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Responsibilities Related to Imminent/Potential Dam/Levee Failures

NOTICE: This publication is available at: <http://www.nws.noaa.gov/directives/>.

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The following changes were made to this issuance:

1. Revised references from Southern Region SharePoint and Intranet to new Google Site.
2. Revised reference from Office of Hydrologic Development to Office of Water Prediction, which includes the National Water Center.
3. Removed reference for requirement to create a NID account for non-governmental users.
4. Mention of expected Hazard Services software implementation to replace GHG and WARNGEN software.

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1. Purpose

The purpose of this Supplement is to describe regional and field office responsibilities and procedures related to dam/levee failures.

2. Procedures

2.1 SRH Responsibilities

The Southern Region (SR) Hydrologic Services Branch (HSB), in collaboration with the SR River Forecast Centers (RFCs) and the Office of Water Prediction, will provide training on dam/levee failure related applications and product templates, as required. SR HSB posts dam/levee failure related information on the HSB Google site. SR HSB works closely with the SR Regional Operations Center (ROC), field offices, and external partners, to disseminate situation reports about potential or imminent dam/levee failures to National Weather Service (NWS) Headquarters.

2.2 WFO Responsibilities

In the event of a known or potential dam/levee failure, which will or could cause high flows and pose a risk to life and property, Weather Forecast Offices (WFOs) issue flash flood/flood watches and warnings for areas/points in their Hydrologic Service Area (HSA) impacted by potential/imminent dam/levee failures.

Upon notification of an imminent/potential dam/levee failure, WFOs should follow the guidance provided in Section 3.6 of NWS Instruction 10-921 and notify the SR Regional Operations Center as soon as possible. The WFO should coordinate follow-up watches/warnings/statements with the RFC, dam/levee owner, and/or local emergency management officials.

Quantitative data (e.g., time and magnitude of the crest, area expected to be inundated) should be incorporated into the follow-up watches/warnings/statements whenever possible. To ensure that information and data provided by the NWS is consistent with information disseminated by dam owners and local officials, WFOs should utilize the dam failure scenario information contained in Emergency Action Plans (EAP), if available. However, confidential information must not be disseminated to the public. WFOs should be familiar with the EAP dam failure scenarios available for dams in their service area. The assumptions and conditions used to generate these scenarios vary from state to state. If EAP dam failure scenarios are not available, WFOs may use dam catalog information or “Rules of Thumb” guidelines for dam failures to provide preliminary quantitative information. In most cases, inclusion of quantitative information will be limited to the follow-up messages (i.e., the Flash Flood Statement) issued after the initial warning.

2.3 RFC Responsibilities

SR RFCs will provide the highest level of support to the WFOs in their service area during potential/imminent dam/levee failure situations. This support should include providing preliminary quantitative information, if required, to the affected WFO. More sophisticated procedures (i.e., simplified or full versions of Dam Break model) will be executed at the RFCs as soon as possible and as data availability allows. RFC support will continue as long as flooding persists. If the flood wave is expected to reach an RFC river forecast point, the RFC will issue River Forecast Guidance (RVF) as is done for other river-based flood events.

2.4 Dam Failure Forecasts

SR WFOs are not expected to execute dam break models to obtain quantitative information on dam failures. This responsibility falls to the RFCs or other agencies with river forecasting responsibilities, such as the Tennessee Valley Authority. WFOs, in collaboration with their servicing RFC, are expected to use the dam failure scenario information from dam EAPs, if available, as the primary source of quantitative information on a flood wave resulting from a dam failure. If no EAP exists or is available for the dam, dam break models should be used to obtain quantitative information on a flood wave resulting from a dam failure. If dam EAP or dam break model scenario information is not available, WFOs may use dam catalog information or “Rules of Thumb” guidelines for dam failures to provide preliminary quantitative information on a flood wave resulting from a dam failure. WFOs should take the lead in collecting information needed by the RFCs to conduct dam break modeling.

2.5 Operational Readiness

SR WFOs should be prepared to take all necessary actions should a dam/levee fail. This preparation should include preformatted watches/warnings/statements using the GHG/WARNINGEN dam break product templates and the use of dam/levee failure logs. (Note: Hazard Services software is expected to replace GHG and WARNINGEN software. When Hazard Services is operationally implemented, substitute this software reference where GHG and WARNINGEN are referenced)

If possible, requests should be made to the dam owner that both the WFO and the servicing RFC receive (preferably digital) copies of the EAP. This will allow the servicing RFC to provide more accurate forecasts. Copies of dam/levee EAPs for projects in the WFO CWA and servicing RFC basins should be kept on station. To determine the availability of EAPs for a given dam or levee, WFOs and RFCs will coordinate with federal agencies such as the US Army Corps of Engineers, the US Bureau of Reclamation, and state dam safety officials.

SR WFOs may gather the necessary input data and execute the Simplified Dam Break Model (SMDBK) for a specific dam based on the following conditions:

- a. There are no imminent/potential dam failures expected.

b. The servicing RFC has not already executed the SMDBK or another dam break model for the dam.

SR WFOs should collaborate with their supporting RFC to provide technical support, guidance, and training on this activity. The final outputs from the WFO SMDBK model runs will be reviewed by the servicing RFC prior to storing the dam failure scenario information in the dam catalog and the dam failure related product templates. WFOs will share the SMDBK model scenario information with their servicing RFC and backup WFOs.

SR RFCs should be prepared to take all necessary actions should a dam/levee fail or threaten to fail. This includes running Dam Break models, providing expert assistance, and performing dam failure analyses for dams that pose an imminent threat to the safety of the residents downstream from the dam. Such a determination should be a coordinated effort among the RFC, WFO, and when possible, the dam/levee owner and/or other responsible state and federal agencies. RFCs should also participate in dam/levee failure exercises sponsored by dam/levee owners, as funding permits.

As part of the SR WFO/RFC collaborative dam failure project, WFOs should integrate generic default scenario information (reference dam/levee information on the HSB Google Site, Software and Technical Resources) into the WARNGEN (or Hazard Services when implemented) dam failure FFW product template for high and significant risk dams in their service area. Generic default scenario information should also be developed for levees of concern in the WFO HSA. SR WFOs should also collaborate with their supporting RFCs to integrate more detailed quantitative dam failure scenario information into the WARNGEN dam failure FFS product template for high and significant risk dams in their service area. WFOs should share their dam/levee failure template files and associated input data files with their backup WFOs. WFO and RFCs should collaborate on conducting internal dam/levee break exercises on an annual basis to prepare for potential/imminent dam/levee failures.

Appendix A

Dam/Levee Related Information Resources

The HSB Google Site contains various information resource links to support WFO/RFC hydrologic operations during pre-event and potential/imminent dam/levee failures. This includes the following:

1. American Association of Dam Safety Officials web page - This web page contains dam safety official contact information for each state. These officials can provide you information pertaining to dams in their state.
2. US Army Corps of Engineers (USACE) National Inventory of Dams (NID) web page – This web page provides you with access to the NID. It is the most current inventory of information for all dams in the Nation. WFO/RFC personnel are strongly encouraged to visit this site and become familiar with its graphical user interface. Non-government users no longer need a user name and password to access the NID database. Government users, however, must still obtain a user name and password should they need access beyond the public site to accomplish their official duties.
3. EAP Point-of-Contact Information for Federal Energy Regulatory Commission (FERC) regulated dams.
4. Tennessee Valley Authority (TVA) - Their web pages contain information on all TVA dams.
5. WARNGEN/GHG Dam Break-Related Product Templates/ User Documentation Product templates and associated input files to assist the WFOs with generating FFA/FFW/FFS dam failure related products. User documentation for these templates is also posted. Web-based training on the WARNGEN OB8.2 templates/input files is available on the NWS portion of the Commerce E-Learning Center (use search engine on the NWS portion and enter “WARNGEN” to get list of available training materials). Click on WARNGEN OB8.2 configuration training. Please also look at training materials/user documentation for WARNGEN OB8.2 patches and subsequent AWIPS/AWIPSII Builds that relate to the WARNGEN dam break-related product templates/input files.
6. Detailed information about “Rules of Thumb” Guidelines for Dam Failures.
7. WFO/RFC Collaborative Dam Failure Project Plan/Procedures.
8. FEMA online information about dam failures/dam safety.
9. USACE National Levee Database.
10. List of USACE’s levees with maintenance concern.
11. USACE policy/guidance relating to levee certification.

The following resources are available from the USACE regarding Dam Emergency Action Plans information/contacts:

1. EAP Contacts at USACE Dams - Contact the dam safety coordinator at the USACE district offices in your service area.

Appendix B

Downstream Hazard Potential Classification of a Dam

The Downstream Hazard Potential Classification of a dam is not related to the dam’s structural integrity. It is defined based on the impacts to society, if the dam breaches or completely fails. It is the responsibility of the dam owner/operator to identify the downstream hazard potential classification of the dam, not the NWS. Also the downstream hazard potential classification of a dam is to remain internal, and shall not to be included in any NWS public products or statements.

The information below was extracted from the USACE NID webpage. Definitions, as accepted by the Interagency Committee on Dam Safety, are as follows:

1. LOW HAZARD POTENTIAL

Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life, and low economic and/or environmental losses. Losses are principally limited to the owner’s property.

2. SIGNIFICANT HAZARD POTENTIAL

Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life, but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

3. HIGH HAZARD POTENTIAL

Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)