

Attachment 2
Recent Description of USEI Site



CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

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

SEP 16 2004

CY-04-168

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
Request for Approval of Proposed Procedures
in accordance with 10 CFR 20.2002

Connecticut Yankee Atomic Power Company (CYAPCO) proposes 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 proposes to dispose of demolition debris from decommissioning of the HNP facilities to the US Ecology Idaho Facility, located in Grand View, Idaho. The purpose of this letter is to request NRC approval of proposed procedures for disposal of certain demolition debris in accordance with the provisions of 10 CFR 20.2002.

A description of the waste material for disposal that potentially contains licensed material is provided in Attachment 1. This description includes the physical and chemical properties important to risk evaluation and the proposed manner and conditions of waste disposal. In addition, 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 as a consequence of the proposed waste disposal 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.

CYAPCO hereby requests expedited review and approval of this request by December 24, 2004 to support our decommissioning activities at the HNP.

There are no regulatory commitments contained in this letter.

A601

**Haddam Neck Plant
Evaluation in Support of Alternate Waste Disposal Procedures
In accordance with 10 CFR 20.2002**

1. INTRODUCTION

Approval of the proposed disposal procedures in accordance with the provisions of 10 CFR 20.2002 would allow Connecticut Yankee Atomic Power Company (CYAPCO) to dispose of demolition debris from the Haddam Neck Plant (HNP) decommissioning activities at the US Ecology Idaho Facility in Grand View, Idaho. This attachment provides a conservative assessment of the radiological impacts of the proposed disposal. The following Sections describe disposal site characteristics, the waste material, the radiological assessment and conclusions. The main conclusion is 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 as a consequence of the proposed waste disposal 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.

2. DISPOSAL SITE CHARACTERISTICS

This section describes the features of the disposal facility of importance in radiological assessment. It describes in turn the geographical and physical environment of the facility, the engineered features, the permits under which the site operates, radioactive material disposal limits, site operations, radiation monitoring, and post-closure plans. A complete description of the site is provided in documents submitted to the State of Idaho in support of permit applications (Envirosafe 1998, Ref. 6.1; EnviroSAFE, 2000, Ref 6.2; CH2M Hill, 1993, Ref 6.3). A description of the key features in detail sufficient to support radiological analysis is provided herein.

2.1 ENVIRONMENT AND FACILITY DESIGN

The US Ecology Idaho site is located near Grand View, Idaho in the Owyhee Desert. Grand View is approximately 40 miles south-southeast of Boise, Idaho. The disposal site is located at 10.5 miles NW on Highway 78, Lemley Road, Grand View, Idaho, 83624.

The most significant natural site features that appear to limit the transport of radioactive material are the low precipitation rate and the long vertical distance to groundwater. The precipitation rate in this arid location is 0.184 meters per year (Envirosafe, 2000, Ref 6.2). The depth to groundwater accommodates a 3.6-meter thick cover, a 33.6-meter thick disposal zone, and a 61-meter thick unsaturated zone between the base of the disposal cell and groundwater (Envirosafe, 2000, Ref 6.2; CH2M Hill, 1993, Ref 6.3).

A number of engineered features designed to enhance confinement performance have been incorporated in the facility. The most important from the standpoint of radioactive material confinement is the 3.6-meter thick, low permeability, erosion resistant cover to be constructed at cell closure. This final cover is to be constructed of compacted soil in conjunction with a 40-mil HDPE liner. The HDPE cover liner is to be integrated with a similar liner along the sides and bottom of the cell. The confinement effectiveness of the HDPE liner is ignored in this analysis to assure that projections of potential radiation dose are conservatively maximal.

Together, the low precipitation rate, the thick, low-permeability cover, and the thick unsaturated zone minimize the potential for long term infiltration, dissolution, and transport of constituents to groundwater. The thick cover also minimizes the potential for exposure of waste material radionuclides by erosion or intrusion and minimizes release of radon gas to the atmosphere (although the dose due to the release of radon is shown to be insignificant in these analyses).

Other facility design features and operating procedures provide shorter term confinement of radioactive materials and limit the potential for radiation exposure during receipt of material and emplacement of materials in the cell. These include a closed facility with filtered ventilation exhaust for transfer of incoming waste material from the shipping conveyance to US Ecology Idaho waste transfer vehicles, mechanized equipment for disposition of waste material in the cell, and the application of an asphaltic spray (to control resuspension of the material into the air) over newly deposited material at the end of each day's operations.

The total capacity of the cell which would receive the HNP waste is approximately two million cubic yards (1.5 million cubic meters). The surface area of the cell is approximately 88,000 square meters. The material that CYAPCO proposes for disposal if occupying the full depth of this cell would have a surface area of approximately 900 square meters. This means that the HNP material would occupy approximately 1 % of the total volume of this disposal cell.

2.2 PERMITS

The US Ecology Idaho site is a Subtitle C RCRA hazardous waste disposal facility permitted under the authority of the Idaho Hazardous Waste Management Act, Chapter 44, Title 39, of the Idaho Code. The site operates under permit IDD073 114654. A Class I Permit Modification was approved in 1999, and a Class II Permit Modification was approved in 2001. The latter permit modification also accommodates recent changes to Idaho law and regulations regarding the disposal of radioactive material, as described below. In accordance with its regulations and permit conditions, the site has been receiving certain radioactive materials exempt from Nuclear Regulatory Commission licensing requirements, including U.S. Army Corps of Engineers formerly Utilized Sites Remedial Action Program materials, for a number of years.

Disposal of radioactive materials at the US Ecology Idaho site is regulated under the Rules of the Department of Environmental Quality, IDAPA 58.01.10, "Rules Regulating the Disposal of Radioactive Materials Not Regulated Under the Atomic Energy Act of 1954, As Amended." These regulations establish radiation protection standards and permit conditions for disposal of these materials at a permitted disposal facility under the authority of the Idaho Hazardous Waste Management Act, Chapter 44, Title 39, Idaho Code.

Under the Idaho Department of Environmental Quality general protection standards, all owners and operators disposing of radioactive materials are required to conduct operations in a manner consistent with radiation protection standards contained in 10 CFR Part 20. In addition, no owner or operator may operate in a manner such that any member of the public would receive an annual TEDE in excess of 100 millirem per year. In addition, no person may release radioactive material for unrestricted use in such a manner that the reasonable maximally exposed individual would receive an annual TEDE greater than 15 millirem per year, excluding natural background.

The facility owner or operator is also required to comply with each of the following permit conditions:

- Department-approved waste acceptance criteria for radioactive material;
- A Department-approved closure program that provides reasonable assurance that the radon emanation rate from the

closed disposal unit will not exceed twenty (20) picocuries per square meter per second averaged across the entire area of the closed disposal unit and meets the general radiation protection standard for the public (TEDE of 15 millirem per year); and

- A Department-approved environmental monitoring program that monitors air, ground water, surface water and soil for radionuclides and ambient radiation levels in the environs of the facility, and which demonstrates that no member of the general public is likely to exceed a radiation dose of 100 millirem per year from operations conducted at the site.

As previously mentioned, the analysis to follow will show that the HNP material proposed for disposal at the US Ecology facility will result in doses that are a small fraction of the applicable limits.

2.3 OPERATIONS

US Ecology Idaho accepts only wastes that conform to waste acceptance criteria approved by the Idaho Department of Environmental Quality, as required in IDAPA 58.01.10. This is implemented in the form of a two-step pre-acceptance protocol. In the first step, the generator prepares a chemical and physical characterization of the waste stream on a US Ecology Idaho standard form. The second step is an evaluation performed by US Ecology Idaho to determine the acceptability of the waste. No waste is shipped until the waste is determined to be acceptable by US Ecology Idaho.

Waste acceptance criteria applicable to the material intended for disposal are as follows:

1. Acceptable Dose Rate at receipt to insure that the yearly dose criteria stated in the following paragraph are maintained.
2. The sum of the concentrations of all radionuclides present in the waste does not exceed 2000 pCi/g.

US Ecology Idaho is required by condition of its Department of Environmental Quality permit to operate in a way that assures that the highest potential dose to a worker handling radioactive material is 400 millirem TEDE per year, and that assures that the highest potential dose to a member of the public is 100 millirem TEDE per year from operations or 15 millirem TEDE per year from release of radioactive materials for unrestricted use.

To meet these requirements, US Ecology Idaho conducts its operations in accordance with its Radioactive Material Health and Safety Manual and other operating procedures. These procedures include measures for minimizing release of material in receipt and handling. Transfers of as-received materials from shipping conveyances to US Ecology Idaho vehicles are performed in a closed structure with bag-filtered ventilation exhaust. Workers use mechanized equipment to transfer and deposit material in the disposal cell. Materials placed in the cell are covered each day with asphaltic spray to minimize the potential for release of radioactive materials to the atmosphere.

To assist in demonstrating compliance with these requirements, US Ecology Idaho also operates a radiation monitoring program approved by the Idaho Department of Environmental Quality, as required in IDAPA 58.01.10. The program includes:

- Periodic collection of grab air samples with analysis for radon progeny,
- Periodic deployment and collection and analysis of passive track-etch detectors with analysis for radon concentration, and
- Periodic deployment and collection of passive dosimeters at locations around the perimeter of the cell with analysis for direct radiation exposure

The following samples are analyzed for isotopic uranium and thorium, Ra-226 and Gross Alpha and Gross Beta radioactivity (The US Ecology Idaho site will soon be receiving materials from NRC Part 50 licensees. Prior to allowing shipment of any of this additional material, analyses of the following samples for gamma radionuclides will also be instituted):

- Periodic collection of grab air samples during material transfer operations,
- Periodic collection of continuous air samples from the admin/lab area,
- Periodic collection of soil samples from locations downwind of the disposal area, and
- Periodic collection of groundwater samples from two monitoring wells with analysis for gross activity.

2.4 POST-CLOSURE PLAN

As required by the Idaho Department of Environmental Quality in IDAPA 58.01.10, US Ecology Idaho maintains an approved closure plan, submitted as part of its permit application (Envirosafe, 1998,

Ref 6.1). The plan conforms to all standard closure and post-closure requirements applicable to RCRA disposal facilities, including post-closure monitoring and financial assurance.

The plan provides reasonable assurance that the radon emanation rate from the closed disposal unit will not exceed twenty (20) picocuries per square meter per second averaged across the entire area of the closed disposal unit and reasonable assurance that the general radiation protection standard for the public (TEDE of 15 millirem per year) will not be exceeded. It should be noted that this standard for post closure exposure to a member of the public is set below the NRC standard for unconditional release of an NRC licensed facility which is 25 millirem per year TEDE.

3. DESCRIPTION OF WASTE

3.1 Physical Properties

The waste material (the demolition debris) intended for disposal includes flooring materials, concrete, rebar, roofing materials, structural steel, soils associated with digging up foundations, and concrete and/or pavement or other similar solid materials. Soils remediated for the purpose of meeting the final status survey requirements of the HNP License Termination Plan (LTP) (i.e., exceed the Derived Concentration Guideline Levels (DCGL) in the LTP) will not be disposed of at the US Ecology facility as the concentrations of the key gamma radionuclides at the DCGL levels are approximately an order of magnitude over the averages determined later in this evaluation. Large quantities of material at the DCGLs would therefore increase the dose to site workers.

The demolition debris proposed for disposal at the US Ecology Idaho facility will originate from the demolition and removal of structures and paved surfaces at the HNP plant site, after the structure/surface has been decontaminated to remove areas that are highly contaminated.

The physical form of this demolition debris will be that of bulk material of various sizes ranging from the size of sand grains up to occasional monoliths with a volume of several cubic feet. CYAPCO, for the purpose of calculations, assumed the material to be a homogeneous mixture with a specific density of 1 gram per cubic centimeter during shipment and 1.5 grams per cubic centimeter after compaction in the disposal cell at US Ecology. The material will be dry solid waste containing no absorbents or chelating agents.