CINTICHEM, INC.
P.O. BOX 816
TUXEDO, NEW YORK 10987 (914) 351-2131

July 12, 1995

Mr. Michael F. Weber
Branch Chief
U. S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Division of Waste Management
Low-Level Waste and Decommissioning Projects Branch
Washington, D. C. 20555-0001

Dear Mr. Weber:

REFERENCE: U. S. NRC Letter (M. F. Weber) dated June 8, 1995
Dockets 70-687 and 50-54, Licenses SNM-639 and R-81

The referenced letter provided NRC's concurrence with the Cintichem proposed method for developing bedrock release criteria that was presented by our letter dated April 6, 1995. This letter is to forward the supplementary information that was also requested in your referenced letter.

The final task in the Cintichem, Inc. decommissioning project will be the demolition of the reactor and radiochemical processing buildings (buildings 1 and 2). We currently intend to have final surveys completed before this task is undertaken. As described in the Decommissioning Plan and supplements thereto, these structures are built into the side of a mountain and many of the foundations are in contact with bedrock. Some of the concrete foundations have been or will be removed in the decommissioning process but it is intended to leave many of the concrete foundations in place where they will be below the post-demolition final grade level. In our April 6th letter prescribing the bedrock criteria formulation method we proposed to have any residual concrete, that is in contact with bedrock, treated as bedrock for the purpose of applying the free release criteria. We believe that this is a reasonable and proper treatment for this part of the structure however, the exact location of the post-demolition final grade level and the exact method of demolition down to that grade level is uncertain at this time. Consequently we want to make our proposal regarding the criteria for residual concrete foundations in contact with bedrock more specific.

We propose to apply the bedrock release criteria to those residual foundations that are in contact with bedrock to only those concrete surfaces that are at the interface between the bedrock and the concrete foundations. Exposed surfaces of these foundations will be subject to the Reg. Guide 1.86 criteria as modified for Fe55 and H-3.

JJM/58.95B

NMSS/1

The structural foundations that are in contact with bedrock are located under and around the reactor room and the reactor pump room floors and footings, the canal floor and wall footings, the gamma pit floor and south wall footing, the hot laboratory west wall footing, the hot laboratory east and north wall footings, the evaporator room footings and the waste storage pit room wall footings. If there was evidence of contaminated soil or bedrock adjacent to these foundations, a biased sampling will be taken of the concrete and bedrock as described in the enclosed Proposed Bedrock Sampling Plan and the bedrock criteria would apply to these samples.

The enclosed Proposed Bedrock Sampling Plan is provided in response to your request in the referenced letter. This was originally requested by the NYDEC along with any information we have at this time about areas in the plant where additional bedrock will be removed. We don't have a definitive answer on this. It is evident from Table 1 of our April 6 submission on the establishment of the bedrock criteria that the most limiting element of any residual bedrock contamination will be that which contributes to direct radiation exposure. We have done radiation exposure measurements in those areas in the plant where bedrock is currently exposed and we have found no areas where it is certain that additional bedrock will have to be removed. On the contrary, we have established that most of the currently exposed bedrock can certainly remain. The only areas now in question are at the north end of building 2 where remediation work is under way on structural surfaces or on soil above the bedrock and accurate direct radiation measurements cannot be taken at this time.

We trust that this additional information will be sufficient to clarify and supplement the proposed formulation and application of the bedrock release criteria in this decommissioning project. We will be able to commence bedrock sampling in some of the locations per the enclosed sampling plan in the near future and, unless we are informed otherwise, we will commence doing so when we are ready.

Very truly yours,

J. J. McGovern
President/Plant Manager

JJMcG/bjc

Enclosure: 1 - Bedrock Sampling Plan

cc: See attached page

JJM/58.95B

REFERENCE: U. S. NRC Letter (M. F. Weber) dated June 8, 1995

cc: Mr. Thomas Dragoun
U. S. Nuclear Regulatory Commission
Region 1 Office
475 Allendale Road
King of Prussia, PA 19406

Mr. Eric Abelquist
ORISE
EESD/ESSAP
1299 Bethel Valley Road
Oak Ridge, TN 37831-0117

Ms. Rita Aldrich
New York State Department of Labor
Radiological Health Unit
One Main Street, Room 813
Brooklyn, NY 11201

Mr. Dominick Orlando
U. S. Nuclear Regulatory Commission
1 White Flint North
11555 Rockville Pike
Rockville, MD 20852

Ms. Barbara Youngberg
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233

U. S. Nuclear Regulatory Commission
Document Control Desk
1 White Flint North
11555 Rockville Pike
Rockville, MD 20852

Mr. Theodore S. Michaels
U. S. Nuclear Regulatory Commission
1 White Flint North
11555 Rockville Pike
Rockville, MD 20852

Director, Technical Development Programs
State of New York Energy Office
Agency Building 2
Empire State Plaza
Albany, NY 12223

Mr. Charles S. Warren
Robinson Silverman Pearce Aronshon & Berman
1290 Avenue of the Americas
New York, NY 10104

JJM/58.95B

REFERENCE: U. S. NRC Letter (M. F. Weber) dated June 8, 1995

cc: (continued)
Mr. Paul Sutton
Building Inspector
Town of Tuxedo
Tuxedo Park, NY 10987

J. Adler
F. Morse
E. Truskowski

JJM/58.95B

PROPOSED BEDROCK SAMPLING PLAN

1. *Perform Systematic Bedrock Sampling Of Affected Areas (Figure A "Typical Sampling Locations").*

   - 10m x 10m grid (same as for affected area soil).
   - 5 sample locations per grid box (same as for soil final surveys).
   - At each location, remove solid cores or grindings from rock drill locations in bedrock. The size of sample cores or drill holes will be ~5cm in diameter and to a depth of ~1.2m or ~0.6m beyond the depth of any rock sample with positive non-natural radionuclides (which ever is greater).

2. *Perform Biased Bedrock Sampling Of Affected Areas*

   - Perform a gross gamma scan of the bedrock surface. The scan will be performed with a scintillation detector. (e.g., 2"x2" NaI detector similar to that used for soil final surveys).
   - Identify any *"Hot Spots"* above ambient conditions.
   - Sample each *"Hot Spot"* area identified, as described in #1 above.

3. *Analyze Bedrock Samples*

   Method For Analyzing Core Samples
   - Cut cores into ~0.3m sections.
   - Use dish-puck grinder to pulverize to powder.
   - Perform gamma spectrum analysis (same as soil procedure).
   - Perform Sr^{90} analysis (same as soil procedure).

   Method For Analyzing Rock Drill Grindings
   - Collect rock drill grindings quantitatively from drill holes during the drilling process.
   - Continue the analysis as described for pulverized core samples.

4. *Perform Gamma Dose Rate Measurements*

- Take measurements at 1m above bedrock surface (same as for final soil surveys).
- Take gross µRem/hr measurement at systematic and biased locations from #1 and #2 above (same as for final soil survey).
- Take in-situ intrinsic germanium measurements for gamma spectrum (at biased locations). Determine fraction of gross dose rate due to natural (background) and non-natural (contamination) radionuclides (same as was done for HUT interim survey).[1] Determine the net dose rate above material background radiation.

5. *Survey Objectives*

- Gamma exposure rates will not exceed an average of 5µR/hr above background at one meter above bedrock surface. Averaging will be done over each major affected area (i.e., reactor monolith, canal-gamma pit, hot lab operating area). Maximum exposure rates at any point will not exceed 15µR/hr above background at one meter above the surface.
- The concentration of contaminants in bedrock and the affected volume of bedrock will not cause the site inventory of contaminant radionuclides in bedrock *and* soil, to exceed the calculated quantity which would produce 4mRem/yr via the water exposure pathway.
- The average concentration of contaminants in bedrock will not exceed the concentrations calculated to produce 10mRem/yr from all pathways (per Figure #1, "Radiation Dose Pathway Logic Diagram For RAM in Bedrock").[2] Averaging will be based on a $100m^2$ grid block and ~0.3m layers.
- *"Hot Spots"* will not exceed three times the average concentration limits.

---

[1]See March 3, 1995 letter from J. Adler, Cintichem to T. Dragoun, NRC Region I; Ref: Responses to questions from NRC February 24, 1995 letter on HUT Interim Survey.

[2]See April 6, 1995 letter from J. McGovern, Cintichem to M. Webber, USNRC, Ref: Responses to March 8, 1995 NRC questions.

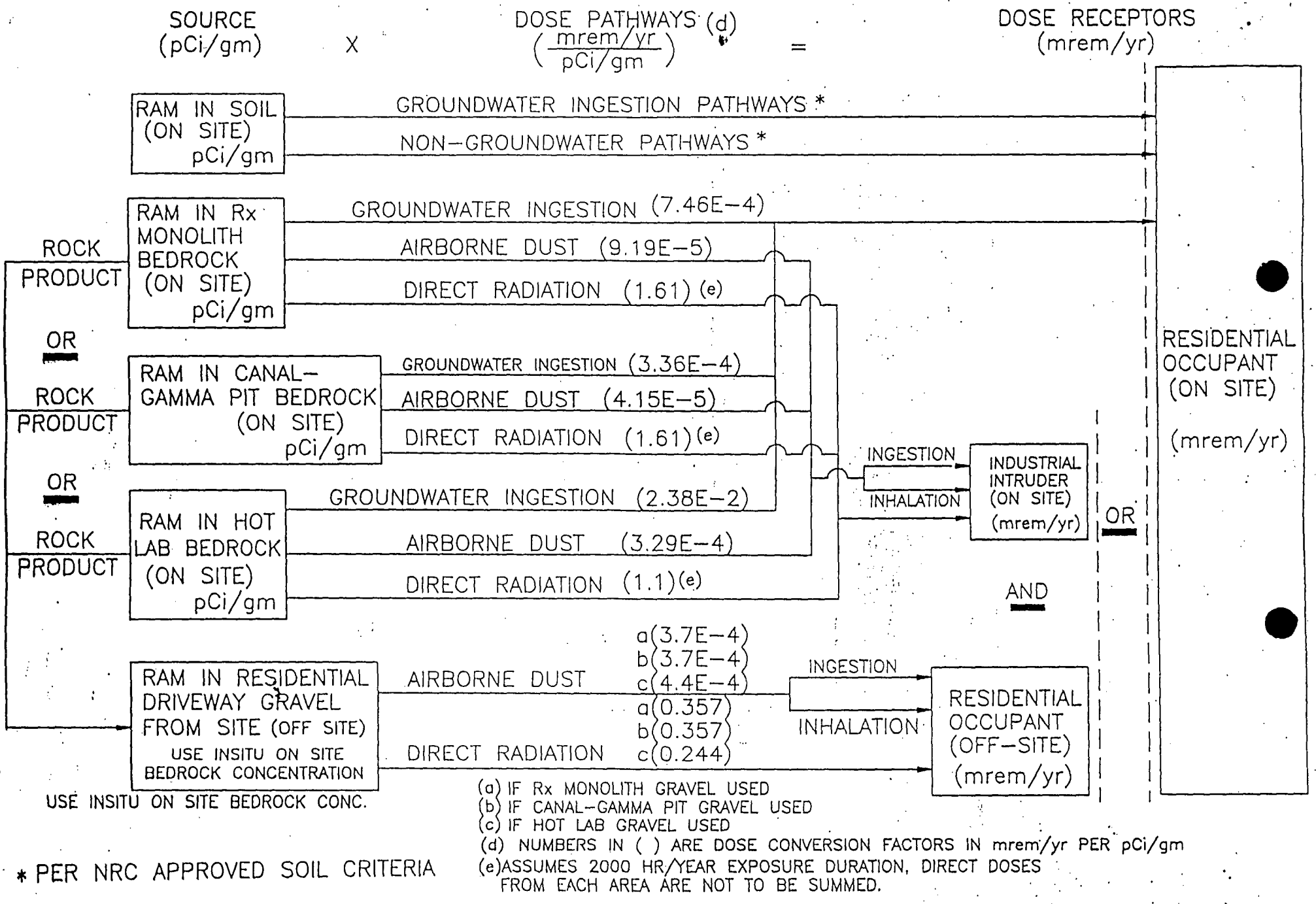

FIGURE 1: RADIATION DOSE PATHWAY LOGIC DIAGRAM FOR RAM IN BEDROCK

DWGS\2941
4/06/95

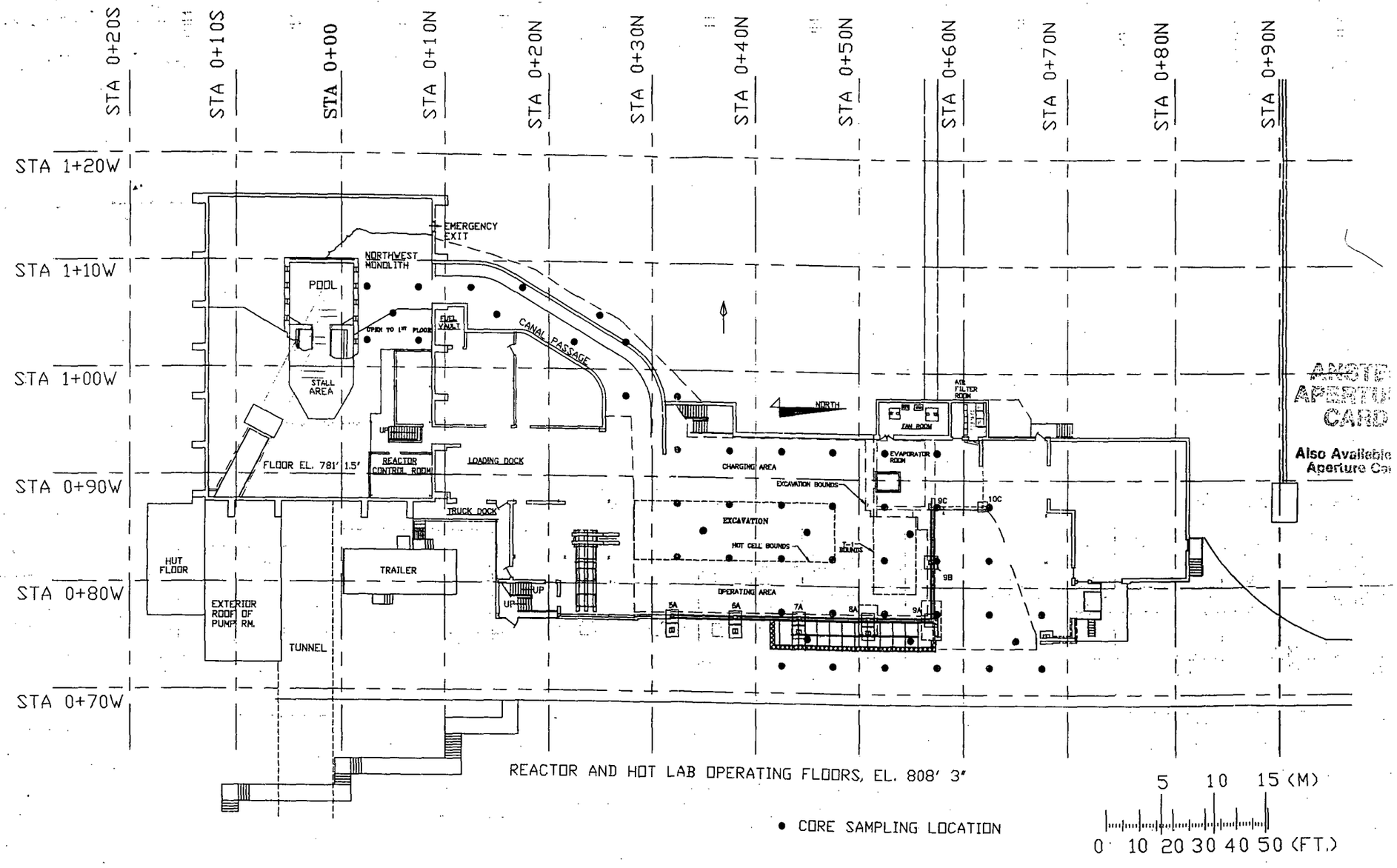

FIG. A TYPICAL SYSTEMATIC BEDROCK SAMPLING LOCATIONS

DWGS\2948
5/19/95