Presentation Overview

* The Ohio Dam Safety Program (ODSP)
* How is dam safety achieved?
* New/continued dam safety initiatives
  * ODSP (Regulatory)
  * ODNR (Dam Owner)
  * Alert Status Descriptions
  * DamWatch

The Ohio Dam Safety Program

* Department of Natural Resources
  * Regulation
    * Division of Soil and Water Resources, Ohio Dam Safety Program (ODSP)
  * Ownership
    * Division of Parks and Recreation
    * Division of Wildlife
    * Division of Forestry
  * Technical Support
    * Division of Engineering
513 Dams Regulated by ODSP

Class III - 600
Class I - 364
Class II - 549

Parts of the Ohio Dam Safety Program

- Periodic safety inspections
  - Evaluate condition, potential downstream hazard, and owner’s safety program
  - Five-year periodic inspections
- Repairs and modifications
  - Review and oversight of repairs and modifications
- Construction permits
  - Issue permits for new dams and increases in size
- Enforcement
  - Authority to compel corrective action through the courts
- Emergency response
  - Authority to require and to take immediate action to improve the safety of a dam

Delhi Dam, 2010
A 47-foot-high wall of sludge swamped Swan Pond Creek, Swan Pond Road and the Emory River.

Kingston Ash Impoundment – 2008

30 regulated ash impoundments in Ohio

Taum Sauk Reservoir - 2005
How is dam safety achieved?

Concrete, Steel, Rock

Calculating, analyzing, designing, constructing

Legal order, directives

Federal Energy Regulatory Commission

The Owners Dam Safety Program is the most important factor in maintaining safe dams and preventing dam failures. Dams with owners who do not have an effective ODSP represent a higher risk. The owner's dam safety program has been cited as a contributing factor in many dam failures including: the 1976 failure of Teton Dam, the 1986 failure of Upriver Dam, the 2003 failure of Silver Lake Dam, and the 2005 failure of Taum Sauk Dam.
OWNERS DAM SAFETY PROGRAM
Assuring the safety of licensed dams is a cooperative effort between owners, consultants and the FERC with the most important role being that of the owners.

"Too high," "too wet," "Foundation, Geometry, Material, Load" and similar characterizations seeking to explain the Kingston Spill miss the fundamental question, which is: did system and culture failures allow such conditions to occur and remain undetected or unaddressed.

How is dam safety achieved?

Concrete, Steel, Rock
Calculating, analyzing, designing, constructing
Legal order, directives
How is dam safety achieved?

Concrete, Steel, Rock

Owner Dam Safety Program
Inspecting, monitoring, planning, communicating
Convince, persuade, facilitate, coordinate, educate

Ohio Revised Code: (E) The owner of a dam ... shall monitor, maintain, and operate the structure ... safely ... The owner shall ... notify ODSP and other responsible authorities of any condition that threatens the safety of the structure and shall take all necessary actions to safeguard life, health, and property.

ODSP - New/Cont. Initiatives
* Owner Dam Safety Program Initiatives
  * A focal point of Periodic Inspection Reports (over 2000 reports since 2007)
  * Dam Safety Workshops (FEMA Grant)
  * Emergency Action Plans
  * Enforcement projects
  * New guidelines and forms on the web site
  * Standardized communications with County EMA’s
* Planning meeting with Co. EMA Director & SWCD
  * EMA Director invites local officials
  * All regulated (Class I, II, III) dam owners in the county receive personal invitation letter
  * One meeting for local officials
  * One meeting for dam owners
  * Educate all on:
    * Importance of good Operation & Maintenance of dams
    * Importance of Emergency Action Plans for dams

**Dam Safety Workshops**

<table>
<thead>
<tr>
<th>Year</th>
<th>Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Ashtabula, Champaign, Cuyahoga, Darke, Defiance, Delaware, Erie, Henry, Hocking, Huron, Jefferson, Monroe, Muskingum, Noble, Preble, Putnam, Union, Vinton</td>
</tr>
<tr>
<td>2011</td>
<td>Brown, Carroll, Clermont, Columbiana, Lorain, Miami, Morgan, Shelby, Stark, Tuscarawas, Van Wert, Williams</td>
</tr>
<tr>
<td>2012</td>
<td>Butler, Clark, Hancock, Holmes, Lake, Lawrence, Mahoning, Montgomery, Ottawa, Paulding, Sandusky, Warren, Wayne</td>
</tr>
<tr>
<td>2013</td>
<td>Athens, Belmont, Clinton, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Licking, Logan, Lucas, Marion, Meigs, Morrow, Portage, Scioto, Summit, Trumbull, Wood</td>
</tr>
<tr>
<td>2014</td>
<td>Ashtabula, Champaign, Cuyahoga, Darke, Defiance, Delaware, Erie, Henry, Hocking, Huron, Jefferson, Monroe, Muskingum, Noble, Preble, Putnam, Union, Vinton</td>
</tr>
</tbody>
</table>

**ODSP - New/Cont. Initiatives**

* Owner Dam Safety Program Initiatives
  * A focal point of Periodic Inspection Reports (2011 since 2007)
  * Dam Safety Workshops (FEMA Grant)
  * Emergency Action Plans
  * Enforcement projects
  * New guidelines and forms on the web site
  * Standardized incident communications with internal and external stakeholders
Standardized Incident Communication

* Call county EMA and provide verbal notification
* Email list:
  * Internal ODSP
  * ODNR Comm. Center
  * State and County EMA
  * Owner
  * Owner’s Engineer
* Alert Status
* Next Update
* Contacts

ODNR - Dam Ownership

* There are 1513 state-regulated dams in Ohio; 364 Class I dams
* ODNR owns 188 regulated dams (12% of 1513); 56 are Class I (15% of 364)

ODNR Initiatives

* June 2013, tabletop exercise
* Key Areas for Improvement
  * Uniformity and clarity in emergency classifications
  * Timeliness and clarity in notification
### FEMA Guidance (2013)

<table>
<thead>
<tr>
<th>FEMA Guidance (2013)</th>
<th>WV</th>
<th>TX</th>
<th>NY</th>
<th>MO</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Flow</td>
<td>Normal Conditions</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Non-failure</td>
<td>Adverse Conditions</td>
<td>Watch</td>
<td>Advisory/Non-failure (Condition C)</td>
<td>Level 1 Emergency</td>
</tr>
<tr>
<td>Potential failure</td>
<td>Standby Alert</td>
<td>Possible Dam Failure</td>
<td>Warning (Condition B)</td>
<td>Level 2 Emergency</td>
</tr>
<tr>
<td>Imminent failure</td>
<td>Evacuation Conditions</td>
<td>Imminent Dam Failure</td>
<td>Emergency (Condition A)</td>
<td>Level 3 Emergency</td>
</tr>
<tr>
<td>--</td>
<td>Dam Failure</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

### New Dam Alert Status Levels

<table>
<thead>
<tr>
<th>New 'Dam Alert Statuses' for all Class I's</th>
<th>Previous for most Class I's</th>
<th>Previous for several Class I's</th>
<th>Previous for Buckeye</th>
<th>Previous for Mt. Gilead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Monitor</td>
<td>Unusual</td>
<td>Emergency Warning</td>
<td>Deficient</td>
</tr>
<tr>
<td>Watch</td>
<td>Watch</td>
<td>Unsafe</td>
<td>Emergency Warning</td>
<td>Watch Stand By</td>
</tr>
<tr>
<td>Warning</td>
<td>Warning</td>
<td>Emergency</td>
<td>Evacuation</td>
<td>Warning</td>
</tr>
</tbody>
</table>

### Status

<table>
<thead>
<tr>
<th>Status</th>
<th>What It Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Alert  Status</td>
<td>Normal dam operations &amp; routine surveillance for unusual conditions.</td>
</tr>
<tr>
<td>Monitoring Alert Status</td>
<td>Hazardous condition is present; potential for failure being evaluated.</td>
</tr>
<tr>
<td>Watch Alert Status</td>
<td>Hazardous condition is present; potential for failure being assessed.</td>
</tr>
<tr>
<td>Warning Alert Status</td>
<td>Damage has occurred or is likely despite corrective measures.</td>
</tr>
</tbody>
</table>
New Dam Alert Status Levels

<table>
<thead>
<tr>
<th>NORMAL Alert Status</th>
<th>MONITORING Alert Status</th>
<th>WATCH Alert Status</th>
<th>WARNING Alert Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>No hazardous conditions exist.</td>
<td>Hazardous condition exists.</td>
<td>Potential for failure exists.</td>
<td>Failure is happening or imminent.</td>
</tr>
<tr>
<td>Unusual condition may be present</td>
<td>High water level &amp; rising (check EAP)</td>
<td>Higher water level &amp; rising (check EAP)</td>
<td>Impending overtopping</td>
</tr>
<tr>
<td>Interim risk reduction measures may be in place</td>
<td>Worsening rainfall predictions</td>
<td>Worsening rainfall predictions</td>
<td>Increased/muddy seepage</td>
</tr>
<tr>
<td></td>
<td>Unusual crack</td>
<td>Increased seepage/leakage</td>
<td>Uncontrollable erosion</td>
</tr>
<tr>
<td></td>
<td>Spillway obstruction</td>
<td>Developing erosion</td>
<td>Actively collapsing sinkhole</td>
</tr>
<tr>
<td></td>
<td>Seismic event</td>
<td>Settlement or upheaval</td>
<td>Collapsing spillway</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sinkhole develops</td>
<td>Massive slide reaches lake</td>
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<tr>
<td></td>
<td></td>
<td>Bok develops</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Substantial slide</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bomb threat/subsidence</td>
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</tr>
</tbody>
</table>

ODNR Initiatives

* June 2013, Tabletop Exercise
* Key Areas for Improvement
  * Uniformity and clarity in emergency classifications
  * Timeliness and clarity in notification
* 56 Emergency Action Plans for Class I dams
* Current construction projects: Tuscarawas Diversion Dam, Acton Lake Dam, Jefferson Lake Dam, Pike Lake Dam, Pond Lick Lake Dam, Roosevelt Lake Dam
* Eight dam assessments
* Improve & Test Protocols (underway now)
* Training (underway now)
* Rollout (early 2014 → late 2014)
  * Improved EAPs
  * Briefs to partners
* Exercises & Community Preparedness (mid 2014 →)
* If your county would be interested...
Features of DamWatch

* Monitoring
* Inspection and Maintenance
* Repository
* Communication

Real-time precipitation and surface water monitoring

* Links to instrumentation
* Notifications
Manage inspections and maintenance
* Store checklists, construction plans, and Emergency Action Plans
* Communications