Characterization Survey of the Reactor Ground

Group C

Indonesia, Romania, Vietnam,

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GENERAL

For the implementation of the clean-up activities and radiological characterization plan the following points are considered:

- Analysis of the historical information (data and previous radiological characterizations);
- Facility description, site location and environmental assessments of the decommissioning area;
- Define clear the purpose of the radiological characterization in order to acquire information necessary for preparing the cost estimates and the risks involved in clean-up and decommissioning activities as well as the amounts and the categories of waste arising from these activities.

FACILITY OPERATION HISTORY

There are a few auxiliary structures in the grounds northwest of the Reactor Building that are considered as part of the PRR-1:

-RG-1 - Earth, Subsoil and Rock;

-RG-2 – Underground waste Water Pipes

-RG-3 – Septic Tanks

-RG-4 – Basement-Level Hallway to ARC Building

-RG-5 – First-Floor Hallway to ARC Building

-RG-6 – Reactor Office

-RG-7 – Large Powerhouse

-RG-8 – Small Powerhouse

-RG-9 – Diesel Fuel Tank

-RG-10 – Raw Water Tank

-RG-11 – Cooling Tower

-RG-12 – Utility House

The history of above structures is defined in section 1.1.2.5. of the exercise material.

IDENTIFICATION OF POTENTIAL CONTAMINATION SOURCES AND LOCATIONS

- Were not recorded radioactive hazardous events in the reactor grounds;
- The original underground pipe for waste water from reactor, excluding sanitary waste, collapsed during the 1980s and was replaced by a new one and were not recorded signs of contamination in the surrounding soil.

RADIOLOGICAL CHARACTERIZATION

- All the worthless objects placed in the grounds will be clean-up after proper radiological measurement;
- There are used the next radiological instruments:

- Radiagem
- InSpector 1000
- ……

- There are used the next devices for sampling:

- Device for drilling the soil for samples;
- Device for smearing.

RADIOLOGICAL CHARACTERIZATION

- The specific types and numbers of measurements in scanning are specified for every characterized area (2mx2m, 1m x1m).
- For beta and gamma activity samples (smears, soil sampling, water sampling) are taken to identify any possible radionuclide and to determine theirs specific activity. Samples are measured in lab;
- The smears are taken one inside and one outside from every building in the reactor backgrounds, cooling tower and pipes and in any point with discovered contamination;
- Soil samples are taken from soil surface and by deep drilling near the pipes of secondary circuit and near the concrete pipe of waste water discharge and in any point with discovered contamination;
- The soil sample will be put on an horizontally and scanned to identify any contamination. If any contamination is identified will be performed a gamma spectrometric analyses and supplementary sampling.
- Water sampling is taken from septic tank, manhole and pipes.

RADIOLOGICAL CHARACTERIZATION

- A preliminary scanning to establish the background value. If possible, background samples and measurements for land areas should be collected at locations which are unaffected by effluent releases and other site operations. Background for buildings is established in other buildings from the site with similar construction but without nuclear operation. The lowest value will be considered as the local background value if are not possible other comparisons;.
- Background must be determined with a detection sensitivity and accuracy at least equivalent to data from which it will be subtracted;
- A complete scan of all auxiliary structures in the reactor grounds (buildings and soil surface) with portable beta-gamma monitor to establish any traces of contamination. There are recorded the values indicated by instruments at fixed distances.

HEALTH AND SAFETY PROVISIONS

Regarding the safety of personnel the electric breakdown and radiological associated hazards are considered.

For the materials (samples and waste) resulted from the characterization and cleanup activities the followings will be established:

- Type and proper treatment;
- Which of these materials can interact with the environment, personnel or among them and the implicit associated hazard;
- Materials used for;
- Free Release criteria for the materials which will be released;
- Transport and storage conditions.

Safety measures will be taken so that the operations – coring, scarifying, cutting could not affect:

- The workers health, environmental security;
- Other structures.

DATA/ RESULTS INTERPRETATION

A statistical approach for measured data is applied.

Radiological survey data is usually obtained in units, such as counts per unit time, which have no intrinsic meaning relative to the guideline values. Therefore, the survey data from field and laboratory measurements are converted to units, which will enable comparisons. Standard units used for expressing survey findings are:

- Surface Contamination - Bq/ cm^2 (disintegrations per second per cm^2)
- Radionuclide Concentration - Bq/ g (disintegrations per second per gram)
- Dose Rate - μSv/ h (microsievert per hour)

FORMAT FOR DATA PRESENTATION

- The data are presented in the format that to be compared directly to the guideline values;
- The measured value and that one from guideline determines the action to be taken:

  - release from regulatory body control;

  - residual activity exceeding the limit should be remediated and followed-up through new surveys.

REPORT

The characterization survey report represents a summary of all the radiological data and information that were collected during the characterization survey. The information is used to provide a status of the facility. The data is also used to finalize the Decommissioning Plan. The content of the Characterization Report is well established.

ANNEX

Fig. 1. of the exercise material

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BIBLIOGRAPHY

- Chapter 1 of exercise material