PPW Report 2003-2

PARTNERSHIP FOR PUBLIC WARNING

ACCESSING AND ORIGINATING WARNINGS FROM CONSEQUENCE MANAGEMENT TOOLS

Partnership for Public Warning

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The Partnership for Public Warning

The Partnership for Public Warning (PPW) is a unique partnership between the private sector, not-for-profit community, academia and government entities at the local, state and Federal level established to improve America's public warning capabilities. PPW was incorporated in January 2002 as a 501(c)3 not-for-profit institute.

PPW's Vision – Every person will have the information needed in an emergency to save lives, prevent injury, mitigate property loss, and minimize the time needed to return to a normal life.

PPW's Mission - To save the lives and property of people at risk from natural disasters, accidents and terrorism by ensuring that they have access to timely and accurate alert and warning information. PPW will accomplish this mission by providing an objective, consensus-based forum in which all interested stakeholders – both public and private -- work together to develop processes, standards, systems and strategies to ensure that the right people have the right information at the right time.

Membership in PPW is open to any organization and individual that shares our goals. For additional information on PPW, visit the web site at www.PartnershipforPublicWarning.org or contact PPW at:

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Accessing and Originating Warnings from Consequence Management Tools

Introduction

The purpose of this document is to explore issues involved in making warning information available as a resource to improve overall emergency management and to help emergency managers generate timely and authoritative public warnings.

Public safety officials need immediate access to all warning information available for their jurisdiction and sometimes are the source of warnings to be issued to the public. Warnings may alert of imminent hazard or may notify of what is happening as disasters unfold. Emergency managers, police, fire, EMS, and public health dispatch centers are increasingly using computer-based consequence management tools to make critical information available in an organized and timely manner and to make critical decisions about the best use of limited resources. The purpose of this document is to explore many of the issues involved in making warning information available to such tools and in using such tools to generate authoritative public warnings.

Currently, public warnings, whether delivered by the Emergency Alert System (EAS), NOAA Weather Radio (NWR), or a plethora of local specialized systems, do not reach enough people directly at risk and may unduly disturb and alarm many more people who are not directly at risk. These issues are described in detail in two reports released by the Partnership for Public Warning:

1. Developing A Unified All-Hazard Public Warning System: A Report by the Workshop on Effective Hazard Warnings, Emmitsburg, Maryland, November 25, 2002, PPW Report 2002-02.
2. A National Strategy for Integrated Public Warning Policy and Capability, Partnership for Public Warning, February 2003, PPW Report 2003-01.

Both documents are available with other documents addressing this issue at www.PartnershipForPublicWarning.org.

Based on these reports and other analyses of available information, the Board of Trustees of the Partnership for Public Warning has identified three initiatives that could have a significant impact on improving all types of public warning in the near future. These initiatives deal with the problem of collecting warnings from thousands of authorized sources and providing them in standard terminology and protocol as input to all systems that can deliver the warnings to people at risk in a timely manner:

1. Develop a standard, all-hazard terminology for expressing risk and what to do about it.
2. Develop standard protocols for packaging warning messages into interoperable formats appropriate for input to the wide range of dissemination systems.
3. Develop ways to collect authorized warnings from all sources and deliver them for input to all types of dissemination systems.

In other words, the central critical problem in public warning today is the lack of a single, uniform stream of official warning information connecting those with information to those who can take action to save lives and reduce losses based on that information. There are numerous

technologies to deliver warnings "the last mile" to people at risk no matter where they are or what they are doing. New technologies are being introduced regularly. The effectiveness of all of these technologies is severely limited by the lack of an official stream of warning information. Consequence management tools rely on the availability of such a stream of information and could be used very effectively to add official information to such a stream.

I. Available Warning Information

The fundamental responsibility for public safety resides with county, municipal, and tribal government. Local government is responsible for providing alerts of imminent danger and notifications of accidents and ongoing hazards. Many parts of local government are potential sources of warning information including police, fire, transportation, public health and emergency management. Warning information would typically be centralized through operations centers for police and fire dispatch, emergency operation centers, 911 call centers, and security centers for critical facilities. The personnel and procedures for taking available information and issuing warnings vary widely and their sophistication also vary widely. For some it is totally ad-hoc, depending heavily on who is at work and how much experience and personal contacts this person has. Other communities have very sophisticated centers with well-established procedures, training, and technology. There are 3,066 counties and more than 10,000 localities in the US. Reliably collecting warning information for all such communities even in a small region is extremely difficult. Disasters often affect multiple localities, further complicating the flow of information. It is also very difficult for those with such information to reliably provide it as input to all available systems for dissemination to the public when time is of the essence.

Local emergency managers and incident commanders have primary responsibility for issuing the part of the warning that advises people at risk what to do. Through prior discussions and agreements, such information may be agreed on and issued by those who have the technical information about the hazard. The ability to input such information to EAS, NWR, and other warning systems varies widely across the US. Methods include:

a. Calling or sending a fax to a National Weather Service (NWS) Office requesting release of the warning.
b. Calling or sending a fax to a broadcast station requesting EAS activation.
c. A few emergency managers and law enforcement agencies have equipment that they can use to encode and send an EAS advisory, alert, or warning.
d. In one pilot area, emergency managers can encode the warning and issue it directly to NWR transmitters.

One example of a state effort to combine and compile warning information and to push it to officials and dissemination systems is the California Emergency Digital Information Service (EDIS, edis.ca.gov). EDIS collects warnings from the National Weather Service, California Department of Transportation, the California Highway Patrol, the Governor's Office of Emergency Services, local law enforcement through the Justice Data Interface Controller (JDIC), and from Operational Area inputs. EDIS also collects earthquake information from the US Geological Survey. Some people think of EDIS as a government to government and government

to media wire service. EDIS in fact was originally designed around the standardized wire service protocol as published by the American Newspaper Association (ANPA). EDIS makes warnings available via satellite to 30 major media centers, by packet radio broadcasts to many other newsrooms and other users in major metropolitan areas, to county emergency operations centers, and to a state provided EDIS web page.

Many states have central communication systems among emergency operations centers for sharing of warning information among officials and for input of key information to the Emergency Alert System (EAS), NOAA Weather Radio, and other systems. Every state has been required for many years to have an emergency communication plan for use of EAS, but eleven still do not have them. In many states, official warnings can only originate from state sources. Event codes used for EAS and NWR are listed in Appendix 1.

The National Warning System (NAWAS) is the primary national system for emergency communications among Federal, state, and local emergency operations centers. This party-line telephone system with 1660 handsets is the official warning system by which the North American Aerospace Defense Command (NORAD), through the FEMA Operation Centers, delivers warnings related to accidental or intentional launch of missiles toward the US. NAWAS is the primary way that national warning information is delivered to states and the primary way states both relay warning information to the counties and by which the counties provide warning information to the states.

There are numerous sources for technical information for warnings:

a) Most public warnings issued to date relate to extreme weather and related flooding. The National Weather Service has done an excellent job developing weather warning information, collecting it together from weather offices across the country, and making it available to industry, emergency managers, and the public by many means described in Appendix 2. Thus several streams of weather warning information with differing levels of detail are readily available.

b) The United States Geological Survey provides earthquake information in a variety of different ways described in Appendix 3. While alerts before an earthquake are rarely available, information about the location and size of earthquakes that have happened is now available within seconds and online maps of anticipated shaking and damage are available in some regions within minutes. Such automatic location allows speed-of-light communication to more distant locations seconds to tens of seconds before the slower-moving seismic waves arrive. Such capability is beginning to be implemented in some areas.

c) The United States Geological Survey provides warnings related to volcanic activity as described in Appendix 4. This information is customized by each volcanic observatory and is not currently available in a standardized stream.

d) The United States Geological Survey provides warnings related to landslides (landslides.usgs.gov), surface-water and ground-water quality (water.usgs.gov/owq), shoreline erosion, and wildlife diseases, but these programs are under development and are not fully operational.

e) The Department of Homeland Security (DHS) issues changes in the Homeland Security Advisory System (HSAS) "levels": Severe (red), High (orange), Elevated (yellow), Guarded (blue), and Low (green). Changes are typically announced in a press conference or press release. Recently, DHS initiated a pilot mechanism targeted for websites that communicate the current HSAS level. This mechanism is not adequate as part of a broad public warning capability, as it neglects contextual information such as who issued the alert, when the alert was issued, what kind of alert it is, etc. DMIS could fix this HSAS alert mechanism by relaying the message in the format given in the proposed standard Common Alerting Protocol, for instance. Another issue of concern is that HSAS collapses onto a single color scale three distinct aspects of warning: severity, urgency and certainty. This confusion of separate aspects makes it hard for people to interpret the HSAS level in actionable terms. DMIS could work with the public warning community on a consensus solution--perhaps asserting that the severity aspect is always "Severe" and the urgency aspect is always "Forecast", so that the five HSAS colors become simply a scale for the certainty aspect. DHS has responsibility for various other types of public warnings as well, and DMIS should become actively involved in these wherever possible.

f) Broadcast alerts to find missing children (commonly referred to as AMBER alerts) have received increasing attention across the country. AMBER enhancements range from changeable messages on highway advisory signs to printouts on state lottery machines. There are now 84 AMBER programs (34 statewide) that follow guidelines from the National Center For Missing and Exploited Children (NCMEC, www.ncmec.org) (Appendix 5). AMBER EAS origination requests come from local law enforcement that takes police reports at the scene and apply AMBER criteria. There is now no one national clearing house, agency or entity who can provide all Amber information in a timely and reliable manner. Many states and localities are still devising legislation and coming up with standards and standard collection methods for AMBER warnings for input to warning dissemination systems that include the EAS.

g) The National Atmospheric Release Advisory Center (NARAC) (narac.llnl.gov) provides advanced tools and services that map the probably spread of hazardous materials released accidentally or intentionally in the atmosphere using the most accurate weather, topographic, and other related information available.

h) Critical nuclear (Appendix 6) and chemical facilities (Appendix 7 and 8) typically have sophisticated community-warning systems as a requirement for their license to operate. Information must be collected from each facility and their community-warning systems rarely have access to warnings for other hazards.

i) The Environmental Protection Agency (EPA) releases warnings through its regions on air and water quality.

j) The Department of State (DOS) may issue travel advisories typically through public statements and media releases. In situations where time is of the essence, no procedures exist to make such information rapidly available to people at risk.

There are also many aggregators of warning information:

a) The National Response System (NRS) is the official government clearinghouse for information on release of oil and chemicals into navigable waters of the United States and its territories (www.nrc.uscg.mil). People with information are supposed to call the NRS and the NRS then notifies appropriate government agencies and their response teams.

b) The Centers for Disease Control (CDC) operates the Health Alert Network (HAN) to collect and issue information about health threats and bio-terrorism (www.bt.cdc.gov/documentsapp/HAN/han.asp).

c) The National Infrastructure Protection Center (NIPC) is the Federal government's focal point for threat assessment, warning, investigation, and response for threats or attacks against our critical infrastructures.

d) Infraguard is a cooperative undertaking between the U.S. Government (led by the FBI) and an association of businesses, academic institutions, state and local law enforcement agencies, and other participants dedicated to increasing the security of United States critical infrastructures through information sharing (www.infraguard.net).

e) The Department of Transportation (DOT) and state Transportation Operations Centers collect information on traffic accidents and hazardous material spills.

f) Numerous private companies aggregate emergency information and make it available to the media and others Examples include media-alert.com and mediapage.com.

II. Issues Related to Collecting Warning Information

The fundamental issue is the problem of collecting warning information from so many widely dispersed sources for availability to consequence managers, for input to consequence management tools, and for dissemination to the public at risk. Warnings do not exist in a common format. Warning systems are not interoperable. Sophisticated warning systems built, for example, around nuclear facilities, rarely include all-hazard inputs. Different systems have been built for different purposes and with different sources of funding. While many of these are excellent systems, their effectiveness is limited because they cannot leverage the effectiveness of related but different systems. This patchwork quilt of disparate warning systems and procedures has very diverse quality control, security, and accuracy. Without interoperable protocols, the integration of inputs from and to these systems is very difficult and unduly complex.

A primary reason for the current disparate state of warning information is that the value proposition of combined warning capability has not been endorsed or made clear by any national body. While the value and indeed necessity of interoperability has become clear in most technological areas, bringing interoperability to warning has been too big an effort for any one

group. Unfortunately implementers of consequence management software must face this challenge directly and do the best they can to meet the needs of their customers.

There is an ongoing effort to develop a Common Alerting Protocol (CAP, incident.com/CAP) that is encouraged by PPW and the EM-XML Consortium, and is now formally part of the OASIS process (www.oasis-open.org).

III. Issues Related to Issuing Warning Information

The primary issue related to issuing warning information is that decisions to warn and how to warn are usually done in an urgent environment by people who recognize that inappropriate action by them could lead to loss of life and property. This means that the system used to issue warnings must:

a) Be intuitively obvious and easy to use
b) Utilize standard forms and procedures worked out in quieter times
c) Be exercised regularly and trained on regularly
d) Assemble all key information to allow informed decisions
e) Be backed by standards of professional practice
f) Provide for only authorized input 24/7
g) Be robust enough to operate during major crises.

Another issue is the difficulty of aggregating warning information and release among neighboring communities and in regions of varying sizes. Disasters do not respect political boundaries and often affect several jurisdictions. There needs to be open and effective communication channels among jurisdictions to share information and often share warning responsibility.

A third issue is the need to release warning information either before or simultaneous with public release to a complex network of government, industry, and other officials. The sample forms and diagrams in Appendix 9 show such considerations just for one oil refinery. Lists of specific officials need to be worked out in detail in advance and then regularly maintained so that notification can be done automatically with “the push of a button”.

The key issue relative to issuing warnings is the need for close regional and state coordination. In many states, few people are authorized to issue warnings. This within the consequence management tool there needs to be the ability to pass the warning information in a timely manner to an authorized specialist with extra information required by the specialist.

Appendix 1: EAS Event Codes

Event codes used in Emergency Alert System messages. New means added in 2002.

National Codes (Required):

Emergency Action Notification	EAN	(National only)
Emergency Action Termination	EAT	(National only)
National Information Center	NIC	
National Periodic Test	NPT	
Required Monthly Test	RMT	
Required Weekly Test	RWT	

State and Local Codes (Optional):

Administrative Message	ADR	
Avalanche Warning	AVW	new
Avalanche Watch	AVA	new
Blizzard Warning	BZW	
Child Abduction Emergency	CAE	new
Civil Danger Warning	CDW	new
Civil Emergency Message	CEM	
Coastal Flood Warning	CFW	new
Coastal Flood Watch	CFA	new
Dust Storm Warning	DSW	new
Earthquake Warning	EQW	new
Evacuation Immediate	EVI	
Fire Warning	FRW	new
Flash Flood Warning	FFW	
Flash Flood Watch	FFA	
Flash Flood Statement	FFS	
Flood Warning	FLW	
Flood Watch	FLA	
Flood Statement	FLS	
Hazardous Materials Warning	HMW	new
High Wind Warning	HWW	
High Wind Watch	HWA	
Hurricane Warning	HUW	
Hurricane Watch	HUA	
Hurricane Statement	HLS	
Law Enforcement Warning	LEW	new
Local Area Emergency	LAE	new
Network Message Notification	NMN	new
911 Telephone Outage Emergency	TOE	new
Nuclear Power Plant Warning	NUW	new
Practice/Demo Warning	DMO	
Radiological Hazard Warning	RHW	new
Severe Thunderstorm Warning	SVR	
Severe Thunderstorm Watch	SVA	

Severe Weather Statement	SVS	
Shelter in Place Warning	SPW	new
Special Marine Warning	SMW	new
Special Weather Statement	SPS	
Tornado Warning	TOR	
Tornado Watch	TOA	
Tropical Storm Warning	TRW	new
Tropical Storm Watch	TRA	new
Tsunami Warning	TSW	
Tsunami Watch	TSA	
Volcano Warning	VOW	new
Winter Storm Warning	WSW	
Winter Storm Watch	WSA	

Washington, DC codes

Closed Circuit Test	CCT
Fog Warning	FOW
Gas Leak Emergency	GLE
Icy Road Warning	IRW
Industrial Plant Emergency	IPE
Law Enforcement Emergency	LEE
Local Area Advisory	LAA
Local Area Emergency	LAE
Special Marine Warning	SMW
Military Emergency	MLE
Nuclear Power Plant Emergency	NPE
Nuclear Power Plant Test	NUT
Radiological Emergency	RDE
Railroad Emergency	RRE
School Closing Emergency	SCE
Shelter In Place Advisory	SIP
State Advisory	STA
State Emergency	STE
Toxic Spill Emergency	TSE
Volcanic Ash Warning	VAW

Appendix 2: Warning Information Issued by the National Weather Service
Dissemination Services (http://www.nws.noaa.gov/om/disemsys.shtml):

NOAA Weather Radio (NWR) / Selective Area Message Encoding (SAME)
NOAA Weather Wire Service (NWWS)
Emergency Managers Weather Information Network (EMWIN)
NWS Website http://www.weather.gov
Interactive Weather Information Network (IWIN) http://iwin.nws.noaa.gov
NOAAPORT
Family of Services (FOS)
- •Public Product Service (PPS)
- •Domestic Data Service (DDS)
- •International Data Service (IDS)
- •High Resolution Data Service (HDS)
- •Server Access Service (SAS)
- •Radar Products Service (RPS)

Emergency Alert System (EAS) http://www.nws.noaa.gov/om/NWS_EAS.htm
Gateway File Services ftp://tgftp.nws.noaa.gov/data

Types of watch, warning, and advisory statements issued by the National Weather Service

Weather-Related Emergency Messages

Items with a * will be encoded using Valid Time Event Code (http://www.nws.noaa.gov/om/vtec/) beginning late Fall 2003

Tropical
- Hurricane Warning
- Typhoon Warning
- Tropical Storm Warning
- Hurricane Force Wind Warning
- Hurricane Watch
- Typhoon Watch
- Tropical Storm Watch
- Hurricane Statement
- Typhoon Statement

Severe Local Storms
- Tornado Warning*
- Severe Thunderstorm Warning*
- Tornado Watch
- Severe Thunderstorm Watch*
- Severe Weather Statement
- County Watch Notification*

Hydrology
- Flash Flood Warning*
- Flood Warning*
- Flash Flood Watch
- Flood Watch*
- Urban And Small Stream Flood Advisory
- Urban And Small Stream Advisory
- Urban And Small Stream Flood Advisory
- Urban Small Stream Advisory
- Small Stream Flood Advisory
- Small Stream Advisory

Flash Flood Statement*
Flood Statement*
Flood Potential Outlook*

Winter Weather Events
Blizzard Warning
Winter Storm Warning*
Ice Storm Warning
Heavy Sleet Warning
Lake Effect Snow Warning
Avalanche Warning
Freeze Warning
Wind Chill Warning
Freezing Fog Warning
Heavy Snow Warning
Frost Warning
Blizzard Watch
Winter Storm Watch*
Freeze Watch
Wind Chill Watch
Sleet Advisory
Lake Effect Snow Watch
Winter Weather Advisory*
Snow Advisory
Blowing Snow Advisory
Snow And Blowing Snow Advisory
Lake Effect Snow Advisory
Freezing Drizzle Advisory
Freezing Rain Advisory
Wind Chill Advisory
Freezing Fog Advisory
Frost Advisory
Winter Weather Statement

Coastal / Marine Events
Storm Warning
Gale Warning
Heavy Surf Warning
Special Marine Warning*
Coastal Flood Warning*
Lakeshore Flood Warning*
Coastal Flood Watch*
Lakeshore Flood Watch*
Lake Wind Advisory
Small Craft Advisory
High Surf Advisory
Marine Weather Statement*
Coastal Flood Statement*

Lakeshore Flood Statement*

Fire Weather
Red Flag Warning*
Fire Weather Watch*
Fire Danger Statement*

Dust Storm Warning

Excessive Heat Warning
Excessive Heat Watch
Heat Advisory

Ashfall Advisory
Dense Fog Advisory
Dense Smoke Advisory
Blowing Dust Advisory
Air Stagnation Advisory
Non-Precipitation Statement

High Wind Warning
High Wind Watch
Wind Advisory

Special Weather Statement

Short Term Forecast

Hazardous Weather Outlook

Non-Weather-Related Emergency Messages

Civil Emergency Message (CEM)

NWS Forecast Offices will issue CEMs to *relay* time critical, life or property saving, non-weather-related official emergency information at the request of federal, state or local officials.

Examples of civil emergencies include but are not limited to:

- Natural (earthquakes, forest/wild fires and volcanic activity)
- Technological Accidents (chemical, oil spill, nuclear incidents, aircraft, maritime, train)
- AMBER (child abductions) Alerts
- Law Enforcement Agencies (prison breaks, hostage situations)
- National Emergencies (terrorist attack, missile launch, weapons of mass destruction, etc.)

CEMs are relayed to the public, media, emergency management and private vendors via a wide array of NWS dissemination systems which include NOAA Weather Radio (NWR), NOAA Weather Wire Service (NWWS), Emergency Managers Weather Information Network (EMWIN), Interactive Weather Information Network (IWIN), NOAAPORT, Family of Services (FOS), NWS Websites and the Gateway File Services. CEMs are also relayed to the Emergency Alert System (EAS) via NWR Specific Area Message Encoding (SAME) technology.

Other Non-Weather-Related Emergency Messages Planned by Late 2003

Avalanche Watch (AVA)
Avalanche Warning (AVW)
Child Abduction Emergency (CAE)
Civil Danger Warning (CDW)
Earthquake Warning (EQW)
Fire Warning (FRW)
Hazardous Materials Warning (HMW)
Law Enforcement Warning (LEW)
Local Area Emergency (LAE)
911 Telephone Outage Emergency (TOE)
Nuclear Power Plant Warning (NUW)
Radiological Hazard Warning (RHW)
Shelter in Place Warning (SPW)
Volcano Warning (VOW)

Appendix 3: Earthquake Warning Information

Type of Warning: Centralized Source for Earthquake Notification and Information
Region Covered: Global
Address: http://earthquake.usgs.gov
Format: Web pages including maps, lists, and text descriptions of activity, also include links as appropriate to maps of estimated shaking and warnings of future events. Links to pages about topical events including significant earthquakes and earthquake warnings. All of the information listed below can be reached from this site. The other pages are listed to highlight specific resources that may be of interest to particular regions or interests but also provide links to significant events in other regions.

Type of Warning: Earthquake Notification
Region Covered: USA
Address: ftp://clover.wr.usgs.gov/pub/QDDS/QDDS.html (program to receive data)
Address: ftp://clover.wr.usgs.gov/pub/QDM/QDM.html (program to manage catalog of data)
Format: Java programs that provide direct access to earthquake notification information by maintaining a current catalog of earthquake information on your machine. Also receives notices of additional information about events. This could be used to pull information about warnings of aftershocks and maps of estimated shaking (see below).

Type of Warning: Maps of Estimated Shaking ("ShakeMap") via web
Region Covered: Southern California
Address: http://pasadena.wr.usgs.gov/latest/shakingmaps.html
Region Covered: Northern California
Address: http://quake.wr.usgs.gov/research/strongmotion/effects/shake/
Region Covered: Pacific Northwest
Address: http://www.ess.washington.edu/shake/
Region Covered: Utah
Address: http://www.seis.utah.edu/shake/
Format: web pages and GIS layers of shaking levels rapidly estimated from recordings during earthquakes.

Type of Warning: Maps of Estimated Shaking ("ShakeMap") Pushed to User Via Ftp
Region Covered: Southern California
Contact: David Wald, wald@usgs.gov
Region Covered: Northern California
Contact: Howard Bundock, bundock@usgs.gov
Note: maps can be pushed in many formats including GIS layers, but requires access for the USGS to ftp files into your facility including through any firewalls. A more robust method that frequently polls the USGS servers for new estimates of shaking is under development.

Type of Warning: Warnings of Future Activity Based on Earthquake Clustering
Region Covered: Northern California
Address: http://quake.usgs.gov
Region Covered: Southern California

Address: http://pasadena.wr.usgs.gov
Format: Links to pages about topical events including significant earthquakes and earthquake warnings.

Type of Warning: Earthquake Notification Via Email
Region Covered: Global
Address: http://neic.usgs.gov/neis/data_services/data_services.html
Region Covered: Southern California (also includes email about estimated shaking)
Address: http://pasadena.wr.usgs.gov/latest/mailing_lists.html
Region Covered: Northern California
Address: http://quake.wr.usgs.gov/recent/eqlist.html
Format: subscription to email lists

Type of Warning: Earthquake Notification via Web
Region Covered: Global
Address: http://earthquake.usgs.gov/activity/world.html
Region Covered: USA
Address: http://earthquake.usgs.gov/recenteqsUS/
Region Covered: California and Nevada
Address: http://quake.usgs.gov/recenteqs/latest.htm
Region Covered: Pacific Northwest
Address: http://www/geophys.washington.edu/recenteqs/
Region Covered: Intermountain West
Address: http://www.seis.utah.edu/recenteqs/
Region Covered: Central US
Address: http://folkworm.ceri.memphis.edu/recenteqs
Format: web pages including maps, lists, and text descriptions of activity, also include links as appropriate to maps of estimated shaking and warnings of future events

Appendix 4: Volcano Warning Information

Type of Warning: Information on current eruptions
Region Covered: USA and Russia, sometimes other countries
Address: Type of Warning: Warnings of Future Activity Based on Earthquake Clustering
Region Covered: Northern California
Address: http://volcanoes.usgs.gov/
Format: Links to pages about topical eruptions and the volcano observatories listed below.

Type of Warning: Information on current eruptions and eruption likelihood
Region Covered: Alaska
Address: http://www.avo.alaska.edu/
Format: Web pages

Type of Warning: Information on current eruptions and eruption likelihood
Region Covered: Pacific Northwest
Address: http://vulcan.wr.usgs.gov
Format: Web pages

Type of Warning: Information on current eruptions and eruption likelihood
Region Covered: Hawaii
Address: http://hvo.wr.usgs.gov
Format: Web pages

Type of Warning: Information on current eruptions and eruption likelihood
Region Covered: Mammoth Lakes area, California
Address: http://lvo.wr.usgs.gov
Format: Web pages

Appendix 5: AMBER Warning Information

There are now 84 AMBER programs across the country set up along the guidelines of the National Center For Missing and Exploited Children (NCMEC, www.ncmec.org). Of these, 34 are statewide. There are now two programs in Canada in the provinces of Ontario and Alberta, and one in Sussex, England. A total of 45 children have been recovered with credit given to AMBER over the past seven years.

The NCMEC tightly defines an AMBER program as one that alerts the public to qualified child abductions by using the EAS. States and the media have confused the issue with illuminated road information signs and other alerting methods, but the NCMEC considers all of these to be variations or enhancements of the core AMBER program as it ties into the EAS.

Nationwide there is now no one clearing house, agency or entity that can provide all Amber information in a timely and reliable manner. This statement holds as well for overall local/state emergency public information. Several for and not for profit agencies have tried or are trying to do one or more pieces of the AMBER puzzle, but have not succeeded for a variety of reasons.

Appendix 6: Warning Information for Nuclear Facilities

There are only a little more than 100 commercial nuclear facilities (see http://www.nrc.gov/reactors/operating/map-power-reactors.html and http://www.nrc.gov/reactors/operating/list-power-reactor-units.html) These plants are required to provide information for warning and other information according to the U.S. Nuclear Regulatory Commission. For information visit: http://www.nrc.gov and for a sample of incidental reports visit http://www.nrc.gov/reading-rm/doc-collections/event-status/event/en.html. Immediate notification requirements for operating nuclear power reactors are provided in http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0072-9-03-1998.html

The plants are required to have an Emergency Notification System as follows:

> A licensee shall have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The licensee shall demonstrate that the State/local officials have the capability to make a public notification decision promptly on being informed by the licensee of an emergency condition. By February 1, 1982, each nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway EPZ. The four-month period in 10 CFR 50.54(s)(2) for the correction of emergency plan deficiencies shall not apply to the initial installation of this public notification system that is required by February 1, 1982. The four-month period will apply to correction of deficiencies identified during the initial installation and testing of the prompt public notification systems as well as those deficiencies discovered thereafter. The design objective of the prompt public notification system shall be to have the capability to essentially complete the initial notification of the public within the plume exposure pathway EPZ within about 15 minutes. The use of this notification capability will range from immediate notification of the public (within 15 minutes of the time that State and local officials are notified that a situation exists requiring urgent action) to the more likely events where there is substantial time available for the State and local governmental officials to make a judgment whether or not to activate the public notification system. Where there is a decision to activate the notification system, the State and local officials will determine whether to activate the entire notification system simultaneously or in a graduated or staged manner. The responsibility for activating such a public notification system shall remain with the appropriate governmental authorities. (Extract from http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-appe.html)

Appendix 7: Chemical Stockpile Emergency Preparedness Program Facilities

These eight Chemical Stockpile Emergency Preparedness Program (CSEPP) facilities (www.csepp.net/links/main.htm) have warning systems in place (See example for example in Pueblo, Colorado at www.dem.co.pueblo.co.us/CSEPP/ows.html**).** The CSEPP alert and notification system consists of a network of outdoor warning devices (generally voice capable sirens) covering populated areas of the Immediate Response Zones, which are used in conjunction with indoor devices in residential dwellings and special facilities. Approximately 500 sirens, most with voice capability, have been installed and are operational within the CSEPP counties.

Three types of indoor receivers are approved for use in CSEPP: specially designed Tone Alert Radios, National Oceanic and Atmospheric Administration weather radios, and Emergency Alert System-capable receivers. Nearly 35,000 such receivers have been installed CSEPP-wide.

Appendix 8: Other Chemical Facilities

These facilities are governed mostly by EPA rules and they are required to provide specific information when they release hazardous substance into the environment.
A list of the plants (around 15,000) was available on the EPA web site but was removed after 9/11. (See yosemite.epa.gov/oswer/ceppoweb.nsf/content/index.html and www.osha-slc.gov/SLTC/processsafetymanagement/index.html.

In principle, facilities must immediately notify the Local Emergency Planning Committees (LEPC) and the State Emergency Planning Committees (SERC) likely to be affected if there is a release into the environment of a hazardous substance that exceeds the reportable quantity for that substance. In addition, they are required to provide a follow-up emergency notice as soon as practicable after the release.

Appendix 9: Sample Forms For Notification of Officials

The notification must be done to a variety of Federal, State, County and City governmental organizations, some only for specific types of incidents. Here is an example from an oil refinery during a liquid release where an incident manager can navigate to find who needs to be notified in a specific incident, and this information is included to this document (Note: this document is more than three years old and not updated).

CWS CIRCLE ONE						
LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	OTHER CRITERIA	**INCIDENT COMMANDER** **Initial Notification Log** **XXX REFINERY** **Name:** _____ **Incident** : _____ **IIS #** _____**Date**: _____ **Time:**_____ Time Under Control:_____ All Clear:_____ Whistle Sounded? ☐ Yes ☐ No ☐ Notifications only ☐ 1st Responders ☐ EOC Mgmt. Call-out ☐ PMAO ☐ SMT Weather conditions: (sun, rain, fog, etc.) _____ Wind direction (from, in degrees): _____ Wind speed (mph): ____	Note whether the agency asked for a follow-up call: **YES/NO**
Call 911 to activate emergency assistance for all Level 3 incidents, building fires, need for law enforcement, etc.						
X CWS	X CWS	X CWS	X CWSP B CAN Zones		**COMMUNITY WARNING SYSTEM ACTIVATION** **Contra Costa County Health Services Department (CCCHSD)** Time CWS terminal sequence or Push Button: _____ Numeric Pager: **(925) xxx-xxxx** Time callback received:_____ Person contacted: _____	
Call these agencies for designated levels after the CWS sequence is sent until further notice:						
	X CWS	X CWS	X CWS		**CCC Fire Protection District** **(925) 930-5531** Time of call:_____ Person contacted: _____	
	X CWS	X CWS	X CWS		**Contra Costa County Office of Emergency Services (OES)** **(925) 228-5000** Time of call:_____ Person contacted: _____	
X	X	X	X		**Bay Area Air Quality Management District (BAAQMD)** **(800) 334-6367** Time of call:_____ Person contacted: _____	
X	X	X	X		Refinery specific	

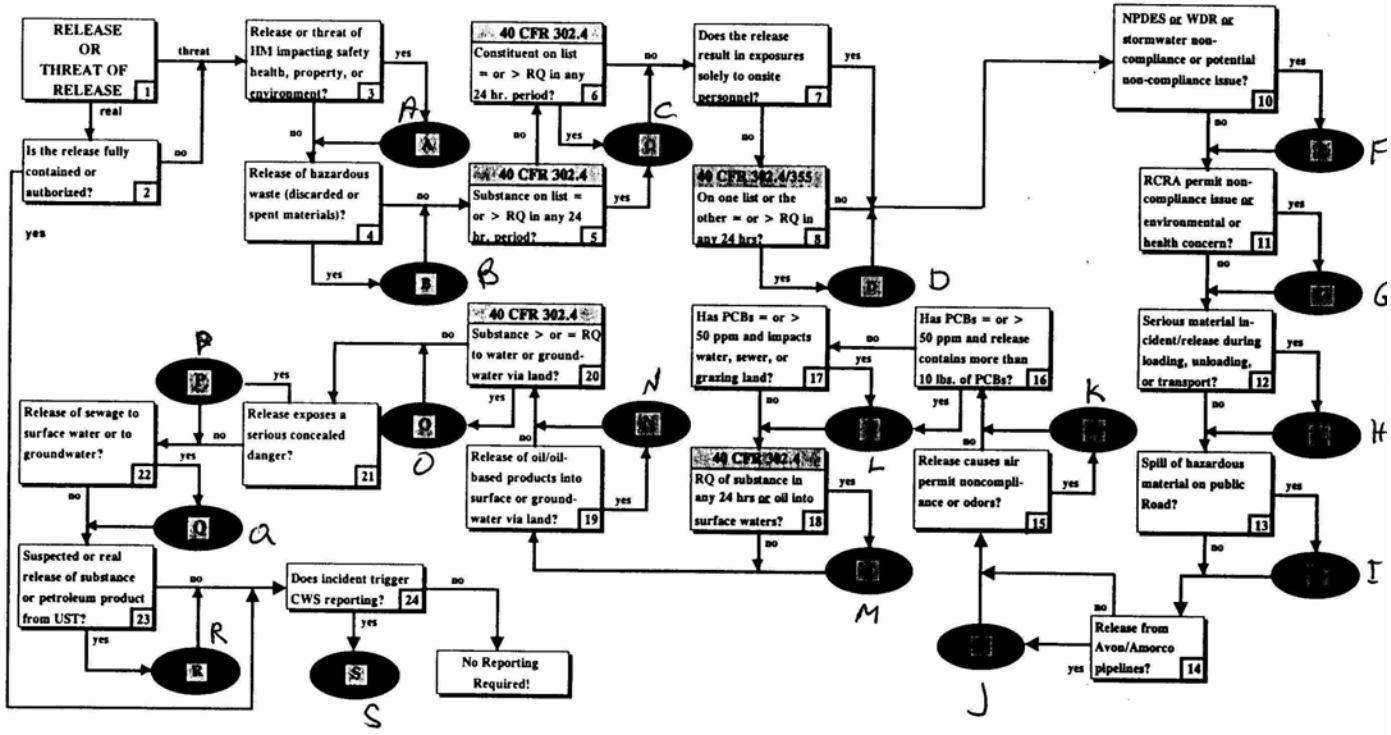
X	X	X	X		Refinery specific	
	X	X	X		Refinery specific	
Make these notifications for any quantity oil spill to Bay or if requested to do so by Environmental:						
				X	**California State Office Of Emergency Services (OES) (800) 852-7550** Time of call:_____ Person contacted: _____ Report #_____	
				X	**National Response Center (NRC) / U.S. Coast Guard (800) 424-8802** Time of call:_____ Person contacted: _____ . Report # _____	
Make these notifications as appropriate if a road closure is needed, or other action from these agencies:						
				X	**Sheriff, Senior Dispatcher** (*For County road closure.*) **(925) xxx-xxxx** Time of call:_____ Person contacted: _____	
				X	**CA Highway Patrol** (*To request Highway road closure.*) **(707) xxx-xxxx Select 1** Time of call:_____ Person contacted: _____	
				X	**City Police Department (925) xxx-xxxx** Time of call:_____ Person contacted: _____	

RELEASE REPORTING REQUIREMENTS

Agency	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
State Office of Emergency Services (800) 852-7550 or (916) 427-4341	X	X		X									X	X		X		
County Office of Emergency Service (925) 228-5000	X	X		X														X
County Health Services Department Page (510) 243-7220	X	X														X	X	X
Rodeo/Hercules Fire Department (510) 799-4484	X	X		X														X
Crockett/Carquinez Fire Department (510) 787-2717	X	X		X														X
Contra Costa Consolidated Fire (925) 933-1313	X	X		X														X
BAAQMD (415) 749-4979	X	X		X						X								X
National Response Center (800) 424-8802		X	X					X				X						
RWQCB Compliance Section (510) 622-2418						X						X	X	X		X		
RWQCB Groundwater Section (510) 622-2416													X	X		X		
DTSC Region 2 (510) 540-2122							X											
California Highway Patrol 911									X									
US EPA Regional Office (415) 744-1500											X						X	
USCG (800) 424-8802												X						

X	Notification **is** required based on the guidance in Boxes A-R
X	Notification **may be** required based on the guidance in Boxes A-R

Reporting Requirements for Real or Threatened Releases of Liquid Material



Incident ID_____

Time_____

Initials_____

Appendix 10: Websites With Integrated Warning Information

AlertNet [http://www.alertnet.org/aboutus/#contact] AlertNet provides global news, communications and logistics services to the international disaster relief community and the public. Reuters 150 years' experience reporting from disaster zones around the world allows AlertNet to give disaster relief organizations reliable information, fast. Anyone can access the public pages, which have a live news feed from Reuters together with articles describing how relief agencies are responding to the latest humanitarian crises. Non-governmental aid agencies working in international relief can access additional reference material, a more extensive newsfeed and an area to exchange information between professionals. Agencies can apply online for a password.

Disaster News Network [http://www.disasternews.net/] Disaster News Network (DNN) is a news service that tells the story of disaster response and suggests appropriate ways the public can help survivors. It also facilitates information sharing among disaster responders. Disaster News Network also covers related special topics such as preparedness and mitigation, public violence, environmental hazards, and terrorist disasters.

Emergency Net [http://www.emergency.com/] The EmergencyNet NEWS Service is the reporting arm and a subsidiary of the Chicago-based Emergency Response and Research Institute, which studies evolving events, problems, and policy germane to the emergency response, intelligence, military, and national security communities. EmergencyNet News specializes in providing timely, comprehensive, and objective reporting on international and domestic terrorism, crime, disasters, and related activities, as well as other emergency response topics. Its goal is to provide the most factual, in-depth and timely information to help users maximize their knowledge and not fall victim to the dangers associated with crime, terrorism and other violence or disasters.

Amateur Radio Disaster Services [http://www.ares.org] Amateur radio operators provide life saving information in and out of disaster areas.

ComCARE Alliance [http://www.comcare.org/] This is a broad-based national coalition of more than 80 organizations (including nurses, physicians, emergency medical technicians, 9-1-1 directors, wireless companies, etc.) advocating emergency communication facilities linked to automobiles.

Emergency Alert System (EAS) [http://www.fcc.gov/eb/eas/] The Emergency Alert System is designed to provide the President of the United States automatic access to the nation's broadcast and cable facilities, and to speak directly to the country in times of national disaster. Also, the EAS system can be used by the National Weather Service and state and local officials to disseminate other types of emergency information.

Emergency Digital Information Service (EDIS) [http://www.edis.ca.gov/]
The Emergency Digital Information Service (EDIS) is an advanced digital tool California's emergency managers can use to alert and inform the news media and the public. EDIS can deliver text, maps, graphics and photos as well as sound files.

Public Safety Wireless Network (PSWIN) [http://www.pswn.gov] Local, state, tribal and Federal agencies jointly plan for and foster interoperability among wireless networks. They strive to make the public safety communications more seamless, effective, efficient, and cost effective.

The Emergency E-mail and Wireless Network [http://www.Emergencyemail.org] The Emergency E-mail and Wireless Network is a free public service to get emergency messages from local, regional and national government sources. Government agencies and non-profits can register to send out messages.

FAA details on Restricted Air Space
[http://www.faa.gov/ntap/SPECIALNOTAMS/specialnotamlisting.htm]
This site provides post-September 11, 2001 special interest notices for flight operation in the National Airspace System.

Office for Preparedness Listserv [http://odp.ncjrs.org/content/subscribe.asp]
This U.S. Department of Justice site allows first responders to sign up for the Domestic Preparedness Support Listserver for daily e-mail messages with background information and news.

Department of Energy Nevada Test Site - Community Environmental Monitoring Program (CEMP) Brochure [http://www.wrcc.dri.edu/cemp/cemp.html]
The Community Environmental Monitoring Program (CEMP) is a network of 24 monitoring stations surrounding the Department of Energy's Nevada Test Site (NTS) that monitor the airborne environment for manmade radioactivity that could result from NTS activities.

Department of Energy - Federal Radiological Monitoring & Assessment Center (FRMAC) [http://www.nv.doe.gov/programs/frmac/default.htm]
The Department of Energy's Federal Radiological Monitoring & Assessment Center (FRMAC) is responsible for providing environmental monitoring, sampling, radioanalysis, data assessment and quality assurance support to affected States during major radiological emergencies.

Interactive Weather Information Network- National Warnings Area
[http://iwin.nws.noaa.gov/iwin/nationalwarnings.html]
NOAA's Interactive Weather Information Network (IWIN) contains a map of current weather observations and warnings from each of the states and Puerto Rico, updated every 60 seconds.

Rivers/Flooding [http://www.nws.noaa.gov/om/water/hsd_products.shtml]
Topics include River and Streamflow (with map of current river conditions), Precipitation (with snow data), Water Supply/ Drought, Flood Conditions chart updated every 5 minutes.

Emergency Managers Weather Information Network (EMWIN)
[http://iwin.nws.noaa.gov/emwin/index.htm] EMWIN is a suite of data access methods which make available a live stream of weather data and other critical emergency information. Get information via radio, internet, satellite.

Northwest Weather and Avalanche Center, Home page [http://www.nwac.noaa.gov/]
This site provides current information on snowpack structure and forecasts of expected changes in related avalanche conditions for the northwest United States.

US Chemical Safety and Hazard Investigation Board: Chemical Incidents Reports Center
[http://www.chemsafety.gov/circ/] The sheer volume of incident reports received each day exceeds the investigative resources of the CSB or any other single organization. Yet sharing knowledge of these incidents may make it possible for others to take actions that may contribute to improving chemical safety. Therefore, the Chemical Safety Board has committed resources to create and maintain the Chemical Incident Reports Center (CIRC). This dynamic, searchable online database of chemical incidents, although subject to limitations inherent in any compilation of information of this type (see disclaimer on site, under "purpose"), may enable or inspire actions by a researcher, a government agency or others in support of improving chemical safety

NWS - Local Warnings and Forecasts [http://www.nws.noaa.gov/]
National map shows current watches, warnings, statements, and advisories for severe weather conditions. Map is clickable to local forecasts.

National Infrastructure Protection Center [http://www.nipc.gov/]
The National Infrastructure Protection Center (NIPC) serves as a national critical infrastructure threat assessment, warning, vulnerability, and law enforcement investigation and response entity. The NIPC provides timely warnings of international threats, comprehensive analysis and law enforcement investigation and response.

Storm Prediction Center [http://www.spc.noaa.gov/] Storm Prediction Center of the National Weather Service has forecasts, watches, discussions and outlooks.

USGS Earthquake Hazards Program [http://earthquake.usgs.gov/] This site is the U.S. Geological Survey Earthquake Hazards Program Website. Information is provided on worldwide earthquake activity, earthquake science, and earthquake hazard reduction.

USGS National Earthquake Information Center (NEIC) [http://neic.usgs.gov/]
This is the home page for the U.S. Geological Survey's World Data Center for Seismology. They provide real-time, current, and general information on earthquakes.

Large Wildland Fire Map [http://www.nifc.gov/fireinfo/firemap.html]
This is National Fire Center's Large Incident Report map, updated regularly.

Wildland Fire Support; Geospatial Multi-Agency Coordination Group (GeoMAC)
[http://geomac.gov/] Site features zoom-in map of current wildfires in 48 states plus Alaska. Site provides information on the Geospatial Multi-Agency Coordination Group (GeoMAC), an internet-based mapping tool providing access to online maps of current fire locations and perimeters in the conterminous 48 states and Alaska.

Accident Investigations fed/state/local [http://www.csb.gov/]
Website for the Chemical Safety Board (CSB). The CSB's mission is to promote the prevention of major chemical accidents. Accident investigation reports, CSB announcements and news items are included.

Landslide News and Information
[http://landslides.usgs.gov/html_files/landslides/newsinfo.html]
This site provides landslide news and information.

USGS Volcano Hazards Program [http://volcanoes.usgs.gov/]
This site provides information on the USGS Volcano Disaster Assistance Program as well as information on the USGS Volcano Hazards Program.

USDA, Office of Communications, Newsroom
[http://www.usda.gov/newsroom.html] Products and services of the USDA Newsroom include: Publications, Agencies Reports, How to Get Information, Biotechnology, Disaster Assistance, National Fire Plan, Press Releases, Speeches and Testimony, Communications to Congress, Radio & Television News Items.

Flash Flood Warnings from National Weather Service, NOAA
[http://iwin.nws.noaa.gov/iwin/us/flashflood.html]
Bulletin Board with various Flash flood warnings posted

NOAA Weather Radio [http://weather.gov/nwr] This is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby National Weather Service office. NWR broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day. Continental U.S., Alaska, Hawaii, Puerto Rico, Guam, American Samoa

USGS: Current earthquake maps of the world
[http://wwwneic.cr.usgs.gov/current_maps.html] USGS National Earthquake Information Center provides current maps of the world's earthquakes.

Real-time earthquake information provided by U.S. Geological Survey
[http://neic.usgs.gov/current_seismicity.html] This site provides Current Earthquake Activity worldwide and other information from the USGS World Data Center for Seismology in Denver, Colorado.

Ways to Get Weather Data [http://www.nws.noaa.gov/om/disemsys.shtml]
The National Weather Service (NWS) explains its programs of weather information dissemination, including weather wire service, weather radio,EMWIN and IWIN, Forecast Offices, NOAAPORT, FOS, electronic networks and telephone systems.

Special Needs Weather Radio [http://www.nssl.noaa.gov/~wood/NWR/]
The Special Needs Weather Radio is a weather alerting system that can be a lifesaver for deaf and hard-of-hearing persons; as much as the commonly-used smoke detector with flashing light,

Space Weather Alerts [http://sec.noaa.gov/] This is the official source of Space Weather Alerts, Warnings, and Forecasts. Continental U.S., Alaska, Hawaii, Puerto Rico, Guam, American Samoa.

New Hampshire Amateur Radio [http://www.nhradio.org/contents.html]
New Hampshire Amateur Radio provides amateur radio emergency services to client agencies, as one team, trained, experienced and prepared to serve during a communications emergency.

National Incident Information Center - Fire and Aviation Management
[http://www.fs.fed.us/news/fire/index.html] The National Incident Information Center gathers and disseminates summary information on fires and other natural disasters. Site includes Morning Report, Fire Location Maps and more.

Eastern North Pacific coastal watches and warnings
[http://www.nhc.noaa.gov/graphicsepac.html] National Hurricane center advisories contain the latest official analysis, forecast and warning information for Atlantic and eastern North Pacific tropical cyclones

West Coast & Alaska Tsunami Warning Center: NOAA updates
[http://wcatwc.arh.noaa.gov/] Site provides warnings, general tsunami information and an Earthquake Felt report form.

DOD Computer Emergency Response Team (CERT) [http://www.cert.mil/]
Access to the DOD Computer Emergency Response Team computer alerts, bulletins, and other technical advisories is limited to .mil users exclusively.

United States Coast Guard Search and Rescue Emergencies
[http://www.uscg.mil/hq/g-o/g-opr/emergencies.htm] Site has procedure to report Search and Rescue Emergencies to the United States Coast Guard.

Nevada Emergency Management - Road Conditions
[http://www.nevadadot.com/traveler/roads/] This site provides current information regarding weather or construction related situations causing traffic controls or delays on Nevada highways.

National Infrastructure Protection Center (NIPC) - Information Sharing and Analysis Centers [http://www.nipc.gov/infosharing/infosharing6.htm]
This site provides links to Information Sharing and Analysis Centers (ISACs) of the National Infrastructure Protection Center (NIPC), the national focal point for gathering information on threats to critical infrastructures. Industries represented are Electric Power, Telecommunications, IT, Banking, Water supply, Surface Transportation, Oil & Gas, Emergency Fire Services, Food, Chemicals Industry, and Emergency Law Enforcement.

Oregon Emergency Management - Technology & Operations

[http://www.osp.state.or.us/oem/Organization/Technology%20and%20response/tech.htm] This site contains information on the Oregon Emergency Management Technology and Response Services Section which provides and maintains a broad range of communication systems used by the general public, the state, local government and other agencies for the purpose of public warning and emergency notification, and for general preparedness and emergency support.

West Virginia Emergency Management - Emergency Alert System

[http://www.state.wv.us/wvoes/EAS.htm] This site of the West Virginia Office Emergency Management provides access to the State of West Virginia Emergency Alert System Operational Plan.

Guam Forecast Office - National Weather Service

[http://www.prh.noaa.gov/pr/guam/] This National Weather Service site provides forecasts and warnings for Guam and the Northern Mariana Islands.

Pago Pago American Samoa Weather Service Office

[http://www.prh.noaa.gov/samoa/] This National Weather Service site provides forecasts and warnings for American Samoa.

San Juan, PR Forecast Office - National Weather Service

[http://www.srh.noaa.gov/sju/] This National Weather Service site provides forecasts and warnings for Puerto Rico and the U.S. Virgin Islands.

Emergency Alert System – Federal Communications Commission

[http://www.fcc.gov/eas] This Federal Communications Commission site summarizes State and Local plans and reports on EAS.

Appendix 11: Participants in This Study

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