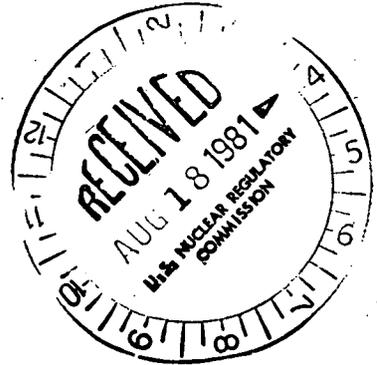


August 3, 1981

Docket No. 50-255  
LS05-81-08-005



Mr. David P. Hoffman  
Nuclear Licensing Administrator  
Consumers Power Company  
1945 W Parnall Road  
Jackson, Michigan 49201

Dear Mr. Hoffman:

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

Enclosed is a copy of our final 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. This evaluation incorporates those comments provided in your letter dated July 2, 1981. Your comment regarding the three airports located between 10 and 13 miles from the plant has been included. However, the nature and distance of these airports preclude them from having a significant effect on plant safety. Therefore, our conclusions regarding aircraft hazards has not been changed.

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 No. 5  
Division of Licensing

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Enclosure:  
As stated

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DATE	7/16/81	7/17/81	7/20/81	7/20/81	7/30/81	7/21/81

Mr. David P. Hoffman

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PALISADES  
SYSTEMATIC EVALUATION PROGRAM TOPIC  
TOPIC III-4.D, SITE PROXIMITY MISSILES  
(INCLUDING AIRCRAFT)

I. INTRODUCTION

The safety objective of this topic is to ensure that the integrity of the safety-related structures, systems and components would not be jeopardized due to the potential for a site proximity missile.

II. REVIEW CRITERIA

General Design Criterion 4, "Environmental and Missile Design Basis." of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that nuclear power plant structures, systems and components important to safety be appropriately protected against events and conditions that may occur outside the nuclear power plant.

III. RELATED SAFETY TOPICS

Topic II-1.C, "Potential Hazards or Changes in Potential Hazards Due to Transportation, Institutional, Industrial and Military Facilities" provides a description of the potential missile hazards.

IV. REVIEW GUIDELINES

The review was conducted in accordance with the guidance given in Standard Review Plan (SRP) Section 2.2.3, "Evaluation of Potential Accidents," 3.5.1.5, "Site Proximity Missiles (except Aircraft)," and 3.5.1.6, "Aircraft Hazards."

V. EVALUATION

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 one turf runway. 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.

In addition, three additional airports, Ross Field, Millburg and Watervliet are located between ten and thirteen miles from the plant. Ross Field has approximately 34,000 operations per year involving general aviation, air carrier, air taxi and military operations. Millburg and Watervliet are uncontrolled airports which do not have a recorded operation history. Since, the nature of operations and distance of these three airports from the Palisades Plant will not have a significant effect on the safety of the plant, we have only considered these operations from the South Haven Airport in our safety evaluation.

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  $1.55 \times 10^{-7}$  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<sup>1</sup>, 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 three sides by the Containment, Auxiliary and Turbine Buildings.

5. Diesel Generators

The Diesel Generators are redundant and physically separated by a concrete and masonry block 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  $2.5 \times 10^{-8}$  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 Airport<sup>1</sup>, 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 management<sup>2</sup> 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.

#### VI. CONCLUSION

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.