



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 07 1980

005
40-134)

MEMORANDUM FOR: Ross A. Scarano, Chief
Uranium Recovery Licensing Branch

FROM: Greg G. Eadie
Uranium Recovery Licensing Branch

SUBJECT: RECOMMENDED RADIOLOGICAL SURVEY PROGRAM FOR
EDGEMONT, SOUTH DAKOTA

Background

At the request of the U. S. Nuclear Regulatory Commission (NRC), the town of Edgemont, South Dakota and vicinity was surveyed in early November 1978 to determine if uranium mill tailings from the former Edgemont Uranium Mill had been used for off-site construction purposes. The U. S. Environmental Protection Agency (EPA) conducted the surveys using a specially shielded gamma radiation detection system mounted in a van type motor vehicle. A similar survey had been conducted by the EPA in 1971-72 and comparison of results between the two surveys (i.e., 1971-72 and 1978) indicated a total of 60 possible tailings use locations in the area. However, there is a possibility that additional tailings use locations exist since the mobile van system has inherent detection problems, such as shielding and response time factors, which essentially limit this system's use and require more detailed gamma radiation surveys at each suspect location.

In December 1979, the EPA provided Radon Progeny Integrating Sampling Units (RPISU) to the State to conduct measurements of working levels (WL) inside those structures identified as gamma anomalies (i.e., above background radiation levels). As of June 10, 1980, the following distribution of WL's has been reported for 31 structures surveyed (note that not all of these structures are gamma anomalies).

>0.10WL -- 4 structures
>0.05WL -- 5 structures
>0.03WL -- 6 structures
>0.015WL -- 4 structures
less than 0.015WL -- 12 structures

Also, the Department of Housing and Urban Development (HUD) has become involved in requiring a grab-WL sampling at any structure in Edgemont prior to guarantying federal mortgage monies. Therefore, in order to

8007250054 C

fully assess all possible locations having elevated radiological conditions, the following programs are recommended for Edgemont, S.D.:

I. Grab Working Level Measurements

A grab (i.e., brief sampling time of about 5 minutes) sample to determine the radon daughter concentrations (in WL) should be completed using the Kusnetz, Tsivoglou, or Thomas method for analysis. This grab WL sampling shall be conducted in the following manner:

1. The structure must be in the "closed-up" condition (i.e., all doors and windows shut, and no air conditioning or heating systems in operation) for at least 4 hours prior to sample collection.
2. The grab WL sample shall be collected in the living room area of a residence, or the main working area of a commercial building (i.e., the area of longest occupancy in the commercial building).
3. A simultaneous grab WL sample shall be collected immediately outside the main entrance to the structure.
4. A comparison of the outside to inside WL results shall be made and if the inside WL exceeds the outside by 0.05 WL such a structure shall then be resampled. If upon confirmation of a net value in excess of 0.05WL, that structure shall be considered for the remedial action engineering assessment.
5. If the net WL (i.e., inside exceeds outside WL) is between 0.01 and 0.05WL then a definitive gamma radiation survey shall be completed as discussed below.
6. If the grab WL is less than 0.010WL, then the structure shall be cleared and will not require further radiological assessments.

II. Gamma Radiation Measurements

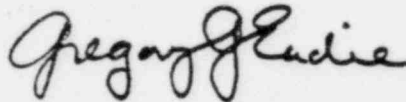
A portable gamma survey meter (e.g., micro R meter) shall be used to complete the gamma radiation measurements both inside and outside of the structure. This survey meter shall be cross-calibrated with a Pressurized Ionization Chamber (PIC) in order to provide realistic exposure measurements. This survey shall be designed to detect the presence of any possible tailings material under, within or around the structure. A map shall be provided indicating all locations having above background radiation levels. This survey need only be performed once for each structure.

III. Radon Progeny Integrating Sampling Unit (RPISU)

RPISU measurements shall be made in any structure having a net grab WL in the range 0.01 to 0.05WL and a gamma radiation survey indicating the presence of tailings material or an exposure rate of 5 μ R/hr above background. RPISU samples shall be collected for at least 100 hours, every other month, for at least six samples during a yearly cycle.

IV. Engineering Assessment

An engineering assessment shall be completed at each structure which exceeds the EPA's standards for uranium mill tailings cleanup (i.e., as proposed in 40 CFR 192 of an annual average WL greater than 0.015, or having radium in soil greater than 5 pCi/g). The assessment shall provide a detailed map of all tailings deposits and volume estimates. Such information may be obtained by gamma radiation survey techniques, bore-hole logging techniques, or soil sampling and analysis.

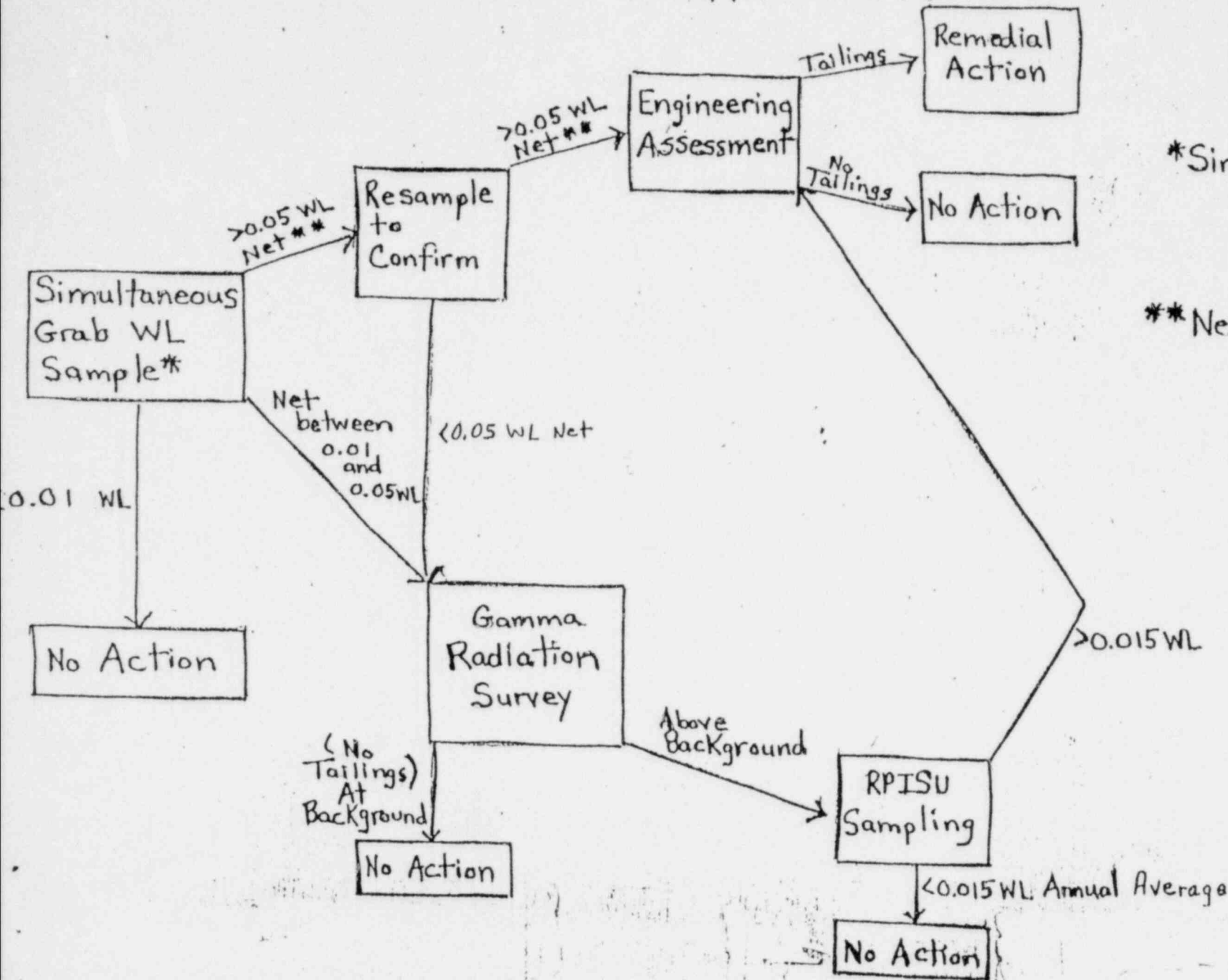


Greg G. Eadie
Uranium Recovery Licensing Branch
Division of Waste Management

Enclosure:
Protocol Diagram

Edgemont, S.D. Protocol
Radiological Surveys to Determine
need for Remedial Action

ENCLOSURE



* Simultaneous = Grab WL Measurements at Same Time both Indoors and Outdoors

** Net = Indoor - Outdoor

References

Kusnetz, H. L.: American Industrial Hygiene Association Journal, Volume 17, No. 1, 1956.

Tsivoglou, E. C., H. E. Ayer, and D. A. Holiday: Nucleonics 11, 40 (1953).

Thomas, J. W.: Measurements of Radon Daughters in Air, Health Physics, Volume 23 (December, 1972).