



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 13 1981

Docket No. 50-255
LS05-81-01-017

Mr. David P. Hoffman
Nuclear Licensing Administrator
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Dear Mr. Hoffman:

SUBJECT: SEP TOPIC III-4.D, SITE PROXIMITY MISSILES (PALISADES)

Enclosed is a copy of our draft safety evaluation of Topic III-4.D, "Site Proximity Missiles" for the Palisades Plant. This assessment compares your facility, as described in Docket No. 50-255, with the criteria currently used by the regulatory staff for licensing new facilities. Please inform us if your as-built facility differs from the licensing basis assumed in our assessment within 30 days of receipt of this letter. If you do not reply within 30 days we will assume you have no comments and that the evaluation is correct.

This evaluation will be used as a basic input to the integrated safety assessment for your facility unless you identify changes needed to reflect the as-built condition at your facility. This topic assessment may be revised in the future if your facility design is changed.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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Mr. David P. Hoffman

PALISADES
DOCKET NO. 50-255

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PALISADES

Topic III - 4.D - Site Proximity Missiles

The safety objective of this topic is to assure that the integrity of the safety-related structures, systems, and components will not be impaired and that they will perform their safety functions in the event of a site proximity missile. The review was conducted in accordance with the guidance given in SRP's 3.5.1.5, 3.5.1.6, and 2.2.3.

The potential for hazardous activities in the vicinity of the Palisades plant has been addressed in SEP topic II-1.C, Potential Hazards due to Nearby Industrial, Transportation, and Military Facilities. As indicated therein, there is little industrial activity near the plant. The distances to the nearest land transportation routes are such (about 3600 feet to the nearest highway, and 11,880 feet to the nearest railroad) that the risk associated with potential missiles from transportation accidents on these routes are well within the SRP 2.2.3 guidelines. Similarly, the nearest pipelines are about three miles from the plant, and do not pose a missile threat to the plant. Lake traffic is also sufficiently far away (about 10 miles) so as not to present a credible missile hazard. There are no military facilities or activities near the plant which would create a missile hazard.

The one activity in the vicinity of the plant that could be a potential missile hazard is in connection with the operation of the South Haven Municipal Airport which is about three miles northeast of the plant.

South Haven Airport is a general aviation facility with one paved runway and three turf runways. The paved runway, designated 4-22 and thus oriented in a northeast-southwest direction, is 3485 feet long and 50 feet wide. The airport is used primarily by light single engine aircraft engaged in general

aviation activities such as business and pleasure flying and agricultural spraying operations. There are currently about 20,000 operations per year at the facility and 12 to 15 based aircraft exclusive of aircraft used for crop dusting.

The regulatory staff, based on evaluations performed in several licensing reviews, has concluded that nuclear power plant structures which are designed to withstand tornado missiles and other design loads can withstand the collision forces imposed by light general aviation aircraft without adverse consequences. Safety-related equipment located outside of such structures, however, would be vulnerable to a light airplane crash. Employing the analytical model given in SRP 3.5.1.6, we calculate, on a conservative basis, that the overall probability of a light aircraft striking such equipment at the Palisades plant for the present level of aircraft operations is about 1.55×10^{-7} per year. This is considered an acceptable level and in accordance with the acceptance criteria of SRP 2.2.3. A major conservatism in our calculation is that all operations at South Haven Airport involve aircraft which arrive or depart the field by passing over the plant area. Only a fraction of the total reported airport operations would involve flights near the plant. Since an operation is considered to be either a takeoff or a landing,¹ on the average no more than one half of the operations are expected to have the potential for being near the plant. Another conservatism stems from the assumption that each relevant plant target is vulnerable to aircraft crashes from any direction. However, most of the targets are shadowed by other plant buildings from one or more directions, so that the effective target area is significantly less than what was used in our evaluation.

The above considerations notwithstanding, we have reviewed the safety-related equipment vulnerable to potential aircraft impacts with respect to availability of backup systems, and the importance of the equipment with respect to achieving a safe shutdown. Specifically, the following equipment was evaluated with respect to aircraft impacts:

1. Condensate Storage Tank

This is a source of water for the auxiliary feed system pumps, and is not required for achieving a safe shutdown under normal plant operating conditions. A backup water supply is available from the fire protection system. The tank is shadowed from three sides by surrounding plant buildings.

2. Atmospheric Dump Valves

The dump valves service the main steam lines and are protected by two feet of concrete. However, the vents protrude beyond the building roof and could conceivably be crimped in the event of an aircraft crash. The dump valve operation is needed for accommodating a plant trip with a loss of offsite power. The simultaneous loss of offsite power in the event of an aircraft crash onto the vents is considered to have a low probability. Hence, the potential for crimping of the vents in the event of an aircraft impact is acceptable, since the vents are not needed for achieving a safe shutdown under normal plant operating conditions.

3. Transformer Area

Damage of the station transformers in the event of an aircraft impact could cause a loss of offsite power. This is acceptable, however, since the diesel generators would be available for supplying the required electrical power for vital plant systems.

The transformer area is partially shielded by the Containment and Turbine buildings.

4. Safety Injection and Refueling Water Tank

This is a source of water for the Safety Injection System. Although there is no backup water source available for the safety injection function, it is not needed for achieving a safe shutdown under normal plant operating conditions. The tank is shadowed on two sides by the Containment and Auxiliary Buildings.

5. Diesel Generators

The Diesel Generators are redundant and physically separated by a concrete wall. They are protected by a minimum of 18 inches of concrete. The air intake and exhaust piping is located in two separate, semi-enclosed concrete structures which are open to the outside on one side. The open side is partially shadowed by the Auxiliary Building structure. The separation of the openings is such that it is highly unlikely that a small aircraft would incapacitate both intake/exhaust piping systems. In any event, the Diesel Generators are not needed for achieving a safe shutdown under normal plant operating conditions, since a simultaneous loss of offsite power is considered to be a low probability event.

6. Spent Fuel Pool

The Spent Fuel Pool is used for storage of spent reactor fuel beneath about 23 feet of water. The nominal plan view pool dimensions are 15 feet by 38 feet. The probability of a light aircraft striking this area is about 2.5×10^{-8} assuming that the building walls and roof were not present. This is a conservative estimate. Although the walls and roof are constructed of relatively thin metal panels, the building support columns and roof beams would provide substantial resistance

to aircraft impacts. The roof area in particular is covered by a framework of I-beams which are spaced 6 feet apart. In order for the aircraft to land within the pool, it would have to miss these structural members. Hence, there is a very low likelihood (well within SRP 2.2.3 criteria) of an aircraft entering the Spent Fuel Pool and damaging a sufficient number of fuel assemblies such that 10 CFR Part 100 dose guidelines would be exceeded.

As indicated above, the safety-related systems potentially vulnerable to light aircraft impacts either have a backup system available or are not needed for achieving a safe shutdown under normal plant operating conditions. This finding is based on the consideration that the combined probability of an aircraft impacting one of these systems and the simultaneous loss of a normal operating function which would lead to a demand for that system is sufficiently low and well within the criteria of SRP 2.2.3.

It should be noted that the projected annual number of operations, as described in the airport master plan for the South Haven Municipal Airport¹, is forecasted to reach a two to three fold increase over the 21 year period from 1974 and 1995. However, this projection was based on the assumption that the airport would have an expanded runway to be built by 1980.

To date, the expansion has not taken place, and discussions with the airport management² indicate that expansion is not contemplated in the foreseeable future. Should the airport activities begin to show a discernible potential for a substantial expansion, we will require the licensee to inform the staff

in a timely manner so that we may evaluate effect of the expansion on the aircraft with respect to the Palisades Plant.

We conclude that the risk of missile impacts (other than aircraft) from offsite sources on the Palisades plant is well within the SRP 2.2.3 criteria. The risk of aircraft impacts on the plant is judged to be sufficiently low on the basis of meeting SRP 2.2.3 criteria and the finding that the consequences in the event of an aircraft crash onto the site are acceptable since the plant will have the ability to achieve a safe shutdown.

REFERENCES

1. "Comprehensive Airport Master Plan. South Haven Municipal Airport," R. Dixon Speas Associates, July, 1978.
2. Oral Communication with F. Kantor, USNRC, and Robert Mueller, South Haven Municipal Airport Manager, September 20, 1979.