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1 PURPOSE AND SCOPE

The purpose of this manual is to provide guidance for the commissioning, operation, and decommissioning of the mobile oily water separator (OWS) in a safe, efficient and environmentally responsible manner.

2 REQUIREMENTS

2.1 REGULATIONS

Type A Water Licence No: "2AM–MRY1325 – Amendment No. 1", Nunavut Water Board

Nunavut Mine Health and Safety Act and Regulations.

2.2 HAZARDS AND REQUIRED HSE EQUIPMENT

2.2.1 HAZARDS

Identified hazards associated with commissioning, operation and decommissioning of the OWS include:

- Working with energized equipment and pressurized lines
- Working with electrically energized equipment near water
- Exposure to contaminated water and hazardous chemicals (i.e. diesel, bentonite)
- Working from heights
- Elevated noise levels (generator)
- Spills

2.2.2 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following personal protective equipment (PPE) requirements have been assigned to the commissioning, operation and decommissioning of the OWS:

Standard PPE

- Hard hat
- Reflective vest
- Safety glasses
- Steel toed boots
- Rubber gloves

Additional PPE

- Face respirator and P100 particulate cartridge (for handling bentonite and lead media)
- Rubber gloves and hip waiters (when installing the berm sump)
- Nitrile gloves, safety glasses and lab coat when performing sample analysis

- Ear protection (when working near generator)

All PPE must comply with applicable Baffinland's PPE policy and be inspected for damage prior to use.

2.2.3 Additional Safety and Environmental Equipment

The following safety and environmental equipment should be available at the OWS unit during operation.

- Fire extinguisher
- Spill kit
- Radio
- Spill pads (for fuel and free product tank)
- Quatrex bags (for used bag filters and spent media)

2.3 General Safety Instructions

- Monitor all pressure gauges and immediately shut down the OWS system if any exceedances occur
- Watch for pinch-points when exchanging bag filters
- Only trained personnel shall open or work on the electrical panels
- As a precaution against arc flashing, use your left hand and turn your body away from the electrical panel when switching off main breaker to the OWS
- When opening valves to vent air, do so slowly and carefully. Do not stand directly in front of valve.
- Ensure all electrical cords are in good condition and safely secured
- Practice good housekeeping inside and around the OWS unit
- Walk carefully between adsorption units, being careful not to become entangled with hoses or shut off valves by accident
- Wear all required PPE when working at OWS

2.4 Training and/or Qualifications

Any person commissioning, operating or decommissioning the OWS at the Project is required to have read and be familiar with this document. All operators will be trained by an experienced operator.

3 DEFINITIONS

Total Adsorption Tank Bed Volume: the maximum total volume of water that the three (3) media vessels can hold when full of their respective medias (i.e. GAC, bentonite, anthracite).

GAC: granular activated carbon

GPM: gallons per minute

LPC: liquid phase carbon

HMI (Human Machine Interface): refers to the screen in the OWS control room.

API: refers to the baffled tank in the first stage of treatment where free product is removed.

BTE: refers to benzene, toluene and ethylbenzene.

4 RESPONSIBILITIES

The following responsibilities have been assigned to Baffinland's Environmental and Surface Works Personnel regarding the commissioning, operation and decommissioning of the OWS.

4.1 ENVIRONMENTAL COORDINATOR

Under the supervision of the Environmental Superintendent, the Environmental Coordinator will be responsible for implementing this SOP at their Project site. In the absence of the Environmental Coordinator, the Project Site Environmental Lead or his/her designate will assume all responsibilities outlined in this procedure. Specifically, the Environmental Coordinator shall:

- Ensure Environmental staff operating the OWS have read, understand and follow this SOP;
- Review and modify this SOP, as necessary;
- Provide updates to the Environment Superintendent and/or Environment Manager on the status and current operations of the OWS;
- Oversee and supervise all OWS operations;
- Report sample analysis results to the Environment Superintendent and/or Environment Manager.

4.2 OPERATORS

Under the supervision of the Environmental Coordinator, OWS operators will be responsible for adhering to and following this manual. Specifically, operators shall:

- Read and adhere to the protocols outlined in this manual
- Wear all required PPE;
- Conduct routine inspections of the OWS work area to ensure adequate controls are in place to mitigate known hazards;

- Maintain a detailed log of all actions undertaken during operations and record all required data in the Daily Log Sheet (Appendix D);
- Complete required sampling and sample analysis (Section 5.5) to ensure OWS is operating as designed and that the final effluent meets water quality discharge criteria

4.3 Surface Works Personnel

Surface Works personnel shall support OWS operations, as necessary. Specifically Surface Works personnel shall:

- Provide a vacuum truck and operator for removing spent media;
- Assist in transporting, relocating and levelling the OWS unit;
- Assist operators in commissioning OWS by providing electrical support regarding power generation and ancillary components (wiring configuration and electrical switches);
- Provide logistical support in transporting barrels, Quatrex bags, supplies and other components to and from the OWS unit, as required.

5 PROTOCOL

5.1 Oily Water Separator (OWS) Overview

The OWS is a prefabricated system housed in a 40' foot seacan and is designed to remove oil, grease and BTE compounds from wastewater contaminated by hydrocarbons. The unit includes an API type separator to remove free product, a bag filter for solids removal and three adsorption units (one clay and two GAC) for hydrocarbon removal. In the event that the wastewater has lead concentrations that exceed the discharge limits outlined in Baffinland's Type 'A' Water License (2AM-MRY1325 Amendment No. 1), additional treatment barrels containing lead removal media will be added to the end of the OWS system. Refer to Section 5.3 for additional information on configuring the lead treatment barrels.

The OWS unit (Newterra model OWS-24) is sized for a water temperature of 7°C, specific gravity of 0.88 (diesel/furnace oil), TOG concentration of 50mg/L and flow rate of 50 gpm.

Error! Reference source not found. shows the Process Flow Diagram for the OWS.

Refer to Appendix A - Section 3 in the Newterra OWS O&M Manual for process and instrumentation drawings These drawings include equipment sizing, valves, and instrumentation as well as equipment/instrument tag and model numbers.

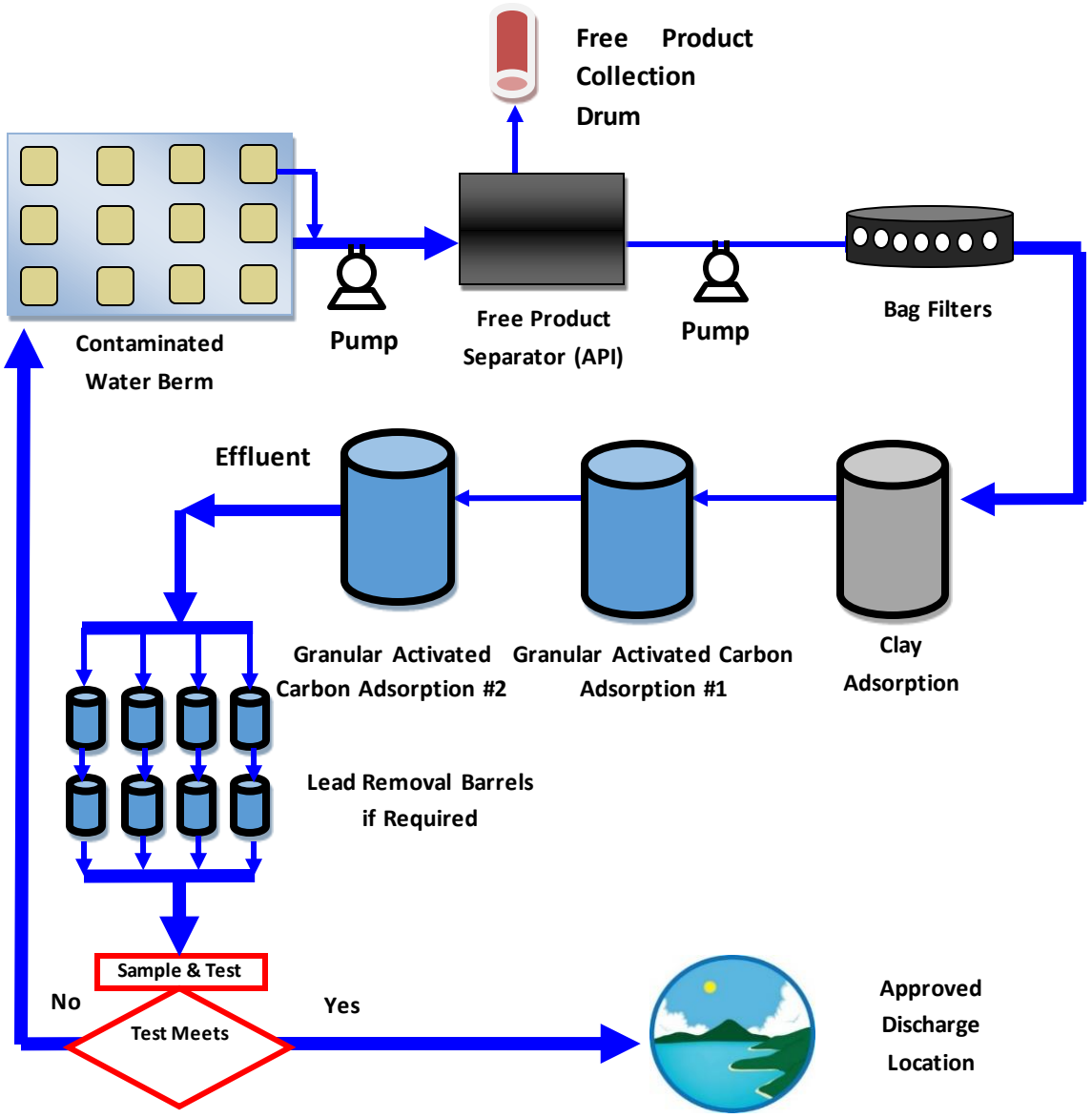

FIGURE 5-1 – OWS PROCESS FLOW DIAGRAM

The following protocols discuss in detail how to operate the OWS unit in a safe, efficient and environmentally responsible manner. Protocols discuss the commissioning, decommissioning and general operation procedures of the OWS unit as well as the water quality discharge criteria outlined in Baffinland's Type 'A' Water Licence (2AM-MRY1325 Amendment No. 1).

5.2 Water Quality Discharge Criteria

The main sources of the contaminated water (wastewater) that the mobile OWS unit will be treating are the Bulk Fuel Containment Facilities/Berms and the Landfarm Facilities (including the Contaminated Snow Containment Berms).

All discharges from Bulk Fuel Storage Facilities will not exceed the following effluent quality limits outlined in Table 5-1. Applicable Monitoring Stations include MP-03, MP-MRY-7, MS-03, MS-04, MS-MRY-6, SP-04 and SP-05.

TABLE 5-1 – EFFLUENT QUALITY DISCHARGE LIMITS FOR BULK FUEL STORAGE FACILITIES

Parameter	Maximum Concentration of Any Grab Sample (ug/L)
Benzene	370
Toluene	2
Ethylbenzene	90
Total Lead	1
Oil and Grease	15,000 and no visible sheen

*Source: Type A Water Licence (2AM-MRY1325 – Amendment 1) Table 8

All discharges from Landfarm Facilities, including the Contaminated Snow Containment Berms, will not exceed the following effluent quality limits outlined in Table 5-2. Applicable Monitoring Stations include MP-04, MS-05 and SP-06.

TABLE 5-2 – EFFLUENT QUALITY DISCHARGE LIMITS FOR LANDFARM FACILITIES

Parameter	Maximum Concentration of Any Grab Sample (ug/L)
pH	Between 6.0 and 9.0
TSS	15
Oil and Grease	15,000 and no visible sheen
Total Lead	1
Benzene	370
Toluene	2
Ethylbenzene	90

*Source: Type A Water Licence (2AM-MRY1325 – Amendment 1) Table 9

5.3 Commissioning the Oily Water Separator

Prior to commissioning the OWS, operators should review the OWS Commissioning Job Hazard Analysis (JHA) presented in Appendix B and inventory all chemicals/equipment required for OWS operation, including the supplies needed for sampling and conducting internal sample analysis.

As previously mentioned, the OWS system is a treatment train comprised of an API separator, a bag filter and three adsorption media vessels (tanks). The first process in the system's treatment train is the API separator which separates free-floating product with a skimmer and densely emulsified product with coarse screen filters. After the API separator, contaminated water is put through a bag filter unit to remove solids and is then percolated through three adsorption media tanks to remove any remaining hydrocarbon fractions. The first adsorption tank contains clay media comprised of two chemicals: anthracite and bentonite. Anthracite is a course media which is added to the tank first so that the anthracite is located at the bottom of the tank near the outlets. Anthracite is added first to prevent the finer bentonite media (added after the anthracite) from clogging the outlet filters located at the bottom of the tank. Following the clay adsorption tank, the second and third adsorption tanks are referred to as the GAC (LPC) tanks and are filled entirely with granulated activated carbon (GAC).

Table 5-3 provides the media types used in the OWS adsorption media tanks and their respective quantities.

TABLE 5-3 – ADSORPTION TANK MEDIAS AND QUANTITIES

OWS Adsorption Tank	Media Type	Quantity	# of bags/boxes
Clay (Tank 1)	Anthracite (added first and is utilized as course media around the outlet ports at the bottom of the tank)	1,000 lbs	18
Clay (Tank 1)	Bentonite	5000 lbs	103
GAC #1 (Tank 2)	Granulated Activated Carbon	3000 lbs	54.5
GAC #2 (Tank 3)	Granulated Activated Carbon	3000 lbs	54.5
Lead media (2 barrels per train, 3-4 trains in parallel)	Metsorb HMRG	3.5 cubic feet	3.5

Before commissioning the OWS system for the upcoming season, the influent and effluent TOG results from the previous year's treatment records should be assessed to determine if the existing media in the

OWS adsorption tanks needs to be replaced. Percent removals for each applicable parameter (i.e. BTE, TOG, lead, etc.) should be calculated using the previous year's influent and effluent analysis results just prior to the previous year's winterization/decommissioning of the OWS system.

$$\text{Percent removal} = \frac{Conc\ influent\ - Conc\ effluent}{100}$$

The media is completely spent (used) and will need to be replaced when the influent concentration is equal to the effluent concentration (i.e. percent removal = 0%). The percent removal is used to assess and determine whether the media is capable of effectively treating current hydrocarbon concentrations found in the wastewater to be treated. The media will need to be replaced if the percent removal is not sufficient to reduce the contaminants concentrations below the discharge requirements outlined in Section 5.2. Contact Environmental Coordinator for direction if unsure.

The following steps are required to replace media from the adsorption media tanks:

1. Review JHA (Appendix B) with supervisor. Modify JHA, if necessary.
2. Wear all appropriate PPE (including respirator and P100 particulate cartridge)
3. Remove lids from adsorption tanks.
4. Contact Surface Works to provide vacuum truck to remove media from tanks.
5. Transfer spent media into labelled Quatrex bags (white).
6. Refill tanks with quantities listed in Table 5-3.
   Note: *Bentonite contains silica dust which is carcinogenic and therefore requires personnel to wear a half mask respirator equipped with a P100 particulate cartridge when handling bentonite. Refer to MSDS for full instructions before handling or opening bags.*
7. Reattach adsorption tank lids.

Whether the existing media from the previous year or brand new media is being used, the media in the adsorption tanks must be soaked in clean freshwater for 24 hours prior to running contaminated water through the system. This allows air trapped in the media's pores to be removed and the full surface area of the media to be utilized in treatment.

The following steps are required to soak the media within the adsorption tanks:

1. Contact Surface Works to provide a water truck with a full load of freshwater.
2. Open up all inlet and outlet valves on adsorption tanks except the outlet valve on the last adsorption tank (GAC#2). This will allow water to equalize among all three adsorption tanks
3. Open pressure valves on the top of each adsorption tank for air venting.
4. Hook up water line to inlet of the first adsorption tank.
5. Begin pumping water into the adsorption tanks using water truck. Ensure water truck pump is throttled to its lowest setting.
6. As tanks fill, use a rubber mallet to hit around the circumference of each tank to release any remaining air.

7. Monitor pressure valves on adsorption tanks and ensure tank pressures **NEVER exceed 40 psi.** If necessary, shut off water truck periodically to allow pressure to release and equalize among tanks.
8. Shut off top pressure valves on each adsorption tank once water begins to come out of the each valve.
9. Shut off water truck once water has come out of each adsorption tank's top pressure valve.
10. Allow media to soak for 24 hours.

The OWS does not have its own power supply and therefore will need to be hooked up to a diesel generator to operate. For a generator and fuel tank, contact Surface Works. Refer to the Newterra OWS manual presented in Appendix A for engineered drawings and detailed instructions on how to hook-up the power line/supply, sump pump, water level float and free-product float.

Prior to starting the OWS unit, the wastewater to be treated (influent) should be sampled and analyzed internally to confirm the OWS unit is able to treat the hydrocarbon (TOG) levels found in the wastewater. If TOG levels are determined to be greater than 120 mg/L, contact the Environmental Coordinator for instruction.

Prior to discharging treated effluent from the OWS to the receiving environment, contaminated water should be re-circulated between the OWS unit and the wastewater containment berm. This is done to (1) flush out the freshwater used to soak the media in the adsorption tanks and (2) confirm the treated effluent discharged from the OWS meets the water quality discharge criteria outlined in Section 5.2 Approximately 10 m^3 (2640 USG) of wastewater must be recirculated through the OWS unit to flush the system of freshwater and confirm effluent quality.

Once the freshwater has been flushed out of the system, effluent samples can be collected for internal and external analysis. External effluent samples should collected and tested for all parameters required by the facility's effluent discharge criteria presented in Section 5.2. Internal samples should be taken in parallel to external samples and tested for TOG on-site using the procedure outlined in Section 5.5.3.

If after receiving the external analysis results, it is determined that lead treatment barrels will be required to ensure that the treated effluent meets the facility's discharge criteria, barrels will be setup following the third adsorption tank (GAC#2) of the OWS. Lead media barrels are typically configured into four trains in parallel with each train made of two barrels hooked up in series. The number of trains used is the limiting factor that determines the overall flow rate that can pass through the system, with each train having an approximate flow rate of 5 gpm. Each lead media barrel is equipped with a pressure gauge and water vent at the inlet valve located at the top of the barrel and an outlet valve at the bottom of the barrel. The effluent manifold should be placed at a higher elevation than the barrels to ensure barrels remain flooded when system is off. Air should be purged from the system upon start up. For more details on how to configure the lead treatment barrels and replace the lead removing media refer to Section 5.4.8.

Do NOT discharge any treated effluent from the OWS system to the receiving environment unless it has been authorized by the Environmental Manager.

5.4 Operation and Maintenance Procedures

The following procedures provide detail on how to safely operate and monitor the mobile OWS system. Prior to operating the OWS, all operators should review the OWS Operation JHA presented in Appendix C.

5.4.1 Target Operating Conditions

The following table outlines the initial target operating conditions:

TABLE 5-4 – INITIAL OPERATING TARGETS

Parameter	Units	Initial Target
Flow rate from Pump 4901 (FQI 7001) without Lead Treatment trains.	gpm	45-50
Flow rate from Pump 4901 (FQI 7001) with four (4) Lead Treatment trains.	gpm	15-20
Discharge Pressure of Pump 4901 (PI 4901)	psi	55
Max Bag Filter Inlet Pressure (PI 6701)	psi	40
Max Adsorption Unit Inlet Pressure (PI 7001)	psi	40
Max Lead Treatment Barrel Inlet Pressure	psi	10

5.4.2 System Start-up

1. Turn generator **ON** if not already running. Ensure sufficient oil in generator and diesel in fuel tank. **Note:** All operators must be trained by Surface Works electricians on the proper starting and fueling procedures when operating the OWS system.
2. Ensure electrical panel is securely closed/locked. **Note:** Only trained personnel should open and adjust breakers in electrical panel.
3. Turn **ON** main disconnect for power to the OWS if not already on. **DO NOT** stand directly in front of panel when turning **ON** or **OFF** main disconnect.
4. The HMI screen will display system status and active alarms. Scroll right or left to view the active alarms. Address any alarms present. Refer to Section 3 of the Newterra O&M Manual presented in Appendix A for a list of alarms and activation/deactivation conditions.

Note: Immediate power surge alarm will show on the HMI screen after power up. This will reset itself after five minutes. Address any other alarms present (float switches, free product barrel level, pressure alarms, etc.).

5. Once alarms are addressed go to main menu and clear alarms.
6. Walk through system to check for leaks and ensure influent pump and discharge lines are properly connected. Ensure all valves are properly positioned. Ensure there are no obstacles over any moving parts.
7. Ensure influent/sump pump and discharge lines are properly positioned and connected. If discharging, make sure a dissipater plate is in place at the discharge point to prevent surface erosion.
8. If no issues are observed turn the system **ON** at the HMI. Pumps should be manually set to **AUTO** mode.
9. Observe system operation to ensure the OWS is operating as designed. Check flow rates, pressures and confirm discharge.
10. Open valves at top of adsorption units and bag filter to purge air as described above.

5.4.3 System Shutdown

1. Turn system **OFF** on HMI.
2. Shutdown generator if system will be off for more than approximately 12 hours.
   Important Note: Turn **OFF** main disconnect in the OWS control room if personnel plan on conducting work on the OWS while the system and generator are off.

5.4.4 Routine System Checks

During normal operation the OWS system should be checked every four (4) hours at a minimum. As the amount of wastewater in the berm decreases or as specific concerns arise, the OWS system should be checked more regularly to ensure excessive amounts of sand or free product are NOT entering the system. The following instructions outline the tasks that should be completed during these routine checks.

1. Walk through system to check for leaks and ensure influent pump and discharge lines are properly placed/connected.
2. Confirm discharge flow and conduct visual inspection for any sheen or odor at the discharge location.
3. Record flow rates and pressures. Complete Daily Log presented in Appendix D. Collect samples as outlined in Section 5.5.2.
4. At the API, check level of free product using dipstick and water-detecting paste. If the free product level is 1/4" or more thick adjust the slotted pipe at the far end of the API using a 4" pipe wrench. The slit in the pipe should be at the surface of the liquid, just enough to remove any free product, and leave any remaining water in the tank. **Note: This is a completely manual step. Do not leave the slotted pipe at the liquid surface unattended for long periods of time as the free product**

level will change over time and result in the free product collection barrel quickly filling up with water.

5. Check level of free product around sump in the berm. If there is significant free product present protect the intake pump with booms. If necessary, the OWS may need to be shut down temporarily to remove excessive amounts of free product within the sump area.
6. Adjust flow balance between influent pump (P 4001) and API discharge pump (P 4901) using the appropriate ball/globe valve if required.
   Note: The target flow rate from the API effluent pump (P 4901) is 30 gpm (20 gpm if using four lead treatment barrel trains in parallel). Flow balance should be such that the desired flow rate through the system is achieved, and the influent pump runs continuously if possible. If the influent pump flow rate is greater than the API effluent pump the LAHH 4901 switch will turn the influent pump off to prevent overflowing the API. This will result in frequent LAHH 4901 alarms on the HMI. A significant amount of flow rate monitoring and adjustment may be required during the initial startup/commissioning of the system to achieve the proper flow balance.
7. Monitor bag filter inlet pressure. Replace bag filters if the maximum bag filter inlet pressure, 35 psi, is reached. Bag filters may require frequent replacement. Refer to Section 5.4.7.
8. Replace GAC/clay media if inlet pressure to the first adsorption unit exceeds 35 psi or if breakthrough of contaminants is observed in the final effluent (visual sheen or high TOG results).
9. Purge any air collected in the system via the vents on the bag filter/adsorption units.
10. Perform/schedule any required maintenance as per the Newterra O&M manual.
11. Collect and analyze samples according to Section 5.5 and take appropriate action.
12. If at any point during the operation of the mobile OWS, the final effluent at the discharge point is discovered to have a sheen or hydrocarbon odour, the OWS must be shut off and all discharge to the natural environment must stop immediately. Contact Environmental Coordinator.
13. If at any point during the operation of the mobile OWS, the internal TOG analyses indicates the final effluent does not meet the required discharge criteria outlined in Section 5.2, the OWS must be shut off and all discharge to the natural environment must stop immediately. Contact Environmental Coordinator.

5.4.5 System Alarms

The OWS system has several shutdown alarms and non-critical alarms. Shutdown alarms will turn the system off. Non-critical alarms will be displayed in the HMI and will activate the alarm light but will not shutdown the system. If an alarm appears on the HMI, investigate the cause and take the appropriate action. Once the issue has been addressed, clear the alarm using the HMI.

Refer to Section 3 in the Newterra O&M manual for details on the how the alarms are activated/deactivated.

5.4.6 MAINTENANCE

Several maintenance activities will need to be carried out after a recommended number of operating hours have passed. Refer to Section 8 in the Newterra O&M manual for details on the maintenance procedures and required, daily, weekly, monthly and yearly checks.

- Strainer cleaning: every 200 operating hours
- Pumps: every 800 operating hours
- Pressure gauges: every 4000 operating hours

In addition to these activities the filter bags and media will need to be replaced based on system pressures and water quality. See the following sections for more information.

5.4.7 FILTER BAG REPLACEMENT

Filter bags will need to be replaced when the inlet pressure to the filter housings reaches 35 psi. At 40 psi an alarm will be initiated.

To change out the filter bags complete the following steps:

1. Turn the system **OFF**.
2. Close inlet and outlet valves.
3. Relieve the pressure in the bag filter housing via the valve at the top of the housing.
4. Undo the housing bolts and remove lid.
5. If possible remove some of the water from the filter housing by partially draining the housing through the two inch line at the bottom of the stand or by removing the water from the top. Ensure drained water is contained and not spilled on floor. The bag filters can be replaced without removing the water however replacing the filter bags is easier when the housings is not full of water.
6. Place used filter bags into a pail or other container for disposal. The bags will be water logged and heavy. Use two people if required and proper lifting techniques (lift with knees NOT back). Filters can be burned and should be dropped off at the Waste Management Building to be incinerated onsite.
7. Insert new filter bags into the housing. The bags should fit flush at the top. Change all seven bags at the same time.
8. Apply silicon grease to the O-ring to prevent leaks from the lid if required.
9. Close the lid and bolt the lid down.
10. Check strainers and empty if required.
11. Open valves to bag filters.
12. Perform pre-start checks of system and turn system **ON**. Remove air trapped in filter housing by opening valve at top of housing until water is observed.

5.4.8 Lead Removal Media

As discussed in Section 5.3, eight barrels containing lead removal media (Metsorb HMRG) should be added downstream of the system following the adsorption tanks if lead concentrations in the effluent exceed discharge criteria. The maximum flow through one barrel is 5 gpm, therefore the maximum flow through four barrels in parallel is 20 gpm. At an influent concentration of 5 µg/L (effluent of >1 µg/L) 1 ft^3 of media should be able to process approximately 70 m^3 of wastewater. Other heavy metals and contaminants in the wastewater will also be adsorbed by the media so the volume of water processed by each cubic foot of media will vary and depend on the total amount of metals in the wastewater. Taking samples of the final effluent and the discharge from the first row of barrels will indicate when the media needs to be replaced.

5.4.8.1 Lead Media Replacement Procedure

If breakthrough (exceedance) is observed at the discharge of the first row of four barrels, the media in these barrels should be replaced and the order of the barrels switched. **The four barrels with new media will be moved to the second row and barrels that were originally in the second row with be moved to the first row.**

To change out the lead media in the barrels complete the following steps:

1. Drain barrels.
2. Remove lids and scoop out spent media into labelled Quatrex bags for hazardous waste disposal.
3. Rinse barrels with a small amount of clean water.
4. Replace or rinse filter sock on bottom piping inside the barrels.
5. Put on appropriate respirators and review MSDS for procedures on handling media. Slowly pour new media into barrels being careful not to damage piping at bottom of barrels. Barrels will be approximately 1/3 full of media with 3-3.5 ft^3 of media. Settling of media inside the barrel can be aided by tapping the barrel sides with a rubber mallet.
6. Replace lids and ensure adequate seal.

5.5 Sampling Schedule, Supplies and Procedures

The following table provides the sampling schedule and requirements for the commissioning and normal operation of the OWS. Confirm with Environmental Coordinator when sending out external samples.

Table 5-5 – **Sampling Schedule**

Parameter	Location within OWS	Internal Sampling Frequency	External Sampling Frequency
Oil and Grease	Influent	Start of open water season at each source/facility that contains wastewater potentially requiring treatment	Start of open water season at each source/facility that contains wastewater potentially requiring treatment
	API Effluent	Every 4 hours	
	Final Effluent	Every 4 hours	Prior to discharge/ Weekly during discharge
Total Lead pH TSS (only effluent)	Influent		Start of open water season at each source/facility that contains wastewater potentially requiring treatment
	Final Effluent		Prior to discharge/ Weekly during discharge
Benzene Toluene Ethylbenzene	Influent		Start of open water season at each source/facility that contains wastewater potentially requiring treatment.
	GAC #1 Effluent		Weekly
	Final Effluent		Prior to discharge/ Weekly during discharge

5.5.1 SAMPLING EQUIPMENT

- Required PPE (refer to Section 2.2.2)
- Sampling bottles: Group 5 bottle set for external samples (See Appendix E for exact bottle set requirements), 250 mL glass wide-mouth jars for internal samples.

5.5.2 SAMPLING PROCEDURE

1. Obtain and wear appropriate PPE listed in Section 2.2.2.
2. Obtain sampling equipment outlined Section 5.5.1.
3. Check HMI to identify any active alarms.
4. Conduct a visual inspection to identify any leaks, system failures, and potential hazards (high pressures, electrical malfunctions, improperly opened valves, poor discharge/recirculation lines, etc.),
5. Record any system failures, leaks, hazards or inconsistencies observed on the Daily Log (refer to Appendix D).
6. Record all readings on the Daily Log.
7. Collect water samples at designated sampling ports for analyses (see Table 5-5 for required sampling locations and analysis).
8. Use 250mL wide-mouthed glass jars to collecting internal samples. Samples should be labeled with the date, time and sampling location/station. Internal sampling jars can be reused for internal analyses however, if reused, sampling jars should be used for the same sampling locations within the system (i.e. influent, effluent, etc.). Replace jars if suspected cross contamination is occurring.
9. All internal samples should be collected by following steps 1 through 6 at the required intervals outlined by Table 5-5.
10. Analyze internal samples for TOG following the analysis procedure outlined in Section 5.5.3.
11. Complete Daily Log with all the required information filled out including the date, time of routine checks, pressure readings throughout the system, totalizer values and internal TOG results. At the end of the day, information on the Daily Log will be transferred to the electronic Discharge Log located on the Mine Site Environmental Server (refer to Appendix D).
12. External samples must be collected according the Sampling Schedule (Table 5-5) and should be delivered to the onsite ALS lab within 24 hours of being collected accompanied with a completed COC.

5.5.3 TOG Sample Analysis Procedure

Required Lab Supplies, Equipment and PPE

- 2 x 20ml glass graduated cylinder
- Glass funnel
- TOG analyzer + cuvette(s)
- Sulphuric Acid (98%) + pump
- S-316 Solvent
- Sodium Sulfate, anhydrous
- Spoon
- Pipette and tips
- Two glass mix jars for influent and effluent samples with 100ml marked
- Whatman filter Paper
- Kim wipes
- Nitrile gloves
- Lab coat
- Safety glasses

1. Turn TOG analyzer **ON** if it is not already on. Allow TOG analyzer to warm up for 1 hour.
   Note: The TOG analyzer can be kept on for the entire length of time the mobile OWS is operating.
2. Rinse all glassware with solvent: Horiba S-316 (i.e. funnels, graduated cylinders, pre marked 100mL mix jars, and cuvettes)
3. Add 100mL of sample to pre-marked mix jar.
4. Add 1mL of sulfuric acid (~98% conc.) to sample in mix jar.
5. Shake for 10 seconds.
6. Add 11mL of solvent to sample. The volume of solvent should be 10% of the total volume of solvent-sample mix.
7. Shake the mix jar for 2 minutes, opening mix jar at least twice to release any vapour buildup.
8. Allow mix jar contents to settle. A solvent layer containing the hydrocarbons in the sample should form at the bottom of the mix jar.
9. Fill cuvette with solvent, wipe thoroughly with Kim wipe and place in analyzer. This will serve as a blank.
10. Press and hold ZERO on analyzer. BAL will display on the screen followed by a number. Leave the cuvette in the analyzer and press RUN. If the result is within ±2 mg/L the analyzer is zeroed.
    Note: The cuvette should be placed in the analyzer with the frosted side facing you. The cuvette should always be placed in the analyzer in the same direction.
11. Add 1 spoonful of sodium sulfate to a folded Whatman filter in the glass funnel.
12. Extract settled solvent layer from bottom of mix jar with a 10mL pipette and filter it through the sodium sulfate inside the Whatman filter and into a clean graduated cylinder. This will remove any remaining water captured during the extraction of the solvent. Only 3-5 mL of filtered solvent

is required to analyze the solvent layer and determine the hydrocarbon concentration in the sample (i.e. effluent, influent, etc.).

13. Fill cuvette with the filtered solvent, wipe thoroughly with Kim wipe and place in analyzer.
14. Press **RUN** to analyze.
15. Record results on Daily Log.
16. If TOG results seem high in comparison to external results, clean all glassware with solvent and redo analysis. If the hydrocarbon concentration in the influent sample water is equal or greater than 120 mg/L, system checks should be done more frequently and sampling should increase to every two (2) hours. Notify Environmental Coordinator of inflated TOG levels in influent.
17. If at any point during the operation of the mobile OWS, the internal TOG analyses indicates the final effluent does not meet the required discharge criteria outlined in Section 5.2, the OWS must be shut off and all discharge to the natural environment must stop immediately. Contact Environmental Coordinator.

5.6 Decommissioning the Oil Water Separator

The following procedures should be followed to safely and effectively decommission the mobile OWS unit when transporting the unit between Project sites or for winterization/end of season storage.

5.6.1 Decommissioning For Transport

Before transporting the mobile OWS unit between Project sites, the unit must be drained. The draining procedure required for transport is identical to seasonal storage draining procedure (refer to Section 5.6.2), however since this is completed to reduce weight for shipping, the lines and pumps are not required to be drained since this is a very time consuming process. Only media vessels and the API tank are required to be drained prior to transport. Additionally, all valves should remain closed during transport.

5.6.2 Decommissioning For Seasonal Storage

The decommissioning of the mobile OWS unit for seasonal storage requires all water to be drained from the system. Electricians are required to disconnect all wiring. All drained sensors and pumps should be placed and stored inside the control room. All hoses and lines must be drained of any residual water so that lines can be disassembled and will not rupture due to ice expansion. Hoses and lines should be drained using the valves at low points and available ports. Residual water must be drained back into the berm or captured in pails/tubs to be eventually transferred back into berm. Spilling contaminated water onto the ground is considered a spill and must be reported.

Complete removal of all water is required for the adsorption tanks and API tank.

To drain the three (3) adsorption tanks, a 3" trash pump must be hooked up to the bottom ball valve of each adsorption tank and used to effectively pump out all remaining water out of each tank. To minimize the possibility of removing any media in this process, the bottom ball valve on the bottom of each adsorption tank should only be partially opened and the trash pump should be throttled down to its lowest

setting to reduce the overall flow rate/vacuum at the outlet of each adsorption tank. When each tank is empty and the trash pump begins to suck in air, the trash pump must be shut-down for 5-10 minutes to allow residual water to gravity drain through media and collect at the bottom of the adsorption tank.

Leave the bottom ball valve of each adsorption tank in the open position with a pail placed underneath the valve to catch any residual water dripping out of the tanks (empty as necessary). Open the lid on the top of each media vessel and allow the media to dry for a 2-3 days. If weather is cold, turn heaters on in the OWS unit or use a frost fighter to expedite the drying process.

To drain the API tank, setup a tub underneath the drain port on the outside of the OWS unit. Open the lowest ball valve on the drain port to allow the water in the API tank to gravity drain into the tub. Transfer contaminated water from the tub to the facility's containment berm.

Double-check that all valves and drain ports are opened and drained to ensure ALL residual water has been removed. It is absolutely critical that all lines, pipes, tanks and vessels have been completely drained of any water prior to freeze up.

5.7 OWS Discharge Log, Results Dissemination and Approval for Discharge

All the monitoring documentation to be completed during the operation of the OWS unit is located in the OWS Discharge Log file on the Mine Site Environmental Server at FINAL File System\2.0 ENV MANAGEMENT, MONITORING PLANS (BIM INTERNAL)\2.08 Oily Water Separators. This file contains the Summary Sheet, the External Results Sheet and the Daily Log Forms presented in Appendix G, Appendix F and Appendix D, respectively.

The External Results Sheet presented in Appendix F must be updated upon receipt of any external sample results, including preliminary results. The Environmental Coordinator or his/her designate will provide the results to the Environment Superintendent and/or Manager who will assess the results and determine whether the effluent quality is acceptable for discharge or will assign instructions for additional treatment.

The Daily Log (refer to Appendix D) must be updated to include all internal samples and weekly external samples (if applicable) throughout the treatment process. End-of-shift cumulative discharge values and additional notes must also be recorded on the Daily Log.

The Summary Sheet (refer to Appendix G) must be filled out after all wastewater has been treated for a specific facility (i.e. Bulk Fuel Storage Facility, Landfarm Facility, etc.).

All documentation must be added to the appropriate site server location (FINAL File System\2.0 ENV MANAGEMENT, MONITORING PLANS (BIM INTERNAL)\2.08 Oily Water Separators). Upon the completion of wastewater treatment at a facility, the completed OWS Discharge Log must be provided to the Environmental Coordinator, Superintendent and Manager.

6 REFERENCES

AMEC FW, (2014). Baffinland Iron Mines field notes OWS. July, 2014

Water Licence No: 2AM-MRY1325 – Amendment No. 1, Nunavut Water Board (July 21, 2015)

Newterra, (2013), Process Treatment System Project # 102140. Operation and Maintenance Manual

APPENDIX A -

NEWTERRA OWS O&M MANUAL

1.0 Start Up Procedure
Commissioning Checklist

Test Records
Packing List

2.0 Mechanical Drawings

3.0 Electrical Drawings

4.0 Control Panel Module

5.0 Components

6.0 Specs

7.0 Manuals

8.0 System Maintenance, Troubleshooting

RTS - 151
150 GPM WATER TREATMENT SYSTEM
STARTUP PROCEDURE

- If the system is being started for the first time then work your way through the commissioning checklist in the installation guide or system manual before starting the system.
- If kill switch on panel (red mushroom shaped button) is pulled out then push it in to confirm that system is off.
- Pull kill button out in process room so the system can start at the appropriate time.
- Walk through process piping and check the position of all process valves.
- Check that there are no obstructions over any moving parts.
- Check that main disconnect is on.
- Put all hand/off/auto switches in auto.
- Pull the kill Button (red button on panel) out to start the process.
- Push the reset button on the operator interface to reset all alarms.
- Push the start button on the Operator Interface.
- If an alarm occurred on startup, then review the alarm descriptions and troubleshooting guide in the installation guide or manual for guidance on how to troubleshoot the problem. Fix the alarm condition and restart the system with the above procedure.

RTS - 151 150 GPM

Mech Eng:		Control:	Tester #1:	Warren, Kevin
Mechanical Team:	Electrical Team:	Panel Team:	Tester #2:	
-Select One-	-Select One-	-Select One-		
			Start Date:	8/20/2013
			End Date:	8/27/2013

SECTION A - PRE-TEST FLOW RATES AND POWER DETAILS

P-VLS		B-STRIP	
B-SVE		P-STRIP	
P-OWS		C-SPRG	
OTHER:		OTHER:	

System Certifications	Panel Standard	System Standard	SETPOINTS
Building #1 / Room #1:	UL 698A	MET us, Classified	
Building #2 / Room #2:	N/A	N/A	
Site Power Requirements			
Voltage:	208 Vac	3-Phase , 3-Wire	
Amperage:	125 Amps		

Notes:

SECTION B - WALK AROUND	OK / NA	INITIALS
Check That Walk Through Issues Have Been Resolved, Review Shop Aids	OK	KW
Lay Down Electrical Safety Mat and Set Up Testing Cart	OK	KW
Ensure That Testing Tote Is Connected and That Hoses Are Secure	OK	KW
Ensure That Carbon Vessels Are Bypassed	OK	KW
Verify That Exhaust Mufflers and Elbows are Installed (SVE/Sparge/Compressed Air)	OK	KW
Make Sure That Building Fan and Louvre Shipping Braces Have Been Removed	OK	KW

SECTION C - WALK THROUGH	OK / NA	INITIALS
Inspect Valves and Process Lines	OK	KW
Check Transmitter / Magnehelic Lines for Low Lying Spots Where Moisture can Collect	N/A	KW
Check That Floor Vents Have Been Installed	N/A	KW
Record Process Equipment Model and Serial Numbers* and Motor Nameplates	OK	KW
Notify Project Manager and Production Staff of Any Outstanding Issues	OK	KW

* This includes motors, blowers, compressors, oxygen/ozone generators, pumps, etc.

SECTION D - PANEL OFF INSPECTION	OK / NA	INITIALS
Check for Dielectric Test Label	OK	KW
Check for Auto Re-Start Label, Check for Ground, L1, L2, L3 and High Leg Labels	OK	KW
Check for IS Wiring Warning Stickers in Panel and on Lines From Panel	OK	KW
Ensure Neutral Wire is Connected To Terminal Block	OK	KW
Inspect 24Vdc and 120Vac Relays for Proper Connections	OK	KW
Check That Spare IS Input Wires Are Pulled	OK	KW
Cross Check Fuses, Circuit Breakers and Starters with Fuse Schedule	OK	KW
Determine Service Factor Amps and Set Motor Overloads	OK	KW

SECTION E - PANEL ON INSPECTION	OK / NA	INITIALS
Record Test Supply Voltages		
Primary: L1/L2 213, L2/L3 213, L3/L1 213 Vac; L1/N 124, L2/N 124, L3/N 124 Vac — **Secondary:** L1/L2 245, L2/L3 124, L3/L1 Vac; L3/N Vac		
Record 24Vdc Supply Voltage 24 Vdc	OK	KW
Test GFI and non GFI Outlets	OK	KW
Check "Push To Test" Panel Indicators	OK	KW
	N/A	KW

SECTION F - INITIAL SYSTEM SETUP AND TESTING	OK / NA	INITIALS
Archive Pre-Test Program Revisions and Create New Revision	N/A	KW
Check E-mail Configuration Through ECOM Card on PLC	N/A	KW
Record H0-ECOM100 Firmware Revision v.	N/A	KW
Update PLC Firmware and Record Revision: v.	OK	KW
Initialize Scratch Pad of Automation Direct PLCs	OK	KW
Upload PLC Program	OK	KW
Set PLC Clock and Calendar	OK	KW
Check Functionality of All Discrete Inputs	OK	KW
Check Functionality of All Discrete Outputs	OK	KW
Check Functionality of All Analog Inputs and Outputs	OK	KW
Switch System Outputs to AUTO Mode	OK	KW
Set and Test All Setpoints	OK	KW

SECTION G - OPERATOR INTERFACE (PANEL DOOR / TOUCHSCREEN)	OK / NA	INITIALS
Type of Operator Interface: -Select One-		
Update Display Screen Firmware, Record Revision v.	OK	KW
Upload Panel Program	OK	KW
Test Panel Menu Hierarchy	OK	KW
Check PLC to Panel Communication, Remove Ground Jumper if Necessary	OK	KW
Verify Value, Scale, Significant Digits and Units of Analogue Signals	N/A	KW
Check Functionality of All Discrete Inputs	OK	KW
Check Functionality of All Discrete Outputs	OK	KW
Test All User-Adjustable Setpoints	OK	KW
Verify Correct Hourmeter Values, Ensure Proper Time is Kept	OK	KW

SECTION H - VFD / SOFT START DEVICES	OK / NA	INITIALS
Drive Type and Application: N/A N/A		
Verify Drive Parameter Settings Match Electrical Drawings	N/A	KW
Test Frequency Control	N/A	KW
Check VFD Noise on Analog Signals / Adjust Carrier Frequency Accordingly	N/A	KW
Save VFD Set-up Variables From PowerSuite / Record VFD Settings	N/A	KW
Verify Integrity of RS-485 Communications, Record Settings	N/A	KW
BAUD: N/A PARITY: N/A STOP BITS: N/A CARRIER: N/A		

SECTION I - ANALOG SIGNALS	INITIALS
PLC Card Slot #1: N/A - Not Installed	KW
PLC Card Slot #2: N/A - Not Installed	KW
PLC Card Slot #3: N/A - Not Installed	KW
PLC Card Slot #4: N/A - Not Installed	KW

Check mA Signals at Different Operating Points for Device Hysterisis and Calibration	N/A	KW
Check Conversion Math and Square Root Functions in PLC Logic	N/A	KW

SECTION J - SYSTEM OPERATION	OK / NA	INITIALS
Check Building Fan(s) and/or Heater(s) Operation	OK	KW
Test All Kill Buttons	OK	KW
Bump Motors and Check For Excessive or Abnormal Current Draw	OK	KW
Ensure that LSL Switches are Above Pump Intakes	OK	KW
Set and Test Pressure and Vacuum Relief Valves According to P&ID	N/A	KW
Thoroughly Test Control Logic	OK	KW
Check Functionality of Oxidizer Interlocks	N/A	KW
Run System In Full Automatic	OK	KW
Simulate All Alarms, Check That Non-Critical Alarms Do Not Shut Down System	N/A	KW
Check Magnehelic Gauges for Accuracy, Verify Air Flows Using Hot Wire Anemometer	N/A	KW
Measured CFM: @ PSI/"Hg/"WC		
Measured CFM: @ PSI/"Hg/"WC		
Measured CFM: @ PSI/"Hg/"WC		
Measured CFM: @ PSI/"Hg/"WC		
Verify Logic and Flow For All Solenoid Valves, Including Auto-Oilers	N/A	KW
Run System With Doors Closed and Monitor Ventilation	N/A	KW
Verify Auto Restart Functionality of Whole System (Including VFD)	OK	KW
Check for Water / Compressed Air (Bubble Test) Leaks	OK	KW

SECTION K - PLC FINAL CHECK	OK / NA	INITIALS
Check Hour Meter Variable Memory Locations and Minute Counters	N/A	KW
Force Datalogging	N/A	KW
Update PLC Program Revision(and Operator Interface if Applicable)	OK	KW
Final Program Revision # : v. 2.0		

SECTION L - TELEMETRY	√OK/ NA	INITIALS
Select Communication Type:		
Confirm Remote Access, Record Method	N/A	KW
Check Modem Auto-Reboot Feature	N/A	KW
Test System Operation Using Offsite Package, Review Datalog Files	N/A	KW
Test System Email Out	N/A	KW
Configure Autodialer (Set Sensaphone Passwords to "2000" and "s2000")	N/A	KW
Test Autodialer Alarm Dial-out and Report	N/A	KW

SECTION M - FINAL SYSTEM TESTING / AS BUILT	OK/ NA	INITIALS
Record Max Noise Level dBA @ ft.	N/A	KW
Record Motor Voltages, Currents and Operating Conditions	OK	KW
Add Flow Charts, Piping Labels (Hot**, Directional), Oxygen / Ozone Generator Labels	OK	KW
Pump Water Out Of System	OK	KW
Turn Off All Breakers and HOA Switches	OK	KW
Take System Pictures	OK	KW
Email Project Manager and Production Staff	OK	KW
Update System Approval Data Plates, Fuse Schedule and Startup Procedure	OK	KW
Ensure appropriate approval labels are obtained (GP, Haz). **Rentals require US and CAN.**	OK	KW
Attach System Approval Stickers, Fuse Schedule and Startup Procedure	OK	KW
Take Panel Pictures and Transfer All Pictures to Project Folder	OK	KW
Check Off "Testing" as Being Complete in APES	N/A	KW
Make Changes to the IO and Alarms Tables Are Captured in the Markups	OK	KW
Update Project Software Folder	OK	KW

Copy Completed Test Sheets to Electrical As-Builts Directory with DWG Files and Bill of Materials
Check Off "As-Builts" Box in APES
** Hot Labels to be Applied to Any Piping >/= 140 DegF as Determined by IR Readings

MECHANICAL TEST RECORD

Device Name:	**P-4901**	Manufacturer:	**GOULDS**
Device Model #:	**4SH2K52COW**	Device Serial #:	**F1200054**
Motor Manufacturer:	**WEG**	Area Classification Tag Checked:	
Motor Model #:	**JM007402**	Motor Serial #:	**1014500858**
HP:	**7.50**	Voltage: **208**	Frame: **184JM** RPM: **3480**
Phase:	**3**	Current: **20.70**	SF: **1.15** ENCL.: **TEFC**

Factory Test:				Field Test:			
L1	L2	L3		L1	L2	L3	
20.9	**20.6**	**21.4**	Amps				Amps
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1	
213	**213**	**213**	Vac				Vac

Device Name:	**P-4001**	Manufacturer:	**GOULDS**
Device Model #:	**WS15112BHF**	Device Serial #:	**RC-061**
Motor Manufacturer:	**GOULDS**	Area Classification Tag Checked:	
Motor Model #:		Motor Serial #:	
HP:	**1.50**	Voltage: **230**	Frame: RPM: **3450**
Phase:		Current: **18.00**	SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3		L1	L2	L3	
17.1			Amps				Amps
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1	
213			Vac				Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:		Area Classification Tag Checked:	
Motor Model #:		Motor Serial #:	
HP:		Voltage:	Frame: RPM:
Phase:		Current:	SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3		L1	L2	L3	
			Amps				Amps
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1	
			Vac				Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:		Area Classification Tag Checked:	
Motor Model #:		Motor Serial #:	
HP:		Voltage:	Frame: RPM:
Phase:		Current:	SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3		L1	L2	L3	
			Amps				Amps
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1	
			Vac				Vac

MECHANICAL TEST RECORD

Device Name: Manufacturer:
Device Model #: Device Serial #:
Motor Manufacturer: Area Classification Tag Checked:
Motor Model #: Motor Serial #:
HP: Voltage: Frame: RPM:
Phase: Current: SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name: Manufacturer:
Device Model #: Device Serial #:
Motor Manufacturer: Area Classification Tag Checked:
Motor Model #: Motor Serial #:
HP: Voltage: Frame: RPM:
Phase: Current: SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name: Manufacturer:
Device Model #: Device Serial #:
Motor Manufacturer: Area Classification Tag Checked:
Motor Model #: Motor Serial #:
HP: Voltage: Frame: RPM:
Phase: Current: SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name: Manufacturer:
Device Model #: Device Serial #:
Motor Manufacturer: Area Classification Tag Checked:
Motor Model #: Motor Serial #:
HP: Voltage: Frame: RPM:
Phase: Current: SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

MECHANICAL TEST RECORD

Device Name: Manufacturer:
Device Model #: Device Serial #:
Motor Manufacturer: Area Classification Tag Checked:
Motor Model #: Motor Serial #:
HP: Voltage: Frame: RPM:
Phase: Current: SF: ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1		L1/L2	L2/L3	L3/L1	

Vac	Vac

Device Name:	Manufacturer:
Device Model #:	Device Serial #:
Motor Manufacturer:	Area Classification Tag Checked:
Motor Model #:	Motor Serial #:
HP: Voltage:	Frame: RPM:
Phase: Current:	SF: ENCL.:
Factory Test:	Field Test:
L1 L2 L3 Amps	L1 L2 L3 Amps
L1/L2 L2/L3 L3/L1 Vac	L1/L2 L2/L3 L3/L1 Vac

Device Name:	Manufacturer:
Device Model #:	Device Serial #:
Motor Manufacturer:	Area Classification Tag Checked:
Motor Model #:	Motor Serial #:
HP: Voltage:	Frame: RPM:
Phase: Current:	SF: ENCL.:
Factory Test:	Field Test:
L1 L2 L3 Amps	L1 L2 L3 Amps
L1/L2 L2/L3 L3/L1 Vac	L1/L2 L2/L3 L3/L1 Vac

Device Name:	Manufacturer:
Device Model #:	Device Serial #:
Motor Manufacturer:	Area Classification Tag Checked:
Motor Model #:	Motor Serial #:
HP: Voltage:	Frame: RPM:
Phase: Current:	SF: ENCL.:
Factory Test:	Field Test:
L1 L2 L3 Amps	L1 L2 L3 Amps
L1/L2 L2/L3 L3/L1 Vac	L1/L2 L2/L3 L3/L1 Vac

Pre-commissioning Checklist

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Please return copy of completed form to newterra prior to startup Project number and name:
The purpose of this report is that the customer is prepared for startup.
Please send us the completed Pre-Commissioning Checklist 5 days prior to our site visit.
Return to Shane Henderson at shenderson@newterra.com or Fax 613-345-7633
Checked by: Date:

Checklist	Ck
Verify site power is correctly installed to the control panel and necessary electrical approvals have been completed.	
Verify that all input wiring is completed and wired into the control panel according to the installation guide.	
Verify that all power wiring is completed and wired into the control panel according to the installation guide.	
Verify that Compressed air will be connected to system (if required).	
Verify that Fresh Water supply is installed to system (if required).	
Verify that all process piping will be installed and completed.	
Verify that the required approvals are in place to allow the system to discharge air and water as designed.	
Verify that system has been installed on a level pad.	
Verify that all field piping will be completed and wells will be connected to the operating system.	
Verify that phone line is installed and activated if required.	
Additional Checklist Items related to Oxidizers	
Verify that all necessary wiring is completed between the oxidizer and the main control system.	
Verify that all piping between oxidizer and treatment system is completed.	
Verify that Power is connected to oxidizer and necessary electrical approvals have been completed.	
Verify that the required approvals are in place to allow the oxidizer to discharge air to the atmosphere.	
Verify that Gas is connected to the oxidizer and activated to allow for testing of the oxidizer. Note: Please ensure that the gas supply valves are not locked out by the local gas installer at time of commissioning.	
If local gas approval is required for oxidizer, ensure that this is completed or planned to occur during the commissioning.	

******All Tasks will be completed No Later Than 5 Business days prior to newterra Technicians arrival onsite.***
Please note if newterra arrives onsite and items have not been completed there will be a charge associated.
Site Address: _____
_____
_____

Onsite Contact Name & Number: _____
_____
Customer Sign-off Date

System Field Test Checklist

This purpose of this report is to test the functionality of electrical, control, and mechanical components to ensure the system operates as originally designed. This testing is then documented so it can be referenced at a later date if needed.

The following field test records must be completed by the startup technician on site before operating the process system. This is the last quality check ensuring the process equipment is ready for continuous operation.

newterra™ highly recommends that the system is started by a newterra factory trained startup technician to ensure the long term success of your project. We understand that this may not always be feasible in which case we would require a highly skilled technician capable of troubleshooting both mechanical and electrical aspects of a process treatment system and be familiar with our manual, equipment and capable of training the operator on operating and maintenance requirements of the treatment system.

This checklist must be sent back to Product Support department at newterra to validate your equipment warranty which begins on the date of shipment from the factory. It can be sent back in one of the following methods:

Email: service@newterra.com

Fax: Att: Product Support
(613) 345 7633
If you choose to fax the document then, please follow up with an email explaining that a fax was sent so we can ensure that we received the fax and properly validated the equipment warranty.

Project number: _____
Project name: _____

Tested By: _____
Company: _____
Date Tested: _____

System Field Test Checklist

Minimum Tools Required:

Clamp style amp meter	Socket Set
Multi meter for AC/DC Volts and ma signals	Wire Cutters
Instrumentation Screw Driver	Wire Strippers
Screw Driver Set	Channel Locks
Wrench Set	Pipe Wrenches
Straight Edge for Aligning couplings and belts	

Testing Checklist	Ck	Initial	Date
Verify site power per system design criteria			
Verify building process flow and instrumentation matches P +ID drawing, check off drawing components against actual (preferably with the customer present)			
Ensure all unions are tight, as some are loosened to prevent stress in shipping.			
Walk through system and open all valves that are required to run the system in automatic			
Check panel for lose wiring			
Tighten all terminals where wires are terminated			
Check alignment of motors			
Check field wiring and piping as per drawings			
Check all motor belt tensions			
Turn power on. Measure site voltage. L1/L2_____ L2/L3_____ L3/L1_____ L1/GRD_____ L2/GRD_____ L3/GRD_____			
Test that incoming power has correct phase sequence. Bump a safe 3 phase motor to test rotation.			
Check voltage on AC step down transformer			
Check voltage on DC transformer			
Check rotation of all motors that were field wired.			
Check that PLC Run light is on and the stop/term/run switch is in term			
Manually test inputs as per input table			

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System Field Test Checklist

Check connections of all field wiring to ensure it was completed per the electrical drawings and per the NEC.			
Manually test control logic for each output			
Manually test all shut down alarms			
Manually test that non-critical alarms do not shut down SVE			
Run through complete logic and alarm sequence with customer and make allowable changes.			
Note name of individual and company with whom logic was reviewed:			
Check overload settings for all motors			
Check/Install filter bag in bag filters			
Test analogue inputs			
Run system in full automatic			
Fill out mechanical test record on each motor and check amperage and voltage. Document amperage on the System test records in the operating manual in the Field test load section.			
Wet test all control inputs and outputs			
Wet test all shut down alarms			
Check systems for leaks (liquid and vapor)			
Test position of ball float switches for proper start/stop level			
Test vacuum and pressure relief valve			
Test air stripper and discharge pump operating sequence			
Check flow rate on all pulse meters such that digital and analogue reading increment at the same rate			
Test operation of building exhaust fan			
Test operation of building heater			
Install louver hoods on system			
Test remote access			

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System Field Test Checklist

Test operation of Auto dialer and program if necessary.			
Note newterra modem offsite web address			
Check flow rate discharging from VLS, should maximize flow to prevent a high level shutdown. If you have a centrifugal pump ensure flow rate is low enough to prevent cavitation on the inlet under vacuum.			
Check the skimmer on the oil water separator should be ½" above water level when water is flowing at full speed. Adjust if necessary.			
If Kaeser Compressor Present – Confirm warranty validation has been completed and submitted to Kaeser for warranty			
Check water flow rate into stripper, should be set to minimum flow to keep up with incoming water to maximize contact time in the air stripper. Adjust flow rate if necessary.			
Check flow rate exiting the air stripper, if there is no carbon filters down stream then allow pump to discharge at maximum flow rate. If carbon vessels are installed, then set pump flow rate to the designed system flow rate			

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System Field Test Checklist

Customer Training Checklist			
Review the operating manual with the customer explaining the various components of the manual and sources of information.			
Review the startup and shutdown procedure with operator.			
Review operation of treatment system and describe the maintenance required for each piece of equipment.			
Describe operation of panel and panel components.			
Train customer to troubleshoot alarms based on input conditions to the PLC or relays in the panel.			
Discuss the operating logic with the customer so they understand how the system is configured to work.			

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System Field Test Checklist

Operating Data and Records

The following table is a guideline to document the operating conditions of the system when running in automatic mode. The startup technician should document the operating conditions at all the locations in the system. This information can be used at a later date to troubleshoot problems that can arise.

Location of Record Description	Recorded Value
Air Vacuum readings:	
Air Pressure Readings	
Water Pressure Readings	
Water Flow Rates	
Air Flow Rates	
Operating Temperatures:	

System Field Test Checklist

Site Contractor Information: It is important that we capture the site contractor's information who was involved in the mechanical and electrical installation of equipment on site. We may be required to contact these companies during the project life to provide services at a later date.

Electrical Contractor:

Company Name: _____

Contact: _____

Phone Number: _____

Mechanical Contractor:

Company Name:

Contact: _____

Phone Number:

Quality Issues Identified during startup: The intension in this section is to list any problems, deficiencies or quality issues that were identified during startup. If the problem was solved during startup, please indicate. If MLE is required to follow up then please indicate.

Issue 1: Identified:

_____

_____

_____

Check box that applies: newterra Follow up Required ☐ Sorted out on Startup ☐

Issue 2: Identified:

_____

_____

_____

Check box that applies: newterra Follow up Required ☐ Sorted out on Startup ☐

Issue 3: Identified:

_____

_____

_____

Check box that applies: newterra Follow up Required ☐ Sorted out on Startup ☐

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System Field Test Checklist

Customer Feedback: newterra is committed to the success of our customers'. Please take a moment and provide any suggestions you may have for our quality and product support teams. We appreciate your comments and look forward to working with you again in the near future.

Please list one item you like about the system you have received:

Please indicate if there are items we could improve upon:

System Field Test Checklist

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MECHANICAL TEST RECORD

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

System Field Test Checklist

MECHANICAL TEST RECORD			
Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Device Name:		Manufacturer:	
Device Model #:		Device Serial #:	
Motor Manufacturer:			
Motor Model #:		Motor Serial #:	
HP:	Voltage:	Frame:	RPM:
Phase:	Current:	SF:	ENCL.:

Factory Test:				Field Test:			
L1	L2	L3	Amps	L1	L2	L3	Amps
L1/L2	L2/L3	L3/L1	Vac	L1/L2	L2/L3	L3/L1	Vac

Project Packing List

PMProjNum **102140**

SOLD - USED RTS151 - Baffinland 150GPM W

PM_ShippingNotes:

Tag	Part Number	Part Description	Req / Rec	PO # / Line	EngMemo
2	18661	Hose, Assembly, J300, 3"	2	-	
Inlet & Outl	ea	Green Hose	0		
Type: G		-3" x 50' Hose assembly with camlocks		0	
2	10541	Camlock Fitting, Aluminum, 3", Part "F"	4		Male Camlocks
Inlet & Outl	ea	Male Adapter x Male Thread Cam Lock Fitting	4		
Type: F		-	102140-003	2	
2	M1108	Switch, Level, Mech Float, Wide Angle, N.O.,	1	---	
LSH-4001	ea	Tilt Float Level Switch 90deg, w 40' cable	1		
Type: I		13A, SPST, N/O ---	102140-011	9	
2	17149	Manual, System, Hard Copy	2	---	
Manual	ea		0		
Type: P		---		0	
2	9999	Misc Part, See Details	1	---	
OWS VEN	ea	As per detailed specification below	0		
Type: P		2IN. X 4FT. PVC OWS VENT STACK		0	
2	RC061	Pump, Sump, Goulds, 100GPM @ 40'	1	---	
P-4001	month	WS1512BHF, w/ switch	0		
Type: R		230V 1 Ph, 1-1/2 HP ---		0	
2	RTS151	WTS, 150 gpm, OWS-24, Carbon, 40' Contair	1	---	
System	month	208/120V, 3ph, Cl1 Div 2	0		
Type: R		Max Water 150gpm @ 40psi ---		0	
5200	M1272	Camlock Fitting, Aluminum, 2", Part "F"	1	---	
5200-Stack	ea	Male Adapter x Male Thread Cam Lock Fitting	0		
Type: F		---		0	
5200	M1137	Drum, Black, Steel, 45 gal, 2 hole lid, bottom ;	1	-	
PST-5201	ea	including palletization	1		
Type: I		-	102140-011	4	
5200	9999	Misc Part, See Details	1	---	
PST-5201	ea	As per detailed specification below	0		
Type: P		2IN. X 5 FT. TANK TRUCK HOSE ASSEMBLY WITH CAMLOCK, TYPE C AND TYPE F		0	
5200	9999	Misc Part, See Details	1	---	
PST-5201	ea	As per detailed specification below	0		
Type: P		2IN. X 4FT. PVC PST VENT STACK		0	

Tag	Part Number	Part Description	Req	PO #		EngMemo
			Rec	Line		
7900	10908	Lock, Passage, 107188, Taymor	2		---	
7900	ea	107188	0			
	Type: I	---			0	
7900	10909	Lock, Deadbolt, 289648, Taymor, 1 cyl, S/S	2		---	
7900	ea	keyed alike #289648	0			
	Type: I	---			0	
7900	24662	Hood, Fan, 27" - on use up	2		---	
F-7901	ea	Fits 24" Fan	2			
	Type: I	---	102140-011		6	
7900	23989	Hood, 15"	2		---	
F-7902	ea	Fits 12" Fan & Louver	2			
	Type: I	---	102140-011		5	

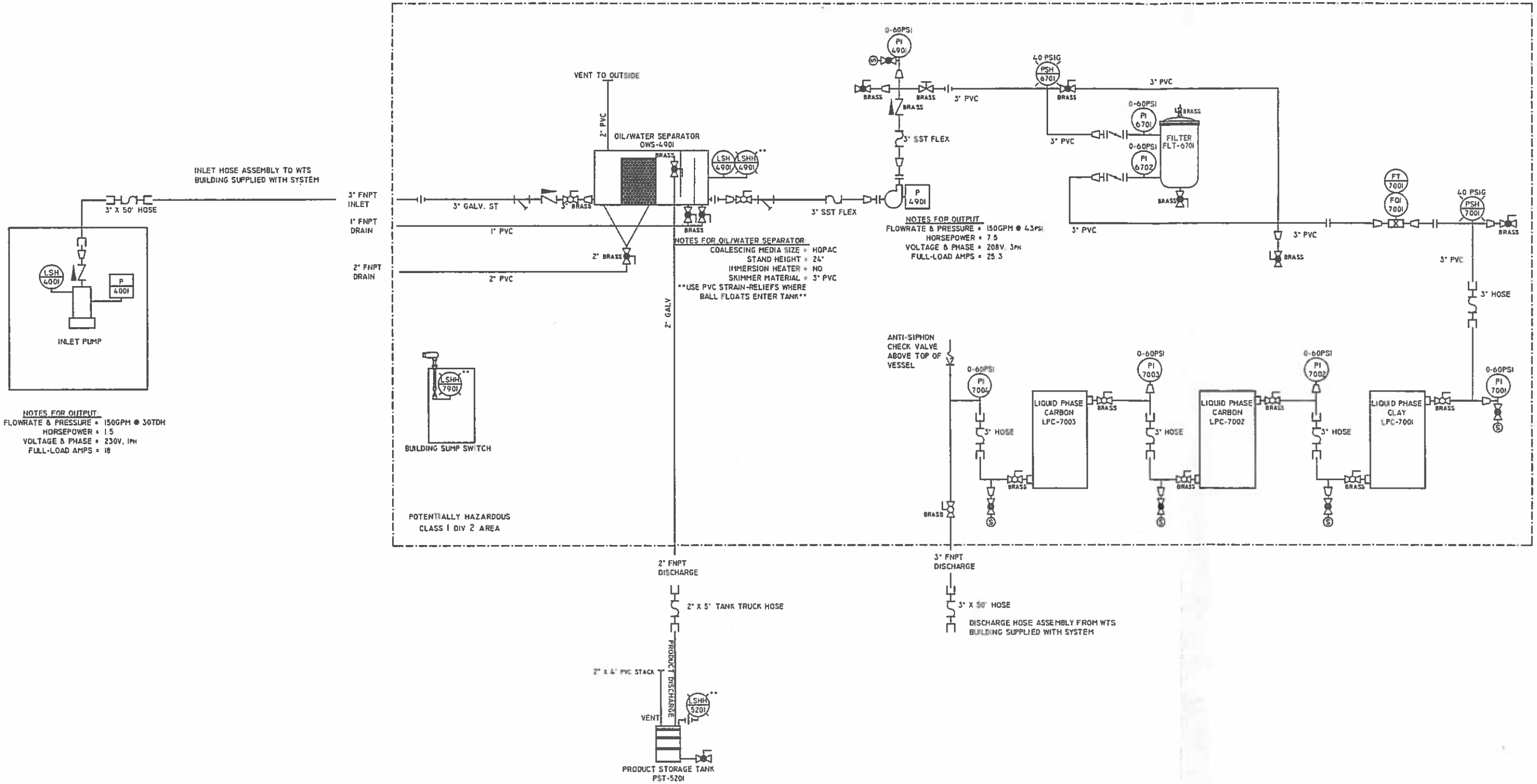
Project Packing List

PMProjNum **102140A**

Baffinland 20' Container for Loose Components

PM_ShippingNotes:

Tag	Part Number	Part Description	Req / Rec	PO # / Line	EngMemo
1	11686	Filter, Bag, FOS P2P, 7" x 32"	120		---
EXTRA	ea	Oil Absorbing Bags, Sub-micron, Plastic Ring	0		
	Type: P	Box Quantity, 20 per box ---		0	
1	25263-T	Melt-Blown Spaghetti Media	15		---
EXTRA	ea	Filter Bag Insert, Oil-Absorbing, Polypropylene	0		
	Type: I	25 lbs/bag ---		0	
1	11214	Media, Clay, TM100	5000		---
EXTRA	lb	(stocked and ordered in lbs)	0		
	Type: I	---		0	
1	20220	Media, Carbon, Liquid, Virgin, 8 x 30 Coconut	6000		---
EXTRA	lb	Sold in 1100 lb (500 Kg) sacks per pound	0		
	Type: I	---		0	
1	9999	Misc Part, See Details	2		---
EXTRA	ea	As per detailed specification below	0		
	Type: P	O-ringsm 4155-1490-B (V6427)		0	
1	21891	Gasket, Flange, Tetrasolv AF Series	6		---
EXTRA	ea	18" Hatch Gasket	0		
	Type: P	Fits, AF250, AF500, AF1000, AF2000, AF300 ---		0	
1	22353	Pump, Part, SSH, Mechanical Seal Kit	2		---
EXTRA	ea	P/N: RPKSSHS	0		
	Type: P	---		0	
1	21605-T	Media, Coal, Anthracite, .9 to .95mm	20		---
EXTRA	lb	52 lbs/bag; sold in lbs.	0		
	Type: I	---		0	
1	11610	Container, 8' x 20' x 8'6"	1		---
EXTRA PA	ea	5-8 yr	0		
	Type: P	---		0	



BUILDING EQUIPMENT AND CONTROL PANEL

BORDER DEFINES THE LIMITS OF THE ENCLOSURE

CONTROL PANEL

TO BE LOCATED ON BUILDING. PANEL TO BE A MINIMUM OF 36" FROM ANY HAZARDOUS PROCESS EQUIPMENT, AND A MINIMUM OF 36" ABOVE GRADE.

TSL 7901, TSL 7902, TSH 7901, TSH 7902, H 7901, H 7902, H 7903, F 7901, F 7902, LSHH 7901**, KILL 7901**

WIRING TO BE CLASS I DIVISION 2, AS PER THE CEC.

IS INPUT WIRING TO BE WIRED FOR INDOORS, ACCORDING CEC FOR HAZARDOUS LOCATIONS.

PIPING DETAILS:
- WATER FLOW METERS: PROVIDE 10 DIA. OF STRAIGHT PIPE BEFORE AND 5 DIA. OF STRAIGHT PIPE AFTER METERS. ENSURE THAT THROTTLING VALVES ARE NOT DIRECTLY IN LINE WITH METERS.
- AIR FLOW METERS: PROVIDE 8 DIA. OF STRAIGHT PIPE BEFORE AND 3 DIA. OF STRAIGHT PIPE AFTER METERS, IF POSSIBLE. AVOID TEES AND ELBOWS BEFORE AND AFTER METERS.
- MATERIALS OF VALVES AND FITTINGS TO BE THE SAME AS THE DESCRIPTION AT THE LINE. IF THERE IS A TRANSITION FROM PVC TO STEEL, THE VALVE SHOULD BE BRASS
- THERE ARE NO SPECIAL PIPING REQUIREMENTS OTHER THAN WHAT IS EXPLAINED ON THE DIAGRAM.
- WHEN PVC HOSE IS SPECIFIED, ALWAYS USE VACUUM HOSE. USE GREEN HOSE FOR PRESSURES LESS THAN 60PSI. USE TANK TRUCK HOSE FOR PRESSURES BETWEEN 60PSI AND 150PSI.
- PVC PIPE MAY BE SUBSTITUTED WITH EQUAL-SIZED PVC HOSE WHERE A FLEXIBLE CONNECTION IS PREFERRED.

C	2013-08-20	DM	AS BUILT
B	2013-08-06	DAM	FOR PRODUCTION

DWG. NO: 102140-01 (PAGE 1 OF 2)

TITLE: PROCESS & INSTRUMENTATION DRAWING

CUSTOMER: MARY RIVER PROJECT BAFFINLAND

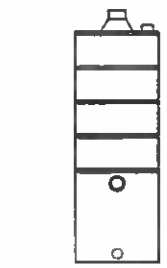
newterra LTD.

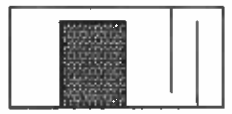
VALVES AND PIPING

NO NC

- BALL VALVE -
- GATE VALVE -
- GLOBE VALVE -
- NEEDLE VALVE -
- SLIDE VALVE -
- SOLENOID VALVE -
- BUTTERFLY VALVE -
- SWING CHECK VALVE -
- WAFER CHECK VALVE -
- SPRING CHECK VALVE -
- WYE STRAINER -
- SAMPLE PORT -
- PRESSURE RELIEF VALVE -
- VACUUM RELIEF VALVE -
- CAMLOCK CONNECTION -
- FERNCO CONNECTION - (FERNCO)
- FLEXIBLE CONNECTION -
- FLANGED CONNECTION -
- REDUCER -
- UNION -
- ADSORBENT FILTER - (A, DRAIN)
- COALESCING FILTER - (DRAIN)
- PARTICULATE FILTER - (DRAIN)
- FILTER, SILENCER -
- PRESSURE REGULATOR -
- REGULATOR W/ FILTER -

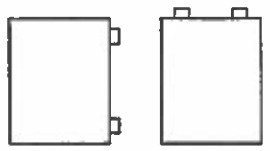
EQUIPMENT

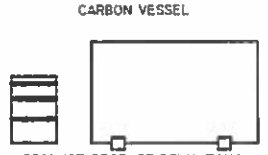

AIR STRIPPER

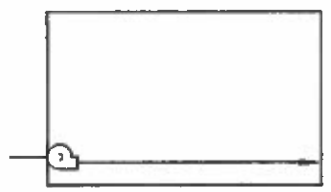

OIL/WATER SEPARATOR


VAPOR/LIQUID, SEAL FLUID SEPARATOR

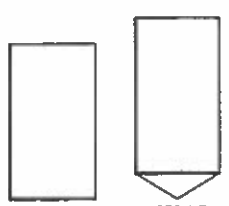

BAG FILTER


CARBON VESSEL


PRODUCT STORAGE DRUM, TANK


OXIDIZER


CHEMICAL DRUM


STANDARD, CONICAL-BOTTOM TANK

EQUIPMENT

- CENTRIFUGAL PUMP -
- PROGRESSIVE-CAVITY PUMP -
- CHEMICAL-INJECTION PUMP -
- CENTRIFUGAL, REGENERATIVE BLOWER -
- POSITIVE-DISPLACEMENT BLOWER -
- ROTARY-CLAW BLOWER -
- LIQUID-RING PUMP -
- ROTARY-VANE COMPRESSOR -
- RECIPROCATING COMPRESSOR -
- HEAT EXCHANGER -
- PASSIVE COOLING FINS -

EQUIPMENT

AS - AIR STRIPPER
BLD - BUILDING, TRAILER OR SKID
FLT - FILTER VESSEL
LPC - LIQUID-PHASE CARBON VESSEL
MFD - MANIFOLD
OWS - OIL/WATER SEPARATOR
OX - OXIDIZER
PST - PRODUCT STORAGE TANK
SOS - SEAL OIL SEPARATOR
SWS - SEAL WATER SEPARATOR
TNK - TANK
VLS - VAPOR/LIQUID SEPARATOR
VPC - VAPOR-PHASE CARBON VESSEL

FLOW MEASUREMENT

- AVERAGING PITOT TUBE - (RANGE, PDI 101, H, L)
- VENTURI - (RANGE, PDI 101, H)
- ROTOMETER - (RANGE, FI 101)
- WATER FLOW METER - (FQI 101)

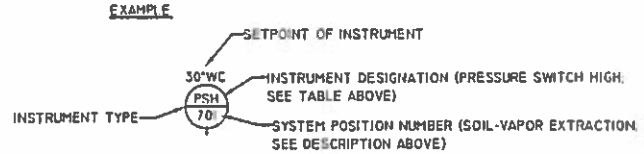
INSTRUMENT DESIGNATION

	INPUT	1ST MODIFIER	2ND MODIFIER	3RD MODIFIER	OUTPUT	1ST MODIFIER	
A			ALARM				A
B						BLOWER	B
C	CYCLE					COMPRESSOR	C
D		DIFFERENTIAL				AIR DRYER	D
E							E
F	FLOW					FAN	F
G	GAS (LEL)		GAUGE				G
H				HIGH	HAND	HEATER	H
I	CURRENT		INDICATOR				I
J							J
K							K
L	LEVEL			LOW			L
M					MOTORIZED		M
N							N
O							O
P	PRESSURE				PNEUMATIC	PUMP	P
Q		QUANTITY					Q
R							R
S	SPEED		SWITCH		SOLENOID		S
T	TEMPERATURE		TRANSMITTER				T
U							U
V						VALVE	V
W							W
X							X
Y							Y
Z	POSITION						Z

INSTRUMENT IDENTIFICATION

- INDICATING INSTRUMENT
- DIGITAL INPUT TO CONTROL PANEL
- DIGITAL INPUT CAUSING ALARM
- ** DIGITAL INPUT CAUSING SYSTEM SHUTDOWN ALARM
- ANALOG INPUT TO CONTROL PANEL
- ANALOG OUTPUT FROM CONTROL PANEL

EXAMPLE



SYSTEM POSITION DESIGNATION

100 - VACUUM INLET MANIFOLD
300 - INLET HEAT EXCHANGER
400 - VAPOR/LIQUID SEPARATOR
500 - VAPOR/LIQUID SEPARATOR - 2
700 - SOIL-VAPOR EXTRACTION
1000 - LIQUID-RING PUMP
1300 - SVE HEAT EXCHANGER
1600 - VAPOR-PHASE CARBON
1900 - OXIDIZER
2200 - AIR SPARGE
2500 - SPARGE HEAT EXCHANGER
2800 - SPARGE OUTLET MANIFOLD
3100 - AIR COMPRESSOR
3400 - COMPRESSED-AIR OUTLET MANIFOLD
3700 - PNEUMATIC WELL PUMPS
4000 - SUBMERSIBLE WELL PUMPS
4300 - SURFACE-MOUNT WELL PUMPS
4600 - GROUNDWATER INLET MANIFOLD
4900 - OIL/WATER SEPARATOR
5200 - PRODUCT STORAGE TANK
5500 - INLET TANK
5800 - UPSTREAM BAG FILTER
6100 - CHEMICAL INJECTION
6400 - AIR STRIPPER
6700 - PRE-CARBON BAG FILTER
7000 - LIQUID-PHASE CARBON
7100 - PRE-MEDIA BAG FILTER
7200 - ACTIVATED ALUMINA
7300 - DISCHARGE TANK
7400 - POST-TREATMENT BAG FILTER
7600 - REINJECTION
7900 - BUILDING, TRAILER OR SKID
8200 - CONTROL PANEL
8500 - ELECTRICAL PARTS
9900 - EXTRAS

PIPING DETAILS
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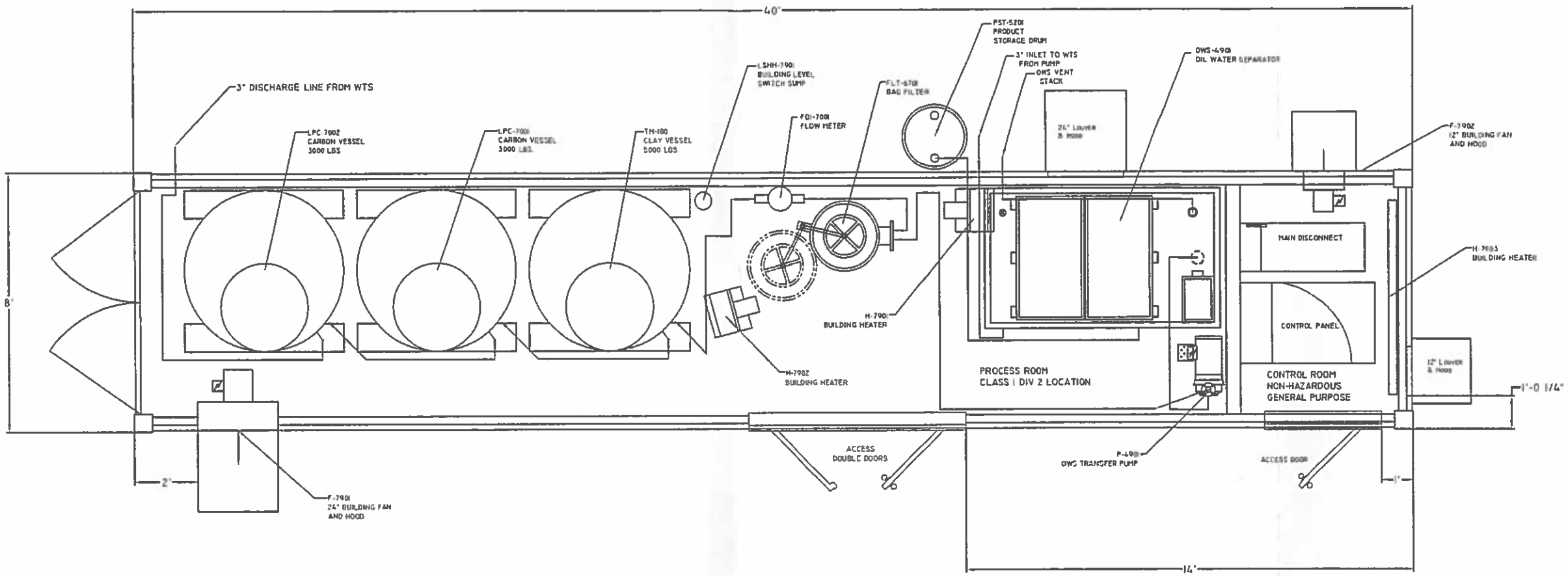
B	2013-08-06	DAM	FOR PRODUCTION	

DWG. NO: 102140-01 (PAGE 2 OF 2)
TITLE: PROCESS & INSTRUMENTATION DRWG LEGEND
CUSTOMER: MARY RIVER PROJECT BAFFINLAND

SCALE BAR, EACH BLOCK IS 12" LONG



PLEASE NOTE: THIS BUILDING IS SHIPPING ON A BOAT AND MUST NOT BE MORE THE 96" IN WIDTH. THIS INCLUDES ALL EQUIPMENT AND CONNECTIONS THAT PROTRUDE THROUGH THE ENCLOSURE.

** CIVIL CONSTRUCTION NOTES **

- BUILDING TO BE PAINTED WITH HEMPATEX HI BUILD 46410 BLUE. HEMPEL COLOUR CODE 33930
- DOOR COLOUR TO BE THE SAME AS BUILDING
- FLOOR TO BE GATOR GUARDED
- PROVIDE WOOD LIP AROUND PERIMETER TO ALLOW SUMP SWITCH TO TRIP
- INSTALL GRATING BETWEEN BUILDING FANS AND OUTSIDE LOUVERS.
- THERMAL INSULATION ON WALLS AND CEILING

**MECH /ELECT ASS'Y NOTES **

- MAXIMUM WIDTH FOR SHIPPING IS 96" THIS INCLUDES ALL CONNECTIONS THAT PROTRUDE THROUGH THE SIDES OF THE ENCLOSURE
- PLUG AND SEAL (WITH WASHERS) ANY HOLES IN THE FLOOR TO CONTAIN WATER SPILLS.
- LOCATE COOLING THERMOSTAT IN THE WARMEST LOCATION AT CEILING LEVEL.
- LOCATE HEATING THERMOSTAT AT FLOOR LEVEL.

*** COMMISSIONING NOTES ***

- NEWTERRA RECOMMENDS PAD BE AT LEAST 12" LARGER THAN ENCLOSURE IN ALL DIRECTIONS LOCAL CODES MAY REQUIRE ALTERNATE DIMENSIONS.
- BUILDINGS NEED TO BE SHIMMED ON SITE TO ALLOW DOORS TO OPEN FREELY. PLEASE HAVE SHIMMING MATERIAL READY DURING BUILDING INSTALLATION
- FOR BUILDINGS IN COLD WEATHER CLIMATES WHERE THE BUILDING IS ELEVATED, A SKIRT MUST BE BUILT AROUND THE BASE TO PREVENT THE FLOOR FROM FREEZING.
- [illegible] AND LOUVER HOODS NEED TO BE INSTALLED [illegible]. CANNOT SHIP WITH HOODS ATTACHED

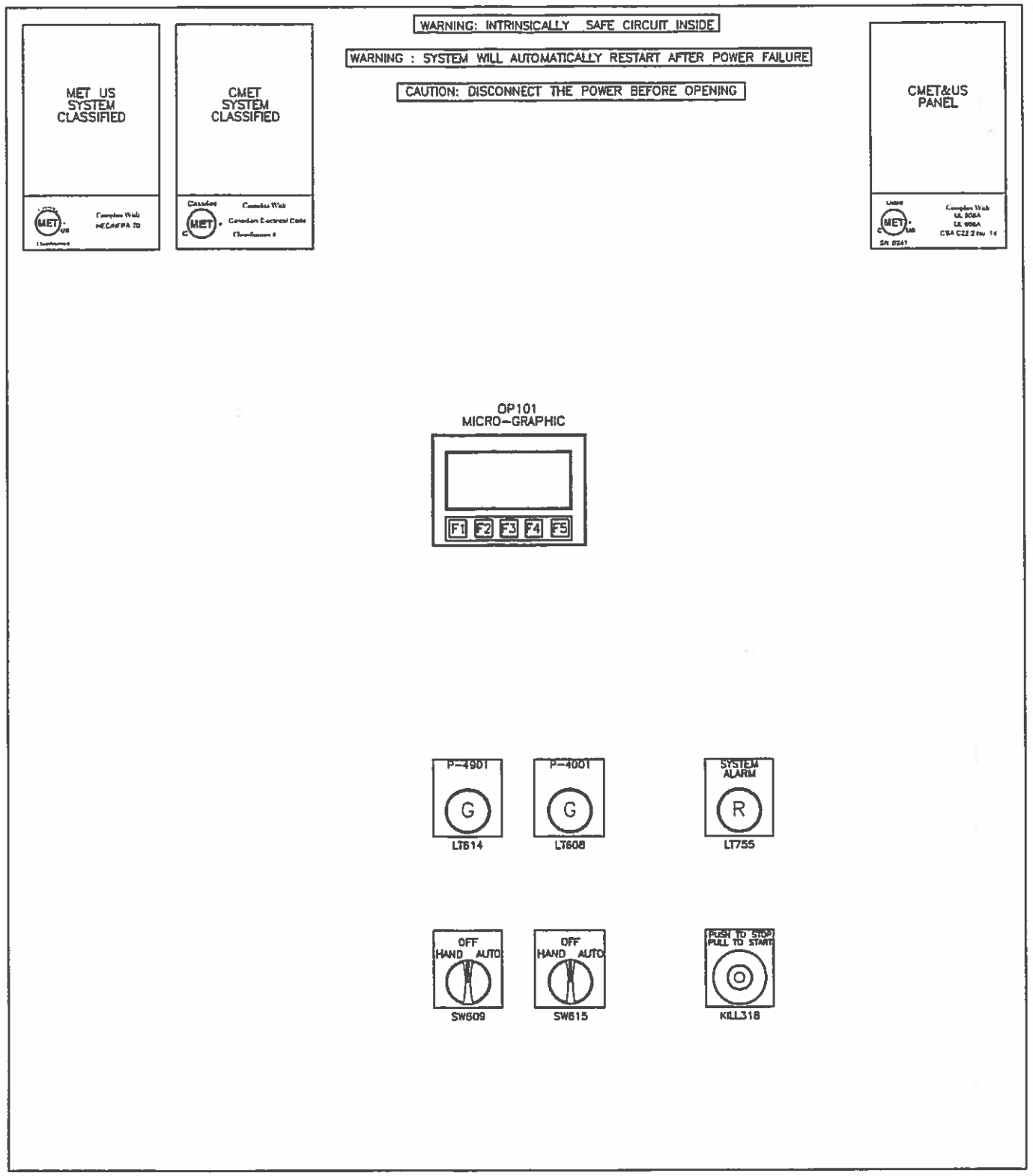
*** DIMENSION INFORMATION ***

DESCRIPTION	DIM (L X W X H)	WEIGHT
40' CONTAINER	8' X 42' X 9.5'	?????

FLOW DIRECTION
ELECTRICAL CONNECTION
FLOW INTO THE PAGE
FLOW OUT OF THE PAGE
THIS AREA REPRESENTS SERVICE SPACE REQUIRED

LEVEL	DATE:	BY	REVISION:
F	2013-08-20	DM	AS BUILT FOR 102140
F2	2013-08-07	DM	PRODUCTION RELEASE FOR 102140

DWG NO: 102140 - 02
TITLE: SYSTEM LAYOUT
CUSTOMER: BAFFINLAND MARY RIVER PROJECT
newterra LTD.



DS201

MAIN DISCONNECT

200 AMP
125A FUSES
208V 3PH
108 FLA

NOTE 1: NEMA 3R LOCKABLE PANEL(S)

NOTE 2: LIGHTS & SWITCHES MOUNTED ON INNER SWING PANEL DOOR

15A GFI

WIRE LEGEND

BLACK:	POWER
RED:	CONTROL
WHITE:	NEUTRAL
BLUE:	+24VDC & I.S.(Intrinsically Safe)
BL/WH:	0VDC
YELLOW:	INTERLOCKS

NOTES:

MET US CERTIFIED, CONTROL ROOM BUILT TO NEC GENERAL PURPOSE STANDARDS, PROCESS ROOM BUILT TO NEC CLASS 1 DIV 2 STANDARDS, ALL WIRING COMPLETE AND ALL EQUIPMENT PRE-PIPED, FACTORY TESTED AND MOUNTED IN ENCLOSURE.

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RTS151 / 150GPM OWS
Baffinland Iron Mines Corp
Mary River Project/ PM 005

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PANEL VIEW

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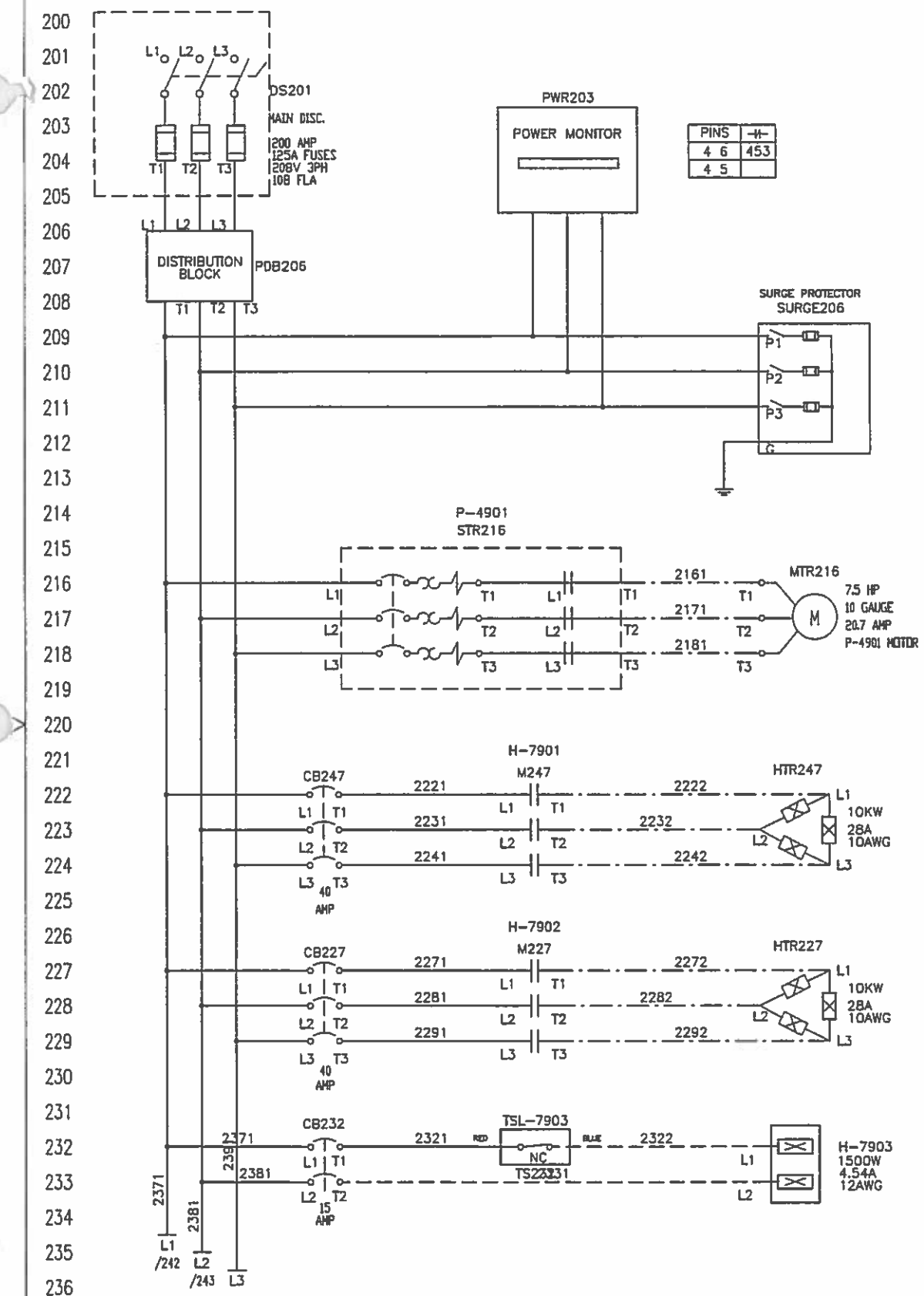

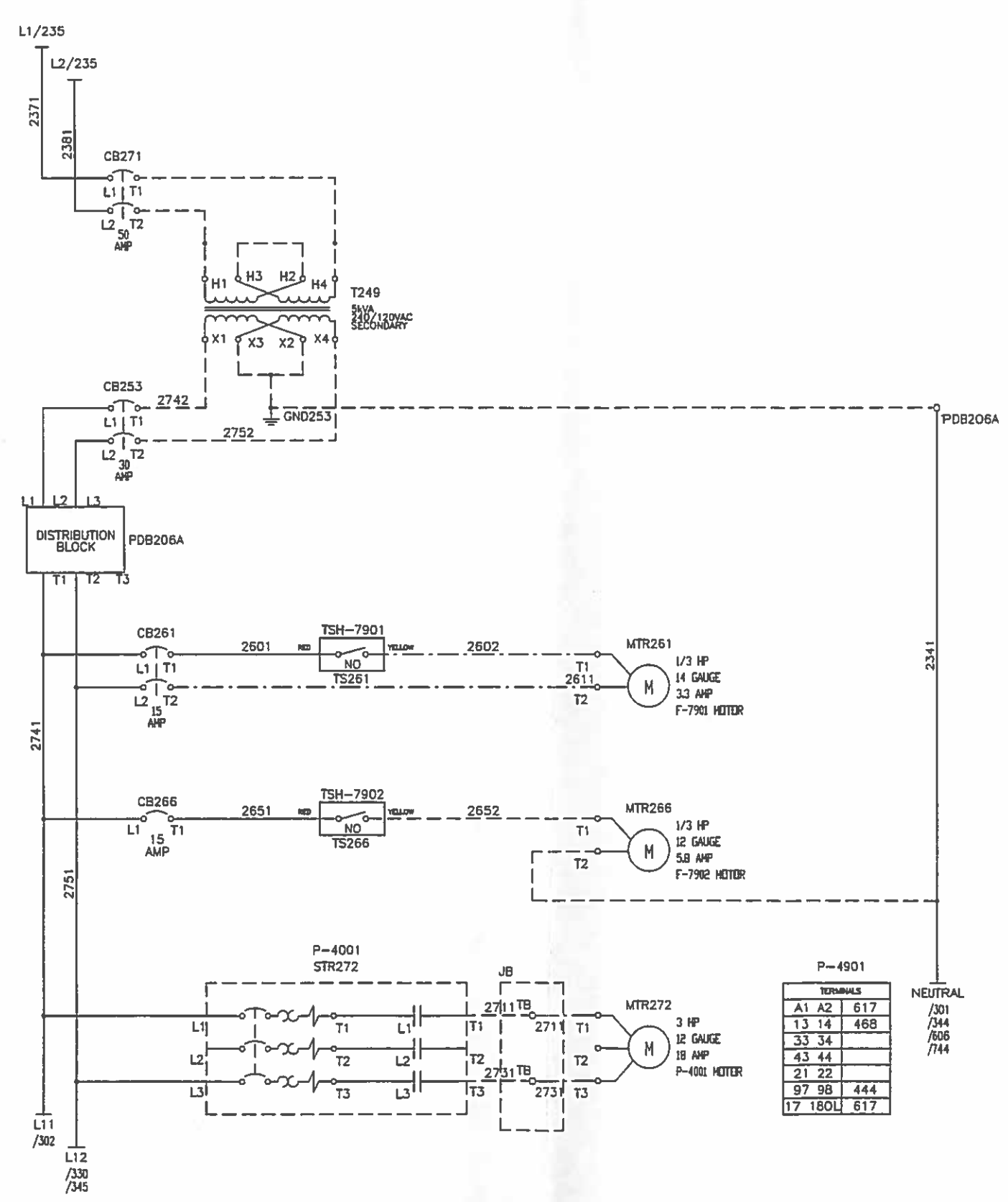

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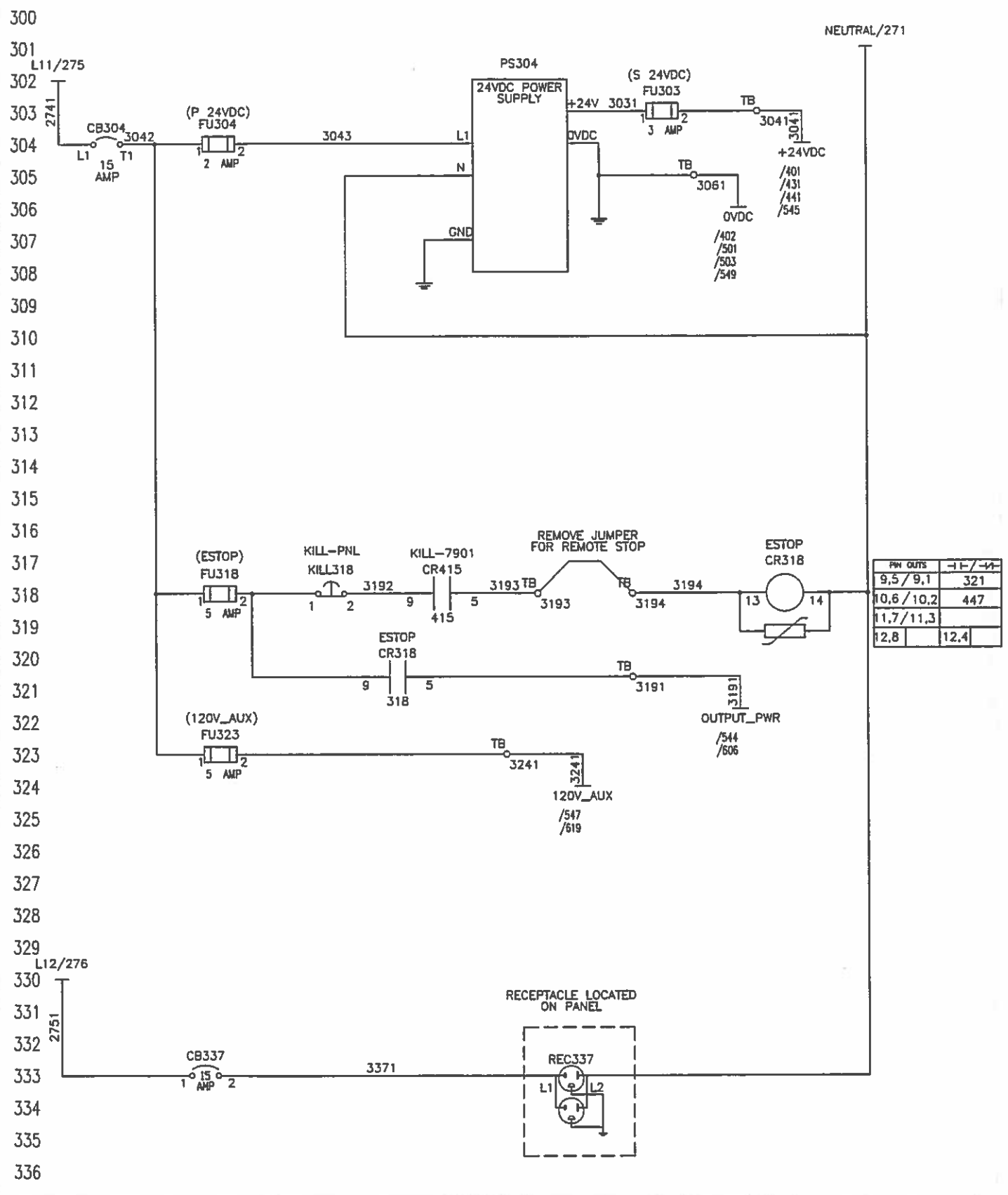

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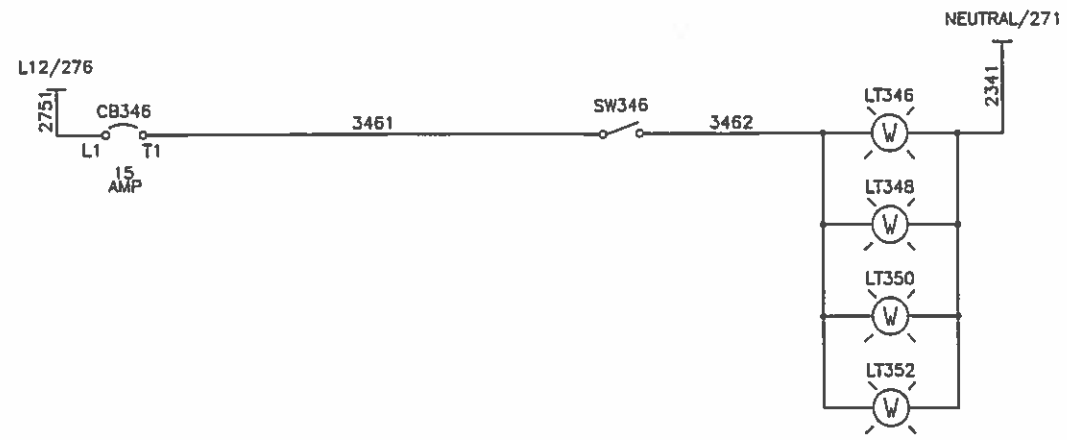

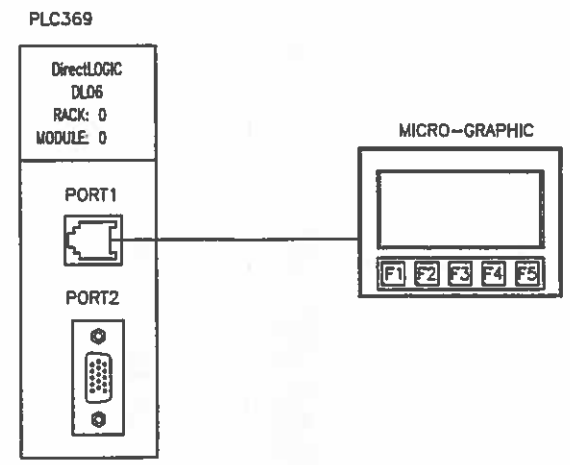

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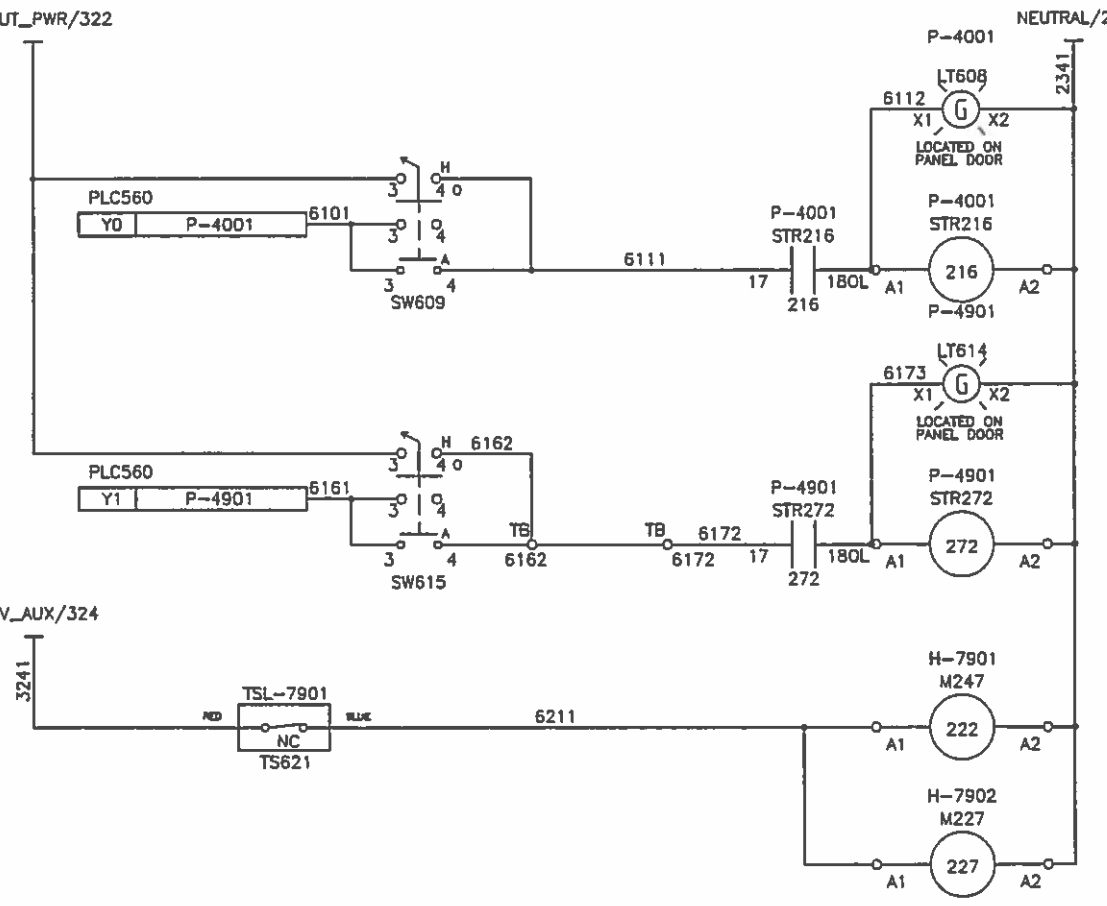

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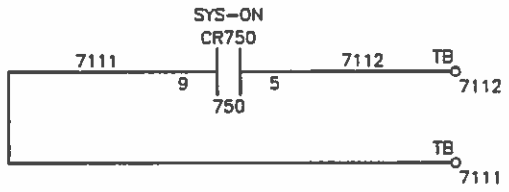

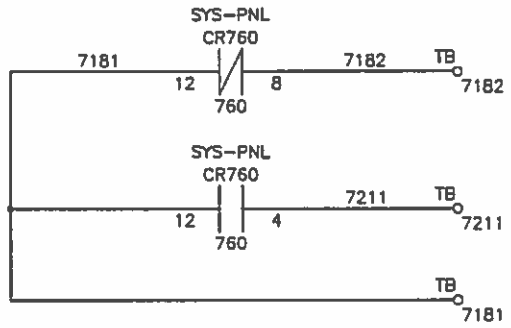

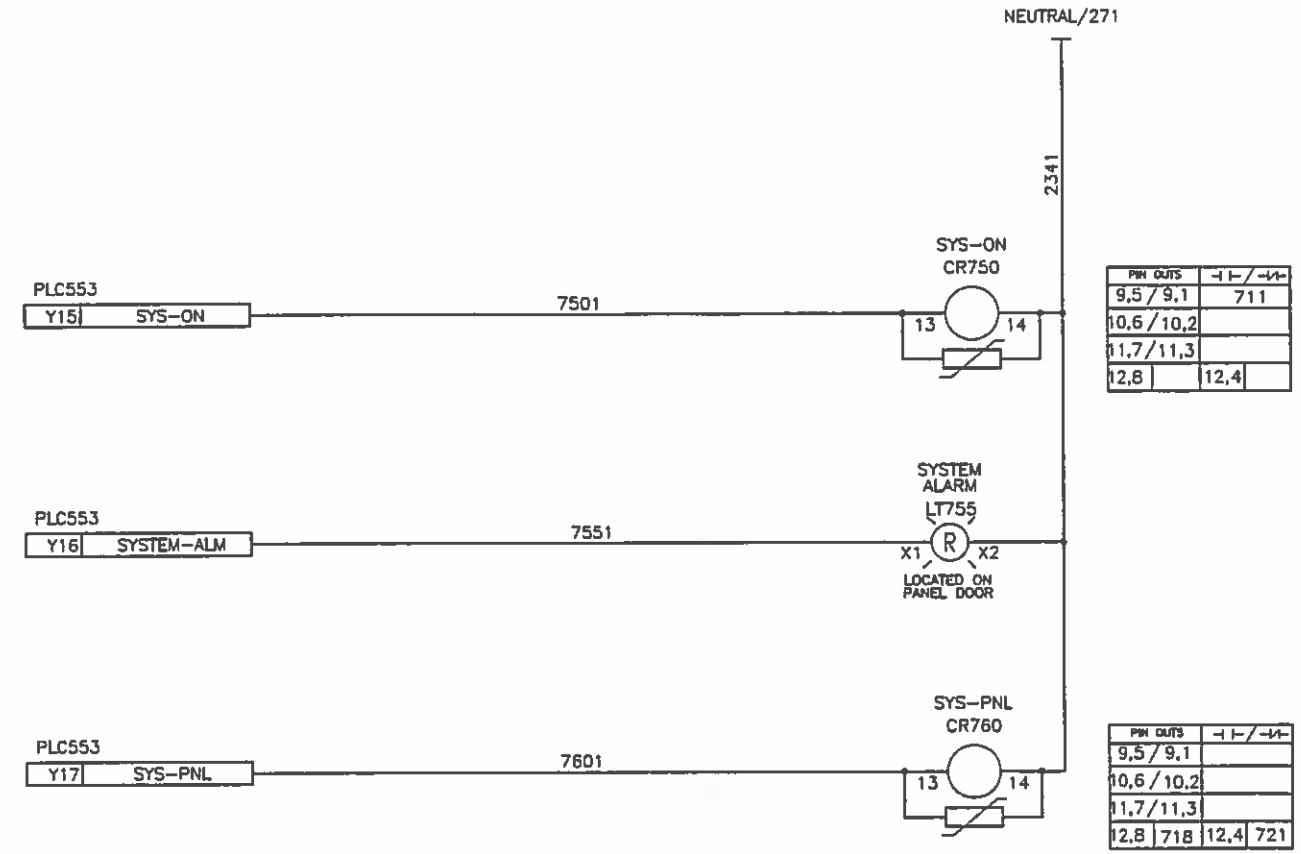

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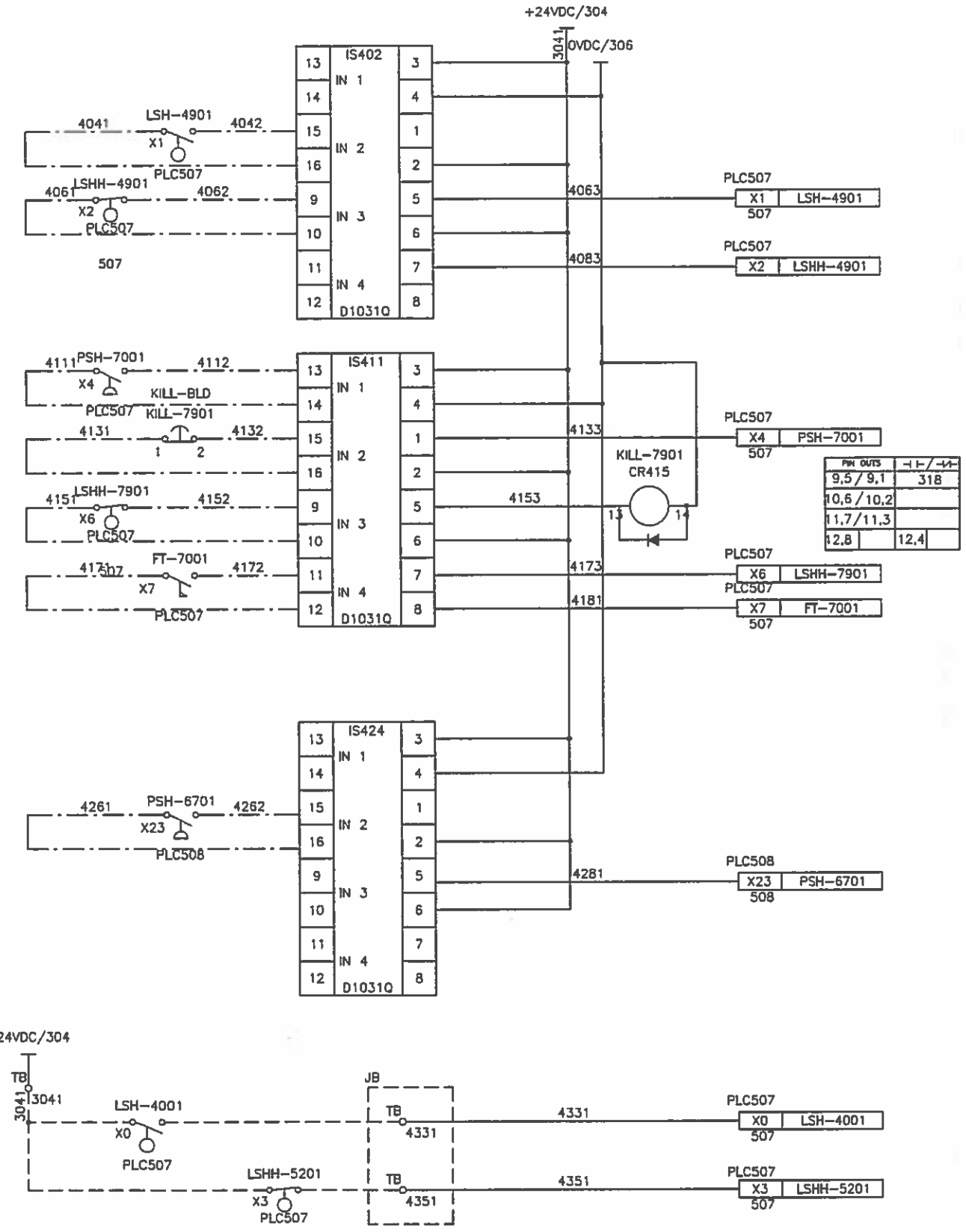

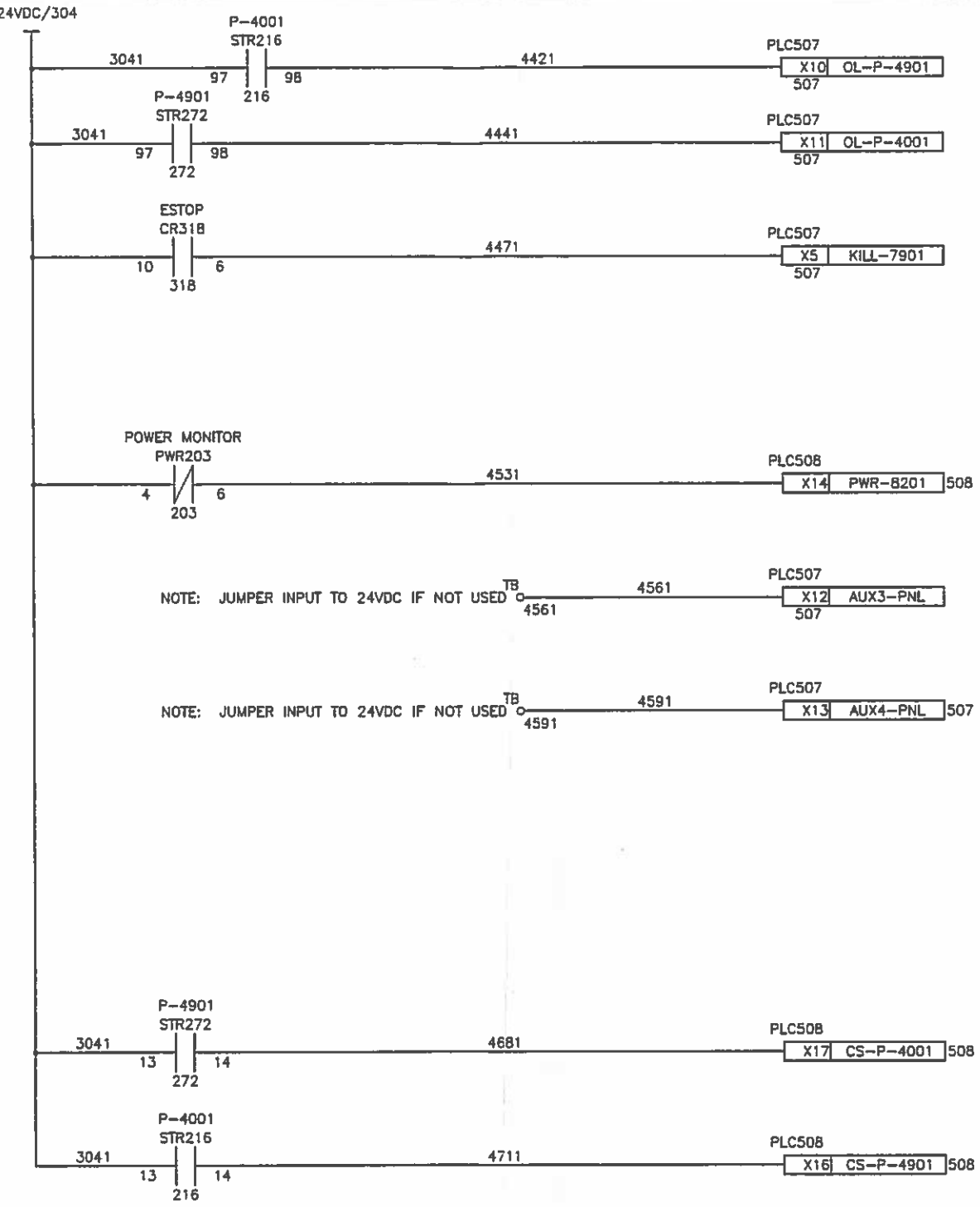

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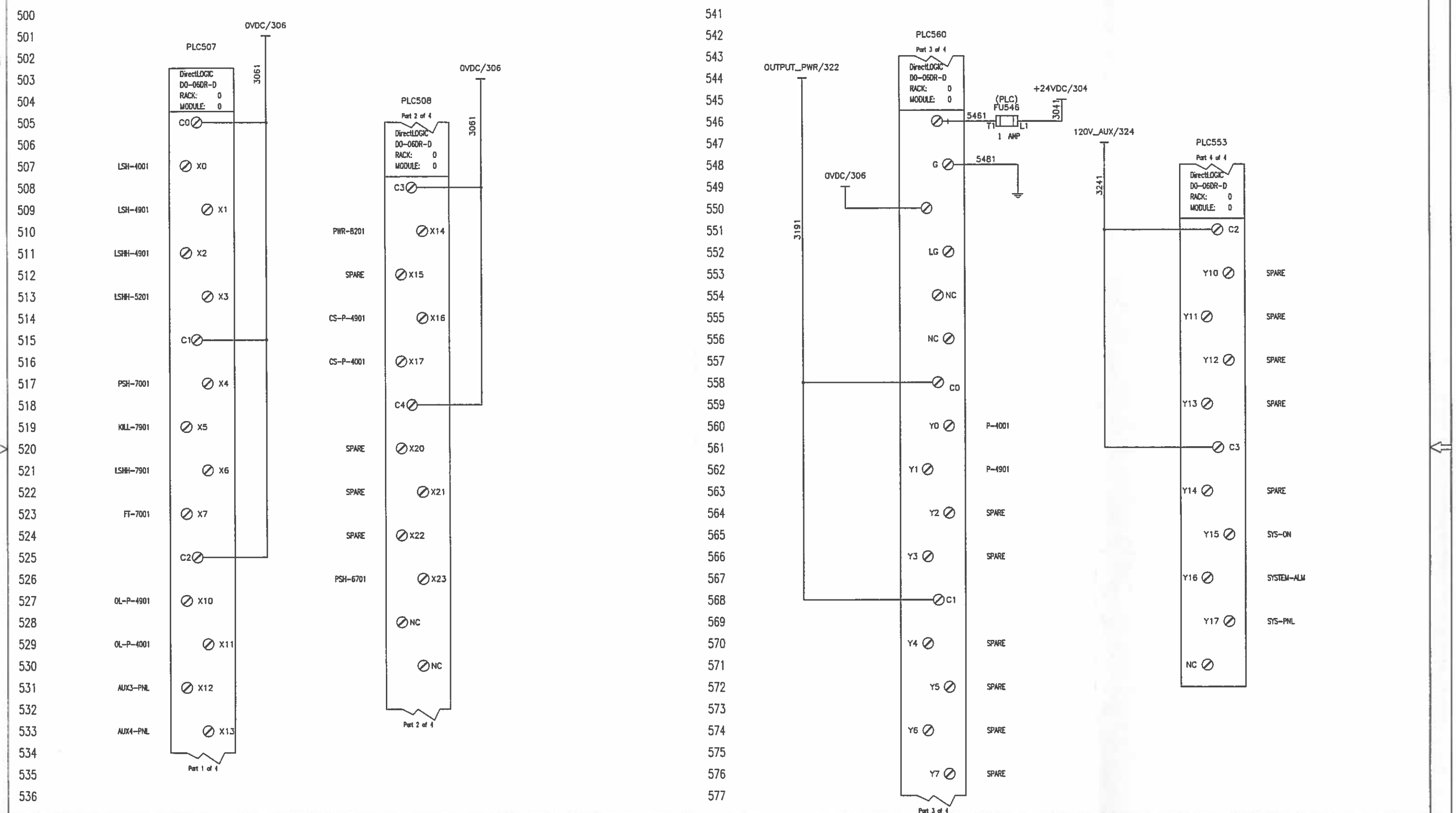

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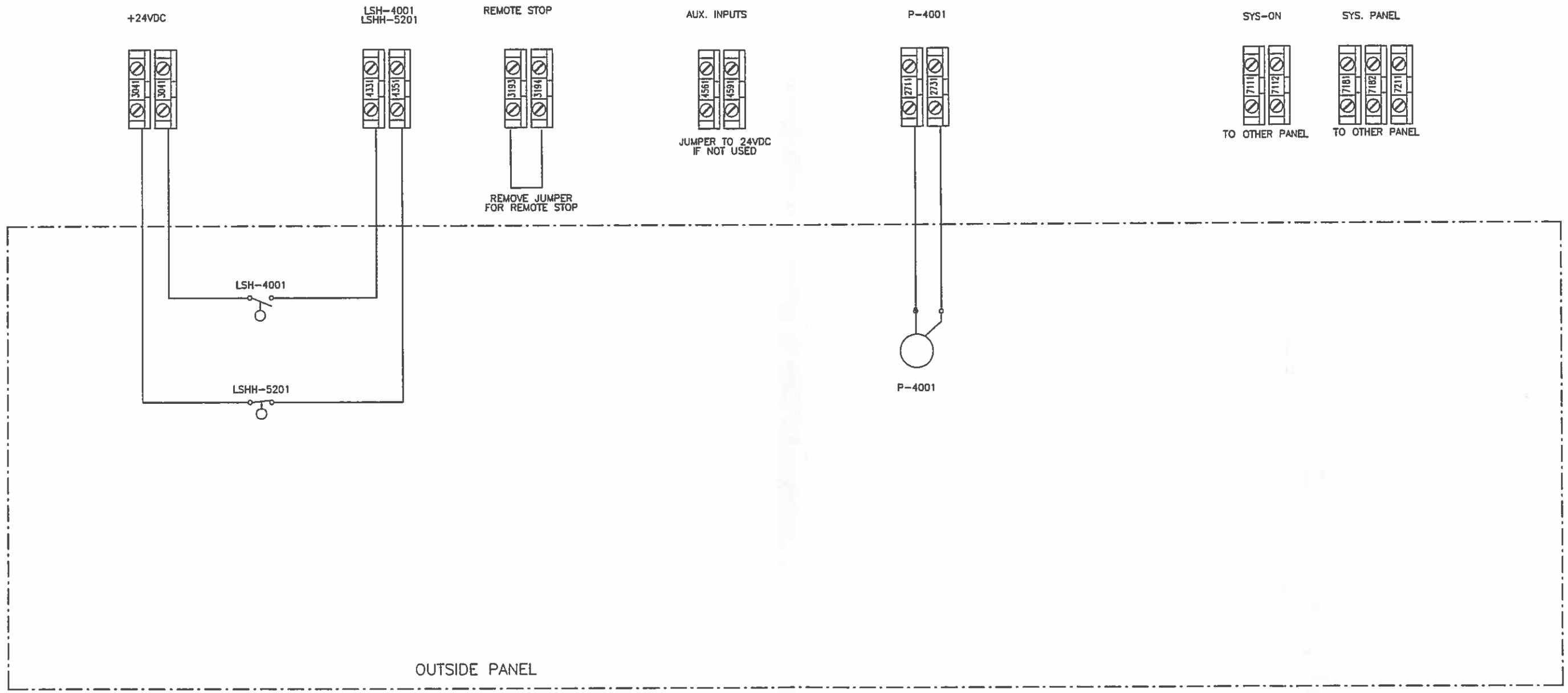
TERMINAL PLAN



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Inputs and Setpoints — *Project: RTS151 WTS, 150gpm, OWS-24, Carbon, 4*

Input Summary	
Digital PLC Inputs:	15
Digital PLC Frequency:	1
Analog(4-20) Inputs:	0
Analog(5V) Inputs:	0
Analog(10V) Inputs:	0

IS Barrier Summary	
Analog IS:	0
Digital IS :	9

Legend for Class

ISA : Intrinsically Safe Analog
ISD: Intrinsically Safe Digital
GP: Wire General Purpose
D1: Wire as DI/1
D2: Wire as DI/2

				PLC		Signal						Datalogger (DLO6)	
Tag	Name	Type	Class	Input	Value	State	Low	High	Units	SQRT	Fctr	Offsite_Col	Note	Main	Monthly (Daily for 30 days)
Digital_PLC															
4000 Submersible Pump															
LSH-4001	Level Switch Hi Well Pump 4001	Digital_PLC	ISD	X000		NormOpen	0	0		☐	0			☐ 0	☐ 0
CS-P-4001	P-4001 Status	Digital_PLC	GP	X017		NormOpen	0	0		☐	0			☐ 0	☐ 0
4900 Oil/Water Separator															
LSH-4901	Level Switch High - Oil Water Separato	Digital_PLC	ISD	X001		NormOpen	0	0		☐	0			☐ 0	☐ 0
LSHH-4901	Level Switch High High - Oil Water Sep	Digital_PLC	ISD	X002		NormClose	0	0		☐	0			☐ 0	☐ 0
CS-P-4901	P-4901 Status	Digital_PLC	GP	X016		NormOpen	0	0		☐	0			☐ 0	☐ 0
5200 Product Storage Tank															
LSHH-5201	Level Switch High High - Product Stora	Digital_PLC	ISD	X003		NormClose	0	0		☐	0			☐ 0	☐ 0
6700 Bag Filter															
PSH-6701	Pressure Switch High Bag Filter 6701	Digital_PLC	ISD	X023		NormOpen	0	0		☐	0			☐ 0	☐ 0
7000 Liquid Phase Carbon															
PSH-7001	High Pressure Switch	Digital_PLC	ISD	X004		NormClose	0	0		☐	0			☐ 0	☐ 0
7900 Building, Trailer or Skid															
KILL-7901	Kill Switch 1 - Building	Digital_PLC	ISD	X005		NormClose	0	0		☐	0			☐ 0	☐ 0
LSHH-7901	Level Switch High High - Building	Digital_PLC	ISD	X006		NormClose	0	0		☐	0			☐ 0	☐ 0
8200 Main Control Panel															
OL-P-4901	P-4901 Overload	Digital_PLC	GP	X010		NormOpen	0	0		☐	0			☐ 0	☐ 0
OL-P-4001	P-4001 Overload	Digital_PLC	GP	X011		NormOpen	0	0		☐	0			☐ 0	☐ 0
AUX-8201	Auxiliary Contact - Control Panel	Digital_PLC	GP	X012		NormClose	0	0		☐	0			☐ 0	☐ 0
AUX-8202	Auxiliary Contact - Control Panel	Digital_PLC		X013		NormClose	0	0		☐	0			☐ 0	☐ 0
PWR-8201	Power/Phase Monitor Panel	Digital_PLC		X014		NormClose	0	0		☐	0			☐ 0	☐ 0
Digital_PLC_Freq															
7000 Liquid Phase Carbon															
FT-7001	Flow Transmitter - Liquid Phase Carbo	Digital_PLC_	ISD	X007		NormOpen	0	0		☐	0			☐ 0	☐ 0
Direct															
7900 Building, Trailer or Skid															
TSH-7901	Temperature Switch High - Room #1	Direct				NormOpen	0	0		☐	0			☐ 0	☐ 0
TSH-7902	Temperature Switch High - Room #2	Direct				NormOpen	0	0		☐	0			☐ 0	☐ 0
TSL-7901	Temp Switch Low - Room #1	Direct				NormClose	0	0		☐	0			☐ 0	☐ 0

				PLC		Signal							Datalogger (DLO6)	
Tag	Name	Type	Class	Input	Value	State	Low	High	Units	SQRT	Fctr	Offsite_Col	Note	Main	Monthly (Daily for 30 days)
TSL-7902	Temp Switch Low - Room #2	Direct				NormClose	0	0		☐	0			☐ 0	☐ 0

Outputs Project RTS151 WTS, 150gpm, OWS-24, Carbon, 40

Largest Motor	7.5

575V-3ph:	0
460V-3ph:	0
230V-3ph:	0
208V-3ph:	20.46

230V-1ph	11.43
208V-1ph	0
115V-1ph	12

230V/115-3ph	0

Tag	PLC Loc	Device	Voltage	Watts	HP	Amps	Switches: At Device	Switches: On Panel	Panel Setup: Hourmeter	Panel Setup: Ammeter	Analog Setup: Signal_Low	Analog Setup: Signal_High	Offsite Communication Package: Offsite_Switch	Offsite_Color	Offsite_Name	Hourmeter	Ammeter	Datalog: Monthly	Datalog: Mai
							Logic												
Digital PLC																			
4000 Submersible Pump																			
P-4001	Y000	Motor Cntr	230V-1ph		1.5	7.83	None	Hand/Off/Auto	Display Only	None						☐	☐	☐ 0	☐ 0
Well Pump 4001							PUMPS FEEDING OWS PUMP START: SYSTEM IN RUN AND LAHH-4901 OFF PUMP STOP: SYSTEM NOT IN RUN OR LAHH-4901 ON												
4900 Oil/Water Separator																			
P-4901	Y001	Motor Cntr	208V-3ph		7.5	20.46	None	Hand/Off/Auto	Display Only	None						☐	☐	☐ 0	☐ 0
Pump - Oil Water Separator							PUMP START: SYSTEM IN RUN AND LSH-4901 ON PUMP STOP: SYSTEM NOT IN RUN OR LSH-4901 OFF												
8200 Main Control Panel																			
AL-8201	Y016	Light	115V-1ph				None	None	None	None						☐	☐	☐ 0	☐ 0
Alarm Light							LIGHT ON: SYSTEM IN ALARM. LIGHT OFF: SYSTEM NOT IN ALARM.												
AR-8201	Y017	Relay(110)	115V-1ph				None	None	None	None						☐	☐	☐ 0	☐ 0
Alarm Relay							RELAY ON: SYSTEM IN SHUTDOWN ALARM. RELAY OFF: SYSTEM NOT IN SHUTDOWN ALARM.												
SYS ON	Y015	Relay(110)	115V-1ph				None	None	None	None						☐	☐	☐ 0	☐ 0
System On Relay							RELAY ON: SYSTEM IN RUN AND KILL SWITCH NOT PRESSED RELAY OFF: SYSTEM NOT IN RUN OR KILL SWTICH PRESSED												
Power																			
7900 Building, Trailer or Skid																			
F-7901		Fan	230V-1ph		0.33	3.6	None	None	None	None	0	0				☐	☐	☐ 0	☐ 0
Fan - Process Room							FAN START: TSH-7901 ON FAN STOP: TSH-7901 OFF												
F-7902		Fan	115V-1ph	0	0.25	2	None	None	None	None	0	0				☐	☐	☐ 0	☐ 0
Fan - Control Room							FAN START: TSH-7902 ON FAN STOP: TSH-7902 OFF												
H-7901		Heater	208V/120V-3	10000	0	28	None	None	None	None	0	0				☐	☐	☐ 0	☐ 0
Heater - Process Room #1							HEATER START: TSL-7901 OFF HEATER STOP: TSL-7901 ON												
H-7902		Heater	208V/120V-3	10000		28	None	None	None	None	0	0				☐	☐	☐ 0	☐ 0
Heater - Process Room #2							HEATER START: TSL-7901 OFF HEATER STOP: TSL-7901 ON												
H-7903		Heater	208V/120V-3	1500	0	4.1	None	None	None	None	0	0				☐	☐	☐ 0	☐ 0
Heater - Control Room							HEATER START: TSL-7902 OFF HEATER STOP: TSL-7902 ON												
Lights		Light	115V-1ph	600		5	None	None	None	None						☐	☐	☐ 0	☐ 0
Inside Lights							LIGHTS ON: LIGHT SWITCH ON LIGHTS OFF: LIGHT SWITCH OFF												

Tag	PLC Loc	Device	Voltage	Watts	HP	Amps	Switches: At Device	Switches: On Panel	Panel Setup: Hourmeter	Panel Setup: Ammeter	Analog Setup: Signal_Low	Analog Setup: Signal_High	Offsite Communication Package: Offsite_Switch	Offsite_Color	Offsite_Name	Hourmeter	Datalog: Ammeter	Datalog: Monthly	Datalog: Mai
							Logic												
1200	Main Control Panel																		
	120V CB	Control Powe	115V-1ph	600		5	None	None	None	None						☐	☐	☐ 0	☐ 0
	120V Control Power																		

Alarms Project RTS151 WTS, 150gpm, OWS-24, Carbon, 40' Contai

Tag		PLC Loc / Logic	Alarm Type	Delay(sec)	Alarms On..	Alarm Setting / Comment
Type: Alarm_PLC						
4900 Oil/Water Separator						
LAHH-4901	**High High Level Alarm - Oil Water Separator**	C103	Recovers	5	Open	0
		SYSTEM SHUTDOWN: ALARM START: SYSTEM IN RUN AND LSHH-4901 OPEN FOR DELAY SHOWN ALARM STOP: SYSTEM RESET				
5200 Product Storage Tank						
LAHH-5201	**High High Level Alarm - Product Storage Tank**	C104	Sys_Shutdown	5	Open	0
		SYSTEM SHUTDOWN: ALARM START: SYSTEM IN RUN AND LSHH-5201 DEACTIVATED FOR DELAY SHOWN (see table) ALARM STOP: SYSTEM RESET				
5800 Bag Filter						
PAH-6701	**High Pressure Alarm Bag Filter 6701**	C110	Light_Only	5	Open	0
		SOFT ALARM: ALARM START: SYSTEM IN RUN AND PSH-6701 ACTIVATED FOR 5 SECONDS ALARM STOP: SYSTEM RESET				
7000 Liquid Phase Carbon						
PAH-7001	**Pressure Alarm High**	C106	Sys_Shutdown	5	Open	0
		SYSTEM SHUTDOWN: ALARM START: SYSTEM ON AND PSH-7001 OPEN FOR DELAY SHOWN (see table) ALARM STOP: SYSTEM RESET				
7900 Building, Trailer or Skid						
KILLA-7901	**Kill Switch Alarm 1 - Building**	C102	Sys_Shutdown	0	Open	0
		SYSTEM SHUTDOWN: ALARM START: ANY KILL INPUT OPEN ALARM STOP: SYSTEM RESET				
LAHH-7901	**Level Alarm High High - Building**	C105	Sys_Shutdown	5	Open	0
		STANDARD LOGIC SYSTEM SHUTDOWN: ALARM START: LSHH-7901 OPEN FOR DELAY SHOWN ALARM STOP: SYSTEM RESET				
8200 Main Control Panel						
OLA-P-4901	**Overload Alarm OWS Discharge Pump**	C111	Sys_Shutdown	1	Open	0
		SYSTEM SHUTDOWN: ALARM START: SYSTEM IN RUN AND OL-P-4901 ACTIVATED ALARM STOP: SYSTEM RESET				

Tag		PLC Loc	Alarm Type	Delay(sec)	Alarms On..	Alarm Setting
		Logic				Comment
OLA-P-4001	**Overload Alarm Inlet Discharge Pump**	C112	Sys_Shutdown	1	Open	0
		SYSTEM SHUTDOWN: ALARM START: SYSTEM IN RUN AND OL-P-4001 ACTIVATED ALARM STOP: SYSTEM RESET				
AUXA-8201	**Auxiliary Alarm - Control Panel**	C113	Sys_Shutdown	5	Open	0
		STANDARD LOGIC SYSTEM SHUTDOWN: ALARM START: SYSTEM IN RUN AND AUX-8201 DEACTIVATED ALARM STOP: SYSTEM RESET				
AUXA-8202	**Auxiliary Alarm - Control Panel**	C113	Sys_Shutdown	5	Open	0
		SYSTEM SHUTDOWN: ALARM START: SYSTEM IN RUN AND AUX-8202 DEACTIVATED ALARM STOP: SYSTEM RESET				
PWRA-8201	**Panel Power Alarm**	C114	Sys_Shutdown	0	Open	0
		SYSTEM SHUTDOWN: ALARM START: POWER LOSS OR INCOMING VOLTAGE FAULT ALARM STOP: SYSTEM RESET AND INCOMING POWER IS WITHIN LIMITS Note. Power limits and tolerance, as well as recovery time is all set locally on device.				

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1 Using the newterra Site-Link: Remote Offsite Telemetry

1.1 Document purpose

This document details the various features and functionality of and procedure for logging in to and using the **newterra** Site-Link: Remote Offsite Telemetry portal.

Revision control

Revision	Author	Date
Rev 1. Original draft.	T Coates/ W Moulton	11 April 2012

2 Table of Contents

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3 Overview

The **newterra** Site-Link: Remote Offsite Telemetry is a customized software program and hardware configuration which provides a real-time link to a process control system via cellular modem using our secure Site-Link Server.

Site-Link does not require any additional software to be downloaded or installed and simply uses your favourite internet browser* to view your system from anywhere you can get internet and is Operating System independent (ie Windows/ MAC). This means that you have access to your system via your internet browser enabled computer, smart phone or similar device. To access your system simply type the following address into your browser: https://sitelink.newterra.com.

** **newterra** recommends Internet Explorer 8.0® or higher for best performance with 800x600 resolution or higher.*

Site-Link comes with the following features:

- Customized P&ID layout with System Status
- Start/ Stop/ Reset of System
- Manual Control of most system components†
- Data and Alarm logging exports in .csv format
- Alarm History including Current Alarm Status
- Hour Meters for Equipment††
- Customization of all system set points†

† certain restrictions apply.
†† only applies when hour meters are quoted with system.

Multiple users can have access to Site-Link, each with their own unique login details. Users can have read and write privileges for monitoring and control, or read only privileges for monitoring only. For customers with multiple systems with Site-Link capability, all those systems will be available via the one login account.

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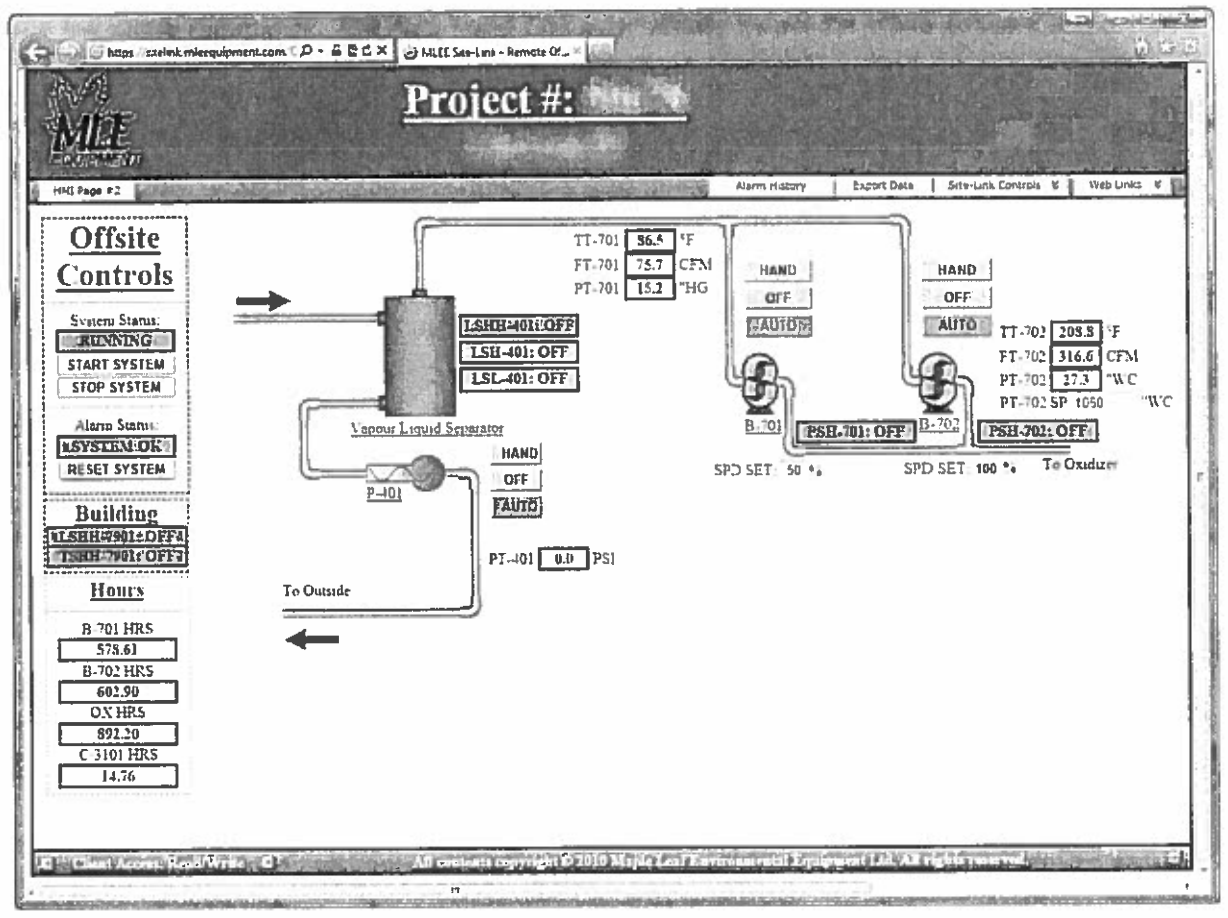
4 P&ID Page 1

P&ID page 1 typically includes system status dialog box (Shutdown/ Running). Start and Stop buttons. Reset button to reset alarms. Alarm status box (System OK/ Alarm). Soft HOA switches for motors/ valves etc. Visual indicators for level switches, active pumps/ motors/ valves etc.
Depending on the components used in the system; instantaneous flow, total flow, analog transmitters and SetPoints.
Tabs for P&ID page 2 (if applicable), alarm history and export data.

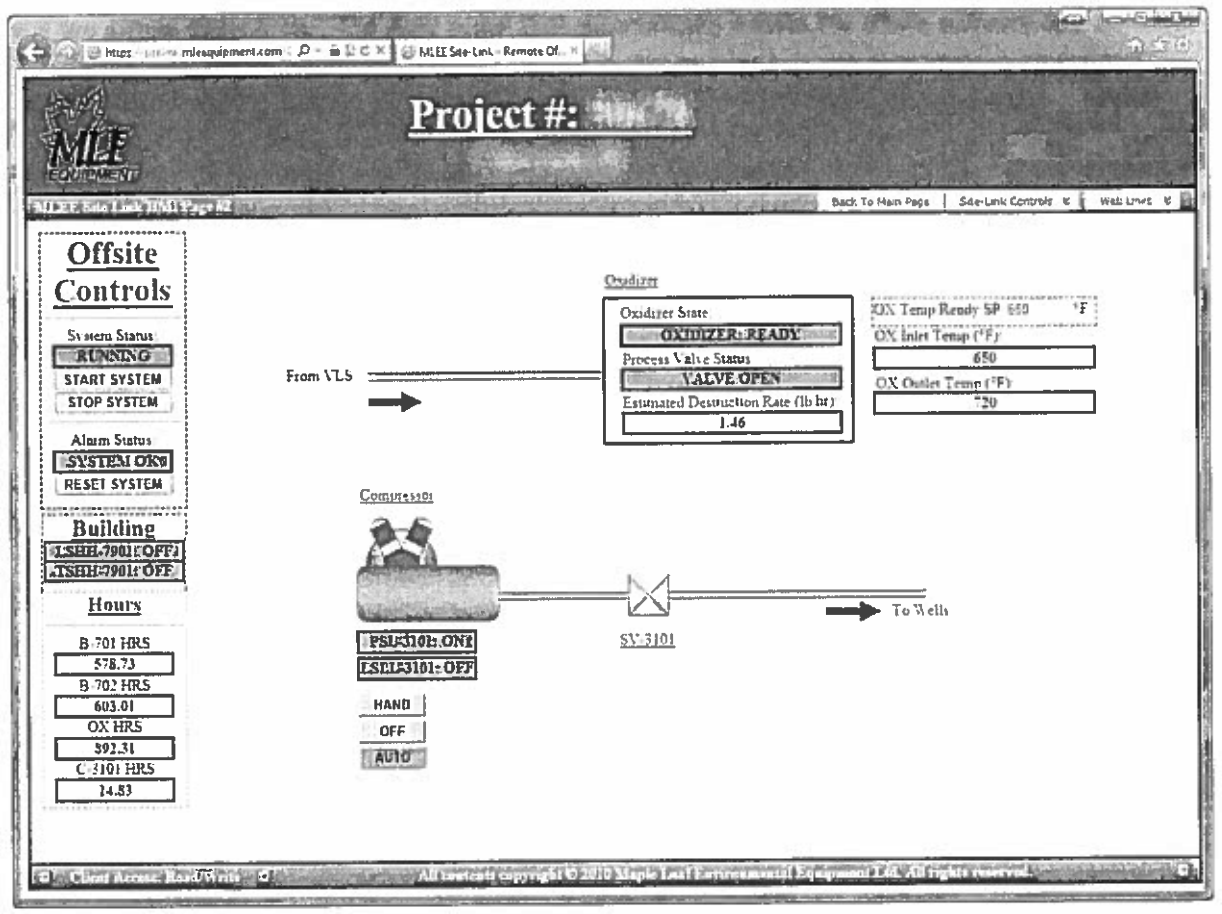


Display refresh rate is once per minute unless a Site-Link button is pressed, in which case the display refresh will be approximately 5 seconds.

To change analog SetPoints simply type into the text box provided and then press the enter key on your computer keyboard.

5 P&ID Page 2

P&ID page 2 is typically used for larger systems and includes many or all of the same features as mentioned above, depending on the system.



6 Datalogging

Analog values and flow data (if present on the system) and hour meters are logged automatically. If the system only has hour meters the standard logging rate is once per day. If the system has analog values and/ or flow data the standard logging rate is once every 10 minutes.

Note: Data is only retained on the server for 90 days before the oldest data starts to be overwritten by the newest data. Therefore it is recommended that downloads are performed every 2 months (see Export Data section below).

7 Yellow/ orange boxes with ?????

Yellow/ orange boxes with ????? instead of the usual red/ green boxes means the Site-Link server is unable to pull any data from the PLC on site. This typically means there is no power to the control panel or possibly an issue with the wireless signal or modem. If symptoms persist please call **newterra**.

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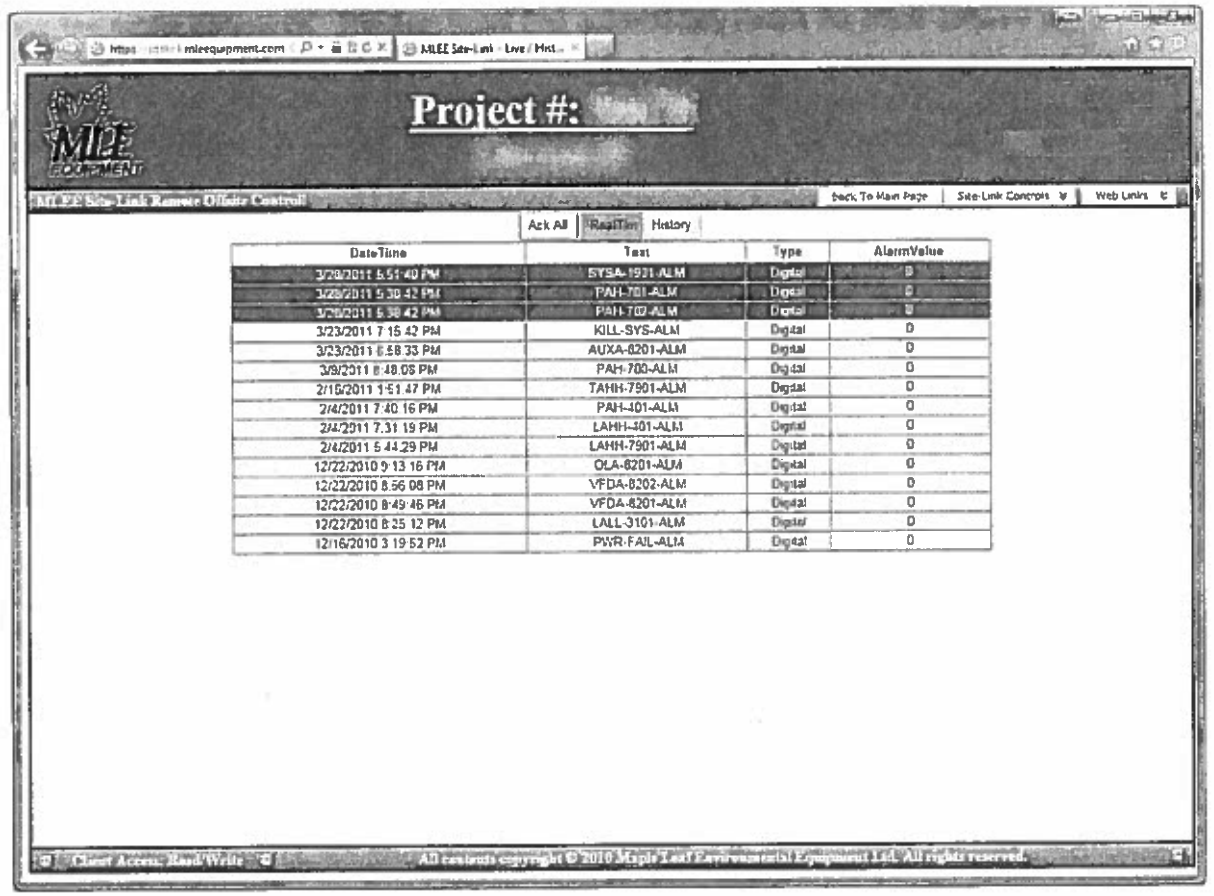
8 Alarm History

This is a list of all the alarms the system is capable of generating, in the order that the alarm status last changed. It details the last date/ time that alarm changed state. For more detailed alarm history the alarm export data download can be performed.



DateTime: Date and time the alarm status changes. (**Note:** All times are taken from the Site-Link server clock which is Eastern Time, EST or EDT depending on the time of year).
Text: Short form alarm code. Please refer to O&M manual for more detailed description.
Type: This will always display Digital.
AlarmValue: 0 indicates that the alarm is inactive. 1 indicates that the alarm is active.
Colour: Yellow indicates alarm statuses that have been acknowledged, even if the alarm is still active. Red indicates alarm statuses that have not been acknowledged since it last changed state, even if the alarm is no longer active (so red does not necessarily mean the alarm is active, just that it has changed state since it was last acknowledged).
Ack All: This will acknowledge all the alarms in the table and turn all the lines yellow, whether the alarm is active or inactive. Please note that this does not physically cancel or reset any alarms on the subject system. An active alarm that has been acknowledged and is displayed on a yellow line will change to a red line once the alarm deactivates, as the alarm has changed state.
History: Provides limited alarm history, it is recommended to use the alarm Export Data download outlined in the next section.

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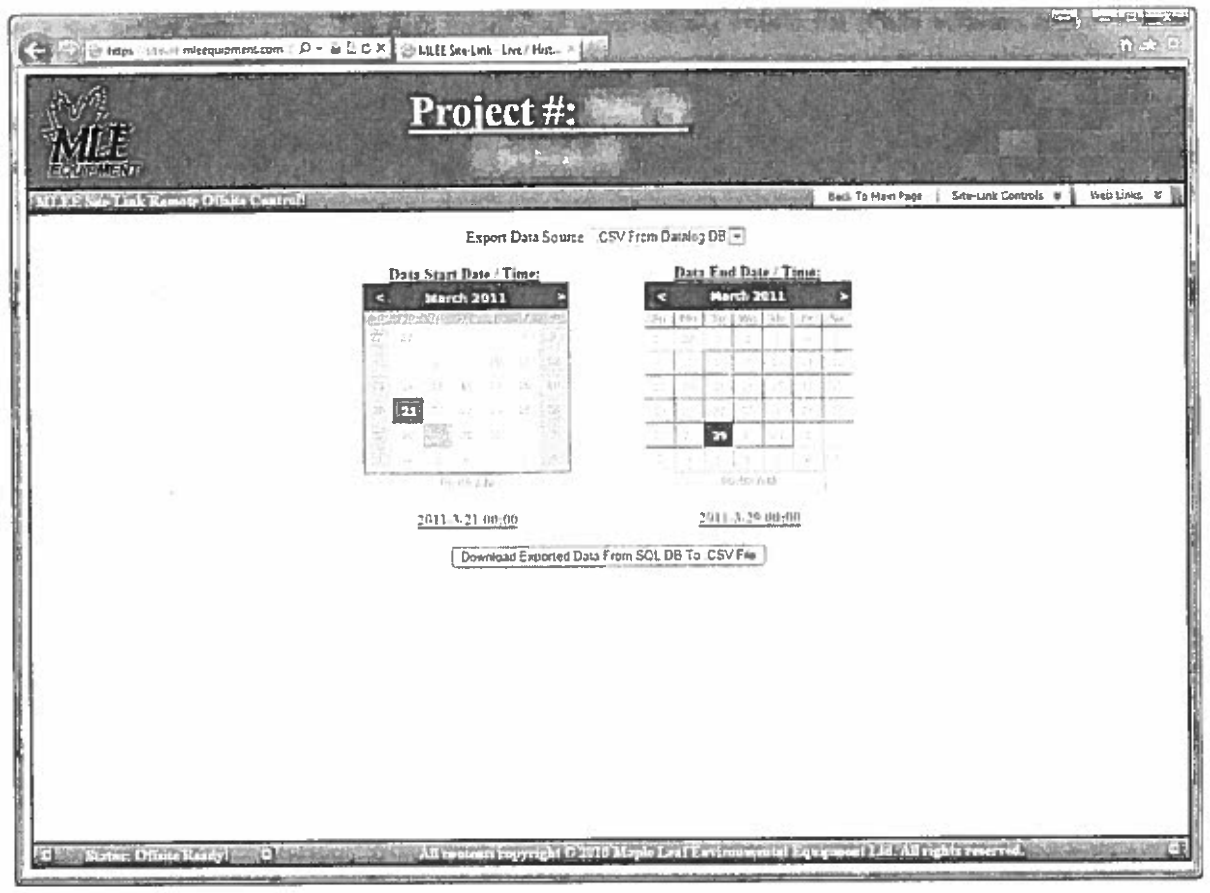
9 Export Data

Data and/ or alarm logs can be downloaded for recording, reporting or trending purposes. **Note:** Data is only retained on the server for 90 days before oldest data starts to be overwritten by the newest data. Therefore it is recommended that downloads are performed every 2 months.



Select data source: Select the data export source from the drop down box, either Datalog DB or Alarm DB.

Select Start Date/ Time: Select the start date by navigating the Data Start Date/ Time calendar to the desired year/ month and click on the day. Set the desired start time in the box below the calendar. (**Note:** All times are taken from the Site-Link server clock which is Eastern Time, EST or EDT depending on the time of year).

Select End Date/ Time: Select the end date by navigating the Data End Date/ Time calendar to the desired year/ month and click on the day. (**Note:** You have to click on the day even if it is today's date, as today's date will always be highlighted and it looks like it is highlighted but it is not). Set the desired start time in the box below the calendar. (**Note:** All times are taken from the Site-Link server clock which is Eastern Time, EST or EDT depending on the time of year).

Download Data: Click on the 'Download Exported Data From SQL DB To .CSV File' button. When prompted by the File Download dialog box click on the Save button to save the .csv file and then navigate to the location you want to save the file to.

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10 Sample Data Download snap shot

Copy and paste from a data download .csv file from a system with only hour meters.

DateAndTime	V_STATUS	C3101_HRS	C3201_HRS	P4901_HRS	B6401_HRS	P6401_HRS
3/13/2012 12:00:00 AM	2	73	159	6	0	0
3/14/2012 12:00:00 AM	2	76	165	6	0	0
3/15/2012 12:00:00 AM	2	81	173	6	0	0
3/16/2012 12:00:00 AM	2	86	180	6	0	0
3/17/2012 12:00:00 AM	2	90	187	7	0	0
3/18/2012 12:00:00 AM	2	95	195	7	0	0
3/19/2012 12:00:00 AM	2	99	202	7	0	0
3/20/2012 12:00:00 AM	2	103	209	7	0	0
3/21/2012 12:00:00 AM	2	109	217	7	0	0
3/22/2012 12:00:00 AM	102	112	220	7	0	0
3/23/2012 12:00:00 AM	114	113	221	7	0	0
3/24/2012 12:00:00 AM	1	116	225	8	0	0
3/25/2012 12:00:00 AM						
3/26/2012 12:00:00 AM	1	116	225	8	0	0
3/27/2012 12:00:00 AM	2	119	228	9	0	0
3/28/2012 12:00:00 AM	2	126	235	12	0	0
3/29/2012 12:00:00 AM	2	132	242	15	0	0
3/30/2012 12:00:00 AM	2	139	249	18	0	0
3/31/2012 12:00:00 AM	2	145	254	20	0	0
04/01/2012 0:00	2	151	261	23	0	0
04/02/2012 0:00	2	158	268	26	0	0
04/03/2012 0:00	2	164	275	29	0	0
04/04/2012 0:00	2	170	282	32	0	0
04/05/2012 0:00	105	177	288	35	0	0
04/06/2012 0:00	105	183	294	37	0	0
04/07/2012 0:00	105	189	301	40	0	0
04/08/2012 0:00	105	196	307	42	0	0
04/09/2012 0:00	105	202	313	43	0	0

DateAndTime: Date and time data log was taken (Eastern Time). If there are no values for a particular data log date/ time then the server was unable to connect to the system (eg power outage at the system).
V_STATUS: Internal PLC status bit used by Site-Link to determine whether the system is running (2), stopped (1) or in alarm (other value).
C3101_HRS: Accumulated run time hours for component.

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11 Sample Alarm Download snap shot

Cut and paste from alarm download .csv file.

AlarmID	AlarmType	AlarmGroup	Priority	AlarmText	Active	Acked	TimeDelay	AlarmValue	ClearedValue	AlarmDateTime
200213.C-SYSTEM-KILL-ALM_Dig	Digital	ALM200213	0	SYSTEM-KILL-ALM	TRUE	FALSE	0	1		3/21/2012 10:02:22 AM
200213.C-SYSTEM-KILL-ALM_Dig	Digital	ALM200213	0	SYSTEM-KILL-ALM	TRUE	FALSE	0	0		3/22/2012 5:13:44 PM
200213.C-CGA-3101-ALM_Dig	Digital	ALM200213	0	CGA-3101-ALM	TRUE	FALSE	0	1		3/22/2012 7:26:07 PM
200213.C-CGA-3101-ALM_Dig	Digital	ALM200213	0	CGA-3101-ALM	TRUE	FALSE	0	0		3/23/2012 8:16:04 AM
200213.C-SYSTEM-KILL-ALM_Dig	Digital	ALM200213	0	SYSTEM-KILL-ALM	TRUE	FALSE	0	1		3/23/2012 8:25:28 AM
200213.C-SYSTEM-KILL-ALM_Dig	Digital	ALM200213	0	SYSTEM-KILL-ALM	TRUE	FALSE	0	0		3/23/2012 8:25:41 AM
200213.C-LALL-3101-ALM_Dig	Digital	ALM200213	0	LALL-3101-ALM	TRUE	FALSE	0	1		3/23/2012 10:36:42 AM
200213.C-LALL-3101-ALM_Dig	Digital	ALM200213	0	LALL-3101-ALM	TRUE	FALSE	0	0		3/23/2012 11:03:57 AM
200213.C-LAHH-4901-ALM_Dig	Digital	ALM200213	0	LAHH-4901-ALM	TRUE	FALSE	0	1		3/23/2012 11:04:03 AM

AlarmID: Short form alarm code. Please refer to O&M manual for more detailed description.
AlarmType: Will always will report Digital. Unable to suppress column.
AlarmGroup: Will always report ALMxxxxxx. Unable to suppress column.
Priority: Will always report zero. Unable to suppress column.
AlarmText: Short form alarm code. Please refer to O&M manual for more detailed description.
Active: Will always report True. Unable to suppress column.
Acked: Will always report False. Unable to suppress column.
TimeDelay: Will always report zero. Unable to suppress column.
AlarmValue: 1 means alarm is/ became active. 0 means alarm is/ became inactive.
ClearedValue: Will always be blank. Unable to suppress column.
AlarmDateTime: Date and time at which alarm changed state (became active and/ or inactive)

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12 PLC Program Changes

Wireless telemetry also enables **newterra** to perform remote PLC program/ system troubleshooting and upload PLC program modifications remotely.

13 Logging in

Each user is added to the Site-Link database and set up with an account by an Administrator at **newterra**. Once this has been done the user will receive an automated Email similar to the one shown below.

From: MLEE Site-Link Admin <sitelink@newterra.com>
Date: 12 April 2012 08:11
Subject: Re: New User Account Created For: jsmith
To: jsmith <jsmith@email.com>

Site-Link Account Information

Project # / Username: jsmith
Contact E-Mail Address: jsmith@email.com

New Random Password: 96a35b

Please feel free to return to https://sitelink.newterra.com to change your password at any time

----
*Thank You Very Much For Using The **newterra** Site-Link Offsite Software,*

~The Site-Link Administrator

Multiple users can have access to Site-Link, each with their own unique login details. Users can have read and write privileges, for monitoring and control, or read only privileges for monitoring only. For customers with multiple systems with Site-Link capability, all those systems will be available with the one login.

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14 E-Alarm

An instant Email or Email to cell phone text is optionally available as a separate service. Personnel on the call out list will receive an automated Email or text similar to the one shown below.

From: 200000 - ABC Air Sparge [mailto:plc@newterra.com]
Sent: April 13, 2012 8:33 AM
To: plc201217
Subject: ALARM! 200000 - ABC Airsparge

C103 - PAH-2401 SPG1
04/13/12,12:32PM
Help: http://goo.gl/upNS6

14.1 E-Alarm Re-Email

Any alarm condition will re-Email every 2 hours (unless specified otherwise by the customer) until the alarm either self clears (if it is recoverable) or is reset via the Site-Link P&ID page.

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15 E-Monitor

A daily system status Email is optionally available as a separate service. Personnel on the call out list will receive a daily automated Email similar to the ones shown below, the more complex the system the more detailed the report.

newterra

Site-Link E-Monitor

Daily Report for

Start: 3-19-2012 EST Stop: 3-19-2012 EST

SYSTEM STATUS: **ALARM**

Date-Time (EST)	Status	System (hours)	B-6401 (hours)	P-4901 (hours)	P-6401 (hours)	P-7301 (hours)	Total Water Discharge FT-7301 (gal)	Total Product Discharge FT-5201 (gal)	Total Inlet Fluids FT-4601 (gal)	pH	DWS LT-4901 (%)	PT-4901 (psi)	PDT-6401 ("WC)	PDT-6402 ("WC)	PT-6401 ("WC)
3-19-2012 2:22:00 PM	RUNNING	1159	1121	68	92	35	327690	0	0	79	48	78	0.8	15.4	59
3-19-2012 2:22:30 PM	RUNNING	1159	1121	68	92	35	327690	0	0	79	47	78	0.7	15.3	59
3-19-2012 2:23:00 PM	RUNNING	1159	1121	68	92	35	327690	0	0	79	49	78	0.7	15.3	59
3-19-2012 2:23:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	51	78	0.7	15.3	59
3-19-2012 2:24:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	52	78	0.7	15.3	59
3-19-2012 2:24:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	54	78	0.8	15.3	59
3-19-2012 2:25:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	55	78	0.8	15.3	59
3-19-2012 2:25:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	53	78	0.8	15.3	59
3-19-2012 2:26:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	57	78	0.7	15	59
3-19-2012 2:26:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	58	78	0.7	15	59
3-19-2012 2:27:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	59	78	0.7	15	59
3-19-2012 2:27:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	56	78	0.8	15.0	59
3-19-2012 2:28:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	38	78	0.8	15.0	59
3-19-2012 2:28:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	20	78	0.7	14.7	59
3-19-2012 2:29:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	18	78	0.7	14.7	59
3-19-2012 2:29:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	16	78	0.6	15.0	59
3-19-2012 2:30:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	19	78	0.6	15.0	59
3-19-2012 2:30:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	21	78	0.7	15.0	59
3-19-2012 2:31:00 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	21	78	0.7	15.0	59
3-19-2012 2:31:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	20	78	0.6	14.9	59
3-19-2012 2:31:59 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	22	78	0.6	14.9	59
3-19-2012 2:32:17 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	25	78	0.7	14.9	59
3-19-2012 2:32:45 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	31	78	0.7	14.9	59
3-19-2012 2:33:05 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	32	78	0.7	14.9	59
3-19-2012 2:33:30 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	33	78	0.7	14.9	59
3-19-2012 2:33:55 PM	RUNNING	1159	1122	68	92	35	327690	0	0	79	35	78	0.7	14.9	59

Printed at 3-20-2012 EST

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Site-Link E-Monitor

Daily Report for

Start: 3/22/2012 9:50:00 AM
Stop: 3/23/2012 9:20:00 AM

SYSTEM STATUS: **RUNNING**

Analogs:

	VT-LRP
MIN:	16.200000762939
MAX:	17.8999996
AVERAGE:	17.3577464

ALARM STATUS

Last Alarm	Active
KILL-SYS-ALM 3/13/2012 2:42:10 PM	NO

HOUR METERS:

DP-PS	2272
VP-LRP	3043
DP-OWS	505
AB-STRP	1406
DP-STRP	423

3/23/2012 9:22:52 AM

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Project As-Built Document

27-Aug-13

RTS151 **WTS, 150gpm, OWS-24, Carbo**

Customer: newterra ltd.

System Site Specifications

Elevation:	0 ft
Max Temp	0 deg F
Min Temp:	0 deg F
Noise Target:	
Gas Required:	
Water Required:	
Telephone Reqd:	
Building:	

System Electrical Specifications

Voltage:	208V/120V-3ph
Main Disconnect	100amp
Panel Approval:	MET1604(CL Class CL1DIV2
System Approval:	Class CL1DIV2
Panel Type:	PLC-DL06
Telemetry:	
Autodialer:	
EMonitor:	Server:

System SVE (First Blower)

0 @ 0

Blower Disch Temp:	0 deg F
Inlet Legs:	0
Disch Press:	0 in wc
Water Flowrate:	0 gpm
Heat xchg Disch:	0 deg F

System SVE (Second Blower)

0 @ 0

Blower Disch Temp:	0 deg F
Inlet Legs:	0
Disch Press:	0 in wc
Water Flowrate:	0 gpm
Heat xchg Disch:	0 deg F

Air Sparge

0 @ 0 psi

Sparge Disch Temp:	0 deg F
Disch Legs:	0
Heat xchg Disch:	0 deg F

Other Specifications

Other Inlet Liquid Flow:	0 gpm
Disch Flow:	150 gpm @ 40 psi
AirTreatment:	None
Water_Treatment:	Carbon
Stripper Airflow:	0 cfm
Stripper Dsn Flow:	0 gpm
OWS_Dsn_Flow:	150 gpm

Contaminants

Other Information May be Presented Below

Connection Info:

Shipping Information

Parts

Module Code: 0

Insulation, Foil Back Foam, 1", R, Thinsulate, 4x8	Part:	10636
	Qty:	34
	Mfg:	
	Mfg Part:	356075
Lumber, Spruce, Dry, 2" x 4" x 10'	Part:	10912
818011	Qty:	96
	Mfg:	
	Mfg Part:	818011
Lumber, Plywood, Spr, STD, 4 x 8 x 3/8"	Part:	14463
620295	Qty:	34
	Mfg:	
	Mfg Part:	620295
Switch, Temperature, Probe, A19ABC-24D	Part:	15651
range -30/100F	Qty:	2
	Mfg:	Johnson Controls
	Mfg Part:	
Breaker, Techna, JTEC4892C40	Part:	17700
240V 40 AMP 2P C Trip Curve	Qty:	1
10k SCCR	Mfg:	Fusetek
	Mfg Part:	JTEC4892C40
Combination Starter, SQT LUCC32FU	Part:	19434
TeSysU 1 Phase Control Unit 8-32A	Qty:	1
110/120VAC coil	Mfg:	Telemecanique
	Mfg Part:	SQT LUCC32FU
Wire, Stranded, T90, #1 AWG, Black	Part:	25152
	Qty:	10
	Mfg:	
	Mfg Part:	T901BLK

FLT-6701

Filter, Bag, Dewatering, Assembly, Four (4)	Part:	RC036
	Qty:	1
	Mfg:	
---	Mfg Part:	---

PI-6701

Gauge, Pressure, 0-60psi, Indumart, P16K2-FG-60 (back)	Part:	19393
SS, brass internals, Glyc. Filled, back mount	Qty:	8
	Mfg:	
---	Mfg Part:	P16K2-FG-60

PSH-6701

Switch, Pressure, A1F-0-SS-1-2	Part:	20589
4-75 PSI Range	Qty:	1
Deadband at Min Range 4 - Max Range 15	Mfg:	Dwyer
---	Mfg Part:	

Rental Components

Module Code: 2

RCHOSE DISCH

Hose, Assembly, J300, 3"	Part:	18661
Green Hose	Qty:	50
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-

RCHOSE-INLET

Hose, Assembly, J300, 3"	Part:	18661
Green Hose	Qty:	50
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-

Submersible Pump

Module Code: 4000

LSH-4001

Switch, Level, Mech Float, Wide Angle, N.O., Red	Part:	M1108
Tilt Float Level Switch 90deg, w 40' cable	Qty:	1
13A, SPST, N/O	Mfg:	Warrick Controls
---	Mfg Part:	GR20W4000

P-4001

Pump, Sump, Goulds, 160GPM @ 40'	Part:	RC073
WS2038BHF, 200V, 3 Ph, 2 HP, w/o switch	Qty:	1
3" Type F Camlock Fitting	Mfg:	Goulds
---	Mfg Part:	

Oil/Water Separator

Module Code: 4900

LSHH-4901

Switch, Level, Mech Float, Narrow Angle, N.C., YEL	Part:	19279
N/C, Yellow float	Qty:	1
	Mfg:	
---	Mfg Part:	PY2CW4000

OWS-4901

Media, Coalescing, HD Q-PAC	Part:	13959
0.25" spacing, 132 sqft/cuft	Qty:	24
	Mfg:	
---	Mfg Part:	HD Q-PAC

Oil Water Separator, OWS-24, Stainless	Part:	16263
24 cubic feet of packing, 304SS	Qty:	1
Note: Build up price from Price Sheet	Mfg:	Maple Leaf Environmental Equipment
To be removed from RTS-148, SVE, WTS returning fron Veron,TX. Purchased used equipment, 50430 Jerry Wood #2 project.	Mfg Part:	

Strain Relief, Connector, PVC, 1/2"	Part:	16884
TSRC10	Qty:	2
	Mfg:	
None	Mfg Part:	TSRC10

Oil Water Separator, Assembly, OWS-24	Part:	17535
	Qty:	1
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-

Switch, Level, Mech Float, Wide Angle, N.O., Red	Part:	m1108
Tilt Float Level Switch 90deg, w 40" cable	Qty:	1
13A, SPST, N/O	Mfg:	Warrick Controls
None	Mfg Part:	GR20W4000

Valve, Ball, Brass, 2", 150#	Part:	p1065
NPT, Teflon seats, 600 PSI WOG	Qty:	1
	Mfg:	Kitz
None	Mfg Part:	601-2

Valve, Ball, Brass, 2", 150#	Part:	p1065
NPT, Teflon seats, 600 PSI WOG	Qty:	1
	Mfg:	Kitz
None	Mfg Part:	601-2

Valve, Ball, Brass, 1", 150#	Part:	p1067
NPT, Teflon seats, 600 PSI WOG	Qty:	3
	Mfg:	Kitz
None	Mfg Part:	601-1

Valve, Ball, Brass, 3", 150#	Part:	P1104
NPT, Teflon seats, 600 PSI WOG	Qty:	3
	Mfg:	
---	Mfg Part:	601-3

P-4901

Valve, Gate, Brass, 3"	Part:	10167
	Qty:	1
	Mfg:	
None	Mfg Part:	514T10
Gauge, Pressure, 0-60psi, Indumart, P16T2-FG-60	Part:	16203
SS, brass internals, Glyc. Filled, bottom mount	Qty:	1
	Mfg:	Indumart
None	Mfg Part.	
Reinforced, Adapter, PVC 80, Female, 3", SxSS	Part:	17055
Fitting, transition, socket x SS	Qty:	1
	Mfg:	
---	Mfg Part:	835-030SR
Pump, Piping, Centrifugal, 3" x 3", 170gpm	Part:	17316
	Qty:	1
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-
Pump, Suction, Goulds, SSH Series, 4SH2K52C0	Part:	21028
7.5hp, 3ph, 208-230/460V, TEFC	Qty:	1
C Impeller	Mfg:	Goulds
---	Mfg Part:	---
Hose, Braided, SS, 3", MNPT fittings, 12" long	Part:	21971
5680K2	Qty:	2
304SS	Mfg:	
None	Mfg Part:	5680K2
Strainer, Wye, Brass, 3"	Part:	M1523
threaded	Qty:	1
	Mfg:	
None	Mfg Part:	145T10
Valve, Check, Swing, Brass, 3"	Part:	M1524
	Qty:	1
	Mfg:	
None	Mfg Part:	521T10
Valve, Check, Swing, Brass, 3"	Part:	M1524
	Qty:	1
	Mfg:	
None	Mfg Part:	521T10
Union, Galv, 3"	Part:	M1530
	Qty:	2
	Mfg:	
None	Mfg Part:	3GLU
Valve, Ball, Brass, 3", 150#	Part:	P1104
NPT, Teflon seats, 600 PSI WOG	Qty:	1
	Mfg:	
-	Mfg Part:	601-3

Product Storage Tank

Module Code: 5200

LSHH-5201

Switch, Level, Almeg, Vertical, ATB3-48B	Part:	12351
1/4NPT	Qty:	1
	Mfg:	Almeg
---	Mfg Part:	ATB3-48B
Reducer, Bushing, Galv, 2" x 1/2"	Part:	P1021
Hex	Qty:	1
	Mfg:	
—	Mfg Part:	2X12GZB
Union, Galv, 2"	Part:	P1093
	Qty:	1
	Mfg:	
—	Mfg Part:	2GZU

PST-5201

Tee, Galv, 2"	Part:	10136
1	Qty:	1
	Mfg:	
—	Mfg Part:	2GZT
Drum, Black, Steel, 45 gal, 2 hole lid, bottom 2" port	Part:	M1137
including palletization	Qty:	1
	Mfg:	
—	Mfg Part:	SOH00733
Elbow, 90deg, Galv, 2"	Part:	P1058
	Qty:	4
	Mfg:	
—	Mfg Part:	2GZE9
Valve, Ball, Brass, 2", 150#	Part:	P1065
NPT, Teflon seats, 600 PSI WOG	Qty:	1
	Mfg:	Kitz
---	Mfg Part:	601-2
Nipple, Galv, 2" x Short	Part:	P1192
	Qty:	5
	Mfg:	
—	Mfg Part:	2xSHGZN

Bag Filter

Module Code: 5800

FLT-5801

O-Ring, Buna-N, 8-3/8" OD, 3/16" Thick A70 Hardness * Fits most Filter Innovation EB112 series ---	Part: Qty: Mfg: Mfg Part:	21619 25 369 BUNA
Filter, Bag, Dewatering, Assembly, Four (4) ---	Part: Qty: Mfg: Mfg Part:	RC033 1 ---

FLT-5802

Reducer, Bushing, Galv, 3" x 2" Hex ---	Part: Qty: Mfg: Mfg Part:	10019 4 3X2GZB
Tee, Galv, 2" 1 ---	Part: Qty: Mfg: Mfg Part:	10136 2 2GZT
Nipple, Galv, 2" x Close ---	Part: Qty: Mfg: Mfg Part:	10222 14 2XCLGZN
Tee, Galv, 3" ---	Part: Qty: Mfg: Mfg Part:	10302 2 3GZT
Valve, Ball, Brass, 1/2", 150# NPT, Teflon seats, 600 PSI WOG ---	Part: Qty: Mfg: Mfg Part:	10538 2 601-1/2
Nipple, Galv, 1/2" x Close ---	Part: Qty: Mfg: Mfg Part:	10619 2 12CLGZN
Skid, 2ft x 4ft ---	Part: Qty: Mfg: Mfg Part:	15152 1 Maple Leaf Environmental Equipment
Sample Port Assembly, 1/4" -	Part: Qty: Mfg: Mfg Part:	18682 2 Maple Leaf Environmental Equipment -
Filter, Bag, Housing, #2, Carbon Steel SS Basket, CS legs ---	Part: Qty: Mfg: Mfg Part:	19117 2

Reducer, Bushing, Galv, 2" x 1/2"	Part:	P1021
Hex	Qty:	2
	Mfg:	
---	Mfg Part:	2X12GZB
Valve, Ball, Brass, 2", 150#	Part:	P1065
NPT, Teflon seats, 600 PSI WOG	Qty:	4
	Mfg:	Kitz
---	Mfg Part:	601-2
Union, Galv, 2"	Part:	P1093
	Qty:	4
	Mfg:	
---	Mfg Part:	2GZU

PI-5801

Gauge, Pressure, 0-60psi, Indumart, P16K2-FG-60 (back)	Part:	19393
SS, brass internals, Glyc. Filled, back mount	Qty:	12
	Mfg:	
---	Mfg Part:	P16K2-FG-60

PSH-5801

Switch, Pressure, A1F-0-SS-1-2	Part:	20589
4-75 PSI Range	Qty:	1
Deadband at Min Range 4 - Max Range 15	Mfg:	Dwyer
---	Mfg Part:	

Bag Filter

Module Code: 6700

FLT-6701

Nipple, Galv, 3" x Close	Part:	11220
	Qty:	6
	Mfg:	
—	Mfg Part:	3CLGZN
Flange, Companion, Galv, 6"	Part:	12572
threaded	Qty:	2
	Mfg:	
—	Mfg Part:	6GZCIF / 12.0905
Valve, Butterfly, Wafer, Ductile Iron, 6"	Part:	15019
316SS disc & stem, BUNA, 10 position lever	Qty:	2
	Mfg:	
—	Mfg Part:	CIWB-SBL 6" CO
Reducer, Bushing, Galv, 6" x 3"	Part:	19681
Hex	Qty:	2
	Mfg:	
—	Mfg Part:	
Tee, PVC 40, 3", SxSxS, 401-030G	Part:	22578
	Qty:	2
	Mfg:	
—	Mfg Part:	
Elbow, 90deg, PVC 40, 3", SxS, 406-030G	Part:	22619
	Qty:	8
	Mfg:	
—	Mfg Part:	406-030G
Misc Part, See Details	Part:	9999
As per detailed specification below	Qty:	1
	Mfg:	
Pricing from Steve Hughes, Aug. 7th,2013 e-mail	Mfg Part:	Qo8L100RB9
V6427-A, Muilti-Bag Filter Housing - 7 Bag Model - 304 Stainless		
Vessel A - Inlet and Outlet are on the right hand side of the unit when looking at the label.		
Misc Part, See Details	Part:	9999
As per detailed specification below	Qty:	2
	Mfg:	
4155-1490-B, O-rings for V6427-A Bag Filter Housing	Mfg Part:	Qo8L100RB9
Valve, Ball, Brass, 3", 150#	Part:	P1104
NPT, Teflon seats, 600 PSI WOG	Qty:	1
	Mfg:	
—	Mfg Part:	601-3
Elbow, 90deg, Galv, 3"	Part:	P1220
	Qty:	1
	Mfg:	
—	Mfg Part:	3GZE9

FT-6701

Reinforced, Adapter, PVC 80, Female, 3", SxSS	Part:	17055
Fitting, transition, socket x SS	Qty:	4
	Mfg:	
---	Mfg Part:	835-030SR

PSH-6701

Switch, Pressure, A1F-0-SS-1-2	Part:	20589
4-75 PSI Range	Qty:	1
Deadband at Min Range 4 - Max Range 15	Mfg:	Dwyer
---	Mfg Part:	

Liquid Phase Carbon

Module Code: 7000

7000

Nipple, Galv, 3" x Close	Part:	11220
	Qty:	2
	Mfg:	
---	Mfg Part:	3CLGZN
Valve, Ball, Brass, 3", 150#	Part:	P1104
NPT, Teflon seats, 600 PSI WOG	Qty:	1
	Mfg:	
---	Mfg Part:	601-3
Adapter, PVC 80, Female, 3", SxT, 835-030G	Part:	P1153
	Qty:	2
	Mfg:	
---	Mfg Part:	835-030

FQI,FT-7001

Meter, Water, 2", US Gal, w/ pulse, Turbine, DLJ	Part:	15499
Flange	Qty:	1
	Mfg:	Daniel L. Jerman Co.
---	Mfg Part:	DLJ200TC

LPC-7001

Reducer, Bushing, Galv, 3" x 2"	Part:	10019
Hex	Qty:	5
	Mfg:	
---	Mfg Part:	3X2GZB
Tee, Galv, 3"	Part:	10302
	Qty:	5
	Mfg:	
---	Mfg Part:	3GZT
Nipple, Galv, 3" x Short (3")	Part:	10445
	Qty:	4
	Mfg:	
---	Mfg Part:	3SHGZN
Camlock Fitting, Aluminum, 3", Part "F"	Part:	10541
Male Adapter x Male Thread Cam Lock Fitting	Qty:	6
	Mfg:	Bayco Industries
-	Mfg Part:	BAL-300F
Camlock Fitting, Aluminum, 3", Part "C"	Part:	10542
Female Adapter x Hose Shank Cam Lock Fitting	Qty:	6
	Mfg:	Bayco Industries
-	Mfg Part:	BAL-300C
Hose, Suction, PVC, Green, 3", J300	Part:	12043
TigerFlex, 65psi@70F, 40psi@100F	Qty:	30
PVC,150F, (min 100ft order)	Mfg:	Kuriyama
-	Mfg Part:	J300
Reinforced, Adapter, PVC 80, Female, 3", SxSS	Part:	17055
Fitting, transition, socket x SS	Qty:	6
	Mfg:	
---	Mfg Part:	835-030SR

Hose, Assembly, J300, 3"	Part:	18661
Green Hose	Qty:	3
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-
Sample Port Assembly, 1/4"	Part:	18682
	Qty:	3
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-
Valve, Check, Spring, Brass, 2"	Part:	M1529
	Qty:	1
	Mfg:	
—	Mfg Part:	2BPUCV
Clamp, Hose, SS, 3", HAS48	Part:	P1044
	Qty:	12
	Mfg:	
None	Mfg Part:	HAS48
Valve, Ball, Brass, 3", 150#	Part:	P1104
NPT, Teflon seats, 600 PSI WOG	Qty:	4
	Mfg:	
—	Mfg Part:	601-3
Reducer, Bushing, Galv, 2" x 1/4"	Part:	P1219
Hex	Qty:	5
	Mfg:	
—	Mfg Part:	2x14GZB

PI-7001

Gauge, Pressure, 0-60psi, Indumart, P16T2-FG-60	Part:	16203
SS, brass internals, Glyc. Filled, bottom mount	Qty:	2
	Mfg:	Indumart
—	Mfg Part:	

PI-7004

Gauge, Pressure, 0-60psi, Indumart, P16K2-FG-60 (back)	Part:	19393
SS, brass internals, Glyc. Filled, back mount	Qty:	1
	Mfg:	
—	Mfg Part:	P16K2-FG-60

PSH-7001

Switch, Pressure, A1F-0-SS-1-2	Part:	20589
4-75 PSI Range	Qty:	1
Deadband at Min Range 4 - Max Range 15	Mfg:	Dwyer
—	Mfg Part:	

Building, Trailer or Skid

Module Code: 7900

7900

Door, Single, 36", Steel slab/no brick moulding, No sill ext	Part:	10822
1103A,wooden frame,open out,RH	Qty:	1
to be pre drilled for passage and deadbolt	Mfg:	
-	Mfg Part:	1103-Dalmen
Lock, Passage, 107188, Taymor	Part:	10908
107188	Qty:	1
	Mfg:	
None	Mfg Part:	
Lock, Deadbolt, 289648, Taymor, 1 cyl, S/S	Part:	10909
keyed alike #289648	Qty:	1
	Mfg:	
None	Mfg Part:	
Container, Painting, 40ft exterior/interior	Part:	12063
	Qty:	1
	Mfg:	
Building exterior, to be painted our standard white finish.	Mfg Part:	
Container, Shipping, Tilt load	Part:	13593
	Qty:	1
	Mfg:	
---	Mfg Part:	
Container, 8' x 40' x High Cube	Part:	15512
	Qty:	1
	Mfg:	
---	Mfg Part:	
Container, Modification	Part:	15513
As per specification below or drawing provided.	Qty:	1
	Mfg:	
---	Mfg Part:	
Door, Assembly, 72", Double	Part:	19012
	Qty:	1
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-
Door, Assembly, 36", Single	Part:	19014
	Qty:	1
	Mfg:	Maple Leaf Environmental Equipment
-	Mfg Part:	-

Access Cover

Misc Part, See Details	Part:	9999
As per detailed specification below	Qty:	3
	Mfg:	
As per attached drawing, For 36"x36" Carbon Access Cover	Mfg Part:	---

F-7901

Fan, Building, 24", 1/3hp, 1625rpm, 120/230V, 1ph, XPF	Part:	10329
SD24-XPF, OSHA Guard,Turnout Box	Qty:	1
	Mfg:	Canarm
---	Mfg Part:	SD24-XPF-OSHA

Fan Shutter Assembly,KD,24",KDS24-SS - Use 23082	Part:	10330
	Qty:	1
	Mfg:	Canarm
---	Mfg Part:	KD24-SS
Fan, Hood, White,24",HFPW-24	Part:	M1411
	Qty:	2
	Mfg:	Canarm
---	Mfg Part:	HFPW-24

F-7903

Fan, Shutter, Backdraft damper, 12"x12"	Part:	23080
Non-Motorized	Qty:	1
	Mfg:	Canarm
---	Mfg Part:	SR3212X12
Hood, 15"	Part:	23989
Fits 12" Fan & Louver	Qty:	2
	Mfg:	
---	Mfg Part:	
Fan, Building, 12", 1/4hp, 1750rpm, 120V, 1ph, TEFC	Part:	M1072
CSA Approved, S12-E1	Qty:	1
	Mfg:	Canarm
---	Mfg Part:	SD120311

H-7901

Switch, Temperature, Johnson Controls, Assembly	Part:	18985
	Qty:	2
	Mfg:	Johnson Controls
-	Mfg Part:	-

H-7903

Heater, Baseboard, Ouellet, 1.5kW, OFM1508	Part:	22314
208V, 66" long	Qty:	1
	Mfg:	Ouellet
---	Mfg Part:	OFM1508

TSH-7903

Switch, Temperature, Probe, A19ABC-24D	Part:	15651
range -30/100F	Qty:	1
	Mfg:	Johnson Controls
-30 - 100 F option	Mfg Part:	
Switch, Temperature, Probe, WEL 14A-602R	Part:	15653
Bulb, Well for Temperature Switch, Brass	Qty:	1
	Mfg:	Johnson Controls
-30 - 100 F option	Mfg Part:	WEL 14A-602R
Switch, Temperature, Johnson Controls, Assembly	Part:	18985
	Qty:	1
	Mfg:	Johnson Controls
-	Mfg Part:	-

TSL-7903

Switch, Temperature, Probe, A19ABC-24D	Part:	15651
range -30/100F	Qty:	1
	Mfg:	Johnson Controls
-30 - 100 F option	Mfg Part:	

Switch, Temperature, Probe, WEL 14A-602R	Part:	15653
Bulb, Well for Temperature Switch, Brass	Qty:	1
	Mfg:	Johnson Controls
-30 - 100 F option	Mfg Part:	WEL 14A-602R
Switch, Temperature, Johnson Controls, Assembly	Part:	18985
	Qty:	1
	Mfg:	Johnson Controls
-	Mfg Part:	-

Main Control Panel

Module Code: 8200

8200

Contactor, SQD LC1D32G7	Part:	10520
32A, 10/10/20/25HP	Qty:	1
120VAC coil	Mfg:	Square D
---	Mfg Part:	SQD LC1D32G7
Disconnect, 3ph, D324N	Part:	11163
200A, UL.240V,Nema 1,fusible disconnect	Qty:	1
	Mfg:	Square D
---	Mfg Part:	SQD D324N
Contactor, SQD LC1D09G7	Part:	12547
9A, 2/2/5/7.5HP	Qty:	1
120VAC coil	Mfg:	Square D
---	Mfg Part:	SQD LC1D09G7
Contactor, SQD LC1D50AG7	Part:	12548
50A, 15/15/40/40HP	Qty:	1
120VAC coil	Mfg:	Square D
---	Mfg Part:	SQD LC1D50G7
Modem, Antenna, Airlink GPRS, N-Female	Part:	13723
120-110-2107	Qty:	1
MAX-BMLPVDB800/1900 Antenna & MAX-MTPM-800 Hardwar	Mfg:	
---	Mfg Part:	120-110-2107
PLC, EA1-S3ML	Part:	17233
C-more micro graphic user interface	Qty:	1
	Mfg:	Automation Direct
---	Mfg Part:	EA1-S3ML
PLC, DV-1000CBL	Part:	17234
2m Cable RJ12 to RJ12	Qty:	1
C-more Micro to DL05/06/205	Mfg:	Automation Direct
---	Mfg Part:	DV-1000CBL
Breaker, Techna, JTEC4892C30	Part:	17543
480/277V 30 AMP 2P C Trip Curve	Qty:	1
10k SCCR	Mfg:	Fusetek
---	Mfg Part:	JTEC4892C30
Breaker, Techna, JTEC4893C06	Part:	17709
480/277V 6 AMP 3P C Trip Curve	Qty:	1
10k SCCR	Mfg:	Fusetek
---	Mfg Part:	JTEC4893C06
Breaker, Techna, JTEC4893C40	Part:	17717
240V 40 AMP 3P C Trip Cuve	Qty:	2
10k SCCR	Mfg:	Fusetek
---	Mfg Part:	JTEC4893C40
Breaker, Techna, JTEC4893C50	Part:	17718
240V 50 AMP 3P C Trip Curve	Qty:	1
10k SCCR	Mfg:	Fusetek
---	Mfg Part:	JTEC4893C50

Breaker, Techna, JTEC4891C15 240V 15A, 1P C Trip Curve 10k SCCR ---	Part: Qty: Mfg: Mfg Part:	18359 1 Fusetek JTEC4891C15
Motor Saver, 460 w/Diagnostic 3ph Finger Safe, DIN Rail Mountable ---	Part: Qty: Mfg: Mfg Part:	18396 1 Symcom 460
Combination Starter, SQT LUB12 TeSysU Power Base 12A 3HP@208/240, 7.5HP@480, 10HP@600 ---	Part: Qty: Mfg: Mfg Part:	19264 1 Telemecanique SQT LUB12
Combination Starter, SQT LUA1C20 TeSysU Aux Contact Module 1NO Ready 1NO Fault ---	Part: Qty: Mfg: Mfg Part:	19269 2 Telemecanique LUA1C20
Combination Starter, SQT LU9SP0 TeSysU UL508 Type E Phase Barrier ---	Part: Qty: Mfg: Mfg Part:	19270 2 Telemecanique SQT LU9SP0
Combination Starter, SQT LUB32 TeSysU Power Base 32A 10HP@208/240, 20HP@480, 25HP@600 ---	Part: Qty: Mfg: Mfg Part:	19273 1 Telemecanique SQT LUB 32
Combination Starter, SQT LUCA32FU TeSysU Standard Control Unit 8-32A 110/120VAC coil ---	Part: Qty: Mfg: Mfg Part:	19274 1 Telemecanique SQT LUCA32FU
Combination Starter, SQT LUCC12FU TeSysU 1 Phase Control Unit 3-12 110/120VAC coil ---	Part: Qty: Mfg: Mfg Part:	19456 1 Telemecanique LUCC12FU
Transformer, Hammond, HAT Q005YEKF 208V to 240V,5KVA,UL/CSA,3R,1ph ---	Part: Qty: Mfg: Mfg Part:	19999 1 Hammond Power Solutions HAT Q005BECF
Modem, Cable, RF, N-Male to SMA-Male, 15' Length GW195-180-SM-NM Use with Raven XE ---	Part: Qty: Mfg: Mfg Part:	20569 1 GW195-180-SM-N
Relay, SQT RXM4AB1F7 Miniature Relay 4PDT 120 V AC ---	Part: Qty: Mfg: Mfg Part:	21887 1 Telemecanique SQT RXM4AB1F
Relay, SQT RXM4AB1BD Miniature Relay 4PDT 24 V DC ---	Part: Qty: Mfg: Mfg Part:	21888 1 Telemecanique SQT RXM4AB1B

Relay, SQT RXZE2S114M	Part:	21889
Base/Socket for RXM4 4P Relays	Qty:	1
	Mfg:	Telemecanique
---	Mfg Part:	SQT RXZE2S114
Relay, SQT RXZE2S114M	Part:	21889
Base/Socket for RXM4 4P Relays	Qty:	1
	Mfg:	Telemecanique
---	Mfg Part:	SQT RXZE2S114
Relay, SQT RXZE2S114M	Part:	21889
Base/Socket for RXM4 4P Relays	Qty:	1
	Mfg:	Telemecanique
---	Mfg Part:	SQT RXZE2S114
Modem, Bracket, Mounting, Airlink Raven XE	Part:	22143
100-170-1015	Qty:	1
Use with Raven XE	Mfg:	
---	Mfg Part:	100-170-1015
Modem, Airlink Raven, XE V2228E-SA w/AC Pwr Adapter, Sprint	Part:	22170
V2228E-SA	Qty:	1
Requires mounting bracket MLE# 22143	Mfg:	Airlink_Communications
---	Mfg Part:	V2221E-SA
Fuse, GLD GDL3	Part:	E1187
3A 250V Time Delay	Qty:	1
Miniature 1/4"x1-1/4"	Mfg:	Ferraz Shawmut
---	Mfg Part:	GLD GDL3
Fuse, GLD TR125R	Part:	E1206
125A 240V Time Delay	Qty:	3
Class R	Mfg:	Ferraz Shawmut
---	Mfg Part:	GLD TR125R

Panel

Misc Part, See Details	Part:	9999
As per detailed specification below	Qty:	1
	Mfg:	
Use and modify the old RTS070 PLC Control panel and Disconnect in the rental tent.	Mfg Part:	---

Bill of Material

Project RTS151
Description Baffinland Iron Mines Corp^Mary River Project/ PM
Ordernumber 102140
Drawing Number

1325 CALIFORNIA AVE.
BROCKVILLE. ONTARIO
CANADA
K6V 5Y6

Installation

No.	Device Id	Function Text	Quantity	Partnumber	Description	Technical Des	Manufacturer
1	CB227		1	17717	Breaker, Techna, JTE	Breaker, Techna, JTEC4893C40 , 240V 40 AMP 3P C Trip Cuve	
2	CB232		1	17397	Breaker, Techna, JTE	Breaker, Techna, JTEC4892C15 , 480/277V 15 AMP 2P C Trip Curve	
3	CB247		1	17717	Breaker, Techna, JTE	Breaker, Techna, JTEC4893C40 , 240V 40 AMP 3P C Trip Cuve	
4	CB253		1	17698	Breaker, Techna, JTE	Breaker, Techna, JTEC4892C20 , 480/277V 20 AMP 2P C Trip Curve	
5	CB261		1	17397	Breaker, Techna, JTE	Breaker, Techna, JTEC4892C15 , 480/277V 15 AMP 2P C Trip Curve	
6	CB266		1	18359	Breaker, Techna, JTE	Breaker, Techna, JTEC4891C15 , 240V 15A, 1P C Trip Curve	Fusetek
7	CB271		1	17701	Breaker, Techna, JTE	Breaker, Techna, JTEC4892C50 , 240V 50 AMP 2P C Trip Curve	
8	CB304		1	18359	Breaker, Techna, JTE	Breaker, Techna, JTEC4891C15 , 240V 15A, 1P C Trip Curve	Fusetek
9	CB337		1	18359	Breaker, Techna, JTE	Breaker, Techna, JTEC4891C15 , 240V 15A, 1P C Trip Curve	Fusetek
10	CB346		1	18359	Breaker, Techna, JTE	Breaker, Techna, JTEC4891C15 , 240V 15A, 1P C Trip Curve	Fusetek
11	CR318	ESTOP	1	21887	Relay, SQT RXM4AB1F7	Relay, SQT RXM4AB1F7 , Miniature Relay 4PDT 120 V AC	Telemechanique
12	CR318	ESTOP	1	21889	Relay, SQT RXZE2S114	Relay, SQT RXZE2S114M , Base/Socket for RXM4 4P Relays	Telemechanique
13	CR415	KILL-7901	1	21888	Relay, SQT RXM4AB1BD	Relay, SQT RXM4AB1BD , Miniature Relay 4PDT 24 V DC	Telemechanique
14	CR415	KILL-7901	1	21889	Relay, SQT RXZE2S114	Relay, SQT RXZE2S114M , Base/Socket for RXM4 4P Relays	Telemechanique
15	CR750	SYS-ON	1	21887	Relay, SQT RXM4AB1F7	Relay, SQT RXM4AB1F7 , Miniature Relay 4PDT 120 V AC	Telemechanique
16	CR750	SYS-ON	1	21889	Relay, SQT RXZE2S114	Relay, SQT RXZE2S114M , Base/Socket for RXM4 4P Relays	Telemechanique
17	CR760	SYS-PNL	1	21887	Relay, SQT RXM4AB1F7	Relay, SQT RXM4AB1F7 , Miniature Relay 4PDT 120 V AC	Telemechanique
18	CR760	SYS-PNL	1	21889	Relay, SQT RXZE2S114	Relay, SQT RXZE2S114M , Base/Socket for RXM4 4P Relays	Telemechanique
19	DS201	200 AMP	1	11163	Disconnect, 3ph, D32	Disconnect, 3ph, D324N , 200A, UL,240V,Nema 1,fusible disconnect	SQD
20	DS201	200 AMP	1	E1206	Fuse, GLD TR125R	Fuse, GLD TR125R , 125A 240V Time Delay	Gould
21	DS201	200 AMP	1	E1206	Fuse, GLD TR125R	Fuse, GLD TR125R , 125A 240V Time Delay	Gould

Installation

No.	Device Id	Function Text	Quantity	Partnumber	Description	Technical Des	Manufacturer
22	DS201	200 AMP	1	E1206	Fuse, GLD TR125R	Fuse, GLD TR125R , 125A 240V Time Delay	Gould
23	FU303		1	E1187	Fuse, GLD GDL3	Fuse, GLD GDL3 , 3A 250V Time Delay	Gould
24	FU303		1	19077	Fuse, Holder, PHX 30	Fuse, Holder, PHX 3004171 , 1P 10A 250V	Phoenix
25	FU304		1	E1186	Fuse, GLD GDL2	Fuse, GLD GDL2 , 2A 250V Time Delay	Gould
26	FU304		1	19077	Fuse, Holder, PHX 30	Fuse, Holder, PHX 3004171 , 1P 10A 250V	Phoenix
27	FU318		1	E1188	Fuse, GLD GDL5	Fuse, GLD GDL5 , 5A 250V Time Delay	Gould
28	FU318		1	19077	Fuse, Holder, PHX 30	Fuse, Holder, PHX 3004171 , 1P 10A 250V	Phoenix
29	FU323		1	E1188	Fuse, GLD GDL5	Fuse, GLD GDL5 , 5A 250V Time Delay	Gould
30	FU323		1	19077	Fuse, Holder, PHX 30	Fuse, Holder, PHX 3004171 , 1P 10A 250V	Phoenix
31	FU546		1	E1190	Fuse, GLD GGC1	Fuse, GLD GGC1 , 1A 250V Fast Acting	Gould
32	FU546		1	19077	Fuse, Holder, PHX 30	Fuse, Holder, PHX 3004171 , 1P 10A 250V	Phoenix
33	IS402		1	12475	Barriers, IS, D1031Q	Barriers, IS, D1031Q , Must be marked with UL Approval	GMI
34	IS411		1	12475	Barriers, IS, D1031Q	Barriers, IS, D1031Q , Must be marked with UL Approval	GMI
35	IS424		1	12475	Barriers, IS, D1031Q	Barriers, IS, D1031Q , Must be marked with UL Approval	GMI
36	KILL318		1	14607	Button, E-Stop, ZB5	Button, E-Stop, ZB5 AT4 , E-Stop Button	SQD
37	KILL318		1	14607	Button, E-Stop, ZB5	Button, E-Stop, ZB5 AT4 , E-Stop Button	SQD
38	KILL318		1	14609	Button, ZB5 AZ105	Collar with 1-N/0 and 1-N/C Contact Block	SQD
39	KILL318		1	14609	Button, ZB5 AZ105	Collar with 1-N/0 and 1-N/C Contact Block	SQD
40	KILL318		1	23054	Label, Emergency Sto	Label, Emergency Stop, SQT ZBY9330 ,	
41	KILL318		1	23054	Label, Emergency Sto	Label, Emergency Stop, SQT ZBY9330 ,	
42	LT608	P-4001	1	18625	Button, XB7EV03GP	Button, XB7EV03GP , Green LED Pilot Light 120VAC	Square D
43	LT614	P-4901	1	18625	Button, XB7EV03GP	Button, XB7EV03GP , Green LED Pilot Light 120VAC	Square D
44	LT755	SYSTEM	1	18626	Button, XB7EV04GP	Button, XB7EV04GP , Red LED Pilot Light 120VAC	Square D
45	M227	H-7902	1	10520	Contactor, SQD LC1D3	Contactor, SQD LC1D32G7 , 32A, 10/10/20/25HP	SQD
46	M247	H-7901	1	10520	Contactor, SQD LC1D3	Contactor, SQD LC1D32G7 , 32A, 10/10/20/25HP	SQD
47	OP367	MICRO-GRAPHIC	1	17233	PLC, EA1-S3ML	PLC, EA1-S3ML , C-more micro graphic user interface	
48	OP367	MICRO-GRAPHIC	1	17234	PLC, DV-1000CBL	PLC, DV-1000CBL , 2m Cable RJ12 to RJ12	
49	PDB206		1	E1217	Power Block, GLD 675	Power Block, GLD 67583 , 175A 1Pri 8Sec Aluminum	Gould
50	PDB206		1	16071	Power Block, GLD 857	Power Block, GLD 8570 , safety cover	Gould
51	PDB206		1	16071	Power Block, GLD 857	Power Block, GLD 8570 , safety cover	Gould
52	PDB206		1	16071	Power Block, GLD 857	Power Block, GLD 8570 , safety cover	Gould
53	PDB206A		1	E1215	Power Block, GLD 631	Power Block, GLD 63163 , 90A 1Pri 4Sec Aluminum 3P	Gould

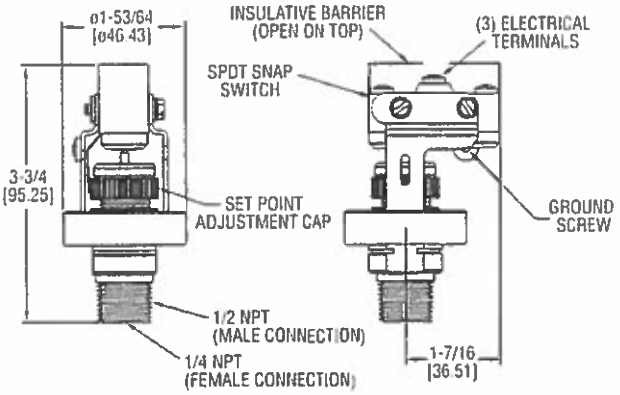
Installation

No.	Device Id	Function Text	Quantity	Partnumber	Description	Technical Des	Manufacturer
54	PDB206A		1	16010	Power Block, GLD 853	Power Block, GLD 8530 , safety cover	Gould
55	PDB206A		1	16010	Power Block, GLD 853	Power Block, GLD 8530 , safety cover	Gould
56	PDB206A		1	16010	Power Block, GLD 853	Power Block, GLD 8530 , safety cover	Gould
57	PLC369		1	DLO6			
58	PLC507		1	12752	PLC, D0-06DR-D	PLC, D0-06DR-D , 20PT 24VDC Input 16PT Relay Output Base Unit DL06	Koyo
59	PLC507		1	E1024	PLC, D2-Bat-1	PLC, D2-Bat-1 , Battery for PLC DL05/06/205	
60	PLC508		1	D0-06DR-D			
61	PS304		1	20780	Power supply, Teleme	Power supply, Telemecanique ABL7 RM24025 , In 100-240VAC Out 24VDC 2.5A	Telemechanique
62	PWR203		1	18396	Motor Saver, 460 w/D	Motor Saver, 460 w/Diagnostic 3ph , Finger Safe, DIN Rail Mountable	
63	REC337		1	GFI-15			
64	STR216	P-4001	1	19274	Combination Starter,	Combination Starter, SQT LUCA32FU , TeSysU Standard Control Unit 8-32A	
65	STR216	P-4001	1	19273	Combination Starter,	Combination Starter, SQT LUB32 , TeSysU Power Base 32A	
66	STR216	P-4001	1	19269	Combination Starter,	Combination Starter, SQT LUA1C20 , TeSysU Aux Contact Module	Telemechanique
67	STR216	P-4001	1	19270	Combination Starter,	Combination Starter, SQT LU9SP0 , TeSysU UL508 Type E Phase Barrier	
68	STR272	P-4901	1	20669	Combination Starter,	Combination Starter, SQT LUCC18FU , TeSysU 1 Phase Control Unit 4.5-18	
69	STR272	P-4901	1	19273	Combination Starter,	Combination Starter, SQT LUB32 , TeSysU Power Base 32A	
70	STR272	P-4901	1	19269	Combination Starter,	Combination Starter, SQT LUA1C20 , TeSysU Aux Contact Module	Telemechanique
71	STR272	P-4901	1	19270	Combination Starter,	Combination Starter, SQT LU9SP0 , TeSysU UL508 Type E Phase Barrier	
72	SW609		1	14660	Button, ZB5 AD3	Button, ZB5 AD3 , 3 Pos. Switch, Maintained	SQD
73	SW609		1	14610	Button, ZB5 AZ103	Button, ZB5 AZ103 , 3	SQD
74	SW615		1	14660	Button, ZB5 AD3	Button, ZB5 AD3 , 3 Pos. Switch, Maintained	SQD
75	SW615		1	14610	Button, ZB5 AZ103	Button, ZB5 AZ103 , 3	SQD
76	T249		1	19999	Transformer, Hammond	Transformer, Hammond, HAT Q005YEKF , 208V to 240V,5KVA,UL/CSA,3R,1ph	

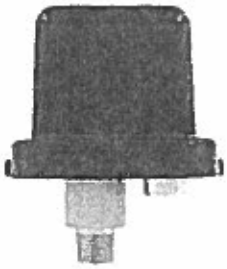
Mercoid® Series A1F Compact OEM Pressure Switch

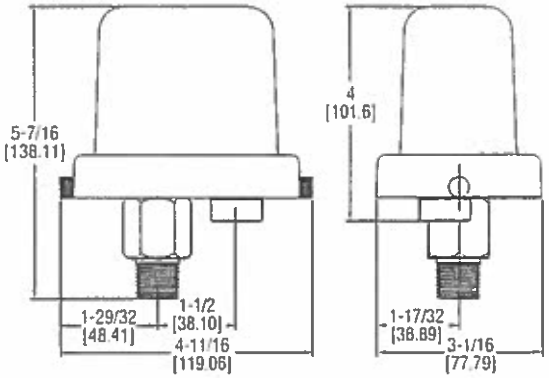
Specifications - Installation and Operating Instructions

A1F



A1F with A-447





The Series A1F Compact OEM Pressure Switch is ideal for panel mounting wherever a high-quality, economical open-case or weatherproof control is required.

INSTALLATION

1. Location: Select a location where the temperature limits of -40 to 180°F (-40 to 82°C) will not be exceeded. Locate the switch as close as possible to the pressure source. Long lengths of piping will not affect accuracy of the actuation point but will slightly add to response time.

2. Mounting and Processing Connection: Avoid mounting surfaces with excess vibration which could cause false actuation when pressure is near setpoint. The switch should be mounted within 20° of vertical for proper operation. Mount the switch by connecting it to the process piping using either 1/4" NPT female or 1/2" male connection. Pipe joint compound or TFE thread tape should be used to prevent leakage.

3. Electrical Connections: The SPDT snap switch includes normally open, normally closed and common connections. The common and normally open contacts will close and the common and normally closed contacts will open when pressure increases to the setpoint. The actions will reverse when pressure decreases below the setpoint minus the deadband. A green grounding screw is provided on the switch bracket. All wiring should be in accordance with local codes.

SETPOINT ADJUSTMENT

1. Determine the setpoint pressure. The approximate actuation point can be set by turning the adjustment cap up or down, aligning the top of the O-ring, located above the cap, with the appropriate scale graduation.
2. Connect tubing or piping from the pressure port on bottom of switch to one leg of a tee. Connect the second leg to a pressure test gage of known accuracy and in an appropriate range. The third leg should be connected to a controllable source of pressure.
3. Connect a volt/ohm meter or other circuit tester to the snap action terminals to indicate when switching occurs.
4. Slowly apply pressure to the system and note the pressure at which switching occurs.
5. Operate the switch through several cycles to confirm proper actuation point.
6. Remove test apparatus and attach switch to pressure source and control circuit wiring. Place switch in service.

SPECIFICATIONS

Service: Compatible liquids and gases.
Wetted Materials:
Pressure Chamber: 316 SS.
Diaphragm: Fluorocarbon.
Temperature Limit: -40 to 175°F (-40 to 80°C).
Pressure Limits: 750 psig (51 bar).
Enclosure Rating: No rating for open construction. Installed properly within an optional A-447 enclosure meets NEMA 4X standards.
Switch Type: SPDT snap switch.
Electrical Rating: 15A @ 120/240/480 VAC, 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC.
Electrical Connection: Screw terminals.
Process Connection: 1/4" female NPT and 1/2" male NPT.
Mounting Orientation: Within 20° of vertical.
Set Point Adjustment: Knurled screw cap with indicating scale.
Deadband: Fixed, See deadband chart.
Weight: 10.5 oz (297 g).

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
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Example of how to order:

A1F	-	O	-	SS	-	1	-	4
1		2		3		4		5

1. Diaphragm Designation:
   F - Fluorocarbon
2. Enclosure Designation:
   O - Open Construction No Enclosure
3. Housing Material Designation:
   SS - 316SS
4. Switch Designation:
   1 - SPDT Snap Action Switch
5. Operating Pressure Range Designation:
   1 - 2 to 15 psig
   2 - 4 to 75 psig
   3 - 8 to 225 psig
   4 - 16 to 450 psig

Series A1F Deadband Chart-psig (bar)

Range	Deadband at Minimum Range	Deadband at Maximum Range
2 to 15 (0.14 to 1.03)	2 (0.14)	3 (0.21)
4 to 75 (0.28 to 5.17)	4 (0.27)	15 (1.0)
8 to 225 (0.55 to 15.5)	8 (0.55)	25 (1.7)
16 to 450 (1.1 to 31.0)	15 (1.0)	50 (3.5)

MAINTENANCE

Upon final installation of the Series A1F Compact OEM Pressure Switch, no routine maintenance is required. A periodic check of the system calibration is recommended. The Series A1F is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

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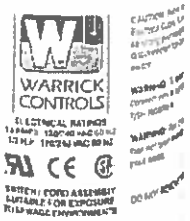
Series M
Mechanical Tilt Float Level Switch

- Non-Mercury Switch
- Sealed Cable
- Impact & Corrosion Resistant ABS Shell
- N.O., N.C., SPDT Contacts
- Various Cable Lengths
- Color Coded Body

Designed for level control and alarm applications in difficult liquids such as sewage and waste water. Series M mechanical tilt floats are ideal for applications where the presence of mercury is a concern. Series M Switches have impact resistant ABS shell and neoprene jacketed cable.



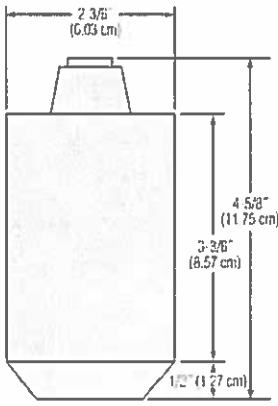
Specifications

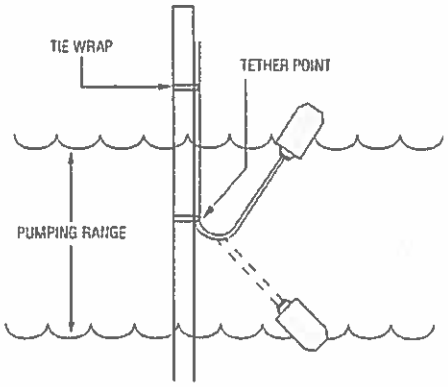
Cord	2 or 3 conductor 16 AWG wire SJOW Oil Resistant CPE
Contact Rating	13 amp @ 120/240 VAC 1/2 hp
Contact Design	SPST, Normally Open or Normally Closed Common with N.O. & N.C. (form C)
Temperature Rating	
Dry	32°F to 194°F (0°C to 90°C)
Water Resistant	32°F to 140°F (0°C to 60°C)
Overall Weight	1.0 lbs. (not including weight)
Tether Method	Tie-wrap nylon, weight: 2.5 lbs.
Approvals	U.L. Recognized, CSA Cert.

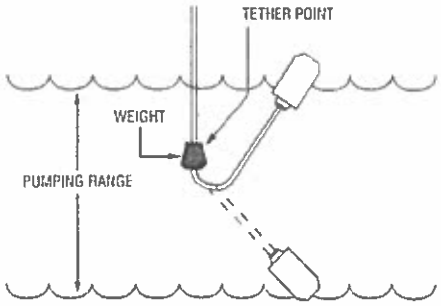
Applications

- Level Control
- Alarms
- Sewage Lift Systems
- Slurries
- Drainage Sumps
- Wastewater Treatment
- Holding Tanks

Dimensions







How to Order

Use the **Bold** characters from the chart below to construct a product code.

M XXX XX X

Series
M

Contact Configuration
BLU – SPST, Normally Open, narrow angle[1]
YEL – SPST, Normally Closed, narrow angle[1]
RED – SPST, Normally Open, wide angle[2]
WHI – SPST, Normally Closed, wide angle[2]
GRE – SPDT, Form C, wide angle[2]

Length
40 – 40 feet (12.19 m)

Tether Method
T – Tie
W – Weight

Tether Method	Part Number
Tie Wrap	7762360
Weight	7762381

Notes:
1. Narrow angle pumping range approximately 2 in. to 8 in.
2. Wide angle pumping range approximately 5 in. to 18 in.

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OIL WATER SEPARATORS – OWS SERIES

Application:

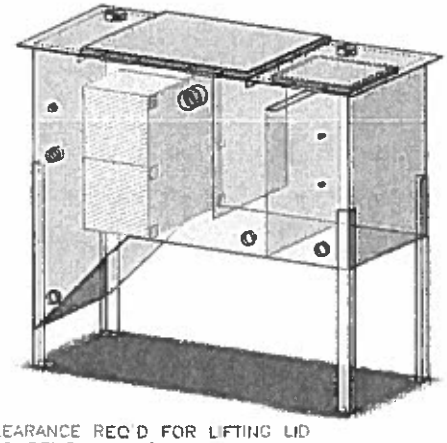
newterra Oil Water Separators are designed to remove oil from a liquid phase inlet stream. As the oil/water mixture is passed through the coalescing oil/water separator, larger oil droplets migrate to the surface to be collected and skimmed off. The media collects the smaller droplets until they are large and buoyant enough to float to the surface.

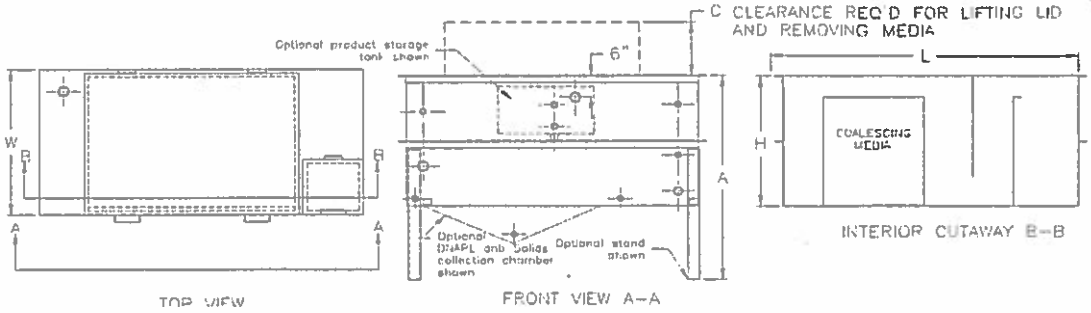
Construction:

The standard OWS Series are fabricated from carbon steel. For corrosion resistance, the interior is epoxy coated and the exterior is painted. Optional stainless steel construction is also available. A large lid allows access to the coalescing media and oil skimmer while a small lid allows access to the pump-out tank.

Standard Features:

- Standard finish: Interior is epoxy coated. Exterior is painted **newterra** blue over zinc primer (except stainless steel option)
- Sacrificial anode to prevent corrosion of tank.
- 11 AWG carbon steel construction
- Sludge containment section
- Adjustable oil skimmer
- Water underflow/overflow weir design
- Easy removal of coalescing media for cleaning
- High Alarm Level Coupling and Pump High/Low Level Coupling in the pump-out chamber





Dimension Chart:

Part Number	Width "W"	Standard Height "H"	Standard Overall Length	Length with Extended Pump-out	Height with Elevated Pump-out "A"	Overhead Clearance "C"	Standard Pump-out Volume	Extended Pump-out Volume	Elevated Pump-out Volume	Product Tank Volume
OWS-2	16"	30"	64"	76"	n/a	14"	23 Gal	41 Gal	n/a	8.1 Gal
OWS-4	28"	30"	64"	76"	n/a	26"	46 Gal	81 Gal	n/a	8.1 Gal
OWS-8	28"	30"	76"	88"	n/a	26"	46 Gal	81 Gal	n/a	8.1 Gal
OWS-12	40"	30"	76"	88"	n/a	38"	70 Gal	122 Gal	n/a	8.1 Gal
OWS-18	40"	30"	88"	n/a	60"	24"	70 Gal	n/a	130 Gal	12.2 Gal
OWS-24	52"	30"	88"	n/a	60"	24"	93 Gal	n/a	173 Gal	12.2 Gal
OWS-36	52"	42"	88"	n/a	72"	24"	133 Gal	n/a	212 Gal	17.8 Gal
OWS-45	64"	42"	88"	n/a	72"	24"	166 Gal	n/a	265 Gal	17.8 Gal
OWS-72	100"	42"	88"	n/a	72"	24"	266 Gal	n/a	425 Gal	17.8 Gal

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OIL WATER SEPARATORS – OWS SERIES

Specification Chart:

Part Number	HQ PAC		½" Packing		¾" Packing		1¼" Packing		Slant Plate	
	Oil (0.9)	Gas (0.72)	Oil (0.9)	Gas (0.72)	Oil (0.9)	Gas (0.72)	Oil (0.9)	Gas (0.72)	Oil (0.9)	Gas (0.72)
OWS-2	9.7	27.0	5.0	14.1	3.5	9.8	2.3	6.3	0.9	2.5
OWS-4	19.3	54.0	10.1	28.2	7.0	19.7	4.5	12.7	1.8	4.9
OWS-8	38.6	108.1	20.2	56.5	14.0	39.3	*9.1*	*25.4*	*3.5*	*9.8*
OWS-12	57.9	162.1	30.3	84.7	21.1	59.0	13.6	38.1	5.3	14.7
OWS-18	86.9	243.2	45.4	127.1	31.6	88.4	20.4	57.1	7.9	22.1
OWS-24	115.8	324.2	60.5	169.5	42.1	117.9	27.2	76.1	10.5	29.5
OWS-36	159.2	445.8	68.1	190.7	47.4	132.6	30.6	85.7	11.8	33.2
OWS-45	199.0	557.3	85.1	238.4	59.2	165.8	38.2	107.1	14.8	41.5
OWS-72	318.5	891.7	136.2	381.4	94.7	265.3	61.2	171.3	23.7	66.3

Rated US GPM (Based on 25 micron particles at 65 deg F and design safety factor of 1.25)
Larger spaced packing will not plug as quickly as closely spaced packing allowing longer intervals between maintenance requirements. The coalescing slant plate should be used in applications with heavy sludge loads because it does not foul quickly.

Options Table:

Option	Description
Stand	The separator will be elevated above ground to assist in gravity discharge or to provide room underneath the separator for blowers and pumps. This replaces the standard foot mounts. The maximum stand height for 8' clearance is 36" for OWS-18 and OWS-24 and 24" for OWS-36 and larger.
Oversize Pump-out (Extended)	OWS-2, OWS-4, OWS-8 and OWS-12 only. The final section of the separator can be oversized to allow a greater water pump-out volume. For the OWS-2, OWS-4, OWS-8 and OWS-12 the oversized pump-out will be an extended length of the final section of the separator.
Oversize Pump-out (Elevated)	OWS-18, OWS-24, OWS-36 and OWS-45 only. The final section of the separator can be oversized to allow a greater water pump-out volume. For the OWS-18, OWS-24, OWS-36 and OWS-45 the separator will be raised on a stand and the final section will extend to the ground to give the oversized volume.
Top Inlet	A top mounted option is available to allow for pre-separation of air and liquid at the inlet to the separator.
Product Storage Tank	A tank may be mounted on the front of the separator to collect the oil from the skimmer. The volume of the product storage tank is: OWS-2, OWS-4, OWS-8 and OWS-12: 8.1 US Gal OWS-18, OWS-24 12.2 US Gal OWS-36, OWS-45 17.8 US Gal
Telerette Basket	A telerette basket may be added to allow for a high surface area polishing media for final hydrocarbon removal.
Oversize Inlet and Outlet	The inlet and outlet couplings may be increased by one size to allow for higher flow through the separator.
Stainless Steel	Each separator can be purchased with Stainless Steel construction instead of the standard Carbon Steel.
Main Tank Low Coupling	Additional couplings may be added to allow for the installation of a low level switch in the main separator tank. NOTE: This option covers only the cost of installing the coupling, the switches must be purchased separately.
Main Tank High High Coupling	Additional couplings may be added to allow for the installation of a high high level switch in the main separator tank. NOTE: This option covers only the cost of installing the coupling, the switches must be purchased separately.
Custom Size	A custom sized separator can be designed to meet specific project needs.
Media	Custom media available for contaminants other than oil/BTEX such as chlorinated solvents and other DNAPL products.
DNAPL Separation	The separator can be supplied with a DNAPL sump to capture heavy fluids and solids and allow collection below the media of the oil water separator.

Sample Ordering Format:

OWS-4 with ½" Packing
SG: 0.9
Temp: 65 deg F
Minimum Micron Size: 25
Design Safety Factor: 1.25
Options:
Oversize Pumpout (Extended)
Product Storage Tank
Stand: 24"

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ATB 3 and ATS3 Series Spec Sheet
Level Switch - Small Size - Heavy Duty

The ATB3 is designed for high or low level alarm or switch point applications in rugged situations similar to oil tank reservoirs or industry vessels that require a more robust level switch. Notice the larger brass one piece machined hex to get a wrench on - this model also has an optional brass set screw locking collar in place of the clip.

Internal reed switch selection is the same Almeg quality standard but we've beefed up the external part as well as fully encapsulated the reed switch to maintain a complete moisture free environment. The leads are wire wrapped (not clipped) soldered and heat shrink sealed to the reed switch before encapsulating.

The TRUE closed cell Buna float will not swell or take on moisture - even if cut or drilled. It is designed like a tight bee hive or honey comb construction.

100% of our controls are tested before shipping.

The ATB3 is available in a single order or OEM applications.