry
    - Urinalysis
    - PCB screening
- Any other test deemed appropriate by the examining physician with the concurrence of the Hydrodec General Manager.

15.3.2 Emergency Medical Treatment

Emergency medical treatment is part of the emergency procedures that Hydrodec has implemented. The provisions for emergency medical treatment are as follows:

- Training in first aid and cardiopulmonary resuscitation (CPR) - voluntary;
- Blood borne pathogen training;
- Appropriate first aid and CPR supplies and equipment;

- Conspicuously posted notices giving the names, phone numbers, addresses, and procedures for contacting the on-call personnel, ambulance, medical facility, emergency fire and police services;
- Prompt and accurate reporting of all accidents and incidents consistent with established procedures.

15.4 Employee Training and Information

All employees will undergo an orientation and basic safety program before PCB contaminated oil is brought onto the site.

15.5 General Safe Work Practices

The following work practices shall be observed by all Hydrodec employees:

1. While processing or transferring waste, all operators will wear the required safety equipment that is described in Section 15.6. A minimum of two operators will be on hand whenever any portion of the system is being operated. Operators will not work alone.
2. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is not permitted onsite except in designated areas.
3. Hands must be thoroughly washed before eating, drinking, or smoking.
4. Legible and understandable precautionary or hazardous waste labels will be appropriately and prominently affixed to containers of materials, scrap, wastes, debris, and contaminated clothing.
5. Personnel will be cautioned to inform each other of subjective symptoms of chemical exposure such as headache, dizziness, nausea, and irritation of the respiratory tract, eyes or skin.
6. When climatic conditions require, provisions will be made to address heat stress prevention.
7. Employees shall become familiar with the location and use of portable or fixed emergency shower and eyewash stations strategically located throughout the regulated area.

15.6 Personal Protective Equipment

15.6.1 General

Selection of appropriate personal protective equipment will be based on the containment type(s), concentration(s), and routes of exposure. Selection of appropriate protection levels will consider all potential exposures to provide adequate worker protection.

The major objectives in the selection of the personal protective equipment and employee training are:

- Ensure the equipment is appropriate and approved for the potential hazards;
- Ensure that the devices are introduced to users with a clear and complete explanation of their protection value and method of proper use;

- Assign supervisory responsibility to ensure proper use and continued maintenance of the devices.

15.6.2 Levels of Protection and Equipment Requirements

Appropriate personal protection shall be worn according to pre-determined exposure levels. At a minimum, steel toe safety shoes, eye protection, and hard hats will be worn at all times in the process areas. The required safety equipment and clothing will be available onsite before work is begun. All respiratory protection selection, use, and maintenance shall be conducted in accordance with the requirements of 29 CFR 1910.134 and recognized consensus standards (e.g. American Industrial Hygiene Association, American National Standards Institute, and National Institute of Occupational Safety and Health). Protective equipment and criteria are provided below.

15.6.2.1 First Aid and Emergency Equipment

An emergency shower and eyewash are located in areas that process oil. In addition, an industrial first aid kit is located in the Control Room. Fire extinguishers are adequately and appropriately located throughout the facility.

15.7 Work Zones and Decontamination Procedures

The possibility of exposure or translocation of contaminants is reduced or eliminated in a number of ways, including:

- Setting up physical barriers to exclude unnecessary personnel from the general area;
- Minimizing the number of personnel and equipment onsite consistent with effective operations;
- Establishing work zones within the site, including a non-contaminated support zone, an exclusion zone where oil handling occurs, and a contamination reduction zone for movement between the two;
- Conducting operations in a manner that reduces exposure of personnel and equipment;
- Minimizing airborne dispersion of contaminants; and
- Implementing appropriate decontamination procedures.

The exclusion zone typically includes the processing area where the oil is being treated. It also includes the feed preparation and temporary storage areas. Other areas are included as appropriate considering the actual contamination level or potential for contamination.

15.8 Decontamination Procedures

As part of the system to prevent or reduce the physical transfer of containments by personnel and/or equipment, safety procedures will be instituted. These procedures include the decontamination of personnel, protective equipment, clean-up equipment, and other contaminated materials. In general, decontamination at the site consists of rinsing equipment with diesel fuel, washing personnel with soap and water, and disposing of disposable protective clothing. Disposal will involve placing all contaminated articles in specified drums, affixing proper labels, and disposal as a regulated waste.

15.9 General Emergency Procedures

In the event of an emergency onsite, the person discovering the emergency will immediately notify the Production Coordinator. The Production Coordinator is the person onsite most knowledgeable with aspects of the process. The Production Coordinator will contact the HSE Manager, for any incident that involves or jeopardizes employees, environment or equipment. The Production Coordinator and HSE Manager will determine if the Contingency Plan is necessary, implement all necessary emergency procedures to protect operational personnel, and notify all unit personnel and the local authorities while coordinating with the General Manager.

15.9.1 Personal Injury

If an injury occurs due to an accident or exposure to a hazardous substance, the Production Coordinator will be immediately notified as well as the HSE Manager. The supervisor will be given all appropriate information concerning the nature and cause of the injury so that the treatment preparations can be initiated. First-aid measures will be administered and medical assistance will be summoned, if warranted. The HSE Manager will then investigate the cause of the injury and make any necessary changes in work procedures with the Production Coordinator. Incident reporting procedures will be followed whose primary focus is the prevention of recurrence of the injurious situation. The Plant Manager and Senior Process Engineer will review all incident reports to assure that adequate corrective measures have been implemented.

15.9.2 Communication Equipment and Alarms

Persons working onsite operating the equipment will be provided with equipment to maintain radio communications with each other. Each operator will have at least one mobile/portable telephone or a “land line” telephone installed in the Control Room. In the event of an emergency, operating personnel will be able to get help, if required, by contacting local emergency response authorities. A telephone or radio will be provided in the processing areas to contact authorities such as police and fire department. An alarm horn will be located on the system and will be capable of indicating an emergency situation and providing an audible warning to all persons working in the area.

SECTION 16 – Training Plan

Hydrodec has developed this training plan as an integral part of the operation of the process. Training is essential to the efficient and safe operation of all facility processes, and to ensure rapid and effective responses to emergency conditions. Hydrodec policy requires that all employees be trained to perform in a manner that emphasizes accident prevention to safeguard human health and the environment.

16.1 General Training Concept

Each new employee will be trained in the general orientation and operation of the site. No employee will be permitted to work under reduced supervision until the Production Coordinator has determined that the employee has successfully completed adequate training. The introductory training will be completed within the first month of the new employee's entry into the site. In addition, every employee will participate in continuing training to maintain proficiency, to learn new techniques and procedures, and to reinforce safety and compliance consciousness.

16.2 Program Implementation

Implementation of the training program encompasses:

- Identification of training requirements;
- Selection of qualified instructors;
- Design of training modules;
- Delivery of training program;
- Employee performance evaluation; and
- Documentation of each training session.

Responsibility for the training rests with the HSE Manager in conjunction with the Senior Process Engineer. The Production Coordinator or his designated representative will select qualified instructors, participate in development of the training program content and format, provide necessary resources, and ensure that employee training records are maintained.

Training is tailored to prepare the employee to perform the functions of his or her position safely and effectively and to ensure that the employee will be able to respond effectively to emergency situations at the facility.

16.2.1 Facility Organization

The primary function of Hydrodec is the re-refining of used transformer oil containing PCBs using properly trained operations personnel. The organizational chart shown in Figure 3-1 (Section 3) depicts the presently expected reporting relationships for operating the site.

16.2.2 Staff Positions

The Hydrodec organization and staff positions include the following:

- Plant Manager
- Senior Process Engineer
- Production Coordinator

Specific position descriptions, including basic functions, duties, responsibilities, and required qualifications are maintained onsite.

16.3 Training Program

Personnel employed at Hydrodec undergo continuing training pursuant to this Plan. Each new employee undergoes introductory training composed of general training, job-specific training, and special skills training to varying degrees. The amount of training an employee receives depends upon his or her job duties, other responsibilities such as spill response, and the employee's competence based upon prior experience. The scope of this introductory training program is defined in this section. The method for determining the amount of training that a specific new employee will receive is explained in Section 16.4.4 of this Plan.

16.3.1 General Training

All trainees complete a series of general training courses to become familiar with the facility and basic emergency response skills. These courses ensure that the trainees have basic skills to protect themselves and their fellow employees soon after becoming a Hydrodec employee.

16.3.1.1 New Employee Orientation and Basic Safety Training

All trainees employed for operating the process undergo an orientation and basic safety training session that introduces them to the company, the management and operation of the process, and basic health and safety skills. This orientation and basic safety training program includes procedures for entering and leaving the site; site layout; restricted areas; the nature and characteristics of hazardous and PCB wastes; an overview of the sites treatment and disposal processes; basic personal protection techniques and the safety rules of the facility; general facility rules; administrative procedures; organizational structure; an outline of the training requirements; and the employee's job duties. Much of Hydrodec's work is covered by OSHA 1910.120 training requirements for Hazardous Waste Operations and Emergency Response (HAZWOPER). As such, many of these training elements are accomplished when the worker takes an initial 40-hr training and an annual 8-hr refresher training under 29 CFR 1910.120 standard.

16.3.1.2 General Emergency Response Training

Training in emergency procedures is coordinated by the HSE Manager. This training will include:

- Description of possible emergency situations;
- Duties of Emergency Contact and others;
- Emergency communications and alarm systems;
- Evacuation procedures and routes;
- Location of emergency equipment such as alarms, first aid stations, eyewash/safety shower locations, firefighting equipment; and
- Incident/accident reporting mechanisms.

The HSE Manager or other qualified trainer must ensure that each trainee has demonstrated his or her knowledge of the facilities Emergency Action / Contingency Plan.

16.3.1.3 Basic Emergency Response and Preparedness Training

All employees will be familiar with the Emergency Action / Contingency Plan and undergo training in basic emergency response preparedness. Employees will participate in emergency simulation/evacuation exercises, conducted annually. This training also includes special hazards posed by the wastes handled in the process (e.g. special concerns regarding PCB toxicity). Each employee is provided, as required, with comprehensive training to prepare the employee for his or her specific emergency response duties. Continuing training emphasizes the need to maintain proficiency in emergency response preparedness. Emergency response exercises, including fire extinguisher training, fire-fighting refreshers, and incident simulations are completed annually and when available, in cooperation with local authorities. The responsible personnel are instructed in the inspection, maintenance, and repair of emergency equipment as part of their on-the-job training.

16.3.2 Job-Specific Training

Specific Hydrodec personnel will be prepared for the operation of the process prior to testing and startup. This preparation will either be the result of active participation in the design and pre-operational testing of the process, or by orientation sessions from personnel who are experts in the operation of the process. Training is the basis of safety during operation. All operating personnel will be familiar with safe handling procedures for PCB contaminated oil and all other equipment/materials. During the first week of on-the-job training, an operator will usually function on as an observer under the tutelage of the Production Coordinator. During the second week of training, an operator will participate in material processing, but only under the direction of the Production Coordinator. During the third and fourth training weeks, the operator will generally be able to function as a normal member of the team, although a more experienced team member will always be onsite. In most cases, at least two operating personnel will be on site at all times.

16.3.3 Special Skills Training

As required, each employee will be provided with comprehensive “special skills” training to prepare him/her for other specific emergency response duties. Depending upon their duties, employees will become familiar with emergency procedures, emergency equipment, and emergency response systems. This specialized emergency response training includes the following elements, as applicable:

- Procedures for inspecting, using, and performing routine maintenance on the emergency equipment;
- Procedures for using the communication and alarm systems;
- Response duties in the event of fires or other incidents;
- Response procedures for incidents that release hazardous wastes, including spill containment/cleanup procedures to prevent ground water contamination;
- Evacuation routes and regrouping areas;
- First Aid and CPR; and
- Casualty control.

Generally, one employee per shift will be trained in first aid and cardiopulmonary resuscitation (CPR). This training may be conducted by the American Red Cross, the American Heart Association, local fire department, and/or qualified first-aid instructors.

16.4 Training Program Administration

The selection of qualified instructors, the use of effective training formats, and the evaluation of an employee's learning are critical. These considerations are described below.

16.4.1 Training Personnel Qualifications

The trainers (instructors) are recognized consultants and in-house specialists in the specific fields being taught and have broad experience in hazardous materials management. This actual hands-on experience is important so that the instructor can relate the specific subject area to actual facility operation and can answer employee questions. Specific training may be conducted by an immediate supervisor, department coordinator, or HSE Manager. Supervisory personnel are encouraged to sharpen their instructional skills by periodically attending classes, seminars, meetings, and workshops at outside institutions.

16.4.2 Training Formats

Training is conducted in classroom meetings, small discussion groups, in-field exercises, emergency drills, and an employee's work station. These activities may be supplemented by reading, problem sets, and other teaching aids. For some classroom training (such as for equipment operators), courses and teaching materials developed by the manufacturer are often used, either by arranging for the course to be presented on-site or by sending employees to the manufacturer's factory training sessions. Field demonstrations and practice sessions reinforce skills and promote safety awareness.

The employee's supervisor is responsible for on-the-job training to ensure that the employee learns correct procedures; can perform them accurately; reliably; and efficiently; and is safety conscious. Corrective action is taken as soon as a deficiency is observed so the trainee does not develop poor working habits. The employee is assigned increasingly complex or responsible duties based on demonstrated performance.

16.4.3 Training Effectiveness Evaluation

Training effectiveness is measured by written or oral examinations, or by job performance evaluations. The HSE Manager must enter into the training record that an employee has completed the necessary training successfully.

16.4.4 Qualification of Trainees for Work under Reduced Supervision

No employee may perform work under reduced supervision on the process until he or she has been qualified as trained by the Production Coordinator or a designee such as the Senior Process Engineer. Qualification is earned through successful completion of the general training, job-specific training, and special skills training based upon the training requirements of the position, and the trainee's prior education, experience, and skills. The Senior Process Engineer and Production Coordinator or designee shall determine the amount of job-specific and special skills training new employee needs in addition to the general training requirements. This determination is made by comparing the employee's record of employment with the description and its training requirements list.

16.4.5 Trainee Feedback

Trainee comments and constructive criticism of the training program are encouraged throughout the entire training process. Such comments are used by the trainers to modify or improve training program scope, content, and/or format.

16.5 Continuing Training

An employee's training does not end with his or her initial qualification. In fact, it never ends as long as the employee continues to work at Hydrodec. Periodic "refresher" training is required and provided, as discussed herein.

16.5.1 Frequency of Training

Continuing training is designed to maintain proficiency in job skills, increase safety and quality consciousness, and teach new skills. Such training consists of regularly scheduled:

- Basic fire-fighting practices;
- Emergency response exercises;
- ~~Respirator and~~ protective equipment reviews;
- Emergency response refresher training;
- CPR re-certification (if necessary); and
- Training to teach new skills, new operating procedures, or great depth in specific areas;

16.5.2. Continuing Training Content

Safety meetings are regularly scheduled for the employees. These sessions are led by the HSE Manager. The meetings are used to educate, communicate with, and motivate employees. The agenda covers many topics, which may range from a review of the safety procedures such as equipment lockout, to a presentation on policy changes, to discussion of accident prevention goals. Thus, the meetings may or may not include performance evaluations.

The fire extinguisher practice is organized by the HSE Manager or an alternate and, if possible, in conjunction with the local fire department. After the practice, the local Fire Chief or the facilities HSE Manager conducts a debriefing meeting with the participants.

The emergency response review is planned by the HSE Manager. An emergency incident (e.g. spill, fire, explosion, or sudden waste release), is simulated and employees respond according to their assigned emergency response duties. Refresher training related to the Emergency Response Plan is required of all employees. This training reviews the site operations and the Emergency Response Plan to update previous training.

As needed, training is provided to cover any changes in facility procedures or operations and to teach new skills; either before or as such changes occur. Some of this training may be accomplished through attendance of adult education classes, colleges, and seminars at off-site institutions.

16.6 Documentation of Training

Training records are maintained at the Hydrodec site. These records include a written description of the content of each training session, a list of attendees and trainer(s), dates of training sessions, and the signatures of trainers and attendees.

SECTION 17 – Demonstration Test Plan

Hydrodec of North America, LLC is submitting a Demonstration Test Plan under separate cover.

SECTION 18 – Test Data and Performance

18.1 Demonstration Test Summary

Hydrodec conducted a Demonstration Test at its Canton, Ohio facility on 20th through 22nd of September 2016. The Demonstration Test consisted of three separate runs at different process conditions, all of which were successful in treating the feed oil to <1 mg/kg PCB and generating no wastewater at 0.5 ug/L PCB or greater.

The Demonstration Test processing runs were each six hours in duration, and took concentrated PCB feed, and blended it at approximately 4:1 with non-PCB feed by means of a small volume, dedicated system, to achieve reactor feed concentrations in approximately the 400-600 mg/kg range. This was then processed at a temperature of approximately 305°C and a pressure of around 3.4 MPa (at varying feed rates for the runs) to produce an output that was <1 mg/kg PCB.

The Demonstration Test was a success with all post-reactor samples returning results of <1 mg/kg PCB.

SECTION 19 – Other Permits and Approvals

Current approval to dispose and commercially store PCBs dated 6/16/2012

Ohio EPA Air Permit P0117927

Ohio EPA General Storm Water NPDES Permit OHR000005

SECTION 20 – Closure Plan

Attached is a completed Closure Plan for Hydrodec of North America, LLC including a PCB Closure Cost Estimate (See Appendix D).

SECTION 21 – Standard Operating Procedures

Hydrodec has developed Standard Operating Procedures for the facility operators for use in plant operations. The following SOPs have been developed and are included in Appendix F:

- Inside Operator Shift Log
- Outside Checklist
- PCB Permit Operating Requirements
- Start-Up and Operation – Fresh Catalyst
- Start-Up after Train Depressurization
- Plant Nitrogen Pressurization and Purge
- Starting Recycle Gas Compressors
- Inhibitor System Operation
- Start-Up and Shut-Down
- Catalyst Activation and Start-Up
- Reactor Shut Down
- Reactor Stop
- Plant Cleaning Schedule

.

Quality Assurance Plan

Hydrodec of North America, LLC PCB Project

2021 Steinway Boulevard, SE
Canton, Ohio 44707

June 2016

QUALITY ASSURANCE PLAN
HYDRODEC OF NORTH AMERICA, LLC
PCB PROJECT

2021 STEINWAY BOULEVARD, SE
CANTON, OHIO

JUNE 2017

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QUALITY ASSURANCE PROJECT PLAN APPROVAL SHEET

PCB PROJECT
HYDRODEC OF NORTH AMERICA, LLC
JUNE 2017

This Quality Assurance Plan (QAP) was prepared for the Hydrodec PCB Project.

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Naomi Mattingly, Hydrodec Project Manager

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William Hand, Hydrodec Quality Manager

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Winston Lue, U.S. EPA Project Manager

QUALITY ASSURANCE PROJECT PLAN DISTRIBUTION LIST

The following have received a copy of this Quality Assurance Project Plan:

Naomi Mattingly, Hydrodec Project Manager
William Hand, Hydrodec Quality Manager
Winston Lue, U.S. EPA Project Manager

ACRONYM LIST

ASTM – ASTM International

CFR – Code of Federal Regulations

COC – Chain of Custody

EPA – Environmental Protection Agency

HASP – Health and Safety Plan

MDLs – Method Detection Limits

OAC - Ohio Administrative Code

O&M – Operation and Maintenance

OSHA – Occupational Safety and Health Administration

PARCCS – Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity

PCBs – Polychlorinated Biphenyls

PE – Performance Evaluation

PPE – Personal Protective Equipment

PQL – Practical Quantification Limit

QA – Quality Assurance

QAP – Quality Assurance Plan

QC – Quality Control

QLs – Quantitation Limits

SOPs – Standard Operating Procedures

SRMs - Standard Reference Materials

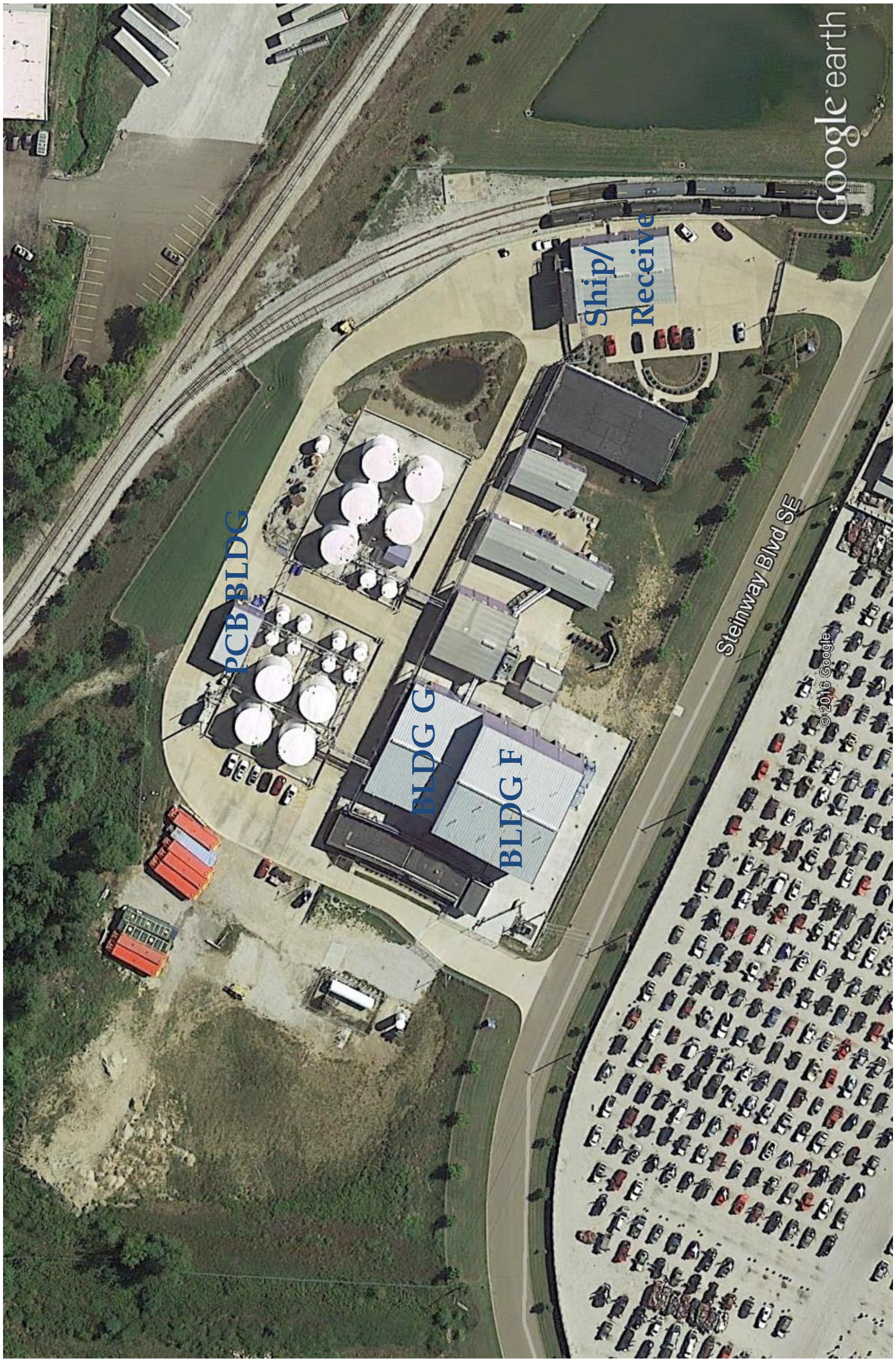
1.0 PROJECT MANAGEMENT

The purpose of this document is to describe the personnel, procedures, and methods for ensuring the quality, accuracy, and precision of data associated with the Hydrodec PCB Project. Following the procedures outlined in this Quality Assurance Plan (QAP) will ensure that the project data meet industry standards. This QAP will be valid for up to 5 years, and it will be reviewed prior to any additional Demonstration Tests. Any updates will be documented and sent to all recipients of the QAP. If substantial changes are anticipated during the project period (new laboratories, additional analyses, new methods, etc.), a call will be arranged with all parties that reviewed this QAP to determine how this document will be revised.

1.1 Project Organization and Responsibility

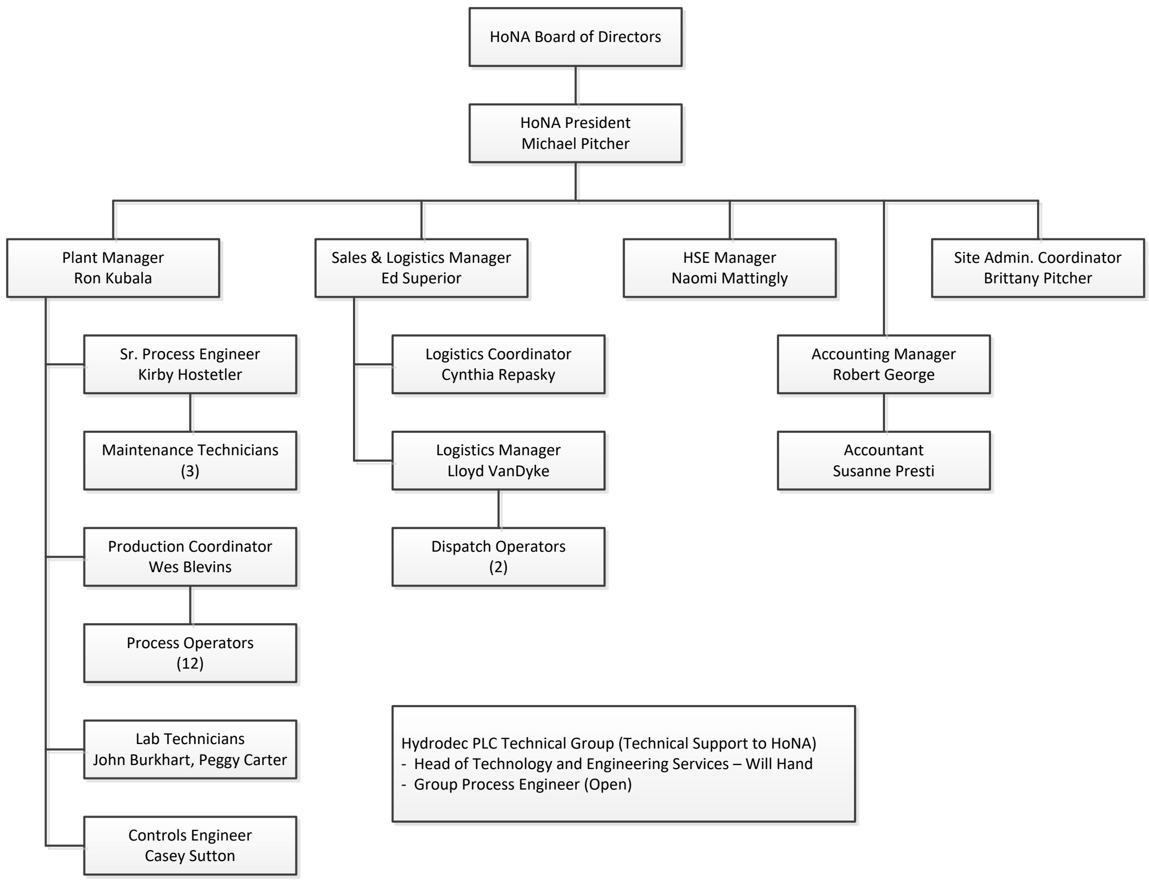
Figure 2 presents the organizational structure for the Hydrodec PCB Project. All lines of communication, management activities, and technical direction within this project team will follow this organization arrangement. Any directions or communications from the U.S. EPA will be given to the Hydrodec Project Manager. The U.S. EPA project manager will be notified of all proposed changes in personnel.

Figure 1 – Site Map



Hydrodec of North America, LLC – Site Map

Figure 2 – Project Organizational Chart



Responsibilities of key project personnel are outlined below.

Hydrodec Project Manager

1. Direct project activities.
2. Responsible for project planning.
3. Review site reports for consistency with objectives stated in work plans.
4. Provide final signatures.
5. Responsible for planning, coordinating, monitoring, and evaluating demonstration test plan.
6. Resolve technical problems.
7. Meet with team members to discuss and review analytical results prior to completion of final reports.
8. Responsible for demonstration test final report.

Hydrodec Quality Manager

1. Ensure that sampling methodology and COC procedures are being followed.
2. Assist in any QA/QC issues with process or laboratory questions, as needed.
3. Conducts Audits.
4. Maintain a record of samples submitted to the laboratory, the analyses being performed on each sample, the final analytical results, and Data Validation Reports (DVRs).
5. Review of QAP as warranted.

U.S. EPA Project Manager

1. Review the QAP
2. Review the final report.

Laboratory Technician

1. Responsible for samples submitted for analysis.
2. Responsible for summarizing quality assurance/quality control (QA/QC) requirements for the project
3. Maintain laboratory schedule and ensure that technical requirements are understood by laboratory personnel.
4. Provide technical guidance to Hydrodec Project Manager.
5. Ensure accuracy of the laboratory data.
6. Responsible for evaluating adherence to policies and ensuring those systems are in place to provide QA/QC as defined in the QAP.
7. Initiate and oversee audits of corrective action procedures.
8. Perform data reviews.

1.2 Facility History/Background Information

The Hydrodec property, as well as the entire Stein Industrial Park, entered into the Ohio Voluntary Action Program (brownfields). A covenant-not-to-sue was received from the Ohio EPA in July of 2009. Construction by Hydrodec began in August of 2007 with the majority of the facilities being completed in October 2008. Plant commission began in October of 2008 and currently processes used oil. The Hydrodec site is approximately 8 acres with operation taking place on approximately 5 of those acres.

1.3 Project Description and Schedule

Hydrodec of North America, LLC has designed a process that effectively treats transformer oils contaminated with polychlorinated biphenyls (PCBs). Hydrodec uses a hydrogenation process that chemically removes the chlorine from the PCB's rendering them harmless. The system is automated and consists of bulk shipment unloading, PCB storage tanks, a feedstock tank, heaters, reactors, heat exchangers, oil, water and gas separation, and a recycle gas recovery system. Hydrodec currently owns a similar facility in Australia. The Australian facility has demonstrated the process effectively destroys PCB's without hazardous emissions or bi-products. A Demonstration Test was conducted on September 20-22, 2016. The project includes feeding PCB contaminated feedstock into the process while monitoring PCB levels of entering and exiting the reactor. Details of the project-specific sampling activities were provided in the Demonstration Test Plan. It also includes a project schedule.

Hydrodec's on site laboratory will be the primary laboratory used for analyses.

1.4 Data Quality

Analytical quality objectives are used to ensure that the analysis will accurately and adequately identify the PCB levels in the Hydrodec process, and to ensure that the analysis selected will be able to achieve the quantization limits.

The project quality objectives process is a series of planning steps designed to ensure that the type, quantity, and quality of data used in evaluation are appropriate for the intended usage.

Samples of oil will be collected for analysis as described in the Permit Application in order to confirm the effectiveness of the Hydrodec process.

The laboratory reporting limit for PCBs in oil is 1 mg/kg. Processed oil samples returning results of greater than 2 mg/kg will be quarantined for re-processing.

Crystal Laboratories reporting limit for PCBs in water is 0.1ug/L. Wastewater samples returning values of greater than 0.5ug/L will be quarantined for off site processing by a licensed facility.

1.5 QA/QC Objectives for Measurement

The overall QA objective for the project is to develop and implement procedures for sampling, COC, laboratory analysis, and reporting. Specific procedures for sampling COC, laboratory instrument calibration, laboratory analysis, reporting of data, are described throughout this plan and in the Permit Application.

The quality control procedures for PCB analysis are provided in Appendix A – USC-LAB-PRC-009 – Analysis of PCBs in Oil By GC-ECD. Appendix A also provides a copy of USC-LAB-WKI-019 – PCB Sample Preparation.

Completeness is defined as the measure of the quantity of valid data obtained from a measurement system compared to the quantity that was expected under normal conditions. While a completeness goal of 100 percent is desirable, an overall completeness goal of 90 percent may be realistically achieved under normal field sampling and laboratory analysis conditions.

Methods used for the assessment of PARCCS for PCBs analytical results and target outcomes are listed below.

Parameter	**Method of Assessment**	**Target Values**
Precision	Replicate Analysis	<±10%
Accuracy	Laboratory Control Samples	<±15%
Completeness	Useable Data Obtained	≥90%

Representativeness and comparability are controlled by utilization of standardized processes for sample collection and handling of samples, and use of SOPs for the analysis of samples. Sensitivity is controlled by utilizing test methods with appropriately low reporting limits compared to the action levels, as described in Section 1.4.

1.6 Documentation and Records

Records generated during projects will be collected and maintained by Hydrodec. Hydrodec will use select documents for recording information during project activities. Records to be used for project documentation include sampling forms, laboratory data sheets, COC forms, and analytical results.

2.0 DATA GENERATION AND ACQUISITION

The purpose of the QAP is to produce reliable data that will be generated throughout the Project by:

- Ensuring the validity and integrity of the data;
- Ensuring and providing mechanisms for ongoing control of data quality;
- Evaluating data quality in terms of PARCCS; and
- Providing usable, quantitative data for analysis, interpretation, and decision making.

2.1 Sampling Process Design

Sample locations, analytical parameter, and frequency of sampling are discussed in the Permit Application. Laboratory test parameters for the sampling program will include analysis of PCBs (ASTM D4059).

QA/QC samples will be submitted in accordance with the Standard Operating Procedure USC-LAB-PRC-009.

2.2 Analytical Methods Requirements

In order to preserve the integrity of samples both before and during analyses, specific analytical methods and requirements for those methods will be followed. Samples will be collected in 2 oz glass bottles, prepared, and analyzed in accordance with the analytical methods outlined in the **Appendix A**. The Hydrodec Laboratory will coordinate all analytical services for this test and provide all sample containers.

2.3 Sample Handling and Custody Requirements

Proper sample handling and custody procedures are crucial to ensuring the quality and validity of data obtained through plant and laboratory analyses. Custody procedure will be used to document the authenticity of data collected during the Hydrodec project. An item is considered in custody if it is:

- In a person's possession;
- In view of the person after being in their possession;
- Sealed in a manner that it cannot be tampered with after having been in physical possession; or
- In a secure area restricted to authorized personnel.

2.3.1 Sample Collection Documentation

Sample-handling procedures include process documentation, COC documentation, sample shipment, and laboratory sample tracking. Various aspects of sample handling and shipment, as well as the proposed sample identification system and documentation, are discussed in the following sections.

2.3.1.1 Sample Log

A Laboratory sample log will be used to document sample details. Entries will be completed by the plant operator and will include location, date and time of sample

2.3.1.2 Identification System

Each sample collected during the project will be given a unique identification code. Each unique sample identification will be in the following format:

"CYYMMDDnn"

- *Project Identification Code.* A one-letter designation will be used to identify the Hydrodec project from which the sample was collected, in this case, C for Canton.

- *Date Code.* Each sample will be identified by the date on which the sample was collected, YY corresponding to the two digit year, MM corresponding to the month of collection, and DD corresponding to the day of the month.

- *Sample Number.* Each sample will be identified by a sequential number denoting the order in which the sample was collected.

- Example

C17051523 = the 23rd oil sample collected on the 15th of May 2017 at the Canton site.

Sample bottle labels appropriate for the size of the container shall be provided by the Hydrodec Laboratory. The sample containers will be labeled at the time of sample collection but prior to being filled. Each label will indicate at a minimum:

- Sample identification;
- Date/time of sample collection;
- Sampler's initials; and
- Required analyses;

All labels will be completed in ink.

2.3.1.3 Sample Handling

The possession and handling of samples will be documented from the time of collection to delivery to the laboratory. Hydrodec personnel are responsible for ensuring that COC procedures are followed. Plant operators will maintain custody of all samples until they are relinquished to the laboratory.

All samples must be catalogued on a Laboratory Sample Log using sample identification codes. The date and time of collection will be recorded on the form, as well as the number of each type of sample, and the type of analysis. Where third party laboratories are required to perform analyses, these will be documented on a Chain of Custody form, and a copy kept in the laboratory.

2.3.1.4 Sample Packaging and Shipping

Samples will be packaged and transported in a manner that maintains the integrity of the sample and permits the analysis to be performed within the prescribed holding time. Prior to shipment, each sample container will be inspected for a label with the proper sample identification code.

Samples will be hand delivered to the Hydrodec Laboratory. The laboratory will be contacted in advance to expect shipment so that holding times of the samples will be conserved.

2.3.2 Laboratory Chain of Custody

The Hydrodec Laboratory will perform laboratory custody procedures for sample receiving and log-in, sample storage, tracking during sample preparation and analysis, and storage of data in accordance with their SOPs. The Laboratory Technician will be responsible for ensuring that laboratory custody protocol is maintained.

2.4 Quality Control (QC) Requirements

The QC requirements ensure that the environmental data collected is of the highest standard feasible as appropriate for the intended application. Facets of the quality control requirements are provided in the following sections.

2.5 Instrument Calibration and Frequency

The responsibility for the calibration of laboratory equipment rests with the laboratory.

Documented and approved procedures will be used for calibrating measuring and testing equipment. Widely accepted procedures, such as those published by U.S. EPA and American Society for Testing and Materials (ASTM), or procedures provided by manufacturers in equipment manuals will be adopted. The proper calibration of laboratory equipment is a key element in the quality of the analysis done by the laboratory.

2.6 Data Management

Hydrodec personnel will collect operating parameter information throughout the Project. A copy of this checklist is provided in the Demonstration Test Plan.

The Laboratory Technician will be responsible for laboratory data management, including the maintenance of sample records and electronic laboratory results storage systems.

3.0 ASSESSMENT/OVERSIGHT

Performance and system audits will be completed to ensure that the sampling activities and laboratory analyses are performed following the procedures established in this QAP, including the attached SOP, and the Permit Application. The audits may be both internally and externally led, as further described below.

3.1 Technical Systems Audits

Generally, system audits are a qualitative measure of adherence to sampling QA measures overall, including sample collection handling, COC, and recording process data, as well as sample receiving, log-in, and instrument operating records in the laboratory.

3.1.1 Process Data

The Hydrodec Operations Coordinator will be present at the site during initial sampling activities and will be responsible for Process Operator sampling. The Operations Coordinator will provide the on-site guidance required during the project. The Operations Coordinator will be in daily contact with the Hydrodec Project Manager, who will then review compliance with the project objectives and sampling protocol outlined in this QAP. Any anticipated modifications to the sampling or monitoring procedures will be reported to the Hydrodec Project Manager.

Sample data precision will be determined by the collection and subsequent analysis of sample duplicates and laboratory control samples. Additionally, some samples may be selected for external laboratory confirmation.

3.1.2 Report Preparation

Prior to submittal to the U.S. EPA, all reports will undergo a peer review conducted by a project team within Hydrodec. All components of the report will be checked and initialed by a designated team member.

3.1.3 Laboratory Data

Laboratory results will be reviewed for compliance against the criteria for the level of reporting required.

3.2 Performance Evaluation Audits

Generally, performance audits are a quantitative measure of sample collection and laboratory analyses quality.

3.2.1 Field Audits

The Hydrodec Project Manager or his delegate will conduct audits of process activities at least twice per year. U.S. EPA may also conduct an independent audit. PCB Processing runs will be selected at random and an audit will cover the activities from receipt through to treatment. The audit will include the following checklist:

Item	Description of Field Audit Activities	Auditor Initials
1.	Review of sampling records	
2.	Review of process checklist	
3.	Examination of the sample label and identifications.	
4.	Review of the sample handling and packaging procedures	
5.	Review of COC procedures	

If deficiencies are observed during the audit, the deficiency shall be noted in writing and a follow-up audit may be completed if deemed necessary by the auditor. Corrective action procedures may need to be implemented due to the findings from the audit. Such actions will be documented in the project notebook.

3.2.2 Laboratory Audits

The Hydrodec Laboratory will perform all of the analytical services required during the assessments. The Hydrodec Laboratory will be responsible for all analytical work for this project using ASTM Method D4059. The Laboratory Technician will be responsible for ensuring that the laboratory data precision and accuracy are maintained in accordance with specifications and laboratory SOPs.

4.0 DATA VERIFICATION /USABILITY

This section describes the QA activities that will be performed to ensure that the collected data are properly documented, and of known quality, and meet project objectives. All analytical data collected from the Hydrodec PCB Project will be verified.

Data verification is a process of evaluating the completeness, correctness, and contractual compliance of a data set against the method standard, SOP, or contract requirements. Data verification will be performed internally by the analytical group or the laboratory generating the data. Data verification may result in accepted, qualified, or rejected data.

Data verification will be performed by evaluation against the precision, accuracy and sensitivity targets identified in Section 1.5. Completeness will then be determined by determination of the number of valid analytical results compared to the number of expected results.

In order to perform the data verification, the reported data will be supported by complete data packages which include sample receipt and tracking information, COC records, tabulated data summary forms, and analytical data for all samples, standards.

APPENDIX A

LABORATORY PCB QC PROCEDURE AND SOP