

## Health and Safety Executive team inspection of the control and supervision of operations at BNFL's Sellafield site<sup>1</sup>

### Background

The Nuclear Installations Inspectorate's (NII) team inspection of Sellafield came as a result of an apparent increase in the number of safety incidents at the site in the first few months of 1999, as well as issues raised by routine NII inspections<sup>2</sup>. The inspection's findings have led to the NII threatening to force BNFL to close down operations at the controversial nuclear site if safety standards are not improved within two months.

The inspection took place over 3 weeks, beginning in September 1999, and focused on:

- the management, control and supervision of BNFL's operations at the site
- the adequacy of resources and staffing
- incidents at the site

The report was originally meant to be published by the end of 1999.

### Findings:

The report concluded that:

- the site 'lacks a high quality safety management system'
- the site lacks sufficient resources to implement the existing safety management system
- there is no effective, independent inspection, auditing and review system within the company

The report highlights a 'decline in safety performance at the site' which it links to inadequate management structures and safety culture. As a result, the NII has threatened to close down operations at the site.

A similar safety audit of BNFL's activities at Sellafield took place in 1986 and resulted in a damning report on the company's practices, including its management, control and instrumentation issues, the containment of radioactivity, ventilation, decontamination, the transfer of radioactive materials, maintenance and staff training. BNFL was strongly criticised for delays in producing a fully developed safety case for B205, the only operating reprocessing plant then at the site<sup>3</sup>, for its short term approach

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<sup>1</sup> Nuclear Installations Inspectorate, February 2000

<sup>2</sup> HM Nuclear Installations Inspectorate, BNFL Sellafield and Drigg and UKAEA Windscale Quarterly Report for 1 April – 30 June 1999, <http://www.hse.gov.uk/nsd/index.htm>

<sup>3</sup> B205 reprocesses nuclear waste fuel from Magnox reactors, the oldest nuclear reactors in the UK. In 1994, a new reprocessing plant – THORP – began operating at Sellafield. THORP reprocesses oxide fuel from AGR and PWR reactors in the UK and abroad. THORP has been plagued with

to the maintenance and renewal of important areas of B205, and over inadequacies in its instructions and procedures<sup>4</sup>.

The 1986 safety audit resulted in changes to BNFL's site licence to impose a condition that specific maintenance measures be completed before plants could be restarted after shutdowns. This effectively meant that operations at the site could have been halted if the safety improvements demanded by the NII were not met.

As the nuclear industry's safety regulator, the NII has the power to stop BNFL's activities at Sellafield if it is not satisfied with the management and operation of the company's activities. Following Stephen Byer's statement that the management of BNFL is 'fundamentally flawed'<sup>5</sup>, and the growing evidence of company mismanagement in dealing with the growing stockpile of nuclear waste shown by the NII's own reports, it is time for this power to be exercised, and for reprocessing in the UK to stop.

## **Selection of incidents at Sellafield 1 January – 30 June 1999<sup>6</sup>:**

### **June 1999: Ground Contamination adjacent to B38**

Following the removal of some stored materials from a storage compound adjacent to B38, BNFL health physicists on 8 June 1999 found higher than expected radiation levels from an area of contaminated ground about 2 feet square. The area concerned had been used to store spare items from the B38 swarf retrieval facility since November 1996. HMNII's investigation of this event has concluded that BNFL failed to make adequate provisions to prevent the leakage and escape of radioactivity from the stored material, as is required by condition number 34 attached to the nuclear site licence. In considering the wider implications of this

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safety problems since it began operation, and is currently significantly behind its predicted throughput as a result of safety and operational problems. For more detailed information, see, for example, CORE briefings at

<http://www.core.furness.co.uk/newsapp/briefings/briefsmenu.asp>

<sup>4</sup> HM Nuclear Installations Inspectorate (1986), Safety Audit of BNFL Sellafield 1986, Vols 1 and 2, HMSO, ISBN 0 11 883894 6

<sup>5</sup> Stephen Byers, Trade and Industry secretary, The Independent, 16 February 2000

<sup>6</sup> HM Nuclear Installations Inspectorate, BNFL Sellafield and Drigg and UKAEA Windscale Quarterly Report for 1 January – 31 March 1999, 1 April – 30 June 1999, <http://www.hse.gov.uk/nsd/index.htm>

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event, the Inspectorate identified a number of other locations around the Sellafield site where the potential for a similar occurrence was evident.

#### **May 1999: Failure of a Safety Mechanism in B205 Magnox Reprocessing Plant**

On 27 May 1999, BNFL observed that both pumps on a criticality safety mechanism in the B205 solvent extraction equipment were out of service. Evidence from the plant records indicates that the equipment may have been unavailable for several days and BNFL staff had failed to recognise the failure.

#### **May 1999: Failure to Maintain and Test a Safety Mechanism in B311 Fuel Handling Plant**

On 26 May 1999, it was discovered that a uranium flask interlock door safety mechanism in B311 had not been maintained and tested within the time specified in the plant maintenance schedule.

#### **May 1999: Breach of Operating Rule in B311 Fuel Handling Plant**

On 8 May 1999, whilst carrying out work in the inlet cell, the shield doors were opened to allow fuel debris to be moved. This operation was in contravention of an Operating Rule. Investigation of the event by HMNII concluded that poor control and supervision of operations was a significant factor.

#### **April 1999: Waste Vitrification Plant Blockage**

On 10 April 1999 BNFL identified a blockage in a pipeline that carries HAL [Highly Active Liquors] within WVP [Waste Vitrification Plant]. The significance of this occurrence is that it is similar to an initiating event that could lead to a release of radioactivity and the occurrence modifies the frequency with which the initiating event is predicted to occur. Following discussions with BNFL, HMNII agreed that the plant could continue to operate to vitrify the remaining HAL within the plant prior to shutting down. The plant was subsequently shutdown. The location of this blockage is such that together with two other pre-existing blockages within the plant, only one of the two WVP lines can be operated. BNFL is now developing inspection and blockage clearance techniques to deal with the problem. BNFL is also developing a modification to the plant that will provide protection against the scenario of a blockage occurring in another part of the plant.

Subsequent discussions between the NII and BNFL revealed that a fourth blockage occurred some years ago. The significance of this fourth blockage is that had HMNII been aware of its occurrence, it is very unlikely that agreement would have been given for the resumption of WVP operations in November 1998 without BNFL installing the currently proposed modification.

**April 1999: Contamination event in B311 Fuel Handling Plant**

A routine survey on 11 April 1999 found particulate contamination in an area adjacent to a master slave manipulator (MSM) port. The area affected, which was restricted to that immediately surrounding the MSM port, was within a contamination controlled area and there was no indication that contamination had escaped from the controlled area. Investigations were carried out by both BNFL and HMNII. The HMNII investigation revealed a number of apparent weaknesses in BNFL's systems for the management of safety, particularly with the control and supervision of operations. This has been observed to be a factor in a number of recent events on the site. BNFL was requested to consider what measures need to be taken to make a positive and lasting effect on the safety culture in B311 and to inform HMNII of its proposals as soon as possible.

**March 1999: B803 Solvent Treatment Plant**

On 11 March 1999, the Solvent Treatment Plant, which is undergoing inactive commissioning, was evacuated when approximately 7m<sup>3</sup> of concentrated Nitric Acid was released into the building. The plant did not contain radioactive material, but the event had the potential to cause serious harm to personnel involved. The NII identified a number of areas for improvements to BNFL's arrangements for controlling work on the plant and consequently two Improvement Notices were issued in April.

HSE's Field Operations Directorate issued an Improvement Notice for inadequacies in BNFL's arrangements to ensure safe systems of work when plant and equipment is required to be isolated before work is undertaken. HMNII issued an Improvement Notice requiring BNFL to take appropriate measures to ensure that people working within STP are suitably qualified and experienced. In addition to these two areas, BNFL has also undertaken to make improvements in a number of other areas identified by HMNII's investigation.

**January 1999: Loss of Sealed Radioactive Source**

On 7 January 1999, BNFL notified HMNII that during a routine survey of sealed sources, it was discovered that a sealed radioactive source was missing. The missing source was a 100uCi (3.7MBq) Radium 226 source. HMNII investigated this event and in view of the findings subsequently carried out a site wide inspection of BNFL's arrangements for the accountancy and keeping of sealed sources. This cross site inspection, which was carried out in March 1999, revealed that even though BNFL had carried out an audit and had instituted some improvements, the arrangements across the site did not comply with the requirements of IRRs Regs 18,19 and 20.

After consultation with BNFL, an Improvement Notice was issued on 24 March 1999, requiring BNFL to make the necessary improvements by 30 September 1999.