SUGESTIONS TO REVIEW THE REGULATION ABOUT RADIOLOGICAL PROTECTION AND SAFETY IN THE INDUSTRIAL MINING

ABSTRACT

In this paper, we want to explain the problems experienced by the mining industry when it is intended to comply with the CNEN – Brazilian National Commission of Nuclear Energy Regulation – CNEN NN 4.01[(1)]. Therefore, this work shows that the present technical and scientific knowledge is considered sufficient to enable the current three categories of facilities to be reduced to two. In addition, to meet the requirements of the law nº 6.189, art.6º, December 16, 1974, it is suggested that the CNEN Regulations CNEN-NE 1.04, CNEN NE 1.13[(2)] and CNEN-NN 4.01 should be reviewed and updated, with mutual recognition taken as part of the process. Suggestions of the content for the revised regulations are, also, included.

1. INTRODUÇÃO

Through a brief examination of the CNEN NN 4.01 regulations content, called "Safety and Radioprotection Requirement for mining Industrial Facilities", elementary faults that should be remarked, in case of a review before the edition, were observed. On the other hand, during its preparation, three categories of facilities were proposed due to the differences among the European Community, EC, EURATON and the International Atomic Energy Agency, IAEA. Both of them stated two categories, but the activity concentration limit was different, with the IAEA value lower than 10 Bq/g and the EC value 500 Bq/g. We believe that these differences between the two organizations do not exist anymore. Taking into account the nuclear legislation, the mine exploitation happens owing to the most economically profitable product and not as a consequence of the uranium quantity economically viable. In the last case, during the processing of the most profitable product, the uranium and/or thorium concentration may occur and they can become a by-product economically viable, not simple waste. The question is how to process the authorized facility to obtain its major product. This paper intends to show some trivial faults as well as to give suggestions for a review of the CNEN regulation in question, besides the CNEN NN 1.13 regulation.

2. SOME FAULTS IN THE CNEN REGULATION NN 4.01

The article 1.2.4 states: "Facilities with specific natural activity or concentrated radioactive solid material less than 10 Bq/g (0.27nCi/g) and dose delivered to the workers less than 1 $mSv.y^{-1}$ are exempted to attend the requirements". This statement is not correct because the dose mentioned is the annual limit for the whole body of the public and, in this case, anyone can stand in the area. Therefore, if this dose limit is not exceeded, the ore is exempted, independently of the thorium or uranium concentration and whether the authority is interested or not.

The article 4.2 advises: "There are facilities with specific activity for natural or concentrated solid radioactive material from 500 Bq/g (0,014µCi/g) to 10 Bq/g (0,27nCi/g)". In this

statement it was forgotten to mention" with doses to the workers in excess of the public annual limits", as it was done in the other two categories.

3. CONCENTRATION LIMIT TO DISTINGUISH BETWEEN THE TWO MINE-INDUSTRIAL FACILITIES

Based on the present technical knowledge we may conclude that the disagreements between the IAEA and the EC information may be solved. To prove this assertion we start with the exempted value internationally accepted and that is reported in several international publications, such as ICRP, IAEA and EURATOM and also in the CNEN NN 3.01[(3)] regulation.

These exemption levels were calculated by a Committee of the EUROPEAN COMMUNITIES COMISSION and were published in the series "Radiation Protection" under the number 65, entitled: "Principles and Methods for Establishing Concentrations and Quantities (Exception Values) Below which Reporting is not required in the European Directive", Doc XI - 028/93.

These values were calculated based on three scenarios, considering all the plausible radiation transference ways. They are:

a) Normal use of the radiation in the workplace
b) Accident in the workplace involving radioisotopes
c) Radioactive material disposal in landfill involving public

For these three scenarios, an effective dose of 10 μSv/y and a collective dose of 1per-Sv were considered.

The result was selected considering the lower value presented by the three scenarios, for each radioisotope and for activity concentration.

The result for the natural uranium in secular equilibrium, with all daughters, was 1Bq/g.

In case it is considered that this concentration gives 10 μSv/y in the most restrictive scenarios, 100 Bq/g would be necessary to reach the annual limit for the public.

If we provide a more suitable scenario for the mine-industry, the European value of 500 Bq/g for the annual limit of the public will be found. This value is our suggestion to separate the two new categories.

4. MINE INDUSTRY FACIITIES WITH URANIUM AND/OR THORIUM BY-PRODUCTS ECONOMICALLY EXPLOITABLE

In this particular case, the CNEN-NE 1.12[(4)] is not applicable because the uranium and thorium are concentrated in a later phase of the mine and processing plants licensing. Uranium and thorium, for instance, may be concentrated by means of precipitation in an acid and then separated and stored in a suitable place, until they are removed by CNEN.

Since the operations are simple, there is not radioactive material handling and the environment has already been explored for the raw material extraction of the commissioned interest, the CNEN-NE 1.04[5] should require something more simplified than what it is requested, regarding this new situation.

It is worthwhile having in mind that the former law nº 6184, dated 12/16/1974, established that if an ore facility had uranium or thorium concentration economically exploitable, it should be transferred to CNEN independently from the fact that it had a by-product economically more profitable. The owner of the land could use the more profitable product ad posteriori.

Regarding the two new categories that would substitute the three currently valid in the CNEN NN 4.01 regulation, we suggest, as we have already justified, that the borderline should be 500 Bq/g and a worker dose higher than 1mSv/y for both.

For these two new categories, we suggest that the same requirements mentioned for the other categories II and III should be maintained because the requirements for the category I are similar to those mentioned in the CNEN-NE 1.13 regulation for uranium and thorium mines and processing plants, not taking into account that the uranium and thorium are by-products, concentrated in a phase posterior to the processing.

5. CONCLUSIONS

Due to the new reality introduced by the law and to the fact that the disagreement between the European Community and the International Atomic Energy Agency was technical and scientifically solved, we concluded that the CNEN regulations nº NE 1.04, NE 1.13 and NN 4.01 should be reviewed and updated, according to the new legislation.

We believe that, with this paper, some good suggestions have been given, deserving consideration and reflection by the CNEN authority so that these norms under consideration may be revised.

REFERENCES

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