ONTARIO POWER GENERATION

Manual

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N286 NUCLEAR CONSTRUCTION QUALITY ASSURANCE PROGRAM MANUAL

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N286 Nuclear Construction Quality Assurance Program Manual

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Foreword

In order to comply with construction requirements specified in N286-12 in OPG Nuclear Facilities, this manual and associated guides are developed and implemented in accordance with N-CHAR-AS-0002, Nuclear Management System, OPG-PROG-0039, Project Management, and OPG-STD-0148, Project Management Standard.

This manual describes Quality Assurance (QA) and Quality Control (QC) requirements and processes used by Field Engineering (FE) for projects and modification in Ontario Power Generation (OPG) Nuclear Facilities in compliance with the applicable codes and standards requirements. All construction activities of projects and modifications to be performed under OPG management system shall be planned, assessed, executed, and completed in accordance with this manual.

If construction activities of projects and modifications shall be planned, assessed, executed and completed in accordance with the contractor's program, OPG Construction Quality Oversight activities over contractor's QA/QC and fieldwork shall be in accordance with this manual.

Quality Assurance (QA) and Quality Control (QC) requirements described in specific codes and standard for electrical, control, civil and mechanical constructions of projects and modifications shall be planned, assessed, executed, and completed in accordance with processes described in this manual and associated guides.

All QA and QC activities described in this manual shall be performed by FE of OPG Nuclear Facilities or delegate.

Adherence to the requirements, processes, and provisions specified in this manual is mandatory during construction of all projects and modifications in OPG Nuclear Facilities.

This manual applies to construction of:

- Projects,
- Modifications to the operating components, systems and structures, and OPG Nuclear Facilities are as following:
- Ontario Power Generation, Darlington NGS, Holt Road South Bowmanville, Ontario L1C 3W2
- Ontario Power Generation, Pickering NGS, 1675 Montgomery Park Road Pickering, Ontario L1V 2R5
- Ontario Power Generation, Nuclear Waste Management Division Western Waste Management Facility, Concession #4, 177 Tie Road, Bruce Township, Tiverton, Ontario N0G 2T0
- Other OPG Nuclear offices locate adjacent to the above address providing support activities

Revision Summary

Revision Number	Date	Comments
R000	2012-07-12	Initial issue.
R001	2018-05-10	This revision includes: (1) Incorporate DCR 137318, to replace “FE-FORM-075” by “N-FORM-82297”. (2) Incorporate DCR 140392, to replace “N-STD-AS-0031” by “OPG-STD-0148”. (3) Incorporate DCR 141105, change the title of this manual from “Field Engineering Quality Control Manual” to “N286 Nuclear Construction Quality Assurance Manual”. (4) Incorporate DCR 141589, to change “IMS” by “IRI” (5) Replace “N-PROG-AS-0007” by “OPG-PROG-0039” (6) Revised Foreword with Authorized approval. (7) Changes to comply requirement of N286-12 (8) FE documents hierarchy is corrected. (9) Major roles, accountabilities and responsibilities are added. (10) Simplified tie-in identification process statement. (11) Minor correction of descriptions, statement, numbering, and typos. (12) Chart of interfacing programs is corrected with superseded reference documents. (13) Replace “FE-FORM-103” with new N-FORM-82365 (14) Add typical forms used by FE but not necessary registered as N-FORM.
R002	2018-11-15	This revision includes: (1) Add Construction Quality Oversight requirements in the Foreword section (2) Add a new section for Construction Quality Oversight (3) Add new Performance References

1.0 INTRODUCTION

1.1 Organizations

QA and QC activities to be performed by FE shall be planned and executed in accordance with this manual and associated guides. The details of Field Engineering organization and job descriptions are available on Ontario Power Generation (OPG) intranet.

Note: Field Engineering is the organization under Projects and Modifications of Pickering, Darlington, and Waste Management at Bruce.

Project Director (Contract & Project Support)

- Accountable to develop this manual and associated guides.
- Accountable to monitor implementation of this manual during projects and modifications.
- Accountable to maintenance this manual in compliance with requirements of associated governance documents and N286-12.
- Ensure interfaces with other programs and organizations are defined and managed.

Manager Projects (Contract & Project Support)

- Accountable to implement this manual during planning and execution of projects and modifications.
- Ensure quality management executed in accordance with this manual
- Ensure adequate engineering and schedule information are available for assignment projects and modifications.
- Ensure interfaces and communications are managed.
- Ensure risks of assigned work are evaluated and understood.
- Ensure adverse conditions are promptly reported and addressed.
- Manage FE resources.

Section Manager - Field Engineering

- Responsible to implement this manual.
- Ensure this manual is reviewed every three years.
- Responsible to update or revised this manual as required.
- Ensure adequate resources assigned to the work.
- Ensure adequate training for employees are available.

- Coordinate with other resources to support the assigned work.
- Responsible to plan and execute required corrective actions.
- Responsible to perform self assessment of implementation of this manual as required.

FLM Field Engineering

- Responsible to comply the manual requirement during construction.
- Responsible to report any adverse conditions associated to implementation of this manual.
- Ensure employees attend necessary training.
- Accountable to maintain employee's qualifications.
- Manage the assigned work in accordance with schedule.
- Ensure all QA and QC documents and records are updated promptly
- Provide supervisory actions in supporting construction QA and QC activities
- Ensure work is assigned to adequate employees with sufficient information
- Review and approve all QA and QC documents, such as FIPR, ITP, CORN, ITR.
- Provide technical support for assessing and execution
- Ensure all assigned works are adequately completed and closed and QA/QC records are filed via Smart Form process.
- Review Project Oversight Plan.
- Monitor Construction Quality Oversight activities.

FLMa Field Engineering

- Assist FLM FE in all of work assigned
- Responsible for the preparation and verification of the Fabrication & Installation Package Release (FIPR) including Inspection and Test Plan (ITP) in accordance with this manual and scope specified in Engineering Change (EC) and maintenance work orders.
- Direct/supervise Project Technician to review assigned EC documents, change papers, and scope of work.
- Ensure applicable codes and standards requirements to the specific work are fulfilled and verified during planning and execution
- Ensure requirements of this manual are adherence
- Responsible for FE calibration shops and oversight for trades calibration shops.
- Monitor Construction Quality Oversight activities assigned to Project Technicians.

- Review Oversight Reports input by oversight personnel in ORS.

Work package Preparers, Verifiers, Inspection Technicians, Calibration Facility workers

- Evaluating EC, Asset Suite assessment and preparation of a FIPR package and associated documentations, including material requests and test instructions, for assigned work in accordance with this manual.
- Coordinating verification activities with other work groups involved such as BTU, Trades, Maintenance Depts., NDE staff, Operations, etc.
- Performing independent verifications of PB fieldwork as per the ITP, documenting results on ITP, check sheets, records and reports, as required.
- Report to FLMa and FLM any deficiency identified during inspection activities.
- Performing calibrations.
- Perform Construction Quality Oversight activities as per Section 10 of this manual.

Job titles of appropriately qualified personnel who may perform the above roles are as follows.

Project Technician – Mechanical, Civil, and E&C

FLMa - Mechanical, Civil, and E&C

1.2 Document Hierarchy

Figure 1 below shows the hierarchy of this manual and guides under OPG-STD-0148, Project Management Standard.

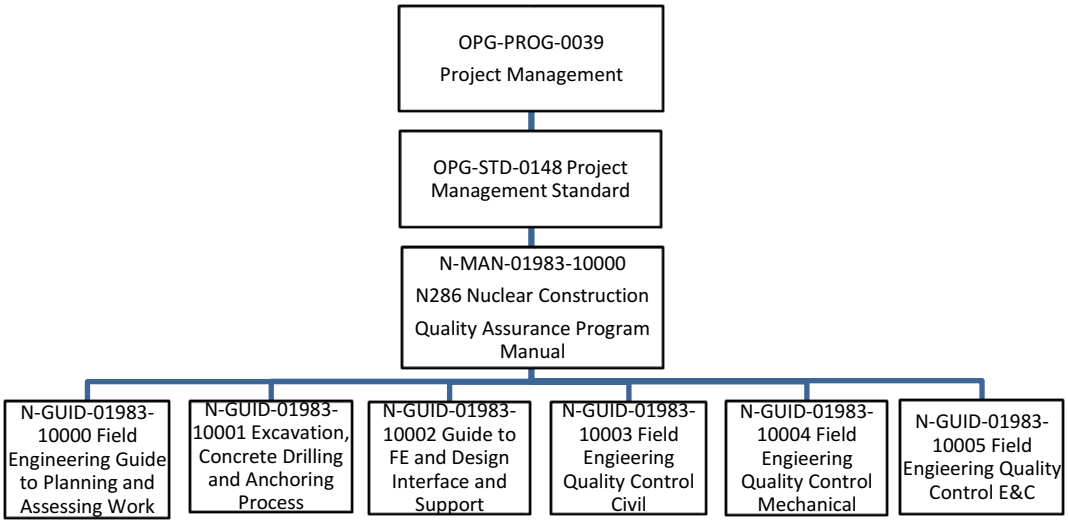


Figure 1, Hierarchy of Construction QA Manual and Guides

1.3 Interfacing with Other Programs

1.3.1 General Requirements

1.3.1.1 Major interfaces of organizations and Programs are specified in Appendix A, Interfacing and Organization Programs/Standards. When FE is interfacing with other programs during project execution, the requirements of the interfacing program shall be fulfilled.

1.3.1.2 Decision for the interfacing issues shall documented in writing (i.e. email or memo).

1.3.2 Interface with Pressure Boundary Program

1.3.2.1 Pressure Boundary (PB) work shall be planned, implemented, inspected, verified, tested and completed in accordance with N-PROG-MP-0004, Pressure Boundary.

1.3.2.2 If a non-PB work is assessed using template, N-TMP-10213, Pressure Boundary Inspection and Test Plan, this work shall be executed in accordance with PB program, N-PROG-MP-0004. However, Authorized Inspection Agency (AIA, i.e. TSSA) involvement is not required.

1.3.3 Interface with Design Projects

1.3.3.1 Scope of a project or modification shall be defined by Design Projects in accordance with N-PROC-MP-0090, Modification Process.

1.3.3.2 Only the scope defined in an approved Design Engineering Change (EC) and its revisions shall be planned, released, executed, and completed.

1.3.4 Interface with Contractors

1.3.4.1 Communications between FE and contractors shall be managed within the channel agreed by Project Manager and Contract Administrator (CA).

1.3.4.2 Planned work package including ITP and other QA and QC documents shall be released to contractor through the CA.

1.3.5 Interface with Contract Management Office (CMO)

FE may interface with CMO for, but are not limited to, the following fieldwork quality associated items:

- Any contractual issues
- Qualification and training requirements of contractor employees
- Scope of work changes
- Contractor's performance
- Fieldwork status
- Contractor's SCR or deficiency issues

1.3.6 Interface with Design

To implement assigned work, FE may interface with design for, but are not limited to, the following, refer to N-GUID-01983-10002, Guide to Field Engineering Design Interface and Support for more information:

- Design support activities
- Design documents clarifications
- Field Initiated Changes (FIC)
- Drawing and Design Bill of Material issues
- Clarification of technical information provided by manufacturers
- Disposition of non-conformance and other corrective actions
- Clarification of design conditions and environmental conditions

1.3.7 Interface with Other Organizations

To implement assigned work, FE may interface with other organizations, including, but are not limited to:

- Supply chain
- Inspection and Reactor Innovation (IRI)
- Metallurgy and Welding
- Code and Standards

- Station Calibration Shop

1.4 Design Support

1.4.1 FE FLM may participate in Constructability, Operability, Maintainability, and Safety (COMS) reviews and walk downs at various stages of design, which are opportunities to identify and resolve potential construction issues.

1.4.2 Subject to the request of Project Manager and approved by FE Section Manager, FE may provide design support services that may include, but are not limited to the following (FE support services does not release the designer's responsibility):

- Recommending piping routing, hanger locations, and layout
- Assisting selection of material and equipment
- Verifying field measurements to the design
- Recommending project logic and implementation strategy and schedule
- Proposing construction techniques
- Identifying and mitigating construction constraints and field conditions
- Providing QA and QC expertise (inspection, examination, verification and testing)
- Evaluating barriers or risks, e.g., critical dates, accessibility, interference with others, etc.
- Identifying specific requirements, e.g., specific training, special storage and handling, mock-ups, etc.
- Review critical attributes for construction.

1.5 Overall FE QC Process

The overall FE QC process is described in section H.1 of Appendix H, Overall QC Process

2.0 WORK PLANNING

Based on approved design information, work planning activities includes, but not limited to:

- Assessing WO in accordance with N-GUID-01983-10000, Field Engineering Guide to Planning and Assessing Work.
- Preparing QA and QC documents, such as ITP, CORN, Inspection and Test Report (ITR), FIPR, in accordance with this manual.

2.1 Quality Registry

The FE Quality Registry is a program used to register and create FE QA and QC records including ITP, CORN, FIPR, Non conformance Report (NR), etc. A unique number will be automatically generated by the program after filling in the required fields for each type of record. Reference Appendix, Identification of Field Engineering Documents/Records.

2.2 Milestones

FE shall adhere to milestones outlined in N-PROC-MA-0013, Planned Outage Management, for outage work and N-PROC-MA-0022, Integrated On-line Work Schedule, for online work. Work Order Assessing

In ASSET SUITE, FE may convert Work Request into WO and create sufficient WO Tasks (WOT) with proper sequencing in accordance with N-GUID-01983-10000.

2.3 Work Planned Prior to EC Approval

Work may be planned prior to EC approval in accordance with MTL request. The work is considered as “At Risk”, and the field work shall not start until:

(a) Work assignment is approved through Purchase Service Agreement (PSA); and where applicable,

(b) Engineering Change (EC) and it revision, if any, is approved in accordance with N-PROC-MP-0090 Modification Process, or

(c) Work at Risk Release (WARR) is approved in accordance with N-PROC-MP-0090.

3.0 VERIFICATION PLANNING

3.1 General

3.1.1 Approved EC documents shall be reviewed by FE for accuracy and constructability.

3.1.2 QC activities shall be planned, sequenced and documented in Inspection and Test Plan (ITP) to ensure that requirements of approved designs, codes and standards are fulfilled. For repair and replacement maintenance work only (excluding works under NICR, T-Mod, and Limited Temporary Modification), if there is a detailed maintenance procedure (such as MMP or CMP) or detailed work plan available, ITP may not be required subject to FLM prescription.

3.1.3 All Pressure Boundary (PB) work shall be planned and executed in accordance with N-PROC-MP-0088, Pressure Boundary Modifications, or N-PROC-MP-0087, Pressure Boundary Repair and Replacement.

3.2 ITP Preparation, Verification, Approval, and Release

3.2.1 ITP Preparation

3.2.1.1 ITP preparation includes following activities:

(a) Review EC in accordance applicable provisions of Appendix B, Design Documents Review.

(b) Perform walkdown(s) to verify design against field conditions.

(c) Any required change to design shall be processed in accordance with EC revision for intent changes or section 9, Field Initiate Changes for non-intent changes.

(d) ITP shall be prepared using N-TMP-10184, FE ITP or N-TMP-10213, PB ITP via FE Quality Registry.

(i) Checklist for Electrical and Control work N-TMP-10184, Field Engineering Inspection and Test Plan.

(ii) Checklist for Mechanical and Tubing work are available in N-TMP-10213, Pressure Boundary Inspection And Test Plan.

(iii) N-TMP-10213 is recommended for modifications on pressure retaining (non-PB) applications.

(iv) If N-TMP-10213 is used, applicable N-INS-01913 series instruction requirements shall be followed, but there will be no AIA (TSSA) involvement.

(e) Refer to applicable FE QC guides listed in section 1.2, Document Hierarchy to determine appropriate checklists and specific instructions or procedures required for the work.

(f) Prepare special instructions, procedures or checklist as required. These special instructions, procedure and checklists shall be referenced in ITP.

Note: (i) Specific instructions or procedures (**Governance**) shall be created in accordance with OPG-PROC-0001, Processing Administrative Governance Documents.

(ii) Specific instructions or procedures (**Controlled Document**) shall be created in accordance with OPG-PROC-0178, Controlled Documents Management.

(g) Consult FLMa, FLM FE, and other subject matter experts to establish necessary verification activities and logic sequence to meet requirements of design, code and standard, and critical acceptance criteria.

(h) Determine necessary supplemental quality records that may be required to capture the results of verifications, examinations and tests.

(i) Define cut-in/tie-in point(s).

3.2.1.2 The following data is required in ITP:

(a) Enter the following information:

- ITP number
  Note: ITP number will be created by Quality Registry.
- Universal Subject Index or System Classification Index (e.g., 31740)
- Unit # (e.g., 1, 2, 3, 4, 018, etc.)
- Revision Number (e.g., R000)

(b) Enter the following data, as applicable:

- Specific modification document numbers (e.g., EC, Drawings, Bills of Material (BOM), Work Plan (WP), WOT).
- Brief description of scope of work
- Identify major equipment or line number including the work location(s), if applicable.
- Identify how materials traceability, when required, will be performed, e.g., Materials List, Drawing, Sketch, Mapping Record.
- Reference codes and standards and associated code effective date.
- Reference procedures and technical requirements (e.g., Mechanical Maintenance Procedure, Control Maintenance Procedure, instructions, standards).

(c) Choose appropriate checklists from ITP template identified in section 3.2.1, ITP Preparation to record information and data.

(d) Specify required inspection, examination, and test activities in a logical (numbered) sequence, based on EC evaluation, walkdown, Work Plan, and installation logic. Each step may start with a verb for required action, for example, verify, inspect, examine, and test.

(e) Ensure each verification activity includes, but is not limited to, the following:

- Work Group involved.
- Description of the inspection, examination, or test activity to be performed. Acceptance criteria including critical attributes with reference to specific documentation, e.g., drawings, specifications, manufacturer manual, procedures, etc.,
- Type of activities, e.g., H for hold point, W for witness point or V for verification.
- QA/QC records or notes that may be generated to document the results.

(f) If welding is involved, obtain input from Welding Engineer/Welding Specialist or delegate to ensure correct welding procedures have been selected by Welding Supervisor in compliance with section 6 Control of Welding Procedures.

(g) When Non-Destructive Examination (NDE) is required, the ITP steps shall clearly specify the NDE requirements and records that shall be provided after NDE and attached to the ITP.

(h) Include step to identify the tie-in location with reference of N-FORM-82365, Identification of Tie-in Location.

(i) List the required items in the material list of the ITP.(i.e. item number, quantity, Cat ID, description, equipment, EQ components, cables, wire, items that have been designated with an equipment number or unique identification number)

3.2.2 ITP Verification, Approval

3.2.2.1 ITP shall be verified by another qualified PT, FLMa or FLM (by exception). The verifier shall:

(a) Review the ITP including sequence logic, type of verification point (H, W, V), major references (i.e. EC documentations, WP, etc.), exceptions, examinations, and test conditions for completeness and accuracy.

(b) Ensure there are accurate and sufficient attachments to the ITP for the work.

(c) Sign and date ITP as Verifier.

3.2.2.2 When welding and NDE are involved, the ITP shall comply with N-PROG-MA-0013, Welding and N-STD-MA-0021, Non-Destructive Examination. The ITP shall be verified by Welding Engineer/Welding Specialist or delegate, and FLM NDE.

3.2.2.3 The verified ITP shall be approved by appropriate FLM FE for implementation.

3.2.3 ITP Change Control

3.2.3.1 Mark up Changes may be applied to ITP by the following for minor or non-intent changes or corrections, e.g. change Cat ID for identical material; add additional non-critical material items; Change quantity if specified items, change reference procedures, instructions, MMP, CMP, correct typos, etc. :

(a) Mark ups apply to additions, deletions, or changes to originally specified information. The ITP revision status after mark ups shall stay the same.

(b) Each mark-up shall be made by a qualified ITP Preparer with initial, employee number and date.

(c) Each mark-up shall be verified by FLMa or FLM FE with initial, employee number and date.

3.2.3.2 ITP may be revised according to the following:

(a) ITP shall be revised by the ITP Preparer and reviewed, approved, and released in accordance with requirements that applied to the previous revision of ITP.

(b) If any steps of the previous revision have been inspected and signed off, the same steps of the revised ITP shall refer to the steps of the previous revision.

All uncompleted steps on the previous revision shall refer to the new revision. This shall apply to material lists, ITP checklists and any subsequent revisions.

(c) All revisions of the ITP that contain verification results shall be retained as records.

3.2.3.3 If a marked up ITP or revised ITP affect trades activities, this marked up ITP or revised ITP shall be issued to the trades under a revised FIPR.

3.3 Change or Rework Notification (CORN)

For minor changes or rework after a FIPR is released, N-FORM-11068, Change or Rework Notification (CORN), may be used to notify FLM Installation and FLM NDE of Inspection and Reactor Innovation (IRI) the required change or rework.

CORN can also be used for small or simple work or modification to document QC activities and results.

Note: CORN shall not be used for PB work.

3.3.1 CORN Preparation and Release

3.3.2 CORN shall be prepared using N-FORM-11068, Change Or Rework Notification (corn), via FE Quality Registry. That shall include a description of work, reference of associated documents, and applicable inspections, examinations and test requirements.

3.3.3 The original copy of the CORN shall be release to IRI, if welding is involved. A copy shall be released to the trades.

4.0 WORK RELEASE

All Work shall be release via Field Installation Package Release (FIPR) process.

4.1 FIPR Preparation

4.1.1 FE shall prepare FIPR using FE-FORM-0001 via FE Quality registry.

4.1.2 PT shall ensure the following before finalizing the FIPR:

(a) Approved design information is sufficient for the work except condition described in above section 2.3, Work Planned Prior to EC Approval for work “At Risk”.

(b) Work Plan (WP) is available, if applicable.

(c) WOT including Material Requests (MR) have been assessed.

(d) ITP or CORN required to perform QC activities have been approved.

4.1.3 FIPR may be released prior to approval of EC as requested by MTL. See Section 2.4, Work Planned Prior to EC Approval.

4.1.4 FIPR may be issued as a “partial package”. The partial package shall clearly define the scope of work and associated documents. A partial package allows starting the work pending remaining engineering documents. This FIPR shall be flagged as “Partial” in the title. When all approved documents are available, either this FIPR shall be revised or a new FIPR shall be initiated to cover the entire scope of work.

Note: For example, a partial package may be issued for the fabrication of piping or tubing for a modification up to the point of pressure testing while waiting for certain documentation. This will constitute a hold point. Subsequently, when the approved documentation is issued and FIPR is revised, testing can start.

4.2 Information Included on FIPR

FE should ensure that the following information is included in FIPR as applicable:

(a) FIPR Identification Number (serial number electronically generated by the FE Quality Registry).

(b) Description of work and project objective, including emphasis on FME Plan when required.

(c) Required project and equipment details in FIPR header.

(d) Field Engineering contacts.

(e) EC numbers.

(f) WP Numbers.

(g) Trades WO Task Numbers. FE tasks may be included if requested by FLM FE.

(h) ITP numbers.

(i) CORN numbers.

(j) Material requests and associated WO tasks.

(k) Fabricated item storage and handling requirements.

(l) Long-term storage and handling requirements.

(m) Scope of Work and explanatory remarks, if required.

(n) List of applicable drawings/DBOMs.

(o) List of applicable procedures, instruction and specifications.

(p) List of attached documents.

4.3 FIPR Attachments

PT preparing FIPR package shall:

(a) Include a list of attachments on FIPR. The attachments may include the following, as applicable:

- WO Package Printout
- ITP and associated QC Checklists
- EC documents
- WP
- Instructions (fabrication/installation, QC, test, maintenance, etc.)
- FME Plan
- Permits (with PC1 number)
- Correspondence
- Reconciliation statement
- Drawings, standards, specification
- Field Initiated Change (FIC)
- CORN
- BOM
- Material Requisition
- Civil cards (e.g. N-FORM-11123, Civil Multi-purpose Activity Card, N-FORM-10427, Concrete Drilling and Anchor Card (CDAC), N-FORM-10429, Excavation Activity Card (EAC))
- CWP
- N-FORM-82365, Identification of Tie-in Location.

(b) Ensure that FIPR identification number is cross-referenced, as required, on any attached documents for traceability purposes (mandatory for marked-up documents).

(c) It is optional to use the following statement on EC change paper documents such as drawings and DBOMs. “Released as part of FIPR # _____ by: _____.” (Stamp with the above wording is available.)

4.4 Short or Long Term Storage and Special Handling

4.4.1 FIPR shall be flagged with “Short Term Storage” if the items shall be stored up to 3 months; or, “Long Term Storage” if the items shall be stored more than 3 months.

4.4.2 Equipment storage conditions and requirements should be specified in the FIPR.

4.4.3 When items must be stored more than 3 months (long term), FE shall:

(a) Issue a new FIPR to specify identification, storage, handling, and Foreign Material Exclusion (FME) requirements.

(b) Specify necessary requirements in consulting with Design and/or Procurement Engineering.

4.4.4 Special handling instruction may be specified in accordance with Engineering, Warehouse or supplier's specification.

4.5 FIPR Verification

4.5.1 FIPR shall be verified by FLMa or another qualified PT who had no involvement with the preparation.

4.5.2 The Verifier shall ensure that information on the FIPR is accurate and sufficient for the work. Verifier shall check that all applicable documents are included in the package. Verifier shall initial and date the "Verified by" section of the FIPR and submit it to FLM or Section Manager (SM) for approval.

4.6 FIPR Approval

4.6.1 FIPR for PB related work shall be approved by a PB FLM FE.

4.6.2 FIPR not related to PB work may be approved by FLM of applicable FE discipline.

4.6.3 Prior to approval of the FIPR, FLM shall ensure it has been verified.

4.6.4 FE Section Manager approves any "At Risk" FIPR.

4.7 Work Release

4.7.1 FE - FLMa or FLM shall manage a briefing meeting with FLM Installation with attendance of CA to ensure that FLM Installation clearly understands the following:

- Scope of work
- Roles and responsibilities of each working group
- Brief project objective and critical attributes
- Review FIPR content and applicable QA/QC requirements
- Other requirements

4.7.2 FLM Installation shall sign the FIPR in the Trades Acceptance/Review Section thus accepting responsibility for performing the work and declaring that the scope of the FIPR and associated requirements are fully understood.

4.7.3 A field walkdown may be arranged involving FE, FLM Installation and CA to view the physical area for installation and ensure understanding of the FIPR scope.

4.7.4 Maximum two copies of the FIPR package shall be issued to the FLM Installation during the FIPR briefing. Each FIPR package shall be assembled with a cover page identifying Unit, EC, WO number and title of the work.

4.7.5 One copy of the FIPR should be issued to the NDE Inspection group of IRI when welding or Swagelok/Gyrolok fittings are involved.

4.7.6 The original FIPR shall be held by FE until work is completed.

4.7.7 PT shall update FIPR status in the Quality Registry.

4.8 FIPR Revision

4.8.1 After FIPR has been issued as Rev. 000, changes that affect the fieldwork shall be included in a revised FIPR.

Note: Minor corrections or additions that do not affect fieldworks may be marked up by hand and initialed and dated by Preparer and FLM.

4.8.2 The revised FIPR shall retain original FIPR number with a new revision number. This new revision number shall be registered in FE Quality Registry.

4.8.3 Revised FIPR scope/instruction section is updated:

(a) State new revision number.

(b) Describe revision information.

(c) Apply solid line to separate the new revision information from previous revision. Previous revisions will be listed below the last.

(d) The new information shall be highlighted (e.g., bold, italic or different colour).

4.8.4 Information of previous FIPR revision(s) shall not be changed.

4.8.5 The revised FIPR shall be issued together with revised or added documents to FLM Installation via CA in accordance with section 4.7 above for implementation.

4.8.6 FLM Installation shall ensure that field working documents are updated to align with FIPR revision up to date.

4.8.7 FE may perform field surveillance to verify that appropriate documents are used.

5.0 WORK VERIFICATION

5.1 ITP and CORN Execution

5.1.1 ITP specified verifications shall be performed to coincide with fabrication and installation logic as well as schedule.

5.1.2 ITP verification steps shall be completed in the sequence as specified. Hold and witness points shall not be bypassed.

5.1.3 If any ITP step cannot be executed as written, the ITP shall be reviewed and revised if applicable.

5.1.4 Any bypassed Hold or Witness point shall be reported via SCR and processed in accordance with Non-conformance Control process, see section 10, Non-conformance Control, in detail.

5.1.5 PT shall perform the following:

(a) Complete the Personnel Identification Record on ITP.

(b) Perform specified QC activities in accordance with acceptance criteria and critical attributes.

(c) Initiate records and/or report, if required.

(d) Initial and date ITP step and associated checklist when verification, inspection, examination, or test is completed and acceptable.

(e) If necessary, process non-conformance in accordance with section 10 Non-conformance Control.

Note: If N-TMP-10213 is used, non-conformances shall be reported in accordance with N-INS-01913.11-10003, Pressure Boundary Non-conformance.

(f) Coordinate with other verifiers to complete specified verifications and obtain acceptance by initial and date on ITP and/or checklist.

5.1.6 NDE shall be carried out and documented by an NDE Technician.

5.1.7 Weld deficiencies shall be reported to FLM NDE for disposition.

5.1.8 After inspections, examinations or tests, all applicable reports, checklist and forms shall be completed and attached to the ITP or CORN.

5.1.9 PT shall update the ITP or CORN status in FE Quality Registry.

5.1.10 FLM NDE and FLM FE shall ensure that required inspections, examinations and tests are completed and documented in the CORN.

5.1.11 During fabrication and installation, PT shall maintain in-process records in a safe location when not in use.

5.2 Material Control

(a) FE shall perform the following after items issued by warehouse:

(1) Perform initial check to confirm identification and integrity.

(2) Perform periodic inspection and maintenance during storage, fabrication and installation to confirm specified conditions (including shelf life of materials), if applicable.

(3) Control non-conformance in accordance with section 10, Non-conformance Control.

(4) Verify items are handled and stored in accordance with specified requirements and meeting Foreign Material Exclusion (FME) requirements, in accordance with N-PROC-MA-0018, Foreign Material Exclusion.

(5) Ensure pre-fabricated items, such as electrical panels, are handled and stored in accordance with specified requirements.

(6) Verify adherence of special handling and storage requirements.

(7) Ensure unused items are disposed of or returned to the Warehouse in accordance with N-PROC-MM-0042, Nuclear Warehousing Core Duties.

(8) Verify traceability items identified in the material list of the ITP have been compared against the issue tickets.

(b) If special handling or storage is required, FE shall:

(1) Provide FLM Installation the special requirements for handling or storage.

(2) Verify the implementation of the special requirements and record verification results.

5.2.1 Items Short-Term Storage

5.2.1.1 FE shall ensure items short term storage is adequate in accordance with specified requirements in FIPR.

5.2.1.2 Storage of large items shall, as a minimum, include a roped off area identified with WO number and owner contact. All small items should be grouped, identified with WO number and owner contact, and stored in a secured place.

5.2.2 Items Long-Term Storage

5.2.2.1 When items must be stored more than 3 months, FE shall:

(a) Ensure a FIPR is issued to specify identification, storage, handling, and FME requirements.

(b) Verify storage conditions to specified requirements

(c) Periodically verify that maintenance instructions are followed.

(d) Verify items storage, handling, and maintenance activities to specified requirements.

5.2.2.2 Storage of large items shall, as a minimum, include a roped off area identified with WO number and owner contact. All small items should be grouped, identified with WO number and owner contact, and stored in a secured place.

5.3 Inspection, Examination, and Test Status

5.3.1 PT shall monitor progress of fieldwork during ITP execution and document specified QC result in ITP steps and/or checklist promptly.

5.3.2 The original copy of in-progress ITP shall be managed by the responsible PT to prevent damage or loss.

5.3.3 FLMa or FLM shall monitor ITP status during execution.

5.3.4 It is acceptable to maintain a written log, notebook, or marked-up drawing containing inspection, examination, and test results for later transfer to applicable ITP, checklist, or report. However, every effort shall be made to ensure QC records are up-dated immediately following inspection.

5.3.5 When data is transferred to final record, actual verification dates shall be documented on the record, not the date when the information is transferred.

5.4 Inspection and Test Report (ITR)

If required, ITR may be initiated in FE Quality Registry and attached to ITP or CORN.

5.5 Control of Tie-in Location

FLM FE shall ensure tie-in location is controlled when equipment/item pre-identification in the field is deemed necessary.

5.5.1 General

5.5.1.1 PT shall:

(a) Confer with FE FLM and FLM Installation to mark tags (N-FORM-82365, Identification of Tie-in Location) as Type 1 or Type 2, and if appropriate, complete section A of the ID/QC tag.

(b) Provide the Tag to FLM Installation with the above confirmed information.

5.5.1.2 FLM Installation shall:

(a) Complete Sections A (if not previously done in conference with FE) and B of the ID/QC tag with his/her initial and date.

(b) Locate unit/system/equipment in the field and hang ID/QC tag.

(c) Notify PT and Holder of Record (HOR) when ready for verification.

5.5.1.3 FE PT shall:

(a) For Type 1 only, verify the tag is in the correct location with correction information in Section A of ID/QC tag, complete Section C and attach a piece of 'RED' tape or write '**RED**' on Section C.

(b) If ID/QC tag is not hung in the right location inform FLM FE and FLM Installation for corrections and initiate a SCR.

(c) Inform FLM Installation that verification of the fieldwork location is complete.

5.5.1.4 Holder of Record (HOR) shall:

Note: In addition to HOR's responsibility for work protection as specified in N-PROC-MA-0012, Work Protection, HOR shall ensure the tie-in location is on correct line and location by the following actions.

(a) Check that the location of the ID/QC tag is within (or will be within) the permit.

(b) When satisfied with location and information on the ID/QC tag, complete Section D and put a piece of 'GREEN' tape or write **'GREEN'** on Section D.

(c) Input application phone number or pager number in Section E.

(d) Approve removal of ID/QC tag after work.

5.5.2 Specific Activities

5.5.2.1 FLM Installation shall perform a walkdown and determine where the ID/QC tags are to be hung.

5.5.2.2 FLM Installation shall confer with FE and clearly mark 'Type 1' or 'Type 2' on ID/QC tags.

- Type 1: Applies to any fieldwork that involves cutting into or tying into a permanent system, especially the pressure boundary.
- Type 2: Applies to any fieldwork that does not fall into the definition of Type 1. FE verification is **not** required, but extra caution is required.

5.5.3 Type 1 Fieldwork Scenario

5.5.3.1 Prior to work being performed at the location, Installation staff shall confirm the ID/QC tag has the following:

- Correct Unit/System/Device Code information
- Has been verified by FE and HOR
- **'RED'** and **'GREEN'** indicators (tape/markings) are on the ID/QC tag.

5.5.3.2 If the information is incomplete, incorrect or the status indicators are missing, installation staff shall 'STOP WORK' and contact FLM Installation for resolution.

5.5.3.3 When the fieldwork is completed, the ID/QC tag shall be removed by FLM Installation.

5.5.4 Type 2 Fieldwork Scenario

5.5.4.1 Prior to work being performed at the location, Installation staff shall confirm that the ID/QC tag has the following:

- Correct Unit/System/Device Code information
- Verified by HOR,
- **'GREEN'** indicator (tape/marking) is on the Tag.

5.5.5 If information is incomplete, incorrect, or status indicator is missing, installation staff shall 'STOP WORK' and contact FLM Installation for resolution.

5.5.5.1 When the fieldwork is completed, the ID/QC tag shall be removed by FLM Installation.

6.0 CONTROL OF WELDING PROCEDURES

6.1 General

6.1.1 Project Technician (PT) shall:

(a) Assemble all information pertaining to the equipment to be installed, such as design installation drawings, manufacturer's drawings, and instruction manuals.

(b) Consult with the Designer and Welding Engineer (or delegate) for any questions, clarifications or changes.

6.1.2 Welding Procedure Specification (WPS) for each weld type on a modification shall be selected from those listed in applicable drawings (and ITP for PB welding) by the Welding Supervisor and verified by the Welding Engineer/Welding Specialist or Delegate. If the Welding Supervisor finds that the drawings (and ITP for PB welding) do not specify appropriate WPS for the job, ITP Preparer shall be contacted to consult with Designer or Welding Engineer/Welding Specialist.

6.1.3 N-FORM-82297, Welding Procedure Request (WPR) shall be completed and approved before undertaking any welding. WPR shall be retained with ITP.

6.1.4 WPR shall be issued on a unit and system basis.

6.1.5 An approved WPR and a copy of the WPS from the OPG Welding Manual shall be available at the worksite for reference by the welder.

6.1.6 WPR is designed to provide the welder with approval to use the specified WPS for the welds based on applicable drawings and ITP for the job.

6.2 Welding

6.2.1 When FIPR package is issued, FLM Installation shall:

(a) Review drawings and ITP.

(b) Initiate WPR.

(c) Identify welds (size, schedule, material) on WPR.

(d) Forward or send PDF copy of WPR to Welding Supervisor.

6.2.2 Welding Supervisor shall:

(a) Review information on WPR, select appropriate WPS for use on each type of weld to be performed, from those specified on drawings (and ITP for PB welding) and ensure all welding information on WPR is correct.

(b) Inform PT if correct WPS is not listed in the approved drawing (and the ITP for PB welding), or if there is any other reason for deviation from a design requirement.

(c) Hold WPR until PT confers with Design and obtains approval for any deviations.

(d) Sign the WPR.

(e) Forward original or send PDF copy of WPR to FLM NDE or delegate.

6.2.3 FLM NDE or delegate shall:

(a) Review information on the WPR.

(b) Inform PT if there is any problem with WPS selected or if there is any other reason for deviation from a design requirement.

(c) Hold WPR until PT confers with Design and obtains approval for any deviations.

(d) Complete the NDE requirements.

(e) Sign the WPR.

(f) Forward or send PDF copy of the WPR to the Welding Engineer/Welding Specialist or delegate.

6.2.4 PT shall process any deviations via non-conformance process.

6.2.5 Design Engineer shall approve use of all Welding Procedures not listed in the approved drawings for the task.

6.2.6 Welding Engineer/Welding Specialist or delegate shall:

(a) Review the information on the WPR for drawing/specification and code compliance.

(b) Verify that WPS listed on WPR is correctly selected.

(c) Inform PT if there is any problem with WPS selected or if there is any other reason for deviation from a design requirements.

(d) Hold WPR until PT confers with Design and obtains approval for any deviations.

(e) Sign WPR.

(f) Send copy (could be a PDF) of approved WPR to the FLM Installation, FLM NDE, and Welding Supervisor.

(g) Return original or send PDF copy of the completed WPR to the PT for attachment to ITP.

6.2.7 FLM Installation shall:

(a) Review the completed WPR and ensure that the welder has the correct WPS prior to commencing welding.

(b) Retain a copy of the WPR until all welding is completed.

6.2.8 Welding Foreman/Trades Foreman shall:

(a) Review completed WPR and WPS with welder.

(b) Retain a copy of WPR and WPS at worksite until work is completed.

6.3 Documentation

PT shall attach completed original WPR or PDF copy to the ITP.

7.0 SPECIAL PROCESSES

7.1 General

7.1.1 Special processes are those for which the quality cannot be directly determined at their completion and thus evidence generated during the process shall be used to verify conformance.

7.1.2 The special processes shall be identified and specified in WO and ITP, if applicable, during assessing

7.1.3 If there is no procedure or instruction available for a special process, a procedure or instruction shall be prepared.

7.1.4 Records shall be kept for qualified personnel, procedures, equipment, material, certificates, and test results, and material traceability, where required in accordance with section 13.

7.1.5 Special processes which shall be controlled include but are not limited to section 7.2 through 7.5.

7.2 Special Processes for Civil Work

7.2.1 Concrete Placement

Refer to N-GUID-01983-10003, Field Engineering Quality Control Civil.

7.2.2 Excavation, Concrete Drilling and Anchoring

Refer to N-GUID-01983-10001, Excavation, Concrete Drilling and Anchoring Process

7.2.3 Protective Coatings

Refer to N-GUID-01983-10003, Field Engineering Quality Control Civil.

7.2.4 Piling

Refer to vendor's procedure or instruction.

7.3 Special Processes for Metallurgy Work

7.3.1 Welding, Non-Destructive Examination, and Heat Treatment,

Refer to N-PROG-MA-0013 and N-STD-MA-0021.

7.4 Special Processes for Cleaning and FME

Refer to N-PROC-MA-0018, Foreign Material Exclusion

7.5 Special Process for Pressure Testing

Refer to N-INS-01913.11-10005, Pressure Boundary Pressure Testing

8.0 CONTROL AND CALIBRATION OF M&TE AND FIELD EQUIPEMENT

The control and calibration activities performed under this manual shall comply with N-PROC-MA-0069, Control and Calibration of Measuring and Test Equipment, and the initial calibration of new instruments, installed as part of a modification, shall be performed in accordance with N-PROC-MA-0070, Calibration of Field Equipment.

Note: If the M&TE is calibrated by the Station Calibration Shop, N-INS-01516-10004, Field Checks for Measuring and Test Equipment, shall be followed.

8.1 General Activities

8.1.1 FLM or delegate assigned to supervise FE Calibration Facility shall perform the following:

(a) Maintain the FE Calibration Facilities and Services for control of M&TE used by FE and Trades.

(b) Compile/maintain a list of all types of M&TE requiring calibration or checking, including the frequency for such calibrations in METCAL.

(c) Compile/maintain an inventory of M&TE types in METCAL (software database).

(d) Complete METCAL and Tool Control System (TCS).

(e) Complete FE-FORM-021, M&TE Calibration Record (see typical FE-FORM-021 in Appendix J of this manual) or N-FORM-10604, Generic Instrument Calibration Work Sheet for each piece of M&TE, including reference to the Calibration Instruction (CI), or equivalent in METCAL.

(f) Ensure CIs for all types of M&TE are prepared, verified and approved.

(g) Ensure that M&TE is calibrated or checked in accordance with the frequencies in METCAL.

(h) Ensure that standards, certifiably traceable to National Standards, are controlled and used only for calibration.

(i) Ensure that standards, sub-standards and M&TE have valid calibration stickers, which show catalogue identification number (Cat ID), serial number/identification number, date calibrated, calibration due date.

(j) Maintain a database containing calibration results and history (METCAL).

(k) Ensure before issue that:

- Select M&TE suited to its application
- Check M&TE for signs of damage
- Ensure M&TE is in good condition.

(l) Checks M&TE for damage on return to the calibration facility.

(m) Notify user the validity of measurement and test results obtained using M&TE which may be affected by the check after use.

(n) Notify user of calibration expiry date.

(o) Ensure that all relevant documentation is maintained and is available for review by an AIA.

(p) Ensure records are entered into METCAL for calibrations performed by Modifications Dept.

8.2 Measuring and Test Equipment Requiring Calibration or Checking

8.2.1 FE shall perform the following:

(a) With assistance from relevant calibration laboratory, compile and maintain a list of all types of M&TE and standards requiring control under this manual. M&TE falls into one of three categories:

- Standards
- Transfer standards
- M&TE.

(b) Compile and maintain Test Equipment Type Registers (inventories), one for each M&TE type, where equipment serial numbers, specific descriptions and manufacturer are listed in METCAL /TCS.

8.3 Control

8.3.1 Each piece of M&TE or standard shall be assigned a unique identification number, which shall appear on the device, as well as being entered in METCAL/TCS. Identification numbers are not re-used when devices are retired or damaged beyond repair.

8.3.2 All M&TE shall be labelled as per N-PROC-MA-0069.

8.3.3 When a device is found defective, it shall be labelled “Defective” or “Do Not Use”, dated, initialled by the individual.

8.3.4 Calibrations, checks, repairs, adjustments, as-received and as-left readings shall be entered directly into METCAL or recorded on or N-FORM-10604, one for each device. This tracks the complete history of the device.

8.3.5 Standards are certified at approved facilities, and are traceable to National Standards. If a National Standard does not exist, the base parameters and the procedure used shall be documented. Standards are usually used only to calibrate Transfer standards which are used to perform most daily calibrations.

8.4 Calibration Instructions (CI)

8.4.1 A listing of CIs is given in Appendix D, Calibration Instructions.

8.4.2 CIs may be incorporated into METCAL in place of the above.

8.4.3 Qualifications for the preparation, verification and approval of CIs are identified in Appendix D.

8.5 General Requirements

8.5.1 One M&TE Calibration Record (FE-FORM-021 or N-FORM-10604) or computerized equivalent shall be completed for each instrument. The data shall include:

- M&TE readings before and after calibration
- Method of calibration (Calibration Instruction)
- Group responsible for the test equipment, its calibration and monitoring
- Approvals.

8.5.2 Unless otherwise stated, the method of verification is direct comparison with the listed reference standard. M&TE shall be calibrated or checked using approved Calibration Instructions.

8.5.3 M&TE shall be calibrated or checked at frequencies shown in MetTrak using only certified standards or transfer standards.

8.5.4 Equipment calibrations or checks shall be conducted in a controlled clean area with limited access.

8.5.5 Calibrations or checks of electrical and control instrumentation and pressure gauges shall be conducted in accordance with calibration instructions that have been approved by an FLM or delegate qualified staff.

8.5.6 Calibrations or checks of Mechanical M&TE shall be conducted in accordance with CIs that have been approved by an FLM or delegate qualified staff.

8.5.7 All M&TE shall be stored and handled in a manner which ensures that no damage is incurred and its calibration is maintained.

8.5.8 M&TE that are used infrequently need not be verified on a continuing basis. After confirming a device is past the required verification interval, the device shall be so marked, tagged and stored in a lock-up. The device shall be calibrated prior to use.

8.5.9 M&TE /Standards sent off site for calibration or repair shall be handled in accordance with Materials Management procedures using ASSET SUITE. Any special handling instructions shall be listed in the material request (MR).

8.5.10 External laboratories shall provide signed certificates which give adequate information to ensure traceability and calibration results of the devices calibrated and a statement of traceability to National Standards. A qualified OPG Calibration Worker or the FLM receiving the item shall review the certificates and sign off and date for acceptability.

8.6 Test and Calibration

Project Technician shall ensure the following:

(a) All field standards and sub-standards shall be functionally checked for damage before use for calibration.

(b) After each calibration or verification (post check) of M&TE, the validity of the calibration and due date shall be recorded on label that is attached to the M&TE.

(c) When test gauges are returned after use, they shall immediately be checked (not necessarily calibrated) to confirm their operating conditions. The as-found readings shall be recorded in METCAL. A Station Condition Record (SCR) shall be initiated when the M&TE is found to be damaged or out of tolerance on return and report the same to the user.

(d) METCAL shall contain an up-to-date FE Calibration Shop register.

(e) M&TE shall be calibrated in accordance with CIs. These procedures shall be referenced in calibration records, copies of which are kept in the Calibration Shop, or equivalent in METCAL.

(f) Specifications for field instrumentation being calibrated or checked prior to permanent installation shall be processed using the Instrument Calibration Worksheet (ICWS).

8.7 Issue of M&TE

8.7.1 FLM or delegate shall ensure that M&TE available for issue has been checked for damage and has a valid calibration sticker.

8.7.2 Issuing and receiving of M&TE shall be recorded in a manner that shall make it possible to track the use of the equipment since it is last verification date, should it be evaluated as not within *standards* upon return to *Calibration* Shop. The issue log shall contain:

- Device identification number
- Brief device description
- Work Order number on which the device is to be used
- Date of issue
- Name of the individual issued the device
- Date the device was *calibrated*
- *Calibration* due date
- Date the device was returned

8.7.3 M&TE issued to the field shall be logged out and logged back in METCAL/TCS. Only currently calibrated equipment shall be issued.

8.7.4 M&TE issued to the field shall be transported in a manner which shall ensure that its calibration is maintained.

8.7.5 Test pressure gauges for PB work shall only be issued to staff who present an approved pressure test instruction issued in accordance with N-INS-01913.11-10005, or equivalent.

8.7.6 An SCR shall be entered whenever M&TE are not returned to the Calibration Shop on or before the calibration due date.

Note: FE and Trades Calibration shops are responsible for the issue and return of M&TE stored at that facility. Stores are responsible for the issue and return of M&TE stored in Station Stores.

8.8 Deficiencies

8.8.1 When test equipment is returned, staff shall check it as soon as possible to confirm it is still within calibration limits. If it is found to be outside the calibration limits, the responsible FLM, or his delegate, shall be notified verbally and by e-mail.

8.8.2 The responsible FLM shall carry out an investigation to determine where the test equipment was used since the last time it was verified.

8.8.3 The FLM FE or delegate shall enter an SCR. Recommended action is noted on the SCR and a copy is sent to the Calibration Shop for attachment to the applicable log. For more information about Non-conformance Reporting, see also section 9, Field

Initiated Changes, and N-PROC-MA-0068, Engineering Requirements Supporting the Calibration Process.

8.8.4 Generally two calibrated pressure gauges of the same range shall be issued for each pressure test performed. If upon return and check one is found to be out of calibration and the other is within calibration, the test shall be considered acceptable and no non-conformance is required. However an SCR shall be entered for trending purposes. If on the other hand both are found to be out of calibration, follow clause 8.8.1 to 8.8.3

8.8.5 The responsible FLM shall request that M&TE sent to off-site agencies for calibration shall be returned with a calibration report that includes the “as received” condition for follow-up, if required.

8.9 Initial Calibration of Permanent Field Instrumentation

8.9.1 When new instrumentation is being installed as part of a modification under the FE QA Program, it shall be calibrated before completion of the installation. The calibration shall be documented on N-FORM-10604, Generic Instrument Calibration Work Sheet, or an electronic equivalent initiated by Design. See N-PROC-MA-0070, Calibration of Field Equipment, for details.

8.9.2 After turnover, this equipment becomes the responsibility of the Maintenance Departments.

8.10 Documentation

The documentation required by this manual shall be completed and filed by the responsible Trades Unit performing the calibration or by the FE Calibration Shop as per N-INS-01516-10001, Measuring and Test Equipment Records and Document Management.

8.11 Calibration Shop(s) Environment

M&TE shall be stabilized to the Calibration Shop temperature before being calibrated or verified. The Calibration Shops shall be maintained as orderly, clean controlled environments, with limited access and within the temperature and relative humidity ranges set out in N-PROC-MA-0069, Control and Calibration of Measuring and Test Equipment.

8.12 Verification

When calibration is performed by other than FE staff, the FLM responsible for monitoring the calibration shall regularly verify that the M&TE is calibrated to appropriate procedures.

8.13 Qualifications

All FE and Trades staff performing calibrations of M&TE shall have the appropriate qualification in accordance with N-TQD-422-00001, Nuclear Field Engineering Training

and Qualification Description. N-PROC-MA-0069 identifies training requirements to work in METCAL.

9.0 FIELD INITIATED CHANGES

9.1 Overview

9.1.1 Field Initiated Change (FIC) can only be initiated on approved Design EC.

9.1.2 Non-intent changes to approved Design ECs or NICR ECs may be processed as a FIC using N-FORM-11128, Field Initiated Change Cover Sheet or Design EC revision. Refer to N-PROC-MP-0090 Appendix E and N-GUID-00700-10000 for more details.

9.1.3 A FIC may be initiated by FE PT who identifies the changes. A FIC is only a request for changes and shall be approved by Design before it can be implemented in the field unless it qualifies as a Minor FIC which may be installed without prior Design approval (see Section 9.1.8).

9.1.4 Implementation of an approved FIC is considered at-risk until the EC is revised to include the FIC. That means there is a potential that when incorporating the FIC into the Design EC revision additional changes may be required or the FIC may even be cancelled.

9.1.5 All pressure tests and other actions (such as commissioning) that energize the system shall not be performed until all associated FIC(s) are incorporated into an approved Design EC revision.

9.1.6 For details on typical changes to approved Design that can be processed through a FIC, refer to Appendix E of N-PROC-MP-0090, Modification Process.

9.1.7 When a FIC is identified, the associated work shall be stopped until the FIC is approved by Design Engineer (DE).

9.1.8 Minor FIC is a sub-set of FIC and applied in accordance with N-PROC-MP-0090, Appendix E. Minor FIC may be installed at risk as per N-PROC-MA-0090 Appendix E.

9.2 FIC Process

9.2.1 The Initiator should be informed of all necessary changes to an approved design. The Initiator or FE FLM should communicate the proposed changes to the DE.

9.2.2 The Initiator should prepare FIC in accordance with N-GUID-00700-10000. FE should document the FIC notes using N-FORM-11128 Refer to Appendix C

9.2.3 FLM FE should review, validate and process the FIC in accordance with N-GUID-00700-10000 and Appendix C.

9.2.4 If DE sets FIC attribute status to REV NEEDED, the Initiator should review the notes entered by the DE to determine the reason for the revision request and consult DE to disposition the issue. The Initiator should update the FIC request as required, FLM FE should reset FIC attribute to H/APPR and inform the DE that the revised FIC is ready for review.

9.2.5 If DE sets FIC attribute to APPROVED, FLM FE may authorize the work to continue at risk while DE initiates EC revision to incorporate the FIC in accordance with N-PROC-MP-0090, Modification Procedure and N-GUID-00700-10000, Guide to Modification Procedure.

9.2.6 When FIC attribute is set to approved, the Initiator should revise the FIPR and ITP as required. PB FIPR/ITP shall not be revised for a FIC.

9.2.7 FE FLM should ensure all approved FICs are installed and incorporated into EC revision prior to system pressure test or energizing. The FIC attribute should be at “CLOSED” status indicating that the FIC has been incorporated into an EC revision.

9.2.8 If DE has set FIC attribute to CANCELED, the FIC has been rejected. PT shall document the cancellation in the FIC notes.

9.3 Record Keeping/Electronic File Retention of Working Files

9.3.1 FE FLM should ensure the following:

(a) **FIC Cover Sheet**: N-FORM-11128 should be scanned and saved in the EC FIC Attribute Notes and attachments should be included or referenced. Prior to saving to the attribute notes, a copy of the FIC should be retained in the common drive Working Folders (FIC Working Files Folder). This new file created for the approved FIC shall be saved with the same file name of the original FIC with a prefix “Approved” (i.e. Approved FICREQ01.doc). Any marked up attachment should be included in this folder. Refer to Appendix C for further information on working file storage.

(b) **FIC Attachments**: These documents can be scanned in and attached to N-FORM-11128 to create a single PDF document with the file name corresponding to the FIC (e.g. FICREQ01.doc). Document numbers can also be referenced here and the actual file inputted in the working files folder. Only the final approved documents should be retained in the FIC Attribute Notes and FIC Working Files.

10.0 CONSTRUCTION QUALITY OVERSIGHT

The purpose of performing Construction Quality Oversight is to help maintain the Operating License condition. The licensee shall implement and maintain a management system that complies with the requirements set out in CSA N286 “Management System Requirements for Nuclear Facilities”.

As per section B.3 of N286-05, “Measures shall be established for the inspection of purchased items or the verification of services”. Inspection and verification shall be planned, documented, and carried out by the organization responsible to ensure that items and/or services meet the requirements of each contract.

10.1 General

Construction Quality Oversight is part of Project Oversight as defined in N-MAN-00120-10004, OS-PLAN, Project Oversight Planning and Implementation, Section 1.0. Construction Quality Oversight relates to the construction phase of a project and validates that the quality of the field installation satisfies project, design, and installation requirements as per the vendor’s QA program.

This process includes the following:

- Ensure the construction vendor is following their QA program
- Ensure the construction activities and end products are in accordance with approved design.

The Project Oversight Plan (POP) is the basis for the Construction Quality Oversight activities to be performed. POP is accessible in the Oversight Reporting System (ORS). Refer to the approved POP for detailed requirements and specific frequency of oversight activities.

In accordance with N-MAN-00120-10004-OS-CON, Nuclear Projects Construction Oversight, Field Engineering (FE) shall perform Construction Quality Oversight on EPC (Engineering, Procurement, and Construction) MODS or MMODs assigned to vendors. Construction Quality Oversight shall be performed in accordance with approved POP for the project.

10.2 Construction Quality Oversight Execution

10.2.1 Review Vendor’s ITP

For EPC MODs the normal requirements are for vendors to submit their approved ITPs to FE for review and acceptance. ITPs are reviewed to ensure adequacy of content and scope after which OPG Verification (V), Witness (W), and Hold (H) requirements are assigned to various steps in the ITP. These assignments are based on consistency with the POP requirements and/or FE discretion.

The following is the definition of V, W or H point as per N-LIST-01300-10008, Lexicon of Engineering Governance Terms.

- Verification (V) - Is the act of an individual or team, qualified in the subject matter, determining and documenting through evaluation of objective evidence whether the product conforms to specified requirements (for example, by reviewing, inspecting, testing, design checking, or otherwise).
- Witness (W) - Is a designated activity on an ITP that requires an identified person or organization to be present to witness the activity.

- Hold (H) - Is a designated stopping place during or following a specific activity at which inspection or examination is required before further work can be performed.

Exceptions may be applied to V or W steps to document partial activities (i.e. ongoing field inspections). Oversight Reports entered will need to provide enough details of what activities were actually verified.

10.2.2 Construction Quality Oversight Activities

Construction Quality Oversight shall not be limited to designated V, W, and H points on vendors ITPs or construction oversight activities listed on the POP. The approved POP needs to be checked periodically to ensure all project expectations are being met. Elements and frequency requirements should be reviewed to determine extent and timing of oversight requirements and quantity of oversight reports required.

In summary, Construction Quality Oversight shall support validation of the following:

a. Ensure vendor's QC inspectors are performing QC activities in accordance with their respective QA program and ITP requirements.
b. Confirm completion of forms, checklist or records supporting the completed ITP steps;
c. Perform field inspections in order to validate that the vendor performed adequate construction and inspection activities.

In addition to the above, Construction Quality Oversight activities includes but are not limited to:

- Perform walkdowns and enter Oversight Reports in ORS, based on elements and frequency specified in the POP.
- On going vendor ITP spot-check reviews to ensure signoffs up to date.
- Verify compliance of construction process with approved design, procedure, work plan, etc., during field walkdowns,
- Verify adequacy of equipment and tools used for construction. (i.e. check MTE info entered into relevant ITP steps)
- Verify final conditions, products and surroundings. (i.e. FME and housekeeping inspections)
- Verify all FICREQ information has been rolled into latest EC revisions during ITP closeout review
- Observe vendor's QC inspector follows appropriate processes when an inspection or test fails to meet acceptance criteria.
- Report any deficiencies to FE FLM and file SCR as appropriate
- Notify vendor QC inspector(s) about findings and discuss potential path forward

10.3 Oversight Reporting

Oversight personnel shall report activities performed including the methods of validation and verification with results entered in ORS. Refer to N-MAN-00120-10004

OS-ORS, Oversight Reporting System (ORS) User Manual, Section 5, for details on how to generate an Oversight Report.

11.0 NON-CONFORMANCE CONTROL

11.1 Detailed Activities

11.1.1 Examples of nonconforming issues include, but are not limited to, the following:

- Deviations from design
- Wrong material used
- Physical defects
- Incorrect or inadequate documentation or workmanship
- Deviations from prescribed processes
- Inspection failures
- Failure of a test (unless test is specifically designed to determine ‘pass’ or ‘fail’ e.g., motor bump test where subsequent activities for either result are planned).

11.1.2 When a non-conformance is identified by the Trades, FLMa or PT, the related work shall be stopped to preclude further deficiencies and responsible FLM FE shall be notified, and SCR raised.. Refer to Appendix H, Non-conformance Report Process Chart, for the overall flowchart for processing a NR.

11.1.3 If the deficiency is related to an EC design document but it does not affect fieldwork, it shall be documented, controlled, and processed in accordance with section 9, Field Initiated Changes.

11.1.4 If the deficiency is not related to design but still require design disposition, it shall be documented, controlled, and processed using FE-FORM-040, Non-conformance Report.

11.2 Non-conformance Report Initiation

11.2.1 NR shall be initiated when a nonconforming item is identified.

11.2.2 PT or FLMa shall initiate NR in FE Quality Registry and complete up to and including the “Description of Non-conformance” section and “Reference Documents” section.

11.2.3 NR Initiator shall:

(a) Input required data, including:

- Initiator Name
- Initiator Title
- Date
- System Classification Index (SCI)/Universal System Index (USI) and system name

- Applicable nonconforming item or affected equipment, line numbers
- Unit number

(b) Describe the deficiency in details so that others not directly involved may understand.

(c) Propose a disposition and associated approver.

(1) Possible proposed dispositions include:

- FIC: A FIC may be issued to resolve the problem with design
- Repair: Involves processing the nonconforming item to restore it to a condition where it is functional, safe and meets design.
- Concession: Could be a concession granted to “use as is”, agreed by Design, FE and/or Regulator, if required.
- Scrap: Involves tagging an item or material as “Scrap” and disposing, as required.
- Rework: Involves repeating the original process to restore the item with a nonconforming characteristic to meet original design requirements.
- Other: Any eventuality not covered above. This could to replace the item or material in question and downgrade the nonconforming item or material for use in applications where code requirements are not as great, providing the item or material meets the lower code/design requirements.

(2) Approvals may include:

- FLM FE (mandatory), and
- System Responsible Engineer(SRE)/DE

(d) Input reference documents (such as an EC, Drawings, FIC) by number and title.

11.2.4 FE staff shall:

(a) Segregate nonconforming items with identification where appropriate. Where impractical, appropriate precautions as deemed necessary by the FLM FE shall be employed to prevent inadvertent use.

(b) Interface with SRE, DE, Authorized Inspector, and other FE disciplines to reach a consensus on final disposition. Any new details shall be documented on NR with appropriate signatures.

(c) Contact the Modification Team Leader and put work on hold for deficiencies that leads to a nuclear safety review.

11.2.5 FLM FE shall complete the “Final Status” Section of the NR, as follows:

(a) Check off the following, as applicable:

- Re-inspection complete
- Retesting complete
- Design approval obtained
- Other (explain).

(b) Include any additional reference document numbers (ITPs, other relevant documents) and/or comments.

(c) Sign and date

(d) Obtain AIA signature and date, if applicable.

11.2.6 SM shall complete Corrective Action Section of the NR, as follows:

(a) Check one of the following, as applicable:

- Required: corrective action applies if this type of non-conformance has occurred more than once, in which case the root cause may not be evident (see Section 10.4).
- Not required.

(b) Reference or describe the corrective action (may include a SCR).

(c) Sign and date.

11.3 Follow up Actions

(a) FLM FE shall periodically review the status of each outstanding non-conformance.

(b) Any supporting documentation shall be attached to the dispositioned NR.

(c) All document attached to the NR shall be at completed status.

11.4 Corrective Action

SM FE shall:

(a) Regularly review corrective actions of NRs to see if there are any trends and to determine if further corrective action is required in order to prevent recurrence.

(b) Initiate SCR if further corrective action is warranted, in accordance with N-PROC-RA-0022, Processing Station Condition Records.

(c) Approve NR.

11.5 Filing Completed NR

11.5.1 For NR related to ITP or CORN, NR shall be referenced in the associated ITP step(s) and CORN. Original NR completed copy shall be attached to ITP or CORN.

11.5.2 For NR not related to ITP or CORN, original shall be sent to Quality Assurance (QA) Vault for filing as a standalone QA record.

12.0 SCR AND CORRECTIVE ACTIONS

12.1 SCR

12.1.1 All adverse conditions shall be reported via SCR process in accordance with N-PROC-RA-0022.

12.1.2 A nonconforming or deficient item may be defined as adverse condition that shall be documented and reported in SCR.

12.2 SCR Evaluation and Corrective Actions

SCR shall be processed; and corrective actions shall be planned and executed in accordance with N-PROC-RA-0022.

13.0 WORK COMPLETION

13.1 ITP and CORN Completion

13.1.1 Results of inspection, examination and tests can be recorded in the CORN. FLM FE shall certify that CORN has been completed and is acceptable.

13.1.2 Completed ITR shall be verified by FLM FE and filed as an attachment to the ITP, CORN or other applicable document that drove the ITR.

13.1.3 All inspections, examinations or tests reports, including checklists and forms shall be completed and attached to ITP or CORN.

13.1.4 Completed ITP and/or CORN, including previous revisions completed reports, checklists and forms shall be filed in the Quality Assurance (QA) Vault in accordance with section 13.

13.2 FIPR Completion

13.2.1 Upon fieldwork completion, PT shall ensure that FLM Installation signs off latest FIPR revision original copy. If FLM Installation is off site when close out takes place, CA may sign off the FIPR on behalf of FLM Installation.

13.2.2 FLM FE shall review and accept the completed FIPR.

13.2.3 Completed original copy of FIPR latest revision, shall be filed in accordance with section 13, Quality Documents Management.

13.3 Work Close-Out

13.3.1 At completion of modification and maintenance works, WOT in ASSET SUITE shall set to finished.

13.3.2 Completed modification project shall be turned over to commissioning or operation in accordance with N-PROC-MP-0090 under direction of MTL.

14.0 QUALITY DOCUMENTS MANAGEMENT

14.1 General Activities

14.1.1 FE Section Manager (SM) or delegate shall ensure the following:

(a) QA/QC records referenced in ITP, CORN or FIRP are adequately identified and completed.

(b) Completed QA/QC records are sent to QA Records via Smart Form Process for filing.

(c) FE Quality Registry is in effective and updated regularly.

14.1.2 FE FLM or Delegate shall:

Prepare, review, and approve FE documentation for particular sphere of activities in accordance with applicable section of this manual and/or associated guides.

Assign unique identification numbers to FE documents and records via FE Quality Registry.

Designate QA/QC record retention period (specified in Appendix E).

Ensure control of documents and working files is maintained during the period construction.

Ensure documents are available and that only current revisions are used for fabrication or installation.

Perform document surveillance periodically during construction.

Ensure QA/QC records are complete to support the project in accordance with N-PROC-MP-0090.

Ensure completed QA/QC records are submitted for filing and status of the records are updated in the FE Quality Registry.

14.1.3 Trades FLM shall ensure:

(a) Trades personnel at workface are using correct revision released for fabrication and installation by FE via FIPR process.

(b) Previous revisions of documents are removed from workface, destroyed and discarded, or clearly marked “SUPERSEDED”.

14.2 Document/Record Life Cycle

14.2.1 The life cycle of documents requires that they are uniquely identified such that they are easy to file and retrieve during their processing and for the long term, when they become records.

14.2.2 Document owner shall classify records as QA or non-QA. QA records shall be further classified as permanent (P) or non-permanent (T).

14.2.3 Documents shall be produced, assigned unique identifiers and processed in accordance with this manual or FE QC guides identified in Section 1.2 Document Hierarchy

14.2.4 During field installation activities, in-progress QA/QC records shall be stored in FE offices.

14.2.5 Completed and signed QA/QC records shall be filed as QA Records via Smart Form Process.

Note: Only the latest revision of FIPR shall be submitted to the Document Custodian, as the latest revision of FIPR contains all previous revisions information.

14.3 Document Identification

14.3.1 The originator shall:

(a) Ensure documents are uniquely identified. More than one document may have the same type, property number, and Universal System Index (USI) or System Classification Index (SCI), so a serial number shall be the unique identifier (see Appendix F).

(b) Obtain serial number from FE Quality Register.

14.3.2 Type of *documents* which may be produced during installation activities are listed in tabular form in Appendix E. The following information is provided:

- Column 1: Item number (for reference purposes only)
- Column 2: Documentation Title
- Column 3: Form/Template Number
- Column 4: Filing Method
- Column 5: QA Record (Y or N)
- Column 6: Retention
- Column 7: Archive location.

14.3.3 When a *record* is completed, the original (along with all revisions) is sent to appropriate FE support staff for filing.

15.0 TRAINING AND QUALIFICATION

15.1.1 General FE training requirements are outlined in N-TQD-422-00001, Nuclear Field Engineering Training and Qualification Description,

Note: FE staff (including temporary employees) involved in PB works shall be trained and qualified in accordance with N-TQD-424-00001, Nuclear Pressure Boundary Fieldwork Administration Training and Qualification Description.

15.1.2 FLM FE shall attend engineering continuing education seminars, when available.

15.1.3 Training and qualification requirements for temporary employee shall be determined by FLM FE consulting with SM in accordance with the assignment for temporary hiring.

15.2 Qualification of Quality Control Inspection Staff

The following process, based on the ASME Section III NCA-4134.2 and NQA-1, is employed within FE to establish the qualifications required for Inspection and Test (I&T) personnel. This process ensures conformance to specified requirements for the purpose of acceptability, selection, indoctrination, training, evaluating and certification of such personnel.

15.3 Selection of Personnel

15.3.1 FLM of each discipline within FE shall designate the activities that require qualified I&T personnel and ensure that only those qualified to this manual are permitted to perform I&T activities.

15.3.2 Personnel selected to perform I&T activities shall have the experience and training requirements based on scope, complexity, or special nature of those activities.

15.3.3 When a single inspection or test activity requires implementation by a team or a group, personnel not meeting the requirements of this manual may be used in data taking assignments provided they are supervised or overseen by a qualified individual.

15.4 General Qualification Process

15.4.1 The process involves evaluation of the candidate by his/her FLM using the education and experience topics described below and recording results (bases) under the appropriate headings of N-FORM-11066, FE Evaluation for Inspection & Test Qualification.

15.4.2 The process categorizes discipline qualifications under the headings; Education, Experience, Indoctrination, Training, Test results and Capability are summarized in

Appendix I, Guideline for Completing a Record of Inspection and Test Qualification Form.

15.4.3 Civil, Mechanical and E&C Inspection Technicians certified in accordance with this manual may be classified in one of the following three categories depending upon their qualifications and the nature of their work experience. Staff are not certified to this manual, they are qualified as per TIMs and use this manual

15.4.4 Staff who have not yet attained certification shall be defined as trainees within Category 1.

15.4.5 Staff qualified the higher level Category will be delinked from the lower level Category.

15.5 Category 1

(a) Suggested Education and Experience

At least one of the following criteria shall be satisfied.

- Two years of related experience in equivalent inspection or testing activities.
- High school graduation and 6 months of related experience in equivalent inspection or testing activities, or 6 months of on-the-job training (OJT) from Category 2 or Category 3 staff.
- Completion of College level work leading to a diploma in a related discipline plus 3 months of related experience in equivalent inspection or testing activities, or 3 months of OJT from Category 2 or Category 3 staff.

(b) Capability

- Category 1 is the entry level for new employees in FE where the employee is determined by the FLM to be capable of performing and documenting the results of inspections or tests that shall be performed in accordance with approved ITPs, procedures, acceptance standards, and/or industry practices.
- Category 1 trainees work under close supervision and receive OJT from Category 3 staff.

15.6 Category 2

(a) Suggested Education and Experience

At least one of the following criteria shall be satisfied.

- One year of satisfactory performance as a Category 1 in the corresponding inspection or test category or class.
- High school graduation plus 3 years of related experience in equivalent inspection or testing activities.

- Completion of college level work leading to a diploma in a related discipline plus 1 year of related experience in equivalent inspection or testing activities.
- Graduation from a 4-year university program plus 6 months of related experience in equivalent inspection or testing activities.

(b) Capability

A Category 2 staff should have all of the capabilities of a Category 1 staff for the inspection or test. In addition, a Category 2 staff is capable to evaluate the assigned work and prepare applicable QA/QC documents, i.e. ITP, CORN, FIC Request, Non-conformance Report, etc.

Additionally, a Category 2 staff shall demonstrate capabilities in the following:

- Planning inspections and tests.
- Setting up tests, including preparation and setup of related equipment, as appropriate.
- Maintaining surveillance over the inspections and tests.
- Providing OJT to personnel in the Category 1 Trainee category and in evaluating the validity and acceptability of quality control (QC) results.
- Perform quality oversight over vendor's activities.

15.7 Category 3

(a) Suggested Education and Experience

At least one of the following criteria shall be satisfied.

- Six years of satisfactory performance as a Category 2 in the corresponding inspection or test category or class.
- High school graduation plus 10 years of related experience in equivalent inspection or testing activities.
- High school graduation plus 8 years of experience in equivalent inspection or testing activities with at least 2 years as a Category 2, and with at least 2 years associated with nuclear facilities, or, if not, at least sufficient *training* to be acquainted with the relevant quality assurance (QA) aspects of a nuclear facility.
- Completion of college level work leading to a diploma and 7 years of related experience in equivalent inspection or testing activities with at least 2 years of this experience associated with nuclear facilities or, if not, at least sufficient *training* to be acquainted with the relevant QA aspects of a nuclear facility.
- Graduation from a 4-year university program plus 5 years of related experience in equivalent inspection or testing activities with at least 2 years of this experience associated with nuclear facilities, or if not, at least sufficient *training* to be acquainted with the relevant QA aspects of a nuclear facility.

(b) Capability

A Category 3 staff shall have all of the capabilities of a Category 2 staff for the inspection and test.

Additionally, a Category 3 staff shall demonstrate capabilities in the following:

- Provide technical assistance to Category 1 and 2 personnel for work assessing and execution.
- Evaluate adequacy of programs to be used for assigned work.
- Review project technical documents, such as EC documents, change papers, work plan, etc.
- Review and comments specific technical procedures and/or instructions.
- Review and comments trades' performance and logic of field activities.
- Supervise a team to work on projects as required.

15.8 Vision Requirements

15.8.1 Each individual shall also meet the standard for vision requirements as stated in N-FORM-10822, PEL 60595 Visual Acuity Report,

15.8.2 Should an individual fail to meet colour vision portion of the test, the FLM, FE may restrict the person to perform inspection and testing activities where colour is not an issue. Alternatively, FLM, FE may administer practical testing to confirm that the individual's inability to distinguish colour does not impair their ability to perform inspections or tests.

15.9 Certification Process

15.9.1 Capabilities of a candidate for certification shall be initially determined by a suitable evaluation of the candidate's education, experience, training, physical capabilities and either test results or capability demonstration.

15.9.2 Candidates shall complete N-FORM-11066, FE Evaluation For Inspection and Test Qualification, which is then reviewed along with vision acuity test results in N-FORM-10822 by the FLM.

15.9.3 If the FLM is in agreement with the qualification, he/she shall sign and date N-FORM-11067, FE Certificate of Inspection and Test Qualification and forward it to SM for approval.

15.9.4 If the SM is in agreement, he/she shall sign and date N-FORM-11067 and return it to the FLM.

15.9.5 When all signatures are obtained on N-FORM-11067 the FLM shall issue the certificate to the Technician, it shall contain the following data:

(a) Employer's name

(b) Employees name

(c) Category of employee *certification*

(d) Basis (may be an attachment) used for *certification*, which includes such factors as:

- Education, experience, indoctrination, and *training*
- Test results, where applicable
- Results of capability demonstration
- Results of periodic evaluation
- Results of physical examinations, when required.

(i) Signature of employee's SM

(ii) Date of *certification* and date of *certification* expiration.

15.9.6 PT Certification shall be renewed every year in line with vision acuity test. The Certification will be removed and associated qualifications will be delinked, if the person is assigned or allocated to an organization other than FE.

15.10 Indoctrination

Provisions shall be made for the indoctrination of personnel as to the technical objectives and requirements of the applicable codes and standards and the QA program elements that are to be employed.

15.11 On-the-Job Training

Formal *training* program is as described in N-TQD-422-00001. The activities described in this instruction are conducted as required to qualify personnel who perform inspections and tests. *OJT* is also included in the *qualification* process, with emphasis on first-hand experience gained through actual performance of inspections and tests.

15.12 Annual Re-Evaluation of Performance and Recertification

15.12.1 The performance of I&T personnel shall be re-evaluated annually. If conditions are met, the certificate is signed and dated by the FLM.

15.12.2 Recertification shall take place a minimum of every year wherein, evaluation shall be by evidence of continued satisfactory performance or re-determination of capability in accordance with the requirements of the previous sections of this instruction. If during this evaluation, or at any other time, it is determined by the responsible organization that the capabilities of an individual are not in accordance with the *qualification* requirements specified for the job, that person shall be removed from that activity until such time as the required capability has been demonstrated.

15.12.3 Any FE staff who has **not** performed activities commensurate with his/her *certification* in his/her qualified area for a period of 1 year, shall be re-evaluated by a re-determination of required capability in accordance with the requirements of the previous sections of this instruction before recommencing duties.

15.13 Physical

The responsible organization shall identify any special physical characteristics needed in the performance of each activity, including the need for initial and subsequent physical examination.

16.0 SELF ASSESSMENT AND CONTINUALLY IMPROVEMENT

In order to continually improving QA and QC performance, self assessment shall be performed annually on either assessing all aspects of Field Engineering or focusing on one or some specific area(s) in accordance with N-PROC-RA-0097, Self-Assessment and Benchmarking.

17.0 AUDIT

Nuclear Oversight has overall responsibility for plan and perform audit to verify compliance to this manual.

18.0 ABBREVIATIONS AND ACRONYMS

AIA	Authorized Inspector Agency
CA	Contract Administrator
CI	Calibration Instruction
CMO	Contract Management Office
COMS	Constructability, Operability, Maintainability, and Safety
CORN	Change or Rework Notification
CWP	Comprehensive Work Package
DBOM	Design Bill of Material
DE	Design Engineer
DWP	Detailed Work Plan
EC	Engineering Change
FE	Field Engineering
FIC	Field Initiated Changes
FIPR	Fabrication and Installation Package Release
FLM	First Line Manager
FLMa	First Line Manager Assistance
FME	Foreign Material Exclusion
HOR	Holder of Record

IRI	Inspection and Reactor Innovation
ID	Identification
ICWS	Instrument Calibration Worksheet
ITP	Inspection and Test Plan
ITR	Inspection and Test Report
METCAL	(software database)
M&TE	Measurement and Test Equipment
MR	Material Request
MTL	Modification Team Leader
NDE	Non-Destructive Examination
NR	Non-conformance Report
OPG	Ontario Power Generation
OJT	On-the-Job Training
PT	Project Technician
PSA	Purchase Service Agreement
PB	Pressure Boundary
QA	Quality Assurance
QC	Quality Control
SCR	Station Condition Record
SM	Section Manager
TIMS	Training Information Management System
WARR	Work at Risk Release
WO	Work Order
WOT	Work Order Task
WPR	Welding Procedure Request
WPS	Welding Procedure Specification
WR	Work Request

19.0 PERFORMANCE REFERENCE

N-INS-01516-10001, Measuring and Test Equipment Records and Document Management

N-INS-01913.11-10003, Pressure Boundary Non-conformances

N-INS-01913.11-10005, Pressure Boundary Pressure Testing

N-INS-01913.11-10006, Pressure Boundary Inspection and Test Plan

N-INS-01913.11-10013, Pressure Boundary Completion Assurance

N-LIST-01300-10008, Lexicon of Engineering Governance Terms

N-MAN-01913.11-10000, Pressure Boundary Program Manual

N-MAN-00120-10004, OS-PLAN, Project Oversight Planning and Implementation

N-MAN-00120-10004-OS-CON, Nuclear Projects Construction Oversight

N-MAN-00120-10004 OS-ORS, Oversight Reporting System (ORS) User Manual

N-PROC-MA-0012, Work Protection

N-PROC-MA-0013, Planned Outage Management

N-PROC-MA-0018, Foreign Material Exclusion

N-PROC-MA-0020, Predefined Process

N-PROC-MA-0022, Integrated On-line Work Schedule

N-PROC-MA-0068, Engineering Requirements Supporting the Calibration Process

N-PROC-MA-0069, Control And Calibration Of Measuring And Test Equipment

N-PROC-MA-0070, Calibration Of Field Equipment

N-PROC-MP-0087, Pressure Boundary repair and Replacement

N-PROC-MP-0088, Pressure Boundary Modifications

N-PROC-MP-0090, Modification Process

N-PROC-RA-0022, Processing Station Condition Records,

N-PROC-MM-0042, Nuclear Warehousing Core Duties

N-PROG-MA-0013, Welding

N-PROG-MP-0004, Pressure Boundary

N-GUID-00700-10000, Guide To Modification Process

N-GUID-01983-10000, Field Engineering Guide To Planning And Assessing Work

N-GUID-01983-10002, Guide to Field Engineering Design Interface And Support

N-GUID-01983-10003, Field Engineering Quality Control Civil

N-GUID-01983-10004, Field Engineering Quality Control Mechanical

N-GUID-01983-10005, Field Engineering Quality Control Electrical and Control

N-TMP-10184, Field Engineering Inspection and Test Plan

N-TMP-10213, Pressure Boundary Inspection and Test Plan

N-TQD-422-00001, Nuclear Field Engineering Training and Qualification Description

N-TQD-424-00001, Nuclear Pressure Boundary Fieldwork Administration Training And Qualification Description

N-STD-MA-0021, Non-Destructive Examination

OPG-PROC-0039, Project Management

OPG-STD-0148, Project Management Standard

OPG-PROC-0001, Processing Administrative Governance Documents

OPG-PROC-0178, Controlled Documents Management

OPG-PROC-0179, Nuclear Quality Assurance Records

N-FORM-11467, Foreign Material Exclusion

N-FORM-10427, Concrete Drilling and Anchor Card

N-FORM-10429, Excavation Activity Card

N-FORM-10604, Generic Instrument Calibration Work Sheet

N-FORM-10653, Document Transmittal Request

N-FORM-10679, Certification of Pressure Boundary Inspection and Test Personnel

N-FORM-10822, PEL 60595 Visual Acuity Report

N-FORM-11066, FE Evaluation for Inspection & Test Qualification

N-FORM-11067, FE Certificate Of Inspection And Test Qualification

N-FORM-11068, Change or Rework Notification (CORN)

N-FORM-11123, Civil Multi-purpose Activity Card

N-FORM-11128, Field Initiated Change Cover Sheet

N-FORM-82365, Identification of Tie-in Location

FE-FORM-001, FIPR (available in FE Quality Registry)

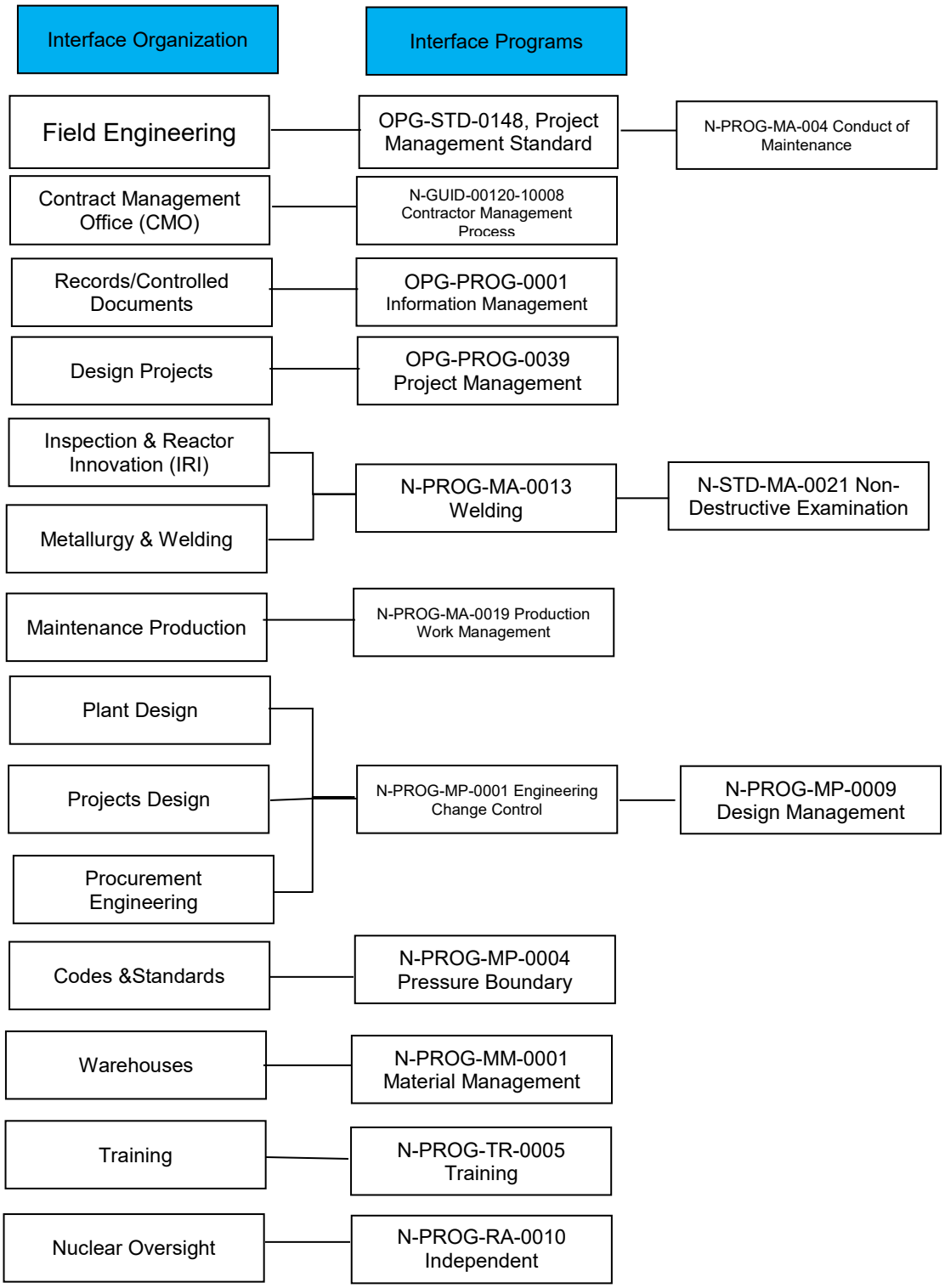
FE-FORM-004, Inspection and Test Report (available in FE Quality Registry)

FE-FORM-021, MTE Calibration Record

20.0 DEVELOPMENT REFERENCE

N286-12, Management System requirements for nuclear facilities

Appendix A: Interfacing Organizations and Programs/Standards



Appendix B: Design Document Review

The purpose of review the design document is to ensure the approved EC change papers are comprehensive for installation and complied with field conditions.

B.1.0 DOCUMENTS TO BE REVIEWED:

- Flow diagram and detailed drawings
- Other EC change papers, such as System Classification List
- Design Bill of Material
- Vendor installation and maintenance manuals or catalogs
- Applicable standards
- Technical specifications
- Purchase specifications
- Other pertinent documents

B.2.0 REVIEWER SHALL ENSURE THE FOLLOWING:

- Scope of work is clearly defined and applicable drawings are approved and included.
- Drawings (including Manufacturers drawings) are accurate and sufficient.
- Drawings and drawing notes, including those on Change Papers, are complete and accurate including references, i.e., codes and standards. Note discrepancies or missing information.
- Applicable code classification, system designation, and other requirements such as, lines, sizes, and devices are identified and numbered and agree with the Engineering Flow Diagram.
- Approved Design Bill of Material (DBOM) for each drawing is available and items conform to drawing requirements. Items are listed and quantities are accurate.
- Erection requirements are shown (i.e., Pipe Procedure No. 1 or 2, Support Procedure No. 1 or 2, piping cold bends and fall or slope requirements).
- Applicable examination and test requirements are indicated.
- Thermal insulation class and thickness is specified.
- Required reference drawings are identified (i.e., support drawings, equipment drawings, plant arrangement drawings, and flow diagrams).
- Drawings are free from any obvious errors (i.e., accuracy, missing information, dimensions, elevations, and locations).
- Review applicable codes and standards as required determining or clarifying requirements governing the assembly, installation, inspection, and testing.

Note: If inconsistencies, errors, or omissions in any of the above documents are identified, SCR may be initiated.

Appendix C: Initiate FIC Request

C.1.0 PREFACE

Field Initiated Change Cover Sheet N-FORM-11128 is intended to enhance consistency of *FIC* notes by FE staff.

The following information is to be used in conjunction with N-PROC-MP-0090, Modification Process and N-GUID-00700-10000 Guide to Modification Process. The intent of this Appendix is to provide clarifications to FE staff (here after called Initiator) to fill out N-FORM-11128 consistently and with quality information. The steps indicated to fill out the form should be considered only as descriptive of the normal process and may be done in any order.

N-FORM-11128 is completed electronically by filling out the required information under relevant sections of the form including FIC number, Problem Statement, Detailed Description, Attached Documents etc. After completing of the entries, the preparer/user ensures that the completed N-FORM-11128 is saved to the FIC attribute notes and a copy is saved to the FIC section of the modification folder as referred to in paragraph C.2.7.0 of this appendix.

The process shown to fill out N-FORM-11128 for a FICREQ will also apply to MINORFIC.

C.2.0 FILLING OUT N-FORM-11128

C.2.1 FIC Number

The latest revision of N-FORM-11128 should be extracted from ASSET SUITE.

Enter the FIC number and EC number on the form in the following format: EC Number–Revision number – FIC attribute (FICREQ or MINORFIC) - number, e.g. EC123456-FICREQ-001. This is to serve as a unique ID for the FIC during the installation process. To select and register a FIC number in the ASSET SUITE EC Panel, refer to N-GUID-00700-10000, Guide to Modification Process.

Subsequent FICs (FICREQ/MINORFIC) that may be initiated under the same EC shall be of unique ID e.g. EC123456-FICREQ01, EC123456-FICRQ02, etc. and

C.2.2 Problem Statement or Brief Description of Proposed Change (FIC Title)

The Initiator is to provide a FIC title that is accurate and descriptive of the problem and proposed change. The Initiator may also provide more clarity by including the particulars of the component, equipment, system and unit that are affected.

C.2.3 Detailed Description

Section used to describe the actual problem in detail with justification of why approved design cannot be installed including information of affected component, equipment, system, unit and design document. Where possible, the Initiator may describe proposed changes to address the problem including a list of affected design documents.

If a proposal cannot be provided in the FIC, the DE assumes the responsibility to review the problem and provide resolution in accordance with N-GUID-00700-10000.

C.2.4 ATTACHED DOCUMENTS

Section contains prerequisites and suggestions for possible methods of attaching the applicable document(s) to N-FORM-11128.

C.2.4.1 Prerequisites for attaching documents

The following prerequisites are typically completed by the Initiator prior to attaching documents to the *FIC*.

(a) **Saving N-FORM-11128:** Initiator saves N-FORM-11128 in FICREQ folder (completed through above steps C.2.1 to C.2.3).

(b) **Creating and saving the digital copy of the marked-up Design EC change papers in FICREQ folder:** The Initiator creates a digital copy of the marked-up change papers. The file name of this digital copy normally contains the FICREQ number and the prefix “Attachment” e.g. Attachment FICREQ02.

(c) **Attaching the FICREQ Coversheet in ASSET SUITE**: The Initiator may following the steps below:

- Select the FICREQ Attribute from ASSET SUITE EC panel
- Select the ‘Notes’ field to open a word document.
- Open the existing FICREQXX file from the FIC Working Folder
- Copy its content
- Paste its in the open ASSET SUITE’s Word document
- Save this file to store the content of FICREQ Coversheet against the FICREQ attribute.

C.2.4.2 Attaching Documents to a FIC

There are multiple ways to attach documents to a FIC. Three typical methods are as following. All methods that are briefed here are descriptive only (not prescriptive or mandatory).

(a) **Copy and Paste - Document file**: The Initiator opens the FICREQ coversheet in ASSET SUITE by navigating through the EC Panel, FICREQ Attribute, Notes and scrolls to the ‘Attached documents’ section of the FIC form, selects the (document) file(s) to be copied, performs copy and paste function. By doing this the digital copy of the document will be attached /pasted as a file directly in the form. This option, although easy to perform, is only suitable to attach simple low memory documents to the FICREQUEST. Documents over 5 MB in size should not be

attached using this method, as ASSET SUITE will not be able to re-open them. If a large document is attached accidentally and the attribute locks, contact IT to have the attachment deleted and attach the document using any of the alternate methods shown below.

(b) **Copy and Paste - Document Address:** The Initiator opens the FICREQ coversheet in ASSET SUITE by navigating through EC Panel, FICREQ Attribute, Notes and scrolls to the 'Attached documents' section of the FICREQ form. Through another window, select and open the attachment document and copy the address of the document from address bar, then paste it under Attached Documents section of the on FICREQ form where a link address can be seen as pasted. The same process to paste link address is repeated for attaching multiple documents.

(c) **Attach Document through HYPERLINK:** The Initiator follows the same sequence of method (b) except in this process the address of the document is attached through hyperlink. For this process, Initiator opens the FICREQ form stored (in the same location), moves the curser to the attached documents, right clicks the mouse and selects hyperlink. In the hyperlink window, initiator navigates or browses to the folder location where the marked-up document attachments are located and then clicks 'OK'. A hyperlink address is seen as pasted under the Attached Documents section of the *FIC* Form. The process is repeated to attach multiple documents.

C.2.5 FIC NOTES (Optional)

The Initiator may use this notes section of the FIC form to indicate the priority of the FIC and expected TCD from design to provide approval or resolution to the FIC. The Initiator or FE-FLM may fill in this information based on the schedule / field requirements.

C.2.5.3 Saving the latest /updated work on the FIC form

After completing entries on the FIC form and attaching the documents, the Initiator ensures that the latest version of the FIC form is always saved to the proper folder in the FIC WORKING FILES section of the Modification folder located on the three common drives (Modifications Pickering A, Modifications Pickering B and Darlington NK38 Modifications).

C.2.6 ROUTING & APPROVAL

Prepared by FTL/Initiator: The FIC Initiator signs the form then attaches the form to the *FIC* as per section C.2.4.1 and C 2.4.2.

Reviewed by FLM: FLM reviews and signs the form then processes the *FIC* as per N-GUID-00700-10000.

Reviewed by DE (OPG or Design Agency) (if required):

For an EC produced by a Design Agency, the FIC is reviewed by the Design Agency's DE who inputs their name and date into the FIC notes or the N-FORM-11128 and adds any required disposition notes then sets FIC status to DES AGY REVW.

Design Review /Disposition Notes: Design Engineer (OPG DE or Design Agency DE) reviewing the *FIC* may input disposition notes in this part of the *FIC*.

OPG Design Acceptance/Approved by: OPG DE reviews the FIC, upon concurrence with the changes, provides OPG Design acceptance by inputting his/her name and setting the FIC status to APPROVED as per as per N-GUID-00700-10000.

C.2.7 Additional Information on Hierarchy of FIC working Files and Records

FIC WORKING FILES: All working files of the FIC Process are currently stored under three common "FIC WORKING FILES" folders located on three separate common drives: Modifications Pickering A, Modifications Pickering B, Darlington NK38 Modifications.

EC Sub folders: Separate EC sub-folders are created under the common FIC WORKING folders for the ECs that are affected with FICs. These sub folders are created and named according to the applicable EC number(s). e.g. EC103369, EC103370, etc.

FIC Files: All FIC (FICREQ) working files include the FIC attribute number in their name, e.g. FICREQ01, FICREQ02 etc. and are stored under the respective EC sub-folders as referred above. For example, the address of a FIC for a typical application for Pickering B will appear as below:

H:/Modifications Pickering B/FIC WORKING FILES/EC103369/FICREQ01.

Or for Darlington: \\corp.opg.com\darlington\NK38 Modifications\Master EC's\FIC-WORKING FILES\EC86852\ FICREQ05.docx

Appendix D: Calibration Instructions

Discipline	Description	Calibration Instruction
Mechanical	Torque Wrench	CI-Q1.1
	Vernier Dial Caliper	CI-Q1.2
	Outside Micrometer	CI-Q1.3
	Vernier Height Gauge	CI-Q1.4
	Dial Gauges	CI-Q1.5
	Depth Micrometer	CI-Q1.6
	Inside Micrometer	CI-Q1.7
	Ball Micrometer	CI-Q1.8
	Gauge Block	CI-Q1.9
	Pole Micrometer	CI-Q1.10
	Level	CI-Q1.11
E & C	Manometers	NA
	Pressure Gauges	CI-Q2.2
	Temperature Devices	CI-Q2.3
	Electronic Field Calibrators	CI-Q2.4
	Torque Tester	NA

	Digital Multimeters	NA
	Multi Gas Monitor LTX 310	NA

FE/Trades Calibration Instructions are numbered as follows:

- Mechanical CI-Q1.Serial #-Rev. #
- Electrical & Controls CI-Q2.Serial #-Rev. #

e.g., CI-Q1.1-0

Appendix D (Continued) Qualification Matrix

Note: The table below lists qualifications required for FE, Projects and Modifications and Contractor staff performing calibration activities under this instruction. These requirements are in addition to those shown in N-PROC-MA-0069.

Task	Pressure Sensitive Device Calibration	Temperature Sensitive Device Calibration	Voltage, Current, Resistance Sensitive Device Calibration	FE Calibration Shop Tech, Gas Monitoring Devices	Calibration of Dimensional Measuring & Test Equipment	Torque Instruments
	PEL	**PEL**	**PEL**	**PEL**	**PEL**	**PEL**
Calibrates	65572	65573	65574	65575	65576	61782
Prepares Calibration Instructions (CIs)	Assigned by FLM	Assigned by FLM	Assigned by FLM	Assigned by FLM	Assigned by FLM	Assigned by FLM
Verifies Calibration Instructions (CIs)	65572	65573	65574	65575	65576	61782
Approves calibration Instructions (CIs)	4259	4259	4259	4259	4259	4259

Appendix E: Document and Record Types

Item	Documentation Title	Form/Template Number	Filing Method	Quality Assurance Record	Retention	Archive Location
FI	**Fabrication and Installation – General**					
1	Fabrication/Installation Package Release (FIPR)	FE-FORM -001 (FE Registry)	1	Y	P	QAV
2	Field Engineering Inspection and Test Plan (non-PB)	N-TMP-10184 (FE Registry)	1	Y	P	QAV
3	Change or Rework Notification (CORN)	N-FORM -11068 (FE Registry)	1, 3 or 4	Y	P	QAV
4	Inspection and Test Reports (Non PB)	FE-FORM -004 (FE Registry)	1, 2 or 3	Y	P	QAV
6	PB ITP and associated report and checksheets	N-TMP-10213	2	Y	P	QAV
7	Weld Procedure Request	N-FORM-82297	2 or 3	Y	P	QAV
8	Pressure Testing Concession	N-FORM-10723	2	Y	P	QAV
9	Piping Systems Installation and Test Data Report	N-FORM-10426	2	Y	P	QAV
~~10~~	~~Test Equipment Type Register~~	~~FE-FORM-019~~	~~1 or 6~~	~~Y~~	~~P~~	~~QAV~~
~~11~~	~~M&TE Issue Control Log~~	~~FE-FORM-020~~	~~1 or 6~~	~~Y~~	~~T-3~~	~~CS~~
12	M&TE Calibration Record	FE-FORM-021	1 or 6	Y	T-3	CS
13	Instrument Calibration Form	N-FORM-10604	1 or 6	Y	P	QAV
14	Calibration Certificates for Working Standards	N/A	1 or 6	Y	P	FE and QAV
15	Calibration Certificates for New Permanent Equipment	N/A	1 or 6	Y	P	QAV
16	Notice of Pressure Test	N-FORM-10923	2	Y	P	QAV
~~17~~	~~Equipment Storage Record~~	~~FE-FORM-039~~	~~1~~	~~Y~~	~~P~~	~~QAV~~
18	Non-conformance Report	FE-FORM -040 (FE Registry)	1 or 3	Y	P	QAV
~~19~~	~~Calibration Instruction Cover Sheet~~	~~FE-FORM-044~~	~~1 or 6~~	~~Y~~	~~N/A~~	~~FE~~
20	FE Evaluation for Inspection and Test Qualification	N-FORM-11066	4	Y	T-3	FE
21	FE Certificate of Inspection and Test Qualification	N-FORM -11067	4, 6	Y	T-3	FE
22	Certificate of PB Inspection and Test Personnel	N-FORM -10679	4, 6	Y	T-3	FE
23	Document Transmittal Request	N-FORM-10653	1	Y	P	QAV
24	Identification of Tie-in Location	N-FORM-82365	1	N	T-1	FE
~~25~~	~~PB – M&TE Care and Control – Shop/Field Walkdown Checklist~~	~~FE-FORM-104~~	~~4~~	~~Y~~	~~T-1~~	~~FE~~

Item	Documentation Title	Form/Template Number	Filing Method	Quality Assurance Record	Retention	Archive Location
~~26~~	~~PB – Material Care and Control – Shop/Field Walkdown Checklist~~	~~FE-FORM-105~~	~~4~~	~~Y~~	~~T-1~~	~~FE~~
~~27~~	~~PB – Welding Equipment/ Consumables Care and Control – Shop/Field Walkdown Checklist~~	~~FE-FORM-106~~	~~4~~	~~Y~~	~~T-1~~	~~FE~~
28	PB ITP FLM Review Checklist	FE-FORM-107	4	N	T-1	FE
~~29~~	~~PB Preparer (Modifications) Checklist~~	~~FE-FORM-108~~	~~4~~	~~N~~	~~T-1~~	~~FE~~
30	PB FLM Installation Checklist	FE-FORM-109	4	N	T-1	FE
FEC	**Field Engineering – Civil**					
1	Concrete Drilling and Anchor Card	N-FORM-10427	1	Y	T-3	FE
2	Rebar and Miscellaneous Items – Cutting Record	N-FORM-10428	1, 2 or 3	Y	P	QAV
3	Excavation Activity Card	N-FORM-10429	1	Y	T-3	FE
4	Civil Multi-purpose Activity Card	N-FOMR-11123	1	Y	T-3	FE

Legend:

CS = Calibration Shop
FE = Field Engineering Files
L = To QA Vault later/upon completion
MM = as per Materials Management Procedures
N = Not required
P = Permanent Record
PB = Pressure Boundary
QAV = QA Records Secure Storage
RC = Records Centre via the Document Originator
T = Temporary Record
Y = Original to QA Vault
EDB = Electronic Data Base

Filing Method:

1 = Filed with attachments, if applicable
2 = Filed with ITP N-TMP-10213
3 = Filed with ITP N-TMP-10184
4 = Filed with Inspector Records
5 = Filed with Turnover document
6 = Filed electronically
7= Filed with QS Plan

Appendix F: Identification of Field Engineering Documents/Records

Pickering (order may vary)

NK 30 - ITP - 34110 - 003 - R01

Revision Number

Serial Number

USI/SCI

FE Document/Record Register Code (Examples)

FIPR - Fabrication/Installation Package Release
ITP - Inspection and Test Plan
IC - Inspection Checklist
ITR - Inspection Test Report
NCR - Non-Conformance Report
FCN - Field Change Notice
CORN -Construction or Rework Notice
PTI - Pressure Test Instruction
ITO - Installation Turnover

Property Number

NK30 - Pickering B
NA44 - Pickering A
etc.

Note: Where applicable, the *documentation* source and unit number may be included in the identification of the *documentation*. For example: NK30-Q1*-33110-ITP-7*-001 where Q1 is the *document* source and 7 is the unit number. * = Optional fields.

The list of documentation sources includes:		The following Unit numbering format applies (as per Equipment Code Guideline:
		0 = Unit 0; 1 = Unit 1; 2 = Unit 2; 8 = Unit 8
Field Engineering – General	FE	012 = Common for Units 1 and 2
Field Eng. – Mechanical	Q1	034 = Common for Units 3 and 4
Field Eng. – E&C	Q2	014 = Common for Units 1,2,3 and 4
Field Eng. – Civil	Q3	056 = Common for Units 5 and 6
		078 = Common for Units 7 and 8
		058 = Common for Units 5,6,7 and 8
		018 = Common for all site Units

Appendix F (Continued) Identification of Field Engineering Documents/Records

Darlington (order may vary)

NK38 - QCL - 21132 - 0002 - 00

REVISION NO.

SERIAL NO.
i.e., 0002 - 2nd checklist by civil

SYSTEM CLASSIFICATION INDEX
(SCI) i.e., 21132 - Embedded Parts

DOCUMENT TYPE
C - CORN
F - CONCESSIONS
G - CORRESPONDENCE
H - HISTORY DOCKET
I - INSPECTION AND TEST PLANS
L - CHECKLIST
M - MAPPING DRAWINGS
P - PROCEDURES
Q - QA PLANS/MANUALS
S - INSTRUCTIONS
T - TEST REPORTS
W - WELD RECORDS
X - RADIOGRAPHS

DOCUMENT SOURCE
C - CIVIL
E - ELECTRICAL
I - INSTRUMENTATION
M - MECHANICAL
N - NUCLEAR
P - CONVENTIONAL
W - WELDING QUALITY CONTROL

Q - SITE QUALITY ASSURANCE RECORD

PROJECT NO.
38 DARLINGTON GS "A"

Appendix G: Field Engineering Document Surveillance Guideline

G.1.0 GENERAL REQUIREMENTS

(a) It is the responsibility of each FE FLM to perform document surveillance as observation of their unit and ongoing projects. The scope of the surveillance shall include any documents/drawings released by FIPR.

(b) The intent of the surveillance is to perform a random check to assess correct document revision usage by PTs and Trades. The FLM may review FE copies of current/issued FIPR and select the type and number of documents/drawings to be checked during the surveillance.

(c) The frequency of the surveillance is established be FLM.

G.2.0 INSTRUCTIONS

(a) The selected document numbers and observations are recorded in OCR.

(b) If the Surveyor discovers a difference between the originating source and the selected document (and revisions), Surveyor shall:

- Inform the responsible PT to determine the difference.
- Initiate SCR to report the difference and affected fieldwork, if applicable.

(c) PT shall:

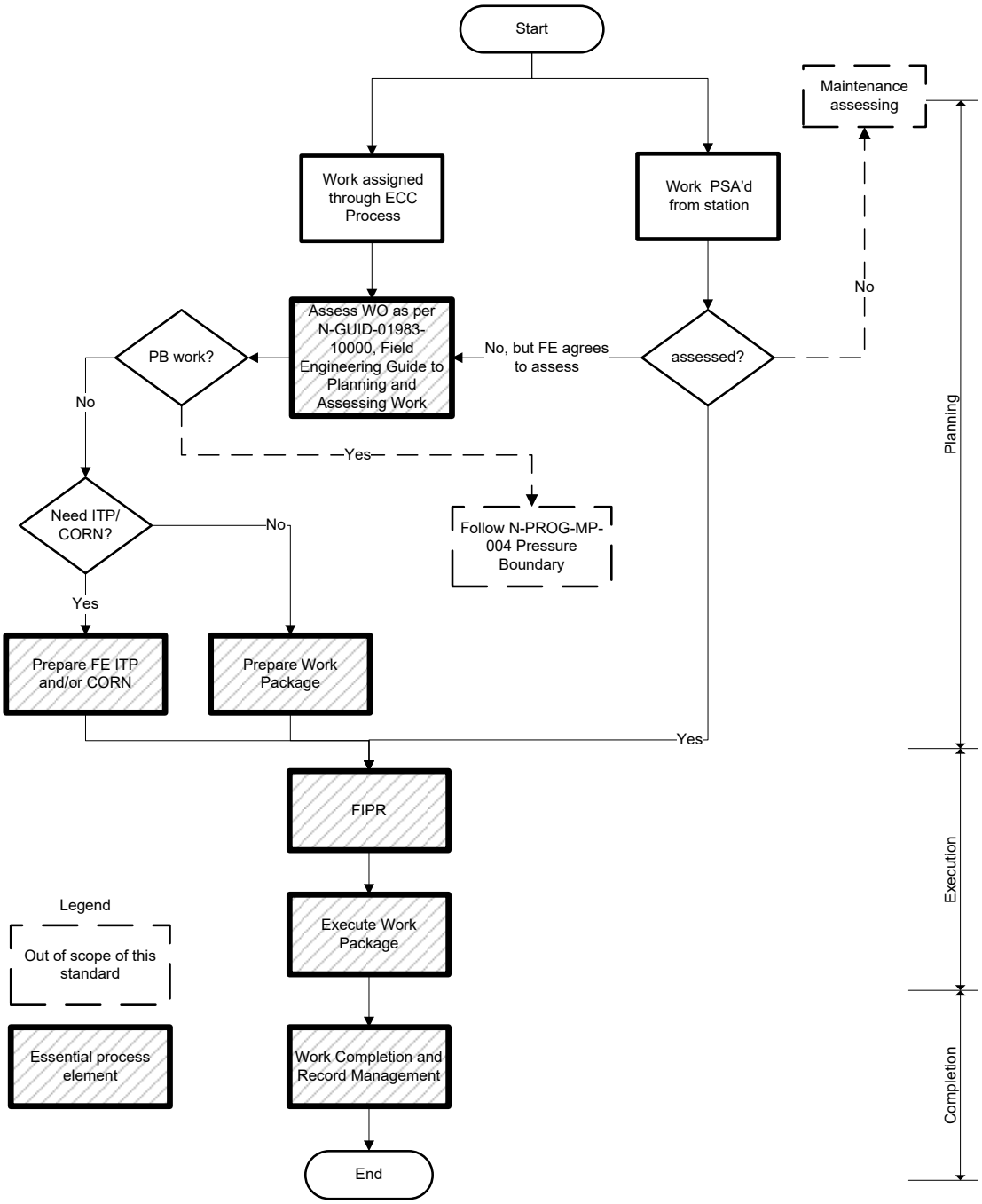
- Ensure correct revision of documents are available on work site, or
- Revise the FIPR to release the correct documents to the Trades.
- Report the affected fieldwork via NR process for disposition.

(d) FLM takes appropriate follow-up action to prevent recurrence of incorrect documents in the places of construction activities.

(e) SM may periodically review the surveillance process for effectiveness.

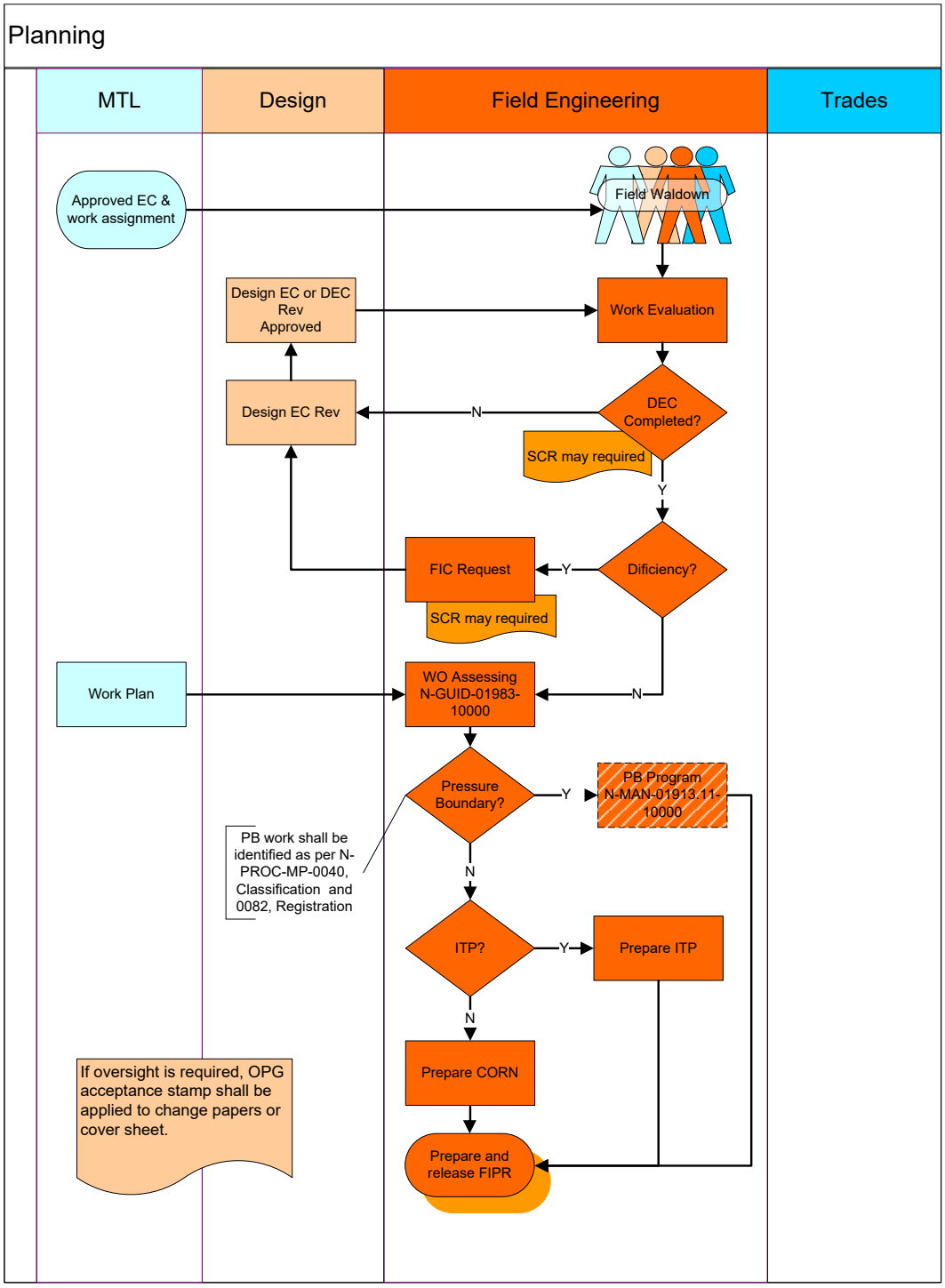
Appendix H: Flow Charts

H.1.0 OVERALL QC PROCESS



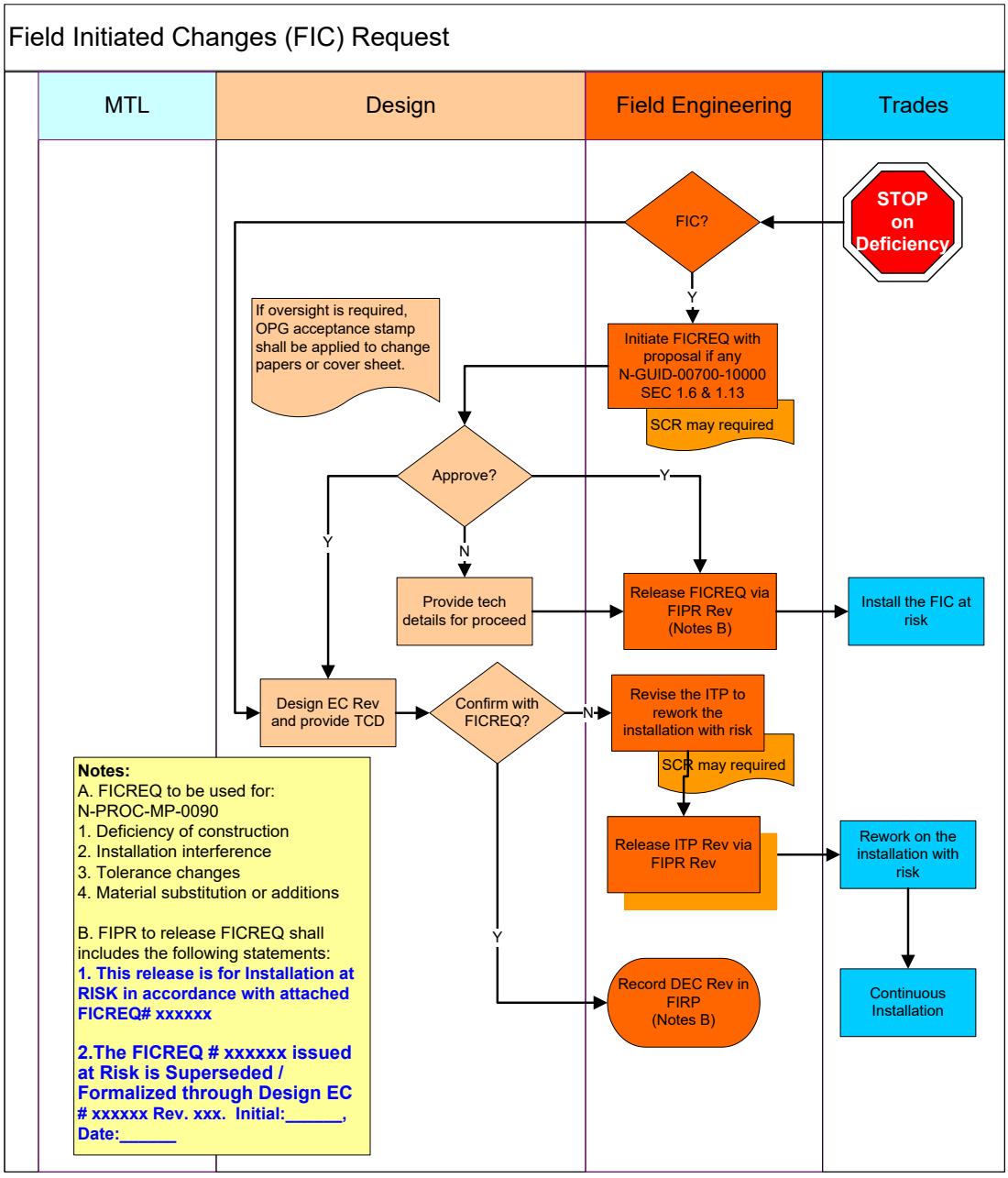
Appendix H (Continued)

H.2.0 PLANNING



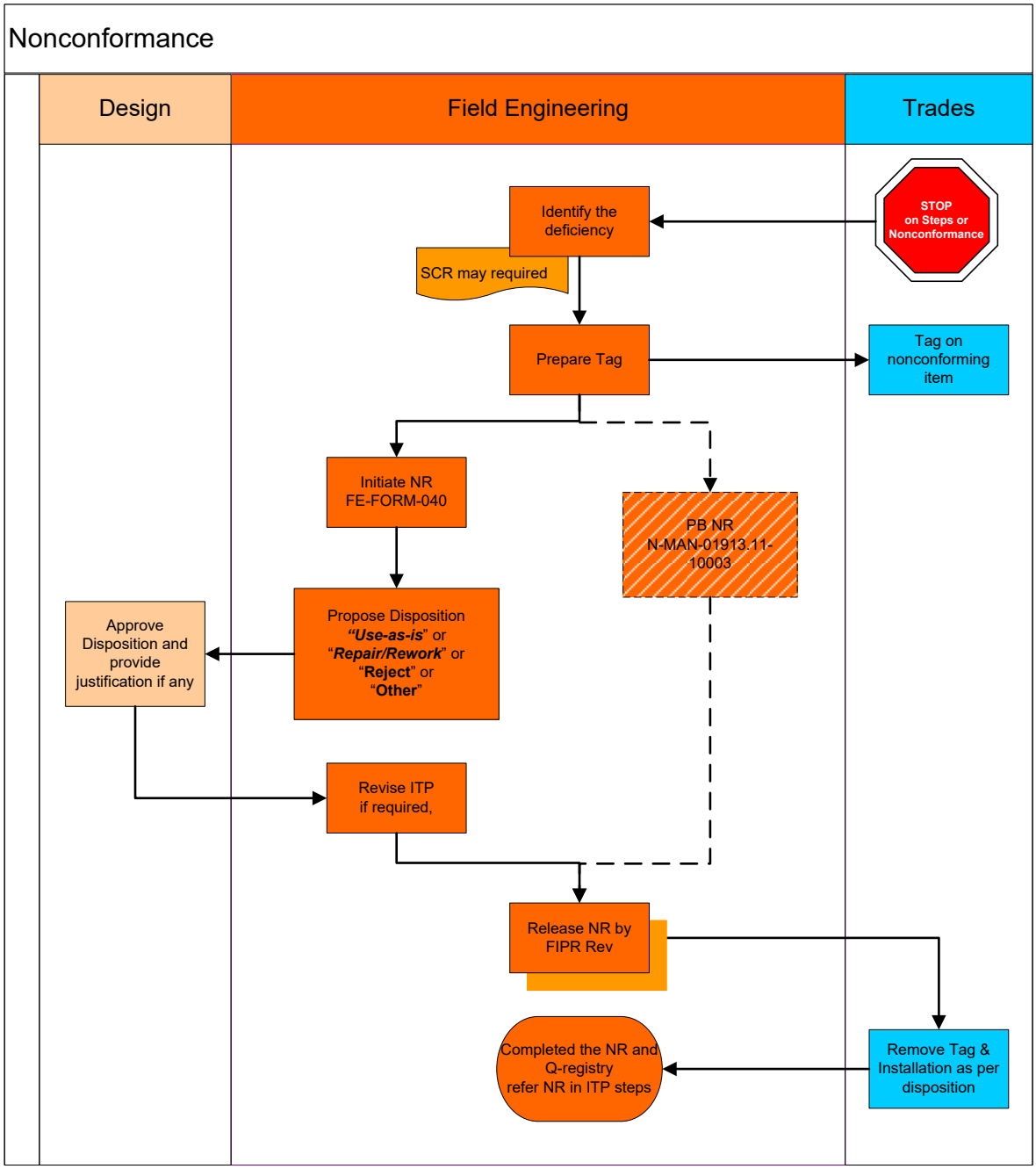
Appendix H (Continued)

H.3.0 FIC PROCESS



Appendix H (Continued)

H.4.0 NR PROCESS



Appendix I: Guideline for Completing a Record of Inspection and Test Qualification Form

Basis for Assigned Qualification Classification Category		
(1)	Education	• List high school, college, university or other achievements, • Data should be consistent with personnel files.
(2)	Experience	• Indicate highlights and location of employment related to I&T such as: Project Technician I and II. • Data should be consistent with personnel files.
(3)	Indoctrination	• Indicate awareness of the following: • CSA codes and standards, and ASME code. • Ontario Power Generation-Nuclear (OPG-N) Quality Programs. • PB Program, General Procedures and Function Specific Procedures. • Specific Functional Documents e.g., Design and Construction (D&C) Requirements Manual, Nuclear Construction Requirements Manual, or other.
(4)	Training	• List relevant training received or reference TIMS i.e., training records in TIMS under Employee #XXXXX. • State whether all mandatory training for job function has been received. • State any relevant OJT being credited
(5)	Test Results	• If a formal examination or test was administered, give the results achieved, the minimum pass mark, and where the examination and results are filed. If not applicable, explain.
(6)	Capability Demonstration	• If a demonstration of skills or knowledge to a recognized standard, procedure or technique is being credited, give the results, minimum required pass mark and description of significance e.g., ability to read drawings, do calculations, etc. If not applicable, say so.
(7)	Physical Limitations	• If physical limitations related to I&T capability are known, list them here i.e., confined to wheelchair, cannot climb ladders, requires corrective lens etc. Otherwise say “None”.
(8)	Visual Acuity	• Consistent with Non-Destructive Examination (NDE) standards, at least every second year, it is recommended that evidence of satisfactory vision as determined by an ophthalmologist, optometrist or other professionally recognized person, be obtained verifying the standard given below. Near Vision Activity • Must demonstrate reading 0.5 M continuous text (N-4) at 40 cm test distance, with their habitual correction (one or both eyes). • Alternative equivalent standards: Times Roman (N-4 at 40 cm); Reduced Snellen (40/50); Jaeger (J2 at 40 cm); 0.5 M at 40 cm is equivalent to 0.37 M at 30 cm. Distance Vision • Shall equal Snellen fraction 20/30 or better in at least one eye, either uncorrected or corrected.

Appendix J: Applicable Forms

Below is typical format of FE-FORM-021, M&TE Calibration Record to be used by FE Calibration shop.

ONTARIOPOWER GENERATION	NUCLEAR FIELD ENGINEERING DEPARTMENT	Document Number: FE-FORM-021	
		Revision: R 07	Page 1 of 1
Title: M & TE Calibration Record			

Asset ID:	Certificate No:	
Calibration Due Date:		Frequency:
Manufacturer/Model:		UTC #:
Range of Scale:	Tolerance:	
Standard Used:	Calibration Due Date:	
Standard Used	Calibration Due Date	
Standard Used	Calibration Due Date	
Date Calibration Performed:		W.O. #:
Calibration Instruction No.:	Humidity %	Temperature (°C)

No.	Input	Readings		% of Tolerance	Pass or Fail	Comments
		As Found	As Left			
1						
2						
3						
4						
5						
6						
7						
8						
9						

Overall Pass / Fail _____

Calibrated by: _____ _____ _____
Print Employee ID/Name *Signature* *Date*

Verified by: _____ _____ _____
Print Employee ID/Name *Signature* *Date*

Reference: N-MAN-01983-10000