

**STUDY OF THE POST-CLOSURE PROVISIONS FOR MANAGING SOLID
TAILINGS FROM THE EXTRACTION AND PROCESSING OF URANIUM ORES
RESULTING FROM THE INDUSTRIAL ACTIVITIES OF THE COMUF COMPANY
AT MOUNANA (GABON)**



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Between 1961 and 1999, in the mining district of Mounana in South-East Gabon, the Uranium Mining Company of Franceville, "COMUF", extracted 7.5 Million tonnes of uranium ore with an average grade of 0.38%, from opencast and underground mines.

The dynamic processing of this ore in two plants brought into service successively in 1961 and in 1982, produced about 28,000 tonnes of uranium and generated about 7.5 million tonnes of tailings stored in one of the opencast mines (Mounana) after extraction, and in a valley (Gamamboungou) and a thalweg near the factory.

Under the European programme for mining development and diversification, "SYSMIN", the Government of the Republic of Gabon commissioned a study to determine the measures to be taken for the remediation of the mining site of Mounana and for radiological monitoring after the COMUF installations close down.

The proposed methodology was based on the principles of justification, optimisation and radiological protection recommended by the CIPR and the IAEA and repeated in Euratom directive n°96/29. The final objective is the respect of an effective annual dose added to the natural level of less than 1 mSv, for persons in the population reference groups.

The remediation and monitoring work on the Mounana site was carried out in three stages:

1. Evaluation of the radiological state of the environment of the installations before remediation (1997);
2. Definition and execution of the work on the areas defined to be decontaminated and restored (1998 - 2000);
3. Setting up radiological monitoring after closure (post 2000).

Stage 1 enabled a list to be drawn up of the zones requiring work (areas to be closed off and products to be managed). The two reference groups of members of the public to be taken into account were defined, and their effective annual added dose (before remediation) was assessed.

Stage 2 defined the remediation work with respect for the following five (5) objectives:

1. To guarantee long-term safety for the populations;
2. To guarantee residual impacts which are as weak as reasonably possible;
3. To ensure physical stability of the waste storage;
4. To determine the future uses of the landscaped areas;
5. To favour integration into the surrounding landscape.

For this, the means implemented were as follows:

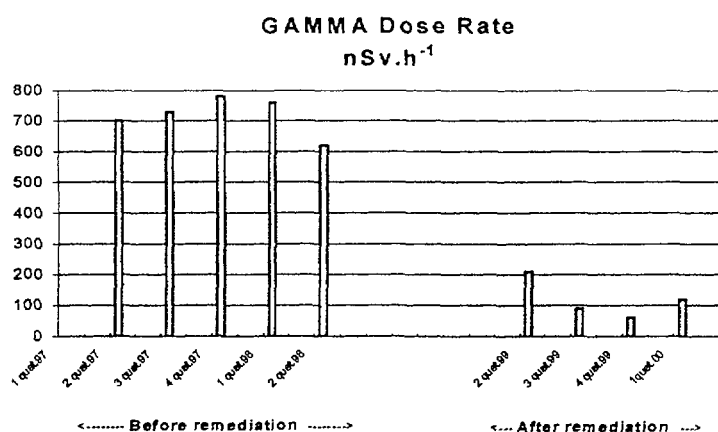
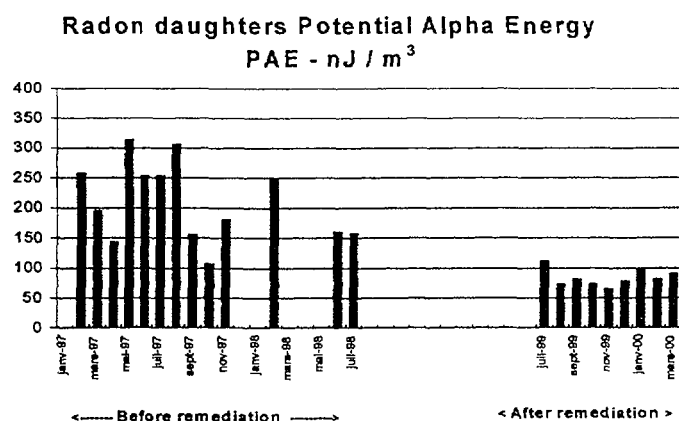
- preliminary studies on the effectiveness of the containments and on geotechnical constraints;
- restoration work from mid 1997 to the end of 2000 with:
 - grouping together the products to be managed to limit as far as possible the areas likely to cause a radiological impact on the populations;
 - containment of the products under water or under solid cover, taking into account geotechnical and radiological constraints.

Stage 3 consisted of setting up a post-remediation network of radiological monitoring, which, from measurements taken on the air and water vectors, on the alimentary chain and certain bio-indicators enable:

- the effectiveness of the restoration work (see graphs below) to be inspected;
- the effective annual added dose for the reference groups to be assessed;
- respect for all of the objectives to be verified.

This network will be managed, as of the year 2001, by a local branch of the Ministry of Mines of the Gabon. A five (5) year monitoring period is planned after the installations close down.

COMUF - MOUNANA OPEN PIT - TAILINGS STORAGE



For the most exposed reference group, the effective added dose, estimated before remediation at 2.42 mSv, was calculated at 1.03 mSv at the end of 1999, before the end of the remediation work, and it is estimated for the years after restoration at 0.80 mSv.