

Substation Maintenance Instruction

Oil separators and bunds

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51 Huntingwood Drive, Huntingwood NSW 2148

Postal address: PO Box 811 Seven Hills 1730

Phone: 131 318 Fax: (02) 9853 6000



SUBSTATION MAINTENANCE INSTRUCTION

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SMI 115 Oil separators and bunds

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1.0 PURPOSE

To set out the broad maintenance requirements for oil-water separator and bund maintenance.

2.0 SCOPE

This instruction shall be read in conjunction with SMI 100 - Minimum requirements for maintenance of transmission and zone substation equipment . It defines the broad maintenance requirements for oil separator and bund maintenance.

3.0 REFERENCES

- Company Policy 4.0 – Environment
- Company Policy 9.9.1 (Network) - Network Asset Maintenance
- Company Procedure GAM 0089 – Authorisation Governance and Management
- Company Procedure GPE 0069 - Polychlorinated Biphenyl (PCB) Management
- Company Procedure GPE 0075 – Storage, Handling and Transport of Oil and Oil Filled Equipment
- Company Procedure GSY 0003 - Manual Handling
- Company Procedure GSY 0050 – Hazardous Chemicals
- Company Procedure GSY 1066 - Worksite Hazard and Risk Assessment
- Company Procedure GSY 1090 – Confined Spaces Risk Management
- Environmental Management Standard EMS 0007 - Waste management
- Environmental Management Standard EMS 0008 – Environmental Incident Response and Management
- Substation Maintenance Instruction SMI 100 - Minimum requirements for maintenance of transmission and zone substation equipment
- Network Management Plan December 2013 Review
- Endeavour Energy Electrical Safety Rules
- ENA National Electricity Network Safety Code (Doc 01-2008)
- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2011
- Protection of the Environment Operations Act 1997
- Environmentally Hazardous Chemicals Act 1985
- AS/NZS 3000:2007 - Electrical installations

4.0 DEFINITIONS AND ABBREVIATIONS

PCB	polychlorinated biphenyl
Surfactants	substance that emulsifies, disperses or dissolves other substances.
Waste	captured material such as oil and sediment within the oil containment system.
Effluent	the outflowing water from the oil-water separator outlet pipe.

5.0 ACTIONS

5.1 General requirements

As distinct types or brands of equipment may not contain some of the components listed for maintenance, that particular component is to be disregarded. All work shall be carried out in accordance with manufacturers' recommendations unless otherwise specified. Maintenance frequencies shall be as specified in SMI 100 - Minimum requirements for maintenance of transmission and zone substation equipment.

Prior to maintenance, records shall be examined to determine if the oil is PCB contaminated or PCB free to ensure that the oil and waste is managed in accordance with legislative requirements. All PCB contaminated wastes and equipment shall be managed in accordance with Company Procedure GPE 0069 - Polychlorinated Biphenyl (PCB) Management

Oil-water separators, whether coalescing plate or gravity separators, must be filled to the top water level to ensure correct operation. Always fill into the outlet chamber of the separator to wash any contaminants back into the separating chamber. In the final stages, minimise the amount of turbulence in the water by reducing the flow, which should also minimise the possibility of sediment discharging to the outlet.

All defects found during maintenance shall be recorded in Ellipse.

5.2 Routine maintenance schedules

5.2.1 Bunds

Bunds shall be maintained in accordance with the following schedule:

1.0 INSPECTION
Check that bund is empty.
Inspect for cracks, structural integrity or other defects.
Remove obstructions or debris from floats, sump pit, grates and pipes.
Remove debris from inside the bund.
Remove debris to ensure that equalising pipes between bunds are unblocked.
Check bund floats are operational and alarm signals operate.
Dispose of oil contaminated debris in accordance with EMS 0007 - Waste management.
Report cracks or leaks and/or other imperfections in bunds to the asset owner.
Check bund drain valve is shut.
Check for excessive oil/sludge on bund surfaces or in sump pits that may reduce the efficiency of the oil-water separating process or cause a safety hazard due to slipping. Refer to section 2.0 - Condition based maintenance.
2.0 CONDITION BASED MAINTENANCE
Wash affected areas to remove the slip hazard or excessive oil/sludge on bund surfaces and in sump pits. The use of surfactants, such as detergents and degreasers will disturb the operation of oil-water separators by emulsifying the oil and allowing it to pass through the system; therefore if they are used for this purpose the separator shall be turned off and the affected areas shall be hosed with clean water immediately afterwards to remove surfactant residue.
Clean out sump pit by pumping out all water, oil and sludge using an appropriately licensed liquid waste contractor
Set the system back to <i>auto</i> mode if applicable.
Dispose of all liquids to a licensed liquid waste facility in accordance with EMS 0007 - Waste management. PCB contaminated wastes shall be managed in accordance with Company Procedure GPE 0069 - Polychlorinated Biphenyl (PCB) Management.

5.2.2 Above ground coalescing plate oil-water separators

The frequency of the minor overhaul will depend on the experience of staff and the consideration of the following critical factors: High usage, the severity of the oil leak and excessive debris in the area.

Above ground coalescing plate oil-water separators shall be maintained in accordance with the following schedule:

1.0 MINOR OVERHAUL
1.1 Initial checks
Inspect the outlet point where the effluent discharges for visual signs of oil staining on blue metal or concrete.
If oil staining is evident, another minor overhaul shall be scheduled after there has been moderate rainfall and subsequent separator usage. If oil staining is evident at this rescheduled minor overhaul, contact the relevant Environmental Business Partner to arrange effluent testing in accordance with section 3.0.
Inspect the outlet chamber inside the separator for visual signs of oil.
If oil is evident, another minor overhaul shall be scheduled after there has been moderate rainfall and subsequent separator usage. If oil is evident at this rescheduled minor overhaul, contact the relevant Environmental Business Partner to arrange effluent testing in accordance with section 3.0.
1.2 Cleaning
Remove any obstructions from the grate and inside the sump pit.
Remove any floating solids inside the separator unit.
Remove as much oil as possible from the separator by blocking the outlet weir and pumping clean water through the unit.
Once all oil has been discharged into the waste oil tank, the main tank can be drained.
Turn power off at control board.
Empty waste oil tank and dispose of waste oil accordance with EMS 0007 – Waste management.
Drain main tank by opening the valve at the bottom of the unit.
Strain the water to collect sediment, sludge and debris so that solids are not recycled back into the sump pit.
Remove and clean the inlet strainer.
Clean stainless steel coalescing plates/PVC coalescing tubes with high pressure hose (do not use surfactants, such as detergents and degreasers).
Close all valves and replace the inlet strainer.
Fill the system with clean water into the outlet chamber to the maximum water level.
Top up sump pit with clean water if required, switch unit to <i>manual</i> at control board and operate until a steady flow rate is achieved.
Check that the water level in the separator is below the oil weir (refer to manufacturer's recommendations - typically 5 to 10 mm) by adjusting the clean water outlet weir.
Set the system back to <i>auto</i> mode.
If oil staining at outlet point is evident, replace stained blue metal and/or clean staining off concrete.

1.3 Final checks
Inspect condition of pump diaphragm.
Check gear oil level and for excessive bearing noise in the reduction gearbox.
Where indication is fitted, check that float switch alarm signals operate on the separator control panel. • Bund high level • Sump high level • Waste oil tank high level
Collect and dispose of all wastes in accordance with EMS 0007 – Waste management.
2.0 MAJOR OVERHAUL
Carry out minor overhaul in accordance with section 1.0.
Replace gear oil in the reduction gearbox.
Check pump cut in/out sump pit levels.
Check that float switch alarm signals operate and communicate to the SCADA master station. • Bund high level • Sump high level • Waste oil tank high level • Loss of separator AC supply
Clean old style underground and above ground tanks by pumping out oil, sludge and silt.
3.0 TESTING
Testing of separator effluent shall be arranged by the Environmental Business Partner where sustained evidence of poor separator performance (visible oil in effluent or oil staining around separator outlet point) is noted and cannot be rectified by carrying out a minor overhaul. To obtain an effluent sample, pour clean water into the bund so that it drains across the bund to top up the sump pit (if required). Switch the unit to <i>manual</i> at the control board and operate until a steady flow rate is achieved. Analysis of effluent sample shall be completed by a NATA accredited laboratory. Obtain an effluent water sample from the outlet pipe. Contaminant concentrations in effluent water shall comply with the following criteria: • Suspended solids (SS) < 50mg/L • Oil and grease/total petroleum hydrocarbons < 10mg/L • pH 6.5 to 8.5 If analysis results do not meet the above criteria, further investigation and remedial action may be warranted.

5.2.3 In-ground gravity oil water separators

All work should be undertaken from above the ground through the access point.

Do not enter the tank unnecessarily; however, if it is necessary to enter the in-ground oil water separator, confined spaces risk management procedures outlined in Company Procedure GSY 1090 - Confined Spaces Risk Management shall be followed.

Optional: As some of these systems are designated confined spaces, entry shall be managed in accordance with Company Procedure GSY 1090 - Confined Spaces Risk Management.

In-ground gravity oil water separators shall be maintained in accordance with the following schedule:

1.0 INSPECTION
Inspect for cracks, structural integrity or other defects.
Remove any obstructions or litter from inlet sump pits, grates and outlet pipe.
If there are noticeable defects/oil in the tank, arrange for disposal of contents in accordance with EMS 0007 – Waste management
Report cracks or leaks and/or other imperfections to tanks to the asset owner
Inspect outlet point of the separator and report any noticeable oil film, staining or defects. The outlet point is the closest outlet to the separators and may be either a stormwater pit or culvert.
2.0 MINOR OVERHAUL
Remove oil from the surface of the water using a vacuum liquid waste tanker until surface becomes clear, not brown.
If the level of water in the separator is below the invert (bottom) of the baffle, add clean water into the outlet chamber of the separator to raise the level to at least 100mm above the invert of the baffle.
Dispose of all wastes to licensed liquid waste facility in accordance with EMS 0007 – Waste management.
PCB contaminated wastes shall be managed in accordance with Company Procedure GPE 0069 - Polychlorinated Biphenyl (PCB) Management.
3.0 MAJOR OVERHAUL
Clean out separator by pumping out all water, oil and sludge using a vacuum liquid waste tanker.
Clean the inside of the tank with a high-pressure hose (do not use surfactants, such as detergents and degreasers).
All work should be undertaken from above the ground through the access point. Do not enter the tank unnecessarily.
Entry into tank shall be managed in accordance with Company Procedure GSY 1090 - Confined Spaces Risk Management.
Dispose of all liquids to a licensed liquid waste facility in accordance with EMS 0007 – Waste management.
PCB contaminated wastes shall be managed in accordance with Company Procedure GPE 0069 - Polychlorinated Biphenyl (PCB) Management.

The oil water separator, once pumped out, must be filled with clean water through the outlet chamber of the separator to approximately 100mm below the top water level.

Allow the water to settle for 5 to 10 minutes to allow any traces of oil to reach the surface within the outlet chamber.

Vacuum off any oil on the surface that becomes evident. Continue to completely fill separator to the top water level.

6.0 AUTHORITIES AND RESPONSIBILITIES

Chief Engineer has the authority and responsibility for approving this instruction.

Manager Network Engineering has the authority and responsibility for making recommendations to the Chief Engineer in respect to this instruction.

Maintenance Manager, Network Engineering has the authority and responsibility for the content of this instruction so that it is kept up to date.

Central Region Transmission Manager has the authority and responsibility for:

- monitoring oil separators and bunds at transmission and zone substations so that they are maintained to the requirements of this instruction and SMI 100 - Minimum requirements for maintenance of transmission and zone substation equipment ;
- overseeing that Endeavour Energy employees and/or contractors engaged to perform the work have appropriate qualifications;
- reporting that work performed is carried out in accordance with local and statutory requirements;
- managing public safety so that it is not compromised; and,
- maintaining that employees are conversant with, and work in accordance with, the Electrical Safety Rules.

Disposal Manager has the authority and responsibility for monitoring that all contaminated waste products collected during the oil separator and bund maintenance process are disposed of in an efficient method that complies with organisational and legislative requirements.

Environmental Business Partner has the authority and responsibility for monitoring effluent testing so that it is carried out in accordance with this standard.

All **Endeavour Energy employees and contractors** have the authority and responsibility for:

- conducting themselves in a manner that meets the requirements of this instruction and SMI 100 - Minimum requirements for maintenance of transmission and zone substation equipment are met;
- working in accordance with local and statutory requirements;
- managing that public safety is not compromised;
- working in accordance with Endeavour Energy's Electrical Safety Rules;
- recording maintenance and test data in Endeavour Energy's electronic databases;
- communicating abnormalities found to the Regional Transmission Manager and the Transmission Substations Manager; and,
- overseeing that these instructions are only carried out only by employees and contractors who have been authorised in accordance with Company Procedure GAM 0089 - Authorisation Governance and Management.

7.0 DOCUMENT CONTROL

Documentation content coordinator: Maintenance Manager, Primary Systems

Documentation process coordinator: Standards Process Coordinator