CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT
362 INJUN HOLLOW ROAD • EAST HAMPTON, CT 06424-3099

MAR 29 2005

CY-05-090
Docket No. 50-213

RE: 10 CFR 20.2002

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D C 20555

Haddam Neck Plant
Additional Information
Request for Approval of Proposed Procedures
In Accordance with 10 CFR 20.2002

In a letter dated September 16, 2004[1], Connecticut Yankee Atomic Power Company (CYAPCO) proposed to transfer certain of its solid waste from decommissioning of the Haddam Neck Plant (HNP) facilities (e.g., structures and buildings) to a disposal facility. Specifically, CYAPCO proposed to dispose of demolition debris from decommissioning of the HNP facilities to the US Ecology Idaho Facility, located in Grand View, Idaho.

CYAPCO has performed a conservative radiological assessment of the demolition debris material and determined that the potential dose to workers involved in the transportation and placement of the waste at the site and to members of the public after closure of the facility will be no more than a few millirem per year Total Effective Dose Equivalent (TEDE) and a small fraction of NRC limits for exposure to members of the public of 25 millirem/yr TEDE. This assessment was provided to the NRC by letter dated September 16, 2004.[1]

In a letter dated December 17, 2004[2], CYAPCO provided an on-site survey limit for the disposition of waste in Intermodal-type containers that can be shipped to the US Ecology Idaho disposal site.

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[1] G. H. Bouchard (CYAPCO) letter to the US NRC, "Request for Approval of Proposed Procedures in accordance with 10 CFR 20.2002", dated September 16, 2004.

[2] G. van Noordennen (CYAPCO) letter to the US NRC, "Supplemental Information Request for Approval of Proposed Procedures in Accordance with 10 CFR 20.2002", dated December 17, 2004.

NMSS01

In a letter dated March 1, 2005[3] , CYAPCO provided supplemental information in two subject areas:

1. Additional characterization information (e.g., Containment Building walls and floors inside the containment liner) which was not available for inclusion in the original submittal of this request.

2. On-site survey limits for various shipping containers other than the Intermodal-type which CYAPCO intends to utilize to ship waste to the US Ecology Idaho site.

The purpose of this letter is to provide additional information requested by the NRC staff in a teleconference with CYAPCO on March 23, 2005. The following modifications are made to the submittal of March 1, 2005:

Containment Building

For the Containment Building internal walls and floors, the C-14 concentration to be used to determine the post closure dose will be that contained in the enclosed Revision 2 of Table 3 using actual characterization data in lieu of using a scaling factor to the waste Co-60 concentration. This change results in a change to the weighted average C-14 concentration for all the waste proposed for disposal at US Ecology (Revision 2 of Table 8 enclosed) and a change in the projected total post closure dose calculation (Revision 2 of Table 9 enclosed). These changes do not alter the conclusion of the original submittal that "the potential dose to workers involved in the transportation and placement of the waste at the site and to members of the public after closure of the facility will be no more than a few millirem per year Total Effective Dose Equivalent (TEDE) and a small fraction of NRC limits for exposure to members of the public of 25 millirem/yr TEDE". In addition, a new Table 10 is included which provides the basis for dilution factors used in determining Table 3 waste concentrations and a sample calculation for C-14 in containment floors and walls.

Spent Fuel Building

Due to the operable status of the Spent Fuel Building, characterization has not been undertaken. Once all the spent fuel and GTCC waste is transferred from the spent fuel pool to the Independent Spent Fuel Storage Installation (ISFSI), characterization of the Spent Fuel Building will be performed. Specifically, 20 samples (evenly spaced with 4 in the walls and 8 in the floors below elevation 17'6" and an additional 8 samples from the walls of the spent fuel pool above elevation 17'6") will be taken to provide enough characterization data to confirm

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[3] G. van Noordennen (CYAPCO) letter to US NRC, "Supplemental Information – Request for Approval of Proposed Procedures in Accordance with 10 CFR 20.2002", dated March 1, 2005.

radionuclide waste concentrations and scaling factors. The samples taken will be analyzed so that the profile with the depth of the concrete can be confidently shown. The samples will include analysis of concrete from inside and outside surfaces and areas inside the wall with at least 15% of the wall/floor thickness characterized. To adequately assess the volumetric contamination of concrete, a wafer from at least 20% of 20 samples will be analyzed for all 20 nuclides listed in Table 2-12 of the HNP License Termination Plan. The results of these samples will be compared to the waste concentrations assumed in this request. If the results show higher waste concentrations (i.e., higher post-closure dose) the NRC will be asked to review and approve the effect of these differences on the conclusions of this submittal. If the waste concentrations are below the values that have been presented, the sample results will be submitted to the NRC for information.

CYAPCO hereby requests expedited review and approval of this request to support our decommissioning activities at the HNP.

If you should have any questions regarding this submittal, please contact me at (860) 267-3938.

Sincerely,

Joseph Bourassa 3/29/05

Joseph F. Bourassa Date
Director, Nuclear Safety/Regulatory Affairs

Attachment

cc: S. J. Collins, NRC Region 1 Administrator
T. B. Smith, NRC Project Manager, Haddam Neck Plant
R. R. Bellamy, Chief, Decommissioning and Laboratory Branch, NRC Region1
E. L. Wilds, Jr., Director, CT DEP Monitoring and Radiation Division

TABLE 3 (Revision 2 dated 3/22/05)

Containment Floor & Wall Samples

	Sample Results Provided with September Submittal										Additional Sample Results as of 2/15/05																								
	Floor # 175		Floor # 176		Contain. Sump # 185			Contain. Sump # 186			Internal Wall Sample # 187					Internal Wall # 188				Internal Wall # 189				Internal Wall #190				Charg. Floor # 191				Charg. Floor # 192				
											Outside		Inside			Outside			Inside	Outside		Inside		Outside			Inside	Outside			Inside	Outside			Inside	
Radionuclide	175-1C-01	175-1C-02	176-1C-01	176-1C-02	185-1C-01	185-1C-02	185-1C-03	186-1C-01	186-1C-02	186-1C-03	3100-187-1C-01	3100-187-1C-02	3100-187-4C-03	3100-187-4C-04	3100-187-4C-05	3100-188-1C-01	3100-188-1C-02	3100-188-1C-03	Use Avg of #s 187-4C-05 & 189-4C-04	3200-189-1C-01	3200-189-1C-02	3200-189-4C-03	3200-189-4C-04	3100-190-1C-01	3100-190-1C-02	3100-190-1C-03	Use Avg of #s 187-4C-05 & 189-4C-04	3300-191-1C-01	3300-191-1C-02	3300-191-1C-03	Use Avg of #s 187-4C-05 & 189-4C-04	3300-192-1C-01	3300-192-1C-02	3300-192-1C-03	Use Avg of #s 187-4C-05 & 189 4C-04	Avg of 1st Sample Diluted over Total depth: All Sample Results
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
H-3					1400			1170			1120	1070	701	1510	626	783	1610	1080	N/A	648	1870	1780	471	467	1010	178	N/A	696	1560	1620	N/A	772	356	837	N/A	**1015**
C-14	720	**0.52**	350	**0.50**	70.00	**0.50**	**0.51**	25.4	**0.57**	**0.54**	131	**0.11**	**0.10**	0.15	450	35	**0.10**	0.12	483	10.1	0.14	0.11	516	187	**0.08**	**0.08**	483	217	**0.08**	**0.08**	483	6.8	**0.09**	0.15	483	N/A
Co-60	7.78	**0.07**	23.10	**0.02**	240.0	0.38	0.09	70.9	**0.02**	**0.07**	0.123	**0.03**	**0.04**	**0.02**	0.09	0.46	**0.05**	**0.08**	N/A	0.25	**0.22**	**0.04**	0.26	0.10	**0.02**	0.06	N/A	4.50	0.13	0.11	N/A	1.83	0.08	0.05	N/A	N/A
Cs-137	34.90	**0.05**	17.00	0.06	1270	6.02	0.15	584	1.59	**0.04**	1.72	**0.03**	**0.03**	**0.03**	0.31	2.67	0.03	0.05	N/A	1.03	**0.02**	**0.08**	6.58	0.42	**0.03**	**0.04**	N/A	5.79	0.02	**0.01**	N/A	17.1	0.01	**0.03**	N/A	N/A
Ratio of C-14/Co-60	**92.54**		**15.15**		**0.29**			**0.36**			**1065**				**4961**	**78**				**39.8**			**1962**	**1928**				**48.2**				**3.72**				
Avg C-14 Conc. Diluted Over Concrete Depth	**75.00**		**36.46**		**Decon**	**0.50**		**Decon**	**0.57**		**23.4**				**80.4**	**6.3**			**86.3**	**1.8**			**92.1**	**33.4**		**86.3**	**45.2**			**100.6**	**1.4**			**100.6**	**48.1**
Avg Co-60 Conc. Diluted Over Concrete Depth	**0.81**		**2.41**		**Decon**	**0.03**		**Decon**	**0.07**		**0.02**				**0.02**	**0.08**				**0.05**			**0.05**	**0.02**				**0.94**				**0.38**				**0.37**
Avg Cs-137 Conc. Diluted Over Concrete Depth	**3.64**		**1.77**		**Decon**	**0.55**		**Decon**	**0.14**		**0.31**				**0.05**	**0.48**				**0.18**			**1.18**	**0.08**				**1.21**				**3.56**				**1.31**

Sept. Submittal	Containment Floor					Containment Internal Walls								
Radionuclide	Duratek Sample 1/27/99 SML #1 First 0.5"	Duratek Sample 1/27/99 SML #1 0.5 to 1 inch	Duratek Sample 1/27/99 SML #1 1 to 1.5"	Avg Over All Samp at SML #1	Avg #1 Diluted over Entire Floor Depth	Duratek Sample 1/27/99 SML #2 First 0.5"	Duratek Sample 1/27/99 SML #2 0.5 to 1"	Avg Over All Samp at SML #2	Avg #2 Diluted over Half of Wall Thick.	Duratek Sample 1/27/99 SML #3 First 0.5"	Duratek Sample 1/27/99 SML #3 0.5 to 1 inch	Duratek Sample 1/27/99 SML #3 1 to 1.5 inch	Avg Over All Samp at SML #3	Avg #3 Diluted over Half of Wall Thick.
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Co-60	23.40	**1.00**	**0.58**	8.33	0.52	0.39	0.50	0.45	0.03	1.68	0.23	**0.52**	0.81	0.09
Cs-137	279	**0.49**	**0.76**	93.42	5.84	2.12	**1.10**	1.61	0.12	13.66	**0.60**	**0.58**	4.95	0.53

Notes: 1. Sample Results in Bold Type are <Minimum Detectable Activity (MDA) (MDA Value Shown)
2. N/A = Not Applicable, the additional samples are only needed to account for the higher concentations of C-14 in the inside surfaces of walls and the charging floor

Table 8 (Revision 2 dated 3/22/05)

Average Waste Concentration Calculation

Source of Concrete Waste	Estimated Waste Weight (Million lbs)	Contam-ination Levels Based On	Average Co-60 Concen-tration by Source (pCi/g)	Average Cs-137 Concen-tration by Source (pCi/g)	Average H-3 Concen-tration by Source (pCi/g)	C-14 Scaling Factor to Co-60	C-14 Concen-tration (pCi/g)	Mn-54 Scaling Factor to Co-60	Mn-54 Concen-tration (pCi/g)	Fe-55 Scaling Factor to Co-60	Fe-55 Concen-tration (pCi/g)	Ni-63 Scaling Factor to Co-60	Ni-63 Concen-tration (pCi/g)	Sr-90 Scaling Factor to Co-60	Sr-90 Concen-tration (pCi/g)	Nb-94 Scaling Factor to Co-60	Nb-94 Concen-tration (pCi/g)	Tc-99 Scaling Fator to Co-60	Tc-99 Concen-tration (pCi/g)	Ag-108m Scaling Factor to Co-60	Ag-108m Concen-tration
Containment Walls	40	Actual	0.06	0.05	5.48	2.522	0.143	0.003	0.000	0.737	0.042	0.322	0.018	Use Actual	0.011	0.0020	0.0001	0.0127	0.0007	0.0036	0.0002
Cont. Floor & Internal	20	Actual Floor	0.67	2.69	1285.00	*N/A*	*48.145*	0.010	0.006	0.226	0.151	12.289	8.214	0.0486	0.032	0.0072	0.0048	0.0343	0.0229	0.0112	0.0075
RHR Floors	1	Actual	1.73	5.78	8.45	0.011	0.020	0.003	0.005	0.737	1.272	0.322	0.556	0.0678	0.117	0.0020	0.0034	0.0127	0.0219	0.0036	0.0062
RHR Walls	2	Actual	0.18	0.63	7.66	0.011	0.002	0.003	0.000	0.737	0.130	0.322	0.057	Use Actual	0.073	0.0020	0.0003	0.0127	0.0022	0.0036	0.0006
Waste Disposal Walls	2.5	RHR Walls	0.18	0.63	7.66	0.011	0.002	0.003	0.000	0.737	0.130	0.322	0.057	RHR Walls	0.073	0.0020	0.0003	0.0127	0.0022	0.0036	0.0006
Waste Disposal Floors	0.5	Actual	2.79	4.59	8.45	0.011	0.032	0.003	0.007	0.737	2.058	0.322	0.899	0.0678	0.189	0.0020	0.0055	0.0127	0.0354	0.0036	0.0100
PAB Above El. 17.5'	7	Cont. Floor	0.67	2.69	7.66	0.011	0.008	0.003	0.002	0.737	0.493	0.322	0.215	0.0486	0.032	0.0020	0.0013	0.0127	0.0085	0.0036	0.0024
Fuel Pool Walls & Floor	1	RHR Floors	1.73	5.78	8.45	0.011	0.020	0.003	0.005	0.737	1.272	0.322	0.556	0.0678	0.117	0.0020	0.0034	0.0127	0.0219	0.0036	0.0062
Remainder of Fuel Bldg	8	RHR Walls	0.18	0.63	7.66	0.011	0.002	0.003	0.000	0.737	0.130	0.322	0.057	RHR Walls	0.073	0.0020	0.0003	0.0127	0.0022	0.0036	0.0006
Service Building	8	Cont. Walls	0.06	0.05	5.48	0.011	0.001	0.003	0.000	0.737	0.042	0.322	0.018	Cont. Walls	0.011	0.0020	0.0001	0.0127	0.0007	0.0036	0.0002
Misc Struct/Soil/Asphalt	10	Cont. Walls	0.06	0.05	5.48	0.011	0.001	0.003	0.000	0.737	0.042	0.322	0.018	Cont. Walls	0.011	0.0020	0.0001	0.0127	0.0007	0.0036	0.0002
Total	100	**Weighted Avg. Conc.**	**0.284**	**0.974**	**261.88**		*9.69*		**1.67E-03**		**0.14**		**1.69**		**2.77E-02**		**1.25E-03**		**6.49E-03**		**2.04E-03**

Source of Concrete Waste	Estimated Waste Weight (Million lbs)	Contam-ination Levels	Average Co-60 Concen-tration by Source (pCi/g)	Cs-134 Scaling Factor to Co-60	Cs-134 Concen-tration (pCi/g)	Eu-152 Scaling Factor to Co-60	Eu-152 Concen-tration (pCi/g)	Eu-154 Scaling Factor to Co-60	Eu-154 Concen-tration (pCi/g)	Eu-155 Scaling Factor to Co-60	Eu-155 Concen-tration (pCi/g)	Pu-238 Scaling Factor to Co-60	Pu-238 Concen-tration (pCi/g)	Pu-239 Scaling Factor to Co-60	Pu-239 Concen-tration (pCi/g)	Pu-241 Scaling Fator to Co-60	Pu-241 Concen-tration (pCi/g)	Am-241 Scaling Fator to Co-60	Am-241 Concen-tration (pCi/g)	Cm-243 Scaling Fator to Co-60	Cm-243 Concen-tration (pCi/g)
Containment Walls	40	Actual	0.06	0.0048	0.0003	0.0087	0.0005	0.0043	0.0002	0.0066	0.0004	0.0112	0.0006	0.0031	0.0002	0.1758	0.0099	0.0143	0.0008	0.0036	0.0002
Cont. Floor & Internal	20	Actual Floor	0.67	0.0312	0.0209	0.0277	0.0185	0.0236	0.0158	0.0214	0.0143	0.0150	0.0101	0.0057	0.0038	0.1837	0.1228	0.0332	0.0222	0.0043	0.0029
RHR Floors	1	Actual	1.73	0.0048	0.0082	0.0087	0.0150	0.0043	0.0075	0.0066	0.0114	0.0112	0.0193	0.0031	0.0053	0.1758	0.3034	0.0143	0.0246	0.0036	0.0062
RHR Walls	2	Actual	0.18	0.0048	0.0008	0.0087	0.0015	0.0043	0.0008	0.0066	0.0012	0.0112	0.0020	0.0031	0.0005	0.1758	0.0310	0.0143	0.0025	0.0036	0.0006
Waste Disposal Walls	2.5	RHR Walls	0.18	0.0048	0.0008	0.0087	0.0015	0.0043	0.0008	0.0066	0.0012	0.0112	0.0020	0.0031	0.0005	0.1758	0.0310	0.0143	0.0025	0.0036	0.0006
Waste Disposal Floors	0.5	Actual	2.79	0.0048	0.0133	0.0087	0.0243	0.0043	0.0121	0.0066	0.0185	0.0112	0.0313	0.0031	0.0086	0.1758	0.4908	0.0143	0.0398	0.0036	0.0100
PAB Above El. 17.5'	7	Cont. Floor	0.67	0.0048	0.0032	0.0087	0.0058	0.0043	0.0029	0.0066	0.0044	0.0112	0.0075	0.0031	0.0021	0.1758	0.1175	0.0143	0.0095	0.0036	0.0024
Fuel Pool Walls & Floor	1	RHR Floors	1.73	0.0048	0.0082	0.0087	0.0150	0.0043	0.0075	0.0066	0.0114	0.0112	0.0193	0.0031	0.0053	0.1758	0.3034	0.0143	0.0246	0.0036	0.0062
Remainder of Fuel Bldg	8	RHR Walls	0.18	0.0048	0.0008	0.0087	0.0015	0.0043	0.0008	0.0066	0.0012	0.0112	0.0020	0.0031	0.0005	0.1758	0.0310	0.0143	0.0025	0.0036	0.0006
Service Building	8	Cont. Walls	0.06	0.0048	0.0003	0.0087	0.0005	0.0043	0.0002	0.0066	0.0004	0.0112	0.0006	0.0031	0.0002	0.1758	0.0099	0.0143	0.0008	0.0036	0.0002
Misc Struct/Soil/Asphalt	10	Cont. Walls	0.06	0.0048	0.0003	0.0087	0.0005	0.0043	0.0002	0.0066	0.0004	0.0112	0.0006	0.0031	0.0002	0.1758	0.0099	0.0143	0.0008	0.0036	0.0002
Total	100	**Weighted Avg. Conc.**	0.28		**4.89E-03**		**5.01E-03**		**3.81E-03**		**3.85E-03**		**3.69E-03**		**1.23E-03**		**5.09E-02**		**6.58E-03**		**1.11E-03**

Note: 1. Information changed from the original submittal shown in italics

CY-05-090
Docket No. 50-213

Attachment 1
(Total of 4 pages)

Table 3 - Containment Floor and Wall Samples, Revision 2

Table 8 - Average Waste Concentration Calculation, Revision 2

Table 9 - Post Closure Dose Calculation, Revision 2

Table 10 - Basis for Dilution Factors Used in Determining Table 3 Waste Concentrations

March 2005

Table 9 (Revision 2 dated 3/22/05)

Post Closure Dose Calculation

Radio-nuclide	Dose Equivilent per Concentration of Radionuclide - Resident Farmer (mrem/yr per pCi/g)	Weighted Average of All Waste (pCi/g)	Post Closure Dose for Avg of All Waste (mrem/yr)
H-3	1.045E-05	261.88	2.737E-03
C-14	3.060E-01	*9.69*	*2.964E+00*
Mn-54	6.286E-25	**1.67E-03**	1.052E-27
Fe-55	0.000E+00	0.14	0.000E+00
Co-60	1.653E-21	0.28	4.692E-22
Ni-63	0.000E+00	1.69	0.000E+00
Sr-90	0.000E+00	0.03	0.000E+00
Nb-94	9.961E-01	**1.25E-03**	1.246E-03
Tc-99	2.221E-01	6.49E-03	1.441E-03
Ag-108m	5.764E-01	**2.04E-03**	1.176E-03
Cs-134	5.881E-26	4.89E-03	2.875E-28
Cs-137	6.850E-27	0.97	6.674E-27
Eu-152	1.567E-23	5.01E-03	7.854E-26
Eu-154	5.997E-23	3.81E-03	2.286E-25
Eu-155	0.000E+00	3.85E-03	0.000E+00
Pu-238	2.004E-06	3.69E-03	7.398E-09
Pu-239	0.000E+00	1.23E-03	0.000E+00
Pu-241	0.000E+00	5.09E-02	0.000E+00
Am-241	0.000E+00	6.58E-03	0.000E+00
Cm-243	0.000E+00	1.11E-03	0.000E+00
Total Post Closure Dose (mrem/yr)			***2.971E+00***

Notes: **1. Values in Bold Type are based on Minimum Detectable Activity (MDA) (i.e. Radionuclide was not detected at the MDA concentration**
2. Information changed from the original submittal shown in italics

TABLE 10

Basis for Dilution Factors Used in Determining Table 3 Waste Concentrations

A. Dilution Factors	Wafer Thick. (in.)	Total Thick. (in.)	Dilution Factor
1. Floor Samples # 175 & 176:	2.5	24	9.6
2. Sump Floor Samples # 185 & 186: (Dilution Factor used for Co-60 in Sample # 185 and Cs-137 in both samples. For all other results, actual value used as sump will have been totally remediated after 1" removal for the other radionuclides)	1.0	11	11
3. Duratek Floor Sample # 1:	1.5	24	16
4. Duratek Wall Sample # 2:	1	14(1/2 Wall)	14
5. Duratek Wall Sample # 3:	1.5	14(1/2 Wall)	9.3
6. Internal Wall Samples # 187 thru 190:	2.5	14(1/2 Wall)	5.6
7. Charging Floor Samples # 191 & 192:	2.5	12(1/2 Floor)	4.8

B. Sample Calculation for C-14 Concentration in Containment Floor and Walls

Sample # From Table 3	Sample Concentration (pCi/g)		Dilution Factor From "A" Above		Waste Concentration (pCi/g)
1) 175-1C-01	720	divided by	9.6	equals	75.00
2) 176-1C-01	350	"	9.6	"	36.46
3) 185-1C-02 (Use 2nd wafer as first 1" of concrete to be disposed elsewhere)					0.5
4) 186-1C-02 (Use 2nd wafer as first 1" of concrete to be disposed elsewhere)					0.57
5) 187-1C-01	131	"	5.6	"	23.4
6) 187-4C-05	450	"	5.6	"	80.4
7) 188-1C-01	35	"	5.6	"	6.3
8) Inside Sample Core #188: Use average of #s 6 & 10 ((450+516)/2)/5.6 =					86.3
9) 189-1C-01	10	"	5.6	"	1.8
10)189-4C-04	516	"	5.6	"	92.1
11)190-1C-01	187	"	5.6	"	33.4
12)Inside Sample Core #190: Use average of #s 6 & 10 ((450+516)/2)/5.6 =					86.3
13)191-1C-01	217	"	4.8	"	45.2
14)Inside Sample Core #191: Use average of #s 6 & 10 ((450+516)/2)/4.8 =					100.6
15)192-1C-01	7	"	4.8	"	1.4
16)Inside Sample Core #192: Use average of #s 6 & 10 ((450+516)/2)/4.8 =					100.6
Average Waste Concentration = 770.3/16=48.1					