



History of Nuclear Energy in Iowa

Iowa has a long history of nuclear energy development and its use in generating power. No nuclear power plants are operating in Iowa. Two plants are operating close to Iowa's borders - Quad-Cities Generating Station and Cooper Nuclear Station. The Quad-Cities Generating Station¹ is a nuclear power plant in Cordova, Illinois, which is northeast of Davenport. MidAmerican owns 25 percent of the Quad Cities Unit 1 and Unit 2 power plants; the other owner is Exelon. Cooper Nuclear Station², operated by Nebraska Public Power, is a power plant close to Iowa's western border, 70 miles south of Omaha, Nebraska, in Brownville.



Decommissioning and decommissioned plants in and around Iowa³

Duane Arnold Energy Center⁴

Duane Arnold Energy Center in Palo was the only nuclear plant generating electricity in Iowa. The plant was slated for closure in October 30, 2020.⁵ The plant ceased operating on August 10, 2020, due to storm damage; it was permanently closed as a result. It was originally licensed in 1974 to

¹ Exelon announced in November, 2013, that the plant would be shuttered if wholesale electricity prices remained low. By 2015, Exelon had lost \$350 million over the previous 5 years at the Cordova plant. In September, 2015, the plant received news that it would be producing power through 2016 and into 2017. Exelon then announced that it would be retiring the Quad-Cities nuclear plant on June 1, 2018, unless the Illinois legislature granted Exelon incentives that would allow it to continue to operate. Ultimately the Illinois legislature agreed to fund a bailout for the plant, including adding charges to customer utility bills to support the bailout. Sources:

www.iaea.org/PRIS/CountryStatistics/ReactorDetails.aspx?current=615 Steve Daniels, "What's stronger than nuclear power? Falling electricity prices", chicagobusiness.com/article/20131116/ISSUE01/311169983/whats-stronger-than-nuclear-power-falling-electricity-prices?r=7555H1929134H2B, November 18, 2013

Barb Ickes, "Local Officials voice support for Exelon nuclear plant", Quad-City Times, August 17, 2015

Jennifer Dewitt, "Exelon nuclear plants clear latest auction", Quad-City Business Journal, September 2, 2015

Ed Tibbetts, "Exelon warns Q-C nuke plant could close in 2018", Quad-City Times, May 6, 2016

Dan Petrella, "Rauner to sign Exelon energy bill Wednesday in Clinton", Quad-City Times, December 6, 2016

Jennifer Dewitt, "Exelon nuclear plants clear latest auction", Quad-City Business Journal, September 2, 2015

² Cooper Nuclear Station was not affected by the flooding of the Missouri River in 2011 since sits on higher ground. See www.nrc.gov/info-finder/reactors/cns.html

³ Anibal L. Taboas, A. Alan Moghissi, Thomas S. LaGuardia, The Decommissioning Handbook, 2004

⁴ www.nrc.gov/info-finder/reactor/duan.html

⁵ Matthew Patane and Mitchell Schmidt, "Iowa's sole nuke plant to close in 2020", Cedar Rapids Gazette, July 28, 2018

and

Mitchell Schmidt, "Powering Down - Iowa's nuclear plant nears end", Cedar Rapids Gazette, May 5, 2019

operate until 2014. The plant was uprated in 2001, which means that it was given a license to increase the amount of power it generated. Then it was relicensed in 2010 to operate until 2034. Duane Arnold is owned by NextEra Energy. The electricity generated by Duane Arnold is sold to Alliant Energy, Central Iowa Power Cooperative, and Corn Belt Power Cooperative. Since the plant was constructed, residences, schools, and businesses were built within 12 miles of the plant, the main area slated for evacuation in an emergency. In July, 2012, the output of the Duane Arnold Energy Center was reduced when water temperatures of the Cedar River became too warm as a result of a heat wave. The Cedar River provided water for the recirculating cooling water system. In August, 2012, the owners of Duane Arnold announced that they were going to dredge the Cedar River due to low water levels and low flow rates. The Cedar River level dropped below three feet and was flowing at 21 percent of its normal August rates.⁶ Duane Arnold was not affected by the floods of the Cedar River in 2008 and 2016.

On August 10, 2020, the power plant went into an automatic scram (emergency shutdown) due to the loss of off-site power as a result of high winds.⁷ The winds damaged the property, but did not damage the reactor building. After the scram, the facility was running on its backup diesel generators, but not producing power. The owners of the plant, NextEra Energy Resources, reported that the cooling tower had been damaged during the storm.⁸

Ames Laboratory at Iowa State University

The Iowa State University campus was home to a research facility called the Ames Laboratory. The laboratory, under the direction of the Atomic Energy Commission, researched the atomic bomb and peaceful uses of atomic energy. A research reactor, located west of the campus, became operational in 1964 and was shuttered in 1977. This reactor has since been decommissioned. Current and former employees of the Ames Laboratory and the Iowa Army Ammunition Plant, are eligible for regular screenings for health problems related to exposure to nuclear materials while employed at the two facilities, including selected cancers and chronic beryllium disease.⁹ These facilities were operated by predecessors of the United States Department of Energy. The Iowa Army Ammunition Plant near Burlington, Iowa, was involved in assembling nuclear weapons.

Iowa State University Nuclear Engineering

A second research reactor sat on the west side of the Iowa State University campus and was used in the nuclear engineering curriculum. It was built in 1959, retired in 1998, and decommissioned in 2002.

Dairyland Power Cooperative

⁶ Dave DeWitte, "Falling Cedar River levels will force Duane Arnold Energy plant to dredge", Cedar Rapids Gazette, August 9, 2012

⁷ US Nuclear Regulatory Commission, Event Reports for 8/10/2020 – 8/11/2020

⁸ Mike Hughlett, "'Derecho' storm causes Cargill plant closure, emergency shutdown of nuclear plant in Iowa", Star Tribune, August 12, 2020

⁹ <http://energy.gov/ehss/services/worker-health-and-safety/former-worker-medical-screening-program>

Close to the northeast corner of Iowa, in Genoa, Wisconsin, Dairyland Power Cooperative plans to complete decommissioning the LaCrosse Boiling Water Reactor in 2026.¹⁰

Omaha Veterans Affairs Medical Center

The Omaha Veterans Affairs Medical Center research reactor in Omaha, Nebraska, called the Alan J. Blotcky Reactor Facility operated between 1959 and 2001 and began decommissioning in 2015.¹¹

The Fort Calhoun Nuclear Generating Station

The Fort Calhoun Nuclear Generating Station, operated by Omaha Public Power District (OPPD), was a nuclear power plant located 20 miles north of Omaha, Nebraska.¹² The plant ceased operating on October 24, 2016.¹³ After the Missouri River flooded in 2011, a cascade of problems with the facility and its operation were identified. After a lengthy process of repairing the plant, establishing improved operational procedures, and retraining the staff, the Nuclear Regulatory Commission authorized the plant to restart in December, 2013.

Heavy snows fell on the Rocky Mountains in Montana during the winter of 2010 and 2011. Accompanied by heavy spring rains, the reservoirs on the upper Missouri River began filling to capacity. In response the Army Corps of Engineers began releasing large amounts of water from the dams. The water began flooding along the entire Missouri River. Fort Calhoun Station sits close to the Missouri River. Throughout the summer of 2011 the Fort Calhoun Station was surrounded by the Missouri River flood waters. In April, 2011, Fort Calhoun was shut down for refueling and remained shut down during the flood. On June 6, 2011, the Federal Aviation Administration issued a no-fly directive preventing airplanes from entering airspace within a two-mile radius of the plant. On June 7, 2011, a fire broke out in one of the buildings; and electricity was shut off to the spent fuel pool for about 90 minutes. Power was restored and no radiation was released. For extra protection from the flood waters, a plastic water-filled berm was installed around the plant. On June 26, 2011, while Nuclear Regulatory Commission inspectors were on-site at the nuclear power plant, the berm was punctured, the berm collapsed, and flood water surrounded the containment structure and auxiliary buildings, however flood protection devices kept water out of the buildings. On August 29, 2011, the floodwaters had receded and the flood emergency was lifted. Throughout the flooding, the plant remained safe and no radioactive particles were released into the environment.

Once the flood waters receded, employees at Fort Calhoun Station began a thorough inspection of the plant in order to ensure that the plant equipment was safe and any equipment that had deteriorated by the flood was replaced. Inspections showed that the plant had a litany of significant problems, not only from the flood but from long-term lack of attention to maintenance. These problems included Teflon seals in the containment building that had not been replaced even though

¹⁰ www.nrc.gov/info-finder/decommissioning/power-reactor/lacrosse-boiling-water-reactor.html

¹¹ www.nrc.gov/info-finder/decommissioning/research-test/veterans-administration.html

¹² www.iaea.org/PRIS/CountryStatistics/ReactorDetails.aspx?current=634

¹³ Frank Morris, "Waste, Families Left Behind as Nuclear Plants Close", Omaha World-Herald, October 24, 2016, and Cole Epley, "OPPD board votes to shut down Fort Calhoun nuclear plant; about 700 jobs tied to facility", Omaha World-Herald, June 17, 2016

the Nuclear Regulatory Commission had ordered them replaced years before because Teflon breaks down in the presence of radiation and poses a threat of leaking nuclear radiation into the environment. Structural problems were identified in the containment building, problems that existed from the time the structure was built.

One of the most dangerous problems involved replacing a circuit breaker with a unit that did not fit the rack for the circuit breaker. The repairman forced the replacement into the rack with grease which should not have been applied. During the shutdown, the circuit breaker began smoking, wafting burning odors for three days. No one bothered to report the acrid odors nor did anyone check into the source of the odor. Subsequently the circuit breaker caught on fire. This resulted in the spent fuel pool being without power for 90 minutes. Because of this incident, the Nuclear Regulatory Commission declared that Fort Calhoun should be placed on an increased level of inspection.¹⁴

¹⁴ Sources on Fort Calhoun Station include:

Nancy Gaarder, "NRC: No flood danger at reactor", Omaha World-Herald, June 17, 2011

Ricky Kreitner, "Airspace Over Flooded Nebraska Nuclear Power Plant Still Closed", Business Insider, June 15, 2011, www.businessinsider.com/faa-closes-airspace-over-flooded-nebraska-nuclear-power-plant-2011-6

CNN Wire Staff, "Flood berm bursts at Nebraska nuclear plant", June 26, 2011, http://articles.cnn.com/2011-06-26/us/nebraska.flooding_1_nuclear-power-plant-omaha-public-power-district-berm?_s=PM:US

David Hendee, "Nebraska nuclear reactor dry though surrounded by flood", Reuters, June 17, 2011, www.reuters.com/article/2011/06/17/us-flooding-nuclear-idUSTRE75G4Z120110617

Associated Press, "Nebraska nuclear plant surrounded by water", Des Moines Register, June 26, 2011

"Nuclear plant no longer in flood emergency", KETV.com, August 29, 2011

Daniel Buhrman, "Decommissioning method shift at Fort Calhoun Station picks up speed, lowers price", *Washington County Pilot-Tribune & Enterprise*, June 25, 2019