



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

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South Texas Project  
Units 1 and 2  
Docket No. STN 50-498 and STN 50-499  
Revised Response to End of Enforcement Discretion and Request for Approval of Alternate  
Disposal Procedures for Very Low-Level Radioactive Material (EPID: L-2021-LLL-0022)

- References:
1. Letter from M. Murray, STPNOC, to B. Holian, NRC; "STPNOC Agreement for Disposal of Very Low-Level Radioactive Material;" August 14, 2018; (NOC-AE-18003591) (ML18226A352)
  2. Letter from C. Erlanger, NRC, to G. Powell, STPNOC; "South Texas Project, Units 1 and 2 – Response to the August 14, 2018, Letter on the Disposal of Very Low-Level Radioactive Material and Exercise of Enforcement Discretion (EPID L-2018-LRO-0032);" October 31, 2018; (AE-NOC-18003147) (ML18260A250)
  3. Letter from B. Pham, NRC, to G. Powell, STPNOC; "South Texas Project, Units 1 and 2 – End of Enforcement Discretion Related to Alternate Disposal Procedures for Very Low-Level Radioactive Material;" August 10, 2021; (AE-NOC-21003328) (ML21180A195)
  4. Letter from K. Harshaw, STPNOC, to B. Pham, NRC; "Response to End of Enforcement Discretion and Request for Approval of Alternate Disposal Procedures for Very Low-Level Radioactive Material;" November 4, 2021; (NOC-AE-21003846) (ML21308A603)

Pursuant to 10 CFR 20.2002, STP Nuclear Operating Company (STPNOC) is requesting approval of an alternate disposal procedure for very low-level waste (VLLW). Specifically, STPNOC is requesting approval of its current disposal practice for VLLW, undertaken pursuant to a long-standing agreement with the State of Texas. STPNOC's current disposal practices present very low risk to the public and the environment.

In August 2018, STPNOC submitted a letter to the NRC describing the existing agreement between STPNOC and the State of Texas for disposal of VLLW and providing information regarding STPNOC's disposal practices (Reference 1).

In October 2018, the NRC responded to the STPNOC letter, granting enforcement discretion for STPNOC's existing process for disposal of low-level waste while the NRC staff evaluated regulatory options to address the issue (Reference 2).

In August 2021, the NRC notified STPNOC that the Staff completed its evaluation and that within 90 days, STPNOC must either comply with the requirements of 10 CFR 20.2001 or request approval of alternate disposal procedures per 10 CFR 20.2002 for future VLLW disposal (Reference 3).

In November 2021, STPNOC requested approval of current VLLW disposal practices as an alternate disposal procedure per 10 CFR 20.2002 (Reference 4). The attached request replaces the previously submitted STPNOC alternate disposal request (Reference 4) in its entirety.

There are no commitments in this letter.

Please contact Ali Albaaj at (361) 972-8949 or me at (361) 972-4778 for questions regarding this matter.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 12/3/2024

Respectfully,



Kimberly A. Harshaw  
Executive Vice President and Chief  
Nuclear Officer

Enclosure: Alternate Disposal Procedure Request

cc:

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## Alternate Disposal Procedure Request

South Texas Project (STP) is located entirely in the State of Texas and Texas is an Agreement State. STP Nuclear Operating Company (STPNOC) requested and obtained permission from the State of Texas for the current disposal method for specific very low-level waste (VLLW) containing radionuclide concentrations and quantities below the limits specified in the Texas Administrative Code (TAC) in a Class 1 or 2 industrial landfill<sup>1</sup> facility within the State of Texas (Reference 1). Specifically, the Texas Commission on Environmental Quality (TCEQ) concurred with STPNOC's request (Reference 1).

Per 10 CFR 20.2002, "Method for obtaining approval of proposed disposal procedures," STPNOC requests approval of our current disposal practices, approved by the State of Texas, as an alternate disposal procedure. STPNOC requests approval of this alternate disposal procedure for the life of the plant.

As stated in 10 CFR 20.2002, licensees may apply to the NRC for approval of proposed procedures to dispose of licensed material by providing the following information for NRC review:

- (a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties important to risk evaluation, and the proposed manner and conditions of waste disposal; and
- (b) An analysis and evaluation of pertinent information on the nature of the environment; and
- (c) The nature and location of other potentially affected licensed and unlicensed facilities; and
- (d) Analyses and procedures to ensure that doses are maintained As Low As Reasonably Achievable (ALARA) and within the dose limits in this part [10 CFR 20].

Each of these elements is addressed below.

***(a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties important to risk evaluation, and the proposed manner and conditions of waste disposal;***

***Description of the Waste***

The VLLW consists of dewatered sewage sludge, ion exchange media, desiccant, ventilation filtration media, and soil that is originated from the secondary side of plant operations.

***Physical and Chemical Properties Important to Risk Evaluation***

A summary of the physical and chemical properties important to risk evaluation of the disposed material is included in Tables 1 and 2. The data provided are for 2015 through 2017 to align with STPNOC's 2018 submittal to the NRC (Reference 1). This three-year period is representative of expected waste annual concentrations and amounts.

STPNOC conservatively calculated the total volume of VLLW deposited from calendar years 2015 through 2017 to be approximately 153 cubic meters. For modeling purposes, this volume was distributed as a 6-inch-thick slab over an area of 1004 square meters, based on waste facility practices to evenly distribute waste upon receipt.

<sup>1</sup> Throughout this document, a "Class 1 or 2 industrial landfill" refers to a landfill that accepts Class 1 or Class 2 waste as defined by 30 TAC 335 Subchapter R

Table 1 Waste Parameters			
<b>Waste Volume</b>	153 meters <sup>3</sup>	<b>Area</b>	1004 meters <sup>2</sup>
<b>Thickness of slab</b>	0.1524 meters	<b>Length</b>	167 meters
<b>Cover depth</b>	0.1524 meters	<b>Width</b>	6 meters

Using the physical waste parameters contained in Table 1, STPNOC calculated the activity concentrations for the VLLW nuclides. The total average activity concentrations are less than 5 pico-curies per gram for all material associated with this request. Radionuclide activities are a small fraction of the activity limits listed in 25 TAC 289.251.

Table 2 Waste Activity and Characteristics for Dose Evaluation				
<i>VLLW Quantities of Activity Per Volume (pico-curies/gram)</i>				
<b>Nuclides</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>3-Year Total</b>
<sup>3</sup> H - Tritium	0	2.60E+00	1.14E-01	2.71E+00
<sup>63</sup> Ni - Nickel-63	0	0	2.60E-02	2.60E-02
<sup>60</sup> Co - Cobalt-60	1.07E-02	2.09E-02	3.57E-02	6.73E-02
<sup>7</sup> Be - Beryllium-7	0	1.92E-02	0	1.92E-02
<sup>55</sup> Fe - Iron-55	0	0	4.41E-02	4.41E-02
<sup>137</sup> Cs - Cesium-137	0	1.19E-03	1.59E-03	2.79E-03
<b>Totals</b>	1.07E-02	2.64E+00	2.22E-01	2.87E+00

*Proposed Manner and Conditions of Disposal*

Waste is held, pending transport, in the STP Environmental Yard as described in plant procedures for packaging and shipment of waste materials. The proposed manner of disposal of the VLLW is near-surface disposal in a Class 1 or 2 industrial landfill facility. This is the current STPNOC practice and is consistent with the determination STPNOC obtained from the TCEQ for disposal of VLLW in these facilities within the State of Texas (Reference 1). Waste is disposed in accordance with 25 TAC 289.251 for concentrations and activity limits. STPNOC performs five shipments per year, on average. STPNOC does not comingle waste with the waste of any other facility.

VLLW delivered to the landfill is distributed by heavy equipment and overlaid with a minimum cover of 6 inches of uncontaminated soil either immediately or by the end of the day. No waste is left uncovered.

Only waste that is determined to be non-hazardous as defined by the United States Environmental Protection Agency (EPA) in 40 CFR Part 261 or industrial waste defined as Class 1 or 2 can be disposed of in this landfill facility.

***(b) An analysis and evaluation of pertinent information on the nature of the environment;***

*Nature of the Environment*

The current landfill site is a flat-lying, partially wooded area. The site soil is sandy clay loam, and the site is well drained and serviced by a perimeter ditch system to control run-off. Typical water well depths in the area are greater than 400-500 feet. Site operations include:

- Maintenance of right-of-way to the landfill,
- management of run-off,
- minimization of erosion and correction of settlement issues,
- maintenance of the leachate operating system and groundwater monitoring system, and
- maintenance and operation of a perimeter landfill gas monitoring system and landfill gas collection system.

### Requirements for Use of Commercial Landfill Sites

The following list is a summary of the required characteristics of disposal facilities permitted by the current STPNOC agreement with the State of Texas. All current and future disposal facilities must meet this criteria to accept STPNOC VLLW.

- Sites accepting VLLW from STPEGS must be approved by the State of Texas (Texas Commission of Environmental Quality) as a Class 1 or 2 facility,
- Sites must be designated by the TCEQ under TAC Title 30 Chapter 330 Subchapter A §330.5 to accept Class 1 or 2 Industrial Waste,
- Waste shipped to such facilities shall be non-hazardous in accordance with 40 CFR Part 261 or industrial waste defined as Class 1 or 2 by 30 TAC Chapter 335, Subchapter R, and
- Waste must be received and interred by the end of business on the date received.

### Considerations for Future Disposal Site Use

TCEQ regulations, specifically TAC 30 §330.463, require post-closure care maintenance to commence immediately upon completion of final closure requirements set forth in the facility Final Closure Plan.

Post-closure care maintenance will continue for a period of 30 years unless the TCEQ approves a period of a different duration. Post-closure care maintenance consists of:

- Retaining the right of entry and maintain all right-of-way to the closed landfill.
- Conducting site inspections, a minimum of semiannually after closure.
- Conducting maintenance and/or remediation activities, as needed, to maintain the integrity and effectiveness of the final cover, site vegetation, and drainage control systems. Vegetation is maintained on the final cover to provide a minimum of 90 percent coverage.
- Managing surface run-on and run-off to minimize the erosion of the final cover system.
- Correcting the effects of settlement, subsidence, ponded water, erosion, or other events or failures in-as-much as these situations are detrimental to the integrity of the closed landfill.
- Maintaining and operating the leachate collection system in accordance with TAC 30 §330.331 and 30 §330.333 and the EPA's Design Criteria (i.e., less than 1 foot of leachate over the liner, or approved equivalent design).

### ***(c) The nature and location of other potentially affected licensed and unlicensed facilities;***

The current landfill site is bordered by commercial development and wooded areas. The nearest residential communities are approximately 275 meters from the site.

### ***(d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this part.***

#### Dose Analyses – Dose to a Facility Worker

- Results were generated using the RESRAD-ONSITE version 7.2 computer code. RESRAD-ONSITE was designed at Argonne National Laboratory for estimating radiation doses to an individual located on top of radioactively contaminated soils and the code is designated by the Department of Energy in Order 458.1 for the evaluation of radioactively contaminated sites.
- STPNOC calculated the direct radiation dose to a worker using a slab source calculation. For this calculation, STPNOC assumes the worker stands in the center of a 6-inch-thick circular slab with an 18-meter radius that is uniformly contaminated with material of the aggregate activity of three years. The material is covered by six inches of uncontaminated soil.
- The radionuclide concentrations used are based on the STPNOC nuclide concentrations shipments for 2015 through 2017. To provide a conservative margin, the hypothetical dose calculation conservatively assumed all three years of material were deposited simultaneously.
- All exposure pathways are modeled for a 50-year dose contribution.

- The largest contributor of dose to a facility worker is from external radiation from the material (soil). The external dose is calculated using the radioactive concentrations found in the soil and adjusted by the dose conversion factors found in Federal Guidance Report 12 (EPA 1993).
- Dose to an individual on-site facility worker would be less than 1 mrem for a 2000-hour work year.

Dose Analyses – Annual Dose Rate to Members of the Public

Table 3 Receptor Parameters			
<b>Distance to residence</b>	275 meters	<b>Distance to agricultural area</b>	275 meters
<b>Distance to nearest lake</b>	589 meters	<b>Width of lake parallel to source</b>	310 meters
<b>Annual Rainfall</b>	1.35 meters	<b>Length perpendicular</b>	140 meters

- RESRAD OFFSITE version 4.0 was used in this analysis to determine the all-pathway doses to members of the public, using the same parameters as RESRAD ONSITE.
- The closest residential dwelling to the active disposal site is approximately 275 meters away.
- Dose to a member of the public for one year at the site’s boundary (approximately 275 meters from the source) would be less than 1 mrem.
- The maximum dose rate to members of the public occurs at time = 18.1 years and is 1.85E-04 mrem/year. Results of RESRAD calculations using inputs from Tables 1, 2, and 3 are shown in Table 4:

Table 4 RESRAD Results (mrem/year)					
Time	0 years	1 years	2 years	3 years	4 years
<b>Dose rate</b>	3.00E-05	4.96E-11	4.40E-11	3.93E-11	3.54E-11
Time	5 years	10 years	20 years	30 years	50 years
<b>Dose rate</b>	3.20E-11	4.78E-07	1.56E-04	2.44E-06	2.18E-08

Dose Analyses – Annual Dose to a Material Shipment Driver

- STPNOC performed a bounding point source calculation.
- STPNOC assumes twelve shipments, each transported 60 miles from STP to the disposal site.
- The dose to the driver was calculated two meters from an unshielded point source.
- Each shipment is assumed to be one-twelfth of an annual activity of 2.00E-05 curies of <sup>60</sup>Co.
- Dose to a material shipment driver over the period of one year would be less than 1 mrem.

Dose Analyses - Conclusions

The STPNOC analyses indicates that for the quantities of VLLW disposed of by STPNOC in a Class 1 or Class 2 industrial landfill facility, the risk to public health and safety is very low. The estimated dose is significantly less than the 0.1 rem (100 mrem) dose limit for the public specified in 10 CFR 20.1301 and the 5 mrem per year value discussed in NUREG-1757, Volume 1.

It is reasonable to assume that the quantity and activity of the VLLW that STPNOC disposes at a Class 1 or 2 industrial landfill facility will remain similar to these values in future years.

Future Use Considerations

Future use of disposal facilities could include residential construction. Doses to members of the public would be similar to those of site workers at the 30-year period. Direct radiation dose to a

member of the public who occupied the center of the slab (used to calculate direct worked dose) would receive an annual dose of less than 1 mrem per year if residence began at the 30-year mark.

Doses to members of the public occupying subsurface structures, such as basements, are not considered. Soil and subsurface conditions in South Texas are not suitable for below grade structures without significant, expensive, civil engineering interventions. Most residential and commercial construction will avoid installation of basements in the region for this reason.

Doses from drinking water wells are considered to be negligible. Typical water well depths for the South Texas coastal counties are greater than 400 feet. Further, residential developments are more likely to source water from Municipal Utility Districts that take water from a variety of sources including rivers and wells.

### Procedures and processes

STPNOC samples, analyzes, and classifies VLLW prior to shipment to ensure the radionuclide content is below both concentration limits and total activity limits in accordance with normal STPNOC operating processes. STPNOC operating procedures are controlled through the normal change review process to ensure all changes are verified as being within 25 TAC 289.251 limits.

Tritium concentrations are determined using liquid scintillation techniques. Radionuclide analyses are performed using a gamma spectroscopy system. STPNOC samples and analyzes these waste streams in accordance with station procedures that provide assurance of an accurate determination of the type and quantity of radioactive material in these waste streams prior to shipment for disposal. An Interlaboratory Comparison Program is maintained to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials are performed as part of the quality assurance program. The program demonstrates the ability to measure low levels of relevant radionuclides. The intercomparison program maintains National Institute of Standards and Technology traceability. These measurements will ensure that regulatory limits are not exceeded. Records of these surveys, analyses, calculations, and shipping manifests will be retained in STPNOC's Records Management System.

In the August 2021 letter sent to STPNOC regarding enforcement discretion for disposal of VLLW, the NRC concluded that the STPNOC VLLW disposals in Texas Class 1 or 2 industrial landfills from 2008 through 2018 are of low risk to public health and safety (Reference 2). The proposed STPNOC alternate disposal practices are consistent with those utilized in the 2008-2018 time period.

STPNOC programmatic controls, including but not limited to the procedure change process, ensure continued compliance with the requirements of the State of Texas agreement (Reference 1). The radionuclide quantity and activity of VLLW disposed of by STPNOC will continue to meet the activity limits established by the State of Texas and 10 CFR 20.

### **Conclusion**

STPNOC procedures ensure VLLW is sampled and below 25 TAC 289.251 limits prior to shipment in alignment with the State of Texas Agreement (Reference 1). STPNOC analyses and procedures ensure that doses are maintained ALARA and within applicable federal and state regulatory dose limits. Calculation of doses by accepted methods demonstrate that doses to workers at the disposal site, delivery truck drivers, and members of the public are a small fraction of limits set by EPA and NRC.

Based on the considerations discussed above, STPNOC's alternative disposal request represents negligible risk to the public and poses very low safety significance.

- References:
1. Letter from M. Murray, STPNOC, to B. Holian, NRC; "STPNOC Agreement for Disposal of Very Low-Level Radioactive Material;" August 14, 2018; (NOC-AE-18003591); (ML18003591)
  2. Letter from B. Pham, NRC, to G. T. Powell, STPNOC; "South Texas Project, Units 1 and 2 – End of Enforcement Discretion Related to Alternate Disposal Procedures for Very Low-Level Radioactive Material;" August 10, 2021; (AE-NOC-21003328) (ML21180A195)