

west virginia department of environmental protection

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DIVISION OF WATER AND WASTE MANAGEMENT

ENVIRONMENTAL ENFORCEMENT/DAM SAFETY SECTION

Example Monitoring and Emergency Action Plan (MEAP)

The following document has been written as an example guide and format for monitoring and emergency action plans to be submitted to the DWWM EE/Dam Safety Section for approval. Dam owners are liable for loss of life and property should a dam failure occur (see Dam Control and Safety Act - Chapter 22-14-12). Approval and implementation of a Monitoring and Emergency Action Plan (MEAP) should allow dam owners to prevent loss of life and thereby reduce legal exposure. The West Virginia Department of Environmental Protection will not assume any obligation or liability through the approval of the plan.

This example plan has been written for a "worst case" situation where a dam above a community has a high risk of failure. Many dams in the State will not fit this example scenario in many respects. As a result, the example plan is <u>not</u> a "fill in the blank" form. Persons involved in writing the plans are expected to tailor them to the specific situation at hand. Also note that this example plan is not written to directly address flooding concerns or impacts below a dam when the structure is functioning as designed and determined to be operating in a safe condition. The plan developer should consider all outflow scenarios from the structure (specifically those that may obstruct access to identified evacuation areas) and determine whether additional notification measures should be incorporated into the plan.

The owner of the dam is responsible for completing the monitoring plan and for coordinating with local and county emergency officials concerning the notification and evacuation portions of the plan. Responsible persons and monitors should attend meetings on-site during the planning process to discuss provisions of the plan. Guidance for optional use of the media in evacuation notification is included in Appendix B.

Please note that the signature page of the plan must be signed by the dam owner/preparer and the County Office of Emergency Management (OEM) Director(s) prior to submission to Dam Safety for review.

A copy of the final draft MEAP may be emailed to <u>DEPDamSafetyProgram@wv.gov</u> in Adobe pdf or other word processing format. Alternatively, plans may be submitted in paper copy to the Dam Safety Office listed at the above address. The Dam Safety Section will review the submitted plan and approve them by letter or email when determined adequate.

The following sequence is recommended during the MEAP preparation process: 1) Prepare draft plan; 2) conduct on-site meeting with responsible persons and agencies; 3) make necessary corrections; 4) obtain involved County OEM Director signature(s); 5) sign and submit draft plan to Dam Safety for approval; 6) Upon approval, distribute to "Distribution List" for activation of the MEAP.

The attached example plan contains notes and guidance for the preparer of the plan. *The notes and guidance that appear in italic print should <u>not</u> be included in the actual plan.*

Title Page

MONITORING AND EMERGENCY ACTION PLAN

for the

Name of Dam

ID # _____

Located at or near

Town, County, State

Owned by _____

INTRODUCTION

Purpose of Plan:

The purpose of this document is to provide for monitoring of the _____ Dam under various conditions so that an emergency at the dam will be observed promptly and reported to agencies and persons who may be affected. This document also provides a plan for the orderly notification and evacuation of downstream residents to a place of safety in the event of a potential or actual dam failure.

Brief Overview of Dam and Observed Problems:

The	Dam is a	struc	cture	feet	high	and
impounding a maximum v	volume of water of	_ acre-feet.	The dam ha	ıs a		inch
principal spillway pipe wi	th the inlet located near the	e	al	outmen	t (loo	king
downstream) along the up	stream face of the embanki	ment. The c	lam has a ga	ate val	ve loc	ated
	for draining the impoundme	ent. The dar	n has an em	ergenc	y spill	lway
open channel located at t	he abu	tment (look	ing downstro	eam).	The	dam
normally has a freeboard (v	vertical distance in feet betw	een the norm	al reservoir	elevati	on and	d the
top of dam) of fee	et.					

List of all known problems concerning the dam:

- 1)
- 2)
- 3)

Driving Directions to Dam:

Provide detailed directions starting from the nearest town to the dam.

How To Use This Document:

Persons using this plan will find a sequence of actions to be taken depending on rainfall and site conditions. A summary of where to find specific monitoring, reporting and evacuation requirements can be found on the Summary and Index page.

MAP (PLAN VIEW) OF DAM

Note to Preparer: A map (plan view) drawing of the dam, spillway locations, seepage zones, drain gate valve location and important utilities must be included on this page. The drawing may be by hand, blueprint, or computer generated, but should not be so "busy" as to obscure the basic components of the dam. Cross sections of the dam may be included but are not required.

SUMMARY AND INDEX

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Note: Page numbers are strongly encouraged.

** DO NOT COPY ALL TEXT BELOW – TAILOR SPECIFICALLY TO DAM **

Part I - Monitoring Plan and Inspection Schedule

HOMELAND SECURITY. In the event of sabotage or security breach **that may lead to failure of the dam**, the county Office of Emergency Management must be notified immediately by calling 911. Proceed immediately to Part I, Section C or D as appropriate.

Section A - Normal Conditions:

Dry weather or occasional light rainfall. The description included in this paragraph must be specific to the dam and list items to be inspected or accomplished under these conditions. Examples include but are not limited to: 1) reading of instrumentation; 2) inspection of trash racks, spillways, seepage zones; 3) check for embankment cracking, slumps, sinkholes, bulges; and 4) gate or equipment failure, concrete alignment and vandalism.

Action

- 1. Inspect weekly/bimonthly/monthly as appropriate to condition of dam
- 2. If a serious problem is found, proceed immediately to Section B or C as appropriate.

Responsibility

(Monitor name, home, and work addresses/phones incl. cell if available)

Notes to Preparer: Alternate Monitors may be listed for this section in case of possible illness or vacation of the usual monitor. Alternates should not be in the same household as the person with primary responsibility.

Names, home, and work addresses/phone numbers (incl. cell if available) may be summarized in an appendix to permit easier updating of the plan. If monitoring responsibility includes several people within 24-hour shifts, then each person's information must be listed. To state "Plant Manager" is not sufficient.

Section B - Adverse Conditions:

Heavy or extended rainfall, flash flood warnings, snow-melt or serious new problems found under normal conditions such as slips, sinkholes or piping. *Grass lined channel spillways flowing without erosion is an adverse condition. This description must be specific to the dam and list items to be inspected or accomplished under these conditions. Typical items include but are not limited to: 1) instrumentation reading; and 2) inspection of trash racks, spillways, spillway discharge levels, reservoir elevation and freeboard, seepage zones, embankment cracking or piping, slumps, sinkholes, bulges, gate or equipment failure, and concrete alignment.*

<u>EARTHQUAKE</u>: Occurrence of an earthquake of sufficient magnitude to cause structural damage to buildings or property in the general area of the dam shall be considered an "adverse condition." Damage from an earthquake may be internal to the dam and problems may not appear for days or weeks after the event. The dam shall be inspected immediately after the quake, and daily for several weeks thereafter. Attention should be directed to looking for cracks, slips, new wet or seepage areas and leakage, both on the face of the dam and in the natural ground areas downstream and at the abutments of the dam.

Action

- 1. Inspect daily or more often as necessary.
- 2. Decrease reservoir level, if possible.

Responsibility

(Monitor name, home, and work addresses/phones incl. cell if available)

Note to Preparer: Alternate Monitors must be listed for this section in case of possible illness or vacation of the usual monitor. Alternates should not be in the same household as the person with primary responsibility.

3. If a problem is observed which could lead to failure, proceed immediately to Section C.

Section C - Standby Alert:

Condition of dam has deteriorated, or water rises to predetermined critical level of _____. (the critical level must be stated in the plan, such as "when water rises to within XX feet below crest of embankment"). The description included in this paragraph must be specific to the dam and must list items to be inspected or accomplished under these conditions. Examples include, but are not limited to, trash racks, spillways, spillway discharge levels, reservoir elevation and freeboard, seepage zones, instrumentation, embankment cracking or piping, slumps, sinkholes, bulges, gate or equipment failure, and concrete alignment. Grass lined channel spillways flowing with active gully erosion is a Standby Alert condition.

Action

Responsibility

1. Constant surveillance; decrease reservoir level, if possible.

(Monitor name, home, and work addresses/phones incl. cell if available)

Note to Preparer: Alternate Monitors <u>must</u> be listed for this section.

2. Notify agencies according to checklists below.

<u>Standby Alert Notifications</u>: The responsible person shall phone or contact each agency listed below in sequence and cover the following items:

Check when completed:

_____ identify yourself

- _____ refer to the dam by name, location, and ID number (on title page)
- _____ advise the person contacted that you are calling as required by the
- monitoring and emergency action plan
- _____ state the condition of the dam
- _____ state that a standby alert is declared
- _____ advise the person contacted of any requested assistance or action
- _____ answer any questions

Check when notified:

Phone

 _____ DWWM Dam Safety Section
 1-800-642-3074

 _____ County Office of Emergency Management
 (county dispatch center)

 _____ Natural Resource Conservation Service
 (county dispatch center)

 _____ (only if dam is NRCS – formerly SCS - structure)
 (county dispatch center)

Action

- 3. Respond to notification of Standby Alert.
- 4. Start emergency communications network, if necessary, based upon the continuing deterioration of the site conditions. Request additional assistance, as necessary.

Responsibility

DWWM Dam Safety Section, county OEM, Fire Department.

(name, home, and work addresses/phones incl. cell if available)

Action

Responsibility

- 5. If a problem is observed which could lead to failure, proceed immediately to Section D.
- 6. Begin emergency repairs if appropriate. The plan should anticipate the type of emergencies which may occur based upon the deficiencies of the dam and state what materials and equipment may be required for emergency temporary repairs to prevent failure. The availability of materials and manpower should be considered in the plan.
- 7. (Optional) Issue media announcement. See Appendix B for guidance.

(name, home, and work addresses/phones incl. cell if available)

(dam monitor or OEM)

Section D - Evacuation Conditions:

The condition of the dam has deteriorated to the point where failure is likely to occur. *Possible evacuation* conditions the plan could list include overtopping of earthen dams, cracking, piping, spillway failure or obstruction, obvious deformation of the dam, etc. Grass lined channel spillways flowing with major erosion advancing toward the entrance of the channel is an evacuation condition.

Action

1. Monitor dam condition, issue evacuation notice.

Responsibility

DWWM Dam Safety Section, if present. If Dam Safety Section personnel are not present, the owner or county authority (specify) may order an evacuation notice.

2. If evacuation notice is given, proceed immediately with Part II.

(name, home, and work addresses/phones incl. cell if available) *Note to Preparer: Alternates <u>must</u> be listed for this section.*

Part II - Emergency Action and Evacuation Plan

Section A - Notification of Agencies:

Action

1. Notify agencies not on-site using the checklists below

Responsibility

Phone

(county dispatch center)

1-800-642-3074

(name, home, and work addresses/phones incl. cell if available) Note to Preparer: Alternates <u>must</u> be listed for this section.

Check when completed:

- _____ identify yourself
- refer to the dam by name, location, and ID number (on title page)
- _____ advise the person contacted that you are calling as required by the
- monitoring and emergency action plan
- _____ state the condition of the dam
- _____ state that an evacuation notice is declared
- _____ advise the person contacted of any requested assistance or action

.

_____ answer any questions

Check when notified:

- _____ county Office of Emergency Management
- ____ DWWM Dam Safety Section
- _____ Natural Resource Conservation Service (only if dam is NRCS formerly SCS structure)

Section B - Evacuation Notification of Downstream Persons:

In accordance with WV Code 22-14-10, it is the responsibility of the dam owner to notify downstream persons, if county emergency authorities are not available or are unable to notify downstream persons.

Note to evacuating authorities: No person may be ordered to leave or to be physically removed from the evacuation area against their will. Notification to persons and providing of assistance to persons in the evacuation area should fulfill agency responsibility under this section of the plan.

Note to preparer: A narrative of evacuation procedures must appear in this section. Evacuation notification procedures may include any number of site-specific measures such as notification of houses within so many vertical feet of a stream or everyone downstream to a certain point. The limits of the notification area may be based upon approved (by DWWM Dam Safety Section) dam break analysis, or by conservative estimates of flood wave height and downstream duration. Details of the evacuation notification must be agreed to in advance through cooperation between the dam owner and appropriate county emergency authorities. Every effort should be made to compile an advance list of the known infirm or disabled persons who may be affected. Reference may be made to applicable portions of the county emergency operations plan. Placement of a copy of this plan into the county emergency operation notification map must be attached to this plan in accordance with page 9 of this example plan.

Action

1. Notification of downstream persons.

2. Transportation of evacuees with priority to the infirm or disabled.

- 3. Establish command post, direct emergency operations, organize effort, direct officials of cooperating agencies.
- 4. Notify American Red Cross, or agencies in charge of evacuation centers, including food and medical facilities. Handle inquiries on status of evacuees.
- 5. Police security of area to prevent looting.
- 6. Establish roadblocks to prevent unauthorized entry.

Responsibility

Note to Preparer: Include name, address, and phone incl cell if available for each item below:

County OEM Director, county sheriff or ranking deputy, fire department, or ranking officer as appropriate to local jurisdictions. <u>Alternate: Dam Owner</u> Citizen resources, with support from fire department, ambulance providers, local transit authority, school bus authority, or other (specify)

County OEM Director or local officer.

Planned by county OEM Director and executed by local officers.

Ranking local law enforcement officer.

Planned by county OEM Director and executed by local officers

Action

Responsibility

7. Locate additional or alternative evacuation centers as needed. (<u>not below dam</u>)

8. Notification of utilities:

Check when notified:

____ Telephone

____ Electric

____ Gas

____ Water

____ Sewage

____ Department of Highways

_____ Railroad (if applicable)

Planned by American Red Cross, or county OEM Director and executed by local officers.

name, address, phone incl. cell if available

Company Name

Phone

Section C - Evacuation Notification Map

This page must contain a detailed map of primary (and secondary) evacuation areas, location of the dam, roadblocks, evacuation center(s), etc.

Acceptable maps include US Geological Survey Topographic Maps (available from the State Geological Survey or local engineering supply companies) or State Department of Highways General Highway County Maps.

Each copy of the map must contain legible markings <u>which may be reproduced by photocopy</u> including the location of the dam, primary and secondary evacuation areas, roadblocks, evacuation centers, etc. Use of black cross-hatched or stippled labels can be effective in showing evacuation areas and are easily reproduced by photocopy. Coloring evacuation areas is discouraged due to the photocopy problem.

Part III - Post Evacuation Notification Action

Section A:

Should no failure occur:

Action

1. Cancel evacuation notification.

Check when notified:

____ County Office of Emergency Management

____ DWWM Dam Safety Section (if not on-site) ...

_____ Natural Resource Conservation Service (only if dam is NRCS - formerly SCS - structure)

Responsibility

DWWM Dam Safety Section or ranking county authority (specify)

Phone

(county dispatch center) 1-800-642-3074

Section B:

Should failure occur:

Action

1. Notify agencies according to checklist below:

Check when notified:

- ____ County Office of Emergency Management
- ____ DWWM Dam Safety Section (if not on-site)
- _____ Natural Resource Conservation Service (only if dam is NRCS - formerly SCS - structure)
- 2. Evacuation or assistance to persons stranded in homes due to highway/bridge washout.
- 3. Search and rescue.
- 4. Cleanup crews and equipment

Responsibility

Phone

(county dispatch center) 1-800-642-3074

County OEM Director and local transit authority (specify)

County OEM Director and other listed agencies.

County OEM Director and other listed persons.

Part IV - Administrative and Record Keeping

Section A - Signature and Distribution List

SIGNATURE:

(Note to Preparer- The signature page of the draft plan must be signed by the dam owner/preparer and the appropriate County Office of Emergency Management Director(s) prior to submittal to Dam Safety for review. If more than one County OEM is involved with the MEAP, additional signature statements must be added.)

COUNTY OFFICE OF EMERGENCY MANAGEMENT:

As the Director of the ______ County Office of Emergency Management (OEM), I hereby certify that I have reviewed this Monitoring and Emergency Action Plan (MEAP) and agree with the actions and responsibilities assigned to this office within this MEAP. It is noted that designated response activities may be altered during an actual event based on consideration of other emergency concerns and relative priorities.

NAME	TITI	LE	DATE
(signature)	Director of	County OEM	
(typed name)		-	

RESPONSIBLE PERSON FOR DISTRIBUTION OF THE PLAN:

The undersigned states he/she will distribute a copy of the Monitoring and Emergency Action Plan for the ______ Dam within fifteen days after receipt of DWWM Dam Safety Section approval to the persons named in the Distribution List below:

NAME	TITLE	DATE	
(signature)			
(typed name)	(dam owner or NRCS sponsor)		

Note for Preparer:

The DWWM Dam Safety Section will not approve draft plans without an up-to-date signature and distribution page. Please note that the signature page of the plan must be signed by the dam owner/preparer and the County Office of Emergency Management (OEM) Director(s) prior to submission to Dam Safety for review.

A copy of the final draft MEAP may be emailed to <u>DEPDamSafetyProgram@wv.gov</u> in Adobe pdf or other word processing format. Alternatively, plans may be submitted in paper copy to the Dam Safety Office listed on the cover sheet. The Dam Safety Section will review the submitted plan and approve them by letter or email when determined adequate. Upon receipt of approval, the owner must send a complete copy of the MEAP to responsible persons and agencies on the distribution list within fifteen (15) days.

DISTRIBUTION LIST:

Note for Preparer:

Names and addresses of all persons or agencies mentioned with responsibilities in the MEAP must be listed in the Distribution List below and retain a copy of the approved plan.

Upon approval of the MEAP, the Dam Safety Section records a copy of the final plan in our files. The Dam Safety Office must be included in the Distribution List to indicate where the Plan is being kept; however, a follow-up copy of the approved plan is <u>not</u> required to be sent.

Note that an approved copy must be sent to the appropriate County OEM Director(s) <u>and</u> emailed to the WV Division of Emergency Management office, as indicated below.

<u>Name</u>	Complete Mailing Address
Program Manager	DEP Division of Water and Waste Management EE/Dam Safety Section 2031 Pleasant Valley Rd, Suite #1 Fairmont, WV 26554
Director	County Office of Emergency Management Director Listing Address
Director	WV Emergency Management Division 1700 MacCorkle Avenue SE 6th Floor Charleston, WV 25314 Email: emdplanning@wv.gov

Section B - Inspection Record

Date Inspected

Inspector

Comments

Note to Preparer: Monitor's copies of the plan must contain the on-going inspection records. The owner's copy of the inspection records must be updated monthly. DWWM Dam Safety Section may request to review the inspection records at any time.

APPENDIX A – UNUSUAL OR EMERGENCY EVENT LOG

Monitor or responsible person to enter the following as events occur:

Dam Name: _____

When and how was the event detected?

General description of the emergency: _____

ACTIONS AND EVENT PROGRESSION

Date	Time	Action/Event Progression	Taken by

Report prepared by:	Date:
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APPENDIX B - OPTIONAL MEDIA CONTACT FOR EVACUATION NOTIFICATION

MEDIA CONTACTS FOR VARIOUS CONDITIONS AT THE DAM

Instructions (Do not include this page in submitted plans)

The use of radio and television announcements as a part of the Monitoring and Emergency Action Plan is <u>NOT</u> a requirement. The use of television and radio announcements may be used to SUPPLEMENT the primary plan, which requires the owner to notify downstream residents in case of an emergency. Use of media may be beneficial where large numbers of people must be notified, however, use of media broadcasts are not a substitute to the primary notification plan. Emergency officials may decide to issue statements for media broadcast at any time during an emergency situation regardless of its inclusion in the Monitoring and Emergency Action Plan.

(NOTE TO PREPARER: The following discussion addresses media contact, including example statements that may be broadcast during each stage of an ongoing emergency. The wording of the statements may be modified as necessary or eliminated depending on site specific conditions.)

The dam monitor may initiate a request for a public service announcement upon a declaration of the standby alert phase of the Monitoring and Emergency Action Plan. Subsequent requests for media broadcast should be initiated only by authorized emergency personnel, using Emergency Broadcast procedures.

THE MANAGEMENT OF ANY TV AND RADIO STATION INCLUDED IN THE PLAN SHOULD BE CONSULTED IN ADVANCE TO VERIFY ITS PROCEDURES FOR EMERGENCY BROADCASTS.

THE INTENT OF THIS NARRATIVE IS TO AID THE EMERGENCY ACTION PLAN PREPARER IN PLANNING FOR MEDIA CONTACT DURING DAM-RELATED EMERGENCIES. MEDIA BROADCASTS SHOULD BE CAREFULLY PLANNED TO MINIMIZE PANIC DURING THE INITIAL STAGES OF THE PLAN, AND TO PROVIDE FOR THE CONSISTENT AND ACCURATE RELEASE OF INFORMATION DURING THE PLAN'S IMPLEMENTATION.

STANDBY ALERT CONDITION (REQUEST FOR PUBLIC SERVICE ANNOUNCEMENT BY DAM MONITOR)

The standby alert condition is declared when a dam's condition has deteriorated to the point that continuous observation of the dam is necessary. The declaration of standby alert allows all of the people and agencies that would be involved in the evacuation notification process to mobilize their resources to act promptly should the situation deteriorate further.

MEDIA CONTACT: (STANDBY ALERT CONDITION)

"This is (callers name), calling to inform your station that a Standby Alert condition has been declared for the _____ Dam, ID# _____, at _____, [perhaps giving local name of dam or lake might increase recognition rather than a ID number] in _____ County. A standby alert means that authorized personnel will continuously monitor the dam until further notice and will take additional action if the situation worsens. (NOTE TO CALLER: STATE THE CONDITIONS FOR WHICH A STANDBY ALERT IS BEING DECLARED, IF APPLICABLE). A standby alert condition is being declared in accordance with the Monitoring and Emergency Action Plan for this structure. Persons living immediately below the dam should be advised to remain alert and to be prepared to evacuate the area if notified. Individuals should seek high ground if the sound of rushing water is heard or rapidly rising stream levels are observed. They should be advised to stay tuned for further information."

Note to Preparer. This message should be made site specific to each dam. The wording shown in these examples may be tailored to fit each situation. This section may be eliminated if media contacts are not needed to enhance the effectiveness of the plan.

EVACUATION NOTIFICATION CONDITION (MEDIA CONTACT BY EMERGENCY PERSONNEL)

The evacuation notification condition is declared when the responsible person or agency personnel at the site decides a dam's condition has deteriorated to the extent where persons living downstream may be endangered. Upon declaration of this phase of the emergency action plan, evacuation notification of downstream residents is required. The example monitoring and emergency action plan lists structural deterioration conditions and events such as overtopping of earthen embankments, obvious deformation of the dam, etc. as possible evacuation conditions. The person in charge at the dam must use his/her judgement to decide if evacuation of downstream persons is advisable.

When the EVACUATION NOTIFICATION CONDITION is declared, the following statement is suggested for media contact by authorized emergency officials:

MEDIA CONTACT: (EVACUATION CONDITION)

"This is <u>(name of caller)</u>, calling to inform you that an Evacuation notification condition has been declared for the _____ Dam, near _____, in _____ County. (Note to caller: Describe the potentially affected area to the extent possible.)

"... Persons in the affected area should seek high ground immediately and follow all orders given by emergency officials on site. The lives of all persons who remain in the evacuation area may be at risk. Emergency shelters are being established at (Note to Caller: Give location of shelter(s) as identified in the EAP). Persons should not return to the evacuated area until emergency officials have advised them to do so."

Note to EAP preparer. This message should be made site specific to each dam. The wording shown in these examples may be tailored to fit each situation. This section may be eliminated if media contacts are not needed to enhance the effectiveness of the plan.