

THE CIP REPORT

CRITICAL INFRASTRUCTURE PROTECTION PROGRAM

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MAY 2008 DAMS SECTOR

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EDITORIAL STAFF

EDITORS

Morgan Allen
Elizabeth Jackson
Olivia Pacheco

STAFF WRITERS

Tim Clancy
Maeve Dion

JMU COORDINATORS

Ken Newbold
John Noftsinger

PUBLISHING

Zeichner Risk Analytics
Contact: CIPP02@gmu.edu
703.993.4840

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For the first time, the Dams Sector is featured in a dedicated issue of *The CIP Report*. The infrastructures that comprise this critical infrastructure and key resource (CI/KR) sector are important in many ways. For example, they are used to control flood waters, provide potable water, generate electricity, and more. Importantly, the Sector not only consists of dams and their supporting infrastructure, such as reservoirs or aqueducts, but also of navigation locks, levees, hurricane barriers, mine tailings impoundments, and other similar water retention and/or control facilities.

In this issue of *The CIP Report*, we are pleased to feature numerous outside contributions. First, a brief overview of the Sector and common types of dams is provided by James Madison University. Information on the Dams Sector security and protection strategy is provided by the Dams Sector-Specific Agency (SSA), the U.S. Department of Homeland Security (DHS). The article from the Dams SSA also describes the Sector's efforts with respect to consequence and risk assessments and education and awareness. The Dams Sector Coordinating Council (DSCC) provides insight on changes in the Sector from the private sector perspective, and offers information on initiatives underway by the DSCC, many in collaboration with the Dams Sector Government Coordinating Council (DGCC). The Association of State Dam Safety Officials (ASDSO) presents a history of the U.S. focus on dam safety and details progress made, as well as additional efforts underway, in enhancing the safety of the Nation's dams. Offering readers valuable information on the development of security programs, the U.S. Bureau of Reclamation outlines key considerations for managing risk within the Dams Sector.

This month's *Legal Insights* article addresses the relationship between the Federal and State governments as it pertains to oversight of dams. It also makes note of the need for continued cooperation among stakeholders and funding for dam safety activities. Lastly, an announcement of the newly created 18th CI/KR sector, Critical Manufacturing, is included. This announcement directs readers to a CIP Program-authored white paper on the Sector and the use of statistical data analysis.

As always, we hope you enjoy this issue. We thank you for your continued support of the CIP Program.



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CRITICAL INFRASTRUCTURE
PROTECTION PROGRAM

Overview of the Dams Sector

by Avery C. Daugherty, Graduate Assistant, Institute for Infrastructure and Information Assurance,
James Madison University

As defined in the National Infrastructure Protection Plan (NIPP), dams constitute one of the designated critical infrastructure and key resource (CI/KR) sectors in the United States. Localities are able to use these structures to balance floods and droughts. In addition, dams, locks, and levees are accredited with not only providing water supply, but also with power generation and providing traversable waterways, safeguards against floods, and an all around stable environment boasting enhancements to habitats across the Nation. The Dams Sector is identified as harboring several interdependencies in a variety of sectors. According to the Department of Homeland Security (DHS), approximately 60 percent of the electricity used along the Pacific coast is generated from hydropower facilities, which therefore links dam structures to the Energy Sector. Being that dam structures are a continued source of water for irrigation and water management, it makes sense that they are connected to the Agriculture and Food Sector. Additionally, dams, levees, and locks create more than 12,000 miles of inland waterways which are used to transport mass quantities of commodities throughout the country, which therefore associates these infrastructure systems with the Transportation Systems Sector. Furthermore, dams also have a clear relationship with the Water Sector due to the fact that potable water is supplied to concentrated

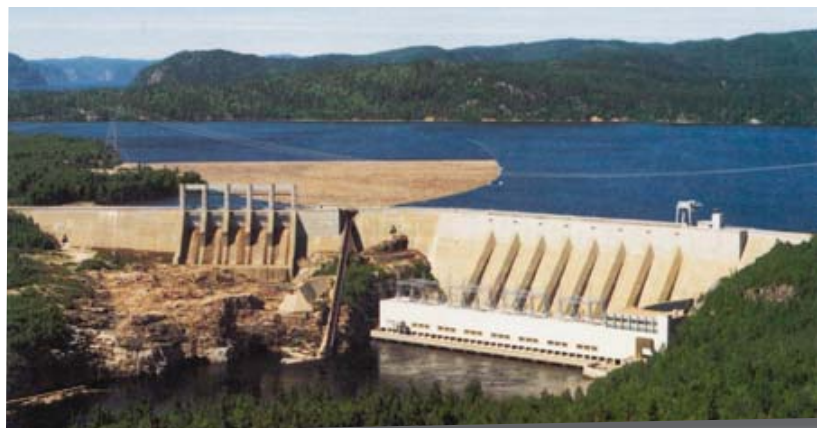
populations. Lastly, the Emergency Services Sector depends on the Dams Sector to assist in providing emergency water in the event of a significant disaster (DHS 2006).

According to the National Inventory of Dams (NID), there are approximately 80,000 dams, both publicly and privately owned, in the United States. Being that most of these identified structures are relatively small, typically their failure would not lead to significant amounts of property damage or result in considerable loss of life. However, a failure of larger dams could result in significant property damage and loss of potable water, lead to a decrease in electric power generation, and carry numerous health and safety consequences. For those dams classified as significantly large structures, the federal government is only responsible for approximately 10 percent. This means that the remaining 90 percent of significantly large dams

belong to state or local governments, utilities, and corporate or private owners (The White House 2003, 76).

There are two distinct groups of dams. Fill and embankment dams are generally classified according to the material of which they are structured. Most fill and embankment dams consist of relatively narrow, impermeable dirt and permeable rock with a clay core. Less commonly, some of these dams are constructed of permeable rock fill with an impermeable membrane made of concrete on the upstream face of the dam wall. Although this grouping of dams is not too common, it has become increasingly popular within the last 25 years. More commonly observed are concrete dams. Several styles of concrete dams are prevalent throughout the world, including gravity dams, arch dams, and buttress dams (The Dam Site).

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Example of a Gravity Dam

Overview (Cont. from 2)

Gravity dams are generally thought of as the strongest of the three styles of concrete dams. These dams resist the horizontal thrust of the water using their own weight and are usually used to block streams through narrow gorges. Because gravity dams rely heavily on their own weight to hold water back, they typically require a significant amount of concrete to construct.

Arch dams require less concrete than gravity dams and are thus considered to be more feasible to construct. This style of dam is most useful for sites that are narrow and have strong abutments. Arch dams are curved, creating an extremely strong foundation. Due to the strong nature of the curved foundation, these dams can withstand significant load resistance, which could not be sustained by the weight of the dam alone.

Similar in design to arch dams, buttress dams are dams in which the face is held up by a series of supports. While these dams can take numerous forms, typically the



Example of a Buttress Dam

faces of these are flat or curved in design. Most buttress dams are made of reinforced concrete and are extremely heavy. Water pushes against the dam causing it to sink slightly in the ground, which allows for greater structural support. This style of dam is excellent in wide valleys where solid rock may be scarce (The Dam Site). ❖

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Example of an Arch Dam

A Security and Protection Strategy for the Dams Sector

by Enrique E. Matheu, PhD

Dams Sector Branch, Sector Specific Agency Executive Management Office,
Office of Infrastructure Protection, U.S. Department of Homeland Security

Homeland Security Presidential Directive 7 (“HSPD-7: Critical Infrastructure Identification, Prioritization, and Protection,” December 2003) identified a set of critical infrastructure and key resources (CIKR) sectors whose failure or disruption could potentially lead to the most severe impacts at the national level. Sector-Specific Agencies (SSAs) were assigned to each of these CIKR sectors with the fundamental mission of coordinating and facilitating the corresponding identification, prioritization, and protection efforts in collaboration with the private sector and the appropriate security partners at the Federal, State, local, territorial, and tribal government levels. HSPD-7 also required the development of a comprehensive national plan as its overarching implementation mechanism. The resulting NIPP was released in June 2006, and the corresponding Sector-Specific Plans (SSPs) for all CIKR sectors were released in May 2007.

The Office of Infrastructure Protection (IP) within DHS serves as the SSA for the Dams Sector. Within IP, the Sector-Specific Agency Executive Management Office maintains responsibility for coordinating critical infrastructure protection activities within the Dams Sector through ongoing collaboration with the Dams Sector Coordinating Council (DSCC) and the Dams Sector Government Coordinating

Council (DGCC), focusing on reducing risk to the assets, systems, networks, and functions related to dam projects, navigation locks, levees, hurricane barriers, mine tailings impoundments, or other similar water retention and/or control facilities. The DGCC was formally established in January 2005, is comprised of representatives from Federal and State agencies, and serves as the counterpart and partner to the DSCC to assist in the planning, prioritization, implementation, and execution of sector-wide security programs. These two councils provide a structure through which representatives from the government and the private sector can effectively collaborate and share approaches focused on the improvement of CIKR protection.

Identification of Critical Assets

The infrastructure assets within the Dams Sector represent complex facilities that continuously provide a wide range of economic, environmental, and social benefits to our Nation, including hydroelectric power, river navigation, water supply, wildlife habitat, waste management, flood control/flood damage reduction, and recreation. The potential risks in the event of failures or disruptions are considerable and could result in significant destruction, including loss of life, massive property damage, and

severe long-term consequences. Residual effects of dam failure can include loss of water supply, power, flood control, navigation, or recreation, all having long-lasting social, economic, and public health impacts. To best protect the Dams Sector, sector security partners must work together to develop a consistent screening strategy required to conduct a systematic preliminary prioritization of the assets included in the Dams Sector.

Considering the large number of assets within this sector, it is appropriate to initially identify and characterize the subset of high-consequence facilities whose failure or disruption could potentially lead to the most severe impacts. This screening can be done at the national level, according to consequence levels adopted as representative of nationally significant incidents, as well as at the State or regional levels for prioritization efforts. There is also a need to establish a consistent sector-wide framework and approach to measure and quantify the consequence elements included in these prioritization analyses.

The Dams SSA, in coordination with sector security partners, is currently developing a Consequence-Based Top Screen (CTS) methodology focused on estimating

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SSA (Cont. from 4)

the following potential impacts of a facility whose failure or disruption could potentially lead to the most severe impacts at the national level:

- Impacts on human health and safety caused by inundation of downstream populated areas, industrial areas, and other critical infrastructure assets;
- Economic impacts associated with substantial damage to or disruption of the facility, considering the damage to downstream inundated areas and the financial losses associated with business interruption;
- Direct impact on government capabilities and unavailability of services critical to the military or other critical government services;
- Indirect effects associated with the loss of critical functions provided by the facility; and
- Serious collateral damage to assets with strong emotional, symbolic, or iconic value.

A Joint DGCC/DSCC Work-group was established to monitor, review, and provide technical guidance for the development of the CTS methodology. This team—comprised of experts from private industry, State governments, and Federal agencies—served a key role in the development of this screening methodology. The approach was successfully tested at several individual sites during 2007. The main purpose of these pilots was to evaluate the practicality and

on-site resource requirements of the methodology. A final pilot involving 24 Pacific Northwest sites was conducted in April 2008 as a way to validate the ranges used in the consequence tables, and to support the validation of the thresholds used to identify facilities potentially associated with nationally significant consequences. The CTS methodology will be implemented through a web form-based questionnaire designed to collect specific information from owners/operators that will allow a complete characterization and subsequent consequence-based prioritization of critical facilities within the Dams Sector.

The Dams SSA is also pursuing active collaboration efforts with the *Universidad Politecnica de Valencia* (Spain) whose researchers have recently completed the development of a risk assessment framework with funding support provided by the European Union. This methodology (“DAMSE – European Methodology for the Security Assessment of Dams”) has been already tested at several dams in Spain, Italy, and Austria. The DAMSE methodology also includes a consequence-based prioritization module.

Regional Consequence Assessment

The sheer number of assets within the Dams Sector, their importance at the local, regional, and often national levels, and their interdependencies with multiple sectors require the development of approaches that can quantify consequences at scales beyond the facility-specific level. Identification

and evaluation of infrastructure interdependencies at the system level or on the regional scale are essential elements for this type of analysis. The Dams SSA has developed partnerships with key sector security partners, including Archer Daniels Midland Co., the Illinois Department of Transportation, the Illinois Terrorism Task Force, the U.S. Coast Guard, and the U.S. Army Corps of Engineers (USACE) to investigate the potential economic consequences associated with the long-term disruption of the Illinois Waterway system. A key element of the study is the development of a regional consequence analysis methodology that can capture infrastructure interdependencies and cascading effects associated with lock disruptions and their effects on the inland waterway system. In addition, the Dams SSA is participating in the initial planning and design of a pilot study to investigate infrastructure interdependencies and cascading effects along the Columbia River Basin, in direct coordination with key private sector, state, and local stakeholders within the Pacific Northwest.

Sector-Wide Comparative Risk Assessment

In addition to the consequence-based prioritization efforts mentioned above, the sector will also benefit from a sector-wide risk assessment framework that would allow for a direct comparison of risk variables among different assets. This framework can be practically developed by restricting the analysis to consequences and

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The Dams Sector Coordinating Council

Who we are, What we've done, Where we are going

by Hal Dalson*

The DSCC represents the private owners and/or operators of dams, locks, and levees throughout the nation. In the United States there are approximately 80,000 dams of various size and mission design; dams contribute approximately eight percent of the nation's power needs from a renewable source. In addition to power production, dams serve a multitude of missions, ranging from supplying water to once dry areas, flood control, and environmental protection by containing hazardous sediments. When the general public thinks of a dam they often envision the large monolithic structures built to harness the energy of the great rivers of the world. While those engineering testaments do exist, most are much smaller in size, yet their missions are remarkably similar: control the water flow, harness its energy, and complete the mission design in a cost effective and safe manner.

The primary focus of any owner or operator in the nation is to ensure the safe, reliable operation of the facility. It is the owners' responsibility to maintain the structure in a manner that not only ensures the facility's continued operation, but also gives those living downstream the assurance that the facility is operated and maintained to the highest standards of safety, and efficiency. Owners have to consider events such as flooding, bank erosion, and structural integrity when designing and maintaining a dam. With that

criteria, they have designed system maintenance programs to inspect the embankments for signs of weakness prior to an actual failure. River design models are followed when building a structure to ensure the structure can withstand historical flooding conditions and inspection programs; the Federal Energy Regulatory Commission (FERC), other federal agencies, and the states ensure those programs are up to date and completed on a regular basis. Additionally the National Hydropower Association (NHA), United States Society on Dams (USSD), and the Association of State Dams Safety Officials (ASDSO) are key strategists in ensuring that standards are applied to all dams in the nation. The operations of the facilities are a team effort, including the owner operators, FERC, the states, and those who live in close proximity to the structures. Each player has a role to ensure the integrity of the system, and all players are tested on an annual basis to show that they are prepared to respond in the event of an emergency. No one member can do it alone; it takes everyone involved to create the best operational practice.

The aftermath of 9-11 challenged the owners and operators of all types of facilities and infrastructures to review their security protocols and policies. Dam owner operators found themselves with a very mature set of emergency response plans, which were based on

catastrophic event preparedness, response, and mitigation. The plans were focused on natural events being the trigger that puts the action plan into motion. The concept of a manmade event causing the activation of the plans was not considered.

Prior to 9-11, very few people considered a manmade event as the cause of a catastrophic failure to result in harm to those downstream, or to cause psychological impact on the nation. The primary focus of existing site security programs considered the curiosity seeker, the vandal, and the petty criminal. The security programs were not designed to detect a person who may be collecting information, conducting operational surveillance, or trending the flood wave as an outcome of an attack. Those considerations have now become part of the conversation, the thought behind the action.

Prior to the manmade disruption concept, the security programs were generally inward looking, meaning they had a tendency to be reactionary. They were designed to identify the act after it had taken place. Usually an employee who reported to the site would be the first to notice an indicator of trespass, vandalism, or property theft. It was then reported to the employee's supervisor who determined at that point if the event would be called into local

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DSCC (Cont. from 6)

authorities. Many times such events were not reported, with little to no records kept of the event. The petty nature of such offenses, coupled with the robustness of dams in general and their predominantly rural locations, kept owner operator concerns at a relatively low level.

Post 9-11 we changed how we, as owner operators, thought about the security of our facilities, and the recognition that those facilities were part of the nation's critical infrastructure. FERC started by establishing a hydro sector security committee, made up of owners from around the nation. Soon after that group was established, FERC led the way by instituting the Dam Assessment Matrix for Security and Vulnerability Risk (DAMSVR) program, and adding a security program section to its annual inspections and reports for the dams it had jurisdiction over. Building on that model, DHS sought input from the private sector for assistance in developing a national security plan, and sector plans for each critical sector in the nation. Focus groups were independently formed, and the result of those discussions was the development of a National Infrastructure Protection governance model with Government Coordinating Councils (GCCs) and private Sector Coordinating Councils (SCCs) across 17 critical infrastructure areas such as finance, transportation, energy, and commercial buildings.

The DSCC was established in 2005 and is made up of 25 active members from the United States and Canada. Approximately 70%

Post 9-11 we changed how we, as owner operators, thought about the security of our facilities, and the recognition that those facilities were part of the nation's critical infrastructure.

of the members are sector security professionals, 20% are operations professionals, and 10% are association representatives. A complete listing of companies and groups who are taking part in this Council can be found in the Dams SSP. The Council also has liaison memberships with related sectors, such as the mining and water sectors and is in the process of establishing a sub-council to focus on security issues for levee owner operators.

The goals of the DSCC are to partner with and educate sector partners on current security practices that are in use by companies around the nation, build on current operations practices, design an effective communication protocol for all owner operators to use, and remove the barriers to having open conversations with our government sector-specific agency, and government sector peers.

From the onset, the Council chose a path that was forward looking. We decided not only to attempt to educate dam owner operators but also the various state and federal agencies we were partnered with. We felt it was mission critical to inform DHS and the other sectors of the programs that were already in place. We wanted recognition for the vulnerability assessments, secu-

rity enhancements, and partnering that had already taken place. Many times the work had been completed independent of any regulation or directive. The decisions to complete the tasks were driven by the companies, based on their obligations as owners. The Council did not, and does not want to, reinvent the wheel.

Upon the completion of the NIPP, and the SSP, the Council formed several work groups designed to enhance areas where we felt there was a need for more emphasis. Along with our federal partners, we have established work groups that are focused on a risk assessment methodology, information sharing and notification, security education, research and development (R&D), and goals and metrics. These work groups provide a forum for open and frank discussion with DHS and the other federal and state agencies who participate. One example is the evaluation of DHS-sponsored risk assessment methodology where we agreed to assist in the development of the product, however if we felt it did not add value to the owner operator we would not promote it.

This may give the impression of a reluctant participant, while in real-

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The Association of State Dam Safety Officials – A Quarter Century Devoted to Improving Dam Safety Now Includes Dam Security

by Lori C. Spragens, Executive Director, ASDSO

Dams in the United States go back as far back as, and are closely tied to, the very beginnings of the nation, especially as people and commerce moved toward the arid but promising west. As people blazed trails and created communities they built dams for water supply, flood control, irrigation purposes, and navigation, and later for electricity and recreational purposes. Without these structures, the country would not be what it is today.

Yet, several devastating dam failures—beginning with the Mill River, Massachusetts and Johnstown, Pennsylvania floods in the 1880s and culminating with several major failures in the 1970s—focused attention on the importance of sound engineering and public safety related to the construction,

continued maintenance, and upgrades of dams. It became clear, especially after the tragedies of the 1970s, that the only way to increase safety and decrease the likelihood of further human and economic losses from dam failures was to develop strong regulations and more coordination within the dam safety community.

This wasn't going to be easy.

Prior to the rash of highly visible dam failures in the 1970s, there was little state or federal interest in



Lawn Lake Dam failure, Colorado. 1982

dam safety. Even dam owners were somewhat unaware of their responsibilities and liabilities. There was no coordination or communication between states, between the federal government and the states, and, technologically, among engineering experts.

At this period of time, in the late 1970s and following the dam failure at Toccoa Falls, Georgia, President Jimmy Carter—a Georgia native—issued an executive order directing USACE to inspect non-federal, high-hazard potential dams. President Carter encouraged state governments to implement effective safety programs for non-federal dams. The Corps' national inspection program, carried out between 1978 and 1981, brought to light the deficiencies in the vast number



*"Carter Vows to Push Long-Delayed Dam Safety Survey,"
The Washington Post, November 11, 1977*

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ASDSO (Cont. from 8)

Historic Dam Failures in the United States

- Toccoa Falls, Georgia – November 5, 1977 – Kelly Barnes Dam failed, killing 39 students and college staff and causing about \$2.5 million in damages.
- Laurel Run, Pennsylvania – July 19-20, 1977 – Laurel Run Dam failed, killing over 40 people and causing \$5.3 million in damages.
- Teton, Idaho – June 5, 1976 – Eleven people perished when Teton Dam failed. The failure caused an unprecedented amount of property damage totaling more than \$1 billion.
- Rapid City, South Dakota – June 9, 1972 – The Canyon Lake Dam failure took an undetermined number of lives (estimates range from 33 to 237). Damages, including destruction of 1,335 homes, totaled more than \$60 million.
- Buffalo Creek Valley, West Virginia – February 26, 1972 – The failure of a coal-waste impoundment at the Valley's head took 125 lives, and caused more than \$400 million in damages, including destruction of over 500 homes.
- Los Angeles, California – December 1963 – The failure of Baldwin Hills Dam killed five people, destroyed 41 homes, and damaged over 1,000 homes and apartment buildings.
- San Francisquito Canyon, California – March 12-13, 1928 – The St. Francis Dam failure killed over 450 people and destroyed 10 bridges and more than 1,200 homes.
- Johnstown, Pennsylvania – May 31, 1889 – The city of Johnstown was devastated, and 2,209 people were killed following the failure of South Fork Dam, located nine miles upstream.
- Williamsburg, Massachusetts – May 16, 1874 – The Mill River Dam failure killed 139 people, and destroyed a number of factories, as well as more than 700 homes in Williamsburg, Leeds, Skinnerville, and Haydenville.

of non-federal dams, and created sufficient state and federal impetus to establish one body that would serve to increase state interest in dam safety regulation and would act as the mechanism to establish a communications link between main players within the community. Thus, within this climate of uncertainty and tragedy, a forward-looking group of dam safety officials from state and federal arenas formed the Association of State Dam Safety Officials.

Now, after a little over 24 years of service to the dam safety community, ASDSO can proudly say that it has made a difference. Its goal—to

advance and improve the safety of dams—is a difficult one, and formidable challenges remain.

What is ASDSO and How is it Run?

ASDSO is considered an educational, charitable organization in the United States, a private organizational designation. ASDSO is not a regulatory body nor does it set policy for the agencies that carry out dam safety regulation. ASDSO does not own dams.

The organization is run by the 50 state dam safety programs through a representative board of directors.

There is a staff of four running the operation out of an office in Lexington, Kentucky. The success of the Association lies in its unity of purpose and in the work of its many dedicated volunteers.

The success shows.

In 1985, when the first ASDSO newsletter was published, 41 states and Puerto Rico had officially joined the Association, and there were only 165 members. Now, ASDSO's numbers have grown to over 2,500 with members in every state and several foreign countries.

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Strategies Behind a Security Program and the U.S. Bureau of Reclamation

by Don Taussig and Kim L. Duran, U.S. Bureau of Reclamation

The devastating terrorist attacks made against United States citizens on April 19, 1995, and on September 11, 2001, clearly demonstrated that critical infrastructures in this country are vulnerable to a determined and motivated aggressor and the loss of critical structures and assets can result in catastrophic consequences. The Bureau of Reclamation (Reclamation) owns and operates numerous facilities that can be exploited by such aggressors that would kill far more people than seen by any terrorist attack made to date. Additionally, intelligence and the study of terroristic capabilities reveal that they recognize dams as attractive critical infrastructure and as potential weapons of mass destruction. This clearly shows that the risks at many Reclamation facilities from human aggression have the potential to be far greater than the risks identified from natural events. Security must fit into the corporate mission. In the case of hydrofacilities, security must be part of the storing and delivering of water, and/or the generation of electricity.

Once the impetus for a security program is established, the next big step is to develop a strategy and framework for that security program. Reclamation, as a Federal agency, must consider the many policies, directives, and standards passed on as a result of the Oklahoma City and 9/11 events. Compliance requirements must be a factor in the development of the framework of a security program, but these requirements must be implemented in a fashion that is practical and cost-effective for each asset being protected and that's where strategy and right-sizing come in.

The number one overarching strategy for Reclamation's long-term security program was and continues to be risk based. For Reclamation, the decision to build our security program upon the foundation of risk management was an easy one. Reclamation is world renowned for its Dam Safety risk management program and human threat is really just one more risk to add into the pool of risks, such

as seismic and flood, already being evaluated and managed. Reclamation developed the Security, Safety, and Law Enforcement Directorate to manage all these risks under the leadership of one director. Though there are many similarities between the Dam Safety risk management and the Security risk management programs, Reclamation recognized that human threat is so much more difficult to predict and prevent than natural threats.

The overarching strategy to incorporate security into other risk management efforts will be key to the long-term success of any credible security program. Let's face it, security implementations without the justification of vulnerability, consequence, and threat behind them just won't last in the long-term fight for funding priority.

Framework

Reclamation's security program adopted the basic framework of its Dam Safety program, which has been tested and refined since its development in the late 1970s after the failure of Teton Dam:

Reclamation's Three Main Factors for Developing a Security Program that Integrates into Hydro-Related Facility Operations and Maintenance Programs

- Build the framework based on the notion that security should be dealt with in the same manner as natural hazards, via a risk management program;
- Develop risk mitigation options based on proven strategies; and
- Run all mitigation options through an established collaborative decision-making process that includes key Reclamation and operations and maintenance (O&M) management to ensure that the security strategies and measures in place are practical, right-sized, and practiced.

- Risk Analysis
- Balanced decision-making and budget process
- Defined recommendation management process
- Detailed documentation of the program, assessments, decisions,

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Reclamation (*Cont. from 10*)

and mitigations

- Established technical center of excellence to design solutions
- Supportable and measurable program metrics data

In addition to these, a security program, due to its sensitive nature of information, must also add information and personnel security into the program's framework. Also, emergency management should be one more factor that you would incorporate within your security program framework. Guidance for information security and emergency management is numerous, but DHS has developed guidance including a Security Classification Guideline, and Coordinating Council handbooks on Security Awareness, Emergency Management, and Protective Measures that were developed by people from various critical infrastructure sectors, including the Dams and Water Sectors.

Strategy

Risk management begins with the understanding of the risk associated with each critical asset. An analysis of risk includes a:

- Site-specific security assessment
- Relative quantification of likelihood of event, likelihood of failure, and consequences
- Development of risk-reducing measures (recommendations) in accordance with prepare, prevent, detect, assess, delay, respond, and recover tactics

This assessment brings together the understanding of single-point vulnerabilities and threat to each

asset, the consequences these will cause, as well as the effectiveness of physical security measures in place, and operational and/or procedural habits of personnel to develop a risk reduction strategy tailored for each site. This strategy should use a combination of preparation, detection, delay, response, and recovery tactics to effectively protect the asset. There is great value in early detection and a visible posture that discourages an attack, such as with increased surveillance and deterrence tactics. This is best met by a holistic approach involving comprehensive procedures and coordination with responders. It also requires the attention and awareness of all employees at the facilities and involves public awareness and its involvement in reporting suspicious activities. Also, since effective response is not always a reliable or feasible option, there can be much justification for your security program to focus on the realms of preparedness and recovery. This would include emphasis on information, operations, and awareness security and regular enhancement and practice/exercises of the security program in terms of preparation, response, and recovery tactics/needs. No facility will ever be totally secure or risk free, but the goal of your security program should always be moving toward obtaining or maintaining a right-sized security and preparedness posture.

The *Dams Sector Protective Measures Handbook*, developed jointly in 2007 by the DSCC, the DGCC, the Critical Infrastructure Partnership Advisory Council, and DHS, provides an excellent summary of

the risk-reduction strategies that can be applied to dams and related critical infrastructure.

Right-Sizing

Getting from the assessment of a facility to the development of recommendations is where the art of security begins. Now that you know what the risk is and you can see how to develop a comprehensive security system that creates a deterring fortress of preparedness, detection, assessment, delay, and recovery, how do you downsize it to make it appropriate in terms of operational practicality, cost, public opinion, politics, etc? What level of risk is acceptable? How do you know if the benefit is worth the cost if you do not really understand the real threat to your facility? If your agency is as large as Reclamation's, then a group of security specialists spread out between headquarters, regional, and area offices may be appropriate and right-sized. If your agency has only a handful of assets to protect, then maybe your security group consists of one individual that wears many security hats.

Decision Making

One of the key processes of a successful security program is decision making. This is the most critical point where buy-in of strategy and collaboration for mitigation implementation is achieved.

Reclamation breaks decision making into two primary phases: technical and managerial. A technical advisory team critically reviews risk-rating

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LEGAL INSIGHTS

Dams Sector: Complex Engineering, Complex Oversight

by Timothy P. Clancy, JD, Principal Research Associate for Law

Dams are certainly critical infrastructures—it is just sometimes difficult to view dams as constituting a stand-alone sector. Water retention facilities are integral components of a complex system of water and power infrastructure sectors, as well as other infrastructures like agriculture and transportation.

These facilities by themselves are complex systems¹ with intricate structural, human and cyber control dimensions. And since consequences of a dam failure could be severe, it is necessary to view dams as a single critical infrastructure sector. Dams represent a perfect example of interdependencies—a catastrophic dam failure would lead to cascading effects across infrastructure sectors and severe damage across multiple jurisdictional boundaries.

This monthly column is called *Legal Insights* but it may as well be called *Federalism Corner* for so many legal issues center around the domestic security relationship between the Federal and State governments. In nearly every critical infrastructure

sector, State and Federal roles intersect, overlap and sometimes conflict. In the Dams Sector, the oversight and regulatory structures are nearly as complex as the Sector itself. Most dams, like nearly all critical infrastructures in the United States, are owned and operated by private entities (65 percent), with dam owners and operators paying for dam maintenance and repair as well as safety and security.

Prior to 9/11, the Dams Sector was concerned primarily with safety—protection from natural hazards, neglect, aging or design flaws. A number of dramatic dam failures beginning in the 1920s spurred action in the states to regulate, inspect and monitor dams to prevent failures.

According to ASDSO, over 85 percent of the roughly 80,000 dams in the United States are regulated by the states. However, ASDSO also notes that “most states are under-funded and under-staffed, and many do not have complete statutory authority to perform critical regulatory functions such as

requiring Emergency Action Plans to warn and evacuate people in the event of a dam failure.”² The Federal government has provided research, coordination, grant and technical assistance to state programs through the NDSP under FEMA. Created after a string of dam failures in the 1970s, the NDSP has been formally authorized through the Water Resources and Development Act of 1996 and the National Dam Safety Act of 2002.

Other federal authorities cover the operation, safety and security of federally-owned dam facilities—about five percent of the U.S. total—under Federal agencies such as the Tennessee Valley Authority (TVA), Bureau of Reclamation and of course USACE that also own and operate many large, high profile dams. These agencies have their own congressional authorities and funding mechanisms for dam safety and security. A notable exception to this state/federal framework is the regulation of non-federal hydro-

(Continued on Page 22)

¹ “The Dams Sector comprises the assets, systems, networks, and functions related to dam projects, navigation locks, levees, hurricane barriers, mine tailings impoundments, or other similar water retention and/or control facilities. Dam projects are complex facilities that typically include water impoundment or control structures, reservoirs, spillways, outlet works, powerhouses, and canals or aqueducts. In some cases, navigation locks are also part of the dam project.” *Dams Sector Security Awareness Guide: A Guide for Owners and Operators*, Department of Homeland Security, 2007, http://www.damsafety.org/media/documents/DownloadableDocuments/DamsSectorSecurityAwareness-Guide_508.pdf.

² *State and Federal Oversight of Dam Safety Must be Improved*, Association of State Dam Safety Officials, September 2007, http://www.damsafety.org/media/Documents/PRESS/NationalDamSafetyOverview_ASDSO_07nov.pdf.

SSA (Cont. from 5)

vulnerabilities, which constitute information elements typically addressed by the risk assessment studies already conducted across the sector. Owners of high-consequence dams have already conducted site-specific risk assessments using a variety of procedures. Assuming availability of these site-specific results, a sector-wide prioritization of protective programs can be developed through a conditional risk assessment approach. A conditional risk assessment is focused on the asset's generic vulnerability to pre-established attack scenarios and the resulting consequences associated with the corresponding failure/disruption mode. This type of general analysis does not factor in the specific likelihood of attack because its objective is not to design or identify security measures that should be implemented for any specific facility. Based on potentially available information, this analysis could help the sector in prioritizing sector-wide collaborative programs, training and education needs, protection gaps, and technology development requirements.

Security Education and Awareness

To help enhance the protective posture across the sector through increased security awareness, the Dams SSA is engaged in active collaboration with the DGCC and the DSCC to develop a comprehensive series of technical reference documents:

- (1) *Dams Sector Security Awareness Handbook* and *Dams Sector Security Awareness Guide* provide sector-specific technical

information that assists in identifying security concerns, coordinating proper response, and establishing effective partnerships with local law enforcement and first responder communities;

- (2) *Dams Sector Protective Measures Handbook* assists owner/operators in selecting protective measures addressing the physical, cyber, and human elements, and will include recommendations for development of site security plans; and
- (3) *Dams Sector Crisis Management Handbook* provides owner/operators with sector-specific technical information related to emergency response and preparedness issues, and includes recommendations for development of emergency action plans and site recovery plans.

Conclusion

Due to the large number and diversity of assets, security postures, and owners and operators within the Dams Sector, it is important to highlight that a "one size fits all" protective program or approach is not appropriate for this sector. Therefore, the Dams SSA, in collaboration with sector security partners, will continue to identify the protective measures, strategies, and policies most appropriate to protect its assets from terrorist acts through the development of multifaceted, multilevel, and flexible security programs designed to accommodate the diversity of

this sector. In addition, the Dams Sector, by fostering and guiding research in the development and implementation of protective measures, will ensure the continued economic use and enjoyment of this key resource through the use of a risk-based management program of preparedness, response, mitigation, and recovery.

For questions or more information, please contact dams@dhs.gov or visit www.dhs.gov/nipp. ❖

DSCC (*Cont. from 7*)

ity we have been and continue to be very open to partnering, which results in designing products, processes, or procedures that are cost effective and ultimately add value to the dam owner operator. We refuse to go with the norm, or accept a product just to mark off a box. The assessment tool has become a methodology that the DSCC and the DGCC see as a favorable means of assessing a facility based on equal comparison. Obviously the vast majority of dams are not iconic in size. However, large dams have the potential of destruction of downstream property if a catastrophic event were to take place. Therefore, we must have the ability to evaluate all dams based on common criteria to determine which facilities should be given additional security mitigation measures to protect the downstream population, and property. This methodology is not based on attack scenarios or type of weaponry used. Those attributes are irrelevant when one looks at potential consequences. The final phase of testing the assessment methodology is scheduled for this spring. Many of those involved believe the methodology could be tailored to fit all identified segments of critical infrastructure. There is also a belief that the states and DHS could use the methodology to help identify critical infrastructure facilities in a more rational manner.

Information sharing has been an ongoing challenge for the Dams Sector; many members have access to the private sector information sharing mechanisms that exist for the Electric, Water, and Natural Gas Sectors or any number of other industry or public safety agency

information sharing mechanisms. However, this is a monumental task to reach out to, and receive feedback from, 80,000 dam facilities around the nation. Currently, we depend heavily on our association members, particularly NHA and ASDSO, to reach the smaller owner operators, and Energy Sector partners such as the Edison Electric Institute (EEI) to share information with those who hold similar energy security-related interests. This has proven to be somewhat of a burden on the operators of hydro electric facilities, and a burden the DSCC has taken on as a “must do” for this year. We have been working closely with DHS to re-define its Homeland Security Information Network (HSIN) system so it can be a viable tool for the Dams Sector to use for all owner operators. This area too has begun to show great promise and we are optimistic to see a test platform later this year to evaluate the value of the tool for owner operators’ use in giving and receiving information.

The majority of DSCC members have strong security backgrounds but recognize that this expertise does not exist for most small and medium dam owners. As such, the DSCC determined it would be in the Dams Sector’s best interest if we could reach out to the small owner operators and train them on what to look for, how to report suspicious matters, and what types of mitigations could be implemented in a cost effective manner. In short, we wanted the local operator to start viewing the world as a trained security professional. We knew we had to keep it simple, and most of

all it had to be a real benefit to the owner. We focused on awareness, observations, critical information, and reporting. We formed a Security Education work group, which has produced training documents that are being shared with owner operators at conventions, conferences, and meetings all over the country. In addition, there have been copies sent to the state dam safety officials to be distributed to their responsible parties. This work group continues today, and will be active for quite some time. Future steps are in draft mode to design a web-based training program for owners that will assist them in surveillance detection, security awareness, and other training programs as the need arises. When the operator signs on and completes the training they receive credit from DHS for taking the course, and it also gives us an indicator of how widely the security training materials are being used.

We are also very active in R&D work groups, and program and metrics work groups. The products and processes that are being produced by the work groups listed are truly the backbone for our future expectations regarding the Dams Sector and the owner operators of North America.

We must be willing to accept the realization that there are those in this world who really are intent on defacing our beliefs in equality, human rights, and freedom. It is important to note that these skeptics are in our very neighborhoods; not all adversaries are located outside of this country. They have

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DSCC (Cont. from 14)

demonstrated their willingness to use any method, any tool, at any cost to promote the message of their choosing. With this realization, we as facility operators and owners are challenged with protecting not only our employees and our physical assets, but also ensuring the confidence of those who are located near the borders of our facilities. No single company, agency, or government entity can maintain the demand for resources or the costs to protect every asset, in every state, in every town. But, we can enhance overall security by taking the time to increase the awareness of those who work at the facilities, who live near the sites, and that deliver goods and services to the sites. We can extend our vision to every corner, on every street, in every town, increasing our reaction time to prepare for an intrusion. We can do it without spending countless billions on “gates, guns, and guards;” we can do it by being vigilant, trained, and aware of our surroundings. Our future is in building partnerships with all stakeholders. We don’t expect to have every fisherman questioned, but if someone sees a fisherman, and they notice something out of place, it should raise a question. We just have to educate those who might have the opportunity to observe that type of anomaly on what questions to ask.

Every terrorist attack takes some degree of planning, practice, or thought. It is in that span of time prior to the attack when we have the greatest opportunity to influence its outcome. Terrorist methods are generally consistent, i.e., gather information either through open

source materials or observing the site from a distance or both. What are the tools used to gather site information? Cameras, field glasses, maps, GPS units, etc. We see them all the time at dam sites, the same tools a tourist carries. How does one tell the difference? Can a terrorist be identified through simple observation, time of year, items that don’t fit situational awareness? These are the kinds of activities we must train those closest to our assets on observing, and more importantly on reporting. The days of the local supervisor or river superintendent of “determining” the intent of the fisherman who didn’t know the season was closed are gone. Those determinations have to be made by people who are trending types of calls, locations of reports, and times of year, and looking for similar actions at related facilities.

We have seen the value of producing training materials for the owner operators to use. Prior to 9-11, we saw very few reports of suspicious activities such as persons photographing dam facilities. However, today we have seen a change in the types of incidents that are being reported, indicating that the owner operators are watching. The largest numbers of reported incidents are that of infrastructure photography. This shows that the owner operators of the dams around the nation are looking through the eyes of a trained security professional. They do consider the act of planning and surveillance as their greatest chance to foil an attack and they are reporting those events so trends may be identified, and alerts can be sent out. Our efforts and those of

our partners, FERC, the Protective Security Advisors (PSAs), DHS, ASDSO, NHA, and the state authorities, are making a difference.

We believe that, while there is much to do, the Dams Sector is on the right path. The partnership between the private and government sectors is one of the strongest among critical infrastructures. Our greatest strengths reside in information sharing, identifying common goals, designing strategies to achieve those goals, and communicating with every owner operator about our plans. We have a patient determination to complete this task. ♦

** Hal Dalson is a Regulatory Security Manager for a Midwest utility. Hal currently serves as the Chairman for the Dams Sector Coordinating Council.*

ASDSO (Cont. from 9)

In 1983, only 24 states met standards established by the *Model State Dam Safety Program*, a guidebook created jointly by ASDSO and federal leaders through the Federal Emergency Management Agency (FEMA). A recent study showed 39 states meeting minimal legislative standards set forth in the *Model State Dam Safety Program*.

State dam inventories have become more comprehensive. In 1976, the Corps' national dam inventory listed 49,329 non-federal dams. Today, state inventories include more than 95,000 dams.

Average state dam safety staff numbers have increased from 5.6 to 7. Although, these numbers are still too low.

The average state dam safety budget has more than quadrupled, from \$132,700 in 1983 to \$653,400 today.

In 1977, dam safety laws were inadequate in about half of all states and non-existent in seven. Today, there are laws regulating dam safety in all states but Alabama, where efforts to establish dam safety legislation are currently underway, with the help and support of ASDSO.

In 1976, it was estimated that approximately 33 percent of non-federal dams were unsafe, meaning they had deficiencies that made them susceptible to failure. By 1996, 42 percent of the previously determined unsafe dams were brought up to state safety standards. Today, the percentage of deficient dams among the 41 states report-

ing has decreased to less than five percent.

Meeting Our Goals

Improving Dam Security

Dams are considered a Key Asset under the President's national plan for critical infrastructure protection. Development of a national program to identify the nation's most vulnerable dams and to step up security in and around those dams is essential for national security. ASDSO leaders are playing a key role in developing and implementing the Dams SSP, part of the NIPP that coordinates federal programs aimed at the infrastructure sectors identified by DHS.

ASDSO is working closely with DHS to coordinate support and training for state dam safety regulators—relatively new to the security business—and for dam owners, and to create an information network among security experts and owners. ASDSO recently integrated security training measures within its dam owner workshop program. An annual dam security forum is in the planning stages currently, with support from DHS, to bring together dam security and safety stakeholders. Many ASDSO members are serving on DHS sector councils and contributing to developing guidelines and tools on dam security.

Federal and State Legislative Support

ASDSO members work to strengthen dam safety regulatory laws and increase budgets for dam safety. ASDSO volunteers routinely visit Washington to educate federal lawmakers about the need for a strong

federal leadership role in dam safety. ASDSO members worked hard to ensure the passage of the National Dam Safety and Security Act, passed in 2006. Administered by FEMA, the Act provides assistance grants to state inspection/permitting programs, continuing education resources to engineers, funding for research in dam safety, and a mechanism to coordinate the many federal dam safety programs and the state programs to improve communication and technology transfer.

ASDSO has been assisting Alabama and Delaware in their efforts to establish state dam safety laws. In 2004, Delaware, aided by ASDSO and FEMA, successfully passed legislation to establish its regulatory program.

ASDSO provides support to states at risk of losing funding or regulatory authority. Recently, the State of Michigan, fighting state budget problems, slashed funding for a number of programs, including its dam safety program. This occurred despite the fact that in 2003 Michigan experienced a devastating dam failure, which caused over \$100 million in property damage and the loss of a power plant for several weeks. ASDSO and its partners fought this action, and are urging Michigan lawmakers to revive the state program, as prevention is much less costly—not to mention heart-wrenching—than dealing with the aftermath of a dam failure.

Peer Review Program

Since 1990, ASDSO has performed Peer Reviews—rigorous dam safety

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ASDSO (Cont. from 16)

program performance reviews for state agencies, many of the largest federal dam safety programs, and private sector utility companies. Teams of experts review program policies and publications and meet with program staff in a confidential review of dam safety policies.

Working with Dam Owners

Dam owners come in all shapes and sizes in the United States. From federal agencies that build the “big ones,” such as Hoover Dam and Grand Coulee, to state or local government bodies, which may own and operate smaller water delivery systems or flood control dams, to private owners including utility companies, farmers, or lake associations, U.S. dam owners are a diverse and complex group.

ASDSO works to educate and assist dam owners through tools, workshops, and the Peer Review program.

Training Engineers and Inspectors

One of ASDSO's main goals is to fill the training gap that exists for dam safety engineers. Although many excellent university engineering schools exist in the United States, there is not one comprehensive program that focuses on dam safety engineering as a specialty. Most engineers would only receive on-the-job training to become well-versed in dam safety engineering if not for the National Dam Safety Program's (NDSP) training program, a program that includes seminars taught through ASDSO.

With funding from the NDSP, ASDSO conducts continuing education courses. Personnel from

every state dam safety agency plus hundreds of private sector and federal engineers have been trained through this program over the past 15 years.

ASDSO also collects and posts information about technical training available from other organizations and agencies at its web-based training calendar.

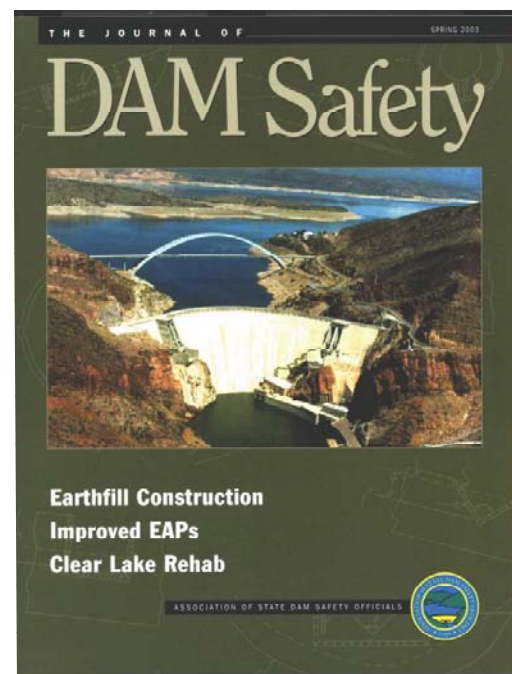
Promoting a National Network

Recent years have seen the formation of strong partnerships of public and private entities. To promote national networking, ASDSO offers regional and national conferences that focus on current issues and transfer of knowledge relating to dam safety.

The next national conference will be held in Indian Wells, California from September 7-11, 2008.

Partnerships can be the key to success when an issue such as dam safety intersects so many interests and concerns. ASDSO maintains communication and leverages support for dam safety by working with other organizations interested in issues related to dam safety, such as:

- Association of State Floodplain Managers
- National Emergency Management Association
- American Society of Civil Engineers, Environment and Water Resources Institute
- Canadian Dam Association
- National Watershed Coalition
- U.S. Society on Dams
- Western State Engineers



ASDSO Journal of Dam Safety

ASDSO also works closely with a number of federal agencies, including:

- U.S. Department of Homeland Security, Federal Emergency Management Agency
- U.S. Department of Homeland Security, Offices of Infrastructure Protection and Intelligence & Analysis
- U.S. Army Corps of Engineers
- Federal Energy Regulatory Commission
- U.S. Department of the Interior, Bureau of Reclamation
- Tennessee Valley Authority
- U.S. Department of Labor, Mine Safety & Health Administration

(Continued on Page 18)

ASDSO (Cont. from 17)

- U.S. Nuclear Regulatory Commission
- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Department of Agriculture, Forest Service
- International Boundary & Water Commission
- U.S. Department of Energy

All of these agencies own dams, regulate dams, or provide technical support for dam safety. They provide a wealth of expertise to dam safety leaders across the country.

The partnership would not be complete without the interest and support coming from the private sector—consulting firms, contractors, suppliers, academia, and others who share the goal of improving dam safety and want to help ASDSO in carrying out its mission. ASDSO maintains close ties with its private sector membership.

Public Outreach

ASDSO spreads the message about the importance of dam safety in several ways:

- By working with the media on issues of local and national interest;
- By making presentations about dam safety to various groups;
- By awarding undergraduate scholarships of up to \$10,000 to students planning a career in dam safety; and
- By providing information via the ASDSO website to students of all ages, as well as the general public.

A Center for Information

ASDSO serves as a clearinghouse for information on dam safety, provides research services, and produces educational publications, periodicals, reports, and statistical analyses.

ASDSO's website posts information for both the dam safety professional and the general public.

ASDSO works closely with a federal program to collect and analyze U.S. dam inventory data and program performance data for all state dam safety programs.

ASDSO distributes a monthly electronic newsletter and a quarterly technical journal to members.

Promoting Research

ASDSO monitors ongoing dam safety research, and has sponsored workshops to assess research needs, in conjunction with the NDSP.

Challenges Ahead

Although much progress has been made in the last 20 years, much remains to be done. Challenges ahead include the following:

- Balancing Dam Security with Safety – Focusing Funds and Programs Accordingly
- Financing for Dam Rehabilitation
- Decreasing Dam Failures
- Increasing Emergency Preparedness and Response



College ASDSO Scholarship Winner

- Improving Public Awareness
- Addressing the Increase in Downstream Development
- Maintaining Strong State Regulatory Programs

For more information:

Association of State Dam Safety Officials

<http://www.damsafety.org>

450 Old Vine St.

Lexington, KY 40507

859-257-5140

The following pages feature graphics depicting numbers and types of dams and dam ownership. ❖

(Continued on Page 19)

ASDSO (Cont. from 18)

Dams in the United States
States regulate the vast majority of U.S. dams . . .

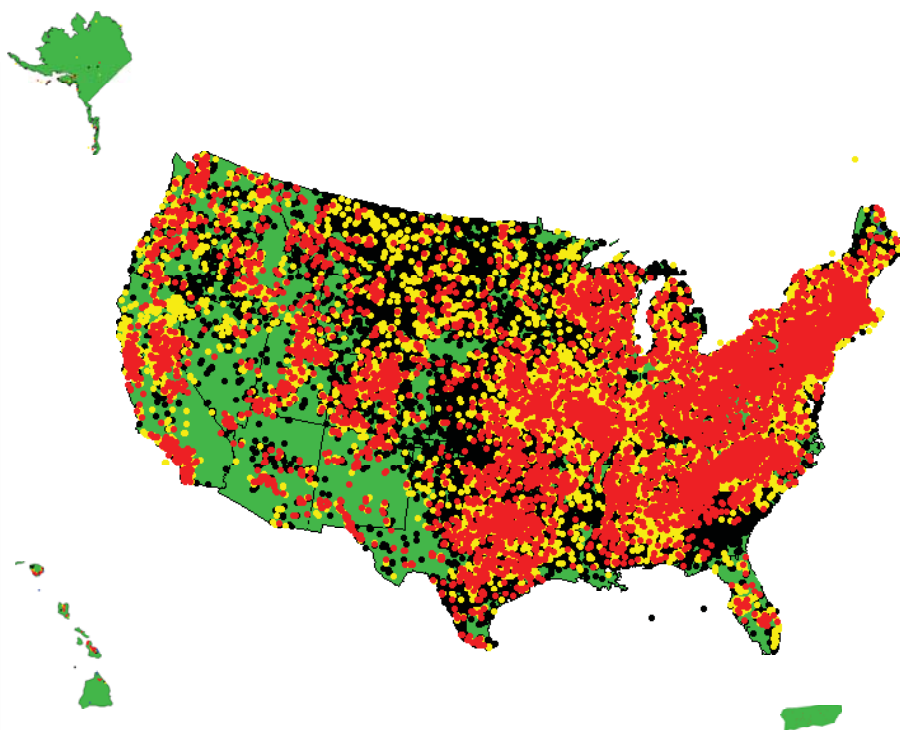
Number of Dams reported to the National Inventory of Dams (NID) (2005).....	82,582
Number of High-Hazard Potential Dams reported to the NID (2005).....	11,881
Number of Dams under State Regulation in 2006:	83,496
Number of High-Hazard Potential State-Regulated Dams:	9,806
Number of Deficient State-Regulated High-Hazard Potential Dams reported in 2006.....	1,308

Red Dots = High-hazard potential dam, typically defined as a dam whose failure or mis-operation will cause loss of human life and significant property destruction.

Yellow Dots = Significant-hazard potential dam, typically defined as a dam whose failure or mis-operation will cause significant property destruction.

Black Dots = Low-hazard potential dam, typically defined as a dam whose failure or mis-operation will cause minimal property destruction.

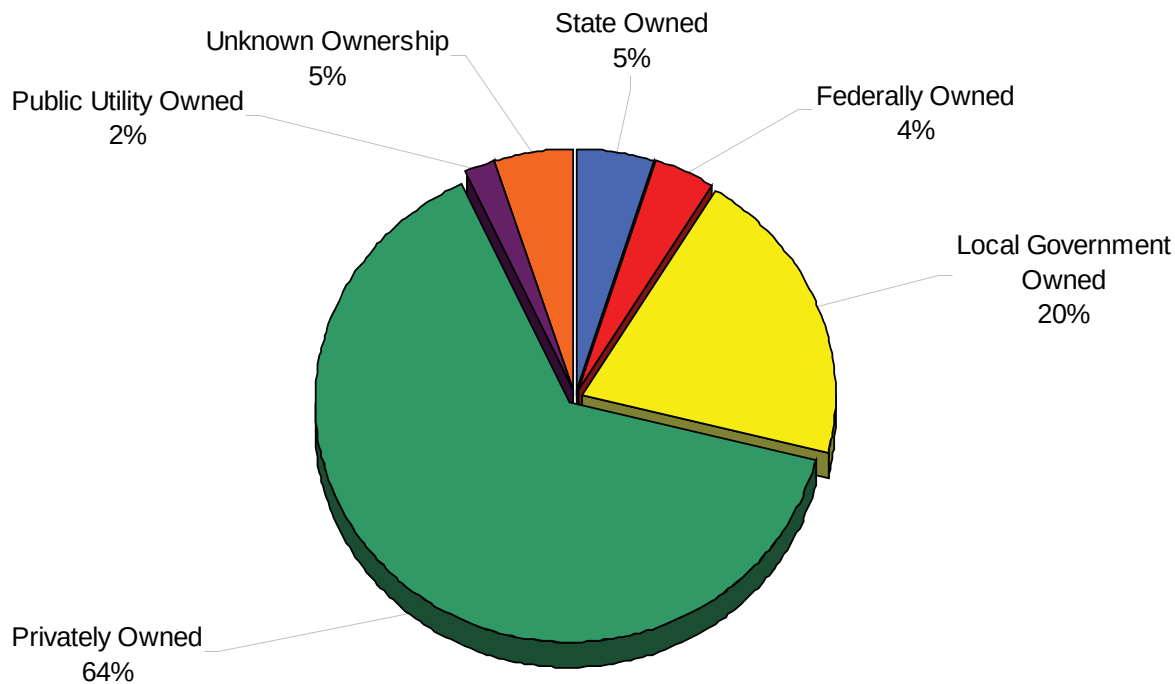
Source: The National Inventory of Dams (NID). NID data is submitted by state and federal dam safety agencies to the NID, administered by the U.S. Army Corps of Engineers Topographic Engineering Center (USACE TEC).



(Continued on Page 20)

ASDSO (Cont. from 19)

Dam Ownership in the United States



The National Inventory of Dams

The NID is administered by the USACE TEC and is updated every other year. It includes both state and federally regulated dams that:

- Are classified as having High or Significant hazard potential; or
- Are classified as having Low Hazard potential but equal or exceed 25 feet in height AND 15 acre-feet storage; or
- Are classified as having Low Hazard potential but equal or exceed 50 acre-feet storage AND 6 feet in height.

State-Regulated Dams

States have the enormous challenge of regulating about 85% of the dams in the United States, leaving a relatively small percentage under federal regulation. State dam safety programs submit biennial statistics on dams that they regulate to the NID. Other state program performance statistics are submitted annually to ASDSO.

Reclamation (Cont. from 11)

determinations of each asset and all proposed security implementations to ensure they are appropriate for the facility, in terms of risk reduction benefit, cost effectiveness, and impact to the facility (e.g., will it impede important O&M functions somehow?). The technical team will also develop a cost estimate, recommended timeframe for mitigation, and implementation priority. Once the team has documented its findings, stakeholder leadership is brought together to make the final decision for implementation or risk acceptance. To the extent possible, all security-related decisions and operations should be tied back into overall facility operations. We strive for decisions that are well thought-out, technically sound, and well documented.

The assessment and two-step decision-making processes allow for all interested parties to have their input into the program regarding their needs and the challenges, impacts, and benefits of proposed security processes or implementations and, therefore, is the key to integrating the security program into the operations of the agency.

The Art of Security

Right-sizing and decision making are oftentimes compared to drawing a line in the sand—where do you *feel* like drawing it? It is based on so many factors and subjectivity is unavoidable. This lack of quantifiable data makes security more of an art than a science. The science: definable processes and measurable metrics. The art: making good decisions based on less than totally definable data or data based on an

ever-changing threat environment.

Nowhere is the art of security more evident than in the decision-making process. Some decisions, such as procedural solutions, are easy; low cost solutions can be accomplished with little to no effort, either monetary or labor. Other decisions require a significant outlay of funds, and returns may not be as readily apparent. However, to protect everything is to protect nothing . . . and to protect nothing is likely unacceptable. So, security managers and corporate leaders must walk the minefield that is good corporate practice. The security program must answer the following questions:

- How much do we know about our vulnerability and consequences (risks)?
- How much do we invest in security and security-related mitigation?
- How do we measure security-related risk reduction?
- How do we make and document the decision?
- What risk is acceptable risk?

Generally, solutions should be the most economical possible without compromising the mission and public safety. Devising and incorporating effective and credible decision-making processes into the risk management framework can aid in prudent decision making with regards to security-related fortification decisions.

While cost is a driving force in any organization, it is not, or should not be, the sole driving force behind security decisions. Instead, effective decisions should be based on some fundamental notions that include:

- 1) Integration with O&M of a facility without compromising the mission;
- 2) Making security decisions that are risk based and thoughtful;
- 3) Incorporation of the needs of the agency in terms of politics, public, etc.; and
- 4) Implementation of actions that can be taken that do not add much expense to the overall security program but that do reduce risk effectively.

(Continued on Page 22)

Additional Challenges Faced by Reclamation

- *Threat* has an indefinable nature, and there is a need to predict relative likelihoods of attack on critical infrastructure
- The nature of *preparedness* requires great collaboration, awareness, and sometimes cost, and can be over-looked in traditional security programs
- Changing political climates, and the indefinable nature of security, are leading to reduced *budgets*
- Balancing the need for confidentiality and the protection of sensitive information with information sharing while *keeping our risks quiet*

The 18th CI/KR Sector

On April 30, 2008, DHS announced the creation of an 18th CI/KR sector, the Critical Manufacturing Sector. The development of this new sector under the NIPP is due to the importance of the manufacturing industry and its cross-sector interdependencies. A [white paper](#) analysis of this event and composition of the new sector is available on our website.

Legal Insights (*Cont. from 12*)

power dams (approximately 2,000) by FERC as part of FERC licensing procedures. These dams follow security guidance and procedures developed by FERC in consultation with industry.

With the advent of CI/KR protection programs established under the Homeland Security Act of 2002 and HSPD-7, dams now are under the integrated risk-based framework of the NIPP with DHS designated as the SSA by HSPD-7. The DSCC and DGCC have developed

an SSP outlining how the NIPP risk management framework will be applied across the Dams Sector. It is worth noting that the DGCC includes several state dam safety officials as well as federal representatives, reflecting the important state role in dam operation and oversight.

In conclusion, the NIPP is an integrated, comprehensive risk-based framework for protecting critical infrastructure. To effectively implement the NIPP framework,

all players in the Dams Sector must integrate state-based dam safety regulation, monitoring and inspection activities with the post-9/11 emphasis on security. Much of the Sector's expertise on risk assessment, mitigation and response can be leveraged to deal with security vulnerabilities. However, increasing investments in security could be complicated by future needs to renew and repair the Nation's aging dams and levees and by the continued decline in funding for state dam safety programs. ♦

Reclamation (*Cont. from 21*)

Conclusion

If you are operating and maintaining a facility that is considered to be a critical infrastructure then you need to have a structured security

program in place. Regardless of the actual size of your program, the framework and strategies used by Reclamation can benefit any hydro operator. Security programs where decisions are based on an under-

standing of risk and risk management will be the ones that stand the strongest in the currents of politics and time. ♦

The CIP Program works in conjunction with James Madison University and seeks to fully integrate the disciplines of law, policy, and technology for enhancing the security of cyber-networks, physical systems, and economic processes supporting the Nation's critical infrastructure. The CIP Program is funded by a grant from The National Institute of Standards and Technology (NIST).

The CIP Report is published by Zeichner Risk Analytics, LLC (ZRA) on behalf of the CIP Program. ZRA is the leading provider of risk and security governance knowledge for senior business and government professionals. ZRA's vision is to be a consistent and reliable source of strategic and operational intelligence to support core business processes, functions, and assurance goals.

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