OPERATIONS AND MAINTENANCE MANUAL

INDUSTRIAL WASTEWATER TREATMENT PLANT
RI-NU Services LLC
815 MISSION ROCK ROAD
SANTA PAULA, CALIFORNIA 93060

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1.1 INTRODUCTION

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This Operations and Maintenance Manual (O&M Manual) is intended to meet, in part, regulatory requirements promulgated by the United States Environmental Protection Agency at Title 40 Code of Federal Regulations (CFR) 437 for The Centralized Waste Treatment Point Source Category, Subpart D — Multiple Wastestream, for RI-NU Services LLC's (RI-NU) industrial wastewater pretreatment system located at 815 Mission Rock Road in Santa Paula, California. Specifically, this document is developed and must be maintained onsite to meet the requirements for Onsite Compliance Paperwork as defined at 40CFR437.41(b), in support of initial and periodic certification statements for pretreatment. This O&M manual has thus been prepared to describe and document the procedures to be followed to ensure that the pretreatment systems are well operated and maintained, and where applicable why these adopted procedures ensure compliance.

Successful facility operation also implies compliance with the conditions of a permit for discharge granted by the City of Oxnard Department of Public Works, Water Resources Division Wastewater Section, attached as Appendix A.

This O&M Manual is intended to provide guidance for wastewater technicians operating the pretreatment system and to be a training tool for all employees at the facility. This O&M Manual is a dynamic document, which will be updated as necessary to reflect any future changes to the system layout, operations, or other changes at the facility. This O&M manual includes a process description, general guidelines for process operations, sampling and testing, personnel responsibilities, record keeping, system maintenance, and emergency operation.

The information contained in this manual is intended to provide an overview of O&M. Where equipment-specific data or information is required for specific operational or maintenance tasks, the technician or maintenance personal should refer to specific procedures and the equipment manufacturer's literature. These manuals, when used in conjunction with recommended maintenance schedules, can form the basis of a preventive maintenance program, which can result in reduced plant down time.

In preparing this manual, it is impractical to describe every potential operating condition, maintenance requirement, or problem which may occur within the facility. Operators and maintenance personal are encouraged to use this manual as a guide in tandem with sound judgment, experience, and testing to assure that treated effluent that is in compliance with the terms and conditions of the Oxnard Department of Public Works Discharge Permit and the Oxnard Municipal Sewer Use Ordinance.

1.3 General Description

The RI-NU industrial wastewater treatment plant, located in Santa Paula, California, operates as a centralized waste treatment (CWT) facility, and receives wastes from numerous industries and activities. As received, these wastewaters may contain pollutants, in particular metals, oils, suspended solids, and organics, which require treatment and removal prior to discharge into the conveyance line connected to the Oxnard municipal sewer system. Wastewater sources potentially treated at this facility include (but are not limited to) coolants or metal working fluids, oil field production water, boiler blowdown water, equipment wash waters, landfill leachates, and industrial rinse waters.

RI-NU is not a direct wastewater discharger (i.e., it does not discharge to a public waterway), but is considered to be an indirect discharger, or pre-treater, which discharges treated wastewater to the City of Oxnard's Municipal Wastewater System. The City of Oxnard manages the local sewer system and treatment plant designed to collect and treat domestic, commercial, and certain industrial wastewater within its service area.

A process and instrumentation diagram for the system is provided in Appendix C, with a facility diagram showing equipment layout provided in Appendix D. These figures will be updated accordingly as modifications are made to the facility.

1.4 Discharge Standards

Oxnard Department of Public Works (ODPW) is the local control authority and enforces the discharge regulations applicable to the RI-NU facility. The discharge from the RI-NU facility is regulated by ODPW at the point where RI-NU discharges the treated wastewater into a dedicated conveyance line connected to the sanitary sewer system. As a CWT facility, RI-NU is subject to national categorical standards (40 CFR 437, which apply to RI-NU's Subpart D (multiple waste subcategory) permit. In addition, ODPW establishes local limits to control discharges from industrial users. The limits are established to protect the sewage conveyance system, water quality of the POTW's receiving stream, the quality of the bio-solids or reusable sludge produced by the POTW, and the operation of the municipal treatment plant. In RI-NU's permit, the more stringent of the local or categorical limits applies for each regulated parameter.

RI-NU has one point where process wastewater is discharged to the sanitary sewer system. ODPW requires that the terms and conditions of the Permit be met at this discharge point, which is a storage area below ground surface designated as the "shipping pit." Before reaching the shipping pit, there is a sample port that the operator or chemist can access to test for compliance or visually inspect the treated effluent.

In addition to these numerical limits, the Permit states types of discharges that are strictly prohibited from introduction into the sanitary sewer, due to the possible interference or inability to be treated at the POTW. Please refer to the Permit in Appendix A for further discussion of these prohibited discharges. The operator should be familiar with the prohibited discharges.

1.5 Industrial Wastewater Treatment System

The industrial wastewater treatment system at the RI-NU facility consists of a chemical precipitation system designed to treat metal-bearing wastewaters, an organics removal system, and an oily water and solids separation system.

The system consists of typical unit processes: wastewater segregation, wastewater storage, solids separation (including a shaker, centrifuge, and clarifiers), metal precipitation (including coagulation, flocculation, settling, and sand filtration), emulsion breaking, oil-water separation, chemical oxidation, advanced dissolved air flotation (via a gas-energy mixing [GEM] system), bag filtration, organo-clay adsorption, and granular activated carbon adsorption. Solids removed from the wastewater process are dewatered via a centrifuge, and the sludge is bulked and solidified as needed before shipping offsite for disposal at a licensed facility. Characterization of wastes sent offsite for disposal is conducted in accordance with the facility's Waste Analysis Plan (WAP).

In a physical/chemical treatment plant, the removal of contaminants requires the addition of various treatment chemicals that perform different functions within the individual treatment processes. The primary treatment chemicals added to the system include the following:

- Sulfuric acid
- Sodium hydroxide solution
- Ferric chloride
- Aluminum sulfate
- Pure-Flo 829 (flocculant polymer)
- GFT 4963 (oil treatment polymer)
- Hydrogen peroxide (chemical oxidizing agent)
- Sodium hypochlorite
- Ozone

The liquid chemicals are stored in drums or totes on spill containment pallets within the hazardous materials storage building for the purposes of chemical segregation and spill containment. Chemical tanks that are actively being used as part of the treatment system are re-filled as needed by

transferring material from the storage building's drums/totes to the active tank(s) using appropriate pumps/hosing. Once transferring is complete, all drums/totes that were removed from the storage building are transferred back into the storage building. The polymers may be obtained in the solid form, in which case dilute solutions are prepared onsite, and then stored in the respective storage tank or container. Polymer delivered in the liquid form will be stored in its provided container. Ozone is generated on-site using an ozone generator. The ozone is then injected into the treatment system. Safety data sheets for these chemicals are presented in Appendix E.

2.1 INFLUENT WASTEWATER EVALUATION AND ACCEPTANCE

2.2 Wastewater Sources

The treatment system receives flows from various industrial clients which vary from day to day. During the profile development process, clients are required to provide information regarding the wastewater, including laboratory analytical test results, to determine whether or not the wastewater can be accepted by the facility. Wastewater must not contain chemicals prohibited from discharge, or properties that categorize the wastewater as Resource Conservation and Recovery Act (RCRA) or non-RCRA hazardous waste (California hazardous). While the facility maintains a Waste Analysis Plan (WAP) that covers acceptance criteria and characterization of waste generated on site, a summary of waste acceptance procedures is provided below.

California hazardous waste is regulated under Code of California Regulations Title 22, Division 4.5, Chapter 10 — Hazardous Waste System Management and Chapter 11 - Identification and Listing of Hazardous Waste (Title 22). The regulation provides the guidelines for determining if a waste is RCRA hazardous or California hazardous. The first step is determining if the wastewater is a RCRA-hazardous waste by the following steps:

- Determine if the wastewater exhibits one of the RCRA-hazardous waste characteristics
  - Ignitability (D001) if the flash point is <140° Fahrenheit
  - Corrosivity (D002) if the pH is ≤2 or ≥12.5
  - Reactivity (D003)
  - Toxicity (D004 through D043) is determined by comparing the constituent concentrations in the analytical report to the regulatory levels that are presented in 22 CCR §66261.24. If the concentrations exceed the regulatory levels, the wastewater is a RCRA hazardous waste.

- Determine if the wastewater is a listed waste as defined by 22 CCR §66261.31 through §66261.33(f). Listed wastes include the following:
  - Wastewater from non-specific sources (F-Listed)
  - Wastewater from specific sources (K-Listed)
  - Discarded unused products including acutely hazardous (P-Listed) and toxic (U-Listed).

If the wastewater does not meet the definition of a RCRA-hazardous waste, then the following steps will be completed to determine if the wastewater meets the definition of a non-RCRA hazardous waste:

- Determine if the wastewater exhibits a non-RCRA corrosivity or toxicity characteristic.

- Determine if the wastewater is on the M List
- Determine if the wastewater is found on or contains substances listed in Appendix X of Title 22.

If the wastewater is determined to be a non-hazardous waste, then it is acceptable for treatment at the facility. RCRA and non-RCRA hazardous wastes will not be accepted into the facility.

Some wastewaters that violate the hazardous waste characteristics above may be exempt from being labelled as hazardous under the Title 40 Code of Federal Regulations (40 CFR). The full list of exemptions is given in 40 CFR, Section 261.4. Oilfield exploration and production (E&P) exempt wastes are discussed in detail in the facility's WAP.

The facility has developed a program to bench test all wastes prior to acceptance to determine if the waste is treatable. Prior to acceptance of wastewaters, operators request a sample of wastewater with characterization data to perform bench scale treatability tests. Once a waste has been accepted by the facility via the profiling process, it can be scheduled for delivery to the facility.

The facility will be processing wastewaters which contain industrial metal-bearing wastes, oily wastes, and organic-bearing wastes. Wastewaters are unloaded by gravity from tanker trucks into distribution pipes before being pumped to holding tanks that are connected to the treatment process.

2.3 Influent Characteristics and Chemistry of Treatment

Influent wastewater characteristics vary day to day depending on client waste delivery. All wastewater streams will come with waste manifests, be inspected and tested by the operator, and evaluated on the bench to determine whether the process can successfully treat them prior to accepting and/or treating the waste.

Influent wastewater may be characteristic of one or more of three categories: metals-containing wastewater (Type A), organics-containing wastewater (Type C), oily wastewater (Type B). Wastes will be classified as one of the three CWT waste types in accordance with the CWT Small Entity Compliance Guide. It should be noted that the classification of the waste as one of the three CWT waste types does not solely dictate the treatment performed on that waste stream. For example, a Type C waste with metals concentrations above discharge limits will require metals treatment. The onsite chemist will determine the treatment needs of influent wastewater based on discharge limits. Note that some incoming wastes will have concentrations of metals, organics, and oils that are below discharge limits; however, these wastes must still be classified as one of the above waste types.

The treatment of different waste streams requires drastically different chemistries to meet the desired effluent limits. It is essential for the staff chemist to fully understand the chemistry of treatment for all waste streams to properly perform bench scale testing, so that treatment can be optimized in the full-scale system.

2.3.1 Treatment Chemistry for Metals-containing Wastewater

The primary mechanism for the removal of metals is through hydroxide precipitation. In the precipitation step, the pH is raised with sodium hydroxide (caustic) to a value necessary for effective precipitation of metals in the wastewater. Precipitation is the chemical process of converting the soluble dissolved metals into an insoluble solid form as a metal hydroxide so that they can be physically removed from the wastewater. Different metals and different solutions will have different ideal pH values for the precipitation of a metal hydroxide; therefore, it is essential that the staff chemist determine this ideal pH prior to treatment.

Some metals cannot be sufficiently removed simply by application of hydroxide precipitation because of complexing or chelation. It is important for the chemist to understand the principles of metals precipitation and its limitations, and presence or absence of chemical constituents that may complicate metals removal.

For some wastewaters, coagulation is used to further enhance metals removal in addition to hydroxide precipitation. Coagulation is the process by which a coagulant is added to the wastewater to destabilize metal solids (floc) that are in suspension. This condition makes the floc more readily stick together, which increases the speed at which the solids settle out of the solution.

Regardless of the use of coagulation in conjunction to metal hydroxide precipitation, flocculation is needed to help metal particles settle. Flocculation is the process in which a flocculant polymer, forms "chains" or "strands" that adsorb to the particles, in effect "bridging" them together to grow larger, heavier particles that settle faster. The polymeric flocculant can also assist with coagulation by neutralizing the charge on the metal particles.

The polymer and wastewater are blended so that the polymer coats and binds to the small precipitated metal particles. The coated particles gently collide and agglomerate (i.e., stick together) to form larger particles. Once metals are allowed to precipitate and agglomerate, floc is allowed to settle by gravity in a clarifier. Additionally, solids can be further removed in the GEM system through use of dissolved air flotation. In the GEM system, air and flocculant chemicals are injected into a high-pressure (100-120 psi) waste stream. The dissolved air forms small bubbles on discharge to a chamber fitted

with surface skimmers that cause neutrally buoyant floc, and oils and greases if present to rise to the top and be skimmed from the water.

2.3.2 Treatment Chemistry for Organics-Containing Wastewater

The primary means of organics treatment at this facility will be through the use of chemical oxidation and activated carbon adsorption. If a wastewater stream is determined to require pre-treatment prior to carbon adsorption, chemical oxidation will occur. Chemical oxidation is the process in which constituents are broken down (usually into less harmful byproducts) through chemical reactions. Chemical oxidation will be used to support the treatment of organics by activated carbon. Chemical oxidants at the RI-NU facility, which include hydrogen peroxide and ozone, will be dosed to degrade higher strength wastes or in some cases larger more recalcitrant compounds, so they are more easily removed by carbon, as needed. The chemist may also determine to dose a waste stream with an oxidant to reduce odor or color. Ozone is a strong oxidizer that is generated on site and injected into the process stream with inline mixing to provide thorough contact and effective oxidation.

Organic containing wastewaters are then treated by being pumped through bag filters to prevent fouling of downstream media, then a column of granular activated carbon (GAC). It is important for the GAC adsorption step to occur after ozonation for the purpose of destroying residual ozone, removing ozonation by-products, and preventing bacterial growth on the media. Both liquid and gas phase organic contaminants can adsorb to the activated carbon, thus trapping it in the column. This process is dictated by the properties of the carbon, the contaminants being targeted, the concentration of the contaminants, and the temperature of the water. When there is suspected oil and grease content in a wastestream, the operators can route the wastewater through the GEM and as needed, the organo-clay media as pretreatment to remove oil and grease and extend the capacity of the GAC columns for dissolved organic compounds.

In any case, care must be taken to ensure that the GAC columns are not fully saturated, or otherwise expended to the extent that contaminants are released back into the wastewater stream at concentrations approaching pretreatment standards. For this purpose, the facility is equipped with vessels that can be operated in a lead/lag configuration, with individual vessels switched as saturation is observed on the first vessel. This setup provides a safeguard to assure compliance with the sewer discharge criteria.

2.3.3 Treatment Chemistry for Oily Wastewater

The primary method used to separate oil from water is by gravity separation. Absent the presence of surfactants or other dispersant chemicals, oil and water are naturally insoluble, so given time; oil will

separate from the water. In the instance that oil and water are emulsified, and prevented from separating, it is the responsibility of the staff chemist to determine a means of breaking the emulsion. The majority of emulsions expected at this facility will likely be in the form of surfactants. A surfactant has a hydrophobic end that has an affinity for oil, and a hydrophilic end that has an affinity for water, which allows for emulsions to stabilize. The treatment of emulsified oil requires the destabilization of the emulsion, usually by altering the surfactant. Surfactants may be destabilized by finding a pH in which the surfactant is denatured, or it may be possible to utilize polymer, ferric chloride, or alum to preferentially bind to surfactants.

Oily water that is not emulsified (or water that after the emulsion has been broken is drained from the tanks used for emulsion breaking) is pumped through and oil/water separator. Oil accumulates on the surface of the separator and drains to a collection tank. The aqueous phase or water is conveyed for further metals or organics treatment as needed.

Because there is the possibility for dissolved organics and or finely divided oil droplets in this treated wastewater, it can be treated further by processing through the GEM unit, and/or through bag filters to remove solids and protect downstream media, and the organo-clay media to trap any additional traces of immiscible oil, followed by granular activated carbon polishing.

2.4 Wastewater Evaluation

Prior to accepting any wastewater or obtaining samples to test on the bench, the waste profile and analytical data must be evaluated to confirm the wastewater meets the requirements for acceptance to the facility. Waste acceptance criteria are discussed in detail in the facility's WAP. If the profile and analytical data indicate the wastewater is acceptable, a sample will be obtained to evaluate for treatability and necessary chemical dosing. This will ensure that the treatment process will be able to effectively remove contaminants of concern without leading to permit violations. The wastewater evaluation process is as follows:

- After profile and analytical data from a California-certified laboratory are reviewed and approved by RI-NU, sample wastewater and evaluate whether treatment is feasible based on source.

- Evaluate sample by visual inspection, scent, and physical characteristics.

- If the wastewater is deemed to be acceptable, determine whether waste needs to be treated for oils, organics, metals, or a combination of these. Evaluate initial concentrations of contaminants of concern by measuring (depending on waste type) metal concentrations on an

ICP, via supplied analytical results, via the HACH DR3900 spectrophotometer and associated test kits, or other suitable testing apparatuses. Test for flash point via flash point testing equipment, if deemed necessary. Oil and grease can be estimated by supplied analytical results and visual inspection.

- If the initial untreated concentration of the sample is below the discharge requirement, no further bench testing will be necessary; the wastewater falls below discharge requirements.

- For wastewater that requires treatment, perform bench scale treatability test as described in Section 2.4.

- Collect sample of supernatant from treatability test and confirm that treatment removed the contaminant of concern and the sample meets the Permit discharge standards. This is primarily for metals as the GAC system will not treat for dissolved metals. Water with residual oil that is not removed in the oil-water separator will be run through the organo-clay vessels to decrease oil and grease concentrations below discharge requirements and to protect the adsorption capacity of GAC media. The waste will then be run through the GAC system to remove remaining organic contaminants before discharge.

- If testing determines that the wastewater meets the Permit requirements, the operator can allow the delivery of wastewater via tanker trucks. The tanker truck is to gravity drain wastewater into the designated discharge pipe network. The discharge pipes are labelled based on the waste type (Type A, B, or C). Once discharge is complete, the wastewater will be pumped to the designated holding tank and subsequently into the treatment system.

- Following the delivery of wastewater to the facility, collect a sample of water from the truck to confirm metals concentration with onsite lab testing apparatuses. For any batches that do not appear consistent with the anticipated characteristics of the wastewater (physical characteristics, odor, metals concentration, etc.), a sample will be collected and the bench scale treatability test as described in Section 2.4 will be repeated to confirm the applicability of the treatment processes and dosing of that load.

2.5 Bench Scale Testing

Bench scale tests of wastewater will allow operators to determine dosing and estimate necessary treatment steps for wastewater in the process tanks. During all tests, record all starting volumes of

wastewater, chemical dosages, contact times, and settling times. These will be utilized in the operation of batch treatment.

2.5.1 Metals-containing Wastewater

The following steps will be conducted for bench scale testing of metals-containing wastewater:

- In a beaker, mix sample and observe pH; depending on source water (basing on operator experience), adjust pH up or down using caustic soda or sulfuric acid. Target pH will depend on the metal being targeted for removal.
  - Different metal hydroxides precipitate at different pH values. See Table 1 for a list of approximate target pH values for metal removal by precipitation. Use the table to set target precipitation points.
  - The operator will need to select the necessary treatment pH based on metals needing treatment in wastewater sample.
- Dose a coagulant (ferric chloride or aluminum sulfate) until visible solids form, coagulant will be selected based on chemist and operator expertise. Allow sample to mix. If addition of ferric chloride or aluminum sulfate drops the pH below the ideal precipitation pH, adjust the pH accordingly.
- Dose the polymer blend to grow floc.
- Terminate mixing to allow solids to settle.
- Evaluate the supernatant.

Table 1
Approximate pH Values for Metals Precipitation

Metal	pH for precipitation
Cadmium	11.5
Chromium (III)	9
Copper	10.5
Lead	10
Nickel	10.5
Zinc	9.5

2.5.2 Organics-containing Wastewater

Prior to bench testing or treating any organics-containing wastewater, the chemist must determine whether or not the organics-containing wastewater requires any chemical treatment in addition to granular activated carbon. Wastewaters that need chemical treatment are any organic bearing water that may contain metals, or organics that more rapidly exhaust carbon. Chemist experience will be necessary to determine which wastewaters will require treatment.

2.5.2.1 Organics Requiring Chemical Treatment

In a beaker, mix sample and test pH level; depending on source water (basing on operator experience), adjust pH up or down using caustic soda or sulfuric acid. Target pH will depend on the treatment goal of the wastewater. Once the target pH level has been reached conduct the following:

- For wastewater that contains metals refer to section 2.4.1 and follow the metals precipitation guidelines to remove the metal(s) of concern.

- For wastewater that contains compounds known to rapidly exhaust carbon, or are difficult to remove by carbon, it may be prudent to chemically oxidize the wastewater.

  Based on the chemist's discretion, add the chemical oxidant at the desired treatment dose. Allow the wastewater to mix and react for 15-30 minutes, or longer for particularly recalcitrant compounds.

2.5.2.2 Organics Treatment

In a beaker, mix sample and test pH level. Depending on source water (based on operator experience), adjust pH up or down using caustic soda or sulfuric acid to neutral ranges. Once the target pH level has been reached conduct the following:

- Once pH is at neutral range, mix in a small volume of activated carbon, and allow the sample to mix for a few minutes.

- Allow the carbon to settle after mixing and once settled, place a sample of the supernatant into three, 40 mL volatile organic analysis (VOA) glass tubes. Send the sample to a certified lab for analysis of volatile organic compounds or additional organic tests depending on the organic contaminants of concern. Additionally, if the chemist determines that the on-site organics treatment, which includes chemical oxidation and GAC adsorption, is known to remove the contaminants of concern, bench scale testing of the organics treatment may be waived in favor of using the known removal efficiency of the GAC system for specific chemicals to determine suitable treatment.

- If the organic constituent concentrations have been decreased by acceptable amounts as determined by the certified lab analysis and chemist, the wastewater will be deemed treatable. If the organic constituent concentrations are still too high, treat the wastewater sample as described in 3.2.1.1 until a combination of oxidation and carbon treatment is found that is successful.

2.5.3 Oily Wastewater

In a small container, invert the oily wastewater sample a few times and allow the sample to sit for a few minutes. Visually assess the sample for a visible separation of oil and water and then conduct the following steps:

- If there is clear separation of the oil from the water, and there is no reason to suspect emulsions, or the need to remove metals or other contaminants from the sample, the oily sample is acceptable.

- If there is no separation, or poor/slow separation, it can be assumed that there are emulsions keeping the oil suspended and the following steps will be conducted:

  - Take a sample of the oily wastewater and add it to a beaker. To attempt to break the emulsion there are multiple options the chemist can attempt:

    - Adjust the pH; depending on the emulsion pH may need to be adjusted up or down. This can destabilize the emulsion and help achieve better separation.

    - The addition of the appropriate polymer can act to agglomerate oil particles, allowing them to separate out from the water.

    - Attempt addition of other available water treatment chemicals to preferentially sorb to surfactants that may be stabilizing the emulsion.

  - Once a method is found to separate oil from the water, the wastewater can be deemed acceptable for treatment.

- If the oily wastewater is known to contain metals as well as oil, and requires additional treatment, once separation is achieved, remove the top layer of oil and proceed to the bench testing procedure described for metals in 2.4.1.

2.5.4 Wastewater Meeting Effluent Limits

For wastewaters that arrive at the facility that fall under the classification of a wastewater for a centralized waste facility, but are also received below the effluent guidelines for the facility, the wastewater will be further evaluated upon arrival at the facility. Wastewaters are nevertheless screened for organics content, metals, and visually for oils before deciding on appropriate treatment, if any.

3.1 DESCRIPTION AND GENERAL OPERATION OF TREATMENT SYSTEM

The following discussion is intended to provide the operator functional information regarding the unit processes within the treatment system. Once a wastewater stream has been accepted, categorized, and tested for treatability by the chemist, refer to the section or sections that apply to treatment of that wastewater stream.

3.2 Common Treatment Procedures

Certain system processes and equipment will be operated the same regardless of the wastewater stream being processed. These processes are described in the following sections.

3.2.1 Pre-Startup Activities

Startup of the system and equipment should only occur after preliminary inspections have been conducted, followed by pre-startup procedures:

- The operator will verify that chemical storage tanks and totes contain adequate volumes of the required chemicals, and that polymer solutions are available.
- The operator will review records from the last operational shift to determine the status of the system and any operational issues.
- The operator or chemist will verify the calibration of the pH probes or other lab equipment prior to any bench-scale or batch treatments processes begin.

3.2.2 Chemical Feed

Process chemicals will be dosed directly from separate chemical day tanks, and may need preparation before they can be fed into process tanks. These processes are described below.

3.2.2.1 Chemical Preparation

Chemical preparation at the facility is minimal, as acid and base are dosed as received from the supplier, and treatment chemicals will be diluted in storage tanks to the desired concentration. Each day, during pre-startup inspections, the operator will evaluate that the chemical dosing tanks have an adequate volume of chemical to treat the day's wastewater.

The polymer solution may require preparation if it arrives in powder form. The technician will add the required mass of solid powder to the desired volume of water in the chemical dosing tank. The polymer solution may be a proprietary blend; see the manufacturer's specifications for the specific ratio

of water to powder. Polymer solutions should be added to the process from tanks or containers that are continually mixed with a low shear mixer to keep in condition for accurate dosing and effectiveness.

3.2.2.2 Chemical Process Control

The liquid chemical addition system onsite uses variable speed, electric metering pumps. The operator must manually turn the appropriate metering pump on at the appropriate flow rate and for the appropriate amount of time as determined by the bench-scale testing.

For chemical additions that will be determined by pH, the operator will lower a pH probe into the tank if there is no pH probe currently in the tank. The operator will then meter in sulfuric acid or sodium hydroxide until the appropriate pH is obtained as determined by discharge limits and bench-scale testing.

3.2.3 Transfer Pumping

Wastewater is gravity drained into the designated discharge pipe network and then pumped into the holding tanks via the use of a centrifugal pump. Operating sequences for the most common transfers are described in the following sections.

3.2.3.1 Transfer from Unloading Tanks to Holding Tanks

The operator will decide into which holding tank wastewater will be delivered based on the wastewater's classification type. The tanker trucks will be connected to the appropriate discharge pipe network via a cam-lock connection. The operator will align valves such that the wastewater flows to the appropriate tank without mixing waste types or dissimilar loads. Transfers should be attended continuously while pump are in operation and receiving tank levels observed to prevent overfill or running the pump dry. Multiple tanks may be filled simultaneously, also with constant operator attention.

Exterior storage tanks will be used in the designated storage area (see Appendix D) as needed and water will be transferred to the appropriate storage tanks via hosing and pumps or via vacuum trucks.

3.2.3.2 Transfer of Solids from Process Tanks to Solids Storage

Solids will be produced from four on-site treatment processes, which include a shaker unit, the GEM system, and centrifuges and clarifiers throughout the treatment system. The shaker unit removes solids through the use of a vibrating, porous conveyor belt. As solids-containing wastewater is pumped though the shaker unit, the solids are conveyed to a solids storage container. The centrifuges are operated at a frequency based on operator experience and the operations manual of the centrifuges.

The solids that separate in the centrifuge are conveyed via auger to a solids storage container, or directly transferred to the solidification pit.

Other solids-bearing wastewater will be pumped through designated clarifiers. Solids will accumulate at the bottom of the clarifier, and be removed, either by a dedicated sludge pump or an auger system within the clarifier. The sludge will be pumped to a solids storage container or processed through the shaker or centrifuge depending on solids content, at the operators' discretion.

The RI-NU facility is equipped with a solidification area. Solids from the solids storage containers can be transferred to this area. The operator will add clean soil, mulch, or another suitable absorbent material to ensure that there is no standing water in the solids pile. After the solidification process is complete, the solids can be disposed of off-site at an appropriate landfill.

3.2.3.3 Transfer from Solids Separation Back to Process Tanks

Following the dewatering of sludge, return the remaining water into the process tank for any necessary treatment prior to discharge. The process return water will be treated as an influent wastewater stream.

3.2.4 Solids Separation

Solids collected from process tanks are pumped from the bottom of the tanks into the sludge dewatering tanks. The sludge dewatering tanks are equipped with multiple drain ports along the entire length of the tank, so that as additional compaction of the sludge occurs in the tank, supernatant fluid can be drawn off at a point above the sludge to aid in dewatering.

3.2.5 Neutralization

Treated water from all waste streams that falls outside of the allowable pH discharge limits will be routed into a neutralization tank following the necessary pretreatment steps. The neutralization tank will be equipped with agitation so that pH adjustments can be made more efficiently.

3.2.6 Filtration

All wastewaters that are treated onsite, will proceed through a series of filters prior to discharge. After clarification, the water will be processed through a sand filter. After the pH of wastewater is neutralized, water is transferred through holding tanks at the GEM system (allowing for solids settling) and through bag filters to remove any fines remaining in the water, before passing through organo-clay media for oil removal (as needed), and activated carbon for organics removal.

3.2.7 Sample Tank to Discharge

Wastewater will automatically flow into an accessible top sample tank after filtration that overflows to the shipping pit.

3.3 Unit Operations for Metals Precipitation

For all wastewaters that have been evaluated and found to be able to be processed in the full-scale system for metals removal, the operator will follow the treatment operations as described below.

3.3.1 Influent Routing

Wastewater which is characteristically only metals bearing is unloaded from trucks pumped directly to storage or process tanks for subsequent metals precipitation. If a waste is a mixture of solids or oily phase materials, pretreatment is needed as described below.

3.3.2 Treatment

All wastewater is to be treated as batches, meaning that water will be pumped into a process tank and then chemicals will be dosed so that, precipitation, flocculation, and clarification can occur in the tank. The operator will dose chemicals based on scaled up dosages determined during bench scale testing.

3.3.2.1 Hydroxide Precipitation

Caustic is metered into the process to achieve the target pH provided by the chemist, as determined during bench scale testing.

For the neutralization process to be effective the pH within the tank must be measured accurately. Accurate control can only be achieved if the pH probe is calibrated properly. It is **STRONGLY RECOMMENDED** that the calibration of the pH probe in this process be verified on a **DAILY BASIS** and re-calibrated if necessary. The pH probe will be dual-point calibrated using 7.0 and 10.0 standard unit solution. Samples will be drawn off during batch treatment from the process tanks to ensure that pH is in optimal treatment ranges prior to proceeding to subsequent steps.

3.3.2.2 Coagulation and Flocculation

The coagulation and flocculation occurs in the same process tank and occurs in conjunction with metal hydroxide precipitation. Depending on operator experience and bench scale testing either ferric chloride or aluminum sulfate will be added to wastewater as a coagulant. Following the addition of coagulant, flocculant polymer is added to the process tank. The polymer is purchased in dry form. The operators prepare batches of solution polymer by mixing the dry polymer with tap water in tanks equipped with mixers. Proper control of this process requires accurate dosing of the polymer solution.

Overdosing causes the condition described as "pin-floc," where the water appears hazy or cloudy and very small particles are present. During overdosing, the small, neutrally buoyant particles have essentially adsorbed too much polymer and the particles are electrically repelling each other. This will result in high metal concentrations in the settler effluent, likely above the discharge limits. Subject to confirmation by the chemist, treatment may be improved in such a batch by processing through the GEM system.

Underdosing results in inadequate flocculation, leading to increased turbidity in the settler effluent. Underdosing is best verified by visually observing the characteristics of the floc formed in the flocculation tank. During underdosing, the floc will not form properly and the water will appear similar in color and clarity to the water in the neutralization tank.

Underdosing can also be caused by inadequate coagulation due to improper coagulant dosage or due to a high loading of negatively charged materials in the system (alkaline cleaner, oil and grease, etc.). If this condition is observed, the operator should first determine if the coagulants are being added in the proper amounts prior to adjusting the polymer dosage.

Because the dosage of polymer is critical, preparation of a consistent batch of polymer solution from the concentrated emulsion and water is critical. The operators must prepare a consistent batch of flocculant polymer every time a batch is prepared.

3.3.2.3 Settling

Precipitated, agglomerated, and flocculated metal solids settle out of the wastewater in this process by gravity. The settled solids are collected in the cone at the bottom of the process tank, or through separation via a clarifier. The waste metal solids concentrated at the bottom of the tank or clarifier (termed "sludge") are to be pumped to the centrifuge for solids separation. Clarified, treated wastewater effluent that should contain a minimal quantity of residual metal solids remains in the tank for subsequent discharge.

Sludge removal from a process tank is controlled by operator observation; the operator must visually monitor the characteristics of material that is being removed from the batch tank. For example, if a significant amount of the liquid appears to be clear water, the operator should discontinue pumping sludge. The operator should attempt to balance the pumping such that the sludge is removed during each process, while removing the minimal amount of treated effluent.

The settled effluent should be routinely monitored by the operator for clarity during their shift.

3.2.3 Batch Discharge

Following treatment of the metals wastewater and solids are separated from the treated water, the treated water will be sent through the remaining treatment processes (Sections 3.1.5, 3.1.6, and 3.1.7). Water will travel through filtration and carbon before ultimately traveling through the sampling tank and into the shipping pit.

Compliance forms maintained at the facility will be used during treatment and batch discharge and will record, at a minimum, the treatment tanks/processes utilized, the type of CWT waste being treated, identification of the source (name of generator and origin process of waste), profile number, manifest number(s), expected pollutants and concentrations requiring treatment, the treated pollutants with pre- and post-concentrations, the treatment methodologies utilized, date and time of discharge, volume of wastewater treated and discharged, pH of discharged wastewater, and treatment/discharging operator(s).

3.3 Unit Operations for Organics Treatment

For all wastewaters that have been evaluated and found to be able to be processed in the full-scale system for organics removal, the operator will follow the treatment operations as described below.

3.3.1 Influent Routing

Wastewater is first unloaded from trucks and pumped to appropriate storage or process tanks. Dissimilar batches must be kept separate for treatment through the process. If an organic waste stream also is high solids content such as oil field produced water, the receiving tank is mixed and the batch is first processed through the shaker/centrifuge system. If there is an oily phase the liquid (or liquid fraction) is first pumped through the oil/water separator before further processing.

3.3.2 Chemical Oxidation

Wastewater with greater organic compound loading, or with compounds that are inefficiently treated by carbon will undergo chemical oxidation to adjust the treatment of organics. Chemical oxidant will be dosed as determined by the staff chemist for ideal removal performance. Oxidants will be fed by chemical feed pumps. Following the addition of chemical oxidants, the tank will be allowed to mix for an appropriate length of time to treat the organics as determined by the staff chemist.

3.3.3 Sorption

Following chemical oxidation, water will be pumped into an unloading sump where it will be pH adjusted as necessary before undergoing filtration and treatment via activated carbon. Refer to Section 3.2 for wastewater that also contains metals and treat the wastewater as described, after performing

oxidation of organics.

3.3.4 Batch Discharge

Following treatment by chemical oxidation, or any secondary treatment, wastewater will be sent through the remaining treatment processes of filtration and carbon for the last stages of organics treatment (Sections 3.1.5, 3.1.6, and 3.1.7). Wastewater will ultimately travel through the sampling tank and surge tank and into the sewer. Compliance forms maintained at the facility will be used during treatment and batch discharge and will record, at a minimum, the treatment tanks/processes utilized, the type of CWT waste being treated, identification of the source (name of generator and origin process of waste), profile number, manifest number(s), expected pollutants and concentrations requiring treatment, the treated pollutants with pre- and post-concentrations, the treatment methodologies utilized, date and time of discharge, volume of wastewater treated and discharged, pH of discharged wastewater, and treatment/discharging operator(s).

3.4 Unit Operations for Oily Wastewater

For all wastewater that has been evaluated and found to be able to be processed in the full-scale system for oils removal, the operator will follow the treatment operations as described below.

3.4.1 Influent

Wastewater is unloaded from trucks holding tanks. Prior to accepting wastewater into the treatment system, the staff chemist will need to evaluate the wastewater to determine if the oils are emulsified or not.

3.4.2 Treatment

Immiscible oil/water mixtures treatment consists gravity separation, with gross separation possibly in a non-agitated tank (decanting) followed by pumping through the oil/water separator. This step applies to both oil/water mixtures as received, or emulsions treated as follows:

3.4.2.1 Emulsified Oils

In the instance that an oily wastewater is highly emulsified, and the oil will not separate out by gravity separation alone, the chemist will recommend to operators to treat the oily wastewater in the oil process tank. In this tank the operator can adjust pH as needed, or feed a variety of polymers or possibly salts, to break the emulsion and achieve phase separation. Any solids from the process can be removed from the bottom of the tank and pumped into sludge holding. Treated oily wastewater, once the emulsion is broken, will then proceed through separation and further processing.

3.4.2.2 Non-emulsified Oils

Wastewaters arriving onsite without emulsions, or wastewaters that have been treated to break emulsions are processed through the oil/water separator. Following the oil separation, wastewater will undergo filtration (clarification and sand filtration), and further processing as needed.

3.4.3 Batch Discharge

Following oil separation, wastewater will be sent through the remaining treatment processes of neutralization, filtration, and carbon (Sections 3.1.5, 3.1.6, and 3.1.7). After all the treatment steps, wastewater will ultimately travel through the sampling tank and into the shipping pit.

Compliance forms maintained at the facility will be used during treatment and batch discharge and will record, at a minimum, the treatment tanks/processes utilized, the type of CWT waste being treated, identification of the source (name of generator and origin process of waste), profile number, manifest number(s), expected pollutants and concentrations requiring treatment, the treated pollutants with pre- and post-concentrations, the treatment methodologies utilized, date and time of discharge, volume of wastewater treated and discharged, pH of discharged wastewater, and treatment/discharging operator(s).

3.5 Wastewaters Meeting Effluent Guidelines

For all wastewaters that have been evaluated and found to be able to be processed in the full-scale system for metals removal, the operator will follow the treatment operations as described below.

3.5.1 Influent

Once wastewater is accepted to the facility (see Section 2.3), wastewater is unloaded from trucks to tanks dedicated to wastestreams not requiring treatment.

3.5.2 Batch Evaluation and Discharge

Upon receiving wastewater that is suspected of meeting effluent requirements, it will be for the chemist to confirm that wastewater matches its profile through screening analysis, as needed. Once wastewater is found to be acceptable, it can be pumped separately to the sample tank and shipping pit.

Compliance forms maintained at the facility will be used during treatment and batch discharge and will record, at a minimum, the treatment tanks/processes utilized, the type of CWT waste being treated, identification of the source (name of generator and origin process of waste), profile number, manifest number(s), expected pollutants and concentrations requiring treatment, the treated pollutants with pre-

and post-concentrations, the treatment methodologies utilized, date and time of discharge, volume of wastewater treated and discharged, pH of discharged wastewater, and treatment/discharging operator(s).

3.6 Operation of Bag Filters, Treated Oil Media Filter, and Activated Carbon.

Standard operation of all filtration media requires that influent and effluent valves to the media be open to allow flow to travel through the system. Operators will check housing of all media daily, and observe pressure drop over the media to determine when change outs are necessary. Descriptions of change-out criteria and procedures are included below. All waste types requiring treatment will be run through the bag filters, treated oil media filters, and activated carbon. This will ensure removal of any residual solids, residual oil, and residual organics prior to discharge.

3.6.1 Bag Filter Change-out Procedure

Bag filters will need to be changed-out whenever the pressure drop across the filter begins to exceed 15 psig, or the appropriate pressure drop set at the control panel. The process flow will normally be shut off for a few minutes to shift valves from primary to secondary vessels and allow the full/spent bags to be replaced. The process for changing bag filters is generally described below:

- Confirm the influent and effluent valves to the filters are closed, and no process flows are being directed to the filters.
- Slowly open the drain valve to relieve pressure in the filters, and allow filter housing to drain.
- Remove the cover to access filter basket housing, and remove the filter bag to dispose.
- Clean out filter housing of any debris, and confirm sealing surfaces and o-rings are intact.
- Install a clean filter basket and filter bag and replace the cover.
- Slowly open the influent and effluent valves to reintroduce flow to bag filters.

3.6.2 Carbon and Oil Filter Change-out Procedure

Carbon vessels will need to be operated in a lead and lag configuration to obtain optimal removal efficiency of organics. This configuration also allows for monitoring of organics removal efficiency, while minimizing risk of releasing organics. TOC will be monitored in effluent from the leading carbon vessel, once breakthrough is 70% of influent TOC, the carbon in the lead vessel will need to be replaced. TOC will be analyzed either by an offsite certified laboratory that can accommodate a rapid turnaround, or via the onsite HACH DR3900 spectrophotometer and associated test kits. After replacing

the carbon, the previous lag vessel will become the lead, and the vessel with fresh carbon will become the lag vessel. The criteria for determining when organo-clay media needs to be replaced will be when pressure drop alarms signify loss of pressure through the media, alarms will be set at manufacturer recommended values.

The process for changing the media is as described below:

- Confirm the influent and effluent valves to the carbon cartridges are closed, and no process flows are being directed to the carbon.
- Drain any liquids in the lead vessel, remove any spent carbon, and place into a container that can also prevent any seepage.
- Rinse the unit and close any valves leaving the lead unit.
- Add water to a level above the screen in the carbon unit to cushion the addition of carbon into the unit, add fresh carbon to the lead unit.
- Hydrate carbon with clean water, secure the unit by closing the lid, and let sit for 12-24 hours.
- Rearrange the valves to set the carbon unit with fresh carbon as the secondary (or lag) unit. Adjust labels on tanks to clearly indicate LEAD/LAG vessels.
- Adjust sample ports so that influent, mid, and effluent sample locations correspond to the new lead/lag configurations.
- Follow the manufacturer's instructions for conditioning and preparation of a fresh adsorption vessel. For example, fill GAC vessels with water; allow to sit overnight and prior to restart of the system, back flush to bleed off any trapped air within the carbon units.

3.7 Non-CWT Wastewaters

Domestic wastewater (i.e. sewage) is received and processed batch-wise through a screening operation, a centrifuge, and a clarifier to remove excess settable solids and discharged via a dedicated sampling tank to the shipping pit.

4.1 PERSONNEL

4.2 Operational and Managerial Responsibilities

The wastewater treatment facility for which this manual has been prepared has been designed to treat the waste load it is expected to receive.

To ensure efficient and economical wastewater treatment system operation, it is necessary to have an onsite supervisor, a chemist, and wastewater operators.

The primary responsibility of the onsite staff is to maintain at all times a quality effluent from the wastewater treatment plant that is in compliance with the permit discharge requirements.

Following is a list of several responsibilities that shall pertain to the onsite supervisor, chemist, and operators (together referred to as the "team") responsible for managing and operating the wastewater system.

- The team shall maintain a safe working environment,
- The team shall maintain a high-quality plant effluent within permitted discharge limits.
- The team shall maintain efficient plant operation and maintenance.
- The team shall maintain adequate treatment system operational and management records.
- The onsite supervisor shall define operator requirements, prepare job descriptions, develop organizational charts, and schedule personnel.
- The onsite supervisor will provide good working conditions, safety equipment, and proper tools for the operational personnel.
- Operations personnel will participate in necessary training programs.
- The onsite supervisor will motivate operators to achieve maximum efficiency of operation.
- The onsite supervisor will make operations personnel aware of importance of proper and efficient plant performance.

- Facility staff will conduct periodic inspections of the treatment system to discuss operational issues.

- The team will maintain good public relations, in particular with the ODPW representatives.

- Facility management, in conjunction with RI-NU management shall prepare budgets and necessary reports.

- The team shall plan for future facility needs.

4.3 Manpower Requirements/Staff

Good operation and maintenance in conjunction with properly working equipment is the major factor in the treatment efficiency of any facility. Without the proper operator attention, even a well-designed treatment facility will not produce the effluent limits it is designed to meet.

Please note the following discussion regarding personnel and staffing is a recommendation based on current conditions. Based on the capacity of the treatment system and the historical requirement for continuous operation, it is anticipated that between four and five full time onsite employees including the chemist, and the supervisor are required for adequate plant staffing during each shift. This staffing level is directly related to the volume of wastewater being accepted onsite. During times of maximum use, as many as three operators may be necessary during each shift to effectively monitor and operate the plant. During periods of reduced wastewater flows, the treatment system may be operated with fewer personnel, assuming that the all treatment systems components and controls are operational.

It is of utmost importance that the operators and maintenance personnel receive up-to-date training in the proper functioning of the wastewater treatment facility. The purpose is to protect the plant equipment and to improve the quality of the effluent.

4.4 Job Description and Qualifications

Listed below is a recommended job description and qualification profile for each of the suggested positions at the treatment plant. Note that a qualified Wastewater Treatment Operator is required at the facility at all times wastewater is being processed at the facility.

Onsite Supervisor

The onsite supervisor serves as the day-to-day operations manager for the plant and also as the lead operator. The success of the plant depends on the ability of the onsite supervisor to recognize problems and communicate them to the project manager.

The onsite supervisor is responsible for ensuring the efficient and economic operation of the treatment plant. The onsite supervisor should provide engineering and technical support for the treatment system and to the operators. The project manager should provide the supervisor and operators with training on the proper function of the wastewater treatment facility. It is recommended that all process decisions have the approval of RI-NU management.

It is the site supervisor's role to analyze the day-to-day data collected by the operators and use this data to determine when a process is not operating efficiently and make recommendations for continuous improvement. The onsite supervisor should work closely with the operators in preparing reports, summaries, and other required written documents.

The site supervisor will, in conjunction with the operators, track the performance of the plant and work closely with the onsite supervisor in a support role.

The utmost priority of the supervisor is to ensure a safe working environment for the operators and any other personnel in the wastewater treatment area. Under no circumstance should the supervisor allow any unsafe practices and procedures to occur at the treatment plant. When dealing with hazardous materials and chemicals, **SAFETY MUST ALWAYS COME FIRST.** The main operational priorities of the onsite supervisor are as follows:

- Ensure that all treated wastewater released to the sewer system is in compliance with the permitted discharge limits. Under **NO CIRCUMSTANCE** will any treated wastewater that is out of compliance be discharged to the shipping pit. Additionally, the supervisor must also make certain that no prohibited discharges are released to the shipping pit.

- Ensure that the wastewater treatment plant is staffed with the appropriate personnel at all times, as necessary to meet the production schedule of the plant.

- Operate the treatment plant as economically and efficiently as possible.

- Maintain adequate supplies and chemicals available for the plant to operate effectively.

In addition to these priorities, the supervisor has general day-to-day duties that consist of management of the operators and the entire operation. Specific job duties can be expected to include the following:

- Control and manage the operation of the treatment plant
- Hands-on training of the operators
- Preparation of shift schedule for the operators
- Enforcement of plant rules and procedures
- Interact with the production and management personnel on a daily basis
- Work with project manager to continuously improve the plant operation
- Maintain shift log and plant operating records
- Prepare status reports
- Maintain facility records

In addition to the onsite managerial duties, the supervisor also serves as an operator and will be expected to perform typical operation functions including but not limited to:

- Operate the treatment facility to control the flow and processing of wastewater, sludge, and effluent
- Monitor gauges, meters, and control panels
- Observe variations in operating conditions and interprets readings and test results to determine treatment requirements
- Operate all wastewater treatment equipment
- Collect samples and perform internal laboratory tests and analyses
- Perform routine maintenance functions and custodial duties

Recommended Onsite Supervisor Qualifications Profile

- Formal Education
  - Minimum of a high school graduate or equivalent training and experience.
- General Requirements
  - Knowledge of processes and equipment involved in wastewater treatment.

- Ability to maintain and evaluate records.
- Ability to perform all required duties.
- Ability to maintain working relationship with other operators and production workers.

- General Educational Development
  - Reasoning
    - Apply knowledge of wastewater treatment to solve practical problems.
    - Interpret a variety of written and oral instructions.
  - Mathematical
    - Perform ordinary arithmetical and algebraic procedures in standard, practical applications.
  - Language
    - Establish and maintain communications with superiors and co-workers.
    - Ability to comprehend oral and written instructions, record information, and request supplies and work-materials orally or in writing.

- Specific Vocational Preparation
  - Minimum of 3 to 12 months experience working at an industrial wastewater treatment plant, depending upon formal training and prior experience.
  - Preferred post-high school education in a vocational or scientific discipline.

- Temperament
  - Supervisor must adjust to a variety of situations and conditions and maintain an even temperament. The supervisor must maintain a positive attitude and exercise calm and reasonable judgment when working with the operators, production personnel, or others.

- Physical Demands
  - Anticipated medium to heavy-duty work, involving climbing, balancing, stooping, kneeling, crouching, reaching, handling, talking, hearing, visual acuity, depth perception, and color vision.

- Working Conditions
  - Operations are conducted both indoors and outdoors. Exposure to weather, fumes, odors, and dust. Potential for exposure to hazardous chemicals or toxic conditions.

Wastewater Treatment Plant Operator

The wastewater treatment plant operator at the facility is expected to be a qualified and competent employee. It is necessary for the operator to also interact with production personnel and perform many functions of the supervisor, when not present. The operator may be required to perform any combination of the following tasks pertinent to controlling operation of plant or performs various tasks as directed.

- Operate treatment facilities to control flow and processing of wastewater, sludge, and effluent.
- Monitor gauges, meters, and control panels.
- Observe variations in operating conditions and interprets meter and gauge readings and test results to determine processing requirements.
- Maintain shift log and daily log and records meter and gauge readings.
- Collect samples and performs routine laboratory tests and analyses.
- Perform routine maintenance functions and custodial duties.
- Assist maintenance mechanic/laborer in any combination of the following tasks pertinent to maintenance of the plant:
  - Performs preventive maintenance and minor repairs on mechanical machinery and equipment.
  - Maintains building structures and grounds.
  - Maintenance tasks, such as, lubricate equipment and check for malfunctions; replace pumps or valves; and replace minor repair parts in motors, pumps, and other equipment. Clean out pipes and perform other minor plumbing and pipe-fitting tasks as required.
  - Assist in keeping maintenance records.
  - Perform minor maintenance and minor repair tasks on buildings, structures, and grounds.

- Collect and dispose of trash.

Qualifications Profile

- Formal Education
  - B.S. degree in Chemical Engineering or Environmental Engineering; or,
  - B.S. degree in any other Engineering or Science, preferably with strong background in Chemistry, industrial wastewater treatment processes, and process control; or,
  - A.A. degree in Science with strong background in Chemistry (at least two semesters of General Chemistry) and at least two years of experience in industrial wastewater treatment; or,
  - Industrial Wastewater Treatment Operator Certificate from the California Water Environment Association (CWEA). CWEA offers certification programs for industrial waste treatment plant operators ranging from Grade I to Grade IV; a Grade I certificate is the minimum requirement.

- General Requirements
  - Ability to operate plant processes and equipment.
  - Ability to maintain and evaluate facility logs/records.
  - Ability to collect samples for laboratory analysis and interpret results.
  - Ability to maintain working relationship with other shift workers.

- General Educational Development
  - Reasoning: Apply common sense understanding to carry out written, oral, or diagrammatic instructions. Deal with problems involving concrete variables in or from standardized situations.
  - Mathematical: Perform ordinary arithmetical calculations.
  - Language: Ability to comprehend oral and written instructions, record information, and request supplies and work materials orally or in writing.

- Specific Vocational Preparation
  - On-the-job training from date of employment. Previous experience as laborer or equipment operator in wastewater treatment plant also desirable.

- Temperament
  - Operator must adjust to a variety of situations and conditions and maintain an even temperament. The operator must maintain a positive attitude and exercise calm and reasonable judgment when working with the production personnel or others.

- Working Conditions
  - Operations are conducted both indoors and outdoors. Exposure to weather, fumes, odors, and dust. Potential for exposure to hazardous chemicals or toxic conditions.

Note that a qualified Wastewater Treatment Operator is required at the facility at all times wastewater is being processed at the facility.

Facility Chemist

The Facility Chemist is expected to be a qualified and competent employee. The chemist may be required to perform any combination of the following tasks pertinent to plant operations or performs various tasks as directed.

- Evaluate influent waste streams and manifests.

- Perform bench scale testing on influent wastes to assess treatability, and scale up chemical dosing for operators to perform full-scale treatment.

- Operation and maintenance of all analytical equipment, including, but not limited to ICP, pH probes, and flow meters.

- Maintain shift log and daily log and records meter and gauge readings.

- Collect samples and performs routine laboratory tests and analyses.

- Perform routine maintenance functions and custodial duties within onsite laboratory space.

Qualifications Profile

- Formal Education
  - College education in technical field or chemistry preferred.

- General Requirements
  - Ability to learn operation of plant processes and equipment.

- Ability to learn basic treatment mechanics for metal precipitation.
- Ability to maintain and evaluate simple records.
- Ability to maintain working relationship with other shift workers.

- General Educational Development
  - Reasoning: Apply common sense understanding to carry out written, oral, or diagrammatic instructions. Deal with problems involving concrete variables in or from standardized situations. Able to apply understanding of metals precipitation to develop testing regimes to treat influent wastewaters.
  - Mathematical: Perform ordinary arithmetical calculations, and able to scale up chemical dosages based on bench tests.
  - Language: Ability to comprehend oral and written instructions, record information, and request supplies and work materials orally or in writing.

- Specific Vocational Preparation
  - On-the-job training from date of employment. Previous experience as chemist or laboratory technician in wastewater treatment plant also desirable.
  - Ability to run and maintain analytical instruments.

- Temperament
  - Chemist must adjust to a variety of situations and conditions and maintain an even temperament. The chemist must maintain a positive attitude and exercise calm and reasonable judgment when working with the production personnel or others.

5.1 SAFETY

5.2 General

The potential safety and health hazards associated with industrial wastewater treatment systems are many and varied. Some of the hazards to which industrial wastewater treatment operators may be exposed include the following:

- Electrical hazards
- Trip/fall hazards
- Chemical exposure
- Confined space hazards
- Explosion and Fire
- Mechanical hazards (e.g., pinch/crush)
- Miscellaneous hazards

Operations personnel should be aware of all potential hazards that exist in their workplace and should be protected — and protect themselves — from these hazards to the greatest extent possible.

The operators should be aware that **injury frequency rates** for wastewater treatment facility employees are **substantially higher** than those for workers in most other industries. Injuries create human suffering and loss of human resources. In addition, they have a deleterious impact on plant efficiency, employee morale, public relations, and profitability.

Effective management and operation of a wastewater facility requires that all aspects of the operation, including the practice of safety, be at the highest level possible. Safety is initiated by the proper attitude of management toward accident prevention. This attitude will be reflected in the supervisory force and the workers. A safety program must have continuously demonstrated interest and commitment on the part of management if employee participation and cooperation are to be obtained.

5.3 Electrical Safety

Most equipment in a wastewater plant uses electricity as the power source. Working with the equipment requires exposure to electrical hazards that may result in electrocution unless safe practices are strictly followed.

The following list of general safety practices should be considered as a start in establishing complete electrical safety rules and procedures at the wastewater plant:

- Allow only qualified and authorized personnel to work on electrical equipment and wiring or to perform electrical maintenance.
- Utilize lockout/tagout procedures when servicing electrical equipment.
- Electrical equipment and lines will always be considered as energized unless they are positively proven to be de-energized and properly grounded. If it is not grounded, it is not dead.
- The use of metal ladders or metal tape measures around electrical equipment will be avoided.
- Two employees will work as a team on energized equipment.
- Approved rubber gloves will be used when working with voltages above 300 volts.
- An electrical control panel will never be opened unless the job requires it.
- Before work is performed on a line or buss that operates at 440 volts or above, it will be de-energized, locked out, and grounded in an approved manner.
- No part of the body will be used to test a circuit.
- Personnel will avoid grounding themselves in water or on pipes, drains, or metal objects when working on electrical equipment or wiring.
- No electrical safety device will be made inoperative or bypassed.
- When working in close quarters, all energized circuits will be covered with insulating blankets.
- All tools will have insulated handles.
- Metal-cased flashlights will never be used.
- Jewelry will not be worn when working with or near electric circuitry.

- All electric tools will be grounded and/or double insulated.
- Rubber mats will be used at control centers and electrical panels.
- All electric motors, switches, and control boxes will be kept clean at all times.
- Floors and working surfaces will be kept dry to the extent practicable.

Typically, wastewater treatment personnel are not qualified to — and thus should not — perform electrical work. However, it is the responsibility of wastewater operations personnel to ensure that safety rules and practices are adhered to by personnel conducting electrical work in the wastewater treatment area, and to report any apparent unsafe situation or practice to the appropriate RI-NU personnel and the facility manager.

In the event of an electrical accident, the employee(s) discovering the accident will assess the situation and develop a course of action. The course of action should include the following steps/considerations:

- Do not rush up to and touch the victim. This may result in electrocution of the rescuer if the victim is still in contact with the electrical source.
- Determine the cause (an electric tool, power line, or piece of equipment) of shock, that is, the source of electricity:
  - If the cause is a tool or piece of equipment with a switch or circuit breaker, turn the switch or breaker to the off position.
  - If the cause has no switch or circuit breaker, try to remove the cause from the victim by using a non-conductor such as a wooden stick or a rope.
  - If the cause cannot be switched off or too large to be moved, try to move the victim away from the cause. Remember not to touch the victim directly. Again, use a non-conductor such as wood, rope, or plastic to push, pull, or lift the victim from the source of electricity.

If an electrical accident occurs in the wastewater treatment area, the operator (or his designate) will immediately notify the appropriate RI-NU personnel and the supervisor.

5.4 Trip/Fall Hazards

The wastewater treatment area presents potential trip/fall hazards in the form of ladders, elevated crosswalks/mezzanines, stairs and cords, hoses or other obstacles on walking surfaces.

To minimize trip/fall hazards, the following practices and procedures will be followed:

- Maintain aisles, passageways, and walkways clear of obstructions
- Clean up materials spilled onto walkways immediately
- Maintain covers and/or guarding over all pits and floor openings
- Ensure that guardrails and stair rails are adequately maintained
- Maintain all ladders in good condition, and free of grease and oil
- Do not use the top step of a ladder as a step
- Exercise particular caution when ascending or descending stairs or ladders, and/or when working on elevated surfaces

5.5 Chemical Exposure

The potential for exposure to hazardous chemicals exists when working with untreated wastewater and chemicals used for treatment. To minimize the risk of chemical exposure, the following general practices/procedures should be followed:

- Utilize safe practices and appropriate personal protective equipment when transferring or otherwise handling hazardous chemicals (e.g., acids, caustics).

- Maintain awareness of the potential hazards associated with chemicals in the wastewater treatment area — read the safety data sheets (SDSs). (SDSs for the chemicals reasonably anticipated to be encountered in the wastewater treatment area are included in Appendix E).

- Ensure that the eyewash stations in the wastewater treatment area are functional and that access to them is unobstructed.

- Maintain clear hazard labels/markings on all containers of hazardous chemicals (e.g., drums, vats, tanks).

- Do not eat, drink or smoke in the wastewater treatment area, and utilize appropriate personal hygiene (e.g., wash hands) before doing so.

- Store hazardous chemicals in closed containers when they are not in use.

- Maintain spill response/cleanup materials in a readily accessible location(s), and utilize appropriate procedures (see below) when cleaning up releases of hazardous chemicals.

- Utilize vacuuming (as opposed to sweeping or blowing) as a means of cleaning up dust whenever possible.

- Maintain descriptive labels/markings on chemical piping systems, and that these systems are maintained free of leaks or drips.

- If a chemical exposure-related accident occurs in the wastewater treatment area, the operator will immediately notify the appropriate RI-NU personnel and the supervisor. The facility is designed such that there is adequate retention on the site so a release will not occur. In the event of a spill or release of a hazardous chemical, follow the procedure outlined in the diagram. In the event of a spill:

  — Determine what has been released, and estimate how much.

  — If there appears to be a threat of fire, explosion or personal injury, evacuate the area, then dial 911 and notify facility management.

  — If there does not appear to be an immediate threat, refer to the SDS for the chemical released for information regarding the appropriate personal protective equipment to be used, spill response procedures, and waste disposal considerations.

  — Contain and clean up the released chemical in accordance with the chemical-specific recommendations from the SDS.

SDSs for each chemical used can be found in Appendix E. If the operator has a specific question regarding the chemical, please refer to the SDS. If treatment chemicals are changed or updated, adjust Appendix E as necessary.

5.6 Confined Space Hazards

Confined space hazards that may be encountered in the wastewater treatment area include tanks that pose hazards associated with chemical exposure, falls, and/or engulfment (e.g., drowning). A confined space is defined by Occupational Safety and Health Administration as a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work;
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- Is not designed for continuous employee occupancy.

Unless properly trained and qualified, wastewater treatment plant employees are not authorized to enter into confined spaces at any time.

If a confined space entry needs to be performed, please contact the site supervisor for assistance.

5.7 Explosion and Fire Hazards

Explosion and/or fire can result from a variety of causes such as ignition (by a spark or flame) of flammable or explosive materials, ignition of materials due to oxygen enrichment, or chemical reactions that produce fire or heat. Explosions and fires can occur spontaneously, but are more often the result of some activity such as the mixing of incompatible chemicals or the inadvertent ignition of a flammable/explosive material or atmosphere.

Explosions and fires can present the following hazards: intense heat, flying debris, smoke inhalation, and/or the release of hazardous products of combustion. To minimize the potential hazards associated with fire and explosion, the following practices and procedures should be followed:

- Maintain an adequate number and type of portable fire extinguishers in readily accessible locations.
- Ensure that operators are periodically instructed in the use of extinguishers and fire protection procedures.
- Store all flammable liquids in closed containers when not in use.

- Store all combustible scrap, debris, and waste materials (e.g., oily rags) in covered metal receptacles, and remove this material from the area promptly.

- Store incompatible chemicals and materials (e.g., acids and bases, oxidizing materials), in separate, designated areas to minimize the risk of explosive reactions.

- Do not smoke in the wastewater treatment area.

- Maintain clear access to all emergency exits.

- In the event of a fire, the operator(s) discovering the fire will:

  Pull the fire alarm.

  — If alarms are not functional for any reason, pass the word "FIRE," give the location over the phone system and notify the appropriate RI-NU personnel.

  — Locate the nearest fire extinguisher.

  — If the operator has been trained to respond, and if exposure to fumes or contact with hazardous materials can be avoided, attempt to extinguish the fire. An operator will not attempt any of these measures alone and will secure help.

  — Once the fire has been extinguished or it has been determined that the fire cannot be safety extinguished, proceed to the nearest exit, and then to the designated evacuation assembly area.

5.8 Miscellaneous Hazards

Operators in the wastewater treatment area may also be exposed to other potential hazards, including heat/cold, blood borne pathogens, cuts and abrasions, and hazards associated with lifting, etc. To minimize these potential hazards, the following practices and procedures should be followed:

- The following general safety guides will be observed whenever working around wastewater.

  — Hands and fingers will be kept from the nose, mouth, eyes, and ears.

- Rubber gloves will be worn when cleaning pumps; handling wastewater, treatment chemicals, sludge or grit; or for other work in which an employee comes into direct contact with untreated wastewater or chemicals.

- Gloves will always be worn when hands are chapped or burned or when the skin is broken for any cause. Gloves will be worn when handling wastewater and/or treatment chemicals.

- Before eating or smoking, and after work, the hands will be washed thoroughly with soap and hot water.

- Fingernails will be kept short, and foreign material will be removed from the nails.

- Fresh work clothes will not be stored with used work clothes.

- All cuts and scratches must be reported and be given first aid treatment.

- A shower should be taken after each workday.

Improper lifting can result in injury. Use proper lifting techniques, and obtain help when necessary.

- If workplace heat becomes a problem, employ appropriate work/rest regimens, and ensure that operators drink adequate fluids.

- If temperatures drop too low, exposure to water spray can induce hypothermia. Ensure operators adequately monitor temperatures, and change out of wet clothing in cold conditions.

- Observe universal precautions in the event of exposure to blood or other potentially infectious materials.

5.9 Laboratory Safety

Safety is important in the laboratory as well as in the rest of the treatment plant. Pertinent safety practices in wastewater plant laboratories are as follows:

- All chipped or cracked glassware will be discarded in a specific container marked for disposal of broken glass.

- When using volatile solvents, bases, or acids, the work will be done in a well ventilated area.
- Solvents will be stored in special explosion-proof cans.
- Acids react violently with some organic materials. When using these chemicals, care should be taken in regard to possible fire or explosion.
- Chemicals will not be handled with the bare hands.
- An emergency eyewash and shower will be located in the laboratory.
- Suction bulbs will be used on all pipettes.
- Appropriate safety equipment will be worn when working with corrosive chemicals.
- A face shield or chemical-type goggles will be used when dangerous chemicals are handled.
- All chemicals will be labeled clearly.
- Gloves will be worn when rubber-to-glass connections are to be made.
- Proper ventilation will be available to remove fumes and dust.
- Smoking and eating in the laboratory is strictly prohibited.
- Any gas cylinders will be stored properly and secured in a well-ventilated area outside the laboratory.
- Appropriate fire extinguishers will be fully charged and readily available in the laboratory.
- Personnel should thoroughly wash their hands with soap and hot water before eating or smoking.
- A container of absorbent inert material, for example, sand, will be available for use in acid or base spills.
- Remember: Always add ACID to WATER, never WATER to ACID.

5.10 Safety Equipment

In addition to the above-mentioned safety equipment for specific areas of the treatment plant, it is necessary to have access to other safety equipment. These items will be located where they are readily accessible to treatment plant personnel, including:

- First aid kits
- Fire extinguishers
- Respirators with the appropriate cartridges
- Protective clothing including gloves and chemical suits
- Face shield
- 5-minute escape bottle
- Safety glasses
- Goggles

Wastewater treatment personnel should maintain familiarity with the location(s) and the proper use and limitations of this equipment.

5.11 Emergency Contact Numbers

The telephone numbers of relevant health and safety personnel including the nearest hospital, police and fire departments, ambulance services, and rescue squad will be posted in the treatment system. The telephone number of the poison control will be readily available in the event of a chemical emergency. The telephone number of the relevant Orange County representatives, RI-NU facility personnel and management will also be posted. For convenience, several important numbers are also provided in this section.

Contact/Situation	Telephone Number
Fire Department/Fire, Explosion	911
Coast Guard National Response Center/Reportable Quantity Release of Hazardous Substance	1-800-424-8802
California Emergency Management Agency/Reportable Quantity Release of Hazardous Substance, Any Significant Emergency Situation	1-800-852-7550 911
Hospital/Medical Emergency	TBD/911
Facility Supervisor	TBD
RI-NU Management	TBD
ODPW (Technical Services Program – Source Control, Jeremy Grant)	805-385-3965

6.1 RECORDS

6.2 General Records

Record keeping to track loads of wastewater received and processed through the facility is a vital aspect of operations. The operator record tests procedures, results, and log all processing step observation and measurements. Among other reasons, these records provide serve as a guide in regulating, adjusting, and modifying when repeat deliveries of the same and similar waste stream occur, and for continuous improvement of the plant facilities and treatment processes. Of great importance also is the establishment of a reliable continuing record of processing decisions, proof of performance, issues and corrective measures or other processing recommendations for future operations.

Operation data that is collected, analyzed, and reported will be geared to the particular needs and circumstances. The operator should be able to justify each measurement, observation, calculation, and report on the basis of expected usefulness and value. Data will be collected and tests performed that are necessary to control the treatment processes and reflect their efficiencies.

Note that the facility must maintain (obtain, generate, and keep) all documents (paper and/or electronic) related to wastewater for review during an inspection and for a **minimum of three years** in accordance with the record-keeping requirements in 40 CFR 403.12(o), and 40 CFR 437.

6.3 Daily Records

Daily records are recorded in two main forms at the plant. A continuing diary, or plant log, is kept that contains a wide variety of factual information on matters such as the general status of the plant, progress of maintenance work, equipment failure and repair, unusual or unexpected conditions or analytical results, and names and affiliations of visitors, etc.

Daily shift logs are to be prepared by the operators each shift. These logs are critical to the successful operation of the treatment plant. Important operational data will be recorded on the shift logs. A copy of sample shift log is included in Appendix F.

6.4 Operation and Maintenance Cost Records

RI-NU also tracks operating costs. The major categories of operating costs are labor, chemicals, supplies, and administration. Chemical inventory is performed on a regular basis and chemical usage tracked daily. Supplies include lab chemicals, cleaning materials, maintenance parts and fluids, and other expendable items. All costs will include information on unit costs, total costs, and amounts/quantities used, and waste disposal.

6.5 Maintenance Records

It is necessary to have readily available the equipment and maintenance force capable of keeping equipment in (or restored to) operational condition. Records of the plant will be available for use by operating personnel and will include operations and maintenance manuals as well as design data, shop drawings, equipment history, and other similar information.

6.6 Reports

6.6.1 Weekly (or Monthly) Operating Reports

Weekly (or monthly) operating reports will be prepared that contain a summary of all data collected on a routine basis. These reports are prepared to provide a snap shot summary of the operation of the plant. Flows, chemical usage, and influent loadings will be presented in the reports. The report also provides status summary of maintenance activities, problems experienced and ongoing activities. Examples of a typical status report, with other beneficial logs are provided in Appendix G.

6.6.2 Annual Operating Reports

The facility supervisor, with the assistance of the operators, will prepare a detailed annual operating report. The report is a summary of developments and activities that occurred during the previous fiscal year. It should enable RI-NU to readily determine the status of the facilities. This report should include a complete fiscal summary detailing chemical costs, maintenance costs, labor cost, project management, supplies, etc.

The report will describe the system and the treatment process and will contain flow data, performance data, chemical usage, and associated graphs. The graphs will reflect present conditions and conditions of past years. There will be a discussion and a table that summarizes flow data and operation efficiency during the past year. Process problems and the solutions will be outlined for future reference.

The maintenance section will briefly describe maintenance projects that were completed during the year. Major projects anticipated during the coming year will also be described along with the anticipated costs.

Improvements or capital additions to the treatment plant will be described, if applicable. The costs of recommended improvements will be included as well as the dates of completion.

An annual cost projection is also a necessary portion of an annual report. The projection should cover the previous year's cost, actual expenditures, and the ensuing year's budget. Expenditures of plant operation, administration, capital expenditures, debts service, and receipts and revenues should be presented. The major expenditures of operation and maintenance are labor and chemicals; therefore, these should be discussed in detail. Trends of these expenditures may be plotted and observed to assist in future planning.

6.7 Self-Monitoring Reports

The analytical methods and frequencies for completion of self-monitoring reports (SMRs) are defined in the facility's Permit. The SMRs must be sent to ODPW at dates that satisfy the deadlines set forth in the Permit. All onsite compliance paperwork and data, including sample data, lab reports, and treatment records, are to be kept on site in an office or other central location. These records must be made available during inspections. If the operator or chemist elects to take additional samples of the system effluent to be analyzed by a state-certified lab, these results must be included in the SMR to be used for calculation of monthly average effluent concentrations.

6.8 Facility Plans

The Site must provide and maintain certain facility plans as required by the permit or City of Oxnard regulations. At a minimum, these include a slug control plan and a waste analysis plan (WAP).

6.9 Personnel Records

Records that reflect such things as employee training and employee turnover rate are valuable to treatment system management. A folder will be kept on file for each employee that contains such information as the date of employment, previous employment history, education, salary increases, company contacts, etc.

6.10 Violations and Equipment Failure

After becoming aware of a violation as determined by sampling conducted by the operator, RI-NU must notify ODPW within a time specified in the Permit. RI-NU shall investigate the cause of the violation, take corrective actions to prevent the violation for recurring, and submit a report to ODPW within a time specified in the Permit.

Upon discovery of any equipment failure, accidental discharge of prohibited substances listed in Chapter 19 of the Oxnard City Code, or any slug loads or spills that may enter the Oxnard Municipal Wastewater System, RI-NU must immediately notify ODPW. The notification should

include the nature of the event, location of discharge, date and time of discharge, concentration and volume of pollutant, and corrective actions already taken or that will be taken.

7.1 ANALYTICAL TESTING

7.2 Purpose

The management and control of any process is essential if the process is to operate efficiently and meet specific standards. To achieve these operational goals, it is necessary to have selected measurements to enable an operator to make the proper decision relative to altering the treatment for varying process conditions.

For the purposes of this operations manual, this analytical testing section will refer to samples being analyzed for regulatory purposes. These samples will be sent to a certified laboratory. However, the principles discussed in this section will also benefit any in-house sampling or monitoring used for bench marking process performance.

7.3 Sampling

Samples are to be taken at the monitoring points as specified in the Permit, and are not to be taken after the wastewater is diluted by any other waste stream, body of water, or substance. All the equipment used for sampling and analysis should be routinely calibrated, inspected, and maintained to ensure measurement accuracy. Calibration frequency of the flowmeters is defined in the Permit.

7.3.1 Sample Types

The value of results from wastewater laboratory testing is dependent upon the sample being representative of the source from which it was taken. There are two types of samples taken for wastewater laboratory analyses:

Grab Sample — A single sample taken at neither set time nor flow.

Composite Sample — A combination of individual samples taken at selected time or flow volume intervals, for a specified period to minimize the effect of the variability of the individual sample.

Samples may be of equal volume or proportional to flow at the time of sampling. Grab samples are collected at a particular instant and represent conditions existing at that single moment. Composite samples represent conditions over a longer, definite period of time.

After a representative sample has been collected, it is essential that it be maintained in a state that will not introduce error before analysis (see Sample Storage below).

Composite samples indicate the characteristics of the wastewater over a period of time. The effects of intermittent changes in strength and flow are mitigated. Composite samples provide sufficiently

accurate data if the variability of the waste characteristics is not extreme; however, the variability of these characteristics must be determined by the analysis of grab samples. The maximum time over which a composited sample may be accumulated is to a degree limited by the period the sample can be stored without changing its characteristics.

7.3.2 Sample Location

The sampling point for the wastewater treatment process is at the sample tank located adjacent to the neutralization sump. Samples are collected via a programmable ISCO sampler that is connected to the sample tank. The sample parameters, monitoring frequency, and method of sample collection are stated in the Permit (Appendix A). All sample analysis as required by the permit must be performed by an approved, California-certified laboratory facility.

Additional grab samples may be drawn off from individual tanks via sampling port. These samples are to be used for in-house testing and monitoring for optimization of treatment processes.

7.3.3 Sample Storage

Composite samples must be preserved in such a way that the characteristics to be measured do not change in quantity or quality. Special collection methods are sometimes required. The analytical laboratory will provide specific preservative and storage requirements for specific analytes.

The final step after a sample has been collected, composited, and preserved is to identify the sample properly and clearly before it is submitted to the laboratory. At the minimum, the following are required for the sample label:

- Designation or location of sample collection
- Date and time of collection
- Indication of grab or composited sample with appropriate time and volume information
- Notation of information that may change before laboratory analyses are made such as temperature, pH, and appearance
- Initials or name of individual who took the sample
- Note regarding preservation used, if any

7.4 Laboratory Procedures

The selected laboratory will be certified for wastewater analysis in California, and will analyze each sample for each indicated parameter in accordance with the methods established by 40 CFR Part 136.

7.4.1 Laboratory References

The following list of references is recommended as they offer instructions for performing laboratory tests.

- American Public Health Association. *Standard Methods for Examination of Water and Sewage*.
- United States Environmental Protection Agency. *Methods for Chemical Analysis of Water and Waste* (GPD Stock No. 5501-0067).
- *WPCF Publication No. 18*, "Simplified Laboratory Procedures for Wastewater Examination."
- *WPCF Manual of Practice No. 11*, "Operation of Wastewater Treatment Plants."
- Sawyer, Claire N. *Chemistry for Sanitary Engineers*. New York, McGraw-Hill. 1967.

8.1 MAINTENANCE

Regularly scheduled equipment maintenance is of the utmost importance and absolutely must be performed to obtain reasonable service life from the equipment. It is important that all employees of the wastewater treatment plant become familiar with necessary routine maintenance on equipment.

8.2 Scheduled Maintenance

Scheduled events listed below are suggested, and facility staff may adjust accordingly to maintain optimal plant performance.

8.2.1 Daily

Each day that the facility is operating, facility staff should:

- Clean all pH probes, follow probe manufacturer recommendations for probe cleaning
- Check calibration of pH probes, if off, recalibrate probes using pH meter manufacturer instructions
- Check all float switches
- Calibrate analytical equipment
- Grease centrifuges and Moyno pumps and other rolling stock as needed.
- Check gear oil and air compressor oil levels
- Check fluid levels on loaders.
- Check coolant water level on ozone generator

8.2.2 Weekly

- At a minimum pH probes will be calibrated each week
- Inspect air compressor for properly functioning blow off
- Check plows on centrifuges and adjust/replace as needed.

8.2.3 Monthly

- Change compressor oil and filters. Drain condensate from receiver.
- Check air dryers and replace as needed.

8.2.4 Annually

All pumps and equipment will be checked annually to confirm that they are in working order, and do not require replacement. Additionally, as per the Permit requirements, the flow meter(s) on the discharge line(s) will be calibrated and recertified, as needed.

8.3 Troubleshooting

The importance of inspection as part of the overall maintenance program cannot be overstressed. All plant employees should participate in the inspection process to insure that problems in any area are resolved as soon as possible. Any issues with any equipment should be followed up with manufacturer's recommendations; a list of some common potential issues with their potential fix is listed below.

- Chemical dosing pumps not operating/poor separation: Confirm that diaphragms are sound, and check valves are not sticking or fouled by confirming flow.
- Metals not precipitating from wastewater: check that pH probe is properly calibrated, as metals precipitation is strongly contingent upon pH.
- Flow rate through organo-clay vessels drops: it is likely that pressure has built up as media is spent. Initiate media change out process, and investigate pressure alarms to confirm they are properly operating.

As the facility continues operation, operators should amend this troubleshooting list to include any common issues and solutions as they are identify.

8.4 Inspection

The importance of inspection as part of the overall maintenance program cannot be overstressed. All plant employees will participate in the inspection process to insure that problems in any area can be quickly discovered and remedied. Each employee is encouraged to report any problems observed while working in the plant.

At the start of and completion of each shift, the facility operator will do a complete walkthrough of the facility. The purpose of this walkthrough is to identify any leaks or potential issues with the facility. The operator will take this time to ensure that if any equipment needs to be turned on or off, it is done so.

8.5 Housekeeping

A general cleanup of the plant each day not only provides a more pleasant place to work, it also helps improve overall plant performance. This cleanup will at least consist of a general floor wash down, removal of trash, organization of supplies and materials, cleaning of filter press area, and cleaning of the laboratory/office area.

Appendix A

City of Oxnard
Industrial Discharge Permit
(Pending permit issuance)

Appendix B
Oxnard City Code

Appendix C
Process Flow Diagram

Appendix D
Facility Layout

Appendix E
Safety Data Sheets

Appendix F
Sample Daily Shift Log

Appendix G
Additional Forms