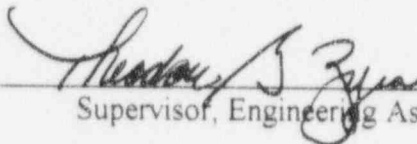


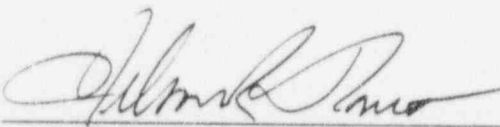
Duquesne Light Company
Beaver Valley Power Station
Nuclear Power Division

Safety System Functional Inspection (SSFI)
Technical Assessment Plan

for

Unit 1 - Safety Injection System (SI)

Prepared by:  Date 9/19/95
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Reviewed by:  Date 9/19/95
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1.0 Introduction

- 1.1 The following plan is intended to summarize the inspection objectives, scope, approach and methodology; tentative inspection schedule; inspection team organization, responsibilities, qualifications and training requirements; and the general guidelines for conducting the Safety System Functional Inspection (SSFI) of the Unit 1 Safety Injection System.
- 1.2 Duquesne Light management has requested that this inspection be performed during the fourth quarter of 1995 as a licensee self-assessment in accordance with NRC Inspection Procedure 40501. The scope and depth of this system inspection shall be at least equivalent to the requirements set forth in NRC Inspection Procedure 93801, Safety System Functional Inspections (SSFI).

2.0 Objective

- 2.1 The primary objective of conducting this Safety System Functional Inspection (SSFI) is to assess the operational performance capability of the selected system through an in-depth, multi-disciplinary engineering review that would verify that this system is capable of performing its intended safety functions.
- 2.2 The secondary objective of the SSFI is to identify and correct performance deficiencies discovered in order to prevent recurrence.

3.0 Scope

- 3.1 The inspection will be accomplished by performing a comprehensive review of the Beaver Valley Power Station Unit 1 Safety Injection System (SI) components and system performance including design requirements; operation, maintenance, surveillance and testing practices; maintenance and performance history; personnel training, quality assurance and implementation of corrective actions.
- 3.2 To ensure that the intended scope and in-depth inspection is conducted, the guidelines and review requirements that are specified in NRC Inspection Procedure 93801, Safety System Functional Inspection (SSFI), will be implemented. See Attachment 16.2 of this inspection plan for the SSFI Review Checklist developed. In addition, recent system performance, events and problems will be reviewed to assess current system status and the effectiveness of corrective actions taken.

- 3.3 In general, the inspection boundaries will extend to both the high head (HHSI) and low head safety injection (LHSI) design functions of the Safety Injection System. The functions of other related systems that continue to operate, up to isolation points, under the Safety Injection System will also be considered part of the inspection scope. For example, the reactor coolant pump seal water injection normally performed by the Chemical Volume and Control System provides an alternate boration flow path to the reactor coolant system under the Safety Injection System and thus will be included within the inspection scope.

4.0 Approach and Methodology

- 4.1 The inspection will use a deep vertical slice technique to accomplish the inspection objectives. The term "deep vertical slice" refers to the in-depth review of the selected safety system in six major functional areas. These areas include: operations, maintenance, surveillance and testing, engineering design, design control, and quality assurance and corrective action. The focus of the inspection will be on the system and hardware requirements within these areas and not on the review of the programmatic requirements.
- 4.2 This inspection will be accomplished by performing a technical assessment which will begin with the accumulation of baseline information in the form of design basis documents and the UFSAR. A review of other system related documents such as Licensee Event Reports (LERs), Problem Reports (PRs), Design Change Packages (DCPs), Technical Evaluation Reports (TERs) and Maintenance Work Requests (MWRs) will be also be conducted. Emphasis will be placed on the evaluation of permanent/temporary changes made and the impact on the original design and licensing basis as well as any impact on related systems and programs. The SSFI Review Checklist developed and contained as Attachment 16.2 of this plan will be used during the course of the inspection.
- 4.3 In addition, selected industry events/concerns which relate directly to this system will be assessed for adequacy of applicability and corrective actions.
- 4.4 It is important that the team members' review be objective and independent and continually exhibit a questioning attitude of the information presented.
- 4.5 Formal inspection entrance and exit meetings will be conducted. Team communications will be accomplished by daily team briefings. In addition, daily inspection status and issues meetings with DLC management and department points of contact will be held.

5.0 Engineering Design and Configuration Control Review

- 5.1 The engineering design and configuration control review will assess the technical adequacy of the system by concentrating on essential safety and functional characteristics. It will be primarily based on the review of design documents, Design Change Packages (DCPs), Technical Evaluation Reports (TERs), interviews with plant personnel, discussions with other team members, and walkdowns of the system. The review will consider such items as: design conditions and system transients, component classification, equipment qualification, single failure criteria, pipe stress analysis, seismic qualifications, component breaker coordination, common mode failure, documentation and control of the plant's design basis, documentation and control of licensing commitments, and a selection of other attributes that contribute to the effectiveness of the system.
- 5.2 A system walkdown will be performed to facilitate the evaluation of certain attributes such as interconnection and interactions, as-built configuration, component layout, access for operations, inservice inspection, maintenance, physical separation of components, and adequate consideration from the effects of environmental conditions.
- 5.3 The overall evaluation approach will be conducted in multiple phases as described below:
- a) Review those sections of the UFSAR and licensing commitments which provide the design and regulatory basis of the system. This portion of the review will provide a foundation for familiarization with the system's safety and operational functional requirements.
 - b) Review selected mechanical and electrical calculations associated with the system to determine if the system design bases are supported by calculation or other suitable documentation. Assessment of the design margins will also be made.
 - c) Provide a review and comparison of selected design, purchase, installation, and equipment specifications to ensure proper interpretation and consistent use of specified systems and component design conditions associated with Design Change Packages.
 - d) Review flow diagrams and piping drawings for consistency with design documents and licensing commitments.
 - e) Review Design Change Packages for consistency with the specification design conditions and adequacy of 10 CFR 50.59 evaluation requirements.
 - f) Evaluate single active failure vulnerabilities of the system.
 - g) Review interfacing systems for their effect on the Safety Injection System operability.

- h) Review electrical loading, logic diagrams and electric drawings for consistency with design documents and licensing commitments.
 - i) Review the dependency of the system operability by other supporting systems.
- 5.4 The review will also include the impact that modifications made on items such as:
- a) Design Basis Documents
 - b) UFSAR
 - c) Plant Type I Drawings
 - d) Design Analysis (Calculations)
 - e) Procedures and Tests
 - f) Plant Technical Specifications
 - g) Vendor Documentation
 - h) Plant Personnel Training
 - i) Human Factors Considerations
- 5.5 Review the NSSS design documents and recent engineering analysis reports (WCAPs) to determine additional bases not specifically identified in the UFSAR.

6.0 Operations Review

- 6.1 The objective of the operations evaluations is to determine that operators can perform the necessary activities to ensure that the Safety Injection System fulfills its required safety functions. The determination will be made by assessing the adequacy of the instructions available to the operator, and the availability of system status information, such as instrumentation and alarms, at the time the operator action is required.
- 6.2 Assessments of the operating instructions will consist primarily of a review of the system's procedures, emergency operating procedures, alarm response procedures, operation's work-arounds, and applicable standing orders. These procedures will be reviewed for adequacy, completeness and consistency with the system as-built condition. The review will also assess the impact of modifications on the operator's ability to perform required actions.
- 6.3 The operator training program, lesson plans, and course materials will be reviewed for the system. The review will identify the level of detail the operators are provided in the system's design, safety functions, and operation methods. The review will evaluate if system modifications are properly included in the training program.
- 6.4 Other operational and administrative controls that would affect the operational requirements of the Safety Injection System will also be reviewed.
- 6.5 Assessments of the availability of essential system status information to the operation staff will be made. This status information will include but not be limited to the system's flows, pressures, temperatures, alarms, etc., which are required for initiation of operator responses, actions, and decisions. These assessments will be accomplished by reviewing design documents, reviewing the control station area, interviewing operating personnel, and an in-depth system walkdown. Particular attention will be given to the human factors aspect of the system status information available at the time when its safety function is required.

7.0 Maintenance Review

- 7.1 The objective of the maintenance evaluation is to verify that the maintenance performed on the system is adequate to ensure that it will perform its intended safety function on demand.
- 7.2 The evaluation will focus on the performance of maintenance as it relates to maintaining the functional capability of the system. Maintenance records will be selectively reviewed to determine if all of the system's safety related components are adequately addressed by the maintenance program. Additionally, the maintenance evaluation will supply and receive information from the other areas being evaluated to ensure the actual interfaces used to communicate and document the maintenance process are assessed.
- 7.3 The approach used to reach the objectives will consist of assessments of the physical conditions observed during the system walkdown, review of applicable documents, discussion with selected maintenance personnel and, if possible, the witnessing of actual maintenance performed on the system.
- 7.4 The system's physical condition will be assessed by walkdown observations and supplemented by the review of documentation such as maintenance history records, failure reports, and maintenance work requests (MWRs). Based on this review, the adequacy level of system/equipment maintenance will be determined. The system/equipment observations considered during the walkdown will include, but not limited to the following:
- a) Leaks, including those for boric acid corrosion control
 - b) General equipment condition
 - c) Cleanliness/Housekeeping
 - d) Equipment labeling
 - e) Environmental conditions at equipment locations
 - f) Instrument calibration
- 7.5 Maintenance records will be assessed through the review of maintenance procedures and guidelines which affect selected components within the system. Selected maintenance documents of the following types will be reviewed:
- a) Preventative / Predictive Maintenance (PMPs)
 - b) Corrective Maintenance Procedures / Maintenance Work Requests (CMPs/MWRs)
 - c) Maintenance Surveillance Procedures (MSPs)
 - d) Instrument Calibration Procedures (ICPs)
 - e) Maintenance training
 - f) Maintenance history including INPO NPRDS and CFAR reports
 - g) Equipment Qualification (MAPs)
 - h) Plant design conditions
 - i) Temporary Modifications

- 7.6 Maintenance training records will be reviewed to determine if maintenance personnel are being adequately trained in the appropriate maintenance processes and procedures.
- 7.7 Maintenance evaluations will include critical components and/or equipment or components that have exhibited a high number of failures. The entire maintenance process beginning with the identification of a problem and ending with the close-out of the maintenance work request will be reviewed for selected maintenance activities.

8.0 Surveillance and Testing Review

- 8.1 The objective of the testing review is to verify that current surveillance and testing performed on the system is sufficient to demonstrate that the system meets its licensing basis and will perform its intended safety functions on demand. The evaluation will focus on the functional testing of the system and related components
- 8.2 The testing evaluation will begin with the accumulation of design and testing baseline information for the system that include:
 - a) Initial preoperational test requirements and criteria
 - b) Technical Specifications
 - c) UFSAR
 - d) Periodic and Surveillance Test Criteria
 - e) Responses/Policy statements made to IE Bulletins, Circulars, and Generic Letters
 - f) Responses/Policy statements made to INPO SERs and SOERs
 - g) Corrective actions in response to Vendor Technical Bulletins
 - h) Plant Drawings
 - i) IST Program
- 8.3 Selected samples of test data results will be evaluated and compared to the functional requirements of the system. These will include but not limited to the following type of test procedures:
 - a) Operational Surveillance Tests (OSTs)
 - b) Temporary Operating Procedures (TOPs)
 - c) Beaver Valley Test Procedures (BVTs)
 - d) Maintenance Surveillance Procedures (MSPs)
- 8.4 Additionally, samples of Design Change Packages (DCPs) and TER test sections and test data will be reviewed to determine if specified test methods and requirements are appropriate for the scope of modification, and acceptance criteria is adequate to verify that modifications to components/system are properly implemented, completed and the intended functional operation was adequately demonstrated.
- 8.5 Samples of maintenance work requests will be evaluated to determine if post-maintenance testing requirements are adequate to ensure components/system have been restored to a fully operational mode
- 8.6 Interviews with plant operators, supervisors, maintenance, and engineering personnel will be performed as part of the inspection.

- 8.7 The surveillance and testing evaluation reviews will cover selected samples of the following:
- a) Pumps and drivers
 - b) Valves (Motor Operated, Air-Operated, Solenoid-Operated, Check, Relief, etc.)
 - c) Instrumentation and Control Loops
 - d) Electrical control circuits
 - e) Electrical protection devices
 - f) Heat exchangers
 - g) Support systems, including SLCRS ventilation and River Water
- 8.8 Other specific areas to be reviewed include: the effectiveness of testing to verify required pump performance and system flow rates and balancing, the adequacy of current testing methods to verify that the intended results are correctly indicative of the acceptance criteria and that administrative controls and procedures content are considered adequate.

9.0 Quality Assurance and Corrective Actions Reviews

- 9.1 The objective of these evaluations is to verify implementation of the Quality Assurance Program by reviewing activities such as: on-site and off-site review committees, corrective action, open item tracking, technical specification operability determinations, regulatory reporting, system performance indicator trending and work quality verification. In addition, the technical adequacy and resolution for previous SI events and conditions will be reviewed.
- 9.2 The plant OSC and ORC meeting minutes, for at least the past six-months, will be reviewed to identify discrepancies or unusual operability determinations pertaining to the Safety Injection System.
- 9.3 The open item tracking system (CTS) will be reviewed for related Unit 1 Safety Injection System items. This review will include an overall assessment of activity compliance to the licensing commitments identified. In addition, it will make an assessment of the technical adequacy and timeliness of the safety system's corrective actions.
- 9.4 The operating history of the Safety Injection System including: Licensee Event Reports (LERs), Problem Reports, Incident Reports, Nuclear Plant Reliability Data System (NPRDS) reports, 10 CFR 50.72 reports, enforcement actions, nonconformance reports, and Maintenance Work Requests (MWRs) will be reviewed for assessing the adequacy of the corrective actions performed including human performance issues.
- 9.5 Technical interviews with key Quality Services and Quality Control personnel will be conducted to determine their technical knowledge and level of involvement in the safety system's field activities. This area of the evaluation will also assess whether the quality verification organization is looking for and/or finding substantial problems related to the system.

10.0 Inspection Schedule

- 10.1 The SSFI Project Plan that identifies the tentative schedule for the conduct of the major activities is provided as Attachment 16.4 of this plan.

11.0 Inspection Responsibilities

- 11.1 **Division Vice President, Nuclear Services**
Has overall responsibility for the conduct of Safety Injection System SSFI. Is responsible for providing Duquesne Light support for the development and implementation of the inspection plan, and ensuring the timely resolution of questions and concerns generated during the course of the inspection.
- 11.2 **Division Vice President, Nuclear Operations**
Is responsible to provide assistance to the Nuclear Services Division Vice President for providing the support for the implementation of the inspection plan, and ensuring the timely resolution of questions and concerns generated during the inspection.
- 11.3 **Department Supervisor(s) / Manager(s) / General Manager(s)**
Are responsible to initiate compliance and reportability reviews, as required by station procedures, when documented concerns are identified that may be potentially safety significant and to initiate appropriate corrective action to resolve these concerns.
- 11.4 **Department Point of Contact Representatives**
Are responsible to provide written responses to all documented requests or concerns assigned to them during the assessment. The responses shall include corrective actions for all concerns concurred as discrepant.
- 11.5 **Manager, Nuclear Safety**
Is responsible for regulatory interfacing, obtaining the necessary approvals for the conduct and reporting of this licensee self-assessment in lieu of a NRC performed Safety System Functional Inspection (SSFI). Is responsible for the overall coordination of the on-site response to the inspection.
- 11.6 **Inspection Team Leader**
Is responsible for:
- a) developing the inspection plan and coordinating the necessary resources to perform the inspection
 - b) providing orientation and training to team members on the approach, methodology and overall expectations
 - c) reviewing and approving checklists, supplements, individual review plans and plant responses to all documented concerns
 - d) directing the course of the inspection and to keep the inspection focused on the important issues
 - e) promptly advising plant management of potential safety/operability items
 - f) developing a summary report of the inspection results
- 11.7 **Inspection Team Members**
Are responsible for the professional conduct of the inspection in accordance with this technical review plan and developed SSFI Project Plan schedule.

12.0 Team Qualifications

12.1 Inspection Team Leader

Supervisor, Engineering Assurance, 22 years of nuclear experience in the areas of engineering, testing and plant performance, quality assurance and maintenance.

12.2 Design and Configuration Control Reviewer (Mechanical)

27 years of nuclear experience, held numerous lead and technical positions within the nuclear/mechanical area, participated as NRC Mechanical Design/System reviewer and developed and/or participated in technical adequacy reviews.

12.3 Design and Configuration Control Reviewer (Electrical)

18 years of nuclear experience, developed and/or participated in various technical audits and assessments.

12.4 Operations Team Reviewer

At least 15 years of nuclear experience, 5 years of which must have been in the area of plant operations.

12.5 Maintenance Team Reviewer

14 years of nuclear experience, assisted utilities in various system assessments and worked as a consultant to the NRC on SSFI and MOV inspections.

12.6 Surveillance and Test Reviewer #1

Independent Safety Evaluation Group (ISEG) Technical Evaluator, 15 years of nuclear experience in the areas of ISEG, quality control and testing.

12.7 Surveillance and Test Reviewer #2

Supervisor System Engineering at North Anna Power Station, 18 years of nuclear experience in the area of engineering and operations, NRC Senior Licensed Operator.

12.8 Quality Assurance and Corrective Action Reviewer

Senior Licensing Supervisor, 25 years of nuclear experience in the areas of licensing, operations and testing.

13.0 Training Requirements

13.1 Each inspection team member shall have a sufficient understanding of the safety related function, operation and design basis of Unit 1's Safety Injection System prior to the commencing their review. They should also become familiar with the various accident sequences that the system is designed to mitigate, as well as the accident analysis assumptions for the system. The required training will, at a minimum, consist of a documented review of the related system information contained in the following:

- a) BVPS Safety System Functional Inspection (SSFI) Technical Assessment Plan for Unit 1 Safety Injection System
- b) Final Safety Analysis Report (FSAR) and Updated Safety Analysis Report (UFSAR)
- c) Operating Manual system operating and functional descriptions
- d) Design Basis Document (DBD) for Unit 1, Safety Injection System
- e) Technical Specification requirements and bases
- f) NRC Inspection Procedures 40501 and 93801
- g) Selected site-specific administrative procedures

14.0 Conduct of the Inspection

- 14.1 An inspection entrance meeting shall be held with the inspection team members, key site personnel, DLC management and NRC representatives to present the purpose, scope and approach of the inspection.
- 14.2 The team will perform a general review of the documentation identified for the conduct of the inspection.
- 14.3 Following the initial document review, each team member will perform a field walkdown of all accessible areas of the system and its components.
- 14.3 During the course of the inspection, the team will make requests for information. The designated department point-of-contacts will communicate this information in a timely manner. If this information is not received by the next working day, the SSFI Question / Response Form (Attachment 16.3) will be transmitted to the manager of the responsible department via electronic mail.
- 14.5 A database of all information requests, open questions and unresolved items will be maintained. Updates will be made on a daily basis.
- 14.6 In order for the inspection team members to benefit from each other's inspection efforts, daily team briefing meetings will be held. The time, number and the agenda for the daily meeting will be identified at the inspection entrance meeting.
- 14.7 As concerns are identified during the inspection, they will be immediately communicated to management for evaluation and reportability. Each concern will be provided with a complete description of the deficiency, including all pertinent information.
- 14.8 An exit meeting will be conducted at the conclusion of inspection. At the exit, a summary of the inspection results will be presented. This summary will detail the review's concerns and open items along with the assessment of the strengths and weaknesses noted during the inspection.
- 14.9 A formal summary report will be issued following the inspection in accordance with the SSFI Project Plan.

15.0 References

- 15.1 NPDAP 8 22, Revision 2, BVPS Safety System Functional Evaluation Program
- 15.2 Safety System Functional Evaluations and Design Basis Reconciliation Program Manual
- 15.3 NRC Inspection Procedure 93801, Safety System Functional Inspection (SSFI), 7/23/90
- 15.4 NRC Inspection Procedure 40501, Licensee Self-Assessments Related to Team Inspections, 7/12/95
- 15.5 ND3NSM 6743, dated November 28, 1994, Team Inspections / Self Assessment Guidelines
- 15.6 ND3NSM 6641, dated August 19, 1994, SWOPI Response Team Observations

16.0 Attachments

- 16.1 Unit 1 Safety Injection SSFI Organization
- 16.2 SSFI Review Checklist
- 16.3 SSFI Question / Response Form
- 16.4 SSFI Project Plan

Unit 1 Safety Injection SSFI Organization

Division Vice President, Nuclear Services
G. S. Thomas

Inspection Team Leader
T. G. Zyra

Design & Configuration Control Reviewer
(*) (Mech) (*) (Elec)

Maintenance Reviewer
(*)

Operations Reviewer
(*)

Surveillance & Testing Reviewer
A. M. Ryan (*)

QA & Corrective Action Reviewer
J. J. Maracek

(*) Consultant or External Utility Team Member Assigned to Review Inspection Area

SSFI Review Checklist for Engineering Design and Configuration Control

Reference	Inspection Requirements	
02.04		
a.1	Review the design basis and other design documents such as calculations and analyses for the selected system and determine the functional requirements for the system and each active component during accident or abnormal conditions. This review should include verifying the appropriateness of the design assumptions boundary conditions, and models. This may include independent calculation by the engineering design inspectors. The review should determine if (1) the design basis is in accordance with the facility's licensing commitments and regulatory requirements, (2) the design bases, analyses, and associated design output documents such as facility drawings and procurement specifications are correct, and (3) if the installed system and components are tested to verify that the design bases have been met.	
a.2	Review the configuration of the selected system as installed in the plant and determine if the drawings which reflect the as-built design and installation match the current design documents and licensing requirements and commitments for the facility.	
a.3	Determine if the as-built and modified system is capable of functioning as specified by the current design documents and licensing requirements and commitments for the facility.	
a.4	Determine if the system operation is consistent with the design documents. Advise the appropriate DLC management of any discrepancies for further review and operations evaluations.	
a.5	Evaluate the licensee's drawing control program, the control and use of design input information, and the adequacy of design calculations from the perspective of modification made to the selected safety system.	
a.6	Review all modifications made to the original system that could have potentially changed the design basis. Determine if the system meets the design basis and the facility's licensing requirements in the as-modified configuration.	
a.7	Determine if system modifications implemented since initial licensing have introduced any unreviewed safety questions.	
a.8	Review the modification packages for the selected safety system to ensure that all changes to the support elements have been made (pursuant to ANSI N45.2.11), including maintenance requirements and procedures, training documentation and training programs, periodic testing, and procurement documentation and specifications. Identify any discrepancies to DLC management for further review and evaluation.	
a.9	Evaluate the interface between engineering and technical support and plant operations.	
a.10	If available, review (usually toward the end of the inspection) the results of the licensee's internal SSFI reviews and technical audits (of the selected system when available).	

**SSFI Review Checklist
for
Engineering Design and Configuration Control**

Reference	Inspection Requirements	
03.05		
a.	<p>For valves: What permissive interlocks are involved? What differential pressures will exist when the valve strokes? Will the valve be repositioned during the course of the event? What is the source of control and indication power? What control logic is involved? What manual actions are required to backup and restore a degraded function?</p>	
b.	<p>For pumps: What are the flow paths the pump will experience during accident scenarios? Do the flow paths change? What permissive interlock and control logic applies? How is the pump controlled during accident condition ? What manual actions are required to back up and restore a degraded function? What suction and discharge pressures can the pump be expected to experience during accident conditions? What is the motive power for the pump during all conditions? Does vendor data and specifications support sustained operations at low flows?</p>	
c.	<p>For instrumentation and sensors: What plant parameters are used as inputs to the instrumentation and control system? Is operator intervention required in certain scenarios? Are the range and accuracy of instrumentation adequate? What is the extent of surveillance and calibrations of such instrumentation?</p>	

SSFI Review Checklist for Operations

Reference	Inspection Requirements	
02.04		
b.1.	Identify the key components of the system and the components to be evaluated during this inspection.	
b.2	Review the technical adequacy and accuracy of alarm response procedures and operating procedures for normal, abnormal and emergency system operations.	
b.3	Review operator training for the selected system, focusing on the technical completeness and accuracy of the training manual and lesson plans. Ensure that the lesson plans reflect the system modifications and that the licensed operators have been trained on these modifications.	
b.4	Walk-through the system operating procedures and the system P&IDs with the operators. Verify that the procedures can be performed using the main control panel and the alternate shutdown panel and that components and equipment are accessible for normal and emergency operation. If any special equipment is require to perform these procedures, determine if the equipment is available and in good working order. Verify that the knowledge level of the operators is adequate concerning equipment location and operation.	
b.5	Conduct interviews with the operators to determine the adequacy of their technical knowledge of the operation of the system, its role in accident mitigation. Technical Specification surveillance requirements, determination of operability, etc.	
b.6	Verify the local operation of equipment. Determine whether the indication available to operate the equipment is in accordance with applicable operation procedures and instructions. Verify that the environmental conditions assumed under accident conditions are adequate for remote operation of equipment, such as expected room temperature, emergency lighting, steam, etc.	
b.7	Verify that the support and interfacing systems and procedures are adequate to support the selected safety system during the event sequences that it is designed to mitigate.	

SSFI Review Checklist for Maintenance

Reference	Inspection Requirements	
02.04		
c.1	Identify the key components of the system and the components to be evaluated during this inspection.	
c.2	In conjunction with other interested functional areas (such as Operations), conduct an in-depth system walkdown.	
c.3	Witness any maintenance performed on the selected system while the team is onsite.	
c.4	Review maintenance procedures for technical adequacy. Determine if the procedures are sufficient to perform the maintenance task and provide for identification and evaluation of equipment and work deficiencies. Check the procedure content against the vendor manuals to verify that the procedure satisfies the vendor requirements, as determined applicable by the licensee, for maintaining the equipment in proper working order. Verify that important vendor manuals are complete and up-to-date.	
c.5	Review the maintenance program for the selected system to determine if the preventive maintenance (PM) requirements are adequate and comprehensive.	
c.6	Determine if the system components are being adequately maintained to ensure their operability under all accident conditions.	
c.7	Review applicable vendor manuals, generic communications (i.e., Bulletins, Information Notices, Generic Letters, and special studies) and verify that the licensee has integrated and implemented the applicable items into the maintenance program.	
c.8	Review the component history files for the selected components for the past two years; however, a longer interval may be necessary. While reviewing the maintenance history, look for recurring equipment problems and attempt to determine if any trends exist. Select several maintenance activities and verify each for technical adequacy, performance of appropriate post-maintenance testing and satisfactory demonstration of equipment operability.	
c.9	Conduct detailed interviews with the maintenance personnel to determine their technical knowledge of how components are maintained, such as setting limit switches, pump coupling alignments, and breaker maintenance.	
c.10	Determine if maintenance personnel receive adequate training pertaining to the selected safety system and if the degree of training is consistent with the amount of technical detail included in procedures.	

SSFI Review Checklist for Maintenance

Reference	Inspection Requirements	
03.07		
a.	Determine if components are accurately labeled and accessible. For example, can the components be operated locally or manually if required and is there health physics or security considerations?	
b.	Determine if motor-operated valve (MOV) operators and check valves (particularly lift check valves) are installed in the orientation required by the manufacturer. Additionally, a human factors assessment of the component (such as the direction of handwheel rotation for valves installed upside down and the number of turns required for full valve travel) should be made.	
c.	Determine if the system lineup is consistent with the design and licensing basis requirements. This lineup inspection should include considerations for the normal and backup power supplies, control circuitry, indication and annunciation status, and sensing lines for instrumentation.	
d.	Determine if manual operated components can be operated under accident conditions (i.e., radiation levels, temperatures, and manpower requirements).	

**SSFI Review Checklist
for
Surveillance and Testing**

Reference	Inspection Requirements	
02.04		
d.1	Identify the key components of the system and the components to be evaluated during this inspection.	
d.2	Review and evaluate the technical adequacy and accuracy of all of the Technical Specification surveillance procedures and inservice test procedures performed in the past two years for this system. Attention should be focused on the specific components selected for detailed review.	
d.3	Verify that the system has been tested in accordance with the accident analysis. Determine if the testing adequately ensures that the system will operate as designed under postulated accident conditions. Verify that the surveillance test procedure acceptance criteria are adequate to demonstrate continued operability.	
d.4	Determine if surveillance test procedures comprehensively address required system responses.	
d.5	Evaluate the support systems and plant modifications selected for review by the engineering team to ensure that system design capability as demonstrated by pre-operational testing has not been compromised.	
d.6	Review the component history files, looking for indication of adverse trends or recurrent test failures.	
d.7	Review the inservice test records for pumps and valves in the selected safety system, emphasizing the technical adequacy and accuracy of the data. Attention should be focused on the specific components selected for detailed review.	
d.8	Conduct interviews with instrumentation and control technicians, discussing in detail such items as how specific instruments are tested, how valve stroke time testing is performed, and how and where temporary test equipment is installed.	
d.9	Determine if engineering and technical support personnel contribute to surveillance test procedures and if they review test results.	
d.10	Witness any post-maintenance, surveillance, and inservice tests performed on the selected system while the inspection team is onsite.	

**SSFI Review Checklist
for
Quality Assurance and Corrective Actions**

Reference	Inspection Requirements	
02.04		
e.1	Review the plant Onsite Safety Review Committee (OSC) and the Offsite Safety Review Committee (ORC) meeting minutes for the past six months for items pertaining to the selected system. Identify any discrepancies and unusual operability determinations to the operations and design inspectors.	
e.2	Review the Open item tracking system for items pertaining to the selected safety system.	
e.3	Conduct technical interviews with key quality assurance and quality control personnel to determine their technical knowledge and level of involvement in field activities.	
e.4	Review the operation history of the selected system, including licensee event reports (LERs), problem reports, incident reports, nuclear plant reliability data system (NPRDS) reports, 10 CFR 50.72 reports, enforcement actions, nonconformance reports, and maintenance work requests, with an emphasis on adequacy of corrective actions performed. Limit the review of work requests to a sample of work requests ready for implementation, with emphasis on hold point identification.	
e.5	Compare the results of the team's assessment of the areas inspected for the selected system with the results of applicable licensee quality verification activities in the same areas (i.e., operations, maintenance, surveillance and testing, engineering design, and design control). In cases where the same findings exist, determine why they have not been corrected. In cases where the team found conditions which were missed by the licensee, determine why the licensee's quality verification activities were not capable of finding these issues.	
e.6	Review the status of the corrective actions for the findings of applicable licensee SSFI reviews and technical audits (of the selected system when available).	

**Beaver Valley Power Station
Unit 1 Safety Injection System
SSFI Question / Response Form**

SUBJECT: _____
QUESTION / REQUEST: _____

Team Member: _____ Date / Time: _____

Assigned To: _____ Response Due Date: _____ Operability: Y / N / ?

RESPONSE:

Operability Review: Y / N / NA

Reportability Review: Y / N / NA

Responder: _____ Date: _____ Phone: _____

Department Manager / Designee Review: _____ Date: _____

SSFI Disposition: Accept / Reject Reviewer: _____ Date: _____

Comments:

SSFI PROJECT PLAN
NUCLEAR SAFETY DEPARTMENT

ID	Task Name	Duration	Start	Finish	% Comp	August				September				October				November				December				January							
						30	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14			
	SSFI PROJECT PLAN	99d	#####	#####																													
1	ASSIGN TEAM LEADER & ASST. TEAM LEADER	1d	Mon 8/14/95	Mon 8/14/95	100%																												
2	DRAFT SSFI PLAN	7d	Tue 8/15/95	Wed 8/23/95	100%																												
3	DEVELOP LIST OF DESIGN & REFERENCES	7d	Tue 8/15/95	Wed 8/23/95	100%																												
4	REQUEST & ASSEMBLE INSPECTION TRAINING & REVIEW	7d	Tue 8/15/95	Wed 8/23/95	100%																												
5	ESTABLISH INSPECTION SCOPE AND RESPONSIBILITIES	1d	Wed 8/23/95	Wed 8/23/95	100%																												
6	REVIEW DRAFT SSFI PLAN	6d	Wed 8/23/95	Wed 8/30/95	100%																												
7	DEVELOP LIST OF TEAM MEMBER CANDIDATES	6d	Wed 8/23/95	Wed 8/30/95	100%																												
8	FINALIZE TEAM ORGANIZATION AND REVIEW AREAS	11d	Wed 8/30/95	Wed 9/13/95	100%																												
9	INCORPORATE INSPECTION PLAN COMMENTS	12d	Wed 8/30/95	Thu 9/14/95	100%																												
10	INITIATE PURCHASE ORDER FOR CONSULTANT TEAM MEMBERS	11d	Fri 9/1/95	Fri 9/15/95	75%																												
11	FINALIZE INSPECTION PLAN & SCHEDULE	3d	Tue 9/12/95	Thu 9/14/95	95%																												
12	OBTAIN INSPECTION PLAN DLC REVIEW/APPROVE	3d	Thu 9/14/95	Mon 9/18/95	0%																												
13	SUBMIT INSPECTION PLAN TO NRC FOR REVIEW	1d	Mon 9/18/95	Mon 9/18/95	0%																												
14	PREPARATION FOR MAKING NRC PLAN INSPECTION	2d	Thu 9/21/95	Fri 9/22/95	0%																												
15	PRESENTATION TO NRC	1d	Mon 9/25/95	Mon 9/25/95	0%																												
16	OBTAIN NRC APPROVAL OF PLAN	6d	Tue 9/26/95	Tue 10/3/95	0%																												
17	ISSUE LETTERS TO MANAGERS REQUESTING CONTACTS	1d	Wed 10/4/95	Wed 10/4/95	0%																												
18	TEAM MEMBERS ORIENTATION & TRAINING	7d	Mon 10/16/95	Tue 10/24/95	0%																												
19	INSPECTION ENTRANCE MEETING	1d	Tue 10/24/95	Tue 10/24/95	0%																												

Project: SSFI PROJECT PLAN Date: Fri 9/15/95	Task		Summary		Rolled Up Progress	
	Progress		Rolled Up Task			
	Milestone		Rolled Up Milestone			

Attachment 16.4

