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Emergency Action Plan

Basin Electric Power Cooperative
Leland Olds Station
3901 Highway 200A
Stanton, North Dakota

AECOM Project No.: 60565307
October 15, 2018

Emergency Action Plan For

Leland Olds Station

3901 Highway 200A, Stanton, ND

County: Mercer County

Owner: Basin Electric Power Cooperative

Contact: Bob Nasset

Telephone: 701-557-5673 direct line

Cell:

Operator: Basin Electric Power Cooperative – Leland Olds Station

Contact: James Porter

Telephone: 701-745-7202 direct line

Cell: 701-955-0147

Owner Mailing Address: 1717 East Interstate Avenue

Bismarck, North Dakota 58503-0564

Quality information

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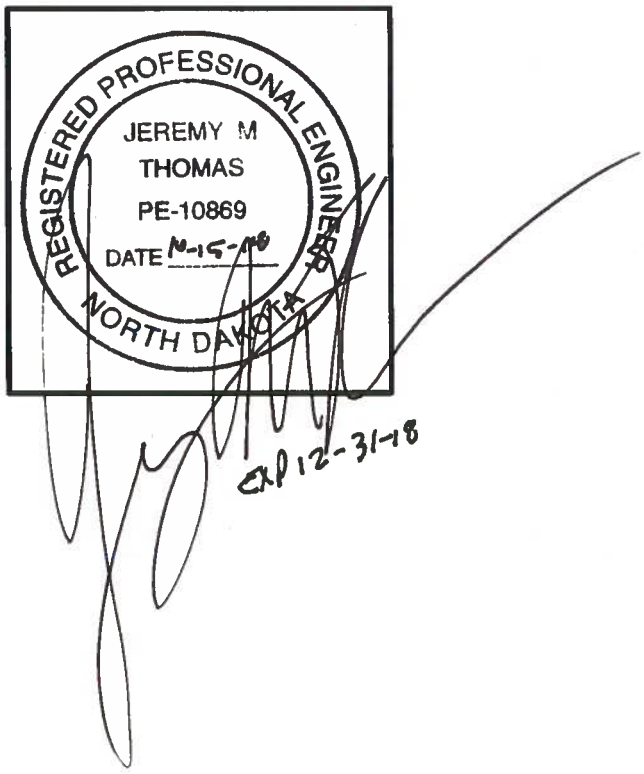
Certification Statement

CCR Units: Basin Electric Power Cooperative; Leland Olds Station; Bottom Ash Pond 2, & 3.

I, Jeremy M. Thomas, being a Registered Professional Engineer in good standing in the State of North Dakota, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this Emergency Action Plan has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR Units, that the Emergency Action Plan dated October 15, 2018 meets the requirements of 40 CFR § 257.73.



Jeremy M. Thomas
Printed Name

October 15, 2018
Date

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1. Introduction

1.1 Purpose and Intent

This Emergency Action Plan (EAP) was developed to provide a single source of information in the event of an emergency as required for CCR impoundments determined to be either a high hazard potential or significant hazard potential CCR impoundment per section §257.73 of the U.S. Environmental Protection Agency (EPA) Final Rule: Disposal of Coal Combustion Residuals from Electric Utilities.

The purpose of an Emergency Action Plan (EAP) is to provide the owner/operator of the CCR impoundments with a clear plan of action when any emergency arises. An emergency is identified as any condition which:

- Develops unexpectedly;
- Endangers the structural integrity of the impoundment; and
- Could result in the impoundment's failure, requiring immediate action.

By writing and implementing an EAP the owner/operator of the impoundment can reduce the risk of human life loss or injury and minimize property damage during an unusual or emergency event.

This is an EAP for the two (2) CCR surface impoundments operated by Basin Electric Power Cooperative (BEPC) at the Leland Olds Station (LOS) in Stanton, North Dakota. The EAP provides a description of the impoundments and the area at risk as well as contact information for all parties involved in responding to or affected by an emergency at the impoundments. The EAP outlines what actions are required in the event of an emergency.

1.2 EAP Summary

This document includes:

- Definition of the events or circumstances involving the two CCR impoundments that represent a safety emergency and the procedures that will be followed to detect a safety emergency in a timely manner.
- Site location map delineating the downstream area which would be affected in the event of a CCR impoundment failure.
- Contact telephone numbers for individuals that must be contacted in the event of an emergency, their respective responsibilities, and notification procedures.
- Procedures following an emergency at the impoundments.
- Provisions for an annual face-to-face meeting or exercise between representatives of the CCR unit and the local emergency responders.

The plan will be implemented once events or circumstances involving the CCR impoundment represent a safety emergency is detected, including conditions identified during periodic structural stability assessments, annual inspections, and inspections by a qualified person. The responsibilities for responding to an incident and implementing the plan are included in the Summary of EAP Responsibilities and Summary of Owner Responsibilities in **Appendix B**. One copy of this plan will be kept at the Leland Olds Station office.

The plan will be amended if the owner/operator of the CCR impoundments whenever there is a change in conditions that would substantially affect the EAP in effect. This plan will, at a minimum, be evaluated every five years to ensure the information required is accurate. If the owner/operator of the CCR impoundment determines during a periodic hazard potential assessment that the CCR impoundments are no longer classified as significant hazard potential CCR impoundments, then the owner or operator is no longer subject to the requirement to prepare and maintain a written EAP.

1.3 Description of Impoundments

The Leland Olds Station (LOS) is located at 3901 Highway 200A in Stanton, North Dakota. LOS has two (2) CCR surface impoundments which are described in **Table 1**. In 2017 BEPC commenced Bottom Ash Pond 2 closure activities with the construction of a temporary clay divider berm to separate the active portion (north of the berm) and the closure area (south of the berm). The norther portion of Bottom Ash Pond 2 is scheduled for closure in 2019. Bottom Ash Pond 3 is located on the north side of Bottom Ash Pond 2.

Table 1. CCR Surface Impoundment Description

	Bottom Ash Pond 2-North	Bottom Ash Pond 2- South	Bottom Ash Pond 3
Type of Impoundment	Earthen	Earthen	Earthen
Height of Impoundment	20.0 feet	26.0 feet	18.0 feet
Max Impoundment Storage Capacity	58.9 acre-feet	353.3 acre-feet[1]	41.3 acre-feet
Use of Impoundment	CCR Operations	CCR Operations	CCR Operations
Hazard Rating	Significant	Significant	Significant

Notes:

1. The storage capacity listed is the pre-closure storage volume. Current storage capacity would be lower, depending on the progress of closure.

Bottom Ash Ponds 2 and 3 are located immediately south of Missouri River and east of Former Ash Pond 1 in the northeast portion of the property. The general location of the site is shown on Figure A.1 Project Overview Map and locations of the impoundments are shown on Figure A.2 Site Overview Map included in **Appendix A**.

AECOM prepared a hazard potential classification assessment in April 2018 for each of the two (2) CCR surface impoundments. As a worst-case scenario, the analysis assumed total original design storage capacity for both impoundments. Significant upstream and downstream features which could be affected by a failure are included on Figure A.4 Hydraulic Shadow Map included in **Appendix A**.

2. Safety Emergency

2.1 Definition of Safety Emergency

A safety incident is an impending or actual sudden uncontrolled release or excessive controlled release of water from an impounding structure. The release may be caused by damage to or failure of the structure, flood conditions unrelated to failure, or any condition that may affect safe operation. The release of water may or may not endanger human life, downstream property, or the operation of the structure.

During normal operation, there is not net change in pond levels.

Plant operators perform operating inspections of the plant facilities once per (8-hour) shift and visually monitor water levels in the pond and observe the embankments for any deficiencies. Emergency action should be taken if the pool elevation is less than 2.0 feet below the crest of the embankment, which correlates to elevations greater than 1,692.0 feet for Ash Pound 2 North and Ash Pound 2 South, and elevations greater than 1,691.0 feet for Ash Pound 3 (NGVD29). Emergency action should also be taken if deficiencies are observed in the perimeter embankments.

AECOM performed a slope stability evaluation in April 2018 to evaluate the existing CCR impoundment dikes and native subgrade soils with regard to static and seismic slope stability as recommended by the EPA Site Assessment Report. Based on the results of the stability evaluation, the perimeter dikes for the two CCR impoundments were considered stable with respect to normal, flood, temporary construction, and seismic conditions.

2.2 EAP Response Process

There are generally five steps that should be followed when an unusual or emergency incident is detected. The steps constitute the EAP response process and are as follows:

1. Incident detection and evaluation
2. Emergency level determination
3. Notification and communication
4. Emergency Actions
5. Termination and follow-up

These steps are discussed further in the following subsections.

2.2.1 Incident Detection and Evaluation

An incident would be considered an unusual or abnormal condition and could be observed using the following:

1. Detecting existing or potential failures.
2. Measuring water level. Normal water level within the impoundments should be:
    a. Bottom Ash Pond 2 – North: 12 feet below the design embankment crest elevation
    b. Bottom Ash Pond 2 – South: 24 feet below the design embankment crest elevation
    c. Bottom Ash Pond 3: 11 feet below the design embankment crest elevation
3. Reviewing monitoring equipment such as sensors or early warning systems.
4. Checking instrumentation.
5. Analyzing and confirming data.

2.2.2 Emergency Level Determination

After an unusual event or incident is detected and confirmed, the event should be categorized into one of the established emergency levels based on the severity of the initiating condition or triggering events. The levels of emergency are:

- High Flow
- Non-Failure
- Potential Failure
- Imminent Failure

It is important to determine the severity of the emergency before responding to an unusual event at the impoundments. The *Guidance for Determining the Emergency Level* table and *Level of Emergency Determination Chart* included in **Appendix B** are to be used to determine the severity of the emergency and to guide the owner/operator's actions during an emergency response. Descriptions of the levels of emergency are provided in the following subsections.

2.2.2.1 High Flow Level of Emergency

The High Flow emergency level indicates that flooding is occurring at LOS, but there is no apparent threat to the integrity of the impoundment. The High Flow emergency level is used by the owner to convey to outside agencies that downstream areas may be affected by the impoundment's release. Although the amount of flooding may be beyond the control of the owner, information on the timing and amount of release from the impoundment may be helpful to authorities in making decisions regarding warnings and evacuations.

2.2.2.2 Non-Failure Level of Emergency

The Non-Failure emergency level is appropriate for an event that will not, by itself, lead to a failure, but requires investigation and notification of internal and/or external personnel. Examples are:

1. New seepage or leakage on the downstream side of the impoundment.
2. Presence of unauthorized personnel.
3. Malfunction of the pump system used to balance the flow of the site.

Some incidents may only require internal response, whereas others may lead to unexpected high releases that could pose a hazard to the downstream public and would require the notification of outside agencies.

2.2.2.3 Potential Failure Level of Emergency

The Potential Failure emergency level indicates that conditions are developing that could lead to a failure. Examples are:

1. Rising reservoir levels that are approaching the top of the non-overflow section of the impoundment.
2. Transverse cracking of an embankment.
3. A verified bomb threat.

Potential Failure should convey that time is available for analyses, decisions, and actions before the impoundments could fail. A failure may occur, but predetermined response actions may moderate or alleviate failure.

2.2.2.4 Imminent Failure Level of Emergency

The Imminent Failure emergency level indicates that time has run out, and the impoundment has failed, is failing, or is about to fail. Imminent Failure typically involves a continuing and progressive loss of material from the impoundment. It is not usually possible to determine how long a complete breach of the impoundment will take. Therefore, once a decision is made that there is no time to prevent failure, the Imminent Failure warning must be

issued. For purposes of evacuation, emergency management authorities may assume the worst-case condition that failure has already occurred.

2.2.3 Notification and Communication

2.2.3.1 EAP Notification Flowchart

After the emergency level at the dam has been determined, notifications are made in accordance with the EAP Notification Flowchart. The purpose of the EAP Notification Flowchart is to provide a visual map of who is to be notified, the order of notification, and who is responsible for notifying various individuals and agencies/organizations. The Notification Flowchart can be customized based on the level of emergency as determined under the Level of Emergency Determination Chart.

The Agency/Organization Notification List should be used as a quick reference for contact information for the Notification Flowchart. It can be customized based on the level of the emergency.

The Emergency Action Plan Notification Flowchart for the LOS impoundments can be found in **Appendix B** and was last updated on the date shown on the bottom of the page. The Agency/Organization Notification List is included on the Notification Flowcharts. The Notification Flowchart will be activated with a telephone call to the Leland Olds Station Contact, James Porter. Contact with Mercer County Emergency Management will be maintained throughout the emergency by phone.

2.2.3.2 Notification to Emergency Management Authorities

When performing notification and communication activities, it is important that people speak in clear, nontechnical terms to ensure those being notified understand what is happening, what the current emergency level is, and which actions to take. To assist in this step, pre-scripted messages to help the caller adequately describe the emergency situation to emergency management authorities are included on the Notification Flowcharts included in **Appendix B**.

2.2.3.3 Status Updates

After initial notification, the owner should make periodic status reports to the affected emergency authorities and other stakeholders in accordance with the Notification Flowcharts. If it appears that the situation is continuing to deteriorate despite actions being taken to moderate or alleviate the failure, local authorities may decide to change their course of action. Depending on location of downstream residents and the estimated time required to warn them, the evacuating agencies may consider early evacuation or continued warnings until the emergency has passed.

2.2.4 Emergency Actions

After the initial notifications have been made, the owner will act to save the impoundments and minimize impacts to life, property, and the environment. During this step, there is a continuous process of taking actions, assessing the status of the situation, and keeping others informed through communication channels established during the initial notifications. The EAP may go through multiple emergency levels as the situation improves or deteriorates. The following subsections include specific actions to minimize impacts. The downstream areas which would be affected in an emergency are indicated on the Shadow Map included in **Appendix A** and discussed further in Section 3 of this EAP.

2.2.4.1 High Flow Level of Emergency

In the event that pool elevations is less than 2.0 feet below the design embankment crest elevation for Bottom Ash Pond 2 North, Bottom Ash Pond 2 South, and Ash Pond 3, the following procedures should be followed:

1. Monitor remaining freeboard between interconnected ponds. Ponds with lesser remaining freeboard shall be pumped toward ponds having greater remaining freeboard utilizing the on-site pumps located in the pump houses.

2.2.4.2 Non-failure Level of Emergency

In the event that a situation is not normal but has not yet threatened the operation or structural integrity of the impoundment(s), the following procedures should be followed:

1. The impoundment should be inspected by personnel at LOS. At minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope of the embankment. Also check the impoundment area for signs of changing conditions. If increased seepage, erosion, cracking, or settlement is observed, immediately report the observed conditions to the EAP coordinator and refer to the emergency level table in **Appendix B** for guidance in determining the appropriate event level for the new condition.
2. Record all contacts that were made and record all information, observations, and actions taken. Note the time of changing conditions. Document the situation with photographs and video, if possible. A sample Communication Documentation Chart is included in **Appendix C**.

2.2.4.3 Potential Failure Level of Emergency

In the event that a situation may eventually lead to embankment failure and flash flooding downstream but there is not an immediate threat of dam failure, the following procedures should be followed:

1. Initiate contacts as outlined in the Notification Flowchart in **Appendix B** and inform parties that the EAP has been activated and, if conditions get worse, the emergency level may increase and the emergency situation may require evacuation. Preparations should be made for possible road closures and evacuations.
2. Provide updates to the Mercer County Emergency Management Coordinator to assist them in making timely decisions concerning the need for warnings, road closures, and evacuations.
3. If time permits, inspect the impoundment. At minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope of the embankment. Also check the impoundment area for signs of changing conditions. If piping, increased seepage, erosion, cracking, or settlement is observed, immediately report the observed conditions to the Mercer County Emergency Management Coordinator and refer to the emergency level table in **Appendix B** for guidance in determining the appropriate event level for the new condition.
4. Record all contacts that were made and record all information, observations, and actions taken. Note the time of changing conditions. Document the situation with photographs and video, if possible. A sample Communication Documentation Chart is included in **Appendix C**.
5. If time permits, remedial actions should be taken for the conditions described in the following sections.

2.2.4.4 Embankment Deficiencies

In the event that deficiencies are observed in the perimeter embankments, the following procedures should be followed:

1. Lower the water within the impoundment to a level below the observed deficiency. Water in adjacent impoundments may also need to be lowered to maintain an equal head of pressure against the berm between impoundments.
2. Install temporary controls as necessary to control the deficiency.
3. Perform a field investigation to determine the cause of the deficiency.
4. Determine and implement corrective measures.

2.2.4.5 Seepage Through Embankment

A subsurface investigation performed by AECOM encountered cohesive and unsaturated materials in the dike and native foundation soils. During the Dam Inspection from July 8, 2015, seepage along the impoundment dikes were not observed, which suggests the pond dikes are functioning as designed and the dikes cohesive materials are generally limiting seepage.

Minor amounts of seepage will occur through most cohesive materials; however significant loss of stiffness or deterioration of the soils could cause significant seepage. Significant seepage is typically identified by saturated soil conditions and/or soft, wet, compressible pockets of soil on the exterior slopes of the dikes.

Consistent, long-term seepage is often accompanied by the growth of phreatophytic (i.e. water loving) vegetation in the area where seepage is occurring.

In the event that seepage is observed in the perimeter embankments, the following procedures should be followed:

1. Lower the water within the impoundment to a level below the seepage. Water in adjacent impoundments may also need to be lowered to maintain an equal head of pressure against the berm between impoundments.
2. Perform a field investigation to determine the cause of the seepage.
3. Determine and implement corrective measures.

2.2.4.6 Imminent Failure Level of Emergency

In the event that embankment failure is imminent or in progress, the following actions should be taken:

1. Contact the Mercer County Emergency Management Coordinator and others listed on the Notification Flowchart in **Appendix B** immediately.
2. Maintain continuous communication and provide the Mercer County Emergency Management Coordinator with updates of the situation to assist him/her in making timely decisions concerning warnings and evacuations.
3. Record all contacts that were made and record all information, observations, and actions taken. Note the time of changing conditions. Document the situation with photographs and video, if possible. A sample Communication Documentation Chart is included in **Appendix C**.
4. Advise people monitoring the embankment to follow safe procedures. Everyone should stay away from any of the failing structures or slopes and out of the potential breach inundation areas.

2.2.5 Termination and Follow-Up

Generally, the owner, or owner's dam safety expert is responsible for notifying the authorities that the emergency condition has been stabilized. Government officials are responsible for declaring an end to the public emergency response.

The following subsections discuss termination and follow up procedures once the incident has been resolved. An Emergency Termination Log is included in **Appendix C** to document conditions and decisions.

2.2.5.1 Reentry and Recovery

Under potential failure and imminent failure scenarios, the emergency at the LOS Impoundments will not be considered over until inspected by owner's engineer and the Mercer County Emergency Management have been consulted. Evacuated residents will be allowed to return based on the plan developed by the Mercer County Emergency Management.

Once the emergency is declared over, owner's engineer will inspect the impoundments for any damage. The review may result in formal orders issued to the owner and may require the submittal of plans and specifications for repair.

2.2.5.2 After Action Review

After an impoundment emergency is ended, a review of the event should take place as soon as practicable. If the review does not take place within 10 to 14 days of the emergency, valuable data may be lost. The following should be discussed and evaluated:

1. Events or conditions leading up to, during, and following the incident
2. Significant actions taken by each participant and improvements for future emergencies

3. All strengths and deficiencies found in the incident management process, materials, equipment, staffing levels, and leadership. The review will determine what was done correctly during the EAP activation, what was done incorrectly and what could be improved.
4. Corrective actions identified and a planned course of action to implement recommendations.

The results should be documented in an After Action Report and used as a basis for revising the EAP. Any needed changes to the LOS Impoundment EAP will be made by Basin Electric Power Cooperative. An updated EAP including an updated Approval will be provided to all holders of the EAP. A copy of the updated EAP will be kept in the shift supervisor's office and weekend duty superintendent's office.

3. Hydraulic Shadow Map

The purpose of the Hydraulic Shadow Map, or inundation map, is to provide a picture of the area that could be affected by a hypothetical failure of the impoundment in order to determine who must be notified and/or evacuated during an emergency and the timeliness to facilitate notification and evacuation.

The Hydraulic Shadow Map for the LOS impoundments was produced by AECOM based on the information from the Dam Failure Analysis. The map can be found in **Appendix A** and was last updated on the date shown on the bottom of the page. For further information on the method used to produce the maps, please contact Basin Electric Power Cooperative.

Due to the proximity of the two CCR impoundments to one another, Bottom Ash Pond 2 and Bottom Ash Pond 3 were combined in one Dam Failure Analysis. The map indicates inundation zones, cross section information, power structures and any other significant features.

4. General Responsibilities

The owner is responsible for developing and maintaining the EAP. Owners and emergency management authorities are responsible for implementing the EAP. The Emergency Incident Log form in **Appendix C** should be used to document incident-related events by all entities involved with EAP implementation. The following subsections specify the responsibilities of all entities to ensure that effective and timely action is taken if an emergency occurs.

4.1 Owner Responsibilities

The owner is responsible for detecting and evaluating the safety incident, classifying the incident, notifying emergency management authorities, and taking appropriate response actions. Refer to the Summary of EAP Responsibilities and Summary of Owner Responsibilities charts in **Appendix B** of this EAP for owner/operator duties for given emergency response situations.

4.2 Notification and Communication Responsibilities

4.2.1 Notification Flowchart

Notifications are made in accordance with the EAP Notification Flowchart. Refer to Sections 2.2.2.1 through 2.2.2.4 of this EAP for additional information and the Notification Flowcharts in **Appendix B**.

4.2.2 Emergency Notification Lists

Emergency Notification Lists are lists of the names, addresses and telephone numbers of individuals, businesses, critical facilities and other entities who would be affected by a failure of the impoundments and who must be notified and/or evacuated in an emergency. The lists have been grouped based on the severity of the emergency. The Emergency Notification Lists for the LOS Impoundments can be found in **Appendix B** and were last updated on the date shown on the bottom of the page.

4.2.3 Media Contact

Interaction with the media should be implemented through the local or State emergency management authority. These agencies should have a Public Information Officer (PIO) and/or a Joint Information Center for disseminating information and handling inquiries.

Local emergency management authorities may activate an Emergency Operations Center (EOC) to serve as a central co-ordination center for emergency response, warning, and evacuation activities. The owner or their representative should go to the EOC to help agency personnel understand the project specific information and inundation maps.

Proper co-ordination and communication between the on-site technical personnel, PIOs and emergency personnel at the EOC are of critical importance to the successful implementation of the EAP. These activities should be thoroughly tested during comprehensive EAP exercises and modified as necessary.

4.3 Evacuation Responsibilities

Warning and evacuation planning and implementation are responsibilities of local emergency management authorities with the legal authority to perform these actions. Under the EAP, the owner is responsible for notifying the appropriate emergency management authority when an incident is anticipated, is imminent, or has occurred. The local emergency management authority is responsible for notifying and evacuating affected people, as necessary. However, based on the conditions at the time of this EAP no residences or buildings will be impacted and no evacuation is anticipated to be required.

4.4 Monitoring, Security, Termination, and Follow-up Responsibilities

A person should be designated as an onsite monitor from the beginning of a safety incident until the emergency has been terminated. This person should provide status updates to the owner so the owner can keep all those involved with the implementation of the EAP informed of developing conditions.

Termination of a safety emergency is usually twofold. The entity that activates the EAP is usually responsible for determining when the safety situation has stabilized. This is typically the owner in consultation with engineers and safety experts but may include other State and Federal regulatory entities. The applicable emergency management authorities, on the other hand, are responsible for termination of the emergency response activities, including termination of an evacuation. Both the owner and the emergency response authorities should coordinate closely while making decisions to terminate both the safety event and response efforts.

Recovery activities will continue on different levels for all involved in the safety incident after the emergency has been terminated.

The owner should coordinate a follow-up evaluation after any emergency. All participants should be involved in this evaluation and should keep logs and records during the incident. An Emergency Incident Log and Emergency Termination Log are included in **Appendix C**. The results of the follow-up evaluation should be documented in a written report (After Action Report) and used to improve future response actions.

4.5 EAP Coordinator Responsibilities

The EAP Coordinator will be responsible for overall EAP-related activities, including but not limited to preparing revisions to the EAP, establishing training seminars, and coordinating EAP exercises. The LOS EAP coordinator is James Porter and is the EAP contact for questions about the plan.

5. Preparedness

Preparedness typically consists of activities and actions taken before the development of an incident. Preparedness activities attempt to facilitate response to an incident as well as prevent, moderate, or alleviate the effects of the incident. The following subsections relate to preparedness actions.

5.1 Surveillance and Monitoring

Prompt detection and evaluation of information from instrumentation and physical monitoring is critical to the effectiveness of the EAP and timely emergency response. The LOS impoundments are inspected by plant operators once per day and visually monitor water levels in the pond. Float control is employed on pumps to provide automated control of the level within the ponds. Alarms sound in the control room if level rise above the high float or fall below the low float to provide constant monitoring of the levels within the impoundments.

5.2 Evaluation of Detection and Response Timing

Total EAP implementation time from the initiation of an actual incident to determination of an emergency situation and notification of appropriate entities involved with implementation should be evaluated and understood.

5.3 Access to the Site

The primary access to reach the site by vehicle from the Town of Stanton is from Highway 31/South West Street to Highway 200A. The main entrance to the site is approximately 3.4 miles east of the Hwy 31 and Hwy 200 intersection. Additional access drives along Highway 200 are also available. Access to the site from the Town of Stanton is anticipated to take about 10 to 15 minutes.

As a secondary means of access, the site could be accessed from the Missouri River. A boat launch is located approximately 1 mile west of BEPC, adjacent to the former Great River Energy Stanton Station.

During an imminent failure emergency event, on-site roads, field trails, and the railroad near the impoundments should not be utilized in the event that these access points become flooded or damaged during the event. Coal is brought in by rail from the northwest, so the railroad should be contacted and notified that access to the site may become compromised.

The access route for reaching the site is shown on Figure A.2 Site Overview Map, included in **Appendix A.** The access to the boat launch ramp is shown on Figure A.3 Access via Boat Launch Map included in **Appendix A**.

5.4 Response during Periods of Darkness

The Leland Olds Station has a light near the pump house but does not have any on-site lighting around the impoundments. If an event is identified during periods of darkness, light plants stored at the yard maintenance should be used to illuminate the area where failures could occur.

During a power failure, on-site backup diesel generators stored at the yard maintenance should be used to operate equipment where manual operation is not feasible. Diesel fuel is stored on-site in the fuel tanks.

5.5 Response during Weekends and Holidays

The Leland Olds Station is operated 24 hours a day, 7 days a week. Therefore, no special response is needed during weekends and holidays. Normal procedures should be followed.

5.6 Response during Adverse Weather

The Leland Olds Station is operated 24 hours a day, 7 days a week. Therefore, no special response is needed during adverse weather. Normal procedures should be followed. Refer to Section 5.3 for primary and secondary access to the site.

5.7 Alternative Sources of Power

Diesel generators are available on-site as an alternative source of power. Fuel is stored in the fuel tanks located on-site.

5.8 Emergency Supplies and Information

Planning and organizational measures that can help the owner and emergency management authorities manage an emergency situation more safely and effectively include stockpiling materials and equipment for emergency use and coordinating information between organizations.

5.8.1 Materials and Equipment

In the event of a high water excursion event, on-site stop logs will be installed or sluice gates will be closed to limit flow of water entering the impoundment by LOS operators. On-site pumps permanently installed in the pump house will be utilized by LOS operators to lower the water level to ponds having greater remaining freeboard.

In the event of embankment deficiencies, water within the impoundments should be lowered by LOS operators below the observed deficiency using the systems currently in place (stop logs, sluice, gates, and/or pumps) unless those systems are not able to address the issue efficiently. Temporary controls such as earth fill or rip rap may be installed by LOS staff to control the deficiency, and earth moving equipment may be necessary for address corrective measures following a field investigation. LOS has a backhoe excavator stored on-site which can be operated by LOS staff.

Material inventory for temporary control measures is stored near the warehouse but often varies in quantity. However, fill material is generally readily available from at the onsite landfill.

5.8.2 Available Resources

During an emergency, the owners/operators may need to bring in outside resources such as heavy equipment, sandbags, pumps, siphons or divers. A listing of the resources including provider names, addresses and telephone numbers available to the owner/operator of the LOS Impoundments can be found in **Appendix B** and was last updated on the date shown on the bottom of the page.

5.9 Coordination of Information

Refer to the Notification Flowchart in **Appendix B** when informing responsible parties of an emergency.

Information on weather should be obtained from the National Weather Service (NWS) at http://www.weather.gov/ or by phone (Stanton, ND is served by NWS Bismarck, ND) at 701-250-4224. Co-ordination with the NWS is recommended to monitor storms, river stages, and flood waves resulting from a failure. The NWS may also be able to supplement warnings being issued using their own communication system.

5.10 Annual Review, Training, and Testing

The EAP should be reviewed on an annual basis to ensure that all contact information listed is accurate and that personnel are familiar with the EAP and understand their role in responding to an emergency. Training and exercise plans should be designed and developed by those entities with responsibilities identified in the EAP. EAP action items and procedures should be exercised periodically for all individuals involved in its implementation so that individuals are familiar with their roles and responsibilities. The annual review of and training for the LOS Impoundment's EAP will occur in December. Based on changes identified in the annual review, copies of updated pages will be provided to all holders of the EAP. A copy of the most current EAP will be kept in the shift supervisor's office and weekend duty superintendent's office.

At least every year, the owner/operator of the LOS Impoundments will meet with the Mercer County Emergency Management to discuss what changes have been made to the Mercer County All Hazards Emergency Response/ Operations Plan and to determine what opportunities exist for exercises. Also, the owner/operator of the LOS

Impoundments will review the dam failure (hydraulic shadow) map to identify any significant land use changes in the hazard area.

The owner/operator should work with local emergency management to determine what opportunities exist to conduct or participate in impoundment related EAP exercises.

5.11 Alternative Systems of Communication

The list below provides information on the forms of communication that are available at the LOS Impoundments and operating procedures during an emergency event:

- Phones: primary source of communication during an emergency event.
- Email: used for follow up communication.
- Plant-wide Emergency Response system: to be used when evacuation of employees is required.

5.12 Public Awareness and Communication

Downstream areas of the LOS Impoundments primarily consist of agricultural land. Public awareness measures should be provided to explain the proximity of the impoundment to the lands of the downstream owners.

Appendix A – Figures

A.1 Project Overview Map

A.2 Site Overview Map

A.3 Access via Boat Launch Map

A.4 Hydraulic Shadow Map

A.5 Dam Failure Analysis Summary Tables

AECOM

Drawn By:	JMJ
Checked By:	PDD
Date:	7/31/2018
Project #:	60565307

LELAND OLDS STATION
STANTON, ND

PROJECT OVERVIEW MAP

Client:
Basin Electric Power Cooperative

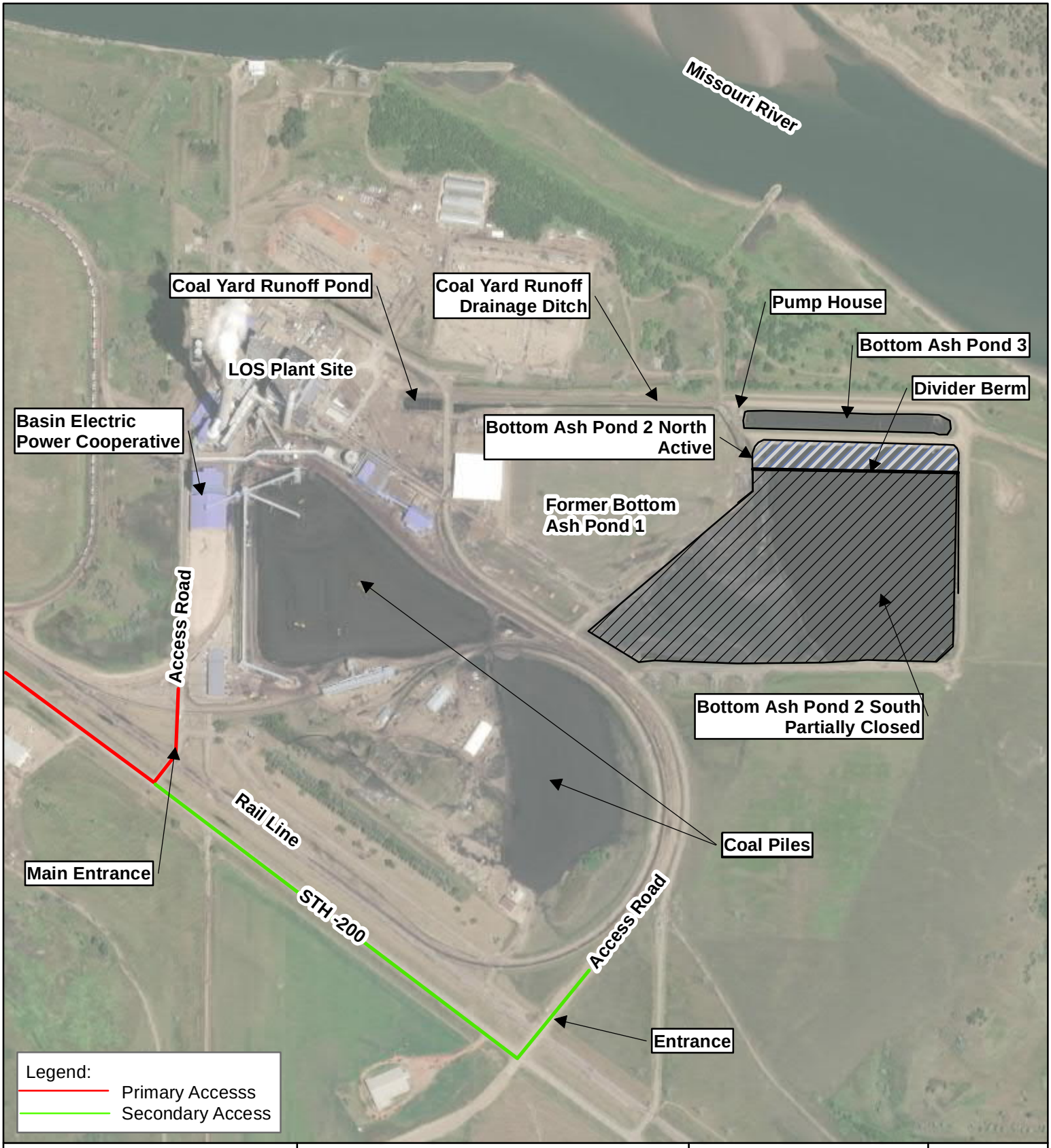
Projection:
NAD 1927 StatePlane North Dakota South FIPS 3302

FIGURE
A.1

1 : 250,000

0 1 2 4
Miles

\\usosh1pfpsw001.na.aecomnet.com\12Projects\Projects\60565307_LOS Ash Ponds\400-Technical\434 EAP\Dam Break Analysis\GIS\920_GIS\Map 1 - Project Overview.mxd



Drawn By:	JMJ
Checked By:	PDD
Date:	8/2/2018
Project #:	60565307

LELAND OLDS STATION
STANTON, ND

SITE OVERVIEW MAP

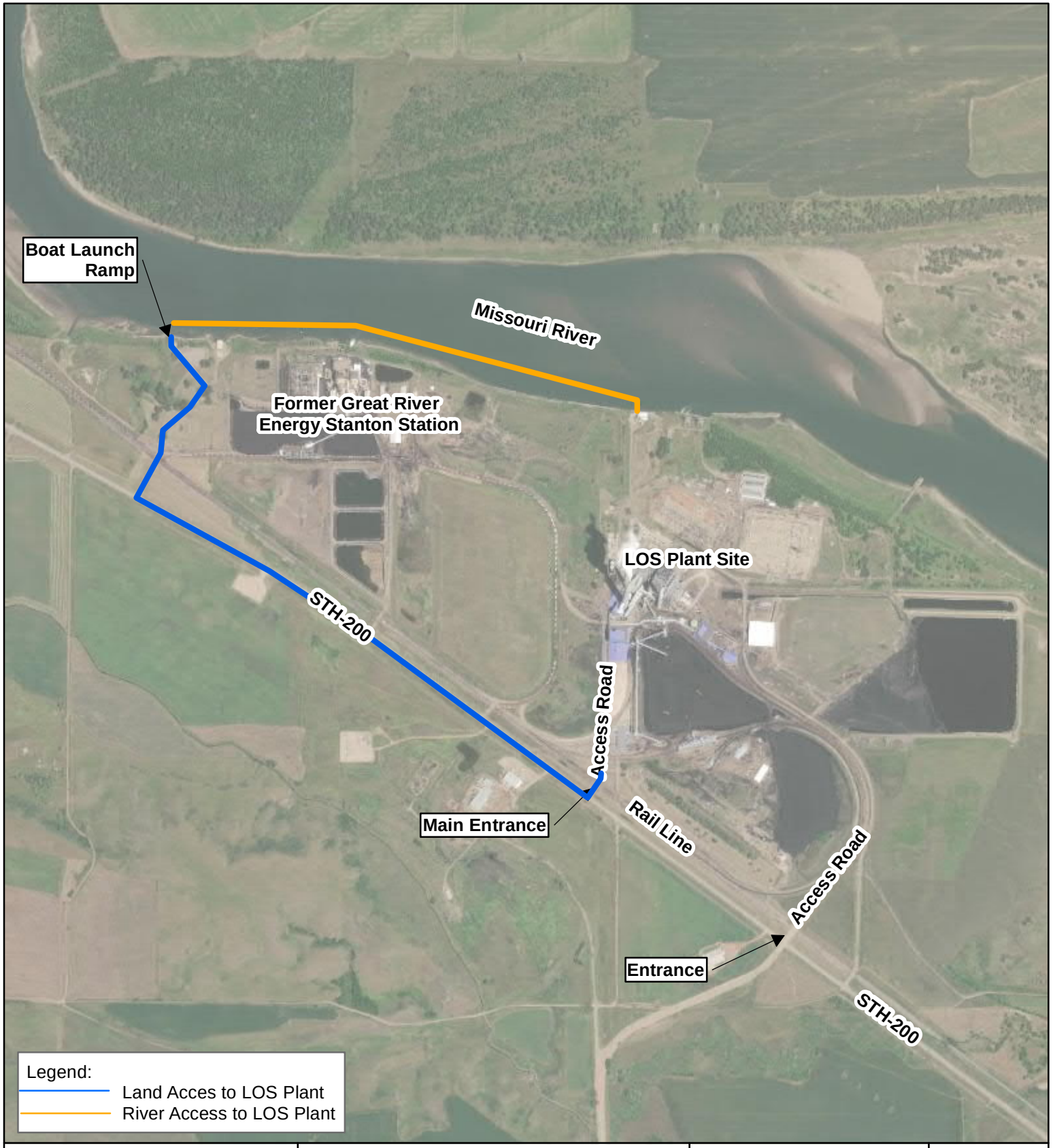
Client:
Basin Electric Power Cooperative

Projection:
NAD 1927 StatePlane North Dakota South FIPS 3302

FIGURE
A.2

1 : 8,000
Feet
0 250 500 1,000

\\usosh1pfpsw001.na.aecomnet.com\12Projects\Projects\60565307_LOS Ash Ponds\400-Technical\434 EAP\Dam Break Analysis\GIS\920_GIS\Map 2 - Site Overview with full hatch.mxd



AECOM

Drawn By:	PEF
Checked By:	SKA
Date:	8/2/2018
Project #:	60565307

LELAND OLDS STATION
STANTON, ND

ACCESS VIA BOAT LAUNCH MAP

Client:
Basin Electric Power Cooperative

Projection:
NAD 1927 StatePlane North Dakota South FIPS 3302

FIGURE
A.3

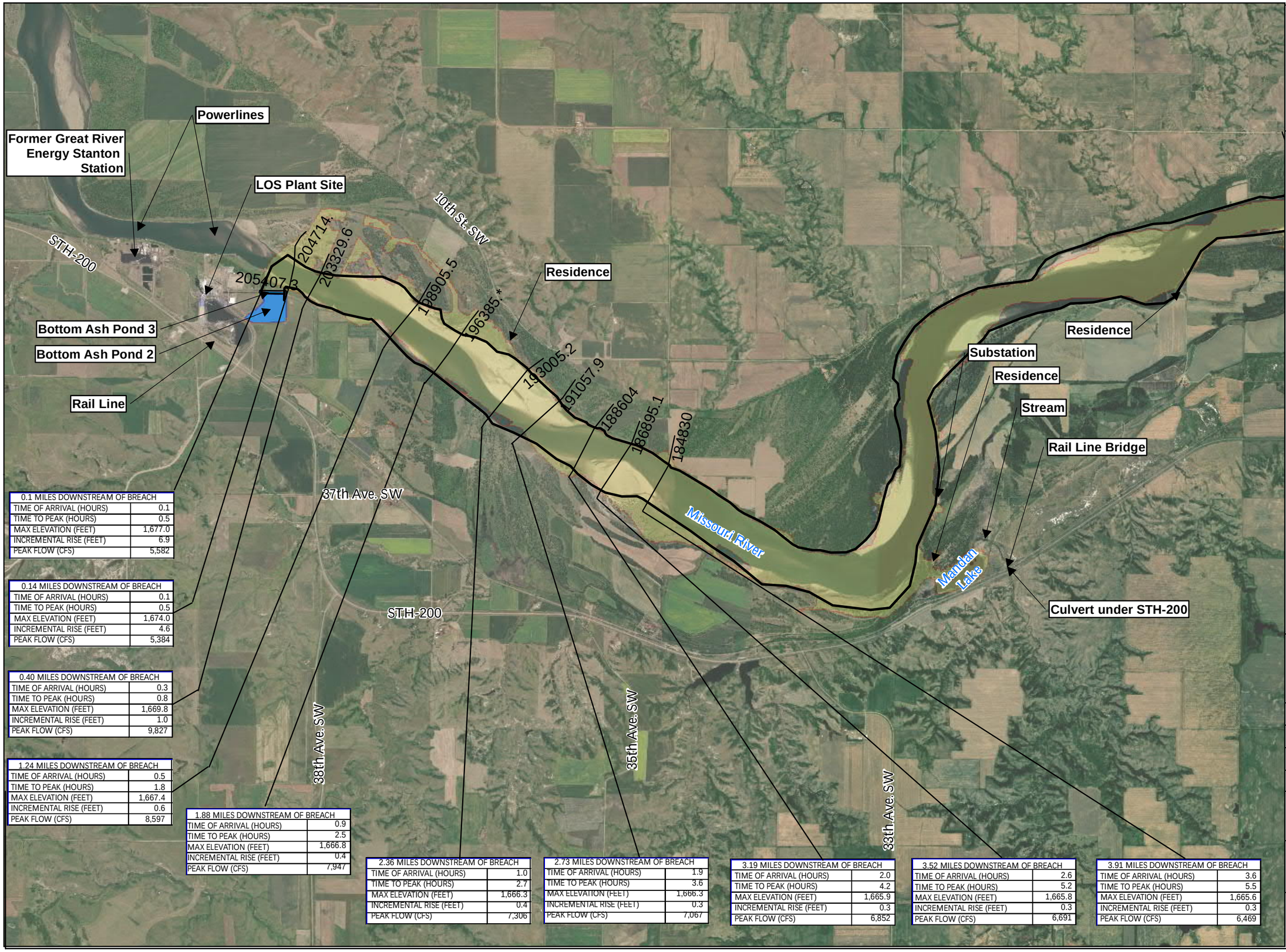
1 : 15,000

0 250 500 1,000
Feet

\\usosh1pfpsw001.na.aecomnet.com\12Projects\Projects\60565307_LOS Ash Ponds\400-Technical\434 EAP\Dam Break Analysis\GIS\920_GIS\Map 3 - Access via boat launch.mxd

LOS SITE

BOTTOM ASH PONDS 2 and 3



0.1 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	0.1
TIME TO PEAK (HOURS)	0.5
MAX ELEVATION (FEET)	1,677.0
INCREMENTAL RISE (FEET)	6.9
PEAK FLOW (CFS)	5,582

0.14 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	0.1
TIME TO PEAK (HOURS)	0.5
MAX ELEVATION (FEET)	1,674.0
INCREMENTAL RISE (FEET)	4.6
PEAK FLOW (CFS)	5,384

0.40 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	0.3
TIME TO PEAK (HOURS)	0.8
MAX ELEVATION (FEET)	1,669.8
INCREMENTAL RISE (FEET)	1.0
PEAK FLOW (CFS)	9,827

1.24 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	0.5
TIME TO PEAK (HOURS)	1.8
MAX ELEVATION (FEET)	1,667.4
INCREMENTAL RISE (FEET)	0.6
PEAK FLOW (CFS)	8,597

1.88 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	0.9
TIME TO PEAK (HOURS)	2.5
MAX ELEVATION (FEET)	1,666.8
INCREMENTAL RISE (FEET)	0.4
PEAK FLOW (CFS)	7,947

2.36 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	1.0
TIME TO PEAK (HOURS)	2.7
MAX ELEVATION (FEET)	1,666.3
INCREMENTAL RISE (FEET)	0.4
PEAK FLOW (CFS)	7,306

2.73 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	1.9
TIME TO PEAK (HOURS)	3.6
MAX ELEVATION (FEET)	1,666.3
INCREMENTAL RISE (FEET)	0.3
PEAK FLOW (CFS)	7,067

3.19 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	2.0
TIME TO PEAK (HOURS)	4.2
MAX ELEVATION (FEET)	1,665.9
INCREMENTAL RISE (FEET)	0.3
PEAK FLOW (CFS)	6,852

3.52 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	2.6
TIME TO PEAK (HOURS)	5.2
MAX ELEVATION (FEET)	1,665.8
INCREMENTAL RISE (FEET)	0.3
PEAK FLOW (CFS)	6,691

3.91 MILES DOWNSTREAM OF BREACH	
TIME OF ARRIVAL (HOURS)	3.6
TIME TO PEAK (HOURS)	5.5
MAX ELEVATION (FEET)	1,665.6
INCREMENTAL RISE (FEET)	0.3
PEAK FLOW (CFS)	6,469

Base Flow Extent
Cross Sections
Storage_Areas
Breach Inundation Area

NOTES:
1. DUE TO THE METHOD, PROCEDURES, AND ASSUMPTIONS USED TO DEVELOP THE FLOODED AREAS, THE LIMITS OF FLOODING SHOWN AND FLOOD WAVE TRAVEL TIMES ARE APPROXIMATE AND SHOULD BE
USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES. ACTUAL AREAS INUNDATED WILL DEPEND ON ACTUAL FAILURE CONDITIONS AND MAY DIFFER FROM AREAS SHOWN ON THE MAP (S).
2. FLOOD MAP DATA ON THIS DRAWING REPRESENT OUTPUT DATA FROM A HECRAS MODEL STUDY AND REPORT ENTITLED "DAM FAILURE ANALYSIS – BASIN ELECTRIC POWER COOPERATIVE" COMPLETED BY AECOM DATED MARCH 2017.
3. BEGINNING AND PEAK FLOOD ARRIVAL TIMES ESTIMATED FROM TIME OF DAM FAILURE.
4. TIME TO PEAK IS DEFINED AS THE TIME FROM BEGINNING OF BREACH TO THE TIME OF PEAK WSEL.
5. BASE MAP COUNTOUR DATA FROM THE NATIONAL ELEVATION DATASET.
6. ALL ELEVATION ARE REFERENCED TO NVGD29 AND SHOWN AS FEET ABOVE MSL.
7. ROAD NAME LABELS OBTAINED FROM GIS.
8. INCREASE IN WSEL IS THE DIFFERENCE BETWEEN MAXIMUM WSEL UNDER DAM FAILURE AND MAXIMUM WSEL UNDER NO FAILURE SCENARIO.
9. ABBREVIATION USED:
W.S. OR WSEL = WATER SURFACE ELEVATION

AECOM

Drawn By:	PEF
Checked By:	CS
Date:	8/3/2018
Project #:	60565307

Projection:
NAD 1927 StatePlane North Dakota South FIPS 3302

FIGURE
A.4

1 : 1,000,000
0 0.5 1 Miles

A.4: Dam Failure Analysis Summary Table, Ponds 2 & 3						
Cross Section River Station	**Miles Downstream**	**Time of Arrival[1] (hours)**	**Time to Peak[1,2] (hours)**	**Max Elevation (ft)**	**Incremental Rise[3] (ft)**	**Peak Flow (cfs)**
205523.5	0.0	0.0	0.0	1686.4	0.0	5,582
RS 205518 Pond 2 & 3 North Embankment						
205407.3	0.01	0.1	0.5	1677.0	6.9	5,582
204714.0	0.14	0.1	0.5	1674.0	4.6	5,384
Mouth of Missouri River						
203329.6	0.40	0.3	0.8	1669.8	1.0	9,827
198905.5	1.24	0.5	1.8	1667.4	0.6	8,597
195545.5	1.88	0.9	2.5	1666.8	0.4	7,947
193005.2	2.36	1.0	2.7	1666.6	0.4	7,306
191057.9	2.73	1.9	3.6	1666.3	0.3	7,067
188604.0	3.19	2.0	4.2	1665.9	0.3	6,852
186895.1	3.52	2.6	5.2	1665.8	0.3	6,691
184830.0	3.91	3.6	5.5	1665.6	0.3	6,469

Notes:

1. Beginning and peak flood arrival times estimated from time of dam failure.
2. Time to peak is defined as the time from beginning of breach to the time of peak water surface elevation.
3. Increase in water surface elevation is the difference between maximum water surface elevation under dam failure and maximum water surface elevation under no failure scenario.

Appendix B – Charts and Tables

Summary of EAP Responsibilities

Entity	Responsibilities
Owner/Operator	1. Verify and assess emergency conditions 2. Notify other participating emergency management agencies 3. Take corrective action at facility 4. Declare termination of emergency at facility 5. Update EAP on at least an annual basis 6. Respond to emergencies at the facility 7. Receive condition status reports from the operator
Mercer County Sheriff's Office and Stanton Rural Fire Protection Department	1. Receive condition status reports from owner 2. Render assistance to Mercer County, ND Fire Departments, as necessary 3. Render assistance to owner, as necessary
Mercer County Sheriff's Office and Mercer County Fire Department	1. Receive condition status reports from owner 2. Notify public within Mercer County 3.

Summary of Owner Responsibilities

Entity	Responsibilities
24/7 Operations Command Center	1. Detect incident 2. Determine emergency level 3. Make calls on notification flow chart 4. Coordinate with Operator and Engineering on gate operations and emergency procedures 5. Provide regular status reports to senior management
On-site Operator	1. Detect/confirm incident 2. Determine emergency level 3. Make calls on Notification Flowchart 4. Coordinate with Command Center and Engineering on emergency procedures 5. Implement emergency procedures 6. Provide regular status reports to senior management
Engineering Manager	1. Support onsite Operator and Operations Command Center on emergency level 2. Make calls on notification flow chart 3. Determine emergency operation and construction procedures 4. Coordinate with Operator and Command Center emergency procedures 5. Dispatch engineers and construction crews as necessary 6. Dispatch engineer as technical liaison to County Emergency Operations Center 7. Provide regular status reports to senior management
Senior Management	1. Make calls on Notification Flowchart 2. Initiate periodic status report conference calls with site, command center, engineering, and public relations 3. Provide regular status reports to County Emergency Operations Center 4. Coordinate with upper management 5. Coordinate with public relations staff at County and technical liaison at County Emergency Operations Center
Public Relations	1. Mobilize to County Offices 2. Participate in periodic status report conference calls with site, command center, engineering, and management 3. Provide input to staff on emergency communications 4. Represent utility to media

Guidance for Determining the Emergency Level

Event	Situation	Emergency Level*
Embankment Overtopping	Reservoir level is 2.0 feet below the top of the impoundment	Potential Failure
	Water from the reservoir is flowing over the top of the impoundment	Imminent Failure
Seepage	New seepage areas in or near the impoundment	Non-failure
	New seepage areas with cloudy discharge or increasing flow rate	Potential Failure
Sinkholes	Observation of new sinkhole in reservoir area or on embankment	Potential Failure
	Rapidly enlarging sinkhole	Imminent Failure
Embankment/ Structural Component Cracking	New cracks in the embankment/structural component greater than ¼-inch wide without seepage	Non-failure
	Cracks in the embankment/structural component with seepage	Potential Failure
Embankment/ Structural Component Movement	Visual movement/slippage of the embankment slope/structural component	Non-failure
	Sudden or rapidly proceeding slides of the embankment slopes/structural component	Imminent Failure
Security Threat	Verified bomb threat that, if carried out, could result in damage to the impoundment	Potential Failure
	Detonated bomb that has resulted in damage to the impoundment or appurtenances	Imminent Failure
Sabotage/ Vandalism	Unauthorized operation of the impoundment	Non-failure
	Damage that could adversely impact the functioning of the impoundment or appurtenances	Non-failure
	Modification to the impoundment or appurtenances that could adversely impact the functioning of the impoundment	Potential Failure
	Damage to impoundment or appurtenances that has resulted in seepage flow	Potential Failure
	Damage to impoundment or appurtenances that has resulted in uncontrolled water release	Imminent Failure

Last Updated: July 2018

Level of Emergency Determination Chart

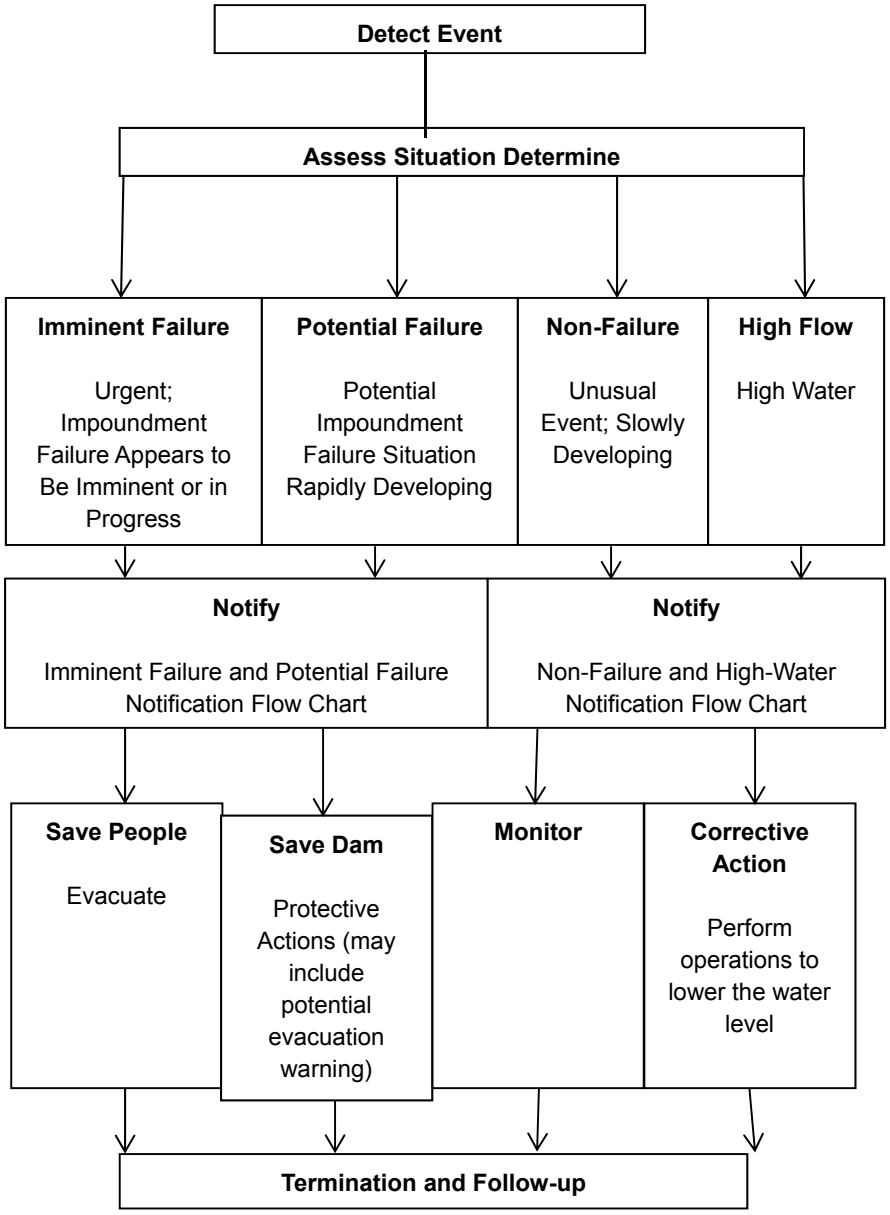
Step 1:
Event Detection

Step 2:
Emergency Level Determination

Step 3:
Notification and Communication

Step 4:
Expected Actions

Step 5:
Termination and Follow-up



Last Updated: July 2018

Imminent Failure and Potential Failure Notification Flow Chart

Notes

1 = Call Sequence

* Call EAP Coordinator if 911 is notified by non-utility observer

Observer of Incident Event

EAP Coordinator (Owner/Operator)

Primary Contact
Name: James Porter
Primary Phone #: 701-745-7202 Direct
Alternate Phone #: 701-955-0147 Cell

Alternate Contact
Name: Casey Mutzenberger
Primary Phone #: 701-745-7271 Direct
Alternate Phone #: 701-400-7751 Cell

Suggested EAP Coordinator Message – Imminent Failure

- This is <state name>. I am making this call in accordance with the Leland Olds Station Emergency Action Plan (EAP).
- Problems have occurred at the Leland Olds Station.
- The EAP has been activated, currently at the highest emergency level, imminent failure.
- Flooding along the Missouri River is possible.
- **Immediately evacuate** residences along the Missouri River.
- We will keep you apprised of the situation. The best telephone number to reach me during this event is <state phone number>.

Suggested EAP Coordinator Message – Potential Failure

- This is <state name>. I am making this call in accordance with the Leland Olds Station Emergency Action Plan (EAP).
- Problems have occurred at the Leland Olds Station.
- The EAP has been activated, currently at the Potential Failure Emergency level.
- Flooding along the Missouri River is possible.
- **Prepare to evacuate** residences along the Missouri River.
- We will keep you apprised of the situation. The best telephone number to reach me during this event is <state phone number>.

1 → **Mercer County Emergency Management***
Primary Phone #: 701-745-3302
Alternate Phone #: 911

2 → **CEO & General Manager**
Name: Paul Sukut
Primary Phone #: 701-557-5715

3 → **BEPC Security (at Least 10 rings)**
Primary Phone #: 701-557-5335

1 → **Hazen Fire and Rescue**
Primary Phone #: 701-745-3333

2 → **Sakakawea Medical Center**
Primary Phone #: 701-748-2225

4 →

Regulatory Authorities

North Dakota Department of Emergency Services (Ask for NDDES Duty Officer (off hours or 701-328-9921)
Primary: 800-472-2121
Alternate: 701-328-8100

North Dakota Governor
Office: 701-328-2200
Alternate (Chief of Staff): 307-262-2142

Dakotas Area Office (Bureau of Reclamation)
Primary: 701-250-4242

Corps of Engineers, Riverdale
Primary: 701-654-7441

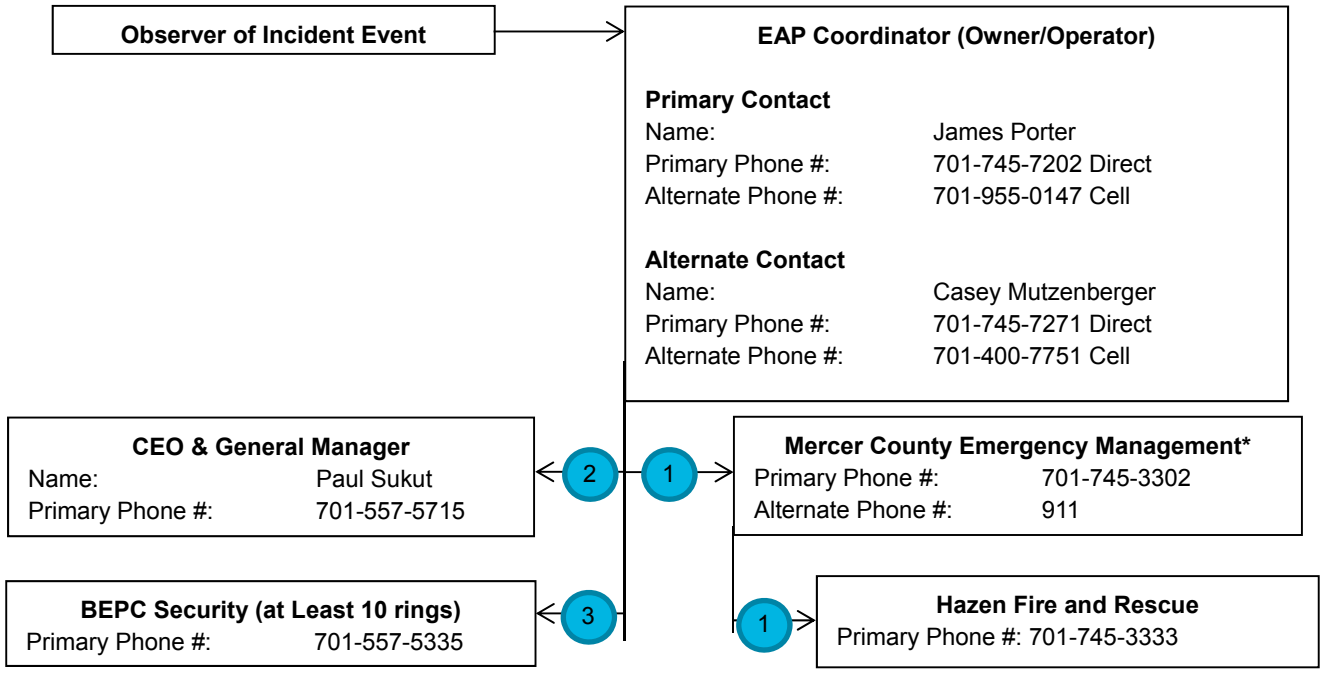
National Weather Service, Bismarck, ND
24 hr. Emergency: 701-250-4224

North Dakota 24-Hour Highway Patrol Dispatch (Western Division)
Primary: 701-328-2467 (non-emergency)

This contact information is not to be released to the public and is not to be used for any purpose other than an emergency.

Last Updated: July 2018

Non-Failure and High Water Notification Flow Chart



Notes

= Call Sequence

* Call EAP Coordinator if 911 is notified by non-utility observer

1

Suggested EAP Coordinator Message

- This is <state name>. I am making this call in accordance with the Leland Olds Station Emergency Action Plan (EAP).
- An incident has been detected at the Leland Olds Station.
- The EAP has been activated, currently at a <state either: non-failure or high water> incident level.
- The situation is being monitored to determine if any evacuation warnings are necessary.
- We will keep you apprised of the situation. The best telephone number to reach me during this event is <state phone number>.

This contact information is not to be released to the public and is not to be used for any purpose other than an emergency.

Last Updated: July 2018

Available Resources

Resource	Company Name	Address	Telephone #
Heavy Equipment Service and Rental	Basin Electric – utilize owned equipment stored on-site.		
	Titan Machinery Rental	1500 Industrial Dr. Bismarck, ND 58501	701-250-7925
Sand and Gravel Supply	Strata Corporation	851 Hwy 49 N Beulah, ND	701-667-1211
	Knife River	1150 W Century Ave. Bismarck, ND	701-530-1307 701-530-1400
	Sundre Sand and Gravel	6220 37th Avenue SE. Minot, ND	701-838-4455
Ready Mix Concrete Supply	Knife River	1150 W Century Ave. Bismarck, ND	701-530-1307 701-530-1400
	Strata Corporation	851 Hwy 49 N Beulah, ND	701-667-1211
Pumps/Siphons	Titan Machinery Rental	1500 Industrial Dr. Bismarck, ND 58501	701-250-7925
	United Rentals	3925 Miriam Avenue, Bismarck, ND 58501	701-222-1040
	Bismarck Rental	1356 Airport Rd. Bismarck, ND	701-663-8495
Diving Contractor	Central Divers L.L.C.	511 West Dakota Rd Pierre, South Dakota	605-224-6572 605-224-4149 (emergency)
	Midco Diving & Marine Services, Inc.	Rapid City, South Dakota	605-791-3030
Sand Bags	Grainger International	3825 12th Avenue North Fargo, ND 58102	800-472-4643
	Grainger International	15 Energy Street 500 Williston, ND 58801	800-472-4643
Generators and Emergency Lighting	Herc Rental	3101 Morrison Ave Bismarck, ND 58504	701-224-3500
	Titan Machinery Rental	1500 Industrial Dr. Bismarck, ND 58501	701-250-7925
Additional Resources:			

Last Updated: July 2018

Appendix C – Blank Forms and Log Sheets

C.1 Communication Documentation Chart

C.2 List of Holders, Receipt Confirmation, and Emergency Action Plan Updates

C.3 Emergency Incident Log

C.4 Emergency Termination Log

Communication Documentation Chart

Date	Time	Person Contacted	Method of Contact	Reason for Contact
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			
	AM PM			

Last Updated: July 2018

Emergency Action Plan Updates

Rev #	Date	Sections Reviewed or Revisions Made	Revisions Made By
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

List of Holders, Receipt Confirmation, and Emergency Action Plan Updates

#	Name	Address	Telephone #	Date of Receipt
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Last Updated: July 2018

Emergency Incident Log

Name: _____ Job Title: _____

Incident Start Date: _____ Incident Start Time: _____

Incident Description: _____

Initial Incident Level: _____

Incident Detection: _____

When did you detect or learn about the incident: _____

How did you detect or learn about the incident: _____

Log All Notifications and Activity in the Table Below

Date	Time	Action/Incident Progression	Action Taken By

Emergency Termination Log

Impoundment Name: _____ County: _____

Impoundment Location: _____ Stream/River: _____

Date/Time: _____

Weather Conditions: _____

General Description of Emergency Situation: _____

_____

Area of Impoundment Affected: _____

Extent of Damage to Impoundment & Possible Cause: _____

_____

Effect on Impoundment Operation: _____

_____

Initial Reservoir Elevation/Time: _____

Maximum Reservoir Elevation/Time: _____

Final Reservoir Elevation/Time: _____

Description of Area Flooded Downstream / Damage/ Loss of Life: _____

_____

Justification for Termination of Dam Safety Emergency: _____

_____

Other Data and Comments: _____

_____

_____

_____

Report Prepared By: _____
(Printed Name and Signature) (Date)

Appendix D – Glossary

Breach: An opening through the embankment resulting in partial or total failure of the impoundment.

Consequences: Potential loss of life or property damage downstream of an impoundment caused by floodwaters released at the impoundment or by waters released by partial or complete failure of impoundment. This includes effects of landslides upstream of the impoundment on the property located around the reservoir.

Emergency Action Plan (EAP): Formal document that identifies potential emergency conditions at an impoundment and specifies preplanned actions to be followed to minimize property damage and loss of life. The EAP describes actions the owner will take to moderate or alleviate a problem at the impoundment, as well as actions the owner, in coordination with emergency management authorities, will take to respond to incidents or emergencies related to the impoundment.

EAP exercise: Activity designed to promote prevention, preparedness, and response to incidents and emergencies, and may also be extended to include recovery operations. The exercise also demonstrates the EAP's effectiveness in an actual situation and demonstrates the readiness levels of key personnel. Periodic exercises result in an improved EAP because lessons learned are incorporated into the updated EAP document. Exercises consist of testing and performing the duties, tasks, or operations identified and defined within the EAP through a simulated event.

Emergency: Any incident, whether natural or manmade, that requires responsive action to protect life or property.

Emergency alert system: A federally established network of commercial radio stations that voluntarily provide official emergency instructions or directions to the public during an emergency.

Emergency management authority: State, local, Tribal, or Territorial agency responsible for emergency operations, planning, mitigation, preparedness, response, and recovery for all hazards. Names of emergency management authorities vary (e.g., Division of Emergency Management, Comprehensive Emergency Management, Disaster Emergency Services, Emergency and Disaster Services).

Emergency Operations Center: The location or facility where responsible officials gather during an emergency to direct and coordinate emergency operations, to communicate with other jurisdictions and with field emergency forces, and to formulate protective action decisions and recommendations during an emergency.

Flood hydrograph: Graph showing the discharge, height, or other characteristic of a flood with respect to time for a given point on a stream.

Flood routing: Process of determining progressively, over time, the amplitude of a flood wave as it moves past an impoundment or downstream to successive points along a river or stream.

Hazard potential: Situation that creates the potential for adverse consequences, such as loss of life, property damage, or other adverse impact. Impacts may be for a defined area downstream of an impoundment from floodwaters released through spillways and outlet works of the impoundment or waters released by partial or complete failure of the impoundment. They may also be for an area upstream of the impoundment from the effects of backwater flooding or the effects of landslides around the reservoir perimeter.

Headwater: Water immediately upstream from an impoundment. The water surface elevation varies due to fluctuations in inflow and the amount of water passed through the impoundment.

Incident: An incident in terms of impoundment operation includes an impending or actual sudden release of water caused by an accident to, or failure of, an impoundment or other water retaining structure, or the result of an impending flood condition when the impoundment is not in danger of failure, or any condition that may affect the safe operation of the impoundment. The release of water may or may not endanger human life, downstream property and structures, or facility operations.

Impoundment Failure: Catastrophic type of failure characterized by the sudden, rapid, and uncontrolled release of impounded water. There are lesser degrees of failure, but any malfunction or abnormality outside the design assumptions and parameters that adversely affect an impoundment's primary function of impounding water is properly considered a failure. Lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. They are, however, normally amendable to corrective action.

Inflow Design Flood (IDF): Flow used in the design of an impoundment and its appurtenant works, particularly for sizing the spillway and outlet works, and for determining the maximum height of the impoundment, freeboard, and temporary storage requirements. The IDF is typically the flow above which the incremental increase in water surface

elevation due to failure of an impoundment is no longer considered to present an unacceptable threat to downstream life or property. The upper limit of an IDF is the Probable Maximum Flood.

Inundation map: Map delineating areas that would be flooded as a result of an impoundment failure.

Inundation zone: Area downstream of the impoundment that could be inundated by the released water. This zone is typically demarcated by a boundary reflecting the vertical elevation of the peak flow of water for both a flood failure and non-failure situation.

Notification: To inform appropriate individuals about an emergency condition so they can take appropriate action.

Owner: Entity that owns the impoundment and associated facilities. The owner also includes the operator and operating organization.

Probable Maximum Flood (PMF): Flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that is reasonably possible in the drainage basin under study.