



A PECO Energy/British Energy Company

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10CFR20.2002

2130-00-20268
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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

SUBJECT: OYSTER CREEK GENERATING STATION (OYSTER CREEK)
FACILITY OPERATING LICENSE NO. DPR-16
DOCKET NO. 50-219
10 CFR 20.2002 REQUEST FOR APPROVAL OF
DISPOSAL OF DREDGED MATERIAL

Dear Sir or Madam:

In accordance with 10 CFR 20.2002, AmerGen Energy Company, LLC (AmerGen) submits this application for approval of disposal of previously dredged material in the existing dewatering basin located on the Finninger Farm property owned by AmerGen.

This application requests approval of procedures used to dispose of dredged material contaminated at minimal levels, which was generated as a result of dredging portions of Oyster Creek and Forked River. Dredging of these waterways was performed in accordance with the final environmental statement for the Oyster Creek Generating Station and the New Jersey Board of Public Utilities to remove sediment from the creek and river bottom, which was causing shoaling.

The disposal method consisted of pumping the dredge material to a dewatering basin, allowing the material to dry and ultimately covering over with topsoil. Disposal of this material in the described manner has no adverse impact to the public.

A radiological assessment and a description of the operational controls and monitoring of the dewatering basin is provided in Attachment 1. The assessment demonstrates that the dose impact from the existing accumulation of dredged material will not approach the regulatory dose limits in either 20.1301 or 20.1402. Soil analyses were performed to environmental monitoring program lower limits of detection. The radiological impact to a maximally exposed member of the public will be limited to less than one mrem/year Total Effective Dose Equivalent (TEDE) to a resident farmer after termination of active site control.

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This application, in accordance with 10 CFR 20.2002, addresses Oyster Creek Non-Cited Violation 50-219/99-08-01.

If any additional information is needed, please contact David J. Distel at (610) 765-5517.

Very truly yours,



Ron J. DeGregorio
Vice President - Oyster Creek

Attachment

cc: H. J. Miller, Administrator, USNRC Region I
H. N. Pastis, USNRC Senior Project Manager
L. A. Dudes, USNRC Senior Resident Inspector
K. Tosch, Director, Bureau of Nuclear Engineering,
Department of Environmental Protection, State of New Jersey
The Honorable John C. Parker, Mayor of Lacey Township
File No. 99175

ATTACHMENT 1

**OYSTER CREEK GENERATING STATION
ASSESSMENT OF DISPOSAL OF DREDGE MATERIAL
ON FINNINGER FARM PROPERTY**

1.0 INTRODUCTION

1.1 Background

Oyster Creek has periodically dredged portions of the Forked River (plant intake) and Oyster Creek (plant discharge) waterways to remove sediment from the bottom which was causing shoaling. This dredging was performed in accordance with the final environmental statement for the Oyster Creek Generating Station and the New Jersey Board of Public Utilities. At the time of dredging, the dredged material was pumped to a dewatering basin located on the Finninger Farm property immediately to the east of Oyster Creek. This property is owned by the licensee but is not considered part of the Oyster Creek Plant site as defined in the Updated Final Safety Analysis Report (UFSAR). The time frame of dredging and the quantity of dredged material is listed below:

1978	1984	1997
cubic yards		
100,000	30,000	50,000

The dewatering basin is a 17.5 acre area of the entire approximately 600-acre Finninger Farm property. On the eastern and western (land-side) boundaries, the farm is bordered with a post and rail fence, which is posted "No Trespassing." Access into the property is along a dirt road which has a locked gate. The dewatering basin is bounded on all sides by a snowdrift type fence. At least one air sampler is located along each side of the basin, two of which are under the control of the New Jersey Bureau of Nuclear Engineering. A remote direct radiation monitor, also under state control, is located along the western border of the basin. The basin currently has a 7-foot high berm around the basin.

Radiological analyses of the aquatic sediment prior to the last dredging in 1997 were performed in June of 1996. These samples were analyzed for gamma emitting radionuclides in accordance with existing procedures used for the operational Radiological Environmental Monitoring Program (REMP). At that time, the maximum concentrations of radionuclides in the sediment that may be attributable to effluents from the Oyster Creek Station were 0.088 picocuries/gram for Cobalt 60 and 0.270 picocuries/gram for Cesium 137. All of the Cobalt 60 came from Oyster Creek effluents. Some of the Cesium 137 is attributable to nuclear weapons testing; background levels in sediment are highly variable but are typically about 0.1 picocuries/gram on average. Sampling and analyses performed on the dredged material in the dewatering basin as a result of the 1978 and 1984 dredging confirmed that concentrations were less than the above values.

The radionuclide concentrations in the dredged material are small fractions of the NRC's default Derived Concentration Guidelines (DCGLs) of 3.8 picocuries/gram and 11 picocuries/gram for Cobalt 60 and Cesium 137, respectively. The default DCGLs for each isotope correspond to an all pathways exposure to the resident farmer of 25 mrem/year. As such, the farm property could be released for unrestricted use immediately.

Cesium 137, with a half life of 30.2 years, is likely to be detectable in the dredged material at levels above weapons testing related background, well beyond the current license expiration date in 2009. The Cobalt 60 (5.3-year half life) should be undetectable by 2009.

1.2 Objective

The objective of this assessment is to present the data and radiological evaluation to demonstrate that deposition of dredged material in the Finninger Farm dewatering basin meets the following applicable regulatory limits:

1. TEDE of a hypothetical maximally exposed individual must be less than 100 mrem/yr (10CFR20.1301).
2. TEDE of the average member of the critical group – a resident farmer - from the probable pathways of exposure must be less than 25 mrem/yr (10CFR20.1402)

2.0 DESCRIPTION OF DREDGED MATERIAL

The dredge spoils which are the subject of this evaluation were obtained from dredging sediment from the Forked River and Oyster Creek bottoms. The dredging and disposal in the Finninger Farm dewatering basin took place in three evolutions, 1978, 1984, and 1997. The total volume of dredged material deposited in the basin is approximately 180,000 cubic yards. The dredge material was pumped to the dewatering basin and allowed to dry. After the initial dredging in 1978, the basin was covered over with top soil. In 1984, the top soil was removed to form a 7-foot berm around the basin. The basin has been left uncovered following the 1984 and 1997 dredging.

Sampling of the river bottom sediment in 1996, prior to the 1997 dredging and sampling of the dewatering basin deposition in 1997, described in Section 1.1 above, verified plant-related radioactivity in the dredged material. This radioactive material was properly released from the site in effluents meeting 10 CFR 20, Appendix B and 10 CFR 50, Appendix I limits.

For the purpose of estimating the concentration of Cobalt 60 and Cesium 137 in the dewatering basin, those samples that had analytical results less than the Minimum Detectable Activity (MDA) were ignored, and the average concentrations were evaluated based only on the positive analytical results. This results in a conservative overestimate of the actual average concentration.

3.0 **DREDGE MATERIAL DISPOSAL AND ADMINISTRATIVE PROCEDURE REQUIREMENTS**

The method of disposal involved the pumping of dredge spoils to the dewatering basin and allowing the material to dry. Determination of the radiological dose impact has been made based on accepted models and pathway assumptions.

Records of the dredge material deposition that are maintained include the following:

- (a) The radionuclide concentrations in the dredge material existing in the dewatering basin in 1996.
- (b) The radionuclide concentrations in the Oyster Creek (plant discharge) sediment bottom in 1996 prior to commencement of the last dredging in 1997.
- (c) Dose calculations required to demonstrate that the dose limits applicable to the dewatering basin have not been exceeded.

There are no restrictions placed on the site due to the dredge material deposition in the dewatering basin.

4.0 **EVALUATION OF ENVIRONMENTAL IMPACTS**

4.1 Site Characteristics

The designated disposal site is located on property owned by the licensee immediately adjacent to the Oyster Creek plant site but is not considered part of the site. The Finninger Farm Site consists of approximately 600 acres. The existing dewatering basin is a 17.5 acre area.

4.2 Radiological Impact

The dose assessment for the residual radioactivity in the dewatering basin was calculated based on the processes provided in and in support of 10CFR20 Subpart E. Since the material is on licensee owned property but is not on the licensed facility, the evaluation of dose based on the critical group scenarios supporting Subpart E dose assessment is most limiting. No credit was taken for the current presence of licensee

control or the expected continuation of that control to and beyond the current license life of the plant in 2009. Concentrations used are those found in 1996 and 1997 samples, no decay to the present or to a period where licensee control is expected to terminate has been applied. No credit is taken for the presence of measurable Cesium 137 in background. These are highly conservative assumptions, since the Cobalt 60 would be expected to decay at least two half lives before the license is terminated, and natural environmental background activity is actually about one-third of the Cesium 137 activity.

The sediments deposited in the basin were known to contain low levels (less than 10% of the DCGLs) of Cesium 137 and Cobalt 60. In a previous assessment submitted to NRC (140-99-20507, dated September 22, 1999) related to the sale of the Forked River property, waste stream analyses done for radwaste shipping purposes were used to evaluate whether other isotopes would also be of interest based on their possibility to be present and dose contribution. This assessment of the "hard to detect" nuclides is equally applicable to the Finninger Farm basin. In order to assess the impact of the "hard to detect" nuclides, the 1998 10CFR61 analysis, a waste mix from 1982 decayed 20 years and the 1998 mix decayed by 20 years was used to evaluate the relative contribution from the common gamma emitting nuclides and the "hard to detect" isotopes listed in 10CFR61. This is applicable to the Finninger Farm basin, since the nuclides present in the dredge spoils are a result of liquid releases conducted in large part prior to 1990.

The percent abundance in the mix (or decayed mix) was divided by the DCGL to provide a DCGL weighted contribution from each isotope. This was adjusted to percent contribution and then converted to the fraction of the 25 mrem limit. This yields the dose contribution from each isotope if it is assumed that each isotope is actually present in a mix at the abundances from the waste mix analysis so that the total dose is 25 mrem. This is not the actual dose calculation for the property but is a demonstration of the relative importance to the dose assessment of each isotope if present at the ratios in the assumed mix.

For the 1998 mix, the Cobalt 60 was about 85% of the dose, Cesium 137 was about 10%, Silver 110m was about 4%, Manganese 54 was about 1%, and all the remaining 18 isotopes evaluated totaled about 1%. For the 1998 mix decayed 20 years, which is intended to represent the current contamination conditions if the 1998 mix had been placed in the sediment 20 years ago, the percent contributions from the Cobalt 60 and Cesium 137 changed somewhat, but the remaining 20 isotopes still totaled less than 1%. For the 1982 mix decayed 20 years, which is intended to represent the current contamination conditions if the 1982 mix had been placed in the sediment 20 years ago, the individual percent for the Cobalt 60 and Cesium 137 were again slightly different, but again the remainder of all of the isotopes, including the transuranics and other "hard to detects", contributed less than a few percent.

From this analysis it can be seen that the readily detectable gamma emitting isotopes completely dominate the dose assessment. Because of the negligible contributions from all of the other isotopes (for which DCGLs were calculated) they are not important to the dose assessment and can be neglected (per Section 2.9 of Draft Guide 4006). This dose assessment based only on gamma analysis (and specifically only Cesium 137 and Cobalt 60) will be within a very few percent of any assessment that would include additional analyses for the remaining isotopes listed above.

Since the concentrations observed in the sediments deposited in the basin are small compared to the published default DCGLs, and the activity from the most recent dredging, which contained the higher concentrations of plant related activity would be in a layer 1 to 3 feet thick on the top of the basin, the default DCGLs are used for the dose assessment, without additional site specific modeling. Further, AmerGen determined that the extent and type of sampling was consistent with the intent of Subpart E survey guidance, although it was not designed to that guidance since it was conducted before Subpart E was enacted.

The conservatively assessed concentration of the two nuclides of interest, Cobalt 60 and Cesium 137, are each about 2% of the respective default DCGLs (3.8 pCi/gm for Cobalt 60 and 11pCi/gm for Cesium 137), with a total of 3.9%. Therefore, the dose to the average member of the critical group would be assessed to be less than 4% of the 20.1402 dose limit, or less than 1 mrem per year for the activity currently in the basin. The nuclide concentration assessment is conservative since: (1) no background activity has been subtracted, (2) concentration averages are based only on the positive sample results, and (3) no adjustment for decay to present date has been included.

These results demonstrate that disposal of the approximately 180,000 yds³ of dredging material is well within the accepted dose limit criteria of 100 mrem/yr TEDE and are fully consistent with the decommissioning and unrestricted release dose criteria of 25 mrem TEDE per year to a resident farmer.

5.0 **RADIOLOGICAL PROTECTION**

The deposition of dredge material in the Finninger Farm property dewatering basin followed the applicable State requirements for land disposal and hypothetical doses to members of the public are well within the required dose criteria.

6.0 **CONCLUSIONS**

Total Effective Dose Equivalent to the hypothetical exposed individual is conservatively estimated to be less than 1 mrem/yr.