



Main Findings of the Commission's Article 35 verification at Dounreay.

Area: UKAEA Dounreay, Caithness, North of Scotland, UK

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Verification team: A. Janssens (team leader)
S. Vadé
S. Van der Stricht
H. Puchta

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Introduction

Article 35 of the Euratom Treaty requires that each Member State shall establish facilities necessary to carry out continuous monitoring of the levels of radioactivity in air, water and soil and to ensure compliance with the basic safety standards. Article 35 also gives the European Commission the right of access to such facilities in order that it may verify their operation and efficiency.

For the purpose of such a review, a verification team visited the North of Scotland and the Dounreay nuclear site operated by the United Kingdom Atomic Energy Authority (UKAEA). Meetings were held with The Scottish Office at Edinburgh. Also visited were the Scottish Environment Protection Agency (SEPA) at Stirling and the radio-analytical laboratories of the National Radiological Protection Board (NRPB) at Glasgow. The NRPB is contracted by SEPA to carry out its independent environmental monitoring programme.

Over the past few years a series of issues have focussed attention on the Dounreay nuclear complex, culminating in a safety audit carried out by Health and Safety Executive (HSE) and SEPA. Issues of overall management, safety culture and waste management as raised in the HSE/SEPA safety audit report are outside the scope of verifications under Article 35 of the Euratom Treaty. However, the verification activities that were carried out took into account those aspects of the report which have implications for the monitoring of radioactive effluents or with levels of radioactivity in the environment.

The verification activities that were carried out related to the technical facilities for monitoring gaseous and liquid discharges from the Dounreay site and to the programmes put in place by the operator and by the authorities for monitoring levels of radioactivity in the environment around the site.

The verification activities encompassed the following audits:

- technical adequacy and functionality of monitoring equipment,
- technical adequacy and functionality of measurement equipment in the laboratories analysing effluent and environmental samples,
- adequacy of procedures (working instructions) and the existence of an overall quality assurance system,
- adequate reporting of monitoring and analysis results,
- consistency between measurement records and reported values.

With respect to the UKAEA Dounreay site verification activities were focused on those discharge points that, since the 1993 Article 35 verification visit, had been subject to modification, avoiding in general a duplication of satisfactory verification activities as performed that year. Therefore the following facilities were not subject to verification: the Dounreay Fast Reactor (DFR), the Prototype Fast Reactor (PFR) and the Low Active Effluent Collection and Disposal Plant housing the liquid effluent discharge tanks.

However, taking into account recent events with respect to the Fuel Cycle Area main aerial discharge stack (as per specific HSE/SEPA Safety Audit Report recommendations and SEPA's relevant Enforcement Notices), it was decided that comparatively more attention would be paid to the monitoring facilities of this stack.

In addition the UK authorities proposed, on a voluntary basis, a verification programme covering the matters in which the verification team had expressed special interest, in particular with regard to on-site waste disposal facilities, including the Dounreay Shaft.

The present report gives an overview of the main findings of the verification team and corresponding recommendations. These recommendations are addressed to the UK authorities.

1. Main findings with respect to UKAEA Dounreay

1.1 Monitoring of gaseous and liquid effluents

FCA main stack monitoring arrangements for isokinetic sampling have been improved since 1993. The new aerial discharge sampling station, providing additional monitoring capacity, was inspected without giving rise to particular remarks. The FCA main stack monitoring provisions are adequate.

Following the FCA main stack power supply failure in 1998, UKAEA started a programme to provide each individual on-site stack with its own back-up power generator.

Subsequent to UKAEA notifying SEPA that, for the period 1996-1998, gaseous radioactivity discharge data (FCA main stack) had been under-recorded and under-reported, SEPA served an Enforcement Notice requesting that gaseous discharge data records be validated for the period 1993-1998 and, where appropriate, corrected. The under-recording and under-reporting only affected a limited number of radionuclides and did not lead to any breaches of authorised discharge levels. The team satisfactorily verified the status of implementation of the Enforcement Notice by checking the amended procedures and verifying the validity of the amended gaseous discharge data.

The team recommends SEPA to ensure that procedures are put in place to allow prompt detection of failures in quality assurance and control programmes.

Three minor stacks were designated for verification: the Marshall Laboratory, WRACS (Waste Receipt Assay Characterisation and Supercompaction facility, being commissioned at the time of the visit) and the Sodium Disposal Facility. Following an inspection by SEPA, UKAEA have implemented the monitoring regime for minor stacks as required in the new Authorisation (in draft at the time of the visit) which also provides discharge limits for all the minor stacks on site. The current Authorisation does not contain discharge limits for minor stacks.

At the Marshall Laboratory the verification team noted the absence of provisions for continuous alpha monitoring and therefore recommends UKAEA to implement such monitoring.

The Sodium Disposal Facility, operated by AEA Technology is currently closed down under a SEPA Prohibition Notice served in 1997 because of inadequate facilities for monitoring and control of gaseous effluents (tritium in particular).

The verification team, after having paid a visit to the Sodium Disposal Plant to verify the existing effluent monitoring provisions and having witnessed the inadequacy of the current systems, considers the Prohibition Notice to be fully justified and recommends that remedial action be taken before resuming operation.

The gaseous effluent monitoring facilities for WRACS are in line with modern standards.

A visit was paid to the Low Level Liquid Effluent Treatment Plant (LLETP, currently under construction) in order to observe the monitoring provisions already in place or under construction. The LLETP is expected to replace the obsolete Low Active Effluent Collection and Disposal Plant during the year 2000. It is the verification team's opinion that the LLETP will improve UKAEA's future control over liquid effluent discharges.

Special attention was paid to data management and quality assurance at the effluent laboratories analysing gaseous as well as liquid discharge samples. A series of spot checks on randomly chosen data sets were performed to satisfaction. Internal quality assurance and control are adequate. Sample management, analytical procedures and record keeping revealed no departure from standards. Data management is consistent, adequate archiving of results is in place. Maintenance and calibration procedures with respect to analytical measurement devices and monitoring equipment are well organised.

1.2 Environmental monitoring around the Dounreay site

The verification team designated the air sampler located at Shebster Water Treatment Works for inspection. At Shebster the air sampler was not in operation when the verification team arrived, its power supply being switched off. The operator told the verification team that the device had been checked the week before the verification visit without encountering any problems. Subsequently another sampling location was submitted to verification and found to be functioning properly.

The verification team recommends UKAEA to fit its environmental monitoring stations with guaranteed power supply systems and to implement a remote automatic warning system in case of failure.

The verification team noted that the amount of samples collected with respect to lobster, salmon and whelks for the year 1998 had been insufficient, thus affecting the availability of Sr-90 data.

The verification team recommends that in future either additional samples be taken until such quantities are gathered which allow a full implementation of the environmental monitoring programme or, where a sample type is not available in sufficient quantity, that this be reported and documented, thus enabling SEPA to take appropriate measures.

As contractor to UKAEA, AEA Technology carries out the Statutory Environmental Monitoring Programme agreed between SEPA and UKAEA. Data are transmitted by UKAEA to SEPA as required in the Authorisation. AEA Technology has prepared, since 1997, the yearly reports on the environmental monitoring programmes in and around Dounreay. These reports, after review by UKAEA, are made public.

Internal quality assurance and control at the UKAEA environmental laboratories are adequate. Sample management, analytical procedures and record keeping revealed no departure from standards. Data management is consistent and adequate archiving of results obtained is in place. Maintenance and calibration procedures with respect to analytical measurement devices and monitoring equipment are well organised.

The verification team endorses the recommendations made in the 1998 SEPA/NRPB report on radioactive particles in the Dounreay marine environment as well as UKAEA's intended investigative programme to establish definitively the origin of the particles.

A clear demonstration of the source(s) of particles and their likely future movement and eventual dispersion is needed to provide a reliable estimate of the risk to the public at Dounreay and the surrounding areas. The Commission would appreciate being kept informed about further investigation results and envisaged remedial actions.

Reassurance monitoring of beaches must continue and be expanded where members of the public potentially may encounter radioactive particles. Subsequent to the 1998 SEPA/NRPB report, and more in particular with respect to recommendations made therein for improved beach monitoring, AEA Technology developed a vehicle-mounted monitoring system.

The verification team recommends the extensive use of the vehicle-mounted beach monitoring system which, in conjunction with the frequency and extent of beach monitoring SEPA is requesting in the new draft Authorisations, will ensure an appropriate monitoring programme of public beaches around Dounreay.

1.3 Waste disposal facilities

The verification team visited the Low Level Waste Pits and observed that drainage pumps are present for each individual pit, extracting water infiltrating from the water table in order to avoid contamination of the surrounding bedrock. Extracted water is sent to the site's low

active drain network and from there to the liquid effluent discharge tanks at the Low Active Effluent Collection and Disposal Plant.

The verification team visited the surface plant above the Shaft and observed the drainage system for extracting ground water accumulating in the Shaft and the concrete wall designed to collect rainwater run-off.

The verification team recommends that the boreholes (that are part of the hydrogeological survey undertaken around the Shaft) be used for environmental monitoring purposes insofar as frequent analysis of water samples extracted from these boreholes may monitor any activity escaping from the Shaft to the environment. The Commission would appreciate receiving a copy of the final report on these hydrogeological investigations and being kept informed about future developments.

2. Main findings with respect to SEPA

2.1 Independent environmental monitoring around UKAEA Dounreay

Since the 1993 Art.35 verification, the monitoring programme has not been modified except for the discontinuation of drycloth filter monitoring decided in 1997. SEPA is currently evaluating whether medium velocity air samplers should replace drycloth filters.

The verification team finds that the installation of independent medium velocity air samplers would be an advantage and recommends that SEPA gives consideration to this.

2.2 Environmental data management at SEPA's Head Office

The audit of the environmental data management structure at the SEPA Head Office revealed that there is room for improvement. It is acknowledged that SEPA became operational recently (in 1996, as an independent regulatory body). However,

The verification team recommends SEPA to integrate the historical set of environmental data it inherited from the Scottish Office into its present electronic data management tool. The present split between the two sets of data is not satisfactory.

The verification team also recommends SEPA to ensure permanent availability of competence in the handling of its electronic data management tool.

3. Main findings with respect to NRPB

The laboratory is equipped with state-of-the-art equipment for radiochemical preparation and analysis of environmental samples. It was noted that particular attention is given to background reduction, especially for liquid scintillation counting.

It was also noted that lower limits of detection are frequently well below those required by SEPA. Significant results above the lower limits of detection but below SEPA requirements

are not necessarily reported but are brought to the attention of and discussed with SEPA during statutory meetings.

Quality assurance comprises controlled documentation, annual audits, yearly proficiency testing of all staff members and intercomparison exercises. Peers systematically check manual calculations. Data processing and archiving is carried out electronically (CD-ROM archive).

The verification team was satisfied about the efficiency of the analytical methods used, data management, data transmission and archiving.

The verification activities performed do not give rise to any specific recommendation.

4. Conclusion

The visit was successful and the objectives of the review were met. The verification team noted that the UK authorities had identified a number of failures and that they intervened to have the situation corrected. The team in particular noted the existence of a programme to investigate the source and extent of contamination of the marine environment with radioactive particles, and the Commission would appreciate being kept informed of the results. Within the remit of verification activities under Article 35 of the Euratom Treaty the report confirms that, with regard to the monitoring of aerial and liquid discharges and of levels of radioactivity in the environment, the situation is broadly satisfactory. Nevertheless, a series of recommendations for further improvement have been made.

A. Janssens
Team leader