Moroni City Wastewater Treatment Plant

Operations and Maintenance Manual—2017 Update

April 2017

AQUA ENGINEERING

p: 801.299.1327 | f: 801.299.0153
533 W 2600 S Suite 275, Bountiful, UT 84010
www.aquaeng.com

MORONI CITY WASTEWATER TREATMENT PLANT

OPERATIONS AND MAINTENANCE MANUAL

2017 UPDATE

APRIL 2017

CHAPTER 1 - INTRODUCTION

1.1 Purpose of Manual

The Moroni Wastewater Treatment Plant (WWTP) is owned by Moroni City and operated by Norbest. The WWTP is a membrane bioreactor system. Figure 1-1 is a design criteria sheet that includes information on the unit processes in the WWTP and a general site layout.

This manual is intended to provide the operators with basic information that will be needed to perform the facility's normal daily operation. This manual is not intended to provide all information on every piece of equipment, but rather to serve as a guide as to where that information can be found. It includes graphical depictions of the physical facility. It has been prepared with the objective of providing guidance to the operating staff of the Moroni City WWTP in the operation and maintenance of this facility. The manual presented herein has been prepared in consideration of the existing operational capacities designed into the WWTP.

1.2 Organization of Manual

This operation and maintenance manual is organized to facilitate the operation and maintenance of the plant under all conditions. The focal point of this manual is on the day-to-day operation and maintenance of the facility and its equipment as well as on the emergency measures necessary to deal with most of the possible problems which can arise at the WWTP.

Provided as supplements to this O&M manual in separate volumes are the following:

1. Equipment manuals which include supplier's information, sources for service and parts, equipment warranties, and shop drawings.
2. As-built drawings.
3. Ordinances for Sewer Use, User Charges, Etc. which are not provided in this manual can be obtained at the City offices.
4. Project Manual for the construction of the treatment facilities.

1.3 Description of the Facility

The entire treatment facility is located on about 6.5 acres at 300 South and 350 West in Moroni, Utah. The original treatment facility included a headworks area, a dissolved air flotation (DAF) unit, aeration basins, secondary clarifiers, sand filters, aerobic digesters, and drying beds. An equalization basin for the turkey processing plant, a chlorine contact basin, and a belt press dewatering facility have been added to the facility since the original construction. With this project upgrade, the headworks has been upgraded, the DAF has been converted to a primary clarifier, the aeration basins upgraded to run as aerobic and anoxic reactors, and the clarifiers and chlorination equipment have been replaced with a membrane bioreactor system.

In 2017, a 15 Million Gallon (MG) anaerobic lagoon was installed to the south of the other process equipment. This lagoon provides additional equalization volume and treatment of flow from the turkey processing plant.

The process is relatively simple in nature with the following processes encompassing the entire treatment process:

- Anaerobic Treatment
- Flow Equalization
- Coarse Screening
- Fine Screening
- Screenings Washing and Compacting
- Primary Clarification
- Anoxic Tank
- Aerobic Tank
- Membrane Filtration
- UV Disinfection
- Aerobic Digestion
- Dewatering
- Solids Drying

This facility can treat an average daily flow of 900,000 gallons per day of raw wastewater and a peak day flow of 1,500,000 gallons per day.

1.4 Operator, Operations Staff, and City Responsibilities

Successful operation of the treatment plant demands that everyone concerned know both their responsibility and that of others. The goal is to discharge the cleanest water possible in order to protect health and the value of downstream water uses. To obtain this goal, the combined effort of operator and City management are required.

1.4.1 Operator Responsibility

The real work of making the treatment plant produce the expected effluent quality is left to the operator who must provide the required daily operation and maintenance. To accomplish this prime responsibility the operator should:

1. Understand the characteristics of the wastewater - i.e., changes in flow patterns, organic solids, and industrial loadings.
2. Know the proper operational procedures - i.e., learn what is necessary to make the plant work and what must be done when the wastewater characteristics change.
3. Become thoroughly familiar with the plant - i.e. know the units, their purpose, operation, and expected efficiency. Know how to check and evaluate unit performance and efficiency.
4. Be aware of safety hazards at the treatment plant. Knowledge of these hazards can be gained from the study of the O&M Manual and on-site instruction and training by qualified personnel.
5. Operate the treatment plant effectively - i.e. change the operation of plant units to give the best treatment under all conditions.
6. Supervise, instruct, and train subordinates to do the best job possible and understand their responsibilities.
7. Maintain accurate and neat records of system's operation and maintenance. Records show the effectiveness of plant operation, areas for improvement, trends, and are useful

for budgeting time and funds. They are used in preparing reports to keep management and/or regulatory agencies informed about the performance and needs of the plant.

8. Properly manage operating funds to achieve the best treatment for the least cost.
9. Keep the plant clean and well maintained. This makes for a more pleasant place to work and provides good public relations by leaving a good impression on visitors.
10. Be prepared to conduct tours and discuss plant operation with visitors.
11. Keep the Operations Staff and City informed of plant status. These entities must know your needs and problems before they can help with your efforts.
12. Assist the Operations Staff and City in preparing an adequate budget.
13. Keep continuously informed of advancements in operation and maintenance practices.
14. Participate in short courses and schools. Available courses include:
    a. "Operation of Wastewater Treatment Plants," prepared by California State University, Sacramento, for the Environmental Protection Agency.
    b. Class A Wastewater Correspondence Course given by the New England Regional Wastewater Institute, South Portland, Maine. Available schools with wastewater curriculum are:
        i. Utah Valley State College
        ii. Salt Lake Community College
15. Subscribe to and regularly read several of the magazines related to wastewater treatment such as the following:
    a. Water Pollution Control Federal Journal
    b. Water Engineering and Management
    c. Pollution Engineering

1.4.2 Operations Staff and City Responsibility

It is the Operation's Staff and City's responsibility to provide the operator the things necessary to properly operate the plant and insure that effluent limitations are met. The following is a list of their specific responsibilities:

1. Maintain efficient plant operation and maintenance.
2. Maintain adequate treatment system operational and management records.

3. Establish staff requirements, prepare job descriptions, develop organization charts, and assign personnel.
4. Provide operational personnel with sufficient funds to properly operate and maintain the treatment facility.
5. Ensure operational personnel are paid a salary commensurate with their level of responsibility.
6. Provide good working conditions, safety equipment, and proper tools for the operational personnel.
7. Establish a harmonious relationship with operational personnel.
8. Motivate personnel to achieve maximum efficiency of operation.
9. Make periodic inspections of the treatment system to discuss mutual problems with the operational personnel and to observe operational practices.
10. Make employees aware of the importance of proper plant performance.
11. Create an atmosphere that will make operational personnel feel that they can bring special problems to the Operation's Staff and City's attention.
12. Maintain good public relations.
13. Prepare budgets and reports.
14. Plan for future facility needs.
15. Take the necessary measures to assure that the plant meets the terms and conditions of the UPDES and Groundwater Discharge permits.

1.5 Personnel

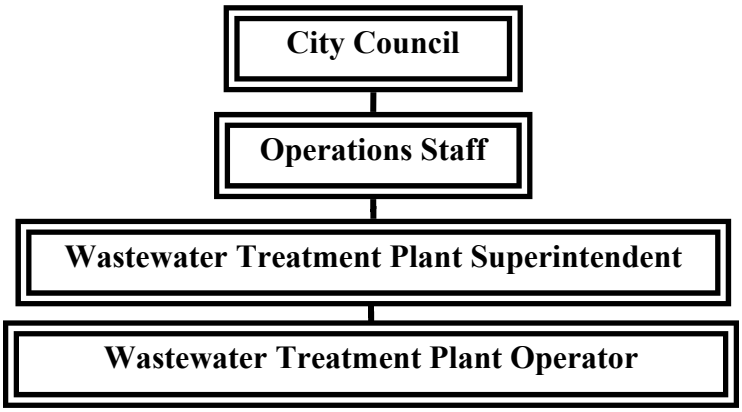
While it is understood that Norbest operates the facility, the following personnel section can be used if the need arises to replace the existing operators or in the future if the City decides to take over operations of the facility.

1.5.1 Plant and Operator Certification

The chief operator and supervisors who make process decisions for the system must be certified at the level of the facility classification. All other operators in direct responsible charge must be certified at no less than one grade lower than the facility classification or at

the lowest required facility classification. All facilities must have an operator certified at the facility level on duty or on call. If a facility or system undergoes a re-rating, all operators considered to be in direct responsible charge must be certified at the appropriate level within one year after notification of the new rating.

1.5.2 Organizational Chart



1.5.3 Job Descriptions

1.5.3.1 Water Reclamation Facility Superintendent

Plans and coordinates activities of workers in operation and maintenance of the Water Reclamation Facility to ensure adequate wastewater treatment by performing the following duties personally. Essential responsibilities are listed below. Other duties may be assigned.

- Operate and maintain all equipment in the treatment plant and other plant facilities and prepare plans and specifications for new equipment or modification of existing equipment.
- Schedule and coordinate all activities concerned with processing wastewater, including assigning personnel to shifts, and preparing budget estimates based on anticipated material and personnel needs.
- Determine action to be taken in event of emergencies such as machine, equipment, or power failure.

- Performs sampling of waters, keeps daily records of samples and reviews and evaluates the water reports, records and logs to confirm adequacy of present and projected water needs.
- Prepares reports concerned with chemical and bacteriological analyses of water for administrative purposes and governmental agencies.

1.5.3.2 Water Reclamation Facility Plant Operator

The Water Reclamation Facility Plant Operator works under the direction of the Water Reclamation Facility Superintendent, performing a variety of un-skilled and semi-skilled maintenance and operational tasks. The plant operator maintains the Water Reclamation Facility to ensure adequate wastewater treatment by performing the following duties:

- Works shifts adequate to operate and maintain all equipment in the treatment plant and other plant facilities.
- Determines action to be taken in the event of emergencies such as machine, equipment, or power failure.
- Performs sampling of waters, keeps daily records of samples and reviews and evaluates the water reports, records and logs to confirm adequacy of present and projected water needs.

Training of the wastewater treatment plant staff should include: theoretical background and understanding, in-plant experience, and new processes and developments.

Regular training sessions should be held at least monthly at the treatment plant. The meetings should be held on paid time and all employees should actively participate. Films are available and can be used for these regular meetings. It cannot be emphasized enough, that all employees should be given the proper training in their job position as well as in the proper safety procedures.

These formal in-plant training sessions should be used to fulfill the needs of the staff as far as theoretical background and understanding are concerned. Training activities sponsored by

outside organizations including operator-training courses, seminars and association conferences can supplement the in-plant training and should be helpful in developing the theoretical background and understanding of the operators as well as acquainting them with new processes and developments in the wastewater field. A list of some of the outside training activities and programs available was presented previously.

The training program should provide training for all employees using the plant O&M Manual as a text along with other operations manuals such as the Water Pollution control Federation's "Operation of Wastewater Treatment Plants" (MOP 11). It should also involve routine presentations by staff members regarding tasks involved in operating the plant. This training program for all operators should provide them with a basic knowledge of plant operation and maintenance. Actual in-plant work experience under close supervision should be provided to the operator that is unfamiliar with a task.

CHAPTER 2 - PERMITS AND STANDARDS

2.1 Utah Pollutant Discharge Elimination System Permit

A surface water discharge permit issued by the State of Utah, Department of Environmental Quality, regulates water discharged from the Water Reclamation Facility. Currently the City is operating a conventional activated sludge system that discharges to either an irrigation system or directly to the San Pitch River.

The current permit is contained in this section. The permit is valid until September 31, 2016. The permit is in the process of being renewed.

As indicated in Part V of the UPDES permit any noncompliance, including spills, must be orally reported within twenty-four (24) hours. The report shall be made to the Division of Water Quality (801) 538-6146, or 24-hour answering service (801) 536-4123.

2.2 Groundwater Discharge Permit

A groundwater discharge permit issued by the State of Utah, Department of Environmental Quality, regulates Moroni City's Water Reclamation Facility and approved the construction of the 15 MG anaerobic wastewater treatment lagoon. The current permit is contained in this section and is valid until June 27, 2021.

As indicated in Part IV of the groundwater permit, advanced notice shall be given to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

CHAPTER 3 - DESCRIPTION, OPERATION AND CONTROL OF WASTEWATER TREATMENT FACILITIES

3.1 General

The Moroni Water Reclamation Facility employs an activated sludge process with membrane filtration, commonly referred to as membrane bioreactor (MBR), as the treatment process at this facility. The key components of the treatment process include the headworks, the membrane bioreactor along with its associated equipment, disinfection, and the effluent structures. The following pages describe the various equipment and structures associated with the treatment process as well as the operation and control of the treatment facility.

3.2 Equalization and Initial Treatment

Flow from the Norbest Turkey Processing Plant flows through anaerobic treatment and flow equalization prior to combining with flows from the City sewers. The combined flows then continue to the headworks process.

3.2.1 Major Components

3.2.1.1 Primary Pump Station

The primary pumps station is located at the south end of the equalization basin and receives the industrial waste stream from Norbest. The pump station has a gate (which, when opened, can divert flow directly from the pump station to the equalization channel), two submersible pumps, floats and electrical gear that assist in the operation of this facility. A concrete wall separates the pump station from the equalization channel. The submersible pumps are Flygt Model 3127 equipped with a 10 hp (7.5kW) drive unit operating at 1000 gpm at 40 feet of head. Flow entering the pump station is typically pumped to the 15 MG anaerobic lagoon.

3.2.1.2 Anaerobic Lagoon

The new anaerobic lagoon was constructed to offer 3 million gallons of equalization storage and an additional 12 million gallons of volume for anaerobic treatment. The 4.75-acre lagoon is located approximately 360-feet southwest of the equalization (EQ)

channel and its dimensions are approximately 560-feet (L) x 370-feet (W) x 14.25-feet (D) at the top of the lagoon. The inlet pipe from the primary pump station is located at the southwest corner of the lagoon and the outlet pipe and new weir box is at the northeast corner. Flow exits the anaerobic lagoon through an 8-inch pipe to the weir box. Through the SCADA system, an Operator can set the flow rate over the weir to the EQ channel. This flow rate should be set to the average daily flow rate. The flow through the weir box is piped directly back into the EQ channel.

3.2.1.3 Equalization Channel

The equalization channel is located on the east side of the facility and is rectangular in shape. Its dimensions are approximately 420’ long by 22’ wide by 8’ deep and is capable of holding approximately 550,000 gallons. At the north end of the channel there is a 12” line which conveys flow from the channel to the plant headworks. A modulating valve is located on this line along with an ultrasonic level sensor and floats which provide for control of the valve through the plant’s control system.

3.2.2 Common Operating Problems

The main operational problems that could be experienced is if a pump or the electronically actuated weir gate at the weir box malfunctions.

A failure in the gate can be identified with a position indication failure. In the event of a gate failure, it will not be possible to remotely operate the gate, and the flow rate out of the lagoon will be dictated by the water level in the lagoon. This effectively eliminates the ability of the lagoon to be used for flow equalization. If the gate fails while closed, the water level in the lagoon will increase until it reaches a high level, at which point the high-level alarm will signal.

The operator would be notified in the event a pump became inoperable and the stand-by pump would automatically begin to run and the operator can investigate the situation of the

inoperable pump. The operators should then consult with the pump O&M manual or the manufacturer for information on troubleshooting or repairing the pump.

If the automatic valve malfunctions it will default to 30% open. At that point the level could rise in equalization basin. If the basin reaches the high-level alarm, the operator will be notified and can investigate the problem.

3.2.3 Start-up Procedures

In order to start-up this equipment, the operator must verify the SCADA system is online and receiving signal from all of the connected components. Then the operator can power on the pumps and the valve, monitoring the system to insure its proper operation.

3.2.4 Normal Operating Procedures

Normally this process will operate with no required interaction by the operator. The operators can set an average flow to the plant via the SCADA system, which will control elevation of the weir and allow constant flow to the treatment plant. This average flow can be adjusted based on incoming flow from the Norbest turkey processing plant. The design intent of the anaerobic basin is to equalize flows to the treatment plant on a weekly time period. Additionally, the rectangular EQ channel can be used in conjunction with the anaerobic pond to provide additional flow equalization if needed. The operator will simply have to check on the process on a daily basis and monitor its operation through the SCADA system.

3.2.5 Emergency Operating Procedures

In the event the plant losses power, the emergency generator will turn on and provide power to all the associated processes. The system can also be run manually by opening the gate at the primary pump station and the manually operated valve on the wall separating the EQ channel and the wet well. In the chance that both influent pumps fail, there is a manually operated gate valve between the wet well and EQ channel that can be opened. However, that means 3 MG of equalization will not be available.

3.3 Headworks

Common to all water reclamation facilities, the treatment process begins with primary treatment in the headworks. These facilities typically protect the rest of the treatment plant by removing material from the waste stream that could be harmful or inhibit the treatment processes or the equipment that is part of the process.

Membrane bioreactor plants are especially dependent on headworks facilities to insure the proper operation of the facility. Membranes are fragile and susceptible to tears and abrasion by a wide variety of objects. The headworks is the mechanism or part of the process that ensures the protection of the membranes, proper plant operation, and prolonged facility life.

3.3.1 Major Components

The major components making up the headworks are as follows:

3.3.1.1 Existing Headworks Structure

The existing structure is divided into two separate trains. One receives flow from the City's collections system and the other from Norbest. The collection system enters the site along the east side of the property. The line comes west down 200 South, turns south at the gate, and then turns west and enters the original headworks structure. The domestic structure contains two channels complete bar screens, grit channels, flow control weir, and a parshall flume and ultrasonic level sensor.

The industrial side has a similar process layout with bar screens, grit channels, and a parshall flume with an ultrasonic level sensor. The flow control weirs have been removed from the channels. Both channels are also equipped with automatic samplers.

The bar screens will be used as needed to provide preliminary screening of the waste stream, prior to its conveyance to the new screening equipment. These bar screens should be kept clean and has collected debris removed from them on a daily basis.

3.3.1.2 Parshall Flumes

The parshall flumes are located just downstream of the bar screens and grit channels. These are standard concrete flumes with the domestic and industrial being 3" and 6" flumes respectively. The domestic flume can pass and measure up to about 1 mgd and the industrial flume will measure up to approximately 2.5 mgd. There are existing ultrasonic level sensors in each flume that are used to measure the flow and provide SCADA interaction. This will allow for trending data to be automatically recorded and stored in the plant computer system.

3.3.1.3 Automatic Refrigerated Samplers

Each train also has an automatic sampler located adjacent to the parshall flume. The samplers provide composite samples for testing the influent wastewater quality. Knowing the influent wastewater quality is critical to determining how well the plant is operating and what can be done to improve or modify the plant operations.

3.3.1.4 Lift Station

After the flow passes through the flume portion of the original headworks, it cascades into the existing lift station. The lift station also receives flow from the new MBR building drains and decant flows from the digester. The lift station is equipped with three (3) submersible pumps, each with the following capability:

- Design Flow Rate – 550 gpm
- Design Total Dynamic Head – 38 ft
- Horsepower – 10 hp

The pumps are operated by the water level in the lift station. When the level is low, the pumps are off. As the level rises, a single pump will turn on and pump at a set flow rate. As the level rises, this flow rate can be increased until the pump is operating at capacity. If the level continues to rise to a higher level, a second pump will turn on. Two pumps will handle the influent flow to the plant with the third acting as a standby unit.

3.3.1.5 Fine Screens

Flow is conveyed from the lift station to the fine screening location. This process consists of two fine screens that are totally enclosed and installed adjacent to the primary clarifier. Each unit can handle the peak design flow of 1.5 mgd. Each screen has a plug valve on its upstream and downstream sides, which allows for easy isolation of a screen for either operation or maintenance purposes.

The fine screens remove objectionable material from the influent waste stream. As previously indicated, they are enclosed with a stainless steel housing. They also contain an integral screw washer and compacting system, which removes objectionable material from the screenings, dewaters them, and then discharges them into an attached plastic bag for removal to the landfill. This system is designed to minimize/eliminate the need for operators to come in direct contact with the screenings.

The fine screens have been supplied by Goble Sampson of Salt Lake City and were manufactured by Huber. The screens are a rotamat style. The screen consists of punched plate drum with 3 mm holes, thus all particles larger than this opening are caught on the screen and then removed from the influent stream.

As the screen cycles the wash system forces removed items into the screw conveyor within the screen and causes the screens to be conveyed from the screen, through the washing section, through the compaction zone, and finally to the discharge point.

3.3.2 Common Operating Problems

All the mechanical equipment associated with the headworks portion of the treatment train require electricity for proper operation. If problems occur with the equipment, the disconnects and control panels located adjacent to this equipment should be checked first to verify a power source is available to the equipment. The screens require a water source and it should also be checked if problems with operation are encountered.

3.3.3 Start-up Procedures

The original headworks area requires no start-up for its operation and will constantly be receiving influent. The gates should be placed to allow flow through the bar screens, grit channels, parshall flumes, and then into the lift station. At that point the pumps should be turned on to pump the flow to the fine screens.

Valves should be checked at the fine screens to ensure the proper flow pattern and wash water supply should be available to the screen. Then the equipment can be started-up according to the direction given in the manufacturer's O&M manuals.

The major equipment items that must be started-up in order to properly operate the headworks facility are as follows:

- Ultrasonic Flow Meters
- Automatic Samplers
- Lift Pumps
- Fine Screens

Each of these pieces of equipment must be properly operating in order to process and measure raw water through the headworks.

3.3.4 Normal Operating Procedures

The mechanical portions of the headworks will operate intermittently due to the design of the facility. The flow meter and automatic sampler will operate constantly as flow passes through the headworks. The screens will operate based on headloss across the screen. As the headloss exceeds a set point (8"), the screen will cycle removing the screenings and reducing the headloss across the screen. As it turns on the integral washpactor will turn on and run to remove the screenings from the process.

For more detail on normal operations of the equipment located in the headworks portion of the plant, please see the respective O&M manuals for the given equipment.

3.3.5 Emergency Operating Procedures

The headworks is an integral part of the plant operations and plays a key role during any emergency period. The equipment has control panels or disconnects adjacent to them so power to this equipment can be quickly shut off at the equipment. If there is a power outage, the emergency standby generator will start and provide power to this equipment, allowing the processes to run normally.

3.4 Primary Clarification

This process has been added to the plant by removing the dissolved air flotation (DAF) equipment from the existing basin and installing a primary clarifier mechanism. The primary clarifier will add two major benefits to the facility. The first is an additional level of protection for the membranes. By providing a primary clarifier, the ability to remove any additional debris that may float or sink from the waste stream. The second benefit is the reduction in BOD and TSS going to the secondary treatment processes.

3.4.1 Major Components

The entire process consists of a clarifier mechanism, drive, baffles, and weirs. The equipment has been provided through Coombs Hopkins and manufactured by Eimco Technologies. The only other major component is the automatic waste valve and associated actuator. This valve allows for the operator to waste from the clarifier for a set amount of time at an operator selected interval.

3.4.2 Common Operating Problems

Losing power to the drive motor or the actuated valve are the two most common problems that could occur. If the drive motor stops, the clarifier can be bypassed until it is restored to operation. If the valve motor is inoperable, then the valve could be opened manually until its operation is restored.

3.4.3 Start-up Procedures

The influent, waste, and drain valves should be checked prior to putting this unit into operation to verify the proper flow pattern. The waste stream can then be introduced and the drive turned on.

3.4.4 Normal Operating Procedures

Please see the manufacture's O&M manual for detail.

3.4.5 Emergency Operating Procedures

In the event of loss of power to the plant, the emergency generator will supply power to this process and allow its operation. If power cannot be restored if there are other problems with the operations, the process can be bypassed until it is restored to normal operations.

3.5 Membrane Bioreactor

The membrane bioreactor (MBR) is the main process at this treatment facility and provides the majority of the wastewater treatment. The MBR consists of anoxic, aeration, membrane, and recycle tanks. Effluent from the primary clarifier is received in the splitting structure which contains two slide gates. The gates divert flow to either the anoxic or aeration tank. Typically the flow goes to the anoxic tank, then to the aeration tank, and finally to the membrane tanks. The flow either leaves the process in these tanks or overflows to the recycle tank where it is conveyed back to either the anoxic or aeration tank. In addition to the tanks, the process contains recycle pumps, permeate pumps, and air blowers, which are all essential to the proper operation of the treatment process.

3.5.1 Major Components

3.5.1.1 Splitting Structure

The splitting structure is located directly after the primary clarifier. It receives wastewater from either the primary clarifier or the effluent of the fine screens. This structure allows the flow to be sent to either the anoxic or aeration basin.

3.5.1.2 Anoxic Basin

As previously mentioned, there is an anoxic tank, which receives raw wastewater from the splitting structure. This basin has the following properties:

- Diameter = 70'
- Side Wall Depth = 16'-10"
- Average Water Depth = 12'-10"
- Volume = 369,000 gallons

This basin was previously equipped with fine bubble diffusers and a surface mixer. The surface mixer has been removed, and 5 eductor tube mixers, which are also known as a cannon mixers or bubble mixers, have been installed. Air is induced into the middle of the mixers near the bottom and simply allowed to rise up the tube. As the large air bubble rise, they induce a current and cause mixed liquor to flow upward in the tube. The induced flow creates a flow pattern in the entire tank causing it to continually turn over and stay completely mixed. Even though air is induced to provide mixing, the bubbles are large enough that relatively no oxygen transfer occurs and the tank remains in an anoxic state.

They receive air from the existing positive displacement (PD) blowers located to the northwest of the anoxic basin. The blower is valved such that either the fine bubble aeration, the bubble mixers, or both can be operated at the same time. Thus, the basin can be run as an anoxic basin for denitrification or it can be aerated to provide additional oxygen to the system and thus remove more BOD or ammonia.

3.5.1.3 Aeration Basin

The aeration tank receives raw wastewater from the anoxic basin. This basin has the following properties:

- Diameter = 70'
- Side Wall Depth = 16'-10"
- Average Water Depth = 12'-10"

- Volume = 369,000 gallons

The existing north aeration basin will continue to be used as an aerobic process. This basin provides oxygen to the waste stream and transports the waste stream from the anoxic basins to the MBR basins. The basin is equipped with a fine bubble diffused aeration system that will provide for oxygen and mixing requirements needed in this process. The aeration system was provided as part of the project through W-Cubed of Salt Lake City, UT. The equipment was manufactured by EDI.

3.5.1.4 Membrane Basins

The membrane basins are connected to the aeration and anoxic basins through some yard piping. This piping allows the flow pattern to be through both basins in series or for either basin to be isolated and taken out of service while the other continues to provide treatment. As the wastewater enters the membrane basin it encounters the membrane units. Each membrane unit is made up of three components; the diffuser bottom, a lower cassette with an attached spacer, and the upper cassette.

The diffuser bottom is bolted to the floor and was leveled as part of the installation process. A support pipe is connected to opposite corners of each diffuser bottom and runs perpendicular to the floor of the basin up to the support angle near the top of the basin. This assembly assists in placing the cassettes on top of the diffuser bottom and also holds the cassettes in place during operation. The diffuser is connected to both a 3" air supply line and a 3" diffuser scour line. The diffuser provides the scouring air, which is essential to the process and keeps the membrane cassettes from fouling. The 3" diffuser scour line is connected to an automatic valve that when opens, initiates a self-cleaning process for the diffuser. Cleaning of the diffusers is important to maintaining sufficient air flow to each cassette during operation.

Each membrane cassette contains 208 membranes and connected to the cassette header pipe. The lower cassette is identical to the upper cassette, except it has a small spacer on top of it to allow the upper cassette to be set down on it without damaging the membranes

and their connections. The upper cassette is also equipped with a guide pipe that slides down adjacent to the support pipes on the diffuser bottom. This guide pipe is attached to the cassette and then once the cassette is set on top of the lower cassette, it is fastened securely to the support angle at the top of the basin. This secures the membranes in place and keeps them from moving around or falling over during operation of the facility.

The membranes are one of the most important parts of the treatment process. The membranes act as the medium that separates the clean water from the solids in this treatment plant. The clean water permeates through the flat plate membrane into its center and out through the permeate piping, while the solids remain in the tanks. The membranes were provided by Goble Sampson of Salt Lake City, UT and Enviroquip, but manufactured by Kubota.

3.5.1.5 Recycle Channel

The plant's recycle flows over the weirs located at the end of the membrane basins and into the recycle channel. This channel collects all of the recycle at one point where recycle pumps have been installed. The recycle pumps were provided by W-Cubed of Salt Lake City, UT, but manufactured by KSB. The pump recycles mixed liquor from this channel to the anoxic basin.

3.5.1.6 Permeate Pump Area

The permeate pumps create the pressure differential that drives the clean water into the membranes, separating it from the wastewater. There are three 6" Gorman Rupp pumps that perform this task. Each pump is equipped with a pressure gages on the suction and discharge sides and flow meters on the discharge side. One pump is connected to the upper cassettes and another pump is connected to the lower cassettes. The third pump is a standby pump that can be connected to either the upper or lower cassettes. Pressure transducers have been installed on the upper and lower permeate suction pipes and constantly monitor the amount of negative pressure in the line. There is a turbidimeter connected to the pump effluent header which constantly records the water turbidity.

These pumps and other associated equipment were also provided by Goble Sampson of Salt Lake City, UT and Enviroquip.

3.5.1.7 Utility Water Pumps

One (1) utility water pump skid was provided by Delco Western and manufactured by Grundfos. The skid provides utility water at 60 psi for the process equipment and for wash down. It is also connected to the utility water system for the plant site and provides water for the irrigation system

3.5.1.8 Air Blowers

Air blowers are located in an enclosed room adjacent to the main process area. The air blowers provide the air necessary to operate the fine bubbler diffused aeration equipment in the aeration basin and the membrane scouring air. Four (4) blowers have been provided at this time, capable of providing all needed process air at the buildout flows and loads with three (3) of the blowers running and one (1) as standby. The blowers were provided by W-Cubed of Salt Lake City, Utah and manufactured by Hibon.

3.5.2 Common Operating Problems

The most common operational problem is associated with the aeration supply to the membranes and other tanks. The membrane air supply must be monitored and maintained with the parameters established by the manufacturer. If the air supply drops to low or goes to high, the membranes could be damaged or sludge could accumulate between the plates. Also if minimum mixing is not maintained in the anoxic or aeration basins, sludging could occur around the diffusers or mixers in these basins, which would inhibit the desired performance.

3.5.3 Start-up Procedures

The MBR process is automated and operator friendly. The entire system is controlled by a control panel and SCADA system.

The Enviroquip O&M Manual indicates the start-up procedures for the MBR.

The following major equipment items must be started-up to properly operate the membrane bioreactor:

- Eductor Tube Mixers
- Fine Bubble Diffused Aeration
- Membrane Scour Aeration
- Permeate Valves, Sensors, and Pumps
- Recycle Pump
- Air Blowers

3.5.4 Normal Operating Procedures

Please refer to the Enviroquip and Continental O&M Manual.

3.5.5 Emergency Operating Procedures

For detailed information regarding equipment emergency operating procedures, please refer to the Enviroquip and Continental O&M Manual.

As with the headworks, all equipment has disconnects or can be disconnected from power supply at the MCC in the event of an emergency. If power failure occurs, the back-up generator will engage and provide necessary power to all processes of the treatment system.

If power cannot be restored and the wastewater continues to pass through the headworks and into the treatment tanks, action must be taken to prevent these tanks from overtopping. The existing EQ basin and secondary clarifiers could be used to by-pass influent wastewater and prevent the treatment tanks from overtopping. This provides a little over 500,000 gallons of storage capacity and would give plant personnel about 12 hours at 0.90 mgd flow rate to get power restored to the plant.

3.6 Disinfection

This facility contains a simple and totally redundant ultraviolet disinfection system. All effluent flows to the existing chlorine contact basin which has be retrofit to house the ultraviolet disinfection system. This system provides the necessary UV dosage for proper disinfection of the effluent water.

3.6.1 Major Components

Two (2) in-channel ultraviolet disinfection modules manufactured by Trojan are installed. The modules can treat the plant's peak flow of 1,500,000 gallons per day with one rack of bulbs offline.

3.6.2 Common Operating Problems

Power to the UV system is the first item to be tested if the system is experiencing problems. The control panels are located adjacent to the chlorine contact basin area and the main power disconnect is on these panels.

Another common problem is if one of the UV bulbs is burned out. The bulbs expected life in hours is indicated in the Trojan O&M Manual and spare bulbs should always be on the shelf to replace burned out bulbs. Bulbs should be replaced when the expected life is exceeded to protect ballasts.

3.6.3 Start-up Procedures

The UV equipment is relatively simple to operate and start-up. Please follow the start-up procedure indicated in the UV O&M Manual.

3.6.4 Normal Operating Procedures

Please refer to O&M Manual.

3.6.5 Emergency Operating Procedures

The UV system has redundancy by having multiple modules and then multiple racks within a module. A spare on-the-shelf rack is also provided. Thus, if one of the racks in either module is inoperable, it can be replaced on quickly.

3.7 Effluent Structures

Once the effluent passes through the UV equipment, it has been properly treated and is ready to be discharged from the facility. The water flows over the CCB weir and out of the plant. Prior to its leaving the plant, samples are collected to measure the effluent water quality.

3.7.1 Major Components

3.7.1.1 Effluent Automatic Sampler

A refrigerated automatic sampler is attached to the effluent line for collecting composite samples of the effluent stream. These samples are then sent out for testing to determine and record the effluent water quality.

3.7.2 Common Operating Problems

Again, the sampler should be checked to ensure that power is on at the units. For other common problems, please refer to the Sigma O&M Manuals.

3.7.3 Start-up Procedures

The system must have water passing through the UV for the sampler to operate. In starting up this equipment, please refer to the Sigma O&M Manual.

3.7.4 Normal Operating Procedures

For detailed operating procedures of the specific equipment, please refer to the Sigma O&M Manual.

This process is mostly conveyance in nature and requires very little if any operations to keep it going. Valves should be checked and maintained in the appropriate position to allow proper conveyance.

3.7.5 Emergency Operating Procedures

For detailed operating procedures of the specific equipment, please refer to Sigma O&M Manual.

CHAPTER 4 - DESCRIPTION, OPERATION, AND CONTROL OF BIOSOLIDS HANDLING EQUIPMENT

4.1 General

The biosolids handling programs at water reclamation facilities vary greatly from facility to facility. Some large facilities have extensive programs while other lagoon systems have no biosolids handling programs. Moroni City's treatment facility is typical of most facilities this size having some form of digestion and then dewatering.

The plant currently uses these processes to prepare to transport biosolids to the Nutrimulch facility where the solids are composted and then given to land owners in the area for agricultural application according to the facilities biosolids permit with the State of Utah.

4.1.1 Major Components

The dewatering system installed at the Moroni Water Reclamation Facility consists of aerobic digesters, a belt filter press, and sludge drying beds.

4.1.1.1 Aerobic Digesters

Solids will be wasted from the MBR process from the recycle channel directly to the aerobic digesters. The facility contains two (2) aerobic digesters that are 60' in diameter and have a side wall depth of 19'. At a normal side water depth of 16', each digester will store about 300,000 gallons of waste, giving this process a total storage capacity of 600,000 gallons.

The solids concentration in the digesters will be approximately 1.5%. The digesters have been equipped during this project with a submersible aspirating mixers. The system was provided by W-Cubed of Salt Lake City and manufactured by Mass Transfer Systems. The system receives uses a submersible motor to inject air into the bottom of the digester. The digesters use the aspirating mixers to provide oxygen to continue the biological stabilization process and also to keep the wasted solids mixed. Once the operator has a

sufficient volume of solids in the digester, they can be pumped to the belt press facility for dewatering.

4.1.1.2 Belt Filter Press

A 1.5 meter belt filter press is installed in its own building to the east of the existing aerobic digesters. Valves can be opened from either digester to feed the belt press. The belt press facility contains a control panel, a sludge feed pump, a polymer feed system, an Ashbrook 1.5 meter press, and a Seepex cake pump. The entire facility is housed in a 50' by 32' pre-engineered metal building, equipped with one (1) garage door so the haul truck can be parked in the building.

The press is capable of processing about 100 gallons of sludge per minute while dewatering the solids to about 15%. The solids are conveyed to a haul truck, where they are removed from the building and taken off-site for further processing.

4.1.1.3 Drying Beds

There are currently six (6) drying beds. Each bed is approximately 110' long by 45' wide with side walls that are approximately 3.5' tall. The beds were designed with sand drain systems running the length of the basins in the middle. However, these have not worked well and are being removed by the operators as their convenience to facilitate working in the beds.

4.1.2 Common Operating Problems

As with all equipment, the most common operating problem usually involves power sources or computer interface to the equipment. The digesters are very low-tech and will work if the mixers are powered. The belt press is more dependent on the PLC and other equipment located in this building. The drying beds will work as long as it is not precipitating at the site.

4.1.3 Start-up Procedures

In order to properly start-up the belt press, the operator must ensure the feed pump and polymer systems are on and the wasting valve from the digester is open. Then the start-up procedures contained in the Belt Press O&M Manual should be followed to complete start-up.

4.1.4 Normal Operational Procedures

Removing solids from the treatment process is addressed in the Enviroquip O&M manual as it indicates the desired MLSS range for treatment plant operations. The MLSS is constantly monitored by the TSS probes placed in the treatment tanks and through laboratory analysis. When solids need to be reduced in the treatment tanks, the solids handling equipment should be used.

Operators must determine what quantity of the mixed liquor should be removed from the process to lower the MLSS to the desired concentration. This is achieved by determining the amount of solids to be wasted from the system. To determine this solids amount only the current MLSS concentration, the desired MLSS concentration, and the tank water level need to be known. Then the following formula can be used:

$$\text{Solids to be wasted} = (MLSS_{(current)} - MLSS_{(desired)})*\text{Water Level}*SA*8.34/1{,}000{,}000$$

The amount of waste activated sludge (WAS) to be processed through the sludge bagger is then determined by the following formula:

$$\text{Gallons of WAS} = \text{Solids to be wasted}/(8.34*MLSS_{(current)})*1{,}000{,}000$$

Once the gallons of WAS is calculated, the operator simply should process that much to the digesters. From the digesters, the solids are delivered to the belt press which should be operated as discussed in the Belt Press O&M Manual.

4.1.5 Emergency Operating Procedures

While the MBR process is an activated sludge process, the solids concentration in the treatment tanks does not have to be monitored and maintained as constantly as does a conventional activated sludge process. The MLSS concentration in the basins can vary between 8,000 mg/l to 12,000 mg/l. The belt press will have to be operated between 12 and 18 hours a week, depending on the flow entering the plant. If there are problems with the equipment, it can easily be repaired and sludge processed after the repairs are complete. Small delays in the wasting solids from the system will not impact the treatment process.

CHAPTER 5 - SAMPLING AND TESTING

5.1 Purpose

Sampling and testing is an important part of the proper operation of the Moroni City Wastewater Treatment Plant (WWTP). It serves several useful purposes.

- It shows the Facility is meeting the State's requirements as outlined in the Utah Pollutant Discharge Elimination System (UPDES) and Ground Water Discharge and Construction (GWD) permits.
- It provides valuable information of what is taking place throughout the treatment process and provides the operator with the necessary data needed to make proper adjustments to the treatment facility when necessary (process control).
- Sampling can also provide useful data that can assist in future plant expansion/ modification design.
- Electrical resistivity and/or liner seam spark testing (ASTM D 6365) is a post-installation quality control method of detecting leaks in the anaerobic lagoon liner.
- Groundwater monitoring wells installed to monitor the flow characteristics and the quality of groundwater near the anaerobic lagoon.

5.2 General Sampling Procedures

It is critical that all samples are collected in such a way as to be representative of the process at the time of sample. In order to help ensure this, the following general procedures should be followed when collecting any sample:

- Samples should be taken from an area where there is good mixing.
- Only clean containers and proper sampling equipment and containers should be used for sampling.
- Floating debris should not be included in the sample.
- Analyze the sample within the allowable holding times. It is good practice to analyze all samples as quickly as possible, regardless of their hold times. In general, the shorter the time that elapses between collection of a sample and its analysis, the more reliable the

results will be. Some samples must be analyzed immediately because the composition can change quickly.

- For samples that are not analyzed immediately, follow proper preservation of samples. For most samples this means keeping the sample on ice until analyses.
- Large particles that are unrepresentative of the waste stream should be excluded from the sample.

WWTP operators may be sampling for the following tests. Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Mixed Liquor Suspended Solids (MLSS), Volatile Suspended Solids (VSS), Specific Oxygen Uptake Rate (SOUR), Ammonia (NH_3), pH, Coliform, and Dissolved Oxygen (DO). **All samples taken for UPDES permit compliance must be analyzed by an outside Laboratory who is certified in the State of Utah.**

5.3 Definitions and Purpose of Sampling

For the purposes of this manual there are two types of samples that will be taken by WWTP operators.

- Samples taken to show compliance with the UPDES permit (a copy of the UPDES permit can be found in the Appendix).
- Samples taken to help understand what is taking place throughout the treatment process, and adjust the plant when necessary (process control).

5.3.1 Biochemical Oxygen Demand (BOD)

The BOD_5 of a sample is a measure of the amount of oxygen used up by bacteria degrading organic material in the sample over a five-day period at 20º C. Generally, the higher the BOD is, the higher the organic matter in the sample. A well running treatment plant should see a minimum BOD removal of 85% between plant influent and effluent. It is realistic to expect a much larger percentage of removal from this facility.

5.3.2 Total Suspended Solids

TSS is a measure, in mg/L, of the amount of insoluble solids found in a sample. These insoluble solids include both volatile and non-volatile. A well running treatment plant should see a minimum TSS removal of 85% between plant influent and effluent. It is realistic to expect a much larger percentage of removal from this facility.

Not only is TSS used as an indication of the treatment plants efficiency, it can affect both, Turbidity and Coliform concentrations due to it "masking" the disinfecting process.

5.3.3 Chemical Oxygen Demand (COD)

COD is a measure of the amount of oxygen required to chemically oxidize organics during a two-hour period. COD's are generally used for process control and pretreatment compliance.

There is a direct correlation between the BOD and COD tests. Because the COD test only takes 2 hours to run as compared to the five days required for a BOD, it is often used as a means of estimating the BOD of wastewater. It is also a much less complex test to run. Generally speaking, typical influent wastewater with a COD of 100 mg/L will have a BOD of around 60 mg/L. Typical Effluent wastewater with a COD of 100mg/L may have a BOD around 10 mg/L depending on how well stabilized it is. BOD to COD ratios can vary greatly from plant to plant and from influent to effluent. Because of this it is necessary to develop the BOD to COD ratio specific to your plant by running BOD and COD tests in parallel.

5.3.4 Solids Sampling (MLSS & VSS)

Mixed Liquor Suspended Solids (MLSS) is the concentration of suspended solids in activated sludge mixed liquor. Volatile Suspended Solids (VSS) is the organic portion of the MLSS.

Solids sampling is used for process control. By controlling the solids, the plants performance can be optimized to remove the greatest amount of BOD, to nitrify, and denitrify if necessary.

5.3.5 Nitrate and Ammonia

Nitrate and Ammonia are generally tested to determine whether a plant is nitrifying and/or denitrifying, and to ensure compliance with discharge requirements when applicable.

5.3.6 pH

pH specifically measure the hydrogen ion concentration in a sample. pH can be tested to show compliance of the permit, to determine pretreatment compliance and it can also help in process control. For example: an aeration basin that has a sudden drop in pH could mean that it has started nitrifying and thereby is reducing the alkalinity in the water.

5.3.7 Dissolved Oxygen

DO is a measure of the free residual dissolved oxygen in a sample. In the case of wastewater treatment, DO must be tested in the aeration tank to ensure the bacteria culture has enough free oxygen available. DO is also measured to determine the Oxygen Uptake Rate and the Specific Oxygen Uptake Rate,

5.3.8 Total and Fecal Coliform

Total and Fecal Coliform represent a group of bacteria which is predominantly found in warm blooded animals. Because it is difficult to test wastewater for every know group and subgroup of pathogenic organisms, coliform is used as an indicator to determine the level of disinfection that has taken place.

5.3.9 Total Dissolved Solids

Dissolved solids include minerals, salts, metals, cation or anions dissolved in water. The principle salts found in water are calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates. TDS is often used as a measure of water quality for drinking water and must be monitored as part of the groundwater discharge permit. For the WWTP, TDS is tested in a certified lab.

5.4 Sampling Required under current Permit

WWTP operators who will be responsible for collecting samples required for compliance with WWTP current UPDES and GWD (compliance samples) should read and understand the current permits. A copy of the WWTP current permits can be found in Appendix of this manual. All compliance samples collected must be analyzed by a laboratory certified by the State of Utah to conduct those tests.

All the compliance samples required under the current permit will be taken from the effluent of the plant. The biosolids samples should be collected at a location representative of the quality of sludge immediately prior to the use-disposal practice. **Any specific questions regarding biosolids compliance should be directed toward the WWTP's current Biosolids Management UPDES Permit and Chapter IV of this manual.**

All samples collected will either be a composite sample or a grab sample. A composite sample is a combination of individual samples taken over a period of time. A grab sample is a single sample taken at a given place at a given time. Either sample can be flow proportional, that is, the sample volume is dependent on the flow at the time the sample is taken. Composite samples are generally required to be flow proportional while grab samples are not. **Samples that are taken for compliance with the UPDES must be taken according to the procedures outlined in the current permit. See permit no. UT0020222 part I.A. for a definition of acceptable methods for taking composite and grab samples. A copy of Moroni City's current permit can be found in Appendix of this manual.**

The following is excerpt taken from the current permit and outlines the required Parameters, Frequency, Sample Type and Units of the Self-Monitoring and Reporting Requirements.

Self-Monitoring and Reporting Requirements (NPDES)			
Parameter	Frequency	Sample Type	Units
Total Flow b/ c/	Continuous	Recorder	MGD
BOD_5, Influent d/ Effluent	2 X weekly 2 X weekly	Composite Composite	mg/L mg/L
TSS, Influent d/ Effluent	2 X weekly 2 X weekly	Composite Composite	mg/L mg/L
E. Coli	2 x Week	Grab	mg/L
TRC, g./	2 X weekly	Grab	mg/L
WET, Acute Biomonitoring	Quarterly	Composite	Pass/Fail
Oil & Grease, e./	Monthly a./	Grab	mg/L
pH	2 x Weekly	Grab	SU
DO	2 X weekly	Grab	mg/L
Ammonia, g./	2 X weekly	Grab	mg/L
TDS	2 X weekly	Grab	mg/L
Metals, Influent Effluent, f./	Quarterly Quarterly	Composite Composite	mg/L mg/L
Organic Toxics	Yearly	Grab	mg/L

The following tables detail sampling requirements associated with the GWD Permit. Complete sampling requirements can be found in the Groundwater Sampling Plan, attached as an appendix.

GWD Permit Lagoon Sampling Requirements (Annual Sampling)		
Parameter	Sample Type	Units
pH	Grab	-
Specific Conductance	Grab	µmhos/cm
Temperature	Grab	F
Total Kjeldahl Nitrogen (TKN)	Grab	mg/L
Ammonia (as N)	Grab	mg/L
Nitrate + Nitrite	Grab	mg/L
Total Sulfate	Grab	mg/L
Chloride	Grab	mg/L
Total Dissolved Solids	Grab	mg/L
Sodium	Grab	mg/L

Potassium	Grab	mg/L
Calcium	Grab	mg/L
Magnesium	Grab	mg/L
Bicarbonate	Grab	mg/L
Phosphorus (Total as P)	Grab	mg/L
Oil and Grease (HEM)	Grab	mg/L

GWD Permit Groundwater Sampling Requirements (Quarterly Sampling for 2 Years, Thereafter Semi-Annually)		
Parameter	Sample Type	Units
pH	Grab	-
Specific Conductance	Grab	µmhos/cm
Temperature	Grab	F
Ammonia (as N)	Grab	mg/L
Bicarbonate	Grab	mg/L
Chloride	Grab	mg/L
Nitrate + Nitrite	Grab	mg/L
Sulfate	Grab	mg/L
Total Dissolved Solids	Grab	mg/L

5.5 Laboratory Testing

As previously mentioned, all compliance testing must be performed by a lab certified by the State of Utah. The Moroni Water Reclamation Facility has a small lab facility currently on site and is used to perform some process control testing. Process control testing is recorded on the monthly operating report (MOR). The plant operators also have a MSDS book on-site, listing all the needed information on chemicals used in the lab and at the facility in general.

5.6 Electrically-Based Geophysical Liner Testing

The anaerobic lagoon was constructed with a liner to prevent the leakage of wastewater into the groundwater below the lagoon. The liner used has a conductive backing to allow for testing of the integrity of the liner. This backing allows for testing to be done while the lagoon is full. This testing is required by the GWD Permit and must be conducted every 2 ½ years. The testing

consists of measuring the conductivity of an electrical spark through the liner. Where punctures or holes exist in the liner, an electrical current can ground out to the soil below the liner. This testing, commonly called a spark test, can be conducted by qualified firms. The contact information for one such company which can do the testing is:

H2J Liners
Matt Johnson
801-592-6325
h2jmatt@gmail.com

5.7 Groundwater Sampling

The GWD Permit also requires groundwater sampling in the area surrounding the lagoon. The Groundwater Sampling Plan, included as an appendix to this manual, details the location of the monitoring wells, the frequency of sampling and the types of samples that must be included. In general reporting will include:

- Field Data Sheets - or copies thereof, including the field measurements and other pertinent field data, such as: sampling location name/number, date and time, names of sampling crew, type of sampling: pump or grab, volume of water purged before sampling.
- Water Level Measurements - water level measurements from ground water monitoring wells will be reported as measured depth to ground water from the surveyed casing measuring point, and ground water elevations as converted by casing measuring point elevations.
- Laboratory Analytical Results - including date sampled, date received; and the results of analysis for each parameter, including: value or concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, and the date of the analysis.
- Results of leak detection surveys if any were conducted during the reporting period.

CHAPTER 6 - OPERATION RECORDS AND REPORTS

6.1 Records

The keeping of adequate plant operating and performance records is an essential element of the management of a wastewater system. The records not only permit the checking of things done or to be done, but also permit the review of historical operating, performance, and cost experience in planning or anticipating future requirements. Records are of particular importance to the maintenance of equipment, and provide a basis for scheduling preventive maintenance activities, providing for contingency situations, and budgeting.

6.2 Daily Operating Log

A daily operating worksheet should be maintained. These sheets should be bound in a notebook to prevent damage or destruction. The operator should record all actions performed during each day the site is visited and describe his observations. Often, these observations will lead to the discovery and possible solution of a problem. The operator should be encouraged to take personal pride in his work and keep neat, legible log sheets. A sample copy of the daily operating log is found at the end of this section.

6.3 Monthly Operating Report and Laboratory Records

A summary sheet should be prepared from data collected daily. This data should be compiled and used in developing the Monthly Operating Report (MOR). A sample MOR is found at the end of this section. This data is very useful for tracking and trending plant operations and is useful for analyzing plant efficiencies and projecting future conditions. Most laboratory tests and associated records will be recorded on the MOR. However, if additional tests are run, the results should be recorded in worksheets and bound in a notebook for reference.

6.4 UPDES Discharge Monitoring

Each month Moroni City WWTP personnel are required to submit a UPDES Discharge Monitoring Report (DMR) to the Utah Division of Water Quality. It should be possible to fill

out this report from the log sheets and the flow charts already discussed. Instructions for completing this form and a copy of the form are found at the end of this section.

6.5 GWD Monitoring

Each month Moroni City WWTP personnel are required to submit a GWD Monitoring Report (DMR) to the Utah Division of Water Quality. It should be possible to fill out this report from the log sheets and the flow charts already discussed. Instructions for completing this form and a copy of the form are found at the end of this section.

6.6 Annual Report

At the end of each fiscal year, an annual report for the City administration should be compiled by the superintendent. This report should generally have two parts, a Management Data Section and an Operating Data Section. The Management Data Section should contain information on:

1. Total historical capital cost
2. Total historical capital cost depreciated
3. Replacement cost
4. Replacement cost depreciated
5. Debt service and outstanding debt schedule
6. Operating expenses
    a. Salaries
    b. Laboratory
    c. Vehicles
7. Future needs

The type of information to be included in the Operating Data Section should include:

1. Connected Population
2. Equivalent Population
3. Flow (MGD)
4. pH
    a. Influent (Maximum and Minimum)

   b. Effluent (Maximum and Minimum)
5. BOD (mg/l)
   a. Influent
   b. Effluent
   c. Percent reduction
6. Suspended Solids (mg/l)
   a. Influent
   b. Effluent
   c. Percent reduction
7. Operating Problems Experienced During the Year

6.7 Maintenance Record

The purpose and content of maintenance records are discussed in detail in Chapter VII. A review of the manufacturer's recommendations will aid in determining what spare parts and miscellaneous supplies should be maintained. Delivery time must also be considered when deciding what items should be carried in inventory. At a minimum, spare pumping capacity equal to that required by the largest unit should be provided. Failure to carry an inventory of items that are used on a routine basis is poor management while maintaining a supply of readily available and/or seldom used items it wasteful.

Inventory sheets should be maintained for all items stored for the facility. The superintendent should inventory the storeroom periodically and update the inventory sheets to determine when reorder is necessary. When the quantity in stock drops to the reorder point, the superintendent will provide a list of items, descriptions, and quantities to the City purchasing department to initiate reorder of supplies.

Other physical plant records should be available for reference at the Plant. These should include:

1. Plant O&M Manual
2. As-built Engineering Drawings
3. Copy of Construction Specifications

4. Equipment Suppliers Manuals
5. Piping and wiring diagrams
6. Inventory of industrial waste contributors

6.8 Personnel Records

The personnel system at the treatment plant shall be the same system as utilized by Moroni City in other departments. That system should include as a minimum the following items:

1. Job Application
2. Time Sheets
3. Sick Leave Records
4. Annual Leave Records
5. Accident Report Forms
6. Performance Appraisal Forms
7. Training and/or Certification Achievements
8. Insurance and Tax Forms
9. Current Certification
10. A Summary of Continuing Education Units.

If any of these items are not included in the present personnel system, the treatment plant superintendent should develop the required record/form. Many personnel systems are available for guidance in preparation of these records/ forms.

Daily Log

Operator		Day
Arrival Time	Departure Time	Date

Time	Required Duties, Activities, Problems	Initials
	Primary lift pumps - inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Equalization channel – check level, automatic valve, and remove debris as needed.	
	Anaerobic Lagoon Liner– inspect liner for damage (visual)	
	Anaerobic Lagoon Weir Box – verify operation of electrically actuated weir gate	
	Bar screens – remove screenings and any large debris	
	Grit channels - inspect and remove debris as needed	
	Flumes – inspect and remove debris as needed	
	Influent samplers – remove samples and replace sample bottles	
	Lift station – inspect floats and level.	
	Lift pumps - inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Fine screens – inspect screen operation and remove debris as required	
	Primary clarifier – inspect sludge level and weirs. Remove any debris as needed	
	Anoxic/aeration basins – inspect mixing/aeration for complete mix. Remove any debris as needed	
	Anoxic blowers – inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Membrane aeration – inspect aeration pattern	
	Membrane aeration – verify automatic diffuser cleaning valve operation	
	Membranes – inspect and log transmembrane pressure	
	Recycle pump – inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Permeate pumps – inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Permeate pumps – inspect pump performance	
	Permeate pumps – inspect bearing and seal lubrication **(Monday Only)**	
	Membrane blowers – inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	UV disinfection – verify UV operation	
	Utility water pumps – inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Effluent Sampler – remove samples and replace sample bottles	
	Digester mixers – inspect general condition (temp, unusual noises, vibrations, cracks, leaks …)	
	Belt filter press – clean belts with wash system	
	Belt filter press – clean spray nozzles	
	Belt filter press – inspect hydraulic fluid level	
	Belt filter press – inspect alarm sensors and emergency trip cord	
	Belt filter press – inspect wear items, frame and roller coatings, and for loose bolts **(Thursday Only)**	
	Belt filter press – inspect/clean belt guides and wiper bars **(Thursday Only)**	

	Belt filter press – inspect and remove remaining debris from cake pump	
Operator		Day
Arrival Time	Departure Time	Date

Time	Other Duties, Activities, Problems	Initials

MORONI WASTEWATER TREATMENT PLANT

MONTHLY OPERATING R

MONTH _____ YEAR __

					INFLUENT									EFFLUENT												PROCESS CONTROL									
					A			B	C	D	E	F	G		H	I	J	K	L	M						N	O	P	Q		R	S	T		U
Date	Precipitation	Air Temp.	Air Temp.	Current Air Temp.	Average Daily Influent Flow	pH	Water Temp.	BOD	COD	TSS	BOD (8.34 x A x B)	COD (8.34 x A x C)	TSS (8.34 x A x D)	pH	BOD	COD	TSS	BOD (8.34 x A x H)	COD (8.34 x A x I)	TSS (8.34 x A x J)	Fecal Coliform	Total Coliform	Chlorine	D.O.	Oil & Grease	MLSS	MLVSS	MLSS (8.34 x 1.0 x N)	MLVSS (8.34 x 1.0 x O)	F/M (E / Q)	WAS Conc.	WAS Flow	Wasted (8.34 x R x S)	MCRT (P / (M + T))	30 min settling
	in	min	max	F	MGD	SU	F	mg/L			lbs/day			SU	mg/L			lbs/day			#/100 mL		mg/L			mg/L		pounds			mg/L	MGD	lbs/day	days	ml
1																																		
2																																		
3																																		
4																																		
5																																		
6																																		
7																																		
8																																		
9																																		
10																																		
11																																		
12																																		
13																																		
14																																		
15																																		
16																																		
17																																		
18																																		
19																																		
20																																		
21																																		
22																																		
23																																		
24																																		
25																																		
26																																		
27																																		
28																																		
29																																		
30																																		
31																																		
Avg																																		
Min																																		
Max																																		

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME: MORONI FEED/WASTEWATER
ADDRESS: P.O. BOX 308
MORONI, UT 84646-0308
FACILITY: MORONI FEED
LOCATION: P.O. BOX 308
MORONI, UT 84646-0308
ATTN: Kerry Farnsworth

PERMIT NUMBER	DISCHARGE NUMBER
UT0020222	001-A

MONITORING PERIOD	
MM/DD/YYYY	MM/DD/YYYY
09/01/2016	09/30/2016

DMR Mailing ZIP CODE: 84646-0308
MAJOR

12" PIPE--S SIDE SAND FILTERS
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Nitrogen, Kjeldahl, total [as N]	SAMPLE MEASUREMENT	******	******	******	******		******				
00625 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	******	mg/L		Monthly	COMPOS
Nitrogen, Kjeldahl, total [as N]	SAMPLE MEASUREMENT	******	******	******	******		******				
00625 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	******	mg/L		Monthly	COMPOS
Nitrite + Nitrate total [as N]	SAMPLE MEASUREMENT	******	******	******	******		******				
00630 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	******	mg/L		Monthly	COMPOS
Phosphorus, total [as P]	SAMPLE MEASUREMENT	******	******	******	******		******				
00665 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	******	mg/L		Monthly	COMPOS
Phosphorus, total [as P]	SAMPLE MEASUREMENT	******	******	******	******		******				
00665 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	******	mg/L		Monthly	COMPOS
Oil and grease	SAMPLE MEASUREMENT	******	******	******	******	******					
03582 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	10 DAILY MX	mg/L		Monthly	GRAB
Phosphate, ortho [as P]	SAMPLE MEASUREMENT	******	******	******	******		******				
04175 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	******	mg/L		Monthly	COMPOS

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.				
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
IF THERE IS A VISAL SHEEN ON OIL THEN OIL AND GREASE NEEDS TO BESAMPLED.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME: MORONI FEED/WASTEWATER
ADDRESS: P.O. BOX 308
MORONI, UT 84646-0308
FACILITY: MORONI FEED
LOCATION: P.O. BOX 308
MORONI, UT 84646-0308
ATTN: Kerry Farnsworth

UT0020222	001-A
PERMIT NUMBER	**DISCHARGE NUMBER**

MONITORING PERIOD	
MM/DD/YYYY	**MM/DD/YYYY**
09/01/2016	09/30/2016

DMR Mailing ZIP CODE: 84646-0308
MAJOR

12" PIPE--S SIDE SAND FILTERS
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT		******		******	******	******	******			
50050 1 0 Effluent Gross	PERMIT REQUIREMENT	1.1 MX MO AV	******	MGD	******	******	******	******		Continuous	Recorder (auto)
Flow, in conduit or thru treatment plant	SAMPLE MEASUREMENT				******	******	******	******			
50050 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	Req. Mon. 30DA AVG	Req. Mon. DAILY MX	MGD	******	******	******	******		Continuous	Recorder (auto)
Chlorine, total residual	SAMPLE MEASUREMENT	******	******	******	******						
50060 1 1 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	.016 MO AVG	.029 DAILY MX	mg/L		Twice per Week	COMPOS
E. coli	SAMPLE MEASUREMENT	******	******	******	******						
51040 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	126 30DA AVG	157 MX WK AV	#/100mL		Twice per Week	GRAB
Solids, total dissolved	SAMPLE MEASUREMENT	******	******	******	******	******					
70295 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	1200 DAILY MX	mg/L		Monthly	GRAB
BOD, 5-day, percent removal	SAMPLE MEASUREMENT	******	******	******		******	******				
81010 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	85 MN % RMV	******	******	%		Monthly	CALCTD
Solids, suspended percent removal	SAMPLE MEASUREMENT	******	******	******		******	******				
81011 K 0 Percent Removal	PERMIT REQUIREMENT	******	******	******	85 MN % RMV	******	******	%		Monthly	CALCTD

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		TELEPHONE		DATE
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
TYPED OR PRINTED			AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
IF THERE IS A VISAL SHEEN ON OIL THEN OIL AND GREASE NEEDS TO BESAMPLED.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME: MORONI FEED/WASTEWATER
ADDRESS: P.O. BOX 308
MORONI, UT 84646-0308
FACILITY: MORONI FEED
LOCATION: P.O. BOX 308
MORONI, UT 84646-0308
ATTN: Kerry Farnsworth

UT0020222	001-A
PERMIT NUMBER	**DISCHARGE NUMBER**

MONITORING PERIOD	
MM/DD/YYYY	**MM/DD/YYYY**
09/01/2016	09/30/2016

DMR Mailing ZIP CODE: 84646-0308
MAJOR

12" PIPE--S SIDE SAND FILTERS
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Oxygen, dissolved [DO]	SAMPLE MEASUREMENT	******	******	******		******	******				
00300 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	5.5 DAILY MN	******	******	mg/L		Twice per Week	GRAB
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	******	******	******	******						
00310 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	25 30DA AVG	35 7 DA AVG	mg/L		Twice per Week	COMPOS
BOD, 5-day, 20 deg. C	SAMPLE MEASUREMENT	******	******	******	******						
00310 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	Req. Mon. 7 DA AVG	mg/L		Twice per Week	COMPOS
pH	SAMPLE MEASUREMENT	******	******	******		******					
00400 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	6.5 DAILY MN	******	9 DAILY MX	SU		Twice per Week	GRAB
Solids, total suspended	SAMPLE MEASUREMENT	******	******	******	******						
00530 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	25 30DA AVG	35 7 DA AVG	mg/L		Twice per Week	COMPOS
Solids, total suspended	SAMPLE MEASUREMENT	******	******	******	******						
00530 G 0 Raw Sewage Influent	PERMIT REQUIREMENT	******	******	******	******	Req. Mon. 30DA AVG	Req. Mon. 7 DA AVG	mg/L		Twice per Week	COMPOS
Nitrogen, ammonia total [as N]	SAMPLE MEASUREMENT	******	******	******	******						
00610 1 1 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	4.2 MO AVG	23.7 DAILY MX	mg/L		Twice per Week	GRAB

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		TELEPHONE		DATE
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
TYPED OR PRINTED			AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
IF THERE IS A VISAL SHEEN ON OIL THEN OIL AND GREASE NEEDS TO BESAMPLED.

EPA Form 3320-1 (Rev.01/06) Previous editions may be used. 06/15/2015 Page 1

CHAPTER 7 - MAINTENANCE

7.1 General

A well-operated plant depends to a great extent on preventive plant maintenance. The wastewater treatment plant must operate 24 hours per day every day. Duplication of plant equipment and functions provides the flexibility necessary for continued operation. The operator's first maintenance goal is to prevent unscheduled maintenance problems. The second goal is to obtain the best possible treatment from the plant during scheduled or unscheduled maintenance. Since wastewater inflow is continuous, the operator must learn to use the flexible aspects of the plant design to stay in operation during maintenance situations.

The operator is referred to the equipment manuals provided with the individual equipment items. These manuals should be studied closely for operation and maintenance instructions, warranty provisions and for responses to specific operating problems for each piece of equipment at the treatment plant. The maintenance instructions in these manuals should be faithfully followed by the operator to avoid invalidating the equipment warranty. It should be emphasized that electrical system repairs should not be attempted by the operator. Only qualified electricians or representatives of the control system supplier should attempt such work.

The maintenance program, outlined in the tables of this chapter, is presented only as a guide and recommendation by the various equipment manufacturers. Due to local environmental conditions (excessive dust, high temperatures, etc.) and operating conditions (frequent or infrequent use, etc.) the operator should remain flexible and adjust the maintenance. If frequencies presented herein for actual operating conditions experienced. However, it should be emphasized that the operator should never omit any maintenance operations but should change their frequency of repetition as required so that the warranty provisions will not be violated. In addition, the operator should note that many equipment manufacturers recommend a special one-time maintenance sequence after the equipment has been in operation a minimal number of hours. These one-time maintenance operations are not presented in the following maintenance tables and the operator is referred to the particular equipment manuals for those requirements.

The tables present only the routine maintenance activities compiled from the individual equipment manuals. The operator is referred to these manuals for responses to common operating problems and for details of the maintenance procedures listed in the tables. No special tools or equipment are required for any of the process equipment at the treatment plant.

7.2 Maintenance Schedule

The facility equipment has been packaged and provided by separate manufacturers. An overall plant maintenance schedule has been prepared and is found at the end of this section. These items should be completed and checked off as completed throughout the year. This maintenance schedule and record should be filed for future reference. Additional detailed information on specific equipment maintenance procedures can be found in the individual equipment O&M manuals, which are important maintenance resources.

These separate O&M manuals must be used and referenced in order to properly follow maintenance guidelines established by the equipment manufacturer. All equipment, especially the membranes, have maintenance requirements associated with the provided warranties. These requirements must be understood and followed in order to protect the City's investment, ensure design life of equipment, and provide high quality wastewater effluent.

7.3 General Good Housekeeping

In addition to the specific maintenance tasks listed in the individual manufacturers O&M manuals, the operator should perform many general good housekeeping tasks on a routine basis. It is important to perform these housekeeping tasks because most accidents or fires are caused by the neglect of these simple routine tasks. The following list is not comprehensive but it should give the treatment plant staff some guidelines for the proper good housekeeping tasks that should be routinely performed.

1. All places of employment, passageways, storerooms, and service rooms should be kept clean and orderly and in a sanitary condition.

2. The floor of every workroom should be maintained in a clean and, as far as possible, a dry condition. Where wet processes are used, drainage should be maintained and false floors, platforms, mats, or other dry standing places should be provided.
3. Trash and loose debris and rubbish should be picked up from floors, stairways, passageways, and platforms.
4. To facilitate cleaning, every floor, working place, and passageway should be kept free of protruding nails, splinters, holes, and loose boards.
5. Walkways should be kept free of grease, sludge, and oil.
6. Splash guards and drip pans should be used whenever possible to keep oil and grease from machinery and pumps off the floor.
7. Walkways and roadways should be kept free of ice. If this is not possible, they should be salted and sanded.
8. Solvent soaked and combustible wastes should be disposed of in airtight metal receptacles and removed daily from the plant.

OPERATION AND MAINTENANCE SCHEDULE

LOCATION	ITEM	MANUAL REFERENCE	MAINTENANCE REQUIRED	MAINTENANCE SCHEDULE														
				DAY	WK	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2 YR	3 YR
EQUALIZATION CHANNEL	Primary Pumps	NA	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x		x						x							
		NA	Insulation resistance Inspect			x						x							
		NA	Visual inspection of power cable			x						x							
		NA	Functional Inspect of monitoring equipment			x						x							
		NA	Change oil															x	
		NA	Visual inspection of lifting chain/wire			x													
	Ultrasonic Level	Nelson Brothers O&M	Visual inspection		x														
	Automatic Valve	Nelson Brothers O&M	Visual inspection	x															
ANAEROBIC LAGOON	Pond Liner	NA	Visually inspect for damage or tears, and debris	x															
			Perform water quality sampling			x													
			Perform liner integrity testing															x	
	Weir Gate	NA	Inspect for proper function		x														
PRIMARY TREATMENT	Manual Bar Screens	NA	Inspect for debris and remove daily	x															
	Grit Channels	NA	Inspect for debris and remove as needed			x	x	x	x	x	x	x	x	x	x	x	x		
	Flow Meters	NA	Visual inspection		x														
	Influent Sampler	Nelson Brothers O&M	Remove samples daily and replace sample bottles	x															
		Nelson Brothers O&M	Inspect program setup			x	x	x	x	x	x	x	x	x	x	x	x		
	Lift Pumps	Nelson Brothers O&M	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x		x						x							
		Nelson Brothers O&M	Insulation resistance Inspect			x						x							
		Nelson Brothers O&M	Visual inspection of power cable			x						x							
		Nelson Brothers O&M	Functional Inspect of monitoring equipment			x						x							
		Nelson Brothers O&M	Change oil															x	
		Nelson Brothers O&M	Visual inspection of lifting chain/wire			x													
	Yard Valves	Nelson Brothers O&M	Exercise valves			x						x							
	Fine Screens	Huber O&M Manual	Inspect screen operation	x															
		Huber O&M Manual	Check screenings container and replace or empty	x															
		Huber O&M Manual	Check and clean level control with hose		x														
		Huber O&M Manual	Open wash water valve for press zone and flush		x														
		Huber O&M Manual	Hose down any deposits on screen basket		x														
		Huber O&M Manual	Change all gearbox oils/greases																x
	PRIMARY CLARIFIER	Eimco O&M Manual	Inspect drive platform and walkway - keep clean and clear or any/all debris	x															
		Eimco O&M Manual	Check drive oil level		x														
		Eimco O&M Manual	Drain condensate from drive		x														
		Eimco O&M Manual	Inspect chain guard		x														
		Eimco O&M Manual	Check drive chanin for tension			x	x	x	x	x	x	x	x	x	x	x	x		
		Eimco O&M Manual	Lubricate drive chain			x	x	x	x	x	x	x	x	x	x	x	x		
		Eimco O&M Manual	Check drive control			x	x	x	x	x	x	x	x	x	x	x	x		
		Eimco O&M Manual	Change drive oil			x													
		Eimco O&M Manual	Check mechanism for loose bolts, nuts, and broken welds			x	x	x	x	x	x	x	x	x	x	x	x		
		Eimco O&M Manual	Check connections between arms and center shaft & shaft to gear adaptor plate			x													
		Eimco O&M Manual	Remove rust spots and repaint as necessary			x													
		Eimco O&M Manual	Check scum box flexible connectors for damage or loose connections			x													
		Eimco O&M Manual	Check squeegees, if used, for damage or wear and replace as necessary			x													
		Eimco O&M Manual	Check and adjust skimmer as required		x														
		Eimco O&M Manual	Check scum box flushing system		x														
		Eimco O&M Manual	Check skimmer wipers for damage or wear.			x													

OPERATION AND MAINTENANCE SCHEDULE

LOCATION	ITEM	MANUAL REFERENCE	MAINTENANCE REQUIRED	MAINTENANCE SCHEDULE														
				DAY	WK	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2 YR	3 YR
SECONDARY TREATMENT TANKS	Anoxic Basin Mixers	JDV O&M Manual	Inspect mixing pattern and adjust as required	x															
		JDV O&M Manual	Inspect all accssible bolts and welds			x						x						x	
	Diffused Aeration	EDI O&M Manual	Visual inspection of aeration pattern			x	x	x	x	x	x	x	x	x	x	x	x		
		EDI O&M Manual	Visual inspection of diffusers for scaling			x													
	Gates	Nelson Brothers O&M	Inspect general condition and operation			x						x							
	Yard Valves	NA	Exercise valves			x						x							
	DO Probes	Nelson Brothers O&M	Inspect probe and calibrate as needed		x														
	Ultrasonic Level	Nelson Brothers O&M	Inspect probe and calibrate as needed		x														
MEMBRANE BUILDING	Membrane Scour Air	NA	Visual inspectionof aeration pattern	x															
		Enviroquip O&M Manual	Verify automatic diffuser cleaning valve operation	x															
	Membranes	Enviroquip O&M Manual	Inpect transmembrane pressure	x															
		Enviroquip O&M Manual	Recovery cleaning			x						x							
	Recycle Pumps	Nelson Brothers O&M	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x		x						x							
		Nelson Brothers O&M	Insulation resistance Inspect			x						x							
		Nelson Brothers O&M	Visual inspection of power cable			x						x							
		Nelson Brothers O&M	Functional Inspect of monitoring equipment			x						x							
		Nelson Brothers O&M	Change oil															x	
		Nelson Brothers O&M	Visual inspection of lifting chain/wire			x													
	Permeate Pumps	Enviroquip O&M Manual	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x															
		Enviroquip O&M Manual	Inspect pump performance	x															
		Enviroquip O&M Manual	Inspect bearing and seal lubrication		x														
		Enviroquip O&M Manual	Replace bearing and seal lubrication			x													
		Enviroquip O&M Manual	Inspect belts			x	x	x	x	x	x	x	x	x	x	x	x		
		Enviroquip O&M Manual	Inspect front and rear impeller clearance			x						x							
		Enviroquip O&M Manual	Inspect check valve			x													
		Enviroquip O&M Manual	Inspect pump and driver alignment			x													
		Enviroquip O&M Manual	Inspect shaft deflection			x													
		Enviroquip O&M Manual	Inspect bearings and bearing housing			x													
	Positive Displacement Blowers	Hibon O&M Manual	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x															
		Hibon O&M Manual	Inspect belt tension		x														
		Hibon O&M Manual	Inspect/replace/clean inlet filters		x														
		Hibon O&M Manual	Inspect oil levels		x														
		Hibon O&M Manual	Inspect/test pressure relief valve			x			x			x			x				
		Hibon O&M Manual	Drain/replace blower oil			x													
		Hibon O&M Manual	Grease motor support rod and check pulleys and belts			x													
	Instruments	NA	Inspect instruments		x														
		NA	Calibrate instruments			x			x			x			x				
	Utility Water Pumps	Grundfos O&M Manual	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x															
	Valves	NA	Exercise valves			x						x							
EFFLUENT STRUCTURES	UV Disinfection System	Trojan O&M Manual	Visual walk-about inspection	x															
			Clean channel around the system.			x													
			Inspect and if required, remove debris from modules using low pressure water			x		x		x		x		x		x			
			Replace lamps and sleeve O-ring seals (every 12,000 hours)			x													
			Check power cable strain relief for tightness			x	x	x	x	x	x	x	x	x	x	x	x		
	Effluent Sampler	NA	Remove samples daily and replace sample bottles	x															
		NA	Inspect program setup			x	x	x	x	x	x	x	x	x	x	x	x		

OPERATION AND MAINTENANCE SCHEDULE

LOCATION	ITEM	MANUAL REFERENCE	MAINTENANCE REQUIRED	MAINTENANCE SCHEDULE														
				DAY	WK	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2 YR	3 YR
AEROBIC DIGESTERS	Submersible Aspirators	MTS O&M Manual	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x															
		MTS O&M Manual	Inspect aeration pattern		x														
		MTS O&M Manual	Inspect/replace/clean inlet filters			x			x			x			x				
		MTS O&M Manual	Inspect/clean motor and blower			x			x			x			x				
	Yard Valves	NA	Exercise valves			x						x							
BELT FILTER PRESS	Sludge Feed Pump	NA	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x															
	Polymer Feed System	NA	Inspect/operate solenoid valve			x	x	x	x	x	x	x	x	x	x	x	x		
		NA	Clean solenoid strainer			x													
		NA	Inpect/clean rotameter			x	x	x	x	x	x	x	x	x	x	x	x		
		NA	Inspect/clean polymer fee check valve			x	x	x	x	x	x	x	x	x	x	x	x		
	Belt Filter Press	NA	Clean belts with wash system	x															
		NA	Clean spray nozzles	x															
		NA	Inspect hydraulic fluid level	x															
		NA	Inspect alarm sensors	x															
		NA	Inspect emergency trip cord	x															
		NA	Inspect wear items		x														
		NA	Inspect frame and roller coatings		x														
	Belt Filter Press	NA	Inspect/clean belt guides and wiper bars		x														
		NA	Inspect for loose bolts		x														
		NA	Clean belts with soap/bleach mixture			x	x	x	x	x	x	x	x	x	x	x	x		
		NA	Inspect belt seam wires			x	x	x	x	x	x	x	x	x	x	x	x		
		NA	Inspect bearings			x	x	x	x	x	x	x	x	x	x	x	x		
		NA	Lubricate bearings			x						x							
		NA	Change oil in hydraulic tank, wash and replace filter screen			x						x							
		NA	Change oil in belt drive gear box			x													
	Cake Pump	Seepex O&M Manual	Inspect general condition (temp, unusual noises, vibrations, cracks, leaks…)	x															
		Seepex O&M Manual	Inspect rotor/stator/shaft seal/drive/and lubricant levels			x			x			x			x				
DRYING BEDS	Yard Valves	NA	Exercise valves			x						x							

CHAPTER 8 - EMERGENCY OPERATING AND RESPONSE PROGRAM

8.1 General

The Emergency Response and Operating Program (EROP) for the Moroni City Water Reclamation Facility (WWTP) is a vital link in the successful operation of the plant. No matter how refined the operation and maintenance programs are, equipment failures and process upsets are likely to occur.

The key elements of the EROP include:

1. Early detection of impending problems.
2. Logical diagnostic steps to identify the cause of the problem.
3. Rapid implementation of problem solution.

This section contains a detailed discussion of a program designed to efficiently accomplish these goals.

The Moroni City WWTP was designed to operate as illustrated in Figure 1-1. There are three ways a problem may be initially detected in the system:

1. By visual observation
2. By interpretation of laboratory analysis
3. By analysis of meter/gauge readings.

It must be remembered that a problem detected in one location may be caused by a system malfunction in another location. As an example, high effluent BOD or TSS concentrations may be caused by problems in the bioreactor stem or in the membrane portion of the plant. Thus, one must follow a sequence of logical steps from problem detection through system diagnosis to resolution.

Records, maps, and inventories of emergency equipment are essential parts of any emergency plan and as such must be protected. This can be done by putting copies of these items in a vault

that is not subject to flooding or other dangers associated with the treatment plant. These records should include: emergency facility and auxiliary personnel; amounts, types, and locations of emergency equipment; treatment equipment such as auxiliary chlorinators; plant O&M manual; manufacturer's manuals; as-built drawings; collection system maps; and other records as required.

The following discussion of problems is not intended to be comprehensive. However, it has sufficient detail to indicate the correct course of action for most situations that might occur at the Moroni WWTP. Additional problems/solutions can be found in the manual for the EPA field study course, "Operation of Wastewater Treatment Plants" and other sources.

8.2 The Troubleshooting Process

In overview, visual observations and/or the monitoring of meter readings are used to define the nature of the problem. Additionally, routine laboratory data can be compared with guidelines in the laboratory checklist to either assist in problem definition and/or confirm the magnitude of the problem.

8.3 Emergencies

Although no one likes to think that any emergency situations will occur, they still do happen. When an emergency does happen, it will probably be at an inconvenient time and require instant reaction. For this reason, a preplanned course of action, such as the outline below should be followed:

1. Identify the problem.
2. Investigate quickly what has happened.
3. Notify the necessary personnel (See Chapter 9.8.1 for staff emergency assignments) and call for help if needed. (See Chapter 9.8.1 for emergency telephone numbers.)
4. Prevent the situation from occurring again.

During emergency situations, which require the assistance of specialized personnel such as the fire department, chemical spill teams, etc., the head of those groups will always be in charge of

the situation. The plant staff will provide any available assistance as requested under the direction of the operator in charge at the time of the emergency.

All treatment plant personnel must understand the use of the emergency equipment, be aware of its location in the building, and the superintendent should make periodic checks of employee ability to operate it. This check should also include a determination that each employee knows when each piece of equipment should be used.

8.4 Mutual Aid Agreements

Many agencies and businesses within and around Moroni City such as construction companies, rescue squads, utility companies, etc., can be helpful during emergencies. Mutual aid agreements should be made with these groups. These agreements can provide the following: emergency equipment and supplies, spare parts, specialized maintenance skills, and auxiliary operating personnel. In addition, the local police and fire departments should provide the following assistance:

8.4.1 Police Department

- Critique existing treatment system security measures.
- Make routine checks of treatment facility.
- Notify treatment plant in the event of a street spill of hazardous materials.
- Be prepared to assist during emergencies within the treatment system.

8.4.2 Fire Department

- Routinely check fire-fighting equipment within the treatment facility and inspect facility for potential fire hazards.
- Provide first aid instruction to treatment system personnel.
- Work with treatment facility personnel on safety precautions to be used with dangerous chemicals.

Normally, the assistance required through these agreements will either be parts or equipment. However, in certain instances personnel may also be required. These auxiliary personnel should be trained as backups for the regular staff. Arrangements should be made for the auxiliary personnel to work periodically with their counterparts on the regular staff to receive this training. Procedures for alerting these auxiliary personnel must be clearly outlined and rehearsals conducted to keep these personnel up to date on emergency operating procedures.

8.5 Alternate Power

The Moroni City WWTP primary source of power is Rocky Mountain Power. There is standby power for the treatment plant site.

CHAPTER 9 - SAFETY

The safety hazards associated with operating and maintaining the Moroni City Water Reclamation Facility (WWTP) are many and varied. These hazards may include:

1. Physical injury
2. Body infections
3. Noxious gas vapors
4. Oxygen deficiency
5. Drowning
6. Electrical Injuries

Because most of the work around the treatment plant will be done normally by a single person, and generally not more than two people, the operator must always think safety. Thus, the operator should consider things such as:

- Red Cross water safety and life saving
- Maintenance of any fencing
- Warning signs around the site
- Electrical safety procedures
- Maintenance of plant structures and equipment

A discussion of these and other safety considerations are contained in this chapter.

Because any injury is a symptom of something wrong in the operation of the treatment system, each case must be investigated diligently to determine the real cause. To aid in developing an effective safety program, records should be kept which may reflect:

1. Persons prone to accidents
2. Hazardous operations
3. Hazardous locations
4. Nature of injuries (suggesting need for protective clothing and equipment)

This information can serve as the basis for a constructive evaluation of safety conditions at Moroni WWTP.

9.1 General Safety Practices

Each member of the treatment plant staff is responsible for observing all the safety rules and procedures established to protect the staff and wastewater treatment facilities. General safety practices that should be followed by all employees are as follows:

1. All written and oral safety rules should be observed and particular job associated hazards recognized.
2. A job should not be started until proper instructions have been received and are understood.
3. Any hazardous conditions, unsafe equipment, or unsafe working practice should be reported to the supervisor immediately.
4. All injuries or accidents should be reported to the supervisor.
5. All water in the plant, other than drinking water fountains or water coolers, should be considered contaminated and unsafe to drink.
6. Running in the plant, except in case of emergency, is forbidden.
7. Moving equipment should not be operated unless instruction in its use has been given.
8. Speed limits, traffic signs, and parking regulations should be observed within the plant site.
9. Safety devices and safety guards must be in place before operating any equipment.
10. Hand tools and special tools should be kept clean and in good repair.
11. The correct tool should be used for the particular job in the proper manner.
12. Proper protective equipment should be used for particular job conditions.
13. Wearing loose clothing should be avoided because it may be caught in moving equipment.
14. Good housekeeping should be practiced at all times.
15. The rules of personal hygiene should be observed to avoid infection.
16. Smoking in hazardous and prohibited areas is forbidden.
17. Practical jokes, rowdiness, and "horseplay" are strictly forbidden.

18. Reporting under the influence of alcohol or drugs, or bringing them on the premises, is forbidden.
19. Under no circumstances should safety be sacrificed for speed.
20. No job should be considered finished until the safety of the next person to use the equipment or facility has been maximized.

9.2 Prevention of Physical Injury

Primary protective devices around the treatment plant are the building itself and warning signs. The building is intended to protect equipment from vandalism but the warning signs also protect those people unaware of the dangers. The building also prevents the curious from wandering into the plant; therefore, the building should be kept locked at all times. Most of the treatment plant structures and wet wells have hand railings to protect the operator. All the flow control structures are provided with planking or gratings to form walkways. The operator should take care to see that these covers are always in place and that they do not slip to one side having an edge without support.

All mechanical equipment is supplied with coupling guards, belt guards, etc. These should always be replaced if removed for any reason. Nevertheless, extreme caution should be exercised when working around any machinery. One should always remember:

1. When taking machinery out of service, the operator in charge should always TURN OFF the pump/motor at the Motor Control Center, tag, and then TURN OFF the local switch and padlock it. The key should remain in the possession of the operator doing the work and under no circumstances should someone's padlock be cut off or otherwise removed by anyone other than the person who locked and tagged it.
2. When returning machinery to service, the operator should always unlock and TURN ON the local switch and then remove the tag and TURN ON the pump/motor at the Motor Control Center.
3. Never leave a dismantled machine unattended unless adequate warning signs are provided.

4. Always wear appropriate protective equipment for the job i.e. safety glasses, chemical (splash) goggles, face shield, gloves, steel toe boots etc. If there is ever a question as to what equipment is needed talk to your supervisor.

The prevention of physical injuries begins with good housekeeping. Therefore, the structures and equipment at the WWTP should be kept in good repair and maintained in a neat condition. Tools should be picked up, manhole covers promptly replaced, and good housekeeping practiced at all times. Control panels, blowers/motors, and other equipment should never be used as clothes or tool racks.

For work in manholes in streets, safety requires full protective measures from traffic hazards. Warning signs and red flags should be set up a suitable distance on each side of the manhole. On extremely busy streets, it may be desirable to station men to flag down and detour fast moving vehicles. It is important that sufficient workers be provided for the job at hand. There should be at least two men at the surface when one goes below. A cage or guard device around a manhole adds protection and aids entering and leaving the manhole. Manhole covers should be lifted with a hook made to fit a ventilation hole or lifting notch. A pick-axe may slip and cause injury or, if struck hard, may give off an igniting spark. Unless a cover is very heavy, it is safer for one man to handle it alone. Two men working as a team must carefully coordinate their efforts to avoid injuries to hands or feet.

The City should adopt a Confined Space Entry Program that addresses concerns and develops a specific policy to address these concerns. A general outline of a Confined Space Entry Program is shown below:

Part A. Scope of the permit Required Confined Spaces Program
Part B. Administration and Operating Procedures
Part C. Authorization of Permits
Part D. Components of the Permit Required Confined Spaces Program
1. Hazard Identification

2. Hazard Control
3. The Permit System
4. Employee Information
5. Prevention of Unauthorized Entry
6. Employee Training
7. Equipment
8. Emergency Procedures
9. Protection from External Hazards
10. Duty to Other Employers
11. Downgrading Permit required Confined Spaces

Part E. Specific Training and Duties

1. The Entrant
2. The Attendant
3. The Personnel Authorizing the Permit

Part F. The In-House Rescue Team

Part G. The Outside Rescue Team

Safety equipment and proper signage should be provided throughout the WWTP. Warning signs should be placed near dangerous/hazardous equipment, hidden obstacles, etc. Fire extinguishers should be placed in sufficient number around the plant. Safety harnesses and hard hats are also prudent safety precautions. The emergency telephone numbers are provided in Chapter 9.8.1.

9.3 Prevention of Body Infections

Workers who come into contact with wastewater are exposed to all the hazards of water borne diseases, including typhoid fever, Para typhoid fever, amoebic dysentery, infectious jaundice, and other intestinal infections. The absence of reported cases of these diseases in a community does not mean that the organisms are absent. All plant personnel should maintain their five-year

inoculation schedules for typhoid, tetanus, diphtheria and other diseases as recommended by local health officials.

The operator may come in contact with potentially infectious wastewater while working around the plant or in the laboratory. Extra care should be taken to avoid accidental ingestion of wastewater, and pipetting in the laboratory by mouth should be strictly prohibited. All personnel should carefully wash their hands with a disinfecting soap after coming into contact with the wastewater. Disinfected plant effluent should contain few organisms. However, some disease carrying organisms can resist disinfection, making disinfected effluent potentially dangerous. All non-potable water hydrants and valves should be painted dark blue with a white band and a sign hung around each warning against drinking.

Except for minor injuries, wounds should be treated by a doctor and reported for possible workmen's compensation. Service trucks and treatment plants should have first aid kits, and the personnel should have had Red Cross first aid instruction. No cut or scratch is too minor to receive attention. All cuts or other wounds should be washed thoroughly before antiseptics and bandages are applied. A two percent tincture of iodine or tincture of methiolate should be immediately applied to all wounds or cuts.

Rubber gloves are inexpensive and afford good protection to the hands while cleaning pumps, handling wastewater screenings, sludge, grit, scum, or other infectious material. Gloves should be cleaned daily after each use. Leather gloves should not be used because infectious organisms can become lodged in the pores of the leather. Glove protection is particularly important when the hands are chapped or burned, or the skin broken from any wound. In wet places, boots or rubber overshoes protect the feet from dampness and infection. Work clothes or coveralls should be worn in dirty places such as manholes, and should be laundered frequently. For extremely dirty jobs, there are available rubberized fabric suits with hoods, which can be washed off with a hose.

Smoking should not be done in sewers or in other hazardous locations. It is practically impossible to avoid contamination by wastewater of the ends of pipes, cigars, or cigarettes. Smoking is also a potential source of ignition for any flammable vapors present. "Keeping the hands below one's collar," while at work in sewers or while handling wastewater or sludge is an excellent rule. A majority of infections reach the body by way of the mouth, nose, eyes, or ears. Hands of wastewater workers should be washed before smoking or eating. Soap preparations requiring no water rinse are available for field use. Of course, the common drinking cup should be banned and paper cups used. Safety meetings should be held and attended at least monthly.

9.4 Noxious Gases or Vapors and Oxygen Deficiency

Gas is a state of matter in which the movement of molecules is practically unrestricted.

9.4.1 Vapor

This is the gaseous phase of a substance, which can exist also in the form of a liquid at common temperatures and pressures. Water vapor and gasoline vapor are examples. A noxious gas or vapor is one that is directly or indirectly hazardous or destructive to the health or life of humans. They may cause burns, explosions, asphyxiation or poisoning.

9.4.2 Sewer Gas

Sewer gas is a mixture of gases from the decomposition of organic matter. It is actually sewage sludge gas with a high content of carbon dioxide and varying amounts of methane, hydrogen, hydrogen sulfide, and a small amount of oxygen. The hazard is from an explosive mixture of methane and oxygen or, more often, from an oxygen deficiency. Sewer gas does not include the extraneous gases or vapors which may be present in sewers from gas main leaks or from gasoline or other volatile solvents which can find their way into sewers.

9.4.3 Oxygen Deficiency

Air normally contains by volume about 21 percent oxygen and 79 percent nitrogen and traces of other gases. Air containing less than 13 percent oxygen by volume is decidedly dangerous to humans. Oxygen deficiency appears to be the leading cause of death in sewers.

Precautions must be taken by ventilation and testing of all manholes and other confined spaces.

9.4.4 Explosive Range

Flammable or burnable gases, when mixed with air (oxygen) in certain proportions, will explode violently upon ignition. No explosion will occur when the mixture is outside this range. The minimum concentration of a gas-air or vapor-air mixture that will explode if ignited is known as the lower explosive limit, while the maximum concentration for explosion is called the upper explosive limit.

The places which are most likely to be dangerous from a noxious gas or vapor situation or oxygen deficiency, and which should be carefully investigated before entering are: (↑,gas accumulates at top; ↓, gas accumulates at bottom)

- Primary Pumping Dry Well ($C0_2$↓, H_2S↓)
- Digester Pump Room ($C0_2$↓, H_2S↓, NH_4↑, CH_3↑)
- Sewers on flat grades where solids may settle and decompose ($C0_2$↓, H_2S↓, NH_4↑, CH_3↑)
- All sewers and manholes more than ten feet deep. ($C0_2$↓, H_2S↓, NH_4↑, CH_3↑)

9.4.5 Chlorine

Chlorine is not currently used at the Moroni WWTP.

9.4.6 Explosion/Fire Hazards

The explosive range of natural gas or sludge gas is approximately 5 - 15 percent by volume in air. Thus, not very much gas needs to be present before an explosion can occur. "NO SMOKING" signs should be posted and observed in areas where a danger of explosion is possible. Obviously, sticking one's head in a manhole while smoking is to be avoided, as is lighting matches to see.

A combustible gas meter should be available for testing an enclosed area prior to working in that area. One should note that many gases can cause explosions or asphyxiation or both.

The places most likely to be dangerous from an explosion/fire hazard are:

- Lift station
- Sewer Manholes

9.4.7 Other Gases

The hazards connected with noxious gases and vapors are as varied as the number of gases used and gases or vapors produced.

Detection of an existing gas or vapor hazard is a sure way to prevent accidents and loss of life before they occur. Fortunately, a simple method of detection of the common hazards is available at reasonable cost. Samples may be taken through a ventilation hole in a manhole cover, under a cover removed partially, or with the cover entirely removed. Care must be taken in all cases to avoid the creation of sparks. It is common practice to test above the manhole or tank floor, assuming that lighter than air gases will be vented from the top.

The ventilation of sewers without testing may be a hazardous procedure. Some of the hazardous gases are odorless and continued ventilation may not correct a hazardous situation. Tests should be made in the following order:

9.4.8 Test for Flammable or Explosive Gases

These gases may exist in many different combinations and can be detected by relatively inexpensive combustible gas indicators. These instruments are battery operated units which oxidize or burn a sample of the test atmosphere over a heated catalytic filament which is part of a balanced electrical circuit. Any combustible gas or vapor in the tested sample will unbalance the circuit, causing a deflection of an indicating needle to show on a scale the concentration of combustible gases or vapors in the sample. This scale is graduated in

percent of the lower explosive limit. For example, if methane alone were present in the sample and the scale needle had read 1150 percent," then two and one half percent of methane by volume is present in the atmosphere tested because the lower explosive limit of methane is five percent*. This would be a hazardous condition, and the manhole should be ventilated and retested. In general, readings in excess of 20 percent of the lower explosive limit should be considered hazardous. The sample is obtained by a tube or probe lowered into the structure and a bulb is used to aspirate the sample through the unit. The instruments are usually calibrated for petroleum vapors and do not give exact accuracy for other vapors. However, the degree of accuracy is adequate for complete safety of personnel.

9.4.9 Test for Hydrogen Sulfide

Lead acetate in a cotton mesh covered ampoule that may be crushed between the fingers and exposed in the atmosphere under test for one minute, turns from a yellow to brown color in the presence of hydrogen sulfide. The color is compared to a chart which indicates concentrations from 5 to 25 parts per million (ppm). Precautions to be taken are given on the chart. A concentration of 20 ppm is indicated as the maximum allowable for eight-hour exposure.

9.4.10 Test for Carbon Monoxide

Ampoules like those described above, contain palladium chloride which, when exposed to the gas, turns from yellow to dark gray. A color chart is used to determine gas concentrations up to 0.1 percent by volume. The chart points out the precautions that should be taken. The exposure time for these ampoules is ten minutes for normal temperatures, and twenty minutes for temperatures below freezing. A maximum allowable concentration for eight-hour exposure is indicated to be 100 ppm.

9.4.11 Test for Oxygen Deficiency

This test is made by aspirating a sample of the questioned atmosphere through a sampling tube and over a flame in an oxygen deficiency indicator. Oxygen deficiency is indicated by the extinguishing or by a decrease in height of the flame. If an explosive amount of

flammable gas is present, the flame will flare up and then be extinguished. The flame will usually be extinguished by an atmosphere containing less than 16 percent of oxygen and always by one containing less than 13 percent of oxygen. The extinguishing of the flame is a good indication of oxygen deficiency. But at elevations over 5,000 feet above sea level the flame may continue to burn in an atmosphere dangerous to life.

Two portable instruments that indicate the percentage of oxygen in a sample without using a flame are available. One instrument uses an oxygen absorbing fluid that increases in volume as it absorbs oxygen. The oxygen absorbing fluid is good for 100 tests of gas samples containing 10 percent oxygen. To recharge the device with fresh fluid, an oxygen free atmosphere must be created. The other portable oxygen indicator reads from 0 to 25 percent of oxygen content by volume. Both a carbon electrode and a zinc electrode are supported in a small plastic cylinder filled with a special proprietary electrolyte. Oxygen in the atmosphere being sampled diffuses through the porous carbon electrode and combines with hydrogen that has been brought to the electrode as hydrogen ions by an electric current generated by the cell. The hydrogen ions polarize the cell. This action is opposed by the oxygen, which changes the terminal voltage and meter reading according to the amount of oxygen in the gas being tested. A disadvantage of this unit is that it must be returned to a clear or ambient atmosphere after each use to ensure proper calibration and readout.

9.5 Safety Equipment

Listed below is the suggested safety equipment for the Moroni Water Reclamation Facility. The asterisk (*) indicates items currently located at the facility.

1. Oxygen Deficiency Indicator
2. Direct Reading Oxygen Indicator
3. Hydrogen Sulfide Detector
4. Combustible Gas Indicator
5. Carbon Monoxide Indicator
6. Sulfur Dioxide Detector
7. Safety Harness

8. Explosion-proof Portable Lights
9. Portable Blower
10. First Aid Kits*
11. Fire Extinguishers*
12. Rubber Gloves*
13. Rubberized Suits

9.6 Electrical Hazards

Most people do not realize that ordinary 110-volt electricity can be fatal. One should never underestimate low voltage and low amperage electricity. The electrical systems at the Moroni City WWTP operate at voltages from 120 to 480. All electricity should be treated with respect. No guesses should be made of the nature of an electrical circuit. Listed below are some suggested precautions to observe:

1. Do not become "grounded" in water or on pipes or drains; these are to be avoided when one is working near any electricity.
2. Allow only authorized people to work on electrical equipment and repairs. Electrical system repairs should not be attempted by the operator. Only qualified electricians or representatives of the control system supplier should attempt such work.
3. Keep all electrical controls accessible and well marked.
4. Keep rubber mats on the floor in front of electrical panels.
5. Keep wires from becoming a tripping hazard.
6. Work in pairs around electrical equipment.
7. Place "Man on Line" signs and lock the switches when working on electrical equipment that another person can turn on.
8. Always turn OFF the Motor Control Center switch before turning OFF the local switch. Always turn the local switch on first.
9. Never use metal ladders around electrical equipment.
10. Handle breaker wires as though they were "live" wires.

11. When there is a question about any electrical hazard, ask before you expose yourself to it.
12. Do not use any part of your body to test a circuit.
13. Ground all electric tools.
14. When working around electrical equipment, as with any other hazardous work, keep aware of the hazards at all times.

9.7 Laboratory Safety

Pertinent safety practices in the wastewater treatment laboratory include:

1. All chipped or cracked glassware should be discarded by placing it in a special container for disposal.
2. Ammonia, nitric, acetic, and perchloric acids: react violently with some organic materials. The possibility of a fire or explosion, when using these chemicals, must always be kept in mind.
3. Chemicals should not be handled with bare hands. Care is required with concentrated acids and bases. A concentrated acid should be added to water and not water to the acid. When a person is splashed with acid, immediately wash the affected area.
4. Suction bulbs on pipettes should be used to avoid mouth contact with sewage or hazardous chemicals.
5. Rubber aprons should be worn when working with corrosive chemicals, and the use of a face shield is highly desirable when handling dangerous chemicals.
6. All chemicals should be clearly labeled.
7. When making rubber to glass connections, the worker should wear gloves and lubricate both the glass and rubber with water. The glass and rubber connections should be held close to each other to avoid slippage.
8. Smoking and eating should be avoided while doing lab work. Always wash your hands before smoking or eating.

9.8 Medical and First Aid

The first aid program at the Moroni City treatment plant should consist of the following items:

1. A person properly trained in first aid to be available for each shift;
2. Approved first aid supplies or kit;
3. A first aid manual;
4. Posted instructions for calling a physician or hospital;
5. Posted instructions for transporting ill or injured employees;
6. Posted instructions for calling an ambulance or rescue squad; and
7. An adequate first aid record system.

Specific first aid procedures for various possible injuries that could occur at the treatment plant can be found in the first aid manual presented in the references. In addition, it is important that the treatment plant staff be familiar with the specific first aid procedures for hydrogen sulfide gas presented below.

9.8.1 Hydrogen Sulfide

Hydrogen sulfide acts so quickly on the lungs that there may be no time to call a doctor before an attempt is made to revive the victim. In such a case, the following steps should be taken and in the order given:

1. Be prepared to enter the area safely.
2. Move the victim at once into fresh air.
3. If the victim is unconscious and not breathing, immediately apply an approved method of artificial respiration and continue without interruption until natural breathing is restored or the victim is pronounced dead by a physician.
4. Keep the patient warm.
5. Summon a doctor and ambulance.
6. If available, give oxygen through a resuscitator.

9.9 References

1. Safety in Wastewater Works, Manual of Practice No. 1, Water Pollution Control Federation, 1975.
2. Safety in the Design, Operation and Maintenance of Wastewater Treatment Works, Background Report, U.S. EPA, 1968.
3. Safety in the Operation and Maintenance of Wastewater Treatment Works, Technical Bulletin, U.S. EPA, 1968.
4. The American Red Cross Text Book on First Aid, Washington, D.C.
5. First Aid Manual, U.S. Bureau of Mines.
6. Operation of Wastewater Treatment Plants, Manual of Practice No. 11, Water Pollution Control Federation, 1976.
7. Management of Small to Medium Sized Municipal Wastewater Treatment Plants, U.S. LPA 430/9 79 013.
8. The Chlorine Institute, Inc. 2001 L Street, N.W., Suite 506 Washington, D.C. 20036

9.9.1 EMERGENCY TELEPHONE NUMBERS

Police and Ambulance Emergencies	911
Ambulance Service	911
Sheriff Dispatcher	911
Fire Emergency	911
City Office	435-436-8359
Power Company, Rocky Mountain Power	877-548-3768
Central Utah Health Department	435-835-2231
Division of Water Quality	1-801-538-6146
State Division of Environmental Health (Salt Lake)	1-801-533-6121

APPENDIX A – UPDES PERMIT

STATE OF UTAH
DIVISION OF WATER QUALITY
DEPARTMENT OF ENVIRONMENTAL QUALITY
SALT LAKE CITY, UTAH

UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM (UPDES) PERMITS

Major Municipal Permit No. **UT0020222**
Biosolids Permit No. **UTL020222**
Storm Water Permit No. **UTR000000**

In compliance with provisions of the Utah *Water Quality Act, Title 19, Chapter 5, Utah Code Annotated ("UCA") 1953, as amended* (the *"Act"*),

MORONI FEED COMPANY

is hereby authorized to discharge from its wastewater treatment facility to receiving waters named **San Pitch River and the Rock Dam irrigation Canal**

to dispose of biosolids,

and to discharge storm water,

in accordance with specific limitations, outfalls, and other conditions set forth herein.

This permit shall become effective on October 1, 2011.

This permit expires at midnight on September 31, 2016.

Signed this 4th day of October, 2011.

John J. Whitehead
Acting Executive Secretary
Utah Water Quality Board

I. DISCHARGE LIMITATIONS AND REPORTING REQUIREMENTS

A. Description of Discharge Points. The authorization to discharge wastewater provided under this part is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under a UPDES permit are violations of the *Act* and may be subject to penalties under the *Act*. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge may be subject to criminal penalties as provided under the *Act*.

Outfall Numbers	Location of Discharge Outfalls
001	An 18" underground pipe runs southeast from the treatment plant and discharges through a diffuser into the San Pitch River at latitude 39°30'52" and longitude 111°35'10".
002	Discharge into the Rock Dam Irrigation Canal at latitude 39°31'08" and longitude 111°35'39".

B. Narrative Standard. It shall be unlawful, and a violation of this permit, for the permittee to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum, or other nuisances such as color, odor or taste, or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by a bioassay or other tests performed in accordance with standard procedures.

C. Specific Limitations and Self-Monitoring Requirements.

1. Effective immediately and lasting through the life of this permit, there shall be no acute toxicity in Outfall 001 and 002 as defined in *Part VII*, and determined by test procedures described in *Part I. C.3 a & b* of this permit.

2. Effective immediately and lasting the duration of this permit, the permittee is authorized to discharge from Outfall 001 and 002. Such discharges shall be limited and monitored by the permittee as specified on the next page:

Parameter	Effluent Limitations a/			
	Monthly Avg	Maximum Weekly Avg	Daily Minimum	Daily Maximum
Flow, MGD	1.1	NA	NA	NA
BOD_5, mg/L	25	35	NA	NA
BOD_5 Min. % Removal	85	NA	NA	NA
TSS, mg/L	25	35	NA	NA
TSS Min. % Removal	85	NA	NA	NA
E-Coli, No./100mL	126	157	NA	NA
TRC, mg/L				
Summer	0.016	NA	NA	0.029
Fall	0.131	NA	NA	0.235
Winter	0.158	NA	NA	0.283
Spring	0.055	NA	NA	0.098
WET, Acute Biomonitoring	NA	NA	NA	LC_{50}> 100% End of pipe
Oil & Grease, mg/L	NA	NA	NA	10
pH, Standard Units	NA	NA	6.5	9.0
Dissolved Oxygen (DO), mg/L	NA	NA	5.5	NA
Ammonia, mg/L				
Summer	4.2	NA	NA	23.7
Fall	12.5	NA	NA	35.0
Winter	24.2	NA	NA	80.1
Spring	21.8	NA	NA	65.6
TDS, mg/L	NA	NA	NA	1200

NA – Not Applicable

Self-Monitoring and Reporting Requirements a/			
Parameter	Frequency	Sample Type	Units
Total Flow b/ c/	Continuous	Recorder	MGD
BOD_5, Influent d/ Effluent	2 X weekly 2 X weekly	Composite Composite	mg/L mg/L
TSS, Influent d/ Effluent	2 X weekly 2 X weekly	Composite Composite	mg/L mg/L
E. Coli	2 X Weekly	Grab	mg/L
TRC	2 X weekly	Grab	mg/L
WET, Acute Biomonitoring	Quarterly	Composite	Pass/Fail
Oil & Grease	Monthly	Grab	mg/L
pH	2 X Weekly	Grab	SU
Dissolved Oxygen	2 X weekly	Grab	mg/L
Ammonia	2 X weekly	Grab	mg/L
TDS	Monthly	Grab	mg/L
Metals, Influent Effluent	2 X Yearly 2 X Yearly	Composite Composite	mg/L mg/L
Organic Toxics	1st, 3rd and 5th year of the permit cycle	Grab	mg/L

a/ See Definitions, *Part VII*, for definition of terms.

b/ Flow measurements of influent/effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.

c/ If the rate of discharge is controlled, the rate and duration of discharge shall be reported.

d/ In addition to monitoring the final discharge, influent samples shall be taken and analyzed for this constituent at the same frequency as required for this constituent in the discharge.

3. Acute/Chronic Whole Effluent Toxicity (WET) Testing.

a. *Whole Effluent Testing – Acute Toxicity.* Starting immediately, the permittee shall conduct quarterly acute static replacement toxicity tests on a composite sample of the final effluent. The sample shall be collected at outfall 001 and 002.

The monitoring frequency for acute tests shall be quarterly unless a sample is found to be acutely toxic during a routine test. If that occurs, the monitoring frequency shall become weekly (See *Part I.C.3.b, Accelerated Testing*). Samples shall be collected on a two day progression; i.e., if the first sample is

on a Monday, during the next sampling period, the sampling shall begin on a Wednesday, etc. Testing will be required using one species quarterly, alternating between Ceriodaphnia dubia and Pimephales promelas (fathead minnow).

The replacement static acute toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Edition, (EPA 821/R/02/012), October 2002,* as per *40 CFR 136.3(a) TABLE 1A-LIST OF APPROVED BIOLOGICAL METHODS.* The permittee shall conduct the 48-hour static replacement toxicity test using Ceriodaphnia dubia and the acute 96-hour static replacement toxicity test using Pimephales promelas (fathead minnow). A CO_2 atmosphere may be used (in conjunction with an unmodified test) in order to account for artificial pH drift, as previously demonstrated to and authorized by the Executive Secretary.

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration (lethal concentration to 50% of the population or LC_{50}). Mortality in the control must simultaneously be 10 percent or less for the results to be considered valid. If more than 10 percent control mortality occurs, the test shall be repeated until satisfactory control mortality is achieved. A variance to this requirement may be granted by the Executive Secretary if a mortality of less than 10 percent was observed in higher effluent dilutions.

If the permit contains a total residual chlorine limitation greater than 0.20 mg/L, the permittee may request from the Executive Secretary approval to de-chlorinate the sample, or collect the sample prior to chlorination.

Quarterly test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the reporting calendar quarter e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28). All test results shall be reported along with the DMR submitted for that reporting period. The format for the report shall be consistent with the latest *Region VIII Guidance for Acute Whole Effluent Reporting* and shall include all chemical and physical data as specified.

If the results for a minimum of ten consecutive tests indicate no acute toxicity, the permittee may request a reduction in testing frequency and/or reduction to one species. The Executive Secretary may approve, partially approve, or deny the request based on results and other available information. If approval is given, the modification will take place without a public notice.

b. *Accelerated Testing.* When acute toxicity is indicated during routine biomonitoring as specified in this permit, the permittee shall notify the Executive Secretary in writing within five (5) days after becoming aware of the test result. The permittee shall perform an accelerated schedule of biomonitoring to establish whether a pattern of toxicity exists. Accelerated testing will begin within seven (7) days after the permittee becomes aware of the test result. Accelerated testing shall be conducted as specified under *Part I.C.3.c, Pattern of Toxic ity.* If the accelerated testing demonstrates no pattern of toxicity, routine monitoring shall be resumed.

c. *Pattern of Toxicity.* A pattern of toxicity is defined by the results of a series of up to five (5) biomonitoring tests pursuant to the accelerated testing requirements using 100 percent effluent on the single species found to be more sensitive, once every week for up to five (5) consecutive weeks.

If two (2) consecutive tests (not including the scheduled quarterly or monthly test which triggered the search for a pattern of toxicity) do not result in acute toxicity, no further accelerated testing will be required and no pattern of toxicity will be found to exist. The permittee will provide written verification to the Executive Secretary within five (5) days, and resume routine monitoring.

A pattern of toxicity is established if one of the following occurs:

(1) If two (2) consecutive test results (not including the scheduled quarterly or monthly test, which triggered the search for a pattern of toxicity) indicate acute toxicity, this constitutes an established pattern of toxicity.

(2) If consecutive tests continue to yield differing results each time, the permittee will be required to conduct up to a maximum of five (5) acute tests (not including the scheduled quarterly or monthly test which triggered the search for a pattern of toxicity). If three out of five test results indicate acute toxicity, this will constitute an established pattern of toxicity.

d. *Preliminary Toxicity Investigation.*

(1) When a pattern of toxicity is detected the permittee will notify the Executive Secretary in writing within five (5) days and begin an evaluation of the possible causes of the toxicity. The permittee will have fifteen (15) working days from demonstration of the pattern to complete a Preliminary Toxicity Investigation (PTI) and submit a written report of the results to the Executive Secretary. The PTI may include, but is not limited to, additional chemical and biological monitoring, examination of pretreatment program records, examination of discharge monitoring reports, a thorough review of the testing protocol, evaluation of treatment

processes and chemical use, inspection of material storage and transfer areas to determine if a spill may have occurred, and similar procedures.

(2) If the PTI identifies a probable toxicant and/or a probable source of toxicity the permittee shall submit, as part of its final results written notification of that effect to the Executive Secretary. Within thirty (30) days of completing the PTI the permittee shall submit for approval a control program to control effluent toxicity and shall proceed to implement such a plan within seven (7) days following approval. The control program, as submitted to or revised by the Executive Secretary, may be incorporated into the permit.

(3) If no probable explanation for toxicity is identified in the PTI, the permittee shall notify the Executive Secretary as part of its final report, along with a schedule for conducting a Phase I Toxicity Reduction Evaluation (TRE) (See *Part I.C.3.e., Toxicity Reduction Evaluation*).

(4) If toxicity spontaneously disappears during the PTI, the permittee shall submit written notification to that effect to the Executive Secretary as part of the reporting requirements of paragraph a. of this section.

e. *Toxicity Reduction Evaluation (TRE).* If toxicity is detected during the life of this permit and it is determined by the Executive Secretary that a TRE is necessary, the permittee shall be so notified and shall initiate a TRE immediately thereafter. The purpose of the TRE will be to establish the cause of toxicity, locate the source(s) of the toxicity, and control or provide treatment for the toxicity.

A TRE may include but is not limited to one, all, or a combination of the following:

(1) Phase I – Toxicity Characterization

(2) Phase II – Toxicity Identification Procedures

(3) Phase III – Toxicity Control Procedures

(4) Any other appropriate procedures for toxicity source elimination and control.

If the TRE establishes that the toxicity cannot be immediately eliminated, the permittee shall submit a proposed compliance plan to the Executive Secretary. The plan shall include the proposed approach to control toxicity and a proposed compliance schedule for achieving control. If the approach and schedule are acceptable to the Executive Secretary, this permit may be reopened and modified.

If the TRE shows that the toxicity is caused by a toxicant(s) that may be controlled with specific numerical limitations, the permittee may:

(a) Submit an alternative control program for compliance with the numerical requirements.

(b) If necessary, provide a modified biomonitoring protocol, which compensates for the pollutant(s) being controlled numerically.

If acceptable to the Executive Secretary, this permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by the Executive Secretary, and/or a modified biomonitoring protocol.

Failure to conduct an adequate TRE, or failure to submit a plan or program as described above, or the submittal of a plan or program judged inadequate by the Executive Secretary, shall be considered a violation of this permit.

D. Reporting of Wastewater Monitoring Results. Monitoring results obtained during the previous month shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1) or by NetDMR, post-marked or entered into NetDMR no later than the 28th day of the month following the completed reporting period. The first report is due on July 28, 2011. If no discharge occurs during the reporting period, "no discharge" shall be reported. Legible copies of these, and all other reports including whole effluent toxicity (WET) test reports required herein, shall be signed and certified in accordance with the requirements of *Signatory Requirements (see Part VI.G)*, and submitted by NetDMR, or to the Division of Water Quality at the following address:

Department of Environmental Quality
Division of Water Quality
PO Box 144870
Salt Lake City, Utah 84114-4870

II. BIOSOLIDS REQUIREMENTS

A. Description of Treatment and Beneficial Use or Disposal

1. Treatment for Class A Standards.

   Composted biosolids produced at the MWRF for sale or giveaway to the public are formed into windrows approximately 5-9 feet high and approximately 12-15 feet wide, turned at least five times during a period of at least five days, and maintained at a temperature of at least 131°F (55°C).

2. Biosolids Beneficial Use or Disposal Method.

   a. Class A biosolids are sold or given away to the public.

      For any biosolids that are land filled, the requirements of *Utah Administrative Code MWRF15-301-5* and *Section 2.12* of the latest version of the *EPA Region VIII Biosolids Management Handbook* must be followed.

3. Changes in Treatment Systems and Disposal Practices.

   Should the MWRF change their disposal methods or the biosolids generation and handling processes of the site, MWRF must notify the Executive Secretary at least 180 days in advance. These changes include, but not limited to, methodology, testing, the addition or removal of any biosolids treatment equipment (e.g., machinery, drying beds, etc.) and/or any other change that may affect the quality of the biosolids or require a major modification of the permit.

B. Specific Limitations and Self-Monitoring Requirements

All biosolids generated by this facility that are land applied shall meet the requirements of *Part II.B.1, 2, 3, and 4* listed below.

1. Metals Limitations

   Class A Requirements
   If the biosolids are to be applied to a lawn or home garden, the biosolids shall meet the maximum heavy metals in Table 1 and the monthly average pollutant concentrations in Table 3.

   If the biosolids do not meet these requirements, the biosolids cannot be sold or given away for application to a lawn or home garden.

Tables 1, and 3 of Class A Heavy Metal Limitations

Heavy Metals	Table 1	Table 3
All heavy metals concentrations shall be measured and reported	Daily Maximum mg/Kg a/b/c/	Monthly Average Concentration mg/Kg a/c/ d/
Total Arsenic	75	41
Total Cadmium	85	39
Total Copper	4300	1500
Total Lead	840	300
Total Mercury	57	17
Total Molybdenum	75	N/A
Total Nickel	420	420
Total Selenium	100	100
Total Zinc	7500	2800

a/ See Part VII. for definition of terms.

b/ The limitations represent the maximum allowable levels of heavy metals in any biosolids intended for land application.

c/ Any violation of these limitations shall be reported in accordance with the requirements of Part II.K.1. of this permit.

d/ These limitations represent the maximum allowable levels of heavy metals based on an average of all samples taken during a 30-day period.

2. Pathogen Limitations

Class A Requirements

If the biosolids are to be sold or given away in a bag or a similar container for application to home lawns and gardens, the biosolids shall meet the requirements of Table 1, below. If the biosolids do not meet these requirements, the biosolids cannot be sold or given away.

Class A Pathogen Reduction Requirements a/

Table 1

Fecal Coliform or *Salmonella* Limits		The process to further reduce pathogens will be met by:
Salmonella shall be <3 MPN/4g of total solids OR Fecal Coliform shall be < 1000 MPN/g of total solids b/	**AND**	Composting using the windrow method, the temperature of the biosolids is maintained at, at least 55° C (131°F) or higher for at least 15 days or longer, with a minimum of 5 turnings of the windrows during the 15 days. a/

3. Vector Attraction Reduction Requirements a/

Vector attraction reduction will be met through the windrow method of composting. The composted biosolids need to be treated for at least 14 days at a temperature of at least 40° C (104° F) for at least 14 days with an average temperature of over 45° C (113° F).

a/ There are additional pathogen reduction and vector attraction reduction alternatives available in *40 CFR 503.32* and *40 CFR 503.33.* If the permittee intends to use one of these alternatives the Executive Secretary and the EPA must be informed at least 30 days prior to its use. This change may be made without additional public notice.

b/ Based on a geometric mean of a minimum of seven (7) samples of biosolids collected over a two week period (or as approved by the Executive Secretary in your sampling and analysis plan).

4. Self-Monitoring Requirements

At a minimum, upon the effective date of this permit, all metals, pathogens and applicable vector attraction reduction requirements shall be monitored according to *40 CFR 503.16.*

C. Special Conditions on Biosolids Storage

Permanent storage of biosolids is prohibited. Biosolids shall not be temporarily stored for more than two years. Written permission to store biosolids for more than two years must be obtained from the Executive Secretary. Storage of biosolids for more than two years will be allowed only if it is determined that significant treatment is occurring.

D. Management Practices for Application of Biosolids to Land

For biosolids that are sold or given away, an information sheet shall be provided to the person who receives the biosolids. The label or information sheet shall contain:

1. The name and address of the person who prepared the biosolids for sale or give away for application to the land.

2. A statement that prohibits the application of the biosolids to the land except in accordance with the instructions on the label or information sheet.

E. Representative Sampling. Biosolids samples used to measure compliance with this section the Permit, shall be collected at locations representative of the quality of biosolids generated at the treatment works and immediately prior to land application.

F. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under *40 CFR Part 503* unless other test procedures have been specified in this permit.

G. Penalties for Tampering. The *Act* provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

H. Reporting of Monitoring Results. MWRF shall provide the results of all monitoring performed in accordance with Part II.B.4., and information on management practices, land application sites, site restrictions and certifications shall be provided no later than February 19 of each year. Each report is for the previous calendar year. If no biosolids were applied to the land during the reporting period, "no biosolids were applied" shall be reported. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the Signatory Requirements (see Part VI.G.), and submitted to the Utah Division of Water Quality and the EPA at the following addresses:

Original to: Biosolids Coordinator
Utah Division of Water Quality
P. O. Box 144870
Salt Lake City Utah, 84114-4870

Copy to: Biosolids Coordinator, 8P-W-P
U. S. Environmental Protection Agency
Region VIII
1595 Wynkoop Street
Denver, Colorado 80202-1129

I. Additional Monitoring by the Permittee. If the MWRF monitors any pollutant more frequently than required by this permit, using test procedures approved under *40 CFR*

503 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted on the Biosolids Report form. Such increased frequency shall also be indicated.

J. Record Keeping

1. If so notified by the Executive Secretary MWRF may be required to add additional record keeping if information provided indicates that this is necessary to protect public health and the environment.

2. If any metal from Table 3 increases to the point where the biosolids no longer meet the limits in Table 3, additional record keeping from *40 CFR 503.17* is required.

3. MWRF is required to keep the following information for at least 5 years:

   a. Concentration of each heavy metal in Table 3.

   b. A description of how the pathogen reduction requirements in Part II.B.2. were met.

   c. A description of how the vector attraction reduction requirements in Part II. B. 3. were met.

   d. A description of how the management practices in Part II.D. were met (if necessary).

   e. The following certification statement:

      "I certify under the penalty of law, that the heavy metals requirements in Part II.B.1., the pathogen requirements in Part II.B.2., the vector attraction requirements in Part II.B.3., the management practices in Part II.D., (if necessary) have been met. This determination has been made under my direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements, the vector attraction reduction requirements, the management practices and the site restrictions have been met. I am aware that there are significant penalties for false certification including the possibility of imprisonment."

4. Records of monitoring information shall include:

   a. The date, exact place, and time of sampling or measurements;

   b. The initials or name(s) of the individual(s) who performed the sampling or measurements;

   c. The date(s) analyses were performed;

d. The time(s) analyses were initiated;

e. The initials or name(s) of individual(s) who performed the analyses;

f. References and written procedures, when available, for the analytical techniques or methods used; and,

g. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

5. MWRF shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application for this permit for the life of the permit. Data collected on site, copies of Biosolids Report forms, and a copy of this UPDES biosolids-only permit must be maintained on site during the duration of activity at the permitted location.

K. Twenty-four Hour Notice of Noncompliance Reporting.

1. MWRF shall report any noncompliance including transportation accidents, spills, and uncontrolled runoff from biosolids transfer or land application sites which may seriously endanger health or the environment as soon as possible, but no later than 24 hours from the time MWRF first became aware of the circumstances. The report shall be made to the Division of Water Quality at (801) 536-4300 or (801) 536-4123 (24-hour answering machine).

2. A written submission shall also be provided within five days of the time that MWRF becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and,

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Executive Secretary may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Division of Water Quality, by phone, at (801) 536-4300.

4. Reports shall be submitted to the addresses in Part II.H., Reporting of Monitoring Results.

L. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.H. are submitted. The reports shall contain the information listed in Part II.J.3.

M. Inspection and Entry. MWRF shall allow the Executive Secretary, or authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon MWRF's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, including, but not limited to, biosolids treatment, collection, storage facilities or area, transport vehicles and containers, and land application sites; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location, including, but not limited to, digested biosolids before dewatering, dewatered biosolids, biosolids transfer or staging areas, any ground or surface waters at the land application sites, or biosolids, soils, or vegetation on the land application sites.

5. MWRF shall make the necessary arrangements with the landowner or leaseholder to obtain permission or clearance, for the Executive Secretary, or authorized representative, upon the presentation of credentials and other documents as may be required by law, to be permitted to enter without delay for the purposes of performing their responsibilities.

III. STORM WATER REQUIREMENTS.

A. Coverage of This Section. The requirements listed under this section shall apply to storm water discharges. Storm water discharges from the following portions of the facility may be eligible for coverage under this permit: biosolids drying beds, haul or access roads on which transportation of biosolids may occur, grit screen cleaning areas, chemical loading, unloading and storage areas, salt or sand storage areas, vehicle or equipment storage and maintenance areas, or any other wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including lands dedicated to the disposal of sewage sludge that are located within the confines of the facility that may have a reasonable expectation to contribute to pollutants in a storm water discharge.

B. Prohibition of Non-Storm Water Discharges. Except for discharges identified in *Part I.*, and discharges described below in this paragraph, non-storm water discharges are prohibited. The following non-storm water discharges may be authorized under this permit provided the non-storm water component of the discharge is in compliance with this section; discharges from fire fighting activities; fire hydrant flushing; potable water sources including waterline flushing; drinking fountain water; irrigation drainage and lawn watering; routine external building wash down water where detergents or other compounds have not been used in the process; pavement wash waters where spills or leaks of toxic or hazardous materials (including oils and fuels) have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated compressor condensate; uncontaminated springs; uncontaminated ground water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

C. Storm Water Pollution Prevention Plan Requirements. The permittee must have (on site) or develop and implement a storm water pollution prevention plan as a condition of this permit.

1. Contents of the Plan. The plan shall include, at a minimum, the following items:

a. *Pollution Prevention Team.* Each plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team who are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

b. *Description of Potential Pollutant Sources.* Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and

significant materials, which may be reasonably expected to have the potential as a significant pollutant source. Each plan shall include, at a minimum:

(1) *Drainage*. A site map indicating drainage areas and storm water outfalls. For each area of the facility that generates storm water discharges associated with the waste water treatment related activity with a reasonable potential for containing significant amounts of pollutants, a prediction of the direction of flow and an identification of the types of pollutants that are likely to be present in storm water discharges associated with the activity. Factors to consider include the toxicity of the pollutant; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified. The site map shall include but not be limited to:

(a) Drainage direction and discharge points from all wastewater associated activities including but not limited to grit screen cleaning, bio-solids drying beds and transport, chemical/material loading, unloading and storage areas, vehicle maintenance areas, salt or sand storage areas.

(b) Location of any erosion and sediment control structure or other control measures utilized for reducing pollutants in storm water runoff.

(c) Location of bio-solids drying beds where exposed to precipitation or where the transportation of bio-solids may be spilled onto internal roadways or tracked off site.

(d) Location where grit screen cleaning or other routinely performed industrial activities are located and are exposed to precipitation.

(e) Location of any handling, loading, unloading or storage of chemicals or potential pollutants such as caustics, hydraulic fluids, lubricants, solvents or other petroleum products, or hazardous wastes and where these may be exposed to precipitation.

(f) Locations where any major spills or leaks of toxic or hazardous materials have occurred.

(g) Location of any sand or salt piles.

(h) Location of fueling stations or vehicle and equipment maintenance and cleaning areas that are exposed to precipitation.

(i) Location of receiving streams or other surface water bodies.

(j) Locations of outfalls and the types of discharges contained in the drainage areas of the outfalls.

(2) *Inventory of Exposed Materials.* An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of 3 years prior to the effective date of this permit and the present; method and location of onsite storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of 3 years prior to the effective date of this permit and the present; the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

(3) *Spills and Leaks.* A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the effective date of this permit. Such list shall be updated as appropriate during the term of the permit.

(4) *Sampling Data.* A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

(5) *Summary of Potential Pollutant Sources and Risk Assessment.* A narrative description of the potential pollutant sources from the following activities associated with treatment works: access roads/rail lines; loading and unloading operations; outdoor storage activities; material handling sites; outdoor vehicle storage or maintenance sites; significant dust or particulate generating processes; and onsite waste disposal practices. Specific potential pollutants shall be identified where known.

(6) *Measures and Controls.* The permittee shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

(7) *Good Housekeeping.* All areas that may contribute pollutants to storm waters discharges shall be maintained in a clean, orderly manner. These are practices that would minimize the generation of pollutants at the source or before it would be necessary to employ sediment ponds or

other control measures at the discharge outlets. Where applicable, such measures or other equivalent measures would include the following: sweepers and covered storage to minimize dust generation and storm runoff; conservation of vegetation where possible to minimize erosion; sweeping of haul roads, bio-solids access points, and exits to reduce or eliminate off site tracking; sweeping of sand or salt storage areas to minimize entrainment in storm water runoff; collection, removal, and proper disposal of waste oils and other fluids resulting from vehicle and equipment maintenance; other equivalent measures to address identified potential sources of pollution.

(8) *Preventive Maintenance*. A preventive maintenance program shall involve timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

(9) *Spill Prevention and Response Procedures*. Areas where potential spills that can contribute pollutants to storm water discharges can occur, and their accompanying drainage points, shall be identified clearly in the storm water pollution prevention plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures and equipment for cleaning up spills shall be identified in the plan and made available to the appropriate personnel.

(10) *Inspections*. In addition to the comprehensive site evaluation required under paragraph (*Part III.C.1.b.(16)*) of this section, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility on a periodic basis. The following areas shall be included in all inspections: access roads/rail lines, equipment storage and maintenance areas (both indoor and outdoor areas); fueling; material handling areas, residual treatment, storage, and disposal areas; and wastewater treatment areas. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained. The use of a checklist developed by the facility is encouraged.

(11) *Employee Training*. Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as spill response, good housekeeping and material management practices. The pollution prevention plan shall identify how often training will take place, but training should be held at least

annually (once per calendar year). Employee training must, at a minimum, address the following areas when applicable to a facility: petroleum product management; process chemical management; spill prevention and control; fueling procedures; general good housekeeping practices; proper procedures for using fertilizers, herbicides and pesticides.

(12) *Record keeping and Internal Reporting Procedures.* A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.

(13) *Non-storm Water Discharges.*

(a) *Certification.* The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the onsite drainage points that were directly observed during the test. Certifications shall be signed in accordance with *Part VI.G* of this permit.

(b) *Exceptions.* Except for flows from fire fighting activities, sources of non-storm water listed in *Part III.B.* (Prohibition of Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

(c) *Failure to Certify.* Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the *Executive Secretary* within 180 days after the effective date of this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the State, which are not, authorized by a *UPDES* permit are unlawful, and must be terminated.

(14) *Sediment and Erosion Control.* The plan shall identify areas, which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify structural, vegetative, and/or stabilization measures to be used to limit erosion.

(15) *Management of Runoff.* The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures that the permittee determines to be reasonable and appropriate shall be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity *Part III.C.1.b* (Description of Potential Pollutant Sources) of this permit] shall be considered when determining reasonable and appropriate measures. Appropriate measures or other equivalent measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, wet detention/retention devices and discharging storm water through the waste water facility for treatment.

(16) *Comprehensive Site Compliance Evaluation.* Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but in no case less than once a year. Such evaluations shall provide:

(a) Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

(b) Based on the results of the evaluation, the description of potential pollutant sources identified in the plan in accordance with *Part III.C.1.b* (Description of Potential Pollutant Sources) of this section and pollution prevention measures and controls identified in the plan in accordance with *Part III.C.1.b.(6)* (Measures and Controls) of this section shall be revised as appropriate within 2 weeks of such evaluation and shall provide for implementation of any changes to

the plan in a timely manner, but in no case more than 12 weeks after the evaluation.

(c) A report summarizing the scope of the evaluation, personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph *i.* (above) shall be made and retained as part of the storm water pollution prevention plan for at least 3 years after the date of the evaluation. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with *Part VI.G* (Signatory Requirements) of this permit.

(17) *Deadlines for Plan Preparation and Compliance*. The permittee shall prepare and implement a plan in compliance with the provisions of this section within 270 days of the effective date of this permit. If the permittee already has a plan, it shall be revised according to *Part III.C.1.b.(16)*, Comprehensive Site Evaluation.

(18) *Keeping Plans Current*. The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, that has a significant effect on the potential for the discharge of pollutants to the waters of the state or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified by the plan, or in otherwise achieving the general objective of controlling pollutants in storm water discharges associated with the activities at the facility.

D. Monitoring and Reporting Requirements.

1. Quarterly Visual Examination of Storm Water Quality. Facilities shall perform and document a visual examination of a storm water discharge associated with industrial activity from each outfall, except discharges exempted below. The examination must be made at least once in each of the following designated periods during daylight hours unless there is insufficient rainfall or snow melt to produce a runoff event: January through March; April through June; July through September; and October through December.

a. *Sample and Data Collection*. Examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 1 hour) of when the runoff or snowmelt begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on the samples.

All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where practicable, the same individual should carry out the collection and examination of discharges for entire permit term.

b. *Visual Storm Water Discharge Examination Reports*. Visual examination reports must be maintained onsite in the pollution prevention plan. The report shall include the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution), and probable sources of any observed storm water contamination.

c. *Representative Discharge*. When the permittee has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the observation data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.

d. *Adverse Conditions*. When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation onsite with the results of the visual examination. Adverse weather conditions, which may prohibit the collection of samples, include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

e. *Inactive and Unstaffed Site*. When a discharger is unable to conduct visual storm water examinations at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirement as long as the facility remains inactive and unstaffed. The facility must maintain a certification with the pollution prevention plan stating that the site is inactive and unstaffed so that performing visual examinations during a qualifying event is not feasible.

IV. MONITORING, RECORDING & GENERAL REPORTING REQUIREMENTS

A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under *Part I* shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. Samples of biosolids shall be collected at a location representative of the quality of biosolids immediately prior to the use-disposal practice.

B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under *Utah Administrative Code ("UAC") R317-2-10 and 40CFR Part 503*, unless other test procedures have been specified in this permit.

C. Penalties for Tampering. The *Act* provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

E. Additional Monitoring by the Permittee. If the permittee monitors any parameter more frequently than required by this permit, using test procedures approved under *UAC R317-2-10* and *40 CFR 503* or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or the Biosolids Report Form. Such increased frequency shall also be indicated. Only those parameters required by the permit need to be reported.

F. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements:
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

G. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five years from the date of the sample, measurement, report or application. This period may be extended by request of the

Executive Secretary at any time. A copy of this UPDES permit must be maintained on site during the duration of activity at the permitted location

H. Twenty-four Hour Notice of Noncompliance Reporting.

1. The permittee shall (orally) report any noncompliance including transportation accidents, spills, and uncontrolled runoff from biosolids transfer or land application sites which may seriously endanger health or environment, as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of circumstances. The report shall be made to the Division of Water Quality, (801) 536-4300, or 24-hour answering service (801) 536-4123.

2. The following occurrences of noncompliance shall be reported by telephone (801) 536-4123 as soon as possible but no later than 24 hours from the time the permittee becomes aware of the circumstances:

   a. Any noncompliance which may endanger health or the environment;

   b. Any unanticipated bypass, which exceeds any effluent limitation in the permit (See *Part V.G, Bypass of Treatment Facilities.)*;

   c. Any upset which exceeds any effluent limitation in the permit (See *Part V.H, Upset Conditions*.);

   d. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit; or,

   e. Violation of any of the Table 3 metals limits, the pathogen limits, the vector attraction reduction limits or the management practices for biosolids that have been sold or given away.

3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected;

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and,

e. Steps taken, if any, to mitigate the adverse impacts on the environment and human health during the noncompliance period.

4. The Executive Secretary may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Division of Water Quality, (801) 538-6146.

5. Reports shall be submitted to the addresses in *Part I.D, Reporting of Monitoring Results*.

I. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for *Part I.D* are submitted. The reports shall contain the information listed in *Part V.H.3*

J. Inspection and Entry The permittee shall allow the Executive Secretary, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, including but not limited to, biosolids treatment, collection, storage facilities or area, transport vehicles and containers, and land application sites;

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the *Act*, any substances or parameters at any location, including, but not limited to, digested biosolids before dewatering, dewatered biosolids, biosolids transfer or staging areas, any ground or surface waters at the land application sites or biosolids, soils, or vegetation on the land application sites; and,

5. The permittee shall make the necessary arrangements with the landowner or leaseholder to obtain permission or clearance, the Executive Secretary, or authorized representative, upon the presentation of credentials and other documents as may be required by law, will be permitted to enter without delay for the purposes of performing their responsibilities.

V. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Executive Secretary of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions. The *Act* provides that any person who violates a permit condition implementing provisions of the *Act* is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions or the Act is subject to a fine not exceeding $25,000 per day of violation. Any person convicted under *UCA 19-5-115(2)* a second time shall be punished by a fine not exceeding $50,000 per day. Except as provided at *Part V.G, Bypass of Treatment Facilities* and *Part V.H, Upset Conditions*, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit, which has a reasonable likelihood of adversely affecting human health or the environment. The permittee shall also take all reasonable steps to minimize or prevent any land application in violation of this permit.

E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Removed Substances. Collected screening, grit, solids, sludge, or other pollutants removed in the course of treatment shall be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or

creating a health hazard. Sludge/digester supernatant and filter backwash shall not directly enter either the final effluent or waters of the state by any other direct route.

G. Bypass of Treatment Facilities.

1. Bypass Not Exceeding Limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to paragraph 2 and 3 of this section.

2. Prohibition of Bypass.

   a. Bypass is prohibited, and the Executive Secretary may take enforcement action against a permittee for bypass, unless:

      (1) Bypass was unavoidable to prevent loss of human life, personal injury, or severe property damage;

      (2) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance, and

      (3) The permittee submitted notices as required under *section V.G.3.*

   b. The executive Secretary may approve an anticipated bypass, after considering its adverse effects, if the Executive Secretary determines that it will meet the three conditions listed in *sections V.G.2.a (1), (2) and (3).*

3. Notice.

   a. *Anticipated bypass.* Except as provided above in *section V.G.2* and below in *section V.G.3.b*, if the permittee knows in advance of the need for a bypass, it shall submit prior notice, at least ninety days before the date of bypass. The prior notice shall include the following unless otherwise waived by the Executive Secretary:

(1) Evaluation of alternative to bypass, including cost-benefit analysis containing an assessment of anticipated resource damages:

(2) A specific bypass plan describing the work to be performed including scheduled dates and times. The permittee must notify the Executive Secretary in advance of any changes to the bypass schedule;

(3) Description of specific measures to be taken to minimize environmental and public health impacts;

(4) A notification plan sufficient to alert all downstream users, the public and others reasonably expected to be impacted by the bypass;

(5) A water quality assessment plan to include sufficient monitoring of the receiving water before, during and following the bypass to enable evaluation of public health risks and environmental impacts; and,

(6) Any additional information requested by the Executive Secretary.

b. *Emergency Bypass*. Where ninety days advance notice is not possible, the permittee must notify the Executive Secretary, and the Director of the Department of Natural Resources, as soon as it becomes aware of the need to bypass and provide to the Executive Secretary the information in *section V.G.3.a.(1) through (6)* to the extent practicable.

c. *Unanticipated bypass*. The permittee shall submit notice of an unanticipated bypass to the Executive Secretary as required under *Part V.H*, Twenty Four Hour Reporting. The permittee shall also immediately notify the Director of the Department of Natural Resources, the public and downstream users and shall implement measures to minimize impacts to public health and environment to the extent practicable.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of paragraph 2 of this section are met. Executive Secretary's administrative determination regarding a claim of upset cannot be judiciously challenged by the permittee until such time as an action is initiated for noncompliance.

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the permittee can identify the cause(s) of the upset;

   b. The permitted facility was at the time being properly operated;

   c. The permittee submitted notice of the upset as required under *Part V.H, Twenty-four Hour Notice of Noncompliance Reporting*; and,

   d. The permittee complied with any remedial measures required under *Part V.D, Duty to Mitigate*.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

VI. GENERAL REQUIREMENTS

A. Planned Changes. The permittee shall give notice to the Executive Secretary as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of parameters discharged or pollutant sold or given away. This notification applies to pollutants, which are not subject to effluent limitations in the permit. In addition, if there are any planned substantial changes to the permittee's existing sludge facilities or their manner of operation or to current sludge management practices of storage and disposal, the permittee shall give notice to the Executive Secretary of any planned changes at least 30 days prior to their implementation.

B. Anticipated Noncompliance. The permittee shall give advance notice to the Executive Secretary of any planned changes in the permitted facility or activity, which may result in noncompliance with permit requirements.

C. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information. The permittee shall furnish to the Executive Secretary, within a reasonable time, any information which the Executive Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Executive Secretary, upon request, copies of records required to be kept by this permit.

F. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Executive Secretary, it shall promptly submit such facts or information.

G. Signatory Requirements. All applications, reports or information submitted to the Executive Secretary shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Executive Secretary shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Executive Secretary, and,

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. A duly authorized representative may thus be either a named individual or any individual occupying a named position.

3. Changes to authorization. If an authorization under *paragraph VI.G.2* is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of *paragraph VI.G.2.* must be submitted to the Executive Secretary prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports. The *Act* provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than

$10,000.00 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports. Except for data determined to be confidential under *UAC R317-8-3.2*, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of Executive Secretary. As required by the *Act*, permit applications, permits and effluent data shall not be considered confidential.

J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the permittee of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under the *Act*.

K. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability. The provisions of this permit are severable, and if any provisions of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Executive Secretary at least 20 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittee's containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

3. The Executive Secretary does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph *2* above.

N. State or Federal Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by *UCA 19-5-117* and *Section 510* of the *Act* or any applicable Federal or State transportation

regulations, such as but not limited to the Department of Transportation regulations.

O. Water Quality - Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. Water Quality Standards for the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

2. A final wasteload allocation is developed and approved by the State and/or EPA for incorporation in this permit.

3. Revisions to the current CWA § 208 areawide treatment management plans or promulgations/revisions to TMDLs (40 CFR 130.7) approved by the EPA and adopted by DWQ which calls for different effluent limitations than contained in this permit.

P. Biosolids – Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate biosolids limitations (and compliance schedule, if necessary), management practices, other appropriate requirements to protect public health and the environment, or if there have been substantial changes (or such changes are planned) in biosolids use or disposal practices; applicable management practices or numerical limitations for pollutants in biosolids have been promulgated which are more stringent than the requirements in this permit; and/or it has been determined that the permittees biosolids use or land application practices do not comply with existing applicable state of federal regulations.

Q. Toxicity Limitation - Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include, whole effluent toxicity (WET) limitations, a compliance date, a compliance schedule, a change in the whole effluent toxicity (biomonitoring) protocol, additional or modified numerical limitations, or any other conditions related to the control of toxicants if one or more of the following events occur;

1. Toxicity is detected, as per *Part I.C.3a.* of this permit, during the duration of this permit.

2. The TRE results indicate that compliance with the toxic limits will require an implementation schedule past the date for compliance and the Executive Secretary agrees with the conclusion.

3. The TRE results indicate that the toxicant(s) represent pollutant(s) that may be controlled with specific numerical limits, and the Executive Secretary agrees that numerical controls are the most appropriate course of action.

4. Following the implementation of numerical control(s) of toxicant(s), the Executive Secretary agrees that a modified biomonitoring protocol is necessary to compensate for those toxicant that are controlled numerically.

5. The TRE reveals other unique conditions or characteristics, which in the opinion of the permit issuing authority justify the incorporation of unanticipated special conditions in the permit.

R. Storm Water-Reopener Provision. At any time during the duration (life) of this permit, this permit may be reopened and modified (following proper administrative procedures) as per *UAC R317.8*, to include, any applicable storm water provisions and requirements, a storm water pollution prevention plan, a compliance schedule, a compliance date, monitoring and/or reporting requirements, or any other conditions related to the control of storm water discharges to "waters-of-State".

VII. DEFINITIONS

A. Wastewater.

1. The "7-day (and weekly) average", other than for e-coli bacteria, fecal coliform bacteria, and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. Geometric means shall be calculated for e-coli bacteria, fecal coliform bacteria, and total coliform bacteria. The 7-day and weekly averages are applicable only to those effluent characteristics for which there are 7-day average effluent limitations. The calendar week, which begins on Sunday and ends on Saturday, shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for that calendar week shall be included in the data for the month that contains Saturday.

2. The "30-day (and monthly) average," other than for e-coli bacteria, fecal coliform bacteria and total coliform bacteria, is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month, whichever is applicable. Geometric means shall be calculated for e-coli bacteria, fecal coliform bacteria and total coliform bacteria. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

3. "Act," means the *Utah Water Quality Act*.

4. "Acute toxicity" occurs when 50 percent or more mortality is observed for either test species at any effluent concentration (lethal concentration to 50% of the population or "LC_{50}").

5. "Bypass," means the diversion of waste streams from any portion of a treatment facility.

6. "Composite Samples" shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

c. Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

d. Continuous sample volume, with sample collection rate proportional to flow rate.

7. "CWA," means *The Federal Water Pollution Control Act*, as amended, by *The Clean Water Act of 1987.*

8. "Daily Maximum" (Daily Max.) is the maximum value allowable in any single sample or instantaneous measurement.

9. "EPA," means the United States Environmental Protection Agency.

10. "Executive Secretary," means Executive Secretary of the Utah Water Quality Board.

11. A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.

12. An "instantaneous" measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.

13. "Severe Property Damage," means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

14. "Upset," means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate

treatment facilities, lack of preventative maintenance, or careless or improper operation.

B. Biosolids.

1. "Biosolids," means any material or material derived from sewage solids that have been biologically treated.

2. "Dry Weight-Basis," means 100 percent solids (i.e. zero percent moisture).

3. "Land Application" is the spraying or spreading of biosolids onto the land surface; the injection of biosolids below the land surface; or the incorporation of biosolids into the land so that the biosolids can either condition the soil or fertilize crops or vegetation grown in the soil. Land application includes distribution and marketing (i.e. the selling or giving away of the biosolids).

4. "Pathogen," means an organism that is capable of producing an infection or disease in a susceptible host.

5. "Pollutant" for the purposes of this permit is an organic substance, an inorganic substance, a combination of organic and inorganic substances, or pathogenic organisms that after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food-chain, could on the basis of information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), or physical deformations in either organisms or offspring of the organisms.

6. "Runoff" is rainwater, leachate, or other liquid that drains over any part of a land surface and runs off the land surface.

7. "Similar Container" is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

8. "Total Solids" are the materials in the biosolids that remain as a residue if the biosolids are dried at 103^{o} or 105^{o} Celsius.

9. "Treatment Works" are either Federally owned, publicly owned, or privately owned devices or systems used to treat (including recycling and

reclamation) either domestic sewage or a combination of domestic sewage and industrial waste or liquid manure.

10. "Vector Attraction" is the characteristic of biosolids that attracts rodents, flies mosquito's or other organisms capable of transporting infectious agents.

11. "Animals" for the purpose of this permit are domestic livestock.

12. "Annual Whole Sludge Application Rate" is the amount of sewage sludge (dry-weight basis) that can be applied to a unit area of land during a cropping cycle.

13. "Agronomic Rate is the whole sludge application rate (dry-weight basis) designed to: (1) provide the amount of nitrogen needed by the crop or vegetation grown on the land; and (2) minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

14. "Annual Pollutant Loading Rate" is the maximum amount of a pollutant (dry-weight basis) that can be applied to a unit area of land during a 365-day period.

15. "Application Site or Land Application Site" means all contiguous areas of a users' property intended for sludge application.

16. "Cumulative Pollutant Loading Rate" is the maximum amount of an inorganic pollutant (dry-weight basis) that can be applied to a unit area of land.

17. "Grit and Screenings" are sand, gravel, cinders, other materials with a high specific gravity and relatively large materials such as rags generated during preliminary treatment of domestic sewage at a treatment works and shall be disposed of according to *40 CFR 258*.

18. "High Potential for Public Contact Site" is land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

19. "Low Potential for Public Contact Site" is the land with a low potential for contact by the public. This includes, but is not limited to, farms, ranches, reclamation areas, and other lands which are private lands, restricted public lands, or lands which are not generally accessible to or used by the public.

20. "Monthly Average" is the arithmetic mean of all measurements taken during the month.

21. "Volatile Solids" is the amount of the total solids in sewage sludge lost when the sludge is combusted at 550 degrees Celsius for 15-20 minutes in the presence of excess air.

C. Storm Water.

1. "Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

2. "Coal pile runoff" means the rainfall runoff from or through any coal storage pile.

3. "Co-located industrial activity" means when a facility has industrial activities being conducted onsite that are described under more than one of the coverage sections of *Appendix II* in the General Multi-Sector Permit for Storm Water Discharges Associated with Industrial Activity. Facilities with co-located industrial activities shall comply with all applicable monitoring and pollution prevention plan requirements of each section in which a co-located industrial activity is described.

4. "Commercial Treatment and Disposal Facilities" means facilities that receive, on a commercial basis, any produced hazardous waste (not their own) and treat or dispose of those wastes as a service to the generators. Such facilities treating and/or disposing exclusively residential hazardous wastes are not included in this definition.

5. "Landfill" means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile.

6. "Land application unit" means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.

7. "Municipal separate storm sewer system" (large and/or medium) means all municipal separate storm sewers that are either:

a. Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (at the issuance date of this permit, Salt Lake City is the only city in Utah that falls in this category); or

b. Located in the counties with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (at the issuance date of this permit Salt Lake County is the only county that falls in this category); or

c. Owned or operated by a municipality other than those described in paragraph *a.* or *b.* (above) and that are designated by the *Executive Secretary* as part of the large or medium municipal separate storm sewer system.

8. "NOI" means "notice of intent", it is an application form that is used to obtain coverage under the General Multi-Sector Permit for Storm Water Discharges Associated with Industrial Activity.

9. "NOT" means "notice of termination", it is a form used to terminate coverage under the General Multi-Sector Permit for Storm Water Discharges Associated with Industrial Activity.

10. "Point source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

11. "Section 313 water priority chemical" means a chemical or chemical categories that:

a. Are listed at *40 CFR 372.65* pursuant to *Section 313* of the *Emergency Planning and Community Right-to-Know Act* (*EPCRA*) (also known as *Title III of the Superfund Amendments and Reauthorization Act* (*SARA*) of 1986);

b. Are present at or above threshold levels at a facility subject to *EPCRA Section 313* reporting requirements; and

c. Meet at least one of the following criteria:

(1) Are listed in *Appendix D* of *40 CFR Part 122* on either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols) or Table V (certain toxic pollutants and hazardous substances);

(2) Are listed as a hazardous substance pursuant to *Section 311(b)(2)(A)* of the *CWA* at *40 CFR 116.4*; or

(3) Are pollutants for which EPA has published acute or chronic water quality criteria. See *Appendix III* of this permit. This appendix was revised based on final rulemaking EPA published in the *Federal Register* November 30, 1994.

12. "Significant materials" includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under *Section 101(14)* of *CERCLA*; any chemical the facility is required to report pursuant to *EPCRA Section 313*; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with storm water discharges.

13. "Significant spills" includes, but is not limited to: releases of oil or hazardous substances in excess of reportable quantities under *Section 311 of the Clean Water Act* (see *40 CFR 110.10* and *CFR 117.21*) or *Section 102* of *CERCLA* (see *40 CFR 302.4*).

14. "Storm water" means storm water runoff, snowmelt runoff, and surface runoff and drainage.

15. "SWDMR" means "storm water discharge monitoring report", a report of the results of storm water monitoring required by the permit. The Division of Water Quality provides the storm water discharge monitoring report form.

16. "Storm water associated with industrial activity" (*UAC R317-8-3.8(6)(c) & (d)*) means the discharge from any conveyance that is used for collecting and conveying storm water and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the *UPDES* program. For the categories of industries identified in paragraphs *(a)* through *(j)* of this definition, the term

includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined in *40 CFR Part 401*); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water. For the categories of industries identified in paragraph *(k)* of this definition, the term includes only storm water discharges from all areas (except access roads and rail lines) listed in the previous sentence where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water. For the purposes of this paragraph, material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are Federally, State, or municipally owned or operated that meet the description of the facilities listed in paragraphs *(a)* to *(k)* of this definition) include those facilities designated under *UAC R317-8-3.8(1)(a)5.* The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this subsection:

a. Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under *40 CFR Subchapter N* (except facilities with toxic pollutant effluent standards that are exempted under category (k) of this definition);

b. Facilities classified as Standard Industrial Classifications 24 (except 2434), 26 (except 265 and 267), 28 (except 283 and 285), 29, 311, 32 (except 323), 33, 3441, 373;

c. Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under *40 CFR 434.11(l)* because the

performance bond issued to the facility by the appropriate SMCRA authority has been released, or except for areas of non-coal mining operations that have been released from applicable State or Federal reclamation requirements after December 17, 1990) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations; inactive mining operations are mining sites that are not being actively mined, but that have an identifiable owner/operator;

d. Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of RCRA;

e. Landfills, land application sites, and open dumps that have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under *Subtitle D* of *RCRA*;

f. Facilities involved in the recycling of materials, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093;

g. Steam electric power generating facilities, including coal handling sites;

h. Transportation facilities classified as Standard Industrial Classifications 40, 41, 42 (except 4221-25), 43, 44, 45 and 5171 that have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or that are otherwise identified under paragraphs (a) to (g) or (I) to (k) of this subsection are associated with industrial activity;

i. Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0

mgd or more, or required to have an approved pretreatment program under *40 CFR Part 403*. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and that are not physically located in the confines of the facility, or areas that are in compliance with *40 CFR Part 503*;

j. Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than 5 acres of total land area that are not part of a larger common plan of development or sale;

k. Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25, (and that are not otherwise included within categories (a) to (j))

17. "Waste pile" means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

APPENDIX B – GROUND WATER DISCHARGE AND CONSTRUCTION PERMIT

STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY
WATER QUALITY BOARD
P.O. BOX 144870
SALT LAKE CITY, UTAH 84114-4870

Ground Water Discharge and Construction Permit
Permit No. UGW390005

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended, the Act,

Norbest Inc.
Moroni Wastewater Treatment Plant
P.O. Box 308
Moroni, Utah 84646

hereafter after referred to as Permittee, is granted a Ground Water Discharge and Construction Permit for the operation of a 15 million gallon anaerobic lagoon. The lagoon is located on a tract of land encompassed in Section 16, Township 15 South, Range 3 East, Salt Lake Base and Meridian, Sanpete County, Utah.

This permit is based on representation made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this permit.

The facility shall be maintained and operated in accordance with conditions set forth in the permit and the Utah Administrative Rules for Ground Water Quality Protection (R317-6).

This permit shall become effective on June 27, 2016

This permit and authorization to operate shall expire at midnight June 27, 2021

_____
Walter L. Baker, P.E.
Director

TABLE OF CONTENTS

Applicable Norbest Operations Documents for this permit include but are not limited to:

Sampling and Analysis Plan

Anaerobic Lagoon Operations Manual

PART I CONSTRUCTION PERMIT ISSUANCE

A. AUTHORIZED CONSTRUCTION

As part of this ground water discharge permit, a construction permit is hereby issued to Norbest Inc. as summarized below and detailed in Appendix A. Construction for this project will consist of a 15 million gallon anaerobic lagoon.

B. DESIGN AND CONSTRUCTION

Under authority of the Utah Water Quality Act, Section 19-5-108(1) Utah Coe Ann. 1953, as amended and Utah Administrative Code R317-1, the authorized facilities will be constructed in accordance with the engineering design plans and specifications attached as Appendix A.

Construction of anaerobic lagoon- The lagoon will be directly south of the Moroni City sanitary wastewater treatment plant. The lagoon will have an approximate footprint of 7 acres and have a minimum operating volume of 46 acre-feet (ac-ft).

Approved construction elements include:

- Construction of a 15 million gallon anaerobic wastewater treatment lagoon.
- The Lagoon will be lined with a Flexible Membrane Liner (FML)(40 mil HDPE) and a leak location test is required and part of the CQA/QC.

BAT Performance Monitoring - Best available technology monitoring will include minimum vertical freeboard.

- Minimum Vertical Freeboard – a minimum of 2 feet of vertical freeboard shall be maintained to ensure total containment.

Spill Containment - The permittee shall design, maintain and construct all pipelines and pumping facilities with a spill containment system that shall:

- Prevent any spills or leakage from any contact with the ground surface or ground water.

Any spill that does come into contact with the ground surface or ground water that causes pollution or has the potential to cause pollution to waters of the state shall be reported in accordance with Part III.I.

PART II SPECIFIC CONDITIONS

A. GROUND WATER CLASSIFICATION

Results of the well sampling program indicate that ground water under the lagoon is likely Class I Drinking Water Quality Ground Water. This determination may be changed if subsequent compliance monitoring determines the ground water quality at the lagoon site.

B. BACKGROUND GROUND WATER QUALITY

Table 1 provides a range of background ground water quality data from Moroni City water supply wells #2 East Well and #3 West Well, and other nearby private wells.

Table 1: Background Ground Water Quality

Parameter	(mg/l)
pH (units)	6.5 – 8.5
Total Dissolved Solids	314 - 708
Chloride	47 - 60
Nitrate as N	.003
Alkalinity total	160 - 313
Bicarbonate	195 - 382
Sulfate	16 - 120
Calcium	48 - 70
Magnesium	20 - 34
Potassium	2 - 9
Sodium	25 - 74

C. GROUND WATER PROTECTION LEVELS

Table 2 provides interim ground water protection levels for compliance monitoring wells. Following an accelerated eight rounds of sampling, ground water protection levels will be established for the site utilizing the provisions outlined in UAC R317-6-4 for the parameters listed in Table 2. The interim protection levels of Table 2 will be modified if necessary. No degradation of ground water greater than existing levels found in monitoring well(s) upgradient of the lagoon will be allowed.

Table 2: Interim Ground Water Protection Levels

Parameter	Protection Levels (mg/l)
pH (units)	6.5-8.5 [(a)]
Total Dissolved Solids	800
Chloride	50
Bicarbonate (HCO_3)	225
Nitrate + nitrite (as N)	2.5
Ammonia as N	7.5
Sulfate	100

(a) Ground Water Quality Standard

D. BEST AVAILABLE TECHNOLOGY (BAT) STANDARD

The administration of this permit is founded on the use of Best Available Technology (BAT), in accordance with the requirements of UAC R317-6-1.3. The construction permit (PART V) issued with this discharge permit describes construction standards for wastewater treatment lagoons. Compliance with the requirements for use of BAT will be demonstrated by construction, operation and maintenance of the anaerobic lagoon according to the construction permit.

Achievement of these performance standards will be demonstrated by:

1) Only wastes from the plant operations may be disposed of in the lagoon.

2) No ground water degradation beyond permit limits established in Table 2 as measured by compliance monitoring wells.

3) Permitted Facilities. The facilities and equipment authorized under this permit are listed in Table 3.

TABLE 3: Permitted Facility and Components

Facility	**Discharge Control Technology**	Latitude	Longitude
Lagoon Cell 1	40-mil HDPE liner	39.5185	111.5957
MW-1	Groundwater monitoring	*a*	*a*
MW-2	Groundwater monitoring	*a*	*a*
MW-3	Groundwater monitoring	*a*	*a*

a = pending completion of drilling and construction

E. BEST MANAGEMENT PRACTICES

1) The Permittee shall operate the facility such that the ground water quality standards (UAC R317-6-2) and ground water protection levels in Table 2 that were developed for this permit are not exceeded in the unconfined aquifer underlying the site, or other aquifers that may be impacted by facility operations. Utah ground water regulations also contain standards for contaminants such as metals, pesticides and volatile organic compounds. Accordingly, the Permittee must not discharge these or any other contaminants that could impair beneficial uses of the ground water.

3) Permittee shall operate the wastewater anaerobic lagoon according to the *Anaerobic Lagoon Operations Manual*. Implementation of the manual will ensure proper handling of plant wastewater, prompt cleanup of any releases, and an ongoing operation, inspection, and maintenance program for ancillary facilities associated with this permit.

F. COMPLIANCE MONITORING REQUIREMENTS

1. General Provisions

a) *Future Modification of the Monitoring Program* - If at any time the Director determines the monitoring program to be inadequate, Permittee shall submit within 30 days of receipt of written notice from the Director a modified monitoring plan that addresses the inadequacies noted by the Director.

b) *Compliance Monitoring Period* - Monitoring shall continue upon issuance of this permit and throughout the term of this permit. For facilities that are constructed during the term of this permit, monitoring shall commence upon initiation of operation of the new facility.

c) *Laboratory Approval* - All water quality analyses shall be performed by a laboratory certified by the State of Utah to perform such analysis.

d) *Water Level Measurement* - In association with each well sampling event, water level measurements shall be made in each monitoring well prior to removal of any water from the well casing. These measurements will be made from a surveyed permanent single reference point clearly marked on the top of the well or surface casing. Measurements will be made to the nearest 0.01 foot.

e) *Sampling Protocol* - Water quality samples will be collected, handled and analyzed in conformance with the current approved version of the *Sampling and Analysis Plan*. The results of ground water monitoring shall be reported in accordance with the schedule in Part I Section H.

f) Ground Water Analyses - The following analysis shall be performed on all water samples collected from **monitoring wells**:

i) Field Measurements: pH, specific conductance, temperature

ii) Laboratory Analysis:

- Ammonia as nitrogen, bicarbonate, chloride, nitrate + nitrite as nitrogen, and sulfate.
- Total Dissolved Solids (TDS)

g) Wastewater Analyses - The following analyses shall be performed on a representative wastewater sample from the lagoon**:**

i) Field Measurements: pH, specific conductance, temperature

ii) Laboratory Analysis:

- Total Kjeldahl Nitrogen (TKN), ammonia (NH3-N), nitrate+nitrite (Total) sulfate, chloride, Total Dissolved Solids (TDS), sodium, potassium, calcium, magnesium, bicarbonate, phosphorus (Total as P), and Oil & Grease (HEM).

h) *Monitoring Frequency*

After installation, any new compliance monitoring well that may be required by the Division of Water Quality will be sampled quarterly until a minimum of eight (8) events have been completed to establish baseline ground water quality. Sampling events will then change to a semi-annual compliance monitoring frequency.

The lagoon shall be sampled not less than annually. Sample collection, handling, and analysis shall be conducted in accordance with the most recently revised and approved version of the *Sampling and Analysis Plan*. Analyses for nitrogen species shall be conducted at the same laboratory. Results of the lagoon wastewater performance monitoring accompanied by any supporting raw data shall be submitted to the Division of Water Quality with the next Ground Water Quality Monitoring Report.

2. Damage to Monitoring Wells

If a monitoring well is damaged, is otherwise rendered inadequate for its intended purpose, or if a previous hydraulic gradient between two monitor wells is reversed, the Director shall be notified in writing within five days of the Permittee becoming aware of the condition.

3. BAT Leak Detection and Performance Monitoring Program

Permittee shall operate the anaerobic lagoon in accordance with the Best Management Practices specified in the *Anaerobic Lagoon Operations Manual*.

Permittee shall conduct a lagoon inspection and maintenance program. Documentation of compliance with this program shall be maintained on site for review by representatives of the Division.

An electrically-based geophysical method will be periodically employed to determine if the synthetic liner of the anaerobic lagoon is free from defects or leakage. A leak detection survey shall be completed at the following frequency:

a) Upon completion of lagoon construction and prior to filling with wastewater.
b) Two times during the 5-year permit term: 2.5 years after permit issuance and 6 months prior to permit renewal.

G. NON-COMPLIANCE STATUS

1. Probable Out-of-Compliance Status - The permittee shall evaluate results of each ground water sampling event to determine any exceedence of the Ground Water Protection Levels found in Table 2 above. Upon determination that a Ground Water Protection Level has been exceeded in the ground water, the permittee shall:

a. Immediately re-sample the source(s) found to be in probable out-of-compliance status for laboratory analysis of the exceeded protection level parameter(s). Submit the analytical results thereof, and notify the Director of the probable out-of-compliance status within 30 days of the initial detection.

b. Upon exceedence of any one parameter listed in Table 2 for two consecutive sampling events, immediately implement an accelerated schedule of monthly sampling analysis, consistent with the requirements of this permit. This monthly sampling will continue for at least two months or until the compliance status can be determined by the Director. Reports of the results of this sampling will be submitted to the Director as soon as they are available, but not later than 30 days from each date of sampling.

2. Out-of-Compliance Status Based on Confirmed Exceedance of Permit Ground Water Protection Levels

a. Out of Compliance Status shall be defined as follows:

For parameters that have been defined as detectable in the background and for which protection levels have been established, out-of-compliance shall be defined as two consecutive samples exceeding the protection level and the mean background concentration by two standard deviations.

b. Notification and Accelerated Monitoring - upon determination by the permittee or the Director, in accordance with UAC R317-6-6.17, that an out-of-compliance status exists, the permittee shall:

1) Verbally notify the Director of the out-of-compliance status or acknowledge Director that such a status exists within 24 hours of receipt of data, and

2) Provide written notice within 5 days of the determination, and

3) Continue an accelerated schedule of monthly ground water monitoring for at least two months and continue monthly monitoring until the facility is brought into compliance as determined by the Director.

c. Source and Contamination Assessment Study Plan - within 30 days after the written notice to the Director required in Part I.G. 2.b.2, above, the permittee shall submit an assessment study plan and compliance schedule for:

1) Assessment of the source or cause of the contamination, and determination of steps necessary to correct the source.

2) Assessment of the extent of the ground water contamination and any potential dispersion.

3) Evaluation of potential remedial actions to restore and maintain ground water quality, and ensure that the ground water standards will not be exceeded at the compliance monitoring locations.

3. Out-of-Compliance Status Based Upon Failure To Maintain Best Available Technology - In the event that electrical leak detection surveys conducted for BAT monitoring indicates a violation of any of the construction or performance standards outlined in Part I.D and E of this permit, the permittee shall submit to the Director a notification and description of the violation in accordance with Part II.I of this permit.

H. REPORTING REQUIREMENTS

1. Water Monitoring - monitoring required in Part I.F above shall be reported according to the schedule in Table 4 below, unless modified by the Director:

Table 4: Compliance Monitoring Report Schedule

Monitoring Period	Report Due Date
January through June	June 15
July thru December	January 15

2. Ground Water Quality Sampling - reporting will include:

a. Field Data Sheets - or copies thereof, including the field measurements and other pertinent field data, such as: sampling location name/number, date and time, names of sampling crew, type of sampling: pump or grab, volume of water purged before sampling.

b. Water Level Measurements - water level measurements from ground water monitoring wells will be reported as measured depth to ground water from the surveyed casing measuring point, and ground water elevations as converted by casing measuring point elevations.

c. Laboratory Analytical Results - including date sampled, date received; and the results of analysis for each parameter, including: value or concentration, units of measurement, reporting limit (minimum detection limit for the examination), analytical method, and the date of the analysis.

d. Results of leak detection surveys if any were conducted during the reporting period.

3. Electronic Filing Requirements - In addition to submittal of the hard copy data, above, the permittee will electronically submit the required ground water monitoring data in the electronic format specified by the Director. The data may be submitted by e-mail, PDF, compact disc, or other approved transmittal mechanism.

4. Monitoring Well As-Built Report - For each new well constructed the permittee shall submit diagrams and descriptions of the final completion of the monitoring wells. The report is due within 60 days of the date of well completion. The report shall include:

a. Casing: depth, diameter, and type of material.

b. Screen: length, depth interval, diameter, material type, slot size.

c. Sand Pack: depth interval, material type and grain size.

d. Annular Seals: depth interval, material type.

e. Surface Casing and Cap: depth, diameter, material type, protection measures constructed.

f. Elevation and Location: ground surface elevation, elevation of water level measuring point, latitude and longitude in hours, minutes and seconds.

g. Well construction description, well completion description, results of well pump tests or slug tests.

I. COMPLIANCE SCHEDULE

1. Permit Compliance Schedule Item #1 (Sampling and Analysis Plan)
Norbest shall submit for the Director's approval a Sampling and Analysis Plan. The Plan shall incorporate the monitoring wells and anaerobic lagoon.

   The Plan shall be submitted within 90 days of the effective date of this permit.

2. Permit Compliance Schedule Item #2 (Anaerobic Lagoon Operations Manual)
Norbest shall submit for the Director's approval an updated Lagoon Operating Procedures Manual that meets the requirements of Part III (E) of this permit.

   The Plan shall be submitted within 90 days of the effective date of this permit.

3. Permit Compliance Schedule Item #3 Prior to placing the lagoon into service, Norbest shall install ground water monitoring wells completed in the shallow aquifer. One upgradient and a minimum of two downgradient wells will serve as one compliance mechanism for monitoring any lagoon discharge.

4. Permit Compliance Schedule Item #4 A site investigation and report that determines the extent of soil and ground water contamination resulting from WWTP equalization basin overflows. In accordance with R317-6-6.15D, the characterization of pollution should include the concentration, environmental fate and transport, and other significant characteristics of substances present, for both ground water contaminants and any contributing surficial contaminants. This report is due within ninety (90) days after issuance of UGW390005.

5. Final Closure Plan. In the event that the permittee decides to discontinue its operations at the facility the permittee shall notify the Director of such a decision and submit a Final Closure Plan. The Final Closure Plan shall be submitted no later than 180 days prior to the closure of the facility. The permittee shall resubmit Final Closure Plans within 60 days of receipt of written notice of deficiencies therein. Any material changes made to this plan shall require final approval of the Director.

PART III MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. REPRESENTATIVE SAMPLING

Samples taken in compliance with the monitoring requirements established under Part I shall be representative of the monitored activity.

B. ANALYTICAL PROCEDURES

Water sample analysis must be conducted according to test procedures specified under UAC R317-6-6.3.L, unless other test procedures have been specified in this permit.

C. PENALTIES FOR TAMPERING

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. REPORTING OF MONITORING RESULTS

Monitoring results obtained during each reporting period specified in the permit, shall be submitted to the Director, Utah Division of Water Quality at the following address no later than the 15th day of the month following the completed reporting period:

State of Utah
Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870
Attention: Ground Water Protection Section

E. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. ADDITIONAL MONITORING BY THE PERMITTEE

If the permittee monitors any pollutant more frequently than required by this permit, using approved test procedures as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. RECORDS CONTENTS

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements:
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. RETENTION OF RECORDS

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

I. TWENTY-FOUR HOUR NOTICE OF NONCOMPLIANCE REPORTING

1. The permittee shall verbally report any noncompliance which may endanger public health or the environment as soon as possible, but no later than 24 hours from the time the permittee first became aware of the circumstances. The report shall be made to the Utah Department of Environmental Quality 24 hour number, (801) 536-4123, or to the Division of Water Quality, Ground Water Protection Section at (801) 536-4300, during normal business hours (Monday through Friday 8:00 am - 5:00 pm Mountain Time).

2. A written submission shall also be provided to the Director within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and,

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. Reports shall be submitted to the addresses in Part II.D, Reporting of Monitoring Results.

J. OTHER NONCOMPLIANCE REPORTING

Instances of noncompliance not required to be reported within 24 hours, shall be reported at the time that monitoring reports for Part II.D are submitted.

K. INSPECTION AND ENTRY

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

PART IV COMPLIANCE RESPONSIBILITIES

A. DUTY TO COMPLY

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding $25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding $50,000 per day. Nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. PROPER OPERATION AND MAINTENANCE

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

PART V GENERAL REQUIREMENTS

A. PLANNED CHANGES

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

B. ANTICIPATED NONCOMPLIANCE

The permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. DUTY TO REAPPLY

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this permit.

E. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. OTHER INFORMATION

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. SIGNATORY REQUIREMENTS

All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:

   a. For a corporation: by a responsible corporate officer;

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

   c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and,

   b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to Authorization. If an authorization under Part IV.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. PENALTIES FOR FALSIFICATION OF REPORTS

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. AVAILABILITY OF REPORTS

Except for data determined to be confidential by the permittee, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.

J. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

K. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

L. TRANSFERS

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue
the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

M. STATE LAWS

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

N. REOPENER PROVISION

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. If new ground water standards are adopted by the Board, the permit may be reopened and modified to extend the terms of the permit or to include pollutants covered by new standards. The permittee may apply for a variance under the conditions outlined in R317-6-6.4.D.

2. If alternative compliance mechanisms are required.

3. If subsequent ground water monitoring data reveals the background water quality values in Part I Table 1 are not accurate.

APPENDIX A
CONSTRUCTION PERMIT
PLANS AND SPECIFICATIONS

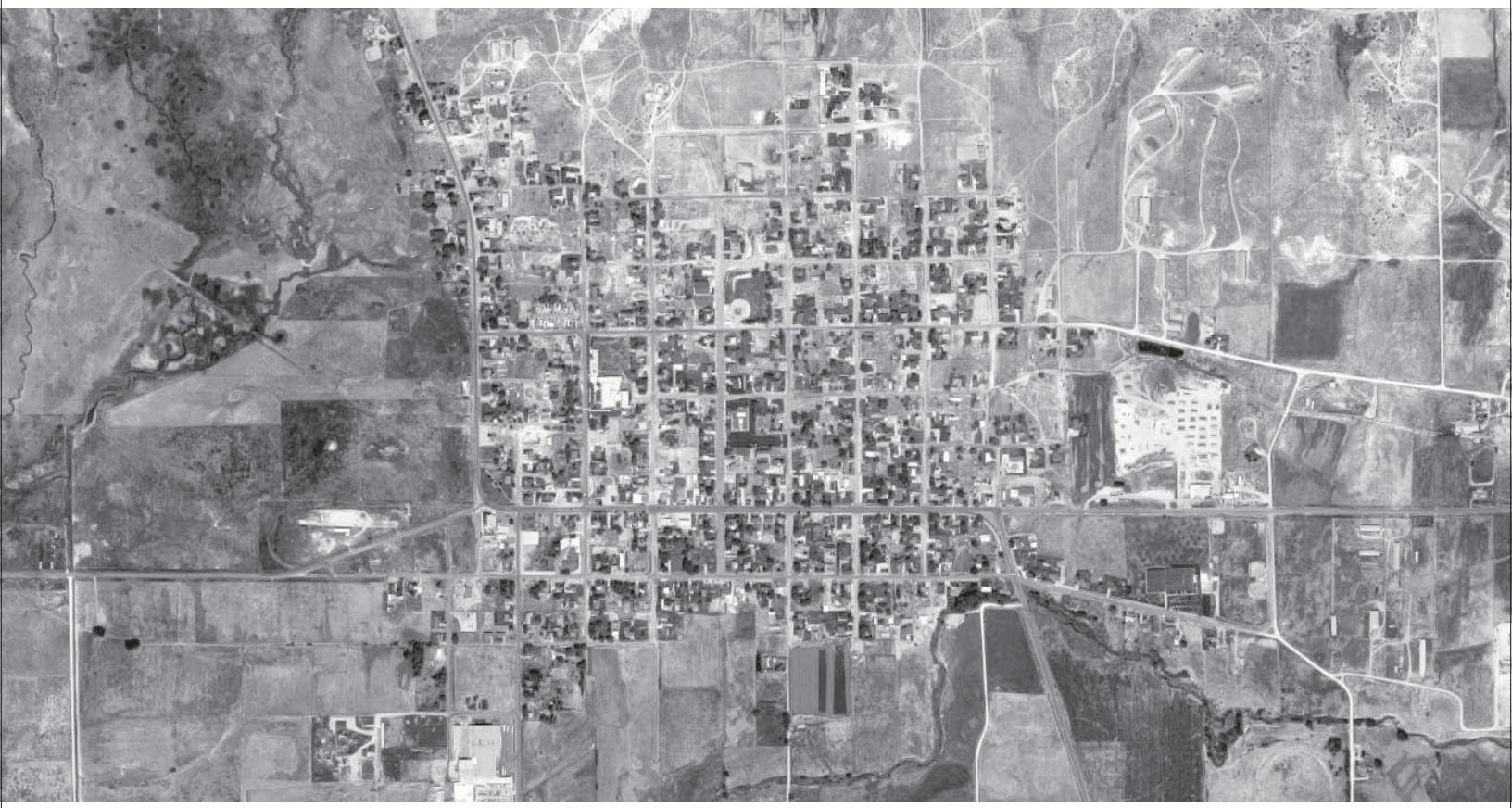
APPENDIX C – GROUNDWATER SAMPLING AND ANALYSIS PLAN

Moroni Wastewater Treatment Plant

15 Million Gallon Anaerobic Lagoon Project

Groundwater Sampling and Analysis Plan

December 2016



AQUA ENGINEERING

MORONI WASTEWATER TREATMENT PLANT

15 MILLION GALLON ANAEROBIC LAGOON PROJECT

GROUNDWATER SAMPLING AND ANALYSIS PLAN

12/23/16

TABLE OF CONTENTS:

1. Project Background and Purpose of Plan

The purpose of this sampling and analysis plan is to identify potential leaks in the anaerobic lagoon to allow for prompt corrective actions to prevent contamination to the groundwater. This sampling plan is prepared in accordance with the requirements of the associated Ground Water Discharge and Construction (GWDC) Permit (UGW390005) for the lagoon.

2. Construction and Location of Monitoring Wells

Based on available data, the flow of the groundwater in the shallow aquifer is best determined to be south-southwest. A total of three monitoring wells will be constructed, with one upgradient of the lagoon, and two immediately downstream of the lagoon. The well locations are shown in Appendix A.

Monitoring wells will be drilled into the shallow aquifer with an approximate depth of 30 feet, terminating before the confining layer separating the shallow aquifer from the deeper aquifer. The depth of the monitoring well is established based on the intent to detect any changes in groundwater quality, which may indicate a leak in the lagoon liner.

a. Groundwater Monitoring Wells As-Built Report

Following completion of the wells, an as-built report will be submitted including the following information:

1. Casing: depth, diameter, and type of material
2. Screen: length, depth interval, diameter, material type, slot size
3. Sand Pack: depth interval, diameter, material type, slot size
4. Annular Seals: depth interval, material type
5. Surface Casing and Cap: depth, diameter, material type protection measures constructed
6. Elevation and Location: ground surface elevation, elevation of water level measuring point, latitude and longitude in hours, minutes and seconds

7. Well construction description, well completion description, results of well pump tests or slug tests

3. Background Concentration

The GWDC Permit provides a table with an estimated groundwater quality in the area based on Moroni City water supply wells and nearby private wells. To establish current background groundwater quality, the monitoring wells will be sampled quarterly until a minimum of eight (8) samples have been completed.

4. Monitoring Frequency

The monitoring wells and anaerobic lagoon shall be sampled at regular time intervals as indicated below.

a. Groundwater Monitoring Wells

Once background water quality has been determined from quarterly sampling as described in Part 3, sampling of the wells shall occur on a semi-annual basis. Ideally, this sampling will occur near the end of the monitoring period given in Part H of the GWDC Permit. Each sample shall follow the sampling procedures detailed in Part 5 below and in accordance with the GWDC permit.

b. Lagoon

The 15 million gallon anaerobic lagoon performance shall be monitored in two ways: (1) water quality from samples taken directly from the lagoon and (2) liner leak detection.

Water quality samples shall be taken annually, ideally coordinating with one of the semi-annual samplings taken at the monitoring wells. Sampling procedures shall be followed as outlined Part 6 below and in accordance with the GWDC Permit.

Lagoon liner leak detection testing shall be conducted twice during the 5-year permit term: Once at 2 ½ years after permit issuance and the second at 6

months prior to permit renewal. Details regarding this testing is included in the Operations and Maintenance Manual.

5. Groundwater Monitoring Well Sampling Procedures

Groundwater samples would be collected using currently accepted and approved techniques and technologies. The protocols for sampling would consist of water level measurements, field measurements and laboratory testing. Samples would be tested using a state certified laboratory. Each sampling protocol is discussed in detail below.

a. Water Level Measurements

Water level measurements would be read to the nearest 0.01 foot. Water level shall be sampled with a sounding tape or another approved measuring device.

b. Water Quality Sampling

i. Field Measurements

Water samples shall be taken using a sampling bailer. Field measurement samples would be collected in a clean beaker once the well was properly purged. All probes or instruments would be kept in designated containers to prevent cross contamination between samples. All instruments would be cleaned per manufacture's recommendations after and prior to taking any measurements. Field measurements and field notes would include:

1. name of collector
2. time of sample
3. weather conditions
4. air temperature
5. date of sample
6. monitoring well identification number

7. water temperature
8. depth to groundwater
9. groundwater elevation
10. pH
11. specific conductance
12. sampling identification number
13. containers used
14. and general comments section.

All this information would be kept in a field notebook. All measurement instruments would be calibrated at the beginning of the day and rechecked after all the sampling was complete to record any possible instrument drift.

ii. Laboratory Testing

Sampling containers and procedures for preparations of samples would be provided by the testing laboratory. Once the samples were collected and prepared to laboratory recommendations, the sample would be immediately labeled, recorded in the field book, and placed in a sampling cooler. The samples would be recorded on a chain-of-custody and remain with the sampler until formally released to another individual.

Custody of the samples would be documented on a chain of custody form. Samples would remain in the custody of the sampler until samples are checked in and relinquished to the laboratory or until they were relinquished for transport to the laboratory.

Constituents to be sampled at the laboratory are as follows:

1. Ammonia (as N)
2. Bicarbonate
3. Chloride

4. Nitrate + Nitrite (as N)
5. pH
6. Sulfate
7. Total Dissolved Solids (TDS)

6. Lagoon Water Sampling

The water samples would be collected using currently accepted and approved techniques and technologies. Samples shall be taken from the weir box, located near the northeast corner of the lagoon. Samples shall be taken upstream of the weir. Samples would be tested using a state certified laboratory. Sampling handling and testing procedures shall be as detailed in Part 5.b above.

Field measurements and field notes shall be as detailed in Part 5.b.i above. Constituents to be sampled at the laboratory are as follows:

1. Total Kjeldahl Nitrogen (TKN)
2. Ammonia (as N)
3. Nitrate + nitrite (as N)
4. Total sulfate
5. Chloride
6. Total Dissolved Solids (TDS)
7. Sodium
8. Potassium
9. Calcium
10. Magnesium
11. Bicarbonate
12. Phosphorus (Total as P)
13. and Oil and Grease (HEM)

7. Reporting and Analysis

a. Analysis of Samples

All data received would be reviewed to assess data validity. Each data report would be checked to insure the following:

- Identification numbers of the samples match.
- Chain of custody and field notes matches the sample information.
- Sample analysis was performed using requested methods and acceptable time limits.
- Reporting limits conform to current detection limits.
- Blank results have been included and are acceptable.
- All QA/QC sampling results are included and acceptable.

If there were any potential problems with the data reports or discrepancies, the laboratory would be notified immediately. If necessary, new samples would be collected and tested. Data would be analyzed based on concentrations of naturally occurring constituents plotted at each well on control charts for that specific well. Each constituent would be analyzed to determine whether groundwater is being impacted.

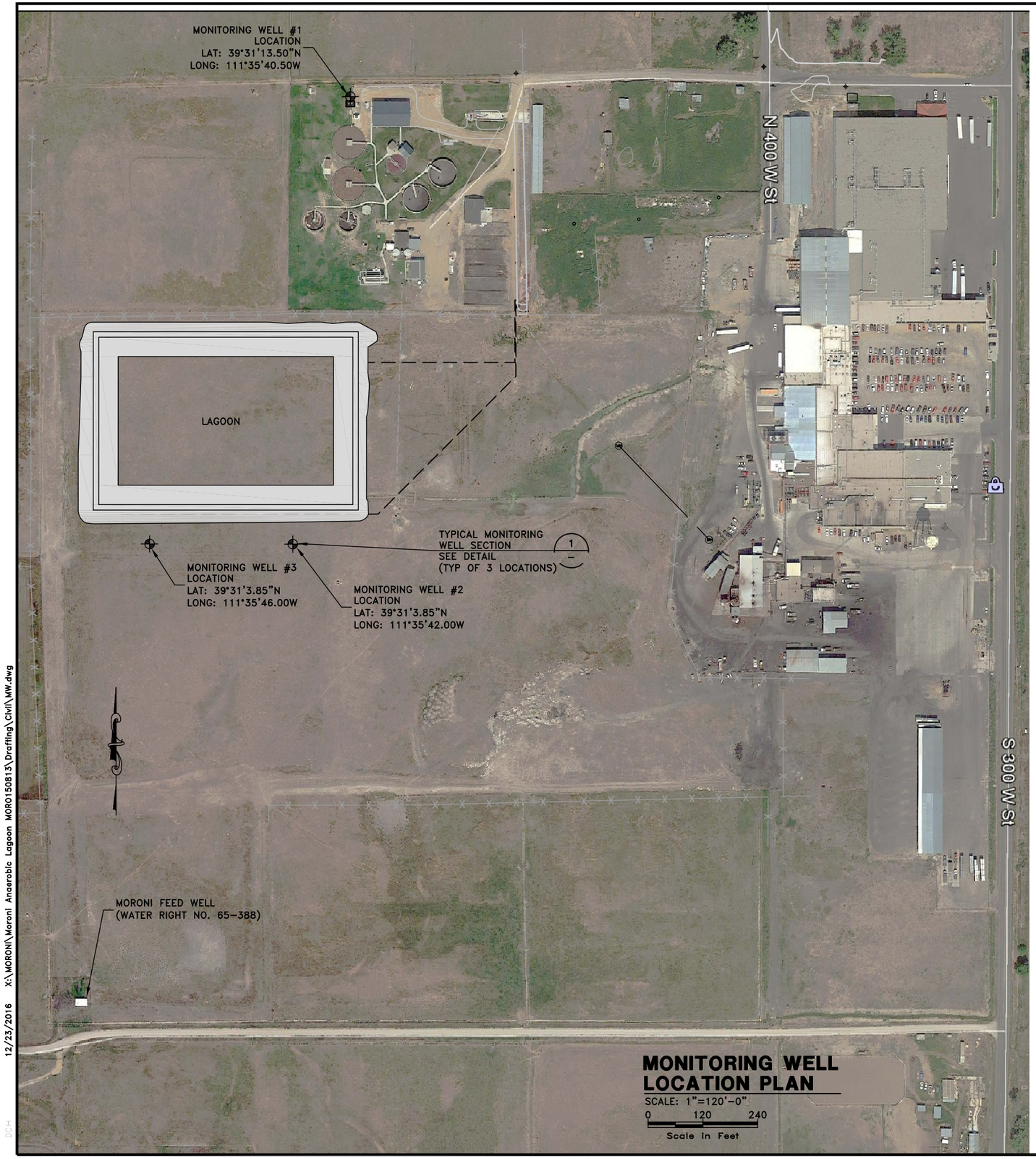
b. Reporting

Reports shall be prepared and submitted in accordance with the Compliance Monitoring Report Schedule given in Part H of the GWDC Permit. The reports shall include the following:

- Description of procedures, including the quality assurance /quality control, followed during the collection of samples.
- Results of field measured parameters.
- Chain of custody and quality assurance /quality control procedures followed by the laboratory.
- Laboratory results with detection limits and testing methods used.
- Statistical analysis of the laboratory results.

Reports shall be submitted in a hard copy format, as well as an electronic format as specified by the Director. Hard copy reports shall be submitted to:

State of Utah
Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870
Attention: Ground Water Protection Section

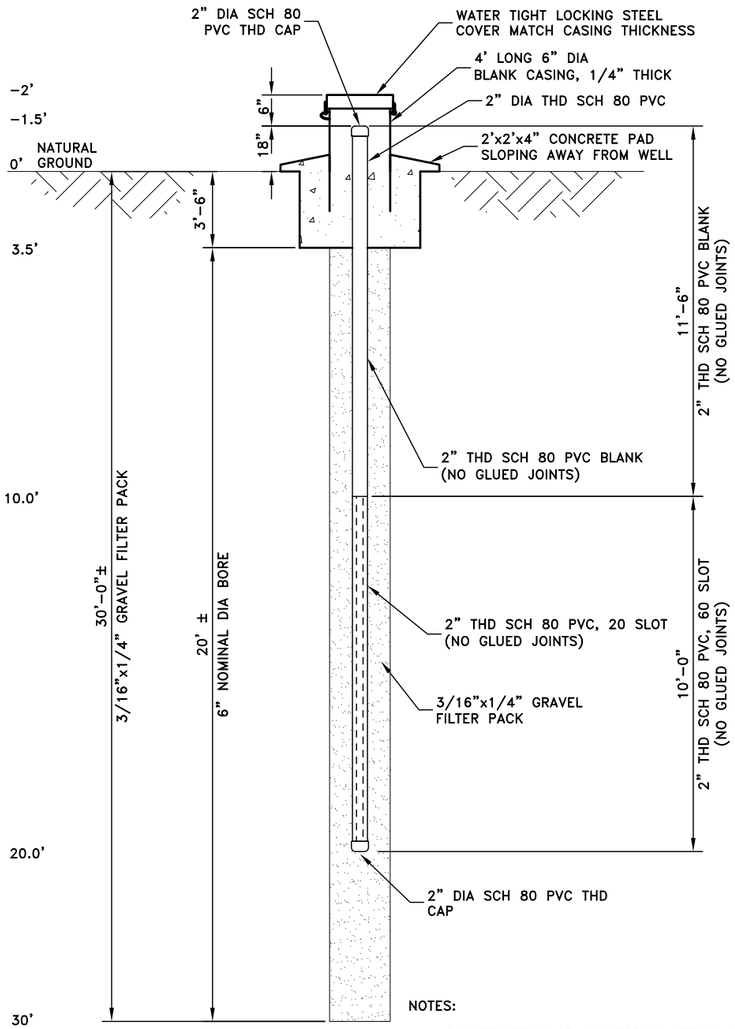


MONITORING WELL LOCATION PLAN

SCALE: 1"=120'-0"

0 120 240

Scale In Feet



NOTES:

1- CONSTRUCTION OF MONITORING WELLS SHALL BE IN ACCORDANCE WITH STATE OF UTAH WATER WELL HANDBOOK.

2- REFER TO MORONI FEED WELL LOG, (WELL LOCATIONS SHOWN ON PLAN) FOR ANTICIPATED GEOLOGY.

3- SAMPLES TO BE TAKEN WITH A SAMPLING BAILER AND DEPTH MEASURED WITH A SOUNDING TAPE.

TYPICAL MONITORING WELL SECTION

1

SCALE: NTS

NO.	DATE	DESIGN	DRAWN	CHECKED
B	11-08-16	DPS	KRB	JRL

REVISIONS

MORONI WASTEWATER TREATMENT PLANT

15 MG ANAEROBIC LAGOON

CIVIL

MONITORING WELL LOCATION AND DETAIL

AQUA ENGINEERING
533 W. 2600 S., SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

0 1/2 1

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

APPENDIX

A

12/23/2016 X:\MORONI\Moroni Anaerobic Lagoon MORO150813\Drafting\Civil\MW.dwg

DCH