

# Network Standard

Document No.

**NS190**

Title:

**Oil Containment Operational Requirements for Major Substations**

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## Table of Contents

Scope .....	3
Reference Documents .....	3
Ausgrid Documents.....	3
Other Standards and Documents .....	3
Acts and Regulations .....	3
1 General .....	4
2 Environmental requirements.....	4
3 Operational performance requirements.....	4
4 Sampling requirements .....	5
5 Bunds – Operational requirements .....	5
6 Pits and flame traps – Operational requirements .....	6
7 Pipes – Operational requirements .....	8
8 Oil containment tank – Operational requirements .....	10
9 Other structures – Operational requirements .....	13
10 Parallel plate separators (PPS) – Operational requirements .....	14
11 Completion of site works.....	15
12 Maintenance frequency .....	15
13 Refurbishment and replacement .....	16

### List of Annexures

Annexure A : Oil Containment System Operation and Maintenance Responsibilities .....	A-1
Annexure B : Oil-Water Separator Sampling Requirements .....	B-1
Annexure C : Determining Sludge and Oil Depths .....	C-1

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## Scope

This Network Standard details the requirements for the operation of oil containment systems at major substations.

The primary objectives of this document are to:

- ensure a consistent approach for the management of oil containment systems; and
- provide clear instructions on the operational requirements for oil containment systems.

This standard does not include requirements for pole top transformers & capacitors, distribution & customer substations, regulators, tap changer auto transformer substations, reclosers or oil filled cables and its associated pressure vessels.

Oil containment operational activities include inspection of oil depths, sludge depth and stormwater discharge concentrations, cleaning and waste removal.

This standard applies to all persons including Ausgrid, contractors, sub-contractors and associates.

Requirements for the design of oil containment at major substations are outlined in NS189.

## Reference Documents

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards.

## Ausgrid Documents

- NS001 Glossary of Terms
- Electricity Network Safety Management System Manual
- NS174 Environmental Procedures
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS189 Oil Containment for Major Substations
- NS212 Integrated Support Requirements for Ausgrid Network Assets
- Public Electrical Safety Awareness Plan
- EG 100: Oil Handling
- EGN 101: Oil spill containment and clean up guide

## Other Standards and Documents

- AS 2865 Confined Spaces
- AS/NZS 3500 Plumbing and Drainage (Series)
- ENA Doc 001-2019 National Electricity Network Safety Code

## Acts and Regulations

- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014
- Environmentally Hazardous Chemicals Act 1985
- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (General) Regulation 1998
- Protection of the Environment Operations (Waste) Regulation 1996
- Work Health and Safety Act 2011
- Work health and Safety Regulation 2017

## Clause Standard Requirements

### 1 General

#### 1.1 Network Technical Maintenance Plans

1.1.1 Ausgrid's Network Technical Maintenance Plans (NTMPs) include Maintenance Standards for the various types of oil containment systems in operation. These NTMPs provide a detailed description of the required maintenance activities and the frequency of inspection for oil containment facilities.

1.1.2 All current NTMPs and Maintenance Standards shall be implemented as required as part of the operational requirements of this standard.

#### 1.2 Confined spaces

1.2.1 All work in confined spaces shall be undertaken in accordance with the Work, Health and Safety (WHS) Act and Regulation and with AS 2865 Confined Spaces.

1.2.2 Enclosed tanks are confined spaces and shall have appropriate signage at entry points, entry permits, standby personnel, gas detectors, training and rescue/escape procedures in accordance with AS 2865 and WHS Regulation.

1.2.3 All personnel entering enclosed tanks shall climb attached and use the appropriate fall arrest protection.

### 2 Environmental requirements

NS174 Environmental Procedures shall be referenced for environmental issues including the handling, storing, transporting and disposing of oil, waste and other materials in accordance with legislative requirements.

### 3 Operational performance requirements

3.1 The relevant performance requirements that are applicable to Ausgrid's oil containment systems are listed in Table 1.

**Table 1: Operational performance requirements**

Item	Criteria
<b>Total Suspended Solids (TSS)</b>	50 ppm
<b>Total Petroleum Recoverable Hydrocarbons (TRH)</b>	Oil containment tanks – 10 ppm under normal flow as defined in NS 189 Oil Containment for Major Substations.
	PPS – 10 ppm
<b>pH</b>	6.5 – 8.5
<b>Turbidity</b>	50 NTU
<b>Silica Gel Test</b>	Used to determine the quantity of free oil in a test sample. Use only; <ul style="list-style-type: none"> <li>on sites that have evidence of significant oil leakage, OR</li> <li>where a TRH test sample of &gt;10 ppm is obtained.</li> </ul>

## 4 Sampling requirements

- 4.1 Oil containment systems shall be sampled periodically to ensure proper functioning of the equipment and compliance with the operational performance criteria.
- 4.2 The sampling procedures are outlined in Annexure B. Refer to the Network Technical Maintenance Plans for further details.

## 5 Bunds – Operational requirements

### 5.1 General

- 5.1.1 Bunds shall remain structurally stable, free of litter, debris, sediment and pooled water or oil. Bunded areas shall not be used for equipment storage.
- 5.1.2 Operational works shall include:
- Remove any debris, sediment and rubbish from the sumps, grates and surface of the bunded area;
  - Ensure drainage paths are free flowing;
  - Inspect brickwork, blockwork or concrete structural integrity, including joint condition. Check for cracking along mortar joints in brick or blockwork walls;
  - Inspect the condition of joint seals in bund floor and walls. Check those areas where exposure to significant oil leakage occurs;
  - Apply surface water across joint seals in bund areas to retain hydrophilic properties. Undertaken only during periods of extended dry weather, and as part of routine maintenance activities;
  - Inspect all internal GATIC covers located below the bund area overflow level. Apply GATIC sealing compound in accordance with the manufacturer's requirements to ensure watertightness. Undertaken at annual intervals, as part of routine maintenance activities; and
  - If bund is not drained to an oil containment system, ensure that drainage valves are locked shut.



**Figure 1: Typical Oil Containment Bund**

### 5.2 Gravel

Gravel within transformer bunds shall be maintained so the bunds remain free draining. Refer to Annexure A.



**Figure 2: Oil Containment Bund with Gravel**

## **6 Pits and flame traps – Operational requirements**

### **6.1 General**

6.1.1 Pits that form part of an oil containment system include sludge pits, valve pits and junction pits.

6.1.2 All pits and flame traps shall remain structurally stable, free of litter, debris, sediment and accumulated oil and shall not have any leaks. Pits shall be inspected regularly to ensure these requirements are satisfied.

### **6.2 Operational maintenance items**

6.2.1 The following operational maintenance items shall be carried out in accordance with the frequency of inspections detailed in Section 12:

- Remove any build-up of material such as leaves and dirt from around pit lids;
- Ensure grates are clear of debris;
- Remove all sediment, floating oil, litter, etc. as required;
- Classify and dispose of wastes; and
- Ensure pits and flame traps are free draining after maintenance works. This may require running water to prove the system is flowing freely.

6.2.2 Where excessive sediment and debris have been identified, an assessment of the on-site and off-site factors that contribute to the condition of the drainage system shall be undertaken (e.g. overhanging trees, open pits, sandy soils etc.). Where external issues may be affecting the efficient operation of the oil containment system, advice shall be sought from the designer. Refer to Annexure A.

6.2.3 Replace or repair any damaged pit covers, grease and position all pit covers level with the surrounding ground. New replacement pits shall be designed in accordance with NS189.

### **6.3 Periodic inspection items**

6.3.1 In addition to the normal operational maintenance items in Clause 6.2, the following periodic inspection checks shall be completed to ensure that pits and flame traps are operating as intended, and to minimise the risk of pollution:

- 1) **Check for structural integrity** – Inspect for any cracks or deformed walls of the pit, noting that damaged pits can be more prevalent in trafficable areas. In addition, check visually for the following aspects:

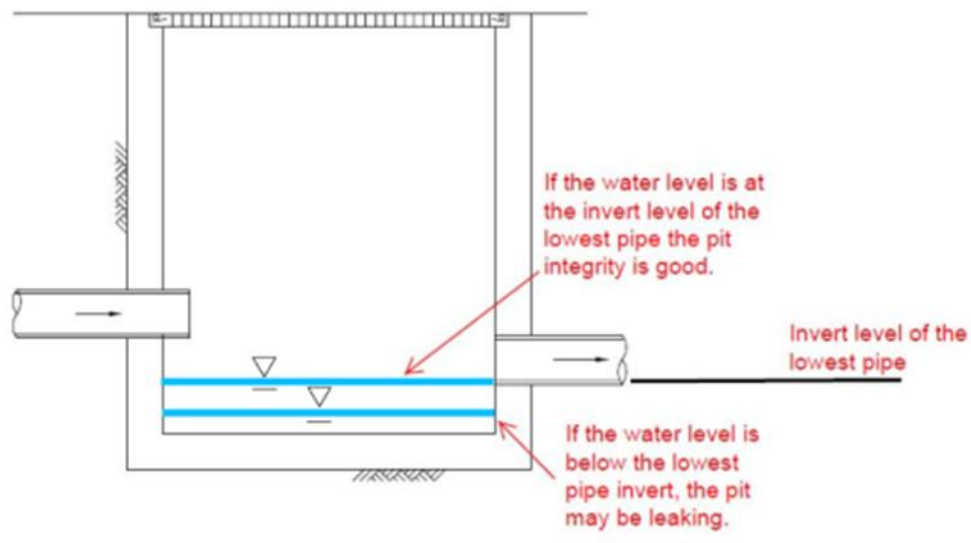
- a) Overall condition of the pit, pit covers, ladders, steps or step irons, noting any corrosion or other defects; and
  - b) Any surface depressions around the pit (may be difficult to detect when surrounded by concrete).
- 2) **Check for hydraulic integrity** – Inspect the water level within the pit (Figure 3) or flame trap (Figure 4) and maintain at the level of the invert (bottom) of the lower outlet pipe. For flame traps, the bottom of the down-turned pipe shall be always submerged, as shown in Figure 5:
- a) Where the water level has dropped below this level the pit may be damaged;
  - b) Fill the pit or flame trap to the pipe invert and check for a drop in level over a two-hour period.

In addition, inspect the pits and flame traps specifically for:

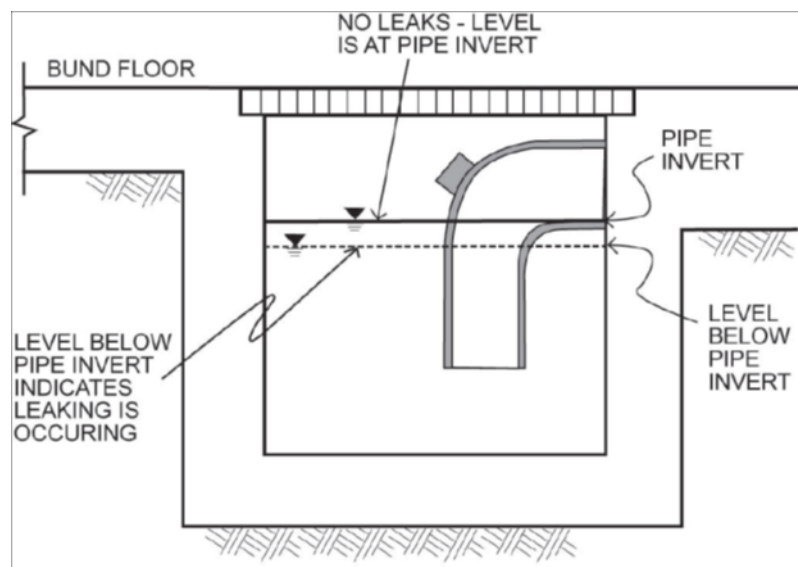
- a) Cracks around pipe entry points, joints and corners;
- b) Malformed pits;
- c) Presence of tree roots; and
- d) Inadequate rendering and mortar seals.

Where required, pressure tests can be used to check the integrity of the pit.

- 6.3.2 Where defects are identified in pits or flame traps, or where a drop in water level has been observed, advice shall be sought from the designer on the specific controls required. Refer to Annexure A.



**Figure 3: Pit Standard Operating Depth**



**Figure 4: Typical Flame Trap Cross Section**



**Figure 5: Typical Flame Trap (grate removed for photo)**

## **7 Pipes – Operational requirements**

### **7.1 General**

All pipes shall remain structurally stable, have hydraulic integrity, be free flowing and free of litter and debris.

### **7.2 Buried pipes**

7.2.1 Inspect for localised ground settlement and differential settlement in the vicinity of the oil containment drainage lines, excessive sediment in the oil containment tank or pits, and low water flows to the oil containment tank. These items all indicate the potential for buried pipes to be damaged.

7.2.2 Conduct routine inspections to minimise the potential risk of oil loss into the environment. The following inspection checks shall be undertaken:

- 1) Walk along the pipe route and look for surface irregularities such as holes or uneven surfaces. This may indicate underground soil erosion.
- 2) Look at other structures on the site to ascertain whether there are any ground movement issues which may warrant further investigation. Check for:
  - a) Leaning lightning masts;
  - b) Sunken slabs;
  - c) Uneven concrete paving; and
  - d) Off-level yard equipment including transformer bases.
- 3) Check for signs of soil in pits. This may be a sign that soil is entering the system through broken pipes.

7.2.3 Where pipe or other defects are identified on site, advice shall be sought from the designer on the specific controls required. In this situation, water flow checks, camera inspections or pressure tests may be required. Refer to Clause 7.4.

### 7.3 Exposed pipes in trenches

Exposed pipes laid in open trenches are designed to minimise the risks of oil loss into the soil. The routine inspection and maintenance requirements for these designs are reduced, and shall include:

- 1) Walk along the pipe route and check for any oil staining or corrosion; and
- 2) Replace any damaged pipe sections.

### 7.4 Pipe tests

#### 7.4.1 CCTV camera inspection

Pipeline CCTV cameras can be used to determine the condition of drainage lines. Camera inspections can identify cracking within the pipes, movement of joints and areas of debris accumulation. It may be necessary to undertake jet flushing prior to camera tests to allow the camera to pass through the drainage system.

#### 7.4.2 Pressure tests

Pressure testing may need to be carried out and shall be in accordance with AS/NZS 3500 Plumbing and Drainage (Series).

#### 7.4.3 Excavation

Excavating the drainage line will reveal any damage to pipework. Excavation is a last resort and shall only be used where all other options have been exercised.

### 7.5 Broken/faulty drainage pipes

The designer shall be notified for an assessment prior to the repair or replacement of broken pipes. All works shall meet the requirements of NS189.

### 7.6 Blocked drainage pipes

7.6.1 High-pressure water jets or rods can be used to flush blocked drainage pipes. All relevant safety precautions shall be addressed when undertaking this work and waste materials shall be disposed of appropriately.

7.6.2 All debris and sediment shall be removed from the oil containment tank on completion of pipe cleaning work.

7.6.3 Repeatedly blocked drainage pipes shall be further assessed for possible replacement. Small pipes (<100mm diameter), where there is a high amount of deleterious material entering the system, are more prone to blockages.

## 8 Oil containment tank – Operational requirements

### 8.1 General

8.1.1 All oil containment tanks shall be free flowing and contain minimal oil and sludge.

8.1.2 Enhanced Gravity Oil and Water Separator (EGOWS) tanks are designed to hold back, or restrict, the discharge flow within the system. Hence, these units may initially appear to be not free flowing.

8.1.3 Operational works shall include:

- Inspect and measure oil and sludge depths;
- Inspect for blocked outlets, low water levels and oil within the outlet chamber;
- Where required remove any oil and sludge; and
- Clean and grease all access covers to ensure they do not seize in place before the next inspection.

8.1.4 Annexure A provides details of the operating and maintenance responsibilities for the oil containment tanks.

8.1.5 The requirements for determining oil and sludge depths within oil containment tanks are included in Annexure C.

### 8.2 Oil removal

8.2.1 Accumulated oil shall be removed from the oil containment tank when oil volumes exceed the relevant criteria given in Table 2.

8.2.2 The oil removal requirements shall be dependent on the type of oil containment tank as detailed in Table 2 below.

**Table 2: Oil removal requirements**

Tank Type	Oil Removal Requirements
Enhanced Gravity Oil Water Separator (EGOWS)	Accumulated oil shall be removed from the main chamber: <ul style="list-style-type: none"> <li>• when the oil depth exceeds 60mm, or</li> <li>• when the oil depth exceeds 30mm, and historical records indicate that it will exceed 60mm at the next scheduled service, or</li> <li>• when the oil depth exceeds 30mm, and there are no reliable historical records available.</li> </ul> One removal point between the stainless steel baffles and end weir wall.
3 Stage	Accumulated oil shall be removed from all chambers: <ul style="list-style-type: none"> <li>• at planned inspections, and</li> <li>• when the oil depth exceeds 10mm in any chamber.</li> </ul> Three removal points, one within each of the three chambers.
2 Stage	Accumulated oil shall be removed from all chambers: <ul style="list-style-type: none"> <li>• at planned inspections, and</li> <li>• when the oil depth exceeds 10mm in any chamber.</li> </ul> Two removal points, one within each of the two chambers.
1 Stage	Accumulated oil shall be removed: <ul style="list-style-type: none"> <li>• at planned inspections, and</li> <li>• when the oil depth exceeds 10mm in the chamber.</li> </ul> One removal point within the tank
Holding Tanks and Intermediate Tanks	Accumulated oil and sludge shall be removed: <ul style="list-style-type: none"> <li>• at planned inspections.</li> </ul>

	One removal point within the tank
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### 8.3 Sludge and sediment removal

8.3.1 Where sludge removal is required, the sludge can be removed by mixing the contents of the oil containment tank and removing the entire contents of the tank as liquid waste. Alternatively, the sludge can be removed manually after the oil and water components within the tank are removed.

8.3.2 For all oil containment tank types, the sludge and sediment shall be removed as soon as its average depth exceeds 75mm in the tank. The sludge and sediment removal points are the same as those indicated for oil in Table 2.

### 8.4 Blocked outlet pipe

8.4.1 Where an oil containment tank has a blocked outlet pipe, the sludge or sediment at the base of the oil containment tank may be blocking the pipe entrance. Measure the sludge or sediment depths using a Sludge Judge (Refer to Annexure C).

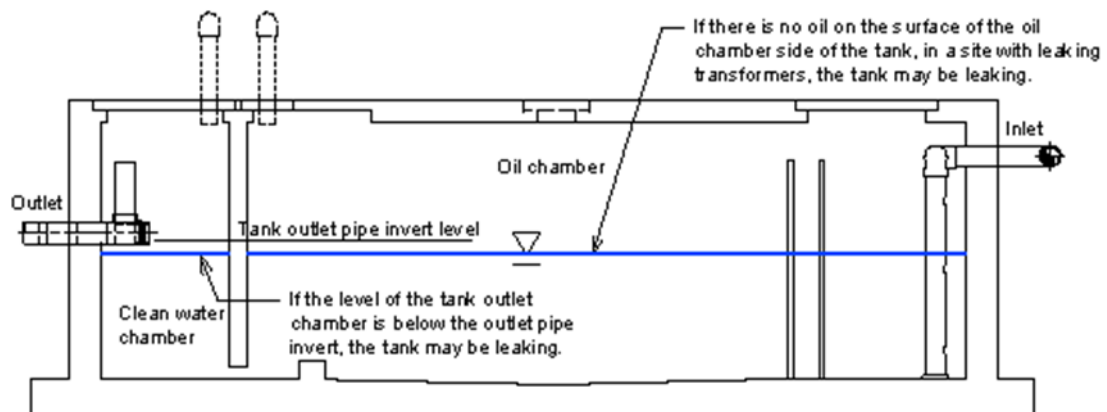
8.4.2 Where an inspection demonstrates that the outlet is blocked, the designer shall be notified prior to removal of the sludge or sediment within the tank.

8.4.3 A blocked outlet pipe may lead to oil being discharged through the tank access covers.

### 8.5 Low water level

8.5.1 Where it is found that the operating level of an oil containment tank is below the invert of the outlet pipe, the tank may have been recently pumped out, or otherwise the tank may be damaged.

8.5.2 Where maintenance records indicate that the tank has not recently been pumped out, the tank shall be filled with water to a nominated level and monitored over a 2-week period. Any decrease in water level will indicate structural damage within the tank. Refer to Figure 6.



**Figure 6: Oil Containment Tank - Low Water Level**

8.5.3 The designer shall be notified prior to pumping out the tank or arranging to undertake a structural inspection.

8.5.4 Oil containment tanks may be fitted with an internal gauge that identifies the tank's steady state level when there is no flow. Where the operating level falls below the minimum gauge height, further investigation is required, and advice shall be sought from the designer.

### 8.6 Oil in the outlet chamber

8.6.1 Where oil is found in the end chamber of a three-stage tank or an EGOWS, the end baffle may be damaged, or the oil storage capacity of the tank has been exceeded. The following steps shall be carried out:

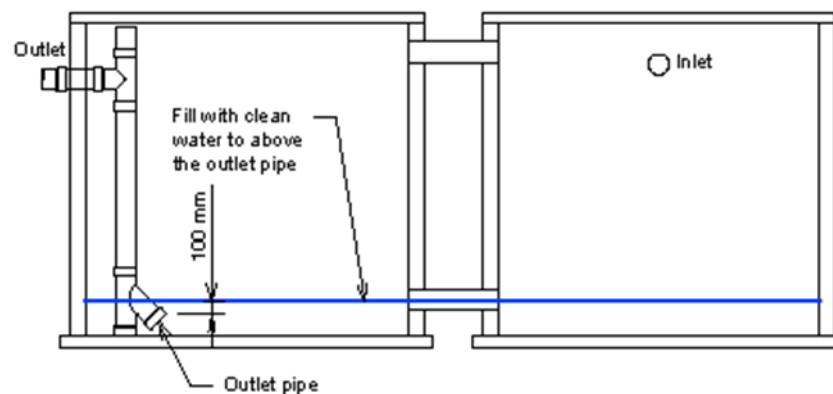
- Determine oil depth within the middle chamber; and
- Report oil depth within the oil containment tank and obtain advice from the designer.

8.6.2 Any oil observed in the outlet chamber of an EGOWS shall be reported to Environmental Services. For other types of oil tanks, a visible oil sheen at the outlet point is not unusual, but more significant oil discharges shall be reported.

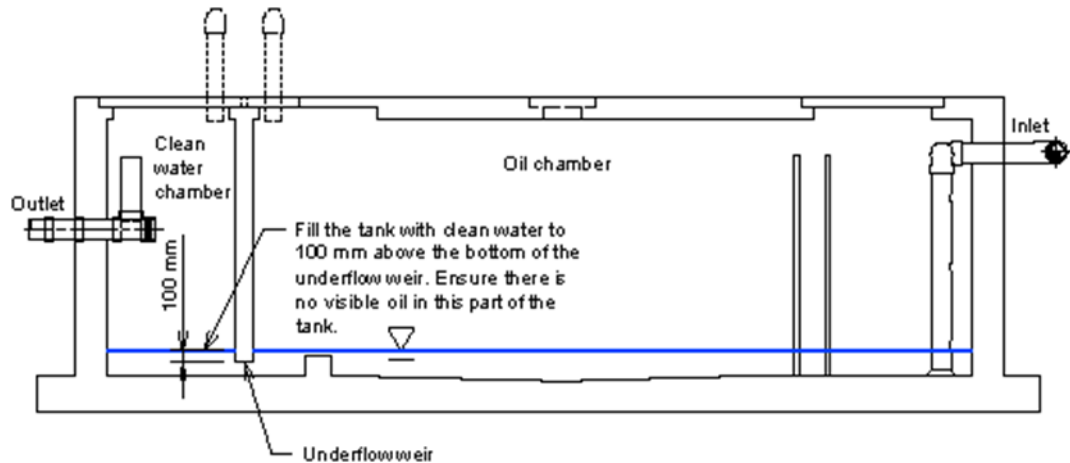
### 8.7 Removal of entire contents of tank

Following an incident, a major oil spill, or when requested by the designer or by Environmental Services, the following steps shall be carried out when emptying the contents of an oil containment tank.

- Open all tank covers, allow ventilation and make safe;
- Implement confined space procedures;
- Remove the contents of the tank. Wherever possible, the volume of waste shall be minimised by segregating wastes. Ensure the water level is recharged in accordance with operating procedures for the facility;
- The entire contents of the tank shall be appropriately waste classified, transported and disposed of by appropriately licensed contractors;
- When required, manually clean the inside of the tank, removing all sediment and oil absorbed to the tank walls and floors. Ensure that the sediment/sludge/oil removed from the tank associated with tank cleaning are disposed of in the appropriate manner;
- Where required, check for clogging and clean the internal structures associated with the oil containment tank. These may include inlet pipes, outlet pipes, siphon and baffles. Refer to site specific drawings for details;
- Check for cracks and other defects when tank walls are clean;
- Ensure that all internal structures such as baffles and siphons are securely fixed; and
- In all tank types, ensure the water level is 100mm above the level of the bottom of the outlet pipe, or 100mm above the level of the underflow weir, as illustrated by Figures 7 and 8.



**Figure 7: Minimum Oil Containment Tank Operating Depth (Typical)**



**Figure 8: Minimum EGOWS Tank Operating Depth**

## 9 Other structures – Operational requirements

### 9.1 Cable pits and cable trenches

At some locations, these structures drain to the oil containment system. Where required, check for silt, leaf litter, rubbish and debris that may be blocking the outlets.

### 9.2 Valves

#### 9.2.1 Typical valves

Ausgrid oil containment systems can contain reflux, butterfly or knife gate valves. Refer to the manufacturer's manuals for specific details on these items. Figure 9 shows typical valves in-situ.



**Figure 9: Butterfly, Knife Gate and Reflux Valves (left to right)**

#### 9.2.2 Reflux, non-return or flap valve

Inspect to ensure that sediment or debris is not restricting the operation of the flap. Ensure that flap can be easily moved and has not seized shut or open. Check for any damage on the flap itself.

### 9.2.3 Butterfly valves

Butterfly valves are housed within a sealed unit and inspection and maintenance shall be in accordance with the manufacturer's manuals. Operation of the valve shall be able to be undertaken manually. Check that the valve can be easily opened or closed. Water shall not be able to pass through the valve in the closed position.

### 9.2.4 Knife gate valve

Inspect to ensure that sediment or debris is not restricting the operation of the valve. Ensure that the valve can be easily moved and has not seized shut or open. Check for any damage on the valve itself. Water shall not be able to pass through the valve in the closed position.

## 9.3 Sediment traps and gas seals

9.3.1 Inspect sediment levels and water levels within the structures to ensure adequate operation of the system. Sediment traps and gas seals are installed where direct connections have been made to Sydney Water or Hunter Water drainage channels or sewer.

9.3.2 These structures are typically precast units. Refer to as-built drawings for documentation of the system installed. Refer to the manufacturer's manuals for specific details on these items.

## 10 Parallel plate separators (PPS) – Operational requirements

### 10.1 General

10.1.1 Ausgrid's Parallel Plate Separators (PPS) are typically installed as shown in Figure 10. Refer to the manufacturer's manuals for specific operating details.

10.1.2 NS189 requires that PPS units are correctly installed and fully commissioned on site.

10.1.3 NS189 also outlines the requirements for the effective handover of the PPS equipment to ensure the unit has been correctly installed prior to acceptance.

10.1.4 Annexure A provides details of the operating and maintenance responsibilities for the PPS systems.

### 10.2 Maintenance

Following the warranty period, the required frequency of maintenance for these PPS units shall be as detailed in Section 12.



**Figure 10: Typical Parallel Plate Separator**

## 11 Completion of site works

### 11.1 General

At completion of the oil containment system site inspection / maintenance works, the following activities shall be undertaken:

- Ensure all valves and float switches are returned to the operating position;
- Check all pumps are ready for operation; and
- Ensure all appropriate alarms are in service.

### 11.2 Use of surfactants

The use of surfactants during maintenance tasks will adversely impact oil and water separation systems. Where surfactants have been used, the entire contents of the oil containment system shall be emptied, and the system recharged with clean water to ensure the operational performance criteria can be achieved.

## 12 Maintenance frequency

### 12.1 General

12.1.1 The Ausgrid maintenance procedures and inspection frequencies for the various oil containment / separation systems are outlined in detail in the relevant Network Technical Maintenance Plans (NTMPs). Refer also to Clause 1.1.

12.1.2 The requirements for inspection and maintenance for of the various types of oil containment systems and their components is summarised in Table 3 below.

12.1.3 The Default Maintenance Periods in Table 3 shall be applicable after the conclusion of the manufacturer's warranty period.

12.1.4 The frequency of maintenance for oil containment / separation systems may increase due to site specific conditions, age, oil leakage and climatic factors. Ausgrid's Aqueous Waste Services shall be advised of all site locations which may require a higher level of maintenance.

12.1.5 Sites with significant oil leakage rates shall be identified and reported to ensure that the level and frequency of maintenance tasks are adequate for the correct operation of oil containment / separation systems.

**Table 3: Oil containment system maintenance frequency**

Oil Separator Type or Component	Default Maintenance Period	Comments
Parallel Plate Separators	Refer to NTMP	Typically, every three (3) months Refer to Clause 12.3
Oil Containment Tanks (1, 2, and 3 Stage and EGOWS)	Routine Refer to NTMP	Typically, every (1) year Accumulation of excessive oil, sludge and sediment may require more frequent maintenance. Refer to Section 8
	Safety / Structural As per NTMP and/or when defects are identified.	Typically, every five (5) years Clean, inspect and report where tank defects are identified. Refer to Section 8
Holding Tanks and Intermediate Tanks	Refer to NTMP	Typically, every (1) year
Pits and Flame Traps	Refer to NTMP	Typically, every (1) year Refer to Section 6

Pipes	Cleaning / Integrity As per NTMP and/or when defects are identified.	Typically, every five (5) years CCTV inspection where pipe defects are identified. Target a minimum of 3 CCTV inspections per year across the network. Project works on site for repair / upgrade shall allow for pipe inspections as part of project scope. Refer to Section 7
Valves	As per NTMP and/or when defects are identified.	Typically, every (1) year Check operation and lubricate as required.

## 12.2 Oil containment tanks

12.2.1 Oil containment tanks shall be inspected periodically for safety, serviceability and durability. Inspections shall occur as per the NTMP and/or when defects are identified as indicated in Table 3.

12.2.2 Records and results of inspections shall be provided to the designer for review.

## 12.3 Parallel plate separators (PPS)

12.3.1 Parallel Plate Separators (PPS) units are designed for a specific flow rate over a defined period of time, after which, the discharge is less likely to be compliant.

12.3.2 The maintenance period in Table 3 is defined by the need to maintain discharge compliance with the criteria of free of visible oils and grease (i.e. 10 ppm).

12.3.3 Adjustments to the maintenance frequency shall require robust sampling and testing for each site. These adjustments may result in reduced maintenance for some sites where the work rate of a PPS is minimal. At other sites where oil leakage is significant, more frequent maintenance will be required.

12.3.4 PPS units that are repeatedly faulty, such as the waste oil tank filling frequently with water, shall be referred to the manufacturer and/or the designer for review of the PPS installation.

## 12.4 Bunds, pits, flame traps and pipes

12.4.1 The cleaning of bunds, pits, flame traps and pipes shall use a high-pressure cleaner (e.g. Gernie 15A) where this is required in order to be effective. Oil-water that becomes emulsified as a result of high-pressure cleaning may require collection for off-site disposal.

12.4.2 Bunds, pits and flame traps shall be cleaned free of oil and sludge and other deleterious materials. Pits and flame traps shall be re-charged with water on completion. Float switches shall be checked to ensure correct operation.

## 13 Refurbishment and replacement

### 13.1 Parallel plate separator (PPS)

13.1.1 A Parallel Plate Separator (PPS) shall be deemed to have reached the end of its serviceable life when:

- the unit has faults which may cause harm to personnel;
- the unit is significantly corroded;
- the unit can no longer be cost-effectively maintained;
- the unit cannot be made to comply with environmental discharge limits; or
- there is significant leakage (e.g. a continuous stream) from the body of the unit which cannot be locally repaired (pipe connections should be adjusted or repaired to stop leaks).

13.1.2 The appearance of rust on welds or panels is not sufficient justification for replacement, unless one of the above conditions also applies.

- 
- 13.1.3 A PPS system shall be considered as serviceable if the discharge oil concentration can be maintained within the specified performance criteria, and the unit is able to operate automatically as originally intended.
- 13.1.4 The designer shall be notified whenever the replacement of a PPS unit is proposed.
- 13.2 [Oil containment tank](#)
- 13.2.1 Oil containment tanks that routinely have water levels below the outlet invert may be leaking and will require further investigation. Remedial works may be necessary to prevent further leaks.
- 13.2.2 The designer and Environmental Services shall be notified of any instances where the oil containment tank level is below the outlet invert level.
- 13.3 [Gravity pipework](#)
- 13.3.1 Buried pipes
- 13.3.1.1 Any buried pipe that is identified as cracked or damaged (e.g. by CCTV investigations) shall be referred to the designer for assessment prior to repair or replacement.
- 13.3.1.2 Buried pipes shall be inspected as per the NTMP and/or when pipe damage is suspected as indicated in Table 3. Surveys of pipework shall use CCTV or other suitable methods.
- 13.3.2 Exposed pipes
- Pipes that are exposed (e.g. in an open pipe trench) do not require regular internal investigations. Any sections of pipe that are leaking shall be repaired or replaced, and the designer notified of the defects. Leaking pipe joints shall be adjusted, or the Nitrile rubber seals replaced.

## Annexure A: Oil Containment System Operation and Maintenance Responsibilities

### A1 Introduction

- A1.1 The design, installation and operation of a compliant oil containment system requires the timely input of various Ausgrid design, environmental, procurement, construction and operational personnel in order to achieve a satisfactory outcome.
- A1.2 Table A1 outlines the key roles and responsibilities within Ausgrid during the design, operation and maintenance phases.

### A2 Key O&M responsibilities

#### A2.1 PPS and oil containment tank systems

The key roles and responsibilities within Ausgrid for the oil containment system are as follows:

- The design and installation responsibilities are as identified in NS189;
- The oil containment system shall be fully commissioned on site with a minimum 12-month defects liability period to ensure effective long-term operation of the system;
- The operation and maintenance activities for flame traps, pipes, valves and the PPS / oil containment tank are the responsibility of Aqueous Waste Services, with technical advice as required from Primary & Civil Engineering and Environmental Services;
- Significant defects relating to the design and/or integrity of bunds, pits, pipework and oil containment tank shall be referred to Primary & Civil Engineering by Aqueous Waste Services; and
- Any modification or upgrade of an oil containment tank system is the responsibility of Primary & Civil Engineering, in consultation with Aqueous Waste Services.

**Table A1 - Oil containment systems – Design, operation and maintenance responsibilities**

Group or Business Unit	Function	Design of System	Set Maintenance Guidelines	Develop maintenance detailed check sheets	Maintain system as designed	Recording of maintenance issues	Alter Maintenance Guidelines from feedback received (MRA)	Project Management (minor or corrective work)
GE / Customer, Assets & Digital				A	A	A	I	A
Design & Engineering Services	Primary & Civil Engineering	R / A <sup>1</sup>	C	C	C	I	C	C
Transmission & Services	Aqueous Waste Services	C	C	R	R	R	C	R
Asset Management & Planning	Maintenance & Replacement Planning	C	A	C	C	I	A	I
Design & Engineering Services	Environmental Services	C	C	C		I	C	C

**Note:** 1. For new substations only.

**R - Responsible:** person who performs an activity or does the work.

**A - Accountable:** person who is ultimately accountable and has Yes/No/Veto.

**C - Consulted:** person that needs to feedback and contribute to the activity.

**I - Informed:** person that needs to know of the decision or action.

## Annexure B: Oil-Water Separator Sampling Requirements

### B1 General

Sampling shall be undertaken prior to any maintenance or disturbance of the oil-water separator.

### B2 Sampling frequency

#### B2.1 Parallel Plate Separator (PPS) systems

Refer to Clause 12.1. Quarterly sampling of the discharge from PPS systems is typically required to confirm compliance of the oil-water separator with the operational performance criteria given in Clause 3.1 (Table 1).

#### B2.2 Oil containment tank systems

Refer to Clause 12.1. Annual sampling of the discharge from oil containment tank systems is typically required to confirm compliance of the oil-water separator with operational performance criteria given in Clause 3.1 (Table 1).

### B3 Sampling procedure

B3.1 The laboratory used for analysing samples shall be NATA accredited to undertake the specific analysis. Sample bottles shall be prepared by the laboratory, and sampling and preservation of the samples shall be in accordance with the laboratory's requirements.

B3.2 Sampling shall be undertaken in a manner that ensures a representative sample is obtained.

B3.3 Sample collection shall be carried out as follows:

- 1) Run a hose at maximum flow over the bund such that the pick-up of any oil is maximised. For example, maximise the distance the water must travel over the bund prior to entering the sump, ensure it runs over the most soiled section of the bund etc;
- 2) Allow a minimum of 5 minutes of discharge, or sufficient time for contaminated water to enter and discharge through the oil-water separator, whichever is the greater, prior to taking a sample;
- 3) Collect samples in clean collection jars from the discharge point of the oil-water separator. Where it is not possible to collect a sample from the discharge point, collect the sample in accordance with Table B1 and indicate this departure on the Chain of Custody Form;
- 4) Fill the laboratory sample bottles from the collection jars promptly so that any contaminants in the collected liquid do not separate;
- 5) Provide a notification for the testing lab to mix the sample prior to testing; and
- 6) Complete the Chain of Custody Form as required.

**Table B1 – Sampling Points and Collection Methods (where discharge point is not accessible)**

Oil-Water Separator Type	Sampling Point	Sample Collection Method
PPS	Final chamber of the oil-water separator	Mix the surface layer of the outlet chamber and plunge a collection jar below the surface and pull it up quickly.
EGOWS	Immediately prior to the outlet	Mix the surface layer of the sampling point and plunge a jar about 300mm below the surface and pull it up quickly.
3 Stage	Final stage	
2 Stage and 1 Stage	Do not collect a sample	N/A

**B4**      **Records**

The results of sampling shall be recorded in a suitable format to enable future reference and analysis.

## Annexure C: Determining Sludge and Oil Depths

### C1 Measurement requirements

When inspecting the operation of an oil containment tank, both oil depths and sludge depths shall be measured. Measurement will be required from the various chambers of an oil containment tank as outlined in Table C2 below.

**Table C2: Measurement and waste collection points**

Tank Type	Measurement Points
Enhanced Gravity Oil Water Separator (EGOWS)	One measurement point between the stainless steel baffles and end weir wall.
3 Stage	Three measurement points, one within each of the three chambers.
2 Stage	Two measurement points, one within each of the two chambers.
1 Stage	One measurement point within the tank

### C2 Contained oil

The following procedure shall be used in determining oil depths using water finding paste (GILBARCO Water Finding Paste or approved equivalent):

- Paint the water finding paste onto a measure stick;
- The water finding paste changes from a green colour to pink when the water is reached; and
- Ensure that all equipment is cleaned before further use or storage.

### C3 Sediment / Sludge

- C3.1 The depth of sludge can be measured within the tank using a Sludge Judge (or approved equivalent) together with an appropriate safe work procedure for work undertaken inside a live yard or near overhead conductors.
- C3.2 The Sludge Judge consists of a plastic tube with a valve system that allows the sediment column to be collected from within the oil containment tank.
- C3.3 The following procedure shall be followed when using the Sludge Judge:
- Slowly lower the Sludge Judge to the bottom of the tank. The Sludge Judge shall be lowered slowly and not plunged to the bottom of the tank. Plunging the unit will result in an inaccurate reading and possible damage to the bottom valve;
  - When the bottom of the tank has been reached or the pipe has filled to the desired level, tug slightly on the rope as you begin to raise the unit. This will seat the check valve, trapping the column of sludge and water in the Sludge Judge;
  - Raise the unit. After looking at the sample through one-foot markers, empty the tube before further use. Care must be taken when raising the unit up, keep it as vertical as possible. Do not allow the unit to bend or bounce while it is full of water; and
  - To empty the tube, touch the pin extending from the bottom section against a hard surface. This opens the check valve to drain the liquid and sludge.
- C3.4 When extending the unit longer than 5 metres, a stiffener may be needed to reduce excessive bending. An aluminium channel can be secured to the unit for this purpose.
- C3.5 Store this unit where it cannot be damaged, especially by foot traffic, doors, or machinery. Do not leave it exposed to the sun.
- C3.6 The unit may be cleaned with hot water and a mild soap or vinegar.