Written Closure Plan

Valmont Station - Boulder, Colorado
Active CCR Landfill

Public Service of Colorado (PSCo)
Denver, Colorado

October 17, 2016
Amended February 27, 2017

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Table of Abbreviations and Acronyms

Abbreviation	Definition
ADF	Ash Disposal Facility
CCR	Coal Combustion Residuals
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
cm/sec	Centimeters per Second
EDOP	Engineering Design and Operations Plan
MW	Megawatt

1.0 General Information

Valmont Station is located at 1800 North 63rd Street Boulder, Colorado, approximately 4 miles east of downtown Boulder. The Ash Disposal Facility (ADF) is located on the Valmont Station Power Plant site approximately one-half mile north of the power plant on the northern side of Leggett Reservoir. Valmont Station currently operates one coal-fired steam generation unit. The 184-megawatt (MW) generator was installed in 1964 and is scheduled to be retired in 2017. Fly ash is collected in bag-houses, temporarily stored in a silo, and transported to the on-site ADF for disposal. During silo unloading, fly ash is conditioned in a pug mill to about 15 percent moisture content for dust control and to aid in compaction.

See the attached figure (**Figure 1**) for a map of the Valmont Power Station.

The ADF was used for coal combustion residuals (CCR) disposal since 1993. The total ADF parcel encompasses approximately 60 acres; the total filled area is approximately 58 acres. The majority of waste disposed at the facility is CCR (bottom ash and fly ash) generated at the Valmont Station Power Plant. Scrubber solids from air emissions control equipment are commingled with the fly ash.

Valmont Station is expected to close in 2017, and closure of the ADF will be completed within the timeframes described in this plan.

In accordance with 40 Code of Federal Regulations (CFR) 257 Disposal of Coal Combustion Residuals From Electrical Utilities (CCR Rule) §102(b), Public Service of Colorado (PSCo) is required to publish a written closure plan that *"…describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices."*

This closure plan fulfills the requirements of 40 CFR 257.102(b).

2.0 Description of Closure Plan – 40 CFR 257.102(b)(1)(i-iii)

The ADF is an active, unlined CCR disposal unit that began construction and operation in 1993 and has remained in continuous operation since that time. The ADF is operated under an Engineering Design and Operations Plan (EDOP) developed pursuant to Colorado Department of Public Health and Environment (CDPHE) Solid Waste Regulations. Assuming current ash production rates, the ADF will reach its disposal capacity by 2022 with the receipt of CCR from the final closure of the on-site CCR impoundments .

According to PSCo documentation, closure of the ADF is implemented in phases as individual areas reach their final capacity. Approximately 30.4 acres were at final capacity and were closed prior to October 19, 2015, in accordance with the EDOP and CDPHE closure requirements. According to the EDOP, once an area reaches its final permitted capacity, the area is closed with an 18-inch soil infiltration layer, followed by a 6-inch soil rooting layer. Areas that ceased accepting CCR and were closed prior to October 19, 2015, are not subject to 40 CFR 257. In addition, approximately 13 acres are separate ash disposal unit that ceased accepting CCR prior to October 19, 2015, these area are not subject to 40 CFR 257.

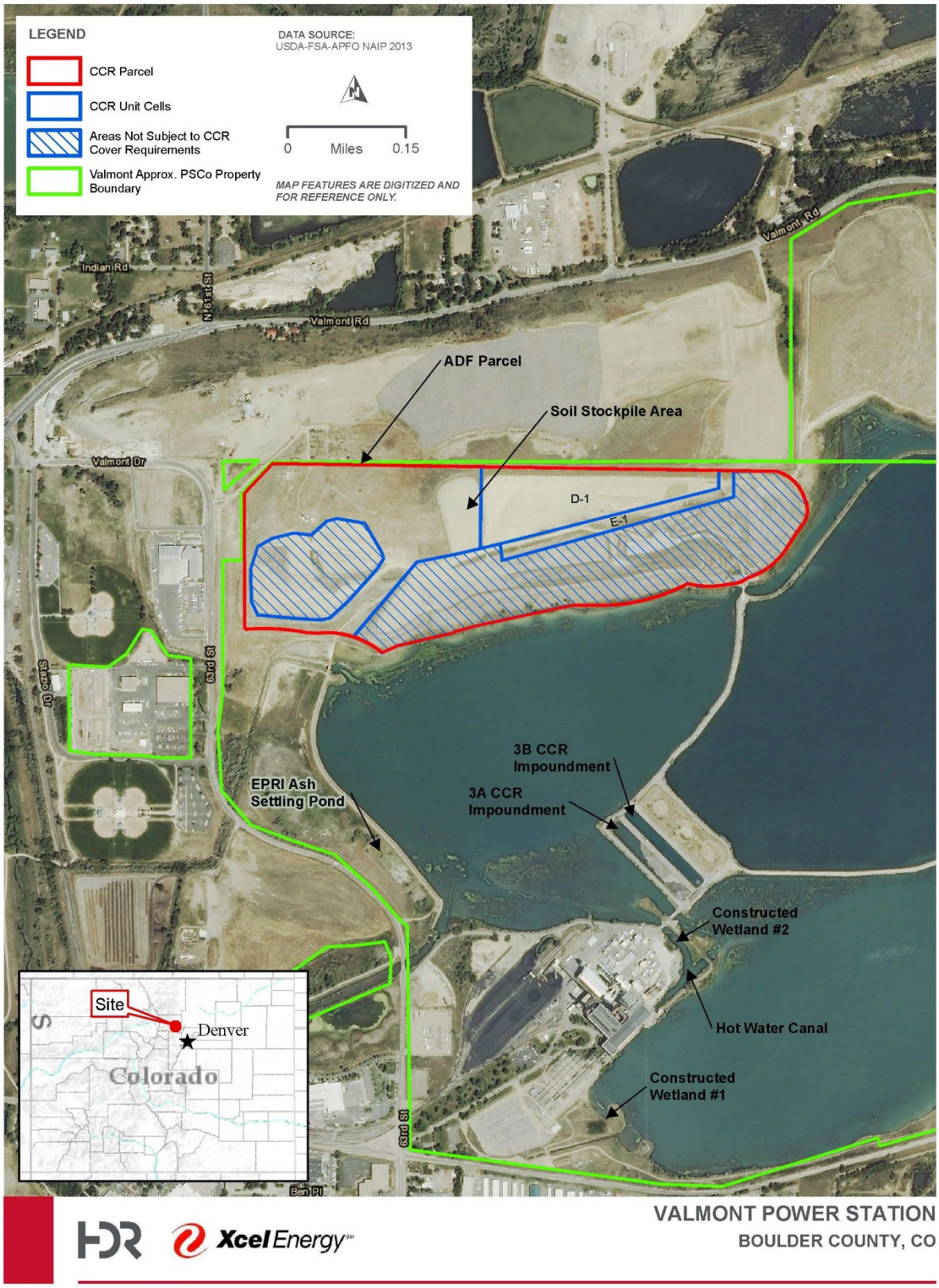

Figure 1. Valmont Power Station

Approximately 14.6 acres of the ADF represent the active CCR disposal area (Area D-1) and an area that has an interim cover but was not closed prior to October 19, 2015 (Area E-1). These areas are subject to 40 CFR 257. As such, these areas will be closed in accordance with 40 CFR 257.102(d). According to 40 CFR 257.102(d) - **Closure performance standard when leaving CCR in place** – *"the final cover system designed to have a permeability less than or equal to any bottom liner system or natural subsoils present, or a permeability no greater than 1x10^{-5} cm/sec."*

According to the EDOP, the permeability of the natural subsoils beneath the ADF was estimated to be 3.0 x10^{-7} centimeters per second (cm/sec). Therefore, to meet the requirements of 40 CFR 257.102, Areas D-1 and E-1will require a final cover with a maximum permeability of 3.0x10^{-7} cm/sec. The impermeable cover layer may be constructed of 18-inches of on-site soils amended with bentonite to meet the 3.0x10^{-7} cm/sec permeability requirement, 18-inches of 3.0x10^{-7} cm/sec soils imported from off-site, a geosynthetic membrane liner, or an alternative cover system that meets the requirements of 40 CFR 257.102(d)(3)(ii). Any soil cover or traditional geosynthetic cover system will consist of a soil rooting layer with a minimum depth of 6-inches that will be seeded with native grasses commonly used in the semi-arid western mountain states at elevations less than 5,500 feet.

Upon completion of closure activities, a notification of completion of closure will be completed, per 40 CFR 257.102(h) and 257.105(i)(8). The notification will document that all requirements and conditions of the Closure Plan were achieved. The report will be signed and sealed by a Colorado registered Professional Engineer.

3.0 Inventory Estimate – 40 CFR 257.102(b)(1)(iv)

In accordance with 257.102(b)(1)(iv) an estimate of the maximum inventory of CCR ever on-site over the active life of the ADF must be provided.

Historically the ADF accepted approximately 60,000 tons of fly ash, 35,000 tons of bottom ash, and 15,000 tons of scrubber solid wastes (fly ash) annually (~110,000 cubic yards/year). The ADF has accepted CCR since 1993. Over the 23-years of operation the ADF has accumulated approximately 2,530,000 cubic yards of CCR material.

Upon final receipt of CCR, the estimated disposed volume of CCR will be approximately 2,750,000 cubic yards.

4.0 Area Requiring Final Cover – 40 CFR 257.102(b)1(v)

In accordance with 40 CFR 257.102(b)(1)(v), an estimate of the largest area of the CCR unit ever requiring a final cover must be provided.

The total ADF disposal area parcel encompasses approximately 60 acres. Historically, approximately 58 acres of the ADF have received landfilled CCR. As discussed in Section 2.0 and according to PSCo documentation, a total of approximately 43.4 acres were either closed and covered prior to October 19, 2015, or ceased receiving CCR before October 19, 2015, and therefore are not subject to 40 CFR 257. Approximately 14.6 acres encompass active CCR disposal (Area D-1) and an area that has interim cover but was not closed prior to October 19, 2015 (E-1) will require a final cover in accordance with 40 CFR 257.102(d).

5.0 Schedule of Closure Activities – 40 CFR 257.102(b)1(vi)

Table 1. Schedule of ADF Closure Activities		
Task	**Start Date**	**Finish Date**
Written Closure Plan	n/a	October 17, 2016
Written Post-Closure Plan	n/a	October 17, 2016
Last Receipt of CCR	Ongoing	April 30, 2022
Notification of Two Year Extension	n/a	April 30, 2019
Notification of Two Year Extension	n/a	April 30, 2021
ADF Landfill Closure	May 31, 2022	November 30, 2022
Annual Inspections	Year 2015	Annually until 2022
Fugitive Dust Plan Updates	Year 2015	Annually until 2022
Post-Closure Maintenance	Year 2022	Year 2052 (minimum)

Note: CCR from closures of on-site CCR surface impoundments will be disposed of at the ADF. The CCR surface impoundment closures must be completed no later than April 2022. If necessary to accommodate receipt of ash from the impoundment closure, notification of two year extension(s) for closure of the landfill will be made pursuant 257.102(e)(2)(ii) and 257.102(e)(2)(iii),

6.0 Qualified Professional Engineer Certification – 40 CFR 257.102(b)(4) and 257.102(d)(3)

According to 40 CFR 257.102(b)(4), the owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the initial and any amendment of the written closure plan meets the requirements of this section.

According to 40 CFR 257.102(d)(3), the owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the design of the final cover system meets the requirements of this section.

I, Christopher M. Koehler, being a registered Professional Engineer, in accordance with the Colorado State Board of Licensure for Architects, Professional Engineers, and Professional Land Surveyors, do hereby certify to the best of my knowledge, information, and belief, that the information contained in this written Closure Plan dated October 17, 2016 and amended February 27, 2017, was conducted in accordance with the requirements of 40 CFR. 257.102(b) and (d), is true and correct, and was prepared in accordance with recognized and generally accepted good engineering practices.

SIGNATURE:  Colorado PE 0051359

DATE: February 27, 2017