



Department for
Business, Energy
& Industrial Strategy

Verification under the terms of Article 35 of the Euratom Treaty

Technical Report

**UNITED KINGDOM
Torness Nuclear Power Plant**

**Government Response to recommendations after monitoring of
radioactive discharges to the environment**

20 December 2018

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 ensure compliance with the Basic Safety Standards.

Article 35 also gives the European Union Commission (EUC) the right of access to such facilities in order to verify their operation and efficiency.

The Radiation Protection and Nuclear Safety Unit (ENER D.3) of the European Commission's Directorate-General for Energy is responsible for undertaking these verifications.

The main purpose of verifications performed under Article 35 of the Euratom Treaty is to provide an independent assessment of the adequacy of monitoring facilities for:

1. Liquid and airborne discharges of radioactivity into the environment by a site;
2. Levels of environmental radioactivity at the site perimeter and in the marine, terrestrial and aquatic environment around the site, for all relevant pathways;
3. Levels of environmental radioactivity on the territory of the Member State.

For the purpose of such a review, a verification team from the EUC's Directorate-General for Energy visited the United Kingdom on 24 – 27 October 2016. This mission dealt with:

1. Monitoring of radioactivity in liquid and gaseous discharges at the Torness nuclear power plant;
2. Environmental radiological monitoring programme and activities as implemented in the vicinity of the Torness Nuclear Power Plant (TNPP), including sampling and monitoring systems, analytical methods, quality assurance and control aspects, reporting, etc.;
3. Measuring laboratories, in particular infrastructure, analytical methods, quality assurance and control aspects, as well as reporting.

MAIN CONCLUSIONS OF THE VERIFICATION

A report detailing the main conclusions by the verification team, referenced UK 19-04, was issued on 8 January 2018. These are summarised below.

All verifications that had been planned by the verification team were completed successfully. The information supplied by the UK authorities in advance of the visit, as well as the additional documentation received during and after the verification was useful.

1. The verification activities that were performed demonstrated that the facilities necessary to carry out continuous monitoring of levels of radioactivity in the air, water and soil on and around the TNPP site are adequate. The Commission could verify the operation and efficiency of a representative part of these facilities.

2. The verification activities that were performed demonstrated that the facilities necessary to carry out continuous monitoring of levels of radioactivity in the gaseous and liquid discharges at the TNPP site are adequate. The Commission could verify the operation and efficiency of these facilities.

3. The following technical recommendations were formulated:

a. Concerning the **monitoring of gaseous discharges** (section 9.2.2 of the Technical Report) the verification team recommended modernisation of the Gaseous Activity Monitoring (GAM) Systems, in particular the computer controlling the systems. In this context, the team recommended that consideration should be given to whether there is a need to install additional back-up systems for the GAM monitors. In addition, as a matter of good laboratory practice, the verification team recommended regular control and long-term trend monitoring of the HPGe-detector resolution (width of the ^{60}Co peak at 1332 keV).

b. Concerning the **TNPP base room laboratory** for radioactive effluent samples (section 9.3.1 of the TR), as a matter of good laboratory practice, the verification team recommended regular control and long-term trend monitoring of the HPGe-detector resolution (width of the ^{60}Co peak at 1332 keV).

c. Concerning the **TNPP radiochemistry laboratory** for radioactive effluent samples (section 9.3.2 of the Technical Report), the verification team recommended more intensive participation in proficiency tests and intercomparison exercises.

d. Concerning the **TNPP laboratory for environmental samples** (section 9.3.3 of the Technical Report), the verification team suggested implementing a more secure and permanent system of recording sample progress. Furthermore, trending of instrument calibration should be implemented, together with logging of instrument maintenance problems. In this respect, the team noted that integration of the laboratory into the already existing Laboratory Information Management System (LIMS) system would be an asset to facilitate all record keeping.

Notwithstanding these remarks, the verified parts of the TNPP discharge monitoring system, on-site environment monitoring facilities and the national monitoring system for environmental radioactivity in the plant vicinity were found to be in conformity with the provisions laid down under Article 35 of the Euratom Treaty.

4. The **detailed verification findings and ensuing recommendations** were compiled in the 'Technical Report' that was addressed to the UK "Competent Authorities" through the United Kingdom Permanent Representation to the European Union.

5. The EUC services requested a report on the implementation of the recommendations from the United Kingdom authorities, including detail on any significant changes in the set-up of the monitoring systems before the end of 2018. Based on this report, the EUC will consider the need for a follow-up verification.

6. The verification team acknowledged the excellent co-operation it received from all persons involved in the activities it performed.

IMPLEMENTATION OF THE RECOMMENDATIONS

All of the recommendations were addressed to EDF, the operator of the Torness Nuclear Power Plant. Responses to the recommendations are as follows:

Recommendation A: Monitoring of gaseous discharges

The need to upgrade GAM Systems has been established as an EDF Energy Advanced Gas-cooled Reactor (AGR) fleet-wide issue and a programme of system replacement has begun. New equipment has been installed and commissioned on two stations and installed but not yet commissioned at a third. The necessary equipment for Torness has been purchased and factory acceptance testing has been completed. There is £250,000 allocated in the 2019 budget to complete the installation at Torness on both reactors.

No additional back-up systems will be installed: The provision of bottled samples and the diverse system of Burst Can Detection is considered adequate. The new GAM equipment will have a through life management strategy, and will be supported by the manufacturer. The fleet will hold strategic spares.

Regular control and long-term trending of the existing HPGe detector resolution is now being carried out by Nuclear Safety Group on the ^{41}Ar peak at 1294 keV, which is assessed a suitable alternative to a ^{60}Co peak at 1332 keV.

Recommendation B: TNPP Base Room Laboratory

Regular control and long-term trend monitoring of the HPGe-detector resolution is now carried out for the TNPP base room laboratory by recording and plotting details of the standard and background checks. The 59, 604, 1115 and 1865 keV peaks are used to monitor Total Activity, Counts Per Second (CPS), Full Width at Half Maximum (FWHM) and Channel keV for each energy. The checks are run weekly: The data is entered into the spreadsheet and trending graphs are produced. This is the same for both the Radiochemistry Lab and the District Survey Lab so that performance can be reviewed and compared.

The current gamma spec standard (Eckert & Zeigler Type 8701 mixed gamma standard) being used does not contain Co-60 which is why we do not use the 1332 keV peak. The new standard (National Physical Laboratory (NPL) R08 Mixed Radionuclide Standard Solution) does contain Co-60. The trending will continue to be done over a range of energies but the isotopes being used will change.

Recommendation C: TNPP Radiochemistry Laboratory

Torness have taken part in the National Physical Laboratory (NPL) inter-comparison study where NPL provide a sample which is analysed at the station, the data returned to NPL who then provide the actual results and supporting information about how the data compared.

Since the audit, Torness have also obtained various test marine samples from The Centre for Environment, Fisheries and Aquaculture Science (Cefas) which were analysed, and the results sent back to Cefas for comparison. The samples have also been sent to all other stations in the fleet to run as a fleet inter-comparison. Liquid samples are routinely sent to the National Nuclear Laboratory (NNL) and Public Health England (PHE) for analysis. Torness have worked with The Scottish Environment Protection Agency to change the samples that are used so that they are the same as those tested by NNL. This allows a check of test data against two other labs. The fleet Discharge and District Survey (DADS) group have also been engaged in looking into other options for fleet inter-comparison testing.

Recommendation D: NPP laboratory for environmental samples

In the Torness laboratory for environmental samples, all samples received are now logged into the LIMS system immediately. This system is used to track the progress of the sample through analysis and provides a secure and permanent record.

Trending of instrument calibration and instrument maintenance problems are now recorded in an Excel spreadsheet which has been set up to record return to service criteria for analytical equipment. These include records of routine services, failures and calibrations. Once entered into the spreadsheet, the paper records are maintained in a folder in the Torness Environmental Safety Group office, this system will be maintained until they can be transferred to the Torness LIMS system. The LIMS system was upgraded in mid-2018 and with the additional scope that this creates it is planned to include records of any instrument calibration and instrument maintenance in the future.

ADDITIONAL INFORMATION

The original report can be found here:

https://ec.europa.eu/energy/sites/ener/files/documents/art_35_main_conclusions_uk_16-04.pdf

This report has been compiled by the Department of Business, Energy and Industrial Strategy and EDF Energy operators from the Torness Nuclear Power Plant, with support from the Office of Nuclear Regulation, Scottish Government, Scottish Environment Protection Agency and Food Standards Scotland.