Wastewater Operations and Maintenance Manual

(O&M)

Group14 Technologies

13431 Wheeler Road Northeast

Moses Lake, WA 98837

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Section 1. Introduction

1.1 Purpose

This Operations and Maintenance (O&M) Manual contains guidance and information for the operations and maintenance of the wastewater system at Group14 Technologies Battery Active Materials Factory (BAM-2) in Moses Lake, Washington. This O&M manual has been prepared in accordance with the requirements of Washington Administrative Code (WAC) 173-240-150. WAC 173-240-150(2) specifically requires the inclusion of 13 topics, which are cross referenced below with the section of this manual where it is discussed.

a) The names and phone numbers of the responsible individuals (Section 2).
b) A description of plant type, flow pattern, operation, and efficiency expected (Section 3).
c) The principal design criteria (Section 3).
d) A process description of each plant unit, that includes function, relationship to other plant units, and schematic diagrams (Section 3).
e) An explanation of the operational objectives for the various wastewater parameters, such as sludge age, settleability, etc. (Section 3).
f) A discussion of the detailed operation of each unit and a description of various controls, recommended settings, fail-safe features, etc. (Section 3).
g) A discussion of how the facilities are to be operated during anticipated startups and shutdowns, maintenance procedures, and less than design loading conditions, so as to maintain efficient treatment (Section 4).
h) A section on laboratory procedures that includes sampling techniques, monitoring requirements, and sample analysis (Section 5).
i) Recordkeeping procedures and sample forms to be used (Section 6).
j) A maintenance schedule that incorporates manufacturer's recommendations, preventative maintenance and housekeeping schedules, and special tools and equipment usage (Section 7).
k) A section on safety (Section 8).

l) A section that contains the spare parts inventory, address of local suppliers, equipment warranties, and appropriate equipment catalogs (Section 9).
m) Emergency plans and procedures (Section 10).

1.2 Audience

This O&M manual is intended for all operators, administrators, and responsible individuals of the wastewater (WW) system at Group14's BAM-2 facility. This manual will be made available by department managers to all employees working with the wastewater system.

Section 2. Responsible Personnel

Several departments and individuals share the responsibility of ensuring the proper operation of the wastewater system at the BAM-2 facility. Every individual working with the wastewater system shall possess the necessary experience and/or education to ensure competence with industrial wastewater operations.

Plant Manager: The Plant Manager is responsible for ensuring that the wastewater system functions properly by providing adequate resources and equipment.

Environmental Manager: The Environmental Manager is responsible for supervising the Environmental Department. The Environmental Department is responsible for verifying permit compliance through sampling and monitoring.

Health and Safety Manager: The Health and Safety Manager is responsible for ensuring that the necessary controls, safeguards, and procedures are implemented to protect the safety of all personnel working with the wastewater system.

Operations Manager: The Operations Manager is responsible for the day to day operations of the wastewater system, and for ensuring that Operators possess the necessary training and competency to safely operate the wastewater system.

Maintenance Manager: The Maintenance Manager is responsible for promptly repairing and maintaining all production and wastewater equipment and directing maintenance personnel to perform periodic maintenance (PMs), maintain logs, and records of maintenance activities.

2.1 List of Responsible Individuals

Plant Manager:

Name: Don Kersey

Telephone Number: (509) 750 9140

Environmental Manager:

Name: Paul Stenhouse

Telephone Number: (509) 761 2934

Health and Safety Manager:

Name: Michael Adamos

Telephone Number: (509) 989 1498

Operations Manager:

Name: Dennis Carheel

Telephone Number: (281) 617 8166

Maintenance Manager:

Name: Art Bolduc

Telephone Number: (509) 771 5365

Section 3. Facility and System Description

The Group14 Technologies BAM-2 is a manufacturing facility that produces silicon- and carbon-based materials for use in rechargeable batteries. The facility's manufacturing processes involve carbon production followed by combination with silicon to produce battery anode material. Production is shared between two production modules, Module 1 and Module 2. Wastewater is generated throughout the facility from domestic waste, boiler blowdown discharge, cooling tower discharges, and reverse osmosis (RO) concentrate/reject. All sources of wastewater are piped into a central waste line that discharges down into a lift station on the western side of the property. The lift station pumps wastewater to the east at a high point on the property, and gravity drains north to the main Wheeler trunk and the City of Moses Lake Sand Dunes Publicly Owned Treatment Works (POTW). Outside of stormwater, which is piped via catch basins and a stormwater system to a groundwater infiltration pond in the northwestern corner of the facility property, all water leaving the facility will be discharged to the City of Moses Lake's Dunes POTW, with discharge not exceeding 100,000 gallons per day.

3.1 Principal Design Criteria

The principal design of the wastewater system at BAM-2 is a straight discharge system with minimal treatment. Both domestic and process wastewaters are combined at the lift station prior to pumping. The domestic wastewater discharge does not receive any treatment on site before discharge to the POTW. The process wastewater may only receive pH adjustment, prior to discharge. Group14 does not anticipate the routine need to adjust pH. Rather, the ability to adjust pH is a safeguard to meet the Moses Lake municipal wastewater regulations. No other wastewater treatment is conducted by the facility.

3.2 Wastewater System Description

Throughout the facility, there are four basic sources of wastewater generated from the facility: RO skids, cooling towers, boilers, and domestic waste. The sources of wastewater are a result of

RO reject/concentrate, boiler blowdowns, cooling towers blowdowns, and the domestic use of showers, sinks, and toilets. These sources may generate solids.

Wastewater collection and discharge is the primary function of the wastewater system. Although it does not generate wastewater itself, this equipment is designed to collect, transport, and discharge wastewater to the POTW. A schematic diagram of the wastewater system is attached as Figure 1, BAM-2 Water Balance PFD.

RO: Reverse Osmosis is the treatment method used to provide high purity make-up water for the waste heat recovery boiler. The RO is supplied with potable city water, which is pressurized via a booster pump. The booster pump distributes the water through a series of semi-permeable membranes, where pure water (permeate) exits through the center of the membrane while the concentrated water stream (concentrate or reject wastewater) passes on the outside of the membranes and is discharged to drain, which goes to the wastewater collection tank. Typically, the concentrate stream is approximately 25-30% of the total raw water flow, and the permeate is 70-75% of the total raw water flow.

Cooling Tower: The cooling tower is used to condense water vapor produced by the boiler, utilizing evaporative cooling. This removes heat and allows the water vapor to condense into liquid (condensate). This heat transfer evaporates the cooling water, which leaves the water impurities behind. The impurities collect in the cooling tower sump. To avoid these impurities forming scale on the condenser, cooling water conductivity is measured, and an automatic blowdown control maintains acceptable levels. This blowdown stream goes to the wastewater collection tank.

Boiler: The boilers produce heated water and vapor for facility operations. As the concentration of dissolved solids increases, the boilers will require blowdown to remain within guidelines for conductivity. A conductivity probe is used to send an output signal to an automatic valve that modulates to maintain the conductivity setpoint. This waste stream of high pressure boiler water is discharged to a blowdown tank that operates at a lower pressure than the boiler. The

boiler water will flash in this lower pressure tank. The blowdown tank is maintained at a specific level. As the concentrated boiler water level increases in the blowdown tank, an automatic valve opens and drains some of this water to the floor drain. This will flow and be collected in the wastewater collection tank. A second source of water from the boiler comes from the intermittent blowdown tank. This water comes from manually opening the bottom blowdown valve on the boiler for removal of concentrated settleable solids. This is a manual operation performed by an operator. This water goes to drain and travels to the wastewater collection tank.

Wastewater Collection System: This system consists of the piping that transports all process wastewater to the WW collection tank. This system includes the WW collection tank and berm, pH adjustment system, tank level instrumentation, sampling equipment, and wastewater flow control valves.

Wastewater Lift Station System: This system consists of the piping that receives all wastewater via gravity feed to the central lift station, the lift station vault, pumps, monitoring equipment, vault level instrumentation, and the piping that pumps all collected wastewater to the POTW.

3.3 System Operations

Each piece of equipment that contributes to the production of wastewater has a specific set of parameters that ensure proper operation and optimization of the equipment process. Automatic controls, sensors and even human interaction all contribute to proper operation of the equipment to minimize the generation of wastewater. The maximum wastewater discharge from the facility will be 100,000 gallons per day (GPD). Verification of proper equipment operation and a preventative maintenance program for scheduled inspection or calibration of equipment ensures the facility minimizes its wastewater generation. Each source of wastewater generation has specific guidelines outlined in facility standard operating procedures (SOPs) for proper operation. This also includes the addition of some chemical treatment to maintain peak

performance of systems that generate wastewater. Below is a brief outline of the instrumentation that may be used on each piece of equipment to optimize performance and minimize wastewater:

- **Reverse Osmosis System (RO)**
    - pH transmitter- Inlet (City) Water Supply
    - ORP - Inlet (City) Water Supply
    - Permeate Conductivity
    - Concentrate (Reject Water) Conductivity
- **Cooling Tower System**
    - Cooling Water Conductivity
    - Cooling Tower Blowdown Control Valve
- **Boiler**
    - Boiler Water Conductivity
    - Boiler Blowdown Control Valve
- **WW Collection System**
    - Wastewater pH
    - Wastewater Conductivity Probe
    - Wastewater Flow Meter
    - Wastewater Autosampler
- **WW Lift Station System**
    - Wastewater Pumps
    - Wastewater pH Probes
    - Wastewater Flow Meter
    - Wastewater Autosampler
    - Wastewater Flow System Control Box

3.4 Equipment Operation

The primary components of the wastewater system and their expected operational parameters are listed below.

RO System: The primary purpose of the RO system is to generate high purity water for use in facility operations. As mentioned above, the RO system produces two grades of water, permeate and reject/concentrate. The permeate is utilized by facility operations and is later converted into wastewater, while the reject is sent to the wastewater tank immediately. Typically, the concentrate stream is approximately 25-30% of the total raw water input, and the permeate generation is 70-75%. Below are the recommended operational settings of the two grades.

- **Permeate**: Typical water quality of the RO Permeate will be < 5 µS/cm, with a pH range of 5-7. The permeate is the source of high purity make-up water to the boiler's deaerator.
- **RO Reject**: The concentrate or reject stream from the RO will have the same pH as the Raw/City water, which is around 8.0-8.9. The anticipated TDS of this waste stream is estimated to be approximately 1075 mg/L.

Boiler: The purpose of the Boiler is to consume excess heat generated from facility operations by heating water. The operating parameters are anticipated to be:

- 150-185 psi operating pressure.
- Boiler conductivity (TDS) of approximately 875-2200 mg/L.
- Approximately 1200 GPD of boiler blowdown, per module.

Cooling Tower- The primary purpose of the cooling towers is to provide a means of evaporative cooling. As the cooling water is circulated, the solids concentration will increase enough to

require a purge or blowdown of some concentrated cooling water. The conductivity setpoint control will be established as:

- 800-950 mg/L.

Wastewater Collection System- The purpose of the wastewater collection system is to control process wastewater discharge stemming from a single point. This is accomplished by all process wastewater piping discharging to a common point: the wastewater collection tank**.** At the WW collection tank, there is a recirculation loop from the wastewater pumps back into the WW collection tank. This loop allows for neutralization of abnormal pH with the addition of acid or caustic in accordance with facility SOP-MFG-06-00010 Wastewater High or Low pH Response. If pH outside of the operational range of 6-11 is detected by the pH probe system, an interlock is triggered, preventing wastewater discharge until the pH is brought to within the acceptable range. The WW tank is discharged via pumps based on wastewater level in the tank. The pumps are controlled with a VFD (variable frequency drive) which enables level control in the collection tank. Should one pump not be able to maintain level, the standby pump will turn on to prevent the tank from overflowing. In the event of a wastewater tank overflow, the tank is located within a containment berm to prevent the uncontrolled release of wastewater. The control valve on the discharge header of the WW pumps will adjust discharge flow based on the pH of the WW collection tank, and tank level. The WW collection system will control WW discharge based on the following parameters:

- pH range of 6.0-11.0.
- TDS load not to exceed 1200 mg/L.
- Daily flow not to exceed 100,000 GPD.

Wastewater Lift Station- The purpose of the wastewater lift station is to collect all wastewater, domestic and process, discharged via gravity feed though the facility's wastewater sewer pipe system, and pump the wastewater via a pressurized line to the City of Moses Lake's sewer system to ultimately be discharged to the Dunes POTW for treatment. Inside the lift station vault are two chopper pumps that grind up solids suspended in the wastewater flow prior to

pumping into the pressurized discharge line. The pumps are controlled via a VFD, and pump operation is based on the water level in the vault. A float system is used to trigger the pumps. When the water level reaches the high float, the pumps turn on until the water level drops to the low float, where the pumps turn off. Additional alarmed floats are installed to notify operators of abnormally low or high water levels, allowing them to respond by either shutting down the wastewater system if the pumps are malfunctioning, or manually turning off the pumps if they are not shutting down.

Section 4. Facility Operations

The BAM-2 facility is fully staffed and in operation every day of the week, 24 hours a day, 365 days a year. Wastewater continually cycles through the system all hours of the day, except during maintenance activities and when the facility is offline. As the BAM-2 facility does not conduct any wastewater treatment outside of adjusting process wastewater for pH, as outlined in subsection 3.4, there are very few procedures related to the operation of the wastewater system during startup, shutdown, and maintenance activities. Due to the proprietary nature of Group14's activities, all operating procedures are confidential and are excluded from this manual. The SOPs related to startup, shutdown, and maintenance operations are listed below. These SOPs are available at the site and may be reviewed during agency inspection.

4.1 Startup Procedures

All operation procedures related to starting up the wastewater system are covered in SOP-MFG-06-00001 Plant Startup which references bringing the wastewater system into service.

4.2 Shutdown Procedures

All operation procedures related to starting up the wastewater system are covered in SOP-MFG-06-00002 Plant Shutdown, which references taking the wastewater system out of service.

4.3 Operations During Maintenance Procedures

Standard operation of the wastewater system is maintained during regular PM activities on pH and conductivity monitoring probes, as each probe is fit into a retractable assembly that allows the probe to be removed without needing to stop flow through the system. Additionally, during servicing of the primary wastewater pump, the standby pump will be used to maintain standard operation while the primary is serviced. Outside of probe and pump maintenance, all remaining maintenance activities will require wastewater system operation to cease. During these activities: The plant will be shut down in accordance with subsection 4.2 Shutdown Procedures, or wastewater will be pumped into storage tanks to maintain standard operations. Stored wastewater will either be disposed of via the appropriate waste channels or will be reintroduced into the wastewater tank as volume allows once the system resumes normal operations.

Section 5. Compliance Monitoring and Laboratory Procedures

Ecology and the City of Moses Lake require compliance monitoring of wastewater discharge. The specific compliance monitoring parameters are outlined in subsection 5.1, and compliance monitoring activities shall be conducted by trained personnel familiar with the operation of the system. Samples required to be collected and analyzed as part of compliance monitoring are collected with the techniques outlined in subsection 5.2. The BAM-2 facility does not have an onsite laboratory for sample analysis, as such, the facility will partner with accredited laboratories to meet compliance requirements as outlined in subsection 5.3.

5.1 Monitoring Requirements

The required monitoring parameters, along with their respective frequencies, are outlined in tables 1 and 2 respectively.

Table 1: Department of Ecology Compliance Parameters					
Parameter	**Fraction**	**Units**	**Sample Frequency**	**Sample Type**	**Limits**
Flow		Gallons/Day (gpd)	Continuous	Metered	100,000
pH		Standard Units	Continuous	Metered	6-11
Conductivity (Specific Conductance)		Micromhos/cm	Continuous	Metered	1.6
Temperature		degrees F	Continuous	Metered	104
Chloride	Total	Pounds/Day (lbs/day) & Milligrams/L (mg/L)	1/week	Composite	
Sodium	Total	Pounds/Day (lbs/day) & Milligrams/L (mg/L)	1/week	Composite	
Total Dissolved Solids (TDS)		Pounds/Day (lbs/day) & Milligrams/L (mg/L)	1/week	Composite	1000.8/ 1200
Total suspended (TSS)		Pounds/Day (lbs/day) & Milligrams/L (mg/L)	1/week	Composite	292/350
BOD5	Total	Pounds/Day (lbs/day) & Milligrams/L (mg/L)	1/week	Composite	250/300
Fats, Oils, and Grease		Milligrams/L (mg/L)	1/week	Grab	100
Color		Color Units	1/Month	Grab	100
Calcium	Total	Milligrams/L (mg/L)	2/Month	Grab	
Magnesium	Total	Milligrams/L (mg/L)	2/Month	Grab	
Potassium	Total	Milligrams/L (mg/L)	2/Month	Grab	
Sulfate	Total	Milligrams/L (mg/L)	2/Month	Grab	
Carbonate Alkalinity (as CaCO3)		Milligrams/L (mg/L)	2/Month	Grab	
Bicarbonate Alkalinity	Bicarbonate	Milligrams/L (mg/L)	2/Month	Grab	
Nitrate	Total	Milligrams/L (mg/L)	2/Month	Grab	
Ammonia	Total	Milligrams/L (mg/L)	2/Month	Grab	
Phosphorus	Total	Milligrams/L (mg/L)	2/Month	Grab	

Table 2: City of Moses Lake Wastewater Compliance Parameters				
Parameter	**Units**	**Sample Frequency**	**Sample Type**	**Limits**
Flow	Gallons/Day	Continuous	Metered	100,000
BOD	lbs/day	1/week	Composite	250
FOG	lbs/day	1/week	Grab	83
TSS	lbs/day	1/week	Composite	292
pH	Standard Units	Continuous	Metered	6-11
Temperature	°F	Continuous	Metered	104
Color	Color Units	Monthly	Grab	100

To comply with monitoring requirements, two monitoring points have been established as part of the wastewater system, monitoring points 1 and 2, respectively (MP-1 and MP-2). MP-1 is located near the process WW collection tank, and monitors compliance of Ecology parameters regulating process wastewater discharge. MP-2 is located at the wastewater lift station, and monitors compliance of City parameters regulating domestic wastewater discharge. Both monitoring points are visible on the facility map (Figure 3). City parameters are sampled at MP-2 after comingling of domestic and process wastewater streams. As such, to determine the domestic contribution to the wastewater stream, the process water values from MP-1 will be deducted from the parameters sampled at MP-2 for reporting purposes.

Parameters with continuous monitoring requirements are logged into the DeltaV distributed control system (DCS). Non-continuous parameters are sampled in accordance with their specific frequency, as outlined in this subsection.

5.2 Sampling Techniques

Two forms of wastewater sampling, grab and composite, are conducted at the facility by trained environmental personnel. The two methods of sampling utilized at the facility are outlined below in subsections 5.2.1 and 5.2.2 respectively.

5.2.1 Grab Sampling

Grab samples consist of either a single discrete sample or individual samples collected over a period of less than 15 minutes. The grab sample shall represent wastewater conditions at the time of sample collection.

1. Process wastewater samples are to be collected out of the manhole vault directly west of the wastewater tank, using sampler rods to reach the wastewater stream. Process grab samples are collected in accordance with Group14's Standard Operating Procedure SOP-EHS-24-001100.
2. Commingled wastewater samples are to be collected out of the lift station vault using sampler rods to reach the wastewater stream. Comingled grab samples are collected in accordance with Group14's Standard Operating Procedure SOP-EHS-24-001101.

5.2.2 Composite Sampling

Composite samples consist of flow proportional samples collected over a 24 hour period, by periodic pulse sampling by an automatic sampler that is connected to a flow measuring device. A composite sample shall represent the average wastewater characteristics over the course of a single day of operation.

1. Process wastewater composite samples shall be collected from the autosampler housed in the sampling shack located at MP-1. Process composite samples are collected in accordance with Group14's Standard Operating Procedure SOP-EHS-24-001103.
2. Commingled wastewater composite samples shall be collected from the autosampler housed in the sampling shack located at MP-2. Comingled composite samples are collected in accordance with Group14's Standard Operating Procedure SOP-EHS-24-001102.

5.2.3 Documentation

All activities occurring at monitoring points will be documented in bound logbooks located in each monitoring point's sample shack. Activities will be documented at the location to provide

quick reference to the operational condition of, and activities completed at, the station by any party utilizing the compliance monitoring equipment.

5.3 Sample Analysis

As this facility does not possess an in-house laboratory, Group14 will utilize an accredited lab to provide laboratory analysis of samples collected as part of compliance monitoring. All methods utilized by the accredited lab will be acceptable to Ecology for reporting purposes, by being either; the method specified by Ecology for the tested parameter or are methods that are Environmental Protection Agency (EPA) approved under 40 CFR Part 136.

The sampler will coordinate with the lab to ensure a steady supply of sample bottles and reliable courier services to ensure laboratory requirements and hold times are being met for all parameters. Samples will be packed into a cooler with ice or blue ice prior to courier arrival, and chain of custody forms (COCs) will be prepared by the sampler and signed by the courier prior to samples being released from Group14 custody.

Upon receival of results from the laboratory, the results will be analyzed by trained environmental personnel to determine compliance with monitoring parameter limits. Should laboratory results indicate an exceedance of permitted limits, the Environmental Department shall follow the reporting instructions outlined in the respective permit for which the exceedance has occurred.

Section 6. Recordkeeping and Reporting

Outlined below are Group14's procedures for recordkeeping and reporting.

6.1 Recordkeeping

As mentioned in the above section, any activities conducted at monitoring points will be logged in a bound logbook contained within the sampling shack. These logbooks will be made available

during agency inspection. Sample chain of custody (COC) forms will be retained, along with copies of their respective laboratory reports, digitally on site for a period of 5 years, in accordance with Ecology requirements. COC forms will be supplied by the accredited lab(s) Group14 contracts with for sample analysis.

Maintenance activities and equipment histories are recorded in the computerized maintenance management system (CMMS), and all records pertaining to process wastewater parameters and discharge will be retained within the CMMS for a minimum of 5 years, in accordance with Ecology requirements. Individual equipment logs and/or maintenance records will be made available at the facility during agency inspections.

6.2 Compliance Reporting

Monthly discharge monitoring reports (DMRs) are required to be electronically submitted to both the City of Moses Lake and Ecology by the 15th of the month following the month for which the compliance report covers. DMRs may include continuous monitoring logs, results of all sampling activities, and any violations or exceedances of permitted limits. Due to the specific monthly deadlines, sampling activities shall be conducted in a manner that allows sufficient time for laboratory analysis and result interpretation prior to the submittal deadline.

Section 7. Major Equipment Maintenance

The proper operation and maintenance of equipment that contributes to the generation of wastewater is vital to ensuring the successful operation of the BAM-2 facility. It is the responsibility of the maintenance department to verify and ensure that facility equipment is operating properly, because if parts/equipment should fail, excessive water consumption and/or wastewater generation can occur. As such, the necessary instruments for verifying equipment function and a stock of readily available replacement parts are necessary for the success of the maintenance program. The supplies and resources necessary to the equipment maintenance program are outlined in section 9 of this manual.

7.1 Equipment Monitoring and Maintenance Schedule.

Facility maintenance activities are conducted via:

- Daily visual checks, As-found/As-Left recorded as a PM check in the facility's CMMS.
    - Any alarms or malfunctioning equipment shall be noted with a Work Order and assigned a high priority detail.
- Periodic calibration, replacement, service, etc. activities shall be conducted as PMs generated by the CMMS based on manufacturer's maintenance recommendations.

Identified below in table 3 are the major pieces of equipment that contribute to the wastewater stream. Their associated operational activities are listed along with the daily monitoring activities required to verify proper equipment function and prevent the excessive generation of wastewater.

Table 3: Equipment Optimization for Management of Wastewater					
System	**Control Equip.**	**Purpose**	**PM Schedule-calibration**	**Daily Checksheet**	**Comments**
Reverse Osmosis					
	RO pre-filter inlet pressure	Prevent RO trip on low pressure		Daily check of inlet pressure	Report low pressure to Maintenance
	RO pre-filter differential pressure (dP)	Prevent RO membrane fouling		Daily check of filter dP	Replace filters if high dP
	Chlorine removal feed system	Prevent damage to RO membranes		Daily tote level check	Replace tote if empty
				Drawdown pump test	If pump does not draw down proper feed rate, report to Maintenance
	Flow meter	Provide accurate flow measurement from RO		Visual	If flow meter displays 0 when RO is running, report to Maintenance
	Conductivity	Monitor high purity water generation	Monthly		Calibrate using 3 standards: low, medium, high
	ORP	Monitor high purity water generation	Monthly		
	pH	Monitor RO supply water	Monthly	Visual	Use 3-buffer solution: acidic, neutral, base
	Permeate tank level transmitter (LT)	Maintain level in Permeate Tank	Semi-annually		Prevent tank overflow
Cooling Water					

	Conductivity	Control cooling water blowdown	Monthly		Calibrate using 3 standards: low, medium, high
	Cooling tower basin LT	Proper level indication to prevent overflow	Quarterly		
	Cooling water blowdown control valve	Ensure proper flow control	Semi-annually		Verify operation at 0%, 25%, 50%, 75%, 100% range of valve
	Cooling tower basin make-up valve	Ensure proper basin level	Semi-annually		Verify operation at 0%, 25%, 50%, 75%, 100% range of valve
Boiler					
	Conductivity	Control boiler blowdown	Monthly		Calibrate using 3 standards: low, medium, high
	Boiler blowdown control valve	Proper operation to prevent excess blowdown or failing closed with no blowdown	Quarterly		Verify operation at 0%, 25%, 50%, 75%, 100% range of valve
WW Collection System					
	Conductivity	Monitor WW conductivity	Monthly		Calibrate using 3 standards: low, medium, high
	pH	Wastewater neutralization	Monthly		Use 3-buffer solution: acidic, neutral, base
	Autosampler	Compliance monitoring	Semi-annually		Replace sampler tubing
WW Lift Station System					

	pH	Compliance monitoring	Monthly		Use 3-buffer solution: acidic, neutral, base
	Autosampler	Compliance monitoring	Semi-annually		Replace sampler tubing

Section 8. Safety

Workers who handle wastewater or sewage may be at increased risk of becoming ill from waterborne diseases. To reduce this risk and protect against illness, workers shall adhere to the below guidance.

8.1 Basic Hygiene Practices for Workers

- Wash hands with soap and water immediately after handling wastewater or sewage, including before eating or drinking and before and after using the restroom.
- Avoid touching face, mouth, eyes, nose, or open sores and cuts while handling wastewater or sewage.
- Keep open sores, cuts, and wounds covered with clean, dry bandages.
- Use waterproof gloves to prevent cuts and contact with wastewater or sewage.
- Do not smoke or chew tobacco or gum while handling wastewater or sewage.
- Gently flush eyes with safe water if wastewater or sewage contacts eyes.

8.2 Personal Protective Equipment (PPE)

Workers handling wastewater or sewage will be provided proper PPE, training on how to use it, and hand washing facilities. Workers shall wash hands with soap and water immediately after removing PPE. The following PPE is recommended for workers handling wastewater or sewage:

- **Goggles:** to protect eyes from splashes, wastewater, or sewage.

- **Protective face mask or splash proof face shield:** to protect nose and mouth from splashes of wastewater or sewage.
- **Liquid repellent coveralls:** to keep wastewater or sewage off clothing.
- **Waterproof gloves:** to prevent exposure to wastewater or sewage.
- **Rubber boots:** to prevent exposure to wastewater or sewage.

8.3 Mechanical and Electrical Equipment Safety

Equipment operators shall be familiar with the manufacturer's proper operating procedures. The proper operation and maintenance of equipment is important to ensuring a safe working environment. The operation and maintenance of electrical equipment creates a potential for electrical and other safety hazards unless safety practices are strictly followed. When maintenance activities are performed, equipment shall be properly lockout/tagout from electricity unless required by manufacturer instructions. In addition to proper lockout/tagout, the general safety practices outlined below minimize risk:

- Allow only qualified and authorized personnel to work on electrical equipment and wiring.
- Consider all equipment and electrical lines as energized until they are proven to be de-energized and grounded.
- Use of ungrounded metal implements around electrical equipment shall be restricted.
- Only open electrical panels if the job requires it.
- Avoid grounded oneself in water or on metal objects when working on electrical equipment or wiring.
- Do not bypass or make inoperative any safety devices.
- Use only grounded or insulated electric tools.
- Keep motors, switches, and control boxes clean.

8.4 Training

Workers who handle wastewater or sewage shall receive training on disease prevention. The training shall include information on basic hygiene practices, use and disposal of PPE, and proper handling of wastewater or sewage. Workers are urged to seek medical attention promptly if displaying any signs or symptoms of illness, such as vomiting, stomach cramps, and/or gastrointestinal distress.

8.5 Visitor Safety

Visitors include company personnel not involved directly with day-to-day operations, guests, inspectors, auditors, and contractors. It is extremely important that visitors are protected against hazards. Visitors unfamiliar with the site and day-to-day operations shall be accompanied at all times by a responsible Group14 employee and shall undergo a site safety orientation based on the level of exposure to facility operations. All visitors are required to comply with safety requirements and precautions.

Section 9. Supplies and Resources

As mentioned in section 7 of this manual, the necessary instruments for verifying equipment function and a stock of readily available replacement parts are vital to the success of the maintenance program. To facilitate this need, the facility maintains electronic records of all manuals, spare parts, monitoring instrumentation, and control devices needed to monitor and maintain equipment in the CMMS system.

9.1 Equipment Manuals and Warranties

The wastewater system is made up of thousands of individual pieces of equipment spread across the entire facility, with many pieces having confidential make-ups and/or manuals, so it would be impractical to list all of the equipment manuals in this O&M. All equipment manuals

are stored at the facility, and are available to operators, maintenance personnel, and other responsible individuals as needed to complete their duties. These manuals may be made available at the facility during agency inspections.

9.2 Spare Part Inventory

Information related to the location of on hand spare parts and/or ordering information are stored in the CMMS at the BAM-2 facility. Given the large quantity of equipment in the makeup of the wastewater system, it would be impractical to reproduce the complete inventory of spare parts and suppliers in this manual, but listed below are examples of major equipment spare parts relevant to the function of the wastewater system that the facility will maintain stock of.

- **RO System**
    - Conductivity probe and transmitter
    - ORP probe and transmitter
    - pH probe
    - RO membranes
    - RO pre-filters
    - RO flow meter
    - RO reject control valve
- **Boiler**
    - Conductivity probe and transmitter
    - Boiler water column level probes (prevent false level and over filling of the boiler)
    - Continuous blowdown control valve
    - Intermittent blowdown tank temperature control valve
- **Cooling Tower**
    - Conductivity probe and transmitter
    - Blowdown control valve components
- **WW Collection System**

- pH probe
- Conductivity probe and transmitter
- Autosampler

- **WW Lift Station System**
  - pH probe
  - Autosampler
  - Flow meter

Section 10. Emergency Procedures

Group14 maintains an Emergency Action Plan (EAP), filed at the facility, that details the response plan for general emergency situations. Employees are oriented to the EAP's contents and trained in the portion of the response plan applicable to their area of operations. In addition, the facility maintains a trained Emergency Response Team to quickly react to any emergency situations. The relevant sections of the EAP may be made available during agency inspections.

10.1 Possible Emergency Conditions

The following contains some, not necessarily all, of the emergency conditions that can directly affect the functionality of the wastewater system and the redundancies it possesses to prevent contamination.

Flooding: During a major flooding event, the rainwater may sufficiently fill the WW tank containment berm to a point where the berm can no longer contain a wastewater tank overflow without spilling over the containment. Should the containment berm begin to rapidly fill with water, notify the Environmental Department, so that testing and drainage can be conducted to ensure proper wastewater containment.

Earthquakes: Should an earthquake of Richter Magnitude 5.0 or greater occur, or if a responsible party has felt ground motions characterized by the following: "*Felt by all. Persons walked unsteadily. Windows, dishes, glassware broken. Knickknacks, books etc. knocked off shelves. furniture moved or overturned. Weak plaster and masonry cracked. Trees/bushes shaken visibly, or heard to rustle."* immediately notify the Environmental Department and the facility Emergency Response Team so that testing can be conducted to determine if any of the sanitary sewer system has experienced damage. Below are some examples of damages that can occur:

- Broken piping leaking wastewater into the ground.
- Crack in a vault allowing seepage.
- Crack in the lift station allowing seepage.

Due to the close proximity of the facility's underground wastewater piping system to the ground water table, it is of utmost importance that cracks or other damages to the system are quickly identified and addressed to minimize the risk to public health and contamination to groundwater.

10.2 Wastewater Spill

The EAP does not specifically cover response plans/procedures for a wastewater upset or spill, as such, the following section contains detailed information related to wastewater system upsets and spills**.** In the event of a wastewater spill or vault overflow, immediately contact the Environmental Department.

10.2.1 Stop the Flow

If the spill occurs due to a leaking pipe or overfilling vault, stopping the flow will reduce the size and quantity of the spill. If safe to do so:

1) Power down facility equipment that is producing the wastewater.
2) Close the valve at the WW tank.
3) Turn off the pump(s) supplying the wastewater.

10.2.2 Contain the Spill

The main source of wastewater at the facility is the wastewater storage tank, which is surrounded by a containment berm. Should a spill occur outside of containment, utilize spill response equipment in accordance with EAP Annex F Hazardous Materials to contain the spill and prevent wastewater from entering the stormwater discharge system.

10.2.3 Assess the Spill

Accurate assessments of spills are vital for determining the facility's course of action and reporting. Specific facts are required to be known about the spill so that an accurate report can be filed with the Department of Ecology.

1) Determine the time the spill started and stopped.
2) Estimate the amount of wastewater released.
3) Record the actions taken to stop and/or contain the spill.
4) Determine the source of the spill.
5) Describe the condition of the area around the spill and note if any wastewater entered the stormwater system or discharged offsite.
6) Describe any damage caused by the spill, such as erosion and/or harm to vegetation or wildlife.

10.2.4 Report the Spill

Contact the Environmental Department immediately. It is the responsibility of the Environmental Department to assess the situation, ensure the spill has been stabilized, and to notify the appropriate agencies.

References

Washington Administrative Code Title 173, Chapter 240, Section 150 (2003).

40 Code of Federal Regulations Part 136 (2024).

Group14 Technologies, Emergency Action Plan (BAM-2) (2024).

Figure 1: BAM-2 Water Balance PFD

BAM-2 Water Balance PFD

△ - Blocks include materials from Module 1 and Module 2

Boiler Chemicals Module 1

Boiler Chemicals Module 2

Boiler Chemicals

Module 1 Boiler

Module 2 Boiler

Boiler Feed Water Tank

Vapor Condenser

Boiler Blowdown

Permeate Tank

City Water

Reverse Osmosis

RO Reject

RO Chemicals

Raw Materials

Raw Material Unloading & Mixing

Carbon Production Furnace

Milling Operation

Compounding Reactor

Product Handling and Packaging △

By-Product △

Ship

Final Product △

Ship

Utility Building Sump

Cooling Tower Chemicals

Evaporation

Cooling Tower

Coooling Tower Blowdowns

Wastewater Tank

Flow Meter
pH Meter
Sample System

Wastewater Chemicals

Domestic Water Use

Flow Meter

POTW

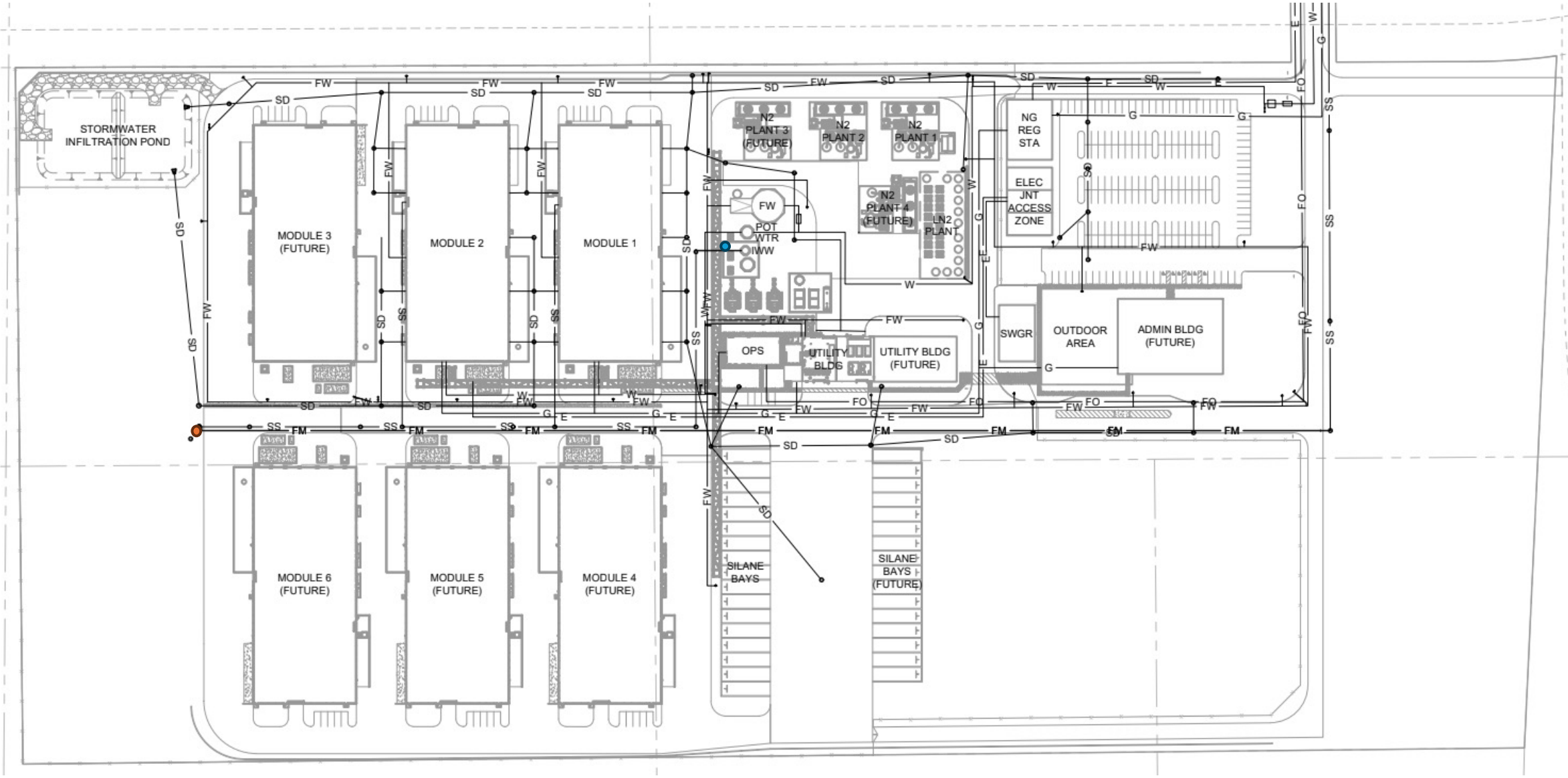
Figure 2: Regional Vicinity Map

MOSES LAKE, WASHINGTON

GROUP14 TECHNOLOGIES - BATTERY ACTIVE MATERIALS FACTORY

Figure 3: BAM-2 Facility Map

BAM-2 Facility Map



SS Sanitary Sewer (Wastewater) Line

- Monitoring Point 1 (Process Wastewater)
- Monitoring Point 2 (Comingled Wastewater)

Group14 Technologies