

Progress on UKAEA's Response to the 1998 HSE/SEPA Audit of Dounreay

September 2000



Redundant oil tank compound prior to excavation to remove the seven tanks that were installed when Dounreay was an airfield during World War II.



Compound with all buildings and soil removed.

BACKGROUND

A detailed audit of the management of safety at United Kingdom Atomic Energy Authority Dounreay was carried out by the Health and Safety Executive (HSE) and the Scottish Environment Protection Agency (SEPA) in June 1998. The audit report was published on 1 September 1998 and made 143 recommendations.

The audit was carried out by a multidisciplinary team of Inspectors from HSE's Nuclear Installations Inspectorate (NII), its Field Operations Directorate (FOD), and an Inspector from the Scottish Environment Protection Agency (SEPA).

The first annual progress report was issued in September 1999. This is the second progress report to be issued jointly by HSE and SEPA, and it provides an update on the position reached by UKAEA in responding to the 143 recommendations.

UKAEA ACTION PLAN

UKAEA responded to the Audit by producing and publishing its Action Plan on 30 November 1998. The action plan divided the audit recommendations into the six theme groups indicated below:

This progress report addresses each of the theme groups identified and recommendations within each of the groups are highlighted to provide further information to illustrate the progress in some of the more significant areas.

Theme Groups

1. Safety Management System
2. Safety Culture
3. Management and Organisation
4. Human Resources and Training
5. Safety Cases
6. Operational Strategy
 - (i) Fuels
 - (ii) Decommissioning
 - (iii) Radioactive Waste

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HSE/SEPA ARRANGEMENTS FOR MONITORING UKAEA'S PROGRESS

Within NII there is an operational inspection unit which covers all of UKAEA's licensed sites including Dounreay. As well as normal regulatory inspection, this unit is responsible for monitoring UKAEA's response to the implementation of their audit Action Plan. This work is carried out in close liaison with SEPA, HSE's Field Operations Directorate and NII's own Assessment Units.

The procedures for close-out of audit recommendations were outlined in the last

issue of the progress report. In essence, before HSE/SEPA consider the close out of any recommendation, a detailed assessment of UKAEA's submission is carried out. For those recommendations which require UKAEA to establish new procedures or arrangements, we would normally require the recommendation to enter a six month review phase to ensure any such procedure has been adequately implemented: only after this will HSE/SEPA consider formally closing out the audit recommendation.

Before recommendations are closed out a detailed assessment is carried out.

PROGRESS MADE BY UKAEA IN RESPONSE TO THE AUDIT RECOMMENDATIONS

Currently, HSE/SEPA have closed out nine recommendations; however, twenty have been completed by UKAEA and have entered the six month review phase. A further fifty one recommendations (mainly in the management and safety culture areas) are expected to be closed or placed into the review phase in the near future.

It is important to note that the number of recommendations closed does not reflect the substantial amount of work undertaken by UKAEA in response to the Audit.

Many recommendations are complex and have interactions with other recommendations. Hence the response by UKAEA has to be equally detailed and comprehensive before HSE/SEPA are prepared to close these out.

However, whilst UKAEA has made good progress in addressing the recommendations associated with changes to their management system, some strategic recommendations, requiring extensive engineering commitment, are understandably some way from completion. Before this work can be started, design specifications must be prepared, followed by extensive planning and project management.



Maintenance Services Department - Works Control Daily Planning Meeting

When UKAEA launched its initial Action Plan, it was clear that a key to success would be the recruitment of experienced engineering and scientific staff. Whilst we are satisfied that UKAEA has been successful in achieving its initial recruitment targets, there are still some specialist vacancies to fill.

Recruitment to achieve Dounreay's commitment to decommission and restore the site is a considerable task and this is one area that HSE/SEPA will be monitoring carefully.

A key to success is the recruitment of engineering and scientific staff

The examples which follow illustrate the progress made by UKAEA in some of the more significant theme group areas.

THEME GROUP 1 Safety Management Systems

UKAEA has progressed well towards the closure of the majority of recommendations in the safety management systems and safety culture areas. In particular UKAEA has been proactive in learning from other organisations' experiences, thus removing the tendency to be self-referencing. The targets UKAEA set in these areas were in the main realistic and have been or should be achieved on programme within the very near future.

Significant work does however remain with two main corporate recommendations, numbers 1 and 7. These two recommendations essentially required UKAEA to put in place adequate corporate management procedures and to rationalise lower tier safety documentation in line with modern practice. Whilst progress has been made by UKAEA in meeting these recommendations, necessary revisions to corporate arrangements has led to delays.

The satisfactory completion of these corporate arrangements is fundamental to UKAEA having an integrated management system which is both comprehensive and user friendly covering safety, environmental and quality issues.

NII wishes to see a good product and it recognises that this may now take longer than originally envisaged. However, it is only with the promised full commitment and effective use of resources by UKAEA that the target date of the end of 2001 will be met. NII believe the key issue is to have a clear integration between corporate instructions and local working practices.

THEME GROUP 2 Safety Culture

Of the sixteen recommendations grouped under this heading, work has been completed by UKAEA on eleven, to programme.

The initiatives which have already been introduced in this area will need to become embedded in UKAEA's routine working arrangements. Hence, HSE/SEPA has placed these recommendations into review prior to formal close out.

THEME GROUP 3 Management and Organisation

UKAEA has continued to make progress towards establishing an authoritative source of technical expertise for the Dounreay site. Design standards and codes of practice continue to be developed, which should contribute towards ensuring that engineering designs meet modern standards. Recruitment to the new engineering group, which forms the main focus of this expertise, has taken place and will continue to support the engineering work programme.

UKAEA has taken significant steps towards ensuring that it, as the licensee, retains a suitable level of control and supervision of contractors. A revised policy, and supporting guidance, on the use and control of contractors on UKAEA sites has been issued, and UKAEA has monitored the implementation of this policy at Dounreay. NII will continue to seek reassurance that the policy is properly understood and applied, and that it is effective.

A key finding of the HSE/SEPA audit was that organisational changes made within UKAEA had weakened its management and technical base at Dounreay such that it was not in a position to deliver its main mission, the decommissioning of the Dounreay site. UKAEA was considered not to have sufficient influence and control within the Dounreay operations management team and was not an intelligent customer for activities and services provided by others.

As a consequence of these findings, all senior managers at the Dounreay site are now UKAEA staff and the Management Support Contract which consisted of a contractors' consortium will be terminated in 2001. From now on, all contractor activities will be undertaken against agreed management arrangements which ensure that UKAEA remains in control.

At the time of the audit the nuclear site licence had thirty-five licence conditions. However, since the HSE/SEPA audit in 1998, the licence has been changed to incorporate an additional condition, Licence Condition 36, Control of Organisational Change. This condition requires each licensee to put in place

and implement adequate arrangements to control any change to its organisational structure or resources which may affect safety. This licence condition will ensure that licensees cannot make significant changes to their staffing structure without considering fully the safety implications. Where appropriate, such changes may require submission to HSE and will then be subject to examination by NII.

THEME GROUP 4 Human Resources and Training

UKAEA has now completed an initial identification of the core skills and competencies needed to fulfil its safety-related duties, and analysed the competencies of current employees. This data has been entered onto an enhanced computer-based information system which provides a sound framework for managing UKAEA's human resources and for ensuring that safety functions are identified and carried out by suitably qualified and experienced persons.

Succession management procedures have been developed and implemented to ensure that suitable replacements will be available in the event of the departure of any personnel holding safety-related posts.

UKAEA is now in the process of recruiting a Training Manager to support the recruitment and training of staff at Dounreay. Although UKAEA has taken significant and positive steps to establish a sound training and human resources infrastructure at Dounreay, many significant challenges remain. Much reliance will continue to be placed on contractors, and NII will monitor UKAEA's recruitment strategy to ensure that sufficient suitably qualified and experienced UKAEA employees are in place to manage the contractors and to maintain an intelligent customer capability.

THEME GROUP 5 Safety Cases

UKAEA has now issued to NII the first safety case (D9867 Retrievable High Alpha, Low Beta Gamma Solid Waste Store) to be written to the revised UKAEA Dounreay "modern standards" format. This safety case is currently

being reviewed by the NII. However, UKAEA experience in producing this safety case and progressing others has shown that the work necessary to review engineering standards is greater than expected. Hence UKAEA has recently advised NII of some delays to its safety case revision programme. Whilst we are fully supportive of the need to achieve high standards we will be discussing this situation with UKAEA to see if the necessary delays have been minimised. A great deal of effort has been employed by UKAEA to progress close out of the other recommendations within the Safety Case Theme Group. However for some of the recommendations, further work is scheduled to be carried out by UKAEA before they are submitted for review or close-out.

THEME GROUP 6 (i) Operational Strategy - Fuels

In the previous issue of this report it was stated that UKAEA was carrying out an options study to develop a strategy for dealing with the irradiated fuel from the Prototype Fast Reactor. An options document covering these aspects was submitted by UKAEA to the Department of Trade and Industry (DTI). Following that, in April, UKAEA published a public consultation paper entitled 'Making the Right Choice' which formed an information package on the options for the future management of the Dounreay Prototype Fast Reactor (PFR) fuels.

In addition, SEPA's new site discharge authorisation required a Best Practicable Environmental Options (BPEO) study to be carried out to assist the decision on the management of the PFR fuel. The purpose of the BPEO study was to ensure that all feasible options had been identified to allow a comparison between the environmental factors on the health and safety of people and their environment to be compared with the practicable factors concerned with technical considerations and financial costs.

Three strategies were identified. Firstly, a Dounreay strategy in which the irradiated and unirradiated fuels are reprocessed at Dounreay. Secondly a hybrid strategy in which the irradiated PFR fuel is reprocessed at BNFL's Thermal Oxide Reprocessing Plant (THORP) at Sellafield and the unirradiated fuel is reprocessed at Dounreay or overseas. Thirdly, a minimum treatment strategy in which all PFR fuel is put into a suitable form for long term storage.

A decision on the outcome of the DTI's consultation is presently awaited.



Presentation of ISO 14001 environmental management certificate to Dounreay by former SEPA Chief Executive Alasdair Paton

THEME GROUP 6 (ii) Operational Strategy - Decommissioning

The task faced by UKAEA to decommission the Dounreay site is considerable. Audit recommendation 45 required UKAEA to develop an integrated decommissioning strategy for the Dounreay site. Recommendation 69 required UKAEA to develop a strategic plan for the handling, treatment, storage and disposal of all radioactive waste on site. UKAEA's response to both of these major recommendations (which in turn will answer many detailed recommendations) is to produce a Site Restoration Plan which will show in detail how the site will be restored from its present condition.

HSE/SEPA received UKAEA's interim Restoration Plan at the end of 1999 and NII has provided feedback and assessment advice since then on behalf of the regulators.

In early September 2000, UKAEA gave both NII and SEPA a presentation on their latest draft of the Dounreay Restoration Plan prior to the issue of their finalised plan later in the year. The presentation outlined the substantial amount of work undertaken by UKAEA in producing the plan and highlighted the considerable depth and details of their proposals.

NII is also considering Approving UKAEA's arrangements for producing and/or modifying the Restoration Plan, and possibly a top tier "milestones"

document. But, we are mindful that any such Approval should not place any restrictions which could in itself introduce undue delays to decommissioning. Also, the Restoration Plan would be considered as part of SEPA's review of the UKAEA's annual discharge authorisation for the site.

Whilst UKAEA has some existing facilities on site to support limited decommissioning, to allow this to proceed at an accelerated rate, in line with UKAEA's current proposals, requires major construction work to proceed. Hence, integrated with the decommissioning of the site, Dounreay must construct about 20 new facilities to treat fuel and process and store the waste. Many of these facilities must be constructed early in the decommissioning programme if the overall site objective is to be met.

THEME GROUP 6 (III) Operational Strategy - Radioactive Waste

Recommendation 60 required UKAEA to ensure that the decontamination and demolition of building D8550 and the PUMA facility were carried out to programme.

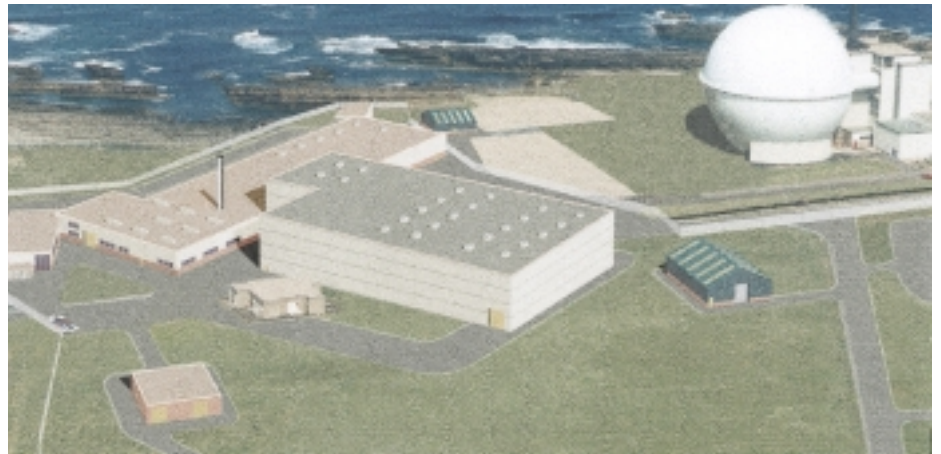
The audit team's concern was that the decommissioning of plutonium facilities should be carried out as soon as reasonably practicable as plutonium decays to americium which is a gamma emitting isotope.



Packing waste from decommissioning the PUMA cell which had been used for criticality experiments.

Since the audit, UKAEA has constructed a changeroom facility and improved the ventilation system. Significant progress has been made in recovering waste and redundant plant and equipment from the PUMA facility (see photograph).

Recommendation 77 of the audit recommended the early construction of a versatile intermediate level waste (ILW) treatment plant to deal with the waste arising from the Dounreay Shaft, the Wet Silo and other redundant facilities.



An artists impression of the proposed new facilities for packing the waste retrieved from the shaft and silo.

This facility, for the processing and storage of large items of solid intermediate level waste is paramount to the timely decommissioning of the Dounreay site.

Currently, the only dedicated plant for the conditioning of liquid ILW is the Dounreay Cementation Plant. Whilst this plant can handle some solid ILW it has a very limited throughput capacity and no conditioning capability for solid waste.

After discussions with NII and SEPA, UKAEA has committed to bring an ILW processing plant forward in their site restoration plan.

SITE ELECTRICAL SUPPLIES

The failure of the 11 kV electrical system within the Fuel Cycle Area (FCA) at Dounreay in May 1998, after a cable was damaged by a mechanical digger, led to the audit of the management of safety at Dounreay being brought forward.

The audit made a number of recommendations regarding the site electrical supplies. Recommendation 117 required UKAEA to analyse the response of the electrical system and its protection and carry out changes to

ensure that, as far as is reasonably practicable, only faulty sections of the distribution system are disconnected when faults occur.

UKAEA has carried out major improvements to the site electrical supplies, including the installation of modern electrical protection devices, to make the system robust to incidents such as cable strikes or other faults on the electrical system. Additionally, two new diesel alternators have been installed to supply power to the main ventilation fans.

The alternators will now support the stack fans in the event of an electrical failure. The Guaranteed Interruptible Distribution (GID) system within the FCA that backs up a wide range of equipment required for safety has also been reinforced.

In addition, a detailed analysis of the modified Dounreay electrical distribution system was carried out by UKAEA to demonstrate that the improved system was stable under all credible fault



Two new 800kVA diesel alternators in weatherproof enclosures. Installed and engineered to provide back-up electricity supply to the fuel cycle area ventilation system fans.

conditions. This analysis identified some deficiencies with the old protection relays and these have now been replaced with modern devices.

Although UKAEA has made good progress in this area, there are still some detailed control and instrumentation issues to address; such as the continuing presence of Vulcanized Rubber Insulated (VRI) wiring in many older facilities at Dounreay. The insulating rubber of this cabling becomes brittle with time and will need to be replaced before faults occur. A survey of the site has been completed by UKAEA and both short and long term strategies for replacing these cables are being developed, linked to their safety significance.

OVERALL POSITION WITH SITE ACTION PLAN

HSE/SEPA recognise that although some recommendations can be closed out fairly quickly, a large number will not be considered as being complete for a considerable time, for example, emptying the wet silo. The position by the end of August 2000 was that 9 recommendations had been formally closed out, 10 are expected to be closed out very soon, a further 10 had been essentially completed and had been moved into the review phase, and the responses to another 51 had been completed by UKAEA and submitted to HSE/SEPA for consideration for close out or review.

As mentioned earlier, HSE remains concerned about UKAEA's ability to recruit sufficient staff of the right experience to successfully decommission the site in accordance with its programme. UKAEA has indicated its proposal to enter alliancing arrangements with contractors for the construction of major facilities. However, in such circumstances, HSE will need to be satisfied that UKAEA meets fully its responsibilities under the nuclear site licence and ensure that it remains in control and an intelligent customer for its contracted services.



FUTURE PROCESS FOR CLOSING OUT THE RECOMMENDATIONS

As stated previously, the amount of work undertaken by UKAEA is not reflected by the number of recommendations which have been closed out due to the complexity and long term nature of the actions.

Typically, those recommendations that have been closed out have been associated with specific plant improvements which UKAEA has been able to complete within a short time scale. For example, Recommendation 130 was for UKAEA to review the adequacy of the ventilation system in a suite of shielded cells in D2670 in its Fuel Cycle Area. A review was carried out by UKAEA which identified the need for additional filtration which was subsequently installed.

The remaining recommendations made in the HSE/SEPA safety audit identified the need for UKAEA to carry out a wide range of activities which should be completed in the longer term, such as the decommissioning of redundant buildings and the construction of new facilities.

Clearly, in the case of those recommendations which have very long timescales, it is not ideal for HSE/SEPA to wait until all of the work has been carried out before closing out the audit recommendation. Instead, for such recommendation NII proposes to adopt an alternative regulatory approach which

is consistent with the manner in which, for example, long term decommissioning projects are regulated at other licensed sites.

ONE WAY OF CLOSING OUT SOME OF THE LONG TERM RECOMMENDATIONS MAY BE OUR APPROVAL OF PART OF THE SITE RESTORATION PLAN.

Hence we are currently discussing close out criteria with UKAEA for each recommendation which will allow HSE/SEPA to close an action when we have confidence that arrangements are in place and ongoing to complete the tasks to agreed timescales.

One way of closing out some of the long term recommendations may be our Approval of part of the Site Restoration Plan. This will allow our attention to focus on the main task of the site which is to decommission safely. This would ensure that UKAEA's progress can be monitored as part of NII's routine inspection activities. Also, UKAEA's progress towards the completion of specific milestones will be progressed during annual meetings with UKAEA senior management.

Future Reporting Intentions

Quarterly Reports will continue to be provided to the Dounreay Local Liaison Committee (LLC) by both the NII and SEPA Site Inspectors. The NII reports can be accessed on HSE's Internet web site at the address given below. The NII Site Inspector and the SEPA Inspector will continue to provide oral reports to the Dounreay LLC at its 6-monthly meetings.

HSE/SEPA intend to issue annual progress reports until we are in a position to produce a close out report. Current expectations are that this may be next year or 2002, but the date clearly depends on the adequacy of UKAEA's response to our recommendations.



ACKNOWLEDGEMENTS

HSE/SEPA wish to thank UKAEA for providing the photographs used in this report.

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This information is available at: <http://www.open.gov.uk/hse/nsd/nsdhome.htm> From November 2000