ENGINEERING PROGRAM

1.0 Objective

The objective of this performance assessment is to evaluate the effectiveness of the laboratory's engineering program as implemented in the facility. The Facility Representative or Environmental, Safety, and Health Support Specialist reviews policies, procedures, programs, and processes implemented at the facility to provide technical support and to apply engineering expertise to required modification and improvement of the facility. The assessment covers all elements of the modification process from preparation of a request for engineering assistance through post-modification testing and package closeout. Assessment activities may include observations of work in progress, interviews with facility and engineering staff personnel, and reviews of applicable documents.

2.0 Definitions

Concern - A determination of a programmatic breakdown or widespread problem supported by one or more findings or observations.

Finding - An individual item which does not meet requirements.

Functional Area - A discrete group of related safety and support programs.

Lines of Inquiry - Questions that guide the assessor in planning and conducting the performance assessment.

Observation - A condition or practice that does not provide or promote effective protection of the health and safety of the public or DOE's workers or the environment.

Performance Assessment - An evaluation of a program or functional area to verify laboratory line management effectiveness in ensuring the health and safety of the public and of DOE's workers and in ensuring protection of the environment.

Performance Attributes - Key elements, functions, or activities to be assessed in a particular functional area.

3.0 References

3.1 DOE 4700.1, *Project Management System*

3.2 DOE 5700.6C, *Quality Assurance*

3.3 *Guidelines for the Conduct of Design Engineering,* INPO 90-009, Rev. 01, February 1992

3.4 *Guidelines for the Conduct of Technical Support Activities at Nuclear Power Stations,* INPO 85-031, Rev. 02, March 1992

4.0 Performance Assessment Activities

The assessor initially reviews applicable program documents and implementing procedures that address engineering and technical support for the facility. The assessor need not review all site-wide engineering policies and procedures. Appendix A provides a suggested list of documents that the assessor may review during preparations for the assessment.

During the assessment, the assessor evaluates selected performance attributes by developing and using lines of inquiry for each performance attribute. Appendix B provides a listing of suggested performance attributes and lines of inquiry. In pursuing lines of inquiry selected for the assessment, the assessor may perform various activities including document reviews, interviews, and observations of work in progress. The assessor may choose to use existing surveillance guides in completing specific portions of the assessment. The surveillance guides that may be useful include ENS 7.1, Definition of Design Requirements and QAS 2.5, Design Control.

During the assessment, the assessor will focus on how effectively the engineering program is implemented in the facility. In performing the assessment, balance must be maintained between reviews of site-wide programs, facility-specific policies and procedures, and implementation. The following questions provide the general framework that should be used in planning, conducting, and documenting the assessment.

- Does an effective process exist to allow the facility to request technical support from the central engineering authority?

- Does the design process from initial identification of a problem through post-modification testing protect the health and safety of the public and workers while ensuring mission requirements are met?

- Does the interface between site-wide and facility engineering ensure that engineering support is timely, thorough, and prioritized correctly?

APPENDIX A
POTENTIAL DOCUMENTS FOR REVIEW

Site-wide Nuclear Safety Policy
Policy establishing the Design Authority
Site-wide Engineering Program
Facility procedures for requesting engineering assistance.
Mission and function statements for site-wide engineering organizations
Sample design change packages

APPENDIX B
PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTE: I. An effective organizational structure has been established for the engineering function and appropriate management systems have been implemented by the organization.

LINES OF INQUIRY:

1. Have roles, responsibilities, accountabilities and interfaces with other site organizations been clearly defined?

2. Have goals and objectives been established for the engineering organization?

3. Have the goals and objectives established for the engineering organization been communicated to employees?

4. Have policies and procedures implementing the defined roles and responsibilities been issued?

5. Has a policy establishing the design authority for the site or facility been approved and issued?

6. Are controls over interfaces between site and engineering organizations and the facility been established?

7. Does the design organization have sufficient resources to handle current and anticipated work loads, monitor work performed by others, and provide timely responses to requests for assistance?

8. Have training and qualification requirements been established for engineering personnel?

9. Do engineering personnel have the required training and qualification for their assigned positions?

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PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTE: II. An effective process has been established to obtain engineering assistance in resolution of operational or safety problems or issues.

LINES OF INQUIRY:

1. Does a mechanism exist for the operations organization or facility support organizations to identify operational problems or issues and request engineering assistance?

2. Do requests for engineering assistance clearly identify the nature of the problem?

3. Do requests for engineering assistance identify all relevant information such as maintenance and operating history, similar or repetitive problems and any earlier attempts to correct the problem?

4. Is the engineering assistance request approved by the appropriate level of management at the facility before transmittal to site-wide engineering?

5. Does the engineering organization promptly process requests for assistance?

6. If requests for engineering assistance are rejected, is the originator notified of the decision and the basis for rejection?

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PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTE: III. The design organization ensures that the appropriate design requirements are incorporated into the design effort.

LINES OF INQUIRY:

1. Is the design consistent with the original design requirements for the system, structure, or component?

2. Are the existing design requirements adequate for the planned design change or modification?

3. Are original design inputs, assumptions, or analyses that provided the bases for the design requirements still valid?

4. If existing design requirements cannot be retrieved, are comprehensive new design requirements established?

5. If new design requirements are established, has a thorough review been performed to identify possible interactions with interfacing components, systems, or processes?

6. Are final design requirements subjected to an internal review before approval?

7. Have the design requirements included applicable DOE requirements, federal and state regulations, and national consensus standards?

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PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTE: IV. The design process ensures that the final design resolves problems identified in the engineering assistance request and meets design objectives.

LINES OF INQUIRY:

1. Do design engineers walkdown the existing equipment or location where the modification will be installed before beginning detailed design?

2. Does the design process adequately consider:

   a. Operability?
   b. Maintainability?
   c. Constructability?
   d. Keeping Radiological Exposure ALARA?

3. Does the design process produce design output documents (drawings, procurement specifications, installation packages, etc.) that are consistent with design requirements?

4. Are all design output documents subjected to an independent technical review before issuance?

5. Is a safety evaluation performed for the final design before it is approved?

6. Do design output documents include acceptance criteria for inspections or tests that demonstrate design requirements have been met?

7. Are design output documents reviewed by facility and plant support organizations to ensure effective protection of worker and public safety and health?

APPENDIX B
PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTE: V. Design changes are installed and tested in accordance with the approved design implementation packages.

LINES OF INQUIRY:

1. Are design change packages translated into installation and testing packages in accordance with approved procedures?

2. Are installation packages, including test procedures, either developed by or reviewed by the design engineers who developed the initial design?

3. Does the installation package invoke appropriate operational controls such as lockout/tagout, hot work permits, radiological work permits, etc.?

4. Does the installation package include provisions for quality control inspection, hold, or witnessing?

5. Are required drawing, bills of material, or special installation instructions included in the package?

6. Are appropriate post-installation tests specified including tests to demonstrate that the installed equipment will meet the design requirements?

7. Are post-modification tests performed in accordance with the installation and test package?

8. Are discrepancies or nonconformances identified during the post-modification testing dispositioned by engineering?

9. Following return to service of the modified system, structure, or component, are all controlled engineering documents updated?

10. Are systems in place to assure that all affected organizations including operations, maintenance, and training are notified that the modification has been implemented?

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PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTE: VI. An effective program has been established to control setpoints for equipment, sensors and instruments that are essential to protecting the health and safety of the public or DOE's workers or fulfilling the facility's mission.

LINES OF INQUIRY:

1. Has a facility setpoint document been established to identify and control all setpoints determined by management to warrant control?

2. Is each setpoint traceable to a design requirement, design basis document, safety analysis or calculation?

3. Has a formal procedure been established to control changes to setpoints?

4. Are changes to setpoints subjected to an effective technical review by personnel qualified to perform design activities?

5. Are safety evaluations completed for changes to plant setpoints?

6. Following approval of changes to setpoints, are affected organizations including operations maintenance and training notified of the completion of the design change?

7. Are applicable materials such as procedures, training materials, and shift orders revised following approval of setpoint changes?

APPENDIX B
PERFORMANCE ATTRIBUTES AND LINES OF INQUIRY

PERFORMANCE ATTRIBUTES: VII. Changes to design change packages or installation and testing packages are controlled to preserve the integrity of the design.

LINES OF INQUIRY:

1. Are changes to design change packages and installation and testing packages subjected to effective technical reviews by the organization that prepared the modification?

2. Are safety evaluations performed for changes other than administrative corrections before the changes are implemented?

3. Are procedural controls in place to identify discrepancies or non-conforming conditions associated with installation, procurement, or testing?

4. Do procedural controls require disposition of all non-conforming conditions by the original design authority?

5. Is a mechanism available for the field to request changes based upon problems encountered during construction, installation, or procurement?

6. Are Field Change Requests and non-conformances dispositioned promptly by the engineering organization?