Location Restrictions
Scrubber Solids Pond No. 3
Sherburne Country Generating Plant

Introduction

This report presents documentation and certification for the location standards for Scrubber Solids Pond No. 3 (Pond 3) at the Sherburne County Generating Plant (Sherco) in Becker, Minnesota. Pond 3 is an "existing" (i.e. received coal combustion residuals both before and after October 14, 2015) lined coal combustion residual (CCR) surface impoundment. This document addresses the requirements of 40 CFR Sections 257.60 through 257.64 (Rules), i.e. location standard requirements, for CCR surface impoundments and demonstrate Pond 3's compliance with the requirements.

Location Restrictions

The sections below provide substantiation of compliance for each of the location restrictions.

Compliance with §257.60, Placement above the uppermost aquifer

To comply with §257.60, the owner or operator must demonstrate that:

(a) *New CCR Landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer…*

Hydrogeologic conditions beneath Pond 3 have been documented in the *Scrubber Solids Pond No. 3 Hydrogeologic Evaluation Report (Xcel, 2002)* prepared as part of a permit application submitted to the Minnesota Pollution Control Agency (MPCA) prior to construction of the pond. The uppermost aquifer beneath Pond 3 in an unconfined, sand and gravel aquifer comprised of Quaternary-age alluvial sediments, and the potentiometric surface (i.e. water table) within this aquifer constitutes the upper limit of the uppermost aquifer. Based on groundwater elevation measurements reported in the *2017 CCR Annual Groundwater Monitoring and Corrective Action Report (Carlson McCain, 2018)*, the minimum separation from the Pond 3 base liner to the groundwater table during 2017 was 9.04 feet. This occurred in the northeast corner of the base liner of Pond 3.

The highest recorded measurement of Pond 3 wells occurred in October, 2011. During this event groundwater elevations were 1.84 to 3.38 feet higher than the October, 2017 measurements. This equates to a groundwater separation between the Pond 3 base liner and the groundwater of at least 5.66 feet for the documented historic high water table.

Figure 1 shows the groundwater contours generated for the CCR Annual Groundwater Report. The Pond 3 base liner contours can be found in the document *Sherco Plant 2004 Pond 3N Construction*

Certification Report (McCain, 2004) and *Sherco Plant 2010 Pond 3S Construction Certification Report (McCain 2010)* placed on Xcel Energy's CCR website.

Compliance with §257.61, Wetlands

To comply with §257.61, the owner or operator must demonstrate that:

(a) New CCR Landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in §232.2 of this chapter…

There are no wetlands mapped within the Pond 3 footprint according to the U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) database. The wetland nearest the Site is located approximately 1,500 feet to the southwest.

Historical land use shown in aerial photography from the years 1991 and 2003 (i.e. prior to construction of Pond 3) and on-site observations do not indicate the presence of wetlands within the Pond 3 footprint. Figure 2 shows the National Wetland Inventory map.

Compliance with §257.62, Fault Areas

To comply with §257.62, the owner or operator must demonstrate that:

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time.

Based on a review of the United States Geologic Survey (USGS) Faults and Folds Database map, Pond 3 is not located within 200 feet of a fault zone which has had displacement in Holocene time. Hydrogeologic investigations conducted within the Pond 3 area confirm the absence of fault activity in recent geologic activity.

Figure 3 shows the site location on a USGS Quaternary Faults and Folds Database map.

Compliance with §257.63, Seismic Impact Zones

To comply with §257.63, the owner or operator must demonstrate that:

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in in seismic impact zones…

To clarify, the Preamble to 40 CFR 257 states that *"a seismic impact zone means an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g) will exceed 0.10 g in 50 years.*

Based on the USGS 2014 two-percent probability of exceedance in 50 years map, Pond 3 is located in an area of peak acceleration ranging from 0.02 g to 0.04 g, which is less than the 0.10 g threshold constituting a seismic impact zone. A map showing the Pond 3 site location relative to peak acceleration zones is provided as Figure 4.

Compliance with §257.64, Unstable Areas

To comply with §257.64, the owner or operator must demonstrate that:

(a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area...

(b) The owner or operator must consider all of the following factors, at minimum, when determining whether an area is unstable:

(1) On-site or local soil conditions that may result in significant differential settling;

(2) On-site or local geologic or geomorphologic features; and

(3) On-site or local human-made features or events (both surface and subsurface).

The Pond 3 Hydrogeologic Evaluation Report referenced above describes the soils and geology beneath Pond 3. The Pond 3 site is located on the Anoka Sand Plain, a physiographic region which occupies large portions of Sherburne, Anoka, and Isanti counties and is characterized by widespread sand and gravel deposits underlain by glacial till. Unconsolidated sediments beneath Pond 3 consist primarily of fine- to coarse-grained sand with gravel along with a layer of silty to sandy, dense glacial till. These soils are stable and are well-suited to support the pond foundation. No soft soils, areas susceptible to mass movements, or karst terrains were reported in the investigation area.

The land surrounding Pond 3 is flat to very gently rolling and slopes gradually (one to three percent slope) south and west to the Mississippi River approximately 2,000 feet southwest of Pond 3.

The arrangement of soils and topography provide a stable base not prone to differential settling or mass movements. Additionally, pond construction practices such as removal of all topsoil and vegetation, soil compaction, and geotechnical testing of the base and embankments ensure the underlying soils are capable of supporting the pond's structural components (liners, leachate collection systems, and future final cover, run-on/run-off systems).

The land on which Pond 3 is constructed was formerly used for farming and portions were excavated for soil borrow during previous pond construction. There were some human-made features located in the surface or subsurface near Pond 3 (telephone cable, abandoned electrical, etc.). Those were terminated and removed prior to construction of the pond.

Conclusion

Pond 3 meets all of the location restrictions listed under 40 CFR §257.60 to §257.64 and there are no apparent conditions that would cause underlying soils to move or impact the structure of the unit and cause risk to human health or the environment through structural failures.

Certification

I hereby certify under penalty of law that this report was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Daniel J. Riggs, PE License No. 49559	October 17, 2018 Date

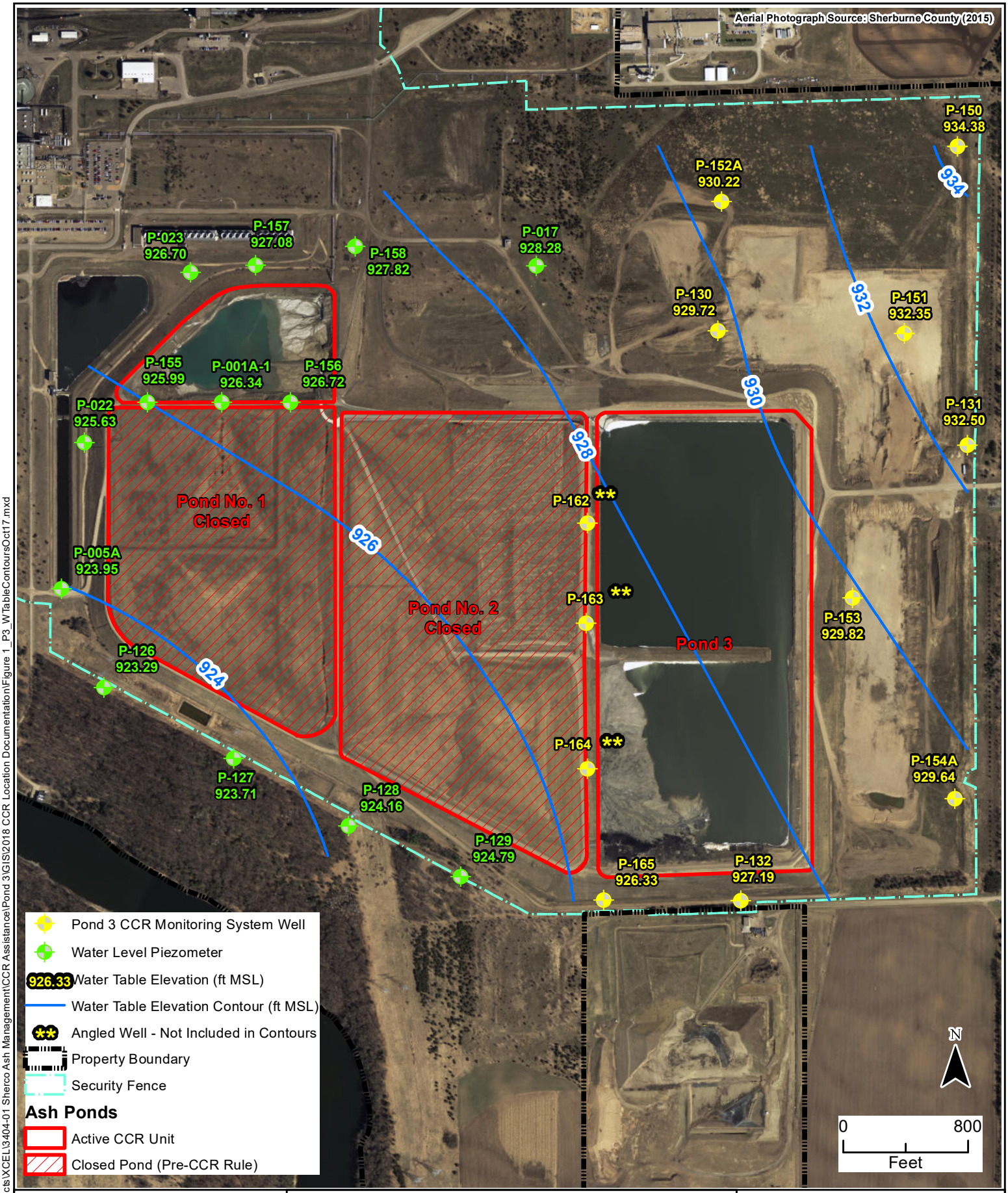
References

Xcel, 2002. Northern States Power Company SHERCO Generating Plant Scrubber Solids Pond No.3 Hydrogeologic Evaluation, Phase II – Field Investigation. Prepared by Xcel Energy, May, 2002.

Carlson McCain, 2018. CCR Annual Groundwater Monitoring and Corrective Action Report; Scrubber Solids Pond No. 3. Sherburne County (Sherco) Generating Plant, Becker, Minnesota. Prepared by Carlson McCain Inc., January 29, 2018.

McCain, 2004. Construction Documentation and Pre-Fill Certification Report, Scrubber Solids Pond No. 3N, Sherburne County Generating Plant, Becker, Minnesota. Prepared by McCain and Associates, Inc., November 2004.

McCain, 2010. Construction Certification Report, Pond No. 3 South Construction, Sherburne County Generating Plant, Becker, Minnesota. Prepared by McCain and Associates, Inc., January 2011.



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CCR LOCATION DOCUMENTATION REPORT
Scrubber Solids Pond No. 3
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Becker, Minnesota

FIGURE 1
WATER TABLE ELEVATION CONTOUR MAP (10/9-12/2017)

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FIGURE 2
CFR §257.61 WETLANDS

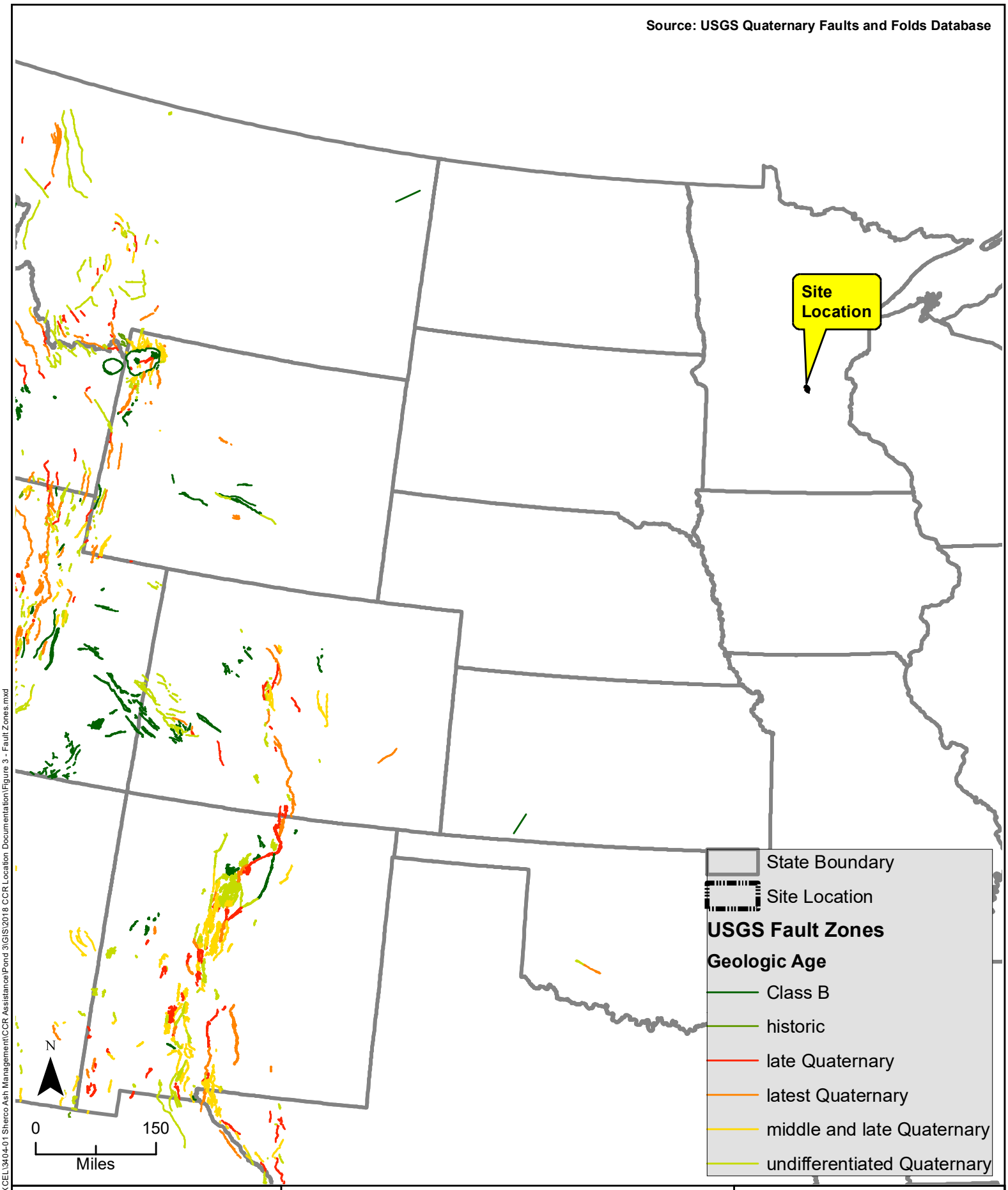

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FIGURE 3
CFR §257.62 FAULT AREAS

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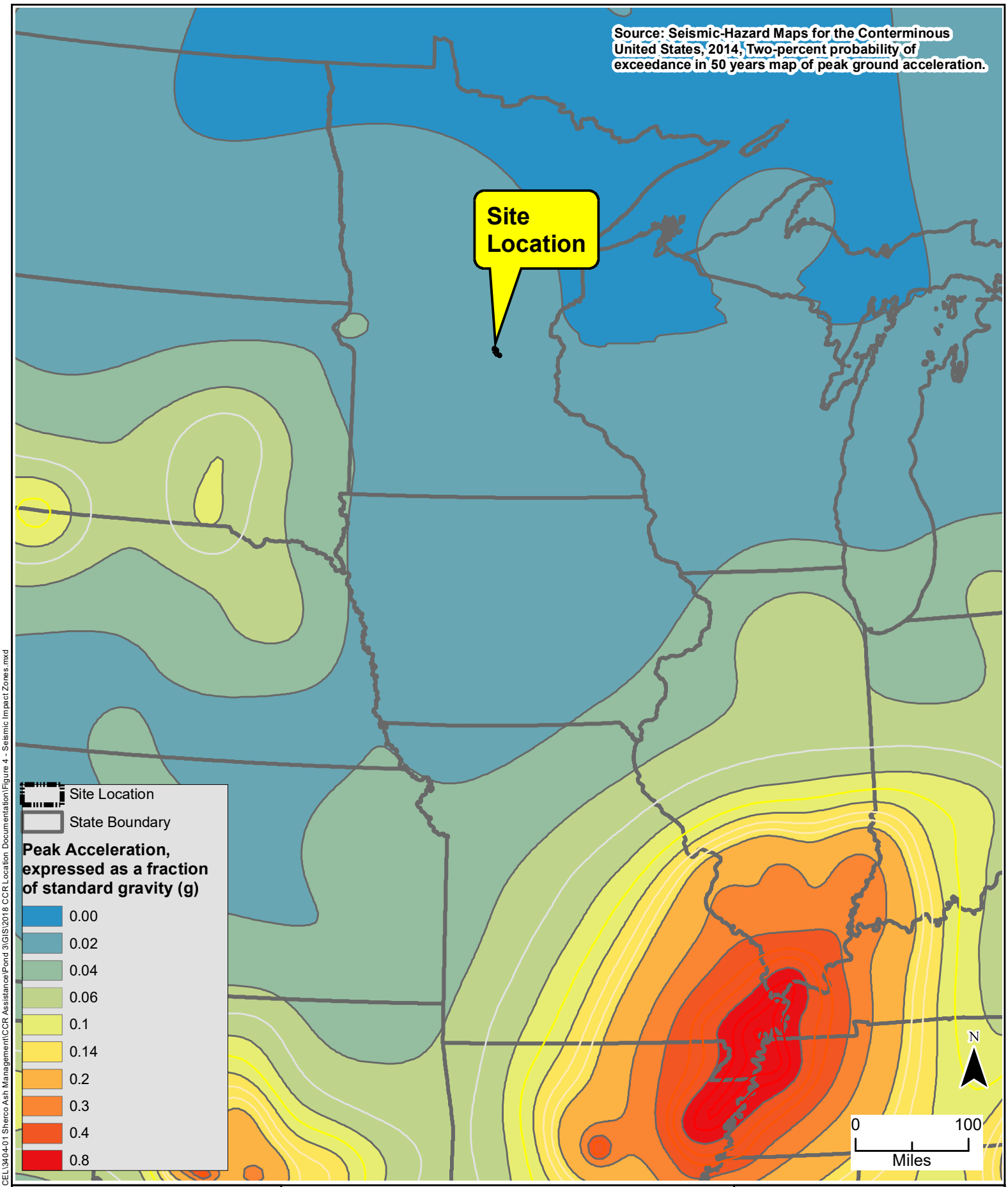

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FIGURE 4
CFR §257.63 SEISMIC IMPACT ZONES

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