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To: File T-4(b)

reactor controls.

B&W NUCLEAR POWER PLANT SIMULATOR - CHECKOUT VISIT

On December 15 and 16, P. F. Collins and R. J. Burse visited the Singer Link Company in Sunnyvale, California to witness the operation of the B&W Nuclear Power Plant Simulator (NPPS). B&W personnel were performing acceptance tests at this time prior to moving the NPPS to Lynchburg, Virginia.

B&W personnel present during the acceptance testing were Messrs. Daddens, Beach, Rosser and Marshall. Singer Link personnel present included Mr. R. Perran, Project Manager, and Dr. D. Frederich, Chief Programmer.

The NPPS is based on the SMUD plant and is a duplication of the SMUD control room. The simulation appears complete. All valves, pumps and instrumentation associated with the primary, secondary, circulating and engineered safeguards are "live" and vary as plant conditions vary.

One excellent feature of the NPPS is the Bailey Meter integrated control system. Rather than program this system into the computer, the ICS is installed and receives the conditions from the computer and, in turn, sends its output to the reactor and turbine controls. Hence, the response of the controls to a change in "plant" conditions should be identical to that on an actual B&W plant.

Real conditions are simulated. As examples: (1) Valve stroke times are programmed into the computer so that systems containing slow moving valves flow increase or decrease gradually as the valve position changes. (2) lights dim as electrical loads are changed, and (3) the main generator motors and rejects the load if improper paralleling techniques are used.

However, programming is not complete. The most serious deficiencies noted by Mr. Burse and me are: (1) inability to duplicate low power conditions up to about 20%, (2) identical response of the four power range channels to a dropped rod located at the periphery of the core, and (3) excessive swelling of the pressurizer level during a normal heatup. These and other deficiencies were discussed with Mr. Daddens at the conclusion of our visit.

Two pieces of equipment, not installed as part of the NPPS, are the nuclear instrumentation and radiation monitoring cabinets. Mr. Daddens stated that these cabinets were located on back panels and therefore were not included. We pointed out to Mr. Daddens that an important part of operator training was to instill in the trainee the habit of verifying

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the proper operation of instruments prior to manipulating reactor controls. Also, we mentioned the importance of following trends on instruments, rather than relying solely on alarms prior to taking corrective action. I plan to discuss these items with Mr. Deddens again and I believe we should require, at a minimum, (1) that one channel of each nuclear instrument be available so that the trainees can perform pre-startup checks and (2) sufficient radiation monitoring instruments be available so that the trainees can monitor changes due to power increases, fuel failures, and excessive releases to the atmosphere.

At the conclusion of our visit we discussed the personnel that were to be the instructors at the NPPS center in Lynchburg, Mr. Deddens informed us that three people, all with many years of military PWR experience, have been selected as instructors. We intend to request Mr. Deddens to furnish us with detailed resumes.

Based on our observations, we believe that the B&W NPPS will eventually be acceptable as part of a training program to qualify individuals for "cold" licensing examinations. The B&W personnel were extremely cooperative and are attempting to meet, or exceed, the requirements imposed in our letter dated December 18, 1969.

We plan further visits to the NPPS when it is installed in Lynchburg to follow up on the deficiencies noted above.

ORIGINAL SIGNED BY
P. F. COLLINS

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