

REGULATORY OPERATIONS, REGION III

A. RO Inspection Report No. 050-331/72-12

Transmittal Date : January 11, 1973

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B. RO Inquiry Report No. _____

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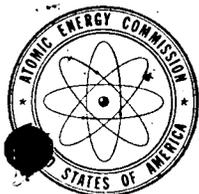
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UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

TELEPHONE
(312) 858-2660

January 11, 1973

Iowa Electric Light and Power Company
ATTN: Mr. Charles W. Sandford
Vice President, Engineering
Security Building
P. O. Box 351
Cedar Rapids, Iowa 52405

Docket No. 50-331

Gentlemen:

This refers to the inspection conducted by Messrs. D. Boyd and W. Fisher of this office on November 28 - 30, 1972, of activities at Duane Arnold Energy Center, authorized by AEC Construction Permit No. CPPR-70 and to the discussion of our findings held by the inspectors with Messrs. L. Root, J. Wallace, D. Arnold, Jr., G. Hunt, E. Hammond, W. Kacer, R. Graybeal, and D. Mineck of your staff at the conclusion of the inspection on November 30, 1972.

Areas examined during this inspection included: a preliminary health physics review of staffing, training, the environmental monitoring program, radiation measurement instruments and methods, and radwaste systems; the degree of IEL&P involvement in the preparation, review, approval, and performance of Preoperational and Acceptance Test Procedures; post construction pipe cleaning and flushing; testing of safety related hoists and cranes; Operations Review Committee functions; current IEL&P operating organization staffing; current IEL&P operating organization training program; and the site technical support provided by the Project Engineering Department. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with plant personnel, and observations by the inspectors.

The major understandings attained as a result of this inspection, and which appear to resolve the items of nonconformance and noncompliance identified in the October 27, 1972, letter from the Directorate of Regulatory Operations, Region III, to you, have been stated previously in our January 4, 1973, letter to you and are restated in the attached inspection report.

Iowa Electric Light and
Power Company

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January 11, 1973

No items of noncompliance with AEC requirements were identified within the scope of this inspection.

A copy of our report of this inspection is enclosed. In accordance with Section 2.790 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter with the enclosed inspection report will be placed in the AEC's Public Document Room. If the inspection report contains information which you or your contractors believe to be proprietary, it is necessary that you submit a written application to this office, within 20 days of the date of this letter, requesting that such information be withheld from public disclosure. If such an application is submitted, it must identify the basis for which information is claimed to be proprietary and should be prepared so that proprietary information identified is contained in a separate part of the document, since the application, excluding this separate part, will also be placed in the Public Document Room. If we do not receive an application to withhold information or are not otherwise contacted within the specified time period, the enclosed report will be placed in the Public Document Room with a copy of this letter.

Unless you wish to make application to withhold information, no reply to this letter is necessary; however, should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely yours,

Boyce H. Grier
Regional Director

Enclosure:

RO Inspection Report No. 050-331/72-12

bcc: RO Chief, RT&OB
RO Chief, RCB
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Licensing (4)
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U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

RO Inspection Report No. 050-331/72-12

Licensee: Iowa Electric Light and Power Company
Security Building
P. O. Box 351
Cedar Rapids, Iowa 52405

Duane Arnold Energy Center
Palo, Iowa

License No. CPPR-70
Category: B

Type of Licensee: BWR, 538 Mwe

Type of Inspection: Routine, Announced (Health Physics)

Dates of Inspection: November 28 - 30, 1972

Dates of Previous Inspection: October 18 - 20 and October 26, 1972

Principal Inspector: *D. C. Boyd*
D. C. Boyd

1-10-73
(Date)

Accompanying Inspector: *D. M. Hunnicutt*
W. L. Fisher

1/10/73
(Date)

Other Accompanying Personnel: None

Reviewed By: *D. M. Hunnicutt*
D. M. Hunnicutt, Chief
Reactor Testing and Startup Branch

1/10/73
(Date)

SUMMARY OF FINDINGS

Enforcement Action

There were no enforcement actions identified as a result of this inspection.

Licensee Action on Previously Identified Enforcement Items

- A. The applicant has satisfactorily clarified their intended preoperational testing program as it pertains to conformance with the Guide for the Planning of Preoperational Testing Programs, issued December 7, 1970. (Paragraph 9)
- B. The applicant has satisfactorily clarified their intended overall testing program, as it pertains to conformance with 10 CFR 50, Appendix B, Criterion XI, to establish that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service and as stated in the application will be performed. (Paragraph 9)
- C. The applicant has satisfactorily clarified their involvement in the review, approval, and audit functions of the intended testing program, as it pertains to conformance with 10 CFR 50, Appendix B, Criterion XVIII, to establish that a comprehensive system of planned and periodic reviews and audits will be carried out to determine the effectiveness of the testing program. (Paragraph 9)

Design Changes

Comments relative to design changes will be identified in reports prepared by Directorate of Regulatory Operations, Construction Branch.

Unusual Occurrences

No unusual occurrences were determined or identified as a result of this inspection.

Other Significant Findings

A. Current Findings

1. Status Report

- a. Construction Completion --- 75%
- b. Primary System Hydro Test - Target Date - April 1, 1973

c. Initial Fuel Loading - Target Date - September 1, 1973

2. Environmental radiation background levels, as measured by thermoluminescent dosimeters (TLD), varied excessively during approximately the first year of measurement. (Paragraph 1)

3. Operations Review Committee

A review of the meeting minutes of the Operations Review Committee indicates that this committee is functioning as indicated in Section 6.2 of the proposed technical specifications. (Paragraph 11)

4. Operating Organization Staffing

A review of the current operating organization staffing status indicates that staffing is in accordance with Section 13 of the FSAR and meets the requirements of ANS Guide 18.1. (Paragraph 12) (Radiation Protection Staffing reviewed separately - see Paragraph 5)

5. Operating Organization Training

A review of the current operating organization training program status indicates that the program is being implemented in accordance with the program identified in Section 13 of the FSAR. (Paragraph 13) (Radiation Protection training review separately - see Paragraph 6)

6. Corporate Office Technical Support for the Site

The applicant indicates that substantial corporate office technical support will be assigned at the site during the preoperational and power ascension phases of the project. (Paragraph 14)

7. Comments on Preoperational Test Procedures

Several understandings were reached in regard to Regulatory Operations comments on preoperational test procedures. (Paragraph 17)

B. Unresolved Items

Post Construction Pipe Cleaning and Flushing

At this point in time, the applicant has not determined whether the final cleaning of the primary recirculating system piping

(for the assured removal of possible foreign objects or debris) will be accomplished by a 100 percent recirculation flow or by some alternate procedure. (Paragraph 10)

C. Status of Previously Reported Unresolved Items

1. Preoperational Testing Program

The applicant has satisfactorily clarified their intended pre-fuel loading testing program and their involvement in the review and approval of test procedures prior to and following their completion. (Paragraph 9)

2. Post Construction Pipe Cleaning and Flushing

A previously expressed Regulatory Operations concern^{1/} regarding the applicant's followup of the Bechtel post construction pipe cleaning and flushing program has been resolved. (Paragraph 15)

3. Testing of Major Cranes and Hoists

A previously expressed Regulatory Operations concern^{2/} regarding the applicant's followup of the Bechtel testing of safety related cranes and hoists has been resolved. (Paragraph 16)

Management Interview

Persons Present

The following personnel were present during the management interview:

Iowa Electric Light and Power Company (IEL&P)

L. Root, DAEC Assistant Project Manager
J. Wallace, IEL&P Production Manager
D. Arnold, Jr., Engineer in Training
G. Hunt, Chief Engineer
E. Hammond, Assistant Chief Engineer
W. Kacer, Quality Assurance Engineer
R. Graybeal, Radiation Protection Engineer
D. Minek, Site Technical Staff

1/ RO Inspection Report No. 050-331/72-08

2/ Ibid.

Directorate of Regulatory Operations, Region III

D. Boyd, Principal Inspector

W. Fisher, Acting Chief, Facilities Radiological and Environmental
Protection Section

Subjects Discussed

The following subjects related to the health physics review were discussed:

A. Radiation Protection Training

Discussed the need for timely training of Radiation Protection personnel and training of other groups in the area of radiation protection. The licensee agreed to review this area to ensure completion of all such training prior to fuel loading. (Paragraph 6)

B. Radiation Protection Personnel

The licensee will make all Radiation Protection personnel resumes available for review. (Paragraph 5)

C. Air Sampling Charcoal Cartridges

The licensee agreed to ensure that sampled air will flow uniformly through charcoal cartridges. He also agreed to prevent water from getting into the charcoal cartridge or its holder. (Paragraph 3)

D. Environmental Radiation Background

The licensee agreed to determine the validity of radiation background data obtained by TLD measurements during approximately the first year of environmental measurements. (Paragraph 1)

E. Calibration of TLD's

Discussed the need for calibration of TLD's in the range of normal measurement. The licensee agreed to do this and on December 12, 1972, notified RO:III that some progress had been made in this regard. (Paragraph 2)

F. Radiation Protection Manual

The licensee agreed to make available for RO:III review its Radiation Protection Manual, which was being drafted at the time of this inspection. (A draft copy received by RO:III on December 18, 1972, was discussed with a licensee representative by telephone on

January 3, 1973. The representative was advised that the final manual would be reviewed during a future inspection.)

G. Radioactive Effluent Release Paths

The licensee agreed to review and identify all paths of actual or potential radioactivity release. (Paragraph 8)

H. Gaseous Effluent Sampling Systems

The licensee agreed to follow closely the installation of sampling systems in order to ensure that representative samples will be obtainable. (Paragraph 8)

I. Preoperational Testing Program

The following understandings were attained in regard to the preoperational testing program:

1. All system and components tests identified in the Guide for the Planning of Preoperational Testing Programs, issued December 7, 1970, which the applicant considers to be safety related, will be tested in accordance with written and approved preoperational test procedures. The remaining system and component tests identified in this guide, which are applicable to this facility, will be tested in accordance with written and approved acceptance test procedures.
2. The degree of IEL&P involvement in the review, participation, and approval of preoperational and acceptance tests is essentially the same with the exception that the IEL&P Quality Assurance review of acceptance test procedures may be of a lesser extent than for preoperational test procedures. (Paragraph 9)

J. RO:III Comments on Preoperational Test Procedures

Discussed the understandings arrived at regarding the RO:III comments on the following preoperational test procedures:

- No. 2 -- 125 Volt D. C. System
- No. 23 -- Diesel Oil Supply
- No. 24 -- Standby Diesel Generators
- No. 30 -- Control Building H/V System

No. 75 -- 24 Volt D. C. System

No. 88 -- 250 Volt D. C. System

K. Post Construction Pipe Cleaning and Flushing

Discussed various aspects concerning the procedure for the final cleaning and flushing of all piping systems having a flow path to the reactor pressure vessel and identified areas requiring additional discussion. (Paragraph 15)

REPORT DETAILS

Persons Contacted

Iowa Electric Light and Power Company (IEL&P)

L. Root, DAEC Assistant Project Manager
J. Wallace, IEL&P Production Manager
D. Arnold, Jr., Engineer in Training
G. Hunt, Chief Engineer
E. Hammond, Assistant Chief Engineer
W. Kacer, Quality Assurance Engineer
R. Graybeal, Radiation Protection Engineer
D. Minek, Site Technical Staff
R. Zook, Operations Preoperational Test Coordinator
J. Gebert, Electrical Maintenance Supervisor
R. Lehman, Mechanical Maintenance Supervisor
R. Lessly, Nuclear Engineer, Project Engineering
V. Barrett, Environmental Monitoring Technician
N. Pike, Radiation and Chemistry Technician

Bechtel Corporation (Bechtel)

R. Cote, Startup Supervisor
M. Roller, Lead Electrical Startup Engineer
F. Adamek, Preoperational Test Engineer

Radiation Protection

1. Environmental Radiation Background

Environmental radiation levels have been measured monthly using LiF TLD's as required by the FSAR and Technical Specifications. Recorded dose rates ranged from about five to thirty millirem per month during the first year. The licensee believes that this wide variation might have resulted from exposure during air transportation from and to the processing contractor's facilities. In order to minimize this problem, the licensee is now processing his own TLD's, except for some annual TLD's which are still furnished and processed by the contractor.

2. Calibration of TLD's

The licensee's TLD's had been calibrated only at exposures of 2 R and 200 mR prior to this inspection. Lower measured exposures were determined from a linear extrapolation of these two calibration

points. On December 12, 1972, the licensee notified RO:III by telephone that additional calibration at 10 mR and 50 mR showed the linear extrapolation to have been conservative by about 10 percent in the normal range of measurement.

3. Air Sampling Charcoal Cartridges

The licensee is installing charcoal cartridges behind the particulate filter at all sixteen air sampling locations. The inspector observed the first such installation, at location number 15. Two potential problems at this installation were discussed with the licensee. First was the possibility of horizontal air flow bypassing the charcoal as a result of charcoal settling. Second was the effect of moisture found inside the charcoal cartridge holder. The licensee agreed to consider these potential problems as they relate to all charcoal sampling installations in the environs and in the plant.

4. The Environmental Program in General

A review of environmental program records, discussion of the program with licensee representatives, and inspection of several monitoring stations indicated that the program is being conducted as described in the FSAR and Technical Specifications. The few instances where data are not recorded have resulted from inability to obtain samples (e.g., aquatic biota) due to weather conditions.

5. Radiation Protection Organization and Personnel

Organization of the Radiation Protection Group was not reviewed in depth, since some organizational changes are being considered. The Radiation Protection Group is expected to become somewhat larger than described in the FSAR. The nature of the group and the education and experience background of its personnel will be reviewed during a future inspection.

6. Radiation Protection Training

A review of training provided to Radiation Protection Group personnel and of radiation protection training provided to other plant personnel indicated a lack of organization and planning in these areas. The inspector discussed the importance of adequate and timely training, especially for those persons lacking nuclear power plant experience. Two of the more important radiation protection courses yet to be taught are "Radiation Safety" (six weeks) and "Basic Nuclear Physics and Plant Chemistry" (four hours per day for approximately eight weeks). At the time of this inspection, no firm plan or schedule for completing such training was available.

7. Radiation Protection Instrumentation

The licensee's intended complement of radiation protection instruments was reviewed. No deficiencies were noted.

8. Radwaste Systems

Radwaste systems were discussed with licensee representatives; however, a detailed RO review of these systems will not occur for several months. Meanwhile, the licensee was asked to review and identify all paths of actual or potential radioactivity release in order that appropriate sampling or monitoring can be ensured. He was also asked to follow closely the installation of gaseous effluent sampling systems in order to ensure that representative samples will be obtainable.

9. Preoperational Testing Program

Previous RO inspection reports have identified areas of concern regarding the applicant's proposed preoperational testing program.^{3/4/5/} Basically, these concerns were identified in two areas. First, the preoperational testing program proposed by the applicant did not appear to include the testing of all safety related systems. Secondly, the degree of testing coverage intended and the degree of applicant involvement in the review, participation, and approval of the test procedures was not clear, since the applicant had elected to separate the test procedures into two categories; preoperational tests, and acceptance tests. The degree of coverage and IEL&P involvement in preoperational testing is adequately defined in Section 13, as supplemented by Amendment 3, of the FSAR. However, prior to this inspection, an adequate description either written or verbal, of IEL&P's involvement in acceptance testing had not been provided to Regulatory Operations.

During this inspection, as a result of discussions with IEL&P management, the following understandings were attained:

- a. All system and component tests identified in the December 7, 1970 Guide for the Planning of Preoperational Testing Programs, which IEL&P considers to be safety related will be tested in accordance with written and approved preoperational test procedures. The remaining system and component tests identified

^{3/} RO Inspection Report No. 050-331/72-04
^{4/} RO Inspection Report No. 050-331/72-06
^{5/} RO Inspection Report No. 050-331/72-08

in this guide, which are applicable to this facility, will be tested in accordance with written and approved acceptance tests procedures.

- b. The degree of IEL&P involvement in the review, participation, and approval of preoperational and acceptance tests is essentially the same for each of these categories of tests with the exception that the IEL&P Quality Assurance Review of acceptance tests procedures may be of a lesser degree than for preoperational test procedures. Specifically, it was agreed that all acceptance tests would be reviewed by the Operations Review Committee, and would be approved by the Chief Engineer.

The inspector reviewed the preoperational test procedure packages for test Nos. 2, 4, 57, and 88. The inspector observed that the test packages contain the following:

- a. A test summary report, prepared by the IEL&P Operating Group for the Operations Review Committee (prepared for each completed test).
 - b. Preoperational test procedure document change notices. (These are reviewed and approved by Bechtel, GE, and IEL&P).
 - c. A complete procedure, all revisions, and data sheets.
 - d. Calibration data sheets for all instruments used in the performance of the tests.
 - e. Deficiency reports (cleared, outstanding).
 - f. Deviations to test procedure.
 - g. Construction release drawings.
 - h. Startup Release package (drawings, checklists).
 - i. Vendor test, vendor component data.
 - j. Additional data sheets for data obtained that was not specified in the test procedure.
10. Post Construction Pipe Cleaning and Flushing

In discussions with the applicant and the Bechtel Startup Engineer, regarding the final flush of all piping systems having a flow path to the reactor pressure vessel, it was determined that it is the

present intent to flush the main recirculating system at approximately 20 percent of flow. The inspector stated that previous experience at similar facilities has established that higher recirculating system flows are required to assure that possible foreign objects and debris is flushed from the systems. Agreement was reached that consideration would be given to either attaining higher flushing flows or to providing alternate means of assuring that the piping and the reactor pressure vessel are free of foreign objects and debris.

11. Operations Review Committee

A review of the functions being performed by the Operations Review Committee indicates that this review body is functioning as stated in the FSAR and as required by Technical Specification 6.2.

The material reviewed by the inspector included the Operations Review Committee meeting minutes for the following dates:

May 9, 1972
July 31, 1972
August 15, 1972
September 19, 1972
October 17, 1972

It was observed that during the above meetings the Committee has reviewed and recommended approval of preoperational tests Nos. 3, 4, 22, 54, 57, 75, and 88. The above meeting minutes also indicate that this review committee has reviewed acceptance tests Nos. 14, 18, and 19.

12. Operating Organization Staffing

The facility chief engineer provided the inspector with the following information regarding recent additions to the operating organization staff:

- a. Seven individuals, all of whom were trained in the Nuclear Navy program have been hired as facility operator candidates. These candidates are currently engaged in the Station's formal training program. (See Paragraph 5)
- b. The Reactor and Plant Performance Group has added two nuclear results engineers. One has a masters degree in Mechanical Engineering, and the other has a masters degree in Nuclear Engineering.

- c. The Reactor and Plant Performance Group has also added a second computer specialist. This individual has a masters degree in Nuclear Engineering and is currently in a Computer Training program in California.
- d. The Radiation Protection Group has added two individuals to their staff. One has a degree in Chemistry and the other is experienced in radwaste handling.

13. Operating Organization Training

The inspector's review of training records and discussions with the Chief Engineer indicated the following:

- a. Twenty-one Facility Operator Candidates have completed the basic nuclear course. The BWR technology course and the research training reactor course.
- b. Eighteen Facility Operator Candidates have completed the BWR simulator training course and all 18 have satisfactorily completed the GE examinations.
- c. These 18 operators are currently engaged in an on-site training program for four hours each day which includes system familiarization by walk through examinations on a system by system basis. The remaining four hours per day is utilized in participation in preoperational and acceptance test activities.
- d. These 18 operators are tentatively scheduled to take their AEC licensing examinations in July 1973.
- e. The 7 newly hired operator candidates (Paragraph 4, above) are currently engaged in the onsite basic nuclear training course, following completion of this course the candidates will take the BWR Technology Course.
- f. Five of the new operator candidates will receive the research reactor training course and the BWR simulator training course.
- g. All 7 of the new operator candidates are tentatively scheduled to be available at the plant site by April 1973 to participate in the preoperational and acceptance testing programs and other plant readiness activities.

14. Corporate Office Technical Support for Site

The inspector's review and discussion of tentative organizational charts with the Assistant Project Manager indicates that approximately twelve members of the project engineering group will be assigned at the site to provide additional technical support to the operating organization during the testing and power ascension phases of the project. Tentatively, these project engineers will be organized as three support teams. The project engineer pointed out that each of these individuals is already knowledgeable in the facility and with the systems and components by virtue of their past participation in the design and construction phases of the project. The project engineer stated that the present intent is to make specific system assignments for each member of this project technical support team. No specific date has been established for this team assignment to become effective.

15. Post Construction Pipe Cleaning and Flushing

A previously expressed Regulatory Operations concern regarding the applicant's followup of the Bechtel post construction pipe cleaning and flushing program has been resolved pending final verification. The applicant stated that members of the operating organization will be assigned to follow the progress and results of this effort. Their responsibilities in this assignment, according to the Chief Engineer, will include verification of valve lineup, flushing flows, water quality, sequence of flushing activities, and adherence to the pipe cleaning and flushing procedures.

16. Testing of Major Cranes and Hoists

A previously expressed Regulatory Operations concern regarding the applicant's followup of the Bechtel testing of safety related cranes and hoists has been resolved pending final verification. The applicant stated that none of this testing has been performed yet. When this testing is conducted, members of the IEL&P Engineering Group will observe the tests and review the data to assure that this equipment meets the requirements of the applicable codes.

The inspector reviewed a letter and forms which establishes that Bechtel, in accordance with OSHA standards, is performing daily, monthly, and annual inspection of cranes and hoists, and that these records will be turned over to IEL&P for review and for continuity of records on these components.

17. Preoperational Test Procedure Review

The inspector discussed his comments on preoperational test procedures with members of IEL&P management and with members of the Bechtel Startup Organization.

Following is a summary of the understandings reached as a result of these discussions:

a. Preoperational Test No. 2 - 125 Volt D. C. Power System

The following items will be reviewed for further discussion and/or resolution:

- (1) It does not appear that this test demonstrated the system capability as stated in section 8.5.2.3 of the FSAR" -- "The chargers must be capable of fully recharging a discharged battery bank within 8 hours while carrying normal steady state D. C. loads."
- (2) The test does not identify what constitutes a "discharged battery bank."
- (3) The test does not identify what the normal steady state D. C. load for this system should be.
- (4) The test does not identify what code was followed in the performance of the battery drawdown test -- or what constitutes a full battery drawn down test.
- (5) These same comments apply to the following preoperational test procedures:

No. 75 -- 24 Volt D. C. System

No. 88 -- 250 Volt D. C. System

b. Preoperational Test No. 23 - Diesel Oil Supply

We understand that the following items will be reviewed for further discussion:

- (1) The test does not appear to verify that the diesel oil transfer pumps have a 200% capacity as stated in Section 8.6.3 of the FSAR.

- (2) The test does appear to demonstrate or verify the automatic operation of the D. C. motor driven fuel pump as a backup to the diesel driven fuel supply pump (possibly in Test No. 24).
- (3) The test does not appear to demonstrate or verify the setting and function of the diesel fuel supply injection header pressure sensor(s) (possibly in Test No. 24).

The applicant states that it is their intent to rerun this test.

c. Preoperational Test No. 24 - Standby Diesel Generator

We understand that the following items will be reviewed for further discussion:

(1) Item 8.5 - Loss of Station Power

It appears that on loss of station power that system 2 should include MCC-1B-42 to assure that an emergency service water pump is available.

- (2) The present procedure, which we understand will be revised states in Item 8.5.2. "Standby diesel generator 1G21 test is not required, the effect of loss of utilities is sufficiently demonstrated on one set only." We understand that the new (revised) test procedure will require the testing of both units.

d. Preoperational Test No. 30 - Control Building H/V System

We understand that the following is intended:

Item 1.3.3 states that "The cable spreading room pressure shall be equal to or greater than the control room pressure."

Since the control room "is designed to remain tenable under incident conditions" we understand that all penetrations from the cable spreading room into the control room (including the computer cubicle) will be sealed.