Operations & Maintenance Report

Former Stauffer Chemical Site
Lewiston, New York

Stauffer Management Company LLC

GHD | 285 Delaware Avenue Buffalo New York 14202

006488 | 20 | **** | Report No 27 | August 2015

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1. Introduction

The Stauffer Management Company (SMC) Site (Site), is located in the Town of Lewiston, New York, immediately north of the Forebay for the Robert Moses Power Plant. Figure 1.1 presents the location of the Site and Figure 1.2 presents the layout of the Site.

This Operation and Maintenance (O&M) Plan has been developed to describe the operation, maintenance, and monitoring activities to be performed during the long term operation of the remedial systems and includes:

i) description of equipment;

ii) normal O&M activities;

iii) routine inspection, monitoring, and laboratory testing requirements;

iv) potential operating problems and solutions;

v) records and recording mechanisms required; and

vi) health & safety plan (HASP).

1.1 Background

The Site is a former chemical manufacturing facility owned and operated by Stauffer Chemical Company. All structures associated with the former plant were demolished in the early 1980s. Stauffer Chemical Company was divested in 1987, and Atkemix Thirty Seven, a subsidiary of Stauffer Management Company, became the Site owner. In 2000, Stauffer Management Company and Atkemix Thirty Seven restructured into a limited liability company that is now known as Stauffer Management Company LLC.

In 1995, in accordance with Consent Order (CO) #B9 0137 86 04, SMC initiated remedial construction for soil and groundwater. At that time, the Treatment Building was erected to house the Site groundwater treatment system and the soil vapor extraction (SVE) treatment system for Area A. A second SVE treatment system, Area C, was mounted in a trailer located off Site, beyond the southeast corner of the Site property. SVE operations at Area C were discontinued in May 2004, and the Area C treatment system was decommissioned in July 2004. A third SVE system at Area T 4 was also installed in 1995, operated until 2000, and decommissioned in September 2001.

Note that the Area A SVE system is currently not in operation with verbal approval of the New York State Department of Environmental Conservation (NYSDEC) pending filing of deed restrictions and the completion of a Site Management Plan (SMP). SMC anticipates that the NYSDEC will grant official permission to cease operation of the Area A SVE system. Upon final approval, Area A will be decommissioned.

The major chemicals of concern in the groundwater at the Site have been identified in the Site Specific Parameter List (SSPL) as follows:

i) carbon disulfide;

ii) carbon tetrachloride;

iii) chloroform;

iv) methylene chloride;

v) tetrachloroethene;

vi) benzene;

vii) chlorobenzene;

viii) toluene; and

ix) trichloroethene.

These chemicals have been detected at varying concentrations in the groundwater, subsurface soils, seeps, and surface water runoff at and in the immediate vicinity of the Site.

2. Remediation Design Objectives

The objective of the groundwater treatment system is to ensure adequate removal of the SSPL compounds. Treatment allows the effluent discharged from the groundwater treatment system to the Forebay to meet NYSDEC mandated discharge limits.

The objective of the groundwater extraction system is to remediate the SSPL contamination in the groundwater at the Site and its immediate vicinity. The groundwater extraction wells are also used to contain the groundwater on Site and prevent migration of the contaminants off Site to the Forebay, which leads to the Niagara River.

3. Remedial System Description

The remedial systems currently operable at the Site include:

1. Area A SVE system (Note that the Area A remedial system is currently turned off, but remains operable – see Section 1.1 above)
2. Bedrock groundwater extraction and treatment system, consisting of deep bedrock and shallow bedrock extraction wells

The remedial systems are briefly described in the following sections.

3.1 Bedrock Groundwater Extraction and Treatment System

The groundwater extraction network consists of two deep bedrock groundwater extraction wells (LR 66 and OW 3), three intermediate/deep bedrock extraction wells (EW 1, EW 2, EW 3), three shallow bedrock extraction wells (EW 4, EW 5, and EW 6), and three shallow wells in Area A that extract groundwater from the interface of the soil and the top of bedrock (DPA 201, DPA 202, and DPA 203). The locations of the extraction wells are shown on Figure 3.1.

Underground forcemains with secondary containment convey the groundwater from each well to the treatment building. The groundwater treatment system is currently housed in the south side of the existing treatment building and the northwest addition to the treatment building.

All groundwater from each of the extraction wells is pumped into the on Site treatment system. The major components of the treatment system are listed below:

1. **Solids Settling Tank:** a 1,500-gallon cone bottom tank installed in 2009 to provide solids settling prior to the influent water entering the carbon treatment system. This tank replaced a Non Aqueous Phase Liquid (NAPL) Separator tank that had deteriorated. Phase separation is not required at the Site, as no NAPL has been observed since beginning system operation.
2. **Carbon Feed Tank:** a process tank used to accumulate water from the solids settling tank.
3. **Carbon Feed Pump:** pumps water from the carbon feed tank through the rest of the treatment system. Flow from the carbon feed pump is regulated by a variable speed drive.
4. **Bag Filters:** groundwater is pumped through thirteen 10 micron bag filters (consisting of an eight bag round filter vessel and a separate five bag unit) operated in parallel to prevent solids from plugging the GAC.
5. **GAC Beds:** after the bag filters, the groundwater passes through two 10,000 pound GAC adsorption vessels operated in series. Note that the 10,000 pound GAC vessels were installed in 2014 as replacements for two 20,000 pound GAC adsorption vessels. The first bed acts as the lead or primary contaminant removal bed and the second bed acts as the lag or polish bed.

The treated water from the GAC units is discharged through the outfall to the New York Power Authority (NYPA) Forebay, located south of the Site. Treated water is discharged in accordance with effluent limits and sampling requirements set by NYSDEC. Due to the Site being operated under the CO, a State Pollutant Discharge Elimination System (SPDES) permit is not required.

During operation of the treatment system, sampling of the carbon interstage flow is performed to evaluate breakthrough between the lead and lag carbon beds.

When SSPL compounds are detected between the beds, the carbon in the lead bed is changed. By alternating the position of in-line valves, the second bed becomes the lead bed and the bed with the fresh carbon becomes the lag or polish bed. The spent carbon is sent off-Site for regeneration as non-hazardous waste.

The carbon beds are capable of being backwashed using potable water supplied to the site.

A 5,500 gallon polyethylene tank is used to hold spent water from carbon transfer and carbon backwash water. These waters are stored in the carbon transfer spent water tank and slowly gravity fed into the treatment system.

3.2 Area A SVE System

Area A occupies approximately 136,500 square feet near the center of the property as shown on Figure 1.2. The remedial system at Area A is a combination of soil vapor and groundwater extraction and includes 39 SVE wells, 3 dual phase groundwater/SVE wells, and a cover comprised of a polyvinyl chloride (PVC) geomembrane liner, a geotextile cushion, and stone.

Each SVE well is connected to one of four header pipes that each enter the Treatment Building and are connected to the vacuum blower housed in the north side of the building. The SVE piping is mounted on a uni strut/pipe strap support system. The Area A SVE treatment system is comprised of a skid with a moisture separator tank, an in line filter, a vacuum blower, a discharge silencer, and

a condensate removal pump, all located in the Treatment Building. The heat exchanger and granular activated carbon (GAC) adsorption units are mounted separately on the concrete floor in the building.

Further details about the SVE wells and operation of the Area A SVE system are not included in this report due to the fact that the system is currently shut down and will likely be decommissioned upon NYSDEC approval of the Environmental Easement for the Site.

3.3 Treatment System Controls

The control room for the groundwater treatment system is housed in the southeast corner of the treatment building. The groundwater treatment system utilizes a Modicon PLC, Wonderware Package Human Machine Interface (HMI), and autodialer for system control. All alarms are displayed and datalogged on the HMI. All unit operations are displayed on the HMI to provide remote monitoring of the treatment status.

The system is designed to notify the operator via the autodialer in the event of high water level in the treatment building floor sump, power failure, and/or extraction well emergency shutdown.

The system is designed to provide for remote dial in to observe system operation status.

4. System Operation

4.1 General

As first discussed in Section 2.0, the goals of the Site remediation are to ensure the protection of human health and the environment while eliminating or minimizing the migration of hazardous constituents in the groundwater to the Forebay and Niagara River. Successful remediation will reduce the concentrations of hazardous constituents within soil and groundwater to acceptable State and Federal levels consistent with the anticipated use of the property, and minimize potential human exposure with waste constituents.

To achieve these goals, the facility operator should adhere to the following general operation and maintenance guidelines:

i) keep the facility and equipment clean at all times;

ii) minimize downtime for all malfunctioning equipment;

iii) respond to all alarms as soon as possible;

iv) adhere to acceptable safe work practices to minimize safety hazards and potential personal injury;

v) use preventative maintenance procedures and review the manufacturer's operation and maintenance manuals for all major equipment;

vi) record all operation and maintenance activities in the appropriate log book;

vii) observe and be aware of the operating conditions in the treatment facility and investigate any changes; and

viii) stock an adequate supply of bag filters, drums, personal protective equipment, sampling equipment, and any other supplies necessary for routine monitoring and sampling activities.

4.2 Normal Operation

Under normal operating conditions the remedial systems are automatic and do not require continuous attention for their operation. The operator's duties include but are not limited to the following:

i) regular inspections;

ii) scheduled maintenance;

iii) unscheduled maintenance;

iv) data collection;

v) routine process sample collection; and

vi) troubleshooting of system malfunctions.

The treatment systems are designed to operate continuously, through the action of sensors and automatic controls. The systems are equipped with both automatic and manual system alarms and interrupts, which function to shut down the treatment systems. The automatic alarms and interrupts are installed to alert the operator of certain process conditions and to prevent an overflow situation or damage to equipment should a failure occur in the system. The manual interrupts are provided to allow operators a means to shut down the system to perform maintenance and repairs.

The system is equipped with the Wonderware HMI package to provide visualization of process conditions from the control room and via remote dial in. The HMI package includes alarm summaries, logging, and trending capabilities that will be discussed in the individual treatment sections.

Appendix A consists of a list and description of the control interlocks for automatic shutdown and operation of the groundwater treatment systems.

Table 4.1 includes a description of all system alarms and basic trouble shooting steps.

4.3 Air Compressors

Compressed air for the groundwater treatment system is provided by a compressor located in the treatment building. The air compressor is piped to a header that branches off to the individual units. The compressor is operated by an individual local on/off switch.

The primary air compressor is manufactured by Ingersoll Rand, Model 7100E15, and has a 15 horsepower (HP), 460 volt, 3 phase motor. The compressor is designed for 50 standard cubic feet per minute (scfm) at 175 pounds per square inch (psi) compressor capacity.

There is a backup compressor manufactured by Ingersoll Rand, Model 242 D5, and has a 5-HP, 460-volt, 3-phase motor. The compressor is designed for 17 scfm at 125 psi compressor capacity.

4.4 Bedrock Groundwater Extraction System

4.4.1 Description

Each of the groundwater extraction wells, EW 1, EW 2, and EW 3, EW-5, and EW-6 are equipped with submersible pumps. The specifications for each well and pump are as follows:

EW-1

- 8-inch steel well casing from 0 feet to 32 feet BGS
- 6-inch open corehole from 32 feet to 163 feet BGS (well bottom)
- Bottom of pump set at 158 feet BGS
- 10GS10 Goulds pump with 1 HP Franklin motor rated to pump 25 GPM.

EW-2

- 8-inch steel well casing from 0 feet to 13 feet BGS
- 6-inch steel well casing from 0 feet to 23 feet BGS
- 6-inch open corehole from 23 feet to 140 feet BGS
- 4-inch open corehole from 140 feet to 150.4 feet BGS (well bottom)
- Bottom of pump set at 145 feet BGS
- 25GS15 Goulds pump with 1.5 HP Franklin motor rated to pump 25 GPM

EW-3

- 8-inch steel well casing from 0 feet to 27 feet BGS
- 6-inch open corehole from 27 feet to 163 feet BGS (well bottom)
- Bottom of pump set at 157 feet BGS
- 25GS10 Goulds pump with 1 HP Franklin motor rated to pump 20 GPM

EW-5

- 8-inch steel well casing from 0 to 13.5 feet BGS
- 6-inch open corehole from 13.5 to 69 feet BGS
- Bottom of pump set at 64 feet BGS
- 18GS10 Goulds pump with 1 HP Franklin motor rated to pump 18 GPM

EW-6

- 8-inch steel well casing from 0 to 16 feet BGS
- 6-inch open corehole from 16 to 71.5 feet BGS
- Bottom of pump set at 66 feet BGS
- 18GS10 Goulds pump with 1 HP Franklin motor rated to pump 18 GPM

These groundwater extraction wells are PLC controlled from the main control room. The pumps turn on at a predetermined high level and turn off at a low level. The pumps can be operated by

hand/off/auto switches on the main control panel. They can also be turned off simultaneously from a HMI screen.

The operation of these five submersible pumps is dependent on pressure transmitters and local level controllers that will turn the pumps on at a predetermined high water level and turn the pump off at a predetermined low water level. Each pump is equipped with local hand/off/auto control switches. The pumps can also be turned on and off in unison from the HMI extraction well screen.

Groundwater extraction wells EW-4, DPA-201, DPA-202, DPA-203 and source recovery wells OW-3 and LR-66 are equipped with self-controlling air displacement pumps. The specifications for each well and pump are as follows:

EW-4

- 8-inch steel casing from 0 to 16 feet BGS
- 6-inch open bedrock corehole from 16 to 71.6 feet BGS
- AP-4 Long bottom loading automatic pump rated to pump 5 GPM

DPA-201

- 6-inch steel casing from 0 to 22 feet BGS
- 4-inch Sch 40 PVC well with 10 feet of 20 slot screen to bottom
- AP-4 Long bottom loading automatic pump rated to pump 5 GPM

DPA-202

- 6-inch steel casing from 0 to 26 feet BGS
- 4-inch Sch 40 PVC well with 10 feet of 20 slot screen to bottom
- AP-4 Long bottom loading automatic pump rated to pump 5 GPM

DPA-203

- 6-inch steel casing from 0 to 27.5 feet BGS
- 4-inch Sch 40 PVC well with 10 feet of 20 slot screen to bottom
- AP-4 Long bottom loading automatic pump rated to pump 5 GPM

OW-3

- 6-inch steel casing from 0 to 15.5 feet BGS
- 4-inch steel casing from 15.5 to 108 feet BGS
- 3-inch open corehole from 108 to 128 feet BGS
- 2-inch SCH 40 PVC well with 20 feet of 20 slot screen to the bottom of the well
- AP-2 Long bottom loading automatic pump rated to 5 GPM

LR-66

- 6-inch steel casing from 0 to 17 feet BGS
- 2 SCH 40 PVC well with 10 feet of 20 slot screen to bottom of well at 89.5 feet BGS

- AP-4 Long bottom loading automatic pump rated to pump 5 GPM

Each of these wells is equipped with a controllerless pneumatic pump. The water level in the well is maintained at the top of the pump. A float/counterweight mechanism fills and empties the pump whenever the level in the wells reaches the top of the pump.

Compressed air is supplied by the air compressor in the treatment building. The displaced groundwater is conveyed into the treatment system through a double contained forcemain.

Controls in the PLC open and close a valve that supplies compressed air. Interlocks in the PLC shut off the air supply when the carbon pump tank is full or if the floor sump reaces high level to prevent flooding in the building.

Each pump is equipped with interlocks through the PLC that will turn the pumps on and off and/or shut down the system based on predetermined conditions.

Controls

A description of the shutdown conditions for the extraction wells is included in the interlock descriptions in Appendix A.

The HMI package contains screens for visualization of individual pump operation, totalized flows, and alarm conditions. Historical trending for individual well flows is also provided.

4.5 Treatment System Components

4.5.1 Carbon Pump Tank

The carbon pump tank is a 1,000-gallon stainless steel tank with a conical bottom, manufactured by Sharpsville Container Corporation. A high-level alarm on the tank will trigger an alarm in the main PLC and will shut down the extraction pumps as per the interlocks in Appendix A.

4.5.2 Carbon Feed Pump

Operation of the pump (P 701) is controlled from the main control room by a hand/off/auto switch at the MCP and the pump motor panel disconnect. Low-level in the carbon pump tank will shut off the carbon feed pump. The carbon feed pump is a Goulds G&L Model SST C5, designed for a 100 GPM flow rate, 7-1/2 HP, 460 volt, 3 phase.

4.5.3 Bag Filters

The bag filter system, manufactured by Filtration Systems, consists of two separate units that are connected in parallel. There is a five single bag unit manufactured by Filtration Systems and an eight filter “kettle” unit containing eight filter bags. The two filtration units are piped together in parallel to common influent and effluent headers. A differential pressure transmitter that can be valved to read across the bag filters and/or the carbon beds is used to log pressures and establish a trend for efficient bag filter changing.

The bag filter system uses 10 micron bags and is designed for a maximum system capacity of 100 GPM. The system is purposely oversized to reduce the need for operator intervention.

4.5.4 Liquid Phase Carbon Beds

The liquid phase carbon beds are manufactured by ChemTrade. Each carbon unit has a 10,000-pound carbon capacity. Each carbon vessel is equipped with rupture disk vents to protect the tanks from excessive pressure buildup.

Operation of the carbon beds is a passive operation. Adsorption of the organics occurs as water is passed through the carbon beds. Effective operation requires monitoring of the pressures, flows, and organic loadings in the carbon system. Appendix B presents the final design drawings for the carbon vessels. Appendix C presents operating instructions for the carbon vessels, including backwashing instructions.

The HMI package contains screens for symbolic visualization of the treatment system and historical trending for the carbon pump tank level, carbon feed pump speed, and the differential pressure across the bag filters and/or carbon adsorbers.

4.5.5 Carbon Transfer Spent Water Tank

The carbon transfer spent water tank is a 5,500-gallon high density polyethylene (HDPE) tank manufactured by IMG. All operations associated with the spent water tank are performed manually.

The tank holds spent water from carbon transfer and carbon backwash. These waters are stored in the carbon transfer spent water tank and slowly gravity fed into the treatment system.

4.5.6 Building Containment Sump

The building containment system is designed to collect all water that may leak or spill on the floor.

Any water collected in the building sump is pumped to the carbon feed tank. The sump pump outlet is equipped with a hand/off/auto switch located above the sump. The sump pump has a float switch that controls on/off operation based on the level in the sump. A high-level switch will trigger a corresponding alarm in the PLC. If the sump high-level alarm is triggered, all treatment equipment is shutdown. This triggers the autodialer alarm and requires response from operating personnel.

The flow from the sump is included in the totalized effluent flow to the outfall. The sump pump is manufactured by Zoeller Pump, Model 53M, 1/3 HP, 120 volt is rated to pump up to 44 gpm.

5. Routine Operation, Maintenance, Monitoring, Sampling, and Reporting Requirements

5.1 Routine Inspection and Maintenance

Regular inspection and maintenance of the treatment systems shall be completed once per Site visit on a weekly basis. The regular inspection and maintenance activities shall include, but are not necessarily limited to, the following:

5.1.1 Groundwater Extraction Systems

The groundwater extraction network consists of two deep bedrock groundwater extraction wells (LR 66 and OW 3), three intermediate/deep bedrock extraction wells (EW 1, EW 2, EW 3),

three shallow bedrock extraction wells (EW 4, EW 5, and EW 6), and three shallow wells in Area A that extract groundwater from the interface of the soil and the top of bedrock (DPA 201, DPA 202, and DPA 203).

5.1.1.1 Routine Inspection and Maintenance

Weekly recording of the flows from each extraction well and dual phase well will be recorded in the operators logbook. The flows will also be entered into the GHD Niagara Falls office PROJ drive found at 6488-SMC/Well-Flow-Data.

If flow from the wells is lower or higher than anticipated, a physical inspection of the flow meter, level instrumentation, and pump is warranted.

Periodic inspections of the leak detection ports for the extraction well double contained piping systems will be performed to verify pump integrity.

5.1.2 Groundwater Treatment System

5.1.2.1 Area-Specific Rules

Groundwater Treatment Area

Modified D PPE is required for replacement of bag filters.

5.1.2.2 Routine Inspection and Maintenance

Weekly Inspections

The weekly inspection of the treatment system will include:

i) general visual inspection of the treatment equipment for leaks, overflows, or malfunctions;

ii) inspection of process-indicating instruments;

iii) recording operating conditions in log book (record system operating status and note any problems);

iv) recording extraction well flow data on the weekly monitoring sheet (see Appendix D).

v) correction of operational problems;

vi) replacement of bag filters, if necessary, as indicated by differential pressure across bag filters (see Table 5.1); and

vii) repair or replacement of damaged parts.

All inspections will be recorded in the operator's logbook.

5.2 Process Monitoring

Weekly samples will be collected from the carbon interstage. The groundwater influent will also be sampled on a monthly basis. Effluent sampling will be monthly unless SSPL compounds have been detected in the interstage, in which case effluent samples will be collected on a weekly basis until a carbon exchange can be performed. Each of these samples will be analyzed for SSPL VOC compounds.

A carbon change will be performed after detection of SSPL compounds at the carbon interstage.

On a quarterly basis, effluent sampling will be performed in accordance with the NYSDEC mandated discharge requirements for the Site see Table 5.2). The list of quarterly parameters and associated discharge limits were originally established in a State Pollutant Discharge Elimination System (SPDES) permit issued by the NYSDEC Division of Water (DOW) in 1995 when Facility groundwater treatment operations were beginning.

Since that time, Facility operations have been conducted in accordance with a July 19, 1993 Order on Consent (AOC) issued by NYSDEC as part of the New York State Superfund program, with oversight by the agency's Division of Environmental Remediation (DER). With respect to Facility effluent discharge, the DOW does not have regulatory authority over discharge from a State Superfund Site. Instead, SMC is responsible for complying with the established Facility effluent criteria and submitting the results of periodic sampling and analysis to DER for review. For the SMC facility, DER requires monthly effluent sampling for SSPL compounds and quarterly effluent sampling for a combined list of SSPL compounds and other SPDES parameters. To differentiate it from the Facility's monthly effluent sampling, the quarterly sampling event is known as the "SPDES sampling" event.

5.3 Facilities, Structures, and Grounds

5.3.1 Facility Structures and Grounds

Many routine inspections for facilities and grounds are carried out as operators perform daily work tasks. These routine inspection tasks include checking the appearance of the grass, driveways, walkways, fencing, and lighting. Inside the facility, the appearance of walls, floors, ceiling, doors, windows, walkways, emergency equipment, lights, sumps, and equipment support structures should be checked. All abnormal conditions should be noted in the operator's daily log and either be corrected immediately or placed on a schedule for maintenance. Abnormal conditions that affect safety or the integrity of the facility should be attended to on a priority basis.

In addition to routine weekly observations, every six months (at the end of winter and summer) the treatment plant buildings should be carefully checked to observe any deterioration such as failure of paint, cracks, open seams, leaks, and operation of doors, and plumbing. Any problems found on six month inspections should be noted in the operations log and placed on a schedule for repair or maintenance. If there are no problems, it shall be so noted.

5.3.2 Building Floor Sump

The building sump is inspected weekly and during each site visit to determine that there are no signs of cracks.

5.3.3 Storage Areas

Storage areas for supplies, tools, maintenance items and chemicals are checked weekly to ensure that they are kept clean, free from clutter and meet pertinent criteria of the site Health and Safety and Plan.

5.3.4 Safety Equipment

Safety equipment such as fire extinguishers, first-aid stations, emergency eye wash stations, and exit lights are checked weekly to ensure that they are in good working order, visible and accessible for their intended use and meet pertinent criteria of the site Health and Safety and Plans.

5.3.5 Tanks and Vessels

Process tanks and vessels and their support structures are inspected weekly for items including leaks and deterioration of protective coatings (such as paint), and the integrity of fittings and valves.

5.3.6 Piping Systems

Piping systems including fittings, valves, support structures, and support hangers should be inspected while performing weekly operations tasks to ensure that there are no leaks or spills or deterioration of insulation, tracing systems, or support structures.

5.3.7 Rotating Equipment

All rotating equipment including pumps, fans, and compressors are inspected while performing weekly operating tasks. Abnormal conditions such as vibration, missing guards, uncovered electrical boxes, unusual noises, or unusually high operating temperatures or pressures should be investigated and corrected whenever they are observed. In addition, follow each manufacturer's written maintenance procedures for lubrication, balancing, etc. according to the published schedules.

5.3.8 Instrument and Controls

The operation of the treatment plant is monitored and automatically controlled through a central control panel. This system is computer controlled with manual override capability and logic program software to provide compliance verification, maintenance tracking, and semi automatic system operation and adjustment. Audible and visual alarms at the control panel are used to signal abnormal process conditions or equipment failures. Electrical interlocks are logically programmed to shut down all, or some of the process system in response to specific failures in order to prevent major process upsets due to failure of a monitored parameter or piece of equipment.

As part of weekly tasks, the operator monitors performance of the automatic control system and takes corrective actions whenever abnormal conditions or malfunctions occur. Specific alarms and the results of analytical tests are responded to and abnormal conditions are corrected as they occur. In addition, routine periodic maintenance is carried out per manufacturer's instructions for specific elements of the control systems.

Periodic maintenance includes replacement of filters, cleaning systems and lubricating control devices as called for in manufacturer's written maintenance instructions for each specific device. An outside repair firm may be contracted to perform repairs and maintenance on control systems that are beyond the capacity of the plant operators. It is the responsibility of the operator to maintain inventories of critical wear and recommended spare parts as prescribed by the equipment manufacturer's maintenance manuals.

5.4 Unscheduled Maintenance

Unscheduled maintenance must be performed as required. Unscheduled inspection and maintenance activities may include the following:

i) changing liquid phase carbon in the groundwater treatment system; and

ii) responding to alarms as necessary.

6. Potential Operating Problems and Solutions

This section presents suggested procedures to be implemented should the system exhibit the indicated malfunction. Table 4.1 shows the recommended troubleshooting techniques.

The operator is required to amend this section as experience is gained with the treatment facility.

7. Safety Plan

The SMC Lewiston Health and Safety Plan (HASP) describes the health and safety procedures and emergency response guidelines to be implemented during the long term O&M activities to be performed at the Site. The applicability of the HASP extends to all personnel who will be working at the Facility and to all visitors to the Site. All monitoring and sampling activities will be conducted in accordance with the HASP.

A summary of general safety and personal hygiene guidelines is provided below.

1. Eating at the Facility is prohibited except in the Control Room.
2. Smoking at the Facility is prohibited.
3. Individuals getting wet to the skin with effluent from the operation must wash the affected area immediately. If clothes in contact with skin are wet, these must be changed.
4. Hands must be washed with soap and water before eating, drinking, smoking, and before using toilets at the facilities provided. There is a utility sink with cold potable water for washing hands and face, etc.
5. Non-hazardous waste will be properly stored until such time that it is disposed of in accordance with appropriate New York State regulations.

8. Waste Handling

The following sections present the waste handling procedures that are implemented during operation of the remedial systems.

8.1 Groundwater

Extracted groundwater is treated at the on Site groundwater treatment facility. Treated water gravity flows to the NYPA Forebay and the Niagara River via an underground outfall pipeline.

8.2 Liquid Phase Carbon

Spent carbon generated by the liquid phase GAC adsorbers of the groundwater treatment system is sent off-Site for regeneration. Procedures for carbon transfer and carbon backwash are presented as Appendix C. All generated wastes will be handled in accordance with applicable laws. Records of waste disposal are forwarded to the Project Manager.

8.3 Personal Protective Equipment

All spent personal protective equipment is stored on-Site for later disposal.

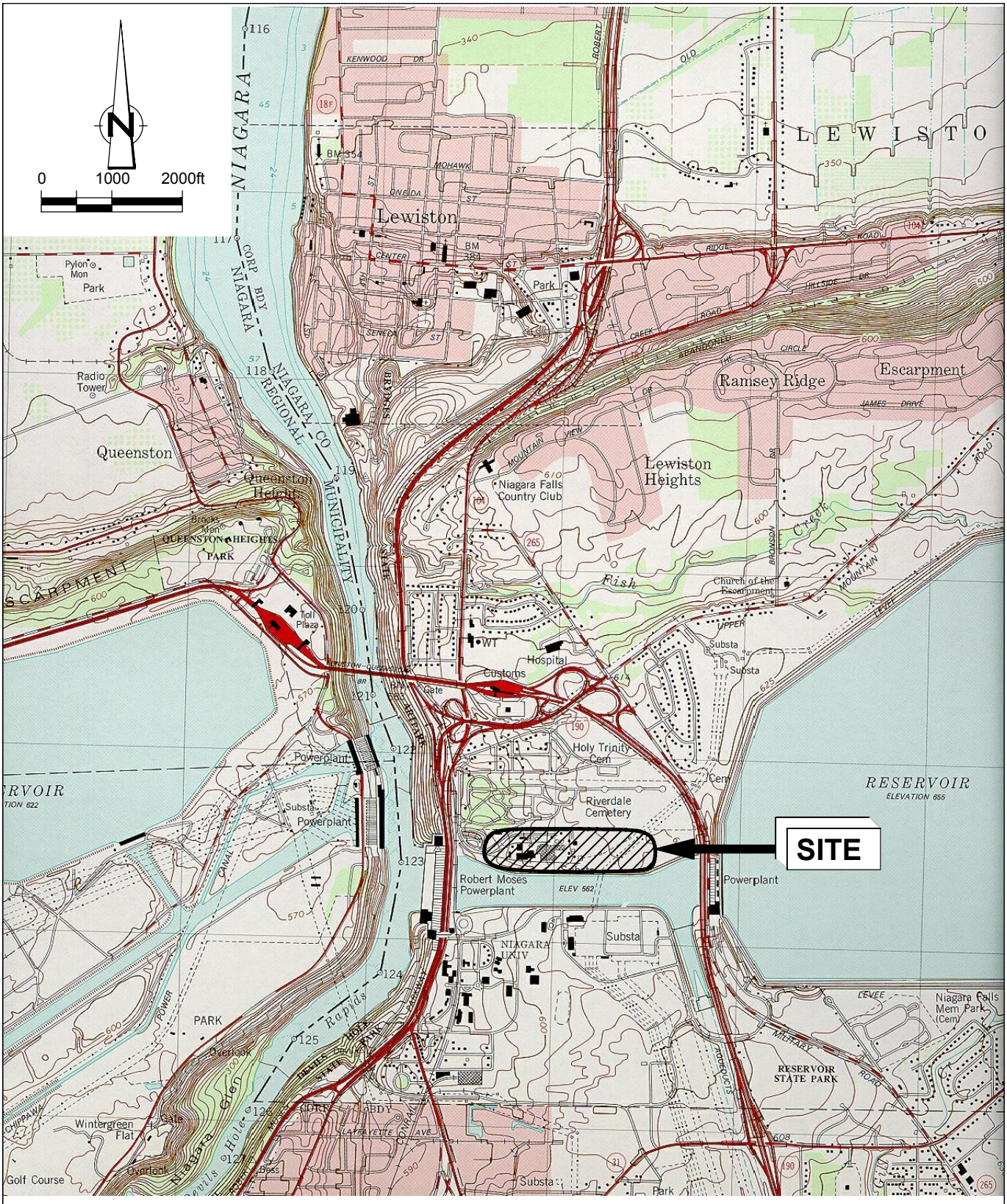
8.4 Bag Filters

Spent bag filters are collected in 55-gallon drums for off Site disposal. Procedures for changing bag filters are presented as Appendix C. The spent bag filters have been determined to be non-hazardous waste and will be handled in accordance with applicable laws.

8.5 Sump Solids

Sump solids are periodically removed from the building floor sump and associated carbon transfer spent water tank. If necessary, the solids are stabilized with cement to absorb excess water and are placed in 55-gallon drums for disposal as non-hazardous waste.

Figures



SOURCE: USGS

figure 1.1

SITE LOCATION
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

06488-20(027)GN-BU001 AUG 10/2015

OW-10

TO OW-8
(350')

GROUNDWATER EXTRACTION WELL EW-1

GROUNDWATER EXTRACTON WELL OW-3

GROUNDWATER EXTRACTION WELL LR-66

TREATMENT BUILDING

GROUNDWATER
EXTRACTION WELL
EW-5

AREA A SVE SYSTEM

FORMER LANDFILL
AREA B

N

0 100 200ft

OW-9

OW-11

OLD LEWISTON ROAD (66' R.O.W.)

GRAVEL DRIVE

EW1

HEADER

EW2

HEADER

HEADER

EW3

8" P.V.C. DISCHARGE PIPE

APPROX. LOCATION OF 6" DIA. HYDROGEN LINE PERMANENT EASEMENT TO HOOKER CHEMICAL CORP., NEW YORK POWER AUTHORITY 204C, SEC. 1 FILED IN N.C.C.O. L.4468, P.25.

PERMANENT EASEMENT TO
NIAGARA MOHAWK
POWER CORPORATION

PERMANENT EASEMENT TO
NIAGARA MOHAWK
POWER CORPORATION

APPROXIMATE ALIGNMENT OF
EXISTING GROUT CURTAIN

GROUNDWATER
EXTRACTION WELL
EW-2

OUTFALL

FOREBAY

GROUNDWATER
EXTRACTION WELL
EW-3

GROUNDWATER
EXTRACTION WELL
EW-4

GROUNDWATER
EXTRACTION WELL
EW-6

AREA T-4
(DECOMMISSIONED)

FORMER LANDFILL
AREA C
(DECOMMISSIONED)

figure 1.2

SITE LAYOUT
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

GHD

06488-20(027)GN-BU002 AUG 10/2015

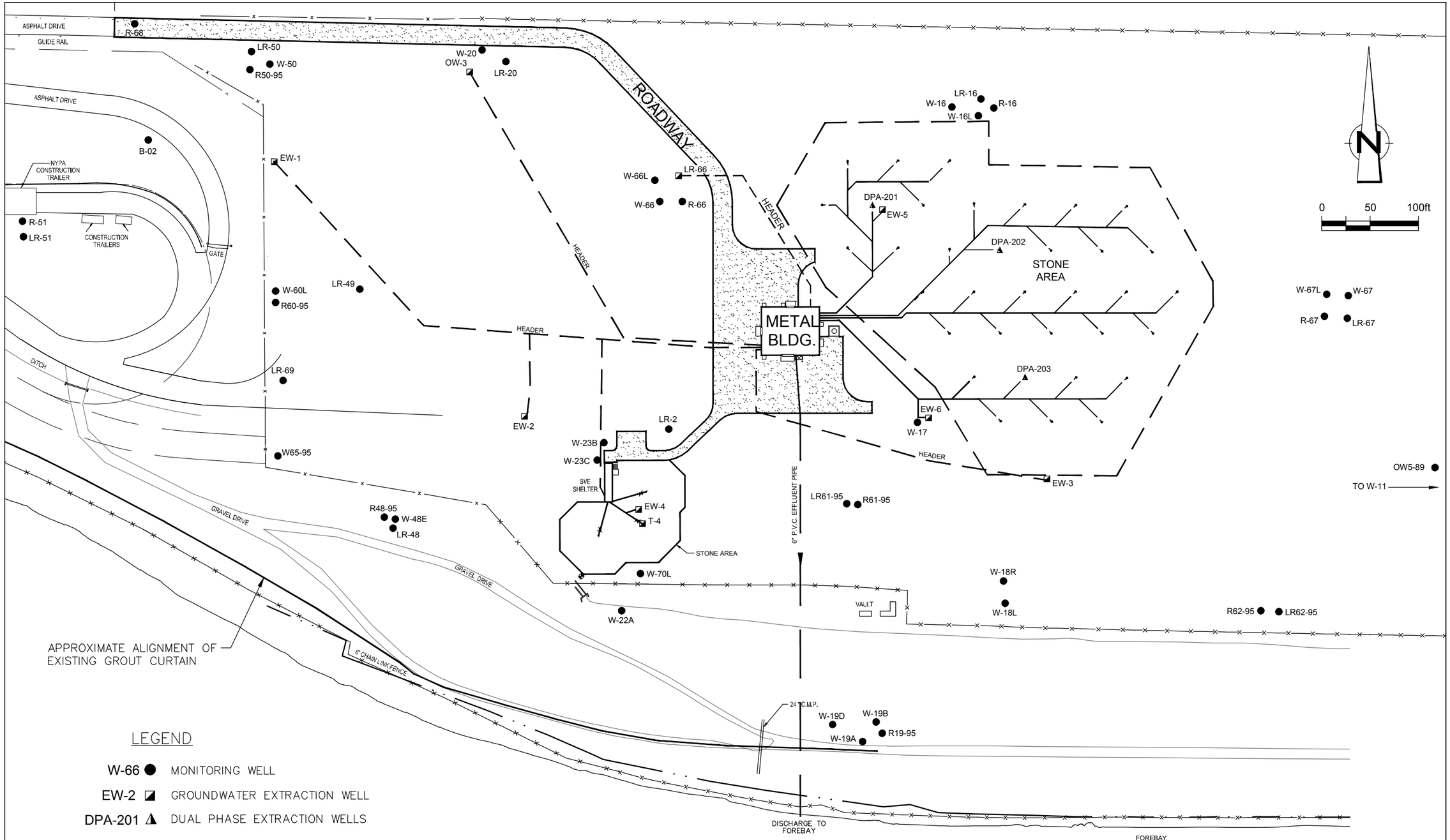


figure 3.1

EXTRACTION AND MONITORING WELLS
STAUFFER MANAGEMENT COMPANY LLC
Lewiston, New York

06488-20(027)GN-BU003 AUG 10/2015

Tables

TABLE 4.1
TROUBLESHOOTING GUIDELINES
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Groundwater Extraction, Groundwater Treatment and Area A SVE Systems

Tag	*Alarm Description*	*Troubleshooting*	*Remedy*
LSH101, LSH 102, LSH103	Extraction Well High Level Alarm	Has there been sufficient time to dewater the well?	
		Is Well Pump Operating ?	Verify Pump is in Auto. Test operation by briefly operating the Pump in Manual Mode.
		Is there sufficient flow ?	Inspect forcemain for pluggage or leaks.
		Are there any additional Pump Alarms (eg. Pump High Pressure)	Check Other alarm sections . (NOTE: if Pump High Pressure, Level Low and Level High are all active at the same time it indicates a loss of control power at the well.)
		Pump will not run in Manual Mode.	Check Pump overload at Pump disconnect panel.
		Loss of Control Power	Reset breaker for well at the main control panel.
		Is the level Really High?	Probe may be coated. Probe may have failed. Clean / replace probe.
		Is the level control relay working properly?	Replace level relay or local level controller.

TABLE 4.1
TROUBLESHOOTING GUIDELINES
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Groundwater Extraction, Groundwater Treatment and Area A SVE Systems

Tag	*Alarm Description*	*Troubleshooting*	*Remedy*
LSL101, LSL102, LSL103	Extraction Well Low Level Alarm (*Note: this alarm is normally a notification of well pump shutdown.)*	Is the Pump in Auto?	The pump must be in Auto for proper start stop operation of the Extraction Pumps.
		Loss of Control Power	Reset breaker for well at the main control panel.
PSH101, PSH102, PSH103	Extraction Well High Pressure Alarm	Is the well pump dead headed?	Open the valve at the inlet to the treatment plant.
		When reset does the pump provide sufficient flow.	If no, inspect forcemain for blockage.
LAHH150	Building Sump High Level	Find source of water.	Repair or Remedy Water Source.

TABLE 4.1
TROUBLESHOOTING GUIDELINES
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Groundwater Extraction, Groundwater Treatment and Area A SVE Systems

Tag	*Alarm Description*	*Troubleshooting*	*Remedy*
LSH700	Pumping Tank High Level	Is the Carbon Feed Pump Operating?	Check Hand/Off/Auto Switch Check Overload at Pump disconnect Panel. Check feed pump switch on computer screen.
		Is the variable speed drive operating properly? (LCV701) (Note: at high level the control valve should be wide open.)	Investigate VFD power supply and programming and PLC signal.
		Are the Bag filters operating at a high differential pressure? (>30 PSI)	Change Bags.
		Is the Carbon System Operating at a high differential pressure?	Burp the carbon tanks to remove air that may have accumulated at the top of the vessel. Backwash the carbon to flush biological growth.

TABLE 4.1
TROUBLESHOOTING GUIDELINES
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Groundwater Extraction, Groundwater Treatment and Area A SVE Systems

Tag	*Alarm Description*	*Troubleshooting*	*Remedy*

TABLE 4.1
TROUBLESHOOTING GUIDELINES
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Groundwater Extraction, Groundwater Treatment and Area A SVE Systems

Tag	*Alarm Description*	*Troubleshooting*	*Remedy*

TABLE 4.1
TROUBLESHOOTING GUIDELINES
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Groundwater Extraction, Groundwater Treatment and Area A SVE Systems

Tag	*Alarm Description*	*Troubleshooting*	*Remedy*

TABLE 5.1
GROUNDWATER TREATMENT SYSTEM MONITORING LOG
STAUFFER MANAGEMENT COMPANY
LEWISTON, NEW YORK

Date	*Time*	*System Inlet Flow Rate (gpm)*	*Carbon Feed Tank Level (inches)*	*Carbon Feed Pump Press. (psi)*	*Bag Filter Pressure (psi)*	*Carbon Inlet Pressure (psi)*	*Carbon Interstage Pressure (psi)*	*Carbon Outlet Pressure (psi)*	*Carbon Discharge Pressure (psi)*	*Initials*

TABLE 5.2
EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS
STAUFFER MANAGEMENT COMPANY LLC
LEWISTON, NEW YORK

Outfall Name & Effluent Parameter		***Discharge Limitation (Daily Maximum)***	***Minimum Monitoring Requirement***
SMC Outfall - Treated Groundwater			
Volatiles	***Units***		
Benzene	µg/L	10	Monthly
Carbon disulfide	µg/L	Monitor	Monthly
Carbon tetrachloride	µg/L	10	Monthly
Chlorobenzene	µg/L	10	Monthly
Chloroform	µg/L	10	Monthly
Methylene chloride	µg/L	10	Monthly
Tetrachloroethene	µg/L	10	Monthly
Toluene	µg/L	10	Monthly
Trichloroethene	µg/L	10	Monthly
Semi-Volatiles			
2,4-Dichlorophenol	µg/L	10	Quarterly
Hexachloroethane	µg/L	10	Quarterly
Naphthalene	µg/L	10	Quarterly
Metals			
Total Arsenic	lb/day	0.036	Quarterly
Total Chromium	lb/day	0.072	Quarterly
Total Copper	lb/day	0.1	Quarterly
Total Lead	lb/day	0.16	Quarterly
Total Nickel	lb/day	0.072	Quarterly
Total Selenium	lb/day	0.48	Quarterly
Total Zinc	lb/day	0.86	Quarterly
Wet Chemistry			
Total Recoverable Phenolics	mg/L	0.010	Quarterly

Notes:

All sample types are grab samples

Appendices

Appendix A
Interlock Description

REVISION NO.: 1

INTERLOCK 01 **June 15, 2015**

SHUTDOWN PUMP P-101, EXTRACTION WELL EW-1

Purpose: To prevent the treatment building from being flooded if there is a break or leak in the process piping The following control actions will take place:

- Pump P-101 will shut down

When any of the conditions listed below occur:

- **Level in leak detection sump in building is at high level**
- **Level in carbon feed tank is above high level**
- **Level in building floor sump is at high level**

After ALL conditions below occur:

- **Level in leak detection sump in building is below high level**
- **Level in carbon feed tank is below Pump On setpoint**
- **Level in building floor sump is below high level**

Then:

- Pump P-101 will be enabled for normal operation

REVISION NO.: 1

INTERLOCK 02 **June 15, 2015**

SHUTDOWN PUMP P-102, EXTRACTION WELL EW-2

Purpose: ..
To prevent the treatment building from being flooded if there is a break or leak in the process piping **The following control actions will take place:**

- Pump P-102 will shut down

When any of the conditions listed below occur:

- **Level in leak detection sump in building is at high level**
- **Level in carbon feed tank is above high level**
- **Level in building floor sump is at high level**

After ALL conditions below occur:

- **Level in leak detection sump in building is below high level**
- **Level in carbon feed tank is below Pump On setpoint**
- **Level in building floor sump is below high level**

Then:

- Pump P-102 will be enabled for normal operation

REVISION NO.: 1

INTERLOCK 03 **June 15, 2015**

SHUTDOWN PUMP P-103, EXTRACTION WELL EW-3

Reference: P & ID Drawing EF-1, EF-2

Purpose: To prevent the treatment building from being flooded if there is a break or leak in the process piping
The following control actions will take place:

- Pump P-103 will shut down

When any of the conditions listed below occur:

- **Level in leak detection sump in building is at high level**
- **Level in carbon feed tank is above high level**
- **Level in building floor sump is at high level**

After ALL conditions below occur:

- **Level in leak detection sump in building is below high level**
- **Level in carbon feed tank is below Pump On setpoint**
- **Level in building floor sump is below high level**

Then:

- Pump P-103 will be enabled for normal operation

REVISION NO.: 1
INTERLOCK 06 **June**
June 15, 2015

SHUTDOWN PUMP P-105, FLOOR SUMP PUMP

Reference: P & ID Drawing EF-2

Purpose: To prevent damage to pump P-105 by running without water.

The following control actions will take place:

- Pump P-105 will shutdown

When the condition listed below occurs:

- Level in Floor Sump is belowLSL-150

After the condition below occurs:

- Level in Floor Sump is above LSH-150

Then:

- Pump P-105 will be enabled for normal operation

REVISION NO.: 1

INTERLOCK 08

June 15, 2015

SHUTDOWN PUMP P-701, CARBON FEED PUMP

Reference: P & ID Drawing EF-3, EF-4

Purpose: To prevent damage to pump P-101 by running with high discharge pressure.

The following control actions will take place:

- Pump P-701 will shut down

When any of the conditions listed below occur:

- **When the level in the building floor sump is above high level**
- **When the level in the carbon feed tank is below the low level setpoint**
- .

After ALL conditions below occur:

- **When the level in the building floor sump is below the high level**
- **When the level in the carbon feed tank is below the Pump On setpoint**

Then:

- Pump P-701 will be enabled for normal operation

REVISION NO.: 1

INTERLOCK 17

June 15, 2015

SHUTDOWN PUMP DPA-201, Dual PHASE Well 201 Area A

Reference: P & ID Drawing EF-8

Purpose: To prevent the treatment building from flooding while there is an active leak in the piping.

The following control actions will take place:

- Pump DPA-201 will shut down

When any of the conditions listed below occur:

- **The level in the leak detection sump (Area A side) is above high level**
- **The level in the carbon feed tank is above high level**
- **The building floor sump is above high level**

After ALL conditions below occur:

- **The level in the leak detection sump (Area A side) is below high level**
- **The level in the carbon feed tank is below the Pump On setpoint**
- **The building floor sump is below high level**
- leak detection sump

Then:

- Pump **D**PA-201 will be enabled for normal operation

REVISION NO.: 1

INTERLOCK 18

June 15, 2015

SHUTDOWN PUMP DPA-202, Dual PHASE Well 202 Area A

Reference: P & ID Drawing EF-8

Purpose: To prevent the treatment building from flooding with water the treatment building from flooding if there is a leak in the process piping.

The following control actions will take place:

- Pump DPA-202 will shut down

When any of the conditions listed below occur:

- **The level in the leak detection sump (Area A side) is above high level**
- **The level in the carbon feed tank is above high level**
- **The building floor sump is above high level**
- sump in the treatment building (AREA A side)
-

After ALL conditions below occur:

- **The level in the leak detection sump (Area A side) is below high level**
- **The level in the carbon feed tank is below the Pump On setpoint**
- **The building floor sump is below high level**

- leak detection sump

Then:

- Pump **D**PA-202 will be enabled for normal operation

REVISION NO.: 1

INTERLOCK 19

June 15, 2015

SHUTDOWN PUMP DPA-203, Dual PHASE Well 203 Area A

Reference: P & ID Drawing EF-8

Purpose: To prevent the treatment building from flooding with water the treatment building from flooding while there is an active leak in the piping.

The following control actions will take place:

- Pump DPA-203 will shut down

When any of the conditions listed below occur:

- **The level in the leak detection sump (Area A side) is above high level**
- **The level in the carbon feed tank is above high level**
- **The building floor sump is above high level**

- sump in the treatment building (AREA A side

After ALL conditions below occur:

- **The level in the leak detection sump (Area A side) is below high level**
- **The level in the carbon feed tank is below the Pump On setpoint**
- **The building floor sump is below high level**

- the leak detection sump

Then:

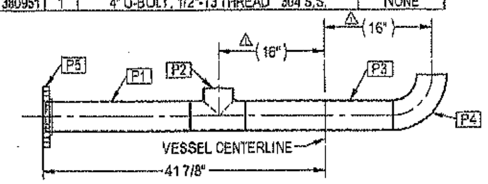
- Pump **D**PA-203 will be enabled for normal operation

Appendix B
Carbon Vessel Drawings

CT196120R REV.3

CUST: CHEM-TRADE	SIZE: 96" X 120" PO #: 2244	W.O. #: C4643
MOD. #: CT196120R REV.3	INT: DEVOE 233H	QTY: 1
SHEET: 2 OF 2 WT: 6,680 LBS	EXT: TNEMEC N69F - SAFETY BLUE	DUE: 4/4/14
	TT HT	

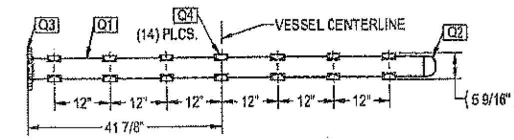
ITEM	Part #	QTY.	Description	Matl. Spec.
P1	157902	1	4" SCH. 10 PIPE X 21-1/4" LG. - 304 S.S.	SA-312
P2	346058	1	TEE 4" SCH. 10S - WELDED 304L	SA-403WP-W
P3	157902	1	4" SCH. 10 PIPE X 25-11/16" LG. - 304 S.S.	SA-312
P4	399998	1	ELBOW 90° 4" SCH.10S L.R. - 304 S.S.	SA-403WP-W
P5	738102	1	SLIP-ON FLANGE 4" R.F. CL150 304/304L	SA-182
P6	337113	1	RING GASKET 4" ANSI 150# 1/8" RED RUBBER	NONE
P7	380488	8	BOLT 5/8"-11 X 3-1/2" HH 304SS	NONE
P8	380268	16	FLAT WASHER 5/8" - 304 S.S.	NONE
P9	380100	8	NUT 5/8"-11 HEX - 304 S.S.	NONE
P10	380951	1	4" U-BOLT, 1/2"-13 THREAD 304 S.S.	NONE



INLET PIPE 'P' RIGHT SIDE VIEW

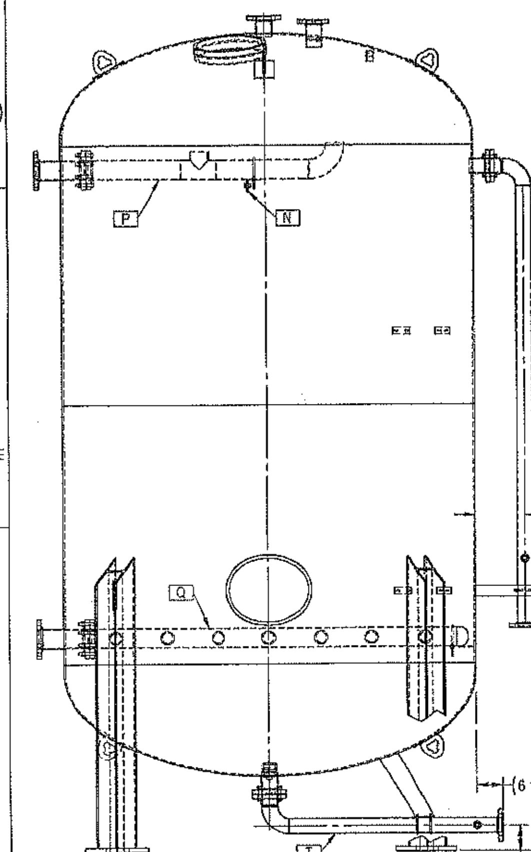
QUICK TANKS TO INSTALL CUSTOMER SUPPLIED LATERALS INTO OUTLET HEADER

ITEM	Part #	QTY.	Description	Matl. Spec.
Q1	157902	1	4" SCH. 10 PIPE X 85" LG. - 304 S.S.	SA-312
Q2	746036	1	PIPE CAP 4" SCH. 10 304SS	SA-403
Q3	738102	1	SLIP-ON FLANGE 4" R.F. CL150 304/304L	SA-182
Q4	710801	14	HALF COUPLING 2" NPT 3000# 304L	SA-182
Q5	337113	1	RING GASKET 4" ANSI 150# 1/8" RED RUBBER	NONE
Q6	380468	8	BOLT 5/8"-11 X 3-1/2" HH 304SS	NONE
Q7	380268	16	FLAT WASHER 5/8" - 304 S.S.	NONE
Q8	380100	8	NUT 5/8"-11 HEX - 304 S.S.	NONE
Q9	380951	1	4" U-BOLT, 1/2"-13 THREAD 304 S.S.	NONE



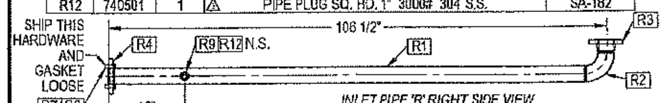
OUTLET HEADER 'Q' TOP VIEW

△2 ITEM	Part #	QTY.	Description	Matl. Spec.	NOTES
N	153119	1	ANGLE 3" X 3" X 3/16" X 92-1/2" LG. W/ SLOTS - 304SS	SA-240	PLASMA
P	NONE	1	4" INTERNAL INLET PIPE ASSEMBLY	SEE DETAILED BOM	
Q	NONE	1	4" INTERNAL OUTLET HEADER ASSEMBLY	SEE DETAILED BOM	
R	NONE	1	3" EXTERNAL INLET PIPE ASSEMBLY	SEE DETAILED BOM	
T	NONE	1	3" EXTERNAL OUTLET PIPE ASSEMBLY	SEE DETAILED BOM	
U	380224	2	△ 3" U-BOLT 304 S.S.	NONE	SHIP LOOSE
V	399996	2	△ U-BOLT, 1" PIPE, 1/4"-20 THREADS 304 S.S.	NONE	SHIP LOOSE



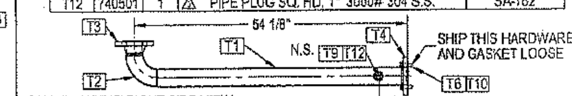
TANK RIGHT SIDE VIEW
WITH BROKEN LEG DETAIL

△2 ITEM	Part #	QTY.	Description	Matl. Spec.
R1	157909	1	PIPE 3" SCH. 10 X 101-1/2" LG. - 304SS	SA-312
R2	399999	1	ELBOW 90° 3" SCH. 10 L.R. - 304 S.S.	SA-403WP-W
R3	337028	1	FLANGE WELD NECK 3" 150# R.F. 304L	SA-182
R4	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182
R5	399997	2	RING GASKET 3" ANSI 150# 1/8" RED RUBBER	NONE
R6	380423	4	BOLT 5/8"-11 X 2" HH 304SS	NONE
R7	380268	12	FLAT WASHER 5/8" - 304 S.S.	NONE
R8	399995	1	3" EXTENDED U-BOLT 316SS, MCMASTER #29805T8	NONE
R9	710501	1	△ HALF COUPLING 1" NPT 3000# 304L	SA-182
R10	380099	4	BOLT 5/8"-11 X 3" HH 304SS	NONE
R11	380100	4	NUT 5/8"-11 HEX - 304 S.S.	NONE
R12	740501	1	△ PIPE PLUG SQ. HD. 1" 3000# 304 S.S.	SA-182

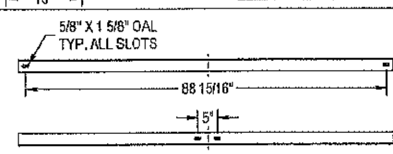


INLET PIPE 'R' RIGHT SIDE VIEW

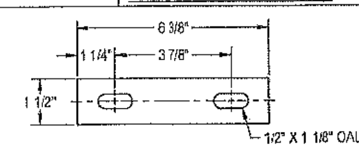
△2 ITEM	Part #	QTY.	Description	Matl. Spec.
T1	157909	1	PIPE 3" SCH. 10 X 49-1/8" LG. - 304SS	SA-312
T2	399999	1	ELBOW 90° 3" SCH. 10 L.R. - 304 S.S.	SA-403WP-W
T3	337028	1	FLANGE WELD NECK 3" 150# R.F. 304L	SA-182
T4	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182
T5	399997	2	RING GASKET 3" ANSI 150# 1/8" RED RUBBER	NONE
T6	380423	4	BOLT 5/8"-11 X 2" HH 304SS	NONE
T7	380099	4	BOLT 5/8"-11 X 3" HH 304SS	NONE
T8	380224	2	3" U-BOLT 304 S.S.	NONE
T9	710501	1	△ HALF COUPLING 1" NPT 3000# 304L	SA-182
T10	380268	12	FLAT WASHER 5/8" - 304 S.S.	NONE
T11	380100	4	NUT 5/8"-11 HEX - 304 S.S.	NONE
T12	740501	1	△ PIPE PLUG SQ. HD. 1" 3000# 304 S.S.	SA-182



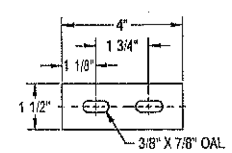
OUTLET PIPE 'T' RIGHT SIDE VIEW



SUPPORT ANGLE 'N' DETAIL



CLIP 'G' DETAIL



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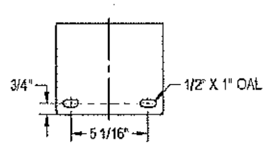

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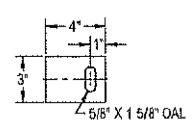
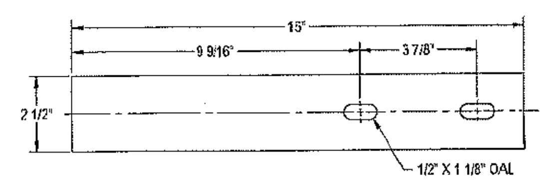


CLIP 'K' DETAIL



CLIP 'L' DETAIL

CODE

CODE

CODE

96" X 120" ASME CODE

WELD TYPES FOR FITTINGS ON THIS VESSEL:

- ☐ ALL DOUBLE FILLET WELDS
- ☐ ALL 100% FULL PENETRATION WELDS
- ☐ BOXED ☐ USE FILLET & SOME 100% FULL PENETRATION WELDS

READ DETAIL INDICATED ON SIDE OF SHT DRAWING

DRAWING APPROVAL

SAFETY RELIEF DEVICES SHALL BE THE RESPONSIBILITY OF THE ENDUSER

PLEASE INDICATE APPROVAL FOR DRAWING & RETURN TO QUICK TANKS

- ☐ APPROVED AS DRAWN. PROCEED WITH FABRICATION
- ☐ APPROVED AS NOTED. PROCEED WITH FABRICATION IN ACCORDANCE WITH NOTED CHANGES. RESUBMIT CORRECTED DRAWING.
- ☐ DISAPPROVED. DO NOT FABRICATE. RESUBMIT DRAWING FOR APPROVAL

BY ______ DATE ______

DESIGN COND.: MAWP 100 PSIG @ +32 °F-+120 °F
HYDROSTATIC TEST @ 130 PSIG
BUILT TO SEC. VIII DIV. 1 ASME BOILER & PRESSURE VESSEL CODE 2013 EDITION

REV.	DESCRIPTION	DATE	APPROVED
△1	ADDED R8, T8, U & V. ADDED GASKETS & HARDWARE.		
	P2 & P4 WERE 11-1/16" OFF CENTER - PRP	2/12/14	
	SEE SHEET 1 FOR ADDITIONAL REVISION INFORMATION		

QUICK TANKS, Inc.
KENDALLVILLE, INDIANA USA

DATE: 2/10/14 DRAWN BY: PRP SIZE: B SCALE: NTS

FM / RTDII / ASME QC REVIEW:

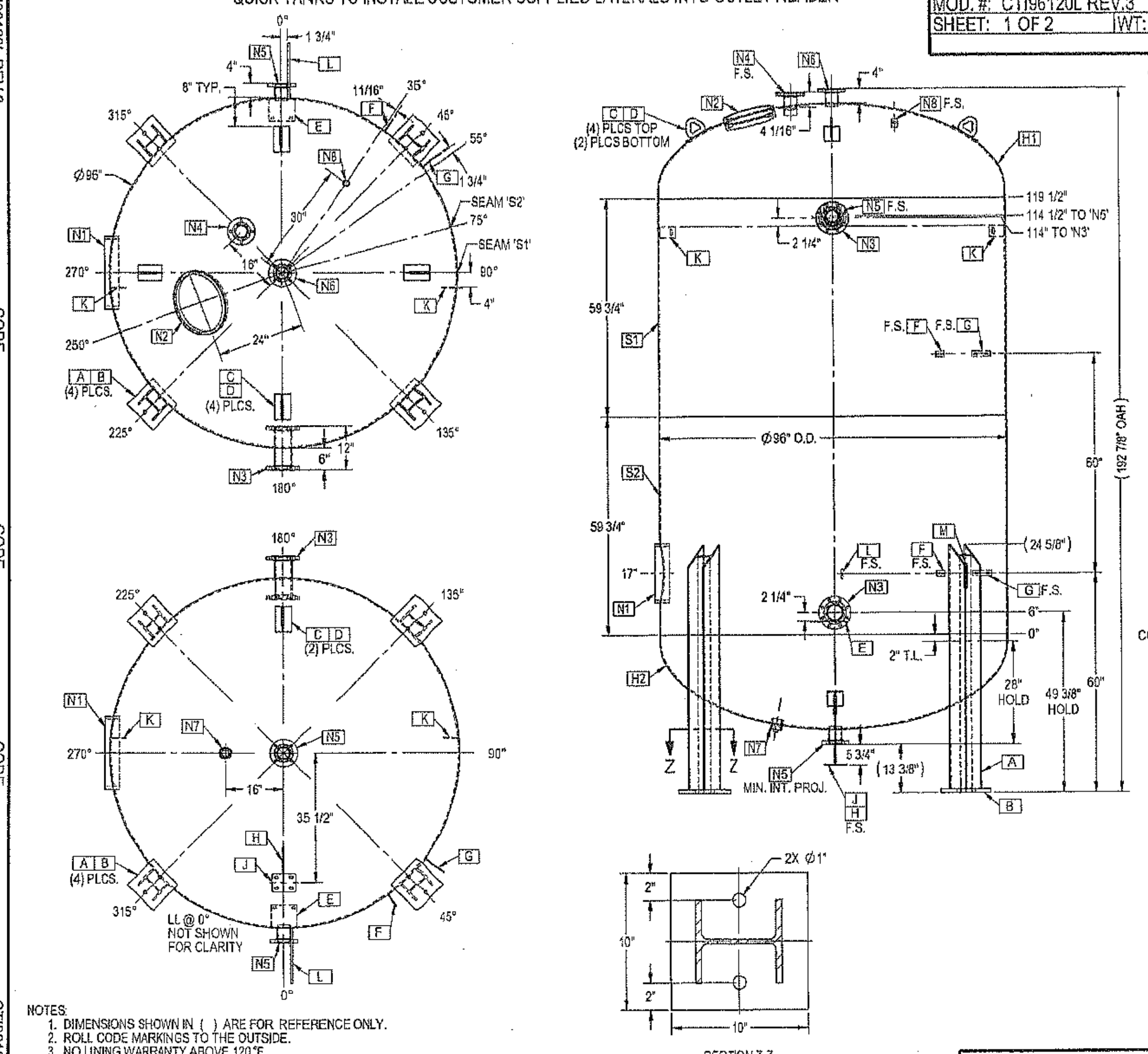
CT196120R REV.3

Approved for construction
RHAdams CRA PROJECT MANAGER
3/12/14

"L"

CT196120L REV.3

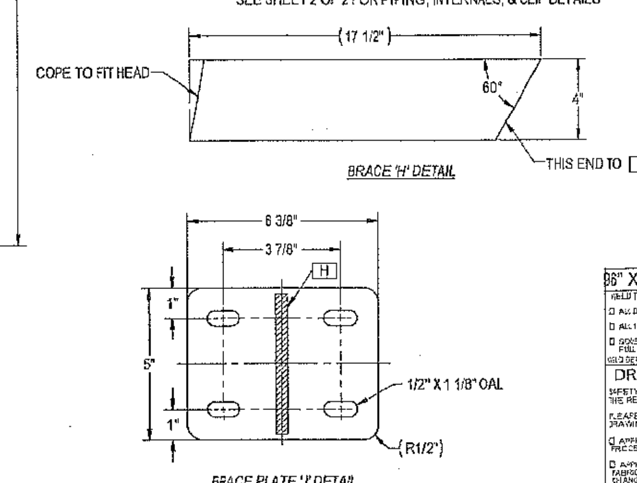
QUICK TANKS TO INSTALL CUSTOMER SUPPLIED LATERALS INTO OUTLET HEADER



CUST: CHEM-TRADE	SIZE: 96" X 120" PO #: 2244	W.O. #: C4642
MOD. #: CT196120L REV.3	INT: DEVOE 233H	QTY: 1
SHEET: 1 OF 2 WT: 6,680 LBS	EXT: TNEMEC N69F - SAFETY BLUE	DUE: 4/4/14
	TT HT	

ITEM	Part #	QTY.	Description	Matl. Spec.	NOTES
S1	579107	1	SHELL 3/8" NOM. X 60" X 301-1/2"	SA-455	PLASMA (WEIGHT: 1,968 LBS.)
S2	579107	1	SHELL 3/8" NOM. X 60" X 301-1/2"	SA-455	PLASMA (WEIGHT: 1,968 LBS.)
H1	649601	1	HEAD 2:1 ELLIP. 96" X .375 NOM. / .3285 MIN.	SA-516-70	PLASMA (WEIGHT: 1,106 LBS.)
H2	649601	1	HEAD 2:1 ELLIP. 96" X .375 NOM. / .3285 MIN.	SA-516-70	PLASMA (WEIGHT: 1,106 LBS.)
N1	364111	1	MANHOLE ASSEMBLY 14" X 18" X 3/4" X 4"	SA-106-C	
N2	363111	1	MANHOLE ASSEMBLY 12" X 16" X 3/4" X 3"	SA-106-C	
N3	157131	2	4" SCH. 40 PIPE X 11-1/4" LG. 304 S.S.	SA-312	
N3	738102	4	SLIP-ON FLANGE 4" R.F. CL150 304/304L	SA-182	
N4	157133	1	3" SCH. 40 PIPE X 6" LG. 304SS	SA-312	
N4	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182	
N5	157133	2	3" SCH. 40 PIPE X 4-1/2" LG. 304SS	SA-312	
N5	738105	2	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182	
N6	157133	1	3" SCH. 40 PIPE X 4-1/2" LG. 304SS	SA-312	
N6	78105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182	
N7	720806	1	FULL COUPLING 2" NPT 3000# 304L	SA-182	AXIS PERPENDICULAR TO HEAD
N7	741001	1	PIPE PLUG SQ. HD. 2" 3000# 304 S.S.	SA-182	
N8	720501	1	FULL COUPLING 1" NPT 3000# 304L	SA-182	
A	155005	4	BEAM W6 X 25# X 67" LG. - MITRE ONE END	SA-572-50	SEISMIC. SEE NOTE 5
B	150054	4	FOOT PAD 1" X 10" X 10" W/ (2)-1" HOLES	A-36	PLASMA
C	780005	12	LIFT LUG REPAD 1/4" X 2" X 8"	SA-516-70	
D	380098	6	LIFTING LUG MEDIUM	SA-105	
E	150064	1	HEADER CLIP 1/4" X 6" X 7" LG. 316SS	SA-240	△ PLASMA
F	150008	2	CLIP 1/4" X 1-1/2" X 4" LG. W/ (2) SLOTS	A-36	PLASMA
G	150008	2	CLIP 1/4" X 1-1/2" X 6-3/8" LG. W/ (2) SLOTS	A-36	PLASMA
H	150034	1	BRACE 3/8" X 4" X 17-1/2" LG.	A-36	
J	117010	1	BRACE PLATE 1/4" X 5" X 6-3/8" LG. W/ (4) SLOTS	A-36	PLASMA
K	150012	2	SUPPORT CLIP 1/4" X 3" X 4" LG. W/ SLOT - 316SS	SA-240	△ PLASMA
L	150018	1	CLIP 1/2" X 2-1/2" X 15" LG. W/ (2) SLOTS	A-36	PLASMA
M	765001	1	ASME CODE NAMEPLATE	NONE	

SEE SHEET 2 OF 2 FOR PIPING, INTERNALS, & CLIP DETAILS



96" X 120" ASME CODE

DRAWING APPROVAL

NOTES:
1. DIMENSIONS SHOWN IN ( ) ARE FOR REFERENCE ONLY.
2. ROLL CODE MARKINGS TO THE OUTSIDE.
3. NO LINING WARRANTY ABOVE 120°F.
4. BOLT HOLES OF FLANGES TO STRADDLE MAJOR VESSEL CENTERLINES, EXCEPT 'N4', 'N4' BOLT HOLES AS SHOWN.
5. LEGS DESIGNED FOR SEISMIC PER IBC-2009 FOR LEWISTON, NY 14092 & 14144.
6. QUICK TANKS TO INSTALL CUSTOMER SUPPLIED LATERALS INTO OUTLET HEADER.

DESIGN COND.: MAWP 100 PSIG @ +32°F-+120°F
HYDROSTATIC TEST @ 130 PSIG
BUILT TO SEC. VIII DIV. 1 ASME BOILER & PRESSURE VESSEL CODE 2013 EDITION

QUICK TANKS, Inc.
KENDALLVILLE, INDIANA USA
DATE: 2/18/14 DRAWN BY: PRP SIZE: B SCALE: NTS

CODE CODE CODE

CT196120L REV.3

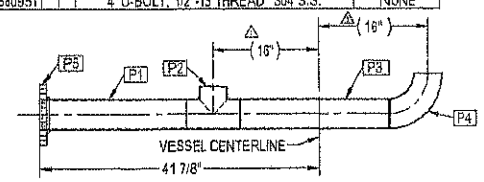
Approved for construction
RJ Adams CRA PROJECT MANAGER
3/12/14

"L"

CUST: CHEM-TRADE	SIZE: 96" X 120" PO #: 2244	W.O. #: C4642
MOD. #: CTI96120L REV.3	INT: DEVOE 233H	QTY: 1
SHEET: 2 OF 2 WT: 6,680 LBS	EXT: TNEMEC N69F - SAFETY BLUE	DUE: 4/4/14
	TT HT	

CTI96120L REV.3

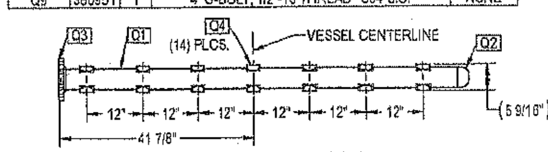
ITEM	Part #	QTY.	Description	Matl. Spec.
P1	157902	1	4" SCH. 10 PIPE X 21-1/4" LG. - 304 S.S.	SA-312
P2	346058	1	TEE 4" SCH. 10S - WELDED 304L	SA-403WP-W
P3	157902	1	4" SCH. 10 PIPE X 25-11/16" LG. - 304 S.S.	SA-312
P4	399998	1	ELBOW 90° 4" SCH.10S L.R. - 304 S.S.	SA-403WP-W
P5	738102	1	SLIP-ON FLANGE 4" R.F. CL150 304/304L	SA-182
P6	337113	1	RING GASKET 4" ANSI 150# 1/8" RED RUBBER	NONE
P7	380468	8	BOLT 5/8"-11 X 3-1/2" HH 304SS	NONE
P8	380268	16	FLAT WASHER 5/8" - 304 S.S.	NONE
P9	380100	8	NUT 5/8"-11 HEX - 304 S.S.	NONE
P10	380951	1	4" U-BOLT, 1/2"-13 THREAD 304 S.S.	NONE



INLET PIPE 'P' RIGHT SIDE VIEW

QUICK TANKS TO INSTALL CUSTOMER SUPPLIED LATERALS INTO OUTLET HEADER

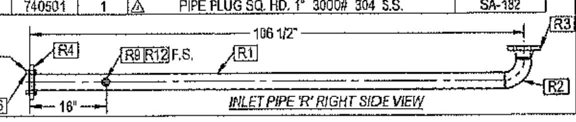
ITEM	Part #	QTY.	Description	Matl. Spec.
Q1	157902	1	4" SCH. 10 PIPE X 85" LG. - 304 S.S.	SA-312
Q2	746036	1	PIPE CAP 4" SCH. 10 304SS	SA-403
Q3	738102	1	SLIP-ON FLANGE 4" R.F. CL150 304/304L	SA-182
Q4	710801	14	HALF COUPLING 2" NPT 3000# 304L	SA-182
Q5	337113	1	RING GASKET 4" ANSI 150# 1/8" RED RUBBER	NONE
Q6	380468	8	BOLT 5/8"-11 X 3-1/2" HH 304SS	NONE
Q7	380268	16	FLAT WASHER 5/8" - 304 S.S.	NONE
Q8	380100	8	NUT 5/8"-11 HEX - 304 S.S.	NONE
Q9	380951	1	4" U-BOLT, 1/2"-13 THREAD 304 S.S.	NONE



OUTLET HEADER 'Q' TOP VIEW

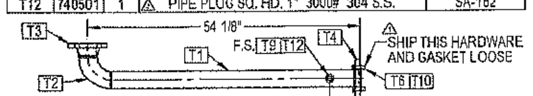
△2 ITEM	Part #	QTY.	Description	Matl. Spec.	NOTES
N	153119	1	ANGLE 3" X 3" X 3/16" X 92-1/2" LG. W/ SLOTS - 304SS	SA-240	PLASMA
P	NONE	1	4" INTERNAL INLET PIPE ASSEMBLY	SEE DETAILED BOM	
Q	NONE	1	4" INTERNAL OUTLET HEADER ASSEMBLY	SEE DETAILED BOM	
R	NONE	1	3" EXTERNAL INLET PIPE ASSEMBLY	SEE DETAILED BOM	
T	NONE	1	3" EXTERNAL OUTLET PIPE ASSEMBLY	SEE DETAILED BOM	
U	380224	2	△ 3" U-BOLT 304 S.S.	NONE	SHIP LOOSE
V	399996	2	△ U-BOLT, 1" PIPE, 1/4"-20 THREADS 304 S.S.	NONE	SHIP LOOSE

△2 ITEM	Part #	QTY.	Description	Matl. Spec.
R1	157909	1	PIPE 3" SCH. 10 X 101-1/2" LG. - 304SS	SA-312
R2	399999	1	ELBOW 90° 3" SCH. 10 L.R. - 304 S.S.	SA-403WP-W
R3	337028	1	FLANGE WELD NECK 3" 150# R.F. 304L	SA-182
R4	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182
R5	399997	2	RING GASKET 3" ANSI 150# 1/8" RED RUBBER	NONE
R6	380423	4	BOLT 5/8"-11 X 2" HH 304SS	NONE
R7	380268	12	FLAT WASHER 5/8" - 304 S.S.	NONE
R8	399995	1	3" EXTENDED U-BOLT 316SS, MCMASTER #29605T8	NONE
R9	710501	1	△ HALF COUPLING 1" NPT 3000# 304L	SA-182
R10	380099	4	BOLT 5/8"-11 X 3" HH 304SS	NONE
R11	380100	4	NUT 5/8"-11 HEX - 304 S.S.	NONE
R12	740501	1	△ PIPE PLUG SQ. HD. 1" 3000# 304 S.S.	SA-182

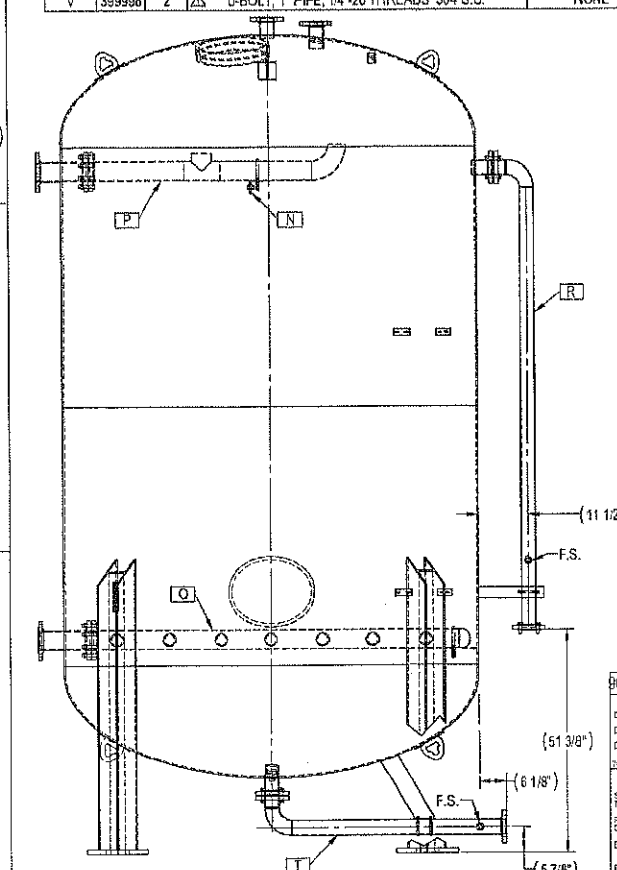


INLET PIPE 'R' RIGHT SIDE VIEW

△2 ITEM	Part #	QTY.	Description	Matl. Spec.
T1	157909	1	PIPE 3" SCH. 10 X 49-1/8" LG. - 304SS	SA-312
T2	399999	1	ELBOW 90° 3" SCH. 10 L.R. - 304 S.S.	SA-403WP-W
T3	337028	1	FLANGE WELD NECK 3" 150# R.F. 304L	SA-182
T4	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182
T5	399997	2	RING GASKET 3" ANSI 150# 1/8" RED RUBBER	NONE
T6	380423	4	BOLT 5/8"-11 X 2" HH 304SS	NONE
T7	380099	4	BOLT 5/8"-11 X 3" HH 304SS	NONE
T8	380224	2	3" U-BOLT 304 S.S.	NONE
T9	710501	1	△ HALF COUPLING 1" NPT 3000# 304L	SA-182
T10	380268	12	FLAT WASHER 5/8" - 304 S.S.	NONE
T11	380100	4	NUT 5/8"-11 HEX - 304 S.S.	NONE
T12	740501	1	△ PIPE PLUG SQ. HD. 1" 3000# 304 S.S.	SA-182



OUTLET PIPE 'T' RIGHT SIDE VIEW

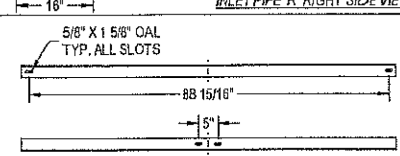


TANK RIGHT SIDE VIEW
WITH BROKEN LEG DETAIL

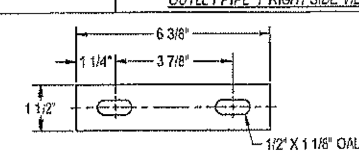
CODE

CODE

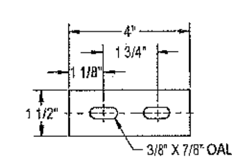
CODE



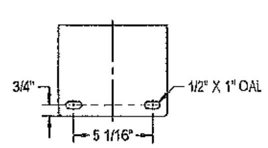
SUPPORT ANGLE 'N' DETAIL



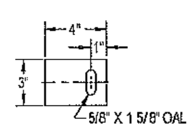
CLIP 'G' DETAIL



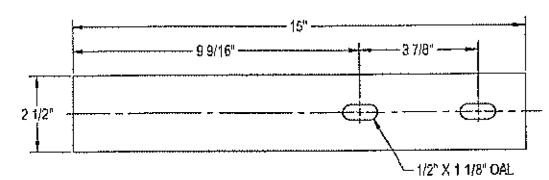
CLIP 'F' DETAIL



CLIP 'E' DETAIL



CLIP 'K' DETAIL



CLIP 'L' DETAIL

96" X 120" ASME CODE

DRAWING APPROVAL

SAFETY RELIEF DEVICES SHALL BE THE RESPONSIBILITY OF THE END USER

PLEASE INDICATE APPROVAL FOR DRAWING & RETURN TO QUICK TANKS

☐ APPROVED AS DRAWN, PROCEED WITH FABRICATION.

☐ APPROVED AS NOTED, PROCEED WITH FABRICATION IN ACCORDANCE WITH NOTED CHANGES, RESUBMIT CORRECTED DRAWING.

☐ DISAPPROVED, DO NOT FABRICATE, RESUBMIT DRAWING FOR APPROVAL

BY DATE

DESIGN COND.: MAWP 100 PSIG @ +32 °F-+120 °F
HYDROSTATIC TEST @ 130 PSIG
BUILT TO SEC. VIII DIV. 1 ASME BOILER & PRESSURE VESSEL CODE 2013 EDITION

REV.	DESCRIPTION	DATE	APPROVED
△1	ADDED R9, T9, U, & V; ADDED GASKETS & HARDWARE		
	P2 & PA WERE 11-1/16" OFF CENTER - PRP	2/13/14	
	-SEE SHEET 1 FOR ADDITIONAL REVISION INFORMATION-		

QUICK TANKS, Inc.
KENDALLVILLE, INDIANA USA

DATE: 2/10/14 DRAWN BY: PRP SIZE: B SCALE: NTS

FM / RT03 / ASME QC REVIEW:

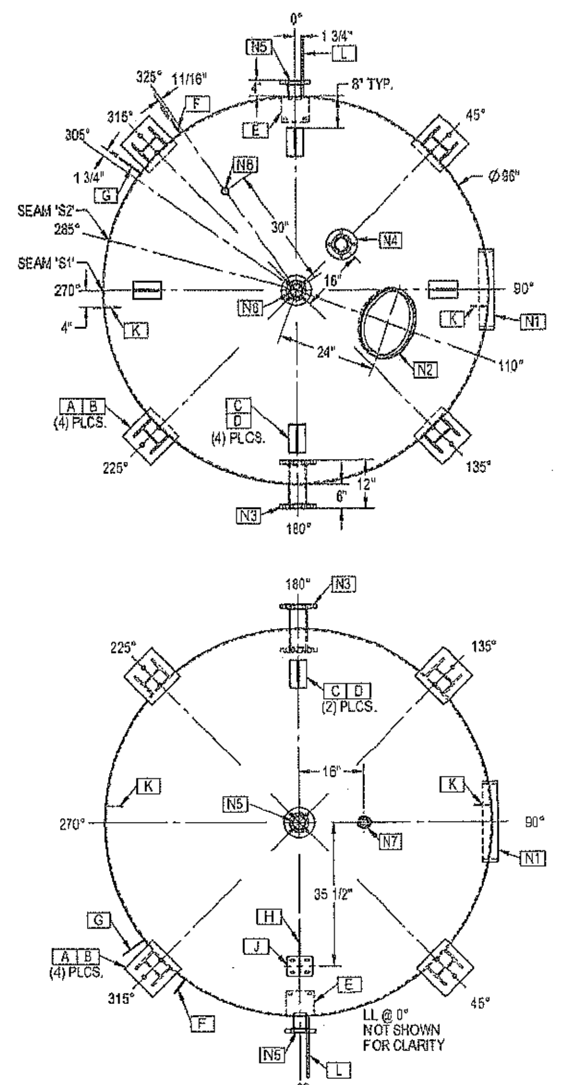
CTI96120L REV.3

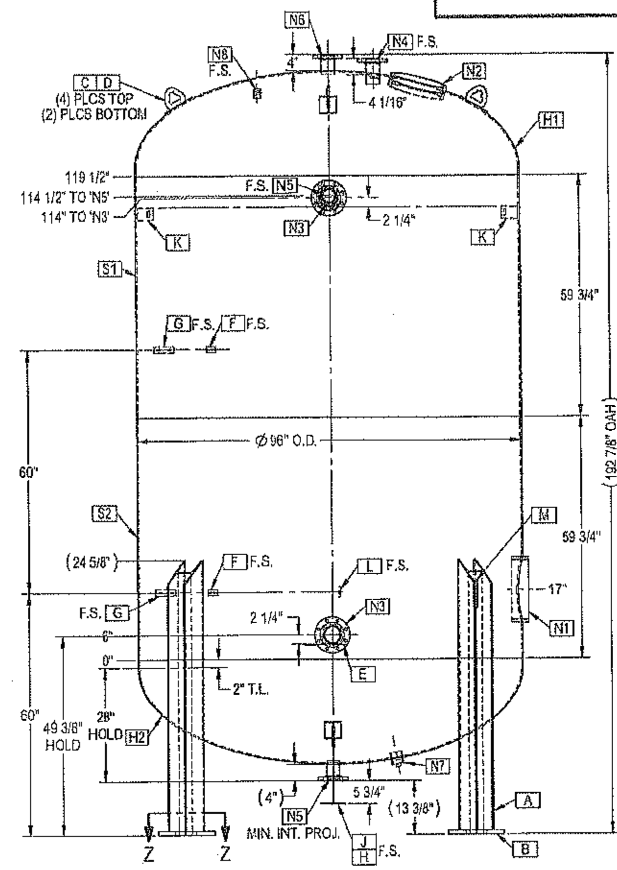
Approved for construction
RKAdams CRA PROJECT MANAGER
3/12/14

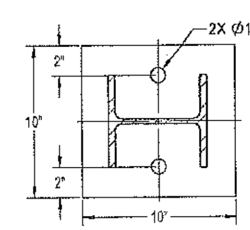
CT196120R REV.3

QUICK TANKS TO INSTALL CUSTOMER SUPPLIED LATERALS INTO OUTLET HEADER

CUST: CHEM-TRADE	SIZE: 96" X 120"	PO #: 2244	W.O. #: C4643
MOD. #: CTI96120R REV.3	INT: DEVOE 233H		QTY: 1
SHEET: 1 OF 2 / WT: 6,680 LBS	EXT: TNEMEC N69F - SAFETY BLUE		DUE: 4/4/14
	TT HT		



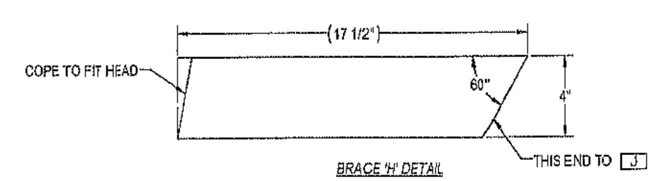




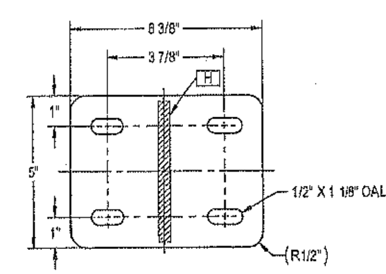
SECTION Z-Z

ITEM	Part #	QTY.	Description	Matl. Spec.	NOTES
S1	579107	1	SHELL 3/8" NOM. X 60" X 301-1/2"	SA-455	PLASMA (WEIGHT: 1,968 LBS.)
S2	579107	1	SHELL 3/8" NOM. X 60" X 301-1/2"	SA-455	PLASMA (WEIGHT: 1,968 LBS.)
H1	649601	1	HEAD 2:1 ELLIP. 96" X .375 NOM. / .3285 MIN.	SA-516-70	PLASMA (WEIGHT: 1,106 LBS.)
H2	649601	1	HEAD 2:1 ELLIP. 96" X .375 NOM. / .3285 MIN.	SA-516-70	PLASMA (WEIGHT: 1,106 LBS.)
N1	364111	1	MANHOLE ASSEMBLY 14" X 18" X 3/4" X 4"	SA-106-C	
N2	363111	1	MANHOLE ASSEMBLY 12" X 16" X 3/4" X 3"	SA-106-C	
N3	157131	2	4" SCH. 40 PIPE X 11-1/4" LG. 304 S.S.	SA-312	
N3	738102	4	SLIP-ON FLANGE 4" R.F. CL150 304/304L	SA-182	
N4	157133	1	3" SCH. 40 PIPE X 6" LG. 304SS	SA-312	
N4	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182	
N5	157133	2	3" SCH. 40 PIPE X 4-1/2" LG. 304SS	SA-312	
N5	738105	2	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182	
N6	157133	1	3" SCH. 40 PIPE X 4-1/2" LG. 304SS	SA-312	
N6	738105	1	SLIP-ON FLANGE 3" R.F. CL150 304/304L	SA-182	
N7	720806	1	FULL COUPLING 2" NPT 3000# 304L	SA-182	AXIS PERPENDICULAR TO HEAD
N7	741001	1	PIPE PLUG SQ. HD. 2" 3000# 304 S.S.	SA-182	
N8	720501	1	FULL COUPLING 1" NPT 3000# 304L	SA-182	
A	155005	4	BEAM W6 X 25# X 67" LG. - MITRE ONE END	SA-572-50	SEISMIC, SEE NOTE 5
B	150054	4	FOOT PAD 1" X 10" X 10" W/ (2)-1" HOLES	A-36	PLASMA
C	780005	12	LIFT LUG REPAD 1/4" X 2' X 8"	SA-516-70	
D	380096	6	LIFTING LUG MEDIUM	SA-105	
E	150064	1	HEADER CLIP 1/4" X 6" X 7" LG. 316SS	SA-240	△ PLASMA
F	150008	2	CLIP 1/4" X 1-1/2" X 4" LG. W/ (2) SLOTS	A-36	PLASMA
G	150008	2	CLIP 1/4" X 1-1/2" X 6-3/8" LG. W/ (2) SLOTS	A-36	PLASMA
H	150034	1	BRACE 3/8" X 4" X 17-1/2" LG.	A-36	
J	117010	1	BRACE PLATE 1/4" X 5" X 6-3/8" LG. W/ (4) SLOTS	A-36	PLASMA
K	150012	2	SUPPORT CLIP 1/4" X 3" X 4" LG. W/ SLOT - 316SS	SA-240	△ PLASMA
L	150018	1	CLIP 1/2" X 2-1/2" X 15" LG. W/ (2) SLOTS	A-36	PLASMA
M	765001	1	ASME CODE NAMEPLATE	NONE	

SEE SHEET 2 OF 2 FOR PIPING, INTERNALS, & CLIP DETAILS



BRACE 'H' DETAIL



BRACE PLATE 'J' DETAIL

96" X 120" ASME CODE

DRAWING APPROVAL

PLEASE INDICATE APPROVAL FOR DRAWING & RETURN TO QUICK TANKS

☐ APPROVED AS DRAWN, PROCEED WITH FABRICATION.

☐ APPROVED AS NOTED, PROCEED WITH FABRICATION IN ACCORDANCE WITH CITED CHANGES, RESUBMIT CORRECTED DRAWING.

☐ DISAPPROVED, DO NOT FABRICATE, RESUBMIT DRAWING FOR APPROVAL.

BY DATE

NOTES:

1. DIMENSIONS SHOWN IN ( ) ARE FOR REFERENCE ONLY.
2. ROLL CODE MARKINGS TO THE OUTSIDE.
3. NO LINING WARRANTY ABOVE 120 °F.
4. BOLT HOLES OF FLANGES TO STRADDLE MAJOR VESSEL CENTERLINES, EXCEPT 'N4'. 'N4' BOLT HOLES AS SHOWN.
5. △ LEGS DESIGNED FOR SEISMIC PER IBC-2009 FOR LEWISTON, NY 14092 & 14144.
6. △ QUICK TANKS TO INSTALL CUSTOMER SUPPLIED LATERALS INTO OUTLET HEADER.

CT196120R REV.3

DESIGN COND.: MAWP 100 PSIG @ +32 °F-+120 °F
HYDROSTATIC TEST @ 130 PSIG
BUILT TO SEC. VIII DIV. 1 ASME BOILER & PRESSURE VESSEL CODE 2013 EDITION

REV.	DESCRIPTION	DATE	APPROVED
△	[illegible]	[illegible]	
△	CHANGED ALL FITTINGS AND HARDWARE TO 304 SS		
	[illegible]	3/7/14	
	SEE SHEET 2 FOR ADDITIONAL REVISION INFORMATION		

QUICK TANKS, Inc.
KENDALLVILLE, INDIANA USA
DATE: 2/10/14 DRAWN BY: PRP SIZE: B SCALE: NTS
PM / RTDE / ASME QC REVIEW:

Approved for construction
RAAdams CRA PROJECT MANAGER
3/12/14

Appendix C
Carbon Vessel Operation Procedures

INSTALLATION AND OPERATING INSTRUCTIONS

Disposable/Refillable Models: DL, DLP and L Series

General

DL, DLP and L Series adsorbers treat aqueous and non-aqueous streams. They normally contain virgin granulated activated carbon. If the label indicates another adsorbent fill, contact Chem-Trade for any procedural changes required.

CAUTION: Activated Carbon can reduce oxygen in confined spaces. Use low oxygen safety procedures when entering adsorber vessels.

Deaeration

For adsorption efficiency, all possible air should be removed before the unit enters service. Deaeration is best accomplished by backfilling with liquid. Units should be backfilled individually before connection in parallel or series.

(1) To backfill, open both inlet and outlet fittings.
(2) Non-contaminated liquid is preferred for backfilling and backwashing, as impure liquid may compromise attaining subsequent ultrahigh purification. Recycle systems, e.g. a side stream of a larger recirculating flow, may use impure liquid if more convenient.
(3) Connect filter *outlet* to source of backfill liquid.
(4) Connect filter *inlet* to sewer or overflow container, according to liquid used.
(5) Admit backfill liquid at a rate 10% of the maximum flow rate of the unit. NOTE: Liquids over 50% organic concentration may require lower backfill rates. Liquids release heat of wetting on initial contact with adsorbents. If heat might promote reaction to damage the liquid, or if combustible or toxic levels of vapor might be evolved, cut backfill rate to eliminate or minimize the effect.
(6) Continue backfilling until a level of liquid is observed over the adsorbent bed (evident when liquid is seen at the inlet fitting). Adsorbent has been wetted from the bottom up, displacing air above the rising liquid surface. If practical, backfilling may be continued at a rate up to twice step (5), to remove adsorbent fines and any additional evolved air.
(7) Allow the unit to vent for approximately 24 hours. For maximum deaeration, after 24 hours of venting, drain all the liquid from the adsorber (by using the liquid drain valve, or for disposable units siphon the liquid from the outlet fitting) and then backfill again as described in steps 5 and 6, above.
(8) The unit is now ready for adsorption service. See *Operation*, below.

CHEM-TRADE INTERNATIONAL, INC.

325 MEADOWLANDS BLVD., SUITE 1
WASHINGTON, PA. 15301

Telephone 724-745-1405
Fax 724-745-0995

Backwashing

Backwashing adsorbers is primarily employed to: (1) remove fine adsorbent particles, and (2) relieve pressure developed in operations. Units are backwashed separately to sewer or collection vessel, never one in series into an upstream unit.

(1) DL, DLP and L Series Adsorbers are supplied with the most active and hardest liquid phase adsorbents available. Shipping vibration may create modest levels of fines, however, but these will normally be retained by the solids filtration capability of the downflow design. For optimal reduction of fines, units may be backwashed after the backfilling operation above. A purified form of the liquid to be treated is normally used, admitted through the outlet fitting at a rate up to the design processing flow of the model (lower flows may be appropriate with liquids more viscous than water, or at low temperatures). Backwash rate should be lowered if adsorbent particles larger than 0.5 mm diameter are present in the effluent. When effluent is clear, normally within two bed volumes, backwashing is complete.

(2) Flow through a packed granular bed should be free of undissolved solids, as these accumulate to create flow restrictions and increase adsorber pressure. Prefiltration minimizes fouling of the adsorbent and operational interruptions for backwashing. If inadvertent fouling occurs, a backwash as outlined in (1) above should remove the solid material(s). In stubborn cases, the top few inches of adsorbent and contamination may be loosened with a rake or removed and discarded. NOTE: A common misconception is that operating until particulate matter creates high back pressure improves particulate filtration and minimizes backwashing inconvenience. In fact, the opposite is true: when differential back pressure (in excess of original adsorber pressure drop) exceeds above five psi., particulate matter is already producing channels in the adsorbent bed. These channels help drive particles deep into the bed, making subsequent backwashing less effective and decreasing adsorption efficiency. Backwashing is recommended after the first few psi. differential pressure develops, so harmful consequences are avoided.

Operation

After backfilling or backwashing, with the bed still immersed in liquid, the treatment source is connected to the inlet, the outlet being opened and connected downstream. Process flow may then start by gravity percolation, system pressure or an upstream pump. Adjust all valves gradually to avoid "water hammer" damage. NOTE that if system or pump pressure is high or potentially high in upset conditions, a relief means should be provided so the maximum design vessel pressure is not exceeded. Pressure relief sizing should handle operational flow rate. NOTE: If outlet piping creates the possibility of accidental siphoning during shutdowns, install preventative siphon break or valving. The adsorber should be completely full of liquid at all times.

CHEM-TRADE INTERNATIONAL, INC.

325 MEADOWLANDS BLVD., SUITE 1
WASHINGTON, PA. 15301

Telephone 724-745-1405
Fax 724-745-0995

Appendix D
Weekly Monitoring Sheet

STAUFFER MANAGEMENT COMPANY

LEWISTON, NEW YORK **CRA Project 6488-20**
WEEKLY MONITORING

DATE _____
TIME _____
RECORDED BY _____

FLOW DATA:

Well	*Units*	*Totalizer Reading*	*Flow Rate*	*Status*	*Notes*
				(circle one)	
EW-1	(gal)			Auto / Off	
EW-2	(gal)			Auto / Off	
EW-3	(gal)			Auto / Off	
EW-4/T4	(gal)			Auto / Off	
EW-5/DPA-201	(gal)			Auto / Off	
EW-6	(gal)			Auto / Off	
OW-3*	(pulses)		NA	Auto / Off	
EW-4**	(pulses)		NA	Auto / Off	
T-4**	(pulses)		NA	Auto / Off	
DPA-201***	(pulses)		NA	Auto / Off	
DPA-202	(gal)			Auto / Off	
DPA-203	(gal)			Auto / Off	
KO Pot	(gal)			Auto / Off	
Above NAPL separator tank	(gal)			Auto / Off	
LR-66****	(gal)		NA	Auto / Off	
Area A	NA	NA	NA	Running / Off	

ADDITIONAL OPERATING DATA

Item	*Units*	*Value*	*Notes*
Effluent pH	su		
Filter Bag Change-outs this week			
OPERATION / MAINTENANCE NOTES:			

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* OW-3 pulse reading is taken at the well.
** EW-4 and T-4 pulse readings are taken at the well
*** DPA-201 pulse reading is taken at the air regulator near the NE corner of the Area A room
**** LR-66 is the brass body meter located in the Area A room