

How a Small Utility Integrated the 2004 Vulnerability Assessment into the 2018 AWIA Requirements

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About City of The Dalles

- Located in the Mid-Columbia Gorge, 83 miles east of Portland, OR
- Incorporated by the Oregon Territorial Government in 1857
- Wasco County seat
- County population about 25,000; City population about 15,276
- Two water utilities in the City Limits
- City utility serves about 12,500 customers; about 5,000 service connections

Topics Today

- Compare and Contrast 2004 Vulnerability Assessment (VA) and 2018 AWIA Risk and Resilience Assessment requirements
- VA elements carried forward
- Data collection tools
- Data assessment tools
- Writing the report

AWIA Risk and Resilience Assessment Requirements

- Each community water system serving a population of greater than 3,300 persons shall assess the risks to, and resilience of, its system. Such an assessment shall include:
 1. the risk to the system from malevolent acts and natural hazards;
 2. the resilience of the pipes and constructed conveyances, physical barriers, source water, water collection and intake, pretreatment, treatment, storage and distribution facilities, electronic, computer, or other automated systems (including the security of such systems) which are utilized by the system;
 3. the monitoring practices of the system;
 4. the financial infrastructure of the system;
 5. the use, storage, or handling of various chemicals by the system; and
 6. the operation and maintenance of the system.
- The assessment may include an evaluation of capital and operational needs for risk and resilience management for the system.

2004 Vulnerability Assessment Requirements

- On June 12, 2002, the President of the United States signed the Public Health Security and Bioterrorism Preparedness and Response Act
- Section 1433(a) required certain water systems to complete a Vulnerability Assessment (VA)
- Certify and submit a copy of the VA to the U.S. EPA
- In January 2003, the U.S. EPA finalized guidance for preparation of a VA
- The VA was focused on malevolent acts only
- The Federal Bureau of Investigation, local police and other members of the water security community were consulted
- Vulnerability Self-Assessment Tool (VSAT) was developed by U.S. EPA and used by the City to develop the VA report

2004 VA
VS.
2018 AWIA

- Each community water system serving a population of greater than 3,300 persons shall assess the risks to, and resilience of, its system. Such an assessment shall include:
 1. **(VA) the risk to the system from malevolent acts** and natural hazards;
 2. the resilience of the pipes and constructed conveyances, physical barriers, source water, water collection and intake, pretreatment, treatment, storage and distribution facilities, electronic, computer, or other automated systems (including the security of such systems) which are utilized by the system;
 3. the monitoring practices of the system;
 4. the financial infrastructure of the system;
 5. **(VA) the use, storage, or handling of various chemicals by the system;** and
 6. the operation and maintenance of the system.
- The assessment may include an evaluation of capital and operational needs for risk and resilience management for the system.

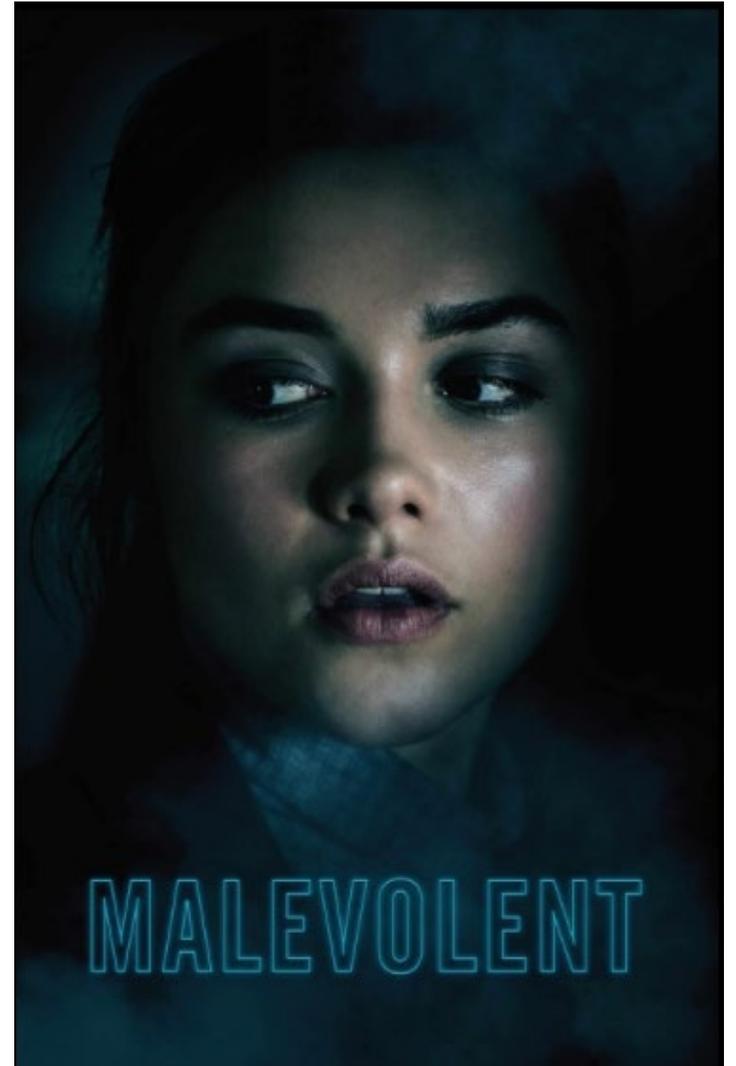
No VA Development Documents

- Only the VA report could be found
- VSAT was used to develop the report
 - VSAT files were saved
 - No VSAT data files could be found
- At the time access to the files were restricted for security reasons
- The person with access to the restricted files was no longer employed at the City
 - Access was apparently not transferred to others
- We had so little to go on that hiring a consultant would not have made development more efficient, so we decided to keep the project in-house.



2004 VA Risks

- Majority of risks identified had been mitigated
- Some risks had been eliminated
- Other risks now seem very far fetched...but 2020!



Malevolent (2018, Netflix): A team of scam artists get more than they bargained for when a job at a haunted country estate gets out of hand. Source: IMDb

VA Elements Carried Forward

- The AWIA assessment working group determined that due to the thorough nature of the 2004 assessment certain elements should be carried forward. These elements include:
 - Seven selected malevolent acts were specifically reviewed and updated in the 2021 AWIA risk assessment.
 - The criticality definitions in the characterization of the water system section were utilized and simplified where appropriate; then were adapted to new asset categories.
 - A criticality rating matrix was created that is similar to the previously created matrix.
- The 2004 VA list of existing countermeasures and the security plan will be reevaluated during development of the AWIA-compliant emergency response plan.

AWIA Resources

- Initial U.S. EPA resources available for assessment were more suitable for large utilities (their deadline was earlier than small utilities)
 - VSAT 2.0
- Later U.S. EPA developed resources more appropriate to the scale of a small utility.

Table 3a: Pipes and Constructed Conveyances, Water Collection, and Intake (Malevolent Acts)

Asset Category: Pipes and Constructed Conveyances, Water Collection, and Intake	
Examples of Assets in this Category: Encompasses the infrastructure that collects and transports water from a source water to treatment or distribution facilities. Possible examples include holding facilities, intake structures and associated pumps and pipes, aqueducts, and other conveyances.	
Malevolent Acts Select the malevolent acts in the left column that pose a <u>significant risk</u> to this asset category at the CWS.	Brief Description of Impacts If you select a malevolent act in the left column as a significant risk to the Pipes and Constructed Conveyances, Water Collection, and Intake asset category, briefly describe in the right column how the malevolent act could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
<input type="checkbox"/> Assault on Utility – Physical	Click or tap here to enter text.
<input type="checkbox"/> Contamination of Finished Water – Intentional	Click or tap here to enter text.
<input type="checkbox"/> Contamination of Finished Water – Accidental ¹	Click or tap here to enter text.
<input type="checkbox"/> Theft or Diversion – Physical	Click or tap here to enter text.
<input type="checkbox"/> Cyberattack on Business Enterprise Systems	Click or tap here to enter text.

Data Collection & Assessment Tools

- Initially intended to use VSAT again
 - Align with development of 2004 VA
- Pros and Cons of using VSAT 2.0
 - Pro: Utility Resilience Index (URI)
 - Pro: Cost/benefit analysis
 - Con: Restricted access; not very adaptable
- Small utility data collection forms
 - Pro: Adaptable for maximum value; There is a complete working record that is restricted, yet accessible to primary team members (managers and directors)
 - Con: No methodology for calculating URI
 - Con: No method for cost/benefit analysis



URI Methodology

- Opflow issue August 2019: What Makes a Utility Resilient?
 - An all hazards, system-level assessment of resilience
 - 12 indicators of resilience
 - Selected based on findings from historical records, after-action reports, best practices and lessons learned from multiple incidents
- Equivalent to VSAT 2.0 URI methodology
- Developed a simple spreadsheet tool using the method described Opflow article
 - Operational indicators
 - Financial indicators

Assessment of Risk Data

- Developed a spreadsheet version of the risk assessment matrix published in the 2004 VA report
 - Presumably VA versions was exported from VSAT
- Simplified a the VA four steps of risk escalation to three steps
- Adapted the risk escalation steps to additional assets to be evaluated in AWIA
- Modified the 2004 VA equation to evaluate risk
 - (VA) Vulnerability = Probability of occurrence of the threat x Probability of asset failure
 - (AWIA) Vulnerability = (Probability of occurrence of the threat x Probability of asset failure) – Reduction of vulnerability due to mitigation

Writing the AWIA Report

- 2004 VA
 - Most of the pages (perhaps all of the pages) were exports from VSAT
 - Original report, “Just the facts, Jack.”
 - Did not capture original data, sources or rationale for decisions
 - Fortunately, someone involved in the 2004 VA development was still employed by the City
- 2021 AWIA
 - Used the 2004 VA report format so that AWIA assessment could be uploaded into new version of VSAT if desired at a later date
 - Includes case studies
 - Captures more information about why the risk was selected
 - Lessons learned to be incorporated into table top exercises
 - Captures a more complete record of institutional knowledge

Alignment with VA – Asset Categories

- Asset categories – not an easy fit
 - Exported list from VSAT was a good starting point
 - Naming convention was clunky, but decided to retain to allow easy upload into VSAT if desired at a later date, example
 - **Physical >> Water >> Source Water >> Groundwater >> Name of Well**

Alignment with VA – Criticality Definition

- Criticality definitions – easy transition
 - VA: Four steps of escalated risk: very high; high; moderate; low
 - AWIA: Three steps of escalated risk: high; moderate; low
 - Majority: Merged very high and high
 - Some: Merged moderate and low
 - An increased level of specificity
 - Retained the original VA five evaluated areas, example:
 - Extent
 - Severity
 - Temporal Effects
 - Recoverability
 - Collateral Damages

Alignment with VA – Characterization of Countermeasures

- Characterization of mitigation and countermeasures – difficult
 - No clue about criteria for assignment of class and type
 - No definitions to apply to new content
 - Very little context for previous use of terms
 - Developed classes and types that made sense today

<i>Class (from VA)</i>	<i>Definition</i>
<i>Access</i>	Who
<i>Delay</i>	When
<i>Detection</i>	What/Why
<i>Prevention</i>	What/Why
<i>Response</i>	How

- “Where” is not in class, but provided in context
- Definitions of types are new

Example Risk Assessment Outline

- Wildfire
 - Definition of Wildfire
 - List all information sources in footnotes
 - Types of Wildfire Impacts
 - Natural Hazard Mitigation Plan
 - Community Wildfire Protection Plan
 - Pacific Northwest Wildfire Coordinating Group
 - FEMA Fire Management Assistance Declaration
 - Case Study: Blackburn Fire 2013
 - Capture institutional memory of lessons learned
 - Structure narrative to assist development of a tabletop or functional exercise
 - Wildfire Mitigation and Countermeasures
 - Capture rationale for decisions
 - Document existing M & C
 - Identify new M & C

Lessons Learned

- Past work is always relevant...but might not be available
- In-house development is entirely dependent upon the skill set of current employees
- Capture the what, why, where, when, who, and how even if it doesn't all end up in the report
- Write the report as if it were the only remaining artifact of the previous assessment process



Questions?

The picture is an excerpt from The Dalles Water Quality Report 2014.



A TOTAL OF NEARLY
11,400 ACRES
WERE BURNED

On August 16, 2013 three separate lightning-caused fires occurred near The Dalles that eventually combined into what became the Government Flat Complex Fire. The largest of the three, the Blackburn Fire, started inside the City's Watershed raising the concern of potential impacts on the primary drinking water source for the City's 12,500 water customers.

A total of nearly 11,400 acres were burned of which 5,400 acres were within the City's Municipal Watershed. The burned Watershed area reached from the Wicks Water Treatment Plant upstream on the South Fork Mill Creek for 4 miles. The burned area was all

After the fire there were concerns of soils stability related to potentially increased erosion, landslides and debris flows impacting water quality and quantity and intensity of the stream flows. Two significant water quality events have occurred since the fire that impacted the water treatment plant. The first was related to a rain-on-snow event in February 2014 and the second was during August of 2014 when a thunderstorm "gully washer" passed over the burned area. Both events washed enough soils into the creek from the burned area

