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November 19, 1969

J. M. Hendrie, Chairman
Shoreham Subcommittee

REVISED PAGES TO MINUTES OF OCTOBER 30, 1969 SITE VISIT, DATED NOVEMBER 3, 1969

Revised pages 1, 2 and 3 of the minutes of the Shoreham site visit and related meetings, dated 11/3/69, are attached. Changes are indicated by a line at the side of the page.

Copies have been provided to the rest of the ACRS members.

Original Signed by
J. E. Hard

J. E. Hard
Senior Staff Assistant

Attachment:
Revised Pages to Minutes of Shoreham
Site Visit, October 30, 1969

cc: Remainder ACRS Members, w/att.

FILE: Shoreham project file

OFFICE ▶	ACRS				
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11/3/69

MINUTES OF
SHOREHAM SUBCOMMITTEE MEETING
(NEAR BROOKHAVEN NATIONAL LABORATORY)
OCTOBER 30, 1969

Visit to Proposed Site

The Subcommittee conducted a walking tour of the land owned by LILCO and proposed to be the site of the Shoreham Nuclear Station. The site is located on the north shore of Long Island just north of Brookhaven National Laboratory; a distance of about 60 miles from downtown New York. All but one of the privately owned homes in the exclusion area had been purchased by LILCO and negotiations were in progress for the last one. A row of summer homes dot the shoreline just west of the exclusion boundary. These are the nearest residents to the proposed reactor location. At the time of visit, completed site preparations included the construction of the intake canal and the diversion of Wading Creek. Some grading had been done in the reactor building and gas turbine generator locations and grading efforts were in progress at the switchyard. An on-site meteorology tower was observed to be in operation.

The Subcommittee also was driven past the closest airport, Grumman, and observed what appeared to be commercial airline training flights (takeoffs and landings) in progress.

Meeting with Regulatory Staff

Goller summarized the status of the technical review and the major problems. There are no difficulties with population or exclusion zone. The airport question, however, may be a point of intervention and they have looked closely at the points brought out by the Lloyd Harbor Study Group*. DRL has evaluated the specific type flights originating at the Grumman airport and looked at the probabilities of accidents for each. The final probability of accidents came out about the same as previously concluded. The training flights had better accident records than the commercial flights, according to the statistics. Therefore, DRL's conclusions were the same as before. One of Mr. Carl's observations referred to using only fatal crashes rather than all crashes. DRL's review showed that the rate of reduction of crash frequency with distance is larger for all crashes than for just fatal crashes. Therefore, using the rates of decrease from fatal crash statistics is more conservative. Goller expected the number of training flights would be reduced in the future. The U. S. Navy does engineering test flights of Grumman aircraft from this field. As far as is known, there are no nuclear weapons at the airport. Goller handed out the DRL discussion paper on the probability of crash at Shoreham. Dr. Isbin brought up the question of whether or not the Carl letter should be referenced and Dr. Hendrie deferred this question to the next Subcommittee meeting. R. Boyd advised against referencing these letters. A Nike missile installation exists at the airport. Dr. Siess observed that these bases are being abandoned around the country. (Turkey Point has a Nike installation and a nearby SAC base.)

*See attached DRL internal memorandum.

** Not correct. See memo to file dtd 9/9/70.

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Regarding the "ologies", Newmark, et al, had questions on liquefaction which are still being evaluated. Regarding hydrology, questions of dilution and site flooding are answered in Amendment 8.

The containment design and geometry (truncated cone with pool underneath) are different here than any other plant. Stone & Webster is evaluating the performance of this rather than GE and DRL appears to be satisfied with the design. The sliding base feature has been replaced with more conventional construction. The CONTEMPT-PS code was used by Regulatory to evaluate the post-accident pressure-time relationship. In this design, the energy deposition rate/vent is more than in any other BWR design. Amendment 9 will be a report on S&W's code used for containment pressure calculations. Dr. Siess questioned the Miller paper which used results from a GE code. All peak pressures and pressure-time traces came out very much the same for all codes employed. The containment structural design involves a floor which separates drywell from suppression chamber. If this floor fails or leaks excessively, steam is not condensed and the containment could be overpressurized. This aspect has no direct parallel in the torus-drywell design. A flexible seal exists between floor and containment walls. This seal, essentially a bellows, must accommodate both horizontal and vertical movements. The seal will be testable and the details of this testing method were reviewed.

NPSH requirements for ECCS pumps are met in this plant as with others by utilizing containment pressure. The NPSH requirement is approximately 33', so about 20' must come from pressure. It was not clear that the analyses assumed only one heat exchanger operating.

A total of five holdup tanks with series flow and HEPA filters are used for waste gas handling. This system is used instead of a stack. A more conservative, no-flow mode of operation is possible. There is no question that 10 CFR 20 limits can be met with this design. The design is such that release levels can be made very low by operating the holdup tanks in a stored vs continuous flow manner.

In this design, the reactor building ventilation system includes a mixing feature to assure that leakage from the containment does not go directly out the building exhaust duct. This is necessary to assure acceptable post-accident doses. This is a unique design feature.

Meeting with the Applicant

Site Characteristics - A 5 mile Low Population Zone is being proposed for this site. About 8,000 people reside in this radius and this number is expected to increase to 15,000 by 1980. Brookhaven National Laboratory land is located immediately to the south.

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The geological history of the site was also reviewed. The present island is the result of outwash from the Wisconsinian glacial period. Thin beds of dense sands were the result and they extend to elevation -120' MSL. Crystalline bedrock is at -1100' MSL. The entire station area will be excavated to -12' and refilled with the sands compacted to at least 85%. A mat-type foundation will be employed. Liquefaction is not expected to be a problem. About 4 earthquakes, each Intensity VII, have occurred in the last 150 years. The nearest one was 45 miles north in 1791. This was overrated from VI to VIII, per the applicant. OBE and DBE are 0.1g and 0.2g at the foundation. The Regulatory Staff has no problems with the seismic spectrum.

Ground water flow is north toward the Sound. The ground water level is +6' to +8' in the site area. The State of New York has strict control over the ground water, principally because of the fear of salt water intrusion.

Dr. Hendrie brought up the subject of flood levels and hurricanes. The Corps of Engineers' Technical Report #4 is being revised and they have problems with the applicant's calculations; both concerns having to do with higher tide levels. The plant is to be protected to +25' MLW. LILCO's intent is to protect the plant to the levels indicated by the CERC calculations (assuming they aren't "overly conservative"). This matter should be resolved in a couple to weeks. Station grade is +20' MLW and equipment will be located so as to realize protection from flooding to +25'.

Containment Design - J. Noble, Stone & Webster, discussed the conceptual design. It is basically a truncated concrete cone on top of a short concrete cylinder, all resting on a concrete base. A metal head and a concrete floor make up the balance of the major features of the containment. Design pressure is 48 psig and the floor is good for 30 psig. The Moody blowdown model was used, assuming zero flow friction, to calculate design pressures (37 psig for homogeneous model vs 42 psig for Moody model). Vent pipes are straight tubes so the ΔP through these is less than in the tube-header system in the usual torus-drywell. Every input into the code was maximized to assure conservatism, according to Noble. Reasonable best-estimate assumptions were not employed because of the difficulty in determining the best values. The largest pipe break gives the largest pressure rise in the containment. Using starting temperature assumptions of other GE plants, peak pressure would be 37 psig vs 42 psig for current assumptions. Drywell design temperature is 309°F. Dr. Isbin questioned the assumption of symmetrical flow through the vent pipes since the break may be on one side of the building. The containment is designed to prevent direct impingement of a jet on the vents. The number of vents was determined using ground rules developed by GE in their pressure suppression tests.

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