JUN 04 1993

Docket No. 030-20934 License No. 37-23341-01

Interstate Nuclear Services
ATTN: Michael J. Bovino, CHP
Manager, Health Physics and Engineering
295 Parker Street
P. O. Box 51957
Springfield, Massachusetts 01151

Dear Mr. Bovino:

Subject: Review of "Radiological Impacts of Effluent Releases to the Atmosphere and Sanitary Sewer from Interstate Nuclear Services - Morris, Illinois"

This refers to your letter dated May 29, 1992 submitting the document "Radiological Impacts of Effluent Releases to the Atmosphere and Sanitary Sewer from Interstate Nuclear Services - Morris, Illinois" dated May 21, 1991. This document was submitted for our review prior to you performing a similar pathway analysis for the Interstate Nuclear Services (INS) laundry facility located in Royersford, Pennsylvania. We understand that you will perform a similar analysis of potential exposures to members of the general public (including workers at the wastewater treatment facility) from radioactive material released by the INS laundry to the Royersford Wastewater Treatment Facility, and that you will incorporate our comments into that document.

The following is a summary of our comments:

1. Wherever possible, use site specific information and data from real measurements and analyses in your calculations.

2. Since INS has applied for a permit to the Pennsylvania Department of Environmental Resources to make releases directly from the Royersford facility to the Schuylkill River, an analysis of this pathway should be included.

3. Strontium-90 should be included as an isotope of concern at the Royersford facility.

4. Section 6.0 should include: a) exposure to employees at the Royersford Wastewater Treatment Facility (RWTF) from sludge in the reed bed, application of sludge to the reed beds, and fall harvest of the reeds; b) exposure to personnel during removal of sludge from reed beds after a five-to-ten year accumulation period; and c) exposure resulting from the disposal of sludge at a public landfill.

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5. Since the RWTF currently dewaters sludge by both mechanical dewatering and by drying in the reed beds, and anticipates continued need of both methods, a comparison of doses from the two methods should be performed to determine which route produces the higher exposure to the maximally exposed individual.

6. The time intervals used to determine the annual average concentrations listed in Tables 9.1 and 9.2 should be specified for the Royersford facility analysis.

7. An incorrect conversion factor of 27.027 becquerels per picocurie was used throughout the document, resulting in an overestimate of projected doses. The correct factor is 27.027 picocuries per becquerel.

The enclosure to this letter contains additional specific comments.

We appreciate your cooperation in this matter. If you have any questions, please contact Betsy Ullrich at (215) 337-5040 or me at (215) 337-5252. Please provide a schedule for submission of the Royersford pathway analysis.

Sincerely,

Original Signed By:
John D. Kinneman

John D. Kinneman, Chief
Research, Development, and
Decommissioning Section
Division of Radiation Safety
and Safety

Enclosure: Comments on INS Submitted, "Radiological Impacts of Effluent Releases to the Atmosphere and Sanitary Sewer from Interstate Nuclear Services - Morris, Illinois

cc:
Interstate Nuclear Services
ATTN: Harry Barnes
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bcc:
Region I Docket Room (w/concurrences)
R. Cooper, RI
R. Bellamy, RI
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J. Kinneman, RI
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J. Glenn, NMSS
J. Austin, NMSS

RI:DRSS
ULRICH/GMP
6/3/93

RI:DRSS
LINNEMAN
6/3/93

USNRC Comments on "Radiological Impacts of Effluent Releases to the Atmosphere and Sanitary Sewer from Interstate Nuclear Services - Morris, Illinois"

Section 5.0 "Examination of dose commitment estimate techniques"

This section states that, to ensure conservative estimates, the most limiting dose conversion factors were selected from the tables within Regulatory Guide 1.109. However, these factors are not always more restrictive than those found in Federal Guidance Report No. 11 (Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion, USEPA, 1988). These newer factors should be used.

Case 6.1 "Dose from inhalation of radionuclides in air"

page 10: An incorrect conversion factor of 27.027 bequerels per picocurie (Bq/pCi) was used instead of the correct conversion factor of 27.027 pCi/Bq.

The ingestion dose conversion factor of 7.28 E-9 sieverts per becquerel (Sv/Bq) was used to calculate an inhalation dose, instead of the inhalation dose conversion factor of 5.91 E-8 Sv/Bq.

Case 6.2 "Dose from exposure to ground deposition of airborne contaminants"

page 11: The value for relative deposition at 500 meters should be 8 E-5 per meter (/m), not 4 E-5/m as shown in equation 6.2.2. Subsequent calculations require correction.

page 12: Assumption 3 on page 11 states that the maximally exposed individual never leaves home; therefore, a value of 8,760 hours per year should be used in the sample calculation, not 2,000 hours per year.

The dose conversion factor of 1.7E-8 (milliroentgen)(square meter) per (hour) (picocurie) [mR m^2/hr pCi] is incorrect. The dose conversion factor should be 3.13 E-8 mR m^2/hr pCi.

Case 6.3 "Dose from ingestion of airborne contaminated green leafy vegetables"

page 14: The corrected value of the average relative deposition calculated in equation 6.2.2 needs to be used in this section, and subsequent calculations corrected.

The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.4 "Dose from ingestion of beef fed upon airborne contaminated green leafy vegetables"

page 16: The corrected value of the annual average deposition rate determined in Case 6.3 needs to be substituted and subsequent calculations corrected.

The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.5 "Dose from ingestion of green leafy vegetables irrigated with contaminated water"

page 17: The assumptions and data given should be reevaluated for the Royersford area. Differences in rainfall, crops, and growing season could greatly affect the volume of contaminated water utilized and subsequent dose calculation.

page 18: The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.6 "Dose from ingestion of beef fed upon green leafy vegetables irrigated with contaminated water"

page 20: The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.7 "Dose from ingestion of contaminated milk"

page 22: The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.8 "Dose from inhalation of contaminated sludge-borne dust"

page 23: The assumptions concerning sludge production and application are strongly site specific and should be verified with actual situations and data from the Royersford Wastewater Treatment Facility (RWTF).

Assumption 3, that the value of the mass loading of dust in air is 100 micrograms per cubic meter(ug/m3), is a long term outdoor average value. The value of 500 ug/m3 in NUREG 5512 for mass dust loading during gardening is more appropriate in the absence of actual data.

Assumption 5, that sludge is continuously produced and removed, is not valid for the RWTF. All such assumptions should be reviewed and site specific criteria should be used where available. In addition, activities such as dewatering of sludge, loading of sludge for disposal, maintenance of the reed beds used for drying of sludge, and removal of dried sludge from reed beds require consideration.

page 24: A value of 2000 hours inhalation per year was used in the calculation, although assumption 4 stated that the total number of hours a worker would spend at this activity is 192 hours. This should be corrected.

The inhalation dose conversion factor of 5.91 E-8 Sv/Bq should be used in the calculation, not the value of 8.94 E-9 Sv/Bq shown.

The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.9 "Dose from direct exposure to contaminated sludge"

page 25: The assumptions concerning sludge production and application are strongly site specific and should be verified with actual situations and data from the Royersford Wastewater Treatment Facility (RWTF). Activities such as dewatering of sludge, loading of sludge for disposal, maintenance of the reed beds used for drying of sludge, removal of dried sludge from reed beds, and exposure to RWTF employees performing routine activities at their facility require consideration.

Case 6.10 "Dose from ingestion of water downstream from the sewage treatment plant"

page 27: Site specific data should be used.

page 28: The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.11 "Dose from ingestion of aquatic foods taken from contaminated water supplies"

page 29: Site specific data should be used for releases from the RWTF. Also, direct release of effluents to the Schuylkill River should be considered.

page 30: The dilution factor used should be the same as that in Case 6.10.

The conversion factor for picocuries to bequerels needs to be corrected.

Case 6.12 "Dose to sewage treatment plant personnel from exposure to the sludge thickening tank"

page 31: Site specific data should be used for the sources at the RWTF which may include: the primary digester, the secondary digester, the reed beds, and containers of dewatered sludge on site during mechanical dewatering. Short-term exposures at closer range need review either here or in Case 6.9.

page 46: Water may not be the appropriate model for the sludge as the source due to the concentration of solids. A justification of the choice of the source used should be included in the description.

The source cylinder should be measured to the inside diameter of the tank, not the outside diameter.

The fourth shield should be the office wall thickness of 1 foot or 30.48 centimeters, not 20.32 centimeters as shown.

The Microshield air gap should be the distance from the office wall to the closest employee, not zero.