**WASHINGTON STATE**
**ENERGY FACILITY SITE EVALUATION COUNCIL (EFSEC)**

# RESOLUTION NO. 299, AMENDMENT NO. 1
# COLUMBIA GENERATING STATION
# COOLING SYSTEM SEDIMENT DISPOSAL

**Nature of Action**. In August 2001, the Council closed Resolution No. 278 and approved Resolution No. 299 authorizing the onsite disposal of cooling system sediments containing low levels of radionuclides at the Energy Northwest Columbia Generating Station subject to the conditions specified in Resolution No. 299, Attachment 1. This Amendment No. 1 to Resolution No. 299 updates the dosimeter used for full-time monitoring of direct radiation from a thermoluminescent dosimeter to an Optically Stimulated Luminescence (OSL) dosimeter.

**Background**. Operation of the open cooling water systems at Columbia Generating Station (CGS) causes radionuclides contained in the source water or entrained from plant emissions to become concentrated in the sediment that accumulates in features of the cooling systems (e.g., tower decks, tower basins, pump basins, spray ponds, piping and system components). The concentrations of radionuclides in the sediment often exceed the lower levels of detection for environmental measurements. This requires that the material be managed as low level radioactive waste when cooling system components are cleaned.

In March 1995, Energy Northwest (then the Washington Public Power Supply System) requested approval of its plan to dispose of contaminated cooling tower sediment onsite. This approval was sought under the existing regulatory framework (WAC 246-221-180) that provides for state review and approval of a site-specific disposal plan. After conferring with the Departments of Health and Ecology, the Council approved Resolution No. 278 on May 8, 1995.

In December 1995, Energy Northwest requested that the scope of the disposal authorization be expanded to include sediment removed from the service water spray ponds. In August 1996, the Council approved by motion the relocation of previously removed spray pond sediment to the designated onsite disposal area. In June 1999, Energy Northwest resubmitted a revised application for a long-term authorization to dispose of spray pond sediment onsite. In June 2000, Energy Northwest provided detailed responses to Department of Health questions concerning the revised application.

The Departments of Health and Ecology reviewed the Energy Northwest application and supplemental information for updates to Resolution 278 and its Attachment 1 and found that the proposed disposal plan for service water cooling system sediments provides sufficient protections for public health and the environment. This judgement was also based on a review of the five years of experience with onsite disposal of circulating cooling water system sediments. Accordingly, in August 2001, Resolution 278 and its attachment were replaced with Resolution 299 and its attachment.

Energy Northwest notified EFSEC in July 2022 that a change in the full-time monitoring of direct radiation by thermoluminescent dosimeter was replaced with an Optically Stimulated

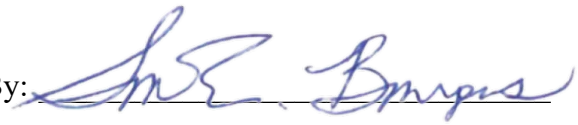
Luminescence (OSL) dosimeter. Although the dosimeters function differently, the thermoluminescent dosimeter relies on heat and the optically stimulated luminescence dosimeter relies on optical stimulation, the accuracy and quality of the dosimeters remain the same. The new OSL meets the requirements of the American National Standards Institute (ANSI) Performance, Testing, Procedural Specifications for Thermoluminescence Dosimetry Environmental Applications (ANSI N545: 75(R1993) and the Nuclear Regulatory Commission (NRC) Regulatory thermoluminescent dosimeter specifications in NRC Guide 4.13 and will not affect the quality of the monitoring Radiological Environmental Monitoring Program (REMP). Council staff has recommended that the requirements of Resolution No. 299 and its Attachment No. 1, be superseded by this resolution, No. 299 Amendment No. 1, and its Attachment. This would change:

1. Replace the full-time monitoring of direct radiation by thermoluminescent dosimeters to Optically Stimulated Luminescence (OSL) dosimeters.

**Resolution**. The Council hereby amends Resolution No. 299 and its Attachment 1 to require full-time monitoring of direct radiation by Optically Stimulated Luminescence dosimeters as specified in Attachment 1 to this resolution amendment.

Dated and effective this 15th day of March, 2023.

Washington State Energy Facility Site Evaluation Council

By: 

Sonia Bumpus, EFSEC Executive Director

Attachment 1. Onsite Disposal of Contaminated Cooling System Sediments

**Resolution No. 299, Attachment 1**
**Columbia Generating Station**
**Onsite Disposal of Contaminated Cooling System Sediments**

Resolution No. 299 authorizes the on-site disposal of sediments removed from cooling systems containing low levels of radionuclides at Energy Northwest's Columbia Generating Station (CGS). This authorization is contingent upon compliance with the following conditions:

1. **Disposal Area**:

   Sediment disposal is limited to disposal cells specifically constructed for this purpose. The cells are to be located in an inactive borrow pit located south of the CGS cooling towers. The corners of the disposal area shall be marked with posts and signs indicating the dedicated purpose of the area. Interim storage of sediment in containers is allowed.

2. **Disposal Area Dose Limit**:

   The disposal limits in Section 3 have been established to limit the annual dose directly attributable to this disposal operation to 15 mrem/year. This is the maximum dose above background that an individual would receive spending 2000 hours at the disposal site. Actual doses are expected to be much lower and should be maintained as low as reasonably achievable.

3. **Disposal Concentration Limits**:

   a. The following individual isotopic limiting concentrations have been established as the maximum values allowed for disposal:

   | | |
   |---|---|
   | Co-60 | 5 pCi/g |
   | Mn-54 | 30 pCi/g |
   | Zn-65 | 50 pCi/g |
   | Cs-134 | 10 pCi/g |
   | Cs-137 | 20 pCi/g |

   b. Since these radionuclides may not occur alone, the combined concentrations of the radionuclides will also be limited such that the sum of the fractions of maximum concentration for each nuclide does not exceed unity:

   A+B+C+D+E # 1.0

   A = actual concentration ÷ maximum concentration Co-60 (5 pCi/g)
   B = actual concentration ÷ maximum concentration Mn-54 (30 pCi/g)
   C = actual concentration ÷ maximum concentration Zn-65 (50 pCi/g)
   D = actual concentration ÷ maximum concentration Cs-134 (10 pCi/g)
   E = actual concentration ÷ maximum concentration Cs-137 (20 pCi/g)

c. This will assure that the incremental dose will remain below 15 mrem/yr. If additional radionuclides are detected, individual limiting concentrations will need to be established with concurrence from the state Department of Health prior to disposal.

4. **Sample Analysis and Environmental Monitoring**:

Monitoring of the sediment and the disposal site will be conducted per Energy Northwest's standard environmental monitoring procedures and practices.

a. **Pre-Disposal Screening Criteria and Sample Requirements**:

1. Areas to be cleaned shall be sampled for pre-disposal screening. Sampling shall be conducted in a manner that discriminates among the areas to be cleaned (e.g., cooling tower basin samples are composited separately from tower deck samples). Wet composite samples shall be taken in sufficient quantity to support additional dry analysis that may be required as described below.

2. If the analysis results of a wet composite sample are less than 20% of the disposal limits listed above and no other man-made radionuclides are found, the sediment from the respective area may be placed in the disposal cell without further pre-disposal analysis.

3. If the analysis results of a wet composite sample are equal to or greater than 20% of the disposal limits listed above, the same sample (or a split of the same sample) shall be dried and reanalyzed. If the dry results are less than the disposal limits and no other man-made radionuclides are found, the sediment from the respective area may be placed in the disposal cell.

4. If the analysis results of a dried composite sample exceed the disposal limits, the material shall be held for decay before it is disposed onsite or it shall be disposed by other means such as burial in a licensed low-level radioactive waste disposal facility.

5. If requested, Energy Northwest shall provide the state a split of any sample taken for analysis.

b. **Routine Disposal Cell Monitoring**:

1. Direct Radiation Dose Rate - An Optically Stimulated Luminescence (OSL) dosimeter station shall be established in close proximity to the disposal cells. OSLs from this station shall be read quarterly.

2. Confirmatory Sampling - A composite sediment sample shall be taken from the disposal cell within thirty (30) days following each cleaning episode and analyzed dry to confirm that the disposal criteria have not been exceeded.

c. **Chemical Sampling**:

Metals - Once every five (5) years, the accumulated sediment shall be sampled and analyzed for total copper, zinc, and nickel. Other constituents will be analyzed if requested by the state Department of Ecology.

5. **Disposal Site Closure**

Disposal operations are anticipated throughout the operating life of Columbia Generating Station. The disposal site shall be closed in accordance with regulations in effect at the time of closure.

6. **Notifications:**

Information regarding unusual circumstances or testing data that exceeds the specified limits will be reviewed within ten (10) working days with the state.

7. **Reporting:**

a. Routine disposal cell monitoring (4.b above) shall be reported annually in the Radiological Environmental Monitoring Program (REMP) report. The report shall also contain the annual quantity or volume and estimated in-place density of sediment, plus the annual quantity of radionuclides placed in the disposal area.

b. Chemical sampling plans and analytic results shall be provided to the Council after each sampling event.