

Earthquake Preparedness for Public Water Systems



Effects of an Earthquake on Raw Water Quality

When the intense shaking of an earthquake occurs, an influx of sediments from the surrounding area can impact water quality for surface and ground water systems. Particles within the sediment could leach nitrates and arsenic compounds into well sources. There may be an additional risk of bacterial contamination in raw water supplies.

Furthermore, ground water wells may experience water level fluctuations either close to or faraway from the earthquakes epicenter. The water level may either increase to the point where water is flowing at land surface or decrease to the point where the well becomes dry.



What can you do to prepare your water system?

- Brace overhead lighting fixtures.
- Hang mirrors and pictures on closed hooks.
- Ensure equipment is fastened or stabilized (i.e., anchored to wall studs).
- Secure electronics with flexible nylon straps or buckles and move away from large windows.
- Regularly back up electronic files
- Place breakable objects in a closed cabinet with a latch. And store heavy, breakable items on lower shelves.
- Secure cabinets or shelves by using “L” brackets, corner brackets, etc.
- Brace pipes.
- Anchor storage tanks.
- Remove fuels, chemicals, pesticides, etc. 100 ft. from source area (i.e., well or surface water source)
- Check/Maintain back-up power supply (i.e., generator) at least monthly
- Have necessary schematics, written emergency plans in key areas of water system.
- Have first-response fire suppression equipment available.
- Develop an inventory of important materials and equipment
- Identify an alternate water supply to address short-term (hours-days) and long-term (weeks to months) potential power outages.
- Consider alternate transportation/evacuation routes for staff if roads are obstructed/damaged.
- Establish designated roles and responsibilities for personnel
- Conduct annual staff training efforts intended to increase response and recovery time
- Reinforce, secure or improve utility transmission lines and connection to withstand earthquake forces, soil movements and differential settlements.
- Establish memorandums of understanding with other nearby facilities to share/provide assistance in the form of equipment, materials and/or time.
- If in doubt, do not hesitate to contact your Environmental Program Specialist.



Department of Environmental Conservation
Drinking Water Program
555 Cordova St. • 1-866-956-7656
<http://www.dec.state.ak.us/eh/dw/index.htm>

During the Earthquake

- If you are inside a building:
 - **Drop** down onto your hands and knees
 - **Cover** your head and neck with both arms, clasping your hands around the back of your neck
 - **Hold On** to your shelter (i.e., table, desk) until the shaking stops.
- If you are outside of a building:
 - Get into the open
 - Stay clear of buildings and powerlines
- If you in a moving vehicle:
 - Pull over and stop your vehicle as quickly and safely as possible
 - Avoid parking under bridges/overpasses
 - Do not park close to signs, power lines or light posts

Helpful Websites

PWS Security Website

<http://dec.alaska.gov/eh/dw/security/security.html>

(EPA) Incident Action Checklist- Earthquake

http://www.epa.gov/sites/production/files/2015-06/documents/earthquake_1.pdf

Alaska Earthquake Center

<http://www.aeic.alaska.edu/>

USGS Earthquake Hazard Program

<http://earthquake.usgs.gov/earthquakes/>

Alaska Division of Homeland Security and Emergency Management

<http://ready.alaska.gov/>

Mitigation Center

<http://mitigation.eeri.org/category/educational-materials/businesses>

After the Earthquake

- Inspect your facility (and surroundings) for visible damage
- Inspect wells for damage caused by liquefaction
- Maintain pressure throughout the system
- Control leaks
- Conduct additional water quality sampling/analysis
- Turn off water meters at destroyed buildings/facilities
- Work with response agencies for obtaining necessary funding, equipment, etc.
- Coordinate with state and/or local partners to restore and treat burned areas.
- Complete damage assessments
- Review/update your Emergency Response Plan or Priority Measures Plan as utility operations change.
- Conduct further staff training and/or drills.
- Consider implementing future mitigation and/or long-term measures such as:
 - Replace seismically weak pipes and wellheads
 - Install gas shut-off valves and valves at intersections, interconnections, and/or pressure zones so problem areas can be isolated
 - Establish procedures/guidance documents to review structural and non-structural hazards around your facility
 - Review construction plans and then consult industry standard publications, building codes, etc. for installing structural resiliency measures
 - Ensure items/content are covered in your hazard insurance policy
 - For new construction, do not build on soft, water-saturated foundations.



Denali Fault Earthquake (2002), Magnitude 7.9;
Photo by DOT & PF



Cook Inlet Earthquake (2016), Magnitude 7.1;
Photo by Bob Hallinen