TECHNICAL MEMORANDUM

Date: January 15, 2018

From: Nick Bonow, P.E., P.G.
        Carlson McCain, Inc.

To: Chuck Donkers. P.G.
        NSPM Environmental Services

Re: SSI Determination – Unit 3 Landfill

The Unit 3 Landfill (Landfill) at the Northern States Power Company, a Minnesota corporation (NSPM), Sherburne County Generating Plant (Sherco) is an operating land disposal facility for the management of coal combustion residuals (CCR), and is subject to the requirements listed in the U.S. Code of Federal Regulations, Title 40 (40 CFR), Part 257. The purpose of this document is to certify NSPM's compliance with 40 CFR §257.93 (h), pertaining to identification of a statistically significant increase over background (SSI) for groundwater monitoring constituents for the Landfill.

Pursuant to §257.94, a detection monitoring program has been established for the Landfill. As part of the detection monitoring program the following activities were conducted by October 17, 2017:

- a baseline of nine independent samples were collected from each background and downgradient (or "compliance") well in the groundwater monitoring system and analyzed for the constituents listed in appendices III and IV to §257; and
- the first semi-annual detection monitoring event was conducted, in which each background and compliance well was sampled and analyzed for the constituents listed in appendix III to §257.

§257.93 (h) (2) requires that 90 days after completing sampling and analysis, the owner or operator must determine whether there has been an SSI for any constituent at each monitoring well.

NSPM has prepared a Statistical Analysis Plan (NSPM, 2017[1]), which presents the statistical methods and procedures for determining whether there has been an SSI, and provides a certification that the methods are appropriate for evaluating groundwater for the Landfill. Pursuant to §257.93 (h)(2) NSPM has conducted statistical analysis of the monitoring data from the October, 2017 detection monitoring event in accordance with the methods and procedures presented in the Statistical Analysis Plan. Monitoring constituents were compared to background groundwater quality using the method of interwell prediction intervals. Prediction intervals are one of the statistical analysis methods specified under §257.93 (f)(3).

For the prediction interval analysis, each constituent result from each compliance well was compared to the upper prediction limit generated from the pooled background data from the upgradient wells. If a constituent concentration exceeds the upper prediction limit, a one-of-two pass verification resample is collected, and an SSI is identified if both the original result and the verification resample exceed the prediction limit. For constituents which report 100% non-detects in background the double quantification rule is applied, meaning if the constituent concentration in a compliance well exceeds the highest historical laboratory reporting limit in background wells in both the original sample and the verification

[1] NSPM, 2017. Statistical Analysis Plan, Sherco Unit 3 Landfill. Northern States Power Company, a Minnesota Corporation. October 16, 2017

resample, an SSI is confirmed. If no resample is conducted, then an SSI is confirmed with the initial exceedance. Additional considerations for statistical analysis, including handling of statistical outliers, data distribution, trend testing, etc., were addressed as needed according to the procedures in the Statistical Analysis Plan.

Based on the results of the statistical analysis, NSPM has determined that one or more monitoring wells exhibit an SSI for one or more constituents listed in §257, appendix III. The following table lists each monitoring well in which an SSI was identified, and the constituent which exhibited the SSI:

Table 1 – SSI Determination
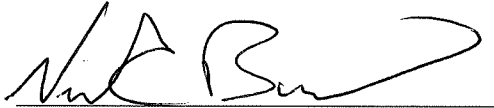**Detection Monitoring Event: October 2017**

Monitoring Well	Constituents Exhibiting an SSI
P-120	Boron
P-137A	Boron Calcium Sulfate Total Dissolved Solids
P-138A	Calcium Total Dissolved Solids
P-73-1	Boron
P-74-1	Boron
P-75-1	Calcium
P-97	Boron

The identification of SSIs begins the process of further investigation and/or assessment monitoring. NSPM will establish an assessment monitoring program meeting the requirements of §257.95, or document that the SSI resulted from an alternative source, an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

See following page for certification

CERTIFICATION

I hereby certify that this document was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. I also certify that the selected statistical method, as described above, is appropriate for evaluating the groundwater monitoring data for this CCR management area.

_____   _____January 15, 2018_____

Nicholas Bonow, P.E., P.G.   Date
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Carlson McCain, Inc.
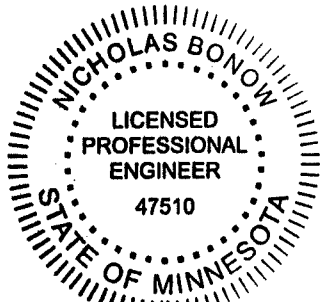
License renewal date: June 30, 2018