Location Restrictions
Bottom Ash Pond No. 2
Sherburne County Generating Plant

Introduction

This report presents documentation and certification for the location standards for the Bottom Ash Pond No. 2 (BAP2) at the Sherburne County Generating Plant (Sherco) in Becker, Minnesota. The Bottom Ash Pond No. 2 is a "new coal combustion residual (CCR) surface impoundment" according to 40 CFR Section §257.53. 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 demonstrates compliance with the requirements for the Bottom Ash Pond No. 2.

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 the Bottom Ash Pond No. 2 have been documented in the *Phase II Hydrogeologic Investigation Report and Phase III Water Monitoring System Work Plan (Carlson McCain, 2019).* The uppermost aquifer beneath the BAP2 is 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 *Phase II Hydrogeologic Investigation Report and Phase III Water Monitoring System Work Plan (Carlson McCain, 2019)*, the minimum separation from the BAP2 base liner to the groundwater table during 2019 was 9.4 feet. This occurred in the northeast corner of the base liner of the BAP2.

During the highest recorded measurement during the last 25 years the groundwater elevations were 3.9 feet higher than the March, 2019 measurements. This equates to a groundwater separation between the BAP2 base liner and the groundwater of at least 5.5 feet for the documented historic high-water table.

Figure 1 shows the groundwater contours generated for the CCR Annual Groundwater Report. The BAP2 base liner contours are shown on drawings found on Xcel Energy's CCR website, in: *257.74(c) Construction Plan, Bottom Ash Pond No. 2 (Carlson McCain, 2020).*

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 footprint for Bottom Ash Pond No. 2, according to the U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) database. The wetland nearest the Site is located approximately 3,000 feet to the south.

On-site observations do not indicate the presence of wetlands within the Bottom Ash Pond No. 2 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, the Bottom Ash Pond No. 2 is not located within 200 feet of a fault zone which has had displacement in Holocene time. Hydrogeologic investigations conducted within the Bottom Ash Pond No. 2 area confirm the absence of fault activity in recent geologic history.

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, the Bottom Ash Pond No. 2 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 Bottom Ash Pond No. 2 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 *Phase II Hydrogeologic Investigation Report and Phase III Water Monitoring System Work Plan (Carlson McCain, 2019)* referenced above describes the soils and geology beneath the Bottom Ash Pond No. 2. The Bottom Ash Pond No. 2 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 the BAP2 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 undeveloped land surrounding the Bottom Ash Pond No. 2 is flat to very gently rolling and slopes gradually (one to three percent slope) south and west to the Mississippi River approximately 3,100 feet southwest of the Bottom Ash Pond No. 2.

The arrangement of soils and topography provide a stable base, which is not prone to differential settling nor 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 (embankments, future final cover, run-on/run-off systems).

The Bottom Ash Pond No. 2 is near other infrastructure with aboveground and underground utilities located adjacent to the pond. There are no utilities that would cause unstable conditions beneath the pond.

Conclusion

The Bottom Ash Pond No. 2 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.

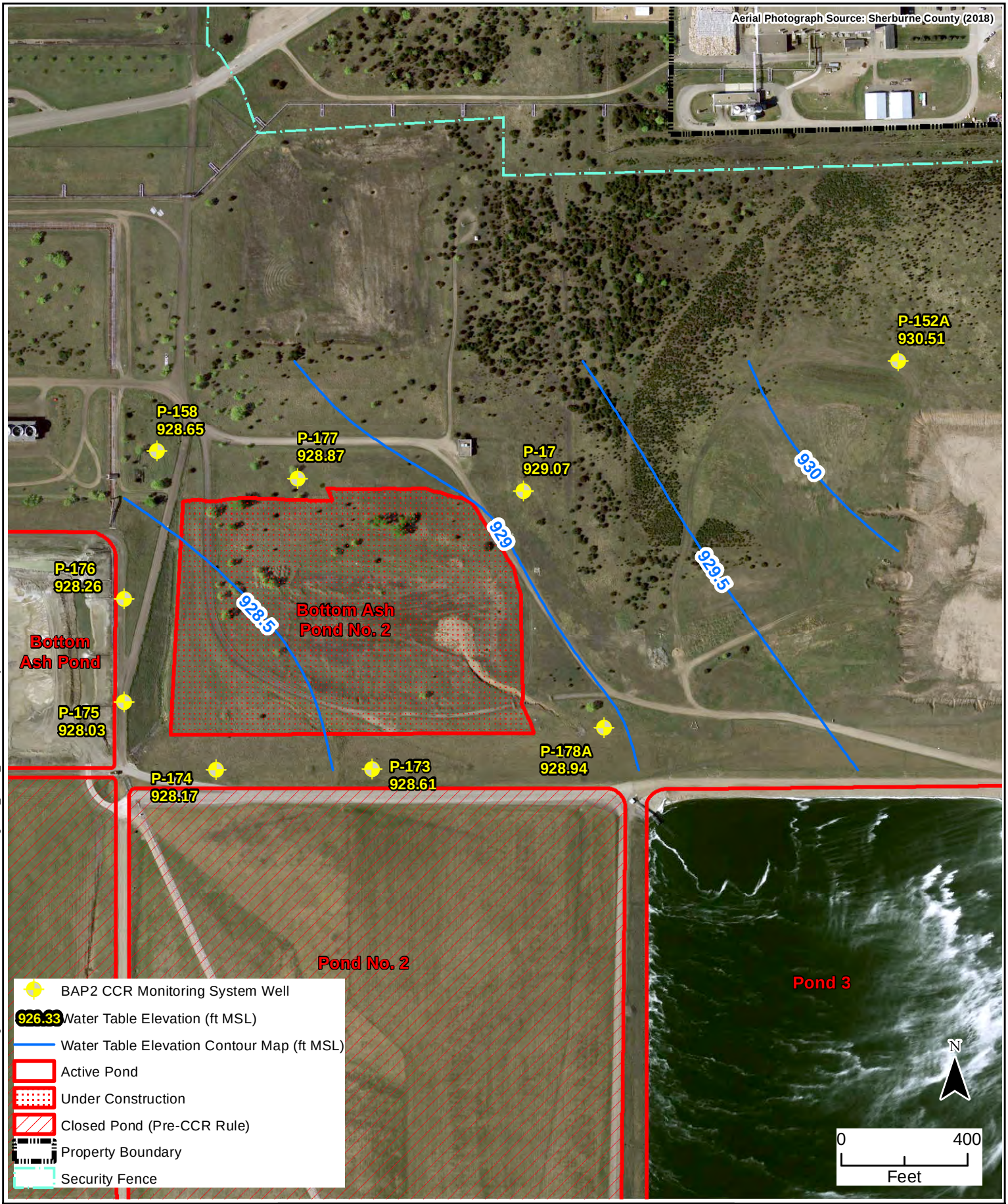
Daniel J. Riggs, PE
License No. 49559

September 29, 2020
Date

References

Carlson McCain, 2019. Phase II Hydrogeologic Investigation Report and Phase II Water Monitoring System Work Plan, April 2019.

Carlson McCain, 2020. 257.74(c) Construction Plans, Bottom Ash Pond 2 Construction. Prepared by Carlson McCain Inc., September 2020.



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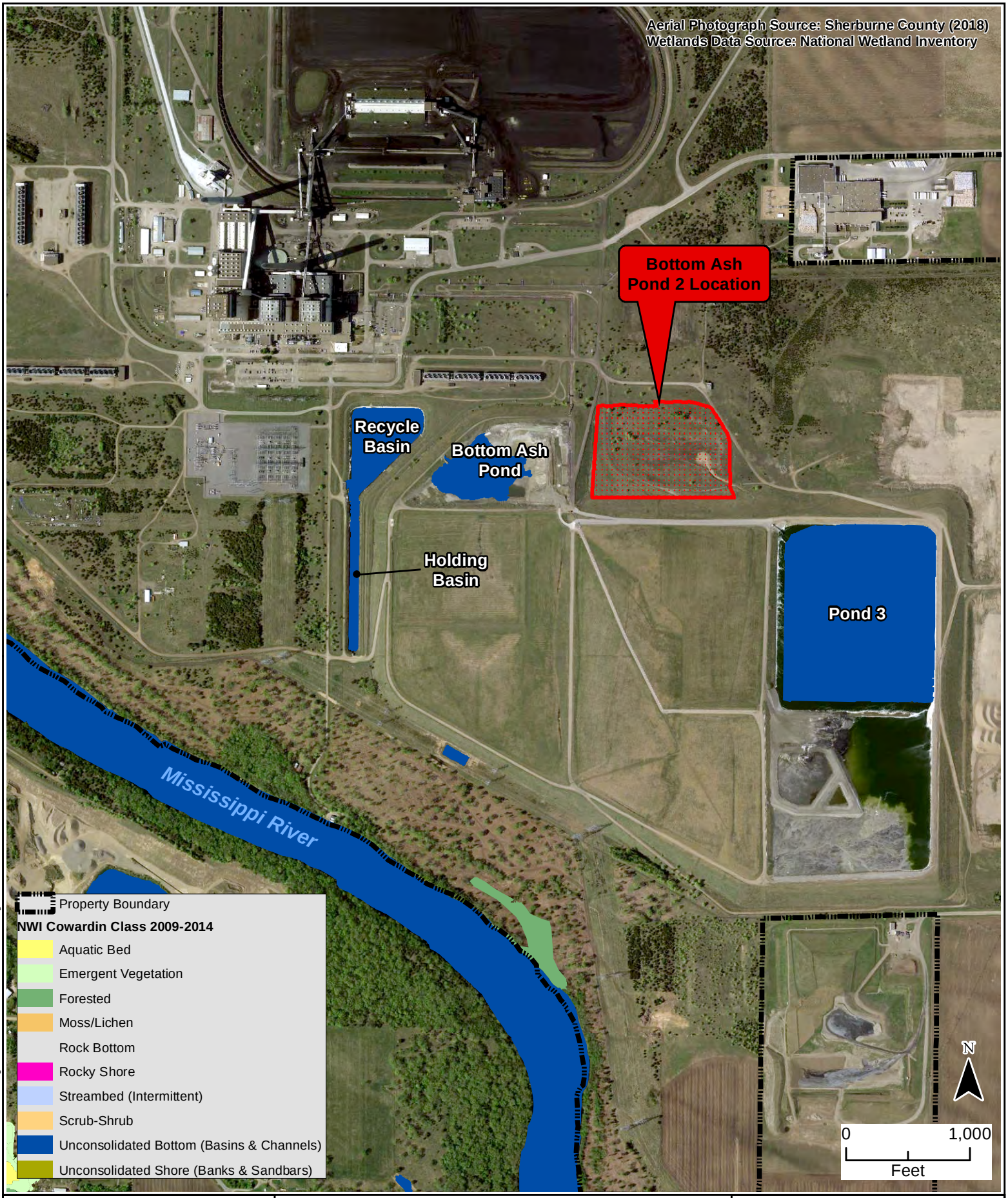
CCR LOCATION DOCUMENTATION REPORT
Bottom Ash Pond 2
Sherburne County Generating Plant
Becker, Minnesota

FIGURE 1
WATER TABLE ELEVATION CONTOUR MAP (05/26-27/2020)



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CCR LOCATION DOCUMENTATION REPORT

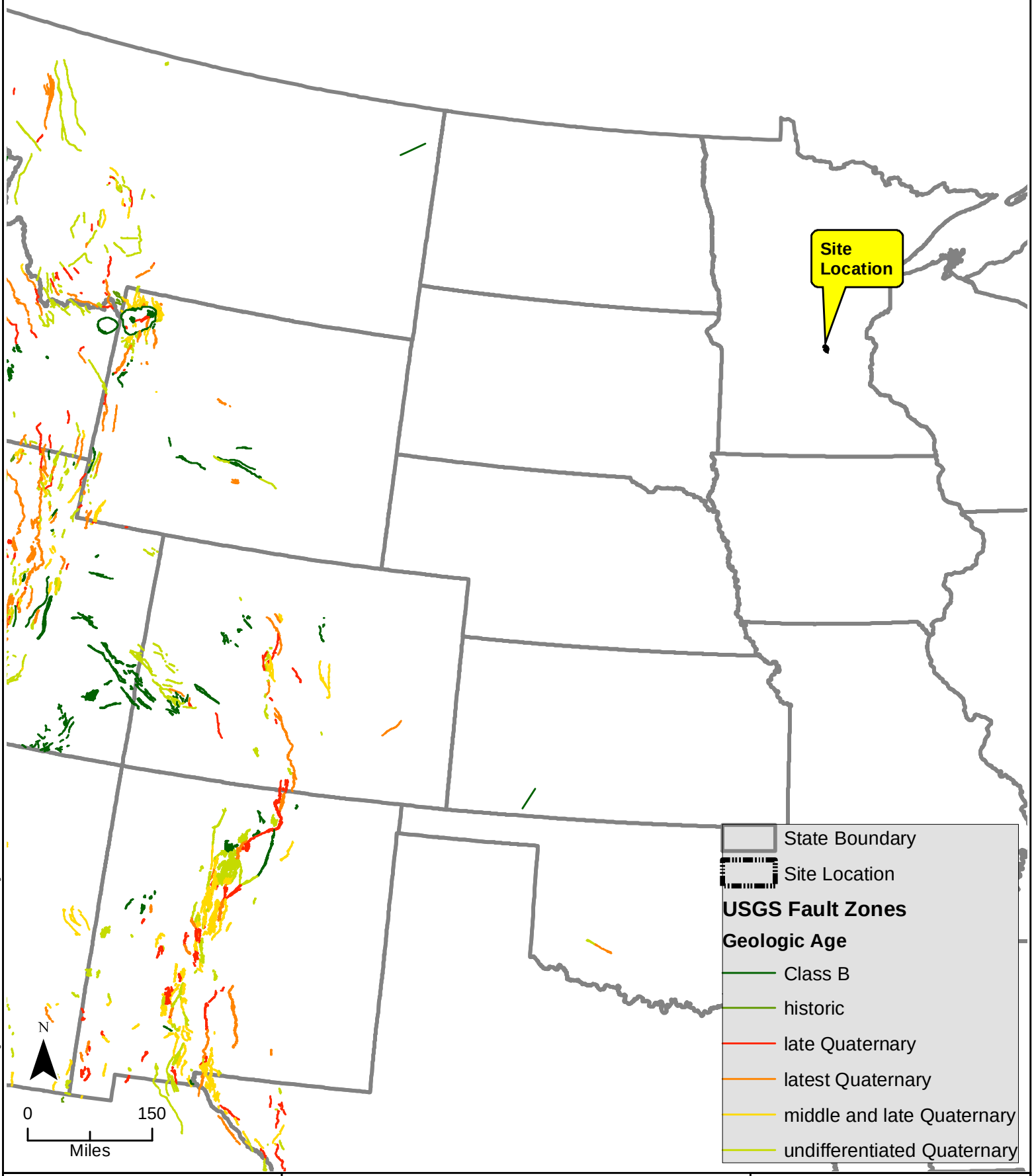
Bottom Ash Pond 2

Sherburne County Generating Plant
Becker, Minnesota

FIGURE 2

CFR §257.61
WETLANDS

Source: USGS Quaternary Faults and Folds Database



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CCR LOCATION DOCUMENTATION REPORT
Bottom Ash Pond 2
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FIGURE 3
CFR §257.62
FAULT AREAS

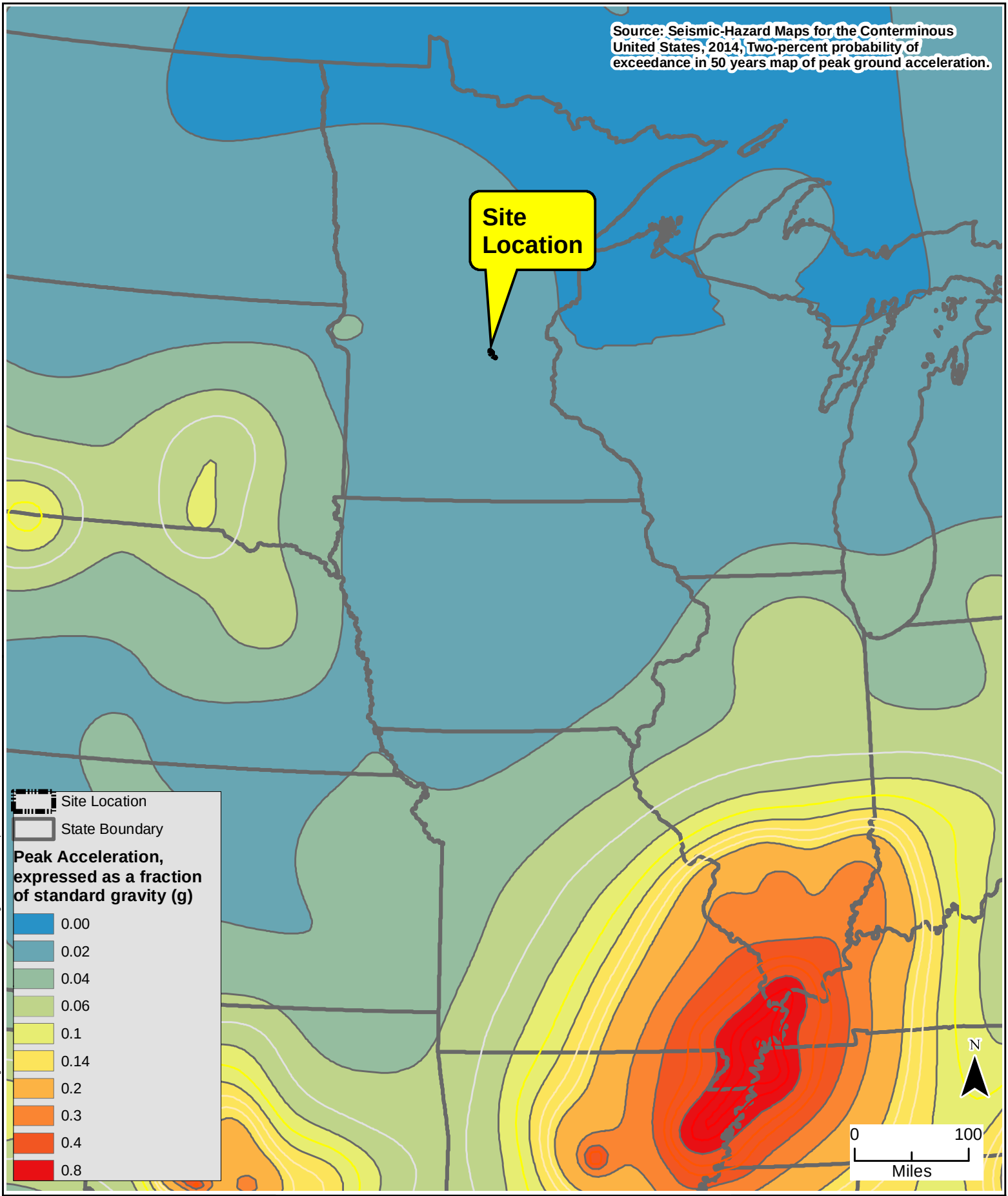

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FIGURE 4
CFR §257.63 SEISMIC IMPACT ZONES