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Midterm exam Applications of Nuclear Engineering in Industry

Assignment

Question 1:

- Non-destructive testing:

    + Check the jaw and structure

    + Certification training

- Radiation technology:

    + Sterilization

    + Food preservation

    + Material transformation

- Nuclear analysis techniques:

    + Environmental control

    + Mineral exploration and exploitation

- Nuclear meter:

    + Machine to control density, humidity, flow measurement, borehole measurement,...

- Radioactive labeling techniques and sealed radioactive sources:

    + Survey and diagnosis of industrial processes; flow measurement; leak detection; corrosion control; oil and gas recovery surveys.

Question 2:

Tower specifications:

Outer diameter: 2.9m

Tower wall thickness: 15mm

Height: 20m

Use the gamma transmission method to evaluate this phenomenon:

The principle follows the formula $I = B.I_o exp(- \mu d)$ in which d is the thickness

of the material, μ is the linear attenuation coefficient, coefficient (When there is no

collimator). Based on the intensity I to determine the condition of the object under investigation.

Measurement system layout:
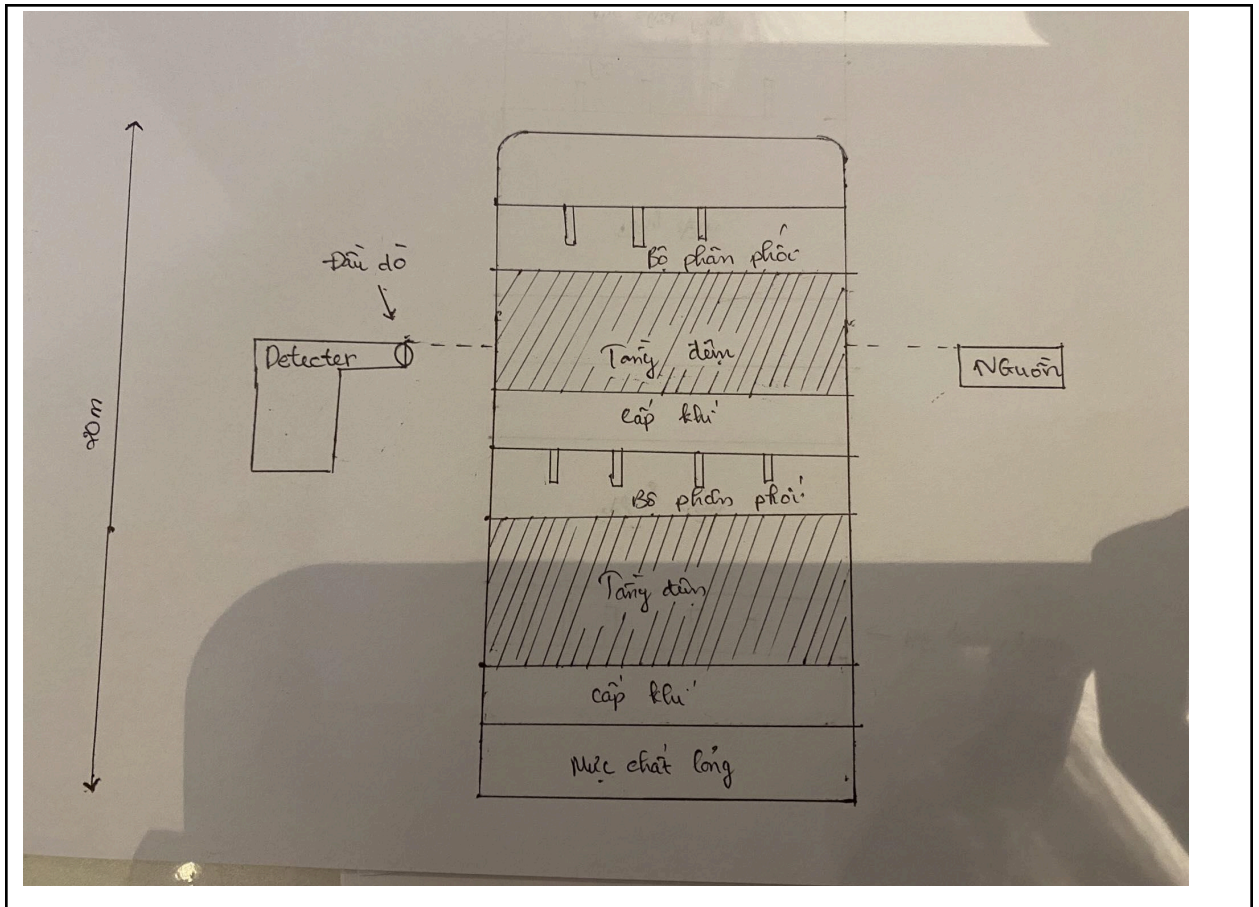
Survey by tower height:

At the location of the buffer layer: if there is a difference in the count according to the height of the tower, if there is a big difference in the count according to the height (the count at the top of the buffer layer is higher than the count at the bottom of the buffer layer), then the buffer layer collapse may occur.

For scaling:

Tower wall scaling: survey of the entire tower (1)

Bottom sedimentation: compare the counts at the bottom and the survey positions in (1), if the difference is large, sedimentation may occur.