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MEMORANDUM FOR: F. J. Miraglia, Technical Assistant, DSE
 FROM: W. S. Bivins, Leader, Hydrologic Engineering
 Section, Hydrology-Meteorology Branch, DSE
 L. C. Hulman, Chief, Hydrology-Meteorology Branch, DSE
 SUBJECT: PHILIPPINE PRELIMINARY SITE INVESTIGATION REVIEW

Pursuant to Mr. Denton's request to Mr. Gammill, dated February 16, 1977 on the above subject (TAC #4450), we have reviewed the report following the guidelines for an ISEI review. Our evaluation of the Preliminary Site Information Report is enclosed. In the areas reviewed (hydrologic, coastal and oceanographic engineering) the report is well written, provides relevant information and is generally of greater scope and depth than previous ISEI reports we have reviewed. This review was performed by E. F. Hawkins.

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Enclosure:
 As stated
 cc w/enc1:
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HYDROLOGIC ENGINEERING EVALUATION
PRELIMINARY SITE INVESTIGATION REPORT
PHILIPPINE NUCLEAR POWER PLANT

The proposed site is on Napot Point of Bataan Peninsula, on the western side of Luzon Island. Napot Point juts out into the South China Sea and is the northern boundary of Bagac Bay. Two small creeks border the point, but no streams cross the proposed plant area. The plant will be an open-cycle cooling system with a flow rate of about 600,000 gpm and a temperature rise of about 14°F across the condenser. Freshwater needs for the plant are estimated to be about 750 gpm, and will be obtained from onsite wells to be developed by the applicant. Plant grade is planned to be about +18m, MSL which will require some cut and fill.

The applicant investigated flooding potential at the site from various sources including probable maximum flooding on nearby creeks, local probable maximum precipitation on plant grade, a probable maximum typhoon and a probable maximum tsunami. According to the applicant's studies, flooding of the site due to a probable maximum flood on the nearby creeks does not appear possible, but subsequent access to the site may be a problem. Similarly, local probable maximum precipitation will be considered in the design of safety-related structures and the plant drainage system.

A probable maximum typhoon was estimated for the site using techniques similar to those employed by the U. S. National Weather Service in the development of Probable Maximum Hurricane criteria for the East and

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Gulf coasts of the United States. The applicant estimated that the ~~maximum~~ surge (stillwater level) at the site, using the bathstrophic ~~storm~~ surge model and including initial rise and astronomical tide, would be about 3.3m, MLLW (equal to about 2.8m, MSL). Runup from the ~~maximum~~ wave was estimated to be to about 14.6m, MSL at the extreme ~~western~~ end of the point of the coast. Runup nearer the site area will be somewhat less.

A probable maximum tsunami was estimated by assuming an earthquake occurs in the Manilla Trench, some 125km west of the site. The movement is assumed to occur over an area that is 40km wide and 200km long with a maximum downward displacement of the sea floor of 4m in about 10 seconds. The resulting disturbance of the sea surface was routed to the coast by a two-dimensional model. Based on this estimate, the maximum drawdown at the coast would be to about -11.6m, MLLW and the maximum runup to about 12.9m, MLLW.

Since plant grade will be at 18m, MSL (18.5m, MLLW), no safety-related structures on plant grade should be affected by flooding. However, the sources of water for the Ultimate Heat Sink was not discussed. If an intake structure on the coast is planned to provide this water, it would have to be designed for the flooding and low water conditions discussed above.

Ground water in the site area was investigated in some detail by the applicant. According to his studies construction of the plant would not adversely affect any nearby uses. In case of an onsite spill of radioactive liquids, the direction of flow would be toward the coast and there are no users between the site and the coast.

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The design basis ground-water level was not specified, but a brief inspection of the observed ground-water levels in the site area indicates that post-construction piezometric ground-water levels may be at (or possibly above) plant grade. This is due to the fact that some of the aquifers in the area are under artesian pressure and the applicant plans some cut and fill.

In general the applicant appears to have done a considerable amount of study prior to this preliminary report. The areas that would need further clarification are, for the most part, already identified by the applicant. The areas that appear to warrant closer study are: (1) the location and design of the intake for safety-related water (UHS); (2) the design of the roofs of safety-related structures and site drainage for a local probable maximum precipitation; and (3) the post-construction ground water levels. In addition, the bases for the assumptions used in developing both the probable maximum typhoon and tsunami need to be discussed in much more detail and substantiated as being conservative.

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