



## U.S. Department of Energy

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Grand Junction, CO 81503

September 6, 2005

WM-110

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Fuel Cycle Licensing Branch  
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**Subject:** Response to the Request for Additional Information on "Field Procedures for the Radiological Excavation Control and Radiological Verification of the Moab Project Site"

In response to your letter of August 11, 2005, requesting additional information on the proposed procedures for use at the Moab Project site, the DOE offers the following:

### Attachment 1, Page 4, Section 2.4

The inclusion/exclusion survey decision tree (enclosed) and associated text in Attachment 1 will be revised to correct the inconsistency for initiating soil sampling for inclusion purposes when the gamma exposure rate is 30-percent above background (1.3 times background) averaged over a 100 square meter area. This change should address concerns of buried tailings deposits that might have been missed using the 25  $\mu$ R/h above background criterion.

### Attachment 2, Page 1, Table 1

Thorium and uranium are not normally found on vicinity properties separate from mill tailings. Our experience from remediating 4,000 properties in Grand Junction was that uranium as a waste stream only occurred on a few properties. In those cases, the process knowledge supported why the waste was present (i.e. a drum recycler). U-nat will have radium in equilibrium with the uranium and consequently have a gamma signature that can be detected. If the U-nat is found to be mill-related, it will be remediated to the appropriate Ra-226 cleanup standard. For the Moab millsite, as with other UMTRA mill sites, DOE may, in consultation with NRC apply a U-nat cleanup criteria in order to lessen impacts to ground water or reduce the time required for active ground water treatment. Due to the differences in solubility and mobility, U-nat may differ from Ra-226 on the effects to the ground water.

### Attachment 2, Page 6, Section 3.7

Excavation control gamma surveys will be performed exclusively by field technicians in the excavation areas using hand-held instrumentation and not through the use of the

GPS/GS scanning system. Technicians will survey 100-percent of the excavated areas as remedial action progresses, delineating soil areas with gamma-exposure rates above an established cutoff relative to appropriate soil cleanup, radium-in soil criteria. These areas will then be removed and the area rescanned to assure that buried deposits are located and removed if present. The GPS/GS scanning system, with the detectors set at the 3-foot height, will only be used to perform exposure-rate surveys while performing verification activities. An average, radium-in-soil value versus exposure-rate correlation will be established to provide evidence that soil cleanup criteria has been met, as described in Section 4.3 of Attachment 2.

Attachment 2, Page 8, Section 4.2

The language in the above described section will be changed under the heading of "aliquots" from 2 to 12 to read 1 to 9 aliquots will make up a composite verification sample. There will be no deviation from this type of composite verification sample.

Attachment 2, Page 12, Section 4.11

The analytical methods for the analysis of Th-230 and U-nat are described in Section 4.5 and not in Section 4.4. The reference will be corrected to read as Section 4.5.

Attachment 2, Page 14, Section 5.2

The abbreviated method for the collection of radon working levels over a 3- to 4-month period will not be used at this time in Moab. The reference will be deleted and the collection of radon working levels at all of the Moab Vicinity Properties will be for a period of 1-year (annual measurement). The text will be corrected to reflect this change. If DOE chooses to collect radon working level measurements using the abbreviated method, a radon study to determine the correct windows for placement will be developed and submitted for approval prior to implementing an abbreviated sampling method.

Attachment 2, Page 17, Section 9.1

Clarification on the 5 pCi/g Ra-226 concentration references for backfill materials will be changed to reflect the lower 2 pCi/g Ra-226 limit. On-site backfill borrow materials used as common fill or off-site backfill materials brought on to the Moab Project site for use or used on the Moab Vicinity Properties will have to meet the 2 pCi/g Ra-226 cutoff.

Attachment 3, Appendix A

The correction factor used in the correlation of moisture and radium-radon disequilibrium in the calculations used by the OCS counting system are found in the UNC Geotech Internal Technical Report RL-0-89-1, "Comparison of the Opposed Crystal Method with the Chemistry Laboratory Method for Determining Radium Concentrations in Soil

Samples", dated December 1989 and authored by Dowell E. Martz. In this study, 5,447 sample pairs were used in the analysis, with 1,223 sample pairs in the 4 to 20 pCi/g Ra-226 range. The moisture in soil factors is also discussed in detail in the report. A copy of this report may be provided for review upon request.

Attachment 6, Page 1, Section 2.1

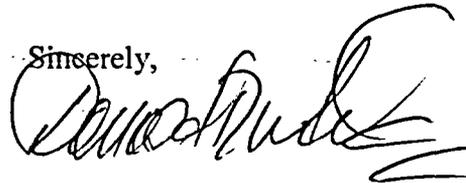
Five-percent of the verification grids will be sampled as part of the GPS/GS verification process. This can be found in Attachment 6, Section 4.6 as well as in Attachment 2, Sections 4.3.2 and 4.6.

Attachment 6, page 3, Section 3.2.1

In the preceding paragraphs of Section 3.2, the sampling protocol is defined for the verification sampling of soil veneers that may be remaining on bedrock type surfaces. When mechanical methods can no longer remove a thin veneer layer of contaminated soil on bedrock, then high pressure washing of bedrock may be employed (as was the case in the cleanup of the Monticello, Utah, millsite). A down stream coffer type dam will be constructed within the contamination area to capture the water and fine soils associated with this type of cleanup. Based on experience gained at other sites, the thin veneer layers of contaminated soil do not yield enough gamma energy to be detectable using hand-held instrumentation to determine if further removal is required. Only when a sample of the soil veneer is collected and analyzed through the OCS counting system for radium-in-soil content, can additional removal be accurately determined. Due to the thickness of the contaminated soil layer, the only feasible method of removal is high-pressure washing followed by subsequent verification type sampling. Due to the geologic characteristics of the Moab site, the use of this procedure should be very limited.

If you would like additional information or would like to discuss the proposed procedures, please contact me at 970-248-7612.

Sincerely,



Donald R. Metzler  
Moab Federal Project Director

cc w/enclosure:

Project File MOA 44.0 (J. Fredlund)

cc w/o enclosure:

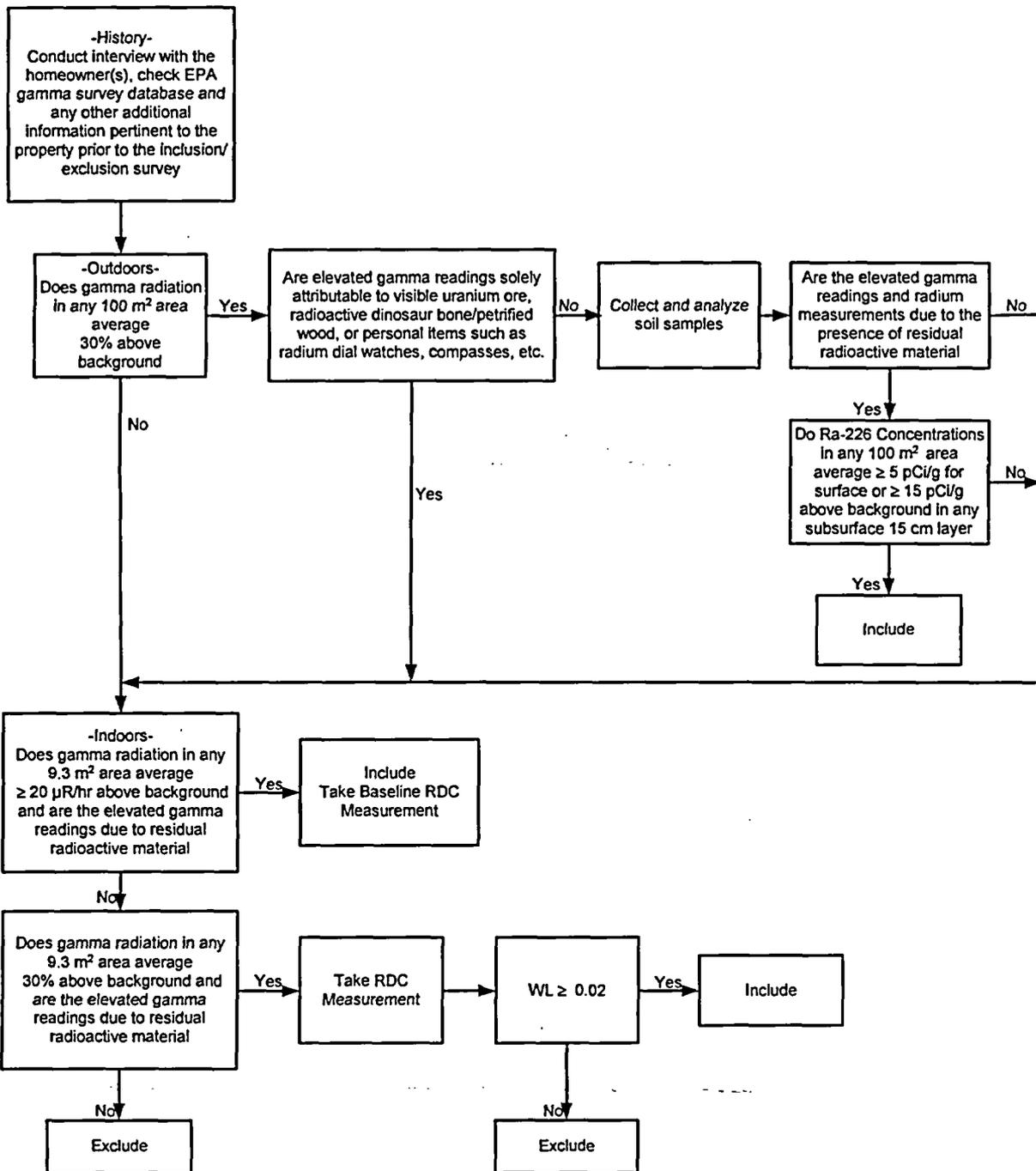
J. Berwick, DOE

J. Elmer, Stoller

B. Hopping, Stoller

K. Karp, Stoller

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Decision Tree for Interior and Exterior