LAKE VICTORIA

DAM OPERATION & MAINTENANCE PLAN

Revised March 13, 2011

The following Operation & Maintenance Plan has been developed for the Lake Victoria Dam System in accordance with the State of Michigan's Department of Environmental Quality (DEQ) mandate.

This documentation is required for the DEQ Dam Safety Inspection Report.
It should be <u>reviewed and updated annual</u> by the Lake Victoria Dam Operator.

All notations in red are works in progress for 2010.

Dam Identification Number:
0618

Hazard Potential Classification:
LOW

Lake Operating Level:
791'9"

Lake Impound Surface Area:
Approximately 139 Acres

Inspection:
Last: 05/13/2010
Next: 2015 when notified

Elevation Survey:
May 13, 2010

Video Survey:
Last: 2006
Next: None Schedule

Dam Operators:
(Both have a Primary Spillway Key)
Duane Albright (3/10) 517-231-0717, redonred82@yahoo.com
Kim Dutcher 651-5120, gemlad@gmail.com

Dam Safety Consultant/Inspector:
Gary Croskey phone: 231-334-6585 cell: 312-401-1323, croskeyg@gmail.com

Emergency Excavating Contractor:
For: 2010
(Confirm each year)
All Terrain 517-655-5448
Contacts in the following order:
#1 Steven Simons 517-202-2751
#2 Tim Bliesener 517-744-1812
#3 Wayne Baum 517-202-0860

Emergency Contact:
911
The Board is now working Reverse 911 with the 911 Administrative Director to create the LAKE VICTORIA ACTION PLAN as it relates to the Lake Victoria Dam System.

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DAM OPERATOR RESPONSIBILITIES

To represent the Lake Victoria Association in matters as they relate to the operation and maintenance of the Lake Victoria Dam system.
To inspect and monitor the condition of the Lake Victoria Dam system.
To maintain the determined operating level of the lake.
To keep a log and permanent record of all maintenance, repairs, improvements and notable events.
To insure all state inspections and requirements are conducted and submitted on or before their due dates.
There should always be someone available to operate the dam. If the Dam Operator is going to be gone for more than a day another board member or qualified person should take over the responsibilities and have the Primary Spillway Valve Key in their possession.

OPERATIONAL LOG AND PERMANENT RECORDS

As required by the DEQ a **monthly log and record will be kept** for the following actions and elements of the Lake Victoria Dam:

1. Lake level
2. Condition of Dam System
3. Primary spillway
   - Opening and closing of valve
   - Removal and replacement of stop logs
4. Closure #1 Dam & Auxiliary Spillway
   - Any flow of water over the spillway
5. Closure #2 Dam and Culvert
6. Maintenance, repairs and improvements projects

As required by the DEQ **annually review and update the Dam Operation & Maintenance Plan.**

LAKE VICTORIA
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ACTION PLANS

Auxiliary Spillway Action Plan
The Board is now working with the 911 administrative directors to create a Lake Victoria Action Plan. The plan will describe the procedures to follow during time when water will flow over the Closure #1 Dam Auxiliary Spillway and the procedures to follow during possible Dam system Failure.

Emergency Action Plan
An Emergency Action Plan is **NOT REQUIRED** with a Hazard Potential Classification **RATING OF LOW**.

Hazard Potential Classification
Classification rating is: **LOW**

BUDGET

Budget
Amount for year $0000.00

Dam Safety Inspection $1,000.00
- Contracted Gary Croskey May 13, 2010 for $1,300.
- Contracted Gary Croskey May 8, 2005 for $1,000.
  Prior to the commencement of work a $400 retainer w/signed contract was required.
- Contracted Gary Croskey April 10, 2000 for $1,800.
  Prior to the commencement of work a $600 retainer w/signed contract was required.
- Contracted Engineering Design Inc. August 16, 1994 for unknown amount.
- Contracted STS Consultant Ltd. October 1987 for $1,500.

Elevation Survey $0.00
Conducted by Gary Croskey as part of the May 13, 2010 Dam Safety Inspection.

Video Survey $0.00
Conducted last in 1998. Contractor Insituform North, Inc. charges unknown.

Dam Safety Consultant Fee $0.00
Contracted Gary Croskey in September 2008

Trapper ..... N/C
Keith Putnam 989-834-2334 was allowed access in 2009 to trap muskrats for their pelts in lieu of billing LVPOA for service. No charge.

To Mow Dam $000.00
Contracted Worthy Acres in 2009

To Mow Price Road Ditch ..... N/C to LVPOA Budget
Clinton County in 2008 using CCRC funds

To Mow Steep Slopes $18.80
Volunteer worker mowed twice in 2009 using LVPOA equipment. Gas charge for LVPOA equipment. No labor charge.

EQUIPMENT

Safety Gear
Two Safety Harnesses ***(to be purchased)*** are to be kept in the association pole barn. Each set consists of a body harness and safety cable. They should be inspected before each use.

Primary Spillway Key
The primary spillway key opens the lock and chain set that secures the valve wheel (located on the top of the Dam Riser structure) used to open and close the Primary Spillway Valve.

Dam Operator should possess a Primary Spillway Key

Kim Dutcher 517-898-8820 has one Primary Spillway Key

One master key should be kept in the association key box.

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INSPECTIONS & SURVEYS

Elevation Survey

The Association will be required, when requested, to have an Elevation Survey performed as part of the Dam Safety Inspection. The Survey and a report must be completed and presented to the Dam Inspector as part of the Dam Safety Inspection.

The Elevation Survey is conducted to detect any settlement of the earth embankment of the Main Dam and Closure #1 Dam.

The last survey was conducted in 2010 as part of the 5-year dam inspection. It will be compared with the 2000 survey.

Monthly Visual Dam Inspection

An inspection of the conditions of all dam elements will be conducted at least once a month and during times of inclement weather conditions.

Main Dam

1. Boat Launch Area
   - Gravel on entrance road and parking area
   - Cement on launch pad
   - Gate, lock, chain, signs, dock, bathroom and trash can
2. Crest, Upstream & Downstream Slopes
   - Wave erosion along shoreline
   - Settlement, seepage, erosion, cracks and sloughing on slopes
   - Conditions and length of vegetation cover on slopes
   - Trees and brush that should be removed
   - Cattails that should be removed from water's edge ***(Cattails encourage burrowing animals and restrict the ability to inspection and monitor for the signs of burrows. They are to be removed so as not to jeopardize the integrity of the dam.)***
   - Signs of burrowing animals
3. Primary Spillway
   - Annual Operational Test of slide gate (in October)
   - Condition of cement and paint on riser cement structure
   - Riser metal work finish, welds, hinges, anchors, bolts, lights, lock and chain
   - Monitor Zebra Mussels and address any issues
   - Remove any debris from Weir / Trash rack
   - Condition of wooden stop logs and any excessive leakage
   - 2-safety harness sets / 2-stoplog removal tools / 1-stop log safety cable
   - Condition of discharge culvert pipe
   - Sign of erosions or borrowing animals around discharge culvert pipe

Closure #1 Dam / Auxiliary Spillway

1. Crest, Upstream & Downstream Slopes
   - Wave erosion along shoreline
   - Settlement, seepage, erosion, cracks and sloughing on slopes
   - Conditions and length of vegetation cover on slopes
   - Trees and brush that should be removed
   - Cattails that should be removed from water's edge ***(Cattails encourage burrowing animals and restrict the ability to inspection and monitor for the signs of burrows. They are to be removed so as not to jeopardize the integrity of the dam.)***
   - Signs of burrowing animals

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Monthly Visual Dam Inspection ***Continued***

Price Road Ditch

1. Spillway
   - Settlement, seepage, erosion, cracks and sloughing
   - Trees and brush that should be removed
   - Condition of culvert pipe
   - Signs of burrowing animals

Closure #2 Dam

1. Crest, Upstream & Downstream Slopes & Roadway
   - Wave erosion along shoreline and ditch
   - Settlement, seepage, erosion, cracks and sloughing on slopes
   - Conditions and length of vegetation cover on slopes
   - Trees and brush that should be removed
   - Signs of burrowing animals
2. Culvert Spillway
   - Condition of culvert pipe
   - Sign of erosions or borrowing animals
   - Condition of wooden stop logs and any excessive leakage
   - Condition of roadway ditch drain grate
3. Weir ***(if and when installed)***
   - Wave erosion along Upstream shoreline
   - Settlement, seepage, erosion, cracks and sloughing on slopes

Safety Inspection

The DEQ will notify the Association of the inspection due date, by certified mail, no later than January 31 of the year in which the inspection report is due.

The Lake Victoria Dam is on a five year schedule. The last dam safety inspection was conducted in 2010. The next inspection will be required in 2015 when notified.

2010 Report
May 13, 2010 by Gary Croskey $1,300
$300 retainer prior to the commencement of work w/signed contract was required.
The $1,300 included the 2010 Elevation Survey.

2005 Report
May 8, 2005 by Gary Croskey $1,000
$400 retainer prior to the commencement of work w/signed contract was required.

2000 Report
April 10, 2000 by Gary Croskey $1,800
$600 retainer prior to the commencement of work w/signed contract was required.

1994 Report
August 16, 1994 by Engineering Design Inc. .....Amount Unknown

1987 Report
February 10, 1987 by STS Consultant Ltd. $1,500

1973 Report
August 22, 1973 by Hathaway Hanes, P.E. $300

1970 Report
April 28, 1970 by Fargo Engineering Co. $900

Settlement, Seepage, Cracks, Sloughing or Erosion

If any settlement, seepage, cracks, sloughing or erosion* is noted contact the Dam Inspector. Immediate action must be taken to repair any of these conditions.

Other than typical erosion usually taken care of during regular maintenance.

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Valve Test of Primary Spillway

This test is to be conducted once a year. It is recommended that it takes place at the end of the boating season. Preferably in conjunction with the scheduled lowering of the lake in October. Performing the test at this time will also help reduce the impact of an event like the failure of the Primary Spillway Valve.

The test procedure is made up of eight steps. Using this method will facilitate the passage of stones and debris in an attempt to keep the valve from jamming or being blocked in an open position.

Step # 1 open valve 2”
Step # 2 close the valve
Step # 3 open valve 4”
Step # 4 close valve
Step # 5 open valve 8”
Step # 6 close valve
Step # 7 open valve 12”
Step # 8 close valve

All parts are to be visually inspected and those requiring lubrication should be greasing at this time.

Video Inspection of Primary Spillway

The Association will be required have a Video Inspection performed as part of the Dam Safety Inspection when requested by the State of Michigan or Dam Inspector.

The Video inspection is conducted, when requested by the State of Michigan or Dam Inspector, to determine the conditions of the Primary Spillway Outlet Tube.

The Video Inspection was performed in 1991 and 1997 prior to the installation of the resin liner system in 1998. Before and after videos were made during the 1998 liner update. Per the 2005 Dam Safety Inspection a video inspection was done in 2006. The inspection showed no change in the condition of the pipe.

2006 Video

January 6, 2006 by ??? $0.00
Required by 2005 Dam Inspection.

1998 Video

May 22, 1998 Insituform North Inc. $0.00
Pre & Post Video of Culvert Reline Project.

1997 Video

June 25, 1997 by SOS Service Group Inc. $0.00

1991 Video

December 13, 1991 by STS Consultants Inc. $0.00

PROCEDURES & PROTOCOL

Borrowing Animals

Immediate action must be taken to remove any animals borrowing into the dam. The DNR should be notified when an animal is trapped. Although it may not possible to get the necessary permits quickly enough to deal with an animal. The animal must be dealt with immediately so the dam’s integrity is not jeopardized. The DNR should still be notified as soon as possible.

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Closure #2 Dam Stop Logs

NOTE: the Clinton County Road and Drain Commission has asked that the culvert under the Peninsula Way road is no longer used as a lake level control device. The culvert should not be blocked in anyway. It is the CCRC and CCDC's recommendation that any control device be placed ahead of the culvert in the channel leading to it.

Closure #2 Dam Weir

NOTE: The LVPOA is working with the Clinton County Road and Drain Commission to create a 791'9" Weir System in the ditch in front of the Peninsula Way Culvert. This is to replace the need for the use of stop logs to control the lake level. The plan is to create the system when the culvert is replaced during the repaving of the road.

Flood Warning Procedure

The Lake Victoria Dam System should be visually monitored while a Flood Warning is in effect for the Lake Victoria area. It is important to watch for signs that could lead to the failure of the dam.

The Primary Spillway was redesigned and modified in 2007 to automatically regulate the water level. Additional water will flow through the spillway without operating the valve or the removal of any stop logs.

If the lake level is above the operating level of 791'9" the valve can be opened ***(at the Dam Operator's discretion)*** if continued heavy rainfall or the melting of large amounts of snow is expected.

NOTE: Gary Croskey the LVPOA Dam Consultant and Inspector has stated that since the 2007 Dam Riser Modification "opening the valve to increase the flow of water through the riser culvert will only have a <u>minimal effect, if any</u>". This procedure is <u>no longer required</u> as part of LVPOA dam operation protocol during water levels above 791'9". (see Dam Log 05/13/2010 entry)

If the lake level reaches 794' 2" the dam system is designed to allow water to flow over the Closure #1 Dam Auxiliary Spillway. If it appears that water will flow over the dam contact 911 to activate the Lake Victoria Auxiliary Spillway Action Plan so Price Road can be closed to traffic if needed. ***(Board is now working with 911 administrative director to create the plan).***

The Main Dam and Closure #1 Dam should be visually monitored during this event to watch for any washout or breakdown that could lead to the failure of the dam.

Only authorized personal are allowed on the Main Dam or Closure #1 Dam during flood warnings.

Monitor Closure #2 Dam Culvert Spillway during flood warnings to make sure no debris blocks the flow of water through the culvert.

In the event water flows over the Closure #1 Dam Auxiliary Spillway a dam inspection should be scheduled with a licensed dam inspector to ensure there are no structural deficiencies.

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Foot and ORV traffic

All traffic is to be limited on the crest and slopes of the entire dam with the exception of the main dam access road, boat ramp and designated parking area. Only authorized maintenance vehicles and machinery are allowed on the dam system when performing official duties.

Access to the North Boat Ramp may be temporarily restricted or terminated for a time if the gravel becomes too soft for traffic. ***Examples: after heavy rains or during spring was the frost leaves the ground.***

NOTE: Members found to have caused damage to any of these areas will be responsible for the cost of repairs and inspection fees. Any cost incurred by the Lake Victory Association to repair the damage will be charge to the offending member in the form of an additional property assessment.

Opening or Accessing the Primary Spillway Interior

There MUST be two people present whenever the Primary Spillway is opened or accessed. A Safety Harness and Cable MUST be worn by any person entering the structure. The Cable MUST be attached to each person's Safety Harness and a secure the metal structure of the Primary Spillway.

Operating the Primary Spillway

The Primary Spillway was redesigned and modified in 2007 to automatically regulate the water level. Additional water will flow through the spillway without operating the valve or removing any stop logs.

In the event water must be lowered below the Lake Operating Level of 791'9" the valve can be opened.

Water Flow Over Closure #1 Dam Auxiliary Spillway

The Lake Victoria Dam System should be visually monitored during any time when water flows over the auxiliary spillway. It is important to watch for signs that could lead to the failure of the dam.

If the lake level reaches 794' 2" the dam system is designed to allow water to flow over the Closure #1 Dam Auxiliary Spillway. If it appears that water will flow over the dam contact 911 to activate the Lake Victoria Auxiliary Spillway Action Plan so Price Road can be closed to traffic if needed. ***(Board is now working with 911 administrative director to create the plan).***

The Main Dam and Closure #1 Dam should be visually monitored during this event to watch for any washout or breakdown that could lead to the failure of the dam.

Only authorized personal are allowed on the Main Dam or Closure #1 Dam during this event.

In the event water flows over the Closure #1 Dam Auxiliary Spillway a dam inspection should be scheduled with a licensed dam inspector to ensure there are no structural deficiencies.

Emergency Excavating Contractor

Each year the Dam Operator will need to obtain an agreement with an excavating contractor who will agree to respond in cases of emergency when heavy equipment and material are needed as it relates to the maintenance needs of the dam. The names and contact numbers should be updated each year and listed on page 1 of this Dam Operation & Maintenance Plan. These contacts may also be part of the 911 plan.

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WATER LEVEL

Lake Victoria Operating Level 791' 9"

2009 marked the completion of the Primary Spillway modifications. These modification were made to give the spillway the ability to automatically increase the flow of water exiting the lake through the Main Dam Riser when the lake level rises above 791'9".

Note: The lake level will rise approximately 1 inch for every ½ inch of precipitation.

It should be understood that extreme weather conditions like excessive rain fall or drought will effect the short term lake level. Lake front owners should always be prepared for these events. All docks, watercraft, yard furnishing, etc. should be constructed, anchored and secured at all times in a manner that will compensate for any unexpected changes in the lake's water level.

All electrical devices installed or used at or below the 794'2" Closure #2 Dam Auxiliary Overflow Level should be of a GFI configuration and able to be submerged without endangering people or property.

It is recommended that all property owners with structures close to the 794'2" Closure #2 Dam Auxiliary Overflow Level consider obtaining flood insurance and creating ways to limit property damage during flood conditions.

Lake Victoria Level Lowering

The lake level can be lowered to approximately 789'each year at the discretion of the LVPOA Board. This allows the association and its members the ability to perform maintenance work. The practice has been to open the Primary Spillway Valve **at the end of the boating season in OCTOBER.**

Notification of all association members should begin in the months prior to October using the online e-Voice. A small printed flyer may also be distributed to lake front property owners.