NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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August 23, 1985

Docket No. 50-245
B11644

Mr. Hugh L. Thompson, Jr., Director
Division of Licensing
Office of Nuclear Regulatory Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 1
Additional Information Regarding
Appendix R Control Room Exemption Request

In accordance with the NRC Staff's verbal request of July 15, 1985, Northeast Nuclear Energy Company (NNECO) is providing in Attachment 1 additional information on the Millstone Unit No. 1 Control Room Halon Fire Suppression System. NNECO originally committed to install a Halon system inside the main control panels.(1) This proposed modification is one of several modifications committed to in the Control Room exemption request from Section III.G of Appendix R. During the engineering and design phase of the Halon system modification for the Haddam Neck Plant, seismic and congested spacing concerns were raised which necessitated an alternative approach to directly discharging Halon inside the main control panels. The alternative design decided upon is a total flooding Halon system. This type of system is widely used in the fire protection industry and is similar to the Halon system installed in the Fire Pump House. The total flooding Halon system affords protection both inside the main control panels via ventilation paths and to the entire Control Room.

The NRC Staff informally agreed during the July 15, 1985 telephone conversation that a total flooding Halon system was an acceptable and more conservative approach to the former local application system inside the main control panels. NNECO hereby informs the NRC that a total flooding Halon system will be installed in the Millstone Unit No. 1 Control Room in accordance with the schedular requirements of 10CFR50.48(c)(3). This system will fully satisfy our previous commitment to provide a Halon fire suppression system inside the main control panels. Further information as to how the total flooding Halon system meets NFPA-12A code requirements and alternative actions taken during temporary system unavailability are provided in Attachment 1.

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(1) W. G. Counsil letter to D. G. Eisenhut, dated December 4, 1984, Docket No. 50-245 (Subject: Millstone Nuclear Power Station, Unit No. 1 - Information Supporting 10CFR50 Appendix R Review).

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NNECO is also formally submitting responses to the NRC Staff verbal requests of April 9 and 10, 1985 in Attachment 2. This information was previously provided informally to the NRC Staff on May 16, 1985.

It is our understanding that the additional information attached to this letter is sufficient to allow the NRC Staff to act on the Millstone Unit No. 1 Appendix R exemption requests and result in the issuance of a favorable SER. To the extent the NRC Staff proposes to take action denying the Control Room or any of the remaining unresolved exemption requests, NNECO reaffirms its request[1, 2, 3] for an appeal meeting with appropriate NRC management prior to issuance of the final fire protection SER for Millstone Unit No. 1.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
J. F. Opeka
Senior Vice President

E. J. Mroczka
By: E. J. Mroczka
Vice President

Attachments

cc: R. H. Vollmer
W. V. Johnston

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(2) W. G. Counsil letter to D. G. Eisenhut, dated April 15, 1983, Docket Nos. 50-245 and 50-336 (Subject: Millstone Nuclear Power Station, Unit Nos. 1 and 2 - Information Supporting 10CFR50 Appendix R Review).

(3) W. G. Counsil letter to D. G. Eisenhut, dated April 15, 1983, Docket No. 50-245 (Subject: Millstone Nuclear Power Station, Unit No. 1 - Control Room Fire Review Supporting Exemptions from 10CFR50, Appendix R).

Docket No. 50-245

Attachment 1

Millstone Nuclear Power Station, Unit No. 1

Additional Information Regarding
Control Room Halon Fire Suppression System

August 1985

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 1

CONTROL ROOM HALON FIRE SUPPRESSION SYSTEM

The automatic Halon 1301 suppression system will provide an effective means of protecting the main control panels, the auxiliary control panels and the entire room to ensure that a fire will be detected and extinguished in its incipient stage before damage to redundant safe shutdown components occurs. The Halon system will be designed as a "Total Flooding System" and will meet the requirements specified by NFPA-12A.

The design Halon concentration for the Control Room will be 7% for a duration of at least 10 minutes. It is estimated the Halon concentration inside the main control panels will reach 7% within 15 seconds of initial Halon discharge in the Control Room. The design parameters and system operation will be verified by an actual discharge test after installation. The test acceptance criteria will be in accordance with NFPA-12A.

The automatic detection system will consist of ionization and photoelectric smoke detectors arranged in a cross-zoned pattern.

The release system will consist of a control panel which receives alarm signals from the detection circuits and provides a timed delay signal (45 seconds) to the Halon 1301 fire suppressant storage tanks. A hazard alarm and flashing light will be installed to warn personnel of a discharge of Halon 1301. Two manual pull stations will be installed which will bypass the discharge timer and immediately cause the Halon release. Two abort switches will also be installed to interrupt the timed discharge of Halon if in the opinion of the Control Room operators the fire can be extinguished manually.

The system will be powered from a 120 volt AC source. Twenty-four hour battery backup will be provided as an integral part of the system.

The Halon 1301 System will be included in the Technical Specifications. If the system is temporarily unavailable for maintenance or repair, a continuous fire watch with backup fire suppression equipment located in the Control Room will be established within one hour. This action is consistent with the present Technical Specification for the Fire Pump House Halon system. A backup Halon supply will not be provided.

A six-month period is needed after the Halon system is installed to verify the automatic initiation system is working properly. This period will provide the operating time needed to calibrate the system to avoid spurious actuations and to correct any equipment problems identified during the discharge test. The manual actuation system will be fully operational but the automatic control panel detector signal to the Halon 1301 fire suppressant storage tanks will be jumpered out during this period.

Docket No. 50-245

Attachment 2

Millstone Nuclear Power Station, Unit No. 1

Additional Information Regarding
Control Room Exemption Request

August 1985

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 1

ADDITIONAL INFORMATION REGARDING APPENDIX R CONTROL ROOM EXEMPTION REQUEST

NNECO's additional information is provided in response to the three questions received informally from the NRC Staff on April 9 and 10, 1985.

Question

1. Demonstrate that Millstone Unit No. 1 can proceed to safe shutdown with the forced evacuation of operators from the control room for a period of one hour.

Response

Position

NNECO believes that it is neither appropriate nor necessary to assume a period of one hour as the duration of time that the operations staff must evacuate the control room in the event of a fire. The wording of the question presumes that evacuation is necessary, when in fact it is not clear that the probability of having a fire of sufficient magnitude to necessitate evacuation is large enough to warrant its inclusion in the design basis.

NNECO intends to maintain operator presence in the control room in the event of a fire. It is NNECO's position that the type and size of fire postulated for the control room would not generate enough smoke to affect control room operation. Ceiling height assures that any smoke generated from the fire would rise away from the control panels to the space above. This space (84.5 ft. by 67.5 ft by 2 ft) is capable of containing 11407.5 cubic feet of smoke before starting to affect visibility. However, should visibility become a problem, smoke removal can be initiated by manually shutting down the control room ventilation and positioning the plant's three, 9,600 cfm smoke ejectors in the doorway leading to the turbine building. It should be noted that these smoke ejectors can be powered from the Unit 2 control room.

The three ejectors are capable of displacing 28,800 cfm or approximately one air change per every two minutes. Should smoke continue to be a problem, the control room operators would be able to don 30-minute Scott Air Pacs (nine of which are located in the control room), or utilize the existing breathing air system (hardpiped), which provides a continuous air system for six persons.

Forced Evacuation of Control Room

Present abnormal operating procedures at Millstone Unit No. 1 designate the shift supervisor or, in his absence, the supervising control operator as the responsible party for directing a control room evacuation. Such a measure would be the result of an extreme condition in any event.

Table 2 of Reference (1) listed the control room actions that must be accomplished by the control room operators for a fire in any one of the four control room fire zones. The number of required actions range from one to four (depending on the zone in which the fire occurs). The time necessary to

accomplish these actions is negligible. Assuming the operators take the appropriate control room actions for a fire in a zone and that the control room fire is restricted to one of the four fire zones, forced evacuation of the control room for a period in excess of one hour would not adversely impact safe shutdown of Millstone Unit No. 1.

Specifically, for the postulated case where the main control board is rendered inoperable by a single fire, operators would perform their designated duties inside the control room and bring the plant to safe shutdown from outside the control room.

For the auxiliary control panel fire, the operators would again assume their designated safe shutdown duties when directed by the shift supervisor. Due to the small amount of combustibles present in the auxiliary cabinets, such a fire would be of sufficiently short duration with effective suppression and smoke removal accomplished such that the operators would be able to perform the functions needed to achieve and maintain safe shutdown from the control room. An operator would remain in the control room under such circumstances utilizing the breathing apparatus previously described and operate the undamaged controls on the main control console. Nevertheless, if the auxiliary control panels are rendered inoperable by a single fire, forced evacuation of the control room for a period in excess of one hour would not adversely impact safe shutdown. Operators would perform the actions listed in Table 2 of Reference (1) and bring the plant to safe shutdown from outside the control room.

During the period of time the plant is brought to safe shutdown, the fire brigade would extinguish the fire and initiate smoke removal activities in the control room. The Unit 1 fire brigade would be supplemented by personnel from Millstone Unit No. 2, as is the current practice. The on-shift complement of personnel at both plants is more than adequate to fulfill both the fire fighting and alternate shutdown activities for a postulated control room fire. Communications between operators would be through normal interplant systems with portable two-way radios as backup.

The shift supervisor would determine the extent of damage to the control room and direct the operators to resume plant control from the control room after verifying that the necessary instrumentation and controls were operable from the control room.

Conclusion

The control room remains the most desirable location from which to direct and control a safe shutdown. Operators would be dispatched as needed to perform the local, remote alternate actions to compensate for damaged control systems. Fire damage diagnostics would be a continuous function best assumed by the operators in the control room.

NNECO does not believe it is credible to assume a fire would force evacuation of the control room. However, if control room evacuation occurred for a period of at least one hour, a control room fire would not adversely impact initiation and maintenance of safe shutdown of the plant.

Question

2. Provide a detailed system description of the Halon fire suppression system and provide more information on the spacing between the main control panels and the auxiliary panels.

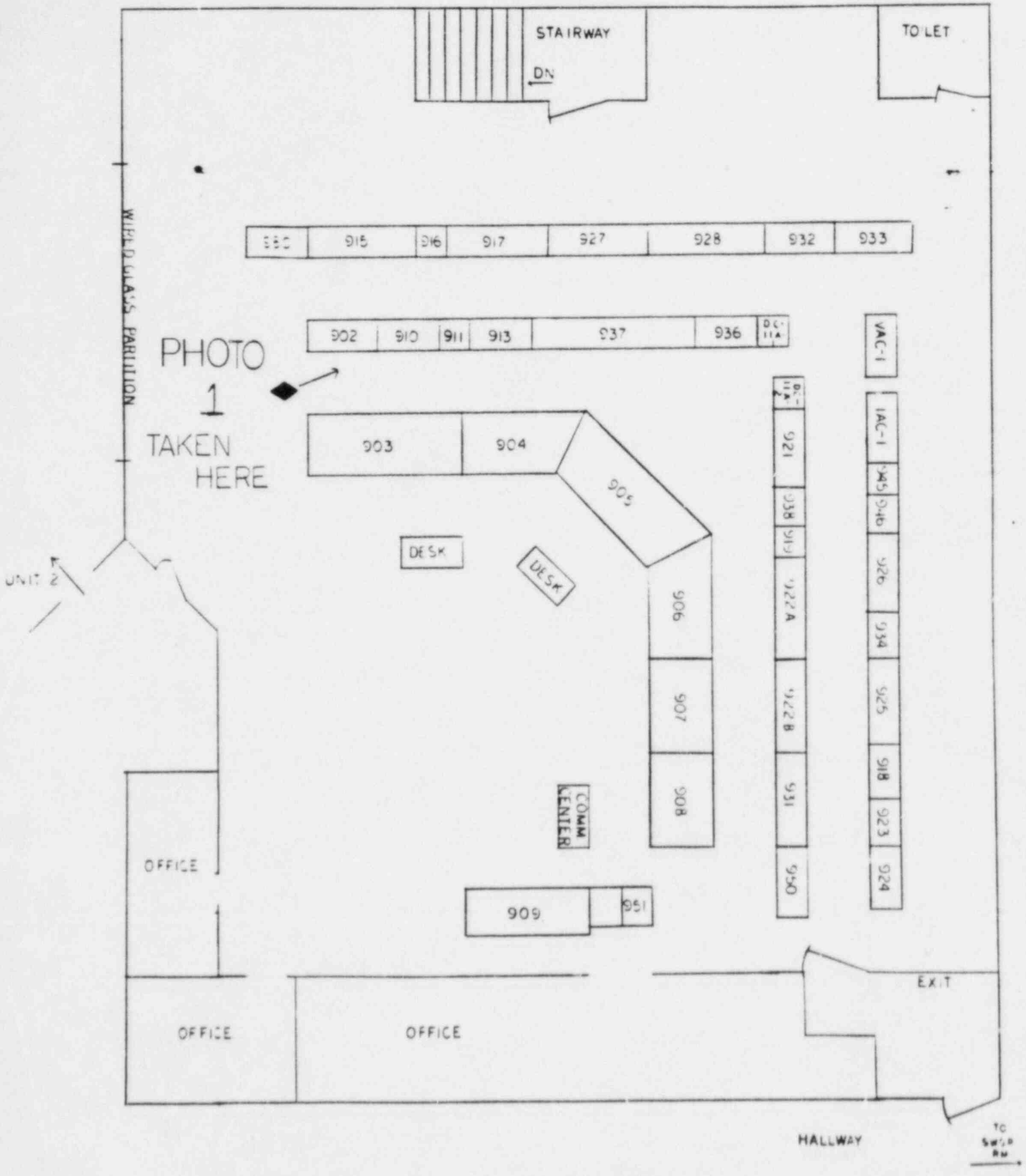
Response

The Control Room Halon fire suppression system is described in Attachment 1. Spacing between the main control panels and the auxiliary panels is shown in the following seven photographs and accompanying sketches and descriptions. Please note that the original photographs were informally provided to the NRC Staff on May 16, 1985.

PHOTO #1

Back of Auxiliary Panels 902 to DC-11A-1 looking from left side of Main Control Board Doorway.

NOTE:
- o Open back on Panels 902 through 936
- o Smoke detection exists independent from proposed halon system detectors.
- o Sheet metal separates each panel.



MILLSTONE NO. 1 CONTROL ROOM

NOT TO SCALE
(TNP)

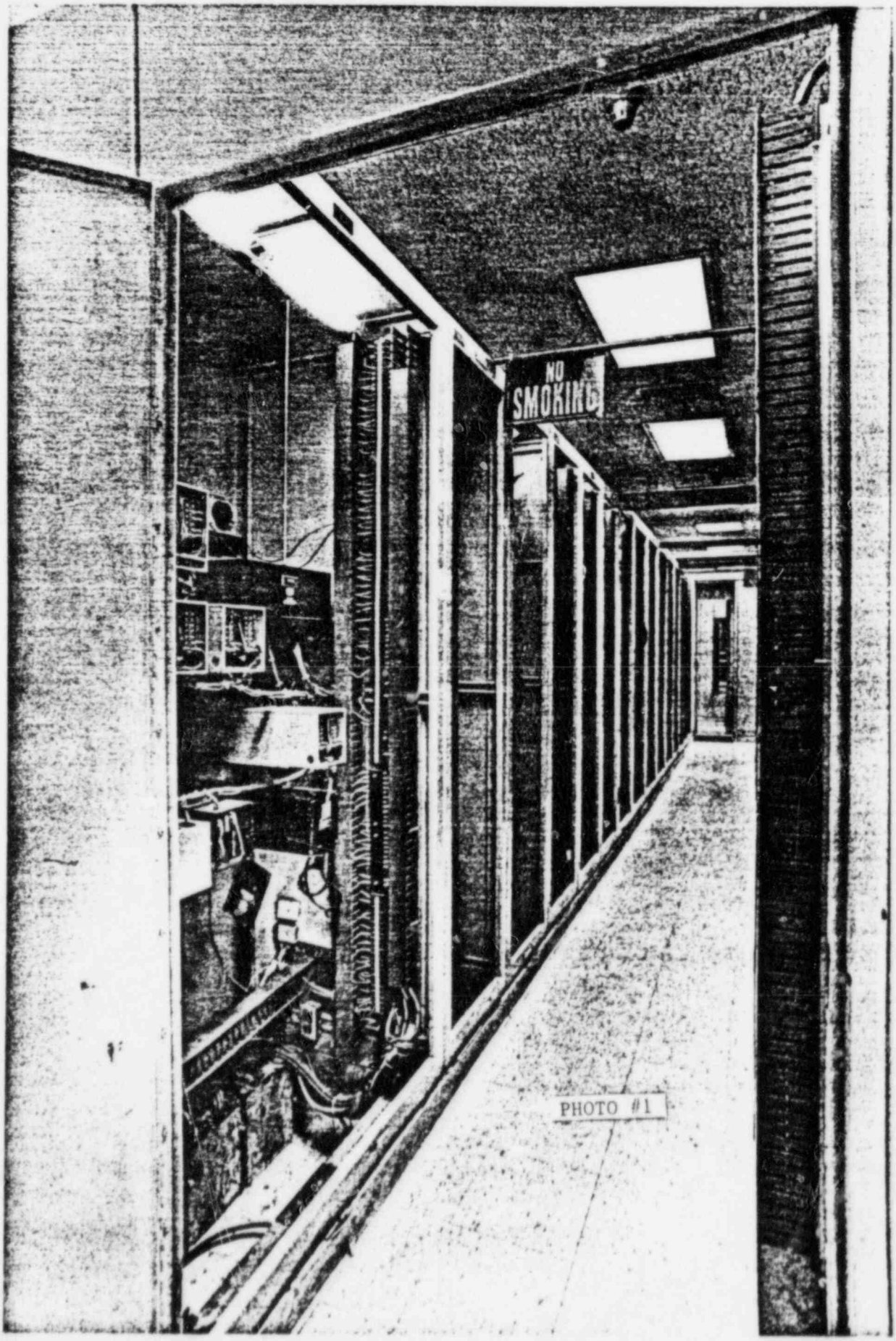


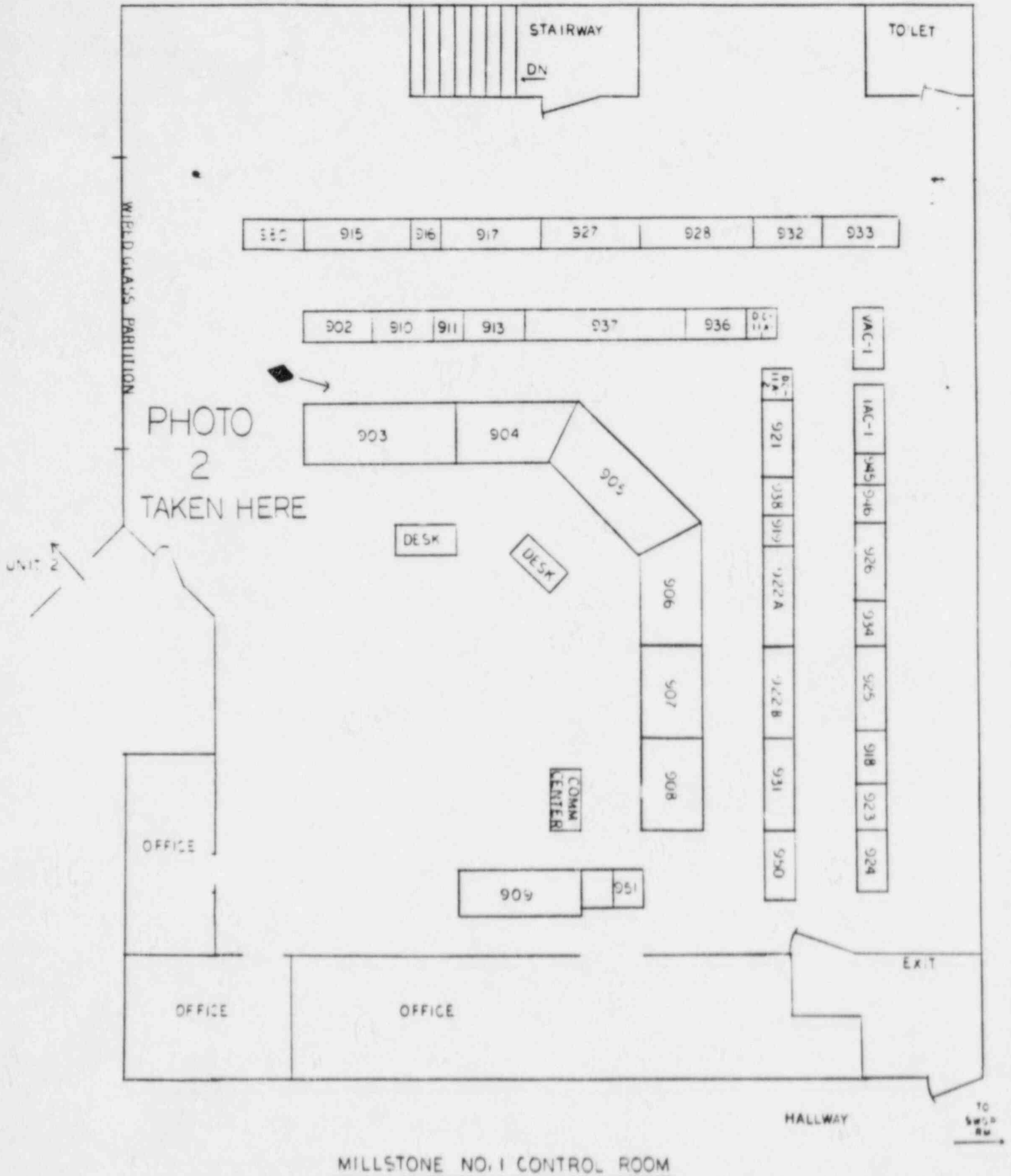
PHOTO #1

PHOTO #2

Back of MCB Panels 903 to 904 looking from left side of MCB Doorway.

NOTE:

- Open back on panels.
- Smoke detection exists independent from proposed halon system detectors.
- Cables/components accessible to halon spray/discharge.
- Sheet metal separates each panel.



MILLSTONE NO. 1 CONTROL ROOM

NOT TO SCALE
(TMP)

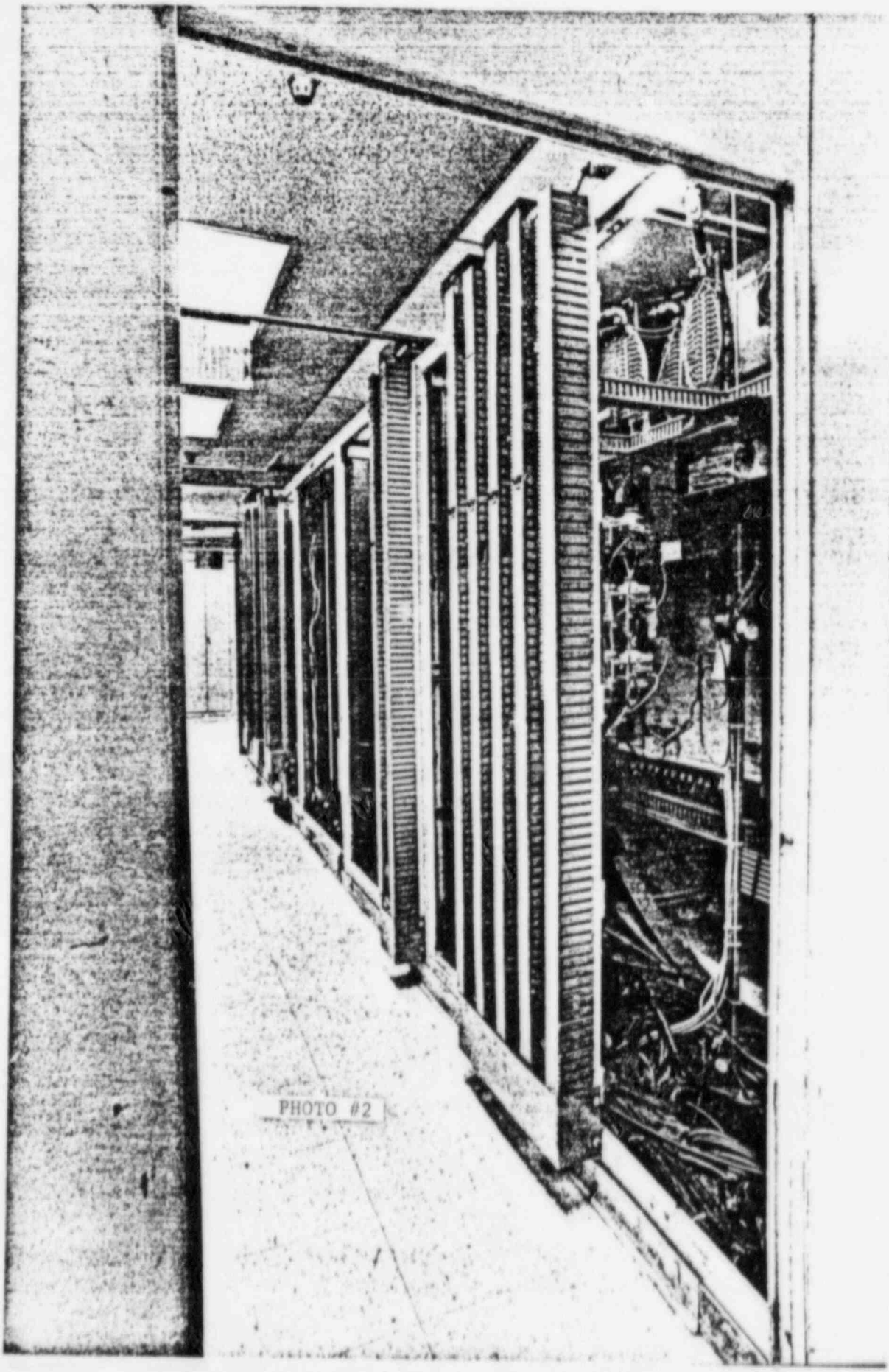


PHOTO #2

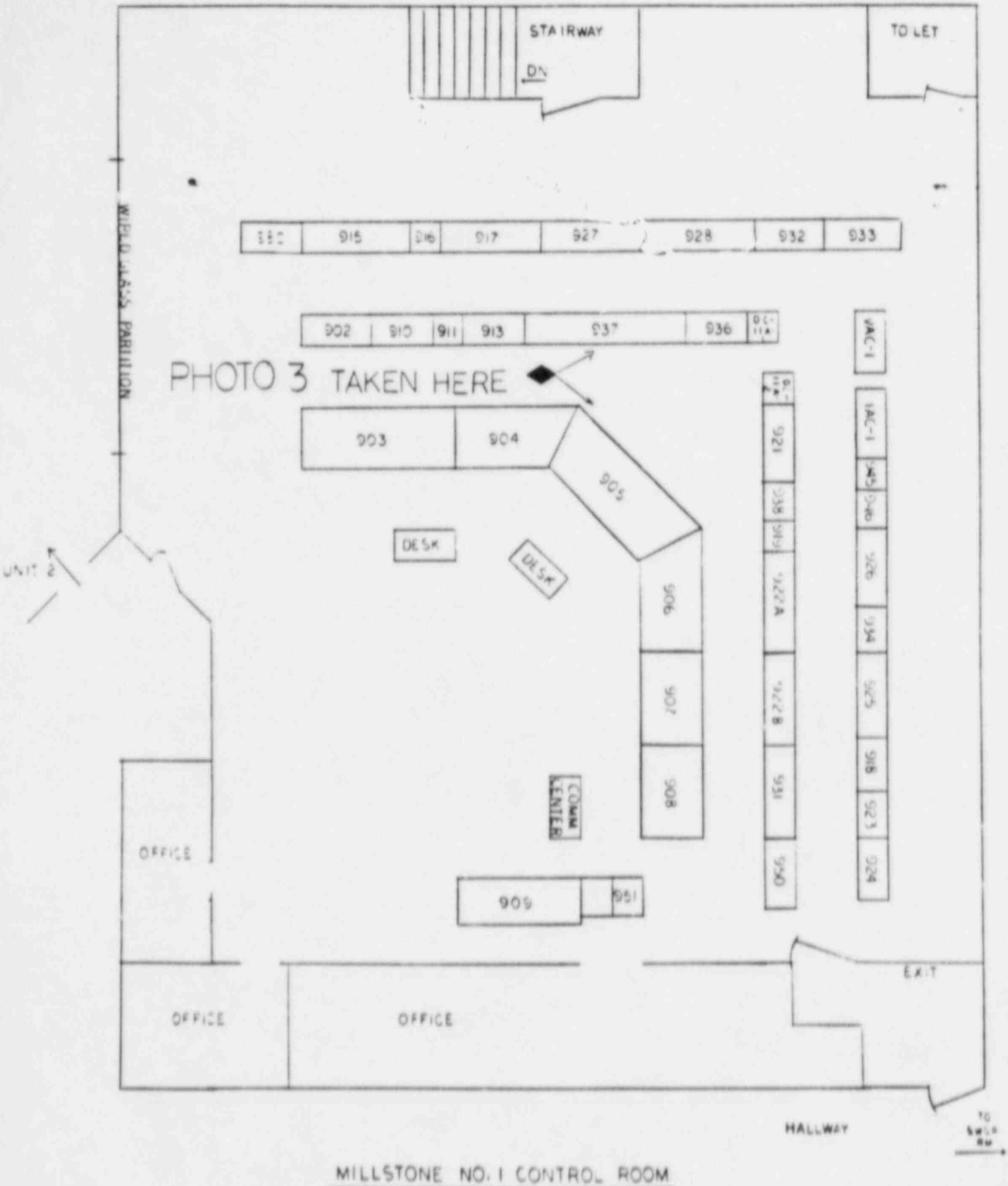
PHOTO #3

Back of Auxiliary Panel DC-11A-2, 921, 938, 919.

- o Back of 905 (right side)
- o Back of 937, 936, DC-11A-1 (left side)

NOTE:

- o Spacial separation between 905 on right and DC-11A-1 and DC-11A-2.
- o Sheet metal doors on DC-11A-1 & 2 on adjacent sides.
- o Spacial separation between DC-11A-1 and DC-11A-2.



MILLSTONE NO. 1 CONTROL ROOM

NOT TO SCALE
(1 of)

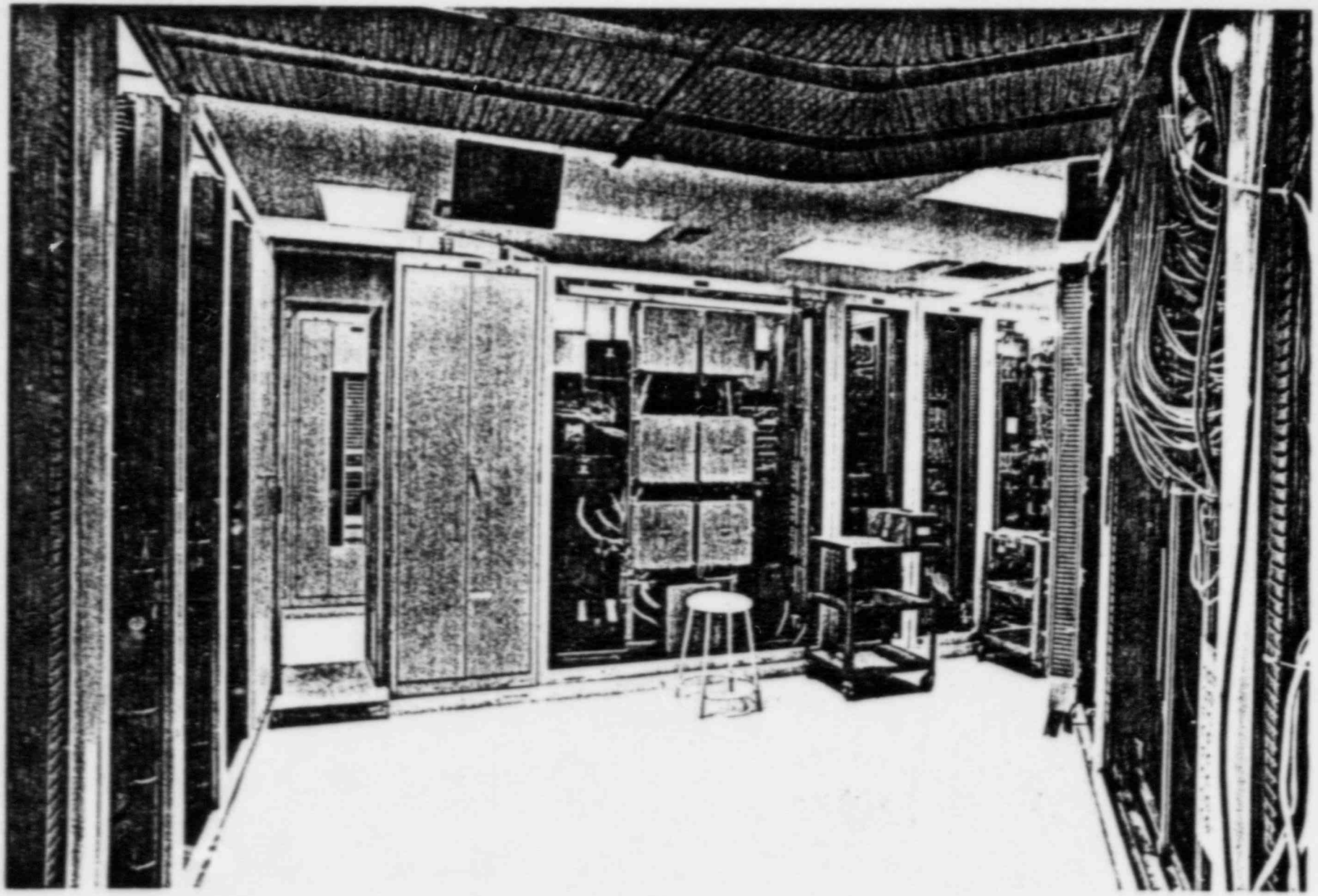


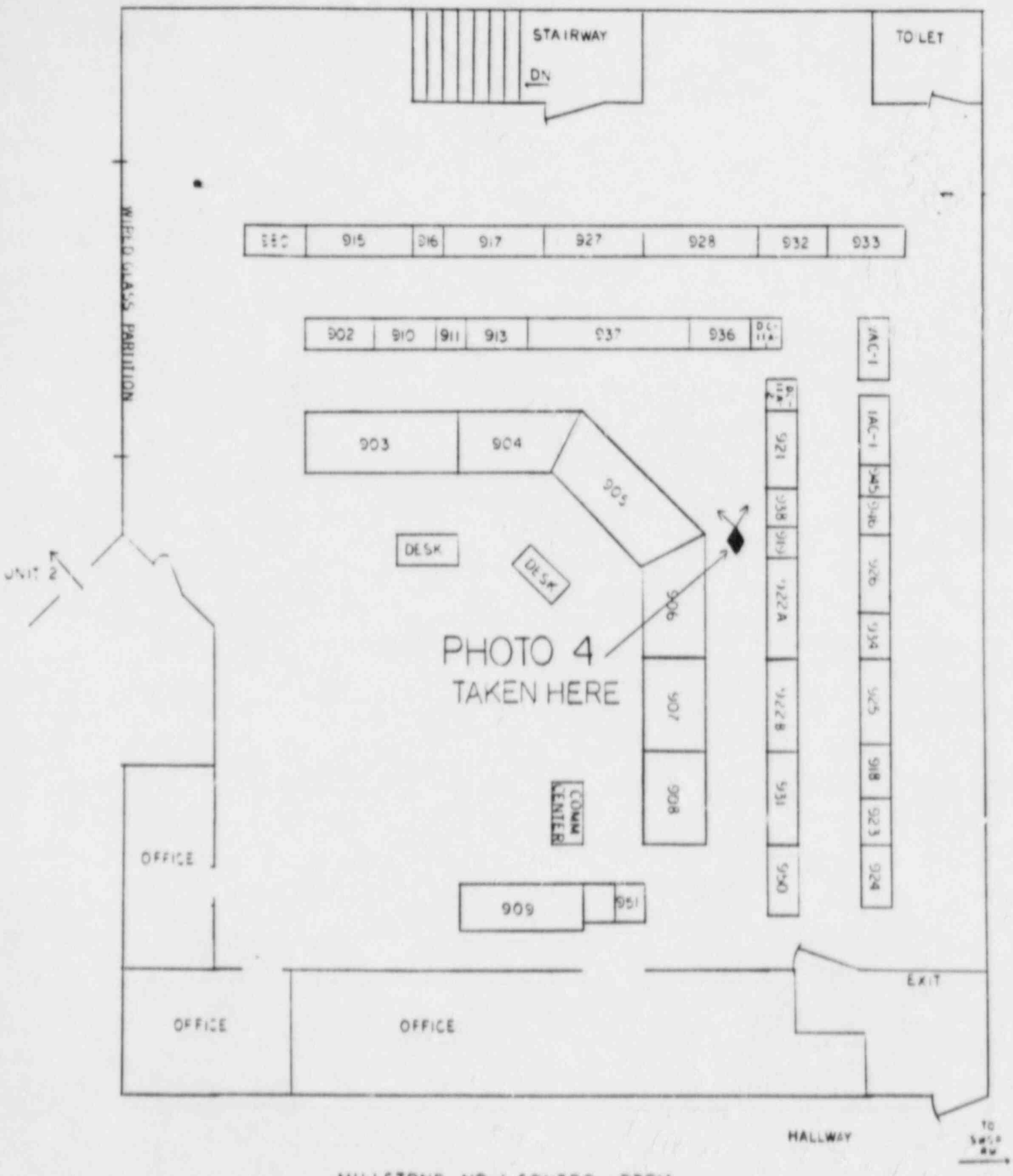
PHOTO #3

PHOTO #4

Backs of 913, 937, 936, DC-11A-1 and 905 on left looking from right side of MCB.

NOTE:

- o Sheet metal separates each panel.
- o DC-11A-1 is protected by sheet metal doors.
- o Spacial separation of 905.



MILLSTONE NO. 1 CONTROL ROOM

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(TNP)

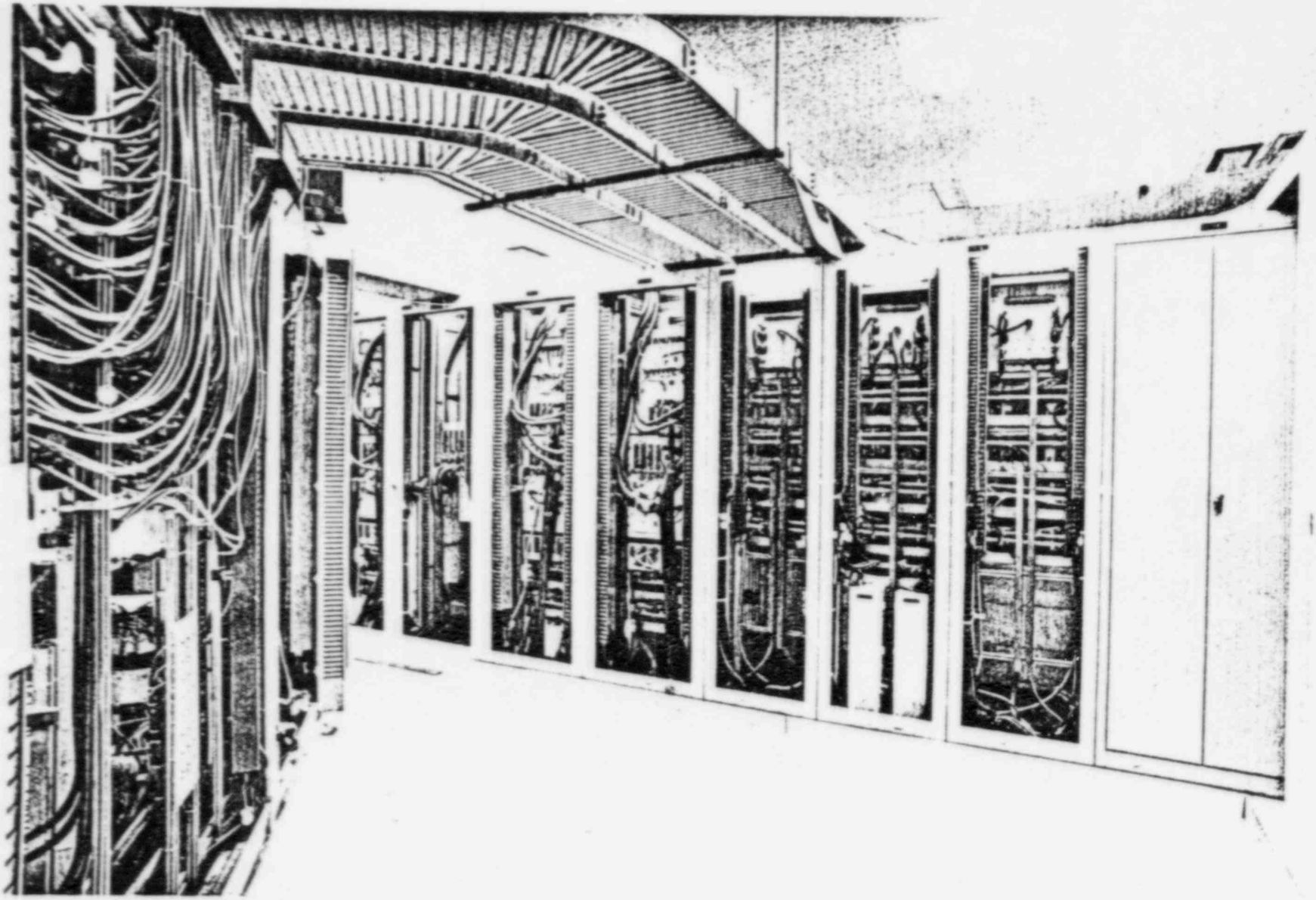
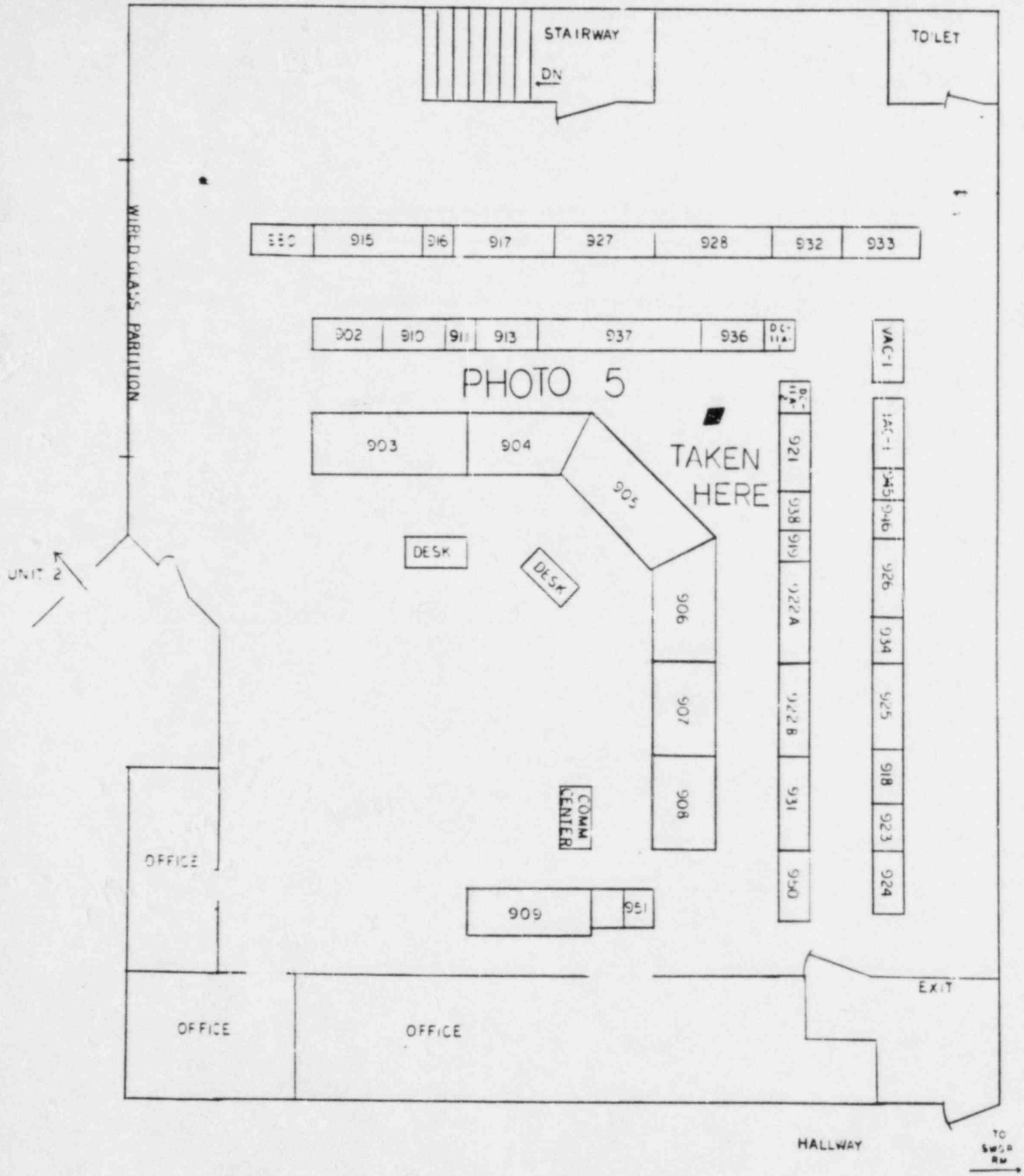


PHOTO #4

PHOTO #5

Backs of DC-11A-1 and DC-11A-2.

NOTE:
- o Sheet metal doors on panels.
- o Limited fixed combustibles.
- o Curb between panels.



MILLSTONE NO. 1 CONTROL ROOM

NOT TO SCALE
(TMP)

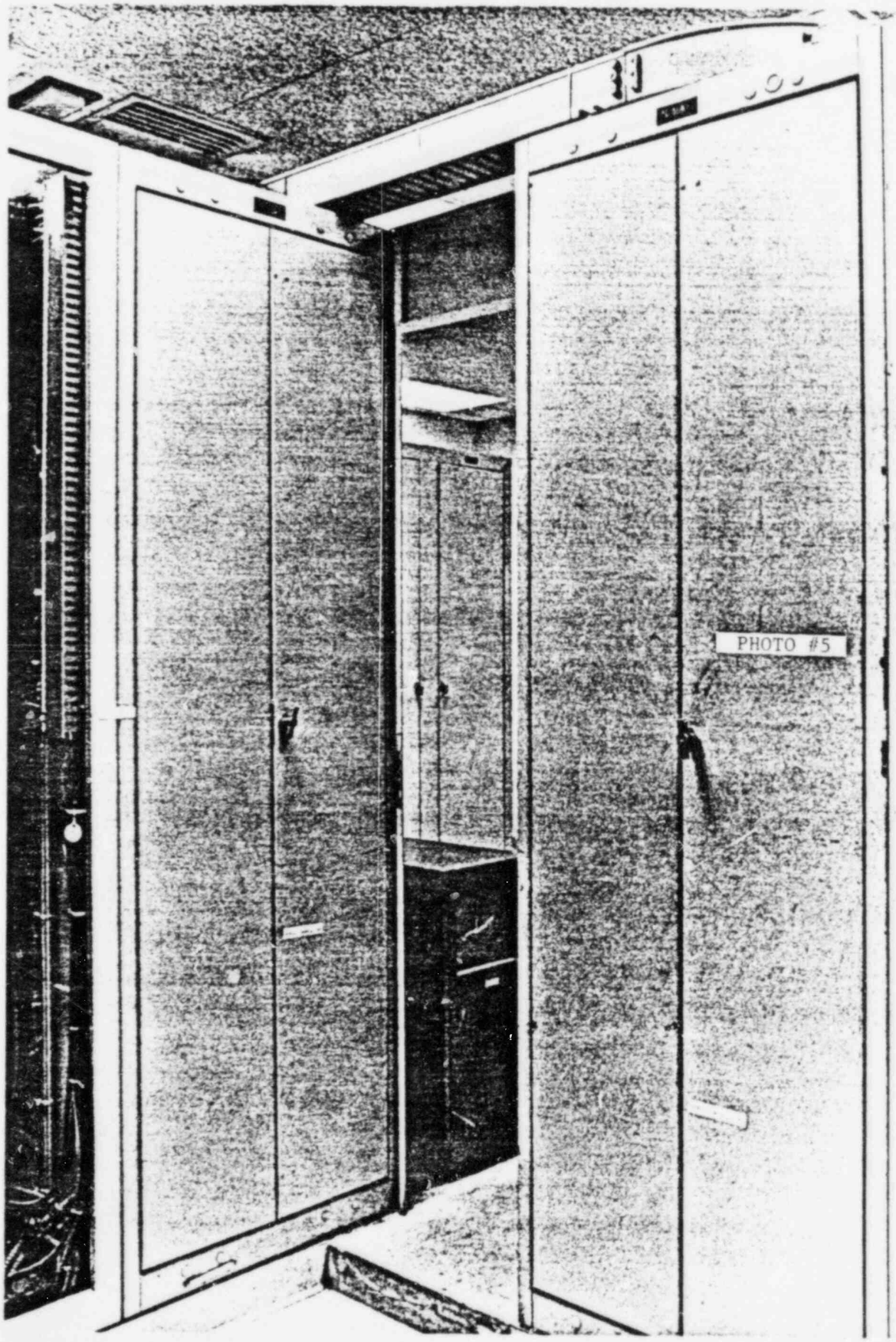
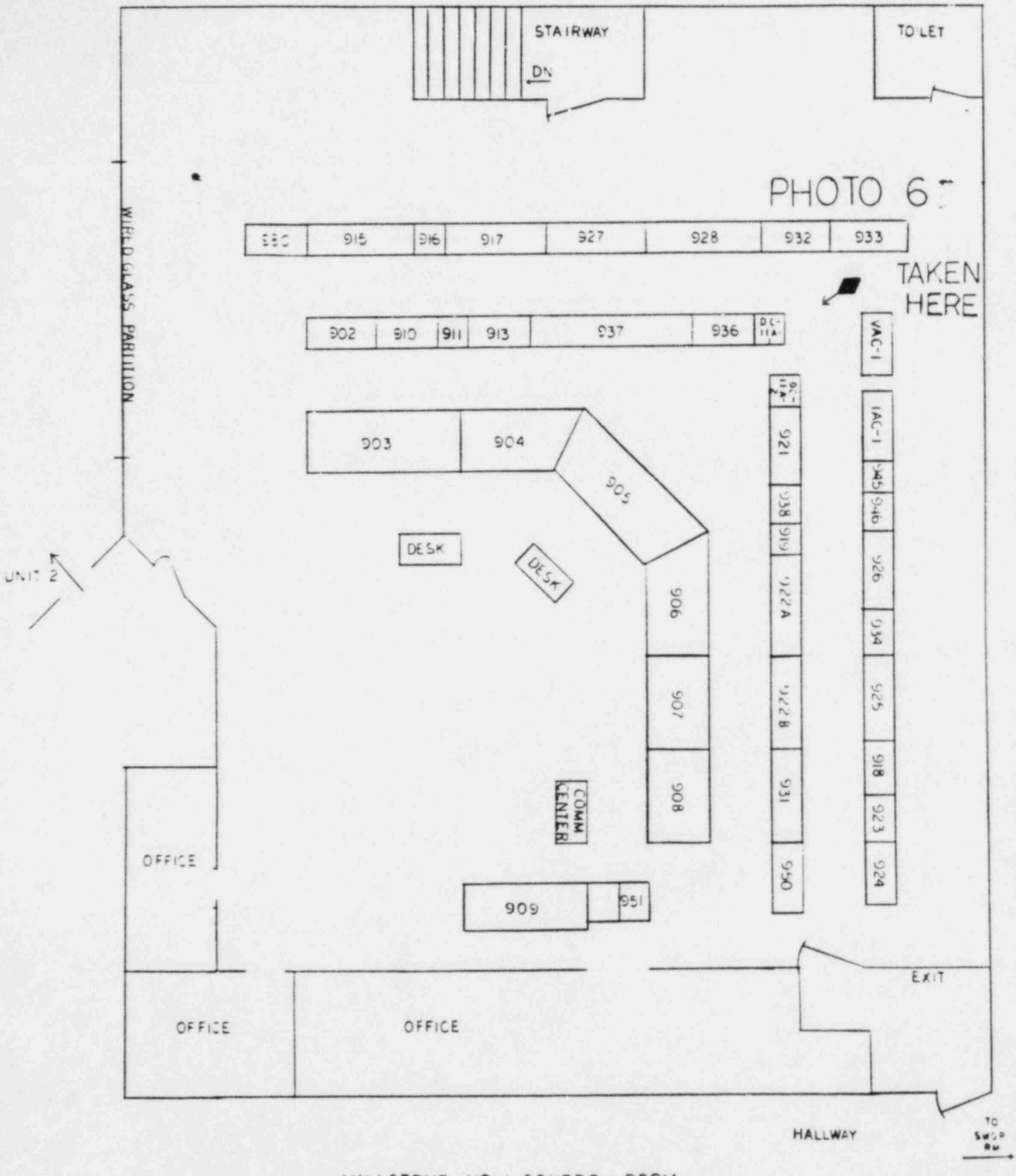


PHOTO #5

PHOTO #6

Front of DC-11A-1 (right) and DC-11A-2 (left).

NOTE:
- o Separation between panels.
- o Separation between DC-11A-1 to 902 from Panels 933 to 980 (right side).
- o Circuit breakers on DC-11A-1 and DC-11A-2 are opposite sides.
- o Curb concrete between DC-11A-1 and DC-11A-2.



MILLSTONE NO. 1 CONTROL ROOM

NOT TO SCALE
(TNP)

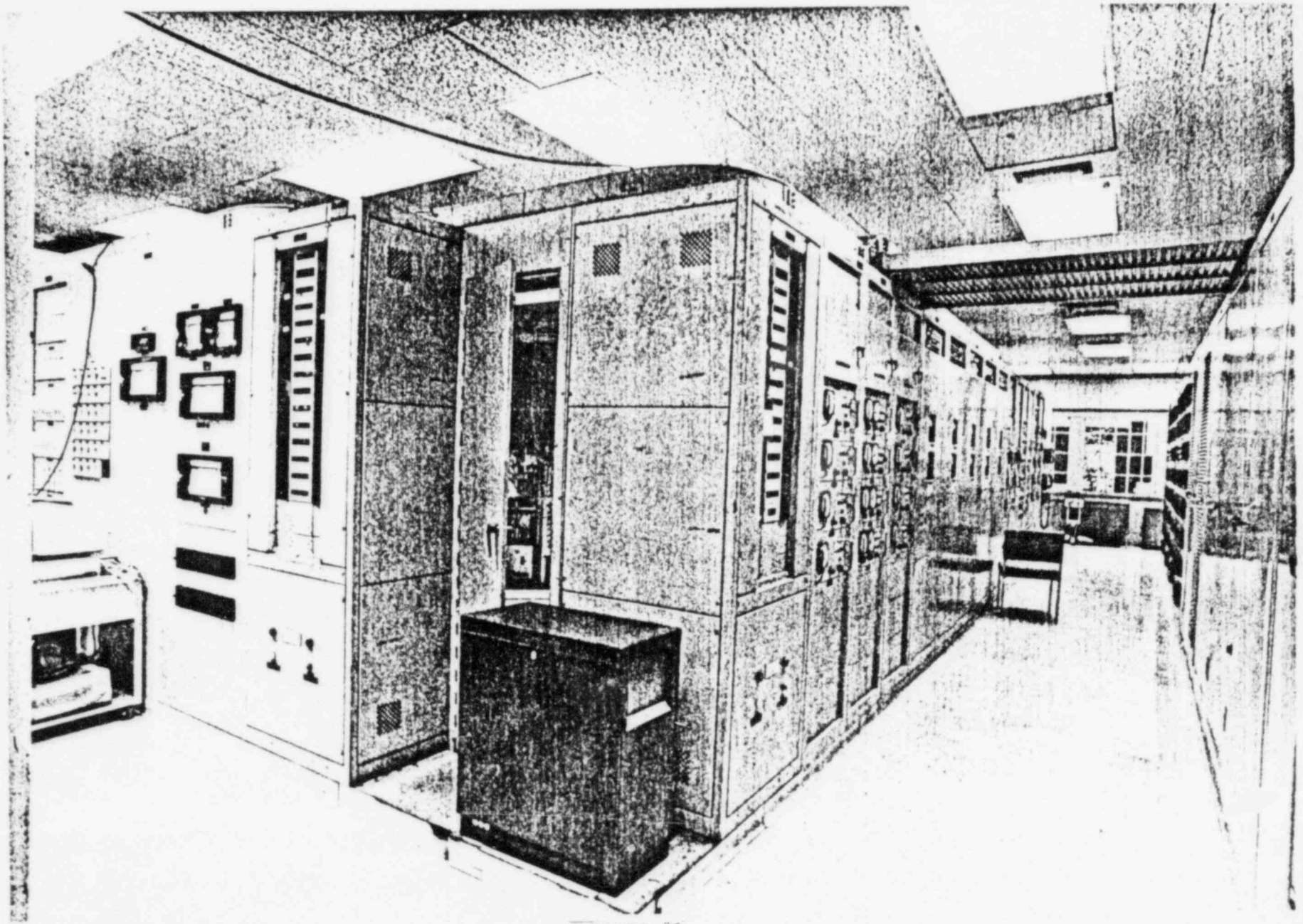


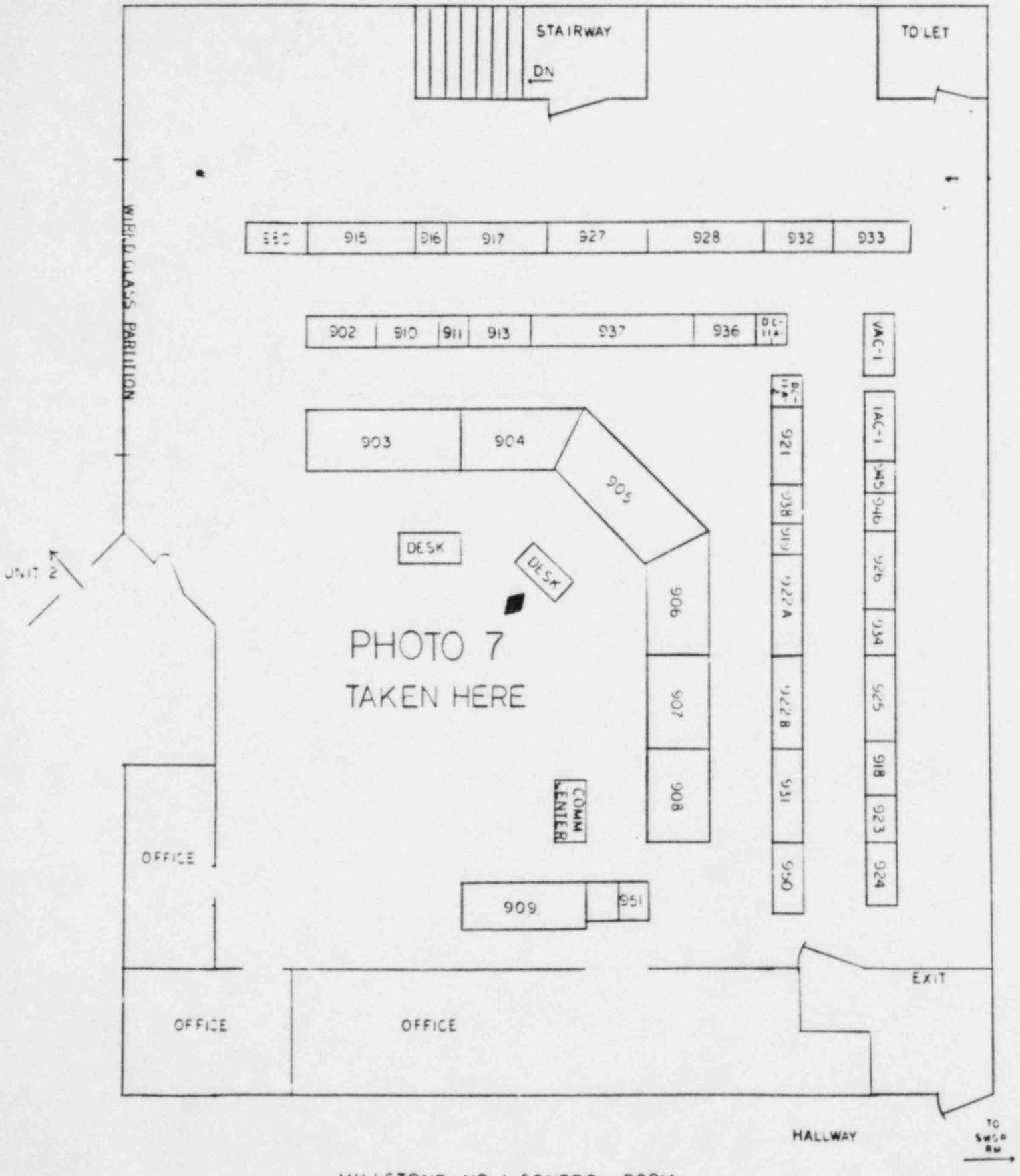
PHOTO #6

PHOTO #7

Front of MCB Panel 905 from 904 to 906.

NOTE: Size of panel.

Fire propagation from 904 through 905 to 906 would be prohibited due to sheet metal which separates panels, size of gas panel and halon extinguishing system.



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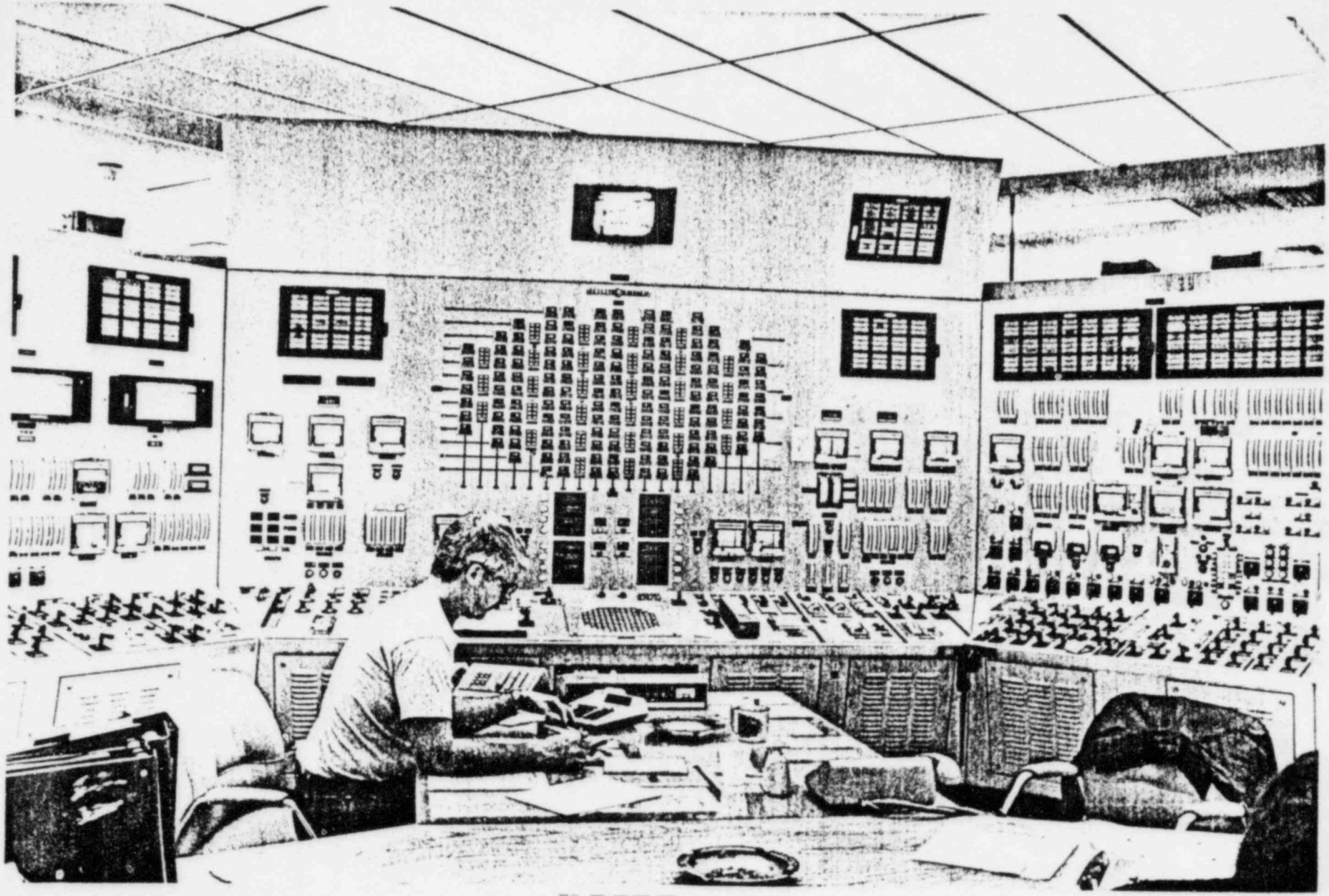

PHOTO #7

Question

3. Can Millstone Unit No. 1 be safely shut down with fire simultaneously affecting or damaging main control panels 904, 905 and 906?

Response

Position

The wording of the question expands the scope of the first of three criteria(1) previously established by the NRC Staff in review of the Haddam Neck and Millstone Unit No. 1 exemption requests. The criterion required a demonstration of operability to safe shutdown with the loss of two adjacent main control board panel sections. This question assumes loss of three adjacent main control board panel sections which is contrary to the criteria previously agreed to by the NRC Staff and NNECO in a meeting on December 1, 1982 as documented by Reference (2).

Fire in Adjacent Main Control Panels 904, 905, 906

Nevertheless, in the interest of continuing the NRC Staff's review of NNECO's exemption request for the Millstone Unit No. 1 control room we offer the following information. Millstone Unit No. 1 can safely shut down with a fire simultaneously affecting or damaging main control panels 904, 905, and 906. The safe shutdown equipment located in main control panels 904, 905, and 906 includes controls for CRD pumps A and B, CRD MOVs 302-8 and 302-10 and manual reactor trip buttons. Assuming as in Reference (1) that the automatic or manual trip is unaffected, the operator actions required to restore reactor make-

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(1) Compliance with the three criteria established by the NRC Staff demonstrates an equivalent level of protection regarding alternate safe shutdown capability in the event of a fire in the control room. The criteria as documented in Reference (2) are:

- o operability to safe shutdown with loss of two adjacent main control board panels sections or a single fully enclosed auxiliary control board panel, or a technically justified evaluation of a fire within the main control board of a magnitude smaller than two adjacent main control board panels;
- o that spurious equipment operation can be compensated using either a system approach or loss of adjacent panel section analysis;
- o actions being taken outside of the control room are achievable considering fire in the control room, time needed to accomplish the function, and manpower required.

up and monitor safe shutdown instrumentation would be the same as if the fire were in Control Room Fire Zone A(2). The operator actions required to restore reactor make-up are described in Table 2 of Reference (1). The overall effect of a fire within main control panels 904, 905 and 906, has a lesser impact on the capability to achieve and maintain safe shutdown than if a fire were in Control Room Fire Zone A or Fire Zone B.

References: (1) W. G. Counsil letter to D. G. Eisenhut, dated December 4, 1984, Docket No. 50-245 (Subject: Millstone Nuclear Power Station, Unit No. 1 - Information Supporting 10CFR50 Appendix R Review).

(2) W. G. Counsil letter to D. G. Eisenhut, dated December 15, 1982.

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(2) The control room failure mode and effect analysis divided the control room layout into four fire zones, zones A, B, C and D. Fire Zone "A" encompasses main control board panels 903, 904, and 905, as well as auxiliary control board panels 902, 910, 911, 913, 937, 936 and 125 VDC distribution panel DC-11A-1. Fire Zone "B" encompasses main control board panels 905, 906, 907 and 908 as well as auxiliary control board panels 950, 931, 922B, 922A, 919, 938, 921, 125 VDC distribution panel DC-11A-2, and panels 909 and 951. Main control board panel 905 will act as the buffer zone between zones A and B by being common to both zones.