17. CHLORINE LEAK/SPILL

17.1 ASSET IDENTIFICATION

This is a hazard-related contingency plan which could also include malfunction of a specific asset.

17.2 SCOPE OF THIS CONTINGENCY PLAN

This Contingency Plan describes the assessment of any incident which involves a liquid chlorine leak or spillage that will impact on production from the Wanneroo Groundwater Treatment Plant. It covers discovery, assessment, planning and management of an incident of this type in general terms for the guidance of Incident and Site Managers.

17.3 CONTINGENCY/INCIDENT MANAGEMENT RELATIONSHIP

This contingency plan should be read in conjunction with the Water Source & Treatment Branch Incident Management Plan. This includes details on areas of responsibilities, contacts (list attached at the end of this document (section 17.26) and media/public interest etc.

17.4 DANGEROUS GOODS ON SITE

17.4.1 Quantity of Chlorine

The Wanneroo G.W.T.P. stores up to **16 x 920 kg drums of Chlorine gas in liquid form** (drawn from the drum as a liquid) – these are stored in the Chlorine Drum Room on the ground floor on the south-eastern side of the Operations Building. Two drums are connected to the delivery manifold with one in use and the other on stand-by. The manifold consists of eight (8) connection points. All drums connected to the manifold have Emergency Shutoff Devices attached. Up to 8 drums are not connected and can be held in store. The Chlorine is fed in a liquid state to evaporators and then to Chlorinators in the adjoining room to the south.

Mechanical ventilation is by exhaust fans at ground level venting at roof level with power switches at all doors.

A "Tecta Fume" gas detector unit is located in the drum room with detectors in both the drum and Chlorinator rooms.

17.4.2 Other Chemicals on Site

- **Two (2) x 20 m^3 tanks of Fluorosilicic Acid (47.2 tonnes)**
- **One Tank of Hydrochloric Acid – 5 kL (5.85 tonnes)**
- **One Tank of Sodium Hydroxide – 20 kL (30.6 tonnes)**

These are located in the following areas:

- 2 x 20 m^3 tanks of Fluorosilicic Acid located at the eastern end of the main chemical tank bund.
- Hydrochloric Acid – 5 kL (5.85 tonnes) located north west of the Miex plant.
- Sodium Hydroxide – 20 kL (30.6 tonnes) located north west of the Miex plant.

See site layout diagram (section 17.24) for location.

17.5 SITE SAFETY EQUIPMENT

Two (2) Self Contained breathing Apparatus (SCBA) sets of 30 minutes capacity are located in:

- Lower Foyer of the Operations Building and;
- On the eastern wall of the Clarifier switchroom.

Personal Protective equipment should always be worn with liquid Chlorine, and also with Chlorine gas in certain situations where gaseous Chlorine will react with water or moisture on the skin to form an acid which can cause blistering. As well as the SCBA sets, a canister respirator is also available, as personal issue, and is to be used strictly for escape, for the initial quick assessment, or during normal operations in the Chlorine Store - NOT for locating a leak or for closure of valves during a Chlorine leak emergency.

Non-emergency but related responsibilities of the Process Co-ordinator include:

- Ensuring safety gear is always in working order - schedule tests;
- Scheduling the testing of alarms to Dawson - AOC (maintenance through an AWP);
- Scheduling safety inspections and preventative maintenance.

17.6 POTENTIAL DANGER TO PERSONNEL

Any failure or damage to chlorine equipment which results in a liquid chlorine leak must be considered as an extremely serious situation. In extreme cases it could be potentially fatal to Water Corporation personnel or members of the public. Concentrations above 37.0 p.p.m. will cause throat irritation, above 74.3 p.p.m. coughing and above 2460 p.p.m will almost certainly cause death.

17.7 NEIGHBOURING PREMISES

Wanneroo G.W.T.P. is located within the Gnangara Pine Plantation. Measured from the Chlorine Drum Room (the potential hazard) residential properties are located

- Only to the south-west at 450 metres (approx.). These consist of stables and private residential properties alongside Hawkins and Townsend Rds.
- There is also a rural property alongside Boundary Rd directly opposite bore W255/W250.
- Recreational users also frequently use areas of the pine plantation and should be considered in an emergency situation.

17.8 DISCOVERY

A fault/failure/leak to any component of the Chlorine System may be discovered by the Process Co-ordinator through any of the following possibilities:

- An alarm received at the Co-ordinators handset.
- Visually on the VDU display at the Citect Operator Station displayed as:
  - A Chlorine leak (2 p.p.m or 5 p.pm.)
  - Chlorination System failure (at 5 p.p.m.)
  - Failed components are shown in red on the screen.
- Visually identified or Chlorine odour detected and reported by Process Co-ordinator or other Water Corporation Staff.
- Locally via red strobe lights and audible alarm.

17.9 HAZARDS AND INCIDENTS

A failure of all or any part of the Chlorine System resulting in a leak may be caused by a number of hazards including lightning, sabotage, Process Co-ordinator inflicted procedure error, vandalism, equipment breakdown, weld failure, valve gate/spindle failure, gasket failure, rupture disc failure, hoisting equipment failure, lack of maintenance, errors during installation or removal of drums from the installation or earthquake.

17.10 RESPONSE ASSESSMENT

The questionnaire at **Appendix 1** should be used to assess the situation , and as an aid, prior to contacting CSBP emergency response crew. If the answer to any question is "**yes**", report the incident to the Incident Manager. At the outset, it may not be possible to accurately estimate the duration or implications until the Maintenance Contractor has assessed the damage. Assessment of failure or repair is required as soon as possible. As soon as is practicable commence filling out an Incident Report (Form WP-1).

17.11 CONTAINMENT

Immediate response by the Process Co-ordinator is **CONTAINMENT**. This should be followed by reporting to the Scheme Manager during normal hours and the Duty Standby Manager after hours. The Incident and Site Manager are then appointed and ensure that an assessment is made prior to a procedure to curtail/address the problem.

17.12 IMMEDIATE ACTION BY THE INCIDENT MANAGER

Speed of reaction is absolutely essential to minimise impact.

As soon as notification is received it is essential to:

- Appoint Site Manager and instruct him/her to carry out the following actions which are classified as urgent:
- Assess plant status then contact and advise the Manager Water Distribution and if necessary, negotiate production strategy.
- Initiate the mobilization of essential resources.

17.13 RESPONSE PLAN

Operational Response.

17.13.1 For any incident after hours:

- The Process Co-ordinator must respond quickly to all emergency alarms.
- The person reporting the fault/failure will contact the Duty Standby Scheme Manager (D.S.S.M) who will decide on the course of action.
- The D.S.S.M. will notify the Scheme Manager responsible for this site (if required). If unavailable, the D.S.S.M will nominate a trained Site Manager.

- The Manager T.O.P.S. shall be notified of the incident and shall determine who will continue as the Incident Manager.
- Depending on the severity the D.S.S.M will then notify the Water Distribution Centre only if plant production is affected.
- Water Distribution Centre will contact the maintenance contractor standby personnel.
- Duty Standby Manager (Incident Manager) will:
  - Notify Fire and Rescue Service, Police, or Ambulance (if required).
  - Contact CSBP Emergency Response Crew

17.13.2 For any incident during hours:

- The Scheme Manager/Process Co-ordinator will notify the maintenance contractor and request repairs, if mechanical or electrical
- Depending on the severity, the Incident Manager will decide on the course of action to be taken on the perceived problem.
- The Manager T.O.P.S. shall be notified of the incident and shall determine who will continue as the Incident Manager.

17.14 INCIDENT TYPES

Minor Incident

1. If definitely a minor leak, close off supply at the chlorine drum;
2. Close valves on both sides of the leak;
3. Switch on exhaust fans;
4. Call the contract maintenance service, if required.

The minor leaks that can be stopped by closing a valve include:

- fractured copper lines;
- leak from header system;
- faulty evaporator;
- valve washers.

Significant or Major Incident

In the event of an uncontrolled leak which requires a **HAZMAT** response the Site Manager shall:

- Provide emergency services personnel with technical support and assistance: and
- Be responsible for liaison with all emergency services attending the emergency.

In a **HAZMAT** situation, the Fire & Rescue Service (FRS) is the Hazard Management Authority and is responsible for the management of the situation, for fire fighting, for rescue and for the control of the chemical emergency. The Police will have the responsibility for overall control and co-ordination of the emergency.

Where the leak is in the piping between the drums and evaporators:

1. Close all doors to the drum store – ensure exhaust fans are OFF;
2. Notify the chlorine supplier, the Incident Manager, and Water Distribution Control Centre;

3. In the case of an uncontrolled chlorine leak:
   - as per previous action;
   - notify FRS;
   - arrange for evacuation of personnel and public;
   - stand by to assist attending emergency services.
4. Maintain constant communication with the Incident Manager.

Where chlorine drums are damaged <u>in the chlorine store</u>:
1. Close the doors to the store – ensure exhaust fans are OFF;
2. Notify Incident Manager, the chlorine supplier and WDC;
3. In the case of an Uncontrolled Leak
   - as per previous action;
   - notify FRS;
   - arrange for evacuation of personnel and public;
   - stand by to assist attending emergency services.
4. Maintain constant communication with the Incident Manager.

Where the damaged drums are <u>outside the chlorine store</u>:
1. Remain upwind of the leak;
2. Notify the chlorine supplier and Incident Manager;
3. Notify FRS;
4. Arrange for evacuation of personnel and public;
5. Stand by to assist attending emergency services;
6. Maintain constant communication with the Incident Manager.

17.15 RESPONSE RESOURCES

For all significant or major faults the Site Manager must notify the Incident Manager.

To repair the fault and depending on the severity the following <u>could</u> be involved:

17.15.1 Personnel:

The first three items for manifold and auxiliary equipment failure.

- The maintenance Contractor (if required).
- The maintenance Contractor's Instrument/Electricians (if required).
- The associated Trades Supervisor (if required).
- CSBP response crew (specific to drum failures).
- Police, Fire & Rescue Service, Ambulance.
- **HAZMAT**

17.15.2 Plant or Equipment:

- SCBA.
- Arc/Oxy/Acetylene Equipment.
- Personal protective equipment.

17.15.3 Supply Items:

- Spare SCBA bottles.
- Fittings (flanges, gaskets, valves).
- Replacement pipe to suit.
- Rupture discs.
- Welding rods.

17.16 ASSET ISOLATION

The following procedure should be followed, in the event of damage to or leakage from any Chlorine equipment. In all situations S.C.B.A. equipment must be worn. Once the situation has been assessed and in the event of a fracture or leakage from pig tails, manifold or any other pipework:

- Emergency Shutoff Devices (ESD's) are installed on all drums and should close drum valves in the event of a leak.
- In anycase ensure drum valves are closed.
- Close valves both sides of leak.

In the event of damage to Chlorine drums caused whilst in transit, and within the treatment plant grounds:

- Providing drum is still on the transport vehicle - drive vehicle into Chlorine building (means of containment).
- Close roller doors and all outlets to the building.
- Contact F.R.S.
- Contact C.S.B.P. emergency crew.
- Evacuate gas from building when advised and safe to do so (a system and procedure is held on site).

In the event of dislodgement of Chlorine drums from transport vehicle and within the treatment plant grounds:

- Isolate area and treatment plant entry.
- Remain upwind of leak.
- Contact F.R.S.
- Call C.S.B.P. and other emergency response services as required.

17.17 ALTERNATE PROCESS CONTROL MEANS

There is no alternate process control means of Chlorination until the damage and leak has been repaired. The treatment plant would shut down until leak/damage has been repaired.

17.18 RESPONSE NOTIFICATION

For all significant events, the following should be notified immediately:

a) By the Site Manager:

For	Contact
• All significant incidents	Incident Manager

b) By the Incident Manager:

For	Contact
• All Major incidents	Incident Director

17.19 RE-COMMISSIONING

The following instructions are to be read in conjunction with the standard commissioning procedures as outlined by Hydramet.

- Ensure repairs are successful (no visible or audible leaks) by pressure testing with nitrogen gas (the maintenance Contractor).
- Connect chlorine drum.
- Open drum valve then test for leaks.
- Return Evaporators to duty.
- Return Chlorinators to duty.
- Increase flow to Water Distribution Centre requirements.

17.20 RECOVERY ASSESSMENT

Assessment and planning of all recovery tasks should begin as soon as all emergency services have been notified and the Chlorine System or drum has been isolated.

The Treatment Operations Site Manager will visually inspect the Chlorine System/drum to assess any other requirements for repairs paying particular attention to:

- Building repair and security.
- Painting of new pipework.
- Damage to cabling, ducting etc.
- Repairs to any other services.

Responsibility between Treatment Operations and the maintenance Contractor for all recovery actions needs to be determined and arranged by the Incident Manager as soon as the recovery assessment is available.

17.21 RECOVERY ACTIONS

Numerous recovery actions may be necessary following an incident involving a Chlorine leak. Responsibilities are as follows:

- The Treatment Operations Site Manager is responsible for identifying all problems and potential problems, and reporting them to the Incident Manager.
- The Site Manager organises and ensures the relevant sections complete restoration.
- The Incident Manager is responsible for all advisory notification and for arranging division of action between himself/herself and the maintenance Contractor.

17.22 DEBRIEF

For a Major Incident or an exemplary Significant Incident, the Incident Manager must arrange for a debrief to take place within seven to fourteen days of the incident, in accordance with the Water Source & Treatment Branch Incident Management Plan.

17.23 MATERIAL SAFETY DATA SHEETS

Insert Current MSD Sheet Here

17.24 EMERGENCY CONTACTS LIST

Insert Current
Emergency Contacts List Here

17.25 APPENDIX 1 - QUESTIONNAIRE

CHLORINE LEAK/SPILL ASSESSMENT QUESTIONNAIRE INFORMATION REQUIRED (where possible circle answer)	
Name of person reporting.	
Time	
Phone number of person reporting (for call back purposes).	
Reason for emergency.	
Chemical involved. **Name** **Hazchem code.** **U.N. number.**	**Chlorine** **2XE** **1017**
Details of any injury.	
Address of installation or location of incident (include nearest intersection if known)	
Will someone direct emergency personnel to site?	
Where will this person be?	
If possible estimated amount and rate of release of contents?	
Is transport or an installation involved?	Transport Installation
Type of container involved? e.g. drum, cylinder etc.	Drum Cylinder Pipework
What is the condition of the container?	New Good Fair Poor
What are the details of the vehicle/installation involved :- a) Is the release liquid? b) Are fumes or gas being generated? c) Are fumes or gas being blown towards a populated area? d) Are contents in danger of entering a drain or water supply? e) Is there a fire involved? f) Is traffic volume heavy? g) What are the weather conditions? h) Are there other relevant details?	 YES NO YES NO YES NO YES NO YES NO YES NO Fine Wet Raining No Yes-give details
What assistance is required?	
Have Police been notified?	YES NO
Have Fire & Rescue Service/Ambulance been notified?	YES NO
What facilities are available on site?	Water Power Lights Gantry Crane Other -
Note: Reference should be made to locality and site maps.	