Valmont Station CCR Landfill

Notification of Updated Groundwater Protection Standards (GPS) and Statistically Significant Levels over GPS

Public Service Company of Colorado (PSCo), an Xcel Energy Company, is the owner of Valmont Station which historically was a coal-fired, steam turbine electric generating station and is subject to requirements of EPA's Disposal of Coal Combustion Residuals from Electrical Utilities Rule (CCR Rule), finalized on April 17, 2015. The station was retired from operations on September 30, 2017 and a CCR landfill remains on site. The majority of the landfilled ash will be removed and beneficially used under a project that will begin in 2023. A smaller area of the landfill will remain in place and will be used for disposal of CCR and non-CCR waste associated with the ash removal and beneficial use project. A Written Closure Plan has been prepared for the CCR landfill which includes installation of a CCR compliant final cover (HDR, 2017).

Protecting the environment is a priority for Xcel Energy

Xcel Energy conducts all of its business in an environmentally responsible manner which includes monitoring our operations and taking steps to protect our air, water and other natural resources. Pursuant to 257.95(g), Xcel Energy has determined that one or more constituents listed in Appendix IV have been detected at Statistically Significant Levels (SSLs) above the Groundwater Protection Standards (GPS) established for the site pursuant to 257.95(h). This is an update to notifications of SSLs over GPS previously made for the ash landfill. The attached memo, Valmont Station Landfill Updated Groundwater Protection Standards and Determination of SSLs, documents the updated GPS for the Appendix IV constituents that have been detected in groundwater at the site and identifies those constituents for which SSLs above the GPS have been determined. This includes SSLs of a previously identified constituent in three additional on-site wells at the landfill. These results do not indicate there is any impact on local drinking water. The monitoring wells evaluate groundwater immediately adjacent to the landfill, and measure groundwater conditions within the Valmont Station property boundary. Xcel Energy will continue to monitor groundwater at the site in accordance with the assessment monitoring program as specified in 257.95 and has also completed an Assessment of Corrective Measures to identify and evaluate corrective measures to address these SSLs over GPS.

Memo

Date: Friday, October 28, 2022

To: Jennifer McCarter, Xcel Energy

From: Matt Rohr, HDR, Inc.

Subject: Valmont Station Landfill
Updated Groundwater Protection Standards and Determination of SSLs per 257.95(g)

The U.S. Environmental Protection Agency's (EPA's) final Coal Combustion Residuals (CCR) Rule establishes a comprehensive set of requirements for the management and disposal of CCR (or coal ash) in landfills and surface impoundments by electric utilities. Valmont Station, located in Boulder, Colorado, has three CCR units subject to the CCR Rule: the ash landfill and two former bottom ash impoundments. Groundwater protection standards (GPS) were previously established for the landfill and impoundments (HDR, 2019). The objective of this memorandum is to document the updated GPS concentrations for each constituent of interest (COI) for the ash landfill and evaluate if the concentration of Appendix IV constituents in groundwater from landfill assessment monitoring are present at statistically significant levels (SSLs) over the GPS.

At Valmont, groundwater monitoring was conducted quarterly between 2015 and 2017 to collect eight rounds of background sampling plus detection monitoring as specified under CCR Rule Part 257.94. The water quality data collected from monitoring well MW-7 located upgradient of the CCR landfill was compiled and statistically analyzed to develop original background threshold values (BTV) for each COI on January 15, 2018. PSCo first detected SSLs of constituents over the GPS and initiated assessment of corrective measures in October 2018. It is customary to periodically update BTVs to reflect a longer period of monitoring data, and PSCo recently updated background threshold values for the Valmont landfill. Updating BTVs with additional monitoring data can result in values that are either lower or higher than originally calculated using a more limited data set. The updated assessment monitoring background values are based upon data from the upgradient well MW-7 from December 2015 through April 2022. The BTVs are the upper tolerance limits (UTLs) for Appendix IV constituents displayed in **Table 1**.

Table 1. Valmont Landfill – Upper Tolerance Limits (UTL) with 95% coverage and 95% confidence for Appendix IV constituents Assessment Monitoring Background Values
(Background well MW-7 Data, Dec 2015 - Apr 2022)

Constituent	Unit	N	No BDL	% BDL	Statistical Method[1]	UTL	Notes
Appendix IV Constituents							
Antimony	mg/l	17	10	59%	Nonparametric	0.0023	a
Arsenic	mg/l	19	10	53%	Nonparametric	0.0014	a
Barium	mg/l	19	0	0%	Gamma	0.038	
Beryllium	mg/l	17	15	88%	Nonparametric	0.00072	a, c
Cadmium	mg/l	18	8	44%	Gamma	0.00060	
Chromium, Total	mg/l	19	4	21%	Gamma	0.012	
Cobalt	mg/l	19	0	0%	Gamma	0.0017	
Fluoride	mg/l	19	0	0%	Gamma	0.59	
Lead	mg/l	19	0	0%	Gamma	0.0028	
Lithium	mg/l	19	6	32%	Gamma	0.051	
Mercury	mg/l	19	15	100%	Nonparametric	0.00013	a, b, c
Molybdenum	mg/l	15	15	100%	Gamma	0.0079	
Radium-226/228	pci/l	19	5	26%	Gamma	1.65	
Selenium	mg/l	19	5	26%	Gamma	0.010	
Thallium	mg/l	16	15	94%	Nonparametric	0.00025	a, c, d

Notes:
a: Nonparametric methods were used since the percent below MDL is greater than 50%.
b: Constituent is 100% non-detects so the maximum detection limit is chosen as the UTL.
c: Maximum detected value was chosen as the UTL as the number of detects is less than 4.
d: Sample contains MDLs that are greater than the maximum detect value.

CCR Rule 257.95(h) describes that GPS must be established for each constituent in Appendix IV detected in the groundwater. The GPS shall be:

> (1) the maximum contaminant level (MCL) for that constituent;
> (2) for constituents for which an MCL has not been established, the background concentration for the constituent established from background wells; or,
> (3) for constituents for which the background level is higher than the MCL, the background concentration.

EPA's Unified Guidance has recommended that the UTL be used as a fixed value similar to a GPS where an MCL does not exist for the constituent at the location (USEPA, 2009). Because the background values (UTLs) for the landfill were updated recently (Table 1), the GPS values were also updated (Table 2). Table 2 lists the EPA established MCL from 40 CFR 141.62 and 141.66, the updated UTLs for the Valmont landfill, and the updated GPS. The GPS for each COI is the higher of the two: MCL or background value/UTL. There are four COIs that do not have

established MCLs (cobalt, lead, lithium, and molybdenum); however, in the July 17, 2018 CCR Rule Amendment EPA adopted health-based concentrations as the GPS for the four Appendix IV constituents without a designated MCL. These concentrations are listed in the MCL column of **Table 2**. All Appendix IV constituents were detected in at least one well, thus updated GPS are established for all Appendix IV COIs.

Table 2. Valmont Landfill - Groundwater Protection Standards for Appendix IV constituents

Constituent	Unit	MCL	Background Value (UTL)	GPS
Antimony	mg/l	0.006	0.0023	0.006
Arsenic	mg/l	0.010	0.0014	0.010
Barium	mg/l	2	0.038	2
Beryllium	mg/l	0.004	0.00072	0.004
Cadmium	mg/l	0.005	0.00060	0.005
Chromium, Total	mg/l	0.1	0.012	0.1
Cobalt	mg/l	0.006*	0.0017	0.006
Fluoride	mg/l	4.0	0.59	4.0
Lead	mg/l	0.015*	0.0028	0.015
Lithium	mg/l	0.0400*	0.051	0.051
Mercury	mg/l	0.002	0.00013	0.002
Molybdenum	mg/l	0.1*	0.0079	0.1
Radium-226-228	pci/l	5.0^	1.65	5.0
Selenium	mg/l	0.05	0.010	0.05
Thallium	mg/l	0.002	0.00025	0.002

* EPA adopted health-based value for constituents with no MCL.
^ Colorado Water Quality Regulation

The background update resulted in UTLs for some constituents decreasing. For those UTLs with lower concentrations, if that value also represented the GPS, then the GPS also lowered. For example, the lithium UTL and GPS decreased from 0.0830 to 0.0506 milligrams per liter (mg/L). This UTL decrease is the result of a larger data set coming from a longer period of record, and since the updated UTL is still higher than the MCL, the UTL is the GPS. The lowering of the GPS for lithium also resulted in new detections of SSLs over GPS.

The assessment monitoring data was compared to the updated GPS values, and some constituents were found to exceed the GPS. To determine if an exceedance of a GPS is statistically significant, the 95% lower confidence limit (95LCL) is calculated for each of the downgradient wells for each of the Appendix IV COIs. The wells with LCLs that exceed the updated GPS are provided in **Table 3**.

Table 3. Valmont Landfill - Newly Detected SSLs Lower Confidence Limits that Exceed the Updated Groundwater Protection Standard		
Monitoring Well	**Appendix IV Constituent**	Lithium
	Unit	mg/l
	GPS	0.051
MW-3	**95% LCL**	0.075
MW-5	**95% LCL**	0.053
MW-6	**95% LCL**	0.060

Table 4 contains all SSLs identified to date, including the newly identified SSLs in MW-3, MW-5, and MW-6.

Table 4. Valmont Landfill - All SSLs Lower Confidence Limits that Exceed Updated Groundwater Protection Standards				
Monitoring Well	**Appendix IV Constituent**	Arsenic	Lithium	Selenium
	Unit	mg/l	mg/l	mg/l
	GPS	0.010	0.051	0.05
MW-3 [a]	**95% LCL**	--	0.075	--
MW-4	**95% LCL**	--	0.20	0.23
MW-5 [a]	**95% LCL**	--	0.053	--
MW-6 [a]	**95% LCL**	--	0.060	--
MW-8	**95% LCL**	--	0.11	--
MW-13	**95% LCL**	--	0.098	0.29
MW-14	**95% LCL**	--	0.14	1.5
MW-15	**95% LCL**	--	--	0.12
MW-21	**95% LCL**	--	0.18	1.2
MW-28	**95% LCL**	0.0088 [b]	0.23	2.7

[a] newly identified SSLs in MW-3, MW-5 and MW-6

[b] the lithium SSL for arsenic in MW-28 was in 2021; however, based on the data through April 2022, the LCL is below GPS.

References

U.S. Environmental Protection Agency (USEPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, USEPA, EPA 530/R-09-007, 2009.

HDR, 2019. Valmont Station CCR Units Groundwater Protection Standards and Determination of SSLs per 257.95(g) June 7, 2019.