

UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION
 OFFICE OF NUCLEAR REACTOR REGULATION
 HAROLD R. DENTON, DIRECTOR

In the Matter of

PUBLIC SERVICE COMPANY OF INDIANA, INC.
 WABASH VALLEY POWER ASSOCIATION, INC.
 (Marble Hill Nuclear Generating
 Station, Units 1 & 2)

)
)
) Docket Nos.: STN 50-546
) STN 50-547
) (10 CFR 2.206)
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DIRECTOR'S DECISION UNDER 10 CFR 2.206

On May 23, 1980, the Commission referred an undated document (docketed on May 14, 1980) to the NRC Staff for consideration under 10 CFR 2.206 of the Commission's regulations. This document, which was filed by Mr. Thomas M. Dattilo on behalf of Save The Valley (STV), is entitled "Save the Valley Additional Comments To Commissioners Concerning Resumption of Work at Marble Hill."^{1/} Notice of receipt of the STV document was published in the Federal Register (45 FR 53287-1980).

Of the various matters raised, STV's document contains two issues which are the responsibility of the Office of Nuclear Reactor Regulation. The first issue concerns STV's allegations that the New Madrid fault zone extends in a northeasterly direction towards the Marble Hill site. The second issue involves a concern over accidental releases of radioactive liquids. For the reasons stated in the remainder of this decision, no further action is warranted at this time with regard to these two issues. The remaining matters raised in the documents, which concern construction practices at Marble Hill, are before the Office of Inspection

^{1/} This document incorporated another document entitled "Save the Valley Comments Regarding the Consideration of the Reopening of Marble Hill," which was docketed on May 7, 1980. The May 7th document concerns issues related to construction activities at Marble Hill which were not considered in this decision.

and Enforcement for appropriate action.

NEW MADRID EXTENSION

With respect to this issue, STV alleges that the New Madrid fault zone extends in a northeasterly direction toward the Marble Hill site and, as a result, there should be a further study made of the New Madrid Seismic Zone Extension and its implications regarding Marble Hill. In determining the safe shutdown earthquake (SSE) for the Marble Hill site, the Licensing Board found that (6 NRC at 345(1977)):

The intensity of the largest earthquake not demonstrated to be reasonably associated with structure which has occurred in [the central Stable Region tectonic] province is VII-VIII Modified Mercalli [Anna, Ohio]. This intensity is assumed to occur at the site in establishing the safe shutdown earthquake [reference omitted].....

[It was also] found that an earthquake like the largest in the New Madrid series of 1811-1812 should be assumed to occur in the Wabash Valley area about 110 miles from the Marble Hill site in establishing the safe shutdown earthquake. Intensity attenuation relationships indicate an intensity near IX Modified Mercalli could be experienced at an epicentral distance of 110 miles from the largest earthquake in the New Madrid series. While this earthquake is expected to produce peak accelerations less than those for a nearby earthquake of intensity VII-VIII Modified Mercalli, its effects need to be considered because of the sustained vibratory motion and increased spectral response at longer periods from such an earthquake. In summary, the vibratory motion used by the Applicants in designing the Marble Hill facility must adequately represent the effects of:

- (1) an intensity VII-VIII Modified Mercalli earthquake occurring near the site, and
- (2) an intensity XI-XII Modified Mercalli-New Madrid type earthquake occurring 110 miles from the site [reference omitted].

We have reviewed recent information on the postulated extension of the New Madrid fault zone in a northeasterly direction. State agencies and cooperating educational institutions in Arkansas, Missouri, Tennessee, Kentucky, Illinois and Indiana have supplied both geologic and geophysical research and have returned results that are helping to define the seismotectonics of the New Madrid Seismic Zone and adjacent areas.

In particular, evidence for the northeasterly extension of the New Madrid Seismic zone across the 38th parallel is inconclusive. Geophysical investigations (in particular gravity and magnetics) north of the 38th parallel have indicated some very subtle similarities with the areas of higher seismicity to the south, such as weak lineations of circular positive magnetic anomalies similar to those measured in the New Madrid area. Interpretation of these similarities is highly conjectural. Postulation of a continuous structure connecting Southern Indiana and the New Madrid Zone using available data has not been endorsed or accepted by a large majority of the geologic and geophysical community. There is certainly no consensus among seismologists that would predicate an earthquake, the size of New Madrid, occurring in Southern Indiana.

The idea of a northeasterly striking alignment is not new. G. P. Wooland suggested a major structural break extending from the Mississippi Valley through the St. Lawrence River Valley.^{2/} However, seismic hazard maps of the United States do not exhibit this feature.^{3/}

Results from a seismic instrument network in the New Madrid area have demonstrated that there is a distinct break in seismicity at about the northern extent of the Mississippi Embayment (37.5 degrees north latitude).^{4, 5/} Seismologists at St. Louis

^{2/} Transactions of American Geophysical Union Volume 39, No. 6, 1958

^{3/} Algermissen, S.T., "Seismic Risk Studies in the United States" Fourth World Conference on Earthquake Engineering, Santiago, Chile, January 1969.

^{4/} W. Stauder, et al., Seismological Society of America Bulletin, Vol. 66, No. 6, 1976.

^{5/} W. Stauder, et al., Central Mississippi Valley Earthquake Bulletin, Quarterly Report No. 23, 1980, St. Louis University.

University have separated seismic occurrence into two zones, New Madrid (South of 37.5° N) and Wabash Valley (North of 37.5° N). The Wabash Valley zone trends more northerly than the proposed northeastern extension of the New Madrid fault zone. We have, up until this time, incorporated both the New Madrid and Wabash Valley fault zones into one zone. Therefore, we believe that the postulation of a New Madrid type earthquake occurring in the Wabash Valley, for the purpose of determining the SSE for Marble Hill, is conservative.

The New Madrid Seismotectonic Study is continuing and new results are regularly evaluated to update our knowledge of earthquake hazard in New Madrid and adjacent areas of the Midwest. Currently, though, we find no reason to change our previous conclusions regarding the SSE for the Marble Hill site.^{6/}

Postulated Liquid Radioactive Releases

The second STV issue involves a concern over leakage of radioactive fluids from the reactor containment building. This matter was the subject of Contention No. 15, "Ground Water Contamination", at the Marble Hill construction permit hearing. The Licensing Board found that (6 NRC at 341(1977)):

The approach of both the Applicants and the Staff in assessing the effect of a postulated accidental release of radioactive liquids from the proposed Marble Hill Station is a highly conservative one. The analyses assume that

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We will give appropriate consideration to future analyses of earthquake hazards that bear on the seismicity of the Marble Hill site, particularly as we conduct the operating license review for the Marble Hill Station. Moreover, this decision does not preclude litigation of appropriate contentions concerning seismic issues in any proceeding on issuance of operating licenses for Marble Hill. For purposes of this decision, however, STV has not identified significant new information that would warrant action to re-evaluate prior resolution of these issues. See Consolidated Edison Co. (Indian Point Station, Units 1-3), CLI-75-8, 2 NRC 173, 176 (1975); Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 & 2), DD-79-21, 10 NRC 717, 719 (1979).

there is a nonmechanistic instantaneous catastrophic failure of the tank that is postulated to have the highest concentration and activity of liquid radioactive waste. This assumption is coupled with the further conservatively inconsistent assumption that all of this liquid rad-waste somehow (non-mechanistically) gets into both the ground water and into the Ohio River, for purposes of analysis of each pathway. In addition, for accident analysis purposes, the radioactivity level assigned to the release assumes no holdup in the tanks and arbitrarily multiplies the activity by a factor of eight (Staff Test., post Tr. 1578; Tr. 1547-88; 1579-81; 1586-88; 1590). The Board agrees with the Staff that these assumptions are not realistic expectations and are therefore highly conservative (Tr. 1580-81; 1590-93).

There is testimony that the sand and gravel alluvial-glaciofluvial aquifer is not continuous between the proposed site and the wells used by the City of Madison (Applicant Test., post Tr. 1505, p. 3). The hydraulic gradient within the aquifer is from north to south, corresponding to the hydraulic gradient of the Ohio River. The City of Madison water wells lie upgradient from the proposed site, any postulated liquid radioactive releases into the ground water will be carried in the direction away from the Madison water wells (Staff Test., post Tr. 1578; Applicant Test., post Tr. 1505, p. 2). Accordingly, the Board finds that there is no credible potential for ground water movements from the proposed site to the upstream Madison, Indiana, wells.

In addition, no unacceptable effects to other pumping centers will result. The postulated release of radioactive liquids from the proposed facility will have no unacceptable effects on either the closest down gradient ground water pumping center (Oldham Water District, located approximately 12 miles downstream) or on the nearest downstream surface water user (the Louisville Water Company, located about 30 miles downstream) (Errata to Staff Site Suitability Report, post Tr. 1296). The calculated radionuclide concentrations for these water users are small fractions of the limits of 10 CFR Part 20 for unrestricted areas, and are therefore acceptable [reference omitted].

As stated in the staff's testimony, the analysis of accidental releases of radioactive fluids from the Marble Hill facility assumed that these liquids would escape through postulated fractures in the limestone to the Ohio River with no holdup in transit. However, our post construction permit review of the lower elevations of the excavation for the Marble Hill facility found that the limestone was very

tight.^{7/} Therefore, our analysis for release of radioactive liquids was very conservative. Further action on STV's concern is not warranted.

CONCLUSION

For the reasons set forth above, no further action will be taken on the two issues raised by Save The Valley. A copy of this decision will be filed with the Secretary of the Commission for review by the Commission in accordance with 10 CFR 2.206(c) of the Commission's regulations. As provided in 10 CFR 2.206(c), this decision will constitute the final action of the Commission twenty (20) days after the date of issuance, unless the Commission on its own motion institutes a review of this decision within that time.

Harold R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 27 day of December, 1980.

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See letter from Brown to Gammill (December 12, 1977) on Marble Hill site visit. A copy is enclosed with this decision.