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Project name:
Spruce ELG Wastewater Compliance

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Date:
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Subject: Spruce ELG Wastewater – Low Volume Waste Pond Narrative Preliminary Design

In the existing system, low volume waste (LVW) from JK Spruce Units 1 and 2 is comingled with other waste streams in the Sludge Recycle Holding (SRH) ponds and the resulting wastewater stream is treated and discharged at Outfall 109. The SRH ponds also receive coal combustion residuals (CCR) in the form of Flue Gas Desulfurization (FGD) waste streams. As such, the SRH ponds are subject to Federal Regulation 40 CFR 257, otherwise known as Coal Combustion Residuals (CCR) Rule.

The SRH ponds are an active CCR surface impoundment and groundwater sampling and analysis are performed at 6 month intervals. If a statistically significant increase (SSI) of the groundwater is detected, this may require early closure of the SRH Pond. In this event, low volume waste (LVW) will be re-directed to a new LVW pond. Other waste streams that are currently sent to the SRH Pond would be re-directed as well. If this is prior to the installation of technology to comply with the Effluent Limitations Guidelines (ELGs), alternate treatment technologies would be implemented as required and the FGD wastewater streams would continue to be discharged at Outfall 109 (bypassing the SRH pond) or directed to a new internal outfall, proposed Outfall 715.

The following provides a summary of preliminary information for the installation of the new LVW pond, subject to final pond location and design:

1. **USGS Map**

   The attached US Geological Survey (USGS) map for the Elmendorf, TX quadrangle shows the approximate location of the LVW Pond and LVW Pond outfall. The approximate latitude and longitude of the LVW pond is 29°19’32” N and 98°19’49” E.

2. **Proposed Outfalls**

   The LWV Pond will discharge to a new internal outfall (proposed internal Outfall 714) to Outfall 007, into the cooling water discharge canal #2. The approximate latitude and longitude of the proposed new LVW Outfall 714 is 29° 18’ 45” N and 98° 18’ 53” W. Flows to the outfall are intermittent and variable.

   Low volume waste streams that are currently received by the SRH Pond and would be redirected to the new LVW Pond are summarized in Exhibit 2.1

Exhibit 2.1. Low Volume Waste Streams to be Re-directed to the New LVW Pond

Spruce Low Volume Waste Streams		Low Volume Waste Flows		
		Average		Maximum
		MGD	% of Total	MGD
1	Transfer Tower Sump	0.02	2%	0.4
2	Eastside Drainage Sump	0.02	2%	0.6
3A	Limestone Hopper Area Sump	0.001	0.1%	0.6
3B	Limestone Hopper Area Sump	0.001	0.1%	0.6
3	JKS1 Boiler Area Waste Sump	0.05	5%	0.3
4	JKS2 Boiler Area Waste Sump	0.91	91%	1.90
	Total	1.0	100%	

Notes:

1. Reference dwg. 142614-CL06-125-C3002 - Sheet 5 of 5, Rev C
2. Reference dwg. D-CL05-025-M002 Sheet 6, Rev B
3. Maximum flowrates reflect design capacity.

The average and maximum flows for each stream are also shown in the referenced water balance diagrams. The Outfall configuration including flow measurement will be determined subject to the final location and final design.

3. Description of effluent disposal site

LVW streams that are currently sent to the SRH Ponds will be redirected to the new LVW pond. The preliminary design for the new LVW pond is approximately 2.5 acres . The LVW pond design includes a fore-bay settling channel to settle-out most of the total suspended solids (TSS), followed by a wastewater pond. The composite lined wastewater pond will function to temporarily retain the processed streams to provide additional settling time to further reduce the TSS below the permitted discharge levels.

The fore-bay channel will be lined with a high density polyethylene (HDPE) synthetic geomembrane liner and a geo-synthetic clay liner (GCL) to prevent percolation of stored waste water. Additionally, the fore-bay channel will include a concrete overliner to protect the geo-synthetic liners during solids removal. The wastewater pond will be lined with a composite liner, which will include a soil cement overliner to protect the geo-synthetic liners during solids removal.

The liquid storage capacity of the new LVW pond is approximately 3,000,000 gallons with a freeboard depth from crest of 2 feet. Embankment crests will be 20 feet wide (minimum) and storm water will be diverted around pond embankments. Access ramps will be included to allow excavators or front loader access into the pond to remove any accumulated sediments.

4. Routing of effluent from the facility to the disposal site

LVW will collected and routed to the new LVW pond via a new transfer system or the existing LVW system will be modified. The lines will be constructed of high density polyethylene (HDPE) and run in trenches, racks or buried. Where buried, the route will be marked. Final routing has not been established, but route will follow existing plant pipe chase, roadways and access ways to facilitate inspection and maintenance.

5. Rainfall Inundation Controls

The LVW pond design includes sufficient freeboard to accommodate a 100 year storm event.

6. Description of the wastewater generating process

LVW is generated by a variety of plant operations. It includes boiler blow down, demineralizer purge, quench water and yard drain run off from the Spruce units. Currently, LVW currently generated by Spruce Units 1 and 2 is sent to the SRH Pond and discharged at Outfall 109. The new LVW discharge will include all current LVW streams sent to the SRH and stormwater that falls directly into the LVW pond.

7. Raw materials, major intermediates, and products handled for the new treatment system.

   The LVW may require treatment using a solid contact clarifier to further reduce the TSS prior to discharge. If a clarifier is used, then water treatment additives will be used to promote solids removal (i.e. Alum, polymers). Treatment of the LVW is not expected to require any additional materials, intermediates or products.

8. Flow schematic with a water balance showing each treatment unit and all sources of water and wastewater flow into the treatment plant and to each outfall/point of disposal.

   The attached flow schematics show the new routing of LVW to the new LVW pond and new LVW outfall to the discharge canal.

9. Daily average effluent flow into ponds with a separate engineering report with water balance and storage volume calculations.

   Average flow to the LVW pond is 1.0 MGD as summarized in Exhibit 2.1 of preceding item 2.

10. Summary of Pond and Outfall Information:
    a. Use Designation (treatment, disposal, containment, or evaporation)
       i. Treatment
    b. Any outfalls associated with the pond
       i. There will be a new Outfall located at the Calaveras Discharge Canal. The proposed Outfall number is 714.
    c. Liner type (compacted clay, in-situ clay, or synthetic) and associated data:
       i. Based on the preliminary design, the fore-bay liner layers from top to bottom will consist of the following:
          1. Roller-compacted concrete (RCC),
          2. Non-woven geotextile (protective layer),
          3. 60-mil HDPE geomembrane liner,
          4. Geosynthetic clay liner (GCL),
          5. Non-woven geotextile (cushion layer),
          6. Prepared subgrade (scarified, proof-rolled, and compacted)
       ii. The water storage pond layers from top to bottom will consist of the following:
          1. Soil cement,
          2. Non-woven geotextile (protective layer),
          3. 60-mil HDPE geomembrane liner,
          4. Geosynthetic clay liner (GCL),
          5. Non-woven geotextile (cushion layer),
          6. Prepared subgrade (scarified, proof-rolled, and compacted).
    d. Dimensions of the liner
       i. The approximate dimensions of the liner are 246 feet x 341 feet
    e. Depth from water surface
       i. Detailed information is not currently available.
    f. Avg. Depth of Groundwater from Natural Ground Level
       i. Based on the most recent geotechnical survey, groundwater depths range between 20 and 25 feet below the natural ground level of the proposed LVW Pond site. The average groundwater depth will be determined pending final pond location.
    g. Maximum Depth from Natural Ground Level
       i. To be determined pending final pond design and location

h. Freeboard (ft)
    i. 2 feet
i. Surface Area (acres)
    i. 2.5 acres total pond area (approximate)
j. Storage Capacity (gallons)
    i. 3,156,800 gallons total (approximate)
k. Meets requirements of 40 CFR Chapter 257, Subpart D
    i. The proposed LVW pond will not receive coal combustion residuals (CCR) and is not a CCR impoundment as defined by 40 CFR Chapter 257, Subpart D. A The LVW Pond will meet the requirements for an industrial wastewater impoundment.
l. Leak Detection System information.
    i. If required, to be determined pending final pond design.
m. Seasonal high water table Depth vs Bottom Depth of Pond (indicate how GW will be protected if necessary). Is the bottom of the pond above the seasonally high water table in the shallowest waste-baring zone?
    i. The depth of the bottom of the pond above the water table will be determined pending final design location of the LVW pond.

11. Is stormwater management a component of the effluent to be discharged from the pond?
    a. Precipitation that falls in the pond is accounted for in the pond sizing and will be treated along with the wastewater. Stormwater that falls outside the pond will be routed away from the pond by the embankments. Provisions to manage stormwater runoff have not been developed at this time and will be included in the final design.
12. Groundwater monitoring wells
    a. The preliminary design does not include groundwater monitoring wells.
13. Analytical data for the discharge
    a. The composition of the LWV discharge is similar to other LVW discharges from the Spruce plants.
14. Is this in the Edwards Aquifer Recharge area?
    a. No, the Calaveras site is located south and east of the Edwards Aquifer Recharge area.
15. Attach additional information pertaining to the groundwater, soils, geology, etc. that has been or can be used to assess the potential for migration of wastes from the impoundments and the potential for contamination of groundwater or surface water, and provide the attachment number in the space provided. Additional data may include logs and location plats of borings, soil analyses, water quality data, etc.
    a. Addition geotechnical information will be provided pending the final design and pond location.
16. Describe each change to the permit and provide supplemental information to support the request

    As currently permitted, the station is authorized to discharge FGD wastewater, low volume waste (LVW), quench water, metal cleaning wastes (MCW) and stormwater at Outfall 109 after treatment in the Sludge Recycle Holding (SRH) pond. In practice, the station does not discharge MCW at this outfall, therefore it is removed from the discussion regarding Outfall 109. To achieve compliance with the Effluent Limitations Guidelines (ELGs) promulgated in federal regulation 40 CFR 423, FGD wastewater will be separated from the other streams for treatment via the evaporation pond or alternate zero liquid discharge (ZLD) evaporation technology. LVW streams that are currently sent to Outfall 109 will be separated and rerouting to the new LVW pond for treatment and discharge. The process for segregation will be impacted by regulatory deadlines to comply with the ELGs and with the Coal Combustion Residual (CCR) Rules and may lead to the following scenarios, requiring flexibility in the TPDES permit as outlined below.

a. Scenario 1 – The SRH pond must be closed due to CCR requirements prior to implementing the new low volume waste pond and evaporation ponds but the TPDES permit has not yet been reissued, and prior to the FGD compliance date (December 31, 2023).

    i. If a new "LVW pond" is already constructed, LVW, quench water and stormwater would be routed to this pond, thence to existing Outfall 109 for discharge.

    ii. If a new LVW pond is not available, LVW, quench water and stormwater would be routed to Outfall 109 or an existing outfall currently permitted to discharge LVW (i.e., Outfalls 102, 103 or 108). This routing may be temporary until a new LVW pond is constructed, or may be permanent.

    iii. FGD wastewater would be segregated from the other flows to avoid sending it to the new LVW pond. This flow would bypass the SRH Pond and continue to be directed to Outfall 109. If LVW, quench water and stormwater continue to flow to Outfall 109, the flows would be commingled prior to discharge.

b. Scenario 2 – The SRH pond must be closed due to CCR requirements prior to implementing the new LVW pond and evaporation ponds after the TPDES permit has been reissued, and prior to the FGD ELGs compliance date of December 31, 2023.

    i. If a new LVW pond is already constructed, LVW, quench water and stormwater would be routed to this pond, thence to new proposed Outfall 714 for discharge.

    ii. If a new LVW pond is not available, LVW, quench water and stormwater would be routed to Outfall 109 or an existing outfall currently permitted to discharge LVW (i.e., Outfalls 102, 103, and 108). This routing may be temporary until a new LVW pond is constructed, or may be permanent.

    iii. FGD wastewater would be segregated from the other flows to avoid sending it to the new LVW pond. This flow would bypass the SRH Pond and continue to be directed to Outfall 109 or to a new temporary Outfall 715. If LVW, quench water and stormwater continue to flow to Outfall 109, the flows would be commingled with FGD wastewater prior to discharge.

c. Scenario 3 –MOST LIKELY SCENARIO – The evaporation pond is available for FGD treatment at the FGD compliance date of December 31, 2023. The permit has been reissued.

    i. The SRH pond will receive all currently permitted streams for treatment and discharge through Outfall 109 until the FGD evaporation pond is available.

    ii. FGD wastewater would be segregated from the other flows and sent to the new evaporation pond.

    iii. If there is no requirement to close the SRH pond, LVW, quench water and stormwater would continue to be routed to the SRH pond and discharged through Outfall 109 until the new LVW pond is operational.

    iv. If a new LVW pond is available, LVW, quench water and stormwater would be routed to the new LVW pond and discharged via a new LVW outfall (proposed internal Outfall 714).

    v. If a new LVW pond is not available, LVW, quench water and stormwater would be discharged via existing Outfall 109 or an existing outfall currently permitted to discharge LVW (i.e., Outfalls 102 103, and 108) . If LVW, quench water and stormwater continue to flow to Outfall 109, the flows would be commingled with FGD wastewater prior to discharge.

    vi. Legacy FGD waste streams generated before December 31, 2023 would continue to be discharged at Outfall 109. After dewatering (post 2023), SRH pond clean closure will commence, and Outfall 109 capped and removed from the permit following closure of the SRH Pond.

d. Summary of permitting request. As noted above, there are several scenarios associated with Outfall 109. CPS Energy requests that all of the following actions be taken by TCEQ in order to provide the best flexibility in the permit to address all scenarios, should they occur.

    i. Information submitted with the application includes preliminary design information on the LVW and evaporation ponds since CPS is in the initial stages of design. CPS will submit final design

plans for the ponds as soon as possible and requests TCEQ review the ponds prior to permit reissuance. This will allow CPS to move forward with preparing the ponds as soon as possible.

ii. Update Outfalls 102 103, and 108 as needed to include the Spruce LVW, quench wastewater and stormwater currently going to the SRH pond to allow discharge of these wastes should the SRH pond is forced into early closure.

iii. Add a new outfall for discharges from the new LVW pond, proposed Outfall 714. The new outfall would discharge the treated LVW, quench wastewater and stormwater that are currently going to the SRH pond and discharged at Outfall 109.

iv. Add a new outfall (proposed Outfall 715) for discharge of the FGD legacy wastewater should the SRH pond is forced into an early closure before complete installation of the evaporation ponds in 2023.

v. Establish a compliance date for FGD wastewater at December 31, 2023 and authorize the use of the evaporation pond as a zero-liquid discharge evaporation technology.