Roles and Responsibilities of Regulatory Body in Licensing Decision for NORM Milling Facility

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1. INTRODUCTION

In Malaysia, the atomic energy activities are controlled by the Department of Atomic Energy (Atom Malaysia), the regulatory body established under the Atomic Energy Licensing Act 1984 (Act 304). The atomic energy activities including the irradiation facility, non-destructive testing activities, gauging, research and education as well as the Naturally Occurring Radioactive Materials (NORM) facilities. Under the Act there are several Regulations and Orders to explain more details regarding the requirements. Licence application are required to fulfil the general and technical requirements under the Act 304.

For the licensing of the naturally occurring radioactive materials (NORM) milling activity, the application together with all of the technical supporting documents will be assessed by the Atom Malaysia provided all other related approval had been granted by other relevant agencies such as local authorities and Department of Environment. There are 3 parts of licensing for NORM milling facility, which is siting licence, construction licence and operation license. Operation license is divided to 2 stages, which are Temporary Operating License and Full Operating License. For siting license, the applicant should submit the background monitoring data which is recorded together in a document called Radiological impact Assessment (RIA) for at least 6 months of data. In another hand, the applicant had also subject to the Department of Environment requirement to submit the Environmental Impact Assessment (EIA). During construction license, the plant design should be endorsed by the Professional's Engineer (PE) approved by the government. The operation license will be started with 2 years temporary operating license and after the full assessment, the licence will be renewed to full operating license.

2. LICENSING REQUIREMENTS/ DECISION

Under the Act 304, licence application to deal NORM milling facility such as rare earth extraction plant. requires the general requirements and specific technical information. The general requirements are to appoint a competent person called Radiation Protection Officer (RPO) and prepare a Radiation Protection Program (RPP), Monitoring Plan, Emergency Response Plan etc. Technical information specifically required for activities milling of naturally occurring radioactive materials (NORM) at each part of Class A licence such as information regarding design, description of the installation, site characteristic, environmental and monitoring are recorded together in a document called Radiological impact Assessment (RIA).

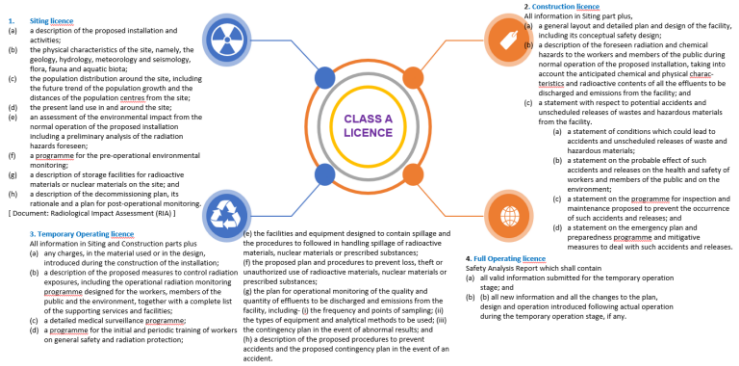

Figure 1: Summary of technical information required for each part of NORM milling licence

For siting of NORM milling plant and radioactive waste disposal facility, locations had been approved by the government after study had carried out by the consultants. Mitigation measures had been introduced to ensure that the construction of the disposal facility is safe. Currently, the implementation for choosing the correct site for construction of radioactive waste disposal facility is to carry out the study on the suitability of the site, radiological impact assessment and the site investigation. All of the study reports and data should be submitted for assessment prior to get the approval from the regulator. The report also made available for the public comment.

Engagement activities had been carried out by the operators as well as the regulators and the technical experts. This includes,

i. Series of public briefing
ii. Briefing to the local authorities and other governmental agencies
iii. Communication with the public/ local communities
iv. Periodically Media briefing
v. Backbenchers' session, to explain to the political people
vi. Invitation public to visit the extraction plant and briefing during tour in the plant
vii. Social responsibilities i.e offering scholarship to the local best students to further study, offering job vacancy to the local people etc.

3. MILLING OF NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORM) – EG. RARE EARTH EXTRACTION PLANT

The whole process cycle for milling of mineral containing NORM involve the importation of raw material, transportation to the plant, storage of the raw material and waste, processing of the raw material to produce products and generate by-products (waste) dan radioactive waste management. Some of the by-products are potentially reuse and recycle to another material used in another industry, but some are disposed of as a radioactive waste. Environmental issues pertaining to the waste disposal is the major consent of the public. The treatment of the by-products containing activity concentration of Uranium and Thorium to below permissible limit is required before the by-products can be reused and recycled.

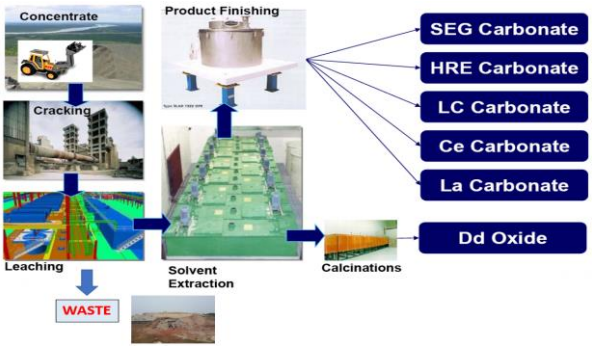

Figure 2: Flow chart of the rare earth processing activities

For the milling and disposal of material containing NORM above the stated limit, is subjected to the regulatory control, licensed and approved by the Board of Atom Malaysia. Table 1 shown the control limit for the licensing of activities involving with NORM.

Table 1: Control limit (licensing) for the activity concentration of raw material and waste containing NORM

Radionuclide	Activity Concentration (Bq g^{-1})
^{40}K	10
Each radionuclide in the chain of Uranium and Thorium decay	1

4. ISSUES AND CHALLENGES

i. Public acceptance

The main issue arise is the public acceptance due to the large amount of very low-level waste containing NORM generated during the operational of the plant. The safe waste management from the milling of NORM activities, had become public concern issue. The location for disposal facility is very difficult to get consent from stakeholders due to lack of awareness as well as the "*Not in My Backyard"* phenomenon (NIMBY). According to the IAEA General Safety Guides (GSG-1) for the Classification of radioactive wastes, the NORM wastes from 1-100 Bq/g are classified as Very Low-Level Waste (VLLW) and the disposal facility recommended are the landfill type.

ii. No one stop regulatory agency

There are different federal agencies to control over the environmental, health, social and radiological issues. The applicant has to comply to the requirements from all related agencies in order to deal with NORM milling activities.

iii. Management of NORM wastes

Whether the dilution principle is allowed in management the NORM waste generated from the rare earth industry, a reference level should be established. Since in Malaysia the clearance level of 1 Bq/g is too low and the dilution required a large amount of normal soil (or other non-radioactive materials), A reference level established could help in safe management of NORM wastes. According to the IAEA document, GSR Part 5 (2009), pre-treatment disposal of radioactive wastes includes three principles:

a. Delay and decay
b. Dilute and disperse
c. Concentrate and contain

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2. Atomic Energy Licensing (Radioactive Waste Management) Regulations: (2011).
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