

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Report No. 030-04632/96-001

Docket No. 030-04632

License No. 20-03529-01

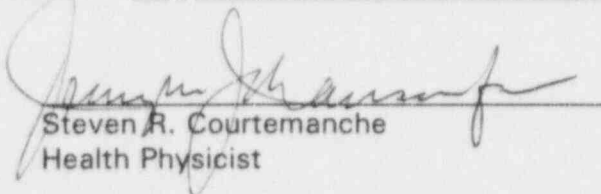
Licensee: INS Corporation
P.O. Box 51957
295 Parker Street
Springfield, Massachusetts 01151

Facility Name: INS Corporation

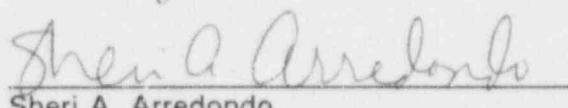
Inspection At: 295 Parker Street
Springfield, Massachusetts

Inspection Conducted: September 30, October 1, 7 and 8, 1996

Inspectors:

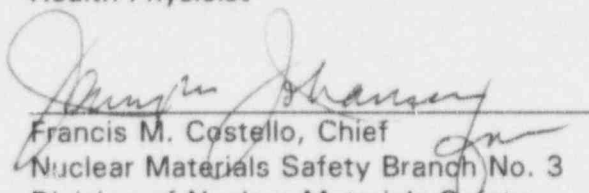

Steven R. Courtemanche
Health Physicist

12/11/96
date


Sheri A. Arredondo
Health Physicist

12/11/96
date

Approved By:


Francis M. Costello, Chief
Nuclear Materials Safety Branch No. 3
Division of Nuclear Materials Safety

12/11/96
date

Inspection Summary: Reactive, announced safety inspection conducted on September 30 and October 1, 7 and 8, 1996 (Inspection Report No. 030-04632/96-001).

Areas Inspected: Licensee's surveys and independent measurements.

Results: No violations were identified. Independent measurements and samples of water and sediment as well as wipe tests found radiation levels and radionuclide concentrations in compliance with NRC regulations.

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REGION I

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DETAILS

1. Persons Contacted

George Bakevich, General Manager
Steven Berger, Plant Manager and Radiation Safety Officer
Michael R. Fuller, Health Physicist
Denise Bonello, Health Physics Technician
Jorge Cabanas, Health Physics Technician
Kevin C. Sheehan, Environmental Compliance Services, Inc.
William Bell, Radiation Scientist, Commonwealth of Massachusetts,
Department of Public Health
William MacGee, City of Springfield

2. Background Information

INS is a subsidiary of UniFirst Corporation (Unifirst) whose headquarters is located in Springfield, Massachusetts. INS is authorized by NRC License No. 20-03529-01 to operate a nuclear laundry to decontaminate clothing of byproduct, source and special nuclear material. Also, Unifirst operates a commercial laundry at this location which cleans clothing not contaminated with licensed material and, therefore, is not licensed by the NRC. These two facilities are located in the same building located at 295 Parker Street and are physically separated by walls.

3. Flood that occurred on September 29, 1996

On September 30, 1996, INS reported to the NRC Operations Officer that when workers reported to the INS nuclear laundry in Springfield, Massachusetts at 5 AM on Sunday morning, the plant was flooded. The licensee's investigation determined that a valve had stuck open in one of their washers. The licensee calculated that if the valve was full open from the time the workers left on Saturday until their return on Sunday, an estimated maximum of 180,000 gallons of water would have flowed through the washer.

The licensee stated that overflow water went out the back door, through the dock area, and into the storm sewers. The storm sewers empty into Dimmock Pond which is adjacent to the site property. According to the licensee the majority of the estimated 180,000 gallons of water ended up in the pond. INS representatives took water samples from Dimmock Pond and the water flowing into the storm sewers. The licensee reported to the NRC that the sewer water samples were analyzed and concentrations of radioactive materials did not exceed the limits of found in 10 CFR 20, Table 2. Also, the licensee reported that the samples from Dimmock Pond were analyzed and the levels of radioactive materials detected did not exceed the Minimum Detectable Activities (MDAs) of the instruments used.

The licensee stated that some of the overflow water went into the underground Low Level Waste Storage facility, in the basement of the nuclear laundry. Three of four

cardboard containers had to be repacked. Five waste drums were floating in 3 feet of water on September 30, 1996. The entire floor of the nuclear laundry was covered with water. Water from the nuclear laundry overflow was disposed of into the on-site holding tanks where the water was treated and tested prior to release to the sanitary sewer.

Some water also flowed into the Unifirst non-nuclear laundry facility, where it soaked the carpets. A wet-vacuum cleaner was used by the licensee to remove the water from the carpets. The licensee reported that the collected water was tested and found to be less than 10 CFR 20, Table 3 concentrations, and was released to the sanitary sewer.

Wipes for removable contamination were taken by the licensee throughout the facility as the areas were cleaned and dried. The licensee reported that the results of the analysis of all wipes were less than allowable licensed levels for removable contamination were detected.

4. INS Initial Measurements

The inspector reviewed the licensee's September 29, 1996 results of water samples taken from the wet-vacuum cleaner, the waste storage vault, and the loading dock outflow. All results were found to be less than the allowable effluent concentration limits listed in 10 CFR 20, Appendix B, Table 2. The inspector reviewed the licensee's September 29, 1996 results of a water sample taken at the outfall of Dimmock Pond and found that the results were less than the licensee's MDA. The inspector also reviewed the licensee's September 29, 1996 wipe test results and found that all the results were less than the allowable levels. The licensed allowable levels of contamination are less than 20 disintegrations per minute (dpm), and 200 dpm for non-contaminated areas, less than 50 dpm and 500 dpm for potentially contaminated areas and less than 100 and 1000 dpm for contaminated areas for alpha and beta contamination, respectively.

5. NRC Independent Measurements at Unifirst

On September 30, 1996, the inspector took wipe tests at the Unifirst facility. On October 8, 1996, the inspector took wipe tests of the Swayco filters through which water may have flowed because of the incident. The wipes were analyzed by the Region I analytical laboratory using a Tennelec Model LB5100 gas flow proportional counter for gross alpha and beta activity. The results are listed in Table 1. All results are less than the MDA of 5 dpm for alpha and 9 dpm for beta.

6. NRC Independent Measurements at INS

On October 1, 1996, the inspector took wipe tests at the INS facility. The wipes were analyzed by the Region I analytical laboratory using a Tennelec Model LB5100 gas flow proportional counter for gross alpha and beta activity. The results are listed in Table 2. All results were less than the MDA of 5 dpm for alpha and 9 dpm for beta with the exception of beta activity ranging from 13.0 dpm to 37.0 dpm in wipe numbers 14-17. Wipe 14 was taken in a potentially contaminated area adjacent to the washers and

wipes 15-17 were taken in contaminated areas. The activities found are within the acceptable levels of less than 500 dpm for potentially contaminated areas and less than 1000 dpm for contaminated areas which are specified in the INS license.

On October 1, 1996, the inspector took a water sample from the waste storage vault. This sample was analyzed by the NRC Region I laboratory using a Princeton Gamma-Tech high purity intrinsic germanium detector for gamma spectroscopy analysis. The result of this sample number 10 in Table 3.

7. NRC Independent Measurements of the Environmental Areas Adjacent to INS

On October 1, 1996, the inspector surveyed the parking lot from the loading docks to the sewer drains using a geiger-mueller pancake probe attached to a Ludlum Model 18, calibrated March 14, 1996, to measure beta and gamma radiation in the unrestricted areas close to the facility. No activity above background was detected. On September 29, 1996 and October 1, 1996, samples of the sand that lay in the path from the loading docks to the storm sewer #2, as well as water and sediment from both storm sewers were taken back to the NRC Region I laboratory for analysis. The analysis was performed using a Princeton Gamma-Tech high purity intrinsic germanium detector for gamma spectroscopy. The results of these samples are given in sample numbers 9, and 12-15 in Table 3. The results show levels of radioactivity well below the current guidelines on acceptable levels of contamination in soil and groundwater in unrestricted areas, namely activity of water in the amount of 100 pCi/l (picocuries per liter) and 200 pCi/l for Co-60 and Cs-137, respectively and activity in the amount of 8 pCi/g (picocuries per gram) and 15 pCi/g of Co-60 and Cs-137, respectively. See Table 8 for a comprehensive list of acceptable levels for other radionuclides. These samples were also split with personnel from the Commonwealth of Massachusetts.

8. NRC Independent Measurements of Dimmock Pond

On September 29 and October 1, 1996, the inspector took samples of water and sediment from Dimmock Pond. These samples were analyzed by the NRC Region I laboratory using a Princeton Gamma-Tech high purity intrinsic germanium detector for gamma spectroscopy analysis. The results of these samples are given in sample numbers 1-8 and 9 in Table 3. The results show levels of radioactivity well below the current guidelines on acceptable levels of contamination in soil and groundwater in unrestricted areas. See Table 8 for a comprehensive list of acceptable levels for radionuclides. These samples were also split with personnel from the Commonwealth of Massachusetts.

9. Comprehensive Sampling at Dimmock Pond

In a letter dated October 4, 1996, the licensee submitted a sampling plan for surface water and sediment samples at Dimmock Pond that was developed by their contractor. This plan was reviewed by the NRC and found acceptable. On October 7-9, 1996, Dimmock Pond was sampled at 21 locations, some of which were taken from the area contained by the dam and others which were taken in the larger part of the pond. One

background sample was taken at Long Pond. These samples were split between the licensee, the NRC, the Commonwealth of Massachusetts, and the City of Springfield. The results of the NRC analysis of the samples are given in Tables 4 through 7. The results show levels of radioactivity well below the current guidelines on acceptable levels of contamination in soil and groundwater in unrestricted areas. See Table 8 for a comprehensive list of acceptable levels for radionuclides.

10. Summary of Results

No safety concerns were identified as a result of the independent measurements taken by the inspectors.

Based on the independent measurements taken by the NRC, the inspectors determined that the licensee was in compliance with NRC regulations in 10 CFR 20 which limits the radiation exposure to members of the public to 100 millirem per year.

TABLE 1

NRC INDEPENDENT MEASUREMENTS

Results of Wipe Tests September 30, and October 8, 1996 Taken at Unifirst

Number	Location	Gross Alpha dpm/100 cm ²	Gross Beta dpm/100 cm ²
1	Floor of Industrial Laundry	-0.9±0.9	6.0±3.0
2	Floor of Industrial Laundry	-0.5±1.0	2.0±2.0
3	Floor of Industrial Laundry	3.0±2.0	-1.0±2.0
4	Floor of Industrial Laundry	-0.9±0.9	5.0±3.0
5	Floor of Old Boiler Room	0.0±1.2	2.0±3.0
6	Plywood in Old Boiler Room	0.0±1.2	-2.0±2.0
7	Wall of Old Boiler Room	-0.5±1.0	-1.0±2.0
8	Floor of Office Area	-0.5±1.0	1.0±3.0
9	Floor of Bathroom in Office Area	0.9±1.3	0.0±2.0
10	Floor of Lobby	0.0±1.2	2.0±2.0
27	Swayco Filter	0.0±1.0	-4.0±2.0
28	Swayco Filter	-0.5±1.0	0.0±3.0
29	Swayco Filter	1.0±1.0	-4.0±2.0
30	Swayco Filter	-0.5±1.0	-4.0±2.0
31	Swayco Filter	-0.5±1.0	-5.0±2.0
32	Swayco Filter	0.5±1.0	-0.4±3.0

Note: Random uncertainties reported are 1 standard deviation. Small negative and other results less than or equal to 2 standard deviations are interpreted as including "zero" or as not detected.

TABLE 2

NRC INDEPENDENT MEASUREMENTS
Results of October 1, 1996 Wipe Tests Taken at INS

Number	Location	Gross Alpha dpm/100 cm ²	Gross Beta dpm/100 cm ²
11	Floor of Office Area	-0.9 \pm 0.9	-3.0 \pm 2.0
12	Floor of Office Area	0.5 \pm 1.2	0.0 \pm 2.0
13	Floor of Production Area (Potentially Contaminated Area)	-0.9 \pm 0.9	2.0 \pm 2.0
14	Floor of Production Area (Potentially Contaminated Area)	0.9 \pm 1.3	13.0 \pm 3.0
15	Floor of Production Area Near Washers (Contaminated Area)	-0.5 \pm 1.0	37.0 \pm 4.0
16	Floor of Production Area Near Washers (Contaminated Area)	0.0 \pm 1.2	29.0 \pm 4.0
17	Floor of Production Area Near Washers (Contaminated Area)	0.0 \pm 1.2	17.0 \pm 4.0
18	Wall of Old Boiler Room	3.0 \pm 2.0	7.0 \pm 3.0
19	Floor of Production Area (Potentially Contaminated Area)	0.5 \pm 1.2	1.0 \pm 2.0
20	Health Physics Laboratory	-0.9 \pm 0.9	1.0 \pm 2.0
21	Loading Dock	-1.4 \pm 0.8	7.0 \pm 3.0
22	Loading Dock	0.5 \pm 1.2	4.0 \pm 3.0
23	Loading Dock	1.4 \pm 1.4	1.0 \pm 2.0
24	Loading Dock	-0.5 \pm 1.0	-1.0 \pm 2.0
25	Ramp of Loading Dock	0.9 \pm 1.3	3.0 \pm 3.0
26	Floor of Production Area Adjacent to Loading Dock	0.0 \pm 1.2	5.0 \pm 3.0

Note: Random uncertainties reported are 1 standard deviation. Small negative and other results less than or equal to 2 standard deviations are interpreted as including "zero" or as not detected.

TABLE 3

NRC INDEPENDENT MEASUREMENTS

Results of September 30 and October 1, 1996 Samples Taken at INS and Dimmock Pond

Sample Number	Sample Type	Mn-54 pCi/l (water) or pCi/g (soil)	Co-58 pCi/l (water) or pCi/g (soil)	Co-60 pCi/l (water) or pCi/g (soil)	Zn-65 pCi/l (water) or pCi/g (soil)	Cs-134 pCi/l (water) or pCi/g (soil)	Cs-137 pCi/l (water) or pCi/g (soil)
1	Water	4 ± 3	< 11	< 12	< 25	< 14	< 13
2	Water	< 16	< 14	< 15	< 32	< 18	< 15
3	Water	< 16	< 14	< 15	< 32	< 18	< 15
4	Water	< 11	< 11	< 12	< 25	< 14	< 13
5	Soil	< 0.011	< 0.011	0.008 ± 4	< 0.028	< 0.014	0.053 ± 6
6	Soil	< 0.01	< 0.009	< 0.011	< 0.024	< 0.012	0.11 ± 4
7	Soil	< 0.016	< 0.016	< 0.017	< 0.038	< 0.021	2.5 ± 20
8	Soil	0.001 ± 3	< 0.01	< 0.013	< 0.028	< 0.014	0.523 ± 9
9	Soil	0.008 ± 4	< 0.012	0.078 ± 7	< 0.028	< 0.015	0.109 ± 5
10	Water	69 ± 9	34 ± 7	244 ± 15	< 34	26 ± 8	176 ± 11
11	Water	< 16	< 14	< 15	< 32	< 18	11 ± 7
12	Water	< 16	< 14	< 15	< 32	< 18	< 15

Sample Number	Sample Type	Mn-54 pCi/l (water) or pCi/g (soil)	Co-58 pCi/l (water) or pCi/g (soil)	Co-60 pCi/l (water) or pCi/g (soil)	Zn-65 pCi/l (water) or pCi/g (soil)	Cs-134 pCi/l (water) or pCi/g (soil)	Cs-137 pCi/l (water) or pCi/g (soil)
13	Water	< 11	< 11	< 12	< 25	< 14	< 13
14	Wet Soil	0.003.5 ± 0.9	0.009 ± 2	0.073 ± 4	0.0014 ± 0.5	0.026 ± 3	0.085 ± 3
15	Wet Soil	0.0027 ± 0.6	0.003 ± 2	0.068 ± 3	0.014 ± 4	0.02 ± 2	0.048 ± 2

NOTE: reported uncertainties are ± one standard deviation. Systematic uncertainties are estimated at ± 7% for water samples and ± 15% for soil samples. Soil results are per dry weight except for samples 14 and 15. Less than values are a posteriori MDC values reported at two significant figures.

TABLE 4

NRC INDEPENDENT MEASUREMENTS
Results of October 7-9, 1996 Samples Taken from Dimmock and Long Ponds

Results (pCi/g)(dry wt.)

Sample Number	Co-60	Cs-137	Cs-134	Co-58	Mn-54	Zn-65
DP-1	<0.02	1.12±0.02	<0.03	<0.03	0.005±0.007	<0.06
DP-2	0.11±0.02	3.89±0.04	<0.04	<0.03	0.003±0.010	<0.07
DP-3	0.05±0.02	3.24±0.04	<0.05	<0.05	<0.04	<0.07
DP-4	0.07±0.02	3.48±0.04	<0.04	<0.04	<0.04	<0.07
DP-5	0.055±0.010	1.94±0.02	<0.03	<0.03	<0.03	<0.05
DP-6	0.050±0.013	2.16±0.03	<0.03	<0.03	0.010±0.008	<0.06
DP-7	0.113±0.015	2.98±0.03	<0.04	<0.04	<0.03	<0.07
DP-8	0.132±0.015	5.01±0.04	<0.04	<0.03	0.001±0.012	<0.06
DP-9	0.11±0.02	3.30±0.04	<0.04	<0.03	0.002±0.009	<0.07
C-1	0.020±0.005	0.142±0.006	NC	NC	0.001±0.004	NC
C-2	<0.02	0.116±0.006	<0.03	<0.02	<0.04	<0.04
C-3	0.017±0.005	0.205±0.008	<0.02	<0.02	0.001±0.005	<0.04
C-4	0.103±0.010	0.569±0.012	<0.03	<0.02	0.002±0.007	<0.04
C-5	<0.02	0.179±0.009	<0.03	<0.02	<0.04	<0.04
C-7	0.053±0.008	0.277±0.009	<0.02	<0.02	0±0.009	<0.04

C-8	0.009 ± 0.005	0.255 ± 0.006	<0.02	<0.02	0.007 ± 0.004	<0.04
C-9	0.040 ± 0.008	0.198 ± 0.007	<0.02	<0.02	$C \pm 0.014$	<0.04
C-10	<0.02	0.063 ± 0.004	<0.02	<0.02	<0.04	<0.03

NOTE: DP denotes samples taken in Dimmock Pond outside of the dam. C denotes those samples taken within the area contained by the dam.

NOTE: reported uncertainties are \pm one standard deviation. Systematic uncertainties are estimated at $\pm 15\%$. Less than values are a posteriori MDC values reported at one significant figure. NC indicates that an MDC was not calculated, but the MDC would be similar to the MDC values in those columns.

TABLE 5

NRC INDEPENDENT MEASUREMENTS

Results of October 7-9, 1996 Samples Taken from Dimmock and Long Ponds

Water Results (pCi/l)

Sample Number	Co-60	Cs-137	Cs-134	Co-58	Mn-54	Zn-65
DP-1	< 20	< 20	< 20	< 20	< 20	< 40
DP-2	< 20	< 20	< 20	< 20	< 20	< 40
DP-3	< 20	< 20	< 20	< 20	< 20	< 30
DP-4	< 10	< 20	< 20	< 20	< 20	< 20
DP-5	< 20	< 20	< 30	< 20	< 10	< 20
DP-6	< 20	< 20	< 20	< 20	< 20	< 30
DP-7	< 10	< 20	< 20	< 20	< 20	< 30
DP-8	< 20	< 20	< 20	< 20	< 20	< 20
DP-9	< 10	< 20	< 20	< 20	< 20	< 40
C-1	< 20	< 20	< 20	< 20	< 20	< 30
C-2	< 20	< 20	< 20	< 20	< 20	< 30
C-3	< 20	< 20	< 20	< 20	< 20	< 30
C-4	< 20	< 20	< 10	< 20	< 10	< 30
C-5	< 20	< 20	< 20	4 ± 3	< 20	< 40
C-7	< 20	< 20	< 20	< 20	< 20	< 30

C-8	< 20	< 20	< 20	< 20	< 20	< 30
C-9	< 20	< 20	< 20	< 20	< 20	< 50
C-10	< 20	< 20	< 20	< 20	< 20	< 30

NOTE: DP denotes samples taken in Dimmock Pond outside of the dam. C denotes those samples taken within the area contained by the dam.

NOTE: reported uncertainties are \pm one standard deviation. Systematic uncertainties are estimated at $\pm 7\%$. Less than values are a posteriori MDC values reported at one significant figure.

TABLE 6

NRC INDEPENDENT MEASUREMENTS

Results of October 7-9, 1996 Samples Taken from Dimmock and Long Ponds

Soil Results (pCi/g)(dry wt.)

Sample No.	Mn-54	Co-58	Co-60	Zn-65	Cs-134	Cs-137
DP-1A	0.014 ± 0.010	<0.05	<0.04	<0.08	<0.04	3.29 ± 0.04
DP-2A	0.008 ± 0.016	<0.06	<0.04	<0.09	<0.05	0.80 ± 0.03
DP-3A	<0.04	<0.05	0.093 ± 0.015	<0.08	<0.04	5.12 ± 0.05
DP-10	0.004 ± 0.006	<0.02	<0.02	<0.04	<0.02	0.166 ± 0.006
DP-11	0.004 ± 0.004	<0.03	0.012 ± 0.003	<0.04	<0.03	0.269 ± 0.008
C-6	NC	<0.02	0.026 ± 0.008	0.016 ± 0.008	<0.02	0.348 ± 0.008
LP-1	0.002 ± 0.004	0.006 ± 0.004	<0.01	<0.03	<0.02	0.036 ± 0.003

NOTE: DP denotes samples taken in Dimmock Pond outside of the dam. C denotes those samples taken within the area contained by the dam. LP denotes samples taken in Long Pond.

NOTE: reported uncertainties are ± one standard deviation. Systematic uncertainties are estimated at ± 15%. Less than values are a posteriori values reported at one significant figure. NC indicates that a result was not calculated.

TABLE 7

NRC INDEPENDENT MEASUREMENTS

Results of October 7-9, 1996 Samples Taken from Dimmock and Long Ponds

Water Results (pCi/l)

Sample No.	Mn-54	Co-58	Co-60	Zn-65	Cs-134	Cs-137
DP-1A	< 20	< 20	< 20	< 30	< 20	< 20
DP-2A	< 20	< 30	< 20	< 40	< 20	< 20
DP-3A	< 20	< 20	< 20	< 30	< 20	8 ± 6
DP-10	< 20	< 30	< 20	< 50	< 30	< 20
DP-11	< 20	< 20	< 20	< 30	< 20	< 20
C-6	< 20	< 20	< 20	< 30	< 20	< 20
LP-1	< 20	< 20	< 20	< 40	< 20	< 20

NOTE: DP denotes samples taken in Dimmock Pond outside of the dam. C denotes those samples taken within the area contained by the dam. LP denotes samples taken in Long Pond.

NOTE: reported uncertainties are ± one standard deviation. Systematic uncertainties are estimated at ± 7%. Less than values are a posteriori values reported at one significant figure.

TABLE 8

SUMMARY OF CRITERIA FOR DECOMMISSIONING / FREE RELEASE

Current Guidelines on Acceptable Levels of Contamination in Soil and Groundwater on Property to be Released for Unrestricted Use

Published as attachment 3 to "Order establishing Criteria and Schedule for Decommissioning the Bloomsburg Site (FR Vol. 57, No. 34, pp. 6136-6141, 2/20/82)

[*On a case-by-case basis, the Staff has developed or provided such criteria for release of property whose soil, groundwater, or both show evidence of radioactive contamination. These criteria are listed below:]

MAXIMUM SOIL CONCENTRATION *		
H-3	**	pCi/g
Co-60	8	pCi/g
Sr-90	5	pCi/g
Cs-137	15	pCi/g
Pu-238, -239	25	pCi/g
Am-241	30	pCi/g
Ra-226	5	pCi/g
Ra-228	5	pCi/g

MAXIMUM GROUNDWATER CONCENTRATION *		
H-3	20000	pCi/l ***
Co-60	100	pCi/l
Sr-90	8	pCi/l
Cs-137	200	pCi/l
Gross alpha, including Ra-226	15	pCi/l
Ra-226, -228	5	pCi/l

* If only one radionuclide is present, then the max concentration is the value listed in the table. However, if more than one radionuclide is present, determine for each radionuclide the ratio between the measured concentration (eg. in site soil or groundwater) and the concentration listed in the appropriate table above for the specific radionuclide when not in combination. The sum of such ratios may not exceed one (ie. unity).

** There is no limit for tritium in soil. The critical pathway is the leaching of H-3 in soil into the groundwater, which is used for drinking water. In this case, the appropriate criterion is 20,000 picocuries per liter. When H-3 use has ceased, the bulk of H-3 waste has been disposed of, and a decision must be made about release of the site for unrestricted use, the Licensees should estimate the total amount of H-3 remaining on the site.

*** USEPA, Office of Water Supply, "National Interim Primary Drinking Water Regs," EPA-570/9-76-003(1976)