

## **BRIEFING FOR DSG**

### **WASTE SUBSTITUTION**

#### **Background**

Scottish Government is currently consulting on Dounreay Radioactive Waste Substitution. Consultation closes on 11th March.

There are five questions to respond from the consultation document, these are:

Q1: Do you agree that a waste substitution policy should be adopted for radioactive waste arising from overseas research reactor fuel reprocessing contracts at Dounreay?

Q2: Do you agree that substituting cemented Materials Test Reactor radioactive waste for Prototype Fast Reactor radioactive waste should be an available option to finalise the overseas contracts?

Q3: Do you agree that substituting vitrified radioactive waste from Sellafield for cemented Materials Test Reactor radioactive waste and/or Prototype Fast Reactor radioactive waste should be an available option to finalise the overseas contracts?

Q4: Do you agree with the proposals to ensure broad environmental neutrality for the United Kingdom?

Q5: Do you agree that all of the relevant implications of the proposed policy have been identified?

#### **Dounreay information**

There are 331 drums of material currently designated to be returned to MTR customer. As per commercial agreement, 123 drums of waste will be returned to Belgium. There will be a number of transports to return the waste.

In addition there are liquid wastes from foreign customers which have yet to be processed equating to some 150 to 200 drums of cemented product.

For other countries, the condition of the waste (cemented) that Dounreay produces is not suitable for return as customers wish to have a vitrified waste. Sellafield treats and vitrifies waste which customers could accept.

This could mean that Sellafield would return its waste to those countries who cannot accept the cemented waste form. Therefore DSRL may be left with approx 380 drums which would remain in the Dounreay inventory and stored along with some 6000 to 6500 drums of waste that will be generated from the operation and decommissioning of the site.

## **RETURN OF WASTE**

In the late 1980s and 1990s, Dounreay signed contracts to recycle fuel from reactors in Belgium, Denmark (for fuel of Italian origin), Germany, the Netherlands, Spain, France and Australia.

This business closed down in the late 1990s. Today, the conclusion of these contracts is a small but important part of the site closure programme.

This involves sending the customer quantities of nuclear material and radioactive waste arising from the work carried out on their fuel.

Three contracts – involving customers in France and Spain – have been concluded successfully.

For the remaining contracts, the radioactive waste associated with this work and due to be returned amounts to two per cent (of the radioactivity) of the intermediate-level waste at the site.

One of the customers has made a formal request for their waste to be sent in a glass form instead of the cement-based mix that is the standard waste product at Dounreay.

Dounreay does not produce waste in a glass form but another NDA site, at Sellafield in Cumbria, does.

If accepted, this proposal would result in an equivalent amount of radioactivity being sent to the customer from a different NDA stock. This is known as “waste substitution”.

It would also mean fewer transports abroad, since radioactivity can be concentrated in a smaller volume of glass than cement.

The Scottish and UK governments on December 3, 2010, opened a consultation on whether waste substitution should be permitted as part of the terms for closing the Dounreay contracts.

## **OVERSEAS FUEL**

Part of the site at Dounreay was devoted to the supply and recycling of specialist nuclear fuel.

A series of chemical plants, known as the Fuel Cycle Area, serviced research reactors in the UK and more than a dozen countries worldwide as well as looking after the needs of Dounreay's three reactors.

These plants recycled used fuel, dissolving the elements in acid and separating the re-usable nuclear materials from the radioactive waste. The recovered nuclear material then could be used again as new fuel.

Between 1958 and its closure in 1996, the materials test reactor reprocessing plant alone dissolved almost 13,000 fuel elements, of which almost 4000 came from reactors in Africa, Asia, Australia and Europe.

In 1976, the UK Government decided the operators of these reactors should in future take back their radioactive waste as well as the recovered materials.

Dounreay concentrated on servicing UK reactors after 1976.

In the late 1980s, when the UK Government decided to close down the fast reactor programme, UKAEA re-opened its chemical plants to overseas reactors. Its objective was to raise money to offset the cost of decommissioning the site's fast reactors.

Dounreay signed a series of new contracts that resulted in spent fuel arriving from Belgium, Denmark (of Italian origin), Germany, the Netherlands, Spain, France and Australia for storage and reprocessing.

The waste to be returned under these contracts was estimated to be equivalent to less than 500 of the standard 500-litre drums used at Dounreay for the conditioning of intermediate-level waste. This represents two per cent of the UK-owned waste at Dounreay. None of this waste has been returned to date.

By 1996, when a breakdown occurred in one of the chemical plants, more than 800 elements from overseas had been reprocessed, with less than a tonne of spent fuel from Belgium, Denmark, Germany, the Netherlands, Spain and France still to be done.

In 1998, UKAEA decided not to take in any new spent fuel (although an exception was made shortly afterwards, on the grounds of international security, for the arrival of a small amount of fuel airlifted from Georgia by the US Government.)

In 2001, following public consultation, the UK Government decided not to repair the chemical plant.

It is now being cleaned out and dismantled along with the other plants in the Fuel Cycle Area. One of these - the fuel fabrication plant - has already been demolished.

Today, a small but important part of the site closure programme is reaching agreements with historic customers to close their contracts. This needs to be done in a way that is compliant with UK Government policy about the return of foreign waste.

Dounreay no longer has plants to recycle the remaining spent fuel and the contracts do not allow it to be returned in its untreated form because the owners do not have specialist treatment facilities of their own.

It has been agreed in principle instead to send each customer an amount of new fuel and waste from UK stocks, equivalent to what would have been produced if the fuel had been reprocessed, with the UK retaining the spent fuel. The detailed arrangements are now the subject of negotiations. This is known as "advance allocation".

The spent fuel from Spain that Dounreay wasn't able to reprocess has been transferred to a third country.

In addition to spent fuel, the site also had contracts in place for unirradiated fuel belonging to other countries. Similarly, with the facilities to carry out work on this fuel now gone, the site is negotiating alternative arrangements to close these contracts, subject to a Government consultation document.

International Nuclear Services has taken over formal management responsibility from Dounreay Site Restoration Ltd for the site's overseas reprocessing contracts, on behalf of the Nuclear Decommissioning Authority.

The majority of these contracts were entered into by the UK Atomic Energy Authority during its management of Dounreay in the 1980s and 1990s.

Reprocessed ceased at Dounreay in 1996 and fuel fabrication in 2004.

The extant contracts transferred from the Atomic Energy Authority to the NDA in 2005.

Closure of these contracts is a small but important part of the site clean-up and shutdown programme.

INS is a wholly-owned subsidiary of the NDA and, as the NDA's sales agent, manages contracts and relationships with customers in the UK and overseas for irradiated fuel management services and the transport of nuclear materials.

The transfer of this responsibility will enable DSRL to continue to focus on the safe clean-up and demolition of the Dounreay site. In addition, synergy can be achieved by INS managing these contracts alongside those already being managed by INS on behalf of the NDA.