ENCLOSURE 2

Phase 1 Archaeological Investigations for the Proposed Expansion of the Independent Spent Fuel Storage Installation and Associated Infrastructure at the Prairie Island Nuclear Generating Plant Goodhue County, Minnesota

Prepared by

Westwood Professional Services
Eden Prairie, MN

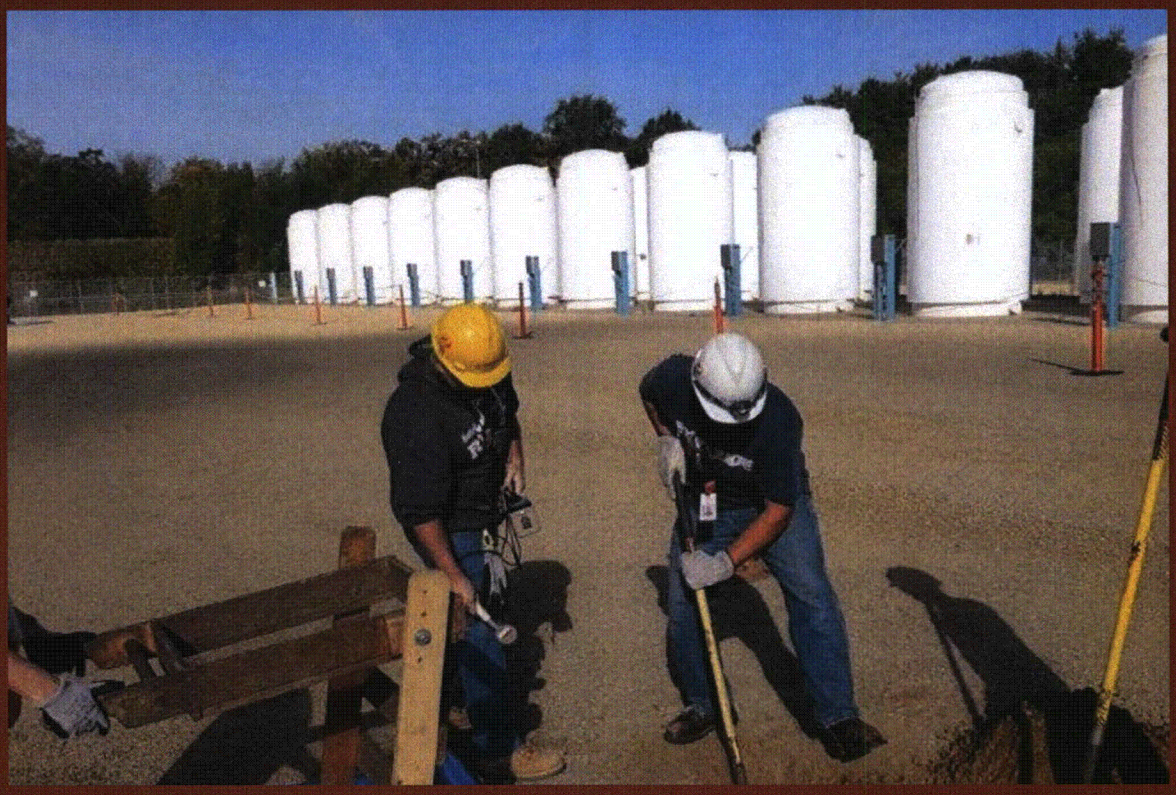
27 pages follow

PHASE I ARCHAEOLOGICAL INVESTIGATIONS

Proposed Expansion of the Independent Spent Fuel Storage Installation and Associated Infrastructure

Prairie Island Nuclear Generating Plant, Goodhue County, Minnesota

December 1, 2014



Prepared For:

Northern States Power MN, d.b.a. Xcel Energy
Prairie Island Nuclear Generating Plant
1717 Wakonade Drive East
Welch, MN 55089-9642

Prepared By:

Westwood

Phase I
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Goodhue County, Minnesota

Prepared for:
Northern States Power MN, d.b.a Xcel Energy
Prairie Island Nuclear Generating Plant
1717 Wakonade Drive East
Welch, MN 55089-9642

Prepared by:
Ryan P. Grohnke
Westwood Professional Services
7699 Anagram Drive
Eden Prairie, MN 55344
952-937-5150

Amanda Gronhovd, MS, RPA
10,000 Lakes Archaeology, Inc.
220 9th Ave South
South Saint Paul, MN 55075
612-670-6431

Project Number: R0003135.00

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MANAGEMENT SUMMARY

Northern States Power MN d.b.a. Xcel Energy (Xcel) is proposing to expand the Independent Spent Fuel Storage Installation (ISFSI) with associated infrastructure at the Prairie Island Nuclear Generating Plant in Goodhue County, Minnesota. To support the proposed expansion, Xcel contracted with Westwood Professional Services (Westwood) to conduct a Phase I Archaeological Survey of the proposed project area. Amanda Gronhovd from 10,000 Lakes Archaeology, Inc. served as Principal Investigator for the project.

The Phase I survey was conducted to ascertain if the project will impact any significant archaeological resources in the project's Area of Potential Effect (APE). The APE for this project was all locations where ground disturbing activities could occur. Fieldwork, consisting of shovel testing, was performed in September 2014. Additionally, soil cores were evaluated to a depth of ten feet to determine if paleosols and potentially deeply buried archaeological deposits might be present within the APE. No archaeological sites or paleosols were identified during the survey.

Based on the results of the fieldwork, it is recommended that a determination be made that no significant archaeological resources are located within the proposed project area, and that no additional archaeological investigations are required in the current APE.

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1.0 INTRODUCTION

Northern States Power MN d.b.a. Xcel Energy (Xcel) retained *Westwood Professional Services, Inc.*, (Westwood) to conduct a Phase I Archaeological Survey of locations associated with the proposed expansion of the Independent Spent Fuel Storage Installation (ISFSI) at Prairie Island Nuclear Generating Plant (PINGP). The project area is located in section 5 of Township 113N, Range 15W, Goodhue County, Minnesota (**Exhibit 1**).

The ISFSI houses spent nuclear fuel storage casks within security fencing and a berm. The proposed project will install an additional concrete pad to allow for expanded cask storage. The new pad is expected to be located south of the existing storage pads and within the secured area. Additional support facilities including a concrete turn-around area and a cask transporter storage facility are also proposed within the PINGP grounds, but outside the ISFSI (**Exhibit 1**).

The project is being conducted in support of the potential expansion of the ISFSI and *anticipated* future Section 106 review. Representatives of the U.S. Nuclear Regulatory Commission (NRC) and the Prairie Island Indian Community (PIIC) Tribal Historic Preservation Office (THPO) were afforded an opportunity to comment on the scope of work prior to field investigations and were present during field investigations.

This Phase I Archaeological Survey will help determine whether cultural resources are present within the proposed project area, and whether these resources are potentially eligible for the National Register of Historic Places (NRHP). Amanda Gronhovd from 10,000 Lakes Archaeology served as Principal Investigator. Ms. Gronhovd meets the Secretary of the Interior's professional qualification standards as stipulated in 36 CFR 61. Ryan Grohnke from Westwood acted as Project Manager and Project Archaeologist.

2.0 SCOPE OF WORK

Archaeologists conducted Phase I Archaeological Reconnaissance Surveys at the proposed project area to determine whether archaeological sites were present within the proposed project's Area of Potential Effect (APE) and, if present, to define the boundaries of any sites located. If archaeologists identified sites during the survey, information would be gathered to determine the impacts of the proposed construction on the site and provide recommendations on avoidance or additional work.

The APE for archaeology for this project was all locations that would potentially be physically impacted by construction. Four locations were identified as the APE for this project, including the proposed concrete pad within the ISFSI, two possible locations for a cask transporter storage facility, and a concrete pad turn around area (**Exhibit 1**).

Ground disturbing activities considered the effects of the proposed project on archaeological resources within the top several feet of soil, as well as paleosols (buried soils). Paleosols are older land surfaces which have been buried, in this case due to alluvial deposition. It is possible for evidence of human occupation to exist in paleosols. A geological investigation at a portion

of Prairie Island in 2009, outside of the current project area and APE, identified the presence of a paleosol between 2.5 and 10 feet below the modern ground surface (Hudak 2009).

3.0 METHODOLOGY

The proposed project area was examined using background research, a literature review, and field survey which consisted of subsurface shovel testing and the examination of deep soil cores. The environmental background and historic contexts were examined to assess the probability and types of sites that might be identified.

The background research and literature review consisted of an examination of files at the Office of the State Archaeologist (OSA) located at Fort Snelling, and the Minnesota State Historic Preservation Office (SHPO) located at the Minnesota History Center, both in St. Paul, MN. Included in the review were site maps, archaeological site forms, burial files, and survey reports. Other sources examined included the Historic Andreas Atlas, Trygg Maps, and county histories and plat books. The background research and literature search assisted in identifying previous cultural resource investigations and previously recorded archaeological sites, along with levels of disturbance and potential for sites within the APE.

Shovel tests were excavated at each of the four APE locations. Shovel testing consisted of excavating 30-35 centimeters (11.8-13.8 inches) diameter holes as deep as possible with a shovel (generally 80-100 centimeters below surface [cmbs]). When shovel excavation was no longer feasible, a bucket auger was used to a depth of approximately 195 cmbs. All materials removed from the shovel and bucket auger tests were screened through ¼-inch mesh hardware cloth. Detailed field notes, including soil profiles, were recorded during field investigations.

Due to governing policies established by Xcel, Westwood personnel were not allowed to excavate on-site. All shovel tests and bucket auger tests excavated during this investigation were dug by Xcel personnel or their sub-contractors. An archaeologist screened the soils and examined the materials removed from the shovel tests, and studied the soil profiles.

Deep soil cores were taken at six of the shovel test locations following the completion of the shovel and bucket auger tests. The soil cores started at the point where the bucket auger had finished, approximately 195 cmbs (6.4 feet) and were evaluated to 305 cmbs (10 feet). An archaeologist examined the soil cores for evidence of a paleosol.

4.0 CULTURAL HISTORY

Minnesota SHPO has developed archaeological contexts for Minnesota and the Upper Midwest. These contexts are based on years of prehistoric and historic research in the region, in order to examine Minnesota's historic (Contact and Post-Contact) and prehistoric (pre-contact) past. They are a general description and interpretation of the history of Minnesota. They give basic observations of current theories relating to prehistoric and historic people from different locations throughout the history of Minnesota.

The Pre-Contact period is focused solely on Native American peoples before the arrival of Euro-Americans. This period is divided into four traditions: Paleoindian, Archaic, Woodland and Plains Village, and Mississippian/Oneota. These traditions are defined, and sub-defined by changes in technology and food sources exploited.

The cultural histories focused on the interaction of American Indians and Euro-Americans are divided into the Contact and Post-Contact periods. These contexts range from the first contact between Europeans and American Indians during European exploration in the region (Contact), through Euro-American settlement of traditionally American Indian lands (Post-Contact).

4.1 PRE- CONTACT

Paleoindian Tradition (12,000 to 8,000 Before Present [B.P.])

The earliest evidence of humans in North America dates to the period during which approximately half of the continent was covered by a glacial ice sheet. As the glaciers melted, people moved south and eventually spread throughout the entirety of the Americas (Dobbs 1990). Archaeological evidence suggests that Paleoindian people lived in small, nomadic groups, making sites of this period relatively uncommon and difficult to locate (Frison 1998). During the Pleistocene, megafauna, such as mammoth and mastodon, also roamed the land.

Paleoindian communities were small, and known best for hunting large megafauna including mammoth, mastodon, and *Bison antiquus* - an extinct bison up to one-third larger than modern bison (Frison 1998). By 11,000 years B.P. mammoth, and other megafauna, were extinct possibly due to a warming environment and human overkill. Thus, the Paleoindians shifted their hunting focus to bison, the next largest mammal (Frison 1998). Evidence also suggests that these people not only hunted megafauna and large mammals, but exploited other food sources such as fish, berries, nuts, and small mammals (Tankersley 1998).

As the environment warmed, the glaciers melted, creating glacial lakes, including Lake Agassiz, Lake Superior, and other smaller lakes. As these lakes drained, their water cut river valleys, and modern vegetation began to grow.

Archaeologists often identify Paleoindian sites based on their artifacts. The earliest Paleoindian spearpoints are easily identified by a distinctive flute down both sides. During the middle to late Paleoindian period lanceolate, nonfluted points replace fluted points. The earliest of the fluted point style is known as the Clovis point, dating from 12,000 – 11,000 years B.P. (Justice 1987). The original Clovis point was recovered from the Blackwater Draw site and named after the nearby town of Clovis, New Mexico. The spearpoints from Blackwater Draw were found in direct

association with late Pleistocene fauna including Columbian mammoth, horse, camel, bison, and saber-tooth cat (Dobbs 1990).

Following the Clovis point is the Folsom point, differentiated from Clovis by a decrease in length and an increase in the length of the flute. Dates of the Folsom Complex last from approximately 11,000 – 10,200 years B.P. (Hofman 1995). The Folsom point and type site is named after the city of Folsom, New Mexico, where a Folsom projectile point was recovered with the ribcage of the now extinct species of bison, *Bison antiquus* (Dobbs 1990).

The Late Paleoindian period generally begins toward the end of the Folsom Complex and lasts to the beginning of the Archaic Period. Late Paleoindian technology is marked by a change from the distinctive Folsom style to nonfluted, unnotched, and finely flaked lanceolate points which continue in the archaeological record until the end of the Paleoindian Tradition (Dobbs 1990).

Archaic Tradition (8,000 to 2,800 B.P.)

Evidence suggests that Archaic people lived in small groups occupying seasonal camps, much like their Paleoindian predecessors (Jones et.al. 2003), although some research counters this belief, suggesting that community size increased and groups became more sedentary (Dobbs 1990). The major innovations differentiating the Archaic from the Paleoindian people include a change in projectile point technology, the invention of groundstone tools, and a change in subsistence strategies. The Archaic Tradition is also noted for the development of regional differences (Anfinson 1987).

By 8,000 years B.P. both the glacial ice sheet and Lake Agassiz had receded into Canada. The post-Pleistocene climate had become more stable, but still fluctuated more than in modern times. Fluctuating precipitation and temperature brought significant changes in the vegetation creating more specific biomes (Dobbs 1990).

Subsistance during the Archaic Period focused on bison, deer, and small mammals. Some archaeologists believe that Archaic people became more regionalized partly due to the major environmental biomes which allowed people to perfect the exploitation of local raw material and food sources (Dobbs 1990).

The Archaic Tradition technology is marked by a change from lanceolate projectile points to notched and stemmed points with diminishing flaking quality. Archaic people also begin to use native copper, and groundstone

tools made by grinding, polishing, and pecking igneous, and metamorphic rocks such as granite and basalt (Anfinson 1987).

Copper artifacts dating to the Archaic Tradition have been recovered throughout Minnesota. The use of copper begins approximately 7,000 years B.P. and persists until approximately 3,500 years B.P. The copper is found in large glacial drift nodules in the region and prehistoric copper mines have been located on Lake Superior's Isle Royale (Dobbs 1990).

As with Minnesota's Paleoindian sites in Minnesota, Archaic sites are few and far between. Sites have been destroyed or buried by various natural geologic processes, making these sites difficult to discover. As of 1990, of the few Archaic sites located, even fewer had been excavated, making it difficult to understand the Archaic Tradition in Minnesota (Dobbs 1990).

Woodland Tradition (2,800 B.P. to European Contact)

The Woodland Tradition is generally divided into three periods throughout the Midwest. These periods are Early Woodland, Middle Woodland, and Late Woodland; although Anfinson (1987) has suggested a division of Initial Woodland and Terminal Woodland for Minnesota. Current research suggests that these divisions can be further divided into Brainerd, Southeast Minnesota Early Woodland, Havana Related, Laurel, Fox Lake, and Lake Benton. The multiple contexts describing the Woodland period are a result of increased regionalization of the Woodland people (Anfinson 1990).

The Woodland Tradition is marked by the emergence of ceramic pottery vessels and the appearance of earthen burial mounds. Ceramics during the Early Woodland period are normally thick and crude with cord-marked decoration on the exterior. Middle Woodland shows early evidence of earthen burial mounds. Late Woodland continues the tradition of ceramics and burial mounds, but ceramic decorations and styles become more refined and regionalized (Anfinson 1990).

The Woodland people exploited similar food sources to their Archaic ancestors. Bison, deer, and small mammals were still major food sources, and plants, such as wild rice, were exploited more heavily than in previous times. There is also evidence of maize and squash cultivation (Dobbs 1990).

Woodland sites are the most common type of precontact archaeological site recorded in Minnesota. This is possibly due to larger, increasingly sedentary communities. Woodland habitation sites tend to be located on prominent land features and close to water, while burial mounds and cemetery sites often overlook lakes and river valleys.

Plains Village & Mississippian/Oneota Traditions (1,100 B.P. to European Contact)

Significant changes in subsistence and settlement patterns characterize the Plains Village and Mississippian/Oneota cultures in Minnesota. The people of this period continued to create ceramic vessels and earthen burial mounds. Populations became larger and even more regionalized than previously. These traditions last from the end of the Terminal Woodland Tradition to first contact with European explorers (Anfinson 1987).

Evidence suggests that the Plains Village Tradition developed out of the Woodland Tradition. The development of the Mississippian/Oneota Traditions are still unclear, possibly a development of people migrating from other areas to the Midwest. Another possibility is the regionalization of groups allowed a people to create distinctive ideas, and life-ways (Anfinson 1987).

The Plains Village and Mississippian/Oneota Traditions span the time of the Little Ice Age. The Little Ice Age is marked by cooler winter temperatures than current and slightly warmer summers. Vegetation at this time is approximately equivalent to the vegetation at the time of the first European explorers (Dobbs 1990).

The Plains Village and Mississippian/Oneota focused heavily on bison for a food source. Corn horticulture also intensified as people limited the number of plant species they exploited and became more regionalized. Perhaps the intensification of corn horticulture is a response to larger community size.

The site types assigned to the Plains Village and Oneota complexes are similar to the Woodland Tradition and the archaeological remains of these complexes range from large cemeteries to small burials; limited use sites to extensive habitation sites. Site location is also consistent with the previous period, and depends on numerous factors including the location of specific resources the people were using or the presence of a particular desirable environment.

4.2 CONTACT

Contact/Post-Contact Period (1630 to Present)

This period generally refers to the span of time extending from the first European explorations until intensive Euro-American settlement of the region. Minnesota's historical period began in 1673 when French explorers Marquette and Joliet discovered the upper portion of the Mississippi River. Ten years later, Catholic Missionary Father Louis Hennepin returned to

France to write the first book about Minnesota, *Description de la Louisiane*, telling his story of exploring Minnesota and being held captive by the Dakota Indians.

The territory containing modern-day Minnesota was claimed by Spain, France, Great Britain, and eventually the United States. Lieutenant Zebulon Montgomery Pike led the first United States expedition through Minnesota in 1805. Fort St. Anthony (later Ft. Snelling) was completed between 1819 and 1824, and in 1836 the Wisconsin Territory including a portion of Minnesota, was formed. Minnesota became a territory in 1849 and achieved statehood on May 11, 1858. The fur trade drove much of the European exploration and settlement in Minnesota through the mid-1800s.

While the fur trade impacted the American Indian communities throughout all of Minnesota, European settlement in the area exploded after the 1860s. As white settlers made Minnesota their home, farming became the predominant industry. Wheat was the cash crop, and mills spring up along major waterways across the state, notably in Minneapolis. Minnesota dominated the world in wheat processing until the 1930s.

In addition to milling, Minnesota was also a leader in lumbering and iron mining. Lumbering played a significant role in the development of northern Minnesota, with the industry peaking between 1899 and 1905, and iron mining began affecting the state's economy in 1884 when the Soudan Mine began shipping ore. The development of the Soudan Mine opened the Vermilion Iron Range, Minnesota's first of three iron ranges, and over the next two decades mines sprang up across the northern and central portions of the state. The Mesabi, Cuyuna, and Vermilion Iron Ranges employed thousands of people and brought millions of dollars into Minnesota's economy.

In Southern Minnesota this period is marked by an agricultural economy. Railroads built lines across the region to transport goods to and from major markets like Minneapolis/St. Paul, Chicago and Sioux City.

Possible archaeological site types associated with this period are generally consistent with those of earlier periods, but the influence of European and Euro-American traders, missionaries, settlers, and industries affected the locations of these sites. This period also includes the settlement patterns, subsistence activities, and economic strategies employed by Euro-American immigrants beginning in the mid-19th century. Associated archaeological and historic site types categorized in the Contact/Post-Contact period include standing structures as well as archaeological sites.

Prairie Island Indian Community

The native people of the Prairie Island area are members of the Mdewakanton ("those who were born of the waters" or "Dwellers of the Spirit Lake") Band of Eastern Dakota. The Mdewakanton are one of the seven bands of the Oceti Sakowin – the Seven Council Fires. The Oceti Sakowin consisted of seven groups of people connected by a common culture and language. This alliance is generally referred to now as the Sioux. The name comes from the Ojibwa na-towe-ssiwa which means "lesser adders" or "lesser poisonous snakes". This is how the Ojibwa named the Sioux to the first French with which they dealt. The French gave it the spelling of Naudoweissious which was later shortened to Sioux and adopted in usage by English speakers. The peoples refer to themselves as Dakota, Nakota or Lakota which means "allies" (PIIC 2014).

Prairie Island was used as a summer camp for hunting, fishing, gathering, and agriculture. The Mdewakanton had made multiple treaties with the U.S. Government between 1805 and 1863. The Prairie Island Mdewakanton lived in the Prairie Island area for generations before ceding much of their land to the U.S. government in 1851. This treaty stipulated that the Prairie Island Mdewakanton retained a strip of land ten miles wide, between Little Rock and Yellow Medicine, on both sides of the Minnesota River. A subsequent treaty signed in 1858, however altered this agreement and resulted in the allotment of 80-acre parcels to the heads of each family, and selling of the remainder of the land (Indian Affairs Council 2012).

This dramatic shift in lifeways resulted in widespread starvation and poverty. Although the treaties stated that the United States government would pay annuities for the land ceded in the treaties, these payments were not being made. The resulting tensions caused by extreme hardship, starvation, and poverty inflicted on the Dakota across Minnesota led to the outbreak of the U.S. - Dakota Wars of 1862 (Gronhovd and Buck 2011). Ultimately, many Dakota and white settlers were killed during the war, and 38 Dakota were hanged in Mankato in December 1862 by order of President Lincoln (Gronhovd, et al, 2006). In April of 1863, the U.S. Congress abolished the reservations and all Dakota were banished from Minnesota.

In 1891, after several decades with no tribal home, the Secretary of the Interior created the Prairie Island Indian reservation by purchasing approximately 120 acres of land which were given to individual Mdewakanton Sioux members who were living on Prairie Island (PIIC 2014). Subsequent purchases further expanded the reservation boundaries, however, much of the tribe's land was flooded by the construction of a lock and dam system built in 1938. Today the Prairies Island Indian Community has over 3,000 acres of land and water as well as additional land off the reservation. PINGP, where the current project area is located, is adjacent to the Prairie Island Indian Community (Indian Affairs Council 2012).

5.0 RESULTS OF INVESTIGATIONS

The project area is located in Goodhue County in SHPO Region 3e, Southeast Riverine East. In this region, precontact base camps would have been located on river terraces, while temporary camps would have been located near rivers and streams. Mounds would have typically been situated on hills near the base camps (Anfinson 1990).

Environmental Background

Geomorphology

The project study area is located in the Blufflands subsection of the Paleozoic Plateau Section of the Eastern Broadleaf Forest Province (MNDNR 2014). This subsection consists of an ancient plateau covered by loess deposits that has been significantly eroded in areas located near rivers and streams. Dissected landscapes are characteristic of the area with bluffs and stream valleys. The immediate project area is located on an island terrace on the west bank of the Mississippi River.

Soils

Most of the soils in the area of the Blufflands subsection includes Udalfs with some Aquents along the floodplains of major rivers (MNDNR 2014). The soils within the APE are Sparta loamy sands. This is an excessively drained soil and is characterized as loamy sand and sand (USDA 2013).

Pre-Settlement Vegetation

Historically, the project area was prairie, wet prairie and river bottom forest (Marschner 1974). Prairie in this region was generally tallgrass (MNDNR 2014). River bottom forest could include Elm, Ash, Cottonwood, Boxelder, Oaks, Basswood and others.

Current Land Use

The project area is located within the grounds of the Prairie Island Nuclear Generating Plant. Much of the immediate area has been previously impacted by the construction of the plant and its infrastructure.

Literature Review

Westwood Cultural Resource Scientist Ryan P. Grohnke conducted a literature review at the offices of the MN SHPO and OSA on September 17, 2014. Although several archaeological sites are located within one- mile of the project, few cultural resources surveys have been conducted in the vicinity of the proposed project area. A single "limited" archaeological reconnaissance survey of the entire Prairie Island facility was conducted by Merjent in 2010 (Boden et al. 2010). Westwood has conducted several archaeological surveys of discrete areas within the PINGP since the Merjent survey, including Phase I archaeological testing in the general vicinity of the ISFSI in 2010 during preparation of the ISFSI License Renewal Application (Sather 2010).

The 2010 Merjent report noted that the locations of the proposed turn around area and cask transport storage facility have been heavily impacted by historic/modern activities and "the potential for older archaeological resources is limited" (Boden et al. 2010: pp. 52). Additionally, the Merjent report also noted the heavy disturbance associated with the ISFSI construction, but was not certain of the depth of disturbance.

No previously recorded archeological sites have been identified in the APE for the current project. Fourteen archaeological sites are recorded within one mile of the project area. The sites and their description are listed in **Table 5-1** below. Site 21GD0002, the Bartron Site, is listed on the National Register of Historic Places (NRHP) while 21GD0148, the Cooling Tower Site has been determined eligible for listing on the NRHP.

Table 5-1: Previously Recorded Archaeological Sites

Site Number	*Site Name*	*Site Type*
21GD0002	*Bartron Site*	*Artifact Scatter*
21GD0058/61	*Birch Lake Mounds/Prairie Island Mounds II*	*Earthworks/Cemetery*
21GD0059	*NSP II*	*Earthworks*
21GD0060	*Vergil Larson Mounds I*	*Earthworks, Artifact Scatter*
21GD0062	*Birch Lake Mound*	*Earthworks*
21GD0064	*Amos Owen Mound*	*Earthworks*
21GD0148	*Cooling Tower*	*Artifact Scatter*
21GD0149	*Substation*	*Artifact Scatter*
21GD0207	*Dike*	*Artifact Scatter*
21GD0277	*Indian Slough Mound*	*Earthworks*
21GD0278	*Otto Phlika Farm*	*Artifact Scatter*
21GD0279	*Kuhns Farmstead*	*Artifact Scatter*
21GD0280	*Reliance Stove Door*	*Artifact Scatter*
21GDI	*Vergil Larson Mounds II*	*Earthworks*

Field Investigations

Field work was conducted on September 23 and 24, 2014. Archaeological field work was performed by Principal Investigator Amanda Gronhovd and Cultural Resource Field Director Ryan P. Grohnke. Chris Powers from Haugo GeoTechnical Services excavated the deep soil cores. Fifteen shovel tests and six soil cores were excavated (**Exhibit 2**). Shovel test notes/soil profiles are attached as **Appendix A**. Michael Bergervoet, the Prairie Island Indian

Community THPO; Jean Trefethen, NRC Project Manager; and Erin Hudson, archaeologist with the Louis Berger Group who is assisting the NRC with the Environmental Assessment, were present as observers.

Shovel tests were excavated as deep as Xcel personnel were able to dig, generally between 80-100 cmbs (31.5-39.4 inches). When shovel testing ceased, a bucket auger was used to continue excavation to approximately 195 cmbs (6.4 feet). All soils from the shovel tests and bucket augers were screened. Certain testing locations were chosen for soil cores to search for possible paleosols. The soil cores were placed into holes already excavated for the shovel tests at locations #1, 5, 9, 12, 14 and 15 (**Exhibit 2**).

Ten shovel and auger tests (Test #s 1-10) were conducted within the APE inside of the ISFSI for the proposed concrete pad (**Exhibit 2**). This area is a highly secure area surrounded by a large earthen berm and capped with Class V gravel. Tests were placed 15 m apart. Generally all soils were sand that became lighter in color the deeper the soils were excavated. No artifacts were recovered. Soil cores were conducted at shovel test locations #1, #5 and #9. No evidence of paleosols was observed.

Three shovel and auger tests (Test #s 11-13) were conducted within the APE for the proposed turn around area (**Exhibit 2**). This area is an existing road way. Tests were placed 15 m apart. Generally all soils were sand that became lighter in color the deeper the soils were excavated. No artifacts were recovered. A soil core was conducted at shovel test location #12. No evidence of paleosols was observed.

Two shovel and auger tests (Test #s 14-15) were conducted within the APE for the two proposed locations for the cask transporter storage facility (**Exhibit 2**). This area is located immediately east of the ISFSI on the north and south sides of the ISFSI access road in an undeveloped grass covered location. Generally all soils were sand that became lighter in color the deeper the soils were excavated. No artifacts were recovered. Soil cores were conducted at both shovel test locations (# 14 and #15). No evidence of paleosols was observed.

6.0 SUMMARY AND CONCLUSION

No archaeological properties were identified within the defined APE as a result of these investigations. Additionally, no evidence of paleosols was observed in the deep soil cores. Westwood and 10,000 Lakes Archaeology recommend that no additional archaeological investigations are warranted in the current project area and that the project be allowed to proceed as planned.

Westwood and 10,000 Lakes Archaeology stress that if any construction plans are altered to include areas that were not previously surveyed, these locations should be examined for cultural resources. Further, if human remains are encountered during construction activities, all ground disturbing activity must cease and local law enforcement must be notified. *Minnesota Statute 307.08, the Private Cemeteries Act, prohibits the intentional disturbance of human burials.*

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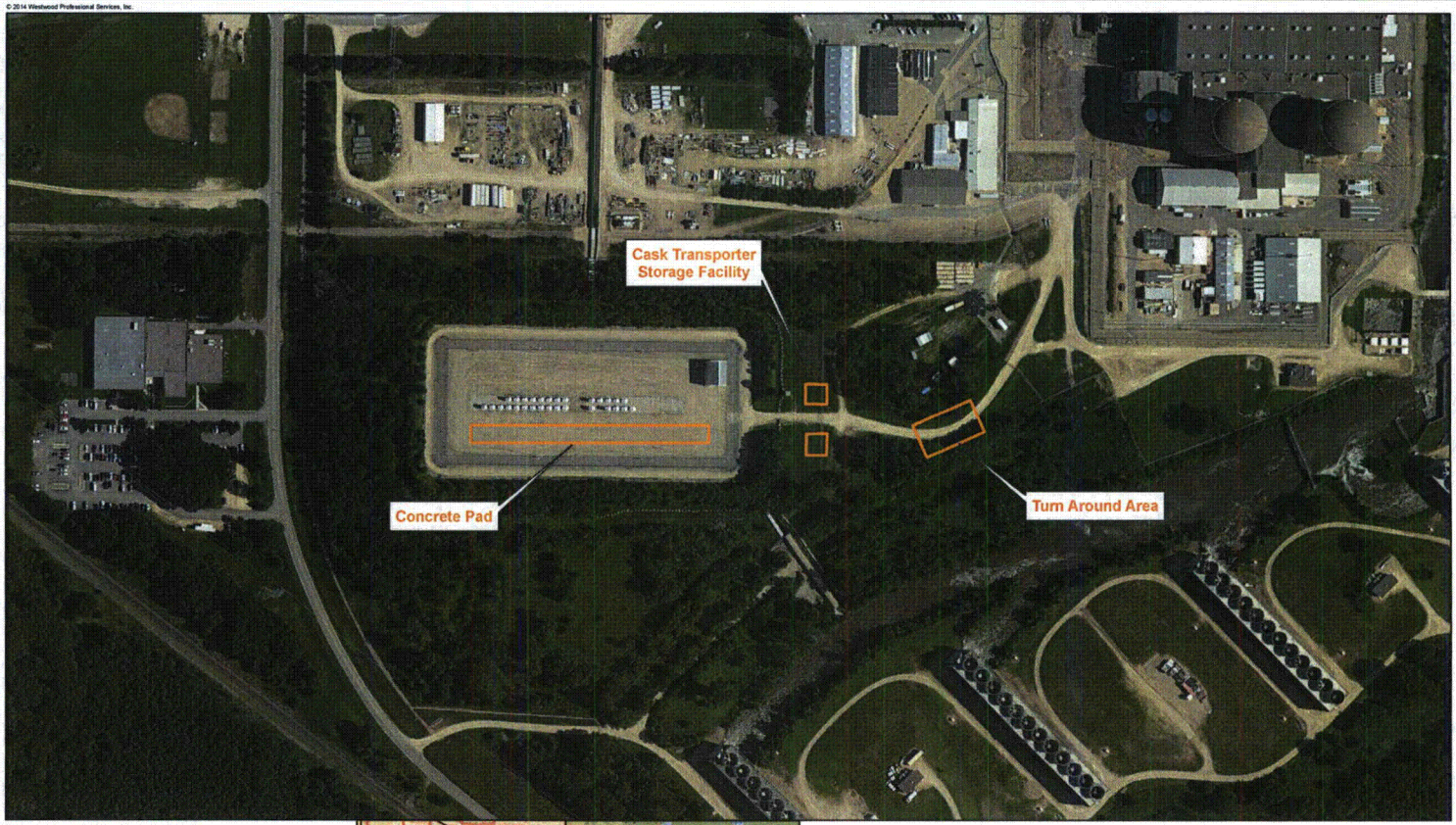


Data Source(s): Westwood (2014); ESRI Data Bank (2007); MnDOT (2003); ESRI WMS World Imagery, Streets, National Geographic (accessed 2014)

Westwood

Westwood Professional Services, Inc.
7699 Anagram Drive,
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-866-937-5150

www.westwoodps.com

N

0 200 Feet

Prairie Island ISFSI Archaeological Support

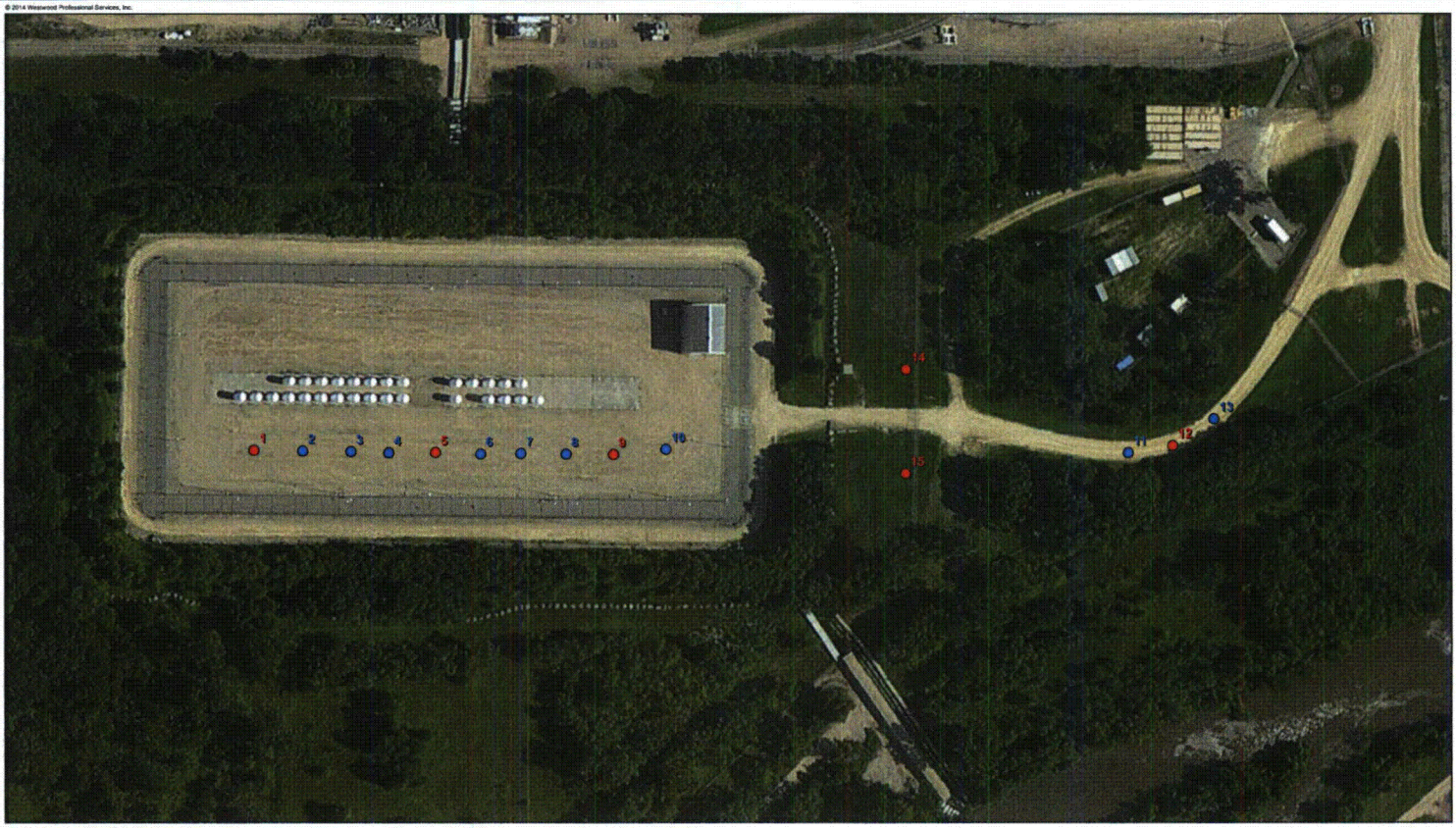
Goodhue County, MN

Legend

Area of Potential Effect

Project Location

EXHIBIT 1



Data Source(s): Westwood (2014), ESRI Data Bank (2007), MnDOT (2003), ESRI WMS World Imagery, Streets, National Geographic (accessed 2014)

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7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

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Legend

- Shovel Tests
- Shovel Test and Soil Core

Prairie Island ISFSI Archaeological Support

Goodhue County, MN

Shovel Tests and Soil Cores

EXHIBIT 2

APPENDIX

Shovel Test Count: 15

Appendix A
Shovel Test Notes
Prairie Island ISFSI Archaeological Support

Test #	Date	Location/Setting	Type	Depth (cm)	Description
1	9/23/2014	ISFSI	Shovel Test 0-115 cm	0-42	Class V gravel
				42-49	10 YR 3/3 - dark brown sand mixed w/gravel
				49-95	10 YR 4/4 dark yellowish brown sand
				95-115	10 YR 5/4 yellowish brown sand
			Bucket Auger 115-205 cm	115-205	light colored sands
			Soil Core 205-305 cm	205-305	light brown fine sands
2	9/23/2014	ISFSI	Shovel Test 0-85 cm	0-40	Class V gravel
			Bucket Auger 85-195 cm	40-apx 150	10 YR 3/3 dark brown sand
				150-195 m	gradually lightening sands
3	9/23/2014	ISFSI	Shovel Test 0-70 cm	0-50	Class V gravel
			Bucket Auger 70-197 cm	50-apx 150	10 YR 3/3 dark brown sand
				150-197	gradually lightening sands
4	9/23/2014	ISFSI	Shovel Test 0-82 cm	0-40	Class V gravel
			Bucket Auger 82-194 cm	40-apx 100	10 YR 3/4 dark yellowish brown sand
				100-194	gradually lightening sands
5	9/23/2014	ISFSI	Shovel Test 0-104 cm	0-36	Class V gravel
				36-44	sand/gravel mix
			Bucket Auger 104-200 cm	44-198	10 YR 3/3 dark brown sand
			Soil Core 200-305 cm	198-243	10 YR 4/4 dark yellowish brown sand
				243-290	10 YR 6/6 brownish yellow sand
				290-305	10 YR 6/8 brownish yellow sand

6	9/23/2014	ISFSI	Shovel Test 0-105 cm Bucket Auger 105-197 cm	0-40 40-197	Class V gravel 10 YR 3/4 dark yellowish brown sand gradually lightening to 10 YR 4/4 dark yellowish brown sand
7	9/23/2014	ISFSI	Shovel Test 0-80 cm Bucket Auger 80-196 cm	0-30 30-150 150-175 175-196	Class V gravel 10 YR 3/2 very dark grayish brown sand 10 YR 3/2, 3/3 and 4/4 mottled sands 10 YR 4/4 and 4/6 mottled dark yellowish brown sands
8	9/23/2014	ISFSI	Shovel Test 0-83 cm Bucket Auger 83-197 cm	0-40 40-197	Class V gravel 10 YR 3/2 very dark grayish brown sand mottled with 10 YR 3/4 dark yellowish brown sand

9	9/23/2014	ISFSI	Shovel Test 0-100 cm	0-40	Class V gravel
				40-44	10 YR 3/2 very dark grayish brown sand
				44-48	10 YR 4/4 dark yellowish brown sand
				48-57	10 YR 3/3 dark brown sand
				57-64	10 YR 4/4 dark yellowish brown sand
			Bucket Auger 100-193 cm	64-150	10 YR 3/3 dark brown sand
				150-193	10 YR 4/3 brown sand
			Soil Core 193-305 cm	193-202	10 YR 4/3 brown sand with gravel
				202-243	10 YR 5/4 yellowish brown sand mottled with 10 YR 4/6 dark yellowish brown sand
				243-292	10 YR 5/4 yellowish brown sand mottled with 10 YR 5/6 yellowish brown sand
				292-305	10 YR 6/6 brownish yellow sand
10	9/23/2014	ISFSI	Shovel Test 0-85 cm	0-42	Class V gravel
			Bucket Auger 85-193 cm	42-150	10 YR 3/2 very dark grayish brown sand. Concrete pieces observed at 65 cm. Wire and bolt observed at 80 cm. Much river cobble observed from 90-120 cm.
				150-175	10 YR 3/2 and 4/4 mottled sands
				175-193	10 YR 4/4 dark yellowish brown sands

11	9/24/2014	Turn around area	Shovel Test 0-70 cm	0-30	Class V gravel
			Bucket Auger 70-200 cm	30-190	10 YR 4/3 brown sand with some mottling. Bolts, brick fragments, nails and glass observed 175-190 cm.
				190-200	10 YR 4/4 dark yellowish brown sands
12	9/24/2014	Turn around area	Shovel Test 0-100 cm	0-48	Class V gravel
			Bucket Auger 100-204 cm	48-208	10 YR 4/4 dark yellowish brown sands with lots of gravel grading to 10 YR 5/8 yellowish brown sands
				208-244	10 YR 4/4 dark yellowish brown sand
			Soil Core 204-305 cm		
				244-249	10 YR 4/4 dark yellowish brown sand mottled with 10 YR 5/6 and 10 YR 5/8 yellowish brown sands
				249-290	10 YR 5/6 and 10 YR 5/8 yellowish
				290-305	10 YR 5/8 yellowish brown sand
13	9/24/2014	Turn around area	Shovel Test 0-70 cm	0-30	Class V gravel
				30-45	10 YR 3/2 very dark grayish brown sand
				45-50	10 YR 3/6 dark yellowish brown sand
			Bucket Auger 70-196 cm	50-apx100	10 YR 3/3 dark brown sands
				100-196	10 YR 3/3 dark brown sand transitioning to 10 YR 4/3 brown sand

14	9/24/2014	Cask Transporter Storage Facility	Shovel Test 0-85 cm	0-32	10 YR 3/2 very dark grayish brown sand
				32-36	10 YR 4/3 brown sand
			Bucket Auger 85-193 cm	36-188	10 YR 3/4 dark yellowish brown sand transitioning to 10 YR 4/4 dark yellowish brown sand with some mottling.
			Soil Core 193-305 cm	188-259	10 YR 5/4 yellowish brown sand
				259-295	10 YR 5/8 yellowish brown sand
				295-305	10 YR 6/6 brownish yellow sand
15	9/24/2014	Cask Transporter Storage Facility	Shovel Test 0-85 cm	0-28	10 YR 3/3 very dark brown sand with lots of gravel
			Bucket Auger 85-193 cm	28-88	10 YR 3/3 very dark brown sand with less gravel
				88-188	10 YR 5/4 yellowish brown sand grading to 10 YR 4/6 dark yellowish brown sand.
			Soil Core 193-305 cm	188-295	10 YR 5/6 yellowish brown sand grading to 10 YR 6/6 brownish yellow sand
				295-305	10 YR 6/6 brownish yellow sand