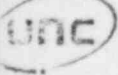


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# UNC RECOVERY SYSTEMS PDR



Division of United Nuclear Corporation One Washington Plaza  
A UNC RESOURCES Company Wood Ridge, New Jersey Branches and Offices

Telephone 401 364-7701

RJG: 82-40

August 31, 1982

Return to  
39655

United States Nuclear  
Regulatory Commission  
Mr. W.T. Crow, Section Leader  
Wilste Building  
7915 Eastern Avenue  
Silver Spring, MD 20910



Gentlemen:

We have received your comments to our "Detailed Soil Decontamination Plan" dated April 12, 1982. Although no response was requested, attached is UNC's response to those comments.

We do not plan to present a revised soil decontamination plan at this time, but shall incorporate any revisions or actions proposed in your comments to our plan to the best of our ability. Our resultant actions will be defined in the Final Survey Report submitted when the de-commissioning program has been completed.

As to your request for copies of our Site Characterization Survey, we have available only 5 copies and these will be furnished under separate cover.



As noted in your letter of June 11, 1982, we too view the conduit to the river as a part of the facility and shall survey this feature as required by the criteria issued for the facility.

If there are any further questions or comments on our response or Soil Decontamination Plan, we will be more than happy to discuss them with you at your convenience.

Very truly yours,  
UNC Recovery Systems

*RJG*  
R. J. Gregg  
Plant Manager

Attachment: Response dated August 31, 1982

- G. O. Amy
- K. A. Helgeson
- D. McFadden
- File (2)



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UNC RESPONSE TO NRC COMMENTS -  
DETAILED SOIL DECONTAMINATION PLAN

August 31, 1982

Comment No. 1, Section III.A (Area A)

Area is outside the controlled area, and therefore not subject to contamination except for clearly definable causes (e.g., presence of emergency exits, location of septic systems, emergency trailer, and lagoon liquid storage tanks). Therefore, UNC feels that a 100 per cent gamma inspection, except in those areas defined above, which are addressed separately in the plan, is adequate to establish the acceptability of this area.

The use of direct gamma radiation measurements in the survey of the grids was not intended as a method of correlation with gross alpha soil analysis. The direct gamma radiation measurements are made to satisfy the requirements of the soil decontamination criteria. The "twice background" gamma radiation level is intended as a triggering mechanism to identify grid blocks which require soil analysis to identify the cause of the higher than background direct gamma readings. In the event that a grid(s) exhibits a twice background reading, that grid(s) plus three contiguous grids will be soil sampled and analyzed for gross alpha. The analysis of the two grids decontaminated in Area A was performed on the basis of past history (adjacent to the original emergency center) which indicated they could possibly be contaminated. As it developed, grid A-004-S-0 indicated an unacceptable contaminant level at the surface. Grid A-003-S-0 did not indicate a similarly unacceptable level. However, it was decided to remove one foot of soil from both of these blocks.

Additional soil samples will be taken from grids contiguous to both of the sampled grid blocks and the samples will be analyzed for gross alpha to assure area compliance to the target criteria. Soil samples have already been taken from the exposed surface of the decontaminated grids to verify decontamination.

Comment No. 2, Section III.B (Area B)

Soil samples, including core samples, were taken from beneath the liners of the trenches and lagoon areas and direct gamma readings were made prior to backfilling of the areas. The gamma survey beneath the liners of the trenches showed no grids above the target criteria.

No grid blocks in Area B were scheduled for decontamination on the basis of external radiation (gamma) measurements alone. The 12 grid blocks referred to were selected on the basis of nuclide inventory and dose commitment.

Comment No. III.B (Area B) continued

However, this is not to say that a grid block would not be selected on the basis of gamma measurements alone.

Comment No. III, Section IV (Solubility Determination)

Radionuclide solubility was determined by utilizing the water leach method described in ASTM 19:12 as approved by the U. S. Environmental Protection Agency, and analytical methods as described in Controls for Environmental Pollutions' document, entitled Water Solubility Test Performed on Soil, which is in your possession. This method is essentially the same as the method recommended by your Dr. Shum during our early discussions of the soil decontamination criteria.

Comment No. 4, Section V (Area A)

As previously stated in the Soil Decontamination Plan dated April 12, 1982, we believe we have described the soil in Area A by use of the statistical sampling methods outlined in the Plan and by comparison of the results obtained with the Mendenhall Equation cited in NUREG CR/2082, page 197. If, during the gamma survey of the grids in Area A, any areas require further investigation, this will be done utilizing the "four adjacent grid" technique, as recommended, with gross alpha as the determinant analysis.

The "affected areas" cited in the comments will be sampled and analyzed for gross alpha.

Analysis of the soil along the length of the conduit to the river, taken at conduit invert depth by coring methods, will be accomplished. The cores will be taken at 30 foot increments. The soil will be analyzed for gross alpha. Any soil exhibiting gross alpha concentrations in excess of the 16.7 picocuries per gram cited as our plan control limit will be investigated and acted upon as necessary.

Comment No. 5, Section VI (Area B)

The sampling method for surface soil will be as recommended in NUREG CR/2082 as follows:

1. Soil areas will be gridded into 30' x 30' squares.
2. Soil samples will be taken from locations within the square, approximately 2 meters in from each corner and at the center of the square. These will be taken from the top centimeter of soil and composited into a single sample for the square of approximately 500 grams. These samples will be pulverized to about 100 mesh consistency, riffled for uniformity and analyzed for gross alpha.

Any soil that is mixed by mechanical means will be sampled and analyzed for gross alpha to assure compliance with the soil

Comment No. 5, Section VI (Area B) continued

decontamination target criteria.

Comment No. 6, Section VII (Lagoon)

The survey results of the soil in the lagoon area indicated that the preponderance of any contamination was in the top 12 inches of the soil. Samples were taken from the surface (B-XXX-S-0), six inches down (B-XXX-S-6), two feet down (B-XXX-S-2), four feet down (B-XXX-S-4), and six feet down (B-XXX-S-6). The analyses are available in the Site Characterization Survey Report and its addendum. The solubility analysis for these samples indicate that very little of the nuclide inventory is in soluble form. It must be remembered that the depth of the trenches, when sampled, was approximately 8' to 10' below ground level before backfilling. With the removal of the one foot of soil below the liners, we feel that the majority of any soil contamination has been removed for burial. At this depth, any minor amounts of contamination remaining are far below any postulated pathways to man.

Comment No. 7, Section VIII (Burial Site)

The mere replacement of cover soil over the old 10CFR20 burial site was never contemplated by UNC. Surface and core samples will be taken and the area surveyed to assure compliance with the NRC target criteria.

Comment No. 8, Section X (Area D)

Soil beneath the macadam areas and the concrete floor of the warehouse will be sampled appropriately by coring through and extracting a sample of soil from the two foot level. Some of this sampling has already been done and the data is available in the Site Characterization Survey Report.

Comment No. 9, Section XII

The rationale for the treatment of the material in the septic tank is as follows:

The contents of the septic tank takes the form of a floating blanket of material (being acted upon by aerobic and anaerobic bacteria), a liquid phase (with high dissolved solids content), and a sediment phase (so-called sludge blanket). However, the total contents of the tank is either soluble or readily dispersible in water (as required in 10CFR20, Para. 20.303). In disposing of septic waste, the material is handled as a slurry and disposed of at a sewage treatment plant as allowed by 10CFR20, Para. 20.303 entitled Disposal by Release into Sanitary Sewage Systems. In using Appendix B, Table I, Column II levels, the contents of the tank will be analyzed (liquid and sediment) and the tanks' volume (about 1500 gallons) will be used to calculate the concentration of radioactive material.

Comment No. 9, Section XII continued

If the tank contents do not exhibit a concentration of radioactivity in excess of the limits, no dilution will be performed on site. If radioactivity exceeds the table limits, the material will be diluted to acceptable levels and disposed of to a municipal sewage treatment plant. Septic waste is never in an uncontrolled state in a municipal treatment facility. The material is chemically, biologically, and mechanically treated to render it biologically harmless. The applicable limits in Appendix B, Table I would be diluted many hundreds of times in the process and the resultant material would not be distinguishable from background. To handle this material any other way would be unfeasible and would present a definite biological health hazard to the personnel working with the material.

Comment No. 10, Attachment A

Additional information is being developed regarding background samples taken during the life of the facility. The comment, apparently based on Attachment A, that a "substantial difference" exists between the 1963 and 1973 sampling program is not understandable. No comparison was attempted between the 1963 (pre-operational survey) and the most recent results. There is no way to reconstruct the sampling, handling and analysis methods used during the early surveys. Is this 1963 date a typographical error? The early surveys were crude in that they were performed only for gross alpha and beta activity and uranium. The only comparisons drawn in the plan were between the 1981 UNC and NRC background samples and these were in good statistical agreement. This would be the only viable comparison. Our background samples were taken at the cardinal points of the compass at a distance of approximately 300 meters from the facility. The samples were taken from the surface and from the bottom 6" of the top one foot of soil. The data (location, depth, etc.) is available for review and verification.

Comment No. 11, Attachment B

193 sample analyses were used for statistical analysis because the balance of the 244 samples were taken from areas selected for decontamination. To use that additional data would cause a large variance in the population data and would be meaningless, since it would represent unacceptable levels of contamination. The statistical method used to develop the gross alpha and dose commitment correlation take into account the dose commitment from all isotopes in relation to the gross alpha analysis, hence, it applies to all isotopic analyses performed on the 193 samples. That data is included in the Site Characterization Report. The overall correlation coefficients for gross alpha and dose commitment aren't significantly far from being a perfect 1.0.

There are several possible sources of Ra-226 that have been on

Comment No. 11, Attachment B continued

site at various times throughout the history of this facility. As you are aware, our license allows 600 kilograms of source material to be on site. We have had drums of waste material (all the way from natural uranium to more exotic mixtures) awaiting burial, to more recently, drums of phosphoric acid crude liquor from the UNC recovery plant in Florida. We, at one time, were attempting to develop a Kinex, counter-current flow extraction system for this type of material. The other possibility, of course, is the 20 plus years of fertilization with crushed fluoroapatite high phosphate fertilizer over a large portion of the cleared site. This is more or less borne out by the average Ra-226 analysis of soil samples, taken in the "potato field", being 3.3 picocuries per gram of soil.

The analytical techniques for Ra-226 used by our vendor have been reviewed and no errors in the technique have been found. All of our vendor analyses were run with interlaboratory cross check samples and split samples run with Oak Ridge Associated Universities have shown good comparison. As far as we can determine, our vendor laboratory is performing in an excellent manner and to good standard laboratory practices.

Comment No. 12, Attachment D

A foot of soil has been removed from this grid block and the exposed surface of the underlying soil has been sampled for a gross alpha analysis.

Comment No. 13, General

- a. All surveys made during the decommissioning have been and will continue to be documented.
- b. As stated elsewhere in this response, UNC has no intention to, and has never proposed covering a contaminated area with soil to make contamination inaccessible or to otherwise meet the decontamination criteria.