

EMERGENCY ACTION PLAN

FOR

Example Lake Dam

(Insert name of dam)

Example COUNTY
Example TOWNSHIP

ODNR-DSWR FILE NUMBER: 1111-055

CLASS III STRUCTURE

DAM OWNER

John Damowner
111 Route 1
New Lexington, OH. 41111

(Insert name and address)

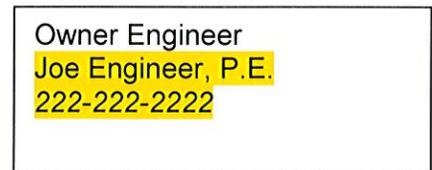
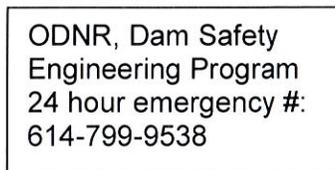
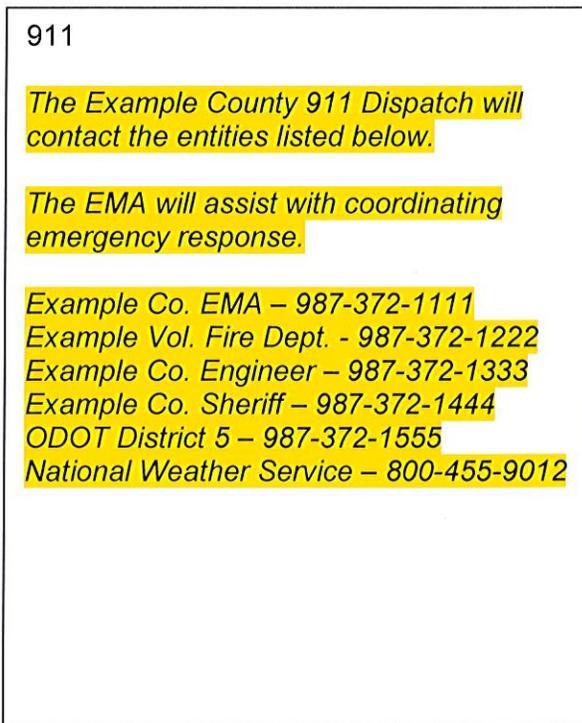
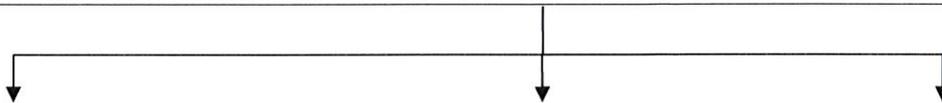
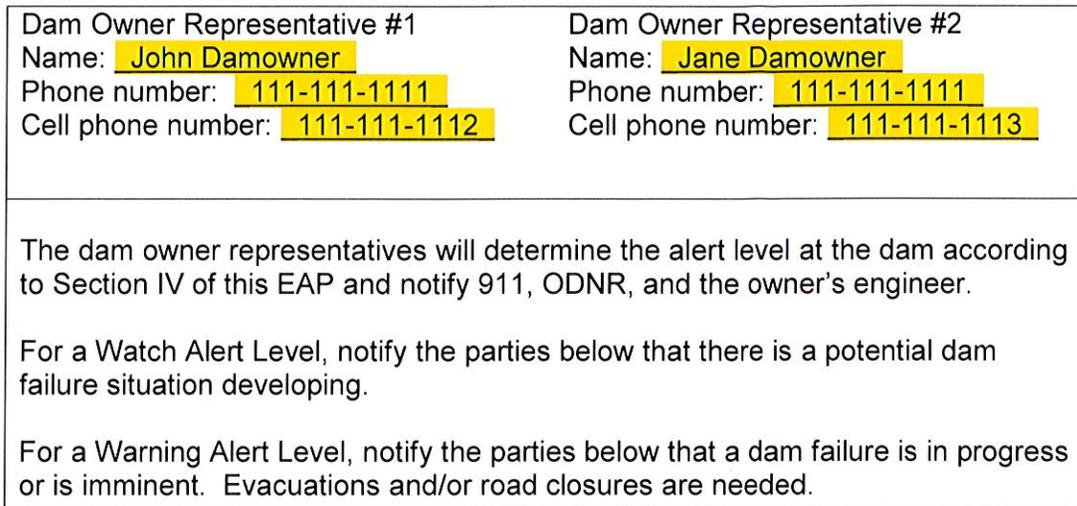
December 2, 2012

(Insert date that EAP created or modified)

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I. Notification Flowchart



II. Purpose

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

- develops unexpectedly;
- endangers the structural integrity of the dam; and
- could result in the dam's failure producing downstream flooding, requiring immediate action.

The EAP provides a description of the dam and the area at risk as well as contact information for all parties involved in responding to or affected by an emergency at the dam. The EAP outlines what actions are required in the event of an emergency.

By creating and implementing an EAP the owner/operator of a dam can reduce the risk of human life loss or injury, minimize property damage during an unusual or emergency event and potentially lessen their liability.

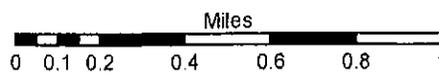
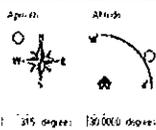
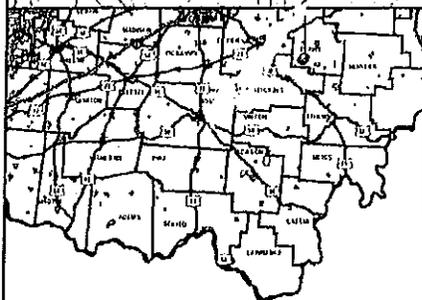
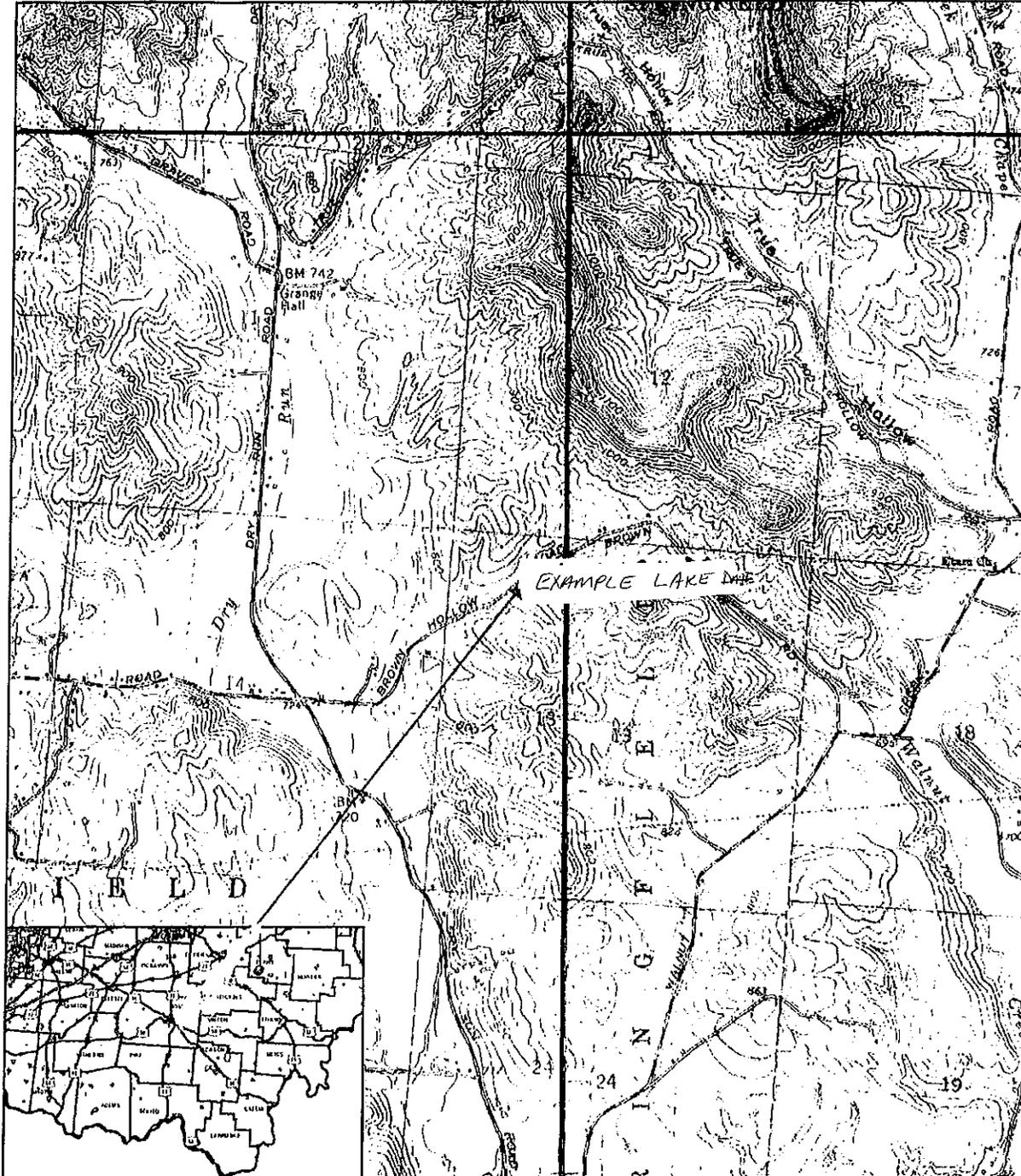
III. Description of Project and Downstream Hazard

In the event of a dam failure, Brown Road, 2 driveways and a barn would be flooded and damaged. No other structures or roads should be affected. See Section VII of this EAP for a map of the potential downstream hazard.

Included are a location map, ODNR Dam Inventory sheet and a sketch of the dam.

LOCATION MAP

EXAMPLE LAKE DAM



Legend

- ★ Dams
- Cities
- ▭ County Boundary
- ▭ Quad Boundary



Feb 27, 2007

Dam Inventory Sheet

Name: EXAMPLE LAKE DAM File No: 1111-055
 National #: OH02355
 Reservoir: Permit No.: N/A
 Class (Ht-Vol): EXEMPT (IV-IV)

Owner Information
 Owner: John Danowner Owner Type: Private
 Address: 111 Route 1 Multi-Dams: -
 City: New Lexington State: OH Zip: 41111
 Contact: Phone No.:

Location Information
 County: Ross Latitude Deg.: 39 Min.: 2 Sec.: 2
 Township: Springfield Longitude Deg.: 82 Min.: 5 Sec.: 3
 Stream: Tributary To Dry Run
 Nearest Affected Community: Three Locks
 Community's Distance from Dam (miles): 8.7
 USGS Quad. Chillicothe East USGS Basin No.: 05060002

Design/Construction Information
 Designed By:
 Constructed By:
 Completed: 1952 Plan Available: At:
 Failure/Incident/Breach:

Structure Information
 Purpose: Recreation, Private
 Type of Impound.: Dam And Spillway
 Type of Structure: Earthfill
 Drainage Area (sq. miles): 0.07 or (acres): 46
Embankment Data
 Length (ft): 585 Upstream Slope: 3H:1V
 Height (ft): 24.9 Downstream Slope: 2H:1V
 Top Width (ft): 5 Volume of Fill (cub. yds.):

Spillway Outlet Works Data
 Lake Drain: 4-INCH-DIAMETER CAST IRON PIPE WITH VALVE
 Principal: 24-INCH-DIAMETER VITRIFIED CLAY PIPE W/4-FT X 4.5-FT CONCRETE RISER
 Emergency: 3-FT-WIDE OPEN CHANNEL W/2.5H:1V SIDE SLOPES
 Maximum Spillway Discharge (cfs): 72 Design Flood: Flood Capacity: 0.12
Dam Reservoir Data

	Elevation (ft-MSL)*	Area (acres)	Storage (acre-feet)
Top of Dam:	792.9	1.9	13.8
Emergency Spillway:	792.4	1.8	13
Principal Spillway:	790.7	1.7	9.9
Streambed:	768		

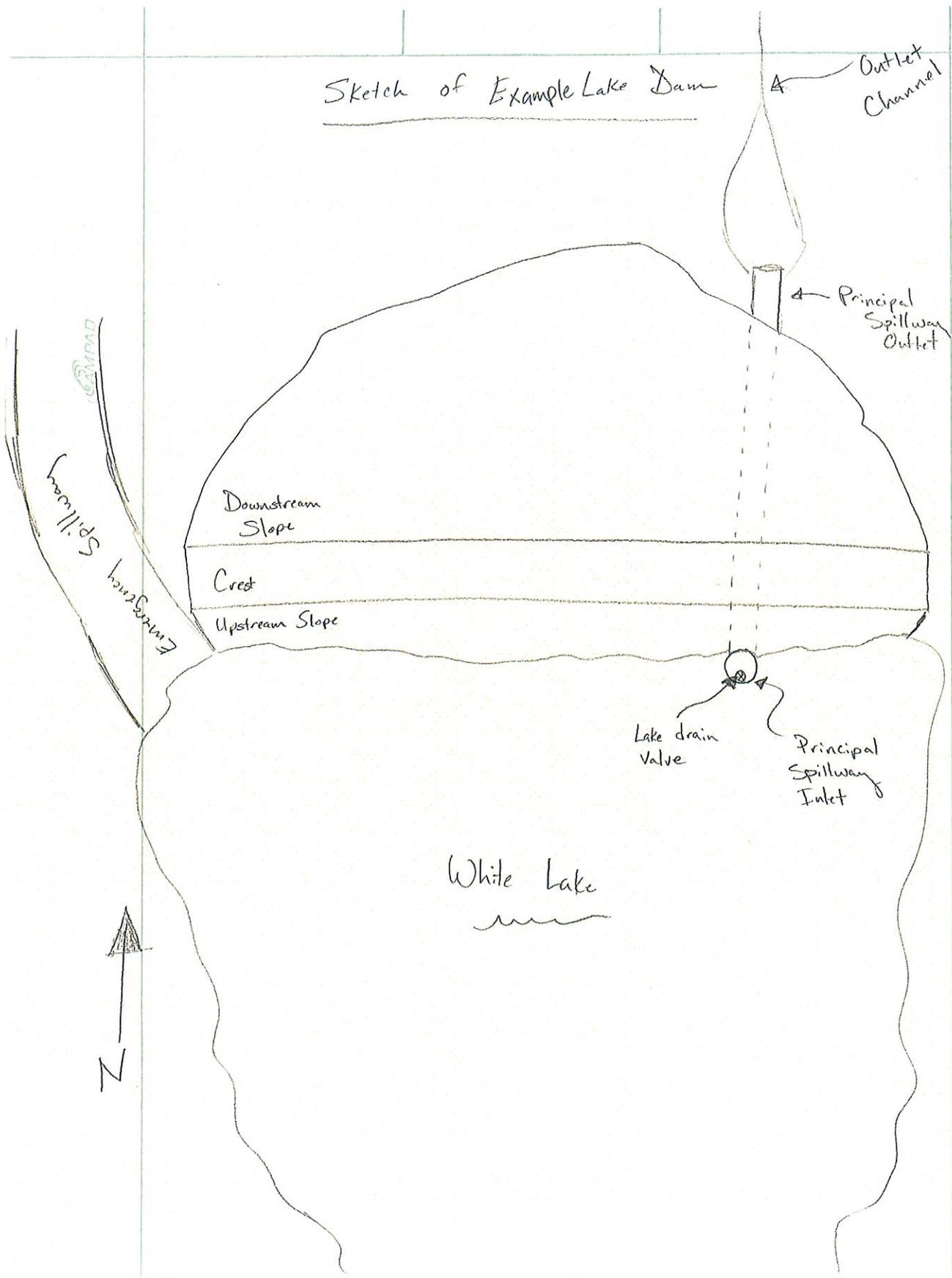
Foundation: *Elevations are not necessarily related to a USGS benchmark

Inspection Information
 Inspection 12/27/2007 DCB Phase I:
 History: 10/29/2001 SGH Other Visits: 5/10/84 INV
 2/20/1991
 Inspection Year: 2007-2008

Operation Information/Remarks
 ANTI-VORTEX IS 8-IN THICK CONCRETE WALL, THE VALVE IS CURRENTLY INOPPERABLE.

Emergency Action Plan: NO Format: OMI:
 Last Entry: 1/2/2008

Sketch of Example Lake Dam



IV. Emergency Detection, Evaluation, and Classification

In order to determine whether an emergency condition exists, the entire dam must be inspected or monitored on a regular basis as outlined in the dam's Operation, Maintenance, and Inspection Manual. When inspecting the dam, pay particular attention to known past problem areas and other areas of current concern as listed below, then use the "Alert Level" table to determine the severity of problems identified from inspecting the dam and the "Classification of Conditions" table to determine the appropriate actions to take.

1. Inspect the dam weekly. This inspection included walking the entire length of the crest and inspecting the following items:
 - Inspect the spillway inlet for obstructions.
 - Monitor the earthen dam for cracks, earth slides/slips, seepage, and sinkholes.
 - This dam has a seepage measuring weir located in the right groin.
 - The end of the spillway pipe is corroded and rusted through on the bottom of the pipe

2. After significant rainfall, dams are more likely to develop problems such as slides, spillway obstructions, seepage, or structural problems. If more than 2 inches of rain occurs within 24 hours or the pool level rises more than one foot, monitor the dam daily until the pool level begins to decrease. Inspect the dam as described in item 1 above. Record rainfall amount and pool elevation. This information can be used to establish how the dam responds to rainfall. It may be found that there is a correlation between lake level and seepage, which would need to be monitored and addressed.

The following references may be used for additional assistance in understanding specific problems with dams and obtaining rainfall data.

- Dam Safety: An Owner's Guidance Manual (FEMA publication 145) (drawings of dam conditions near the end of the report can be used to identify problems): <ftp://ftp.dnr.state.oh.us/water/Public/DCB/EAP/FEMA145/>
- Division of Soil and Water Resources Facts sheets and other publications: <http://www.dnr.state.oh.us/water/dsafety/publications/tabid/3335/Default.aspx>
- Automated Flood Warning System (current rainfall): <http://www.afws.net/states/oh/oh.htm>
- NOAA rainfall maps: <http://www.erh.noaa.gov/ohrfc/Observed.html>

Examples of Emergency Situations

The following are examples of conditions that usually constitute an emergency situation that may occur at a dam. **These are examples only and may or may not apply to this dam.** Adverse or unusual conditions that can cause the failure of a dam are typically related to aging or design and construction oversights. Extreme weather events that exceed the original designed conditions can cause significant flow through the auxiliary spillway or overtopping of the embankment. However, accidental or intentional damage to the dam may also result in emergency conditions. The conditions have been grouped to identify the most likely emergency-level condition. The groupings are provided as guidance only. Not all emergency conditions may be listed, and the dam operator is urged to use conservative judgment in determining whether a specific condition should be defined as an emergency situation at the dam.

Earth Spillway Flows

- **Watch Alert Level—Potential dam failure situation; rapidly developing:**
 1. Significant erosion or headcutting of the spillway is occurring, but the rate does not appear to threaten an imminent breach of the spillway crest that would result in an uncontrolled release of the reservoir.
 2. Flow through the earth auxiliary spillway is or is expected to cause flooding that could threaten people, homes, and/or roads downstream from the dam.
- **Warning Alert Level—Urgent; dam failure appears imminent or is in progress:**
 1. Significant erosion or headcutting of the spillway is occurring at a rapid rate, and a breach of the control section appears imminent.
 2. Flow through the earth auxiliary spillway is causing flooding that is threatening people, homes, and/or roads downstream from the dam.

Embankment Overtopping

- **Watch Alert Level—Potential dam failure situation; rapidly developing:**
 1. The reservoir level is within 1 foot from the top of the dam.
- **Warning Alert Level—Urgent; dam failure appears imminent or is in progress:**
 1. The reservoir level has exceeded the top of the dam, and flow is occurring over the embankment.

Seepage and Sinkholes

- **Watch Alert Level—Potential dam failure situation; rapidly developing:**
 1. Cloudy seepage or soil deposits are observed at seepage exit points or from internal drain outlet pipes.
 2. New or increased areas of wet or muddy soils are present on the downstream slope, abutment, and/or foundation of the dam, and there is an easily detectable and unusual increase in volume of downstream seepage.

3. Significant new or enlarging sinkhole(s) near the dam or settlement of the dam is observed.
 4. Reservoir level is falling without apparent cause.
 5. The following known dam defects are or will soon be inundated by a rise in the reservoir:
 - Sinkhole(s) located on the upstream slope, crest, abutment, and/or foundation of the dam; or
 - Transverse cracks extending through the dam, abutments, or foundation.
- **Warning Alert Level—Urgent; dam failure appears imminent or is in progress:**
 1. Rapidly increasing cloudy seepage or soil deposits at seepage exit points to the extent that failure appears imminent or is in progress.
 2. Rapid increase in volume of downstream seepage to the extent that failure appears imminent or is in progress.
 3. Water flowing out of holes in the downstream slope, abutment, and/or foundation of the dam to the extent that failure appears imminent or is in progress.
 4. Whirlpools or other evidence exists indicating that the reservoir is draining rapidly through the dam or foundation.
 5. Rapidly enlarging sinkhole(s) are forming on the dam or abutments to the extent that failure appears imminent or is in progress.
 6. Rapidly increasing flow through crack(s) eroding materials to the extent that failure appears imminent or is in progress.

Embankment Movement and Cracking

- **Watch Alert Level —Potential dam failure situation; rapidly developing:**
 1. Settlement of the crest, slopes, abutments and/or foundation of the dam that may eventually result in breaching of the dam.
 2. Significant increase in length, width, or offset of cracks in the crest, slopes, abutments, and/or foundation of the dam that may eventually result in breaching of the dam.
- **Warning Alert Level—Urgent; dam failure appears imminent or is in progress:**
 1. Sudden or rapidly proceeding slides, settlement, or cracking of the embankment crest, slopes, abutments, and/or foundation, and breaching of the dam appears imminent or is in progress.

Alert Level Table		
Event	Situation	Alert Level*
Earth Spillway Flow	Reservoir water surface elevation at spillway crest or spillway is flowing with no active erosion	Monitor
	Spillway flowing with active gully erosion	Watch
	Spillway flow that could result in flooding of people downstream	Watch
	Spillway flowing with an advancing headcut that is threatening the control section	Warning
	Spillway flow that is flooding people downstream	Warning
Embankment Overtopping	No overtopping flow but water level in lake within 6 inches of crest.	Watch
	Major overtopping flow eroding the embankment slope	Warning
Seepage	New seepage areas in or near the dam with clear flow	Monitor
	New seepage areas with cloudy discharge or increasing flow rate	Watch
	Heavy seepage with active erosion. Muddy flow and/or sand boils.	Warning
Sinkholes	Observation of new sinkhole in reservoir area or on embankment.	Watch
	Rapidly enlarging sinkhole on the embankment with visible flow or whirlpool in the lake.	Warning
Embankment Cracking	New cracks in the embankment greater than 1/4-inch wide without seepage	Monitor
	Cracks in the embankment with seepage	Watch
Embankment Movement	Visual movement/slippage of the embankment slope	Monitor
Instruments	Instrumentation readings beyond predetermined values	Monitor
Earthquake	Measurable earthquake felt or reported on or within 50 miles of the dam	Monitor
	Earthquake resulting in visible damage to the dam or appurtenances	Watch
	Earthquake resulting in uncontrolled release of water from the dam	Warning
Security Threat	Verified bomb threat that, if carried out, could result in damage to the dam	Watch
	Detonated bomb that has resulted in damage to the dam or appurtenances	Warning
Sabotage	Damage to dam or appurtenances with no impacts to the functioning of the dam	Monitor
	Damage to dam or appurtenances that has resulted in seepage flow	Watch
	Damage to dam or appurtenances that has resulted in uncontrolled water release	Warning

* See the "Classification of Conditions" table on the following page for Alert Level description and recommended action.

Review the dam history and previous dam safety inspection reports to include additional dam-specific items to this list. An example may include deterioration of spillways that are in poor condition.

Classification of Conditions Table		
Alert Level	Description	Action
Monitor	Unusual event, slowly developing, not an immediate threat to the dam.	<p>Dam owner representative must inspect the dam.</p> <p>Document the incident and report findings to your engineer and the ODNR, Dam Safety Engineering Program.</p> <p>Obtain instructions regarding the next course of action from your engineer and/or ODNR.</p>
Watch	Unsafe situation that may lead to failure of the dam but not an immediate threat.	<p>Begin notifications according to <u>Section I: Notification Flowchart</u> in this EAP.</p> <p>Begin constant surveillance of the dam.</p>
Warning	Urgent situation. Failure is occurring or about to occur. Or, areas downstream are flooding due to spillway flow. Evacuation of downstream area necessary.	<p>Begin notifications according to <u>Section I: Notification Flowchart</u> in this EAP.</p> <p>Begin constant surveillance of the dam.</p>

V. Responsibilities

Dam Owner

- Performing weekly dam inspections
- Initiating emergency actions at the dam
- Terminating emergency actions at the dam

County Emergency Management Agencies (EMA)

- Coordinates or assists local emergency response

County Sheriff/Local Police/Fire Department

- Leads evacuation and road closure efforts

ODNR, Dam Safety Engineering Program

- Provides technical guidance during an emergency
- Can initiate emergency actions at the dam if the dam owner is not fulfilling their responsibilities
- Perform periodic dam safety inspections usually no more frequently than every 5 years

Dam Owner's Engineer

- Provides technical guidance
- Coordinates with ODNR and County EMA for remedial actions

VI. Preparedness

After all the proper notifications have been made according to the Flowchart, the following actions should be taken. If time permits, ODNR and the dam owner's engineer should be contacted for technical consultation.

Emergency remedial actions

If time permits, the following emergency remedial actions should be considered for Emergency Level 2 conditions. Immediate implementation of these remedial actions may delay, moderate, or prevent the failure of the dam. Several of the listed adverse or unusual conditions may be apparent at the dam at the same time, requiring implementation of several modes of remedial actions. Close monitoring of the dam must be maintained to confirm the success of any remedial action taken at the dam. See *Resources Available* (Appendix B-1) for sources of equipment and materials to assist with remedial actions.

Embankment overtopping

1. If the water level in the reservoir is no longer rising, place sandbags along the low areas of the top of the dam to control wave action, reduce the likelihood of flow concentration during minor overtopping, and to safely direct more water through the spillway.
2. Cover the weak areas of the top of the dam and downstream slope with riprap, sandbags, plastic sheets, or other materials to provide erosion-resistant protection.

Seepage and sinkholes

1. Open the lake drain, other spillway gates, or provide pumps to lower the reservoir level as rapidly as possible to a level that stops or decreases the seepage to a nonerosive velocity. If the gate is damaged or blocked, pumping or siphoning may be required.

Continue lowering the water level until the seepage stops.

2. If the entrance to the seepage origination point is observed in the reservoir (possible whirlpool) and is accessible, attempt to reduce the flow by plugging the entrance with readily available materials such as hay bales, bentonite, soil or rockfill, or plastic sheeting.
3. Cover the seepage exit area(s) with several feet of sand/gravel to hold fine-grained embankment or foundation materials in place. Alternatively, construct sandbag or other types of ring dikes around seepage exit areas to retain a pool of water, providing backpressure and reducing the erosive nature of the seepage.
4. Prevent vehicles and equipment from driving between the seepage exit points and the embankment to avoid potential loss from the collapse of an underground void.

Embankment movement

1. Open drain, other spillway gates, or provide pumps to lower the reservoir to a safe level at a rate commensurate with the urgency and severity of the condition of the slide or slump. If the gate is damaged or blocked, pumping or siphoning may be required.
2. Repair settlement of the crest by placing sandbags or earth and rockfill materials in the damaged area to restore freeboard.
3. Stabilize slides by placing a soil or rockfill buttress against the toe of the slide.

Earthquake

1. Immediately conduct a general overall visual inspection of the dam.
2. Perform a field survey to determine if there has been any settlement and movement of the dam embankment, spillway, and low-level outlet works.
3. Drain the reservoir, if required.

Site-Specific Concerns and Resources Availability

- Include contact information for equipment rental such as pumps, lighting, heavy machinery, sand bags, generators, etc.

Heavy Equipment Rental Store
1234 New Town Rd.
New Town, OH. 67890
Phone #: 111-222-1234

- Include contact information for local sources of sand, gravel, and large stone.

Good Earth Materials
2222 New Town Rd.
New Town, OH. 67890
Phone #: 111-222-4567

- Include contact information for concrete supply

New Town Concrete Co.
3333 New Town Rd.
New Town, OH. 67890
Phone #: 111-333-7654

- include contact for diving contractor

Joe's Dive Inspection Services
4444 New Town Rd.
New Town, OH. 67890
Phone #: 111-444-9078

- Include information regarding access to the site such as primary and secondary routes, means for reaching the site under various conditions, or other special instructions.

If the road is flooded, the dam can be accessed from Brown Road on the North or South ends of the dam. There is a locked gate to the property. There is no electric on-site.

VII. Downstream Hazard Map

Insert aerial photo that shows the dam and downstream areas. The maps should show houses, businesses, and roads downstream of the dam that may be inundated by a dam failure or flooding from spillway releases. Refer to the Hazard Classification Section of the most recent ODNR Dam Safety Inspection report for the dam for information on downstream hazard.

Potential Downstream Hazard

I	II	III	IV	-	-			
Probable loss of human life	Damage to high-value or Class I, II, III dam or levee	Damage to rural building, not otherwise high-valued property, or Class IV dam or levee	Loss restricted mainly to the dam or agricultural /rural land	No hazard to structure noted	No hazard assessment; further investigation needed	Distance downstream of dam to affected structure (feet)	Vertical distance from streambed to base of affected structure (feet)	Horizontal distance from stream to affected structure (feet)
Loss of public water supply or wastewater treatment facility, release of health hazardous waste	Damage to major road (US or state route), disruption of only access to residential or critical facility area	Damage to local road (county and township)				0	0	0
Flooding of structure or high-value property						100	6	170
						580	5	0
						680	5	0

Brown Road
Bam
Driveway
Driveway

This checklist is intended to establish or verify the appropriate classification in accordance with the OAC – it does not necessarily show all potential hazards or the full extent of inundation.

Sketch of Developments Downstream of Dam



Example Lake Dam, File Number: 1111-055, Inspected: December 27, 2007, DCB

VIII. Appendices

Appendix A: Plans for Training, Exercising, Updating, and Compliant Dam Discount

The purpose of an annual review of the EAP and training for dam owners and operators is to ensure that all contact information listed is accurate and that dam personnel are familiar with the EAP and understand their role in responding to a dam emergency. The annual review of and training for the **Example Lake Dam's** EAP will occur during the month of **January**. The dam owner, **John Damowner**, will be responsible for updating and distributing copies of the EAP. 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 by the following parties.

- Dam Owner
- ODNR, Division of Soil and Water Resources
- County EMA
- Others *insert names*

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

Emergency Action Plan Owner's Certification

For

Dam Name: Example Lake

File Number: 2222-055

County: Example

In accordance with Section 1501:21-21-04 of the Ohio Administrative Code, I am certifying that I understand my responsibilities as a dam owner for the safe operation of this dam and for executing this Emergency Action Plan. I also understand that this plan must be reviewed and updated annually.

John Damowner
Dam Owner's Signature

12/2/12
Date

Appendix B: Distribution of the EAP

This EAP has been distributed to those Individuals listed below.

1. John Damowner,	Dam Owner	111 Route 1, New Lexington, OH. 41111	11/13/12
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

2. Joe Jacobs, Director,	Example Co. EMA	222 2 nd . St, New Lexington, OH. 43111	11/13/12
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

3. Wade Garrett, Sheriff	Example Co.	321 3 rd St, New Lexington, OH. 43111	11/13/12
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

4. Miles Finch, Chief	Example Twp. Fire Dept.	651 SR. 21 New Lexington, OH. 43111	11/13/12
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

5. _____	_____	_____	_____
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

6. _____	_____	_____	_____
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

7. _____	_____	_____	_____
<i>Name & Title</i>	<i>Organization</i>	<i>Address</i>	<i>Date</i>

Appendix C: Glossary of Terms

Abutment That part of the valley side against which the dam is constructed. The left and right abutments of dams are defined with the observer looking downstream from the dam.

Acre-foot A unit of volumetric measure that would cover 1 acre to a depth of 1 foot. One acre-foot is equal to 43,560 cubic feet or 325,850 gallons.

Appurtenant Structures The structures or machinery auxiliary to dams which are built to operate and maintain dams; such as outlet works, spillway, powerhouse, tunnels, etc.

Berm A nearly horizontal step (bench) in the upstream or downstream sloping face of the dam.

Boil A disruption of the soil surface due to water discharging from below the surface. Eroded soil may be deposited in the form of a ring (miniature volcano) around the disruption.

Breach An opening through the dam that allows draining of the reservoir. A controlled breach is an intentionally constructed opening. An uncontrolled breach is an unintended failure of the dam.

Conduit A closed channel (round pipe or rectangular box) that conveys water through, around, or under the dam.

Control section A usually level segment in the profile of an open channel spillway above which water in the reservoir discharges through the spillway.

Crest of Dam The crown of an overflow section of the dam. In the United States, the term "crest of dam" is often used when "top of dam" is intended. To avoid confusion, the terms crest of spillway and top of dam should be used in referring to the overflow section and dam proper, respectively.

Cross section A slice through the dam showing elevation vertically and direction of natural water flow horizontally from left to right. Also, a slice through a spillway showing elevation vertically and left and right sides of the spillway looking downstream.

Cutoff Wall A wall of impervious material (e.g., concrete, asphaltic concrete, steel sheet piling) built into the foundation to reduce seepage under the dam.

Dam An artificial barrier generally constructed across a watercourse for the purpose of impounding or diverting water.

Dam failure The uncontrolled release of a dam's impounded water.

Dam Operator The person(s) or unit(s) of government with responsibility for the operation and maintenance of dam.

Drain, toe or foundation, or blanket A water collection system of sand and gravel and typically pipes along the downstream portion of the dam to collect seepage and convey it to a safe outlet.

Drainage area (watershed) The geographic area on which rainfall flows into the dam.

Drawdown The lowering or releasing of the water level in a reservoir over time or the volume lowered or released over a particular period of time.

Embankment Fill material, usually earth or rock, placed with sloping sides.

Emergency A condition that develops unexpectedly, endangers the structural integrity of the dam and/or downstream human life and property, and requires immediate action.

Emergency Action Plan(EAP) A formal document identifying potential emergency conditions that may occur at the dam and specifying preplanned actions to minimize potential failure of the dam or minimize failure consequences including loss of life, property damage, and environmental impacts.

Evacuation map A map showing the geographic area downstream of a dam that should be evacuated if it is threatened to be flooded by a breach of the dam or other large discharge.

Failure An incident resulting in the uncontrolled release of water from a dam.

Filter The layers of sand and gravel in a drain that allow seepage through an embankment to discharge into the drain without eroding the embankment soil.

Foundation of Dam The natural material on which the dam structure is placed.

Freeboard Vertical distance between a stated water level in the reservoir and the top of dam.

Gate, slide or sluice, or regulating An operable, watertight valve to manage the discharge of water from the dam.

Groin The area along the intersection of the face of a dam and the abutment.

Hazard classification A system that categorizes dams (high, significant, or low) according to the degree of their potential to create adverse incremental consequences such as loss of life, property damage, or environmental impacts of a failure or misoperation of a dam.

Height, dam The vertical distance between the lowest point along the top of the dam and the lowest point at the downstream toe, which usually occurs in the bed of the outlet channel.

Hydrograph, inflow or outflow, or breach A graphical representation of either the flow rate or flow depth at a specific point above or below the dam over time for a specific flood occurrence.

Incident Commander The highest predetermined official available at the scene of an emergency situation.

Instrumentation An arrangement of devices installed into or near dams that provide measurements to evaluate the structural behavior and other performance parameters of the dam and appurtenant structures.

Notification To immediately inform appropriate individuals, organizations, or agencies about a potentially emergency situation so they can initiate appropriate actions.

Piping The progressive destruction of an embankment or embankment foundation by internal erosion of the soil by seepage flows.

Primary Spillway (Principal Spillway) The principal or first used spillway during flood flows.

Probable Maximum Precipitation (PMP) or Flood (PMF) The theoretically greatest precipitation or resulting flood that is meteorologically feasible for a given duration over a specific drainage area at a particular geographical location.

Reservoir The body of water impounded or potentially impounded by the dam.

Riprap A layer of large rock, precast blocks, bags of cement, or other suitable material, generally placed on an embankment or along a watercourse as protection against wave action, erosion, or scour.

Risk A measure of the likelihood and severity of an adverse consequence.

Scarp The nearly vertical, exposed earth surface created at the upper edge of a slide or a breached area along the upstream slope of an earthen embankment.

Seepage The natural movement of water through the embankment, foundation, or abutments of the dam.

Slide The movement of a mass of earth down a slope on the embankment or abutment of the dam.

Spillway (auxiliary or emergency) The appurtenant structure that provides the controlled conveyance of excess water through, over, or around the dam.

Spillway capacity The maximum discharge the spillway can safely convey with the reservoir at the maximum design elevation.

Spillway crest The lowest level at which reservoir water can flow into the spillway.

Stilling Basin A basin constructed to dissipate the energy of fast-flowing water, eg. from a spillway or bottom outlet, and to protect the river bed from erosion.

Stoplogs Logs or timbers, steel or concrete beams placed on top of each other with their ends held in guides on each side of a channel or conduit.

Storage The retention of water or delay in runoff either by planned operation, as in a reservoir, or by temporarily filling the overflow areas, as in the progression of a flood crest through a natural stream channel.

Tailwater The body of water immediately downstream of the embankment at a specific point in time.

Toe of dam The junction of the upstream or downstream face of an embankment with the ground surface.

Top of dam (crest of dam) The elevation of the uppermost surface of an embankment which can safely impound water behind the dam.

Trash Rack A structure of metal or concrete bars located in the waterway at an intake to prevent the entry of floating or submerged debris.

Valve In general, a device fitted to a pipeline or orifice in which the closure member is either rotated or moved transversely or longitudinally in the waterway so as to control or stop the flow.

Weir A low dam or wall built across a stream to raise the upstream water level. Termed fixed-crest weir when uncontrolled. A structure built across a stream or channel for the purpose of measuring flow. Sometimes described as a measuring weir or gauging weir. Types of weirs include broadcrested weirs, sharpcrested weirs, ogee weirs, and V-notched weirs.