9809300068 980921
PDR ADOCK 05200003
A PDR

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WESTINGHOUSE ELECTRIC CORPORATION

PRESENTATION

TO

UNITED STATES

NUCLEAR REGULATORY COMMISSION

Enclosure 1

WESTINGHOUSE ROCKVILLE LICENSING OFFICE

JULY 14, 1993

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WESTINGHOUSE ELECTRIC CORPORATION

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PRESENTATION

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Enclosure 1

WESTINGHOUSE ROCKVILLE LICENSING OFFICE

JULY 14, 1993

INTRODUCTION

Andrea L. Sterdis

Advanced Plant Safety and Licensing

AGENDA

Introduction	**Rick Hasselberg / Andrea Sterdis**
Main Control Room/Technical Support Center HVAC	
• System Description	**Mike O'Connor**
• Modes of Operation	**Mike O'Connor**
• Main Control Room Doses	**Jim Grover**
Main Control Room Emergency Habitability System	
• System Description	**Dan McDermott**
• Modes of Operation	**Dan McDermott**
• Testing	**Dan McDermott**
• Main Control Room Doses	**Jim Grover**
• Requests for Additional Information	

AP600 MAIN CONTROL ROOM / TECHNICAL SUPPORT CENTER HVAC

Mike O'Connor

MCR/TSC HVAC (VBS)

SYSTEM DESCRIPTION

- Design bases
- Functions
- Design features
- GDC 19 compliance

MODES OF OPERATION

- Normal operation
- High radiation
- Smoke purge
- Smoke/toxic chemicals

MCR/TSC HVAC (VBS)

SYSTEM DESCRIPTION

- Design bases
  - Nonsafety-related
    - Maintain MCR at:
      - 70±3°F ambient temperature
      - Capable of maintaining 73 to 78°F
      - 25% and 60% relative humidity range
      - Slightly positive pressure
    - Maintain TSC at:
      - 73°F to 78°F ambient temperature
      - 25% and 60% relative humidity range
      - Slightly positive pressure

MCR/TSC HVAC (VBS)

- Design bases (cont'd)
  - Defense-in-Depth
    - Maintain passive cooling heat sinks initial temperature $\leq$ 80°F
    - MCR/TSC $\geq$ 1/8 in. Wg pressure when high radiation present
    - Auto transfer to standby diesel on LOOP
  - Safety-related
    - Provide MCR envelope isolation dampers and start emergency habitability system (VES) on high-high radiation

MCR/TSC HVAC (VBS)

- Functions
  - Nonsafety-related
    - Control MCR/TSC ambient environment during normal operation
  - Defense-in-Depth
    - Nonsafety-related Defense-in-Depth for control room habitability
    - Maintain passive cooling heat sink ambient temperature
    - Filter makeup air to MCR/TSC during high radiation condition
    - MCR/TSC recirc mode when smoke detected from external fire (toxic chemicals are site specific)

MCR/TSC HVAC (VBS)

- Functions (cont'd)

  - Defense-in-Depth (cont'd)

    - Provide smoke removal capability for internal fire

  - Safety-related

    - Initiate MCR Emergency Habitability System on high-high radiation, if required

MCR/TSC HVAC (VBS)

- Design features
  - Nonsafety-related
    - Two 100% capacity trains with common duct work
    - Kitchen and toilet exhaust fan
  - Defense-in-Depth
    - Tornado protection damper in the outside air intake duct
    - Redundant smoke detectors in outside air intake duct
    - Operable during or after DBE if ac power is available
    - Supplemental air filtration on high radiation, containment isolation or manual actuation

MCR/TSC HVAC (VBS)

- Design features (cont'd)
  - Defense-in-Depth (cont'd)
    - Support provided by Defense-in-Depth systems such as Chilled Water and Standby Diesels

    Safety-related
    - Redundant safety-related radiation monitors in MCR supply air duct
    - Redundant safety-related/seismic I isolation dampers for MCR envelope

MCR/TSC HVAC (VBS)

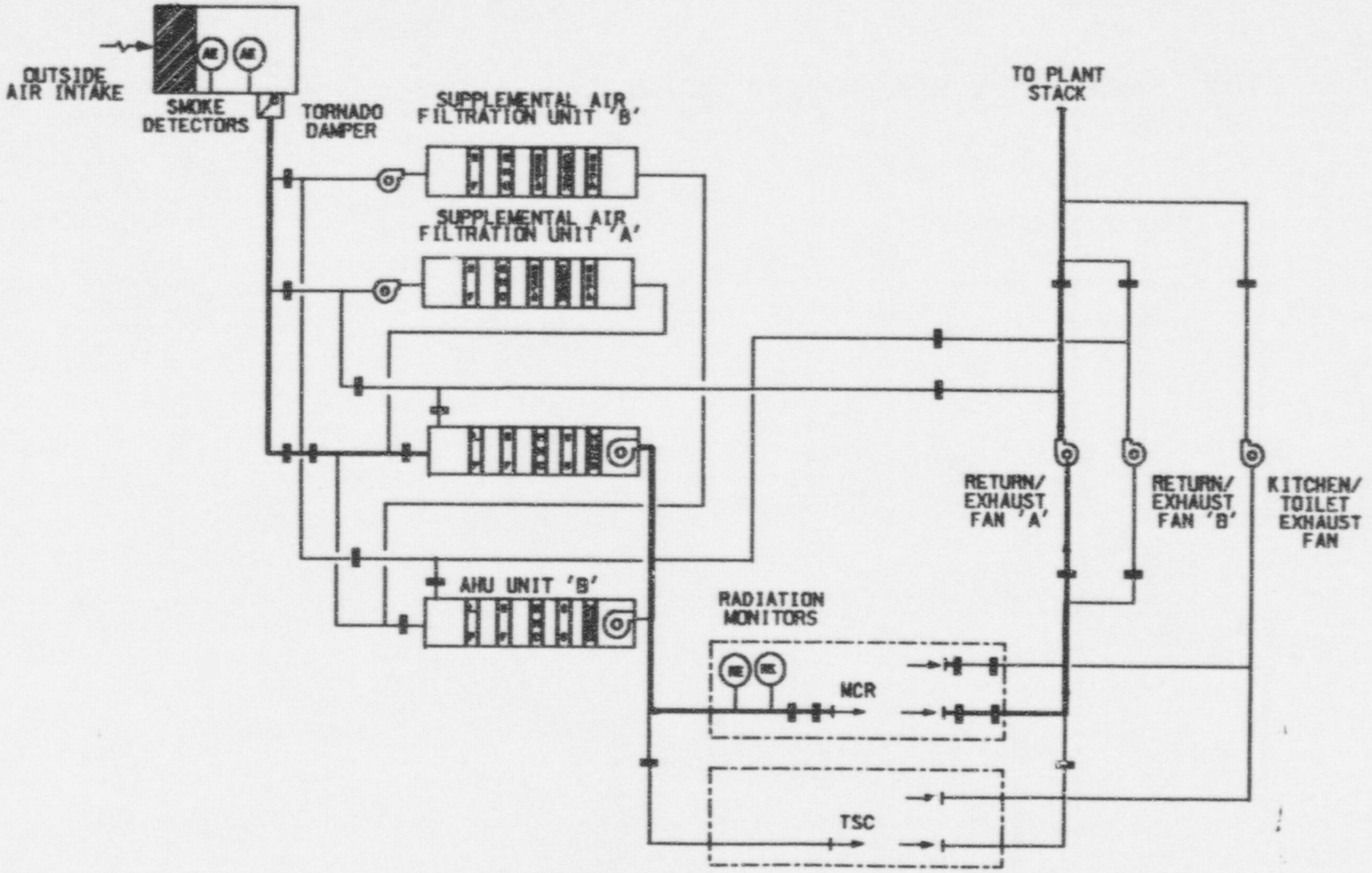
- GDC 19 compliance
  - Provides adequate ventilation and cooling under normal conditions
  - Provides safe environment under accident conditions if ac power is available
  - Provides adequate radiation protection for access and occupancy for duration of accident

MCR/TSC HVAC (VBS)

MODES OF OPERATION

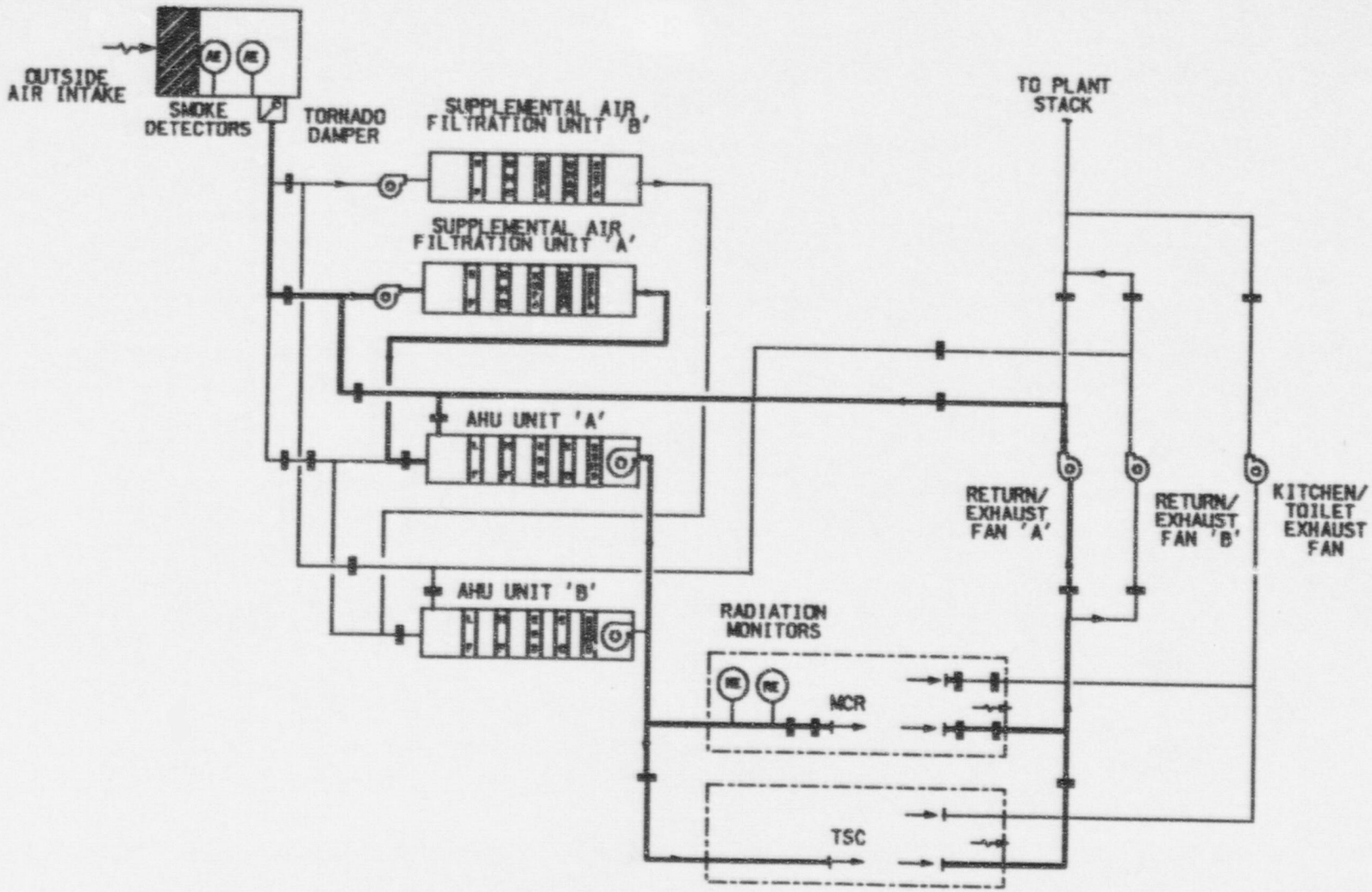
- Normal operation
- High radiation
- Smoke purge
- Smoke/toxic chemicals

MCR/TSC HVAC (VBS)



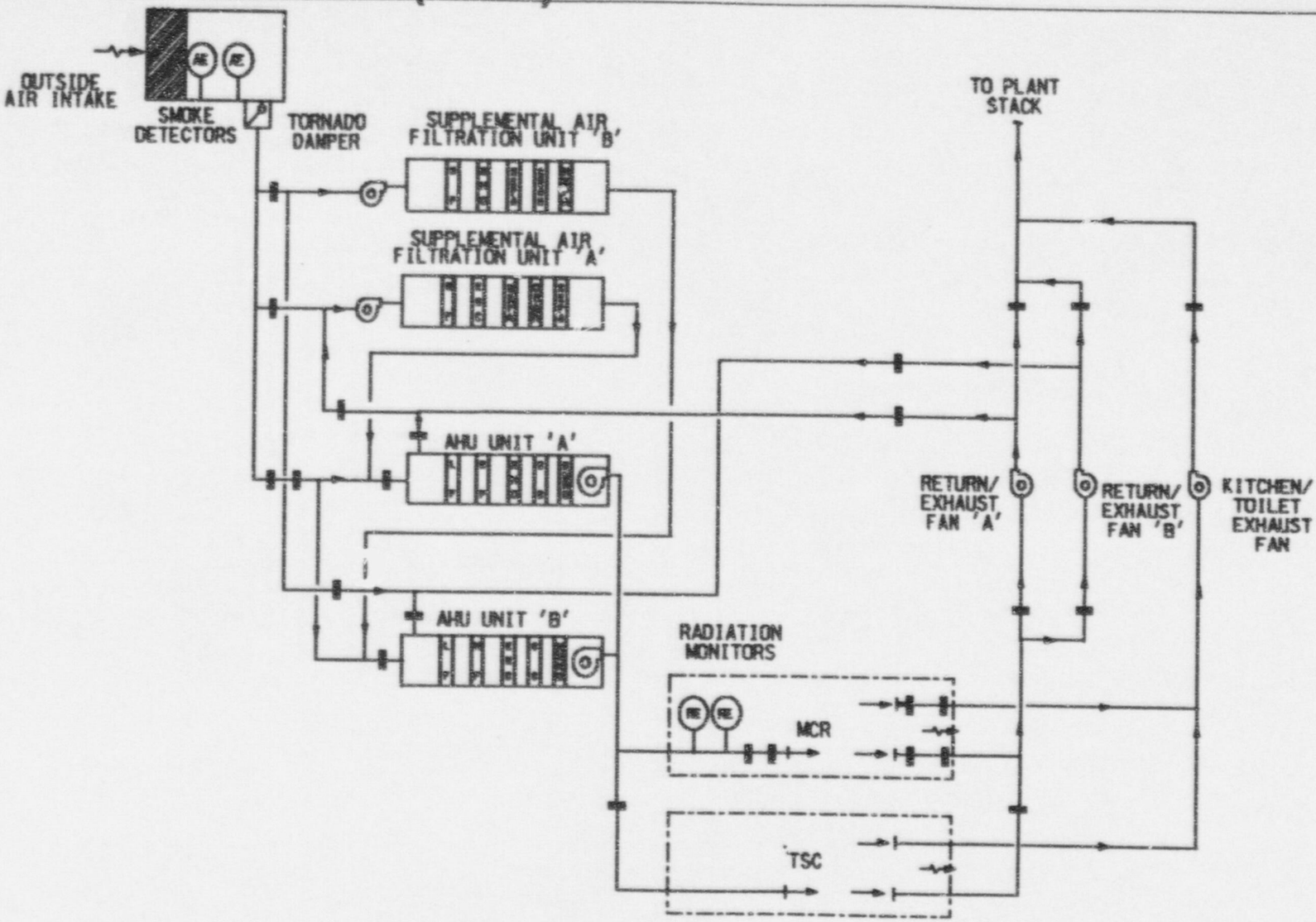
TRAIN "A" MCR SMOKE PURGE OPERATION

MCR/TSC HVAC (VBS)



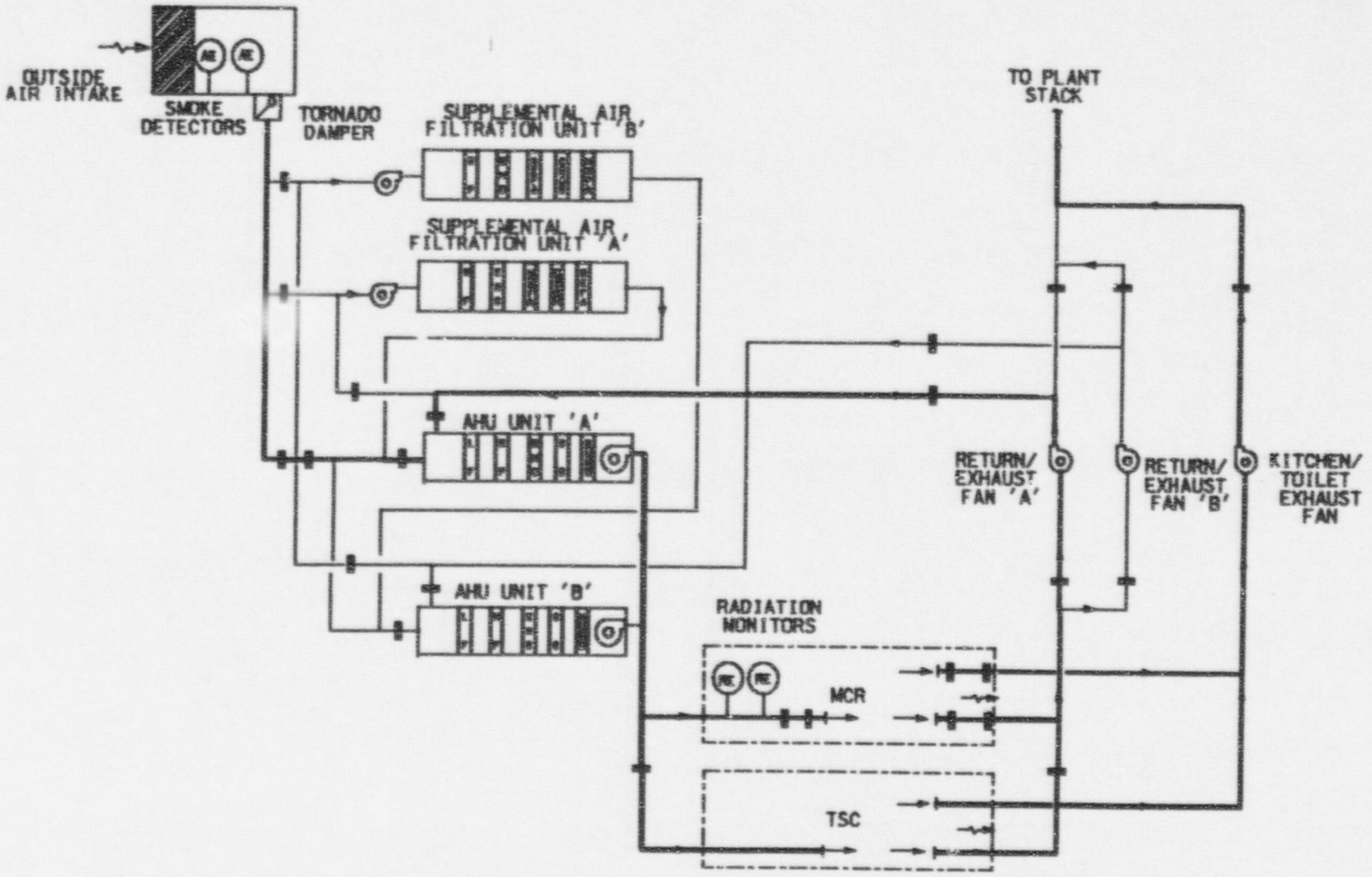
TRAIN "A" HIGH RADIATION OPERATION

MCR/TSC HVAC (VBS)



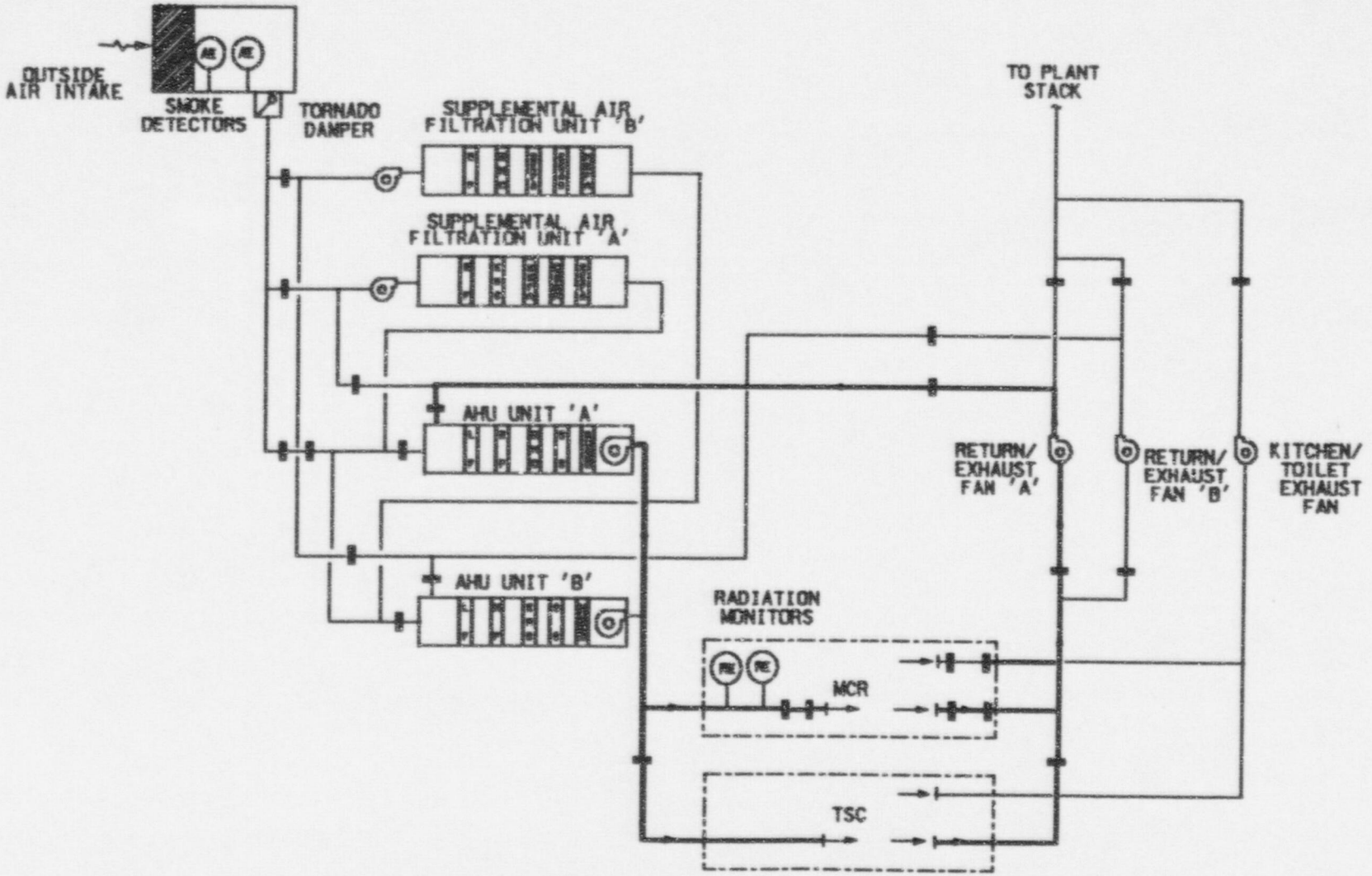
MCR/TSC HVAC SUBSYSTEM

MCR/TSC HVAC (VBS)



TRAIN "A" NORMAL OPERATION

MCR/TSC HVAC (VBS)



TRAIN "A" SMOKE/TOXIC CHEMICAL OPERATION

AP600 MAIN CONTROL ROOM DOSES

Jim Grover

CR Doses with Active HVAC

Thyroid Dose	9.6 rem
Gamma-Body Dose (from immersion in the noble gas cloud inside Control Room)	0.16 rem
Beta-Skin Dose (from immersion in the noble gas cloud inside Control Room)	8.8 rem

Assumptions Used to Determine CR Doses

- LOCA Source Term as described in SSAR (EPRI Defined Source Term)
- Control Room Occupancy of: 100% for 0 to 24 hours
  60% for 24 to 96 hours
  40% for 96 to 720 hours
- Breathing Rate: 3.47×10^{-4} m^3/sec
- Atmospheric dispersion factors (X/Q values) are as stated in the SSAR:

0 - 2 hr	2.2×10^{-3} sec/m^3
2 - 8	1.5×10^{-3}
8 - 24	1.3×10^{-3}
24 - 96	8.4×10^{-4}
96 - 720	4.8×10^{-4}

- Dose Conversion Factors are from ICRP Publication 30 and EPA Federal Guidance Report No. 11
- Control Room volume: 42,260 cubic feet

Assumptions Used to Determine CR Doses (cont.)

- Technical Support Center volume: 69,850 cubic feet
- Unfiltered air inleakage of 40 cfm
- Pressurization air flow of 960 cfm
- Filtration of pressurization air flow:

Particulate	99%
Organic	90%
Elemental	90%

- Recirculation air flow of 14,000 cfm with 3000 cfm passing through the supplemental air filtration unit (all of the flow passes through the main air handling unit)
- Filtration of recirculation air flow:

	Main Air Handling Unit	Supplemental Air Filtration Unit
Particulate	80%	99%
Organic	N/A	90%
Elemental	N/A	90%

AP600 MAIN CONTROL ROOM EMERGENCY HABITABILITY SYSTEM

Dan McDermott

MCR EMERGENCY HABITABILITY SYSTEM (VES)

SAFETY-RELATED FUNCTIONS / DESIGN BASIS

- Provide MCR with an adequate supply of breathable air
  - Maintain breathable air standards with $C0_2$ levels below one percent by volume (OSHA, 29 CFR 1910)
- Pressurize MCR to limit ingress of radioactive contaminants
  - Maintain MCR pressure 1/8 inch water gage relative to adjoining areas
- Limit MCR temperature rise
  - Limit temperature excursion following DBE, with a loss of all ac power, to 15°F for 72 hours

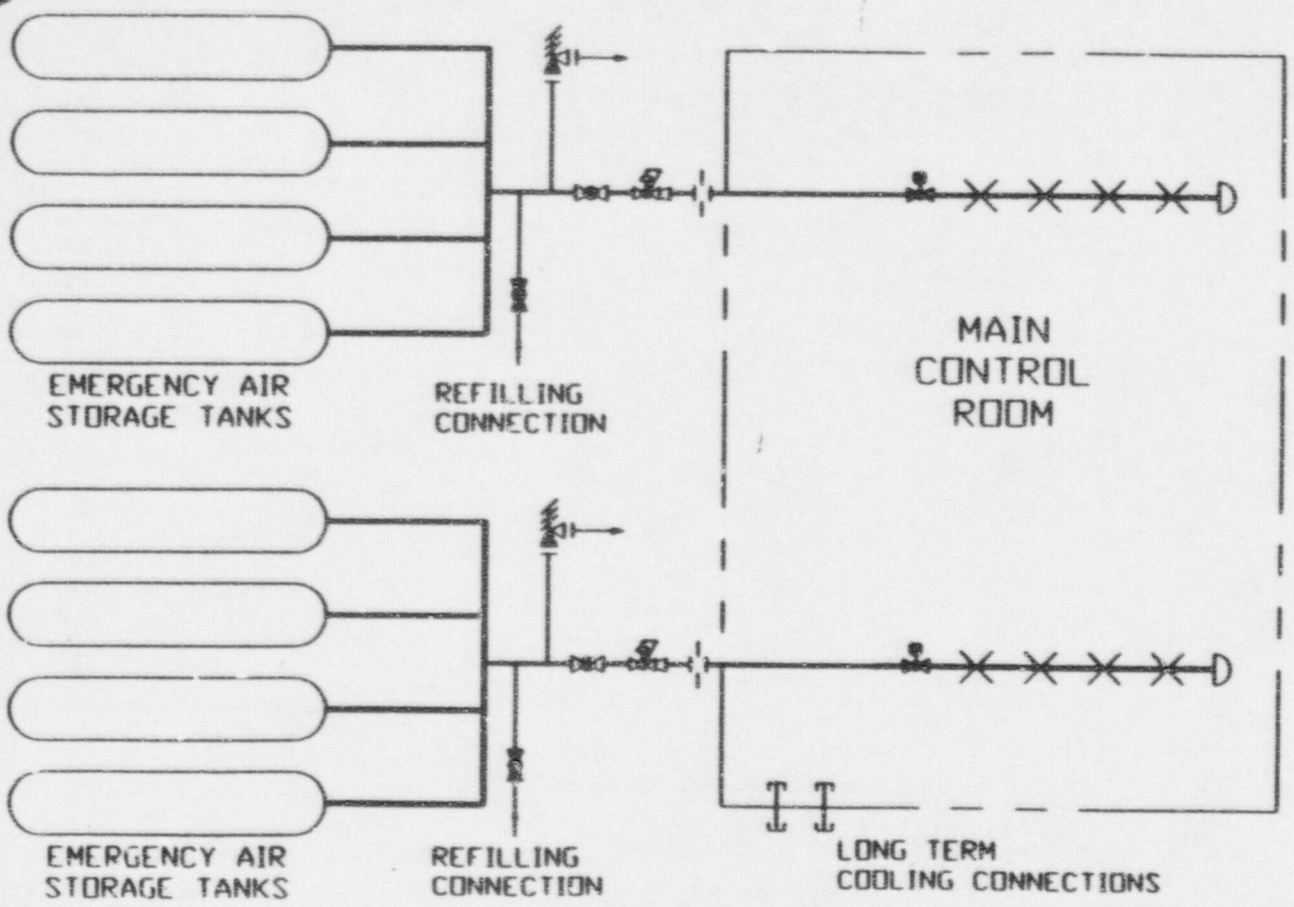
MCR EMERGENCY HABITABILITY SYSTEM (VES)

DESIGN CRITERIA

- GDC 19:
  - Provide a control room to operate the reactor plant safely under normal conditions and maintain it safely under accident conditions. Adequate radiation protection to limit operator doses to less than 5 rem whole body or equivalent.
- Safety-related design
  - ASME Section III, Safety Class 3
  - Seismic Category 1
  - Class 1E
  - Meets single failure criterion

VES SCHEMATIC - ACTUATION - OPERATION

AP600 – MAIN CONTROL ROOM HABITABILITY SYSTEM



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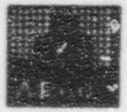
VES SYSTEM PARAMETERS / PERFORMANCE



VENTILATION

- System design basis

- Air flow rate	20 cfm
- Max. CO_2 concentration (OSHA, 29 CFR 1910)	1.0 %

- Evaluation basis

- Initial CO_2 concentration	0.25 %
- Personnel	5
- Duration	72 hours
- CO_2 production/person	0.0155 cfm

- Results

- CO_2 concentration	<1.00%
- Margin	[redacted] ~ 12 persons

VES SYSTEM PARAMETERS / PERFORMANCE

PRESSURIZATION

- System design basis

- Air tank volume	664 ft^3 (2 sets)
- Air tank pressure	2500 psia

- Evaluation basis

- MCR positive pressure	1/8 inch water
- MCR maximum leakage rate	20 cfm @ 1/8 inch water[1]

- Results
  - Margin ~ 4 safety factor

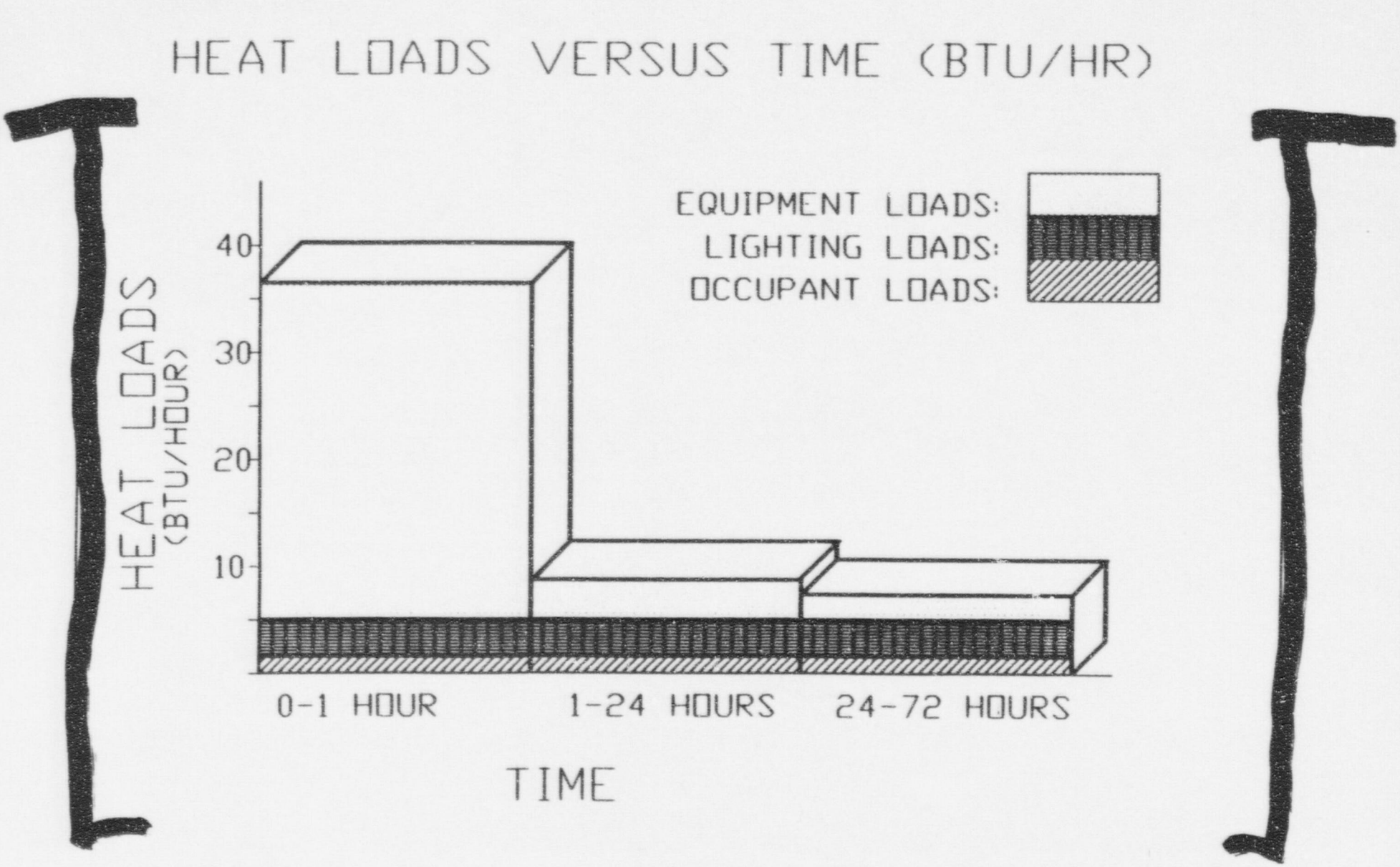
[1] MCR envelope leakage rate calculations: Methodology and assumptions consistent with "Conventional Building for Reactor Containment."

VES SYSTEM PARAMETERS / PERFORMANCE

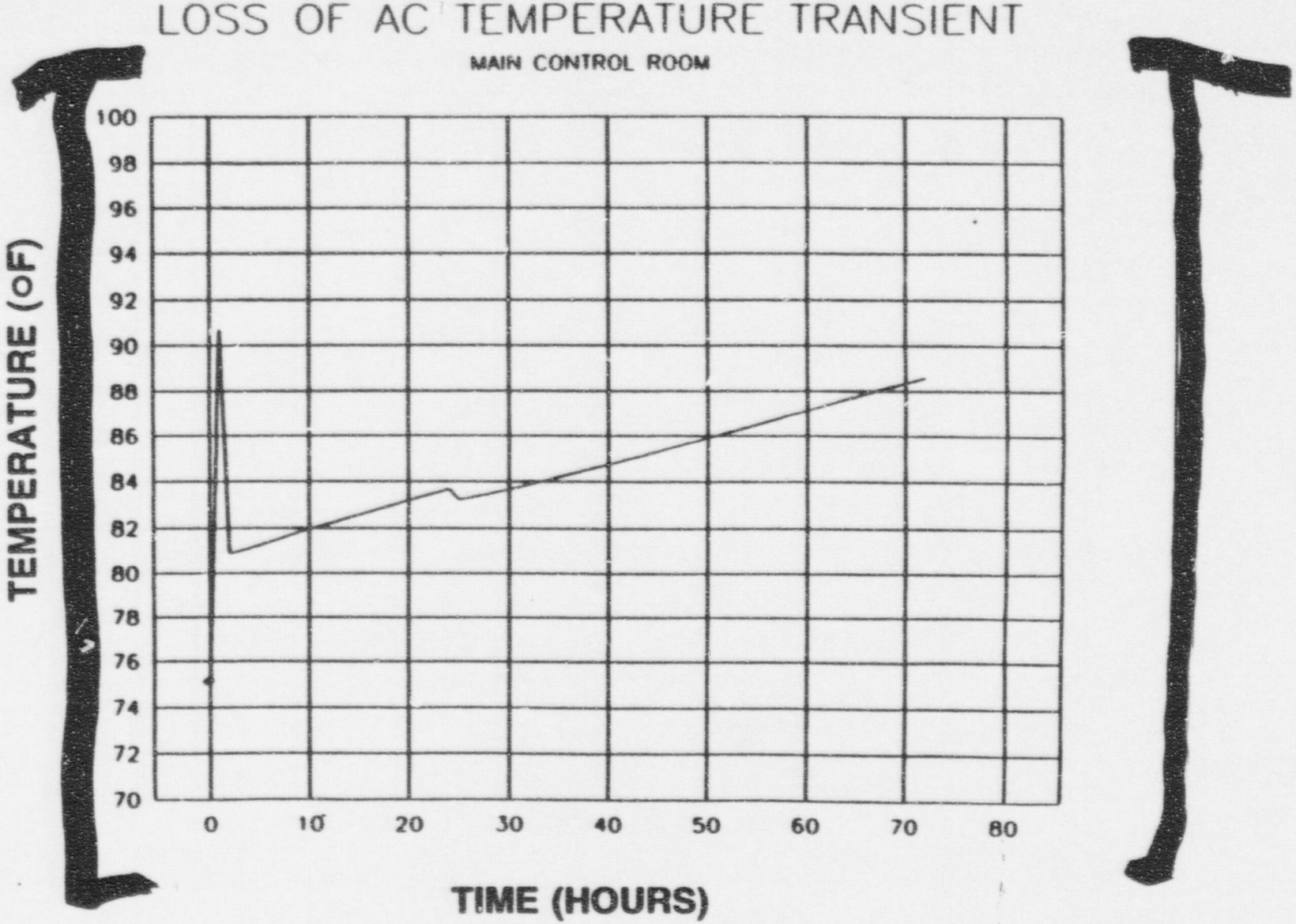
COOLING

- System design basis
  - MCR max. temperature rise — 15°F
- Evaluation basis
  - Heat sources (variation with time) — Graph
  - Heat sink initial temperature — Tech Spec
  - Heat sink configurations — Finned ceiling, flat walls
- Margin
  - Temperature rise — Graph

MCR HEAT SOURCES



MCR THERMAL TRANSIENT

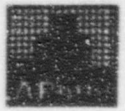


MCR EMERGENCY HABITABILITY SYSTEM (VES)

MODES OF OPERATION

- Normal
  - System in standby
    - Air supply/heat sinks maintained per Tech Specs
- Abnormal
  - Smoke / Fire
    - Normal HVAC (VBS) placed in recirc. mode
    - Passive system (VES) maintained in standby, available for manual actuation
  - Toxic releases
    - Normal HVAC (VBS) placed in recirc. mode
    - Passive system (VES) maintained in standby, available for manual actuation

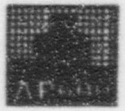
MCR EMERGENCY HABITABILITY SYSTEM (VES)



MODES OF OPERATION

- Abnormal (cont'd)
  - Design basis event
    - Normal HVAC (VBS) automatically placed in supplemental mode of operation
      - High radiation level at air intake
      - Containment isolation signal
    - Passive habitability system (VES)
      - Automatic actuation on loss of all ac power or high-high radiation level signals
      - Manual actuation capability

MCR EMERGENCY HABITABILITY SYSTEM (VES)



POST-72 HOUR DESIGN PROVISIONS

- Compressed-air storage tank refill connections
  - Located in truck/rail bay area
  - Permanently installed
  - Safety-related
  - Seismic
- Cooling capability
  - Sealed penetrations provided through MCR envelope (provides for cooled water supply and return)
    - Permanently installed
    - Safety-related
    - Seismic
  - Portable unit cooler to be provided inside MCR
  - Portable air-cooled chiller to be provided outside MCR envelope

MCR EMERGENCY HABITABILITY SYSTEM (VES)

SYSTEM TESTING PROVISIONS

- ITAAC testing
  - Air flow rate
  - Pressurization capability
  - Temperature rise with heat sources
  - System operation (proper valve operation and actuation)

- Initial test program
  - Air flow rate
  - Pressurization capability
  - Temperature rise with heat sources
  - System operation (proper valve operation and actuation)

- Technical Specification Surveillance
  - MCR Temperature
  - Air storage tank pressure
  - Valve operation
  - Air flow rate
  - Pressurization capability

AP600 MAIN CONTROL ROOM DOSES

Jim Grover

CR Doses with Passive CR Habitability System

Thyroid Dose	23.3 rem
Gamma-Body Dose (from immersion in the noble gas cloud inside Control Room)	0.0023 rem
Beta-Skin Dose (from immersion in the noble gas cloud inside Control Room)	0.17 rem

Assumptions Used to Determine CR Doses

- LOCA Source Term as described in SSAR (EPRI Defined Source Term)
- Control Room Occupancy of: 100% for 0 to 24 hours
  60% for 24 to 96 hours
  40% for 96 to 720 hours
- Breathing Rate: 3.47×10^{-4} m^3/sec
- Atmospheric dispersion factors (X/Q values) are as stated in the SSAR
- Dose Conversion Factors are from ICRP Publication 30 and EPA Federal Guidance Report No. 11
- Control Room volume: 42,260 cubic feet
- Unfiltered air inleakage: 0.3 cfm
- Control Room pressurization air flow (from air bottles): 20 cfm
- No recirculation air cleanup

NRC REQUESTS FOR ADDITIONAL INFORMATION

RAI 410.96: Justify the nonsafety-related designation of the VBS filtration function of the CRAVS

RAI 410.97: Demonstrate how the VBS complies with GDC 4 "Environmental and Missile Design Basis"

RAI 450.1: Provide methodology for pressurization capability of VES. Provide methodology for assessing CO_2 concentration. Provide rationale for habitability. Provide justification that safety-related and defense-in-depth equipment will not be degraded during DBA's. Provide rationale for not providing an ESF filtration system in accordance with RG 1.52.

RAI 450.2: Justify the unfiltered inleakage assumption for the MCR envelope and explain MCR isolation actions.

NRC REQUESTS FOR ADDITIONAL INFORMATION

RAI 410.96: Justify interfaces for future applicants to:

- ensure VES complies with GDCs 4, 5, and 19
- verify procedures are consistent with licensing basis documentation
- verify technical specifications are consistent with licensing basis documentation

Distribution: Mary Rad
B. J. Huffman

Westinghouse Electric Corporation **Energy Systems**

Box 355
Pittsburgh Pennsylvania 15230-0355

DCP/NRC1409
NSD-NRC-98-5753
Docket No. 52-003

August 13, 1998

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: T. R. QUAY

SUBJECT: RESPONSE TO NRC LETTERS CONCERNING REQUEST FOR WITHHOLDING INFORMATION

Reference:

1. Letter, Sebrosky to McIntyre, "Request for withholding proprietary information for Westinghouse letters dated December 14, 1992, and December 17, 1992," dated July 10, 1998.

2. Letter, Huffman to McIntyre, "Request for withholding information from public disclosure of Westinghouse AP600 design letters of December 15, 1992," dated July 14, 1998.

3. Letter, Sebrosky to McIntyre, "Request for withholding information from public disclosure for Westinghouse AP600 design letter of February 24, 1993, April 19, 1993, and July 14, 1993," dated June 18, 1998.

4. Letter, McIntyre to Quay, "Status review of AP600 proprietary submittals," dated September 18, 1995.

Dear Mr. Quay:

Reference 1 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated December 14, 1992, that provided the NRC with copies of presentation material from a management meeting held December 14, 1992, discussing the AP600 testing program. The NRC has no record of a nonproprietary version of the slides being provided. At the time this presentation was made, the information was proprietary since that description of the AP600 testing program had commercial value to Westinghouse. At this time, almost six years later, this information does not have commercial value and is no longer considered to be proprietary by Westinghouse.

Reference 1 also provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated December 17, 1992, that provided the NRC with copies of presentation material from a meeting with the technical staff held December 9-10, 1992, discussing the AP600

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Enclosure 2

AUG 13'98 13:22 FR ARC-MONROEVILLE 412 374 4772 TO 81301415207? P.02/05

testing program. The NRC has no record of a nonproprietary version of the slides being provided. At the time this presentation was made, the information was proprietary since that description of the AP600 testing program had commercial value to Westinghouse. At this time, almost six years later, this information does not have commercial value and is no longer considered to be proprietary by Westinghouse.

Reference 2 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated December 15, 1992, that contained a preliminary description of the AP600 refueling outage plan activities. The NRC assessment was that no material in the letter was specifically identified as being proprietary and that a nonproprietary version was not provided. At the time this subject was being discussed with the NRC technical staff, the information was considered to be proprietary by Westinghouse since it contained information that had commercial value to Westinghouse. At this time, almost six years later, this information does not have commercial value and is no longer considered to be proprietary by Westinghouse.

Reference 3 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated February 24, 1993, that contained presentation materials from the February 24, 1993, Westinghouse/NRC AP600 senior management meeting. The NRC assessment was that the material was similar to material that exists in the current (1998) nonproprietary version of the AP600 probabilistic risk assessment and AP600 standard safety analysis report. In addition the staff indicated the material was used by the staff in the development of the AP600 draft safety evaluation report and therefore should remain on the docket. Our 1995 request, Reference 4, indicated that the material provided in the Westinghouse letter of February 24, 1993, was presentation material that was intended for clarification only, not part of the formal review material and requested that the material be returned to Westinghouse. At the time this subject was being discussed with the NRC technical staff, the information was considered to be proprietary by Westinghouse since it contained information that had commercial value to Westinghouse. If this presentation material was indeed used by the staff in development of the AP600 draft final safety evaluation report in November 30, 1994, then at this time, over five years later, this information is no longer considered to be proprietary by Westinghouse.

Reference 3 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated April 19, 1993, that contained presentation materials from the April 20, 1993, AP600 overview. The NRC assessment was that the material was similar to material that exists in the current (1998) nonproprietary version of the AP600 probabilistic risk assessment and AP600 standard safety analysis report. In addition the staff indicated the material was used by the staff in the development of the AP600 draft safety evaluation report and therefore should remain on the docket. Our 1995 request, Reference 4, indicated that the material provided in the Westinghouse letter of April 19, 1993, was presentation material that was intended for clarification only, not part of the formal review material and requested that the material be returned to Westinghouse. At the time this subject was being discussed with the NRC technical staff, the information was considered to be proprietary by Westinghouse since it contained information that had commercial value to Westinghouse. If this presentation material was indeed used by the staff in development of the AP600 draft final safety evaluation report in November 30, 1994, then at this time, over five years later, this information is no longer considered to be proprietary by Westinghouse.

AUG 13'98 13:23 FR ARC-MONROEVILLE 412 374 4772 TO 81301415200Z P.03/05

Reference 3 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated July 14, 1993, that contained presentation materials from the July 14, 1993, meeting where the AP600 main control room habitability was discussed. The NRC assessment was that the material was similar to material that exists in the current (1998) nonproprietary version of the AP600 probabilistic risk assessment and AP600 standard safety analysis report. In addition the staff indicated the material was used by the staff in the development of the AP600 draft safety evaluation report and therefore should remain on the docket. Our 1995 request, Reference 4, indicated that the material provided in the Westinghouse letter of July 14, 1993, was presentation material that was intended for clarification only, not part of the formal review material and requested that the material be returned to Westinghouse. At the time this subject was being discussed with the NRC technical staff, the information was considered to be proprietary by Westinghouse since it contained information that had commercial value to Westinghouse. If this presentation material was indeed used by the staff in development of the AP600 draft final safety evaluation report in November 30, 1994, then at this time, over five years later, this information is no longer considered to be proprietary by Westinghouse.

This response addresses the proprietary issues delineated in the references.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

cc: J. W. Roe - NRC/NRR/DRPM
J. M. Sebrosky - NRC/NRR/DRPM
W. C. Huffman - NRC/NRR/DRPM
H. A. Sepp - Westinghouse

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