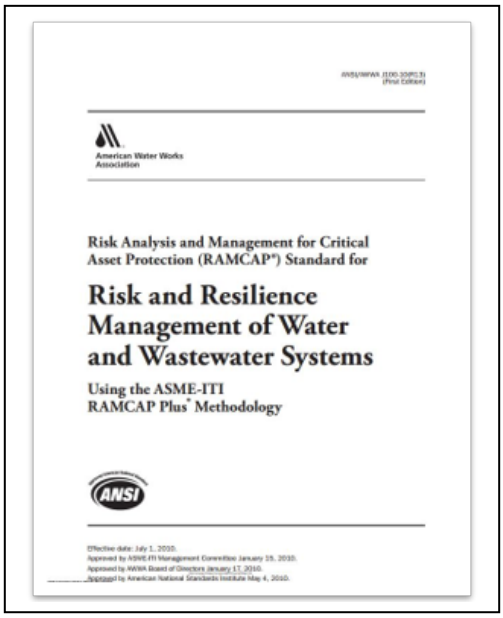
Emergency Response Planning

INTRODUCTION



The America Water Infrastructure Act (AWIA) requires all utilities serving over 3,300 people to develop or update a Risk and Resiliency Assessment (RRA) and Emergency Response Plan (ERP). The law identifies the specific components that must be included in the RRA and ERP and establishes deadlines by which the water system must certify, to the EPA, completion of those documents. The RRA requires an "all hazards" risk approach including malevolent acts and natural hazards.

The RRA needs to evaluate all the critical assets of the water utility including transmission and distribution mains, source water, intakes, pretreatment and water treatment facilities, storage, SCADA system (cybersecurity), etc. It also needs to evaluate the 1) monitoring practices of the utility, 2) financial infrastructure, 3) use, storage and handling of various chemicals and 4) operation and maintenance of the system.

The ERP needs to incorporate the findings of the RRA and include strategies and resources to improve the resilience of the system, plans and procedures that can be implemented to respond to any hazard that threatens the ability of the system to deliver safe drinking water; actions, procedures and equipment that can be used to significantly lessen the impact of an event and strategies that can be used to aid in the detection of a hazard.

Compliance with the AWIA is mandatory and deadlines are imposed.

APPROACH

Varius believes that the most effective RRA and ERP updates are a collaboration between Varius (who has specialized knowledge regarding the threats and impacts of various emergencies) and the Utilities' staff (who will have specialized knowledge about the operation and response of the utility to various situations and actions). "Reliability and Resilience" is a Mission/Goal driven function for nearly every water system. In order for the project to be truly beneficial to the utility, a collaborative partnership approach is needed between Varius and the Utility staff.

The AWIA does not require water systems to use any specific or designated standards or methodologies for the completion of the work, however, the water system is responsible for ensuring that the RRA and ERP fully address all AWIA requirements. Varius recommends using AWWA J100 (Risk and Resilience Management for Water and Wastewater Systems), AWWA M19 (Emergency Planning for Water and Wastewater Utilities) and supplemental AWWA standard G430, G440-17 and J430-14 for assistance and compliance. These standards have been developed by AWWA and, if followed, will ensure that the water system meets the requirements of AWIA. Outlined below are the four major steps needed to complete the project.

Step 1 – Preliminary Update of Existing Emergency Response Plan

The Bioterrorism Act of 2002 required most water systems to do a Vulnerability Assessment (VA). Varius recommends a review of this document and, in conjunction with a review of the existing Emergency Response Plan, is usually an excellent starting point for an AWIA compliant project. The review should include any other emergency planning documents that the water system may utilize that are not included in the ERP, such as: emergency operation plans, emergency water supply plans, etc. The review will provide excellent background information on the water system, allow Varius to gain a better understanding of the water utility, evaluate the status of the current ERP and the assets evaluated in the current system. One of the goals for this ERP update is to make the document more interactive and user friendly in addition for the need to update the technical data, contact information, etc. In addition, the ERP will need to include findings and recommendations from the RRA. Outlined below are the major elements involved in Step 1, updating the ERP.

- Coordinate update with local emergency management committee
- Preform gap analysis on current ERP
- Incorporated findings of gap analysis into ERP
- Update data in current ERP (contact info, relationships, contracts, etc.)
- Develop new format for ERP to make user friendly, interactive search, active calendar, etc.
- Incorporate RRA findings into ERP
- Develop draft ERP
- Review of update by Utility
- Final document

Step 2 – Conduct Risk and Resiliency Assessment

Varius recommends using AWWA J100 as the methodology for conducting the Risk and Resiliency Assessment (RRA). This process in very detailed and analytical in nature but provides a process for identifying vulnerabilities to man-made threats, natural hazards, and dependencies and proximity to hazard sites and provides methods to evaluate the options for improving weakness in water utilities. In addition, the RRA will evaluate the water systems security practices for operations and management using AWWA G430 as a guide and Emergency Preparedness Practices using AWWA G440. Cybersecurity is one of the major threats to the utility which will need to be addressed and Varius recommends conducting this work using utility staff or by using the services of an outside consultant who specializes in this type of work. AWWA has also developed J430 as a tool to assist water utilities in evaluating cybersecurity threats. Finally, AWIA requires water systems to develop a financial plan to ensure their financial infrastructure is also secure. Outlined below are the major elements involved in Step 2, conducting the Risk and Resiliency Assessment.

AWWA - J100

- 7 step process
- Develop Asset-Threat Pair from list
- Develop quantifiable values for Consequences(C), Vulnerability(V) and Threat Likelihood(T)
- Develop/utilize quantified data to rank each asset-threat pair (R = C * V * T)
- Eliminate lower ranked pairs from analysis
- Develop Risk/Resilience Analysis for each pair
- Develop RRA Management Plan
- Document process/ranking/assumptions

Due to the severe consequences of a potential Cascadia earthquake event and the potential damage to the water system assets following a Cascadia earthquake, the risk for this event will likely rank as the highest (R=C*V*T) for the water system. Our strategy is to focus on the risk/resilience analysis for a large (M9.0) earthquake and let this event define the most significant mitigation and resiliency strategies. These strategies can then be used, essentially reused, as predefined elements, and carried over to other risk events developed in the process. Varius has extensive knowledge of the potential impacts of the Cascadia earthquake event due to its work on developing ShakeAlert related

alarm systems. ShakeAlert can play a valuable role in mitigating the potential damage and maintaining some basic usable infrastructure for the water system, and this can be used to significantly simplify the RRA and the ERP (lower project cost, quicker completion schedule).

Step 3 – Incorporate Findings of RRA into ERP

The RRA was completed specifically to provide an overall assessment of the water system in order to gain an understanding of what actions and procedures are needed in the Emergency Response Plan to minimize service disruption in the water supply system during emergencies. Specific operational procedures, system improvements and plans may need to be developed as part of this step to ensure the ERP meets the needs of the community. Since the RRA is a comprehensive process that considers all the risks to the major assets of the utility it may take years to fully implement. Varius recommends a phased approach wherein the most significant risks are addressed initially in a first phase update to the ERP and a longer-term action plan developed to address other risks in future phases.

Step 4 - Certification to EPA and Final Plan

The final step for AWIA compliance requires the water system to certify to the EPA that it has completed the RRA and ERP. Varius will assist the utility in developing the certification letter. The final RRA and ERP will be submitted to the utility by Varius. It will include all of the tables, graphs and work papers used to make the assessment/evaluation in the RRA process. This will be important in the future as AWIA requires that the RRA and ERP be updated every 5 years.

Incident Specifics

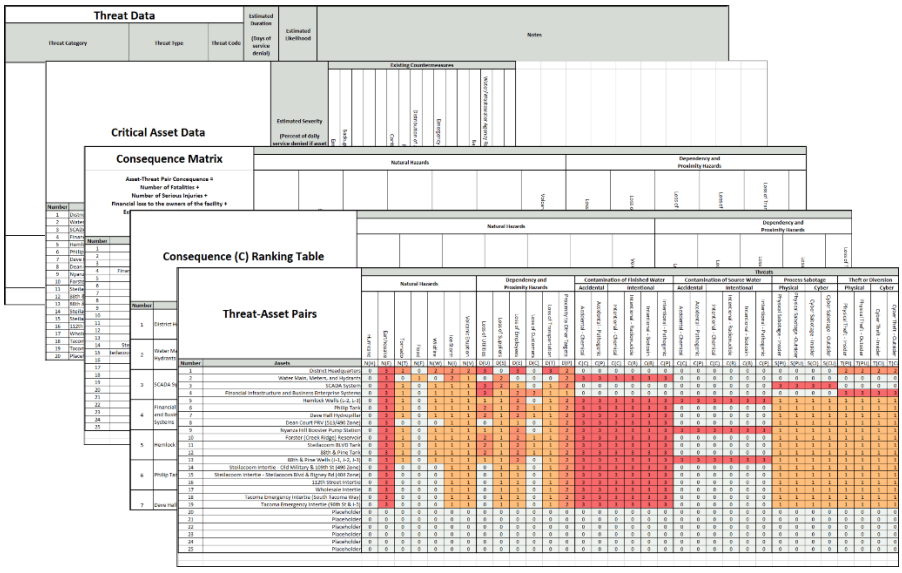
The following specific emergency conditions or incidences are included in most RRA evaluations and ERP plans:

A. General Response to Terrorist Threats (Other than Bomb Threat and Incident-Specific Threats)
B. Incident-Specific Response to Man-Made or Technological Emergencies
1. Contamination Event (Articulated Threat with Unspecified Materials)
2. Contamination Threat at a Major Event
3. Notification from Health Officials of Potential Water Contamination
4. Intrusion through Supervisory Control and Data Acquisition (SCADA)
C. Significant structural damage resulting from intentional act
D. Customer complaints
E. Severe weather response (snow, ice, temperature, lightning)
F. Flood response
G. Hurricane and/or tornado response
H. Fire response
I. Explosion response
J. Major vehicle accident response
K. Electrical power outage response
L. Water supply interruption response
M. Transportation accident response – barge, plane, train, semi-trailer/tanker
N. Contaminated/tampered with water treatment chemicals
O. Earthquakes response
P. Disgruntled employees' response (i.e., workplace violence)
Q. Vandals response
R. Bomb threat response
S. Civil disturbance/riot/strike
T. Armed intruder response

U. Suspicious mail handling and reporting

V. Hazardous chemical spill/release response (including Material Safety Data Sheets)

W. Cyber-security/Supervisory Control and Data Acquisition (SCADA) system attack response (other than incident-specific, e.g., hacker).



Samples of the custom software tools developed by Varius to assist in completing the AWIA compliant Risk and Resiliency Assessment.