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SUBJECT: Forwards response to 840817 request for addl info re NUREG-0737,Item III.D.3.4, "Control Room Habitability."

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October 5, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Response to Request for Additional Information
NUREG-0737 Item III.D.3.4
Control Room Habitability

Dear Mr. Denton:

Attached you will find the additional information necessary to complete your review of NUREG-0737 Item III.D.3.4, "Control Room Habitability," as requested in your August 17, 1984 letter. My letter of September 21, 1984 addressed the reasons for the delay.

Very truly yours,

H.B. Tucker / [illegible]

Hal B. Tucker

JCP:slb

Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
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Mr. J. C. Bryant
NRC Resident Inspector
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Duke Power Company
Response to NRC Request for Additional Information
Control Room Habitability - Oconee Nuclear Station

1). Additional information is needed on the ability of control room habitability system to function assuming a single active failure (i.e., of components such as radiation detector, toxic gas detector, isolation valve, air handling unit, chiller, etc.). The evaluation should estimate the effects of such failure on habitability parameters (ex., radiation dose, temperature and toxic gas concentrations.)

Response:

1). Oconee Nuclear Station, an early 1970's vintage plant, consists of a control room ventilation system that was designed and installed in accordance with HVAC Industry Standards and practice for commercial and industrial systems at that time. However, the proposed modifications to the control room ventilation systems will maintain redundancy capabilities as currently addressed in Section 9.4.1 of the Oconee FSAR.

Return air from the control room is continuously monitored by process radiation monitors (RIA-39) before recirculating back to the control room. A high radiation level detection by RIA-39 or the unit vent monitor will alert the operators to actuate the outside air filter trains. Area radiation monitors (RIA-1) that are provided in the control room would detect high radiation levels should the monitors in the duct fail. Abnormal radiation levels at any area monitor are alarmed at the detect location and in the control room.

Refer to the October 24, 1983 letter from H. B. Tucker to H. R. Denton for proposed modifications regarding operator protection against accidental chlorine release. Presently, a maximun of four single containers weighing 150 lbs. each are stored on-site, at a distance no less than 150 meters from the inlet vents to each control room (See Attachment 1). Proposed modifications call for two redundant and physically separate chlorine monitors at the gas bottle storage shed providing both local and control room enunciation.

The outside air isolation damper to be installed as part of the proposed modifications will be normally closed, though the damper will be designed to fail open. Therefore, control room isolation from outside air is not dependent upon chlorine monitor enunciation. In the case of concurrent chlorine release and isolation damper failure, because of the chlorine location, there would be sufficient time to manually close the damper due to its easy accessibility (refer to Standard Review Plan, Section 6.4, Appendix A, "Acceptance Criteria for Valve or Damper Repair Alternative").

Outside air is supplied to the control room from the single outside air intakes through two 50 percent capacity outside air filter trains. After completion of the proposed modifications, failure of a single filter train would result in a reduced, but not eliminate capacity to maintain control room pressurization.

During normal operation the control room is primarily served by two large 100 percent capacity air handling units. The air handling units consist of roughing filters, chilled water cooling coils, and centrifugal fans. Chilled water is supplied to the units from the Plant Chilled Water System. The Plant Chilled Water System is comprised of two chillers, two chilled water pumps, and two condenser water pumps. The system is designed such that should any of the components fail, sufficient chilled water would be available to serve the needs of the control room with one chiller, one chilled water pump, and one condenser water pump in operation.

2). Provide the control room emergency systems actuation response time. Considerations should be given to set point, location and redundancy of detectors, and to whether the system is manually or automatically initiated. Documentation such as R.F. 1.78 and draft ANSI N660 can be used in determining the time response for operator actions.

Response:

2). As specified in Regulatory Guide 1.95, if chlorine detection is by remote detectors, isolation time is effectively zero since detection and isolation will be accomplished before the chlorine reaches the control room isolation dampers. Further, since the outside air isolation damper is normally closed, control room isolation is not dependent upon chlorine monitor enunciation.

3). For Oconee 1 and 2, supply the infiltration rate and pressure differential across the control room emergency envelope, assuming failure of one of the 50% capacity air handling units. The dose to the control room operator should be recalculated if the infiltration rate deviates from that assumed.

Response:

3). With the completion of the proposed modifications, failure of one of the 50 percent capacity outside air filter trains would result in a reduced capacity to maintain control room pressurization, but would not eliminate a pressurized control room. With the single outside air handling unit supplying positive pressurization flow, the unfiltered inleakage rate should not significantly deviate from that previously assumed, i.e., 10 cfm.

4). Provide justification for the filter efficiency assumed in the dose calculation if dehumidification, at a location upstream of the emergency filters, is not part of the design.

Response:

4). The outside air filter trains are energized only during an emergency and periodic testing. During normal plant operation, the filter trains are idle and no air is flowing through the carbon filter. Plans are underway to replace the charcoal in the filter trains with Sutcliff - Speekman's triethylenediamine (TEDA) impregnated charcoal. According to NRL Memorandum Report 4006, "Effects of Weathering on Impregnated Charcoal Performance" dated May 10, 1979, the effect of high humidity on carbon removal efficiency on $CH_3{}^{131}I$ for TEDA impregnated charcoal is less than 1% penetration. Based on this report, the filter efficiency used in the dose calculation was assumed to be reasonable.

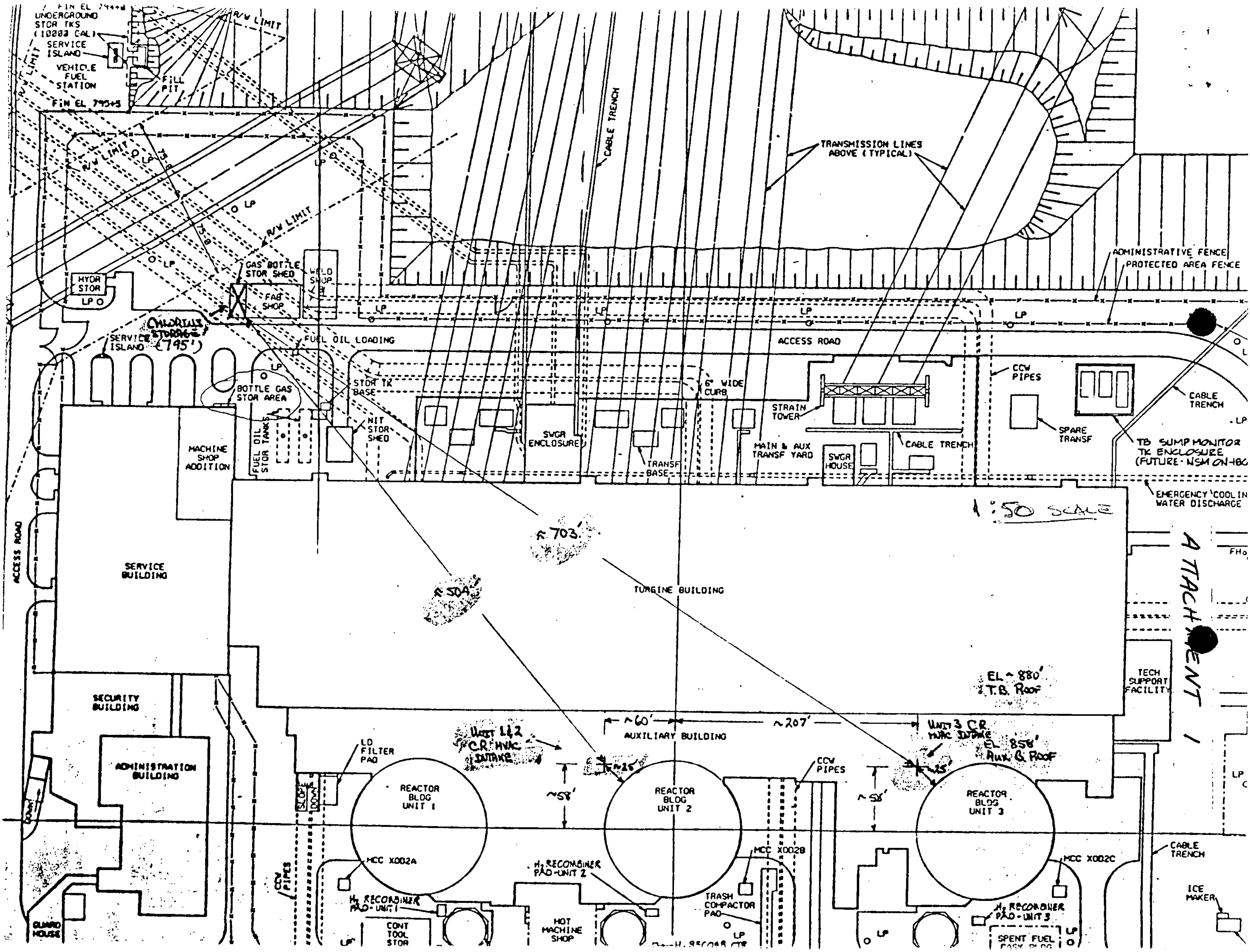
5). Relative to self-contained breathing apparatus available to the operator, justify if there are less than 5 hours of iar for 6 men per control room.

Response:

5). Refer to the September 22, 1983 letter from H. B. Tucker to H. R. Denton for previously transmitted information concerning the self-contained breathing apparatus (SCBA) and air supplies contained in and available to the control rooms. It was stated in that correspondence that with all three units running with fuel in the core, the new NRC ruling effective January 1, 1983 requires three Senior Operators (with one in each control room), and five operators. This totals a possible number of eight required operators that may be in Oconee's control room. During an actual emergency which involves control room habitability, the number of persons in the control room would be reduced to the minimum number of persons required to operate. Duke feels that this is an adequate number of persons to provide for with equipment actually stored in the control rooms. There are ten SCBAs in the Unit 1 and 2 control room, and five SCBAs in the Unit 3 control room (there are a total of 39 SCBAs on site). Regulatory Guide 1.78 and 1.95 suggest the control room storage of one extra unit (SCBA) for every three units required in consideration of single failure criteria. The control room SCBAs total fifteen, which includes one SCBA for each of the eight required control room operators, and seven extra SCBAs which can be used in case of unit failure. Standard Review Plan 6.4, in addition to Regulatory Guides 1.78 and 1.95, suggests a six hour onsite bottled air supply for each control room emergency personnel. For the required eight persons, 48 hours of air would be needed. The following breathing air sources are available on-site:

Source	Air Supply
·69 SCBA air cylinders-each with a 30 minute air supply	34.5 hours
·5 cylinders of bottled air-each can fill 6 SCBAs	15 hours
·Outside source (outside the control room)-can fill 10 SCBAs in first 30 minutes, fewer in the second 30 minutes.	5 hours (in the first hour)
·Total	54.5 hours (minimum)

It is felt that the present number of SCBAs air cylinders in the Oconee Unit 1 and 2 and Unit 3 control rooms and the other air supplies available to the control rooms are sufficient to satisfy an emergency situation in the control rooms where a contained source of air is needed.


UNDERGROUND STOR TKS (10000 GAL)
SERVICE ISLAND
VEHICLE FUEL STATION
FILL PIT
FIN EL 795+5
R/W LIMIT
CABLE TRENCH
TRANSMISSION LINES ABOVE (TYPICAL)
ADMINISTRATIVE FENCE
PROTECTED AREA FENCE
HYDR STOR
LP
GAS BOTTLE STOR SHED
FAB SHOP
WELD SHOP
CHLORINE STORAGE (795')
SERVICE ISLAND
FUEL OIL LOADING
ACCESS ROAD
BOTTLE GAS STOR AREA
STOR TK BASE
NIT STOR SHED
FUEL OIL STOR TANKS
MACHINE SHOP ADDITION
SWGR ENCLOSURE
TRANSF BASE
6" WIDE CURB
STRAIN TOWER
MAIN & AUX TRANSF YARD
SWGR HOUSE
CABLE TRENCH
CCW PIPES
SPARE TRANSF
TB SUMP MONITOR TK ENCLOSURE (FUTURE - NSM ON-186)
EMERGENCY COOLING WATER DISCHARGE
1:50 SCALE
≈703'
≈504'
SERVICE BUILDING
TURBINE BUILDING
EL ~ 880' T.B. Roof
TECH SUPPORT FACILITY
ATTACHMENT 1
SECURITY BUILDING
ADMINISTRATION BUILDING
~60'
~207'
AUXILIARY BUILDING
Unit 1&2 C.R. HVAC INTAKE
Unit 3 C.R. HVAC INTAKE
EL 858' Aux. B. Roof
~25'
~58'
LD FILTER PAD
CCW PIPES
REACTOR BLDG UNIT 1
REACTOR BLDG UNIT 2
REACTOR BLDG UNIT 3
MCC X002A
MCC X002B
MCC X002C
H2 RECOMBINER PAD - UNIT 1
H2 RECOMBINER PAD - UNIT 2
H2 RECOMBINER PAD - UNIT 3
TRASH COMPACTOR PAD
CONT TOOL STOR
HOT MACHINE SHOP
SPENT FUEL CASK BLDG
CABLE TRENCH
ICE MAKER
GUARD HOUSE
ACCESS ROAD
CCW PIPES