NS190

Oil Containment Operational Requirements for Major Substations

February 2008

Amendments included from NSA 1448 Feb 2008 & 1526 May 2009

SUMMARY

Network Standard NS190 details the general requirements for the operation of oil containment systems at major substations.

ISSUE

This Standard is subject to amendment by Ausgrid at any time.

Ausgrid staff: This Standard is for issue to all overhead line staff, and for reference by technical and engineering staff associated with the design and installation of overhead lines.

Where this document is issued as a controlled document replacing an earlier edition; remove and destroy the superseded document.

Accredited Service Providers and Contractors: This document is issued on an uncontrolled basis. It is the user's responsibility to ensure that the document being used is current and includes any amendments issued since the date on the document.

Ausgrid offers a subscription service which provides for updates and amendments to standards on payment of an annual fee.

Current network standards are also available on Ausgrid's Internet site at www.ausgrid.com.au.

DISCLAIMER

This Standard has been developed using information available from field and other sources and is suitable for most situations encountered in Ausgrid. Particular conditions, projects or localities may require special or different practices. Any proposed deviation from this Standard must be submitted to Ausgrid for approval before it is implemented.

It is the responsibility of all persons involved to ensure that a safe system of work is employed and that statutory requirements are met.

Ausgrid will not accept any liability for work carried out to a superseded standard. Ausgrid may not accept work carried out which is not in accordance with current standard requirements.

Ausgrid's standards are subject to ongoing review. It is possible that conflict may exist between standard documents. In this event, the most recent standard is to prevail.

INTERPRETATION

In the event that any user of this Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it were included in the Standard, and is final and binding. No correspondence will be entered into with any person disputing the meaning of the provision published in the Standard or the accuracy of Ausgrid's interpretation.

Network Standard
NS190
Oil Containment Operational Requirements for Major Substations
February 2008

CONTENTS

1 SCOPE

The scope of this document is to provide guidelines for the operation of oil containment systems at Zone and STS Substations.

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

This document applies to all persons including Ausgrid, Contractors, Sub-Contractors and associates, and employees of any of the above.

2 OBJECTIVES

The primary objectives of this document are:

- To ensure a consistent approach is undertaken for the management of oil containment systems.
- To provide clear instructions on the general operational requirements for oil containment systems.

3 DEFINITIONS

Approved Equivalent	Equipment or materials approved in writing by Ausgrid.
Bund	A wall/barrier of sufficient height constructed around fluid filled equipment to contain spillage of liquids.
Butterfly valve	A valve used (generally with automatic fire protection systems) to close the outlet of the oil containment tank.
EGOWS	An Enhanced Gravity Oil and Water Separator is an oil containment tank developed by the UNSW. The tank contains stainless steel baffles and flow retarding devices.
Flame trap	A pit with a down turned pipe used as a fire quenching mechanism.
Gravel	Stone including blue metal and river stone used as a flame-quenching medium.
Knife Gate Valve	Manual valve or penstock used to close outlet to an oil containment tank.
Major Substation	For the purpose of this document, major substation means zone and sub-transmission substations with primary voltages of 132, 66, and 33 kV.
Non Return Valve	Also called a flap valve, it is a one way valve that prevents flow back up into the pipe
Oil Containment	The oil containment system refers to the transformer *bunds*,

System	together with a suitable combination of *flame traps*, pipes, oil containment tank and *Plate Separator* as required. The *oil containment system* is not designed as an oil storage system. It is designed for emergency situations and the treatment of minor oil contamination from transformer *bunds*.
Plate Separator	Parallel Plate Separator (PPS) is a device that uses parallel plates to coalesce and separate oil and water.
Single Stage Separator	An oil containment tank that consists of a single chamber that discharges water from the bottom of the tank.
Sludge Judge	Device used to check the depth of sludge within the oil containment tank.
Surfactants	A substance, which emulsifies, disperses or dissolves other substances; eg. a detergent
Tank Profiler	Clear plastic tube lowered into the oil containment tank to determine oil depths.
Triple Stage Separator	An oil containment tank that consists of three chambers through which the contaminated water runs through consecutively. Water is discharged from the bottom of the third chamber.
Waste	Captured oil and sediment within the oil containment system.

4 INTRODUCTION

Ausgrid has a number of different oil containment systems that have different and specific operating requirements. The as-built oil containment drawings will document the oil containment installed at each substation.

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

5 OIL CONTAINMENT DESIGN

The design requirements for oil containment at major substations are outlined in NS189 Oil Containment for Major Substations.

6 STANDARDS AND OTHER REFERENCES

All work covered in this document shall conform to all relevant legislation, Standards, Codes of Practice and Network Standards including but not limited to:

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (General) Regulation 1998

- Protection of the Environment Operations (Waste) Regulation 1996
- Environmentally Hazardous Chemicals Act 1985
- OH&S Act and Regulations
- NUS174 Environmental Procedures
- NUS151 Work in Confined Spaces
- NUS181 Approval of Materials and Equipment and Network Standard Variations
- NENS 01 National Electricity Network Safety Code
- Ausgrid's Electrical Safety Rules
- Ausgrid Network Management Plan
- Any relevant WorkCover documentation.

7 OPERATIONAL REQUIREMENTS

7.1 General

7.1.1 Network Maintenance Plans

Network has developed a series of Technical Maintenance Plans (TMPs) for substations which includes Maintenance Standards for the various types of oil containment systems in operation. These TMPs are regularly updated and include a detailed description of the required maintenance activities and the frequency of inspection for oil containment facilities.

All current TMPs and Maintenance Standards are to be implemented as part of the operational requirements of this document.

7.1.2 Surfactants

The use of surfactants will disturb the operation of a Plate Separator or oil containment tank and oil and water separation may not be properly achieved. Where surfactants have been used, the entire contents of the oil containment system must be emptied and the system recharged with clean water to ensure discharge compliance can be continued.

7.1.3 Confined Spaces

All work in confined spaces are to be undertaken in accordance with the Occupational Health and Safety Act and Regulation, Australian Standard 2865 Safe Working in a Confined Space and Ausgrid Network Standard NUS151 Work in Confined Spaces.

7.1.4 Other Safety Issues

Waste removal and waste sampling may have specific safety & PPE requirements and must be taken into consideration in the preparation of Safe Work Method Statements.

7.2 Oil Handling Requirements

EG100: Oil Handling and Spill Response Guidelines provides guidance to assist Ausgrid Employees handling, storing, transporting and disposing of oil, in accordance with legislative requirements.

7.3 Waste Requirements

EG120: Waste Guidelines provides guidance to Ausgrid employees in managing typical Ausgrid wastes in accordance with legislative requirements.

7.4 Licence Requirements

Some oil containment facilities may be licensed. The licence may contain requirements that will affect the operational requirements of the oil containment system. ECS125 should be consulted prior to changes or implementation in operating and/or maintenance procedures of the oil containment facilities at a particular site.

ECS125 Compliance System – Licence Compliance provides a list of Environmental Licences. This is available on Ausgrid Procedures\Environment \Environmental Guidelines.

7.5 Bunds

7.5.1 General

Bunds must remain structurally stable, free of litter, debris, sediment and pooled water or oil.

Operational works include:

- Removing debris, sediment and rubbish from the sumps, grates and surface of the bunded area.
- Ensuring drainage paths are free flowing.
- Inspecting brickwork, blockwork or concrete structural integrity, including joint condition. Check for cracking along mortar joints in brick or blockwork walls. Refer defects to Network Engineering.
- If bund is not drained ensure that valves are locked shut.

Figure 1: Typical Oil Containment Bund

7.5.2 Gravel

Gravel within transformer bunds must remain free draining. Where gravel within transformer bunds is clogged, the gravel should be replaced. Advice must be sought from Network Engineering on replacement options.

Figure 2: Oil Containment Bund with Gravel

7.6 Junction Pits, Sludge Pits, Valve Pits and Flame Traps

7.6.1 General

Pits must remain structurally stable, free of litter, debris, sediment and pooled water or oil.

Operational works include:

- Remove any build up of material such as leaves and dirt from around pit lids.
- Ensure grates are clear of debris.
- Remove sediment, floating oil, litter, etc as required.
- Classify and dispose of wastes.

Where required replace or repair pit covers, grease and position all pit covers level with the surrounding ground. Pit replacement must be in accordance with NS189.

Figure 3: Typical Stormwater Pit

7.6.2 Water Level

Pits

The water level within the pit must be maintained at the level of the invert (bottom) of the outlet pipe (lowest pipe) as shown in Figure 4. If the water level has dropped below this level the pit may be damaged.

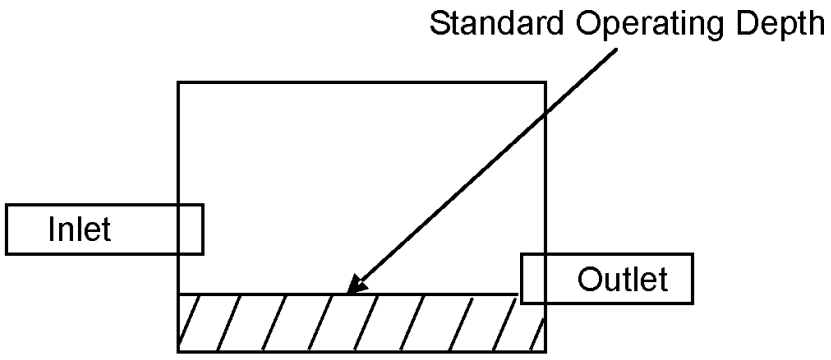

Figure 4: Pit Standard Operating Depth

When determining if a pit is damaged the following items should be checked:

- Cracks around pipe entry points, joints and corners;
- Malformed pits;
- Presence of tree roots;
- Adequacy of rendering and mortar seals; and
- Structural condition of the pit, ladders, steps or step irons.

Where requested by Network Engineering pressure tests can be used to check the integrity of the pit.

Flame Traps

Flames traps must have a water level to the invert (bottom level) of the pipe. The bottom of the down turned pipe must be submerged at all times.

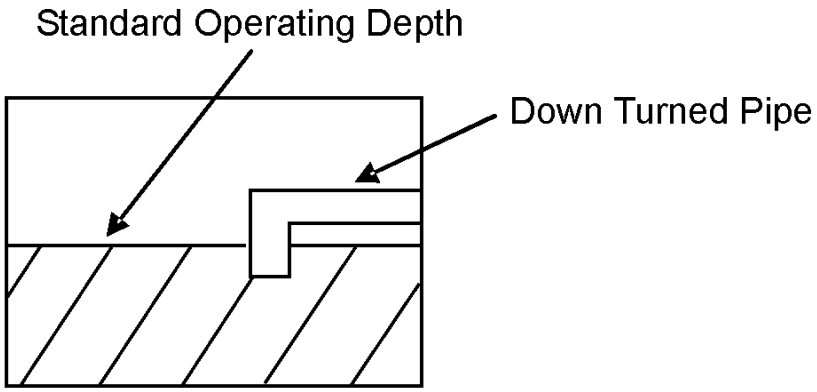

Figure 5: Flame Trap Standard Operating Depth

Operating works include:

- Where required fill the flame trap to the standard operating depth.
- Where a dropped water level has been identified and there is no visible cracking a high evaporation rate may be occurring. Advice should be sought from Network Engineering on specific controls required.

Details on gravel flame traps are referred to in Section 7.5.2 Gravel.

Figure 6: Typical Flame Trap (grate removed for photo)

7.6.3 Excessive Sediment and Debris

Where excessive sediment and debris have been identified assess on-site and off-site factors that contribute to the condition of the drainage system (eg. overhanging trees, open pits in sandy areas). Advice must be sought from Network Engineering where external issues may be affecting the operation of the oil containment system.

7.7 Pipes

7.7.1 General

All pipe must remain structurally stable, free flowing and free of litter and debris.

Operational works include:

- Inspecting the drainage system for signs of differential settlement, excessive sediment build-up or blockages within pits and tanks.
- Inspecting for broken or faulty pipes or blocked pipes.

7.7.2 Differential Settlement, Excessive Sediment Build Up in Pits and Tank

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 all indicate potential for the pipes to be damaged. The build up of sediment around pit entries can also suggest inadequate slopes on drainage surfaces.

In this situation water flow checks, camera inspections or pressure tests may be required to locate the damaged pipe.

Where requested by Network Engineering the following tests may be required:

Water Flow Checks

Water flow checks can be conducted on the oil containment/stormwater drainage lines and supporting structures.

The water flow checks involve:

- Locating all drainage structures and opening pits, tanks, etc, to allow visual inspection of the water flow.
- Pumping a known volume of water from a tanker or hose into the oil containment system. The oil containment system may include the transformer bunds, bays, pits and transformer roadways.
- Tracking water flow through system.
- Documenting water losses through the system. The pipe system is functioning when the known volume of water appears in the tank.
- During the water flow check ensure that the process does not compromise oil retention in the oil containment tank.

Water flow checks are effective in verifying flow paths and identifying significant blockages in the drainage system. However this does not indicate any leaks in the drainage lines.

The use of water to check overland flow paths may assist in determining the cause of the sediment build up on paved surfaces.

Localised regrading of the site may be required. Seek advice from Network Engineering.

Camera Inspection

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

Pressure Tests

Pressure Tests shall be carried out in accordance with *AS3500 National Plumbing And Drainage Code*.

Excavation

Excavating the drainage line will clearly show any damage. Excavation should only be used where all other options have been exercised.

7.7.3 Broken/Faulty Drainage Pipes

Where approved by Network Engineering replace or repair broken pipes. All works must meet the requirements of NS189.

7.7.4 Blocked Drainage Pipes

High-pressure water jets or rods can be used to flush the drainage lines. All relevant safety precautions must be addressed when undertaking this work and waste materials must be disposed of appropriately. Ensure that all debris and sediment is removed from the oil containment tank on completion of pipe cleaning work.

Permanently blocked drainage pipes may need to be replaced.

7.8 Oil Containment Tank

7.8.1 General

All oil containment tanks must be free flowing and contain minimal oil and sludge

Operational works include:

- Inspecting oil and sludge depths
- Inspecting for blocked outlets, low water levels and oil within the outlet chamber.
- Where required removing oil and sludge

7.8.2 Sampling Procedures

When inspecting the operation of an oil containment tank, check oil depths and sludge depths.

Sampling will be required from the various chambers of an oil containment tank. Sampling requirements are outlined in the following table:

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

Table 1: Sampling and Waste Collection Points

All sampling undertaken for waste classification purposes must be in accordance with the Draft Environmental Guideline 170 Soil and Water Sampling Procedures.

Contained Oil

The volume of contained oil can be measured using a tank profiler or measure stick with water finding paste. The tank profiler consists of plastic tube 5 – 10cm diameter with a stopper or valve used to collect the water column and determine oil depths as illustrated in Figure 7.

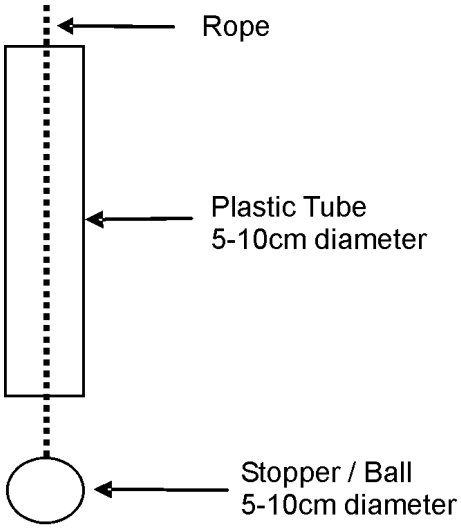

Figure 7: Tank Profiler

The following procedure should be used in determining oil depths using a Tank Profiler.

- First lower the stopper **slowly** into the water by releasing the rope. Do not drop the stopper into the tank, as it may disturb the contents of the tank. Allow any disturbed contents to settle, or drag the profiler across the tank to an area where the oil/water interface has not been disturbed (note that the measuring cylinder is still entirely above the liquid surface).
- Slowly lower the main unit into the tank, so that 5-10cm of the measuring cylinder remains **above** the tank liquid surface. Ensure that the unit is kept in a vertical position as it is being lowered into the tank.

- Whilst maintaining the unit in position, slowly raise the stopper until a seal is formed between the stopper and the bottom of the measuring cylinder.
- Raise the entire unit from the tank, ensuring that the seal is maintained between the stopper and the measuring cylinder. Raising the unit with the rope can do this.
- Allow the contents to settle, and read off the depth of oil in the tank.
- Ensure unit is cleaned before further use or storage.

The following procedure should be used in determining oil depths using water-finding paste.

Paint *GILBARCO Water Finding Paste* or approved equivalent by Network Engineering onto a measure stick.

The water finding paste changes from a green colour to pink when the water is reached.

Ensure that all equipment is cleaned before further use or storage.

Sediment / Sludge

The depth of sludge can be measured within the tank using a Sludge Judge.

The Sludge Judge or Network Engineering approved equivalent consists of a clear plastic tube with a valve system that allows the sediment column to be collected from within the oil containment tank, as shown in Figure 8.

Figure 8: Sludge Judge

The following procedure should be followed when using the Sludge Judge.

- Lower the Sludge Judge to the bottom of the tank.
- It must 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.
- 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. After looking at the sample through one-foot markers, empty the tube before further use.
- 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.

When extending the unit longer than 15ft, a stiffener may be needed to reduce excessive bending. An aluminium channel, available from a hardware store, can be secured to the unit for this purpose.

Store this unit where it cannot be damaged, especially by foot traffic, doors, or machinery. Do not leave it exposed to the sun.

The unit may be cleaned with hot water and a mild soap or vinegar.

7.8.3 Oil Removal

The quantity of oil to be removed will be determined by the sampling results.

Remove quantity of oil as specified by Network Engineering. Oil quantity will be specified as a depth relative the surface level of the oil containment tank.

The oil removal requirements will be dependent on the type of oil containment tank and detailed in the following table.

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

Table 2: Oil Removal Requirements

7.8.4 Sludge and Sediment Removal

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 of the separator are removed.

The sludge removal requirements will be dependent on the type of oil containment tank as detailed in the following table.

Tank Type	Sludge Removal Requirements when contents of tank is mixed
Enhanced Gravity Oil Water Separator (EGOWS)	One removal point between the stainless steel baffles and end weir wall. One Sampling & Waste Collection Point adjacent to the stainless steel baffles.
3 Stage	Three removal points, one within each of the three chambers.
2 Stage	Two removal points, one within each of the two chambers.
1 Stage	One removal point within the tank

Table 3: Sludge Removal Requirements when contents of tank is mixed.

7.8.5 Blocked Outlet Pipe

Where it is found that 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 sludge or sediment depths using a sludge judge.

Where sampling demonstrates that the outlet is blocked, obtain approval from Network Engineering to remove the sludge or sediment within the tank.

7.8.6 Low Water Level

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

Where maintenance records indicate that the tank had not recently been pumped out, fill the tank to a nominated level and monitor the water depth over a 2-week period. Any decrease in water level will indicate structural damage within the tank.

Obtain Network Engineering approval to pump out the tank and undertake a structural inspection.

7.8.7 Oil in the Outlet Chamber

Where it is found that there is oil in the end chamber of an EGOWS, the end baffle may be damaged or the oil storage capacity of the tank has been exceeded.

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

7.8.8 Empty Entire Contents of Tank

As a result of an incident, major oil spill, or as requested by Network Engineering these steps should be carried out when emptying the contents of an oil containment tank.

- Carry out a Hazard Assessment Checksheet
- Open all tank covers, allow ventilation and make safe
- Implement confined space procedures.

- The entire contents of the tank shall be appropriately waste classified, transported and disposed of by appropriately licensed contractors.
- Remove the contents of the tank. Wherever possible the volume of waste should be minimised by segregating wastes. Ensure water level is recharged in accordance with operating procedures for the facility.
- 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 or clogged 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.
- Where requested by Network Engineering check for cracks and other defects when tank walls are clean.
- Ensure that all internal structures such as baffles and siphons are securely fixed.
- In all separator types ensure the water level is 100mm above the level of the bottom of the outlet pipe as illustrated by Figure 9

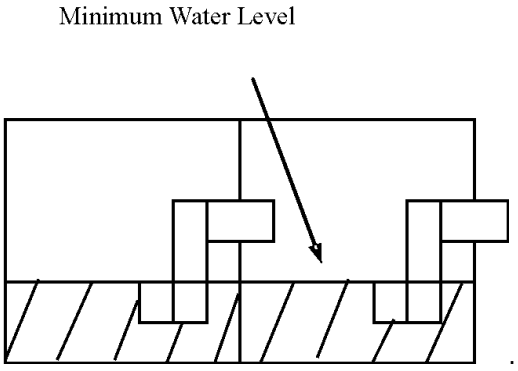

Figure 9: Minimum Oil Containment Tank Operating Depth

7.9 Other Structures in Zone and STS Substations

7.9.1 Cable Pits & Cable Trenches

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

7.9.2 Valves

Ausgrid oil containment systems may contain reflux, butterfly or knife gate valves. Refer to the manufacturer's manuals for specific details on these items. Figure 10 shows a typical knife gate valve in situ.

Figure 10: Knife Gate Valve

Reflux, Non-Return or Flap Valve

Generally 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.

Butterfly Valves

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

Knife Gate Valve

Generally 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 should not be able to pass through the valve in the closed position.

Sediment Traps and Gas Seals

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

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.

7.10 Oil and Water Plate Separators

Ausgrid's major substations use parallel-plate separators (PPS) typically as shown in Figure 11. Refer to the manufacturer's manuals for specific operating details.

Network Standard NS189 requires that these units are correctly installed and fully commissioned on site with a minimum 12 month defects liability period for a new unit. Limited recourse to the installation contractor may be available during this period if operational problems are evident that cannot be easily remedied.

Appendix A outlines the requirements for the effective handover of the PPS equipment and provides a commissioning checklist and procedure to ensure the unit has been correctly installed prior to acceptance.

Appendix A also provides details of the operating and maintenance requirements for these units during both the warranty and post-warranty period.

Figure 11: Typical Plate Separator

7.11 Site Completion

At completion of site inspection or works the following must be undertaken:

- Ensure all valves are returned to the operating position.
- Check all pumps are energised, checked and available for operation.
- Ensure all appropriate alarms are activated.

APPENDIX A: Oil Separator Commissioning, Operations and Maintenance Requirements

A1 Oil Separator Installation and Commissioning

1. Introduction

There are a number of manufacturers and types of oil containment systems. The PPS unit currently being installed for Ausgrid is the AJM EnviroSEP OS7500 Oil Separator

The design principle is generally consistent across all substations but may require variations to the final placement of some components due to local equipment and conditions.

The key roles and responsibilities within Ausgrid for the installation and commissioning of oil separators are as follows;

1. The installation or upgrade of the oil separator is project managed by the Project's Group;

2. The Design drawings "For Construction" are provided by the Design Group;

3. The installation is mainly carried out by Contractors, with minor activities by Ausgrid Field Technicians;

4. The Commissioning and Maintenance is carried out by the Oil Containment Group.

The oil separator shall be correctly installed and fully commissioned on site with a minimum 12 months defects liability period to ensure effective long term operation of the system. To facilitate this process, and ensure an effective handover of the equipment, the Project Manager shall obtain the advice and input of the Oil Containment Group during the installation and final inspection of the oil separator.

A2 AJM EnviroSEP OS7500 Oil Separator – Commissioning Checklist

Substation No.: Name :

A	OIL SEPARATOR UNIT	
1	Unit installed on four mounting studs c/w nuts for height adjustment	
2	Lids are adequate and can be secured in Open and Closed Positions	
3	Levels are Weir +/- 0mm across the fixed secondary weir and max 5mm along the unit	
4	Hose Kamlock fittings are readily accessible with or without the 90^0 detachable elbow, as applicable.	
5	Discharge to well drained area and no long term ponding in front of Control Panel	
6	Flowrate checked OK	
7	High Oil Alarm operation checked	

B	CONTROL PANEL	
1	Control Panel door is lockable and hinged mounting panel is lockable	
2	Installed securely to enable access from outside of bund area	
3	Oil Containment Label and contact phone number on outside	
4	Control Room Operator contact number on inside, near Alarm Switch	
5	20A Supply on a dedicated circuit from Substation AC Board	
6	Alarm Auto/Non-Auto Switch fitted to Control Panel	
7	Alarm and cancel operation checked with Control Room	
8	All conduit and cable entries are waterproof and secure	
9	Pump Isolating Switch is lockable in OFF Position	

C	BUND AREAS, PUMPS and FLOAT SWITCHES	1	2	3	4
1	Pumps installed above high water level				
2	Pumps are fitted with a removable weatherproof cover				
3	Each Pump Motor is supplied via a 240vAC 10A Switched Power Outlet (rated IP67 or above)				
4	Pump motor clockwise rotation (from rear) and breather checked				
5	Pump primed and flowrate checked				
6	Flexible hose length is 500mm on the discharge side only of pump				
7	All pipes sizes are as per pipe schedules on project drawings				
8	Stainless steel ball valve fitted only between flex hose and fixed pipes.				
9	All electrical conduits are in accordance with AS 3000				
10	Float Switch position and operation checked				
11	Bunds and Pumps labelled correctly				

D	GENERAL	
1	All conduits with cables are bushed to prevent cable damage	
2	All conduits are mechanically protected over/outside of bunds	
3	Water supply available nearby. (where possible)	
4	Power Supply circuit protected by RCD Unit incorporating a C.B.	
5	Operation/Maintenance settings and functionality checked	
6	Discharge water 500ml sample for Oil%, PCB and pH levels.	

E	ADMINISTRATION		
1	The Substation has an Emergency Drainage Diagram	Dwg :	
2	Oil Separator Unit entered in TIS as Task U116		
3	Electricians "Certificate of Completion" signed and submitted – No.	Dated:	
4	A copy of this report is given to Project Group	Date:	
5	Identified remedial actions completed.	Date:	

Checked by: ..... **Date:**.....

A3 AJM EnviroSEP OS7500 Oil Separator Commissioning Procedure

Substation :

Contact:	Projects Group :
Equipment required:	1. Socket Set 2. Silicon and Application Gun 3. Allen Keys 4. Rags 5. Spirit Level 6. Rule / Tape measure 7. Permanent Marker
System Status:	1. Installation is complete 2. Power is connected 3. Pump direction has been checked – clockwise from rear of pump motor 4. Oil Separator unit is filled with water 5. Water is available on site for this procedure
System Preparation:	1. Alarm Non-Auto and advise System Control Room – as per label 2. Record details of the Oil Separator Unit and all pumps 3. Ensure all switches in the Control Panel are OFF 4. Check the Pump Isolating Switch on the side of the Control Panel is OFF 5. Check the Main Supply Circuit Breaker inside the Control Panel is OFF 6. Check that all wiring appears complete. 7. Check that the pumps are mounted above the bund spill height. 8. Check that electrical cables do not rub against metal edges 9. Check that the pump has been prepared for operation 10. Pipework between the sumps and pumps are complete and correct size (40mm). 11. Pipework between the pumps and separator are complete and correct size (50mm) 12. Flexible hoses are used between pumps and discharge pipes of at least 500mm in length (end fittings excluded). 13. The oil separator outlet pipe flows to stormwater. 14. Water in all the bund sumps covers the float switches. 15. Check the Oil Separator Unit levels – front to back (+/- 0mm) and side to side (+/- 5mm)
Pump Operation Checks:	1. Ensure the Main Supply Circuit Breaker inside the Control Panel is ON 2. Ensure the Pump Isolating Switch on the side of the Control Panel is ON 3. Turn Pump Switch No1 to AUTO 4. Raise No.1 float switch to initiate No.1 pump start 5. With each pump operation check pump direction and water flow – prime if necessary 6. Repeat pump operation check for each Pump Switch 7. Ensure that all Pump Switches are OFF after each pump operation check
Bund Float Alarm Checks	1. Ensure the Main Supply Circuit Breaker inside the Control Panel is ON 2. Ensure the Pump Isolating Switch on the side of the Control Panel is ON 3. Raise High Alarm Float in Bund No.1 and observe alarm operation 4. Bund No.1 Alarm and Common Flashing Alarm should both light up. 5. Lower the High Alarm Float and both the Alarm Indicators should reset 6. Repeat the High Alarm check for each bund.

1.

High Oil Level	1. Ensure the Main Supply Circuit Breaker inside the Control Panel is ON

Alarm Check	2. Ensure the Pump Isolating Switch on the side of the Control Panel is ON 3. Raise High Oil Alarm Float in the Oil Separator and observe alarm operation 4. The High Oil Alarm and Common Flashing Alarm should both light up. 5. Lower the High Oil Alarm Float and both the Alarm Indicators should reset
Pump Supply Fail Alarm Check	1. Ensure the Main Supply Circuit Breaker inside the Control Panel is ON 2. Ensure the Pump Isolating Switch on the side of the Control Panel is ON 3. Trip the Circuit Breaker for Pump No.1 inside the Control Panel 4. Observe that the Pump Fault Light and Common Alarm Light operate 5. Reset the Circuit Breaker and observe that both alarms reset 6. Repeat this test for each pump
Oil Weir Setting	1. Fill unit with water to almost full 2. Note the distance from the top of the water to the top of the fixed oil weir 3. Set the distance from the water to the adjustable oil weir 4. Set the adjustable oil weir with silicon 5. Ensure that the silicon is level across its length
Outlet Weir Setting	1. The Outlet Weir setting determines the level of the water in the separator. 2. Ensure the Main Supply Circuit Breaker inside the Control Panel is ON 3. Ensure the Pump Isolating Switch on the side of the Control Panel is ON 4. Turn each Pump Switch on the Control Panel to AUTO 5. Allow the flow to maximise and settle 6. Adjust the Outlet Weir to be 3 – 8 mm below both the oil weirs. 7. Lock the Outlet Weir using an Allen Key on the grub screw. 8. Allow the system to drain each bund which automatically switches each pump OFF
Discharge Testing	1. Ensure that the oil separator has stabilised and is operating with discharge water flowing 2. Fill a 500ml sample bottle from the discharge outlet flow for testing 3. Arrange for testing of the discharge sample for Oil, PCB and pH.
Checks completed	1. Contact Supervisor if the supply RCD Safety Switch does not reset after test. 2. Ensure that all Switches are in AUTO or ON 3. Secure the inside panel and Control Panel door and retrieve all access keys 4. Restore Alarm then contact System Control Room Operator to confirm Alarm and Reset 5. Ensure all equipment details are recorded 6. Record any defects, required repairs and items for attention 7. Contact Supervisor if any unsafe condition is found.

A4 Typical Warranty Maintenance Requirements

Weekly	Visual check	Water flows into Waste Oil Tank	Adjust levels
		Oil flows over Adjustable Weir	Adjust levels
		Waste Oil tank level	Drain if necessary, adjust levels
		Foreign material in tanks	Clean tank
		Foreign material in Inlet Screening Basket	Clean screen
Monthly	Visual checks	As per weekly checks above	
		Oil Weir – oil depth is less than 10 - 25mm	Clean then reset Weir level
		Sludge	Clean.
6mth	Visual checks	As per monthly checks above	
	Cleaning	Note condition	Drain and clean unit

The oil depth observed at the Oil Weir should preferably be between zero and 10mm but shall not exceed 25mm.

The typical warranty maintenance requirements, as noted in the table above, are recommendations only and applicable during the manufacturer's period of warranty. At the conclusion of the warranty period the frequency of maintenance for oil separator systems shall revert to the current Ausgrid Default Period of 3 months.

Outflow sampling from the oil separator shall be undertaken by Ausgrid initially at the time of commissioning and then annually thereafter. Outflow sampling shall record and monitor for the following aspects;

a) Solids (0 < 50mg/l)
b) Total Oil / Grease (0 < 10mg/l)
c) pH (6.5 < 8.5)

A5 Oil Separator Maintenance Requirements

The frequency of maintenance for oil containment / separation systems may differ due to site specific conditions, age and climatic factors.

For Ausgrid installations, the following maintenance Default Periods are currently applicable after the conclusion of the manufacturer's warranty period;

1. Oil Containment System (1, 2, 3 and 4 Stage and EGOWS)
   - Default Period one (1) year
2. Oil Separator / Treatment System
   - Default Period three (3) months

The cleaning of sumps, pits and pipes at some locations may require the use of a high pressure Gernie (15A) system in order to be effective.

The Ausgrid maintenance procedures required for the various oil containment / separation systems are outlined in the following schedules.

This Maintenance is scheduled for: _____ Van # : _____

Sub :

U0115 Oil Containment	Stage 1	Stage 2	Stage 3	Stage 4	EGOWS
1. Check that lids and surrounding surfaces are secure and undamaged.					
2. Examine hatch / Inspection / Sample / Pump out accesses are operable.					
3. Examine hatch / Inspection / Sample / Pump out accesses for defects, corrosion, misalignment, obstruction.					
4. Measure total depth / volume of liquid per chamber					mm
5. Measure oil depth / volume per chamber					mm
6. Take oil sample for PCB test					Yes / No
7. Check pump operation					
8. Check and clean drains and collection pits for oil and debris					
9. If volume of oil exceeds 10% of chamber volume arrange for pump out refer to Task R0117					

U0116 Oil Separator / Treatment	AJM	Baldwin	SEPA
1. Check that system and supports are secure and undamaged.			
2. Examine hatch / Inspection / Sample / Pump out accesses for defects, corrosion, misalignment, obstruction.			
3. Check pump operation			
4. Check operation of unit			
5. Check and clean drains and collection pits for oil and debris			
6. Check and clean separator plates			
7. Take oil sample for PCB test			Yes / No
8. Measure oil depth / quantity in collection drum			mm
9. If volume of oil in drum exceeds 50% of capacity replace drum refer to Task R0117			

R0117	Pump Out required	Yes / No	Date:
	Alarm Operation		OK / Faulty / Alarm Not Fitted
	Water sample taken for test – Solids, Oil and pH levels		Yes / No

Notes:

Checked by :	Date:	Entered in TIS

Revision History	
Initial issue:	22/06/06
Revised	01/02/08

Document Control	
Authorised By: T.Lampard	Date: 22/06/06
Manager Standards & Communications	
Document Number:	NS190