Project Safety Features

The design of the proposed plant incorporates many safety features. Dynamic maintains a strong safety culture in both the management of the company and all the employees. We want to ensure that the system is designed to minimize the potential hazards the employees might face as well as protect the environment from any possible issues. These features are described in detail below.

General Site Safety

General safety measures are in place to ensure the site remains safe and secure. There is a fence around the perimeter of the plant to ensure people or animals are not on site without the knowledge of the staff. All visitors are required to check-in at the office and be escorted by plant personnel while on-site. There are also numerous security cameras located around the site and within the buildings.

The control system and security camera system can be accessed remotely by the on-call personnel and managers. This allows them to check on the function of the plant remotely and do a remote walk-through of the operation while on-call or when the control system notifies the operator of an issue.

All the buildings on site are typically given a letter code and all doorways are given a number code. A map of the site with the building and doorway codes is provided to the local emergency responders and is available in multiple locations around the site. This allows for quick and accurate communication with first responders about where to go immediately when they arrive on site.

The project also welcomes the fire department and first responders on site as the facility is coming on-line as well as a couple times a year for training and inspections to ensure they are prepared for any type of emergency they may encounter.

The employees also do daily walk-throughs of the plant as part of the Daily Site Monitoring and Inspection Plan. These walk-throughs are utilized as a preventive maintenance tool as well as identifying any potential safety issue that needs correction, monitoring the site for noise, and monitoring the site for odor.

The plant will have an Emergency Response Plan outlining the key contacts and actions that need to be taken depending on the emergency. A Spill Prevention and Response Plan will be in place to ensure the systems are functioning properly and provide detailed guidance and key contacts in the event of an incident. The Malfunction and Abatement Plan will be required as a part of the facility's air permit.

Spill Prevention/Containment

Numerous features are incorporated into the design of the plant to detect a leak and minimize its potential impact. All process piping is measured for flow and pressure. In the event of a sudden pressure drop in the pipe, the valves are closed and the pump stops. In the event that the pressure

increases and there is no flow, the pump is stopped and the valves are closed due to the potential of a plugged pipe. In the event the pressure remains constant, but flow is not detected, the pumps stop, the valves are closed, and the operator is signaled to investigate the situation.

All the process buildings on site have a concrete curb around the perimeter to prevent any material from leaking outside the buildings. All the floors of the buildings have large trench drains that drain to a collection sump. The sumps within the buildings pump the liquids back into one of the process tanks. The floors are equipped with multiple sensors that detect moisture on the floor. If moisture is detected, all pumps stop and the valves are closed to isolate the potential problem. Additionally, the sumps in the floor have level indicators. If the level increases in the sump without a known maintenance activity taking place, all pumps stop, valves close, and the operator is signaled to investigate.

All digester tanks are equipped with redundant valves for the process piping to provide a backup if one valve fails to close or a leak is detected. The digester tanks are continually monitored for level. In the event the level of the digester changes unexpectedly or drops at a rate that is quicker than typical, the valves close and isolate the digester.

Sensors are also in place to detect issues with other process equipment such as the screw presses, drum dryers, and conveying system. In the event a conveyor isn't on or the belt stops moving, the zero-speed sensor on the belt will trip and all the previous pieces of equipment will stop until the conveyor is returned to proper operation. The drum dryers are equipped with numerous sensors to detect temperature. In the event an extremely high temperature is detected, a water extinguishing system is automatically activated to cool the material and prevent a potential fire. In the event a screw press malfunctions, there are sensors at the discharge of the screw press that can detect the malfunction and stop the press and close the valve. These types of safety features are also included on all the water treatment equipment.

In the unlikely event that all of the other safety equipment fails to react properly, there is a berm around the perimeter of the site to prevent any possible material from reaching the water. This containment system will provide hours of protection and the ability to contain an incident to the site to allow for proper cleanup and disposal while protecting the surrounding area.

Biogas Safety

The primary safety concern with the biogas system is a fire. In order to have a fire, there needs to be oxygen introduced to the biogas in the correct ratio and an ignition source. In order to generate an explosion, pressure is also required. The biogas system is designed to operate at approximately 0.1 psi. In the event that both oxygen is introduced at the right concentration to the enclosed system and an ignition source is present, a flash fire may occur. Since the system is an anaerobic system, there is

no oxygen present in the system to provide the oxygen that is needed to support a fire. There are oxygen sensors in the biogas system that are continually measuring for the presence of oxygen.

The flare system is also activated if the pressure exceeds 0.1 psi. As a backup to the flare system, all the tanks are equipped with pressure relief valves to ensure the digesters do not build up biogas pressure and to protect the integrity of the tanks and roofs.

All motors and instruments that are located near the biogas system are explosion proof as required by the Nation Fire Protection Association (NFPA). As mentioned previously, it takes both oxygen and an ignition source to start the biogas on fire. By utilizing explosion proof motors and instruments, this eliminates the ignition source in the event both biogas and oxygen are present.

There are also numerous methane and hydrogen sulfide sensors in the buildings around the plant to ensure that these gases are not present in any of the buildings. In addition to the sensors, all of the buildings are designed with adequate ventilation to prevent the build-up of any unsafe gases.

Finally, in the event of a power outage on site, the biogas system and control system are connected to an emergency back-up generator to ensure that these protective systems continue to operate in the event of a loss of power from the utility.

Personnel Safety

Throughout the design of the plant, we try to minimize the amount of potential confined spaces since these have the potential to create the largest risk for the employees. This is one of the reasons why we utilize above ground digester tanks. It is much easier to open them up and ventilate them so they are not a hazardous confined space while cleaning them out.

The plant also utilizes hydraulically driven pumps for all below grade applications rather than electric pumps. With an electric driven pump, if something gets stuck in the pump, the breaker will trip and the employees have to clean out the pump prior to resetting the breaker and restarting the pump. Hydraulic drive pumps minimize the need for plant personnel to remove debris from them since the hydraulic system can detect when the pump is stuck and reverse the direction of flow to remove the object. Also, when it comes time to replace the wear parts of the pump, it can be quickly disconnected from the hydraulic system with the quick connect hoses, lifted out, and replaced with a rebuilt pump to minimize time in the pumping dry well. The old pump can then be rebuilt back in the shop rather than in the field.

The plant is also designed to limit noise to 75 dB at the property line. This is the equivalent to noise from a dishwasher or a shower. This is done for neighbor relations as well as protecting the hearing of the employees. The goal is to keep the noise level below 80 dB wherever possible. If the noise level of a particular process exceeds 80 dB, employees are required to utilize hearing protection.

Employees are issued a 4-gas analyzer that clips to their uniform when performing certain tasks. This analyzer notifies them if they enter an area with a potentially hazardous gas or a lack of oxygen. Employees are provided general personal protective equipment (PPE) such as eye protection, hearing protection, and hardhats. All employees are also provided a fall protection harness that is also required for confined space entry. Since each employee can fit the harness to their size, it allows them to utilize them more safely, quickly, and efficiently rather than having to adjust one prior to each use.

All employees are required to go through site specific safety training and receive Occupational Safety and Health Administration (OSHA) training on an ongoing basis with the goal of having all employees OSHA 10-hour certified. All visitors and subcontractors are also required to go through site specific orientation and safety training. As part of the plant safety program, employees take part in regular safety talks, and safety audits of the site are routinely performed.

The plant also has a WDNR certified wastewater operator. This person is particularly knowledgeable about the system and process to ensure all hazards are identified and all employees are properly trained for their tasks.

Dynamic also works with Dr. John Katers, Dean of the College of Science and Technology at UW-Green Bay, to maximize the performance of the plant and provide input and guidance as needed and Cheryl Skjolaas, Agriculture Safety and Health Specialist at UW-Extension, on agriculture and manure safety related issues.