PowerWater

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LUDMILLA WASTE WATER TREATMENT PLANT

EMERGENCY RESPONSE PLAN

Dangerous Goods Emergencies

CHLORINE GAS, FERRIC SULPHATE SOLUTION, QUICKLIME & DIESEL FUEL

Approved by:	Prepared by:	Issue Date: 12/04/2013	Status: Approved
		Review Date: 24/01/2017	
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Contents

PART A: SPECIFIC OPERATIONAL REQUIREMENTS

1. PROPOSED PLAN

This emergency response plan (ERP) provides information to assist in the control and combat of any incident or emergency involving the release of Chlorine Gas, Ferric Sulphate solution, Quicklime, Diesel Fuel or any other chemical at the Ludmilla Waste Water Treatment Plant.

This ERP should be read with the corporate Crisis Management and Emergency Recovery Plan, corporate Emergency Response Procedure, asset management plans, safety & operations manuals and plant equipment maintenance manuals.

2. ROLES AND RESPONSIBIILITIES

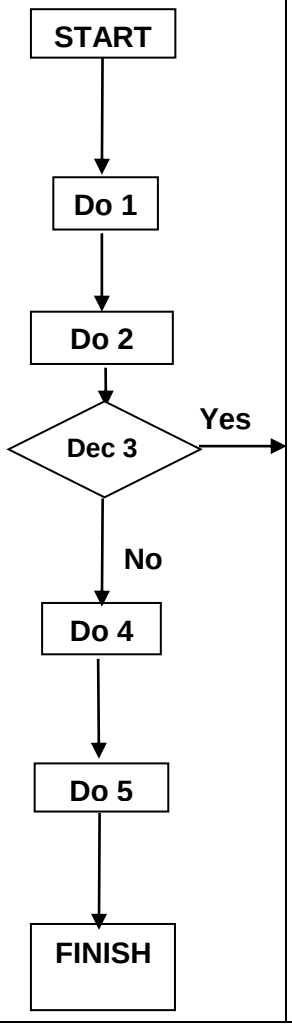
Incident manager	This person is defined as the service coordinator managing the site at the time of the incident

3. EMERGENCY OPERATIONS FLOW CHART

The simple flow chart below shows what actions to take, who will take them and how and where to carry them out in the event of an incident that may lead to an emergency. Conduct these actions in accordance with relevant response, investigation and emergency procedure training.

NTFRS AND POLICE MANAGE NON-CONTAINABLE LEAKS - WITH ASSISTANCE PROVIDED BY THE POWER AND WATER CORPORATION'S TRAINED PERSONNEL (AND SUPPLIERS OF EMERGENCY RESPONSE CREW IF AVAILABLE) AS REQUESTED BY NTFRS.

POWER AND WATER PERSONNEL ARE *NOT* TO COMBAT NON-CONTAINABLE LEAKS.

Action	Flow Chart	References
1. Site operations personnel become aware of the emergency leak within the facility – activate response. 2. Make a quick assessment of situation. 3. Is the containable? **Y/N.** 4. Move to a safe location and contact emergency services on 000 Then Hudson Ck SCC 5. Continue to consult with the emergency services until the incident manager arrives no matter what the situation.		See PWC Emergency Response procedure or attached Emergency procedures or attached links: **Chlorine Leak Response** **Chlorine Drums Emergency Capping** **Hydrocarbon spill response** **PPE for handling Lime** Dec 3 = Yes - contain as per Water Services Response procedures. Dec 3 = No – Do 4. Move to safe area and Contact Police on **000** and call the Power and Water Corporations Hudson Creek System Control number 8947 7015 or PWC Public number 1800 245 090. Stay at the evacuation point till the incident manager arrives. If an incident is declared, as Incident manager ensure all persons are evacuated from the immediate area affected by the leak or fire.

4. ADDITIONAL RESOURCES

Place these numbers on operators' mobile phones.

4.1 Emergency Services Agencies

Emergency Service Agency	Phone Number
Northern Territory Fire and Rescue Service (NTFRS)	000
HAZMAT – Emergency Response	As above
NTWorksafe – Emergency (incl. dangerous goods).	1800 019 115
EPA – A/Hours Emergency	1800 064 567
Poisons Information Services	13 11 26
Incitec Pivot (Work hours only)	86954419

4.2 Other Emergency Contacts

Emergency Contact	Phone Number
Power and Water Corporation (All Hours) – Emergency (Hudson Creek System Control Centre	1800 245 090 8947 7015
Police/ambulance/fire	000
Orica – Emergency Response	1800 033 111

4.3 Power and Water Corporation Personnel Contacts

Emergency Contact	Phone Number
Water Service North Operations Manager	04087815372
Water Services Senior Coordinator	0417836691
Ludmilla Waste Water Plant Coordinator	0401114461

5. DANGEROUS GOODS ON SITE

5.1 Emergency Services Manifest (extract only)

Product Name	Hazardous Description	DG Class / Sub Risk	Packing Group	UN No.	Hazchem Code	Maximum Quantity	Site Map ID
Chlorine	Highly Corrosive – Toxic	2.3/8	I	1017	2XE	11 x 920kg drums	A
Ferric Sulphate 45% Solution	Corrosive Liquide – Acidic, inorganic, N.O.S	8	II	3264	2X	64000L	B
Diesel Fuel	Moderately Toxicity - irritant	Na	Na	Na	Na	55000L	D
Quick Lime (ANC Powder makers)	Corrosive	Na	Na	Na	Na	120,000kg	E

5.2 Storage

Chlorine Gas – is held in 11 x 920 kg chlorine drums, which are stored and used in the Chlorine Room within the building module. See 6.3.1 Chlorine room.

Ferric Sulphate 45% Solution is held in 2 x 32,000 litre Poly Carbonate Tanks, which are located in the fully bunded Coagulant tank Storage room. See 6.3.2 Coagulant tank room

Diesel Fuel - is held in a fully bunded, undercover steel above ground 55000 litre storage tank. See 6.3.3 above ground Diesel tank

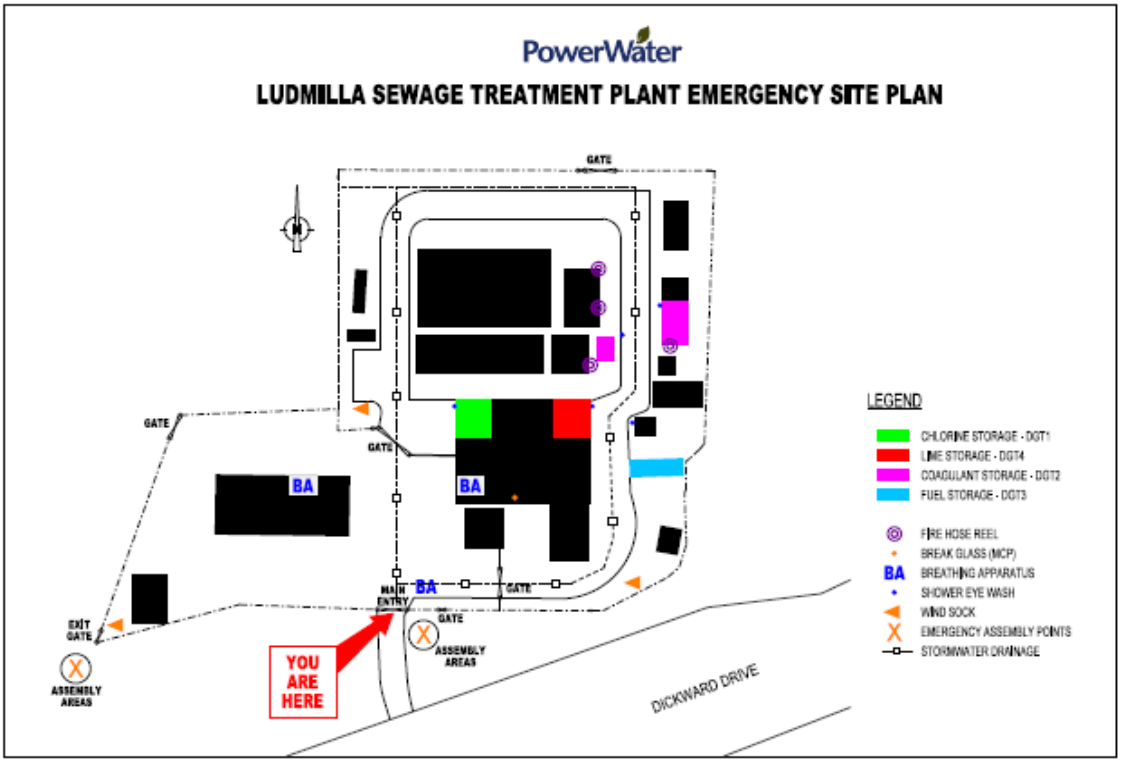
Quick Lime – is held in an internal concrete silo, holding 120,000kg of Lime. See 6.3.4 access door to internal Lime silo. See 6.3.4 Quick lime silo room door

6. LOCATION MAP & SITE LAYOUT

6.1 Location Map

The map above displays Dick Ward Drive., in relation to the Ludmilla site. The plant is located on a short access road which leads to Dick Ward Drive.

6.2 Site Layout

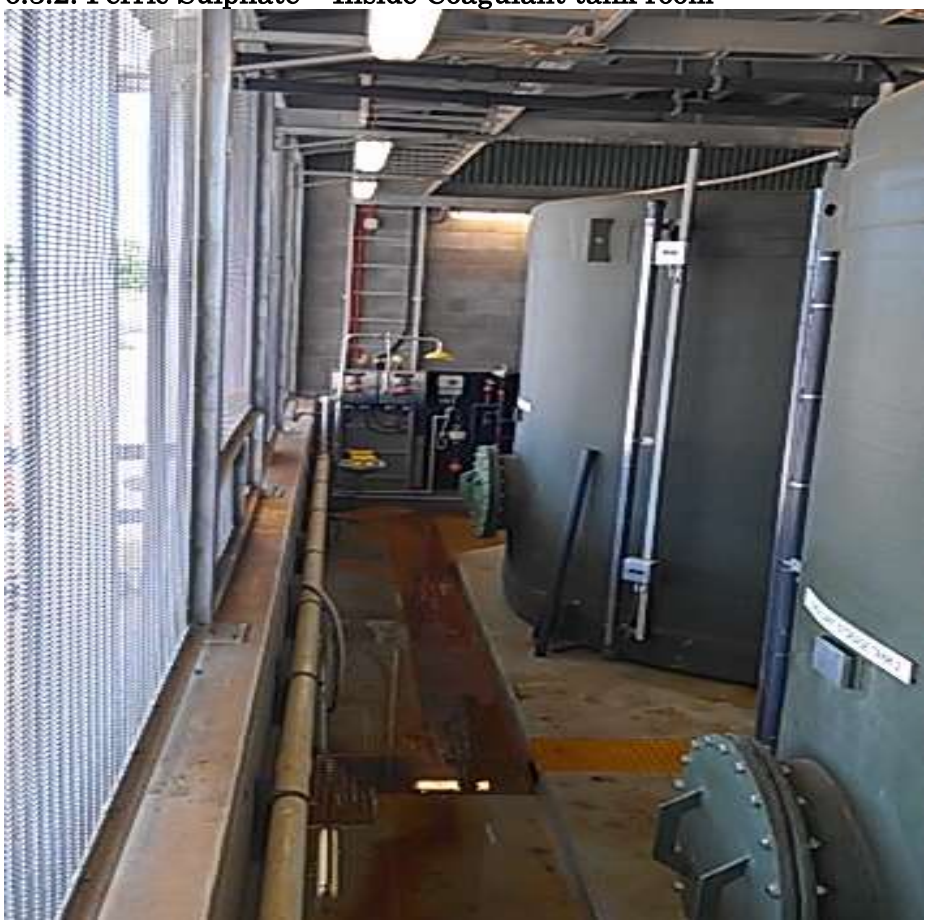


6.3 Buildings Layouts

6.3.1 Chlorine Room. View inside Chlorine room 920 kg drums

View of outside Chlorine room

6.3.2. Ferric Sulphate – Inside Coagulant tank room



View of outside Coagulant tank room. Ferric Sulphate solution tanks and bund

6.3.3 Inside view of Diesel fuel 55000L undercover tank and bund

Outside view of Diesel fuel 550000L undercover tank and bund

6.3.4 Outside view of Quick Lime storage silo room

DESCRIPTION OF EMERGENCIES

6.4 Dangerous Goods Emergencies

Any dangerous goods chemical leak, potential leak, spill, or effects from a fire that may affect the chemical storage can be classified as either containable or non-containable.

6.5 Chlorine Gas Leak

Refer Water Services Chlorine Leak Response Work Instruction.

6.5.1 Non-Containable Leak of Chlorine Gas

An uncontrolled leak which:

- Would require evacuation of personnel on site of the Water Treatment Plant (WTP).
- May require evacuation of people within close proximity of the WTP.
- May cause harm to people and the environment beyond the WTP.
- Requires assistance of emergency services (Police, NTFRS, and/or Ambulance) and/or;
- Support from chlorine or other chemical supplier (Orica);

is an **emergency** as defined in the Corporate Emergency Response Manual.

A non-containable leak may be semi-contained and require a controlled ventilation release by Water Services incident management personnel under the supervision of external emergency services.

NTFRS AND POLICE MANAGE NON-CONTAINABLE LEAKS - WITH ASSISTANCE PROVIDED BY THE POWER AND WATER CORPORATION'S TRAINED PERSONNEL (AND SUPPLIERS OF EMERGENCY RESPONSE CREW IF AVAILABLE) AS REQUESTED BY NTFRS.

POWER AND WATER PERSONNEL ARE *NOT* TO COMBAT NON-CONTAINABLE LEAKS.

6.5.2 Containable Leak of Chlorine Gas

NOTE: A containable leak does not trigger an emergency as defined in the Corporate Manual.

A containable chlorine leak is usually unlikely to affect anyone more than a few metres away.

Only trained and competent personnel shall endeavour to contain a chlorine gas leak. Appropriate PPE and Breathing Apparatus must be worn at all times whilst containing a chlorine leak.

Refer to Water Services Chlorine Leak Response procedure for more detailed instructions on how to contain a chlorine leak. Refer Appendix C.

6.5.3 Containment and Ventilation of Chlorine Gas

The Chlorine Gas drums are contained in a ventilated room within the Plant. Any chlorine gas in the room will vent through ventilation fans. There are automatic initiated exhaust fans in the chlorine store room.

6.6 Effect of Release of Chlorine Gas

Considerations of wind direction and speed and the rate of release (concentration) of chlorine gas from the store room, will determine the risk to persons downwind of the leak.

NOTE: The full contents of a 920kg drum when released to atmosphere in a complete / instantaneous release will produce a vapour cloud which can drift up to the distances (in the accompanying table) from the plant at concentrations as indicated.

6.6.1 Risk and Chlorine Dispersion

The dispersion of chlorine for each site using different leak scenarios and climatic conditions is reflected in the table on the following pages.
These should be used to determine the risk on and off site and if it is necessary to evacuate people on and off the site concerned.

EMERGENCY PLANNING INFORMATION (ERPGs)

Emergency Response Planning Guidelines (ERPGs) are values intended to provide estimates of concentration ranges above which one could reasonably anticipate observing adverse health effects and are set for three levels, ERPG-1; ERPG-2; and ERPG-3.

- ***ERPG-3*** *is defined as the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects. Chlorine ERPG-3 is 20ppm*

- ***ERPG-2*** *is defined as the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action. Chlorine ERPG-2 is 3ppm*

- ***ERPG-1*** *is defined as the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odour. Chlorine ERPG-1 is 1ppm*

In order to determine what areas will be affected during the day and/or night the following tables will need to used.

- Select the hole size of the leak.
- Select the Day/Time condition for the site.
- Look across to determine the distance chlorine could affect.

For Example: Ludmilla Wastewater Treatment Plant

A Hole size 3mm, assuming the leak occurs in day time (D3 condition) and prevailing wind is per Table 5.1.

From the Table below the ERPG3 , ERPG2 and ERPG1 areas (distances and widths) are:

ERPG	Chlorine Concentration (ppm)	Distance(m)	Width(m)
ERPG3	20 ppm	435	100
ERPG2	3 ppm	1200	200
ERPG1	1 ppm	2200	250

The scenarios included are listed in the summary in Tables A5.1. Note that results are presented for a representative set of scenarios for a consolidated set of wind weather conditions.

“D3” conditions are typical daytime, F2.2 or F2.8 are night time / early morning.

Table A5.1: Summary of Met Data Conditions for Site

	D3	F2.2	F2.8	Drums	Cylinders	Prevailing Wind Direction (towards)
Ludmilla	√	-	√	√	-	West-North West

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Results Summary

sherpa consulting

Summary of downwind distance to respective ERPG levels

1). ALL SITES

					ALOHA					
	Hole Diameter	Leak Rate	Duration	Phase	ERPG 3		ERPG 2		ERPG 1	
					Length (m)	Width (m)	Length (m)	Width (m)	Length (m)	Width (m)
D3	3	**0.19**	3600	L	435	100	1200	200	2200	250
	6	**0.77**	1195	L	891	200	2500	400	4500	600
	6	**0.06**	3600	V	242	50	666	75	1200	125
	20	**8.56**	107	L	2100	600	4500	800	6700	1000
	burst	**920**	-	Contents	2000	600	4300	850	6500	1000

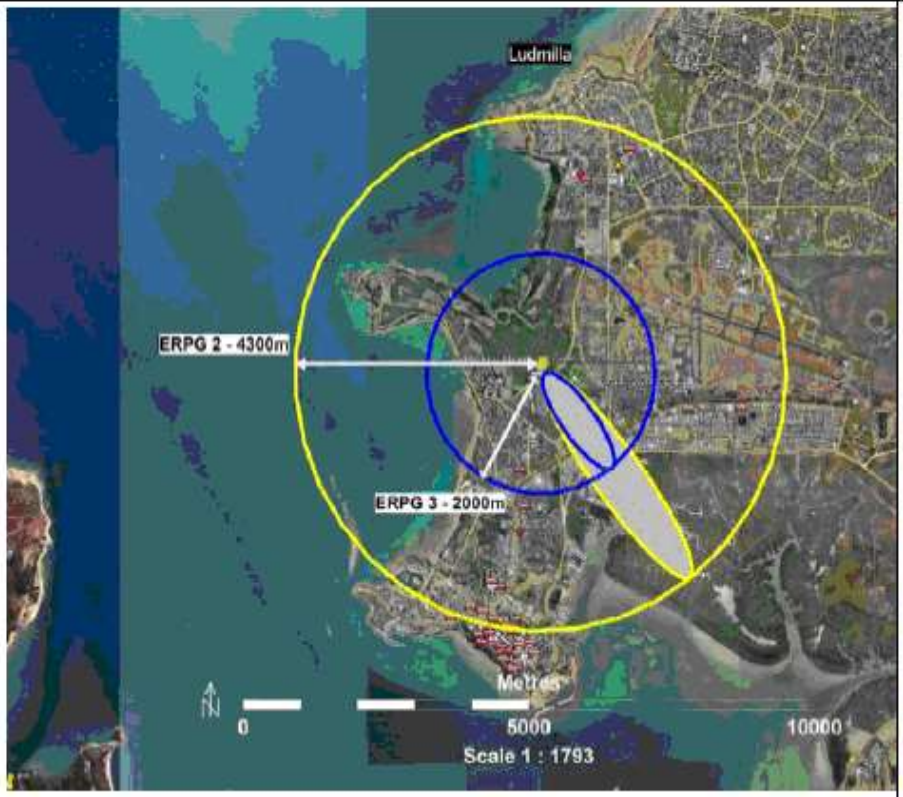
					ALOHA					
	Hole Diameter	Leak Rate	Duration (s)	Phase	ERPG 3		ERPG 2		ERPG 1	
					Length (m)	Width (m)	Length (m)	Width (m)	Length (m)	Width (m)
F2.2	3	0.19	3600	L	713	< 400	2500	< 400	4500	400
	6	0.77	1195	L	1400	< 750	4800	< 750	8500	750
	6	0.06	3600	V	414	< 300	1400	< 300	2500	300
	20	8.56	107	L	1900	750	4200	1250	6800	1500
	burst	920	-	Contents	1800	900	4000	1200	6400	1500

					ALOHA					
	Hole Diameter	Leak Rate	Duration (s)	Phase	ERPG 3		ERPG 2		ERPG 1	
					Length (m)	Width (m)	Length (m)	Width (m)	Length (m)	Width (m)
F2.8	3	0.19	3600	L	704	200	2200	250	4000	300
	6	0.77	1195	L	1400	400	4500	500	8200	600
	6	0.06	3600	V	409	80	1200	100	2200	200
	20	8.56	107	L	2100	600	4800	900	7800	1000
	burst	920	-	Contents	2000	800	4500	900	7300	1300

6.6.2 RISK ASSESSMENT MAP

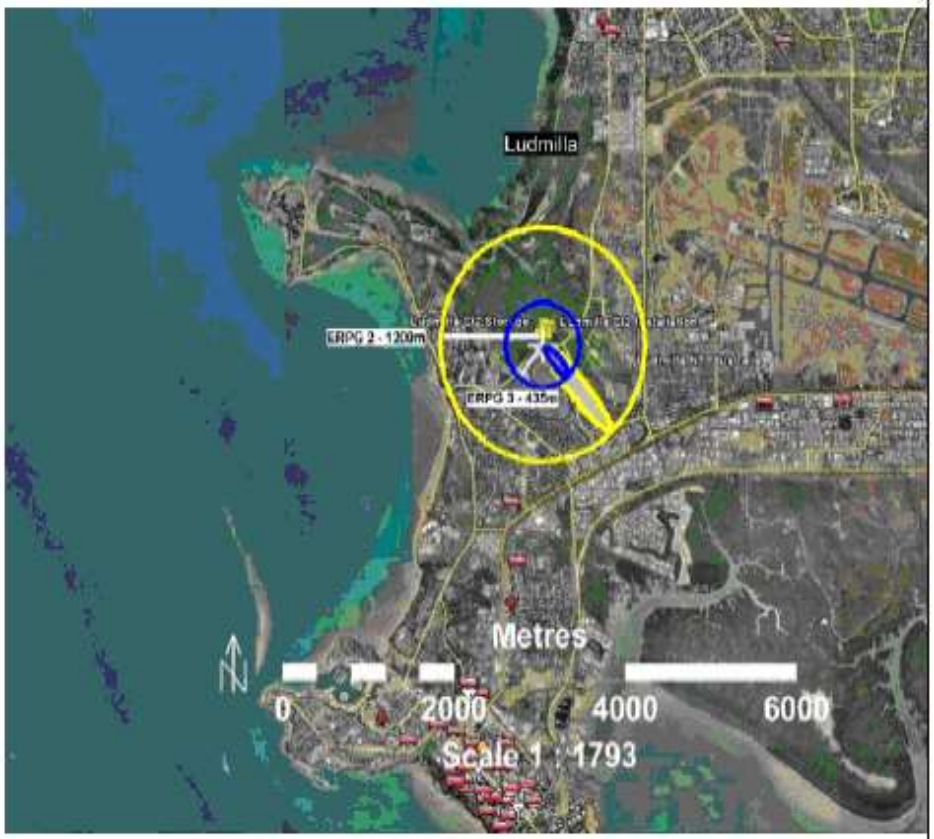
SITE: Ludmilla

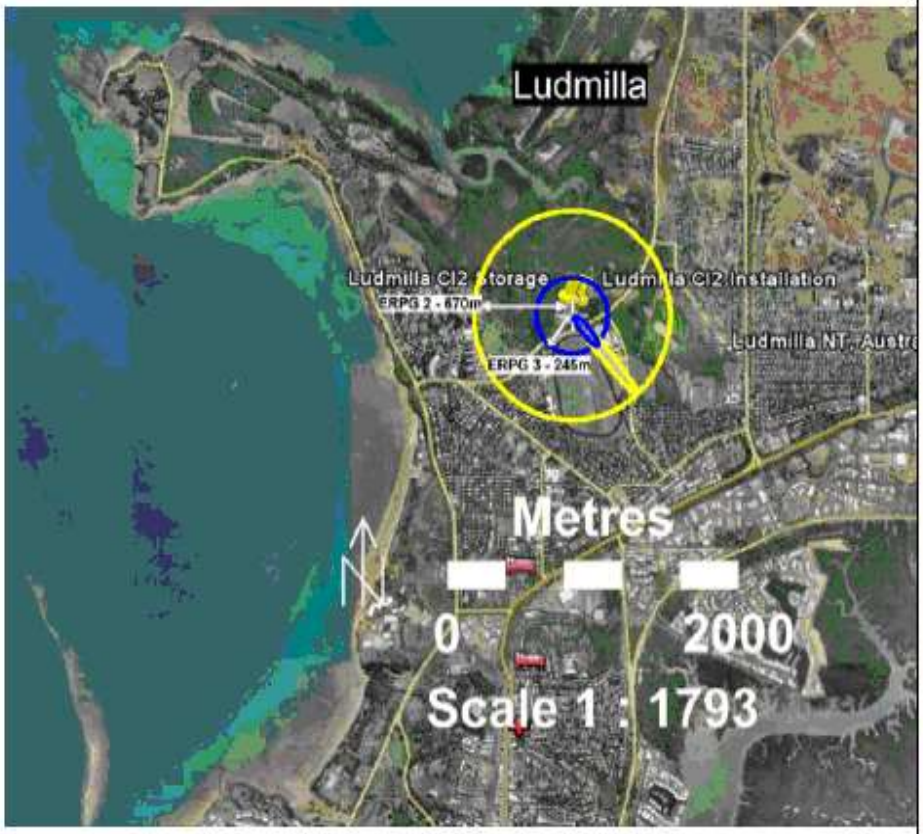
Scenario: Drum rupture

D3 (typically daytime)	F2.8 (typically night time / early morning)
	

Scenario: Valve leak from drum (6mm hole size, liquid release)	
D3 (typically daytime)	F2.8 (typically night time / early morning)
	

Scenario: Corrosion hole in drum (3mm hole size, liquid release)

D3 (typically daytime)	F2.8 (typically night time / early morning)
	

Scenario: Leak in piping / tubing (6mm hole size, vapour)	
D3 (typically daytime)	F2.8 (typically night time / early morning)
	

6.7 Ferric Sulphate solution, Diesel Fuel or Quicklime spill

Only trained and competent personnel shall endeavour to contain a Ferric Sulphate Solution, Diesel Fuel and QuickLime leak or spill. Refer to the MSDS (See Appendix B) for Precautions, appropriate PPE, First Aid and Health Hazards when responding to a leak or spill.

***Non-controllable leak** of* Ferric Sulphate Solution, Diesel Fuel and QuickLime leak or spill.

As the bunding for each Chemical at the Ludmilla Wastewater Treatment plant is large enough to contain all the contents of Ferric Sulphate Solution and Diesel Fuel, should the tank leak or spill occur, thus there should be no Non-controllable leak from these chemicals.

NTFRS AND POLICE MANAGE NON-CONTAINABLE LEAKS - WITH ASSISTANCE PROVIDED BY THE POWER AND WATER CORPORATION'S TRAINED PERSONNEL (AND SUPPLIERS OF EMERGENCY RESPONSE CREW IF AVAILABLE) AS REQUESTED BY NTFRS.
POWER AND WATER PERSONNEL ARE *NOT* TO COMBAT NON-CONTAINABLE LEAKS.

***Containable Leak** of* Ferric Sulphate Solution and Diesel Fuel.

NOTE: A containable leak does not trigger an emergency as defined in the Corporate Emergency response Manual.

Only trained and competent personnel shall endeavour to contain a Ferric Sulphate Solution or Diesel Fuel Leak or spill. Refer to the MSDS attached for Precautions, appropriate PPE, First Aid, Health Hazards and Accidental Release measures when responding to a leak or spill.

In the event of a Diesel spill refer to the Power and Water Hydrocarbon Spill Response Work Instruction for containment procedure. Refer Appendix C.

7. ALARM INITIATION

The Chlorine alarm system at Ludmilla Wastewater Treatment Plant has one mode of operation:

An automatic alarm is sent via mobile phone to the Ludmilla on call operator (chlorine leak alarm). The operator then responds in accordance with Power and Water's Chlorine Leak Response Work Instruction.

If the leak is 5ppm or greater, then an alarm is also notifies the Northern Territory Fire and Emergency Services, who respond accordingly.

If a Power and Water employee or contractor detects a chemical leak, spill, or fire they must contact the Water Services Senior Service Coordinator, Power and Water Corporation's Hudson Creek System Control Centre Emergency Number on **8947 7015** and / or NT Fire and Rescue Service on 000 depending whether it's a containable or Non-Containable Leak

7.1 Chlorine Leak Detection

The chlorine building is equipped with several chlorine leak detectors that initiate various control and alarm actions in the event of a chlorine gas leak.

Visual alarms are raised via SCADA in the Control Room,

Local audible and visual (red flashing lights) alarms on the exterior of the chlorine building.

An automatic alarm is also sent via mobile phone to the Ludmilla on call operator (chlorine leak alarm). If the leak is 5ppm or greater, then an alarm is also notifies the Northern Territory Fire and Emergency Services, who respond accordingly.

Chlorine leak alarms activate the automatic shut off valves that are connected to both the duty and standby 920kg drums.

The chlorine gas leak detectors are physically tested on a weekly basis, while serviced/calibrated annually. The chlorine leak detectors also have a local indication of any fault condition within the detector.

In addition, operations personnel may detect a containable chlorine gas leak by the use of a 5% ammonia solution in a puffer bottle which gives a visual indication when combined with chlorine gas (white smoke).

If a non-containable chlorine leak is detected, it must be reported immediately to the Incident Manager who will assess the situation and direct the appropriate action.

8. NOTIFICATION OF AUTHORITIES

8.1 Procedure for Contacting & Briefing Emergency Services

The Incident Manager on site shall act in accordance with the flow chart on page 5:

If the person on site who discovers the leak decides that the leak is non-containable, evacuate and ring the NTFRS on **000** and then Hudson Creek SCC on **8947 7015**. If no person is on site, an alarm will be raised automatically which will advise the emergency services.

PART B: INCIDENT MANAGEMENT REQUIREMENTS

9. EMERGENCY RESPONSE AND CONTROL

9.1 Responsibilities

The service coordinator managing the site at the time of the incident is deemed the Incident Manager and must provide emergency services with technical support and assistance.

This person is responsible for liaison with all emergency services attending the emergency but not for media liaison which will be referred to Corporate Communications/ Regional manager in all instances.

Police have the responsibility for overall control and coordination of the emergency.

NT Fire & Rescue Service personnel are the lead Combat Authority and are responsible for the management of the situation, fire fighting, rescue and control of the chemical emergency.

Supplier's emergency crews (Orica) if required are trained to deal with major chlorine emergencies and carry specialised capping equipment. However, these crews are not stationed in the NT and would therefore only be available for major incidents – after transport from interstate. However, 24 hour a day specialist emergency advise is available from Power and Water's Supplier, Orica by calling the **Orica Emergency Response on 1800 033 111.**

9.2 Containment and Controlled Venting of Chlorine (NTFRS Action Only)

9.3 Spillage of Liquid Chlorine (NTFRS Action Only)

10. NOTIFICATION OF NEIGHBOURS (NTFRS ACTION ONLY)

11. EVACUATION OF LUDMILLA WASTEWATER TREATMENT PLANT

11.1 On-Site

In the event of an evacuation being ordered all on-site personnel shall move immediately to the designated emergency assembly area. There are two emergency evacuation areas at the Ludmilla Wastewater Treatment facility (Section 6.2 site plan) the incident manager will direct people at the plant as to what site is best to use – generally head up wind of the chlorine leak plume.

In the event of an evacuation, the Incident Manager will coordinate the following actions (where possible):

- Clearly indicate which emergency assembly area is to be used.
- If possible, check the site visitors log book and take to the emergency area.
- Ensure that all personnel are accounted for.
- Coordinate all further actions as necessary.

11.2 Off-Site (NTFRS Action Only)

12. FACILITY OPERATIONS CENTRE

In the event of an emergency, the Emergency Operations Centre (EOC) shall be the Water Services Ben Hammond complex, Iliffe Street Stuart Park located away from the Ludmilla Wastewater Treatment Plant.

12.1 Description

The EOC is approximately ten minutes from the Ludmilla Wastewater Treatment Plant and shall provide the following equipment, which shall be stored and in good working order at all times:

- Telephones.
- Facsimile capacity.
- A copy of this ERP.
- A3 size As-Constructed drawings.

The Senior Service Coordinator is responsible for up-keep of the EOC.

- Emergency lighting/power.
- Whiteboards.
- Incident management forms.
- Plan tables.
- Asset Management Plan.

13. CORPORATE COMMUNICATIONS

In the event of an incident or emergency, all discussions with the media or general public shall be handled by the Power and Water Corporation's corporate public relations/media group.

Other Power and Water personnel approached by the media or general public shall refer them to Power and Water's corporate public relations/media personnel and shall decline to comment or answer any questions themselves.

14. INCIDENT INVESTIGATION

An incident investigation shall be carried out and logged in the GRACE database, in accordance with Power and Water procedures.

15. TERMINATION OF EMERGENCY AND DEBRIEF

15.1 Termination of the Emergency

Police and NT Fire & Rescue personnel will determine when the emergency will terminate.

15.2 Notification of Cessation of Emergency

This termination of the emergency must be notified to Hudson Creek System Control and emergency operations centre immediately after the decision to terminate has been made.

15.3 Debrief of Emergency Services Personnel and Report to Power and Water Corporation

In accordance with PWC standard procedures as identified on the PWC procedures database.

16. TRAINING, EXERCISES AND REVIEW

16.1 Training

The training of personnel to deal with emergency situations is the responsibility of the General Manager Water Services (GMWS) and in the case of the Ludmilla WTP and this plan. The following items have been delegated by the GMWS to Senior Service Coordinator Ludmilla:

- The fitting and use of personal protective equipment – six monthly.
- The method of and use of materials of, absorbing spilled substances that may be required to be used in the emergency situations – yearly.
- Safety and first aid – as required.
- The set up and use of chlorine drum capping equipment – yearly.

16.2 Exercises

Exercises will be undertaken at the following frequency as determined by the Water Services Operations Manager Darwin

Exercise	Parties Involved	Frequency
Chlorine Gas Leak Response	PWC operators	Yearly
Ferris Sulphate solution and Diesel Leak response	PWC operators	Yearly
Training emergency capping equipment chlorine	PWC operators, NTFRS	Yearly
Training breathing apparatus use	PWC operators	Yearly

16.3 Assessment

At the completion of each and every training session and exercise, provision shall be made to assess the effectiveness of the plan and the performance of the personnel by the registered training provider.

16.4 Review of Plan

Review of the plan effectiveness shall be the responsibility of the Senior Service Coordinator Ludmilla Wastewater Treatment Plant and OH and S representative who shall report to the GMWS on that review. This shall be performed every two years or earlier where a need is indicated by:

- Changes to substances stored, or knowledge of the hazards.
- Changes to procedures or operations which affect hazards
- Observations through training, exercises or actual experience.
- Assessment of asset condition.

DISTRIBUTION LIST

The location of all copies of this plan and the officer responsible for each copy is identified in the following table.

Copy No.	Location	Officer Responsible
1	NT Fire Emergency Services (NTFES)	
2	General Manager Water Services	
3	Manager Water Operations Darwin	
4	Health & Safety Specialist Water Services	
5	Senior Service Coordinator LWWTP	
6	Ludmilla Wastewater Treatment Plant	
7	Ludmilla Wastewater Treatment main gate	

APPENDIX A: NOTIFYING EMERGENCY SERVICES – CHEMICAL LEAK/SPILL OR FIRE ASSESSMENT QUESTIONNAIRE

When notifying Emergency Services of an Incident, completion of this questionnaire may assist the incident management process. Use this questionnaire while following the procedures in Section 8 "Notifying Authorities".

CHEMICAL LEAK/SPILL OR FIRE ASSESSMENT QUESTIONNAIRE INFORMATION REQUIRED	
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.**	
Details of any injury.	
Address of installation/location of incident (nearest intersection if known)	Ludmilla WWTP
Will someone direct emergency personnel to site?	Yes/No
Where will this person be?	At the muster point at Ludmilla WWTP
If possible estimated amount and rate of release of contents?	
Is transport or an installation involved?	Transport Installation
Type of container involved? e.g. tank etc.	Tank 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? If so provide notes.	 YES NO YES NO YES NO YES NO YES NO YES NO Dry Wet Storm
i) What other assistance is required?	
What facilities are available on site?	Water Power Lights Gantry Crane Other -

APPENDIX B: MATERIAL SAFETY DATA SHEETS ATTACHED

1. Chlorine Gas (Liquid gas)
2. Ferric Sulphate 45% Solution
3. Diesel Fuel
4. QuickLime

APPENDIX C: WATER SERVICE PROCEDURES LINKS

1. Chlorine Leak Response work instruction
2. Chlorine Drums Emergency Capping
3. Hydrocarbon spill Response work instruction
4. PPE for working with Lime