EUROPEAN COMMISSION

DIRECTORATE-GENERAL ENERGY & TRANSPORT
Directorate H – Nuclear Energy
TREN.H.4 – Radiation Protection

Main Findings of the Commission's Article 35 verification in Cyprus

Cypriot National Monitoring Network for Environmental Radioactivity

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Verification team: Mr C. Gitzinger (team leader)

Ms A. Godeanu-Metz

Mr E. Henrich

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INTRODUCTION

Article 35 of the Euratom Treaty requires that each Member State shall establish the 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.

Within the Commission, the Directorate-General Energy & Transport (DG TREN) and more in particular its Radiation Protection Unit (TREN.H4) is responsible for conducting 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 (as far as applicable in the Member State):

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

From 23 to 27 June 2008, a team from DG TREN proceeded to a re-verification of the implementation of Article 35 according to the recommendations laid down in the technical report of the verification conducted from 08 to 12 May 2006 in Cyprus (verification reference CY-06/3).

In addition to this, a verification of the monitoring of radioactivity releases from the nuclear department of a Cypriot hospital and the monitoring of radioactivity in imported food from non-Member States, was performed.

Recommendations are addressed to the Cypriot competent authority.

MAIN FINDINGS

The proposed verification programme could be completed within the time allocated. In this regard the verification team appreciates the advance information supplied, as well as the additional documentation received during and after the verification.

1. Main findings with respect to the monitoring facilities of RICS (re-verification)

The verification activities performed at the Department of Labour Inspection – Radiation Inspection and Control Service (RICS) demonstrated that:

1.1 Environmental radioactivity monitoring has been further developed since the previous verification and is at an advanced stage of implementation. RICS as the Regulatory Authority is responsible for operating the radiation monitoring network, including sampling, data management and reporting. The State General Laboratory (SGL) provides radioactivity analysis and measurement services for all samples collected and sent by RICS.

1.2 The verification team noted that within RICS (and also SGL) there are staffing issues, some personnel being employed on short term contract basis. This might negatively affect the sampling and analysis programmes.

The verification team strongly supports all efforts overcoming the existing staffing problem.

2. Main findings with respect to the Telemetric Radioactivity Monitoring Network (TRMN) of RICS (re-verification)

The verification activities:

2.1 Demonstrated that RICS has established an ambient gamma radiation monitoring network, with seven local monitoring stations and three control centres. This network is also used as Early Warning System (EWS).

2.2 The team was informed that it is planned to extend the network soon with an automatic online aerosol monitor. The use of some automatic dose rate monitoring stations powered by solar energy is discussed.

The verification team supports all plans to strengthen the automatic network, in particular with regard to any geographical extension of the system.

3. Main findings with respect to the Department of Labour Inspection - Data Centre (re-verification)

The verification activities performed at the Department of Labour Inspection - Data Centre established that:

3.1 At the time of the first verification visit (in 2006) the telemetric system had been largely completed at the data centre at the Department of Labour Inspection; however it had not yet been commissioned. In the meantime commissioning was done and the system has reached routine operational status.

3.2 The team was told that the backup-PC of the telemetric system is also used for storing data from laboratory measurements for transfer to the REM system.

3.3 The team was informed that at the data centre the data from the telemetric system are not mirrored. Changing operation to the backup system needs manually changing the plugging to connect to the monitoring stations. The team was given a presentation of the REM data submission tool; results from SGL (received as printout) are manually typed in at RICS although electronic data transfer would be possible.

The team would support increasing the availability and reliability of the system by having the data mirrored on hard disks in the servers and by installing an automatic switch to connect the monitoring stations to the backup system.

4. Monitoring station at Evrychou – Village Municipality

The verification activities performed at the monitoring station at Evrychou, which had not been part of the visit in 2006 established that:

4.1 The location lying in a wide valley is well suited.

4.2 The dose rate detector was mounted on a small roof protecting the entrance of the building, between the ground floor and the 1st floor of a 1 storey building. Being somehow "shielded" by the building, this probe is not ideally placed.

The verification team recommends discussing a move of the dose rate detector to the annex building, in vicinity to the rain gauge, to avoid any shielding effect by the main building.

5. Monitoring station at Pafos – Labour Inspection building (re-verification)

The verification activities performed at the monitoring station at the Monitoring station at Pafos established that:

5.1 The dose rate detector – which was fixed to the building wall at the time of the verification in 2006 – has been removed and is now situated at about 5 m away from the wall in direction of the centre of the flat roof. The team noted that the dose rate detector could have been moved a bit further away from the wall, but that its current location is definitely an improvement.

5.2 The precipitation gauge / sampler had not been moved and thus still is located at about 6 m from the wall.

5.3 The team noted that the precipitation gauge/sampler is made of a black material which, due to sunshine, could increase temperature and lead to heating up and evaporation of rain in the container bottle before sampling and measurement. The team noticed also that the precipitation sampler was connected to a sample container underneath the gauge and that this part of the device was not cooled.

The verification team suggests moving the dose rate device further towards the centre of the roof if this can be done with little effort. It also suggests exploring the possibility to reduce any losses of rain water in the precipitation sample

container by e.g. applying suitable reflecting material and cooling. The rain sampler could also be used for collecting 'total deposition' (i.e. dry plus wet deposition) in monthly samples (by rinsing with distilled or demineralised water; to avoid wrong data, in such cases the precipitation amount determination of the device would have to be turned off).

6. Environmental sampling and measurement programme

Cyprus operates an automatic (telemetric) monitoring system that provides ambient dose rate data and rain values. It also operates a system based on sampling, sample preparation for analysis, and measurement in a laboratory. Sampling is done by members of the staff of RICS; most of sample preparation and measurement is done in the State General Laboratory. The sampling and analysis programme has been designed by the Department of Labour Inspection, in close collaboration with the laboratories involved.

6.1 Airborne radioactivity; gases and particulates

RICS has purchased and installed two state-of-the-art medium volume sequential pumps, which are used for sampling of air particulates. Recently also a high volume air sampler has been purchased. The verification team was shown the location at the Civil Defence storage site, where this high volume sampler is to be installed very soon. Currently the location is well suited; the general placing is excellent – an area in the large plain South of Lefkosia – and there are no major obstacles in the close vicinity. However, any construction in that industrial development area may change the positive evaluation.

With respect to the high volume air sampler the verification team would like to point out that – although currently the site is well suited – any future construction in that industrial area might impair the quality of the site.

6.2 The verification team discussed rain water sampling, marine sampling, milk and foodstuff sampling in Cyprus.

Verification activities with respect to water-, marine-, milk- and food-sampling do not give rise to particular remarks.

7. Laboratories with tasks in environmental monitoring

7.1 The State General Laboratory (SGL) of the Ministry of Health (re-verification)

The current infrastructure of SGL encompasses 19 different laboratories. Sixteen of these are related to food, water, environment and drugs and were accredited according to international standards by the Hellenic Accreditation Council (ESYD). Meanwhile a Cypriot accreditation authority was established. The three not yet accredited laboratories of SGL (among which is the radionuclide laboratory), apply the same QA system (procedures, manuals etc.) and most of these laboratories are in an advanced process of accreditation, including the radionuclide laboratory. SGL has a QA unit and a quality manager.

7.1.1 The verification team was informed that the radionuclide laboratory at SGL is only staffed with two persons, a chemist/technician on a one year contract basis and the manager of the laboratory. The team noted that the staffing issue, already noticed at the previous

verification visit, is persisting and is a serious problem considering the future tasks of the laboratory.

7.1.2 Concerning the very small space available to the lab, the team learned that the ministry had approved a plan for a new building for SGL, comprising about 360 m^2 for the radioactivity laboratory.

7.1.3 The verification team was informed that SGL is in the process of installing a laboratory information management system (LIMS) for all laboratories and that some departments are using it already. The radionuclide laboratory is about to put it into operation.

7.1.4 With regard to paper archiving, the team noted that the registry books generally are kept on another shelf; only the one from the current year is located on the table in front of the PC used for calculating results; the values input are double checked by a staff member.

7.1.5 Results to the Department of Labour Inspection are currently transmitted in printed form; the team was informed that an electronic transfer would be feasible if the DLI so wishes, albeit under certain conditions.

The team recommends considering very seriously the existing staff issue (too few persons for the projected workload) and to find a stable position for personnel with regard to routine monitoring tasks. It also encourages strongly all efforts to receive full accreditation. The team fully endorses the planned allocation of 360 m^2 of space in a new building to the radiation laboratory.

Verification activities with respect to quality control and record keeping do not give rise to particular remarks. The participation of the Radionuclide Laboratory in the setting-up of a LIMS is strongly encouraged. The team suggests avoiding manual data inputs as much as possible and replacing such by equipment interfaces that allow ample control. It also encourages using electronic data transmission e.g. to the Department of Labour Inspection to reduce the risk of input errors in the further usage of results.

7.2 University of Cyprus, Lefkosia – Radiochemistry Unit– Radioanalytical Chemistry Research Laboratory

The team was given a presentation of the unit's laboratory where research on uranium in sea water is performed. Phosphogypsum is another centre of interest. The laboratory is not part of the Cypriot routine monitoring system, but performs special investigations.

Collaboration with SGL (e.g. with regard to preparation of sea water samples and of calibration sources) exists. Collaboration with the Department of Labour Inspection regarding instrumentation would be welcome.

Verification activities do not give rise to particular technical remarks. The verification team encourages all efforts to develop and use the expertise of the Department with respect to environmental monitoring; in particular it encourages collaboration with SGL.

7.3 University of Cyprus, Lefkosia – Nuclear Physics Research laboratory

The research interest of the nuclear physics research laboratory relates a.o. to radon, food, and building materials (the laboratory conducted several studies on the behaviour of radiosulphate

in the Vassilikos phosphogypsum fertiliser factory). The laboratory employs two persons. The verification team received an overview over the equipment used.

Verification activities do not give rise to particular technical remarks.

8. THE FERTILISER FACTORY IN VASSILIKO; PHOSHPHOGYPSUM SITE – NORM PLANT (re-verification)

At the time of the verification visit in 2006 parts of the plant were still standing, albeit not anymore used. The plant is now completely dismantled and the contaminated material has been transported to Greece and Germany.

The verification team was informed that the "historical phosphogypsum lagoon" close to the sea is still a major issue. The team witnessed that the area of the phosphogypsum lagoon has now been completely covered by a plastic membrane and by a 1.50 m layer of industrial soil. As a protection towards the sea, concrete blocks have been placed at the seaside border to consolidate the waterfront. It is planned that the covered area shall contain the facility for excess-gas burning of the neighbouring coal fired power plant. The engineers have to consider possible issues with the foundations of such installations on that site.

The team was also informed that a specific study concerning the effects of the phosphogypsum lagoon on the sea next to it (water, plankton, fish, mussels etc.) has been carried out with the collaboration of the University of Cyprus, the Demokritos Institute, Greece, and the Greek Oceanographic Research Institute and a specific monitoring programme is in place.

The verification team encourages all efforts to set up and implement a suitable routine sea water monitoring programme in the region of Vassilikos with a view to detect any impacts of the former activities in time.

9. MONITORING OF RADIOACTIVE DISCHARGES FROM NUCLEAR MEDICINE DEPARTMENTS AND RESEARCH LABORATORIES

There are only a few small nuclear medicine departments and research laboratories in Cyprus and the radionuclides used are generally of short half-lives. All these centres are licensed and inspected regularly by RICS. The wastes produced are handled properly according to the requirements of the legislation and the conditions of the license and are kept in stores until the radioactivity levels are very low to be disposed of as normal waste. The verification team was informed that taking into account the radionuclides used, the number of patients treated, the quantities of waste produced and the sewage systems used in these centres, according to Cypriot legislation no retention tanks are needed for such small nuclear medicine centres.

The verification team recommends considering the installation of a retention tank system when planning new or in case of modifications of existing nuclear medical installations. It recommends periodically taking and analysing appropriate discharge samples in order to prove that no relevant activities (as defined by the competent authority) are released to the environment.

9.1 MONITORING OF RADIOACTIVE DISCHARGES FROM THE BANK OF CYPRUS ONCOLOGY CENTRE

The centre operates specialist oncology units for several types of cancer as well as for less common oncological diseases such as endocrine cancer and benign tumours.

The Centre's medical services are organised in two main departments: the Department of Radiation Oncology and Diagnostic Radiology, and the Department of Medical Oncology. The verification team visited the nuclear medicine department, where radiotherapy and brachytherapy is performed. The team witnessed also a special shielded suite for patient high dose cancer treatment.

All procedures were available in printed form (in English) and on the IT network as part of the hospital's QM system. All personnel (nurses) are trained for the case of need (according to a medical directive). Before staff can treat patients, they undergo specific training using a simulator. Refreshment courses have to be attended every 6 months.

Verification activities do not give rise to particular remarks.

CONCLUSIONS

All verifications that had been planned by the verification team were completed successfully. In this regard, the information supplied in advance of the visit, as well as the additional documentation received before the start and during the verification, was useful. The information provided and the outcome of the verification activities led to the following observations:

(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 in Cyprus are installed or in an advanced stage of implementation. The Commission could verify the operation and efficiency of most of the facilities.

(2) The team welcomes the efforts undertaken to set up a routine programme in Cyprus with the close collaboration of the various actors.

(3) Some topical recommendations and suggestions are formulated that mainly aim at improving some aspects of environmental surveillance in Cyprus. These do not discredit the fact that environmental monitoring in Cyprus is in conformity with the provisions laid down under Article 35 of the Euratom Treaty.

(4) The verification team acknowledges the excellent co-operation it received from all persons involved.

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[signed]

C. GITZINGER

Team Leader