Guidelines On Dam Safety Management

Residents of areas that could be affected by a dam failure or operational incident have a risk of loss of life, injuries, and damage to property from a failure or operational incident. The purpose of this document is to provide guidelines for the preparation of an Emergency Action Plan (EAP) to facilitate the development of plans that are comprehensive and consistent. The purpose of an EAP is to protect lives and reduce property damage. The intended readers of this document are dam owners and emergency management authorities who work together in the response to dam safety emergencies. An EAP is a formal document that identifies potential emergency conditions at a dam and specifies actions to be followed to minimize loss of life and property damage. The EAP includes:

In April 1977, President Carter issued a memorandum directing the review of federal dam safety activities by an ad hoc panel of recognized experts. In June 1979, the ad hoc interagency committee on dam safety (ICODS) issued its report, which contained the first guidelines for federal agency dam owners. The Federal Guidelines for Dam Safety (Guidelines) encourage strict safety standards in the practices and procedures employed by federal agencies or required of dam owners regulated by the federal agencies. The Guidelines address management practices and procedures but do not attempt to establish technical standards. They provide the most complete and authoritative statement available of the desired management practices for promoting dam safety and the welfare of the public. To supplement the Guidelines, ICODS prepared and approved federal guidelines in the areas of emergency action planning; earthquake analysis and design of dams; and selecting and accommodating inflow design floods for dams. These publications, based on the most current knowledge and experience available, provided authoritative statements on the state of the art for three important technical areas involving dam safety. In 1994, the ICODS Subcommittee to Review/Update the Federal Guidelines began an update to these guidelines to meet new dam safety challenges and to ensure consistency across agencies and users. In addition, the ICODS Subcommittee on Federal/Non-Federal Dam Safety Coordination developed a new guideline, Hazard Potential Classification System for Dams. With the passage of the National Dam Safety Program Act of 1996, Public Law 104-303, ICODS and its Subcommittees were reorganized to reflect the objectives and requirements of Public Law 104-303. In 1998, the newly convened Guidelines Development Subcommittee completed work on the update of all of the following guidelines: Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners; Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams; Federal Guidelines for Dam Safety: Earthquake Analyses and Design of Dams; Federal Guidelines for Dam Safety: Selecting and Accommodating Inflow Design Floods for Dams; Federal Guidelines for Dam Safety: Glossary of Terms. The publication of these guidelines marks the final step in the review and update process. In recognition of the continuing need to enhance dam safety through coordination and information exchange among federal and state agencies, the Guidelines Development Subcommittee will be responsible for maintaining these documents and establishing additional guidelines that will help achieve the objectives of the National Dam Safety Program.

Dams are part of human achievements that induce great benefits for society but also bear a potential risk to people, property and the natural environment. The risk of a dam rupture is extremely low and diffi cult to quantify accurately. The aim of 'Dam surveillance' (ICOLD Bulletin 158), is to help reduce these risks by early detection of an undesirable event. The objective of dam surveillance is to make a precise and timely diagnosis of the behavior of dams, in order to prevent undesirable consequences. Both the monitoring system and surveillance program has to be designed and should be able to detect any abnormal behaviour. 'Dam surveillance' (ICOLD Bulletin 158), emphasizes the following aspects: • Routine visual inspection • Special inspection • Checking and testing of Hydro-electromechanical equipment • Monitoring parameters and devices • Automation • Maintenance of ageing monitoring systems • Re-instrumentation of existing dams • Recent developments • Data management • Dam documentation management • Assessment of dam condition and behaviour • Assessment of routine dam safety monitoring programme • Prioritization of maintenance, remedial and upgrading works.

Hydrology and dams are two fields that are obviously closely related. Four bulletins have so far been published by the Committee: Selection of Design Flood – Current methods, Dams and Floods – Guidelines and cases histories, Role of Dams in Flood Mitigation – A review and Integrated Flood Management. These bulletins have essentially addressed floods, the risks they represent and their significance for the concerned populations. The present Bulletin deviates slightly from this path, adopting a somewhat more technical perspective. The text consists of three chapters, conceived to be accessible to the practitioners.

Early Progress to Implement the Federal Guidelines for Dam Safety and Recommendations to Improve Federal Dam Safety Programs
Dam Safety Course Version
Glossary of Terms
Implementation of Federal Guidelines for Dam Safety
Dam Safety Guidelines
Emergency Action Planning for Dams
Guidelines on the Consequence Categories for Dams
Catalog of FEMA Dam Safety Resources
National Dam Safety Program

The aim of the book is to give an up-to-date review on dam-break problems, along with the main theoretical background and the practical aspects involved in dam failures, design of flood defense structures, prevention measures and the environmental social, economic and forensic aspects related to the topic. Moreover, an exhaustive range of laboratory tests and modeling techniques is explored to deal effectively with shock waves and other disasters caused by dam failures. Disaster management refers to programs and strategies designed to prevent, mitigate, prepare for, respond to and recover from the effects of these phenomena.To manage and minimize these risks, it is necessary to identify hazards and vulnerability by means of a deep knowledge of the causes which drive to dam failures, and to understand the flow propagation process.Knowledge and advanced scientific tools play a role of paramount importance of coping with flooding and other dam-break problems along with capacity building in the context of political and administrative frameworks. All these aspects are featured in the book, which is a comprehensive treaty that covers the most theoretical and advanced aspects of structural and hydraulic engineering, together with the hazard assessment and mitigation measures and the social economic and forensic aspects related to subject.

The Interagency Committee on Dam Safety (ICODS) was established to provide the Federal agencies involved in dam safety with the opportunity to coordinate their dam safety activities. One of the goals of ICODS is to provide a common forum for the Federal agencies and State officials to exchange ideas and procedures that are used for dam safety and to provide an efficient mechanism for technology transfer. The purpose of this document is to establish a common Glossary of Terms for Dam Safety.

The Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures is presented by the Federal Emergency Management Agency (FEMA) as part of the National Dam Safety Program (NDSP), a partnership of States, Federal agencies, and other stakeholders formed to encourage individual and community responsibility for dam safety. As part of the NDSP, States are responsible for regulating non-Federal dams and do so autonomously from the Federal government and other States. This document provides information for Federal and State agencies, local governments, dam owners, and emergency management officials to use for reducing flood hazards and the resulting potential for economic damage and loss of life. This document is intended as a resource for developing State-specific guidelines for dam safety and as a reference manual for dam safety professionals to map dam breach inundation zones. The purpose of this document is to provide dam safety professionals with guidance on how to prepare dam breach inundation modeling studies and conduct mapping that can be used for multiple purposes, including dam safety, hazard mitigation, consequence evaluation, and emergency management including developing EAPs. This guidance is intended to provide a consistent approach that can be applied across the country. If adopted by individual States, the standardized methods and approaches presented in this document can be leveraged for a variety of dam safety products and across jurisdictional boundaries to strengthen dam safety across the United States. This document is not intended to establish dam safety policy or provide requirements and specifications, but rather to function as a compilation of the best technical resources and practices available for inundation modeling and mapping. It is also not intended to provide a complete manual of all procedures available for dam breach analysis and mapping. Topics include conducting breach assessments, methods for estimating breach parameters and generating breach hydrographs, downstream inundation modeling, and generation of consistent inundation maps. This guidance document is intended to aid in the areas of dam safety, hazard mitigation planning, consequence and loss estimation, and emergency management. FEMA P-946.

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Dam Surveillance Guide
October 2012
Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures
Dam and Levee Safety and Community Resilience
Dam Safety
Inspection & Maintenance of Dams
ICOLD Dam Decommissioning - Guidelines
Dam-break Problems, Solutions and Case Studies
Selecting and Accommodating Inflow Design Floods for Dams

In April 1977, President Carter issued a memorandum directing the review of federal dam safety activities by an ad hoc panel of recognized experts. In June 1979, the ad hoc interagency committee on dam safety (ICODS) issued its report, which contained the first guidelines for federal agency dam owners. The Federal Guidelines for Dam Safety (Guidelines) encourage strict safety standards in the practices and procedures employed by the federal agencies or required of dam owners regulated by the federal agencies. The Guidelines address management practices and procedures but do not attempt to establish technical standards. They provide the most complete and authoritative statement available of the desired management practices for promoting dam safety and the welfare of the public. To supplement the Guidelines, ICODS prepared and approved federal guidelines in the areas of emergency action planning; earthquake analysis and design of dams; selecting and accommodating inflow design floods for dams; and glossary of terms. These publications, based on the current knowledge and experience available, provided authoritative statements on the state of the art for these important technical areas involving dam safety. In 1994, the ICODS Subcommittee to Review/Update Federal Guidelines began an update to these guidelines to meet the new dam safety challenges and to ensure consistency across agencies and users. In addition, the ICODS Subcommittee on Federal/Non-Federal Coordination developed a new guideline on hazard potential classification systems for dams. With the passage of the National Dam Safety Program Act of 1996, Public Law 104-303, ICODS and its Subcommittees were reorganized to reflect the objectives and requirements of Public Law 104-303. In 1998, the newly convened Guidelines Development Subcommittee completed work on the update of the following guidelines: Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners, FEMA 64, October 1998, reprinted April 2004; Federal Guidelines for Dam Safety: Selecting and Accommodating Inflow Design Floods for Dams, FEMA 94, 1998, reprinted April 2004; Federal Guidelines for Dam Safety: Hazard Potential Classification Systems for Dams, FEMA 333, October 1998, reprinted April 2004. With the amendment of the Act into the National Dam Safety and Security Act of 2002, Public Law 107-310, former ICODS Subcommittees were reorganized under the National Dam Safety Review Board (NDSRB). In 2004, two task groups finalized the ongoing work of the previous Subcommittee on the update of the following guidelines: Federal Guidelines for Dam Safety: Glossary of Terms, FEMA 148, printed April 2004; Federal Guidelines for Dam Safety: Earthquake Analyses and Design of Dams, FEMA 65, printed May 2005. The publication of these guidelines marks the final step in the review and update process. In recognition of the continuing need to enhance dam safety through coordination and information exchange amongst federal and state agencies, the NDSRB will assume responsibility for maintaining these documents and establishing additional guidelines that will help achieve the objectives of the Dam Safety Program. The NDSRB has established a task group and work is currently underway to prepare an update to the ground motions portion of this document with new research and methodologies.

'Regulatory Frameworks for Dam Safety' was conceived and prepared in response to growing concern over the safety of dams. Given the large number of dams around the world, the safe operation of dams has significant social, economic, and environmental relevance. A dam failure can result in extremely adverse impacts, including a large-scale loss of human life. For countries with large stocks of dams, the issue of dam safety is critical. The book examines the dam safety regulatory frameworks of 22 countries. It draws comparisons and highlights similarities among the various systems. Most important, it identifies essential elements, desirable features, and emerging trends for dam safety regulatory frameworks. The authors are leading experts in their fields. Daniel Bradlow is professor and director of the International Legal Studies Program at the Washington College of Law at American University and was a consultant to the World Commission on Dams. Alessandro Palmieri is Lead Dam Specialist in the Quality Assurance and Compliance Unit of the Environmentally and Socially Sustainable Development Vice Presidency at the World Bank. Salman Salman is Lead Counsel in the Environmentally and Socially Sustainable Development and International Law Group of the World Bank's Legal Vice Presidency and has published extensively in the area of water law.

Although advances in engineering can reduce the risk of dam and levee failure, some failures will still occur. Such events cause impacts on social and physical infrastructure that extend far beyond the flood zone. Broadening dam and levee safety programs to consider community- and regional-level priorities in decision making can help reduce the risk of, and increase community resilience to, potential dam and levee failures. Collaboration between dam and levee safety professionals at all levels, persons and property owners at direct risk, members of the wider economy, and the social and environmental networks in a community would allow all stakeholders to understand risks, shared needs, and opportunities, and make more informed decisions related to dam and levee infrastructure and community resilience. Dam and Levee Safety and Community Resilience: A Vision for Future Practice explains that fundamental shifts in safety culture will be necessary to integrate the concepts of resilience into dam and levee safety programs.

Dam Safety Management is a major concern during the entire lifetime cycle of a dam scheme. This is particularly true for the operational phase of the scheme that represents by far the longest period in its lifetime cycle. Bulletin 154 presented a general approach and concepts to be applied to dam operation. The current Bulletin 175 extends the developed concepts to all phases preceding the operational phase. Many risks associated with the operation of existing dams have their origins in other phases preceding the actual operation. A are numerous ICOLD Bulletins addressing technical aspects of planning, design, construction and commissioning of dams, there is not a single Bulletin which covers the subject in a comprehensive manner. The current document is a first attempt to capture all relevant dam safety aspects in all preoperational phases by systematically characterizing the actors involved, their roles, the activities and complex interactions present in different phases of the dam lifecycle. An Overarching Safety Management System is specifically developed t applied to all actors involved. La gestion de la sécurité des barrages est une préoccupation majeure pendant tout le cycle de vie d'un projet de barrage. Cela est particulièrement vrai pour la phase opérationnelle du système qui représente de loin la période la plus longue de son cycle de vie. Le Bulletin 154 présente une approche générale et des concepts à appliquer à l'exploitation des barrages. Le Bulletin 175 actuel étend les concepts développés à toutes les phases précédant la phase d'exploitation. De nombreux risques associés barrages existants ont leur origine dans d'autres phases précédant l'exploitation proprement dite. Bien qu'il existe de nombreux bulletins ICOLD traitant des aspects techniques de la planification, de la conception, de la construction et de la mise en service des barrages, il n'existe pas un seul bulletin qui couvre le sujet de manière exhaustive. Le document actuel est une première tentative de capturer tous les aspects pertinents de la sécurité des barrages dans toutes les phases pré-opérationnelles en caractérisant systématiquement l impliqués, leurs rôles, les activités et les interactions complexes présentes dans les différentes phases du cycle de vie du barrage. Un système global de gestion de la sécurité est spécifiquement développé et peut être appliqué à tous les acteurs impliqués.

Queensland Dam Safety Management Guidelines
Pre operational phases of the dam life cycle / Phases de conception, construction et mise en service
National Dam Safety Program Act
Earthquake Analyses and Design of Dams
Inspection and Maintenance of Dams
Federal Guidelines for Dam Safety - Emergency Action Planning for Dams
Progress Report to Federal Management Agency (FEMA) October 1981-September 1983
Dam Safety Guidelines 2007
Dam Safety Management / Gestion de la Sécurité des Barrages

As there has been a continued increase in the demand for higher levels of safety, security and reliability for all critical infrastructures, the design, construction, and operation of dams should be integrated as part of a comprehensive risk management framework that can effectively address natural and manmade hazards. As an effect, in recent years

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Dam decommissioning or dam removal has been increasingly common since the past decade. The reason for considering dam removal may have to do with the safety of dams, high repair costs, high operating and maintenance costs, or effects on fish passage and water quality. However, the decision to remove a dam must be based on careful evaluation of the alternatives to address the specific problem at each dam. The ICOLD Committee for decommissioning dams was established in 2005 to develop information that can be used by ICOLD members to respond to questions about the dismantling of dams and to provide a forum for the exchange of information . This ICOLD Bulletin is not intended as a design guide, but as a guide to the decision making process, consultation and regulatory approvals, design and construction issues, sediment management and performance monitoring. The primary aim of these Dam decommissioning guidelines is to provide dam owners, dam engineers and other professionals with the information needed to guide decision making when considering dam dismantling as a project alternative. They are not meant to be used as a design guide, but as a guide to highlighting the points of interest. The guidelines in this ICOLD Bulletin apply only to flood defense structures and not to fall dams.

NOTE: NO FURTHER DISCOUNT FOR THIS PRINT PRODUCT--OVERSTOCK SALE -- Significantly reduced list price while supplies last Contains guidelines that apply to Federal practices for dams with a direct Federal interest. These guidelines encourage strict safety standards in the practices and procedures employed by federal agencies or required of dam owners regulated by the federal agencies. The guidelines provide the most complete and authoritative statement available of the desired management practices for promoting dam safety and the welfare of the public. The guidelines apply to federal practices for dams with a direct federal interest; the guidelines do not attempt to establish technical standards and are not intended to supplant or conflict with state or local government responsibilities for the safety of dams under their jurisdiction. Additionally,engineers, designers, architects, concrete, and construction crews, and others involved in dam safety and maintenance would find this informative. Related resources: Dams, Canals & Levees resources collection is available here: https://bookstore.gpo.gov/catalog/science-technology/engineering/dams-canals-levees

A Vision for Future Practice
Federal Guidelines for Dam Safety Risk Management
Emergency Action Planning for Dam Owners
Flood Evaluation and Dam Safety
Model State Dam Safety Program
Hazard Potential Classification System for Dams
A Comparative Study
A Report
Guidelines for Dam Safety Emergency Management Plans