Report

Hazard Potential Classification Assessment - CCR Surface Impoundment 3B

MidAmerican Energy Company

Neal North Energy Center – Sergeant Bluff, Iowa

Revision 1
October 2021

Project I.D.: 18M014.00

Solving our clients' toughest science and engineering challenges.

Hazard Potential Classification Assessment

Project ID: 18M014.00

Prepared for

MidAmerican Energy Company

1151 260th Street
Sergeant Bluff, IA 51054

Prepared by

Foth Infrastructure & Environment, LLC

Revision 1
October 2021

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foth.com

Hazard Potential Classification Assessment
Table of Contents

Tables

Figures

Appendices

List of Abbreviations, Acronyms, and Symbols

§	Section
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
Foth	Foth Infrastructure & Environment, LLC
IDNR	Iowa Department of Natural Resources
Impoundment 3B	CCR Surface Impoundment 3B
MEC	MidAmerican Energy Company
NNEC	Neal North Energy Center
P.E.	Professional Engineer
RCRA	Resource Conservation and Recovery Act
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
Closure Plan Rev1	*Closure Plan – Coal Combustion Residuals Surface Impoundments 1, 2, 3A, and 3B (Revision 1)*
3B NOI	*Notice of Intent to Close Neal North Surface Impoundment 3B*
Hazard Classification Assessment Rev1	*Hazard Potential Classification Assessment - CCR Surface Impoundment 3B (Revision 1)*

Certifications

I hereby certify that this engineering document was prepared by me or under by direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Glenn Leo, P.E.

10/4/2021
Date

Iowa P.E. No. 23233

My license renewal date is: December 31, 2021

Pages or sheets covered by this seal: *Hazard Potential Classification Assessment - CCR Surface Impoundment 3B (Revision 1).*

1. Introduction

On April 17, 2015, the United States Environmental Protection Agency (USEPA) issued the final version of the Federal Coal Combustion Residual (CCR) Rule to regulate the disposal of CCR materials generated at coal-fired units. The rule is administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) Section (§) 6901 et seq.], using the Subtitle D approach.

CCR Surface Impoundment 3B at the MidAmerican Energy Company (MEC) Neal North Energy Center (NNEC) is subject to the CCR Rule. Per the requirements of 40 Code of Federal Regulations (CFR) 257.73(a), an initial *Hazard Potential Classification Assessment for CCR Surface Impoundment 3B* was completed in October 2016 (Burns & McDonnell, 2016), which is provided in Appendix A.

40 CFR 257.73(f) states that a periodic hazard potential classification assessment must be completed every 5 years for existing surface impoundments. The seal on this document certifies that the hazard potential classification assessment provided herein meets the requirements of 40 CFR 257.73(a). Once closure of CCR Surface Impoundment 3B is complete, the requirements in 40 CFR 257.73 for structural integrity criteria for existing CCR surface impoundments, including this report, will no longer be applicable.

2. Background

NNEC is located on the east bank of the Missouri River and is approximately five miles south of Sergeant Bluff, Iowa as shown in Figure 1. NNEC has four inactive CCR surface impoundments (Impoundments 1, 2, 3A, and 3B) located to the south of the NNEC plant site as shown in Figure 2.

CCR Surface Impoundment 1 (north) was previously closed by removal of CCR (Iowa Department of Natural Resources [IDNR] - Doc #86660), and lined non-CCR wastewater ponds were constructed in the closure by removal area. CCR Surface Impoundments 1 (south), 2, and 3A were previously closed with a final cover system over in-place CCR in accordance with 40 CFR Section 257.102(d). Construction of the final cover system for CCR Surface Impoundments 1 (south), 2, and 3A was completed in December of 2017.

At the time of the previous report in 2016 CCR Surface Impoundment 3B was an active CCR unit. Since the previous report was completed MEC ceased operation of CCR Surface Impoundment 3B and initiated closure as described in the *Notice of Intent to Close Neal North Surface Impoundment 3B* (*3B NOI*), dated July 27, 2018.

In 2019 MEC elected to modify the cap-in-place closure of CCR Surface Impoundments 1, 2, 3A to closure-by-removal in accordance with 40 CFR Section 257.102(c), and consolidate CCR within CCR Surface Impoundment 3B in accordance with 40 CFR Section 257.102(d). The combined closure of CCR Surface Impoundments 1 (south), 2, 3A and 3B includes CCR material in CCR Surface Impoundment 3B to be excavated and stockpiled within the impoundment footprint, and clean fill soil to be placed at the base of CCR Surface Impoundment 3B to the high-water elevation prior to consolidation of CCR. The consolidated CCR in the footprint of CCR Surface Impoundment 3B will be capped with an alternative cover system in accordance with the CCR Rule (257.102(d)(3)(ii)).

MEC obtained a closure permit (Permit No. 97-SDP-22-16C) for the combined closure of the CCR Surface Impoundments at NNEC from IDNR dated February 25, 2020, and subsequently posted to the operating record the *Closure Plan – Coal Combustion Residuals Surface Impoundments 1, 2, 3A, and 3B (Revision 1)* (*Closure Plan Rev1*), dated April 17, 2020.

Construction for closure of CCR Surface Impoundments 1 (south), 2, 3A, and 3B commenced in June 2020 and is significantly underway. Figure 3 shows an aerial photograph, taken August 2021, of construction progress for closure of CCR Surface Impoundment 3B. Closure construction for CCR Surface Impoundment 3B is anticipated to be completed by November 2022.

3. Hazard Assessment Background

Hazard potential classification assessments are used to identify the potential impact on the surroundings of a dam, that would occur following a "breach" or failure, or from "mis-operation" (which is an unscheduled release). In the initial *Hazard Potential Classification Assessment for CCR Surface Impoundment 3B* (Burns & McDonnell, 2016), the applicable classification protocols were reviewed from the Association of State Dam Safety and IDNR (Technical Bulletin 16 – *Design Criteria and Guidelines for Iowa Dams*).These guidelines indicate that a hazard potential classification assessment should be performed with the understanding that a failure, no matter the size, can result in a threat to downstream life and property. Allowances for evacuation or other emergency actions should not be considered as a substitute for appropriate design, construction, and/or maintenance. Ultimately, common sense and engineering judgment plays a major role in hazard potential classification assessment.

The body of the CCR Rule further provided the definitions listed in Table 3-1 as a means to classify CCR surface impoundments.

Table 3-1
CCR Rule Hazard Classification Definitions

High hazard potential	Where failure or mis-operation will probably cause loss of human life.
Significant hazard potential	Where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
Low hazard potential	Where failure or mis-operation results in no probable loss of life andlow economic and/or environmental losses. Losses are principally limited to the surface impoundment's owner's property.

Foth Infrastructure & Environment, LLC (Foth) has reviewed and verified that the hazard classification requirements identified are the appropriate criteria for this updated report. Due to the ongoing conversion and modifications to the site, the structure no longer serves as an impoundment and is not classified as a dam.

4. CCR Surface Impoundment 3B Classification

The initial *Hazard Potential Classification Assessment for CCR Surface Impoundment 3B* (Burns & McDonnell, 2016) included the following conclusions:

- Loss of human life was not expected in the event of a mis-operation or failure.
- Economic and environmental losses would be minimal and mostly limited to MEC's property.
- Downstream areas were predominantly undeveloped, rural and/or agricultural farmland.

Foth has reviewed the applicable factors and determined that the stated conclusions remain unchanged. Due to the on-going closure implementation, elimination of the entrained free water in the CCR, and the elimination of the water impoundment, the risk of failure has been further reduced. Failure mechanisms of the current modified structure would involve erosion or mass material movement and the potential for movement of material or water off of the property is further reduced from the conditions identified in the initial hazard classification assessment (Burns & McDonnell, 2016). Foth recommends that the site no longer be considered formally as an impoundment, upon completion of the closure project.

For the purposes of updating this report, Foth has identified an overall reduction in the hazard potential through the elimination of the impounded water and has classified the structure as having "Low" hazard potential, which represents no change in the classification from the previous assessment and classification.

5. Periodic Assessment and Amendment

MEC placed the initial hazard potential classification assessment in the CCR Operating Record on October 10, 2016. MEC may amend the plan at any time and is required to do so whenever there is a change in conditions which would substantially affect the written plan in effect. If the hazard rating changes from low to either high or significant hazard, a written Emergency Action Plan must be prepared per the CCR Rule.

MEC must conduct periodic hazard potential classification assessments every five years. Preparing the periodic assessments may be achieved by reviewing the current assessment in effect and amending the assessment as required. In all cases, the date for completing the previous plan is the basis for establishing the deadline to complete the subsequent periodic plan. Each periodic plan shall be certified by a qualified professional engineer (P.E.) in the State of Iowa. A record of revisions made to this document is included in Section 6.0.

Once closure of CCR Surface Impoundment 3B is complete, the requirements in 40 CFR 257.73 for structural integrity criteria for existing CCR surface impoundments, including this report, will no longer be applicable.

6. Record of Revisions and Updates

Revision Number	Date	Revision(s) Made	By Whom
0	10/10/2016	Initial Issue	Burns & McDonnell
1	10/4/2021	Periodic assessment	Foth Infrastructure & Environment, LLC

7. References

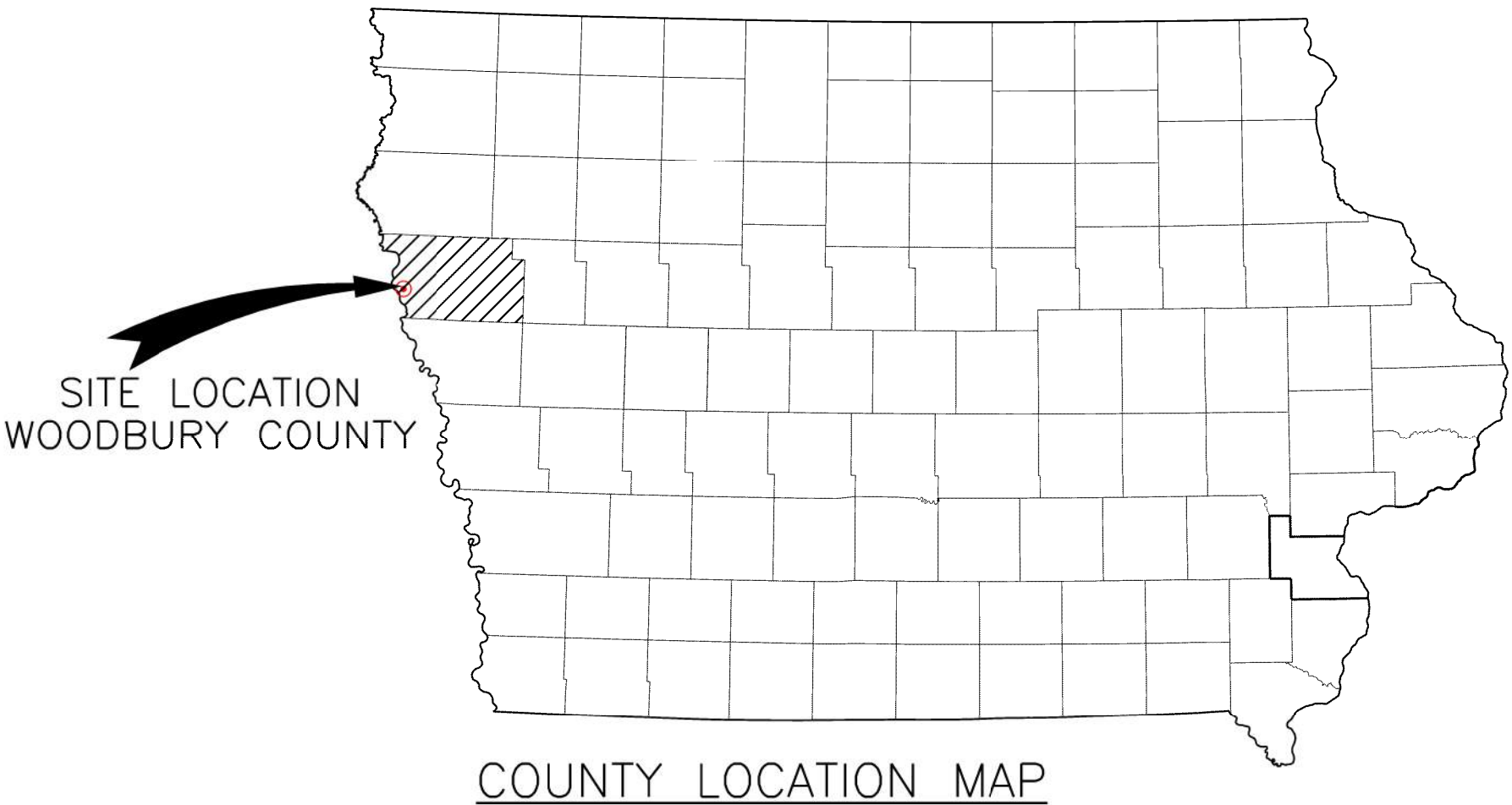
Burns & McDonnell, 2016. *Hazard Potential Classification Assessment for CCR Surface Impoundment 3B*. October 10, 2016.

Foth Infrastructure & Environment, LLC (Foth), 2018. *Notice of Intent to Close Neal North Surface Impoundment 3B* (*3B NOI*). July 2018.

Foth, 2020. *Closure Plan – Coal Combustion Residuals Surface Impoundments 1, 2, 3A, and 3B (Revision 1)* (*Closure Plan Rev1*). April 17, 2020.

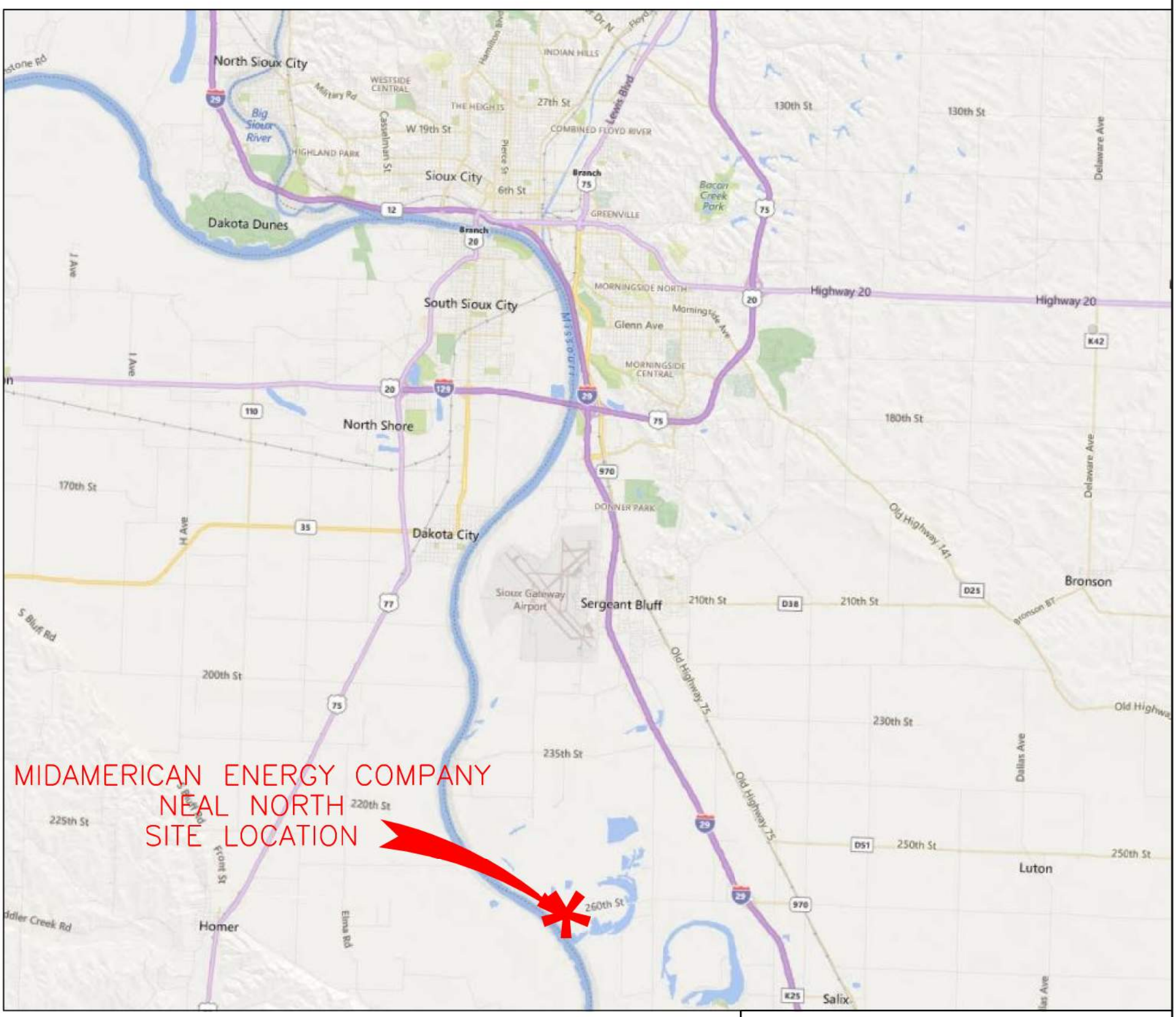
Iowa Department of Natural Resources (IDNR), 2017. *Sanitary Disposal Project Closure Permit* (*SDP Closure Permit*). MidAmerican Energy Company, Neal North Energy Center, CCR Surface Impoundments 1, 2, & 3A Closure. Permit No. 97-SDP-22-16C.

Figures



COUNTY LOCATION MAP

NOT TO SCALE



N

Foth

0' 5,000' 10,000'

BAR SCALE

MIDAMERICAN ENERGY COMPANY - NEAL NORTH

FIGURE 1

SITE LOCATION

Date: September 2021	Revision Date:	
Drawn By: CKV	Checked By: GRL	Project: 18M014

pw:\\PW-APS1.foth.com:PW_IE\Documents\Clients\MidAmerican Energy\Secured\0018M014.00\CAD\Figures\Notice of Intent to close\18M014 Figure 1 - site location.dgn
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4/14/2020 12:51:20 PM mrs

Foth

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MIDAMERICAN ENERGY COMPANY

CONSTRUCTION DRAWINGS
FOR CLOSURE OF
IMPOUNDMENTS 1, 2, 3A & 3B
NEAL ENERGY CENTER NORTH
SERGEANT BLUFF, IOWA

WOODBURY, CO IOWA

NO.	BY	DATE	DESCRIPTION
1			
2			
3			
4			

RECORD DRAWING OF COMPLETED CONSTRUCTION BY:

RECORD DRAWINGS OF COMPLETED CONSTRUCTION CONFORMING TO CONTRACTOR AND/OR OWNERS RECORDS:
BY _____ DATE _____

DATE OF PREPARATION

	BY	DATE
SURVEYED		
DRAWN	MRS	APR., 2019
DESIGNED	MRS	APR., 2019
CHECKED	BKH	APR., 2019

SITE PLAN

HORIZONTAL SCALE:
0 300' 600'

PROJECT ID: 18M014

FIGURE 2

NOTES:
1. Horizontal coordinate system used was NAD83 Iowa State Plane North Zone
2. *Inaccessible due to ground conditions.

LEGEND
Surface Impoundment 3B

Foth

N

0 300 600
Ft

This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only.

MIDAMERICAN ENERGY COMPANY

FIGURE 3

CLOSURE CONSTRUCTION PROGRESS AUGUST 2021

Date: SEPTEMBER 2021	Revision Date:	
Drawn By: JRS6	Checked By: BMS	Project: 19MO14

Path: Q:\Midamerican\GIS\mxd\Figure 3 Closure Construction Progress August 2021t.mxd Date: 9/9/2021

Appendix A

Hazard Potential Classification Assessment for CCR Surface Impoundment 3B. (Burns & McDonnell, 2016)

Hazard Potential Classification Assessment for CCR Surface Impoundment 3B

MidAmerican Energy Company, Neal North Energy Center

Coal Combustion Residual Rule Compliance

October 10, 2016

Hazard Potential Classification Assessment for CCR Surface Impoundment 3B

Prepared for

MidAmerican Energy Company, Neal North Energy Center
Coal Combustion Residual Rule Compliance
Sergeant Bluff, Iowa

October 10, 2016

Prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

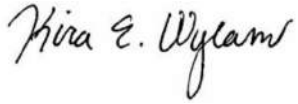
INDEX AND CERTIFICATION

MidAmerican Energy Company, Neal North Energy Center
Hazard Potential Classification Assessment for CCR Surface Impoundment 3B

Report Index

Certification

I hereby certify, as a Professional Engineer in the State of Iowa, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the MidAmerican Energy Company, Neal North Energy Center or others without specific verification or adaptation by the Engineer.



Kira Wylam, P.E. (IA #23129)

Date: 10/10/2016

Kira Wylam
License Number 23129

My license renewal date is December 31, 2016

Pages or sheets covered by this seal: As noted above.

TABLE OF CONTENTS

Page No.

LIST OF FIGURES

Page No.

LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BMcD	Burns & McDonnell Engineering Company, Inc.
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
MEC	MidAmerican Energy Company
RCRA	Resource Conservation and Recovery Act
U.S.C.	United States Code

1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residual (CCR) Rule to regulate the disposal of CCR materials generated at coal-fired units. The rule is administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) Section 6901 et seq.], using the Subtitle D approach.

MidAmerican Energy Company (MEC) is subject to the CCR Rule and as such must develop a Hazard Potential Classification Assessment per 40 Code of Federal Regulations (CFR) Part 257.73(a)(2). This report provides and certifies the Hazard Assessment Certification for the Impoundment 3B at the Neal North Energy Center. Part 257.73(a)(2) requires that this document accomplish the following:

- Document the hazard potential classification of each CCR unit as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment.
- Document the basis for each hazard potential classification.

2.0 SITE INFORMATION

The following report is in reference to Impoundment 3B, which is located at the Neal North Energy Center, near Sergeant Bluff, Iowa. Impoundment 3B is approximately 36 acres in size, and is comprised of north and south components. To the west of Impoundment 3B are three inactive CCR surface impoundments. MEC is planning to close these impoundments by April 17, 2018. The closure of these inactive impoundments is discussed further in a document titled, "Notification of Intent to Initiate Closure of Inactive Impoundments 1, 2, and 3A," (Burns & McDonnell, 2015) which is available in the facility's operating record and on MEC's public CCR website.

The Missouri River is located west of the inactive CCR surface impoundments. An industrial facility is located approximately one mile downstream of the site. There are no residences off of the Missouri River for approximately 9.5 miles downstream of the site.

MEC property surrounds the immediate perimeter of Impoundment 3B, as shown on SK-001 in Appendix A. To the southeast of the impoundment is a body of water referred to as New Lake. The New Lake property is owned by MEC and does not serve recreational purposes. To the northeast of Impoundment 3B is a small industrial facility. The topographic grade of the area surrounding Impoundment 3B is generally directed to the northeast and to New Lake.

Discharge from Impoundment 3B flows through an outfall control structure which drains from a pipe into a channel. The channel runs along the south side of the inactive impoundments, and conveys the discharge from Impoundment 3B to the Missouri River.

3.0 HAZARD ASSESSMENT BACKGROUND

Hazard potential classification assessments are commonly used among federal and state dam safety organizations to aid in the classification of a dam based on its potential impact to its surroundings following a "breach" or failure, or "mis-operation" (which is an unscheduled release). These classification protocols are numerous and can greatly differ. Burns & McDonnell (BMcD) reviewed information available via public websites for the Association of State Dam Safety and the Iowa Department of Natural Resources ("Technical Bulletin 16 – Design Criteria and Guidelines for Iowa Dams,") and noticed a common thread between the classification recommendations, which is to classify a dam according to the potential impacts should a failure or mis-operation occur.

Furthermore, these guidelines indicate that a hazard potential classification assessment should be performed with the understanding that a failure, no matter the size, can result in a threat to downstream life and property. Allowances for evacuation or other emergency actions should not be considered as a substitute for appropriate design, construction, and/or maintenance. Ultimately, common sense and engineering judgment plays a major role in hazard potential classification assessment.

Burns & McDonnell used the observed common vein of the dam safety classification systems in conjunction with the CCR Rule criteria to determine a hazard potential classification rating for the Neal North Energy Center CCR Surface Impoundment 3B. The body of the CCR Rule provides the definitions listed in Table 3-1 as a means to classify CCR surface impoundments.

Table 3-1. CCR Rule Hazard Classification Definitions

High hazard potential	Where failure or mis-operation will probably cause loss of human life.
Significant hazard potential	Where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
Low hazard potential	Where failure or mis-operation results in no probable loss of life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment's owner's property.

In the preamble to the CCR Rule, the EPA specifically discusses using the Federal Emergency Management Agency (FEMA) Publication No. 333, "Federal Guidelines for Dam Safety," as guidance in determining the hazard potential classification of a CCR surface impoundment. The only noted variance in the FEMA definitions of the classification system levels, as compared to the CCR Rule definitions (listed in Table 3-1) is that FEMA's definition for significant hazard includes the following statement:

"Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure."

According to FEMA: "the hazard potential classification for a dam is intended to rank dams in terms of potential losses to downstream interests if the dam should fail for any reason. The classification is based on the incremental adverse consequences of failure or mis-operation, and has no relationship to the current structural integrity, operational status, flood routing capability, or safety condition of the dam or its appurtenances. The hazard potential classification is based on potential adverse impacts/losses in four categories: environmental, life line, economic, and/or human life."

Furthermore, FEMA mentions that, "the hazard potential classification for a dam may change over time. New downstream development, raising of a dam to increase storage, the finding of an endangered or threatened species, revisions to National Weather Service Hydrometerological Reports, or downstream land use changes could warrant changing the hazard potential classification. Thus, it will be necessary to periodically review and update the classification of each dam based on the prior documented classification." The hazard potential classification review cycle for Impoundment 3B should occur every five years in accordance with Part 257.73(f)(3) of the CCR Rule.

In the preamble to the CCR Rule, the EPA mentions that the hazard potential classification is to, "serve as a proxy for the amount of water and CCR that could potentially be released to the environment in the event of a CCR surface impoundment failure." The recommended hazard classification rating provided herein will furthermore be used as the basis for structural stability and inflow design flood control system analyses, also defined by the CCR Rule.

4.0 IMPOUNDMENT 3B CLASSIFICATION

In May 2011, the EPA selected Dewberry & Davis, LLC, to prepare a Dam Assessment Report for the Neal North Energy Center. Within the report, Impoundment 3B was classified as being low hazard based on engineering judgement and the following criteria:

- Loss of human life was not expected; and
- Economic losses would be minor and limited to MidAmerican property and possibly to the nearby industrial site.

The recommendation of Dewberry and Davis, LLC was based on the FEMA guidelines discussed in Section 3.0.

In addition to the EPA Dam Assessment Report, as a part of the hazard potential classification determination process, BMcD reviewed past Impoundment 3B construction documentation. The rating provided at the end of this Section is based on engineering judgment and a review of the aforementioned documents, as well as visual observations of the impoundment and surrounding topography.

Conclusions drawn from the hazard potential classification assessment process for Impoundment 3B include the following:

- Loss of human life is not expected in the event of a mis-operation or failure
- Economic and environmental losses would be minimal and mostly limited to MEC's property
- Downstream areas are predominantly undeveloped, rural and/or agricultural farmland

Loss of human life is not expected because of the remoteness of Impoundment 3B to any residential areas, as was discussed in Section 2.0. A failure of the north berm of Impoundment 3B would drain to the north and be retained on MEC property. A failure of the east berm of the north portion of Impoundment 3B would drain towards the industrial site to the east. However, a very small quantity of water is retained in Impoundment 3B North, and would therefore have minimal impact on the property.

A failure of the east and south berms of Impoundment 3B South would drain to New Lake. A gate structure separates New Lake from the Missouri River. In the event of a berm failure, this gate could be closed to contain CCR material within the limits of New Lake. A failure of the west berm of Impoundment 3B would be contained within the limits of the inactive Impoundment 3A, even subsequent of the closure of Impoundment 3A.

Based on these documents, the CCR Rule, and FEMA criteria for hazard potential classification discussed in Section 3.0, the Neal North Energy Center CCR Surface Impoundment 3B has been given a “Low” hazard potential rating.

5.0 PERIODIC ASSESSMENT AND AMMENDMENT

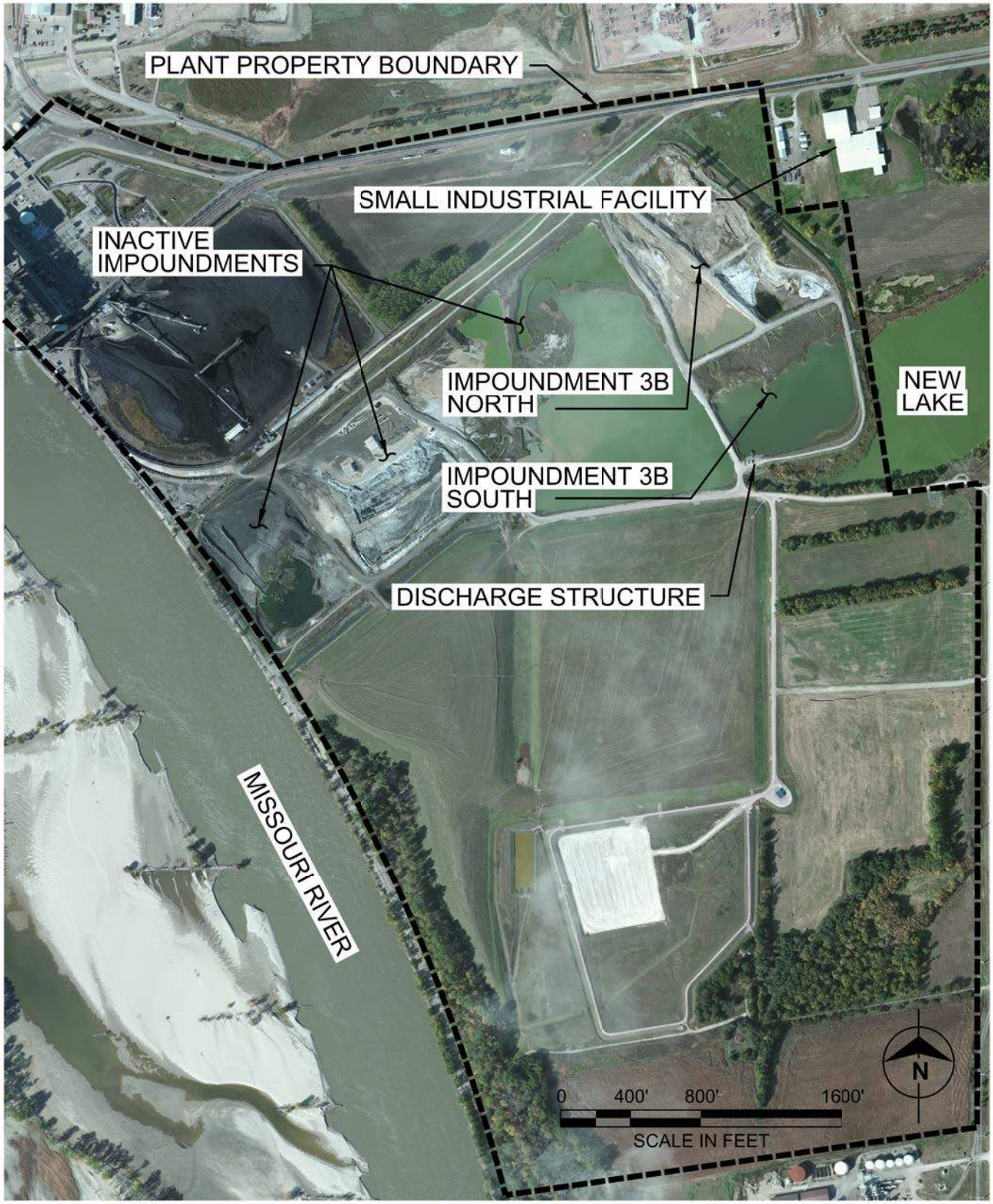
MEC must place the initial hazard potential classification assessment in the CCR Operating Record by October 17, 2016. MEC may amend the plan at any time, and is required to do so whenever there is a change in conditions which would substantially affect the written plan in effect. If the hazard rating changes from low to either high or significant hazard, a written Emergency Action Plan must be prepared per the CCR Rule.

MEC must conduct periodic hazard potential classification assessments every five years. Preparing the periodic plans may be achieved by reviewing the current plan in effect and amending the plan as required. In all cases, the date for completing the previous plan is the basis for establishing the deadline to complete the subsequent periodic plan. Each periodic plan shall be certified by a qualified professional engineer in the State of Iowa. A record of revisions made to this document is included in Section 6.0.

6.0 RECORD OF REVISIONS AND UPDATES

Revision Number	Date	Revisions Made	By Whom
0	10/10/2016	Initial Issue	Burns & McDonnell

APPENDIX A – IMPOUNDMENT 3B SITE PLAN



BURNS McDONNELL

date APRIL 15, 2016

designed K. WYLAM

MIDAMERICAN ENERGY COMPANY

NEAL NORTH

HAZARD POTENTIAL CLASSIFICATION SITE PLAN

project 86609

contract

SK - 001

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