

nationalgrid
Oil Management Unit

Oil Management

Commercial
Engineering
Services

High Voltage Engineering Specialists
A unique combination of experience and expertise

Asset
Maintenance



Introduction:

Why choose National Grid?

Over 20 years experience in oil management

We established the Oil Management Unit (OMU) in 1991 to manage our own extensive requirement for oil services. As a result, we have been successfully supplying these services for many years using bespoke specialised mobile oil processing units, all of which allow high speed oil processing and can operate 24 hours a day, reducing the time taken to complete work.

These processing units are fitted with the latest technology including satellite broadband connections, on-board oil testing facilities and on-board fuel efficient, low emission diesel generators.

Always looking to innovate, to meet the changing demands of maintenance for high voltage assets, we have designed a comprehensive range of bespoke equipment for different oil services, such as diverter maintenance, selector maintenance and oil level top up, which we can perform from ground level.

The OMU operates from three strategic locations – Dartford, Leicester and Doncaster – ensuring we are conveniently placed to provide oil services across the UK and Ireland.

Our many years of experience have allowed us to develop systems of best practice for all oil handling and oil processing

requirements. The comprehensive range of services offered covers all aspects of oil management from sampling right through to oil reclamation.

The OMU operatives are all rigorously trained, working to the highest standards as required by National Grid. Each OMU team is controlled by a Lead Operative who is responsible for all safety, operational and environmental aspects of our on site work.

Our OMU sites are licensed by the Environment Agency under Pollution, Prevention and Control legislation. This covers our activity with contaminated and cleansed oil. We are accredited to ISO9001 and ISO14001 and at Dartford we are licensed for PCB destruction.

National Grid is a world leading organisation and FTSE blue-chip company. We employ world renowned experts in this field and have a wealth of experience and understanding of the technical requirements for oil management. By applying this expertise we continually improve our processes to protect the assets and to prevent the introduction of issues that can have long-lasting effects.

Our aim is to support your asset management strategy by increasing your asset availability and prolonging asset life.





Sampling, Testing and Analysis

We offer a variety of sampling and testing facilities at our OMU sites, at an independent accredited laboratory, and from our mobile processing units' on-board laboratories during site works.

- **OMU site testing** – at our OMU sites, using calibrated instruments, we can test High Voltage breakdown up to 100kV, moisture to below 5ppm, resistivity and copper corrosion to IEC standards and silver corrosion to DIN 51353.
- **On-board testing** – on OMU processing units we are able to do the above tests with the exception of copper and silver corrosion which is carried out at Dartford. Having the facility to test on-board our processing units enables constant monitoring of the process. From these results we can tailor the service we provide.
- **Independent testing** – in support of site routine activities and asset monitoring we provide a full range of oil testing and analysis at a third party UKAS ISO/IEC17025 accredited laboratory.

Supply of Oil

- **Transformer Bushing Oil** – is dried and degassed to an exacting standard of under 5ppm moisture and supplied to sites, in 5 litre sealed flasks, with a six month shelf life. These can be sent to your site by courier for next day delivery if ordered by midday.
- **Transformer Top Up Oil** – is sold in units of 2,000 litres with a 12 hour emergency and 24 hour response.
- **Oil Circuit Breaker (OCB) Oil** – can either be collected, reconditioned (dried and degassed) at our purpose built facilities and returned to site, or reconditioned oil can be supplied to the customer in any quantity.
- **Disposal of surplus oils** – all surplus oils can be removed from electrical equipment or tanks and disposed of in compliance with environmental regulations.
- **New oil** – is sold in any quantity, and can be supplied as uninhibited or inhibited depending on customer requirements.

We offer a variety of sampling and testing facilities from our mobile processing units' on-board laboratories.



PCB Destruction

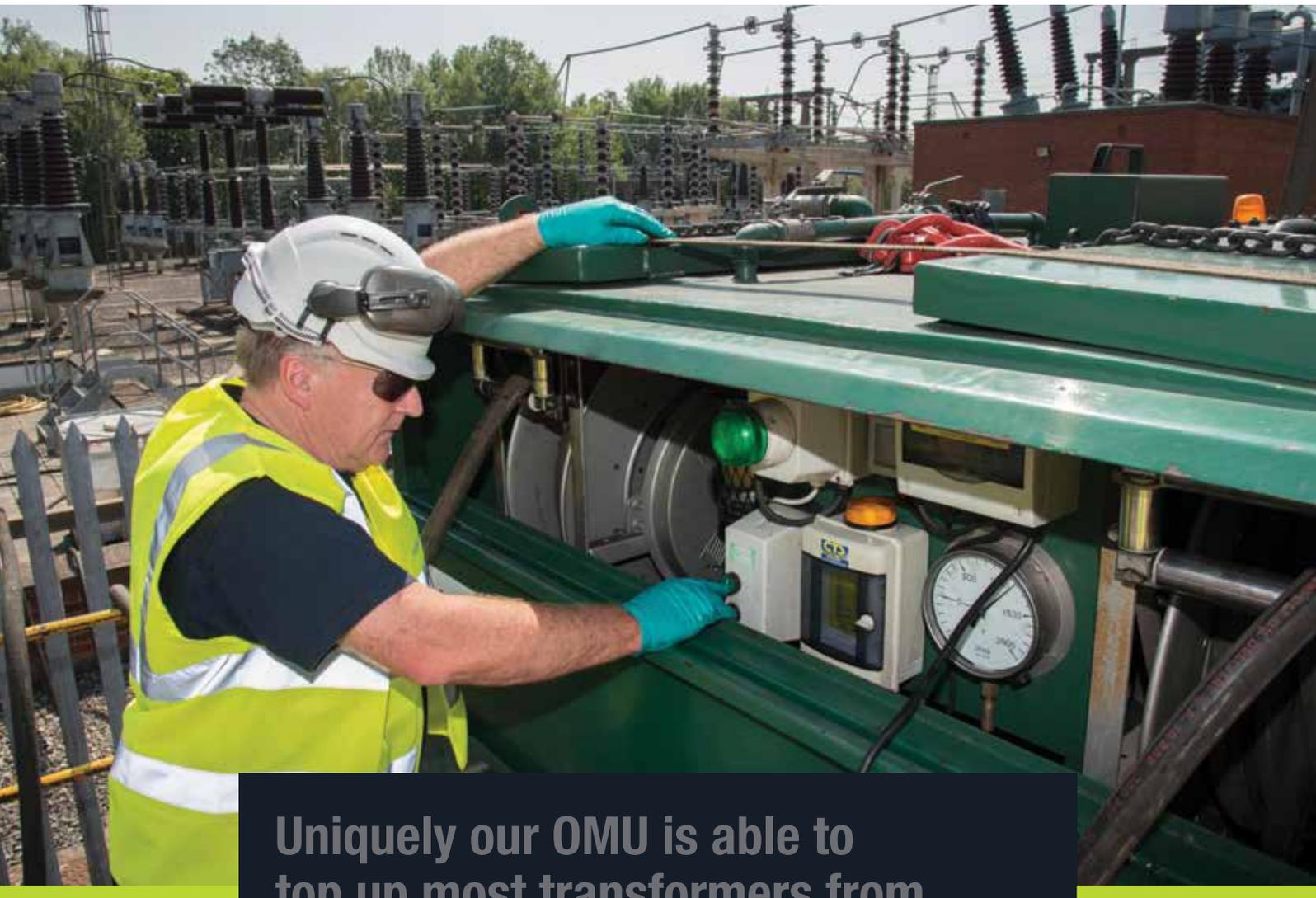
We own and operate a waste treatment facility licensed for PCB (Polychlorinated Biphenyls) destruction for small volume equipment.

PCBs are man-made chemicals present in insulating oils, mainly through cross contamination from a time before they were known to be harmful. Due to their high stability they may still be found in some assets. They are environmentally hazardous pollutants that are strictly regulated.

The strict procedures used by the OMU allow us to transport PCB-contaminated equipment without having to give prior notice of movement to the Environment Agency, allowing us to get the job done quickly.

Oil Replacement or Reconditioning

- **Oil Circuit Breaker Service** – we remove dirty oil from the asset during maintenance, which is either stored on site or taken to our facilities for processing. On completion of the maintenance work, reconditioned oil is then used to refill the circuit breaker.
- **Transformer Diverter Oil Service** – we have a bespoke oil handling kit for diverter maintenance, consisting of two portable 2000 litre bunded tanks with associated pipework and flanges. Dirty switchgear oil is drained into the empty tank. The second tank contains 2000 litres of switchgear oil, reconditioned to agreed standards, which is used for refilling.
- **Transformer Selector Oil Service** – we have a bespoke oil handling kit for selector maintenance, which consists of a 6000 litre portable tank with associated pipework and flanges. This allows the selector compartment to be gravity drained ready for maintenance. After the maintenance work is completed, the oil is returned to the selector compartment via one of our OMU oil processing units, to ensure the oil meets agreed standards.
- **Topping up Transformers using a ground level connection** – uniquely, our OMU is able to top up most transformers from ground level using bespoke equipment that contains dried and degassed new oil, saving time, cost and eliminating safety hazards associated with working at height.
- **On site high speed Transformer Oil Drying and Degassing Service** – we use our mobile drying and degassing units to recondition the oil back to the required standards. Testing of the oil is undertaken to confirm oil quality and to ensure unnecessary processing is avoided and quality of oil is achieved.
- **Transformer Major Oil Change Service** – we connect the transformer to one of our OMU dry air machines. It is then drained, flushed and vacuumed, as per the manufacturer's instructions, and refilled via our mobile processing unit.
- **The Addition of Inhibitor/Passivator to a Transformer Service** – we add passivator and inhibitor concentrates to the transformer, to the customer's required specifications.



Uniquely our OMU is able to top up most transformers from ground level.



Transformer Oil Reclamation

This is undertaken using a mobile high speed reclamation unit. Oil reclamation is a process which eliminates, by physical and chemical absorbent means, the contaminants and products of oil deterioration.

Left unchecked in transformers, these will lead to accelerated ageing as a result of sludge formation, causing blocked cooling channels and overheating or volatile acid formation, attacking solid insulation directly.

Concentrated inhibitor is usually added at the end of the process to restore the oxidation resistance lost during its service life, unless the customer specifies otherwise.

The outcome of effective reclamation is that the oil will have many similar characteristics to new oil.

Benefits of Oil Reclamation

Oil reclamation is a more cost-effective alternative to replacing oil. The price of new oil is becoming increasingly expensive and oil disposal can be costly.

Replacing oil will often leave behind some acids and sludge in the paper that can affect the performance of the new oil; these are more easily removed with reclamation.

The removal of acids, sludge and other degradation products from the oil significantly reduces the oil's aging rate, which can help a transformer to achieve its asset life. It is a more environmentally-sound solution, since the oil is filtered and returned to the transformer. Waste is limited and only a small amount of new oil is required.

The CO₂ footprint of our reclamation units is minimised as only a small amount of new oil is required, rather than several tanker loads.

Site benefits:

- Reduced outage durations, due to the very high speeds at which our vehicles operate.
- Reduced site access issues compared with replacing oil (because replacing oil in a 100,000 litre transformer requires 6 tankers to remove old oil and 6 to refill; this includes flushing oil).
- Minimal waste compared with replacing oil (because replacing oil requires the transformer to be flushed with 20% of the transformer oil volume, which cannot then be used for filling the transformer).



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OIL MANAGEMENT SERVICES

During a planned outage of Generator 8 at the Heysham 2 Power Station, Commercial Engineering Services (CES) organised for a National Grid mobile, high-tech oil processing unit to carry out services on site. Generator transformer 8 was refilled and the oil processed to the correct quality standard. Unit transformers 8C and 8D were flushed, drained, refilled and the new oil processed to the correct quality standard.

The customer found the Oil Management Unit (OMU) service and equipment to be excellent, our staff to be very helpful and accommodating, and the 24 hour operation of the OMU machinery to be very beneficial, because it reduced the time taken for the operation.

Peter Starkie (Contract Manager), for EDF added, “OMU staff worked in conjunction with station and other contractors to achieve the planned results. The staff attending site understood the scope and their interaction within a challenging programme to achieve the end result.”

Douglas Barker (Responsible Engineer), for EDF added, “We have now had 3 transformers refilled by the OMU working in conjunction with Shell and a further 2 transformers reprocessed. The quality of the flushing has been exceptional leading to better than expected results and benefits from the refills. The attention to detail, experience, environmental awareness and attitude of the OMU staff, while working on our nuclear site, has been exactly what we expect.”



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National Grid is a trading name for:
National Grid Electricity Transmission plc
Registered Office: 1-3 Strand, London WC2N 5EH
Registered in England and Wales, No 2366977

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