1.0 PURPOSE AND SCOPE

1.1 The purpose of this document is to outline the standard operating procedures to be followed for the proper operation of the chlorination and dechlorination systems of the Glasgow Waste Water Treatment Plant.

1.2 Because the chemical properties and hazards of chlorine and sulfur dioxide are similar, the procedures outlined apply to both chemicals. Any differences will be highlighted where appropriate.

1.3 These procedures apply only to the Glasgow Waste Water Treatment Plant’s chlorination and dechlorination systems.

2.0 SAFETY EQUIPMENT AND SYSTEMS

2.1 Leak Detectors and Alarms

2.1.1 The WWTP scale room is equipped with gas monitors designed to detect and alert employees to the presence of chlorine and/or sulfur dioxide.

2.1.2 The detectors are calibrated to alarm at 1 ppm of chlorine and/or sulfur dioxide.

2.1.3 The detectors are equipped with an audible alarm that is readily heard from any location at the plant (90dB) and also with a visual strobe/flashing light to alert employees of a release.

2.2 Buddy System

2.2.1 In any activity pertaining to the chlorine or sulfur dioxide processes, the employees of the Glasgow Water Company will, at all times and without exception, operate on a buddy system. This requirement includes weekends and holidays.

2.2.2 One operator will complete the task, while the other operator will assist or act as an observer to ensure the procedures are properly and safely followed.

2.2.3 One operator shall never attempt to change a container alone.

2.3 Ventilation: Local ventilation should always be operable when employees are working in process areas.

2.4 Personal Protective Equipment

2.4.1 Operators shall wear chemical gloves and chemical goggles when disconnecting and removing out empty containers.

3.0 PROPERTIES AND HAZARDS OF CHLORINE

3.1 Physical Characteristics

**Appearance:** Green-Yellow Gas
**Odor:** Strong, Pungent odor
**Vapor Density:** Heavier than air
**Flammability:** Not flammable or combustible.
**Reactivity:** See Special Hazards below.
**Corrosivity:** Strong Oxidizer; very corrosive in presence of liquid/moisture; see Special Hazards below.

3.2 Health Hazards

3.2.1 Chlorine gas and liquid can be lethal to human life above certain concentrations by attacking mucous membranes in the eyes, throat and lungs. The degree of reaction to
exposure to any chemical depends on three main factors: the level of exposure, the route of exposure (breathing, touching, etc.), and the length of time of the exposure.

3.2.2 Short-term exposures can result in the following:

3.2.2.1 Nose and throat irritation, watery eyes, coughing, bloody nose, nausea, vomiting, chest pain, and/or lightheadedness

3.2.2.2 Contact with chlorine gas can severely burn and irritate the eyes and skin upon contact, possibly causing permanent damage

3.2.2.3 Contact with chlorine liquid can cause frostbite and chemical burns

3.2.2.4 Ingestion can cause vomiting, nausea, and throat and stomach irritation

3.2.2.5 High level exposures can be lethal in minutes

3.2.3 Long-term or chronic exposure to low levels of chlorine gas has been potentially linked to diseases of the lung and tooth corrosion. No cancer or reproductive effects have been reported from chronic exposure to chlorine.

3.3 Special or Unique Hazards

3.3.1 Corrosivity

3.3.1.1 In the absence of moisture, chlorine will not attack ferrous metals.

3.3.1.2 Moist chlorine gas will attack copper and all ferrous metals, including stainless steel and ferrous alloys.

3.3.1.3 Aqueous solutions of chlorine are extremely corrosive.

3.3.2 Reactivity

3.3.2.1 Liquid chlorine will attack and very quickly destroy polyvinyl chloride (PVC) and rubber, hard or soft. It also reacts with grease and oils to form a voluminous frothy substance.

3.3.2.2 Mixtures of chlorine and sulfur dioxide can result in chemical reactions that generate harmful and toxic substances, as well as significant increases in pressure and temperature.

4.0 PROPERTIES AND HAZARDS OF SULFUR DIOXIDE

4.1 Physical Characteristics

Appearance: Colorless Gas

Odor: Strong, Pungent odor

Vapor Density: Heavier than air

Flammability: Not flammable or combustible.

Reactivity: See Special Hazards below.

Corrosivity: Non-corrosive when pure; very corrosive in presence of liquid/moisture; see Special Hazards below.

4.2 Health Hazards

4.2.1 Sulfur dioxide can be lethal to human life above certain concentrations by attacking mucous membranes in the eyes, throat and lungs. The degree of reaction to exposure to any chemical depends on three main factors: the level of exposure, the route of exposure (breathing, touching, etc.), and the length of time of the exposure.

4.2.2 Sulfur dioxide is irritating to the eyes and the upper respiratory tract. Inhaling high concentrations may cause runny nose, coughing, shortness of breath, chest tightness,
and, a choking sensation. People with asthma or with other diseases concerning the respiratory tract are more vulnerable to sulfur dioxide exposure.

4.2.3 Direct skin or eye contact with liquid sulfur dioxide may cause frostbite and/or freeze tissues. Contact with gaseous sulfur dioxide can result in chemical burns. Sulfur dioxide is not a carcinogen.

4.3 Special or Unique Hazards

4.3.1 Corrosivity: Pure sulfur dioxide, liquid or gaseous, is largely non-corrosive to most metals. However, with water or moisture, sulfur dioxide becomes extremely corrosive. For more detailed Corrosivity information, see PSI document A06g – *ASM Handbook of Corrosion Data: Sulfur Dioxide* (1995).

4.3.2 Reactivity

4.3.2.1 Sulfur dioxide will react explosively with fluorine.

4.3.2.2 Combination of liquid sulfur dioxide and water may result in violent boiling and extremely rapid vaporization. If the water is hot, an explosion may occur. If this reaction occurs in an enclosed space or container, the increased vapor pressure as a result may build to dangerous levels.

4.3.2.3 The combination of gaseous sulfur dioxide with water will form sulfurous acid (H₂SO₃), a corrosive liquid.

5.0 PRECAUTIONS TO PREVENT EXPOSURE

5.1 Wear required personal protective equipment: goggles and chemical gloves.

5.2 Area ventilation should always be engaged before employees enter process areas.

5.3 Never enter an area where chlorine or sulfur dioxide has been released.

5.4 Follow procedure steps as required.

5.5 Follow recommendations of manufacturer’s safety data sheet.

5.6 Never reuse a lead gasket to connect a container of chlorine or sulfur dioxide.

6.0 CONTROL MEASURES IN THE EVENT OF CONTACT OR EXPOSURE

6.1 If chlorine or sulfur dioxide gas is present in the atmosphere, the detector alarms should activate to alert all personnel. The detection setting on these monitors is set below the IDLH level, which should result in an alarm well before an atmosphere becomes lethal.

6.2 Employees should never enter process areas once the detector alarms have activated.

6.3 If exposed to chlorine or sulfur dioxide gas during container changeover, employees should immediately:

6.3.1 Evacuate the area,

6.3.2 Activate the emergency response plan, and

6.3.3 Seek medical or first aid attention.

6.4 Employees are never to attempt to rescue or retrieve a person who has collapsed when the chlorine or sulfur dioxide gas may be present in the atmosphere.

7.0 QUALITY CONTROL FOR RAW MATERIALS

7.1 Contents are checked against the bill of lading and shipping manifest when delivered.

7.2 Containers are colored coded to identify contents.

7.3 Containers are labeled with contents in multiple locations.

7.4 Both operators must verify contents prior to connection to the covered process.
8.0 CONSEQUENCES OF DEVIATION

8.1 In general, the consequence of deviation from the operating limits of the system or from the operating procedures is a release of chlorine gas. The severity of such a release is dependent upon the severity of the deviation and other factors.

8.2 Operating Limits

8.2.1 In general, the operational limits of the process are determined by the materials of construction and other factors outside the control of the operator. Where the operator’s actions or inactions can affect the operating limits of the process, these have been noted in the “Notes and Safety Alerts” sections of the procedures.

8.2.2 For further information on the system operating limits, see PSI, Section A-4-b Consequences of Deviation.

8.3 Operating Procedures

8.3.1 The Glasgow Water Company has developed these operating procedures as the best and safest method for operation of the chlorination process.

8.3.2 If the operating procedures are not implemented or adhered to, an incident could occur resulting in the release of chlorine that could endanger the health and safety of the employees and the surrounding community.

9.0 OPERATIONS

9.1 Initial Startup: No special procedures or steps.

9.2 Normal Operations: See Appendices A through E.

9.3 Temporary Operations: No special procedures or steps.

9.4 Emergency Operations: No special procedures or steps.

9.5 Normal Shutdown: See Appendices F through H.

9.6 Startup Following Turnaround or Emergency Shutdown: No special procedures or steps.

10.0 DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Revision By</th>
<th>Changes Made</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>09/05/2014</td>
<td>L. Crimmins</td>
<td>Initial Issuance</td>
</tr>
<tr>
<td>0</td>
<td>06/03/2015</td>
<td>L. Crimmins</td>
<td>Revised 8.5 to reflect specific LOTO procedures.</td>
</tr>
</tbody>
</table>
Appendix A – Shut Off and Isolate Empty Container

Equipment Required

| Safety Goggles | Cylinder Wrench (90° twist) |
| Chemical Gloves | Lead Gaskets |
| Ammonia Solution in squeeze bottle | Rubber Mallet |

<table>
<thead>
<tr>
<th>Procedure Step</th>
<th>Notes and Safety Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Check to be sure which container is empty.</td>
<td>Container with magnet labeled “Feed” should be empty.</td>
</tr>
<tr>
<td>2) Using the cylinder wrench, turn the manifold valve stem clockwise until it stops.</td>
<td>This closes the empty container.</td>
</tr>
<tr>
<td>3) Turn vacuum regulator indicator on empty container back to the operating position.</td>
<td>This tells the feed system to ‘pull’ from the empty (and closed) container.</td>
</tr>
<tr>
<td>4) Close the orange ball valve for the full container.</td>
<td>This shuts off the gas flow from the full container and forces the vacuum system to pull any remaining gas from the empty container lines.</td>
</tr>
<tr>
<td>5) Wait until vacuum regulator indicator on the empty container returns to red (or empty) position.</td>
<td>This gives time for all the gas to be pulled from the lines.</td>
</tr>
<tr>
<td>6) Close the orange ball valve on the empty container side.</td>
<td>This closes off the empty side and prevents any gas from getting back into the lines.</td>
</tr>
<tr>
<td>7) Open orange ball valve on the full container side.</td>
<td>This turns the flow of gas back on to the system.</td>
</tr>
<tr>
<td>8) Turn feed indicator on the vacuum regulator clockwise to the red or empty position.</td>
<td>This shuts the valve in the vacuum regulator assembly.</td>
</tr>
</tbody>
</table>
## Appendix B – Disconnect Empty Container

### Equipment Required

<table>
<thead>
<tr>
<th>Safety Goggles</th>
<th>Cylinder Wrench (90° twist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Gloves</td>
<td>Lead Gaskets</td>
</tr>
<tr>
<td>Ammonia Solution in squeeze bottle</td>
<td>Rubber Mallet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedure Step</th>
<th>Notes and Safety Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Check that the valves are properly closed.</td>
<td>Orange ball valve and container valve should both be closed.</td>
</tr>
<tr>
<td>2) Using the cylinder wrench, slightly loosen the yoke assembly on the vacuum regulator.</td>
<td>Only slightly loosen – <strong>DO NOT REMOVE YOKE ASSEMBLY.</strong></td>
</tr>
<tr>
<td>3) Check for leaks.</td>
<td>It is possible for the container valve to malfunction and appear closed, but really be open. Checking for leaks ensures that any gas remaining in the container is not accidentally released.</td>
</tr>
<tr>
<td>a) Squeeze the bottle of ammonia solution near the yoke assembly-container joint, at the same time blowing the ammonia gas in the direction of the joint.</td>
<td>The ammonia solution in the squeeze bottle should be kept within reach of the operator working on disconnecting and connecting the vacuum regulator. A white cloud of smoke will appear if a leak has occurred. There can possibly be small traces of gas present and the cloud should dissipate quickly. If any cloud doesn’t dissipate quickly or if there after several tests, this means a container valve may have malfunctioned – STOP the procedure immediately.</td>
</tr>
<tr>
<td>4) Fully loosen and remove the yoke holding the vacuum regulator.</td>
<td>Only if no leaks are detected.</td>
</tr>
<tr>
<td>5) Carefully place vacuum regulator on the floor.</td>
<td></td>
</tr>
<tr>
<td>6) Place the cap back onto the manifold valve.</td>
<td></td>
</tr>
<tr>
<td>7) Tighten the cap with the cylinder wrench.</td>
<td></td>
</tr>
<tr>
<td>8) Check the container valve for leaks using the ammonia solution in the squeeze bottle.</td>
<td>See above. If no cloud is present then proceed.</td>
</tr>
<tr>
<td>9) Place the bonnet on the container and twist the cover to hold it in place.</td>
<td></td>
</tr>
<tr>
<td>10) Tighten bolt down that secures the bonnet.</td>
<td>The container is now ready for removal from scales.</td>
</tr>
</tbody>
</table>
## Appendix C – Remove Empty Container from the Scales

### Equipment Required

<table>
<thead>
<tr>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Goggles</td>
</tr>
<tr>
<td>Chemical Gloves</td>
</tr>
<tr>
<td>Ammonia Solution in squeeze bottle</td>
</tr>
<tr>
<td>Powered Hoist</td>
</tr>
<tr>
<td>Lifting Bar</td>
</tr>
</tbody>
</table>

### Procedure Step | Notes and Safety Alerts

1. **Procedure Step**: Remove the “Full” magnet label from the container currently feeding gas.

2. **Procedure Step**: Place the “Feed” magnet label on the container which is currently feeding gas.

3. **Procedure Step**: Open the two sliding doors separating the scale room from the storage area.

4. **Procedure Step**: Perform visual inspection of hoist and lifting bar.

5. **Procedure Step**: Jog lifting bar into place above empty container.

6. **Procedure Step**: Connect lifting bar to the empty container.

7. **Procedure Step**: Lift the empty container. Be sure to lift container high enough to clear any obstacles.

8. **Procedure Step**: Jog the empty container to the storage area.

9. **Procedure Step**: Slowly lower the container to the floor.

10. **Procedure Step**: Detach lifting bar and return it and hoist to scale room.

11. **Procedure Step**: Chock empty container on both sides to prevent rolling.

12. **Procedure Step**: Place an “Empty” magnet label on the empty container.
Appendix D – Place Full Container onto the Scales

**Equipment Required**
- Safety Goggles
- Powered Hoist
- Chemical Gloves
- Lifting Bar
- Ammonia Solution in squeeze bottle

<table>
<thead>
<tr>
<th>Procedure Step</th>
<th>Notes and Safety Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Check to be sure the container is a full container.</td>
<td>The magnet on the container should read “FULL”.</td>
</tr>
<tr>
<td>2) Ensure that container is positioned so that the valve locations match the vacuum regulators.</td>
<td>The bonnet or valve cover is the correct end for the vacuum regulator side.</td>
</tr>
<tr>
<td>3) Verify that the arrows on each end of the container are in the 6 and 12 o’clock positions.</td>
<td>This ensures the valves are in the right position.</td>
</tr>
<tr>
<td>4) Secure the lifting bar to each end of the container</td>
<td></td>
</tr>
<tr>
<td>5) Using the hoist, lift the container high enough to clear the other containers in the scale room.</td>
<td></td>
</tr>
<tr>
<td>6) Jog the hoisted container into the correct position above the scale.</td>
<td></td>
</tr>
<tr>
<td>7) Carefully lower the container onto the scale.</td>
<td>One operator controls the hoist, while the other operator assists in centering of the container onto the scale rack.</td>
</tr>
<tr>
<td>8) Once container is in place, remove the lifting bar.</td>
<td></td>
</tr>
<tr>
<td>9) Move the lifting bar and hoist into position directly between each set of containers.</td>
<td></td>
</tr>
<tr>
<td>10) Carefully lower lifting bar onto floor.</td>
<td></td>
</tr>
</tbody>
</table>
# Appendix E – Connect the Full Container

## Equipment Required

<table>
<thead>
<tr>
<th>Safety Goggles</th>
<th>Cylinder Wrench (90° twist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Gloves</td>
<td>Lead Gaskets</td>
</tr>
<tr>
<td>Ammonia Solution in squeeze bottle</td>
<td>Rubber Mallet</td>
</tr>
</tbody>
</table>

## Procedure Step

<table>
<thead>
<tr>
<th>Procedure Step</th>
<th>Notes and Safety Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Check the vacuum regulator to ensure that the old gasket is not still place.</td>
<td>Most of the time the gasket sticks to the yoke when removing it from the manifold valve of the empty tank.</td>
</tr>
<tr>
<td>2) Loosen the bolt securing the bonnet or valve covering.</td>
<td></td>
</tr>
<tr>
<td>3) Twist the cover to the correct position and pull it off.</td>
<td></td>
</tr>
<tr>
<td>4) Place the cover underneath or close to the cylinder.</td>
<td></td>
</tr>
<tr>
<td>5) Ensure the manifold valve is in the correct 90° position to harness the vacuum regulator.</td>
<td></td>
</tr>
<tr>
<td>6) Inspect the lead gasket that you intend to use to confirm it has not been damaged.</td>
<td>Each new full cylinder delivered here from the tank suppliers has with it new lead gaskets usually tied together with wire, hanging from the valves.</td>
</tr>
<tr>
<td>7) Place the lead gasket on the valve body of the yoke assembly</td>
<td>NEVER REUSE LEAD GASKET.</td>
</tr>
<tr>
<td>8) Using the cylinder wrench, verify that the manifold valve to the full tank is closed.</td>
<td>It is important to check for tightness, because the valve could possibly jar loose during transportation.</td>
</tr>
<tr>
<td>9) Loosen the cap slightly.</td>
<td></td>
</tr>
<tr>
<td>10) Check for leaks at the valve.</td>
<td>It is possible for the container valve to malfunction and appear closed, but really be open. Checking for leaks ensures that any gas remaining in the container is not accidentally released.</td>
</tr>
<tr>
<td>a) Squeeze the bottle of ammonia solution near the yoke assembly-container joint, at the same time blowing the ammonia gas in the direction of the joint.</td>
<td>The ammonia solution in the squeeze bottle should be kept within reach of the operator working on disconnecting and connecting the vacuum regulator. A white cloud of smoke will appear if a leak has occurred. There can possibly be small traces of gas present and the cloud should dissipate quickly.</td>
</tr>
<tr>
<td>Procedure Step</td>
<td>Notes and Safety Alerts</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>11) Remove the cap.</td>
<td>If any cloud doesn’t dissipate quickly or is there after several tests, this means a container valve may have malfunctioned – STOP the procedure immediately.</td>
</tr>
<tr>
<td>12) Check that the lead gasket is still in the correct position on the yoke assembly.</td>
<td>Only if no leaks are detected.</td>
</tr>
<tr>
<td>13) Place the yoke assembly connected with the vacuum regulator onto the manifold valve</td>
<td>Always connect the vacuum regulator to the valve on top which pulls the gas from the cylinder. The bottom valve is used for drawing chlorine liquid and is never used.</td>
</tr>
<tr>
<td>14) Slowly tighten the yoke screw.</td>
<td>While tightening, ensure that the assembly is correctly coming together.</td>
</tr>
<tr>
<td>15) Continue tightening the yoke screw until the lead gasket is properly seated.</td>
<td>Note: Do not under tighten or over tighten the yoke screw for you could create leaks.</td>
</tr>
<tr>
<td>16) Using the cylinder wrench, open the manifold valve one half turn for brief moment and then shut it back.</td>
<td>A rubber mallet hammer may be needed to slightly tap the cylinder wrench to assist you in opening the manifold valve. This step pressurizes the yoke assembly, allowing the system to be checked for leaks.</td>
</tr>
<tr>
<td>17) Instantly after closing the valve, check the yoke assembly for leaks with the ammonia solution as described in step #10.</td>
<td>This step is where most leaks occur.</td>
</tr>
<tr>
<td>18) Open the manifold valve ¾ of a turn.</td>
<td>Only if no leaks are detected.</td>
</tr>
<tr>
<td>19) Twist the vacuum regulator indicator counterclockwise and pull the indicator up to the standby position.</td>
<td></td>
</tr>
<tr>
<td>20) Open the orange ball valve in the feed system.</td>
<td>This valve is located on the same side of the scales as the newly placed tank.</td>
</tr>
<tr>
<td>21) Check the entire gas feed system for leaks with the ammonia solution as described in step #10.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix F: Lockout of Chlorine Feed System

505 - Operating Procedures: Waste Water Treatment Plant

Revision: 0  Effective Date: 06-03-2015

LOCKOUT GUIDELINES

EQUIPMENT: Chlorine Storage Tanks
LOCATION: WWTP Scale Room

SOURCES OF ENERGY FOR THIS EQUIPMENT:
Chemical (Chlorine Gas)

POTENTIAL SOURCES OF STORED ENERGY:
Chemical (Chlorine Gas)

PROPER LOCKOUT PROCEDURE

1) Close tank valve to shut off chlorine supply.
2) Turn dial on vacuum regulator (PC 1001 or PC 1002) to OFF position.
3) Close chlorine feed valve (VC 1001 or VC 1002).
4) Apply lockout device and lock to valve.

STEPS TO PREVENT RELEASE OF STORED ENERGY

1) Ensure supply valve on tank is completely closed.
2) Close and lockout valves in proper order to prevent trapped gas in the piping.

VERIFICATION OF ISOLATION

ONLY IF LOCKING OUT BOTH TANKS:
1) Verify that rotameter gauge in chlorinator room shows a reading of zero (0). Any reading other than zero is a sign that the flow of gas has NOT been shut off.
LOCKOUT GUIDELINES

EQUIPMENT: Sulfur Dioxide Storage Tanks
LOCATION: WWTP Scale Room

SOURCES OF ENERGY FOR THIS EQUIPMENT:
Chemical (Sulfur Dioxide Gas)

POTENTIAL SOURCES OF STORED ENERGY:
Chemical (Sulfur Dioxide Gas)

PROPER LOCKOUT PROCEDURE

1) Close tank valve to shut off sulfur dioxide supply.
2) Turn dial on vacuum regulator (PC 1101 or PC 1102) to OFF position.
3) Close sulfur dioxide feed valve (VS 1101 or VC 1102).
4) Apply lockout device and lock to valve.

STEPS TO PREVENT RELEASE OF STORED ENERGY

1) Ensure supply valve on tank is completely closed.
2) Close and lockout valves in proper order to prevent trapped gas in the piping.

VERIFICATION OF ISOLATION

ONLY IF LOCKING OUT BOTH TANKS:
1) Verify that rotameter gauge on sulfinator shows a reading of zero (0).
   Any reading other than zero is a sign that the flow of gas has NOT been shut off.
LOCKOUT GUIDELINES

EQUIPMENT: Chemical Injection System
LOCATION: WWTP Chlorinator Room

SOURCES OF ENERGY FOR THIS EQUIPMENT:
Chemical (Chlorine or Sulfur Dioxide gas)

POTENTIAL SOURCES OF STORED ENERGY:
Chemical (Chlorine or Sulfur Dioxide gas)

PROPER LOCKOUT PROCEDURE

1) Verify the system element that needs to be shut down.
2) Close appropriate valve downstream of rotameter to shut off gas supply.
   Chlorine: Valve VC 1201, VC 12002, VC 1203
   Sulfur Dioxide: Valve VS1201
3) Apply lockout device and lock to appropriate valve.
4) Monitor rotameter until it shows a reading of zero (0).
5) Close appropriate water feed supply valve to shut off water supply.
   (Valve VW 2101, VW 2102, VW 2103, VW 2104, VW 2105, OR VW 2106)
   Chlorine: Valve VW 1206, VW 12007, VW 1208
   Sulfur Dioxide: Valve VW 1209
   Note: If shutting down the entire system, the water feed can be shut off by closing valve VW 2101.
6) Apply lockout device and lock to appropriate valve.
7) Close appropriate water outlet valve to shut off treated water outfeed.
   FIC 1201(Cl2): Valves VM 1203, VC 1204, and VC 1205.
   FIC 1202(Cl2): Valves VM 1202 and VC 1203.
   FIC 1203(Cl2): Valve VM 1201.
   FIC 1204 (SO2): Valves VM 1207, VC 1208, and VC 1209.
8) Apply lockout device and lock to appropriate valve.

STEPS TO PREVENT RELEASE OF STORED ENERGY

1) Make sure that rotameter shows a zero (0) reading before closing water feed supply valve.

VERIFICATION OF ISOLATION

1) Verify that rotameter gauge shows a reading of zero (0).
   Any reading other than zero is a sign that the flow of gas has NOT been shut off.