

Title
EQUIPMENT ENVIRONMENTAL QUALIFICATION

Revision No

0-00

Applicability Scope
Equipment Environmental Qualification for
TMI-1 and Oyster Creek Nuclear Generating Stations

Responsible Office
EP&S 5110

This document is important to safety ☐ Yes ☒ No

Effective Date

7/1/84

List of Effective Pages

Page	Revision	Page	Revision	Page	Revision
1.0	0-00	E3-1	0-00	E8-5	0-00
1a	0-00	E4-1	0-00	E8-6	0-00
2.0	0-00	E4-2	0-00	E8-7	0-00
3.0	0-00	E5-1	0-00	E8-8	0-00
4.0	0-00	E5-2	0-00	E8-9	0-00
5.0	0-00	E5-3	0-00	E8-10	0-00
6.0	0-00	E6-1	0-00	E8-11	0-00
7.0	0-00	E6-2	0-00	E8-12	0-00
8.0	0-00	E6-3	0-00	E8-13	0-00
9.0	0-00	E6-4	0-00	E8-14	0-00
10.0	0-00	E6-5	0-00	E8-15	0-00
11.0	0-00	E7-1	0-00	E8-16	0-00
12.0	0-00	E7-2	0-00	E8-17	0-00
13.0	0-00	E7-3	0-00	E8-18	0-00
14.0	0-00	E8-1	0-00	E8-19	0-00
15.0	0-00	E8-2	0-00	E9-1	0-00
E1-1	0-00	E8-3	0-00		
E2-1	0-00	E8-4	0-00		

	Signature	Concurring Organizational Element	Date
Originator	<i>J.C. FLYNN</i>	Engrg. Proc. & Stds. Manager	28 June 84
Concurred by	<i>[Signature]</i>	Manager, Elect Power & Instr	6-29-84
	<i>[Signature]</i>	Director Engrg. & Design	6-28-84
	/s/	VP/Director, Oyster Creek	6-28-84
	/s/	VP-Administration	6-28-84
	/s/	VP-Maintenance & Construction	6-27-84
	<i>Robert L Long</i>	VP-Nuclear Assurance	6-29-84
	/s/	VP & Director, TMI Unit 1	6-29-84
	/s/	Sr. Analyst-Bus. Info. Systems	6-28-84
Approved by	<i>P.T. Wilson</i>	Vice-Pres - Technical Functions	6/29/84

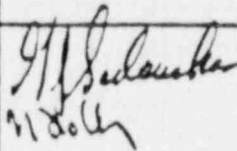
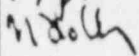
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TITLE Equipment Environmental Qualification

REV	SUMMARY OF CHANGE	APPROVAL	DATE
0-00	<p>Revised into Corporate format; contains major changes which more completely define the program.</p> <p>Revised to include additional EQ file forms, Quarterly Status Report, EQ Document Checklists; reworded major portions included various comments made on Rev. 0-00.</p>	 	<p>6/27/84</p> <p>6/28/84</p>

Title

Equipment Environmental Qualification

Revision No

0-00

1.0 PURPOSE & SCOPE

This procedure prescribes the methods by which GPU establishes the environmental qualification requirements of equipment and assures compliance with applicable regulations.

2.0 APPLICABILITY/SCOPE

This procedure applies to the TMI-1 and Oyster Creek Generating Stations.

3.0 DEFINITIONS

3.1 Class IE Equipment (Per 10CFR50.49)

Electrical equipment used in Nuclear Safety Related applications. Includes all electrical equipment needed to achieve and maintain emergency reactor shutdown, containment isolation, reactor core cooling, containment and reactor heat removal, and prevention of significant release of radioactive material to the environment.

3.2 Harsh Environment

An environment that would become more severe as a result of a design basis event not enveloped by normal operation or anticipated operational occurrences. (See 10CFR50.49, subparagraph (b)(3)(c).)

3.3 Mild Environment

An environment that does not become significantly severe as a result of a design basis event not enveloped by normal operation or anticipated operational occurrences. (See 10CFR50.49, subparagraph (b)(3)(c).)

3.4 Design Basis Event

Conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be designed to ensure integrity of the reactor coolant pressure boundary, the capability to shut down the reactor and maintain it in a safe shutdown condition and the capability to prevent or mitigate the consequence of accidents that could result in potential offsite exposure comparable to the 10 CFR 100 guidelines. A design basis accident is that subset of a design basis event which requires safety function performance.

Title Equipment Environmental Qualification

Revision No 0-00

3.5 Qualified Life (Per IEEE Std. 323-1983)

The period of time, prior to the start of a design basis event, for which equipment was demonstrated to meet the design requirements for the specified service conditions. At the end of the qualified life, the equipment shall be capable of performing the safety function(s) required for the postulated design basis and post-design basis events.

3.6 Refer to "Glossary of Terms" used in Technical Functions Procedures.

4.0 PROCEDURE

4.1 General

All IE equipment as defined in Section 3.1 and all equipment whose failure due to environmental conditions could adversely impact those functions defined in Section 3.1 shall be environmentally qualified in accordance with design bases and applicable regulations. Detailed requirements for electrical equipment are specified in 10CFR50.49. Electrical equipment located in a mild environment, and mechanical equipment, are required to be qualified in accordance with Criterion 1, 2, 4, and 23 of 10CFR50 Appendix A and are not within the scope of 10CFR50.49. Plant specific lists of systems containing equipment requiring environmental qualification have been submitted to the NRC and have been approved by the NRC.

4.2 The Equipment Environmental Qualification Test Report Index

The Equipment Environmental Qualification Test Report Index contains a listing by component of those items which have been qualified for use in harsh environments of either TMI-1 or Oyster Creek. The index identifies the references, reports and calculations which establish the qualification of the component and specifies the qualification level (i.e. DOR guidelines or NUREG 0588, Category 1 or 2).

4.2.1 When replacing or adding new Class IE equipment a review of NUREG 0588 shall be performed. The review will be performed by Technical Functions Engineering to determine if qualification is required.

4.2.2 Any determination that Class IE equipment in a harsh environment does not require qualification within the scope of 10CFR50.49 shall be documented and filed in ED&CC. A list of these determinations shall be maintained by ED&CC.

Title

Equipment Environmental Qualification

Revision No

0-00

4.2.3 Tech. Functions Manager of EQ will issue a quarterly status report. Ref: Exhibit 9.

4.3 Environmental Qualification Files

Equipment Environmental Qualification files shall be established in ED&CC with a duplicate file maintained at the site DDCC as defined by the requirements of 5000-ADM-7206.01 (TAP-006). These files shall consist of Component Qualification files, Master Lists (Exhibit 5), regulatory and general correspondence, System Component Evaluation Work Sheets (SCEWS) (Exhibit 6), Accident Profiles, Equipment Environmental Qualification Test Report Index, and documentation of IE items determined to be outside the scope of the EQ program. The component qualification files shall be organized in accordance with Exhibit 7. The purpose of the file is to provide the auditable source of qualification data. Input is prepared by the Environmental Qualification (EQ) Sub Section. Master Lists and SCEW Sheets are released for Operations and Maintenance in accordance with 5000-ADM-1215.02 (EMP-008) through Engineering Data & Configuration Control (ED&CC). This release should occur prior to turnover of a modification to the plant as defined by the requirements of 5000-ADM-7311.04 (EMP-017). ED&CC shall make distribution as directed by EQ and update the data base Index (CARIRS) as required. EQ Subsection releases other documents for record to ED&CC in accordance with 5000-ADM-1215.02 (EMP-008).

The checklist (Exhibit 8a and 8b) shall be used to evaluate qualification requirements of components covered by the file.

- 4.3.1 Design verification of engineering and design documents classified as Important to Safety (ITS), which includes all documents in the Environmental Qualification files, shall be performed in accordance with 5000-ADM-7311.02 (EP-009).

EQ design verification shall employ the checklist in Exhibit 8a and 8b of this procedure in lieu of the General Verification Checklist contained in EP-009.

- 4.3.2 Revisions to documents in the EQ files shall also be released in accordance with EMP-008. Other than for minor editorial changes, the review and concurrence flow path used for the original release shall be used for revisions.

1000-ADM-7317.C 121103 2111 R21

Title

Equipment Environmental Qualification

Revision No

0-00

5.0 RESPONSIBILITIES

5.1 Technical Functions Environmental Qualification Sub-Section Responsibilities

- 5.1.1 Establish and maintain a current master list (by plant and system) of components/equipment Important to Safety which must be environmentally qualified for use in a harsh environment (Exhibit 5). Prepares list of components exempted from qualification with basis for exemption documented.
- 5.1.2 Establish the environmental qualification requirements for each component on the master list.
- 5.1.3 Establish the environmental qualification status for each master list component. The basis is dependent upon the applicable regulations and usually is by test, by analysis, or a combination of both. When the basis for qualification is a test report, the report shall be reviewed in accordance with the process described in 5000-ADM-7316.02 (EP-J03) or similar manner to ensure that it does demonstrate the qualification of a particular item for application in the environment to which it is subjected. The report must also be in accordance with any applicable regulations such as IEEE 323-1974. When the above criteria are met, the report will be classified as approved and will be filed in the Environmental Qualification File.

When the qualification of a component cannot immediately be established, a justification for continued operation (JCO) must be prepared.

- 5.1.4 Determine qualification requirements of new equipment prior to procurement and evaluate adequacy of documentation qualification prior to turn-over.
- 5.1.5 Perform age related surveillance evaluations.
- 5.1.6 Provide input to Plant Materiel or Maintenance and Construction as required to identify environmentally qualified equipment to be included in the maintenance programs and to assist in establishing replacement maintenance schedules for ITS components/equipment to assure inservice items are within the limits of qualified life.
- 5.1.7 Jointly with the Plant develop list of applicable Maintenance and Surveillance procedures and review these procedures to ensure environmental qualification requirements are maintained.

Title

Equipment Environmental Qualification

Revision No

0-00

- 5.1.8 Provide technical criteria for defining shelf-life and operating life.
- 5.1.9 Document the environments for the various plant areas.
- 5.1.10 Assure that an engineering evaluation has been performed and documented for components that are "better than or equal to", if items are not exact duplicates of qualified items.
- 5.1.11 Provide a quarterly status report of all installed components requiring qualification.
- 5.1.12 Make qualification determination of replacement IE equipment.

5.2 Technical Functions-Functional Engineering Section Responsibilities

- 5.2.1 Establish environmental qualification requirements including necessary performance requirements.
- 5.2.2 Review test reports and other qualification documents to confirm that component is qualified for the intended application.

5.3 Plant Responsibilities

The following are Plant-specific requirements for which responsibility is normally delegated by the Vice President-Director of the Plant to subordinate departments.

- 5.3.1 Establish a schedule to ensure that timely overhaul to extend qualified life or replacement of ITS components/equipment is accomplished prior to the end of the qualified life when qualified to less than the life of the plant.
- 5.3.2 Prepare Plant maintenance/surveillance procedures to ensure that master list equipment is not degraded during replacement or maintenance.
- 5.3.3 Advise the EQ Subsection (utilizing EMP-015) when the Plant initiates a change which impacts the data on a Master List or SCEW Sheet.
- 5.3.4 Initiate and implement a program that provides sufficient information to the Administration Division (warehouse)/Maintenance/M&C to assure that non-qualified

Title

Equipment Environmental Qualification

Revision No

0-00

components and consumables such as lubricants are not inadvertently installed or used in an application requiring qualification.

- 5.3.5 Assure that an engineering evaluation has been performed and documented for components that are "better than or equal to", if items are not exact duplicates of qualified items.

5.4 Administration Division Responsibilities

Responsibilities for certain equipment environmental qualification requirements which fall within the purview of Materials Management Department are:

- 5.4.1 Initiate and implement a program for procurement of environmentally qualified spare parts and maintaining an appropriate stockage level for replacement parts.
- 5.4.2 Provide for adequate and appropriate storage and retrievability of environmentally qualified spare parts to include replacement of shelf-life sensitive components or parts.
- 5.4.3 Implement the program to preclude the inadvertent issuance of non-qualified components in applications requiring qualification (Ref 5.3.4).

5.5 Nuclear Assurance Responsibilities

Overall responsibilities for Quality Assurance or Quality Control requirements for Equipment Environmental Qualification shall be delegated, as appropriate, within the Nuclear Assurance Division.

- 5.5.1 Establish and maintain an inspection and monitoring program for ITS components/equipment to assure environmentally qualified equipment is procured, stocked, properly stored and installed in those environments for which it is required and that replacement or upgrading of such equipment is being accomplished prior to the end of the qualified life.
- 5.5.2 Audit records and files required to implement and sustain systems, procedures, and programs established to ensure the proper control of environmentally qualified equipment. Report results and findings of audits, monitorings and inspections conducted in connection with the Equipment Environmental Qualification program.

1000-ADM-7317.0 (11 R2)

Title

Equipment Environmental Qualification

Revision No

0-00

5.6 Implementation - Development of Criteria/Requirements Documents
- (Refer to Procedure Flow Chart, Exhibit 1)

ENVIRON-
MENTAL
QUALIFI-
CATION
(EQ)

- 5.6.1 Establishes environmental qualification criteria and requirements which include:
- Identifying design basis events with environmental qualification impact
 - Determining the harsh areas generated by these events and the characteristics of the harsh environments
 - Specifying systems and specific system capabilities required to mitigate the event and achieve cold shutdown

Contacts the Plant for incorporating operating experience

Tasks other sections for support as required

Establishes a review cycle and submits draft document for review [5000-ADM-7370-03 and 5000-ADM-1215.02) (EP-008 and EMP-008)] as appropriate)

FUNC-
TIONAL
ENGI-
NEERING
SECTION

- 5.6.2 Provides input to EQ as follows:
- DBE (SAPC)
 - Harsh area locations (MS)
 - Harsh area pressure, temperature and humidity (SAPC)
 - Harsh area radiation (Fuel Projects)
 - Systems and capabilities (SAPC)
- Reviews and comments on established environmental parameters

QUALITY
ASSURANCE
(QA)

- 5.6.3 Reviews and comments for compliance with Operational Quality Assurance Plan

PLANT
ENGI-
NEERING
(PE)

- 5.6.4 Reviews and comments per EP-008

ENVIRON-
MENTAL
QUALI-
FICATION
(EQ)

- 5.6.5 Resolves comments and updates draft document(s)
Establishes distribution requirements and notifies ED&CC

1000-ADM-7317.01 (11/87)

Title

Equipment Environmental Qualification

Revision No

0-00

ENGI- 5.6.6 Files original document and makes distribution as
NEERING directed by DRF per 5000-ADM-1215.02 (EMP-008)
DATA & CON-
FIGURATION
CONTROL
(ED&CC)

5.7 Implementation - Development of the Master Lists(s) (Required
for Each Plant) - (Refer to Procedure Flow Chart, Exhibit 2)

ENVIRON- 5.7.1 Prepares the master list(s) for harsh environment
MENTAL components and list of components exempted from
QUALI- qualification with basis for exemption documented
FICATION Completes applicable forms per Exhibit 5
(EQ)

PLANT 5.7.2 Reviews and comments (in line) per EP-008
ENGI-
NEERING
(PE)

FUNCTIONAL 5.7.3 Reviews and comments on Component Master Lists and list
ENGINEER- of components exempted from qualification
ING
SECTIONS
(FES)

ENVIRON- 5.7.4 Resolves comments
MENTAL QUALI- Establishes the distribution requirements
FICATION Releases Master List (or revision) for Operation
(EQ) & Maintenance per 5000-ADM-1215.02 (EMP-008)
Forwards to Engineering Data & Configuration
Control (ED&CC)

ENGI- 5.7.5 Update CARIRS and files original of master list
NEERING Makes distribution of the Master List in accor-
DATA & CON- dance with Environmental Qualification
FIGURATION Section's standard Distribution List of
CONTROL instructions on DRF per 1000-ADM-1215.02 (EMP-008)
(ED&CC) Forwards to DDCC

5.8 Implementation - Development of System Component Evaluation Work
(SCEW) Sheets (Required for each existing plant component)
(Refer to Procedure Flow Chart, Exhibit 3)

Title

Equipment Environmental Qualification

Revision No

0-00

ENVIRON- 5.8.1 Prepares the SCEW sheets for harsh environment components
MENTAL Completes applicable forms per Exhibit 6
QUALIFICA- Lists replacement interval if entire component or a part
TION thereof has less than 40 year life span
(EQ) Establishes the distribution requirements
Releases SCEW sheets (or revisions) for Operation & Main-
tenance per 5000-ADM-1215.02 (EMP-008)
Forwards to ED&CC

FUNCTIONAL 5.8.2 Provides input to EQ for preparation of SCEW sheets
ENGINEERING Appropriate engineering discipline reviews and comments
SECTION on SCEW sheets
(FES)

PLANT 5.8.3 Reviews and comments per EP-008 (in line)
ENGI-
NEERING
(PE)

ENVIRON- 5.8.4 Resolves comments
MENTAL Prepares justification for continued operation (JCO) if
QUALIFI- component qualification has not been fully
CATION established and identify JCO on SCEW sheet
(EQ)

ENGINEER- 5.8.5 Update CARIRS and files original SCEW sheets
ING DATA Makes distribution of the SCEW sheets in accordance with
AND CONFIG- Environmental Qualification Subsection's standard
URATION Distribution List of instructions on DRF per
CONTRL 5000-ADM-1215.02 (EMP-008)
(ED&CC)

5.9 Implementation - Development of Environmental Equipment Data,
Modification - (Refer to Procedure Flow Chart, Exhibit 4-1)

ENGINEER 5.9.1 Establishes that the component is required to be
(E) environmentally qualified for either a harsh
or mild environment and what the environments are
Defines environmental parameters and requests qualifica-
tion data on the Purchase Requisition if required
Assures equipment is installed per engineering documents
or changes are concurred with prior to turnover
Assures that modification or replacement does not alter
the equipment interfaces for which qualification was
based
Assures that the Environmental Qualification
Section has reviewed all the qualification
data required to qualify the component prior to
turnover to the Plant

Title

Equipment Environmental Qualification

Revision No

0-00

Note: The above actions require concurrence from the
Environmental Qualification Section

M&C/
PLANT
MAIN-
TENANCE
(M&C/PM)

- 5.9.2 Performs installation in accordance with approved engineering documents. [This ensures that modifications or replacements do not alter equipment interfaces upon which qualification was based]

ENVIRON-
MENTAL
QUALI-
FICATION
(EQ)

- 5.9.3 Performs calculations and analyses for environmental qualification attributes
Obtains environmental qualification data and reports and evaluates them
Obtains the services of others when necessary to obtain qualification data
Determines the qualification status and expected life for each component on the Master List
Updates master list
Documents review of IE equipment found to be exempt from qualification requirements
Advises the Manager-Engineering Projects and the Director of Engineering and Design of components which cannot meet the environmental requirements
Identifies components with expected life less than the plant design life and identifies on SCEW sheets
Identifies subcomponents which should be replaced during the qualified life span of a component on SCEW sheets
Prepares the qualification documentation, e.g., component qualification files

ENVIRON-
MENTAL
QUALI-
FICATION
(EQ)

- 5.9.4 Releases new or revised Master Lists and SCEW sheets for Operations & Maintenance to the Engineering Data & Configuration Control (ED&CC) in accordance with Section 5.7 and 5.8 for filing and distribution as per 5000-ADM-1215.02 (EMP-008)
Prepare quarterly status report

DIRECTOR,
ENGINEER-
ING AND
DESIGN
(DED)

- 5.9.5 Decides on course of action for components that cannot be environmentally qualified
Reviews justification for continued operations (JCO) if component qualification has not been fully established

Title

Equipment Environmental Qualification

Revision No

0-00

- ENGINEER-
ING DATA
& CONFIG-
URATION
CONTROL
(ED&CC)
- 5.9.6 Updates CARIRS and Maintains environmental qualification files
Makes applicable distribution as directed by DRF
- 5.10 Implementation - Development of Environmental Equipment Data, Replacement (Refer to Procedure Flow Chart, Exhibit 4-2)
- M&C/
PLANT
MAIN-
TENANCE
(M&C/PM)
- 5.10.1 Reviews the Master List to determine if the component being replaced is an environmentally qualified component
Verifies that the replacement part to be installed is qualified, if not:
Requests Plant Engineering to evaluate if the warehouse component is suitable for the application. If a generic engineering evaluation is issued as part of the program required by Section 5.3.4, a case-by-case evaluation is not required by Plant Engineering
- PLANT
ENGI-
NEERING
- 5.10.2 Completes engineering evaluation of warehouse components
Issues technical requirements for replacement components
Requests support from EQ subsection as required
Issues change document, if required, against the SCEW sheet
- M&C/
PLANT
MAIN-
TENANCE
(M&C/PM)
- 5.10.3 Performs installation in accordance with approved engineering documents.[This ensures that modification or replacement does not alter equipment interfaces upon which qualification was based]
- ENVIRON-
MENTAL
QUALI-
FICATION
(EQ)
- 5.10.4 Develops engineering evaluation of warehouse components as required by Plant Engineering
Releases new or revised Master Lists and SCEW sheets for Operations and Maintenance to the Engineering Data & Configuration Control (ED&CC) in accordance with 5.7 and 5.8
- ENGI-
NEERING
DATA & CON-
FIGURATION
CONTROL
(ED&CC)
- 5.10.5 Updates CARIRS and maintains environmental qualification files
Makes applicable distribution as directed by DRF

Title

Equipment Environmental Qualification

Revision No

0-00

5.11 Implementation - Development of Environmental Equipment Data,
Existing Plant EquipmentENVIRON-
MENTAL
QUALI-
FICATION
(EQ)

- 5.11.1 Performs calculations and analyses
Obtains environmental qualification data and reports and evaluates them
Obtains the services of others when necessary to obtain qualification data
Determines the qualification status and expected life for each component on the Master List
Advises the Director of Engineering and Design of components which cannot meet the environmental requirements
Identifies components with expected life less than the plant design life on SCEW sheets
Identifies subcomponents which should be replaced during the qualified life span of a component on SCEW sheets
Prepares the qualification documentation, e.g., component qualification files

ENVIRON-
MENTAL
QUALI-
FICATION
(EQ)

- 5.11.2 Releases new or revised Master Lists and SCEW sheets for Operations & Maintenance to the Engineering Data & Configuration Control (ED&CC) in accordance with Section 5.7 and 5.8 for filing and distribution as per 5000-ADM-1215.02 (EMP-008)
Prepare quarterly status report

ENGINEER-
ING DATA
& CONFIG-
URATION
CONTROL
(ED&CC)

- 5.11.3 Updates CARIRS and Maintains environmental qualification files
Makes applicable distribution as directed by DRF

DIRECTOR,
ENGINEER-
ING AND
DESIGN
(DED)

- 5.11.4 Decides on course of action for components that cannot be environmentally qualified
Reviews justification for continued operations (JCO) if component qualification has not been fully established

5.12 Implementation - Development of Environmental Equipment Data,
Maintenance and SurveillanceENVIRON-
MENTAL
QUALIFICA-
TION
(EQ)

- 5.12.1 Review and concur with applicable Maintenance and - surveillance procedures to ensure environmental qualification requirements are maintained
Monitors Plant maintenance and surveillance data for potential impact on environmental qualification of components

Title
Equipment Environmental Qualification

Revision No
0-00

M&C/
PLANT
MAIN-
TENANCE
(M&C/PM)

- 5.12.2 Assures that maintenance procedures are adequate to ensure that the environmental qualification of the safety related equipment is not degraded due to maintenance activities.
- Assures that lubricants and solvents used during maintenance are controlled and consistent with recommendations included in the approved manufacturer's Technical Manual or requests engineering evaluation of deviations

ENVIRON-
MENTAL
QUALIFICA-
TION
(EQ)

- 5.12.3 Performs evaluations to ensure lubricants and solvents used during maintenance do not degrade the environmental qualification of safety related equipment.

5.13 Implementation - Development of Environmental Equipment Data, Emergency Procedures

INDEPEN-
DENT
SAFETY
REVIEWER
(ISR)

- 5.13.1 Identifies during review of Emergency Procedures and revisions thereto, Control Room displays which are required by the operators to manually respond to emergency symptoms
- Notifies Environmental Qualification subsection of results

ENVIRON-
MENTAL
QUALIFICA-
TION
(EQ)

- 5.13.2 Establishes qualification of all components of the instrument string providing the required Control Room display which are located in a harsh environment

5.14 Implementation - Development of Environmental Equipment Data, Industry Experience

LICEN-
SING
(L)

- 5.14.1 Identify NRC I&E Notices and Bulletins relating to environmental qualification and submit to EQ subsection for evaluation

MANAGER
PLANT
ANALYSIS
(PA)

- 5.14.2 Identify INPO-SOER's and other source documents on industry experience related to environmental qualification and submit to EQ subsection for evaluation

ENVIRON-
MENTAL
QUALIFI-
CATION
(EQ)

- 5.14.3 Complete evaluation of industry experience notices
- Initiate corrective action if required
- File notice and evaluation in the EQ files

Title

Equipment Environmental Qualification

Revision No

0-00

6.0 REFERENCES

- 6.1 5000-ADM-6230.01 (TAP-011) - "Purchase Requisitions"
- 6.2 5000-ADM-1215.02 (EMP-008) - "Technical Document Release"
- 6.3 5000-ADM-7316.01 (EP-001) - "Technical Reports"
- 6.4 5000-ADM-7315.02 (EP-003) "Vendor Document Review"
- 6.5 5000-ADM-7370.03 (EP-008) - "Control Evaluation, and Resolution of Review Comments on Technical Documents"
- 6.6 5000-ADM-7341.02 (EP-026) - "Spare Parts" Draft
- 6.7 5000-ADM-7313.02 (EP-011) - "Quality Classification List"
- 6.8 ES-011 - "Methodology and Content of TMI Quality Classification List"
- 6.9 TDR-282 - "TMI-1 Equipment Locations and Environments"
- 6.10 TDR-297 - "OC Equipment Locations and Environments"
- 6.11 IEEE STD 323-1974 (and 1983) - Qualifying Class IE Equipment for Nuclear Power Generating Plants
- 6.12 10CFR50.49 - Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants
- 6.13 10CFR50, Appendix A - General Design Criteria for Nuclear Power Plants
- 6.14 Equipment Environmental Qualification Licensing Submittals to the NRC
- 6.15 I&E Bulletin 79-01B
- 6.16 NUREG 0588
- 6.17 EMP-015 "Field Questionnaires, Change Notices and Change Requests"

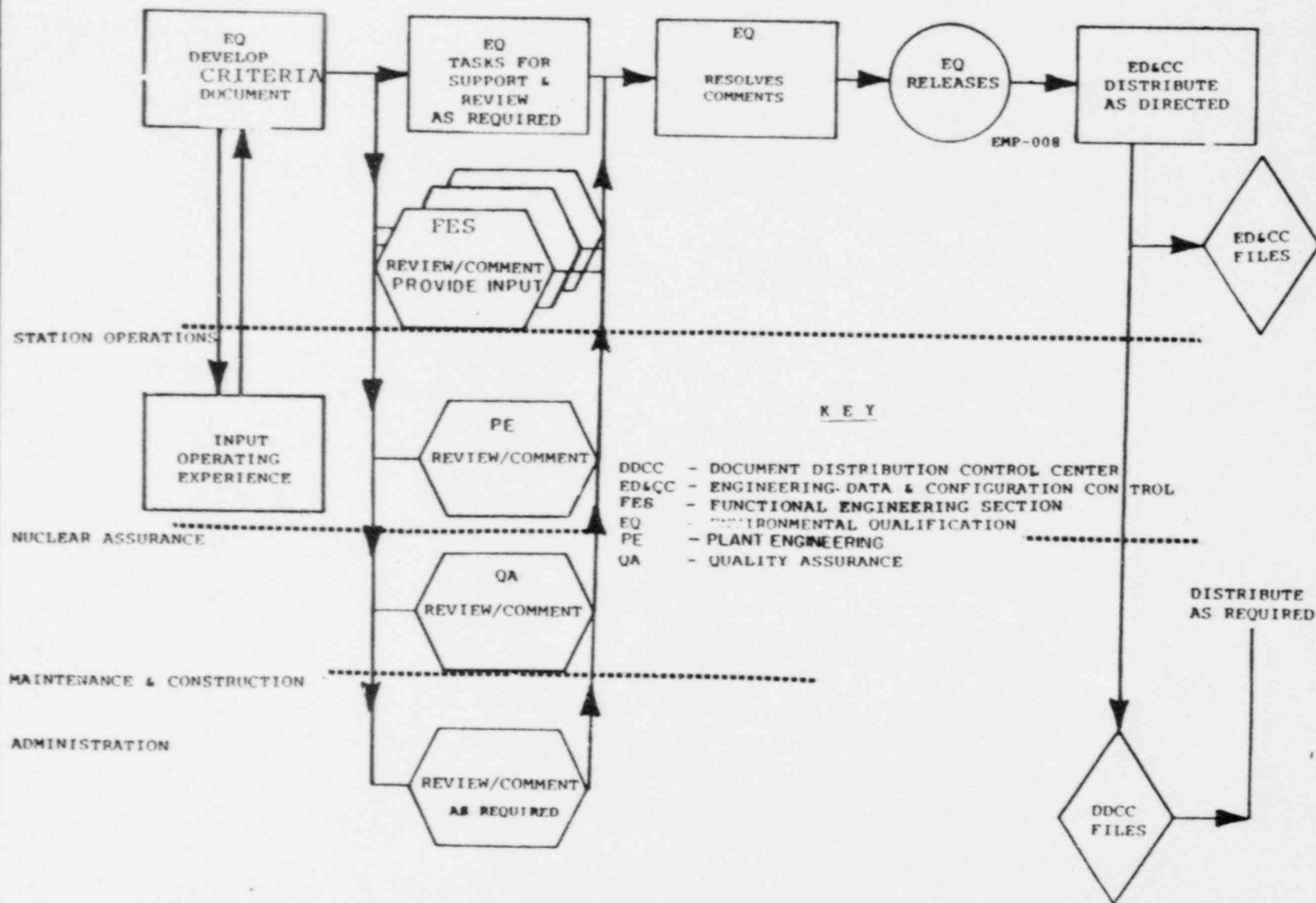
7.0 ATTACHMENTS

- 7.1 Exhibit 1 - Development of Criteria Documents
- 7.2 Exhibit 2 - Development of Master List(s) Required for Each Plant)
- 7.3 Exhibit 3 - Development of SCEW Sheets
- 7.4 Exhibit 4 - Development of Environmental Equipment Data
- 7.5 Exhibit 5 - Master Lists
- 7.6 Exhibit 6 - System Component Evaluation Work Sheets (SCEWS)
- 7.7 Exhibit 7 - EQ File Forms
- 7.8 Exhibit 8 - EQ Document Checklist
- 7.9 Exhibit 9 - Quarterly Status Report

EXHIBIT 1

DEVELOPMENT OF CRITERIA DOCUMENTS

TECHNICAL FUNCTIONS



Title

Equipment Environmental Qualification

GPU Nuclear

GPU Nuclear Corporate Policy and
Procedure Manual

Revision No

0-00

Number (EP-031)

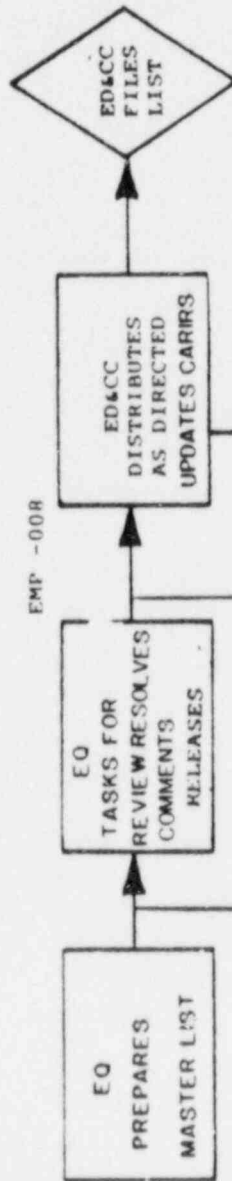
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Title
Equipment Environmental Qualification

Revision No
0-00

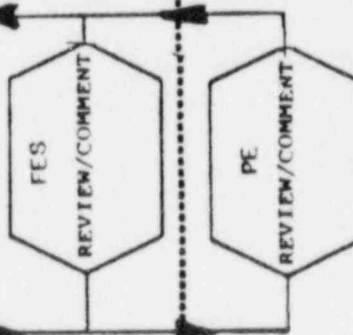
EXHIBIT 2 DEVELOPMENT OF THE MASTER LIST(S) REQUIRED FOR EACH PLANT

TECHNICAL FUNCTIONS



EMP -00R

STATION OPERATIONS



ADMINISTRATION

DISTRIBUTES AS REQUIRED

KEY

- FES - FUNCTIONAL ENGINEERING SECTION
- DDCC - DOCUMENT DISTRIBUTION CONTROL CENTER
- ED&CC - ENGINEERING DATA & CONFIGURATION CONTROL
- FJ - ENVIRONMENTAL QUALIFICATION
- PE - PLANT ENGINEERING

Title

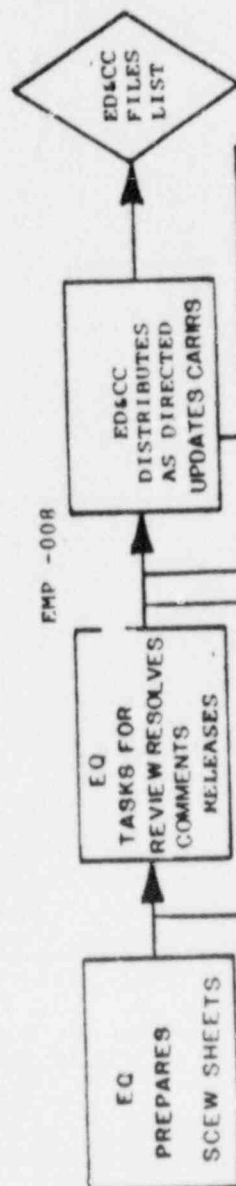
Equipment Environmental Qualification

Revision No

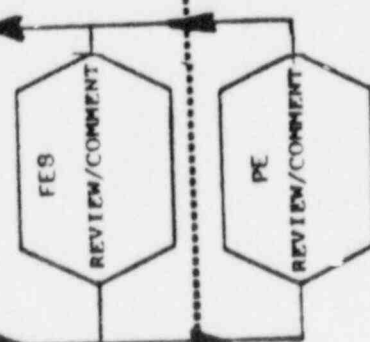
0-00

EXHIBIT 3
DEVELOPMENT OF SCEW SHEETS

TECHNICAL FUNCTIONS



STATION OPERATIONS



ADMINISTRATION

DISTRIBUTES
AS REQUIRED

KEY

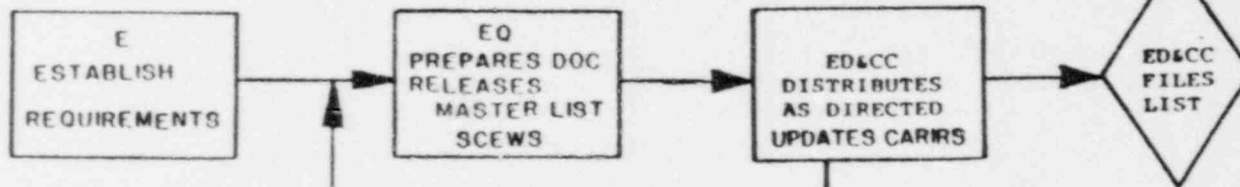
- FES** - FUNCTIONAL ENGINEERING SECTION
- DDCC** - DOCUMENT DISTRIBUTION CONTROL CENTER
- ED&CC** - ENGINEERING DATA & CONFIGURATION CONTROL
- EQ** - ENVIRONMENTAL QUALIFICATION
- PE** - PLANT ENGINEERING

EXHIBIT 4-i

DEVELOPMENT OF ENVIRONMENTAL EQUIPMENT DATA MODIFICATION

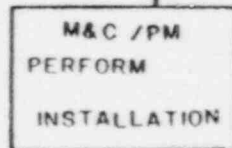
TECHNICAL FUNCTIONS

EMP - 008



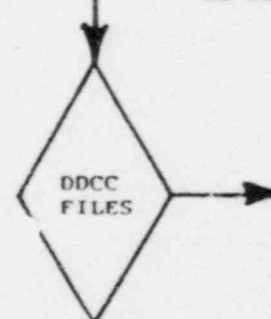
STATION OPERATIONS

MAINTENANCE & CONSTRUCTION



ADMINISTRATION

DISTRIBUTES
AS REQUIRED



KEY

- FES - FUNCTIONAL ENGINEERING SECTION
- DDCC - DOCUMENT DISTRIBUTION CONTROL CENTER
- ED&CC - ENGINEERING DATA & CONFIGURATION CONTROL
- EQ - ENVIRONMENTAL QUALIFICATION
- PE - PLANT ENGINEERING
- M&C - MAINTENANCE & CONSTRUCTION

Title

Equipment Environmental Qualification

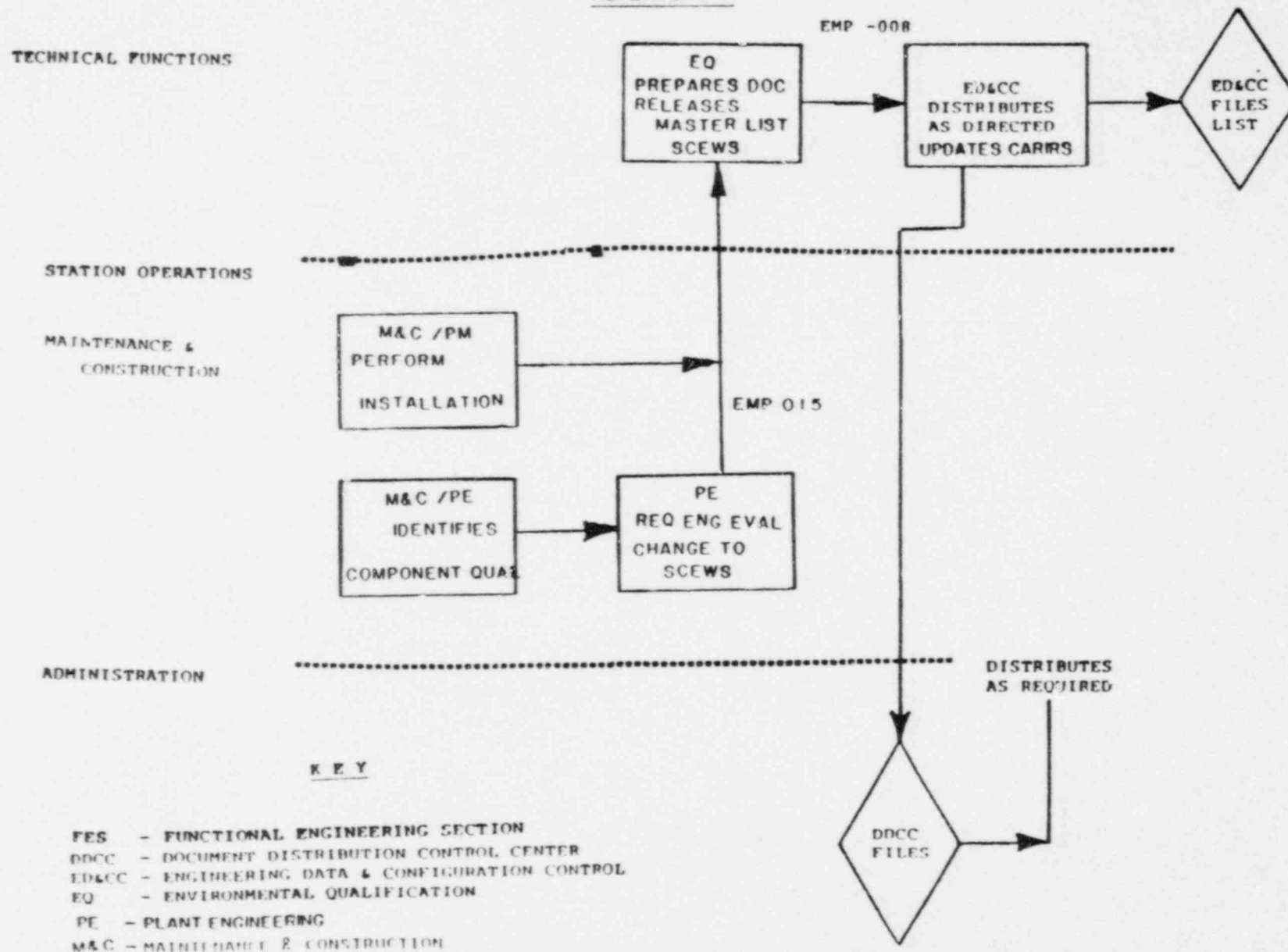
Revision No
0-00

GPU Nuclear

GPU Nuclear Corporate Policy and
Procedure Manual

Number
1000-ADM-7-73 (REV. 11-82)

EXHIBIT 4-2

DEVELOPMENT OF ENVIRONMENTAL EQUIPMENT DATA
REPLACEMENT

Title

Equipment Environmental Qualification

GPU Nuclear

GPU Nuclear Corporate Policy and
Procedure Manual

Number

1000-ADW-7317.00

Revision No

0-00

Title
Equipment Environmental QualificationRevision No
0-00EXHIBIT 5MASTER LIST
(HARSH ENVIRONMENT)MASTER LIST SYSTEMS

The Equipment Environmental Qualification Master list shall be prepared for components required to function under conditions of a postulated accident. The EQ section shall prepare the Master List on the form shown in this Exhibit. System functions to be covered by Master Lists include:

- Engineered Safeguards Actuation
- Reactor Protection
- Containment Isolation
- Steamline Isolation
- Main Feedwater Shutdown and Isolation
- Emergency Power
- Emergency Core Cooling¹
- Containment Heat Removal
- Containment Fission Product Removal
- Containment Combustible Gas Control
- Auxiliary Feedwater
- Containment Ventilation
- Containment Radiation Monitoring
- Control Room Habitability Systems (e.g., HVAC, Radiation Filters)
- Ventilation for Areas Containing Safety Equipment
- Component Cooling
- Service Water
- Emergency Shutdown²
- Post Accident Sampling and Monitoring³
- Radiation Monitoring³
- Safety Related Display Instrumentation³

¹These systems will differ for PWRs and BWRs, and for older and newer plants. In each case the system features which allow for transfer to recirculation cooling mode and establishment of long term cooling with boron precipitation control are to be considered as part of the system to be evaluated.

²Emergency shutdown systems include those systems used to bring the plant to a cold shutdown condition following

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 5 (Contd.)MASTER LIST
(HARSH ENVIRONMENT)

accidents which do not result in a breach of the reactor coolant pressure boundary together with a rapid depressurization of the reactor coolant system. Examples of such systems and equipment are the RHR system, PORVs, RCIC, pressurizer sprays, chemical and volume control system, and steam dump systems.

³More specific identification of these types of equipment can be found in the plant emergency procedures.

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 6
HARSH ENVIRONMENT
SYSTEM COMPONENT EVALUATION WORK SHEETS (SCEWS)

A System Component Evaluation Work Sheet (SCEWS) shall be prepared by the Environmental Qualification Section on each component identified on the Master List. SCEW sheets shall be grouped by system and each group shall be preceded by a list of effective pages for SCEW sheets for that system.

This exhibit provides the form/format required to prepare SCEW sheets to satisfy requirements of 10CFR50.49. The SCEW sheets for each component shall contain the complete information indicated on the sheet. In addition to this basic information, it may be necessary to provide supplemental information as indicated on the supplemental forms. The object of the evaluation is to provide complete justification for the conclusion of the component's qualification. Instructions are provided in the Exhibit to assist in preparing the SCEW sheets.

Engineering Data & Configuration Control (ED&CC) shall maintain SCEW sheet log. SCEW sheets shall each be numbered according to the following scheme:

SCEW-XX-XXX

TI-TMI-1-----

OC-Oyster Creek

-----Sequential Number
(from ED&CC)

Title

Equipment Environmental Qualification

Revision No
0-00

EXHIBIT 6 - (Contd.)

System Component Evaluation Work Sheet

SCEM-XX-XXX

(Note 3)

Prepared _____
Approved _____
Revision _____ Date _____
Sheet _____ of _____

Equipment Description	Environment			Documentation Ref.		Qualification Method	Outstanding Items
	Parameter	Specification	Qualification	Specification	Qualification		
System Plant ID No Component Manufacturer Model Number Function Accuracy Spec. Service Location Flood Level Elev. Above Flood Level	Note 1 Operating Time						
	Accident Temperature (°F)						
	Accident Pressure (PSIA)						
	Relative Humidity (%)						
	Chemical Spray (PSI)						
	Note 2 Radiation (RAD)						
	Aging (Y/years)						
	Submergence						

Notes:

1. (Include acc & post-acc durations)
2. (Include normal and acc radiation levels)
3. Include qualification level (i.e. DOR Guide lines or NUREG-0588, Category 1)

Documentation References:

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 6 - (Contd.)HARSH ENVIRONMENT
SYSTEM COMPONENT EVALUATION WORK SHEETS (SCEWS)

1. Equipment Description: Provide the specific information requested for each Class 1E electrical component. Provide component location, specific information such as the building, access floor elevations, and whether the component is above the flood level elevation. Cables, electrical penetrations, terminal blocks, interfaces, e.g. electrical or mechanical seals (unless the device is included with the component with which it interfaces) and other items shall be identified as 1E components.
2. Environment: List values for each environmental parameter indicated. List the "specification values" obtained from postulated accident analysis in the "SPEC" column. List the "qualification values" obtained from test reports, engineering analysis data, etc. in the "Qual" column. Temperature, pressure, etc., as a function of time shall be provided in profile or tabular form. Specify the time function and identify the document which provides the basis for this time interval.
3. Documentation Reference: Reference the documents from which information was obtained in the "Spec" column. Identify the document that contains the postulated accident environmental specification data. In the "Qual" column identify the document that contains the environmental qualification data. In all cases, specify the document by source including figure or page number.
4. Qualification Method: Identify the method of qualification. To describe the qualification method use words such as simultaneous test, comparison test sequential test, and/or engineering/mathematical analysis. Words such as "test" and/or "analysis" when used alone do not adequately identify the qualification method.
5. Outstanding Items: Identify parameters for which no qualification data is presently available. Also, identify parameters, service conditions, or environments not previously addressed during FSAR environmental qualification analysis such as submergence, qualified life (aging), or HELB. Identify in the "Notes" section on page 1 of this attachment the actions planned for determining qualification and the schedule for completing these actions.

n = 20

EXHIBIT 6 - (Contd.)

Revision:
Date:

Sheet

COMPONENT MATERIALS EVALUATION SHEET

Plant I.D. No.:

Manufacturer:

Component:

Model No.:

PARTS LIST	THERMAL AGING		RADIATION	
	MATERIALS LIST	QUALIFICATION REFERENCE	QUALIFICATION	REFERENCE

Title
Equipment Environmental QualificationRevision No
0-00EXHIBIT 6 - (Contd.)SCEWS SUPPLEMENTARY SHEET (Contd.)Page _____ of _____
Rev.
Date:ELECTRICAL COMPONENT EVALUATIONAssessment:Safety Impact:**SAMPLE
FORMAT**

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 7

Pages E7-1 through E7-3 FORMS ARE TO BE USED FOR ORGANIZING EQ FILES.

GENERAL PUBLIC UTILITIES NUCLEAR CORPORATION
THREE MILE ISLAND NUCLEAR POWER STATION - UNIT 1
ENVIRONMENTAL QUALIFICATION PROGRAM

File No.: _____

Manufacturer: _____

Model: _____

Component: _____

Revision 0 Prepared _____ Date _____
(Printed Name, Position,
Signature)Approved _____ Date _____
(Printed Name, Position,
Signature)Note: Signature on this sheet confirms that the file has been reviewed
for completeness and correctness and, unless explicitly identified
herein, the component is environmentally qualified the level
identified on this sheet.

1000-ADM-737.01-2-001 (B7)

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 7 - con't

File No. _____

Revision _____

TABLE OF CONTENTS

Reference
NumberDescriptionNone
NoneVendor Component Reference Matrix
SCEWs

Title

Equipment Environmental Qualification

 Revision No.
0-00

EXHIBIT 7- con't

VENDOR COMPONENT REFERENCE MATRIX

File:

Revision:

 PLANT ID
NUMBER

REFERENCE NUMBER

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 8

The Assessment Report (E8-2 or E8-11) shall be prepared by Technical Functions Engineering & Design and filed in the EQ component file.

E8-2 or E8-10 shall be signed by the Engineer making the review and approved by the Section Manager.

Questions contained in the checklists are provided to assist in assessing the qualification requirements of IE components.

Exhibit 8A (E8-2) is to be used for DOR Guidelines requirements.

Exhibit 8B (E8-11) is to be used for NUREG-588 requirements.

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 8ADOR GUIDELINES QUALIFICATION ASSESSMENT REPORT

Manufacturer: _____

Model Number: _____

Component: _____

Reviewer's Conclusion☐ Acceptable (i.e., This equipment meets the requirements of the DOR Guidelines)☐ Acceptable, providing the following comments are addressedSpecial Conditions/Comments:Prepared By: _____
Signature DateChecked By: _____
Signature DateApproved By: _____
Signature DateRevision 0
Page 1 of

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 8A - Cont'dTABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
Maintenance Required to Maintain Qualified Life	
Documents Reviewed for This Report	
DOR Guidelines Qualification Report Review Checklist	
Notes	

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1	Temperature Profile Comparison	

Revision 0
Page 2 of

FORM 1000 ADM 7317.01 2.03 R2

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 8A - Cont'dMAINTENANCE REQUIRED TO MAINTAIN QUALIFIED LIFEDOCUMENTS REVIEWED FOR THIS REPORTRevision 0
Page 3 of

FORM 1000 ADM 7317.01 - (11/82)

EXHIBIT 8A - Cont'd
DOR GUIDELINES QUALIFICATION EVALUATION CHECKLIST
I. SIMILARITY

1. Have all Equipment ID's on the Master List associated with this EQ file been addressed in the documentation?
2. Is the plant equipment identical to the test specimen?
 - a. If not, are the differences justified?

II. SIMULATED SERVICE CONDITIONS AND TEST DURATION

3. Do the temperature/pressure test parameters meet or exceed the postulated accident environmental conditions? Make a copy of the test temperature envelope and superimpose it on the required accident environmental envelope. Assume that deviations between the two are justified in the documentation.
4. Does the test operating time under the harsh environment equal or exceed the equipment's required operating time.

III. RADIATION

5. Is radiation aging addressed?

YES	NO	NA	REFERENCE
			Figure 1

 Revision 0
Page 4 of

Title
Equipment Environmental QualificationRevision No
0-00EXHIBIT 8A - Cont'dDOR GUIDELINES QUALIFICATION EVALUATION CHECKLIST

(continued)

	YES	NO	NA	REFERENCE
6. Does the qualified radiation dose, i.e., integrated dose for normal operations and accident dose for the plant, fall within the envelope used in qualification?				
7. Does the total integrated dose include Beta radiation?				
<u>IV. AGING</u>				
8. Are the thermal aging parameters chosen and used supported by adequate documentation or references?				
9. Is the qualified life (QL) explicitly stated?				
10. Does the qualified life take into account the normal operating state of the equipment (i.e., energized)?				
<u>V. CHEMICAL SPRAY</u>				
10. Will this equipment be exposed to chemical spray?				
11. Does the qualified spray and pH meet or exceed those to be used for the plant?				
<u>VI. SUBMERGENCE</u>				
12. Will this equipment be submerged post-accident?				
13. If yes, does the test program include submergence tests?				

Revision 0
Page 5 of

EXHIBIT 8A - Cont'd

DOR GUIDELINES QUALIFICATION EVALUATION CHECKLIST

(continued)

VIII. FUNCTIONAL REQUIREMENTS

14. Does the test plan/report specify an acceptance criteria for equipment performance?
15. Was an initial base line test done to establish reference performance characteristics?
16. Is the accuracy demonstrated during testing equal to or better than that specified?
17. Review the test results on a relative comparison basis (i.e., performance parameters of the baseline tests versus those during the various tests). Was there any major discrepancy?
18. If so, was it satisfactorily explained in the report?

XI. MAINTENANCE REQUIREMENTS

19. Are maintenance requirements and component replacement intervals specified to maintain qualified life?

XII. INSTALLATION INTERFACES

20. Have installation interfaces required to maintain qualification been identified in the test report? If yes, explain in a note.

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Revision 0
Page 6 of

Title

Equipment Environmental Qualification

Revision No

0-00

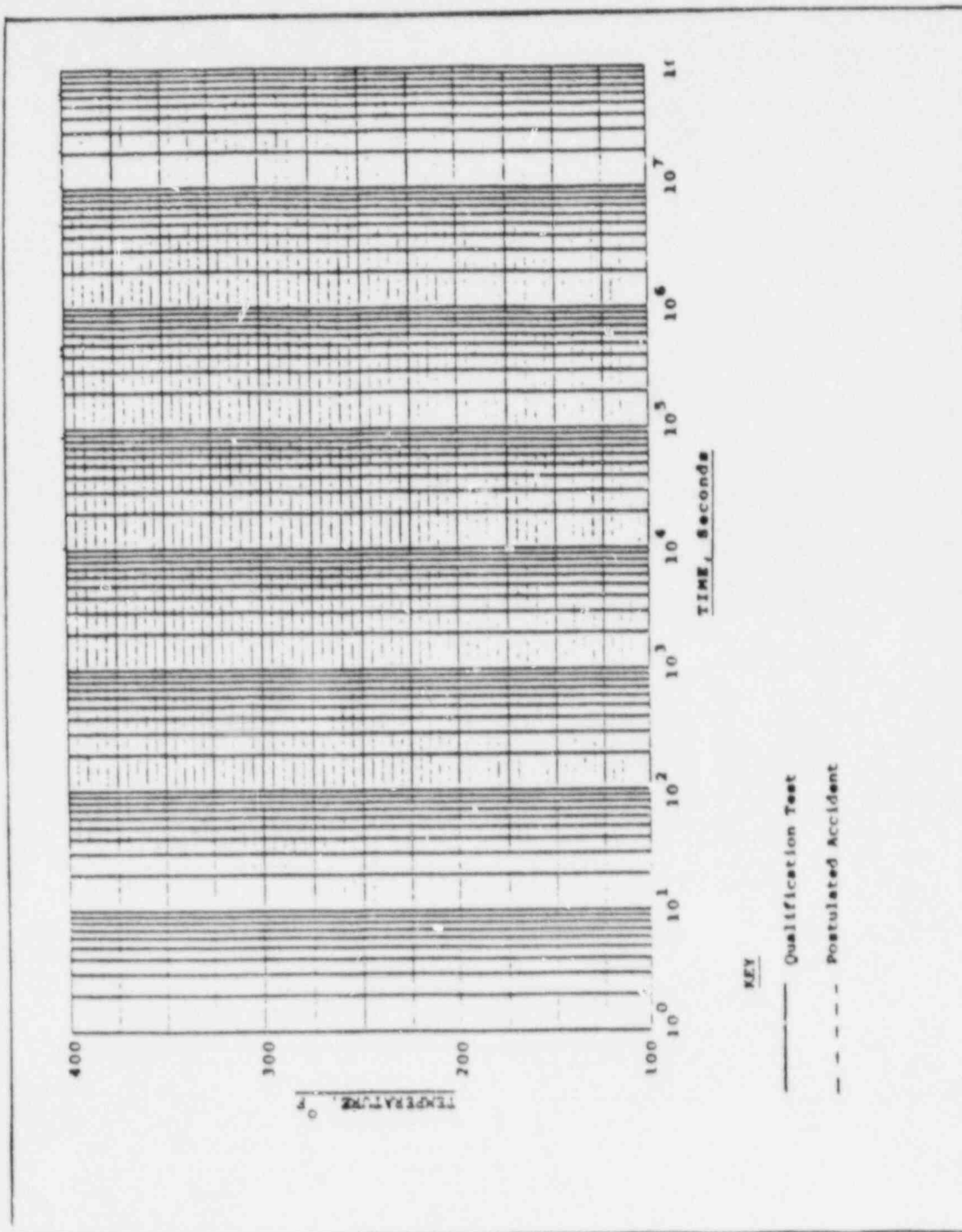
EXHIBIT 8A - Cont'dNOTESRevision 0
Page 8 of

1000-ADM-7317.01 - (11 B2)

Title
Equipment Environmental Qualification

Revision No
0-00

EXHIBIT 8A - Cont'd



FORM 1000-ADM-7317.0 (11/87)

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 88NUREG-0588, CATEGORY I QUALIFICATION ASSESSMENT REPORT

Manufacturer: _____

Model Number: _____

Component: _____

Reviewer's Conclusion☐ Acceptable (i.e., This equipment meets the requirements of
NUREG-0588, Category I)☐ Acceptable, providing the following comments are addressedSpecial Conditions/Comments:Prepared By: _____
Signature DateChecked By: _____
Signature DateApproved By: _____
Signature DateRevision 0
Page 1 of

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 88 - Cont'd
TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
Maintenance Required to Maintain Qualified Life	
Documents Reviewed for This Report	
MUREG-0588, Category I Qualification Report Review Checklist	
Notes	

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1	Temperature Profile Comparison	

 Revision 0
 Page 2 of

FORM 1000-ADM 1218-01 2-11-82

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 88 - Cont'dMAINTENANCE REQUIRED TO MAINTAIN QUALIFIED LIFEDOCUMENTS REVIEWED FOR THIS REPORTRevision 0
Page 3 of

FORM 3-000 ADM 121013 2 011 R/1

4-0007-15

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 88 - Cont'dNUREG-0588, CATEGORY I QUALIFICATION REPORT REVIEW CHECKLISTI. SIMILARITY

1. Have all Equipment ID's on the Master List associated with this EQ File number been addressed in the documentation?
2. Is the documentation traceable to the plant equipment?

II. SIMULATED SERVICE CONDITIONS AND TEST DURATION

3. Do the temperature/pressure test parameters meet or exceed the postulated accident environmental conditions? Make a copy of the test temperature envelope and superimpose it on the required accident environmental envelope. Assume that deviations between the two are justified in the documentation.
4. Do the margins of the test profiles over the plant specific profiles conform to those suggested by IEEE 323-1974 and any applicable daughter standard for this equipment.
5. Does the test operating time under the harsh environment equal or exceed the equipment's required operating time?

YES	NO	NA	REFERENCE
			Figure 1

Revision 0
Page 4 of

EXHIBIT 88 - Cont'd

NUREG-0588, CATEGORY I QUALIFICATION REPORT REVIEW CHECKLIST

(continued)

III. RADIATION

6. Does the radiation dose, i.e., integrated dose, for normal operations and accident dose for the plant, fall within the envelope used in qualification?
7. Does the total integrated dose include Beta radiation?

IV. AGING

8. Are the thermal aging parameters chosen and used in the test supported by adequate documentation or references?
9. Was mechanical and/or electrical cycling addressed?
10. Is the qualified life (QL) explicitly stated?
11. Does the qualified life take into account the normal operating state of the equipment (i.e., energized)?

V. CHEMICAL SPRAY

11. Does the DBE qualification testing include chemical spray?
12. Does the spray concentration and pH used in tests meet or exceed those to be used for the plant?

[illegible]

Revision 0
Page 5 of

Title
Equipment Environmental Qualification

 Revision No
0-00

EXHIBIT 88 - Cont'd
NUREG-0588, CATEGORY I QUALIFICATION REPORT REVIEW CHECKLIST

(continued)

	YES	NO	NA	REFERENCE
13. Was the spray testing done while under the extremes of pressure and temperature?				
<u>VI. SUBMERGENCE</u>				
14. Does the test program include submergence tests?				
<u>VII. SEISMIC</u>				
15. Was the seismic testing/analysis done on aged component or equipment?				
16. Did the seismic testing/analysis address effects on age?				
<u>VIII. FUNCTIONAL REQUIREMENTS</u>				
17. Does the test plan/report specify an acceptance criteria for equipment performance?				
18. Was an initial base line test done to establish reference performance characteristics?				
19. Is the accuracy demonstrated during testing equal to or better than that specified?				
20. Review the test results on a relative comparison basis (i.e., performance parameters of the baseline tests versus those during the various tests). Was there any major discrepancy?				

 Revision 0
Page 6 of

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 88 - Cont'dNUREG-0588, CATEGORY I QUALIFICATION REPORT REVIEW CHECKLIST

(continued)

	YES	NO	NA	REFERENCE
21. If so, was it satisfactorily explained in the report?				
IX. <u>SEQUENCE</u>				
22. Was the same test specimen subject to the entire test sequence including aging tests?				
23. Compare the test sequence performed for this report against your understanding of what test and procedures are required as per IEEE 323-1974 and any applicable daughter standard for this equipment. Do you believe the report meets the intent of these standards?				
X. <u>TEST SET-UP</u>				
24. Was the test measuring equipment (TME) calibration addressed in the report?				
XI. <u>MAINTENANCE REQUIREMENTS</u>				
25. Are maintenance requirements and component replacement intervals specified to maintain qualified life?				
XII. <u>INSTALLATION INTERFACES</u>				
26. Have installation interfaces required to maintain qualification been identified in the test report? If yes, explain in a note.				

Revision 0
Page 7 of

Title

Equipment Environmental Qualification

Revision No

0-00

EXHIBIT 88 - Cont'dNOTESRevision 0
Page 8 of

FORM 1000-ADM 121801 2 (11-82)

EXHIBIT 8B- (Contd.)

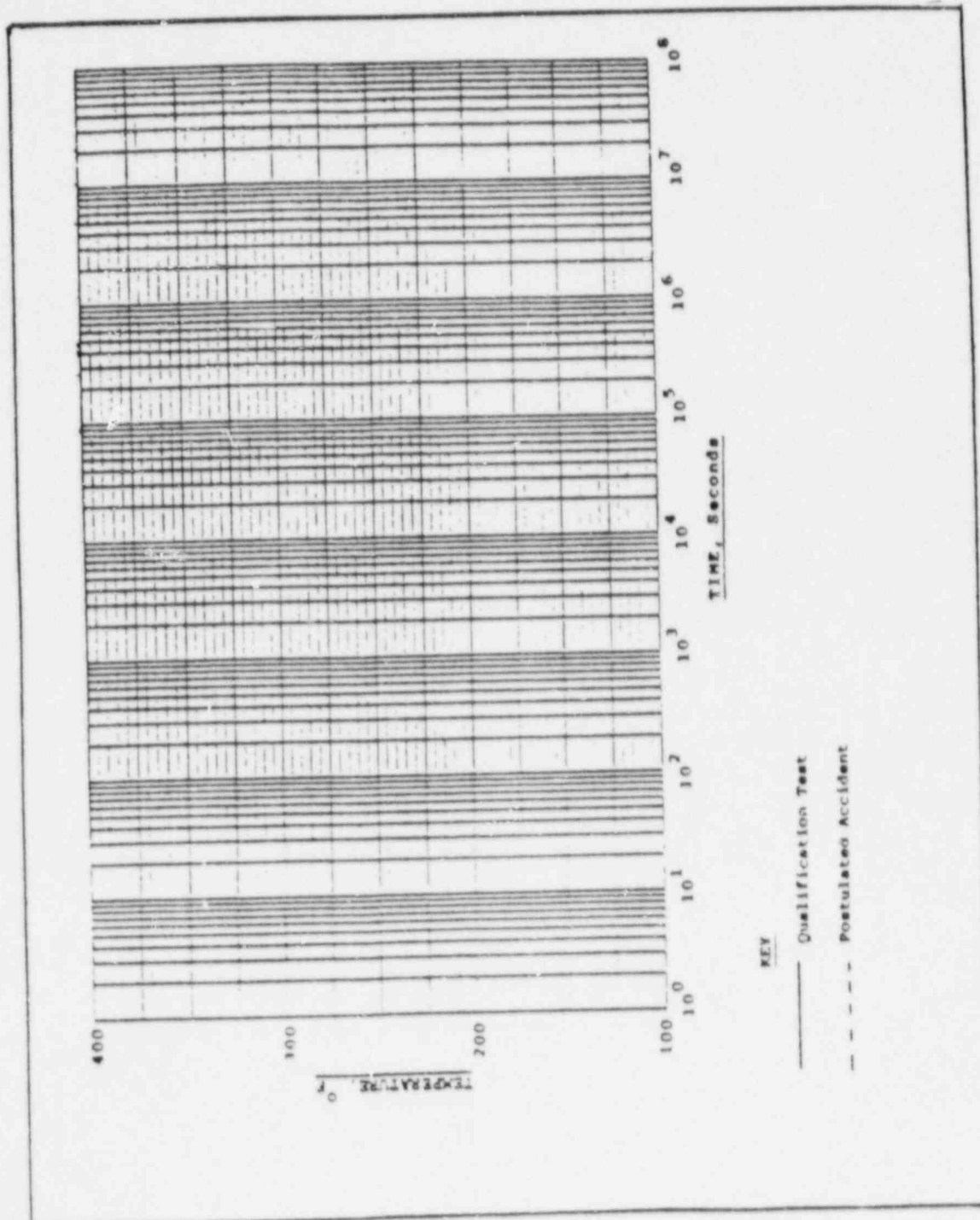


EXHIBIT 9

QUARTERLY STATUS REPORT

[illegible]