



# NUCLEAR CORPORATION OF AMERICA

DENVILLE, NEW JERSEY  
OAKWOOD 7-4200

April 18, 1961

Division of Licensing and Regulation  
U. S. Atomic Energy Commission  
Washington 25, D.C.

Gentlemen:

1. Enclosed please find drawings of source and detector assembly and other information relating to the Nuclear Corporation's Model RC-1 sludge reader. The information is submitted to establish this device for licensing.
2. The Model RC-1 device is designed to measure the density (or percent solids) of processed sewage or other materials flowing through 8" and 10" metal pipes.
3. The device utilizes the following two sealed strontium 90 beta sources encapsulated by U.S. Nuclear Corporation, Milpitas, Calif.
  - a. 200 millicurie Type 320
  - b. 5 microcurie Type 311

Drawings for the two source types are enclosed.

4. A drawing (D-90039) of the detector and source assembly mounted on an 8" pipe has been enclosed. Explanatory notes and a radiation profile with the 200 mc source and the 5 uc source both exposed and no water in the pipe has been provided. The profile supplied represents the most severe conditions for the gauge; i.e. an empty pipe of the smallest diameter (8") with both sources exposed simultaneously. The radiation dose was measured with a calibrated Cs-40A ionization chamber instrument. Readings were made with the chamber in contact with external surfaces of the pipe section and the detector and source housings.
5. Two radiation warning labels will be attached to the device in the regions designated on drawing No.D-90039. The labels will be metal plates fastened to the gauge by means of four screws, one in each corner. Facsimiles of the two labels are enclosed.

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6. In production and prior to shipment the following quality control tests will be conducted on each gauge.

- (a) Wipe test on each source prior to insertion in source containers. The external surface of each source will be wiped with filter paper saturated with an aqueous detergent solution. The filter discs will be dried and counted in a fixed geometry using an end window G-M tube mounted in a lead shield and a scaler. The counts obtained will be compared to a known sample of Sr-90 deposited on similar filter paper (10,000 dpm) of the same dimensions. If the swipe activity is less than 0.05 microcuries the source will be considered acceptable. If in excess of this value the source will be returned to the manufacturer for replacement.
  - (b) Once assembled the gauge will be mounted on a pipe section (as shown in drawing No. D-90039) and a profile taken to ensure a surface dose rate less than 4 mr/hr.
  - (c) A copy of results of swipe tests and profile will be kept on file at Nuclear Corporation of America, and additional copies will be forwarded to the end user.
  - (d) Prior to installation on pipe section each source housing will be checked for shielding flaws by external radiation measurements.
7. Two source control mechanisms are provided as shown (D-90039). For the larger source two indications (EXPOSED-CLOSED) are provided by engraved lettering filled in white on dark gray. An arrow similarly engraved and filled, indicates source position (which is controlled by rotation of the barrel--see notes and drawing D-90039). For the smaller source two indications (Calibrate and Operate) are provided, utilizing similar marking techniques.
8. A description of the source control mechanisms is given in the explanatory notes of drawing No. D-90039.

9. A radiological safety instruction sheet will be provided with each unit. A copy of the sheet is enclosed.

10. Installation, repair, servicing, and wipe testing of the detector and source housing will be performed by licensed personnel of the Nuclear Corporation of America. The leak testing will be restricted to wipe tests on the external edges of the barrel, containing the large source and similar areas around the calibration source. The units will not be disassembled for wipe testing unless a leak is detected in the area indicated.

11. The two housings containing the radioactive sources will be secured by locks. The keys to these locks will be retained by the Nuclear Corporation of America.

Your prompt attention to the above licensing request will be appreciated. If there is any further information you require, please phone us at once or contact our Washington representative, Mr. Fred Baur at District 7-1272. We are quite anxious to expedite this matter and we will be grateful for your cooperation.

Very truly yours,

NUCLEAR CORPORATION OF AMERICA  
Instrument and Control Division

*Elmo D. Lanni*  
Elmo D. Lanni  
Division Manager

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