U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

Report No. 99900526/80-01 Program No. 51200

Company: Black and Veatch Consulting Engineers
Post Office Box 8405
Kansas City, Missouri

Inspection at: Overland Park, Kansas

Inspection conducted: August 4-8, 1980

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Vendor Inspection Branch

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C. J. Hale, Chief Date
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Approved by: C. J. Hale 8-25-80
C. J. Hale, Chief Date
Program Evaluation Section
Vendor Inspection Branch

Summary

Inspection conducted August 4-8, 1980 (99900526/80-01)

Areas Inspected: Implementation of the requirements of 10 CFR 50, Appendix B, in the areas of design change control, design interfaces, QA manual review, and action on previous inspection findings. The inspection involved one hundred thirteen (113) inspector-hours on-site by four (4) NRC inspectors.

Results: There were no unresolved items identified in any area. There were four (4) deviations identified as follows:

Deviations: Action on previous inspection findings - Engineering Change Notices (ECN) outstanding against each Project Design Manual section are not identified on the B&V Drawing Index as required by procedures (Notice of Deviation enclosure, item A.). Failure to have procedures controlling maintenance of the ECN log (Notice of Deviation enclosure, item B.). Design Change Control - failure to follow the procedure that controls changes to the project PSAR; (Notice of Deviation enclosure, item C.). QA Manual Review - Failure to document the review and resolution of deviations to the detailed designs in the System Design Specification. (Notice of Deviation enclosure, item D.).

DETAILS SECTION I

(Prepared by R. H. Brickley & C. J. Hale)

A. Persons Contacted

W. A. Hartman, Division Document Control Supervisor
F. R. Rollins, Project QC Engineer

B. Action on Previous Inspection Findings

1. (Closed) Deviation (Report No. 79-02): The Project Design Engineer - Systems did not have complete records pertaining to the approval of the original issue or subsequent issues of the Project Design Manual (PDM).

   The inspector verified that the corrective actions and preventive measures committed in the letters of response, dated September 20, 1979, and October 30, 1979, i.e. a copy of the PDM has been designated as the historical record and placed in the Project Security File. The review and approval of all sections have been documented, and QA program procedure SP 3.21 (Project Design Manual) has been revised (November 19, 1979) to require retention of review records.

2. (Closed) Deviation (Report No. 79-02): The historical copy of the PDM did not contain the table of contents or a list of effective dates for the original issue.

   The inspector verified that the corrective action and preventive measures committed in the letters of response, dated September 20, 1979 and October 30, 1979, i.e. a listing of the effective content of the PDM had been prepared, included on the B&V Drawing Index, and QA program procedure SP 3.2 (Project Design Manual) had been revised to require that the effective content of the PDM be shown on the B&V Drawing Index.

   In connection with the closeout of this item the inspector examined the B&V Drawing Index - Supplement C dated July 2, 1980, and compared it with the Engineering Change Notice (ECN) Log maintained by the Systems Department. The inspector identified several errors in the ECN log and B&V Drawing Index (See Notice of Deviation, enclosure items A. and B.).

3. (Closed) Deviation (Report No. 79-02): The procedure governing drawings and lists (SP 5.2) allows the destruction of documented evidence of reviews.

The inspector verified that the corrective action and preventive measures committed in the letter of response dated September 20, 1979, i.e. SP 5.2 was revised on January 22, 1980, to require the retention and filing of review Form P-GN-101, Project Design Engineers were informed of the change during the staff meeting on February 6, 1980, and Section 4 (Project QA Program) of the Project Instructions was revised to include review records.

4. With respect to Deviation D and the unresolved item from inspection Report No. 79-02, the B&V personnel present during this inspection were unable to produce documentation to substantiate the validity of some statements made in the B&V letter of response, dated September 20, 1979. These items will remain open pending examination of the documentation or clarifcation of the statements.

C. Exit Interview

An exit interview was held with the following management representatives at the conclusion of the inspection on August 8, 1980.

P. J. Adam, Head of Power Division
R. M. Butcher, Manager of Engineering
M. J. Robinson, Project Manager
F. R. Rollins, Project QC Engineer

Mr. C. J. Hale summarized the scope and findings of the inspection. It was also emphasized that it is necessary for B&V to clearly describe their corrective and preventive actions taken in response to our inspection findings and the importance of documentary evidence of these actions. The management comments were generally for clarification or acknowledgement

DETAILS SECTION II

(Prepared by J. M. Johnson)

A. Persons Contacted

A. R. Bauch, Project Quality Control Engineer
H. Dastmalchian, Supervisor, NBS (Nuclear Boiler System)
R. Everett, Licensing Engineer
D. F. Guyot, Project Engineer, Structural
K. Jennison, Systems Engineer
S. L. McCabe, Supervisor, Pipe Stress
M. M. Moussa, Structural Engineer
L. S. Newland, Plant Production Supervisor
R. Nickum, Project Engineer, Controls
F. Rollins, Project Quality Control Engineer
W. J. Zidziunas, Project Engineer, Mechanical

B. Design Interfaces

1. Objectives

The objectives of this area of the inspection for both internal and external interfaces were to determine that procedures have been established and implemented that:

a. Require that design organizations identify, in writing, their interfaces for managing the flow of design information.

b. Define and document the responsibilities of each organizational unit for the preparation, review, approval, distribution, and revision of documents involving design interfaces.

c. Establish methods for systematically communicating needed design information, including changes thereto, across design interfaces as work progresses.

d. Require documention of information transmitted between organizations which identified the status of the design information or documents and incomplete items which require further evaluation, review or approval.

e. Require that design information transmitted orally or by other informal means is promptly documented, and the documentation confirmed and controlled.

f. Identify the external organizations providing criteria, designs, specifications, and technical direction.

g. Identify the positions and titles of key personnel in the communications channel and their responsibilities for decision making, problem resolution, providing and reviewing information.

2. Method of Accomplishment

a. Review of the following documents to determine whether procedures have been established to control internal and external design interfaces:

(1) Sections 17B.1.2.1, 17B.1.2.3.1, 17B.1.2.3.2, 17B.1.2.4, 17B.1.3.5, 17B.1.3.6., 17B.1.3.7, 17B.1.4.1, 17B.1.7.1, 17B.1.15 and 3.8.2.3.12 of the PSAR for Black Fox Station, to determine the original commitments relative to Black and Veatch design interface control.

(2) Sections III and IV of the Black and Veatch Quality Assurance Program-Nuclear and Standard Procedures Nos. SP 3.3, SP 5.3, SP 3.10, SP 5.1 and SP 7.6, to determine QA Manual requirements concerning design interface control.

(3) Sections 2,4,5,7 and 8 of the Black Fox Station Project Instructions Manual, to determine project unique requirements for design interface control.

(4) Section 4.2 of the Project Design Manual

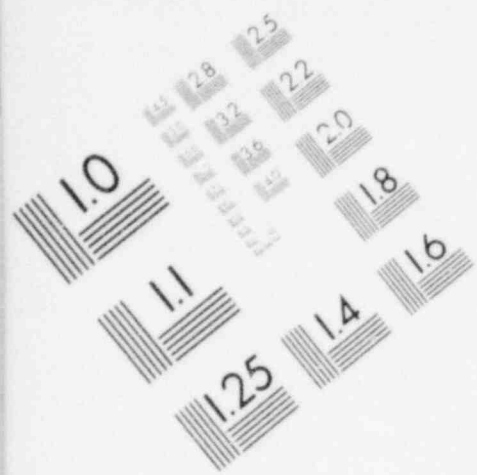
b. Review of the following to determine whether the objectives of paragraph B.1. above were implemented.

(1) Documents related to the Drywell Vent Structure:

(a) Black & Veatch Drawings S5000, Revisions 9 and 10, S5021, S5022, Revision 4, and S5023, Revisions 6 and 7.

(b) Specification number 6212.311.8020.41 and related review and approval sheets for Preliminary Issue and Bid Issue.

(c) Component Design Specification (CDS) number 6212.215.3240.17 and comparison with GE input documents 22A5709, 762E458, 762E576, 213A5452 and 762E547. Also comparison with PSAR requirements and information in GE document 300-13-AB (Containment Vessel-TVA Stride), Section 15.9.



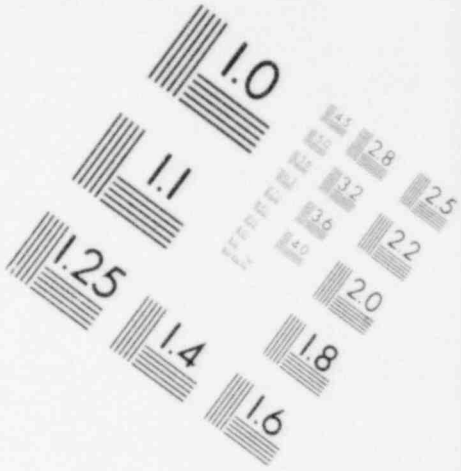


IMAGE EVALUATION
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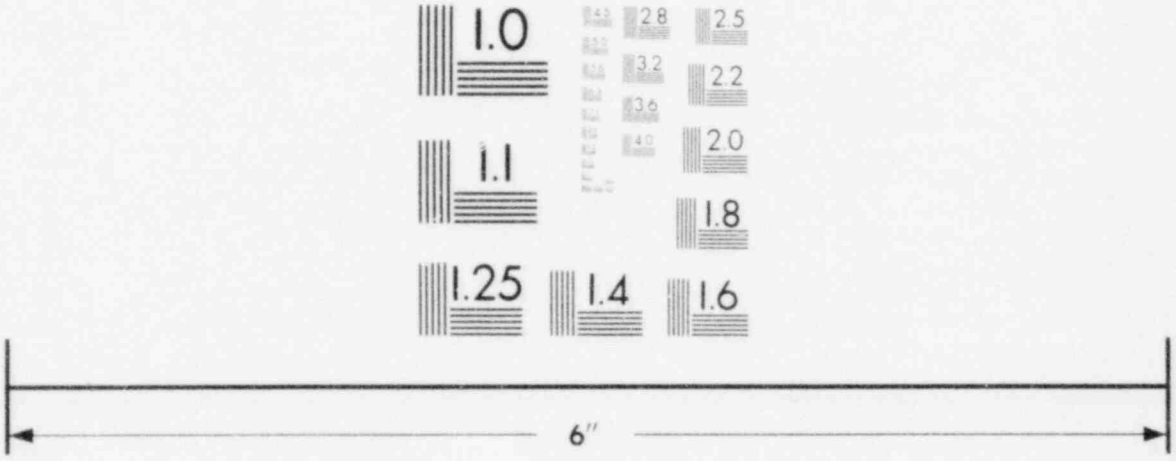

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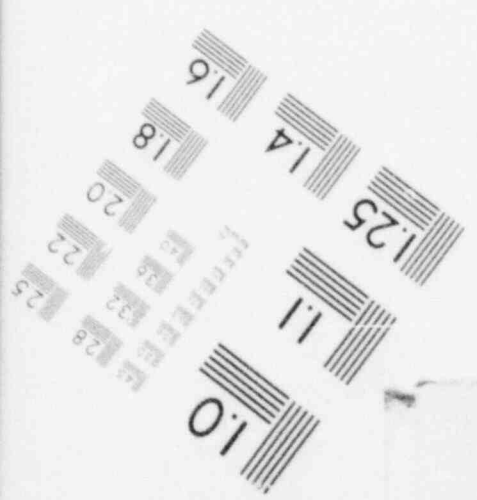

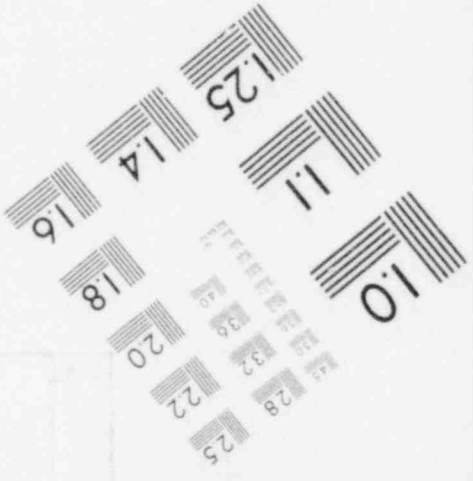

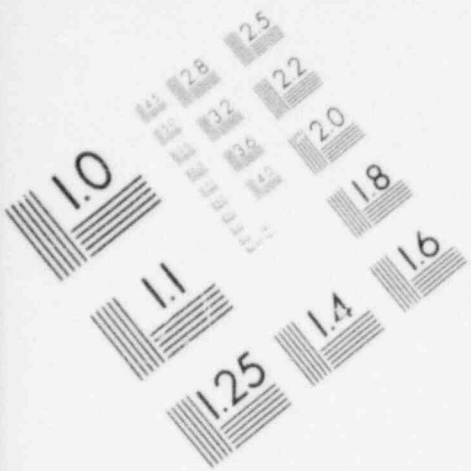

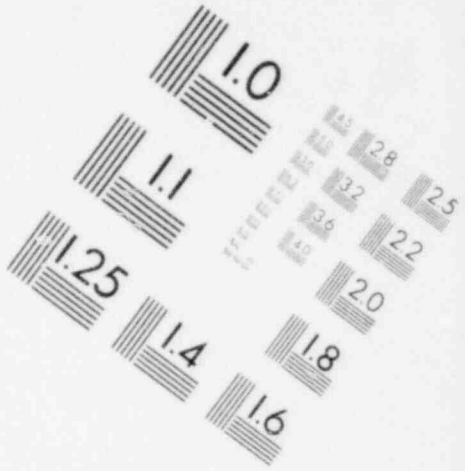

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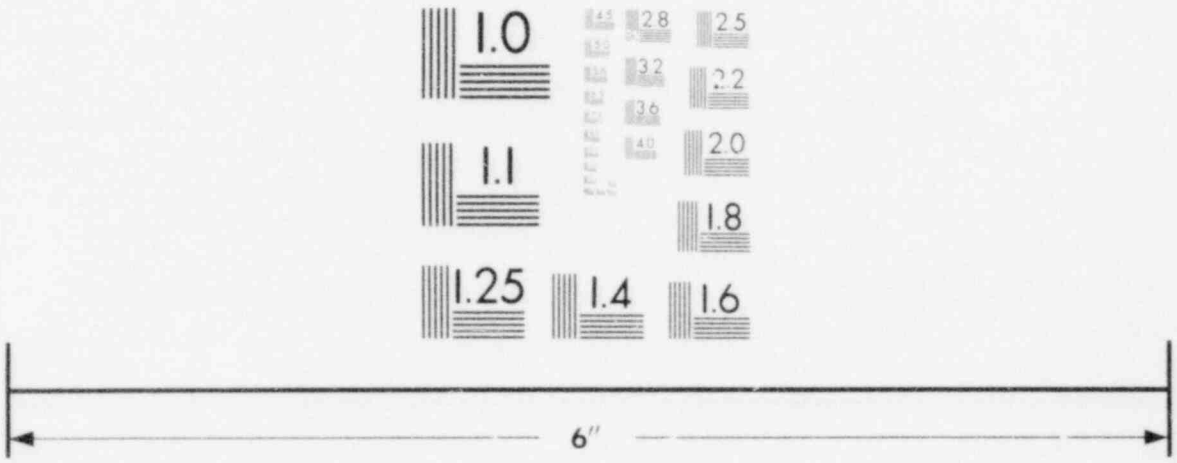

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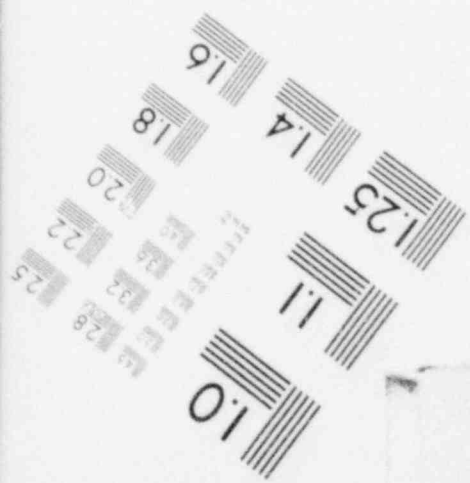

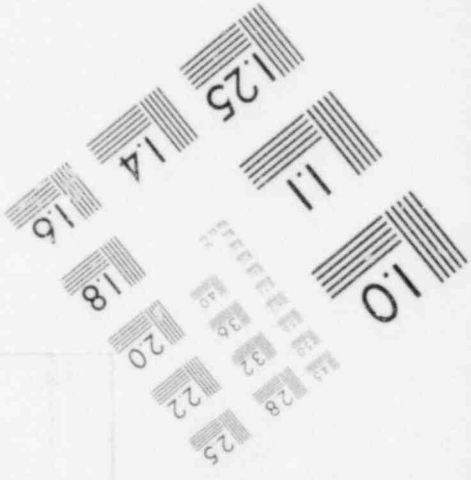

(d) Vendor documents and their review by Black and Veatch, including NNI (Newport News Industries) drawing 288715 and NNI weld procedure number 1/8.1.3-001.

(2) Documents related to RVDL (Relief Valve Discharge Line):

(a) Black and Veatch drawing numbers MR 4030, MR 4028, MR 4010, M4001T and comparison with GE drawing number 131C8967. Black and Veatch drawing MR 1000-01 compared with PSAR Figure A.4.3 and GE document 22A - 4365, Figure A.4.3. PSAR Table A4.4 compared with GE document 22A 4365 and the Black and Veatch drawing.

(b) Generic Dynamic Load Report Number 6212.200.130[illegible].14.

(c) Calculation file number 215.1000, including revised calculations for vent lines V-1 and V-19.

(d) Black and Veatch internal drawing reviews for five (5) Black and Veatch NBS (Nuclear Boiler System) drawings.

(e) GE drawing 762E276C checked for Black and Veatch review and comments (still open).

(f) Specification 312.6110 was compared with requirements for size and material for RDVL.

(3) Documents related to the Process Radiation Monitoring System:

(a) System Design Description (SDD) number 6212.215.3611.12.

(b) Drawing review by Black and Veatch of GE interface drawing numbers: 22A2736, 851E606, 851E716, 851E502 and comparison with Black and Veatch drawing number ES-D17K01.

3. Findings

a. Deviations from Commitment

(1) See Notice of Deviation, Item C.

(2) Concerning the above deviation, the changes from PSAR preliminary design appear to constitute improvements or corrections. Hence NRC's concern is to see that procedures are followed to track the change for incorporation in the SAR and for notification to PSO (Public Service of Oklahoma) Licensing of these changes.

b. Unresolved and Follow Up Items

There were no unresolved or followup items identified in this area of the inspection.

c. Additional Information

During the course of and as a result of this inspection, two (2) ECNs (Engineering Change Notices) were issued to rectify a dimensional discrepancy between PSAR and GE contractual document requirements and two (2) Black and Veatch Component Design Specifications (CDS). Section 3.8.2.3.12 of the PSAR states that, "As a last-ditch contingency to cover undefined damage resulting from a LOCA, the Mark III Containment could be flooded to a level 6'10" above the top of active full (TAF) in the core. For accident recovery purposes, the containment shall be evaluated for flooding to a level 6'10" above the top of active fuel." Also, GE document number 22A5709, Section 6.2.2.3 states, "Containment Flooding. The containment should be designed to be flooded to a level at least 6'10" above the top of active fuel for accident recovery after a LOCA." Black and Veatch Component Design Specification for Containment Vessel and Component Design Specification for Drywell and Weirwall had specified only 6' 9½" flooding level above TAF, due to the use of an erroneous figure to calculate water height from the bottom of the reactor vessel. The figure had been obtained from an informational GE TVA Stride document, rather that from contractual GE design documents. No deviation was issued because the ECNs which were issued correct the discrepancy, the case appears isolated, and the percentage of error was minimal and has no effect on the structural integrity, fabrication or mechanical properties of th containment.

C. Design Change Control

1. Objectives

The objectives of this area of the inspection were to verify that:

a. Procedures have been established and implemented for controlling changes to approved design documents.

b. Design changes are:

(1) reviewed for the impact of the change

(2) documented as to the action taken,

(3) transmitted to all affected persons and organizations, and

(4) justified and subjected to review and approval by the same groups or organizations as for the original design (see c. below for exceptions).

c. When responsibility has been changed, the designated organization shall have access to the pertinent information, competence in the specific area of design, and an understanding of the requirements and intent of the original design.

2. Method of Accomplishment

a. Review of the following documents to determine whether procedures have been established to control design changes:

(1) Sections 17B.1.2.1, 17B.1.3.7, 17B.1.4.1, 17B.1.7.1 and 17B.1.15 of the PSAR for Black Fox Station, to determine the original commitments relative to Black and Veatch control of design changes.

(2) Section III of the Black and Veatch Quality Assurance Program-Nuclear and Standard Procedures 3.10, 6.5, 3.3, 3.4 and 3.5, to determine QA Manual requirements concerning design interface control.

(3) Sections 3, 4, 8, 11 and 14 of the Black Fox Station Project Instructions Manual, to determine project unique requirements for design interface control.

b. Review of the following to determine whether the objectives of paragraph C.1. above were implemented.

(1) Documents related to the Drywell Vent Structure:

(a) Black and Veatch drawings numbers S5000, Revisions 9 and 10, and S5023, Revisions 6 and 7 reviewed for changes, approvals, and transmittal.

(b) Description of Change Documents (DCD) numbers KC-16 and KC-17 to impose new revisions of Black & Veatch drawings on vendors, and their approval in house at Black and Veatch, and transmittal to PSO (to approve and issue as modification orders to the vendors).

(c) DCD KC-10 dealing with ceramic backed full penetration shop welds.

(d) Engineering Change Notice (ECN) numbers N-S-0038 and N-S-0039 and their review and approval.

(2) Documents related to the RVDL (Relief Valve Discharge Line):

(a) Revised drawing numbers MR 4010, MR 4028 and MR 4030 and revised calculations in calculation book 215.1000 (p. 68a) reviewed for changes, checking and approvals for rerouting of vent lines V-1 and V-19 to avoid interferences.

(b) Internal memo dated May 11, 1977, and memos to licensee dated June 6, 1977, and November 7, 1979, concerning change from carbon steel to 304 stainless steel for a part of the SRV (Safety-Relief Valve) discharge line.

(c) Engineering Change Notices (ECN) N-M-3, N-M-4, N-M-8 and N-M-28 and their review and approval.

(3) Documents related to Process Radiation Monitoring System:

(a) System Design Description (SDD) number 6212.215.3611.12, Revision 2, and its review and approval.

3. Findings

a. Deviations, Unresolved Items and Followup Items

There were no deviations, unresolved items or followup items identified in this area of the inspection.

b. Additional Information

It was noted that although a number of design changes to issued contracts had been processed within Black and Veatch (especially drawing revisions) and some of these had been transmitted to Public Service of Oklahoma (PSO), the changes had not been incorporated in the vendor contracts by Modification Orders. At least one instance appeared to affect current fabrication, although a number of others pertain to contracts with Stop Work imposed due to BFS slow down. No deviation was issued because this area of design change is the responsibility of the licensee and out of the scope of work contracted or delegated to Black & Veatch.

DETAILS SECTION III

(Prepared by P. B. Aylward)

A. Persons Contacted

F. Rollins, Project Quality Control Engineer
W. Zidziunas, Project Engineer, Mechanical
R. S. Gilbert, Mechanical Engineer

B. QA Program and Organization

1. Objectives

The objectives of this area of the inspection were to:

a. Determine that the basic QA program includes a management policy statement, indoctrination and training in the execution of the QA program, regular management review of the QA program's implementation, definition of the QA staff and its responsibilities, and identification of the activities to which the program applies.

b. Verify that the QA program or its schedule for development, is consistent with the ongoing, or scheduled, safety related activities.

c. Verify that personnel or groups determining conformance to established quality requirements are independent of the activities being verified.

2. Method of Accomplishment

The preceding obectives were accomplished by an examination of:

a. Black and Veatch (B&V) Quality Assurance Manual-Nuclear (QAN) which contains:

(1) An endorsement by the head of the Power Division committing all B&V activities affecting quality to the QAN when compliance to 10 CFR 50, Appendix B, is required.

(2) Requirement for indoctrination and training, per paragraph 2.5 of the QAN, is the responsibility of the Quality Assurance Manager. Procedure SP 2.2 of the QAN provides the measures for indoctrinating and training personnel in the Quality Assurance Program requirements.

(3) Regular management review of the QA program is provided for by paragraph 2.8 in the QAN. Procedure SP 2.4 provides the measures to implement regular management reviews.

b. The Project Design Manual (PDM) and Project Instructions (P.I.) establish site-specific instructions for the Black Fox project, each manual being governed by QAN requirements.

3. Findings

a. The Black and Veatch QA Program is documented in the QAN, PDM, and PI manuals.

b. Within this area of the inspection, no deviations or unresolved items were identified.

C. Design Control

1. Objectives

The objectives of this area of the inspection were to verify that procedures have been established and implemented that provide for:

a. Definition of design activities and organizational interfaces.

b. Correct translation of specified design requirements into design output documents.

c. Control of design in all disciplines, independent design verification, and design change control.

d. Review, approval, release, distribution, and revision of design documents.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

a. The QAN Section 3, Design Control, and Standard Procedures 3.1 through 3.10.

b. The following documents to verify implementation of the QAN procedures.

(1) The Black & Veatch System Design Specification (SDS Rev. 3) for Residual Heat Removal (RHR) system.

(2) General Electric's (GE) Design Specification Data Sheet (Rev. 0, MPL #E12-4110) Residual Heat Removal (RHR) system.

(3) Calculations of pressure drops and flow rates for relief valves in the RHR system, including verification of calculations.

(4) Component Design Specifications (CDS) for High Pressure and Power Actuated Valves.

(5) Black and Veatch Piping and Instrument Diagram (P&ID) for RHR system.

3. Findings

a. Deviations from Commitment

The following is information relative to Item D. of the Notice of Deviation enclosure.

The RHR System Design Specification (SDS, Rev. 3) references a CE document (Design Specification Data Sheet, Rev.0) that specifies valves F053 A and B to be not larger than a 12 inch Schedule 80 valve because of a valve response/closure time needed of 33 seconds.

Contrary to the above, the valve data sheet (Appendix E, Rev. 0) of the Black and Veatch Component Design Specification (CDS-High Pressure and Power Actuated Valves, Rev. 0) lists valves F053, A and B as 14 inch valves. Black and Veatch presented flow rate calculations showing that for the high flow rates involved, a 14 inch valve would be much more feasible. Black and Veatch also contacted Anchor-Darling (the vendor) and received assurance that they could procure a 14 inch valve which would have the correct response requirements. However, there was no documentation available to show GE's review and concurrence that Black and Veatch's departure from the valve's design specifications was acceptable.

b. No other deviations or unresolved items were identified.

D. Procurement Control, Control of Purchased Materials and Services, Nonconforming Materials, and Corrective Action

1. Objectives

The objectives were to verify that procedures have been established that provide for:

a. Including or referencing applicable regulatory requirements, design bases, and other requirements necessary to obtain adequate quality and performance in documents for procurement of items and services.

b. Changes to procurement documents being subjected to the same degree of control as the original document.

c. Procurement documents extending appropriate requirements to lower tier suppliers.

d. Assuring that purchased services or items conform to procurement documents.

e. Source evaluation and selection.

f. Documented evidence of conformance of procurement quality objectives.

g. Surveillance consistent with safety significance of purchased item or service.

h. The control of nonconforming materials, parts, or components to prevent their inadvertant use or installation.

i. Identification, documentation, segregation, and disposition of nonconforming items and notification to affected organizations.

2. Method of Accomplishment

The preceding objectives were accomplished by review of QAN Sections 4.0, 7.0, 15.0, and 16.0 which establish requirements for procurement document control, control of purchased material and services, nonconforming materials, and corrective action.

3. Findings

a. Measures are established for procurement control of purchased materials and services, nonconforming materials, and corrective action. However, the inspector did not get to inspect in the area of implementation of the preceding activities.

b. No deviations or unresolved items were identified in this area of the inspection.

E. Audits

1. Objectives

Determine if the basic implemented QA program includes provisions for:

a. A system of audits to verify compliance with all aspects of the QA program and to determine the effectiveness of the QA program.

b. Documenting responsibilities and procedures for auditing, the required frequency of audits, documenting and reviewing audit results, corrective action followup, and designating management levels to review and assess audit results.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of the QAN, Section 18.0, Audits, which establishes the requirements for the Black and Veatch internal audit program and Section 4.0, for the external audit program.

3. Findings

a. Measures are established for the QA audit program. However, the inspector was unable to inspect in the area of implementation.

b. No deviations or unresolved items were identified in this area of inspection.

F. QA Records and Document Control

1. Objectives

Determine if the basic implemented QA program provides provisions for:

a. Maintenance of records to furnish evidence of activities affecting quality.

b. Identification, retrieval, and retention of records.

c. Measures for control of the issuance of documents that precribe activities affecting quality including review, approval and distribution to the location where the prescribed activity is performed.

d. Measures to assure that those participating in an activity are aware of and use proper and current documents.

2. Methods of Accomplishment

The preceding objectives were accomplished by review of:

a. QAN Sections 6.0, and 17.0 which establish requirements for document control and the maintenance and use of a Quality Assurance Records system.

b. The QA Records File access list, which showed who was allowed in the Working, Special, and Security files.

c. The inspector accompanied the Document Control Clerk to the Security File building and visually inspected the security measures being employed to protect their documents.

3. Findings

No deviations or unresolved items were identified in this area of the inspection.

G. Instructions, Procedures, and Drawings

1. Objectives

Determine if the basic implemented QA program provides provisions for:

a. All activities affecting quality are prescribed by documented instructions, procedures, or drawings.

b. Activities affecting quality are carried out through use of documented instructions that include appropriate quantitative or qualitative acceptance criteria for determining that quality related activities have been satisfactorily accomplished.

2. Methods of Accomplishment

The preceding objectives were accomplished by review of:

a. The QAN, specifically SP 5.1 and 5.2, which establishes requirements for procedure preparation, and the use of drawings and lists.

b. The Black and Veatch Project Instructions Manual which establishes site specific (Black Fox) instructions for activities affecting quality.

3. Findings

No deviations or unresolved items were identified in this area of inspection.