

SAFETY EVALUATION REPORT SUPPLEMENT
DAVIS-BESSE UNIT 1
GEOLOGY-SEISMOLOGY
DOCKET NO. 50-500/501

The vibratory motion for seismic design at the Davis-Besse Unit 1 site is assumed to result from a Modified Mercalli intensity VII-VIII. This corresponds to the Anna, Ohio, event of March 8, 1937, the highest intensity earthquake in the central stable region that has not been definitely associated with structure. It had a felt area of 150,000 sq. miles and an estimated magnitude of 5.5 (5 to 6) based upon limited instrumental data, felt area and intensity-magnitude correlations. The extent of the felt area indicates that it could not have been a very shallow (less than 5 km deep) event. The foundation conditions at the Davis-Besse 1 site 100 miles north of Anna consist of 15 feet of glacial till overlying bedrock (dolomite and shale). The Category I structures are either on or near the bedrock surface. Vibratory ground motion estimates that best approximate the safe shutdown earthquake would then be that derived from accelerograms recorded on rock near magnitude 5 to 6 earthquakes that had maximum intensities of VII-VIII.

The applicant designed the Davis-Besse 1 power plant prior to the issuance of Appendix A to 10 CFR Part 100 and Regulatory Guide 1.60. The design response spectrum was based on a modification of the E-W accelerogram recorded during the Helena, Montana earthquake of October 31, 1935. This earthquake had an instrumentally determined magnitude of 6.0, a maximum epicentral intensity of VIII, and a felt area of 140,000 square miles.

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Due to regional variations in seismic wave attenuation, western earthquakes have smaller felt areas than eastern earthquakes of similar magnitude. The accelerogram which had a peak acceleration of 0.16g was recorded on a rock site approximately 5 miles from the epicenter. Considering the parameters of the safe shutdown earthquake required for the Davis-Besse site (MM VII-VIII) this accelerogram may be considered a good choice for design basis with respect to expected earthquake magnitude, intensity, epicentral distance and foundation conditions. Moreover, the 1935 Helena earthquake appears to be conservative with respect to earthquakes that could be expected to occur in the vicinity of the Davis-Besse site.

References

1. Trifunac, M. D. and A. G. Brady, "On the Correlation of Seismic Intensity Scales with Peaks of Recorded Strong Ground Motion." Bulletin of the Seismological Society of America, Volume 65, pages 139-162, 1975.