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ACCESSION NBR: 8710060418 DOC. DATE: 87/09/28 NOTARIZED: NO DOCKET #
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SUBJECT: Submits addl info re plant hydrogen water chemistry program to suppl info provided in 870410 ltr. Closest safety related bldg to hydrogen tank will be southeast corner of emergency filtration treatment bldg.

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September 28, 1987

Director of Nuclear Reactor Regulation
Attn: Document Control Desk
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Washington, DC 20555

Monticello Nuclear Generating Plant
Docket No. 50-263 License No. DPR-22

Additional Information on Hydrogen Water Chemistry Program

Reference: (a) NSP letter dated April 10, 1987 with attached report, "Implementation of Hydrogen Water Chemistry at Monticello"

The purpose of this letter is to provide additional information related to the Monticello Hydrogen Water Chemistry Program to supplement the information provided in Reference (a). This information was requested during a telephone conference call with the NRC Project Manager for Monticello and members of the NRC technical staff.

Question 1

What is the safety related building closest to the hydrogen tank?

Response

The closest safety related building to the hydrogen tank is the southeast corner of the Emergency Filtration Treatment (EFT) building which is 1250 feet from the hydrogen tank. This building is adjacent to the Administration Building and houses ventilation and air filtration equipment for the control room and technical support center, the alternate shutdown panel (used if a fire disables equipment located in the control room or cable spreading room), and various instrumentation and control equipment.

Refer to Figure 12.1-1 of the Updated Safety Analysis Report (USAR)

Question 2

Is the turbine building considered to be a safety related building? It should be if it contains any safety related systems.

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Response

The turbine building is a Class II structure except for certain areas housing Class I equipment. These portions of the turbine building are designed to the same criteria as Class I structures.

Question 3

Provide a written evaluation of the effect of hydrogen explosion on reactor building and turbine building enclosures. This evaluation should be based on the Bechtel analysis. It should include the following:

a. Statement that no missiles will be generated from the reactor building enclosure.

b. Either a statement that the turbine building is not a safety related structure and in this case that it will not generate missiles, or that it is a safety related structure and it will survive a hydrogen explosion.

Response

The hydrogen storage tank is sited at a remote location in accordance with the guidelines contained in EPRI Report NP-4500-SR-LD, "Guidelines for Permanent BWR Hydrogen Water Chemistry Installation," 1987 Revision. This provides assurance that the concrete portions on the reactor building and turbine building housing safeguards equipment will not be affected by a postulated explosion of the contents of the storage tank.

The top floors of the turbine building and reactor building are covered with structural steel and metal siding. These metal sided structures are not classified as safety related, but do have safety implications since the reactor building top floor (the refueling floor) provides access to the fuel pool and the turbine building top floor (the turbine deck) has safety related switches associated with the reactor protection system.

Bechtel Western Power Corporation has performed a hydrogen blast study which focused on the effects on the steel sided portions of the reactor and turbine buildings from blast loads from the hydrogen storage facility. The evaluation of the side panels showed that the siding experiences deformation, but has sufficient membrane strength so that the panels do not fail. The wind girts supporting the siding have sufficient capacity to withstand the blast load and remain within their elastic limits. Consequently, due to the integrity of the siding system, the columns of the east face are subjected to the full shock wave pressure load.

Since the east face is subject to the full shock wave, some inelastic deformation occurs in some of the structural members of the reactor building with no member failure. An evaluation of the high strength bolts at the member connections indicates that the bolts may fail even though the structural members do not. The reactor building will withstand the effects of a postulated blast if the connections in question are reinforced by welding.

The evaluation of the connections showed that the connections at or near the east side of the building require strengthening to redistribute the blast load into the structure. Nine horizontal members in the lower chord of the roof trusses and four members in each of two levels of chords for a total of 17 members require reinforcement by welding the connection. The turbine building enclosure was analyzed in a similar manner and 30 connections were found to require strengthening by welding if the building is to be strengthened to withstand the effects of the postulated explosion. In addition to welding connections, steel must be added to members on the east bay of the roof structure or to the five columns along the east face.

We will proceed with the recommended modifications to the Reactor Building.

Bechtel will evaluate expected damage to the turbine building in the event that the metal walls and roof fail from a postulated explosion to determine if the safety related portions of the building can be affected in any way. If safety related equipment in the turbine building is found to be adversely affected from failure of the structural steel and siding, one of the following actions will be taken:

a. safety related switches on the turbine deck will be relocated or protected if it cannot be shown than failure is in a safe direction.

b. the turbine building metal structure will be strengthened as described above.

Question 4

What is the air intake to safety related buildings closest to the oxygen tank.

Response

The nearest air intake from the oxygen storage tank is the entrance door of the administration building which is 1100 feet away. The air

intake to the diesel generator building is 1400 feet away. This distance is sufficient to prevent a fire hazard or adversely affect diesel generator operation.

The EPRI Guidelines require a separation distance of 1060 feet for a 9000 gallon oxygen tank.

Question 5

Describe the procedure used for monitoring the concentration of oxygen dissolved in the recirculation water and show that the operator could rely on it for timely detection of the off-spec oxygen concentrations, hence making the high alarm unnecessary.

Response

Oxygen concentration monitoring will be added to the operator round check list at a frequency sufficient to assure proper control.

Question 6

Show that in your proposed design the single liquid oxygen vaporization unit will operate with a sufficient degree of reliability that there will be no need for two independently operating units recommended by the EPRI Guidelines.

Response

The EPRI Guidelines for liquid oxygen supply should have been the same as those specified for hydrogen and should not have implied redundancy. The hydrogen guidelines specify two vaporizers in parallel or one vaporizer with sufficient capacity. We will install a single unit properly sized for full capacity.

Question 7

Describe in detail the procedures used for protecting the components in the liquid oxygen system during construction and show that they will prevent contaminants from entering the system and make construction cleaning unnecessary.

Response

To avoid post-construction cleaning of the liquid oxygen system, due to the long lengths of pipe involved and the difficulty in assuring that pockets of cleaning solution would not be left in the system, the pipe used at Monticello was supplied cleaned and the pipe ends were

cleaned after fabrication. The only material in contact with the piping has been weld rod on socket welds. Quality Control verified joint cleanliness prior to joint fit up. The pipe has been pneumatically tested with nitrogen and is sealed with a nitrogen purge. We feel confident that there is no oil in the system.

Question 8

Has the hydrogen injection system provision for adjusting manually injection flow rates for each individual reactor feed pump as is recommended by the EPRI Guidelines?

Response

Each valve has the provision for automatic and manual actuation.

Question 9

How will the liquid hydrogen storage system be protected from the effects of lightning?

Response

Linde, the hydrogen and oxygen supplier, has indicated that a good ground grid is all that is needed to provide protection. We plan to do this.

Question 10

What will be the size of the oxygen cryogenic tank

Response

The size of the oxygen tank will be the same as the hydrogen tank, 9,000 gallons.

Question 11

Describe the over pressure protection system for the liquid oxygen storage system.

Response

NSP will follow the EPRI Guidelines for oxygen storage system over pressure protection. Dual pressure relief valves and dual rupture discs will be provided.

Question 12

Describe your plans for relocating certain temporary trailers from the uncontrolled areas in order to maintain the expected radiation dose rates below the regulatory limits defined in 10 CFR Part 20.

Response

The full effects of shine radiation will not be known until after system operation begins. Detailed radiation surveys will be made. If dose rates are high enough to restrict access to some areas, we will restrict them. Radiation protection standards will be rigidly and conservatively applied in all instances

Question 13

What changes are you planning to introduce into the current daily surveillance program of the turbine building in order to meet the ALARA requirements.

Response

The results of detailed radiation surveys with the hydrogen water chemistry system in operation are needed before changes can be made with any certainty. Again, our radiation protection policies and procedures are, without question, conservative. All changes needed to assure ALARA is achieved will be made.

Question 14

What type of chlorination system is on site?

Response

Bulk storage of chlorine (which could come in contact with hydrogen gas) is no longer used at Monticello. A sodium hypochlorate system was recently installed.

Please contact us if you have any questions related to the information we have provided.

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