AkzoNobel

Moses Lake, Washington

Operations and Maintenance Manual

Waste Water Permit # ST-8078

Purpose: This manual covers the requirements of WAC 173-240-150 for Operations and Maintenance Manual requirements for the AkzoNobel Moses Lake Plants waste water permit.

Scope: The Operations and Maintenance Manual covers the AkzoNobel Bleaching Chemicals and Paper Chemicals waste water systems at the Moses Lake Plant.

O&M Requirements:

A. The names and phone numbers of the responsible individuals.

B. A description of plant type, flow pattern, operation, and efficiency expected.

C. The principal design criteria.

D. A process description of each plant unit, that includes functions, relationship to other plant units and schematic diagrams.

E. An explanation of the operational objectives for the various wastewater parameters, such as sludge age settle ability, etc.

F. A discussion of the detailed operation unit and a description of various controls, recommended setting, fail-safe features.

G. A discussion of how the facilities are to be operated during anticipated start-ups and shutdowns, maintenance procedures, and less than design loading conditions, so as to maintain efficient treatment.

H. A section on laboratory procedures that includes sampling techniques, monitoring requirements, and sample analysis.

I. Recordkeeping procedures and sample forms to be used.

J. A maintenance schedule that incorporates manufacturer's recommendations, preventive maintenance and housekeeping schedules, and special tools and equipment usage.

K. A section on safety.

L. A section that contains the spare parts inventory, address of local suppliers, equipment warranties, and appropriate equipment catalogues.

M. Emergency plans and procedures.

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Section A

A. The names and phone numbers of the responsible individuals:

   a. Refer to the Application for Industrial Wastewater Discharge submitted 11-2-2011

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Section B

A. A description of plant type, flow pattern, operation, and efficiency expected.

   a. Refer to the Application for Industrial Wastewater Discharge submitted 11-2-2011. Sections B.1, C.1 and C.2

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Section C

A. The principal design criteria.

   a. Refer to the Application for Industrial Wastewater Discharge submitted 11-2-2011. Sections C.2

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Section D

A. A process description of each plant unit, that includes functions, relationship to other plant units and schematic diagrams.

   a. Refer to the Application for Industrial Wastewater Discharge submitted 11-2-2011. Section B.1, C.1, and C.2
   b. Both plants are operated by AkzoNobel and manufacture products used in the pulp and paper industry. The only other similarity is that waste water discharges are comingled at Outfall # 1.

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Section E

A. An explanation of the operational objectives for the various wastewater parameters, such as sludge age settle ability, etc.

   a. Refer to the Application for Industrial Wastewater Discharge submitted 11-2-2011. Section B.3 defines the production capabilities of both operating units. Section C.2 defines the operation characteristics of the water usage and waste water flow.
   b. There is no sludge generated from the waste water streams.

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Section F

A. A discussion of the detailed operation unit and a description of various controls, recommended setting, fail-safe features.

   a. Each operating unit has procedures describing the waste water systems and safe guards that are in place; such as: Water Systems Description, T-107 Neutralization System, PC Wastewater Handling Procedure, Sewer Effluent.

Water System Description

1. **PURPOSE:**

2. **SCOPE:**

3. **DEFINITIONS:**

4. **SAFETY:**

5. **DESCRIPTION:**

Water is supplied to the Moses Lake plant from wells owned and operated by the City of Moses Lake. There are four main types of water in the plant; potable water, service water, safety shower water and fire water. There are two main supply lines feeding Eka Chemicals. (The supply lines tie into a fire header loop). All of the other users take off of a second loop. The water is metered and cost is assessed on a per gallon basis.

A. Flow Diagram:

See flow diagram attached.

B. Major Equipment:

1. Safety shower system.
2. Fire water system.
3. Service water system.
4. Potable water system.
   a. Administration building.
   b. Maintenance building.
   c. Process building.

(See the Water Distribution Diagram on the following page)

Wastewater Permit Description

1. PURPOSE:

The purpose of this description is to provide guidance to plant personnel and SH&E auditors the process used for establishing and modifying waste water permits.

This document contains references to sources of information concerning the operating and maintenance of water quality environmental control systems in this facility.

It is the intention of Eka Chemicals to operate the Moses Lake process and equipment in a manner which, meets or exceeds all requirements and limitations as set forth in the current waste water permit granted by the Washington Department of Ecology.

2. SCOPE:

The scope of this document only concerns equipment, instrumentation, operation and maintenance of equipment that ensures discharge water quality at Eka Chemicals, Moses Lake facility.

3. DEFINITIONS:

N/A

4. SAFETY:

N/A

5. DESCRIPTION:

A. General:

In the process of manufacturing Sodium Chlorate and Paper Chemicals products, the plants generate certain quantities of wastewater. Eka Chemicals Moses Lake is permitted by the Washington State Department of Ecology (WDOE) and the City of Moses Lake to discharge wastewater. The water is discharged into the City of Moses Lake's Public Owned Treatment Works (POTW).

The Clean Water Act, enacted in 1972 requires criteria be met to ensure resource water quality. Washington is a self-regulating state and must be in accordance with the requirements of the Clean Water Act.

The City of Moses Lake is permitted by the WDOE to operate and maintain the POTW. The City of Moses Lake Public Works Department permitting process must be in accordance with the requirements of the Washington Department of Ecology.

All processes and sanitary wastewater exiting the facility is permitted.

1. Process water is monitored as water passes through the metering manhole, designated as Outfall #001. Samples are drawn using a calibrated metering

pump, collecting a representative sample. The sample is analyzed and results are reported as per the assigned frequency.

2. Sanitary waste flows are recorded monthly; these numbers are calculated by adding up the total non-process water entering Maintenance, Production, Administration, and the Paper Chemicals Unit.

B. Normal Parameters:

The normal parameters defining the allowable wastewater effluent limits are listed in the State Waste Discharge Permit and the City of Moses Lake Permit. The discharge chart provides a list of constituents, monthly averages, and daily maximums allowed.

C. Maintenance Schedule:

The Maintenance Department maintains safety and environmental equipment. The equipment identified relating to the waste water discharge are:

Equipment # 10015718, Technical ID # SPL004-Ml, Sigma Effluent Sampling Unit
Equipment # 10015310, Technical ID # FT-4090-ML, Plant Effluent Water Flow
Equipment # 10015620, Technical ID # PHT-4089-ML, Effluent Water to City pH
Equipment # 10015626, Technical ID # PHT-4722-ML, PC Waste Water Discharge PH

Equipment #'s 10015310, 10015620, and 1001626 are on the plants Preventive Maintenance (PM) system. This equipment is maintained as per the AkzoNobel or manufactures recommended maintenance frequency. The frequency and PM process is detailed in the AkzoNobel SAP Maintenance Module.
Equipment # 10015718 is monitored daily by the Laboratory Technician when the waste water samples are extracted from the sampling unit. When the Lab Technician finds the unit not working he is required to immediately notify the Maintenance Supervisor of the condition and follow up with writing a Maintenance Notification in the AkzoNobel SAP Maintenance Module. When entering the Maintenance Notification in SAP the priority must be identified as #1. Priority #1 Maintenance Notifications are defined as emergency repairs and immediate corrective actions are taken to make the equipment function as designed.

D. Monitoring and Record Keeping Requirements:

The monitoring and reporting requirements for wastewater effluent are outlined in the Waste Water Permits issued by the Washington State Department of Ecology and the City of Moses Lake.

Process Water Deionization System
Regeneration Procedure

1. PURPOSE:

To define and describe the various functions, related activities of the regeneration and operation of the DI unit. The essential information for good regeneration is provided in this procedure.

The DI unit feed is raw water from the city. Deionization upgrades the water quality, therefore making it compatible with our process. Impurities (silica, calcium, magnesium, iron, manganese) are removed from the water. Pure water is required, as it is a raw material in our process.

2. SCOPE:

3. DEFINITIONS:

4. SAFETY:

There are three hazardous chemicals in this operation. The chemicals consist of caustic soda (NaOH), hydrochloric acid (HCl), and sulfuric Acid (H_2SO_4). Safety gear is required when handling caustic and acid.

5. PROCEDURE:

A. Regen Steps:

NOTE: All sequences use a built-in timing function, programmed in the Bailey.

1. Re-circulation (not currently used).
2. In service (making process water).
3. Cation backwash, this step lasts 15 minutes.
4. **HCl injection:** this step lasts 40 minutes. The acid goes in the unit at a rate of 8 gpm. The specific gravity (SpG) of the solution is to be between 1.020 and 1.025.
5. **Acid displacement:** this step lasts for 50 minutes.
6. **Cation fast rinse:** this step lasts for 10 minutes.
7. **Anion backwash:** this step lasts for 48 minutes.
8. **Caustic injection:** this step lasts for 30 minutes. The caustic goes in the unit at a rate of 1.5 gpm. The specific gravity of this solution is to be between 1.040 and 1.045.
9. **Caustic displacement:** this step lasts 15 minutes.
10. **Anion fast rinse**: this step lasts for 30 minutes.

11. **Re-circulation:** this step lasts for 60 minutes, with the automatic timer system of the unit. This step may also be held for as long as you need. This step permits re-circulation to improve water quality. It allows the unit time to polish itself so that the conductivity (measured in micro-siemens: MSEM) is low and the pH is low.

NOTE: In steps 5.A.1 to 5.A.6 liquid will go to T-718. This neutralized effluent will get shipped to the salt pits for raw salt dissolving. In steps 5.A.7 to 5.A.10 liquid will be sent to the city sewer system via T-107.

12. Tank T-718 will be neutralized through the use of acid and caustic. These materials are used for pH adjustment inside our system, therefore they are very compatible.

13. Tank T-107 will be neutralized, through the use of Sulfuric Acid, to keep the chloride concentration low in the effluent.

14. In steps 5.A.5, 5.A.6, 5.A.8, and 5.A.9 be sure to check the rotameters on the unit to assure you have the proper dilution flow to the unit. If these flow rates drop, the specific gravity will increase, therefore resulting in a bad regeneration of the unit.

NOTE: The pump stroke rate should be noted. P-614 should run approximately 50 strokes.

T-107 Neutralization System

1. PURPOSE:

The system is used to neutralize the contents of T-107 after the regeneration of the D.I. unit using 93% Sulfuric Acid.

2. SCOPE:

Eka Chemicals, Inc. Moses Lake, WA.

3. DEFINITIONS:

N/A

4. SAFETY:

Do not mix any acid with Sodium Chlorate to a pH lower than 4 pH. Lower pH's will create Chlorine Dioxide gas. 93% Sulfuric Acid is much stronger than the HCl acid that we use. Delivery drivers must wear Personal Protective Equipment (PPE): slicker suit, rubber boots, safety glasses, face-shield, rubber gloves, and hardhat.

When handling concentrated Sulfuric Acid, AkzoNobel employees shall wear (PPE): slicker suit, rubber boots, safety glasses, face-shield, rubber gloves, and hardhat. In the event of a spill or release of Sulfuric Acid, refer to the Emergency Response Manual (EMR). Always read and follow recommendation on the Material Safety Data Sheet (MSDS).

5. DESCRIPTION:

The Sulfuric Acid system will be used to neutralize T-107 after a DI regeneration. This system will replace the CO_2 system.

The system consists of a 1,000 gallon storage tank T-126 (located west of the 312 system), sandpiper pump, P-126 isolation valves, AV valve 4401 and an air solenoid valve AV-4402.

6. PROCEDURE:

A. Once the DI regeneration is completed and the T-107 is filled up with regenerant liquid, the tank 107 will be neutralized through the use of Sulfuric Acid to keep the chloride content low in the effluent.

B. Verify that the P-106 and A-107 are running.

C. Take note of the beginning pH in T-107.

D. Verify valve line-up from the Sulfuric Acid tank to T-107.

E. Enter pH set point of approximate 10.2 (pH may drift down slightly from this point).

F. Initiate the operation of the Sulfuric Acid sandpiper pump.

G. Verify the slow shake rate of the pump and that the line is not leaking. (**NOTE**: pump will cycle on automatically approximately 15 seconds out of each minute.)

H. The pump will automatically shutoff when it reaches the pH set point (and may drift lower slightly).

I. Verify the final/ending pH with the lab pH meter.

J. Collect final retain sample for the lab prior to discharging.

K. The Bailey Interlocks are:

1. Both P-106 and A-107 are required to be running in order for either the AV-4402 or the sandpiper pump P-126 to operate.

2. AV-4402 will operate in unison with P-126. The AV-4401 will open five seconds before the pump.

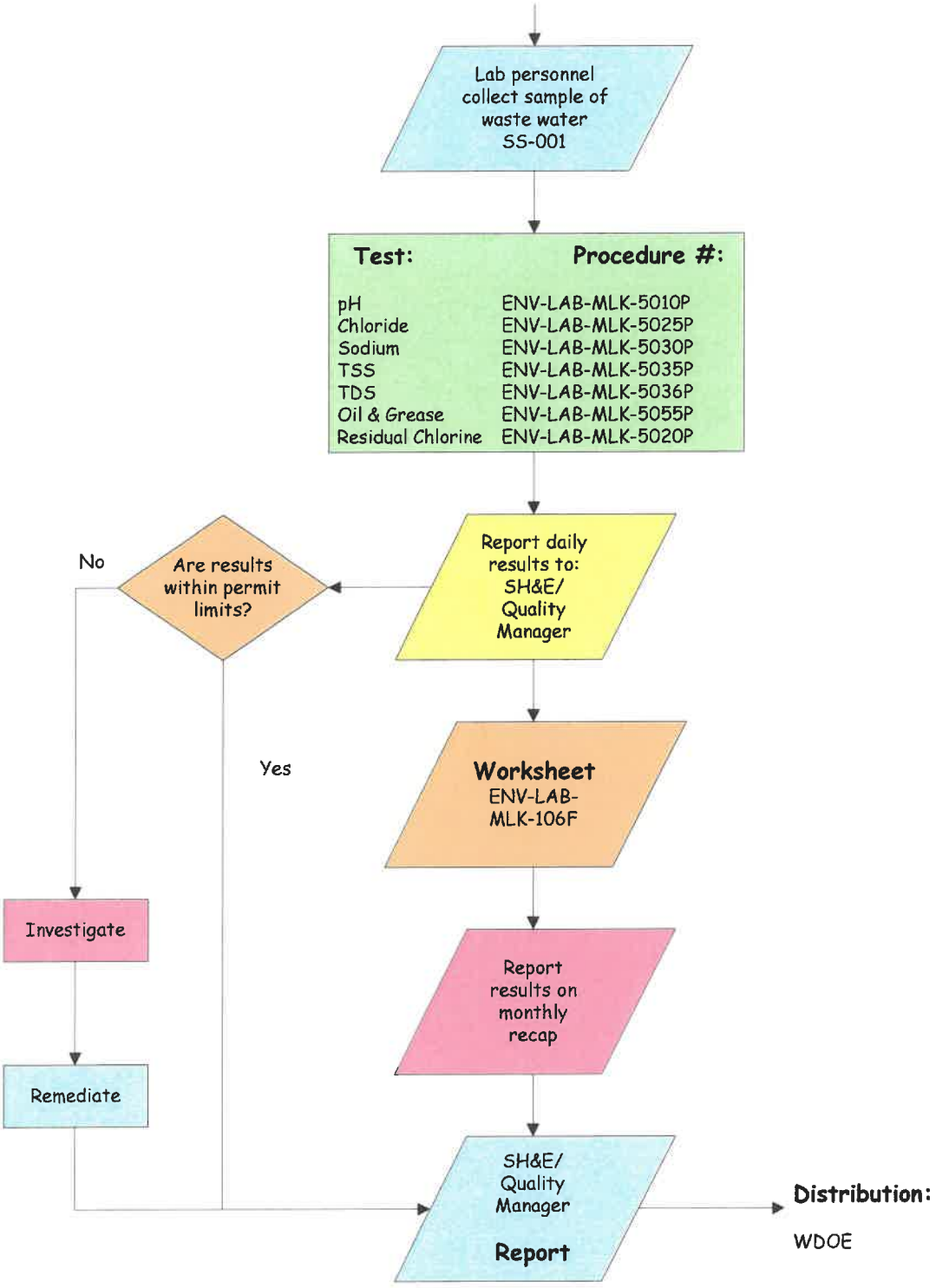
3. AV-4401 will close five seconds after AV-4402 closes.

4. AV-4402 will close if pHIA-3157 is less than 9 pH.

5. AV-4402 will close after fifteen minutes of running.

6. P-106 will shut off if the city effluent pH hits a 7 pH or a 10 pH.

Sewer Effluent



PC Wastewater Handling Procedure

1. INTRODUCTION:

This document is intended to outline the various operating parameters and related process equipment which may impact wastewater discharges originating from the Paper Chemicals Operating Unit.

The waste water discharge system is essentially manual in operation and currently there are no installed primary system interlocks.

2. SYSTEM OVERVIEW:

A. Details of the Paper Chemicals Unit production process are described in the Unit's Quality System Procedures.

B. Process and instrument diagrams showing the Paper Chemicals Unit Wastewater System are available in the site engineering records or electronically via the LAN.

C. Sources for the Paper Chemicals Units wastewater are as follows:

1. The PC Units Process Water Softener automatically regenerates the resin bed based on established set points. The set points are set by operations based on incoming water hardness and the softeners resin capacity. The regeneration of the resin bed is accomplished by back flushing a saturated brine solution through the resin bed. This brine back flush and follow up rinse water is discharged directly to the site process sewer through line 2"-WW1610-PVC.

2. Boiler blow down water is collected in a 200 gallon sump located in the boiler room. The sump is automatically pumped out when necessary by a float controlled sump pump. The contents of this sump are discharged directly to the site process sewer through line 2"-WW1610-PVC by way of line 1-1/2"-WW1617-PVC.

3. The plungers on the homogenizer are cooled and lubricated by a steady spray of water during homogenizer operation. The water is drained from the homogenizer into a small collection tank where it is automatically pumped out when necessary by a float controlled duplex pump. The contents of this sump are discharged directly to the site process sewer through line 2"-WW1610-PVC by way of line 1"-PWR1404-PVC.

The sources described above are discharged directly to the site process sewer without manual intervention by an operator. All sources of wastewater leaving the Paper Chemicals Unit flow through a totalizing flow meter, FI-1208.

4. Process waste water is also generated during vessel rinsing, vessel jacket draining, incidental spill clean up, tote washing etc. All waste water generated during these activities is collected in the process trench drains which all lead into a 300 gallon sump pit. This pit is automatically pumped out when necessary by a float controlled sump pump. The contents are pumped into Process Wastewater Tank T-1208.

D. Paper Chemicals Unit batch wastewater discharge system consists of the following major pieces of equipment:

1. Trench drain system around Coating Additive process vessels and warehouse storage tank farm.
2. 300 gallon collection sump with integral solids separation weir.
3. Float controlled sump pump.
4. Wastewater batch tank T-1208.
5. Wastewater discharge pump P-1208.
6. Wastewater discharge filter F-1208.
7. Wastewater discharge totalizing flow meter FI-1208.

E. Batch operation of system:

1. Process wastewater generated during operation is channeled through the plant trench drain system into the collection sump where initial solids separation occurs due to the integral weir.

2. The collection sump float will trigger pump out when sump level requires. Wastewater will be pumped to tank T-1208 through line 2"-WW1615-PVC.

3. When the quantity of wastewater in T-1208 necessitates pumping out to the site sewer the following procedure will apply:

   a. Operator will hook up an AOD pump to the available drain nozzle of T-1208 and to the T-1208 circulation line. The operator will install a new filter bag into Wastewater Discharge Filter F-1208. The operator will then open valves V-1225 and V-1226 and begin re-circulating the contents of T-1208. This is to ensure uniform mixing of the tank prior to pH testing and subsequent discharge.

   b. While the tank is mixing, the operator will call the chlorate plant control room and verify that there are no site discharges occurring that could be impacted by the pump out of T-1208. Permission to pump out will be recorded on the Wastewater Discharge Log.

   c. After a minimum of 30 minutes mixing the operator will take a sample from T-1208 and verify that the pH is within the permissible range (pH 6-11) for discharge to the site sewer. The pH value will be recorded on the Wastewater Discharge Log.

   d. The operator will open V-1223 and start Wastewater Discharge pump P-1208.

   e. At this point the wastewater in T-1208 is being pumped through flow meter FI-1208 and out to the site sewer. The process can continue until Chlorate Plant Operations requests a halt to pump out or T-1208 is empty.

3. SYSTEM MAINTENANCE AND RECORDKEEPING:

A. The system as describes should require only standard maintenance at typical plant intervals.

B. All recordkeeping required per this procedure is the use of the Wastewater Discharge Log. See the procedure details for appropriate and required data recording.

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Section G

A. A discussion of how the facilities are to be operated during anticipated start-ups and shutdowns, maintenance procedures, and less than design loading conditions, so as to maintain efficient treatment.

   a. The sodium chlorate plant is able to shutdown various parts of the plant as required. When this occurs there is no impact to the wastewater systems.
   b. The sodium chlorate plant generally has two major shutdowns, one in the spring and one in the fall. When these occur all systems affecting the wastewater systems are no longer functioning. Therefore the flow to the POTW is significantly reduced.
   c. The plant uses a computer based maintenance management system called SAP. The system equipment is identified by technical name and instrument tag number. Each identified piece of equipment has an established preventive maintenance (PM) plan that defines the frequency of the PM and the procedure used to calibrate / verify each piece of equipment.

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Section H

A. A section on laboratory procedures that includes sampling techniques, monitoring requirements, and sample analysis.

   a. The site maintains a document control system. In the system we have a section called Laboratory consisting of 129 procedures corresponding to the operation of the lab, within those procedures is a sub-section called Environmental Laboratory Procedures. The procedures pertaining to the management of wastewater are attached.

Wastewater Sampling

1. PURPOSE:

This procedure identifies and outlines the sampling of in-plant discharge points that when discharged are monitored while passing through Outfall #1 to the city of Moses Lake's public owned treatment works (POTW). The retention of these samples will assist plant personnel in detecting the source and identifying problems when permit conditions are approached or exceeded.

2. SCOPE:

This procedure applies to those discharges identified in the sodium chlorate process building and PC Unit.

3. DEFINITIONS:

N/A

4. SAFETY:

Refer to the OSM Procedures for proper use of personal protective equipment.

5. DESCRIPTION:

There are seven identified wastewater discharge points that are monitored as they pass through Outfall #1. The discharge points consist of sources that are continuous, automatic, periodic, and batch process flows. They are:

- Cooling tower blow down – continuous
- T-107 – batch
- Incoming raw water multi-media filter backwash – Periodic, discharged to cooling tower basin
- PC Unit boiler room sump – Automatic. Sent to the Outfall #1, no sampling protocol.
- PC Unit water softener – Automatic, collected in PC Unit wastewater storage tank.
- PC Unit homogenizer cooling water – continuous when homogenizer is in operation. Sent to Outfall #1, no sampling protocol.
- PC Unit wastewater storage tank - batch

6. PROCEDURE:

A. Continuous & Automatic

These flows are sampled as they pass through Outfall #1. The sampling station collects a defined volume of water according to flow through the flume. This water is collected over a 24 hour period. Water samples are collected daily. The plant Laboratory analyses the water for the defined constituents as per the WDOE Waste Water Permit. The plant Laboratory maintains retained samples of the waste water as per their environmental procedures.

B. Batch

Prior to discharge a sample will be taken at the discharge point. Samples shall be retained for a period not less than two days or until the next batch is discharged and another sample is drawn.

T-107 has a capacity of 5000 gallons. A sample is drawn when the tank is full and prior to the first discharge. Operations discharge the tank over a two day period.

PC Unit Waste Water Tank has a capacity of 20,000 gallons. PC Operators are required to complete the Wastewater Discharge Log prior to discharge, see ENV-MLK-412.1F.

C. Periodic

Incoming raw water multi-media filter backwash. This unit is a sand filter that requires a back flush periodically, approximately every three months. The back flush water is routed to the cooling tower basin and discharged through the cooling tower blow down. This flow is comingled with the cooling tower blow down and monitored as it passes through Outfall #1.

Should permit conditions be exceeded the retained samples would be analyzed, providing data necessary for locating the source and constituent causing the excursion.

Any non-routine discharges to the city must be cleared through the HSE & Logistics Manager.

Procedure for Taking Environmental Samples

1. PURPOSE

This procedure describes the taking of environmental samples by laboratory personnel, entering the samples into the basic tracking system for laboratory samples, and the storage of samples held for a prescribed time.

2. SCOPE

This procedure covers the taking of waste water samples described in the State of Washington Waste Water Permit #8078. These samples are limited to outfall samples taken by an automatic sampler, and grab samples taken from the cooling tower recirculation line and storm water pond.

3. RESPONSIBILITY

It is the responsibility of the Operations Manager to see that the conditions of this procedure are followed, that the training required to follow this procedure is administered, and the actions of the technicians performing the work are monitored.

4. REFERENCES

A. APHA Standard Methods, (18th edition)
B. EPA Methods, SW-846
C. ASTM Methods for Waste Water Analysis
D. Washington State Waste Water Discharge Permit- ST-8078

5. METHOD

A. Equipment Used:

1. **Automatic Sampler**:

American Sigma refrigerated sampler set to take a grab sample of a constant quantity for each 500 gallons of waste water discharged to the sewer. The sampler is housed in a heated shelter to protect it from extremes of weather.

2. **Sample Bottles - Plastic**:

500 mL bottles with sealing lids, cleaned by the directions given in procedure 4.10-LAB-MLK-11P. Bottles are supplied with appropriate labels.

3. **Sampling Manhole**:

A manhole equipped with a Pershal Flume for measuring flow, an ultrasonic level instrument for electronically recording flow, pH, and temperature sensors.

4. **Heated Shelter for the Sampler and Recorders**:

   A heated shelter is provided adjacent to the sampling manhole to house the sampler and the electronic recording devices. This house contains electronic recorders for the accumulated flow going to the sewer, pH measuring and recording equipment, and temperature indicating equipment.

5. Forms for recording the daily flow quantities, temperature, and pH readings.

B. Outfall #001 Sampling:

1. All sample gathering starts at 0700 hours, Monday through Friday, and the process takes approximately 20 minutes to complete. All records of waste water discharge begin at 0700 hours and represent the discharge activities taking place over a period of 24 hours. Analytical results are recorded on the date the sample is analyzed and reflects the composition of the sample taken over the previous 24 hours.

2. The outfall sample is taken from the sampling manhole by the automated sampler and stored in a refrigerated container. A technician from the laboratory removes the container and transfers a portion of the contents to a pre-cleaned laboratory container. The laboratory sample bottle is first rinsed with sample from the refrigerated container, the reinstate is discharged to the sampling manhole, then the laboratory sample bottle is filled with sample and the bottle is sealed and labeled. The remaining sample from the refrigerated container is discharged into the sample manhole.

3. A grab sample of BOD analysis is taken once per quarter from the sampling manhole. This sample is taken from the area of the Pershal Flume by manually pumping the automatic sampler so the sample flows directly into a laboratory sample container.

4. The accumulated flow readings are taken from the electronic recording device (totalizer) and recorded on a form provided at the sampling enclosure. Daily flow quantities are computed from consecutive daily readings. A pH and temperature reading is taken at the time of sample gathering. Trends of pH readings can be retrieved from the data chart recorder. This would occur when a high pH is recorded for the composite sample, or during an investigation for the city.

C. Cooling Tower Samples:

Grab samples are taken from the cooling tower recirculation line (SS-002). Rinse, and then take the sample for analysis. These samples are dated for the day the sample was taken.

D. Sampling Storm Water Pond –Outfall #002

1. The storm water pond depth is measured weekly. The pond is equipped with a measuring device located in the northeast corner of the pond. The device is a

metal rod set in concrete with markers at every foot and will show depth up to eight feet.

2. The storm water pH is recorded monthly. Grab sampling is carried out by the lab technician or designee.

3. Quarterly the storm water pond is sampled for TDS, Chloride, Sodium, Antimony-Total, and Chromium-total. Grab sampling is carried out by the lab technician or designee.

E. Sample Labeling and Laboratory Entry:

1. Sample labels contain the information concerning the date the sample represents, the sample location, and the person taking the sample.

2. Samples that are not analyzed when received are stored in a refrigerator and fixed with nitric acid when required. Procedures governing this activity are found in the Storage and Preservation Table 1060 in APHA Standard Methods, 8th edition.

3. The samples for BOD and oil & grease analysis are placed in a shipping cooler, packed with ice, and sent by overnight delivery service to a contract laboratory for analysis.

Argentometric Method for Determination of Chloride in Waste Water Effluent

Analytical Range = 10 - 700 mg/L

1. METHOD

A. Equipment:

1. Casseroles: 210 mL
2. Buret: 10 mL
3. Stirring rod
4. 50 mL Class A pipet

B. Reagents:

1. 0.02 N Silver Nitrate Titrant (standardized)
2. 5% Potassium Chromate indicator
3. Sodium Chloride standard 0.02 N

C. Procedure:

1. Pipet 50 mL of sample into a casserole.
2. Add seven (7) to eight (8) drops of potassium chromate indicator.
3. Titrate with 0.02 N silver nitrate.
4. The end point is the first permanent appearance of red-orange.
5. Record volume of titrant at end point.
6. Run a blank using 50 mL DI water.
7. Run a sodium chloride check standard once a week and a sample duplicate every two (2) weeks for QA control charting.

D. Calculation:

$$mg\ Cl^{-}/L = \frac{(\ A - B\ )\ x\ N\ x\ 35450}{mL\ of\ sample}$$

A = mL titration for sample
B = mL titration for blank
N = normality of $AgNO_3$

2. HAZARDS

None observed.

3. SCOPE

This procedure determines the concentration of chloride ion in waste water with an analytical range of 10 - 700 mg/L.

4. PRINCIPLE

In a neutral or slightly alkaline solution, potassium chromate can indicate the end point of the silver nitrate titration of chloride. Silver chloride is precipitated quantitatively before red silver chromate is formed.

5. INTERFERENCES

Substances in amounts normally found in this waste water will not interfere. Sample pH between seven and ten (7 - 10) is necessary for accurate results.

6. SAMPLING

Samples are taken in a clean glass container. Analysis for chloride are done immediately.

7. SOLUTIONS

A. **0.02 N Silver Nitrate Titrant:** Dissolve 3.3974g $AgNO_3$ in distilled water and dilute to 1000 mL. Standardize against NaCl 0.02 N standard and store in a brown bottle.

B. **5% Potassium Chromate Indicator:** Dissolve 50g K_2CrO_4 in a little distilled water. Add $AgNO_3$ solution until a definite red precipitate is formed. Let stand 12 hours, filter, and dilute to one (1) liter with distilled water.

C. **0.02 N Sodium Chloride Standard:** Dissolve 1.1688g NaCl (dried at 140° C) in distilled water and dilute to one (1) liter.

8. STATISTICAL CONTROL

A. Control charts are generated from existing precision data and are used to demonstrate that the method is in control.

B. A check standard is analyzed weekly and sample duplicate is analyzed once every two (2) weeks.

9. REFERENCES

APHA 4500-Cl^- : Argentometric Method (18th edition)

Electrometric Method for Determination of pH in Waste Water Effluent

Analytical Range = 0 - 14

1. METHOD

A. Equipment:

1. pH meter and associated equipment
2. 200 mL tall beakers
3. Stirrer and stirring bar

B. Reagents:

1. pH buffer 4,5,7,8 and 10, NBS traceable.

C. Procedure:

1. Establish equilibrium between electrodes and sample by stirring sample to insure homogeneity; stir gently to minimize carbon dioxide entrainment.
2. Immerse the electrode and temperature compensator into the sample and read the pH.
3. Always remember to rinse the electrode between solutions.
4. Analyze a 5.0 and 8.0 pH buffer as a check standard and record results for QA program.

2. HAZARDS

None observed.

3. SCOPE

This procedure determines the pH in waste water effluent with an analytical range of 0 - 14.

4. PRINCIPLE

Electrometric pH measurement is the determination of the activity of the hydrogen ions by potentiometric measurement. The electromotive force (emf) produced in the glass electrode system varies linearly with pH. This linear relationship is described by plotting the measured emf against the pH of different buffers. Sample pH is determined by extrapolation.

5. INTERFERENCES

pH measurements are affected by temperature chemically because of equilibrium changes. These are compensated by the automatic temperature compensating probe.

6. SAMPLING

Samples are taken in a clean glass container. pH measurements are taken immediately. The sample is then stored in the refrigerator for other analyses.

7. SOLUTIONS

All buffers are purchased, NIST traceable solutions.

8. STATISTICAL CONTROL

Control charts will be generated on check standards.

9. REFERENCES

APHA 4500 H^+ B: Electrometric Method (18th edition)

Gravimetric Method for Determination of Total Suspended Solids in Waste Water Effluent

Analytical Range = 1.0 - 500 mg/L

1. METHOD

A. Equipment:

1. Nalgne filtering apparatus, 47mm
2. Glass-fiber filter disk (Whatman GF/A) 47mm
3. Filter flask
4. 100 mL graduated cylinder

B. Reagents:

No prepared solutions needed.

C. Procedure:

Filter Preparation: Wash filter with three (3) successive 20 mL volumes of DI water. Dry in oven at 103° - 105° C. Cool in desiccator to balance temperature and weigh. Repeat until constant weight is reached.

1. Weigh filter and record on waste water analysis form.

2. Wet with a small volume of DI water to seat filter.

3. Stir sample with a magnetic stirrer. While stirring, pipet 100 mL of sample and then filter through a glass-fiber filter. Wash with three (3) successive 10 mL volumes of DI water. Continue suction for about three (3) minutes after filtration. Save filtrate for dissolved solids determination. (Run duplicates of each sample).

4. Dry filter in oven (103° - 105° C) for at least one (1) hour. Cool in desiccator to balance temperature and weigh. Repeat drying, cooling, and desiccating steps until a constant weight is obtained. Loss should be less than 4% of previous weight. Replicate should be within 5% of the average of the two (2) samples.

5. Two (2) check standards of different concentrations will be analyzed every two (2) weeks. (See section 7., Solutions).

D. Calculation:

$$mg\ suspended\ solids / L = \frac{(\ A - B\ )\, x\, 1000}{sample\ volume\ (mL)}$$

A = weight of residue and filter (mg)
B = weight of filter (mg)

2. HAZARDS

None observed.

3. SCOPE

This procedure determines the concentration of suspended solids in waste water effluent with an analytical range of 1.0 - 500 mg/L.

4. PRINCIPLE

A well-mixed sample is filtered through a weighed standard glass-fiber filter and the residue retained on the filter is dried to a constant weight at 103° to 105° C. The increase in weight of the filter represents the total suspended solids.

5. INTERFERNECES

Because excessive residue on the filter may form a water entrapping crust, limit the sample size to that yielding no more than 200 mg residue.

6. SAMPLING

Samples are taken in a clean glass container. Analysis for suspended solids is done immediately.

7. SOLUTIONS

TSS Check Standard: Using Sigma cell 20, cat. #S3504 (Sigma Chemical Co.) or equivalent cellulose powder weigh out 50 to 200 mg and place into warm (130° F) water. Total volume should be four (4) liters. This suspension should be analyzed the same as the samples making sure that the sample is well shaken before each use.

8. STATISTICAL CONTROL

A. Control charts are generated from existing precision data and used to demonstrate that the method is in control.

B. Two (2) check standards and a sample duplicate are analyzed every two (2) weeks.

9. REFERENCES

APHA 2540 D: Total Suspended Solids Dried at 103° - 105° C (18th edition)

Gravimetric Method for Determination of Total Dissolved Solids in Waste Water Effluent

Analytical Range = 1.0 - 5000 mg/L

1. METHOD

A. Equipment:

1. Porcelain evaporating dish
2. Drying oven (180° ± 2° C)

B. Reagents:

No prepared solutions needed.

C. Procedure:

Preparation of Evaporating Dish: Heat clean dish to 180° ± 2° C for one (1) hour in drying oven. Store dish in desiccator until needed. Weigh immediately before use.

1. Filter 100 mL of waste water sample and rinse with DI water. Refer to procedure for suspected solids. (See: ENV-LAB-MLK-5035P).

2. Transfer total filtrate (with washings) to a weighed evaporating dish and evaporate to dryness on a steam bath. If filtrate volume exceeds dish capacity add successive portions to the same dish after evaporation.

3. Dry for at least one (1) hour in drying oven at 180° ± 2° C, cool in desiccator to balance temperature and weigh. Repeat cycle of drying, cooling, desiccating, and weighing until a constant weight is obtained.

D. Calculation:

$$mg\ Dissolved\ Solids / L = \frac{(\ A - B\ )\, x\, 1000}{sample\ volume\ (mL)}$$

A = weight of residue + dish (mg)
B = weight of dish (mg)

2. HAZARDS

Take caution when handling hot labware.

3. SCOPE

This procedure determines the concentration of total dissolved solids in waste effluent with an analytical range of 1.0 - 5000 mg/L.

4. PRINCIPLE

A well-mixed sample is filtered through a standard glass fiber filter and the filtrate is evaporated to dryness in a weighed dish and dried to a constant weight at 180° C. The increase in dish weight represents the total dissolved solids. The filtrate from the total suspended solids determination may be used for the determination of total dissolved solids.

5. INTERFERENCES

No known interferences.

6. SAMPLING

Samples are taken in a clean glass container. Analysis for total dissolved solids is done immediately.

7. SOLUTIONS

TDS Check Standard: Weigh 2.00g reagent grade NaCl and dissolve in a two (2) liter volumetric flask. Dilute to mark and transfer to storage containers. Evaporate 100 mL of sample each time.

8. STATISTICAL CONTROL

A. Control charts are generated from existing precision data and used to demonstrate that the method is in control.

B. A check standard and a sample duplicate are analyzed every two weeks.

9. REFERENCES

APHA 2540 C: Total Dissolved Solids Dried at 180° (18th edition)

Storm Water Pond Management Procedure

1. PURPOSE:

This procedure is to communicate how the storm water pond is managed in regard to discharges to the storm water pond, maintenance, monitoring and sampling.

2. SCOPE:

This applies to the storm water pond at the Moses Lake, WA plant.

3. SAFETY:

The storm water pond is listed as a non-permit required confined space. See confined space permit procedures prior to entering the pond.

Access to the pond should only take place near the inlet piping. There is a chain ladder to assist in getting to the floor of the pond. Access to the pond when water is present is strictly controlled and may only take place when authorized and all permits to work are completed.

There are two lifesaving throw rings hanging on the north and south sides of the pond fencing.

4. DESCRIPTION:

The storm water pond is located at the southwest corner of the Moses Lake plant. The pond is 120' X 200' with sloped side walls having a depth of 8'. The capacity of the pond is approximately 1.5 million gallons. The storm water pond was relined in Q4 of 2013. The lining is 100 mil polyethylene sheeting.

The plants storm water drainage system is designed to collect rain water and snow melt. These waters all discharge into the storm water pond. The storm water pond is a closed system. The storm water pond level is managed by evaporation.

5. PROCEDURE:

The storm water pond primary purpose is for the collection of rain water and snow melt. Discharges into the storm water pond other than rain water or snow melt must be authorized by the WDOE in writing.

All uncontrolled discharge to the storm water pond must be reported immediately to the HSE & Logistics Manager or Manager-on–call. Uncontrolled discharges to the storm water pond must be reported the WDOE.

Efforts shall be taken to minimize the uncontrolled discharge. If unable to stop the discharge use your best estimate to calculate the discharge rate and document the duration of the release.

The Washington State Department of Ecology has defined in the State Waste Discharge Permit ST-8078 detailed monitoring requirements. The monitoring and sampling of the pond is completed by the Moses Lake Lab Technician or designee. Results of the monitoring and sampling are reported through the WEBDMR provided by the WDOE. The Lab Technician enters the results in the WEBDMR. The WEBDMR is emailed to the HSE & Logistics Manager for final approval and submittal to the WDOE.

Operational and Maintenance Manual

Waste Water Permit ST-8078

Section I

A. Recordkeeping procedures and sample forms to be used.

   a. See the attached recordkeeping procedures and sample sheets.

Environmental Sampling and Storage List
Akzo Nobel

Analysis	Sample Point	Test Frequency	Storage & Pressure
Chloride	SS-001/24 hr. comp.	2/wk	test immediate
Sodium, Na	SS-001/24 hr. comp.	2/wk	test immediate
Total S. Solids	SS-001/24 hr. comp.	1/wk	test immediate
pH and Flow	SS-001	5/wk	continuous
Turbidity	SS-001	5/wk	test immediate
Conductivity	SS-001	5/wk	continuous
Total D. Solids	SS-001/24 hr. comp.	2/wk	test immediate
BOD	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Calcium	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Magnesium	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Potassium	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Sulfate	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Carbonate	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Bicarbonate	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Nitrate	SS-001/24 hr. comp.	1/qtr	take to Soiltest
Ammonia	SS-001/24 hr. comp.	1/qtr	take to Soiltest

Note: SS-001 is sample station for sewer effluent.

Wastewater Discharge Log

Akzo Nobel Paper Chemicals Unit – Moses Lake, WA

Please refer to "PC Wastewater Handling Procedure," ENV-MLK-412P.

Date	Technician (Initial)	Tank Level (GAL)	Filter Cleaned (Yes/No)	Recirc. Time (minutes)	Chlorate Notified (Yes/No)	pH (pH)	pH Adjusted (Yes/No)	Discharge Start Time (Time)	Flow Rate (GPM)	Discharge Stop Time (Time)	Tank Level (GAL)	Total Discharge (GAL)
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					
			Yes / No		Yes / No		Yes / No					

Comments / Notes:

Permissible pH range for wastewater discharge is pH 6-11.
Please note if pH adjustment is required and what is used for adjustment, (e.g. sulfuric acid, caustic).

Retained Sample Procedure

1. PURPOSE

This procedure describes the handling and storage of retained product samples of customer shipments, from the time they are received in the laboratory until they are no longer required.

2. SCOPE

This procedure applies to the Moses Lake, Paper Chemicals Laboratory for shipments originating from the Paper Chemicals Plant.

3. DEFINITIONS

Retained Sample: Product sample from customer shipment.

4. SAFETY, HEALTH AND ENVIRONMENTAL (SHE)

No special safety requirements are associated with the handling of retained samples. Standard lab safety procedures shall be observed. Samples shall be disposed of in accordance with good environmental practice by returning to the process if suitable as determined by the technician, or otherwise disposed of as determined by the site SHE/Quality Manager.

5. EXHIBITS

Retained Sample Label (example).

6. REFERENCES

N/A

7. PROCEDURE

A. General:

Retained samples are taken from each shipment of product to a customer. The samples are identified to ensure traceability to production and shipping documents and maintained in the laboratory. After an appropriate period of time the samples are disposed of. Retain samples are kept for a minimum of three (3) months.

B. Sample Handling and Identification:

Sampling procedures are described in the loading procedures/checklists for each product. Testing procedures and requirements are described in the Paper Chemicals Laboratory procedures. Retained samples are kept in the laboratory until testing is complete. They are then transferred to retained sample storage by the end of the next working day.

Samples are labeled by writing in ink, the appropriate information on stickers provided for this purpose. The stickers are stored in the laboratory. **The PC Production Technician records the product name, customer's name, initials, lot # and/or ship date on the label**. Samples are maintained in the storage cabinet and/or refrigerator for a minimum of three months, after which time they are reprocessed or disposed of as determined by the PC Technician.

C. Sample Storage Conditions:

AKD based emulsions/Rosin emulsions are stored in the retained sample refrigerator in the lab. This unit maintains the cool temperatures required by these emulsions and is for sample retains ONLY.

Waste Water Analysis Form

Date: **Technician:**

Date	Temp	Gallon	pH High	pH Low	Conductivity	Turbidity

Sodium

Date	STD 25 mg/L	STD 50 mg/L	STD 100 mg/L	Check Sample	Dilution	mg/L Na^+	Final Result

Chloride

Date	Sample mL	Titrant	$AgNO_3$	Blank	Chloride mg/L

TSS: Total Suspended Solids

Date	Filter Wt.	Filter + S	Wt/mg	Solids

TDS: Total Dissolved Solids

Date	Dish Wt	Dish +S	Wt/mg	TDS

Analytical Methods :			
Specific Conductance	SM 2510	TSS	SM 2540 D
Chloride	SM 4500 – Cl^- B	TDS	SM 2540 C
Sodium	SM 3111 B		

Operational and Maintenance Manual

Waste Water Permit ST-8078

Section K

A. A section on safety.

   a. The majority of the procedures have a section regarding safety. When procedures are written safety is a consideration, when there is a potential for injury or exposure best practices are defined in the safety section of the procedure.
   b. The plant maintains an Operating Safety Manual within the document control system. Attached is the Personnel Protective Equipment Policy. In the case of wastewater management the primary concerns are PPE related.

Personal Protective Equipment Policy

1. INTRODUCTION:

This policy addresses the requirements for personal protective equipment to be worn in the plant. Personal Protective Equipment (PPE) includes: safety footwear, clothing, hard hats, eye wear, and hearing protection. Respiratory protection is addressed in OSM-MLK-40P. Contact with sodium chlorate, electrolyte or solution, and other chemicals such as caustic soda or hydrochloric acid can cause injury to employees.

2. SCOPE AND FIELD OF APPLICATION:

A. This policy applies to all employees of the Moses Lake Plant, including part-time or temporary employees, contractors, and visitors. PPE will be issued to visitors as required, prior to entry into specified areas.

B. Refer to the attached map for the clarification of what personal protective equipment is required in each area.

C. The approval of PPE will be made by the plant HSE & Logistics Manger.

3. REFERENCES:

Code of Federal Regulations; 29 Parts: 1910.132-136; Personal Protective Equipment.

4. DEFINITIONS:

N/A

5. RESPONSIBILITY:

The HSE & Logistics Manager is responsible for training AkzoNobel employees prior to performing their assigned job functions and to train other employer's employees of the proper personal protection required when working within AkzoNobel boundaries. It's each individual's responsibility that PPE be inspected, maintained, and worn as specified by the manufacturer.

The HSE & Logistics Manager is required to perform written PPE Hazard Assessments when new equipment or hazards are identified. Hazard assessments are maintained, filed, and made available upon request.

Each employee is responsible for personnel who may be visiting the plant to ensure approved PPE is provided and worn according to this policy.

The Contract Administrator is responsible for ensuring contractors are wearing approved PPE as per this policy and the Contractor's Safety Policy.

6. SAFETY FOOTWEAR:

No high heeled shoes shall be allowed to be worn in the plant or where grating is present. High heeled shoes are considered to be any heel greater than one inch in height.

A. *Steel-toed footwear is **required** in all areas of the plant-site except:*

1. The Production Control Room area.

2. The Maintenance offices and lunchroom.

3. The Administration building.

4. The Paper Chemicals office area.

5. The employee locker room area

.

B. *Approved footwear:*

1. Rubber Steel-toed boots with a minimum height of 6 inches or the Royer (blue) boots.

2. The occasional visitor may wear leather shoes, covered by rubber overshoes.

3. Leather or composition footwear with steel-toed protection may be worn by employees working at the Paper Chemicals Plant.

4. Laboratory personnel: ***No*** open toed shoes, sandals, or slick soled footwear is allowed.

C. *Visitors:*

1. All visitors when entering the Bleaching Chemicals process building are required to wear hard hat, safety glasses, and rubber over shoes. Additional outer wear such as: lab coat or coveralls may be required.

2. All visitors when entering the Paper Chemicals process building are required to wear hard hat and safety glasses.

3. All visitors performing work in the maintenance shop are required to wear safety glasses. When the crane is in use, hard hat protection is required. No open toed footwear is allowed.

4. Contractors working at the Moses Lake plant are required to wear hard hats, safety glasses, rubber steel-toed boots, and AkzoNobel provided work coveralls.
Refer to the Contractor's Safety Policy

5. Visitors are not required to wear personal protective equipment when in the Bleaching Chemicals control room, Paper Chemicals offices, maintenance offices, and administration offices.

7. PROTECTIVE CLOTHING:

A. *Uniforms:*

1. Each production, maintenance, and laboratory employee will be provided with shirts, pants, socks, a belt, and a coat. Cold weather gear such as insulated coveralls, parkas, and helmet liners will be issued as needed. Employees not normally working in the plant area will be provided coveralls to wear over their street clothing.

2. Employees working in the Chlorate Production area will change into clean clothing at the beginning of each shift. If an employee's clothing becomes contaminated with Chlorate during the work shift, they will change into a clean set of clothing as soon as possible.

B. *Other protective clothing:*

Protective clothing such as PVC rain/chemical suits (slicker suits) is provided to employees involved in routine or emergency activities. It is the responsibility of the employee to visually check such clothing to assure it is in good repair and suitable to provide the necessary personal protection.

C. *Availability:*

All AkzoNobel employees shall be provided personal protective equipment at no cost to the employee. PPE is located in the maintenance store room. Adequate supplies are maintained and replacements are available and considered open stock.

8. HARD HATS:

A. *Hard hats are required in all areas of the plant-site except:*

1. The Production Control Room area.
2. The Maintenance offices and shop (unless overhead work is being performed).
3. The Administration building.
4. Process building laboratories.
5. The Paper Chemicals office and laboratory.
6. The employee locker room area.
7. The PC Mezzanine area.

B. Refer to the attached map for designated hard hat areas.

9. SAFETY EYE WEAR:

A. *Face Protection:*

1. Face shields are provided throughout the facility. Face protection shall be worn when performing work activities such as: grinding, cutting, or sanding.

2. Protective goggles are available in stores. The plant has no specific job requiring the use of goggles.

B. *Hand Protection:*

Employees are encouraged to wear hand protection while performing work activities. ***No*** leather gloves are allowed in the Bleaching Chemicals process building. In stores several types of gloves are available such as:

1. Jersey cotton gloves.
2. Cotton fit coated gloves.
3. Neoprene gloves.
4. Nitrile gloves.

C. Safety glasses, both prescription and non-prescription are provided for all employees. Approved safety glasses with side shields are required throughout the plant site in all production areas, yard areas, maintenance shops, laboratories and production laboratory, storeroom, and where a reasonably foreseeable potential for eye injury exists.

When traveling on plant roadways, safety glasses are not required unless there is a reasonably foreseeable potential for eye injury.

They are not required inside control rooms, office areas, lunchrooms, dressing rooms, and when going from employee parking lot to dressing room.

Refer to the plot plan for the pictorial view of PPE required areas.

D. Contact lens of the gas-permeable "soft lens" type may be worn in all areas of the plant; however, they must be worn in conjunction with safety glasses and/or goggles/face shields. It is the responsibility of the employee to remove and clean contact lens that have come in contact with dust or chemical vapors.

E. Plant visitor shall wear approved safety glasses with side shields when entering the plant.

1. Approved safety glasses with side shields shall be issued to visitors and returned to the receptionist when leaving.

2. Visitors required to wear prescription eyewear, shall wear approved prescription safety glasses. Otherwise they shall wear approved safety glasses over their regular prescription glasses.

F. Employee Prescription Safety Eyewear:
Refer to OSM-MLK-34P.

10. HEARING PROTECTION:

A. Hearing protection devices may be obtained from stores and are also available in various locations in the plant. Approved types of protection are:

1. Compressible foam, disposable earplugs.

2. Hard hat-mount "sound silencer" earmuffs.

B. Hearing protection *must* be worn while working in the following areas of the plant:

1. Chiller room.

2. Blower room.

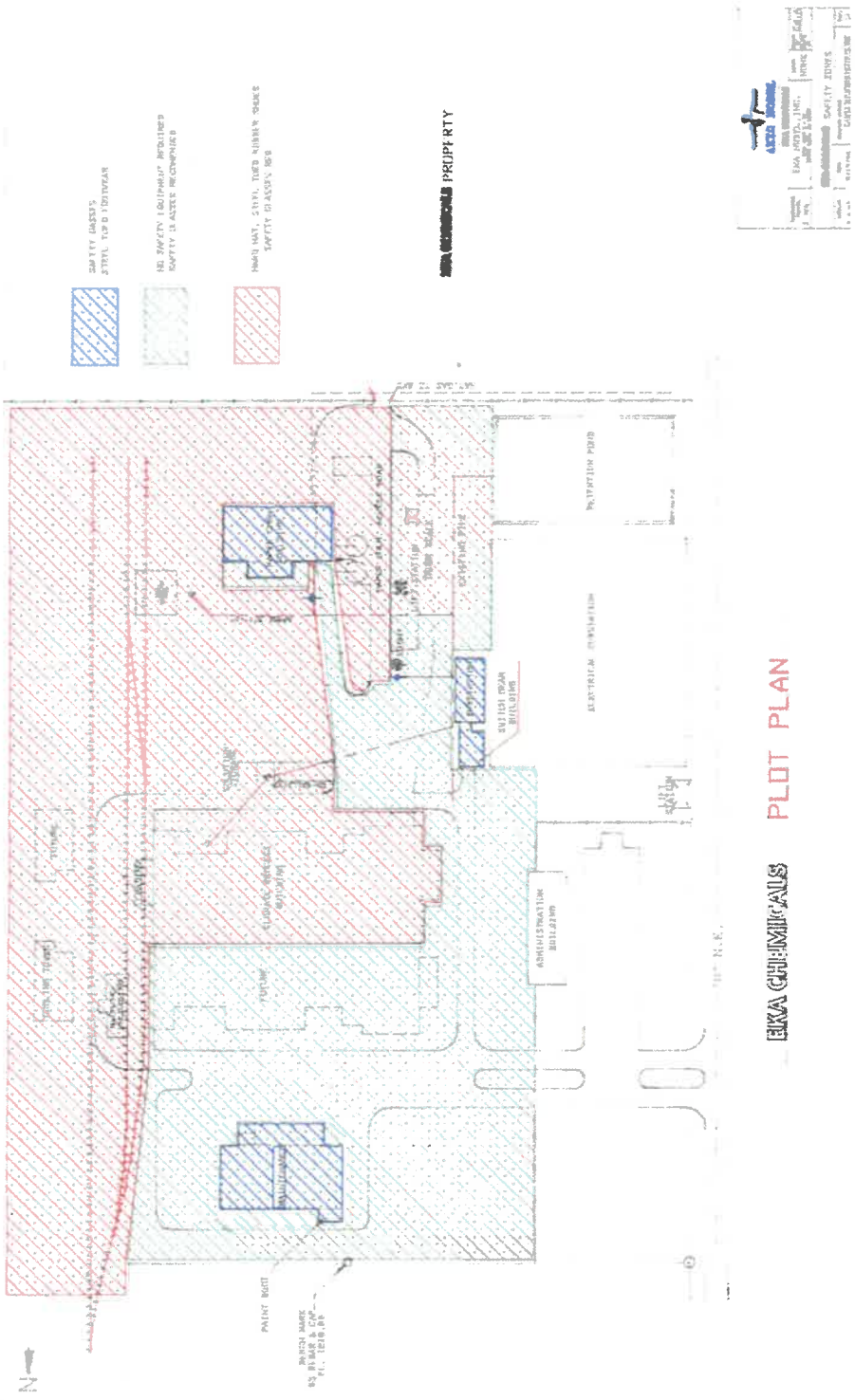
3. Rectifier room.

4. Hydrogen Delivery Building.

11. Non-Routine Task:

Non-routine tasks shall be reviewed individually as they occur. A ***Task Risk Analysis (TRA)*** shall be conducted outlining the specific hazards associated with the task. If questions arise during the TRA where further clarification is required, the HSE & Logistics Manager shall be included to address the concerns.

(See the following page for PPE map)



A.I.R. - Accident Incident Reporting and Investigation Procedure

1. INTRODUCTION:

The A.I.R. form is used to record Safety and Health issues and Workplace Accidents with or without injury relating to near-miss or potential incident situations such as: personal injury, fire, environmental and hazardous conditions.

2. SCOPE AND FIELD OF APPLICATION:

A.I.R. is intended to be used by all employees at the Moses Lake Plant. In the event other employer's employees report an incident or unsafe condition, the A.I.R. Form should be used.

3. DEFINITIONS:

Accident – An undesired and unplanned event that results in harm to a person and/or damage to property or the environment.

Flexite – Intranet accessible system used by AkzoNobel North America to track a variety of events.

Incident/Hazardous Condition – An undesired and unplanned event that under different circumstances, could have resulted in or may result in an accident.

Incident Investigation – An activity conducted by two or more individuals, to observe or study by close examination and systematic inquiry the events causing an accident/incident/hazardous condition.

Investigation Team – A group of plant personnel assembled to conduct an incident investigation. The team must consist of two or more individuals depending on the severity of the accident/incident/hazardous condition. At a minimum, the team would include the department supervisor and one Safety Committee member.

Investigation Report – A clear, concise, and thorough written document, explaining the accident/incident/hazardous condition in detail, provide recommendations to prevent recurrence and follow-up requirements.

4. REFERENCES:

N/A

5. RESPONSIBILITY:

It is each employee's responsibility to use the A.I.R. Form whenever an accident/incident occurs and whenever any unsafe act or potential incident is witnessed. It is management's responsibility to provide a positive atmosphere to encourage the use of reporting injury accidents, equipment damage incidents, near miss, or potential incidents.

6. MEDICAL EVALUATION:

All work related injuries regardless of their severity must be reported immediately to your supervisor or management staff.

Whenever the injury does not necessitate medical attention or the employee does not desire it, decisions concerning the need to seek medical attention from a Professional Health Care Provider (PHCP) will include a management staff member (i.e., Plant Manager or HSE & Logistics Manager) who is responsible for making the decision on behalf of the employee's and company's best interest.

7. REPORTING:

All employees will report all accidents, near misses, and potential incidents to their supervisor immediately.

A.I.R. form/report will be written during the same shift period that an accident, near miss or potential incident occurs.

The A.I.R. form/report is generally written by the individual who is most affected or knowledgeable of the accident/incident or near miss. In the event of a serious injury or illness, the A.I.R. form/report will be completed by the employee's supervisor or employee who witnessed or is directly knowledgeable of the event.

8. PROCEDURE:

A. Originator: The originator is required to complete the portion of the form labeled "Originator".

* Type of accident /incident and check the appropriate box.
* Name of person writing the report.
* The date the report was written.
* The affected department the accident/incident took place.
* The date of the accident/incident.
* The Time of the accident/incident.
* The exact location the accident/incident occurred.
* Description of what happened or condition indentified.
* Immediate action taken, if none then state "no" action taken.
* List what may prevent the accident/incident from recurring.
* When finished completing the "Originator" section: forward to your supervisor.

B. Supervisor: The supervisor of the person originator is required to complete the portion of the form labeled "Supervisor".

* Based on the information provided the supervisor will check one of the boxes identifying the preliminary cause.
* Identify other action that should occur and make recommendations to prevent recurrence.
* When finished completing the "Supervisors" section: sign, date and forward the form to the Department Manager.

C. Dept. Manager: The Department Manager of the originator is required to complete the portion of the form labeled "Dept. Manager".

* The department manager may make comments or identify additional actions to be taken.
* When other actions are identified the department manager will define who is responsible and a target date for completion of the identified action.
* When finished completing the "Dept. Managers" section: sign, date and forward to the HSE Manager.

D. HSE Manager: The HSE Manager will determine the need for further action.

* Does accident/incident meet AkzoNobel 24-hour reporting criteria?
* Does the accident/incident trigger the need for a formal Accident/Incident Investigation?
* Has the accident/incident been entered in Airsweb?
* When finished completing the "HSE Managers" section: attached available documentation and forward to the Plant Manager.

E. Plant Manager: The Plant Manager will review the A.I.R. If satisfied with the actions identified he will sign, date and forward to the HSE & Logistics Manager.

F. HSE Manager: The HSE Manager is responsible for maintaining completed reports and posting them throughout the facility.

G. Plant Personnel: When the final reports are posted personnel should review what was reported. The reports should be used as discussion points between each other, morning meeting, or monthly safety meeting. As an employee you have the right and are encouraged to identify other potential action items that may prevent recurrence of the accident/incident on the report. Additional suggestions should be expressed verbally or through email to the Supervisor identified on the report.

9. REVIEW:

Employees are encouraged to periodically review the posted reports.

The reports should be used as discussion points between each other, morning meeting, and/or monthly safety meeting.

The Safety Committee reviews all Accident/Incident Reports and evaluates the response and/or conclusions to each report. The Safety Committee may determine additional actions are required. In this event the supervisor identified on the report would be advised of the recommendations verbally or by email. The supervisor should consider the suggestion however he ultimately makes the decision to act or not to the suggestion. If additional actions are identified and acted on the supervisor should document them and forward to the HSE Manager. The HSE Manager will attach any additional paperwork to the final report.

10. ACCIDENT/INCIDENT INVESTIGATION:

An Accident/Incident Investigation shall be conducted within 48 hours of the accident/incident when any of the following events occur:

A. A medical emergency.
B. Medical treatment is administered.
C. Significant environmental damage.
D. Significant property damage.

Not all Accident/Incident trigger the need for an Investigation. The Moses Lake management team or AkzoNobel corporate management team will determine the need for a formal investigation. When this becomes the case the investigation shall be conducted within 96 hours of the accident/incident.

Refer to the definitions for the Investigation Team.

11. ACCIDENT/INCIDENT INVESTIGATION REPORT:

The team leader shall be responsible for completing and submitting the Accident/ Incident Investigation Report.

The Accident/Incident Investigation Report shall be prepared including:

A. Investigation team
B. Date of the accident/incident
C. Date of the report
D. Nature of the Accident/Incident
E. Description of the Accident/Incident
F. Photos, diagrams, measurements of Accident/Incident scene
G. Witnesses and their descriptions of the Accident/Incident
H. List of unsafe acts or conditions causing the Accident/Incident
I. List of defective safety controls:

    * Procedures
    * Environmental
    * Safety administration

J. Recommendations to prevent recurrence
K. Immediate action taken
L. Recommendations review date
M. Accident/Incident Report prepared by

The Accident/Incident Investigation Report shall be completed in accordance with the time frames specified in section #10 of this procedure. The report can be hand written or typed and must be legible.

When the Accident/Incident Investigation Report is complete, it shall be attached to the Airsweb report.

Operational and Maintenance Manual

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Section J

A. A maintenance schedule that incorporates manufacturer's recommendations, preventive maintenance and housekeeping schedules, and special tools and equipment usage.

   a. The plant uses a computer based maintenance management system called, SAP. In the system equipment is identified by technical name and instrument tag number. Each identified piece of equipment has an established preventive maintenance (PM) plan that defines the frequency of the PM and the procedure used to calibrate / verify each piece of equipment.
   b. Housekeeping is maintained throughout the plant daily by each employee. Monthly walk around inspections are conducted. Results of the inspection are posted in the sites SHE Committee minutes.
   c. Special tools and equipment is being used during the calibration of critical equipment by the maintenance department as defined in the PM procedures.

Safety and Environmental Critical Equipment List

Cat. 2 (Red Tags)

	Instrument Tag	Process Service Description	MTM Procedure	Verification Frequency
1.	AT-3519	H_2 Scrubber Outlet O_2 Content	P020	Weekly
2.	AT-3522	Cell Line A Header O_2 Content	P020	
3.	AT-3523	Cell Line B Header O_2 Content	P020	
4.	pHT-4089	Effluent Water to City pH	P017	
1.	AM-001	Portable Gas Monitors PM	P047	Monthly
1.	LT-3600	HCL Storage Tank Level	P016	Quarterly
2.	LT-3215	A Cell Line First Stage Reactor Primary Level	P016	
3.	LT-3214	A Cell Line First Stage Reactor Redund Level	P040	
4.	LT-3226	B Cell Line First Stage Reactor Primary Level	P016	
5.	LT-3225	B Cell Line First Stage Reactor Redund Level	P040	
6.	PS-3782	Seal Water Pressure Switch	P028	
7.	PT-4203	Hydrogen Compressor B-504A Suction Pressure	P033	
8.	PT-4204	Hydrogen Compressor B-504B Suction Pressure	P033	
9.	FS-4229	Hydrogen System Nitrogen Purge Switch	P028	
10.	AT-5003	Hydrogen Gas Detector H_2 Scrubber	P042	
11.	AT-5004	Hydrogen Gas Detector H_2 Scrubber	P042	
12.	AT-5000	Hydrogen Gas Detector H_2 Delivery Room	P042	
13.	AT-5001	Hydrogen Gas Detector H_2 Delivery Room	P042	
14.	AT-5002	Hydrogen Gas Detector H_2 Delivery Room	P042	
15.	AT-4113	HCL Gas Detector Inside Area	P048	
16.	AT-4116	HCL Gas Detector Outside Area	P048	
1.	ET-3210	Cell Box E201A Input Strap Voltage	P035	Semi-annual
2.	ET-3211	Cell Box E201A Strap Voltage	P035	
3.	ET-3232	Cell Box E202A Input Strap Voltage	P035	
4.	ET-3233	Cell Box E202A Strap Voltage	P035	
5.	ET-3212	Cell Box E203A Strap Voltage	P035	

	Instrument Tag	Process Service Description	MTM Procedure	Verification Frequency
6.	ET-3234	Cell Box E204A Strap Voltage	P035	Semi-annual
7.	ET-3216	Cell Box E205A Strap Voltage	P035	
8.	ET-3235	Cell Box E206A Strap Voltage	P035	
9.	ET-3220	Cell Box E207A Strap Voltage	P035	
10.	ET-3249	Cell Box E208A Strap Voltage	P035	
11.	ET-3222	Cell Box E209A Strap Voltage	P035	
12.	ET-3250	Cell Box E2010A Strap Voltage	P035	
13.	ET-3230	Cell Box E2011A Strap Voltage	P035	
14.	ET-3253	Cell Box E2012A Strap Voltage	P035	
15.	ET-3231	Cell Box E2013A Strap Voltage	P035	
16.	ET-3254	Cell Box E2014A Strap Voltage	P035	
17.	ET-3850	Cell Box E201B Input Strap Voltage	P035	
18.	ET-3851	Cell Box E201B Strap Voltage	P035	
19.	ET-3858	Cell Box E202B Input Strap Voltage	P035	
20.	ET-3859	Cell Box E202B Strap Voltage	P035	
21.	ET-3852	Cell Box E203B Strap Voltage	P035	
22.	ET-3860	Cell Box E204B Strap Voltage	P035	
23.	ET-3853	Cell Box E205B Strap Voltage	P035	
24.	ET-3861	Cell Box E206B Strap Voltage	P035	
25.	ET-3854	Cell Box E207B Strap Voltage	P035	
26.	ET-3862	Cell Box E208B Strap Voltage	P035	
27.	ET-3855	Cell Box E209B Strap Voltage	P035	
28.	ET-3863	Cell Box E2010B Strap Voltage	P035	
29.	ET-3856	Cell Box E2011B Strap Voltage	P035	
30.	ET-3864	Cell Box E2012B Strap Voltage	P035	
31.	ET-3857	Cell Box E2013B Strap Voltage	P035	
32.	ET-3865	Cell Box E2014B Strap Voltage	P035	
33.	ET-3255	Cell Box E201A Voltage	P023	
34.	ET-3292	Cell Box E202A Voltage	P023	

	Instrument Tag	Process Service Description	MTM Procedure	Verification Frequency
35.	ET-3258	Cell Box E203A Voltage	P023	Semi-annual
36.	ET-3293	Cell Box E204A Voltage	P023	
37.	ET-3261	Cell Box E205A Voltage	P023	
38.	ET-3294	Cell Box E206A Voltage	P023	
39.	ET-3264	Cell Box E207A Voltage	P023	
40.	ET-3295	Cell Box E208A Voltage	P023	
41.	ET-3267	Cell Box E209A Voltage	P023	
42.	ET-3296	Cell Box E210A Voltage	P023	
43.	ET-3270	Cell Box E211A Voltage	P023	
44.	ET-3297	Cell Box E212A Voltage	P023	
45.	ET-3273	Cell Box E213A Voltage	P023	
46.	ET-3298	Cell Box E214A Voltage	P023	
47.	ET-3822	Cell Box E201B Voltage	P023	
48.	ET-3843	Cell Box E202B Voltage	P023	
49.	ET-3823	Cell Box E203B Voltage	P023	
50.	ET-3844	Cell Box E204B Voltage	P023	
51.	ET-3824	Cell Box E205B Voltage	P023	
52.	ET-3845	Cell Box E206B Voltage	P023	
53.	ET-3825	Cell Box E207B Voltage	P023	
54.	ET-3846	Cell Box E208B Voltage	P023	
55.	ET-3826	Cell Box E209B Voltage	P023	
56.	ET-3847	Cell Box E210B Voltage	P023	
57.	ET-3827	Cell Box E211B Voltage	P023	
58.	ET-3848	Cell Box E212B Voltage	P023	
59.	ET-3828	Cell Box E213B Voltage	P023	
60.	ET-3849	Cell Box E214B Voltage	P023	
61.	ET-3669	Cell Line A Rectifier Voltage	P038	
62.	ET-3944	Cell Line B Rectifier Voltage	P038	
63.	LT-3613	Caustic Storage Tank Level	P016	

	Instrument Tag	Process Service Description	MTM Procedure	Verification Frequency
64.	LT-3996	Nitrogen Storage Tank Level	P026	Semi-annual
65.	LT-3775	Seal Water Tank Level	P016	
66.	PT-3205	Cell Line A Header Pressure	P018	
67.	PT-3532	Reaction Gas Tank Pressure	P018	
68.	PT-3703	Cell Line B Nitrogen Supply Pressure	P018	
69.	PT-3737	Cell Line A Nitrogen Supply Pressure	P018	
70.	PT-3797	Air Supply Header Pressure	P018	
71.	PT-3802	Cell Line B Header Pressure	P018	
72.	PT-3995	Nitrogen Storage Tank Pressure	P026	
73.	PT-3204	Cell Line A Header Pressure	P018	
74.	PT-3800	Cell Line B Header Pressure	P018	
75.	TT-3207	Cell Box E201A Temperature	P029	
76.	TT-3278	Cell Box E202A Temperature	P029	
77.	TT-3257	Cell Box E203A Temperature	P029	
78.	TT-3280	Cell Box E204A Temperature	P029	
79.	TT-3260	Cell Box E205A Temperature	P029	
80.	TT-3282	Cell Box E206A Temperature	P029	
81.	TT-3263	Cell Box E207A Temperature	P029	
82.	TT-3284	Cell Box E208A Temperature	P029	
83.	TT-3266	Cell Box E209A Temperature	P029	
84.	TT-3286	Cell Box E210A Temperature	P029	
85.	TT-3269	Cell Box E211A Temperature	P029	
86.	TT-3288	Cell Box E212A Temperature	P029	
87.	TT-3272	Cell Box E203A Temperature	P029	
88.	TT-3290	Cell Box E204A Temperature	P029	
89.	TT-3808	Cell Box E201B Temperature	P029	
90.	TT-3829	Cell Box E202B Temperature	P029	
91.	TT-3810	Cell Box E203B Temperature	P029	
92.	TT-3831	Cell Box E204B Temperature	P029	

	Instrument Tag	Process Service Description	MTM Procedure	Verification Frequency
93.	TT-3812	Cell Box E205B Temperature	P029	Semi-annual
94.	TT-3833	Cell Box E206B Temperature	P029	
95.	TT-3814	Cell Box E207B Temperature	P029	
96.	TT-3835	Cell Box E208B Temperature	P029	
97.	TT-3816	Cell Box E209B Temperature	P029	
98.	TT-3837	Cell Box E210B Temperature	P029	
99.	TT-3818	Cell Box E211B Temperature	P029	
100.	TT-3839	Cell Box E212B Temperature	P029	
101.	TT-3820	Cell Box E213B Temperature	P029	
102.	TT-3841	Cell Box E214B Temperature	P029	
103.	TT-4011	Chlorate Dryer Heater Temperature	P029	
104.	TT-4012	Chlorate Dryer Heater Temperature	P029	
105.	TT-4013	Chlorate Dryer Heater Temperature	P029	
106.	PT-4201	Hydrogen Compressor Suction Pressure	P033	
107.	PT-4202	Hydrogen Compressor Discharge Pressure	P033	
108.	PT-4217	Hydrogen Compressor Delivery Pressure	P033	
109.	TT-4206	Hydrogen Delivery Temperature	P014	
110.	LT-4399	Hydrogen Compressor Separator Tank Level	P018	
1.	PRV-001	Paper Chemicals Steam Boiler PRV Replacement		Annually
2.	FT-4283	Evaporator Slurry Recirculation Flow	P032	
3.	LS-3601	HCL Storage Tank Level Switch	P051	
4.	LS-3616	Caustic Storage Tank Level Switch	P051	
5.	PHT-4722	Paper Chemicals WW Discharge pH	P017	
6.	TT-3525A	Hydrogen Stack Temperature 1	P024	
7.	TT-3525B	Hydrogen Stack Temperature 2	P024	
8.	TT-3525C	Hydrogen Stack Temperature 3	P024	

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Section L

A. A section that contains the spare parts inventory, address of local suppliers, equipment warranties, and appropriate equipment catalogues.

   a. The Moses Lake plant maintains its own Stores Area. The store room keeps a supply of part parts inventory for repair of environmental critical equipment. Each item is catalogued, usages are recorded, price and availability, vendor information, lead time, and minimum / maximum order quantity. This all is carried out through the SAP Computer based system.

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Section M

a. The site has an Integrated Contingency Plan (ICP). The Washington State Department of Ecology receives and updated ICP electronically annually.