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DIRECTORATE-GENERAL ENERGY

Directorate D – Nuclear Energy
Radiation Protection

BULGARIA

Uranium Sites Environmental Radioactivity and Discharge Monitoring

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INTRODUCTION

Article 35 of the Euratom Treaty requires that each Member State 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 ⁽¹⁾.

Article 35 also gives the European Commission (EC) through the Directorate-General for Energy (DG ENER), and in particular its Radiation Protection Unit (ENER D4) the right of access to such facilities in order that it may verify their operation and efficiency.

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:

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

The aim of this verification was to check the operation and efficiency of the facilities and associated analytical laboratories for continuous monitoring of the level of radioactivity in the vicinity of uranium mining sites on the territory of Bulgaria. The verification scope also covered on-site facilities monitoring liquid discharges of radioactivity into the environment.

The verifications covered the following sites and facilities:

1. the *Chora, Iskra, and Byalata voda* sites having installations for sorption purification of uranium contaminated mine waters using ion exchange resins,
2. the *Eleshnitsa* site which performs the regeneration of ion exchange resins stemming from the water purification process,
3. the *Buhovo* and *Eleshnitsa* tailings ponds,
4. the laboratory facilities of *DIAL Ltd., dosimetric aero logical engineering laboratory*,
5. Remediation of former mining sites.

Recommendations are addressed to the Bulgarian competent authority, the Ministry of Economy and Energy (MEE).

¹ Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation (OJ L-159 of 29/06/1996).

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 Chora, Iskra, and Byalata voda sites

- 1.1 The verification activities performed confirmed the existence of an environmental monitoring programme accepted by the ministries involved.

The verifications do not give rise to specific remarks.

2. Main findings with respect to the Eleshnitsa site

- 2.1 The uranium recovery plant receives ion exchange resins from different purification locations in the country for regeneration and in the process also produces yellow cake.

The verifications do not give rise to specific remarks.

3. Main findings with respect to the Buhovo and Eleshnitsa tailings ponds

- 3.1 At the Buhovo tailings ponds the verification team noted that there are 2 ponds, the old and the new. In addition, before the construction of the tailings ponds mine waters were discharged without treatment, thus contaminating the area ('Yana overflow').

- 3.2 At the Eleshnitsa tailings ponds the verification team noted that a purification facility for treating the drainage water had been built under a Phare Project.

- 3.3 With respect to the point 3.1 above the verification team noted the instability of the new tailings pond.

Regarding both the old and new tailings ponds the team recommends installing radiological monitoring (e.g. with regard to radon emanation at the site and potential groundwater contamination). Such monitoring would have to be in place for long term surveillance; adequate administrative and financial support would be necessary.

Regarding the new tailings pond, the verification team encourages all efforts to improve the quality of the dam and to guarantee its stability. Certification of the construction by the concerned authority is also recommended. For the near future the team recommends full remediation of this pond.

After remediation of both ponds, restrictions on agricultural use of the concerned land should apply: e.g. no deep rooting trees (may destroy upper remediation layer), no deep ploughing, grazing restrictions.

With regard to the 'Yana overflow' the team recommends performing radiological measurements with a view to have a continuous realistic assessment of the situation. The team supports any measures to protect the

population of the affected area (e.g. agricultural restrictions). This would have to take into account socio-economic and psychological factors, the extremely long duration of the contamination, the need for long term surveillance and long term financial and administrative aspects.

3.4 With respect to the point 3.2 above the verification team

Recommends maintaining radiological monitoring (e.g. with regard to radon emanation at the site and potential groundwater contamination). Such monitoring would have to be in place for long term surveillance; adequate administrative and financial support would be necessary.

Restrictions to agricultural use of the reclaimed pond areas should apply: e.g. no deep rooting trees (may destroy upper remediation layer), no deep ploughing, grazing restrictions.

4. Main findings with respect to the laboratory facilities of DIAL Ltd.

4.1 The verification team confirmed that the laboratory is accredited under BDS EN ISO/IEC 17025 for the analysis of water, soil, sediments, construction materials and waste from concrete, gravel, facilities, parts of facilities, metallic materials, technological waste – tailing, cuttings, ion-exchange resins; foods and air.

However,

4.2 With respect to the point 4.1 above the verification team noted that currently there is no Laboratory Information Management System (LIMS) in place.

The team recommends exploring the usefulness of applying a Laboratory Information Management System (LIMS) for sample registration and data handling tasks with a view to simplifying procedures and to avoid manual input errors. It also recommends having all procedures available at the appropriate workplaces.

5. Main findings with respect to the remediation of former uranium mines

5.1 The verification team was informed that all the activities regarding the technical liquidation and technical and biological remediation of the uranium mining facilities are based on a prepared Hydro-Ecological expertise, Assessment and Prognosis (HEAP) and a Radio-Ecological expertise, Assessment and Prognosis (REAP) performed in the period 1992 - 1994.

5.2 In the regions where the in situ leaching process was particularly intensive, sorption type treatment facilities have been set up, so called "Installations for sorption purification of uranium contaminated mine waters".

The verification team recommends studying the issue of leachates accumulating inside the mines below the outflow surface, in particular with regard to any contamination of ground water in the very long run, and to consider measures to overcome the highlighted issues.

CONCLUSIONS

The verification visit was successful and the objectives of the review were met. Within the remit of verification activities under the Article 35 of the Euratom Treaty it has been demonstrated that the facilities necessary to carry out continuous monitoring of levels of radioactivity in the air, water and soil in the vicinity of those uranium mining sites visited on the territory of Bulgaria are adequate. The Commission could verify the operation and efficiency of these facilities.

A few recommendations and suggestions have been formulated, mainly in relation to tailings ponds, remediation and laboratory practice. These recommendations do not detract from the general conclusion that the Bulgarian national monitoring network is in conformity with the provisions laid down under Article 35 of the Euratom Treaty.

Finally, the verification team acknowledges the excellent co-operation it received from all persons involved.

C. GITZINGER

Team Leader