



Report for:

2006 Inspection Report Lake Lemon Dam Unionville, Indiana

Prepared for:

Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, Indiana 47468

DLZ Ohio, Inc.

6121 Huntley Road
Columbus, Ohio 43229-1003
Phone: (614) 888-0040
Fax: (614) 888-6415

DLZ Job No. 0463-0294.90

October 26, 2006

Prepared by



October 26, 2006

Lake Lemon Conservancy District
7599 North Tunnel Road
Unionville, Indiana 47468

Attn: Mr. Bob Madden
Manager

Re: 2006 Inspection Report
Lake Lemon Dam

Dear Mr. Madden:

Enclosed are four (4) copies of our 2006 inspection report for the subject dam. Based on our inspection, it appears the overall condition of the project has not changed significantly since the 2004 inspection, when the overall surficial condition of the project was determined to be satisfactory.

If we can be of further assistance or if you have any questions regarding the inspection report, please do not hesitate to call us.

Sincerely,

DLZ OHIO, INC.

A handwritten signature in blue ink, appearing to read "Pete Nix", with a stylized flourish to the right.

Pete Nix
Geotechnical Division Manager

A handwritten signature in blue ink, appearing to read "Eric Tse", with a stylized flourish below it.

Eric Tse, Ph.D., P.E.
Senior Geotechnical Engineer

cc: John Langley, City of Bloomington Utilities - 1
DLZ Indiana - 1
File - 1

2006 INSPECTION REPORT

LAKE LEMON DAM

Unionville, Indiana

Prepared by:

**DLZ OHIO, INC.
6121 Huntley Rd
Columbus, OH 43229**

October 2006

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2006 INSPECTION REPORT LAKE LEMON DAM UNIONVILLE, INDIANA

INTRODUCTION

As requested by the Lake Lemon Conservancy District and the City of Bloomington Utilities, DLZ performed a field inspection of Lake Lemon Dam on September 25, 2006. Mr. Pete Nix, a geotechnical engineer with DLZ, completed the surficial inspection. During the surficial inspection, color photographs were taken of pertinent features of the dam. Representative photographs are included in this report in Appendix I. It should be noted that the inspection was performed on a Monday following a weekend of heavy rain across southern Indiana.

A representative of Commercial Diving Services (CDS) inspected the interior of the outlet works, including the gate, the gatewell, and the outlet pipe. A copy of their inspection report is presented in Appendix II.

This report presents the observations and recommendations resulting from the inspections. As part of the inspection, IDNR's file on the project was reviewed as well as previous inspection reports. The completed IDNR Dam Inspection Report Form is presented in Appendix III.

PROJECT INFORMATION

General

It is believed that the dam was constructed in the early 1950's. For years the project was used for water supply to the City of Bloomington, but is now used for recreation. The drainage area is about 71 square miles and the pool area is approximately 1700 acres. The earth embankment is roughly 50 feet high with a crest length of approximately 660 feet. The crest width is about 13 feet, and the upstream and downstream slopes are about 1V:3.5H.

The outlet works consist of a reinforced concrete pipe near the left abutment. From its inlet to the gatewell, the pipe is 42 inches in diameter while the portion of the pipe between the gatewell and the stilling basin is 30 inches in diameter. Flow through the pipe is controlled by a gatewell, and the pipe discharges into a stilling basin.

The principal spillway is a 329-foot long, concrete ogee-type structure. The spillway is located in a valley northeast of the embankment.

Security

Access to the embankment is along a private drive with a locked gate. The lake manager has access to this lock, as well as the City of Bloomington Utilities.

FIELD INSPECTION

Embankment

The inspection disclosed no serious problem areas in the physical condition of the embankment. The slopes were relatively uniform; no bulges or depressions were noted. Grass and vegetation on the embankment slopes and crest was high. It is understood from the lake manager that the embankment is mowed twice a year and the second mowing would be performed yet this fall.

Some small brush and trees were observed along the water's edge, as noted in the 2004 inspection. This brush and the small trees should be removed. In addition, there was some rutting on the crest from vehicular traffic, as was also noted in the 2004 inspection. These ruts should be filled to enhance drainage.

An area of possible seepage was observed along the downstream toe, near the midpoint of the embankment. This area appears to be the location of the original stream channel. No discharge could be seen, but the old channel is wet with iron-stained, brackish water. This possible seepage was noted in the 2002 and 2004 inspections, also. Based on the comments in the 2002 and 2004 inspection reports, it doesn't appear that the seepage has changed significantly since then. This area did appear to contain more standing water than in the 2004 inspection but it is believed that this condition was caused by the heavy rainfall prior to the inspection.

However, because of the high hazard associated with the project, it is recommended that this area be monitored visually on a monthly basis and following significant rainfall events. Any changes in the quantity or appearance of the seepage in this area should be brought to the attention of a dam engineer immediately.

It should also be noted that a poorly-drained area was observed immediately downstream of the right groin. Standing water was ponded in this area but it is believed that this was runoff from the abutment and embankment. Regardless, this area should be regraded or new ditches installed to prevent ponding and to allow surface water to drain to the creek.

Outlet Works

Internal Inspection.

As part of the 2006 inspection, the downstream portion of the outlet works was dewatered and inspected. A diver from CDS Construction performed the inspection and videotaped the

condition of the outlet pipe. We would note that CDS divers inspect and operate the Lake Lemon gate every two years and they are very familiar with the project. A copy of their inspection report of the outlet works is presented in Appendix III.

To facilitate the inspection of the downstream portion of the outlet pipe (gatewell to stilling basin), the gate was closed and the stilling basin pumped dry. Although some water remained in the pipe, it allowed the interior of the pipe to be visually inspected. The inspection of the downstream portion of the outlet pipe noted only one visible deficiency. Approximately three feet downstream of the gate, filler has been lost from about 1/3 of the pipe joint. This condition didn't appear to have occurred recently but it should be repaired during the next gate inspection in two years. The inspection also noted that the gate leaked slightly at the bottom when in the closed condition.

The upstream portion of the outlet works (gatewell to pipe inlet) was also inspected but visibility was extremely poor and the condition of the pipe and joints were estimated by feel. No obvious distress was noted in the upstream portion of the outlet works during the inspection.

Finally, as part of the gatewell inspection, the gate stem was observed and all the frame bolts and adjusting bolts were checked for tightness. No distress was noted.

External Inspection. The visible portions of the outlet works appeared in satisfactory condition. Only minor deficiencies were noted in the structure itself, although vegetation obscured the left side of the stilling basin. This vegetation should be removed to facilitate inspections of the structure.

A large crack was observed in the left wall near the end of the stilling basin. This crack was about a 1/2 inch wide and extended from the top of the wall to the bottom. This crack appeared old and doesn't appear to have changed recently.

Also, as mentioned above, the stilling basin was dewatered as part of the inspection. The portions of the stilling basin below water also appeared to be in satisfactory condition.

However, after the stilling basin dewatering was performed, an area of scour in the bottom of channel bottom was noted immediately downstream of the end of the stilling basin. This area should be backfilled with large riprap to prevent the scoured area from enlarging and undermining the stilling basin slab. The stilling basin design should be reviewed to determine the velocities at the end of the stilling basin so that the riprap can be properly sized.

In addition, the gate was exercised as part of the inspection. The gate was opened fully and allowed to run with full flow for about five minutes. The gate operated well and no problems were noted. We would recommend that the gate be exercised to its full limit at least once per year.

Principal Spillway

The principal spillway was in acceptable condition. It does not appear to have changed significantly since the last inspection. In the 2004 inspection, minor spalling in the ogee face was observed. However, the lake manager indicated these areas were repaired recently. There has been some displacement in the joints over the years ($\frac{1}{2}$ to $\frac{3}{4}$ inches) but the overall condition of the spillway appears to be acceptable.

CONCLUSIONS

Based on our observations, it appears that the project condition has not changed significantly since the 2004 inspection, where the overall surficial condition of the project was determined to be 'Satisfactory'.

RECOMMENDATIONS

1. Visually monitor the possible seepage condition at the toe of the embankment. Report any changes to a dam engineer immediately.
2. Remove the small brush and trees in the embankment along the water's edge.
3. Fill ruts in the crest to facilitate drainage.
4. Remove vegetation from the left wall of the stilling basin.
5. Repair scoured area in the channel bottom immediately downstream of the stilling basin. It is anticipated that large riprap will be needed. The design velocities for the outflow will need to be evaluated to properly size the riprap.
6. Regrade or ditch the area downstream of the right abutment groin to facilitate surface drainage in this area.
7. Repair the missing joint filler in the outlet pipe during the next inspection in two years.
8. Inspect the interior of the outlet pipe again in six years. However, a more frequent inspection may be needed if conditions warrant.
9. Prepare an emergency action plan (EAP) for the project.

CLOSING REMARKS

We hope this information is helpful. If you have any questions, please do not hesitate to call.

Sincerely,

DLZ Ohio, Inc.



Pete Nix
Geotechnical Division Manager



Eric Tse, Ph.D., P.E.
Senior Geotechnical Engineer

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APPENDIX I

Photographs



Crest and downstream slope. View is from left abutment to right abutment.



Upstream slope. View is from left abutment to right abutment



Vegetation along shore.



Upstream slope. View is from right abutment to left abutment.



Downstream slope. View is from right abutment to left abutment.



Standing water and seepage in original stream channel.



Stilling basin.



Scour and erosion at end of stilling basin.



Crack in left training wall at end of stilling basin. Crack is old and doesn't appear to have moved significantly recently.



Gatewell.



Ogee spillway crest.



Downstream toe of ogee spillway.



Diver preparing to enter outlet pipe.



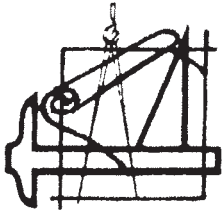
Diver preparing to enter gatewell.



Diver entering gatewell.

APPENDIX II

Outlet Works Inspection Report



C.D.S. Construction Co., Inc.

A Division of ADS & Associates

- MARINE CONTRACTING
- CONSULTING ENGINEERS
- FIBER OPTIC INSTALLATION
- DESIGN & FABRICATION

Keith Elkins, President / CEO

(502) 937-8061 Office

(502) 937-3970

(502) 937-3971 Fax

October 3, 2006

D.L.Z.

Attn: Pete Nix

RE: Lake Lemon

On September 25, 2006 – C.D.S. Construction Dive Team inspected the Lake Lemon Dam Sluice Gate Discharge System.

The first dive was from location A to B on the attached drawing. This portion of the inspection was video taped. Because of high turbidity levels the discharge conduit was partially emptied for the inspection. As you can see on the video, there is an area approximately 38" downstream from the sluice gate that should be repaired in the future. This pipe joint on the downstream side of the thimble has lost packing on about one third of the circumference. The joint is still in place with no apparent leakage or damage. If not repaired, during high flow for extended periods could cause cavitation in the conduit walls. This could possibly be repaired at a later date, due to the fact that the conduit is normally dormant. This was the only area of concern in the discharge conduit.

The next dive was inside of the gate well riser. The diver entered the well on the ladder, which terminated at the water line. He continued down the gate stem, inspecting stem guides to the top of the gate. The gate was in the closed position with slight leakage at the bottom. (This was due to the gate not being closed tight.) All frame bolts and adjusting bolts were checked for tightness.

Riverport Industrial Complex
7400 Distribution Drive • Louisville, Kentucky 40258

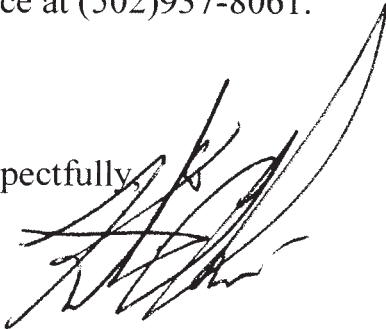
The diver encountered one stop log gate at the bottom of the well in the stop log track.

The diver proceeded into the 42" intake conduit for approximately 150' into the intake structure. The bar screens are in good condition. There was some debris on the top of the structure, which could be removed by reaching through the bars. Diver returned to the gate well and hooked up the stop log gate to a chain. The diver ascended to the surface and climbed out of the well. City of Bloomington crews then pulled the gate out of the well with a backhoe.

The gate was then operated to 1/3 open and then closed. Then opened to full open for approximately 15 minutes and then closed. This concluded the inspection.

If any questions or if further information is needed, you may contact our office at (502)937-8061.

Respectfully,



Keith Elkins
President/CEO

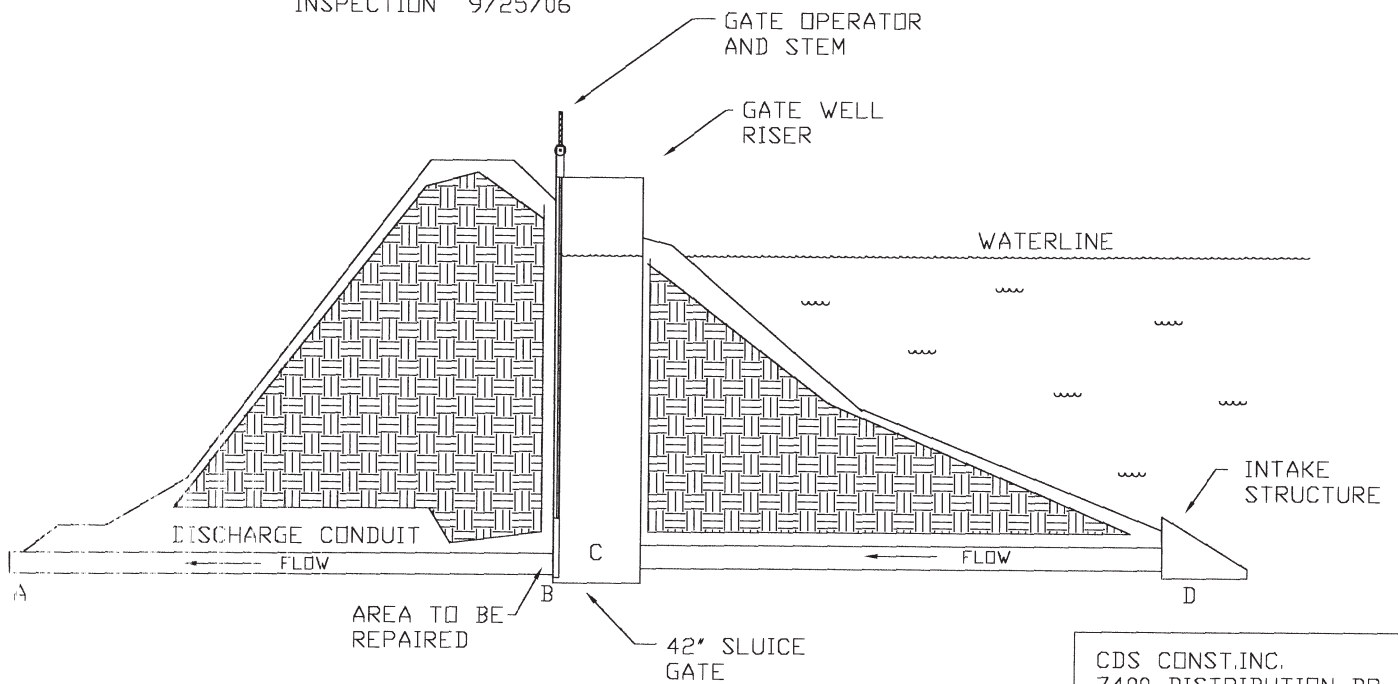
Respectfully,



Dave Colston
Diving Supervisor

LAKE LEMON

INSPECTION 9/25/06



CDS CONST. INC.
7400 DISTRIBUTION DR.
LOUISVILLE, KY, 40258
502 937-8061

APPENDIX III

Completed IDNR Dam Inspection Report Form

IDNR DAM INSPECTION REPORT FORM (Refer to pages 5 and 6 for instructions.)

Name of Professional Conducting Inspection Pete Nix		Professional License No. (Indiana)
Business Address 6121 Huntley Rd., Columbus, OH 43219		Phone: (day) 614 - 848 - 4141 (evening) 614 - 329 - 3150

Company Name DLZ Ohio, Inc.	
INSPECTION PREPARATION: Reviewed all pertinent technical documentation related to this dam and site in the State's and the Owner's files: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Comment <u>Last inspection report was reviewed prior to inspection. IDNR's file on the project was also reviewed, including the original construction documents.</u>	
MULTIDISCIPLINARY: I am experienced in the technical disciplines or I am working with other professionals experienced in the technical disciplines to properly inspect this dam and appurtenant works. Technical disciplines, in addition to the general civil engineering, may include geotechnical, geological, hydrologic, structural, and mechanical. Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Comment _____	

Dam Name Lake Lemon Dam		Quad. Hindustan	Date of Inspection 09/25/2006				
State Dam ID 58-1	Permit (if unapproved see pg. 6) State Approved on Construction Completed in 1952	County Monroe	Sec. 28 T. 10 R. N 1 E	Last Inspection 07/15/2004			
Owners Name City of Bloomington Utilities			Owner's Phone (812) 349-3655				
Address/Zip Code P.O. Box 1216, Bloomington, IN 47401							
Contact's Name Lake Lemon Conservancy District Bob Madden, Manager		Contact's Phone (day) 812 - 334 - 0233 (evening) - -		Spillway Width Top Bot. ~330 Ft. FBD. ~16			
Hazard High	Drainage Area ~71 MI²	Surface Area ~1700 AC	Height ~50 FT	Crest Length ~660 FT	Crest Width ~13 FT	Inlet Below Crest ~16 FT	Slope: Up 3 1/2: 1 Down 3 1/2: 1

FIELD CONDITIONS OBSERVED Water Level - Below Dam Crest ~17 Ft. Ground Moisture Condition: Dry _____ Wet <input checked="" type="checkbox"/> Snowcover _____ Other _____	DRAWDOWN STRUCTURE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> None Comment <u>A 42-in. diameter R.C. pipe with a gatewell and stilling basin.</u>
--	--

MONITORING <input type="checkbox"/> Yes <input checked="" type="checkbox"/> None [<input type="checkbox"/> Gage Rod <input type="checkbox"/> Piezometers <input type="checkbox"/> Seepage Weirs <input type="checkbox"/> Survey Monuments <input type="checkbox"/> Other]
Comments _____

A UPSTREAM SLOPE GOOD ACCEPTABLE <input checked="" type="checkbox"/> DEFICIENT POOR	PROBLEMS NOTED: <input checked="" type="checkbox"/> (A-1) None <input type="checkbox"/> (A-2) Riprap - Missing, Sparse, Displaced, Weathered <input type="checkbox"/> (A-3) Wave Erosion-with Scarps <input type="checkbox"/> (A-4) Cracks-with Displacement <input type="checkbox"/> (A-5) Sinkhole <input type="checkbox"/> (A-6) Appears Too Steep <input type="checkbox"/> (A-7) Depressions or Bulges <input type="checkbox"/> (A-8) Slides <input type="checkbox"/> (A-9) Animal Burrows <input type="checkbox"/> (A-10) Trees, Brush, Briars <input type="checkbox"/> (A-11) Other _____ Comments: <u>Some brush / weeds observed at the waterline. Grass and vegetation cover is high. Project reportedly is mowed twice annually and has yet to be mowed for second time.</u>

B CREST GOOD ACCEPTABLE <input checked="" type="checkbox"/> DEFICIENT POOR	PROBLEMS NOTED: <input type="checkbox"/> (B-1) None <input checked="" type="checkbox"/> (B-2) Ruts or Puddles <input type="checkbox"/> (B-3) Erosion <input type="checkbox"/> (B-4) Cracks with Displacement <input type="checkbox"/> (B-5) Sinkholes <input type="checkbox"/> (B-6) Not Wide Enough <input type="checkbox"/> (B-7) Low Area <input type="checkbox"/> (B-8) Misalignment <input checked="" type="checkbox"/> (B-9) Inadequate Surface Drainage <input type="checkbox"/> (B-10) Trees, Brush, Briars <input type="checkbox"/> (B-11) Other _____ Comments: <u>Ruts from vehicular traffic were visible. These ruts look slightly deeper than they were in the 2004 inspection.</u>

Spillway Width refers to the open channel (typically the emergency or auxiliary spillway) at the control section.

Ft. FBD. refers to the vertical distance from the emergency (auxiliary) spillway control section to the lowest point of the crest of the dam.

Inlet Below Crest refers to the vertical distance from the inlet of the principal spillway to the crest of the dam.

C DOWNSTREAM SLOPE	
GOOD	
ACCEPTABLE	X
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (C-1) None ☐ (C-2) Livestock Damage ☒ (C-3) Erosion or Gullies ☐ (C-4) Cracks with Displacement ☐ (C-5) Sinkholes ☐ (C-6) Appears too Steep ☐ (C-7) Depression or Bulges ☐ (C-8) Slide ☐ (C-9) Soft Areas ☐ (C-10) Trees, Brush, Briars ☐ (C-11) Animal Burrows ☐ (C-12) Other _____

Comments: A few isolated erosion areas were noted.

D SEEPAGE	
GOOD (NONE)	
ACCEPTABLE	X
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (D-1) None ☐ (D-2) Saturated Embankment Area ☐ (D-3) Seepage Exits on Embankment ☐ (D-4) Seepage Exits at Point Source ☐ (D-5) Seepage Area at Toe ☐ (D-6) Flow Adjacent to Outlet ☐ (D-7) Seepage Clear/Muddy ☐ (D-8) Flow Clear/Muddy ☐ (D-9) Dry/Obstructed] ☒ (D-10) Other _____ Describe location of drains and indicate amount and quality of discharge.

Comments: Possible seep observed at toe about mid-length of the embankment. Appears to be in the original stream channel. Does seem to appear to be more standing water than 2004 inspection. However, heavy rain preceded inspection. Also, a poor draining area was noted at downstream end of right groin. Standing water was observed in this area but believed to be runoff.

E PRINCIPAL SPILLWAY	
GOOD	
ACCEPTABLE	X
DEFICIENT	
POOR	

DESCRIPTION: A 329-foot long concrete ogee-type (curved crest) structure located in a topographic saddle northeast of the dam.

PROBLEMS NOTED: ☐ (E-1) None ☒ (E-2) Deterioration ☐ (E-3) Separation ☒ (E-4) Cracking ☐ (E-5) Inlet, Outlet Deficiency ☐ (E-6) Stilling Basin Inadequacies ☐ (E-7) Trash Rack ☐ (E-8) Other _____

Comments: Spalling visible in 2004 inspection was repaired in last two years. Some joints offset 1/2" to 1" and joint filler being squeezed out. These conditions are old and the spillway appears to be in satisfactory condition.

F AUXILIARY SPILLWAY	
GOOD	
ACCEPTABLE	
DEFICIENT	
POOR	

DESCRIPTION: _____

PROBLEMS NOTED: ☐ (F-1) None ☒ (F-2) No Auxiliary Spillway Found ☐ (F-3) Erosion-with Backcutting ☐ (F-4) Crack with Displacement ☐ (F-5) Appears to be Structurally Inadequate ☐ (F-6) Appears too Small ☐ (F-7) Inadequate Freeboard ☐ (F-8) Flow Obstructed ☐ (F-9) Concrete Deteriorated/Undermined ☐ (F-10) Other _____

Comments: _____

G MAINTENANCE AND REPAIRS	
GOOD	
ACCEPTABLE	
DEFICIENT	
POOR	

PROBLEMS NOTED: ☐ (G-1) None ☐ (G-2) Access Road Needs Maintenance ☐ (G-3) Cattle Damage ☐ (G-4) Spillway Obstruction ☐ (G-5) Brush, Weeds, Tall Grass, on Upstream Slope, Crest, Downstream Slope, Toe ☐ (G-6) Trees on Upstream Slope, Crest, Downstream Slope ☐ (G-7) Rodent Activity on Upstream Slope, Crest, Downstream Slope, Toe ☐ (G-8) Deteriorated Concrete-Facing, Outlet, Spillway ☐ (G-9) Gate and/or Drawdown Need Repair ☐ (G-10) Other _____

Comments: Refer to page 3 of 6.

H OVERALL CONDITIONS

Based on this inspection and recent file review, the overall surficial condition is determined to be: ☒ (H-1) Satisfactory ☐ (H-2) fair ☐ (H-3) Conditionally Poor ☐ (H-4) Poor ☐ (H-5) Unsatisfactory

IMPORTANT: IF THIS RATING IS DIFFERENT THAN PREVIOUS IDNR RATING, PLEASE ATTACH EXPLANATION AND REASONS FOR CHANGE ON PAGE 4.

Page 3 of 6

EXPLANATION FOR CHANGE IN RATINGS (Describe all repairs, upgrades or improvements made if dam conditions and rating have improved since the last inspection. Describe deteriorating conditions if ratings have worsened.)

REASONS FOR RATING CHANGE: _____

PREVIOUS RECOMMENDATIONS FOR MAINTENANCE, REPAIRS, AND UPGRADES:

HAVE THEY BEEN PERFORMED ☐ YES ☒ NO (If no, please explain:)

Ruts on crest still need filled.

An emergency action plan still needs to be prepared.

Supporting Documentation

Photographs ☐ Attachments ☐ Calculations ☐ Drawings ☐ Other ☐

Comments:

INSTRUCTIONS FOR COMPLETING DAM VISUAL INSPECTION REPORT

1. Complete all items that are applicable; if not applicable, write in "N/A". For concrete dams, complete all applicable items and use "comments" section to cover items not included in the check boxes. Also indicate that the dam is concrete in the comments section.
2. Use page 6 to determine ratings of each dam component (items A through G) and for Overall Conditions (Item H).
3. Please write legibly and concisely.
4. Inspector must be knowledgeable with the type of dam, materials, and components being inspected. If not, qualified assistance shall be engaged.
5. The inspector shall review the dam owner's and IDNR project files prior to the inspection. Previous inspection reports shall be closely reviewed for previous problems and deficiencies.
6. If the ratings of the components (items A through G) or the Overall Conditions (item H) of the dam have changed since the last inspection, please complete page 4. If a rating has improved, dam repairs, improvements, analyses, or maintenance must have been performed and documented on page 4.
7. For a dam to have a satisfactory "Overall Conditions" rating, it must have no existing or potential dam safety deficiencies recognized. Safe performance is expected under all anticipated loading conditions, including infrequent hydrologic events (PMP for high hazard dams) and seismic events. The dam owner's project files must contain hydrologic and hydraulic analyses of the dam and its spillways to verify performance. The files must also contain slope stability analyses to verify embankment stability under full reservoir conditions and rapid-draw down conditions. The dam and all of its components must meet current IDNR and design standards. "Normal" deficiencies such as minor erosion, minor seepage, or normal concrete aging may not make a dam unsatisfactory or unacceptable. For a satisfactory "Overall Conditions" rating to be assigned, items A through G generally should all have a "good" rating; however, in some cases an "acceptable" rating may be satisfactory if the "Problems Noted" are minor, or "normal" conditions, such as minor erosion rills, small puddles on crest, or if grass needs mowed, but is in good condition.
8. This inspection report form must be submitted to IDNR along with a formal technical inspection report as described in Chapter 4.0 of Part 3 of the Indiana Dam Safety Inspection Manual.
9. Please sign and date this page in the space below to verify that you have read and understand these instructions.

Inspector's Signature: _____

Date: _____

GUIDELINES FOR DETERMINING CONDITIONS

CONDITIONS OBSERVED - APPLIES TO UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, PRINCIPAL SPILLWAY, AUXILIARY SPILLWAY

GOOD	ACCEPTABLE	DEFICIENT	POOR
In general, this part of the structure has a good appearance, and conditions observed in this area do not appear to threaten the safety of the dam.	Although general cross-section is maintained, surfaces may be irregular, eroded, rutted, spalled, or otherwise not in new condition. Conditions in this area do not currently appear to threaten the safety of the dam.	Continued deterioration and/or unusual loading may threaten the safety of the dam.	Conditions observed in this area appear to threaten the safety of the dam. Conditions observed in this area are unacceptable.

CONDITIONS OBSERVED - APPLIES TO SEEPAGE

GOOD (NONE)	ACCEPTABLE	DEFICIENT	POOR
No evidence of uncontrolled seepage. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions do not appear to threaten the safety of the dam.	Some seepage exists at areas other than the drain outfalls, or other designed drains. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions observed do not currently appear to threaten the safety of the dam.	Excessive seepage exists at areas other than drain outfalls and other designed drains. Seepage needs to be evaluated. Increased flow and/or continued deterioration in seepage conditions may threaten the safety of the dam.	Excessive seepage conditions observed appear to threaten the safety of the dam and is unacceptable. Examples: 1) Designed drain or seepage flows have increased without increase in reservoir level. 2) Drain or seepage flows contain sediment. i.e., muddy water or particles in jar samples. 3) Widespread seepage, concentrated seepage or ponding appears to threaten the safety of the dam.

CONDITIONS OBSERVED - APPLIES TO MAINTENANCE AND REPAIR

GOOD	ACCEPTABLE	DEFICIENT	POOR
Dam appears to receive effective on-going maintenance and repair, and only a few minor items may need to be addressed.	Dam appears to receive maintenance, but some maintenance items need to be addressed. No major repairs are required.	Level of maintenance of the dam needs significant improvement. Major repairs may be required. Continued neglect of maintenance may threaten the safety of the dam.	Dam does not receive adequate maintenance. One or more items needing maintenance or repair has begun to threaten the safety of the dam. Level of maintenance is unacceptable.

OVERALL CONDITIONS

SATISFACTORY - No existing or potential dam safety deficiencies recognized. Safe performance is expected under all anticipated loading conditions, including such events as infrequent hydrologic and/or seismic events. Project Files contain necessary hydrologic, and other engineering calculations to verify dam safety and performance.

FAIR - No existing dam safety deficiencies are recognized for normal loading conditions. Infrequent hydrologic and/or

seismic events would probably result in a dam safety deficiency.

CONDITIONALLY POOR - A potential safety deficiency is recognized for unusual loading conditions which may realistically occur during the expected life of the structure. **CONDITIONALLY POOR** may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency; further investigations and studies are necessary.

POOR - A potential dam safety deficiency is clearly recognized for normal loading conditions. Immediate actions to resolve the deficiency are recommended; reservoir restrictions may be necessary until problem resolution.

UNSATISFACTORY - A dam safety deficiency exists for normal conditions. Immediate remedial action is required for problem resolution.

HAZARD CLASSIFICATIONS OF DAMS (STRUCTURE)

LOW HAZARD- A structure the failure of which may damage farm buildings, agricultural land, or local roads

SIGNIFICANT HAZARD- A structure the failure of which may damage isolated homes and highways, or cause the temporary interruption of public utility services.

HIGH HAZARD-A structure the failure of which may cause the loss of life and serious damage to homes, industrial and commercial buildings, public utilities, major highways, or railroads.

UNAPPROVED STATUS OF DAM

A dam that has been given an unapproved status (see entry for permit) means that plans, construction specifications, hydraulic analyses, and/or a geotechnical investigation on your dam, proving the safety of the structure, have not been received and approved by the Indiana Department of Natural Resources (IDNR). IDNR records indicate that no progress has been made to secure this approval. The fact that the dam is inspected under the Regulation of Dams Act (IC 14-27-7.5) in no way alters the illegal status of the structures.

If your dam is indicated to be unapproved, it is requested that your engineer contact the Indiana Department of Natural Resources,