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Fractures, Faults and Fission

Bellefonte is Not Suitable for Nuclear Reactors

The Tennessee Valley Authority's Bellefonte site near Scottsboro, Alabama is in an earthquake zone. Nuclear Regulatory Commission geologic and seismic regulations detail the requirements for determining whether a proposed site is acceptable for a nuclear power plant.[1] The criteria include earthquake ground motion, surface tectonic and non-tectonic deformations, seismically induced floods and waves, soil and rock stability, liquefaction potential, slope stability, and cooling water supply
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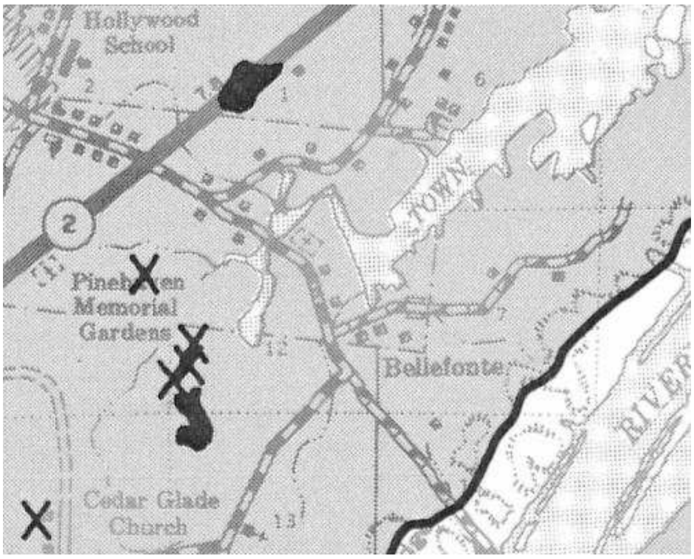

Karst Terrain Fractures

Karst is created by the water dissolving bedrock such as limestone, forming sinkholes and caves. Because it fractures easily, building on or near it poses problems. Karst terrain is prevalent at Bellefonte. But TVA's nuclear construction license application for Bellefonte reactors omitted important geologic features. For example, TVA stated: "No natural sinkholes have been identified and no enterable caves have been located."[2] But the 2007 Alabama Cave Survey database shows 58 caves within 5 miles of Bellefonte, and 1,854 caves in Jackson County. Also, TVA reports no "natural" sinkholes but omits "induced" sinkholes, those produced by human activity. A report by the US Geological Survey [3] provides further information:

> Sinkholes in Alabama are divided into two categories defined as "induced" and "natural." Induced sinkholes are those related to man's activities whereas natural sinkholes are not. Induced sinkholes are further divided into two types: those resulting from a decline in the water table due to ground-water withdrawals and those resulting from construction. Those resulting from a decline in the water table…far outnumber those resulting from all other causes.

The map above, published by the University of Alabama Department of Geography[4], shows sinkholes of two basic sizes: the "X" indicates sinkholes or depressions smaller than 1000 feet

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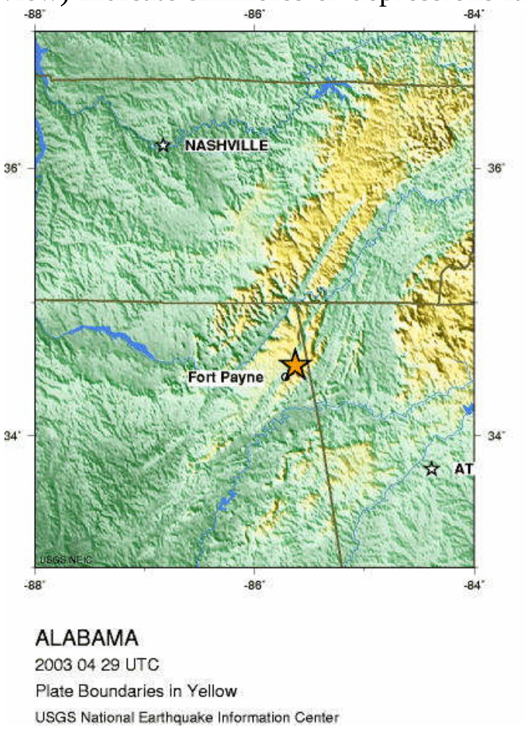
[1] 10 CFR § 100.23
[2] TVA COLA Part 2 FSAR Section 2.5.4.1.3 Weathering Processes and Features
[3] Case History No. 9.11. Alabama, U.S.A., by J. G. Newton, U.S. Geological Survey, Tuscaloosa, Alabama
[4] University of Alabama Department of Geography
http://alabamamaps.ua.edu/historicalmaps/counties/jackson/jackson.html.

across and the irregular marks (two shown in this view) indicate sinkholes or depressions larger than 1000 feet across. These features are within 1 to 2 miles of the proposed Bellefonte reactors.



Seismic Zone

The Bellefonte site is near the Eastern Tennessee Seismic Zone, one of the most active earthquake areas east of the Rocky Mountains. Studies indicate that this seismic zone may have the potential to produce large magnitude earthquakes.

The Eastern Tennessee Seismic Zone extends from southwest Virginia to northeast Alabama. Recent large earthquakes there include a magnitude 4.6 in 1973 near Knoxville and the 2003 Fort Payne Earthquake, also a magnitude 4.6, one of the largest to have occurred anywhere in the southern Appalachians. This quake damaged chimneys and formed cracks in some structures. The event raised concerns about the impact on essential services like water supplies and potential landslides on nearby mountain slopes. The Fort Payne earthquake epicenter is shown by the star on the map, fifty miles from Scottsboro, Alabama.[5] The ETSZ is laced with ancient faults that developed as the Appalachian Mountains formed hundreds of millions of years ago. The possibility of an earthquake with a magnitude of 5.0 and higher is possible; it would cause serious damage to a nuclear plant.

The AP-1000 Reactor Design is on Shaky Ground

Nuclear reactor shield buildings are supposed to protect the reactor from outside events and provide a barrier to the outside world from radiation releases. One of the cost-cutting measures employed by Westinghouse is to use modular construction instead of casting the concrete containment structures as a unit. Also, the AP-1000 shield building supports a gravity-fed emergency cooling water tank with eight hundred thousand gallons of water weighing 3,334 tons. For comparison, the total weight of the nuclear reactor vessel itself is only 417 tons.[6] In October 2009 the Nuclear Regulatory Commission sent Westinghouse back to the drawing board because the company had not demonstrated the ability of the AP-1000 structure to meet standards. NRC said, "Specifically, the design of the steel and concrete composite structural module (SC module) must demonstrate the ability to function as a unit during design basis events."[7]

L. Zeller, March 24, 2011

[5] Map retrieved from Wikipedia April 7, 2008 at http://en.wikipedia.org/wiki/2003_Alabama_earthquake
[6] AP1000 Design Control Document Reactor Coolant System and Connected Systems 5.3.4.1, Revision 15
[7] Letter to Westinghouse From Dave Matthews to Rob Sisk regarding AP1000 Shield Building Design, 10/15/2009