

10 CFR 50.90

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October 14, 2010

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Peach Bottom Atomic Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277, and 50-278

Subject: Supplemental Information Concerning License Amendment to Allow Receipt and Storage of Low-Level Radioactive Waste at Peach Bottom Atomic Power Station, Units 2 and 3

- References:**
- 1) Letter from D. M. Benyak (Exelon Generation Company, LLC) to U. S. NRC, "Request for License Amendment to Allow Receipt and Storage of Low-Level Radioactive Waste at Peach Bottom Atomic Power Station, Units 1, 2, and 3," dated January 6, 2010
 - 2) Letter from J. L. Hansen (Exelon Generation Company, LLC) to U. S. NRC, "Supplemental Information Concerning License Amendment to Allow Receipt and Storage of Low-Level Radioactive Waste at Peach Bottom Atomic Power Station, Units 1, 2, and 3," dated August 20, 2010.
 - 3) Letter from J. D. Hughey (U. S. NRC) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Units 1, 2, and 3 - Request for Additional Information Related to License Amendment Request to Allow Receipt and Storage of Low-Level Radioactive Waste Generated Off-Site (TAC Nos. ME3092 and ME3093)," dated September 27, 2010.

In Reference 1, Exelon Generation Company, LLC (EGC) submitted a request to amend Facility Operating License (FOL) No. DPR-12, and Renewed FOLs DPR-44 and DPR-56 for Peach Bottom Atomic Power Station (PBAPS), Units 1, 2, and 3, respectively. The proposed change will enable PBAPS to store Class B and Class C low-level radioactive waste (LLRW) from Limerick Generating Station, Units 1 and 2 (LGS) in the PBAPS Low Level Radioactive Waste Storage Facility (LLRWSF).

In Reference 2, EGC provided supplemental information concerning the Reference 1 license amendment request (LAR) and withdrew the LAR for PBAPS Unit 1.

In Reference 3, the NRC forwarded request(s) for additional information (RAIs) concerning the Reference 1 LAR. The attachment to this letter provides the information requested by the NRC.

EGC has reviewed the information supporting a finding of no significant hazards consideration, and the environmental consideration that were previously provided to the NRC in Reference 1. The additional information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration. In addition, the additional information provided in this submittal does not affect the bases for concluding that neither an environmental impact statement nor an environmental assessment is required for the proposed amendment. There are no regulatory commitments in this letter or the attachment.

Should you have any questions or require additional information, please contact Mr. John L. Schrage at (630) 657-2821.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 14th day of October 2010.

Respectfully,



Jeffrey L. Hansen
Manager - Licensing
Exelon Generation Company, LLC

Attachment: Response to Requests for Additional Information Concerning License Amendment to Allow Receipt and Storage of Low-Level Radioactive Waste at Peach Bottom Atomic Power Station, Units 2 and 3, Renewed Facility Operating Licenses DPR-44 and DPR-56

cc: Administrator – NRC Region I
NRC Project Manager, NRR – Peach Bottom Atomic Power Station
Director, Bureau of Radiation Protection - Pennsylvania Department of Environmental Resources

Attachment

Response to Requests for Additional Information Concerning License Amendment to Allow Receipt and Storage of Low-Level Radioactive Waste at Peach Bottom Atomic Power Station, Units 2 and 3 Renewed Facility Operating Licenses DPR-44 and DPR-56

By letter to the Nuclear Regulatory Commission (NRC) dated January 6, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML100200009), as supplemented by letter dated August 20, 2010 (ADAMS Accession No. ML102350035), Exelon Generation Company, LLC (EGC) submitted a request to revise paragraph 2.B(5) of License Nos. DPR-44 and DPR-56 for PBAPS Units 2 and 3, respectively. The proposed change would enable PBAPS to possess byproduct and special nuclear material from Limerick Generating Station, Units 1 and 2 (LGS). Specifically, the revised license paragraph would enable EGC to store low-level radioactive waste (LLRW) from LGS in the PBAPS LLRW Storage Facility. The PBAPS LLRW Storage Facility currently provides storage for LLRW generated at PBAPS.

NRC Request for Additional Information (RAI)

"The NRC staff has reviewed Exelon's submittal and determined that additional information, as described below, is needed to complete the review."

NRC RAI-07

"Will waste classified as "Greater Than Class C" (GTCC) be transferred and stored in the LLRW Storage Facility?"

Exelon Generation Company, LLC Response

Exelon Generation Company, LLC (EGC) will not transfer or store Greater than Class C (GTCC) low-level radioactive waste (LLRW) from Limerick Generating Station, Units 1 and 2 (LGS) in the Peach Bottom Atomic Power Station (PBAPS) LLRW storage facility (LLWRSF).

NRC RAI-08

"Describe the reprocessing and repackaging capabilities in the **Radwaste Building** where waste from the LLRW Storage Facility would be transferred for reprocessing and repackaging if necessary due to loss of container integrity in order to meet storage, transportation and / or disposal requirements."

EGC Response

The methods and capabilities that EGC utilizes for processing and packaging solid radioactive wastes at PBAPS are based upon the waste characteristics, and are described in the PBAPS Updated Final Safety Analysis Report (UFSAR), Section 9.3, "Solid Radwaste System."

With respect to reprocessing and repackaging waste, EGC procedure RW-AA-100, "Process Control Program for Radioactive Wastes," establishes the process and boundary conditions for the preparation of specific procedures for processing, sampling, analysis, packaging, storage, and shipment of solid radwaste in accordance with local, state, and federal requirements. Specifically, RW-AA-100 establishes parameters that provide reasonable assurance that LLRW which is processed by the in-plant waste process systems or by on-site vendor supplied waste processing systems, meet the acceptance criteria for transfer to a licensed burial facility, as required by 10 CFR Part 20, 10 CFR Part 61, 10 CFR Part 71, 49 CFR Parts 171-172, "Technical Position on Waste Form (Revision 1)" January 1991, "Low-Level

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Waste Licensing Branch Technical Position on Radioactive Waste Classification" May 1983, and the PBAPS Technical Specifications.

At PBAPS, High Integrity Containers (HICs) are used when the waste classification requires that the waste meet stability requirements, which would include Class B and Class C LLRW. EGC only uses HICs that are certified acceptable for use at the disposal facility to which the waste is destined to be shipped. The HICs will be filled, solidified, or dewatered, as required by RW-AA-100. The dewatering system in the Radwaste Building is used to dewater filter and demineralizer material to meet burial site and 10 CFR 61.56 requirements.

NRC RAI-09

"Provide the justification for the lack of installed area radiation monitors in the LLRW Storage Facility to provide worker protection against unplanned radiation exposures."

EGC Response

During waste handling operations in the LLRWSF, personnel access in and around the LLRWSF is limited and controlled by Radiation Protection personnel, in accordance with the requirements of EGC procedures RP-AA-403, "Administration of the Radiation Work Permit Program," RP-AA-460, "Controls for High and Locked High Radiation Areas," and RP-AA-376, "Radiological Posting Labeling and Marking." The LLRWSF control room, truck bay, and all outside areas in the vicinity of the truck bay are monitored and controlled by Radiation Protection personnel to prevent excessive exposure of personnel during transfer of LLRW liners from the transport cask to the storage cells. Routine radiation surveys in and around the LLRWSF are conducted after each transfer of LLRW liners, to ensure that all radiation exposures are within expected operation and design limits. All personnel with access to, and around the LLRWSF during waste handling operations are equipped with a primary dosimeter (i.e., a thermo luminescent dosimeter (TLD)) and a secondary dosimeter (i.e., an alarming electronic dosimeter).

Prior to the start of a waste handling evolution, personnel receive a procedurally-required pre-job briefing and a High Radiation Area (HRA)/ Locked High Radiation Area (LHRA) briefing. An initial survey is performed by Radiation Protection personnel on the shipping cask to verify dose rates and contamination levels prior to allowing access to the trailer or cask. The cask is then moved into the LLRWSF truck bay. Once the cask and trailer are inside, HRA controls are established within the truck bay and storage cell decks prior to removing any cell or cask lids. Once the covers are removed, personnel are restricted to the LLRWSF Crane Control room, except as allowed by Radiation Protection personnel at the LLRWSF.

This combination of access control and continual dose rate monitoring during waste handling operations ensures that unplanned radiation exposures are prevented during these operations, thus obviating the need for installed area radiation monitors.

NRC RAI-10

"For onsite radiation protection purposes, describe the boundaries of the Title 10 of the Code of Federal Regulations Part 20 (10 CFR 20) controlled area (e.g., provide map and distances to the LLRW Storage

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Facility); describe whether members of the public are allowed in the controlled area, and describe how the dose limits of 10 CFR 20.1301(a) and (b) will be met."

EGC Response

The PBAPS LLRWSF is located inside the Owner Controlled Area (OCA), as depicted on Figure 1, "PBAPS Facility Locations for LLRWSF Public Radiological Impact Evaluations." Within the OCA, inadvertent public access is limited to the boat ramp as shown on Figure 1. This location is near the residential location which is nearest to the LLRWSF (i.e., also depicted on Figure 1), as well as an environmental TLD (i.e., as part of the Radiological Environmental Monitoring Program (REMP)).

Figure 1 also depicts the nearest approach on the site boundary (i.e., the Susquehanna River), relative to the LLRWSF. The nearest location is approximately 125 meters from the LLRWSF analyzed waste center, with a calculated dose rate of 0.02 mrem/hr. Utilizing the maximum occupancy assumptions for shoreline recreation, as delineated in Regulatory Guide (RG) 1.109, "Calculation of Annual Doses to Man from Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR PART 50, Appendix I," Table E-5, "Recommended Values for U_{ap} to be Used for the Maximum Exposed Individual in Lieu of Site-Specific Data," (i.e., 67 hours per year for a teen) the maximum expected annual dose at the nearest approach is 1.34 mrem.

Site access at the boat ramp, the nearest approach, or the site access road, by members of the public would be inadvertent or trespassing, and would be controlled by security. Both security patrols and continuous line-of-site observation would prevent any extended occupancy in the vicinity of the LLRWSF. The distance from the analyzed center of the LLRWSF to the nearest inadvertently accessed parking space (i.e., immediately east of the LLRWSF) is 65 meters. This configuration is illustrated in Figure 2, "PBAPS LLRWSF Immediately Surrounding Owner Controlled Areas." At this location, the design basis dose rate is 0.05 mrem/hr.

For onsite radiation protection purposes, the handling, loading, and placement of LLRW liners within the LLRWSF is controlled by real-time dose rate limitations (i.e., within the LLRWSF, as well as on the exterior surface and in the immediate vicinity of the LLRWSF). Compliance with these limitations is established by direct radiation surveys. Routine radiation surveys in and around the LLRWSF are conducted after each transfer of LLRW liners, to ensure that all radiation exposures are within expected operation and design limits (i.e., contact dose rate on the exterior surface of the LLRWSF will be less than 1 mrem/hr).

During storage-only conditions, dose rate surveys of the LLRWSF are performed on a monthly basis, as required by PBAPS surveillance RT-H-099-960-2, "Outside Radioactive Material Storage Area Inspection and Surveys". In addition, EGC has installed three personnel monitoring TLDs along the fence line at the south, east and north fence line surrounding the paved area north of the LLRWSF. These TLDs are replaced and processed every quarter.

The combination of dose rate surveys (i.e., during and immediately after handling LLRW liners in the LLRWSF, as well as on a periodic basis), TLD monitoring (i.e., both environmental and personnel), and the access controls for the LLRWSF and surrounding areas, ensure compliance with 10 CFR 20.1301 dose limits.

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NRC RAI-11

"For offsite radiation protection considerations under 10 CFR 20.1301(e), explain the methods used in the Offsite Dose Calculation Manual methods to measure and/or calculate the net dose at the nearest residence attributable to the LLW Storage Facility and those doses attributable to the nuclear site from other sources of the direct radiation. For the environmental monitoring dosimeters, describe how the background (baseline) radiation dose will be (or has been) determined, how the standard deviation at each environmental dosimeter location has been determined, and the estimated Lower Limit of Detection for dosimeters that can be achieved at the 95% confidence level."

EGC Response

As noted in Generic Letter 81-38, with respect to 40 CFR 190, "Offsite doses from onsite storage must be sufficiently low to account for other uranium fuel cycle sources (e.g., an additional dose of < 1 mrem/year is not likely to cause the limits of 40 CFR 190 to be exceeded." Historically, this criterion has been treated as a threshold for the requirements for explicit treatment of the source in the ODCM as a direct radiation source. As described below, both personnel and environmental TLDs and dose rate surveys will be used to confirm that dose rates due to the PBAPS LLRWSF remain within the analyzed basis.

The current dominant calculated direct radiation source at PBAPS is the ISFSI, with the bounding receptor south of the plant as shown on Figure 1. This location is 1550 meters from the LLRWSF and will not be impacted. Conversely, the bounding offsite receptors to the north for the LLRWSF will not be significantly impacted by other direct radiation sources.

The PBAPS LLRWSF is a heavily shielded structure that has been analyzed with bounding design basis assumptions on building loading and container radioactivity. The methodology for this analysis is described in Reference 1, Attachment 3, "Peach Bottom LLRWSF LAR Support, Technical Report Supporting Engineering Change Request (ECR) No. 09-00301," Section 8.5.3, "Shielding Analysis Methodology." In the shielding analysis, skyshine is the controlling phenomenon for offsite locations. The source term assumptions in the analysis included 400 R/hr contact dose rates on containers in the interior 15 cells and 125 R/hr contact dose rates on containers in peripheral cells. LLRWSF loading and liner placement procedures will ensure that dose rates on the exterior surface of the LLRWSF will be maintained less than 1 mrem/hr.

The calculated dose rates versus distance from center of the LLRWSF is depicted in Figure 3, "Design Basis Analysis – Controlling Skyshine Dose from LLRWSF." The calculated dose rate at the nearest residence is 0.4 mrem/year. This location is approximately 585 meters from the modeled waste center and, although principally used as a summer residence, was evaluated with 100% occupancy. The nearest full-year residence, which is not shown on Figure 1, is approximately 620 meters from the modeled waste center, with a calculated dose rate of 0.3 mrem/year.

No credit is taken in the shielding analysis for decay in place, even though this is expected to be substantial. Additionally, the capacity of the LLRWSF for Class B and Class C LLRW is well in excess of anticipated combined volumes from PBAPS and LGS.

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The total dose from all contained sources, to a member of the public, is verified on a quarterly basis by the Radiological Environmental Monitoring Program (REMP). The implementation of the PBAPS REMP is described in EGC procedures CY-AA-170-1000, "Radiological Environmental Monitoring Program and Meteorological Program Implementation," and CY-AA-170-1100, "Quality Assurance for Radiological Monitoring Programs." These procedures establish compliance of the PBAPS REMP with Regulatory Guide (RG) 4.13, "Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications" and RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment."

Normal background radiation levels were measured using Panasonic 814 (CaSO₄) TLDs at 47 locations around the site. As stated above, the PBAPS REMP implementing procedures ensure compliance with RG 4.13, including Section C. "Regulatory Position" requirements concerning performance, error measurement, reproducibility, and uniformity. The calculated standard deviation at each environmental dosimeter location is calculated from six individual measurements (i.e., two TLDs with three measuring elements in each TLD).

The measured background levels at the nearest residence (i.e., TLD location 1E), as well as at two closer locations, is delineated in Table 1 below. Also included in Table 1 are the maximum calculated dose rates from a filled LLRWSF. Based on the measured background radiation levels in Table 1, the estimated impact of the LLRWSF will be nearly undetectable, and well within the limits 10 CFR 20.1301(e) and 40 CFR 190.

Table 1
Background Levels and Maximum Calculated Dose Rate from LLRWSF

TLD	Direction From LLRWSF Waste Center	Distance From LLRWSF Waste Center	Max Calculated Dose Rate From Filled LLRWSF	2009 Average Reading (w/ uncertainty)
1E	NNW	525 meters	0.10 micro-rem/hr	7.7 ± 1.4 micro-rem/hr
1B	WNW	425 meters	0.31 micro-rem/hr	7.4 ± 1.9 micro-rem/hr
1L	ESE	480 meters	0.17 micro-rem/hr	7.1 ± 2.6 micro-rem/hr

NRC RAI-12.a

"How many plant-to-plant shipments of LLRW are projected in a year?"

EGC Response

EGC anticipates approximately two to three shipments of Class B and Class C LLRW liners per year to PBAPS from LGS.

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NRC RAI-12.b

"How does the number of trips stated in the response to RAI-12.a compare to the past average annual number of trips to the Barnwell facility?"

EGC Response

The projected number of shipments stated in the response to RAI-12.a is equivalent to the past average annual number of total shipments of Class B and Class C LLRW liners to the Barnwell facility from LGS.

NRC RAI-13.a

"Will there be any new construction (i.e., staging pads, shelters, support, or storage buildings) in any undisturbed land portions of either the Limerick or Peach Bottom plant sites?"

EGC Response

The proposed use of the PBAPS LLRWSF to receive and store Class B and Class C LLRW from LGS will not result in any new construction on undisturbed land at PBAPS or LGS.

NRC RAI-13.b

"If the response to RAI-13.a is yes, please provide a discussion of the potential impact to the terrestrial and aquatic environment and your procedures for the protection of cultural and archeological artifacts."

EGC Response

As stated in the response to NRC RAI 13.a, the proposed use of the PBAPS LLRWSF to receive and store Class B and Class C LLRW from LGS will not result in any new construction on undisturbed land at PBAPS or LGS.



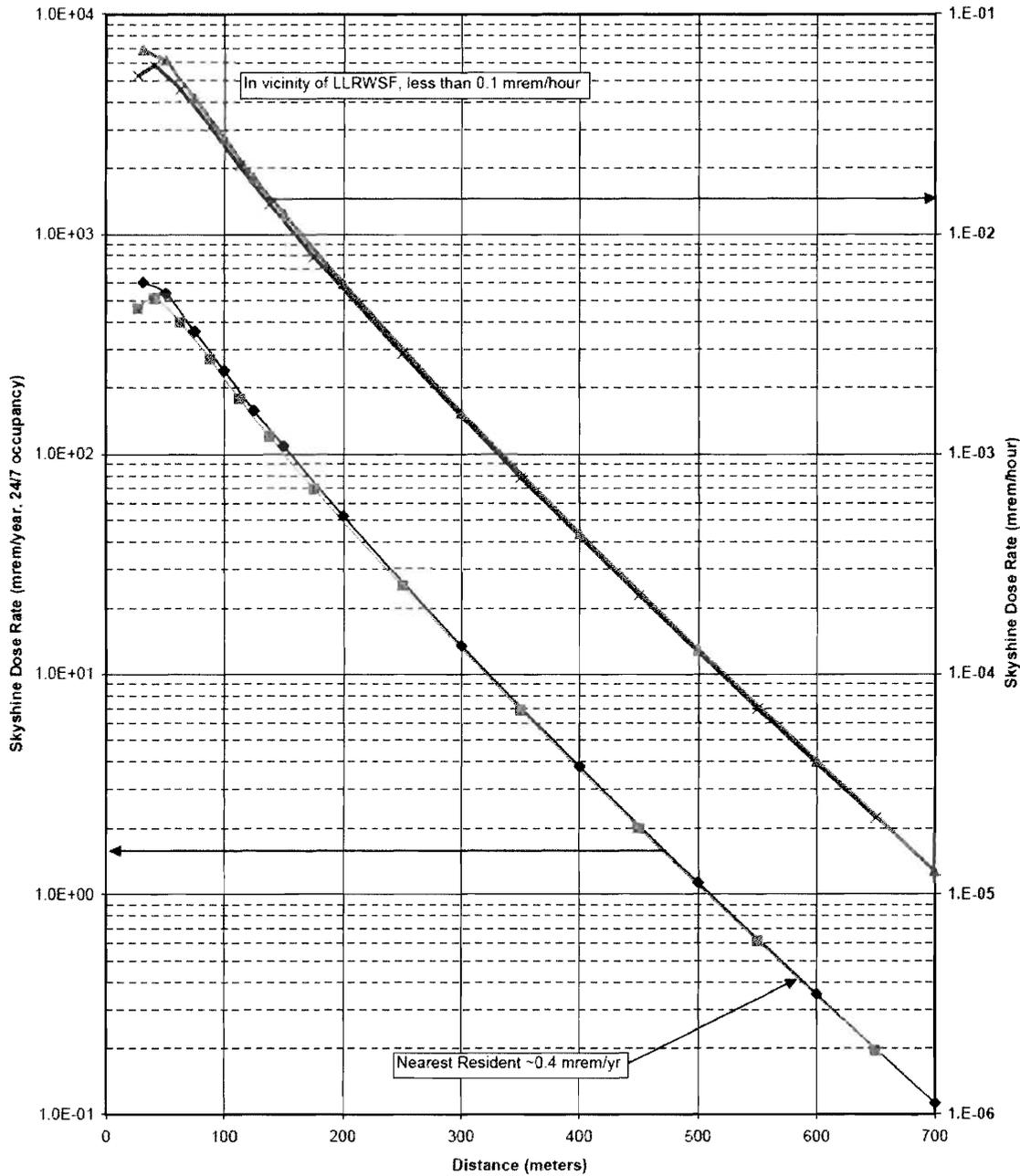
Figure 1: PBAPS Facility Locations for LLRWSF Public Radiological Impact Evaluations



Figure 2: PBAPS LLRWSF Immediately Surrounding Owner Controlled Areas

Figure 3: Design Basis Analysis – Controlling Skyshine Dose from LLRWSF

Skyshine vs. Distance



Annual 24/7 —◆— Vertical Surfaces, ground to 23.5 ft above —■— Ground Surface, average over segment
 Hourly —◆— Vertical Surfaces, ground to 23.5 ft above —■— Ground Surface, average over segment