



Transport Operations

Report to WCSSG

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Introduction

International Nuclear Services (INS) is responsible for the international shipment of spent fuel, MOX, plutonium and high level waste (HLW) between the overseas utility customers and Sellafield. Though the INS subsidiary Pacific Nuclear Transport Limited (PNTL), INS also has responsibility for the same types of shipment from France to Japan. In order to discharge these responsibilities, INS operates a fleet of four vessels (three owned by PNTL, one by NDA), port facilities in Barrow and Dunkirk, and a fleet of flasks (again owned by PNTL or NDA). INS also makes use of other port facilities in the UK and overseas, perhaps most notably Workington. The purpose of this paper is to provide information on these operations to the WCSSG, particularly relating to the movement of material to and from Sellafield, through the Ports of Barrow and Workington.

International Nuclear Services is a subsidiary of Sellafield Ltd with 51% of its shares held by Sellafield Ltd and 49% held by NDA. INS employs around 150 people and is responsible for the commercial contracts for reprocessing and MOX as well as International Transport. INS holds a 62.5% shareholding in PNTL which employs around 140 seafarers.

Background

Shipments of spent fuel from overseas customers to Sellafield commenced in the late 1960s. Since that time, over 2000 flask movements over a distance in excess of five million miles have taken place without any incidents resulting in a release of radioactivity. Spent fuel transports from overseas customers to Sellafield and from Japan to France for all existing contracts have essentially been completed and INS is now concentrating on sending the products of reprocessing back to the overseas customers. There are however some shipments on material test reactor fuel which may pass through Sellafield en-route to the USA as part of the US Department of Energy's non-proliferation programme. A total of twelve shipments of HLW have been returned from France to Japan, completing their HLW returns. There have also been two shipments of MOX from Europe to Japan, one return MOX voyage and four shipments of MOX from Sellafield through France to Switzerland.

Barrow Marine Terminal

The Barrow Marine Terminal is leased by NDA from Associated Ports and operated on their behalf by INS. The most obvious facility at the port is the large crane used for loading and unloading flasks from the ships to rail wagons. This crane has recently been up rated from 120Te to 150Te safe working load to accommodate the heavier HLW flasks which are shortly to be transported from Sellafield. The Terminal however also provides safe and secure berthing for the vessels, including shore power supplies which are more environmentally



friendly than running the ships' diesel alternators while alongside. There is also accommodation for the terminal staff and provision for health physics monitoring of the flasks during cargo operations. Finally the terminal has emergency provision such as the helicopter pad and fire fighting equipment.

A typical operation at Barrow would be for a train to arrive from Sellafield with a number of flasks on dedicated railwagons. These would be marshalled on to the two rail lines which are parallel to the quayside ready for loading to the ship. The flasks would undergo health physics monitoring and be lifted from the railwagon into the ship where they would be bolted down in readiness for the sea voyage. Following completion of all the necessary paperwork, the ship would then be ready to depart from the port.

As part of our commitment to the local community in Barrow, INS and PNTL both make charitable donations in the Barrow area and there is a Ramsden Dock Terminal Stakeholder Group which meets twice per year to discuss operations at the terminal.

Ship Operations

The ships in the PNTL fleet are classified under the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on board Ships (INF code) as INF 3 vessels. This means that they are able to carry an unlimited amount of radioactivity which is most appropriate for voyages to Japan where the long distance means that it is most economic to maximise the quantity of material carried, subject to the customers' requirements. In Europe in contrast, particularly for MOX or Plutonium transport, the quantity of material carried is lower making an INF 2 ship appropriate. The NDA vessel used for these transports is the Atlantic Osprey.

All the vessels have safety features appropriate to their classification which includes in all cases enhanced buoyancy, additional fire fighting equipment, duplicated cargo cooling systems and an alternative source of electrical power. In addition, all officers hold certificates for the rank above (ie the Chief Officer will hold a Master's certificate). The INF 3 PNTL vessels have extra features over and above the INF 2 vessel such as a double hull.

Flasks

Spent Fuel, MOX, Plutonium and HLW all require to be carried in type B packages which are certified by the competent authority of the countries in which they are used. All these packages must meet the stringent requirements of the International Atomic Energy Agency which includes a series of tests designed to represent worst case real life accident scenarios. These include a 1m drop onto a steel punch aimed at the most vulnerable point on the flask, a 9m drop onto an unyielding surface, an all engulfing fire at 800°C for 30 minutes and immersion to 200m in water. Packages must be able to withstand all of these tests sequentially.



MOX shipments

Due to the long land transport element of MOX transport to European Utility Customers, these shipments must be undertaken by road rather than rail. This requirement is driven by security considerations because it is much easier to divert or reverse a road vehicle than a train. For this reason, the transport system for MOX deliveries to European Customers requires lightweight packages (still meeting all the type B test requirements) in high security vehicles. These are then loaded on to the Atlantic Osprey, normally at Workington. Similar arrangements will be used for plutonium shipments. In contrast, for MOX shipments to Japan, security considerations are dominated by the long sea voyage and use of heavy flasks which would be very difficult to remove from the vessel is more advantageous. The heavy flasks in turn require rail transport to the port.

Security

All MOX and plutonium shipments are defined as category 1 shipments under the Nuclear Industry Security Regulations. This means that they must be accompanied by an armed guard from the Civil Nuclear Constabulary (CNC) throughout the transport whether by road, rail or sea. INS have worked very closely with the CNC to develop security arrangements both for transport to the port and at sea on board the vessels. All category 1 shipments are approved by the Office of Civil Nuclear Security in advance.

Part of the security arrangements for any shipment, but particularly category 1 shipments, is the protection of sensitive information such as details of the route or timing. For this reason, INS cannot divulge details of transports in advance and when we do confirm transport operations are underway, we cannot reveal detailed route or arrival timing information. Similarly we cannot reveal the details of the security arrangements put in place for shipments. Within these constraints however, we always strive to be as open as possible about our shipments.

Future Plans

INS expects to continue to operate from the Barrow Marine Terminal for many years to deliver HLW to our overseas customers starting next year. MOX shipments to Japan from France are expected to recommence on a similar timescale and will be carried out jointly with shipments from SMP in due course.

We will also continue to use Workington for shipments of MOX from Sellafield to European customers on the Atlantic Osprey.