ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

July 15, 1964

Honorable Glenn T. Seaborg
Chairman
U. S. Atomic Energy Commission
Washington, D. C.

Subject: REPORT ON CITY OF LOS ANGELES - MALIBU NUCLEAR PLANT - UNIT NO. 1

Dear Dr. Seaborg:

At its fifty-sixth meeting at Brookhaven National Laboratory on July 9-11, 1964, the Advisory Committee on Reactor Safeguards reviewed the proposal of the City of Los Angeles to construct and operate a 1473 MW(t) pressurized water reactor, Malibu Nuclear Plant - Unit No. 1, at Corral Canyon, twenty-nine miles west of Los Angeles. The Committee had the benefit of discussions with representatives of the Department of Water & Power of the City of Los Angeles, Westinghouse Electric Corporation, Stone & Webster Engineering Corporation, the AEC staff, their consultants, and of a Subcommittee meeting on June 18, 1964. The Committee also had the benefit of the documents listed below.

The proximity of large population centers and the probable growth of population in the vicinity of the proposed reactor site require dependence on engineered safeguards to limit the consequences in the unlikely event of a major credible accident. For this reason, safeguard provisions more extensive than those normally employed in nuclear power reactor plants must be provided in lieu of the distance factor to protect the public.

The applicant has proposed as engineered safeguards a novel containment structure intended to prevent any leakage to the environment, and additional features consisting of:

1. A reinforced concrete containment structure.

2. A containment volume spray system, and

3. An emergency borated-water injection system.

The total containment feature of the building is to be achieved by providing two complete steel liners separated by a layer of porous concrete. The space between the liners will be maintained at a sub-atmospheric pressure by continuously pumping back air to the containment volume. An air recirculating and cooling system is required to remove any heat that is generated within the containment volume. Power and water to assure operation of these systems under all conditions must be provided.

Detailed design of the reactor core has not been established yet, but the general features will be similar to those of other nuclear plants proposed for construction by the same nuclear contractor, and expected to be tested in operation prior to completion of the Malibu plant. Nuclear reactivity coefficients are expected to be negative in this reactor. The probability and effects of control rod ejection require further evaluation. The applicant has suggested several possible means of limiting the consequences of such an accident, and the Committee believes that this question can be resolved satisfactorily during the design stage.

Although stainless steel cladding is planned for the first core, it is anticipated that zirconium alloys may be used in future cores. Complete information on the effect of a possible zirconium-water reaction on the course of accidents is not available. Hence, further review will be needed prior to use of zirconium alloy clad cores.

The Committee was informed that the geology of the site was suitable for the proposed construction. It was reported that no active geological faults are present at the site. Grading of the canyon slopes is proposed to ensure that potential landslide motion does not present a hazard to the plant. It is proposed that critical structures be designed for a suitable response spectrum associated with an earthquake which has a maximum acceleration of 0.3 g. occurring when the containment is under the pressure associated with an accident. The resulting stresses will not exceed 80% of the minimum yield value. Components within the building will be designed to withstand 0.3 g. acceleration acting simultaneously in horizontal and vertical plants.

The ability of the plant to withstand the effects of a tsunami following a major earthquake has been discussed with the applicant. There has not been agreement among consultants about the height of water to be expected should a tsunami occur in this area. The Committee is not prepared to resolve the conflicting opinions, and suggests that intensive efforts be made to establish rational and consistent parameters for this phenomenon. The applicant has stated that the containment structure will not be impaired by inundation to a height of fifty feet above mean sea level. The

integrity of emergency in-house power supplies should also be assured by location at a suitable height and by using water-proof techniques for the vital power system. The emergency power system should be sized to allow simultaneous operation of the containment building spray system and the recirculation and cooling system. Ability to remove shutdown core heat under conditions of total loss of normal electrical supply should be assured. If these provisions are made, the Committee believes that the plant will be adequately protected.

The applicant has proposed to deny entrance to the containment while the reactor is operating. This mode of operation does not permit frequent surveillance of equipment and prompt detection of incipient defects. Operating experience at other power plants has demonstrated the value of accessibility for inspection. The Committee suggests that the applicant reconsider this question and explore design modifications which will allow entrance without violating the containment integrity.

As the Committee has commented in its earlier letters, the hold-up of routine gaseous and liquid releases may be necessary during unfavorable conditions. In this connection, it will be necessary to conduct additional pre-operational meteorological and oceanographic survey programs.

The Advisory Committee on Reactor Safeguards believes that the items mentioned above can be suitably dealt with during construction, and that the proposed Malibu Nuclear Plant can be constructed with reasonable assurance that it can be operated at the site without undue risk to the health and safety of the public.

Sincerely yours,

/s/

Herbert Kouts
Chairman

References Attached.

References:

1. Preliminary Hazards Summary Report, Malibu Nuclear Plant, Unit No. 1, Part B, dated November 1963.

2. General Information in Support of Application for Construction Permit and License, Malibu Nuclear Plant, Unit No. 1, Part A, dated November 1963.

3. Second Amendment to Application for Construction Permit and Facility License for Malibu Nuclear Plant - Unit No. 1, dated May 6, 1964.

4. Third Amendment to Application for Construction Permit and Facility License for Malibu Nuclear Plant - Unit No. 1, dated May 20, 1964.

5. Fourth Amendment to Application for Construction Permit and Facility License, dated June 3, 1964.