



NEWAYGO COUNTY

MUSKEGON RIVER EMERGENCY EVACUATION PLAN FOR DAM FAILURE AND FLOODING

2016 EDITION



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Geographical Data & Map Provided by: Newaygo County Geographic Information Systems

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PREFACE

The worst recorded dam failure in U.S. history occurred in Johnstown, Pennsylvania, in 1889. More than 2,200 people were killed when a dam upstream from Johnstown failed; sending a huge wall of water downstream which completely inundated the town.

Dams in Michigan are regulated by Part 307, Inland Lake Levels, and Part 315, Dam Safety, of The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. As defined the Act, a dam means an artificial barrier, including dikes, embankments, and appurtenant works, that impounds, diverts, or is designed to impound or divert water, or water and any other liquid or material in the water, and that is or will, when complete, be 6 feet or more in height, and has or will have an impounding capacity at design flood elevation of 5 surface acres or more. In Michigan there are 2,500 dams.

The DEQ also classifies dams into three different categories:

1. High Hazard Potential: Failure may cause serious damage to inhabited homes, agricultural buildings, campgrounds, recreational facilities, industrial or commercial buildings, public utilities, main highways or class I carrier railroads, or where environmental degradation would be significant, or where danger to individuals exists with the potential for loss of life. (Sec.31503 [11])
2. Significant Hazard: failure may cause damage limited to isolated inhabited homes, agricultural buildings, structures, secondary highways, short line railroads, or public utilities, where environmental degradation may be significant, or where and danger to individuals exists. (Sec. 31505 [5])
3. Low Hazard: failure may cause damage limited to agriculture, uninhabited buildings, township or county roads, where environmental degradation would be minimal, and danger to individuals is slight or nonexistent. (Sec. 31504 [2])

There are also 99 hydroelectric dams in Michigan regulated by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act. Both dams on the Muskegon River in Newaygo County are classified as High Hazard Potential Hydroelectric Dams owned by Consumers Energy and regulated by FERC.

The Newaygo County Emergency Services Department, in conjunction with the Newaygo County Local Emergency Planning Team and Consumer's Energy, has developed this evacuation plan for the affected areas downstream from both dams on the Muskegon River. This plan should be used in conjunction with the current Newaygo County Emergency Operations Plan, Newaygo County Emergency Operations Plan 2015 Edition.

Part I – Introduction

Purpose

The purpose the Newaygo County Muskegon River Evacuation Plan is to save lives, minimize damage, and enhance emergency response operations during an Emergency Classification at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County. This plan sets forth the emergency response organizational structure and management system under which Newaygo County will operate during a dam failure or flooding incident. It describes how different government and non-governmental entities will interact with each other to effectively disseminate out emergency alerts and information, conduct emergency evacuations, and shelter persons who would be impacted by a dam failure or flooding event on the Muskegon River. This plan is a supporting Hazard Specific Annex to the Newaygo County Emergency Operations Plan and the Emergency Action Plans for Hardy and Croton Hydro Plants.

Scope

The Newaygo County Muskegon River Evacuation Plan is local in application and pertains to any four of the Emergency Classifications at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County. It describes actions necessary to accomplish the warning and evacuation of areas within Newaygo County which may be impacted by flood waters.

Objectives

The objectives of the Newaygo County Muskegon River Evacuation Plan are:

1. To establish guidance for disseminating out emergency alerts and emergency information to impacted areas.
2. To establish clear lines of authority and responsibility for managing emergency response operations during an Emergency Classification at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County.
3. To establish guidance for conducting emergency evacuations including identifying impacted areas, emergency evacuation routes, and supporting evacuation facilities including reception centers and temporary emergency shelters.
5. To establish guidance for securing the impacted area including perimeter and access.
6. To establish guidance for search and rescue and recovery.
7. To establish guidance for short term recovery.

Plan Components

The developed guidelines and procedures for dealing with existing and potential emergency incidents on the Muskegon River are defined in the plan below. The basic plan, and the functional and hazard-specific annexes outline an organized, systematic method to mitigate, prevent, prepare for, respond

to, and recover from incidents.

Basic Plan

The Basic Plan describes the purpose, scope, situation, policies, and concept of operations for the response and recovery activities to an Emergency Classification at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County.

Dam Failure Hazard Specific Annex

The Dam Failure Hazard Specific Annex describes incident goals, operational period objectives, safety considerations, and other critical response objectives for the response to and recovery from a Condition A – Imminent Failure of the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County. This section of the plan also contains supporting planning documents including Inundation Maps, Evacuation Zone information, Evacuation routes and shelters, etc.

Flood Hazard Specific Annex

The Flood Hazard Specific Annex describes incident goals, operational period objectives, safety considerations, and other critical response objectives for the response to and recovery from a Condition C – High Flows of the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County. This section of the plan also contains supporting planning documents including Inundation Maps, Evacuation Zone information, Damage Assessment Supporting documentation, etc.

PUBLIC ACCESS **(Supervised and Documented Access For Official Use Only)**

The Introduction and Basic Plan sections of the Newaygo County Muskegon River Evacuation Plan 2016 are public documents. Access to both are available on the Newaygo County Emergency Services Department Website at <http://www.countyofnewaygo.com/EmergencyServices.aspx>

Both the Dam Failure Hazard Specific Annex and Flood Hazard Specific Annex sections, which include personal contact information, inundation and evacuation maps, and other supporting documentation are considered except from the Michigan Freedom of Information Act (MCL 15.243y). Unauthorized possession of this information to the extent that it pertains to a specific vulnerable target could constitute a violation of the Michigan Anti Terrorism Act (MCL 750.543r).

The information contained in this document is intended for official emergency preparedness use only.

Part II – Basic Plan**NEWAYGO COUNTY MUSKEGON RIVER EMERGENCY
EVACUATION PLAN**

UNDER THE AUTHORITY VESTED IN ME BY P.A. 390, "THE MICHIGAN EMERGENCY MANAGEMENT ACT" AND "THE NEWAYGO COUNTY EMERGENCY MANAGEMENT RESOLUTION", I CERTIFY THAT THIS NEWAYGO COUNTY MUSKEGON RIVER EVACUATION PLAN DATED **2016** IS A SUPPORTING PLAN TO THE NEWAYGO COUNTY EMERGENCY OPERATIONS PLAN DATED 2015 AND IS THE OFFICIAL EMERGENCY PLANNING DOCUMENT FOR THE MUSKEGON RIVER DURING RESPONSE AN EMERGENCY CLASSIFICATION AT THE HARDY HYDROELECTRIC PROJECT OR THE CROTON HYDROELECTRIC PROJECT ON THE MUSKEGON RIVER WITHIN NEWAYGO COUNTY.

PATRICK GARDNER, Chairperson
Newaygo County Board of Commissioners

Date

ABIGAIL B. WATKINS P.E.M., M.E.P, Director
Newaygo County Emergency Services
Department

Date

HAZARD ANALYSIS

Newaygo County is vulnerable to a wide range of natural, technological and human-related hazards. Managing these many varied threats, and protecting life and property, are the challenges faced by emergency management officials at all levels of government. In order to attain effective emergency management capability, an understanding of the multitude of hazards that confront the County must first be obtained, and then a plan must be developed to systematically address those threats.

A hazard analysis provides an understanding of the potential threats facing the community. By pinpointing the location, extent and magnitude of past disasters or emergency situations, and by examining knowledge of new or emerging risks, it is possible to estimate the probability of such events occurring and the vulnerability of people and property. By viewing this information along with relevant land use, economic, and demographic information from a well prepared “community profile,” emergency management coordinators can make assumptions about those segments of the community that might be impacted in a given situation. This, in turn, allows them to set priorities and goals for resource allocation and response, recovery, and mitigation activities prior to an incident occurring.

The following Dam Failure and Flooding Hazard Information comes from the Newaygo County Hazard Management Plan 2015 Edition.

Hazard Description

Flood hazards in Michigan include dam failures, riverine flooding, urban flooding, and Great Lakes shoreline flooding, and erosion. Flooding in Michigan can cause extensive property damage, reduced quality of life, and even injuries and deaths. Flooding can be caused by weather hazards including thunderstorms, severe winter weather, and extreme temperatures, technological hazards including dam failures, sewer pumping, and lift station failures, and human related hazards such as terrorism, sabotage, or civil disturbances.

Every year, flooding causes more than \$2 billion of property damage in the U.S. Floods can damage or destroy public and private property, disable utilities, make roads and bridges impassable, destroy crops and agricultural lands, cause disruption to emergency services, and result in fatalities. People may be stranded in their homes for several days without power or heat, or they may be unable to reach their homes at all. Long-term collateral dangers include the outbreak of disease, widespread animal death, broken sewer lines causing water supply pollution, downed power lines, broken gas lines, fires, and the release of hazardous materials. In a high risk area, a home has at least a 26% chance of being damaged by a flood during the course of a 30-year mortgage, compared to a 9% chance of being damaged by fire.

Flooding in Newaygo County

Like many Michigan communities, Newaygo County is permeated with numerous lakes, rivers, and streams of varying sizes, including 234 natural lakes and ponds, 356 miles of rivers and streams covering 12,543 acres. Naturally, these have resulted in a significant amount of seasonal and permanent housing development along the scenic waterways and have added to the area's popularity in recreational activities.

Along with the role that the water base has played in the jurisdiction's development, it has also resulted in a significant flooding risk to those same areas of the population. Minor flooding occurs annually along the low lying areas of the Muskegon River and White River, which regularly affect the permanent and seasonal residences in the associated sub-divisions.

The Muskegon River



The Muskegon River Watershed begins in north-central lower Michigan, flowing from Higgins and Houghton Lakes, southwesterly to the City of Muskegon and discharging into central Lake Michigan. The watershed incorporates over 2,350 square miles of land with approximately 94 tributaries flowing directly into the Muskegon River. Most of the watershed is contained within eight counties: Roscommon, Missaukee, Clare, Osceola, Mecosta, Montcalm, Newaygo, and Muskegon. The Muskegon River is the main stem river within the Muskegon River Watershed. The river is 212 miles long and drops 575 feet in elevation between its sources and the river mouth.

There are numerous dams and impoundments in the Muskegon River watershed. Many dams are not registered with the State of Michigan and are established on tributary streams. Four dams are currently located on the Muskegon River and include Reedsburg Dam (constructed in 1940), Rogers Dam (constructed in 1906), Hardy Dam (constructed in 1931), and Croton Dam (constructed in 1907). The Hardy Dam and Croton Dams are both located within Newaygo County.



Hardy Dam



Located in Big Prairie Township, the Hardy Hydroelectric Dam is the third largest earthen-filled dam in the world, and the largest east of the Mississippi River. Its impoundment forms Michigan's largest inland lake with over 50 miles of shoreline and a reservoir of 3,902 acres. The average annual cubic feet per second of flow through the dam is 1,460. The Hardy Dam is capable of generating 30,000 kilowatts of electricity which is enough power to serve a community of 16,600 people.

The Hardy Dam is owned and operated by Consumers Energy. Because of its size and operation, the dam is licensed by the Federal Energy Regulatory Commission (FERC). This license governs plant operation, dam safety, and land management and recreation. The Hardy Dam is not designed and cannot operate as a flood control structure under the FERC License. The dam operates in a peaking mode, with pond levels maintained within +/- 0.5 feet of the 822.0 feet surface water level on a daily basis (except during drawdown and refill). Annually, from January until the end of April, the Hardy Dam may be drawn down up to -12 feet below 822.0 feet +/- 0.5 feet. The maximum depth of the drawdown is based on a winter snow survey conducted with the National Weather Service. The pond must be refilled back to full levels by May 1st. Rates of drawdown and refill must not exceed 1 foot in a 24 hour period.

The Hardy Dam is listed as a High Hazard Dam by the Michigan DEQ. This dam is noteworthy not only because of the large amounts of water impounded behind it, but also because of its location upstream from the populated and agriculture areas along the Muskegon River near the City of Newaygo and in Muskegon County. A failure on this dam would likely result in loss of life and/or damage to structures, roads, utilities, crops and the environment. In addition, a failure of the Hardy Dam would cause a failure of the Croton Dam.



Croton Dam

The Croton Hydroelectric Generating Dam has been in continuous operation since 1907. Its impoundment, the Croton Pond, is 1,290 acres with a mean depth of 18 feet. The average annual cubic feet per second of flow through the dam is 1,871. The dam is capable of generating 8,800 kilowatts of electricity, enough to serve a community of about 4,900 people. The plant is located in Newaygo County's Croton Township and is the site of the great salmon migration.

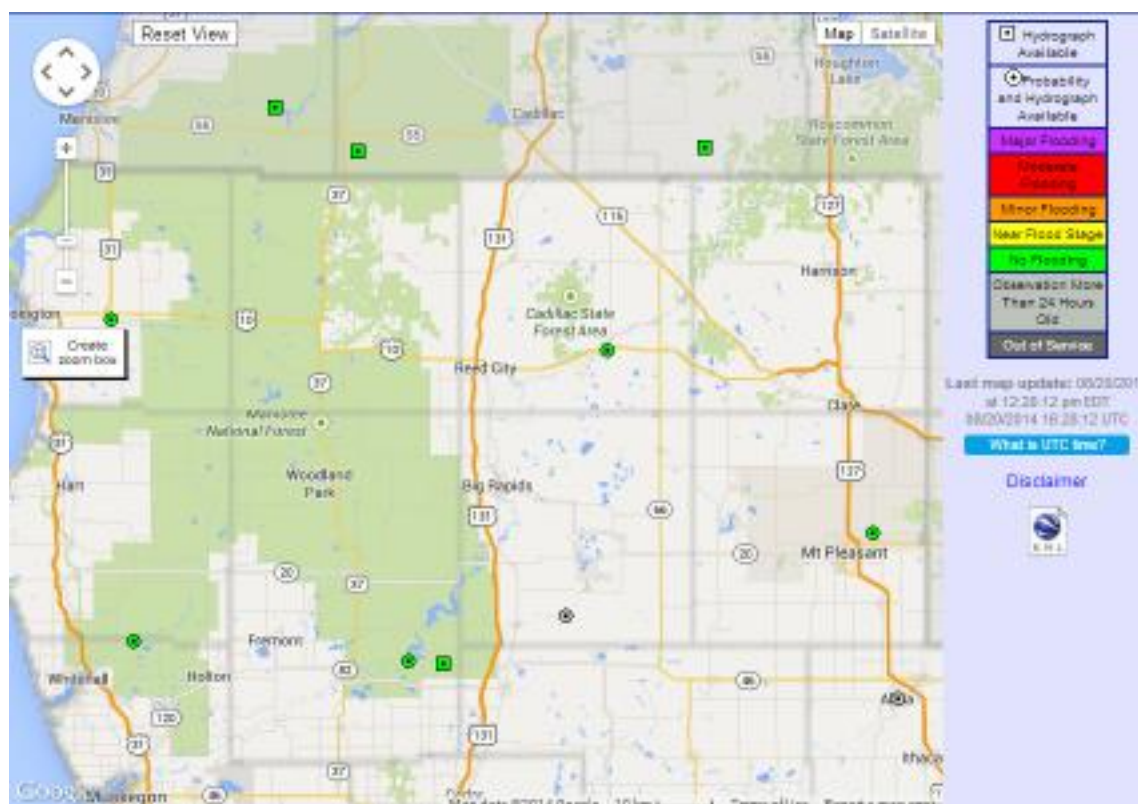


The Croton Dam is owned and operated by Consumers Energy. Because of its size and operation, the dam is licensed by the Federal Energy Regulatory Commission (FERC). This license governs plant operation, dam safety, and land management and recreation. The Croton Dam is not designed and cannot operate as a flood control structure under the FERC License. The dam operates in a re-regulation mode, with pond levels maintained at 722.0 feet surface water level on a daily basis. With Hardy at full or minimum pond level, flows from Croton are to approximate the inflows from Rodgers Dam plus the Little Muskegon River. During the Hardy drawdown or refill periods, Croton is to release the projected daily average flow from Hardy plus the Little Muskegon River. Rates of drawdown and refill must not exceed 1 foot in a 24 hour period.

The Croton Dam is also listed as a High Hazard Dam by the Michigan DEQ. This dam is noteworthy not only because of the large amounts of water impounded behind it, but also because of its location upstream from the populated and agriculture areas along the Muskegon River near the City of Newaygo and in Muskegon County. A failure on this dam would likely result in loss of life and/or damage to structures, roads, utilities, crops and the environment.

USGS River Gauges on the Muskegon River

A system of United States Geological Survey (USGS) stream gauges exists across Michigan and is linked with a real-time remote monitoring system through the internet (www.waterwatch.usgs.gov). Most gauges commonly measure the height and volume of water flowing through rivers. Live updates and old records from the gauges are available online. Local, State, and Federal agencies rely on the data for flood forecasting and issuing permits. Along the Muskegon River there are two USGS stream gauges, one in the City of Evart and one below the Croton Dam in Newaygo.



The USGS from 1964 through 1993, the Muskegon River gauge below the Croton Dam was located within the City of Newaygo. While the gauge was at this location, the flood stage was 11.0 feet. During this 29 year period there were 12 flooding events. The following graph shows the Peak Streamflow on the Muskegon River at Newaygo, MI from the USGS:

Water Year	Date	Gage Height (Feet)	Flood Height above FS	Stream Flow (CFS)
1964	May 01, 1964	9.42		4,580
1965	April 12, 1965	11.05	0.05	7,190
1966	December 15, 1965	10.34		6,050
1967	December 10, 1966	10.97		7,060
1968	June 28, 1968	9.72		5,130
1969	July 1, 1969	13.98	2.98	9,550
1970	June 3, 1970	12.08	1.08	5,900
1971	April 17, 1971	12.31	1.31	7,220
1972	April 20, 1972	10.59		5,190
1973	March 9, 1973	10.67		6,390
1974	May 18, 1974	11.01	0.01	7,020

1975	September 2, 1975	12.75	1.75	9,800
Water Year	Date	Gage Height (Feet)	Flood Height above FS	Stream Flow (CFS)
1976	March 30, 1976	13.37	2.37	10,800
1977	March 13, 1977	9.78		5,170
1978	April 11, 1978	10.20		5,800
1979	April 2, 1979	10.40		6,100
1980	March 21, 1980	9.94		5,410
1981	February 24, 1981	9.87		5,300
1982	April 3, 1982	10.06		5,590
1983	December 4, 1982	10.50		6,720
1984	June 17, 1984	10.54		6,300
1985	December 30, 1984	11.06	0.06	7,090
1986	September 12, 1986	19.54	8.54	23,200
1987	October 1, 1986	12.88	1.88	9,940
1988	April 4, 1988	10.57		6,280
1989	April 2, 1989	11.83	0.83	8,290
1990	March 14, 1990	10.50		6,170
1991	April 16, 1991	10.95		6,870
1992	November 1, 1991	11.28	0.28	7,400
1993	April 21, 1993	10.57		6,280



When the gauge was moved to Croton in 1995, the flood stage dropped to 9.0 feet. Trends have been regularly tracked by local and state officials through various methods including a local spotting system and an electronic river gauge installed on the Muskegon River. Utilizing this information, emergency officials have been able to anticipate routine flooding activity and severity with relatively high accuracy. From 1996-2014, a 19 year period, there were 8 flooding events. The following graph shows the Peak Streamflow on the Muskegon River at Croton, MI from the USGS:

Water Year	Date	Gage Height (Feet)	Flood Height above FS	Stream Flow (CFS)
1996	June 24, 1996	8.42		5,780
1997	Jan 5, 1997	8.23		5,410
1998	April 2, 1998	9.12	0.12	7,130
1999	June 15, 1999	7.56		4,150
2000	May 19, 2000	8.33		6,080
2001	May 18, 2001	8.49		6,390
2002	March 10, 2002	8.67		6,620
2003	May 12, 2003	6.84		3,420
2004	May 24, 2004	10.45	1.45	9,580
2005	April 4, 2005	9.10	0.10	7,080
2006	March 14, 2006	9.42	0.42	7,630
2007	March 24, 2007	8.45		6,020
2008	June 9, 2008	8.78		6,550
2009	December 29, 2008	8.89		6,730
2010	October 31, 2009	8.63		6,300
2011	April 29, 2001	10.64	1.64	9,970
2012	May 5, 2012	8.49		6,150
2013	April 19, 2013	11.11	2.11	11,000
2014	April 15, 2014	12.89	3.89	15,600



Action Stage	8 Feet
Flood Stage	9 Feet
Moderate Flooding	11 Feet
Major Flood Stage	12 Feet

Flood Impacts on the Muskegon River

13.0	Flood water begins surrounding properties on Russel Road and Salmon Run in Croton Township... Cottonwood Flats and Gould Subdivision in Brooks Township... and 128th Street in Bridgeton Township impacting 77 properties. Expect Major flooding of 132 properties in Old Womans Bend... Anderson Flats... 100th Avenue... Sycamore Flats... SugarBush Lane... Bell Meadow... Leisure Land... Freight Hill... Bridgeton Flats... and Devils Hole. Expect Moderate flooding of an additional 55 properties in these areas.
12.0	Expect the Bridge Street Bridge in the City of Newaygo and the Maple Island Bridge in Bridgeton Township to close. Expect water over Maple Island Road in Bridgeton Township and Main Street in Brooks Township. Expect Major flooding of 80 properties downstream from the City of Newaygo in Old Womans Bend... Anderson Flats... 100th Avenue... Sycamore Flats... SugarBush Lane... Bell Meadow... Leisure Land... Freight Hill... and Bridgeton Flats. Expect Major flooding of 16 properties in Devils Hole.
11	Flood water begins surrounding homes on Sarrell Street in the City of Newaygo. Expect water to be over South River Drive near Maple Island and Main Street in Bridgeton Township. Expect Moderate flooding of 76 properties downstream from the City of Newaygo in Old Womans Bend... Anderson Flats... 100th Avenue... Sycamore Flats... SugarBush Lane... Bell Meadow... Leisure Land... Freight Hill... and Bridgeton Flats. Expect Minor flooding in Devils Hole in Brooks Township.
10.5	Flood water begins surrounding cottages and homes downstream from the City of Newaygo in the areas of Sugarbush Lane and 100th Avenue in Ashland Township...and Bell Meadow Subdivision...Leisure Land Subdivision...Freight Hill Subdivision...and Main Street in Bridgeton Township...impacting 76 properties. Flood water begins surrounding cottages and homes upstream from the City of Newaygo in Devils Hole and Main Street in Brooks Township. Expect all public River Access Sites to be closed.
10	Flood water begins surrounding properties downstream from the City of Newaygo in the areas of Anderson Flats and Old Women's Bend in Garfield Township and Fright Hill Subdivision and 8753 S River Drive and 9230 Main Street in Bridgeton Township impacting 54 properties. Felch Ave near Salmon Run Campground and South River Lane become impassable in Garfield Township. Expect minor flooding in Leisure Land Subdivision and Sycamore Flats. Expect all public River Access Sites to be closed.
9.5	Flood water begins surrounding cottages and homes downstream from the City of Newaygo in the areas of Leisure Land Subdivision in Bridgeton Township and Sycamore Flats in Ashland Township impacting 17 properties.
8	River is at bankfull. River begins to exceed its banks and minor flooding begins in low lying areas along the river.

Planning Assumptions

The following all-hazards planning assumptions have been developed to provide a foundation for planning and response considerations. They include key concepts that must be taken into account throughout all phases of mitigation, preparedness, response, and recovery.

The Newaygo County Muskegon River Evacuation Plan assumes:

- The Muskegon River within Newaygo County is susceptible to a wide range of natural, technological, and man-made conditions that could result in four emergency classifications of sufficient magnitude to overwhelm available local capabilities and resources AND significantly threaten the lives, property, and environment.
- It is the principle responsibility of the Newaygo County Government to protect the life and health of persons along the Muskegon River within Newaygo County. Thus it is the responsibility of the Newaygo County Government to maintain a system to provide for the safety and welfare of its citizens when emergencies / disasters occur.
- A major disaster could occur at any time, and at any place. In many cases, dissemination of warning to public safety officials and the public and implementation of increased readiness measures may be possible; however, some emergency situations occur with little or no warning.
- A “Sunny Day Failure” could occur at any time without warning. Action is required immediately to save lives and protect property. Newaygo County public safety officials, the Emergency Operations Center, Consumers Energy, and other key stakeholders are trained to act quickly and knowledgeably during an incident through the development, maintenance, and exercising of the plan.
- Maintaining the Newaygo County Muskegon River Evacuation Plan and providing frequent opportunities for the general public, public safety officials, emergency operations center staff, elected officials and other key stakeholders to exercise the plan can improve Newaygo County’s readiness to respond to an during an Emergency Classification at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County..
- The Newaygo County Emergency Operations Plan is the primary emergency response plan for Newaygo County and its comprising jurisdictions (townships, cities, villages). The Newaygo County Muskegon River Evacuation Plan is a supporting plan to the Newaygo County Emergency Operations Plan dated 2015 and is the official emergency management planning document for responding to an Emergency Classification at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County.

Concept of Operations

To assure appropriate and prompt response to an emergency situation at any of the two dams, the Emergency Action Plan for Hardy Hydro Plant Project 2452 and Croton Hydro Plant Project 2468 developed by Consumers Energy and regulated by the Federal Energy Regulatory Commission (FERC), has classified potential emergency situation or conditions according to the relative urgency as follows:

Condition A: Failure is Imminent or has occurred.

Condition A will be activated where a failure either has occurred, is occurring, or is obviously about to occur. Once it has been determined that there is no longer any time available to attempt corrective measures to prevent the failure, the *Failure is Imminent or Has Occurred* warning should be issued. The Hydro Operations Supervisor will immediately notify Newaygo County Central Dispatch who will then notify appropriate local authorities according to the Emergency Notification Flow Chart in the Emergency Action Plan for Hardy Hydro Plant and Croton Hydro Plant. In addition, the Hydro Operations Supervisor or Newaygo County Central Dispatch will immediately activate the 8 dam failure warning sirens. Newaygo County Emergency Services Department, if not already done so, will activate the Emergency Operations Center and implement local evacuation plans.

Condition B: Potential failure situation is developing.

Condition B will be activated when a potential failure situation is developing which allows for further analysis/decisions to be made before dam failure is considered to be a foregone conclusion. This is a situation where a failure may eventually occur, but preplanned actions taken during certain events may moderate or alleviate failure. Even if failure is inevitable, more time is generally available than in a Failure has occurred situation to issue warnings and or to take preparedness actions.

Condition C: High Flow Emergency condition.

Condition C will be activated when the flow conditions are as such that flooding is expected to occur downstream of the dam. Use of this classification allows for early warning of downstream areas during flood conditions. While the amount of flooding may be beyond control, information on the amount of releases from the dam is provided to authorities for any decisions on the need for evacuations. Condition C at Hardy Dam is quantified by three machines are at 100% governor; three spill valves are 30% open or the equivalent percentage (7,110 cubic feet per second), and additional spill is required; and/or local run-off increases river levels downstream.

Condition D: Non-Failure Emergency condition.

Condition D will be activated when a situation is developing that will not, by itself, lead to a failure but requires investigation and notification to internal and/or external personnel. External notification will be made only when the public could be affected. An example would be if a

gate malfunctioned which may lead to unexpected high releases that could pose a hazard to the downstream public.

Incident Response

Successful management of emergencies / disasters requires rapid decision making to complex problems by government officials and emergency service agencies. For disasters, history has proven that the most challenging of these involve unclear direction for initial response, authority, mutual aid, and evacuation. Pursuant to Act 390, P.A. 1976, as amended, and the Newaygo County Emergency Services Resolution 01-005-15, dated January 28, 2015, Newaygo County has an established Emergency Operations Plan to save lives, minimize damage, and enhance emergency response operations during any incident within Newaygo County. This plan sets forth the emergency response organizational structure and management system under which Newaygo County will operate. It describes how different government and non-government entities will interact with each other to respond effectively during any disaster or emergency situation. In addition, this plan assigns various emergency objectives and responsibilities that may need to be performed when circumstances call for response and recovery measures outside the realm of normal operations.

As the Newaygo County Muskegon River Evacuation Plan is a supporting plan to the Newaygo County Emergency Operations Plan, the following describes specific Incident Response Considerations for responding to an Emergency Classification at the Hardy Hydroelectric Project or Croton Hydroelectric Project on the Muskegon River within Newaygo County.

Situation Recognition and Assessment

Consumer's Energy requires hydro operators to be certified through the Hydro Operator Certification Program which qualifies operators to detect, evaluate, and classify emergency situations. An operator is responsible for monitoring, recording, and interpretation of changes to dikes and flows. Operators are also trained to analyze, evaluate, and initiate corrective action for station alarms and emergency response procedures.

Any unusual situations for data detected or observed will be reported by the operator to the Hydro Supervisor. The supervision staff will immediately become involved in the evaluation of any detected abnormalities. The Hydro Operations Supervisor, in the event of any emergency, will take immediate action necessary to prevent failure and to prevent or minimize loss of life and property. He/she will initiate predetermined emergency notification procedures base on emergency conditions. In the case of an active or immanent failure, Hydro Dam Operators, will also regulate generation and spill as needed to maintain the integrity of the plant and public safety as long as operator's safety will allow.

Emergency Notification to Local, State, and Federal Response Organizations

In the event of an emergency condition at the Hardy or Croton project, it is important for Consumers Energy to notify all appropriate agencies, organizations, and individuals based on

predetermined procedures for each emergency condition. Utilizing established Notification Flow Charts and Warning Diagrams, Consumers Energy will begin emergency notifications. Once Consumers Energy notifies Newaygo County Central Dispatch (911), Central Dispatch is responsible for notification to the first responder organizations responding to the emergency condition

Incident Management

The National Incident Management System (NIMS) is a set of principles that provides a systematic, proactive approach guiding government agencies at all levels, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life or property and harm to the environment. This system ensures that those involved in incident response/recovery understand what their roles are and have the tools they need to be effective.

The NIMS and utilization of the incident command system is recognized as the standard for incident management. Newaygo County will operate in accordance with the principles and concepts of NIMS and the Incident Command System (ICS). The Incident Command System (ICS) will be used to manage all incidents and major planned events. The use of this system allows the Newaygo County to be readily integrated into the emergency response system used by local emergency services agencies throughout Michigan.

Activation of the Emergency Operations Center

At the direction of the Chief Elected Official and Board of Commissioners, Newaygo County Emergency Services daily operations focus is on large and/or unusual emergency events. NCES is specifically tasked and trained to coordinate and support “large” or “unusual” emergencies that are out of scope of day-to-day emergency responses. Upon notification of an emergency condition at the Hardy or Croton project, Newaygo County Emergency Services will initiate one of three defined levels of response: Advisory, Activation, or Emergency. All response actions will be in accordance to procedures identified in the Newaygo County Emergency Operations Plan and the Newaygo County Muskegon River Evacuation Plan via the local emergency operations center and Incident Command System.

Communications and Information Exchange

Throughout an Emergency Condition at the Hardy and/or Croton Projects, it is imperative to maintain close contact between Consumers Energy and the Local Emergency Operations Center. Routine times should be established for information sharing and updates between the Hydro Dam Operations Supervisor or Consumers Energy Emergency Planning Coordinator with the Emergency Services Director as the situation develops. If the local Emergency Operations Center is fully activated, Consumers Energy will appoint a liaison to the EOC to assist with technical information and emergency population protection measures.

Public Alert and Notification

It is the responsibility of the Newaygo County to direct the alert and notification of emergency events and/or hazardous situations to the public, response agencies, and critical officials by the utilization of available warning systems. Utilizing a leveled warning system, officials are able to appropriately select and utilize available warning mechanisms to alert and notify targeted audiences of emergency conditions. The goal is to quickly make the information common knowledge and current.

For all emergency conditions except Condition A: Failure is imminent or has occurred, Targeted and/or Comprehensive Warning Systems will be utilized. Targeted Warning Systems are designed to alert and notify a local, defined location, or identified population of emergency events and/or hazardous situations. Warning messages are Community Level or Advisory Level Messages which are typically written or audible. Targeted audiences include response agencies, critical officials, reporting authorities, and defined locations and or populations. Comprehensive Warning Systems are designed for a rapid dissemination of alerts AND public information to a variety of public mechanisms. The goal is to quickly make the alert & information common knowledge. Warning messages are or Advisory Level or Alert Level Messages which are typically written and rebroadcasted. Targeted audiences include the general public within Newaygo County and surrounding areas. Examples of these types of systems includes but is not limited to:

- ✓ **Nixle Engage:** Nixle connects public safety agencies to their community residents via text, web, and email to distribute out alert, advisories, and community messages. Qualifying agencies can use Nixle Connect Plus to author and send geographically targeted emergency messages via FEMA's Integrated Public Alert & Warning System (IPAWS). IPAWS encompasses multiple alert networks including the Wireless Emergency Alert (WEA) and the Emergency Alert System (EAS) to provide rapid, multi-channel distribution of your most critical messages.
- ✓ **Personal Notifications:** Door to door visits or vehicle public address system notifications to area homes and businesses by emergency responders. Notifies high percentage of population within a defined area or vulnerable audience with direct message. Highly effective in absence of other alerting systems or situations needing personal contact.
- ✓ **NOAA Weather Radios:** Activation of NOAA Weather radio monitors & associated systems alerts monitors with audible tone and subsequent voice announcement as well as through various other services (i.e. website, weather systems). Is the recognized standard for all-hazards warning nationwide and is tied into multiple local, state, and regional warning services.

For Condition A: Failure is imminent or has occurred, the Integrated Public Alert and Warning System (IPAWS) system will be utilized. IPAWS is for issuance of critical public alerts and warnings of severe urgency disseminated to all available warning systems and the widest range of audience. IPAWS is

designed for the Highest Alert Level Message and warning information that has an extreme urgency. IPAWS will reach the mass population of Newaygo County and surrounding areas.

In addition to IPAWS, there is a Public Warning System installed downstream of Hardy dam. The system is comprised of four sirens below Hardy and four sirens below Croton that are activated, during a Condition A – Failure is Imminent or has occurred ONLY, by Consumers Energy or Newaygo County Central Dispatch or Consumers Energy. The system is capable of siren sounds and recorded messages to allow the county to immediately notify residents and visitors if an emergency exists at the Hardy and/or Croton Hydro Plants.

Public Protective Measures

Michigan Emergency Management Act – (P.A. 390, 1976, Sec 2 & 10, as amended) describes the powers invested in established emergency management programs to declare a local state of emergency, activate emergency response and recovery plans, and authorizes the furnishing of aid, assistance, and directives under those plans. Specific notations include directing and coordinating local multi-agency response to emergencies and providing for the health and safety of persons and property.

Locally, emergency evacuation can only be recommended to homeowners. Michigan law provides for explicit authority to the Governor to compel protective measures such as a mandatory evacuation for catastrophic emergencies. All Public Protective Measures, including non-mandatory evacuation, road closures, public access site closures, emergency utility shut offs, etc are coordinated through the Newaygo County Emergency Operations Center. Considerations for carrying out emergency protective measures can be located within Part III – Dam Failure Hazard Specific Annex or Part IV – Flood Hazard Specific Annex of this Emergency Plan.

Public Information

All Public Information will be managed according to the public information strategy, guidelines, and Standard Operating Procedures established by the Newaygo County Emergency Operations Plan. All public information officers, both public and private, will work in coordination with the lead Newaygo County Public Information Officer through the Joint Information Center. All information will be cleared through the Newaygo County Board of Commissioners Chief Elected Official, Incident Commander, and Consumers Energy.

The Consumers Energy Public Affairs Department has a standardized media contact list which will be utilized to notify the media of the situation and how public information will be handled. Consumers Energy Public Affairs Department will have a dedicated official appointed to the Joint Information

Center and will secure ongoing and frequent updates from the designated onsite supervisor to provide information to the media.

Recovery Operations

The Newaygo County Emergency Operations Center will coordinate all recovery operations including access and re-entry, debris removal, restoration of utilities, infrastructure repairs, disaster assistance, etc. Recovery operations will be phased in nature and be impacted by the time required for flood waters to recede to normal levels after a flood or dam failure. This will vary depending upon ground saturation, distance downstream, and the extent of failure.

Access and re-entry

Trained field damage assessment teams will assess all homes, businesses, roadways and bridges for damage as soon as the area is no longer impacted by flood waters. Based on safety considerations, damage assessment teams in conjunction with public safety officials will determine if it is safe to grant access to a specific area. Field Damage Assessment teams will also post each home and business with either a Certificate of Re-Entry or a Certificate of Inspection.

Safety Inspections

Homes and businesses which have been posted with a Certificate of Inspection will require additional safety inspections by the Building Inspector's Office, Environmental Health Sanitarian, or State Inspector's Office prior to being allowed to return. These initial inspections are free of charge and are for the safety of the homeowner and/or business.

1. **Electrical Inspection** is required if more than 18" of water was on the first floor, water submerged the breaker box, or the electrical meter was submerged or damaged.
2. **Building Inspection** is required if more than 18" of water was on the first floor for more than one day, foundation is cracked or shifted, home has major damaged or is destroyed.
3. **Mechanical Inspection** is required if there is damage to the furnace, hot water heater, propane tank, or other utilities within the home that would impact the safety of the homeowner.

If a permit needs to be filed to complete necessary work, ie. rewiring a flooded breaker box and all connecting electrical wires, the homeowner will be required to pay the permit fees.

Restoration of Utilities

Utility companies will not restore utilities to the impacted area unless deemed safe and marked by the Field Damage Assessment Teams, Public Safety Officials, and/or the Building Inspector's Office. Homes and businesses which require additional safety inspections or permit work to be completed, will be required to complete the work prior to having utilities restored.

Debris Removal

Debris removal from private property will be a rare occurrence and limited **ONLY** to those situations where there is a clear danger (present / imminent / potential) to public health and/or safety. Examples include but are not limited to:

- 1) dangerously leaning / damaged trees or limbs over public rights-of-way or other public spaces
- 2) partially or totally collapsed structures that could endanger the public
- 3) debris that poses a clear and present fire danger
- 4) debris that negatively impacts critical infrastructure and/or services
- 5) hazardous household waste (HHW) which if left unaddressed poses an imminent threat to public health and/or safety.

Debris that does not meet these (or similar) circumstances is the responsibility of individual property owners. Private debris brought to the roadway right-of-way and/or taken to established Collection Centers in accordance with published guidelines will be removed by designated debris management forces.

Disaster Assistance

Based on the impacts and damage to the community from the emergency condition at the Hardy and or Croton Projects, the Newaygo County Emergency Operations Center will follow all State and Federal guidelines in an effort to receive disaster assistance resources to help the community recover.

Plan Maintenance

Maintenance of the Newaygo County Muskegon River Evacuation Plan shall be the responsibility of the Newaygo County Local Emergency Planning Team in conjunction with Consumers Energy. All plan reviews and revisions, training, exercises, and after action reviews shall be facilitated by this team.

Plan Review

The Newaygo County Muskegon River Evacuation Plan will be maintained in accordance with current standards of the county plan and the county government. Review of this plan should be accomplished annually by the Newaygo County Board of Commissioners Public Safety Committee.

Training

Newaygo County will conduct regular training on the Newaygo County Muskegon River Evacuation Plan to educate Emergency Operations Center Staff, public safety personnel,

elected officials, and other key stakeholders on their roles and responsibilities before, during, and after an incident at the Hardy and or Croton projects.

Exercises

Newaygo County will conduct hazard specific exercises as needed to provide practical experience and maintain operational readiness.

After Action Reviews

After all training, exercises, potential incidents, and plan activations, Newaygo County in conjunction with Consumers Energy may conduct an After Action Review to evaluate the Newaygo County Muskegon River Evacuation Plan's strengths and weaknesses and to identify corrective measures for improvement.

Authorities/References:

Federal:

1. Federal Guidelines for Dam Safety, June 1979.
2. National Response Coordination Framework, January 2008
3. Presidential Policy Directive 5, National Incident Mgt System
4. Presidential Policy Directive 8, National Preparedness

State:

1. The Michigan Natural Resources and Environmental Protection Act, 1994 PA 451 Part 307 and Part 315 as amended
2. Michigan Public Act 390, ie the Emergency Management Act
3. Michigan Emergency Operations Plan, 2012

Local:

1. Newaygo County Emergency Services Resolution, 2015
2. Newaygo County Emergency Operations Plan, 2015
3. Newaygo County Hazard Management Plan, 2015
4. Consumers Energy Hardy Dam Emergency Action Plan
5. Consumers Energy Croton Dam Emergency Action Plan