The Palisades nuclear reactor (power plant) is located on the southeast shore of Lake Michigan near South Haven, Michigan. The 811 megawatt pressurized water reactor, now operated by Entergy, began operation in 1971, making it one of the world’s oldest operating nuclear reactors.

PALISADES: AMERICA’S MOST EMBRITTLED NUCLEAR REACTOR  Embrittlement is a term for changes in metal that make it more brittle and subject to fracture. Bombardment by radioactivity causes embrittlement over time. Ironically, through-wall fracture could occur if cold water is put into the reactor by the Emergency Core Cooling System.

Rupture of the Palisades pressure vessel due to embrittlement could kill thousands of western Michigan residents, ruin thousands of square miles of the best agricultural land in the state, and poison Lake Michigan, the source of drinking water for millions of people.

The U.S. Nuclear Regulatory Commission (NRC) has recognized on several occasions that Palisades has the worst embrittled reactor pressure vessel in the U.S. This caused the utility and NRC to propose permanent closure as early as 1995. Instead, closure has been postponed seven times* thanks to NRC regulatory rollbacks. Entergy has now applied to the NRC for another weakening of the rules, to allow operation past 2017.

LEGAL CHALLENGES TO CONTINUED OPERATION

In 1993 the NRC approved VSC-24 casks for storage of high-level radioactive waste (used or irradiated nuclear fuel) at Palisades. Citizen groups, led by Michigan’s Attorney General Frank Kelley, appealed the decision, citing that VSC-24 casks lacked quality assurance, failed to comply with the National Environmental Policy Act, and were put on sand in a high-risk erosion zone. The court unfortunately deferred to the NRC’s “expertise” in cask approval, overlooking collusion between industry and the NRC. U.S. courts also saw no problem in allowing NRC to use a “generic” license for dry cask storage anywhere in the country. This generic license prevents the public from bringing up site-specific concerns if casks are stored in questionable places.

Palisades’ radioactive waste sits outdoors just 150 yards from Lake Michigan. This storage violates NRC’s own earthquake regulations. Waste is stored in (now) more than 30 concrete and steel casks, each loaded cask weighing about 130 tons. The casks rest on two separate 3-foot-thick concrete pads. The pads were built on loose sand despite reports by the U.S. Army Corps of Engineers and Michigan Department of Natural Resources that the location was a high-risk erosion zone. VSC-24 casks have exploded due to hydrogen gas buildup, as well as having weld failures in their shield lids at 3 reactor sites.

Palisades sits amazingly close to Lake Michigan. Note water use.

In 2005 a broad coalition of citizens and organizations legally intervened at the NRC, opposing a license extension for Palisades. The coalition cited 11 major problems including an embrittled reactor pressure vessel; routine radioactive releases contaminating Lake Michigan and the local drinking water supply; waste storage on the shoreline in violation of regulations; no permanent solution for the waste; and environmental justice violations. The NRC overruled the coalition’s challenges and in 2007 granted Palisades a license extension for 20 years beyond its 40-year engineered lifetime, until 2031.

In 2007, watchdog groups legally challenged NRC to enforce its own earthquake regulations at Palisades. Denied by NRC, groups took the case to the U.S. Circuit Court of Appeals. That court ruled in favor of NRC, deferring to NRC’s supposed technical expertise and ignoring the agency’s collusion with industry. Continued on Page 2.
In December of 2014, four environmental organizations filed a petition with the NRC’s Atomic Safety and Licensing Board for a hearing on Palisades’ embrittlement and Entergy’s License Amendment Request to use proxy data modelling from another reactor to determine the strength of the Palisades reactor. Environmental groups want actual testing of the metal. The ASLB denied a hearing. The coalition has appealed the ASLB ruling to the full NRC.

In March of 2015, the coalition filed a second petition to the ASLB on reactor fracture risk at hotter temperatures. The ASLB ruled in the coalition’s favor, granting a hearing. Entergy appealed this ruling to the full NRC. In July the mayor of Grand Rapids asked the NRC to allow the hearing. In August the Sierra Club filed a “Friend of the Court” legal brief with NRC, supporting the hearing. Ruling is expected in 2015/16.

**PALISADES’ OTHER TROUBLED HISTORY**

- Tritium (radioactive water) is leaking from the reactor directly into Lake Michigan and is also contaminating the groundwater.

- Two steam generators were replaced in 1991. This involved cutting a 28 by 26 foot opening through the 3.5-foot-thick reinforced concrete wall of the containment building. Cutting has weakened the structure. The removed radioactive steam generators are in a large concrete bunker on plant property. A second (unique in history – but needed) replacement of the steam generators is long overdue.

- In 2011 alone, Palisades had five unplanned shutdowns. On Sept. 25 of that year, the near electrocution of a Palisades electrician caused loss of electricity to half the control room. In the resulting chaos, cooling water from the emergency core cooling system was nearly injected into the hot, embrittled reactor pressure vessel.

- In May 2012 when NRC Chair Gregory Jaczko toured Palisades, he was not told about a leak of radioactively contaminated and corrosive water that was ongoing in the control room for over a year.

- Since March of 2014, Palisades has been operating with a 5- by 12-inch piece of metal from a broken impeller blade lodged in the reactor vessel. If it dislodges, serious damage could result.

**BAD ECONOMICS:** After Entergy bought Palisades from Consumers Energy in 2007, the U.S. economy went into recession, creating a downturn in electric consumption. Natural gas and wind prices dropped and the Fukushima disaster highlighted the risks of nuclear power. Today, Wall Street sees most nuclear plants as liabilities, not assets.

In particular, the long-term financial viability of the aging, problem-prone Palisades is uncertain. Until April of 2022, Palisades is buffered from market forces. The sale to Entergy included an agreement that Consumers Energy would purchase all Palisades’ power until 2022, regardless of higher cost or demand.

Nuclear power is not viable without subsidies such as the power purchase agreement in the paragraph above. Other subsidies to nuclear power include government exemption from all but a relatively small amount of liability in the case of an accident or meltdown. Home and business insurance policies contain an exception for nuclear accident damage. NOW IS THE TIME TO CLOSE PALISADES AND REPLACE IT WITH CLEAN, SAFE, AND LESS EXPENSIVE RENEWABLE ENERGY AND EFFICIENCY!

* The underlined/hyperlinked references, plus more information about Palisades and other nuclear issues can be found on the Michigan Sierra Club website www.sierraclub.org/michigan/nuclear-free-future. August 2015

Solar panels and wind turbines do not need armed guards.