U. S. ATOMIC ENERGY COMMISSION
REGION I
DIVISION OF COMPLIANCE

Report of Inspection

CO Report No. 363/~~60~~70-2

Licensee: Jersey Central Power and Light Company
Forked River No. 1
License Number Pending

Dates of Inspection: November 2-3, 1970

Dates of Previous Inspection: October 26, 1970

Inspected By: R. F. Heishman, Reactor Inspector (Principal) — 12-22-70 Date

W. M. Hayward, Reactor Inspector (Construction) — 22 DEC 70 Date

J. H. Tillou, Reactor Inspector (Construction) — 12-22-70 Date

T. F. Westerman, Reactor Inspector — 12-22-70 Date

Reviewed By: E. M. Howard — 12-23-70 Date

Proprietary Information: None

I. Summary

The Jersey Central Power and Light Company has developed a quality assurance program which appears to meet the intent of Appendix B, 10 CFR 50 and fulfill the intent of their application. General Public Utilities Corporation, which is the parent company, and has assumed the responsibility for program development, has imposed on JCP&L contractors well defined QA/QC responsibilities. The responsibility assignments appear to provide adequate capability to assure that the intent of the 18 criteria is met.

The Forked River QA program represents a considerable improvement over the Three Mile Island No. 2 program. Burns and Roe, the A-E, has developed a QA program and has imposed these requirements in all areas of their assigned responsibility.

Stearns-Roger, the constructor, has primary responsibility for construction site activities, and has been required by GPU to provide a detailed program which satisfies the intent of the 18 criteria.

JCP&L and GPU have delegated the bulk of responsibility reserving for themselves principally an audit function, occasional vendor inspection, and a token review and approval of design concepts. MPR Associates have been retained by JCP&L and GPU to provide QA assistance as construction progresses.

The QA program has not been approved, therefore, the findings are predicated on the assumption that approval will be effected.

## II. General

### A. Background

The inspection was in accordance with the Region I Inspection Plan which was adopted from PI 4000. JCP&L and GPU have engaged Burns and Roe as the Architect-Engineer, Stearns-Roger as constructor, and Combustion Engineering as the NSSS supplier. The inspection was conducted at the corporate offices of the General Public Utilities Corporation with representatives from B&R, CE, S-R in attendance during discussions of interfaces of responsibility and authority.

### B. Inspection Assignments

R. F. Heishman was responsible for overall coordination of the inspection. He was also responsible for evaluating the overall organizational and administrative areas including the QA program. Mr. Heishman was in charge of the conduct of the inspection at GPU Service Company.

W. M. Hayward inspected the design program giving particular attention to means of assuring that the general and specific requirements and/or commitments of the PSAR, AEC regulations, and the construction permit are factored into the design. Design review, technical aspects of procurement, work performance procedures, design changes and deviation review, document control, records, and audits, were inspected to determine if explicit procedural control existed and was implemented.

T. F. Westerman inspected the procurement program to determine if procedural control had been established and implemented to best assure that PSAR commitments, codes, standards, and AEC regulations were included in final procurement documents, and to examine the steps used from design to receipt to gain this assurance. Included were verification of vendor conformance with QA requirements, vendor inspection, shipping, handling and storage, procedures and requirements for calibrating measurement and test equipment at the vendor facility.

J. H. Tillou inspected those areas which are applicable to field work, which included control of field work, special processes, inspection and test, calibration of measurement and test equipment in the field, work status, and field control of nonconforming items.

C. Sequence of Events

An introductory meeting was held on October 26, 1970, with Jersey Central Power and Light management at corporate headquarters, Parsippany, New Jersey as a preliminary to the initial inspection. Purpose and mode of the inspection to follow were explained in addition to a discussion of regulatory policy, including Utility-AEC Compliance relationships for the construction phase and life of the plant. Emphasis was placed on the demonstrated degree of quality program preparedness as it would affect issuance of the construction permit and enhance the effectiveness of quality program implementation.

D. Persons Contacted in Performance of Inspection

Jersey Central Power and Light/General Public Utilities

W. Verrochi, GPU Project Executive
R. W. Heward, Jr., Project Manager, Forked River 1
B. G. Avers, Manager, Quality Assurance, GPU
S. B. Palmeter, Manager of Construction, GPU
S. Bartnoff, Manager of Engineering, GPU
E. S. Fisher, Forked River Quality Engineer, GPU
M. Goodenough, Quality Assurance Engineer, GPU
M. K. Pastor, Assistant Project Manager, Forked River 1
J. R. Thorpe, Manager of Safety and Licensing, GPU
E. G. Roome, Safety and Licensing Engineer, GPU

MPR Associates

H. M. Panoff, Senior Partner
N. M. Cole, Engineer

Combustion Engineering, Incorporated

J. C. Moulton, Project Manager, Forked River 1
T. H. Gamon, Manager, Quality Control
T. R. Colandrea, Manager, Quality Systems

Burns & Roe

R. P. Giloth, Project Manager, Forked River 1
F. C. Meckle, Quality Assurance Leader

Stearns-Roger Corporation

E. D. Hill, Project Manager
T. S. Frost, Quality Assurance Manager
Mr. Kurlander, Quality Assurance Site Supervisor

III. Project Status

A. Engineering

1. Nuclear Steam Supply System (CE)

The licensee reported the engineering design of the nuclear steam supply system to be approximately 7% complete as of the time of the inspection. The approval of the design by the licensee was reported to be 0%.

2. Balance of Plant (B&R)

The licensee reported the engineering design of the "balance of plant" to be approximately 8% complete as of the time of the inspection. The licensee had not approved any of the design in this area.

B. Procurement

1. Nuclear Steam Supply System (CE)

The following items were reported by the licensee to have been released for procurement.

a. Reactor Vessel, Steam Generators, and Pressurizers

Released to CE, Chattanooga for design; "long lead" plate and forgings released for procurement.

b. Reactor Internals

Released for design and procurement of materials to P. F. Avery, Incorporated.

2. Balance of Plant (JCP&L)

The turbine generator has been contracted to the Brown-Boveri Corporation, North Brunswick, New Jersey, by JCP&L.

C. Construction

No construction has been started, and current plans are to start excavation and dewatering in early 1971.

IV. Significant Findings

In accordance with Memorandum, Chief Reactor Inspection and Enforcement Branch, January 23, 1970, only a summary description of those criteria where problems exist is provided.

Criterion II - Quality Assurance Program

A. Discussion

1. JCP&L and GPU

The QA/QC program prepared by JCP&L/GPU is incomplete and in a preliminary draft form. While some procedures have not been prepared, they are in outline form. The program does, however, outline in detail the responsibilities and requirements for first, second, and third level quality assurance. Stearns-Roger is assigned site quality control and the S-R plan is being prepared to include detailed procedures for the implementation of a QA program responsive to all 18 criteria contained in Appendix B, 10 CFR 50.

The Burns & Roe QA plan emphasizes QC activities appropriate to home office and construction site Level II QC activities. The Combustion Engineering quality control plan emphasizes control of vendor manufacturing services and quality programs at product sources.

B. Findings

The Forked River quality assurance program is not considered complete, since procedure development is not scheduled, although it presently exists in outline form and formal approval has not yet been accomplished.

The program appears, as it is presently being developed, to represent an understanding of the intent of the criteria and is consistent with design and construction progress.

Continued development and subsequent approval of the program extrapolated from what presently exists and is outlined, should result in a program which meets the intent of the criterion.

Criterion III - Design Control

A. Discussion

Design control is assigned to CE, B&R, and S-R. The task, at present, is omitted from those charged to the GPU engineering group assigned to the Forked River Project. The contractors have responded to the PSAR requirements, and those contained in Criterion III of Appendix B, 10 CFR 50, by incorporation of policy and directives in project and QC plans. Each of the plans is supported by adequate procedures and/or inspection/guidelines responsive to the respective design control section of each QA/QC plan.

The program guidance documents observed contained requirements and techniques for verifying that regulatory and PSAR requirements are considered and satisfied.

Contractor engineering instructions cover review of design changes initiated both in the design office and those originating in the field.

Burns & Roe has been assigned the task of keeping the PSAR up to date. They will collect the data relating to variations from PSAR language occuring in the construction phases, submit it to the safety and licensing section of the GPU project group for review, and correct format, after which it will be returned to B&R for publication in preparation for assembly into the FSAR. The technique is documented.

The design review provides comprehensive coverage of all pertinent facets of the designs prepared by and internal to CE, B&R, and GPU; however, GPU does not have a design review procedure for design performed by contractors or internal to themselves.

GPU employs an audit procedure 8-1, for internal management monitoring of the status of design review. Part 3.14 of that procedure requires accounting for and evidence of the activities involving design reviews by GPU, CE, and B&R. The contract organizations having design reviews are each contractually required to submit design review status at 30 day and 90 day intervals.

B&R applies procedure 2700-EDP-1 to the review of design interfaces between disciplines and agencies. CE QA Program, Section III, "Control of Design", addresses itself specifically in Part 3 to the 'assurance of compatability with engineering and construction (interfaces).' The task is specifically assigned to the project engineer to attend to and disposition interface problems.

B. Findings

The GPU QA organization has prepared an audit procedure to evaluate the effectiveness of engineering (including design review) functional effectiveness, although GPU engineering states no intent to develop and operate to a formal design review procedure. GPU states its portion of engineering effort in the project to be nearly 1/5 of the total engineering effort required on the project. Specific detailed tasks have not been assigned by the engineering manager, although he concedes that design review might be performed by the assigned engineering group.

The high probability of design review being accomplished by GPU and the informality of current assignments are strong factors necessitating the development of a formal design control procedure.

The GPU program does not appear to meet the intent of Criterion III.

Criterion IV - Procurement Document Control

A. Discussion

General Public Utilities (GPU)

GPU review of purchase documents for appropriate QA, PSAR, and Code requirements was stated by Mr. Fisher to be on an "as required" basis. GPU has provided indirect control of QA requirements of the 18 QA criteria, 10 CFR 50, by contractually imposing generic requirements for QA on contractors. GPU has final approval of S-R and B&R procurement documents and contractors. CE will procure using only bidders on the approved list. GPU does not have final approval of CE procurement, except for deviations from the appoved bidders list.

The GPU procedures applicable to this area were designated by title only or were in rough draft form. No schedule for completion has been established.

Burns & Roe (B&R)

The B&R organization is contractually responsible for procurement of all components excluding the NSSS and the turbine generator (to be supplied by CE and Brown-Boveri Corporation, respectively).

Preparation of specifications and procurement documents through an approval chain is specified in a document approved by all project management involved, entitled "Project Organization and Responsibilities."

The B&R organization is responsible to review the engineering and design requirements of the bid documents submitted by vendors. This excludes the NSSS which is a CE responsibility.

B&R is responsible to establish a proposed bidders list for B&R procured components.

All B&R nuclear related purchase documents will include the JCP&L generic QA document 'Quality Assurance Requirements for Contractors and Subcontractors." Categories assigned will be based on GPU procedure 4-1, "Material Classification/Categories."

Stearns-Roger (S-R)

S-R is contractually responsible for site procurement.

A similar approval chain, as for B&R procurement, is specified in the "Project Organization and Responsibilities" document.

S-R will review all purchase documents for QA requirements and B&R will review for technical and engineering design requirements (excluding NSSS).

S-R has two basic procedures which control S-R procurement activities, which includes definitions of responsibilities for review and issue of drawings, specifications, and purchase documents.

"Design Review", an S-R procedure, defines S-R responsibility in the review chain for B&R procurement document review. Procedures were in draft or were not completed but had a scheduled completion date of April 1971.

All S-R purchase documents will include the JCP&L generic QA document 'Quality Assurance Requirements for Contractors and Subcontractors." Categories assigned will be based on GPU procedure 4-1 "Material Classification/Categories."

Combustion Engineering (CE)

CE is contractually responsible for procurement of NSSS components, utilizing an approved bidders list which has been approved by B&R and GPU.

CE vendor selection is governed by CE procedure WQC-11.2, "Procedure for Pre-Award Quality Planning and Vendor Selection Control." The approval route is defined in this procedure.

B. Findings

GPU's QA program for procurement generally meets the inspectors understanding of the intent of Criterion IV, except for the absence of specific guidelines as to what purchase documents will be reviewed by GPU quality management.

Criterion XVIII - Audits

A. Discussion

The GPU QA organization is submitting to GPU project management audit procedures 8-1 and 8-14 for approval, and has developed an audit "check list" for use in auditing a vendor quality control program for effectiveness and internal audit of GPU. Internal audits have not yet been implemented in or by the GPU engineering organization. GPU engineering has not planned to make determinations of their own performance or effectiveness.

The MPR quality organization has been engaged to act as consultant/agent to the GPU quality assurance manager. One audit of a vendor, at source, has been performed by MPR for GPU.

There is no evidence of an audit schedule having been prepared, nor evidence of audits to be performed to a schedule.

All four quality organizations have audit procedures in preparation, or submitted for approval as of the date of this inspection.

B. Findings

The GPU audit program does not appear to meet the intent of Criterion XVIII in the present stage of the program development. Inadequate evidence precludes evaluation as to conformance with the intent of this criterion.

Jersey Central Power and Light Company
Forked River No. 1

Feeder Report
CO Report No. 363/70-2

Date of Inspection: November 2 and 3, 1970

Feeder Report by: for W. M. Hayward, Reactor Inspector (Construction) 11/15/71 Date

## SCOPE

This inspection constitutes the initial evaluation of the quality assurance program prepared for use on the Forked River 1 power facility by the owner, Jersey Central Power and Light Company.

This feeder report is limited to findings made in the review of quality program preparation and implementation of design control, document control, quality record controls, and quality audits, by JCP&L and its contractors, Burns and Roe, Combustion Engineering, and MPR.

## SUMMARY

The total of engineering/design effort is divided in the following fashion.

| | |
|---|---|
| GPU (Utility) | approximately 17% |
| Architect-Engineer | approximately 21% |
| Nuclear Steam System Supplier | approximately 62% |

The utility engineering organization assigned to the project has not established and does not intend to prepare written procedural guidance for use in design review functions.

The architect-engineer, and the nuclear steam system supplier each have prepared and employ written guidance for use in performing design reviews.

The GPU quality organization has indicated, by way of the PSAR, that the greater portion of their quality program will consist of audits performed to determine and report on the effectiveness of contractor and vendor quality programs. As of the time of this audit, the utility quality manager had not prepared nor directed the preparation of an audit list/schedule, nor had he arranged for the development of audit plans for use in preparing for and performing the audits.

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DETAILS

A. Persons Contacted

R. Heward, GPU/JCP&L Project Executive
S. Bartnoff, GPU, Director of Engineering
W. Verrochi, GPU, Project Executive
B. Avers, GPU, Manager QA
E. Fisher, GPU, Quality Engineer
K. Pastor, JCP&L-GPU, Forked River 1 Project Manager
R. Giloth, Burns and Roe, QA
J. Moulton, Combustion Engineering, QA
N. Cole, MPR, Quality Engineer
M. Panoff, MPR, Senior Quality Consultant

B. Project Status

N/A. Mr. Heishman will provide data.

C. Evaluation Against Criteria

1. Criterion III - Design Control

Is there a procedure for design control?

This function is assigned to the utility's contractors, CE, B&R, and S-R. Each of the contractors has developed a quality program plan responding to the PSAR and Appendix B 18 criteria for quality in construction. In turn, each of the plans is augmented by a procedure for design control. The GPU quality assurance orgainzation has prepared an audit procedure to evaluate the effectiveness of contractor.

Engineering (including design review) is functionally effective but GPU engineering states no intent to develop and apply a GPU engineering design review procedure. Examples of the procedures directives, instructions, and specifications are:

| | |
|---|---|
| S-R | Procedure No. QC-21 |
| B&R | EDP 2700-1 |
| CE | Section III of CE Procedures (Control of Design) and NPD-MPI Instructions to Engineering |

Does this include verification that regulatory and PSAR requirements are considered and satisfied?

Yes. Examples of specific verbage are included in: the GPU organization and responsibility document; CE, B&R, S-R specific contract language, and GPU's quality audit/verification items such as 3.1 and 3.2.

Does the system include review of design changes initiated in the design office and from the field?

Yes. GPU audit items 3.19 and 3.20 determine and assure that design changes in-house or on site are subjected to design controls. Burns & Roe Procedure 9, "Project Design Review Procedure" imposes specific requirements regarding design changes. Stearns-Roger QA Plan item 5.3.15 gives attention to design changes. The CE NPD-MPI's for changes, deviations and revisions speak directly to the review and disposition of changes in design and in the field.

Is there a system for keeping the PSAR up to date?

Yes. The Burns and Roe organization has been assigned this task. They will collect the data relating to variation from PSAR language occurring in the construction phase, submit it to the safety and licensing section of the GPU project group for review and correct formatting, after which it will be returned to B&R for publication in preparation for assembly into the FSAR.

The design review does provide very comprehensive coverage of all pertinent facets of the designs prepared by CE, B&R, and GPU (without formal control).

Is there a system for internal management monitoring of the status of design review?

GPU employs an audit procedure 8-1, and specifically 3.14 of that procedure requires accounting for and evidence of the activities involving design reviews by GPU, CE, and B&R. The contract organizations having design review assignments are each contractually required to submit design review status at 30 day and 90 day intervals.

Are there procedures for appropriate review of design interfaces both between disciplines and between design agencies?

B&R applies procedure 2700-EDP-1 to the review of design interfaces between diciplines and agencies. CE QA program, Section III, "Control of Design", addresses itself specifically in Part 3 to the "assurance of compatability with engineering and construction (interfaces)." The task is specifically assigned to the project engineer to attend to and disposition interface problems.

2. Criterion VI - Document Control

Is there a system for control of documents?

Yes. GPU has developed a document control procedure. Stearns-Roger has implemented QA-4. Combustion Engineering uses an NPD-MPI and Burns and Roe is operating to procedures 11 and 17.

Do these systems include review and approval for adequacy?

Yes they do.

Do these systems provide for distribution to all affected personnel?

Yes they do.

Do the systems include provisions for approval of changes?

Yes, as they do in the matter of changes to prints, specs, etc.

Do these systems include provisions for retrieval and disposition of obsolete documents?

Yes they do.

This criterion is complied with satisfactorily.

Criterion XVII - Quality Records

Each of the four QA organizations in their respective QA plans requires identification of records to be logged and retained for quality program purposes.

Some quality records are not intended to be available on site during the construction period, but will be gathered into one repository at the time of plant turnover. Both CE and B&R have developed record retention and historical data file systems at the direction of the utility.

All quality data records are to be available on an immediate basis at source, and onsite assay data is to be available as the plant is built.

Quality records are planned to be distributed to involved individuals assigne to task of evaluating quality of material, process, and assembly and to project management for status of quality program in each organization.

The overall records system does provide for long-term retention of specifically identified records in a manner and location appropriate for prompt easy identification and retieval of any desired individual document listed in the approved index of historical quality documentation.

This criterion is met satisfactorily.

4. Criterion XVIII - Audits

The GPU QA organization is submitting audit procedure 8-1 and 8-14 for approval and has developed and audit "check list" for use in auditing a vendor quality control program for effectivensee and internal audit at GPU. Internal audits have not yet been implemented in or by the GPU engineering organization. GPU engineering has not planned to make determinations of their own performances or effectivensee. A portion of this situation is understandable in consideration of the informal approach or attitude taken toward engineering assignments and task content. Evaluation of performance is difficult when specific requirements or standards are not operating.

The MPR quality organization has been engaged to act as consultant/agent to the GPU quality assurance manager. One audit of a vendor, at source has been performed by MPR for GPU.

There is no evidence of an audit schedule having been prepared nor evidence of audits to be performed to a schedule.

All four quality organizations have audit procedures in preparation or submitted for approval as of the date of this inspection.

Findings

The GPU audit program should be judged noncompliant with Criterion XVIII until sufficient evidence is provided to demonstrate implementation of a full audit program. Audits shall be supported by approved procedures, a list of conditions, activities, and components to be audited, and a schedule coordinated with design, procurement, and construction status. Each subject shall be audited using an individually prepared check list or audit plan specific to that subject. Written reports to project management shall describe quality status, require responses, and be recorded in a tickler type suspense file to implement correction closeout items, and alert management to critical quality problems remaining unresolved.

Jersey Central Power and Light Company
Forked River No. 1

Feeder Report on Procurement
CO Report No. 363/70-2

Date of Inspection: November 2 and 3, 1970

Feeder Report by: T. F. Westerman, Reactor Inspector — 11/4/71 Date

Proprietary Information: None

## SCOPE

Review of procurement activities as related to the 18 QA criterion of Appendix B, 10 CFR 50.

## DETAILS

A. Persons Contacted

GPU

E. Fisher, GPU QA
B. Avers, GPU, Manager QA

MPR

N. Cole, Engineer

CE

T. R. Colandrea, Manager, Quality Systems

S-R

M. Kurlander, Site QA Supervisor
Curr

B&R

F. Meckle, Quality Assurance Coordinator

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Criterion IV - Procurement Document Control

1. Discussion

a. GPU

GPU review of purchase documents for appropriate QC, PSAR, and code requirements was stated by Mr. Fisher to be on an as required basis by GPU project manager and QA manager. GPU has provided indirect control of QC requirements of the 18 QA criteria, 10 CFR 50, by contractually imposing generic requirements for QA on contractors. CE is contractually committed to a document prepared by B&R for GPU entitled 2700-1 "Nuclear Steam System." Generic QA requirements are imposed on CE and their subcontractors based on a four category system. See Attachment I for the classifications within this system. B&R and S-R are contractually committed to GPU procedure 4-1 "Material Classification/Cateogries" which imposes generic QA requirements based on the four category system described in Attachment I. The specific generic requirements imposed on B&R and S-R are defined in JCP&L document "Quality Assurance Requirements for Contractors and Subcontractors." (Attachment II) GPU has final approval of S-R and B&R procurement documents and contractors. GPU and B&R have reviewed a master CE bidder list. CE will procure using only bidders on the approved list. GPU does not have final approval of CE procurement.

GPU has designated the following list of procedures in addition to 4-1 "Material Classification/Cateogries" which pertain to procurement.

8-1 "Audit of Design Contractors"
8-2 "Audit of Main Contractors"
8-3 "Audit of First Level Vendor and Subcontractor"
8-9 "Review of Contractor Prepared Specifications"
8-8 "Review of Contractor Prepared Work, Test and Inspection Procedures"
8-10 "Procurement Control and Audit of Procurement Control Activities"
8-11 "Project Document Control and Audit of Document Control Activities"

The majority of these procedures were in rough draft or designated by title only. No conclusion can be drawn at this time.

b. B&R

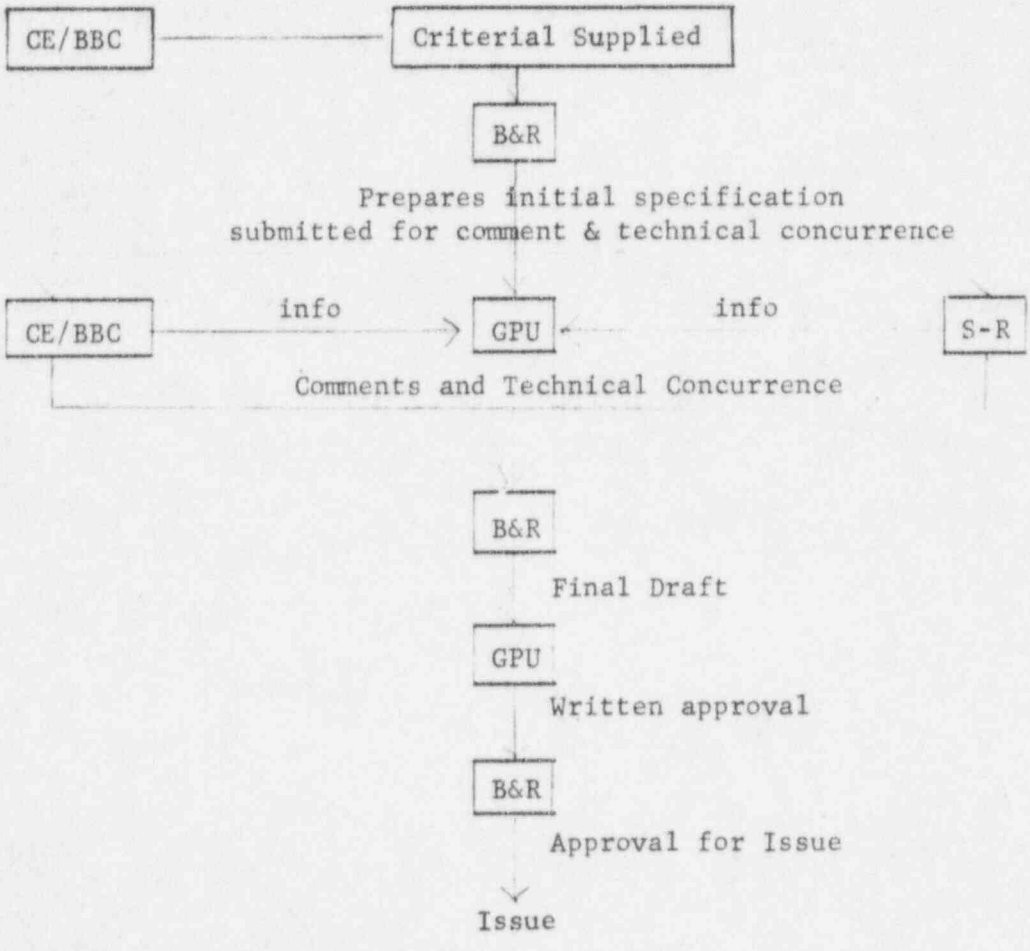
B&R is contractually responsible for procurement of all components excluding the NSSS and the turbine generator (to be supplied by CE and Brown-Boveri Corporation respectively).

Preparation through approval chain for specifications and purchase documents is specified in a document approved by all project management involved, entitled "Project Organization and Responsibilities".

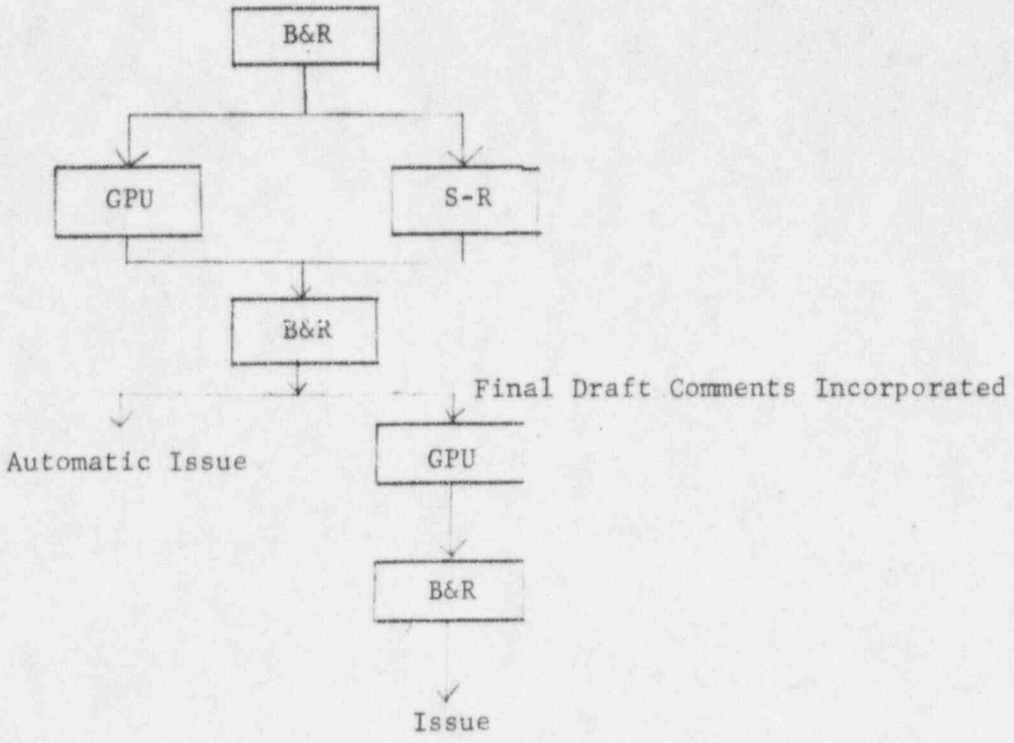
The flow of documents for approval is as follows:

(1) Specifications

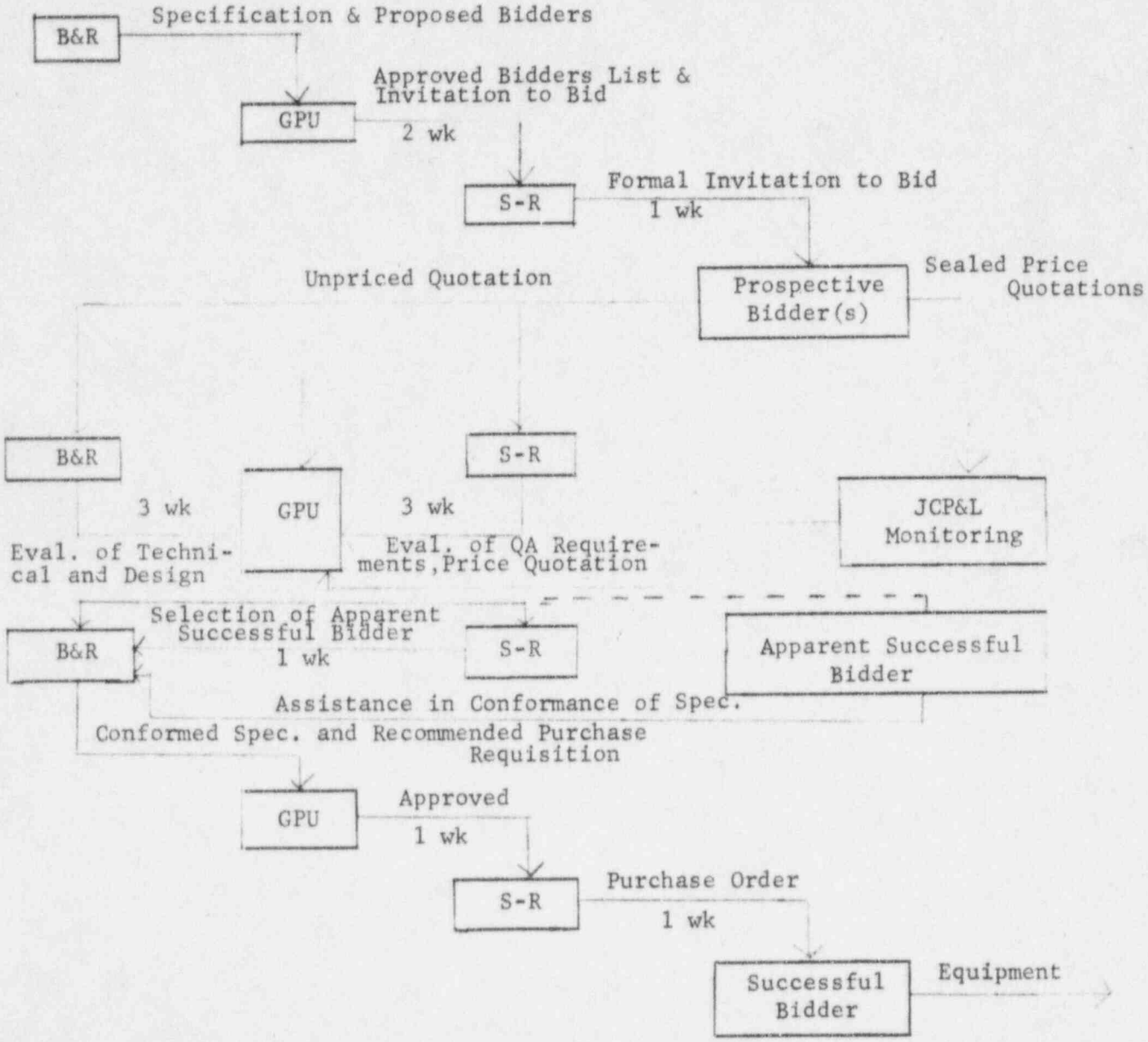
(a) Interfaced Specification



(b) B&R Originated



(2) Procurement Documents



B&R is responsible to establish a proposed bidders list for B&R procured components. B&R procedure 84-9 "Quality Assurance Pre-Qualification Program" provides for a contractor quality assurance program questionnaire which is sent out to each new contractor. A proposed bidders list is then forwarded to GPU.

Upon submittal of the prospective vendor bids, B&R may be requested by GPU to conduct a pre-award survey of the proposed vendors QA program. B&R procedure 84-1 "Contractor Quality Control Survey" is used for pre-award survey. This same procedure is followed for vendor audits during fabrication.

B&R is responsible to review the engineering and design requirements of the vendor submitted bid documents. This excludes the NSSS which is a CE responsibility.

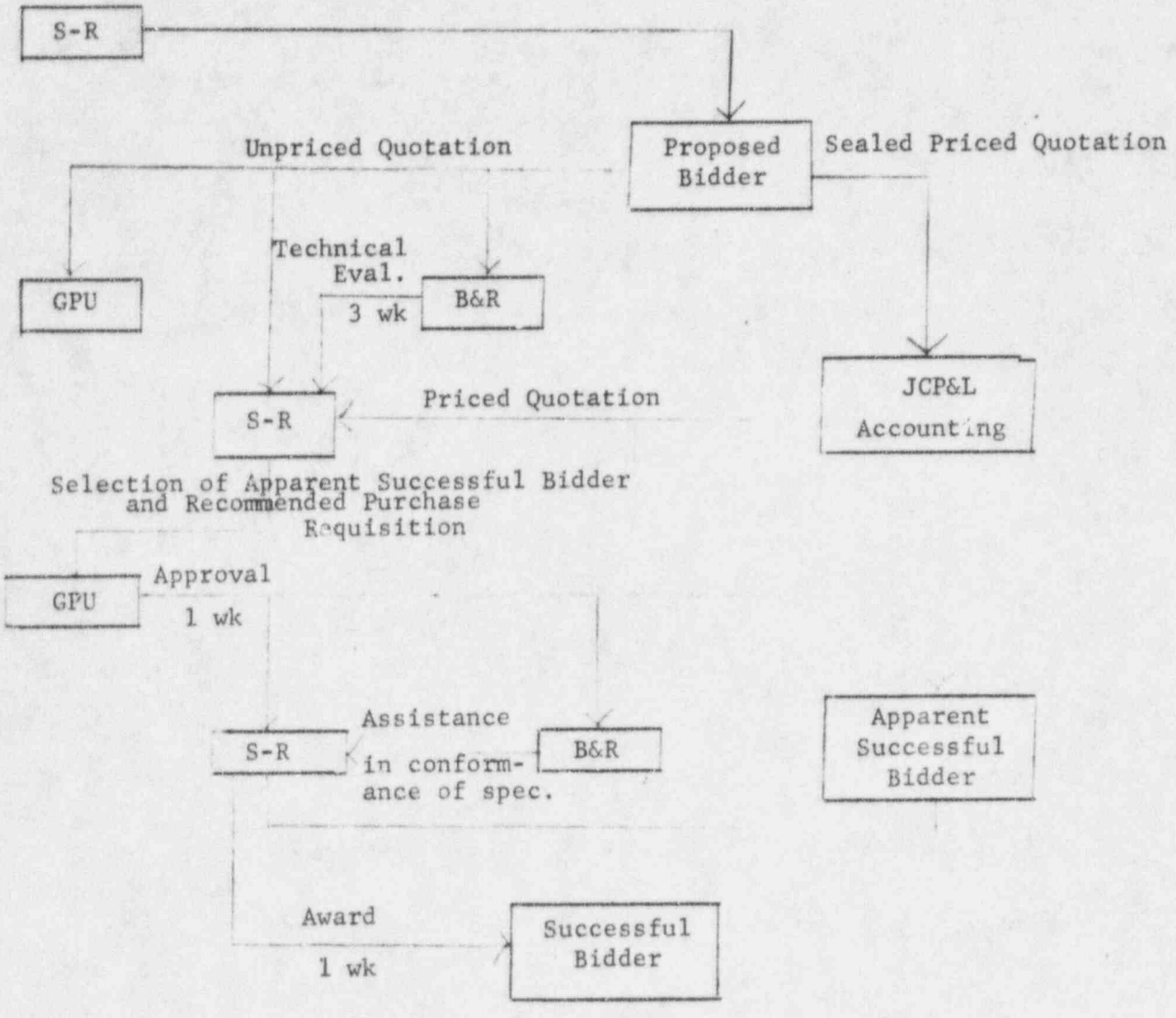
All B&R nuclear related purchase documents will include JCP&L generic QA document "Quality Assurance Requirements for Contractors and Subcontractors". Categories assigned will be based on GPU procedure 4-1, "Material Classification/Categories."

c. S-R

S-R is contractually responsible for site procurement. This involves such contractors as excavation, concrete, iron work, etc.

A similar approval chain as for B&R procurement is specified in the "Projects Organization and Responsibilities" document.

The approval chain is as follows:




S-R will review all purchase documents for QA requirements and B&R is responsible to review for technical and engineering design requirements. (Excluding NSSS)

S-R has basically two procedures which control S-R's procurement activities. QA-4 "Drawing, Specification, and Purchase Document Control" defines responsibilities and lines of flow for S-R procurement for site activities. This included defining responsibilities for review and issue of drawings, specifications, and purchase documents.

S-R procedure QC-21 "Design Review" defines S-R responsibility in the review chain for B&R procurement document review.

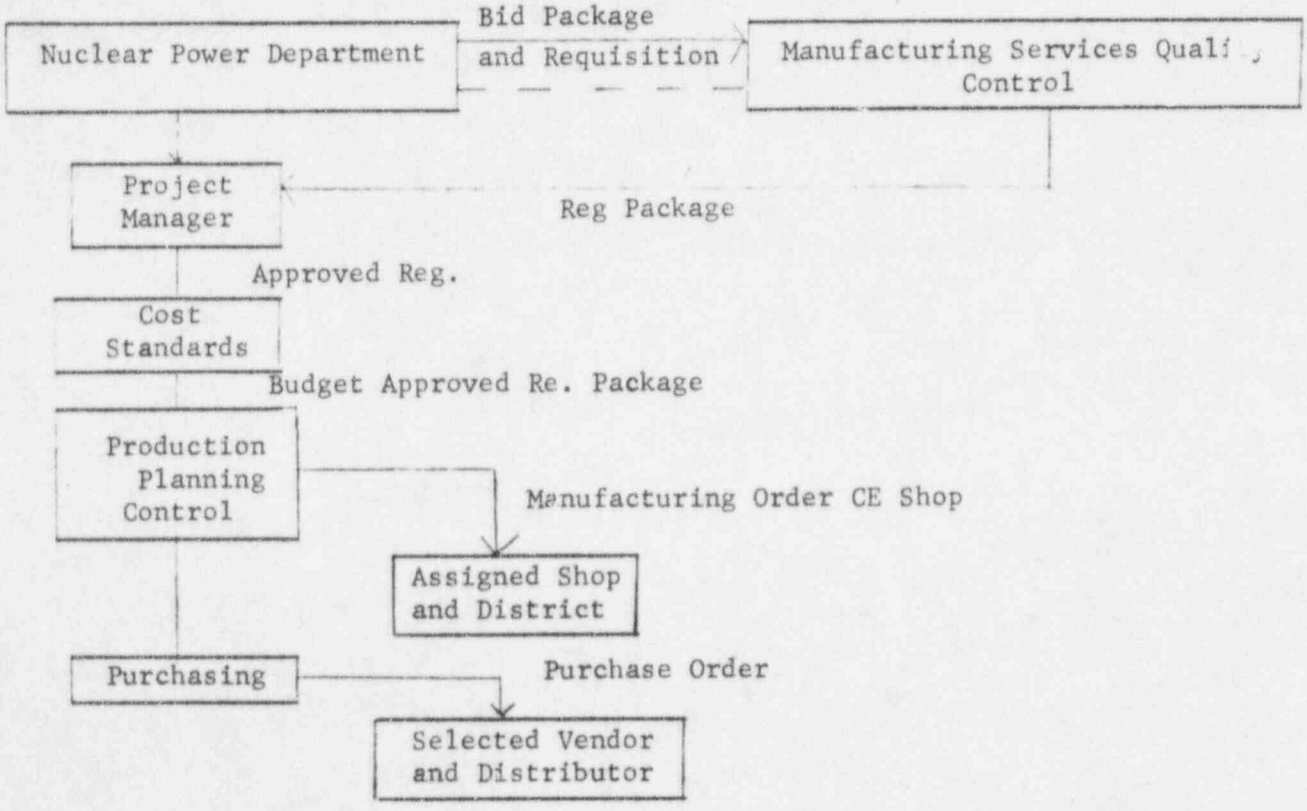
QA-4 was stated to be in draft form and QC-21 was scheduled to be completed by April 1971.

All S-R purchase documents will include JCP&L generic QA document "Quality Assurance Requirements for Contractors and Subcontractors". Categories assigned will be based on GPU procedure 4-1 "Material Classification/Categories."

d. CE

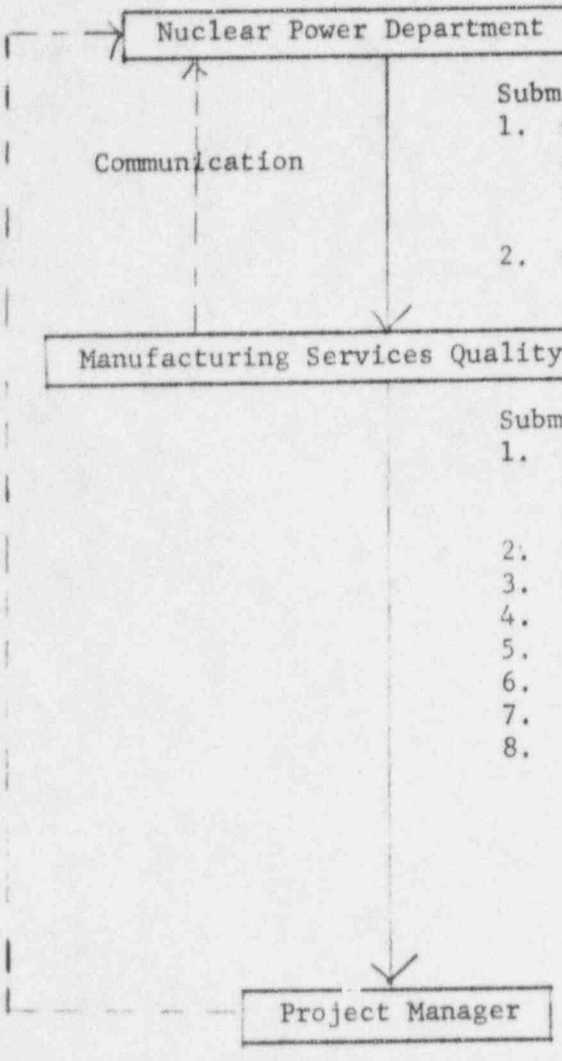
CE is contractually responsible for procurement of NSSS components based on approved bidders list which has been approved by B&R and GPU.

CE vendor selection is governed by CE procedure WQC-11.2 "Procedure for Pre-Award Quality Planning and Vendor Selection Control." The approved flow path is defined in this procedure as follows:




Overall Flow

Function of Manufacturing Services Quality Control




Submits Bid Package and Requisition

1. Quality level included based on WQC-11.2, "Procedure for Pre-Award Quality Planning and Vendor Selection Control."
2. QC comments to be resolved.

Submits Bid Package and Requisition

1. Reviews for applicable requirements of WQC-11.1 "Quality Control Program Requirements for Suppliers of Nuclear Components and Equipment."
2. Resolve QC requirements with engineering.
3. Vendor survey if requested.
4. Inform purchasing if QC is less than acceptable.
5. Review unapproved vendors.
6. Provide source inspection as required.
7. Issue an updated vendor list once per year.
8. Provide following services for purchasing:
   a. Evaluate new source.
   b. Approve of new source.
   c. Purchasing arranges coordination between vendor and CE.
   d. Assists in assuring vendor compliance with data submitted.

GPU has contractually committed CE to GPU document 2700-1 "Nuclear Steam System." This document basically imposes the material classifications defined in GPU procedure 4-1 "Material Classification/Categories" and the generic QA requirements of JCP&L purchase document "Quality Assurance Requirements for Contractors and Subcontractors."

In discussion with Mr. Colandrea, the inspector was informed that CE procedures WQC-11.1 "Quality Control Program Requirements for Suppliers of Nuclear Components and Equipment" and WQC-11.2 "Procedure for Pre-Award Quality Planning and Vendor Selection Control" were being modified to reflect the requirements of GPU document 2700-1 "Nuclear Steam System."

WQC-11.1 was to be modified to reflect the generic QA requirements of JCP&L purchase document "Quality Assurance Requirements for Contractors and Subcontractors." WQC-11.2 was to be modified to reflect the material classification of GPU procedure 4-1 "Material Classification/Categories." Mr. Colandrea informed the inspector that a two category classification system will be used in WQC-11.2.

2. Findings (Procurement Document Control)

a. GPU has delegated the task of procurement to its primary contractors. GPU has maintained responsibility by retaining final approval of B&R and S-R award of the final bid selections. GPU has approved CE's bidder list, but does not approve each individual bid.

b. Measures are being established by CE, B&R, and S-R to meet the intent of this criterion. Final development of approved procedures and instructions has not, however, been completed. GPU should assure that completion is timely and commensurate with project status. Reinspection for adequacy of final approved procedures would appear necessary.

c. GPU's QA program for procurement generally meets the inspector's understandin of the intent of Criterion IV. The borderline at which one assigns generic QA requirements of these criteria to some material classifications and not to others remains as a grey area. (See Attachment III). What may be adequate for procurement, may not be adequate for field installation.

d. GPU review of purchase documents for appropriate QC, PSAR, and code requirements is on an "if required" basis. Clear guide lines appear to be needed in this area.

Criterion VII - Control of Purchased Material, Equipment, and Services

1. Discussion

S-R and B&R will include in JCP&L generic QA document "Quality Assurance Requirements for Contractors and Vendors" in their originated procurement documents. CE will include WQC-11.1 "Quality Control Program Requirements

for Suppliers of Nuclear Components and Equipment" in their originated procurement documents. It appears that these generic QA documents adequately meet the intent of this criterion. Documentary evidence of compliance with the requirements of this criterion are to be available on site including CE (NSSS) procured and manufactured components. GPU will conduct overall audit of the program although no overall audit of the program schedule was evident. B&R will conduct vendor audit for B&R procured components (excluding NSSS). Schedule and hold points to be established at time bidder is approved. S-R will conduct site audits of S-R procured vendors. CE will conduct vendor audits. Schedule and hold points are to be established per WQC-11.1 and 11.2.

2. Findings

GPU QA program for procurement meets the inspector's understanding of the intent of this criterion. A GPU overall systematic schedule of audits was not evident at this time.

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Attachment I

4-1 "Material Classification/Categories"

Category 1

1. Applies to the containment system.

2. Applies to nuclear fuel and control elements.

3. Applies to those high pressure and temperature systems and components which are located within containment and whose failure could directly cause one or more of the following:

   a. The postulated design basis accident.

   b. An excessive loss of reactor coolant.

   c. An excessive loss of main steam or feedwater.

   d. An excessive loss of a radioactive fluid.

   NOTE: All pressure and temperature qualifications referenced in this document are based on design conditions rather than operating conditions. High pressure: Those pressures exceeding 150 psig. High temperature: Those temperatures exceeding 212°F.

Category 2

1. Applies to those high pressure and tempreature systems and components which are located within the containment and whose failure could not cause an excessive loss of the following:

   a. Reactor Coolant.

   b. Main stear or feedwater.

   c. A radioactive fluid.

2. Applies to those high pressure and temperature systems and components which are located outside the containment and contain reactor coolant or a radioactive fluid either under normal conditions or following a LOCA.

3. Applies to those systems and components which are located within the containment and contain a combustible fluid.

Category 3

1. Applies to those low pressure or temperature systems and components located within the containment.

2. Applies to those low pressure or temperature systems and components which are located outside of the containment and contain reactor coolant or a radioactive fluid either under normal conditions or following a LOCA.

3. Applies to those portions of low pressure or temperature engineered safety items which are located outside the containment and are non-redundant.

Category 4

Applies to those non-radioactive and redundant components and systems of nuclear related portions of the plant which are located outside of containment and whose failure would not create a nuclear safety hazard, or hazardous conditions to operating personnel, nor would it seriously affect the plant operational capability.

Example: Diesel generators, component cooling water systems.

## Electrical Instrumentation/Control Components/Systems

Category 1

Category 1 applies to electrical, instrumentation, and control equipment which meets all of the following:

a. It is vital to plant operability/plant.

b. It is specially designed equipment.

c. It is located inside containment.

d. There is no redundant or backup system and/or equipment available.**

**Redundant means that equivalent systems are available to perform the same functions so that plant operation is unaffected by failure in the sense that a non-redundant component is a reactor coolant pump whose failure of a single pump impairs plant operation. This may be contrasted to a failure of one of the three charging pumps, which would not impair plant operation.

Examples: plant operability, reactor coolant pumps motor; plant safety, control rod drive mechanism holding coils.

Specially designed equipment is defined as equipment of the design unique to the plant or which is not proven by extensive use in equivalent service and environmental conditions.

Category 2

1. Category 2 applies to electrical instrumentation and control equipment which meets all of the following:

   a. It is directly associated with the operability or availability of the primary coolant system independent of redundancy or backup.

   b. It is located inside containment.

   c. It is not included in Category 1.

      NOTE: Inner connecting wire, cable inside the containment building is specifically excluded from this category and shall be placed in Category 4 discussed below.

   Examples: (1) Instrumentation equipment, portions of the reactor coolant, instrumentation system, steam generator water level, control systems, rod position indication systems, etc., located inside containment.

   (2) Control equipment - valve operators located inside containment and associated with a reactor coolant system. An example--pressurizer spray valve operator.

2. Category 2 also applies to electrical instrumentation and control equipment which meets all of the following:

   a. It is directly associated with the operability or availability of plant safety systems, independent of redundancy or backup.

   b. It is located inside containment.

   c. It is not included in Category 1.

      NOTE: Inner connecting wires and cables inside the containment building are specifically excluded from this category and shall be placed in Category 4.

   Examples: (1) Instrumentation portions of the emergency system actuation system in containment detectors which sense increasing building pressure in event of LOCA. Also that portion of the reactor protection system located inside containment.

(2) Control equipment valve operators located inside containment buildin? associated safety systems. For example, the operators for the isolation valves for the core flooding tanks or the operators on the valves in the decay heat removal system located inside containment.

(3) Electrical equipment or switch gears which are a portion of the engineering safeguards system, for example, the motors in the reactor building air coolers.

3. Categroy 2 applies to containment building electrical assemblies, non-pressure bound reports.

4. Category applies to electrical, instrumentation, and control equipment which meet all of the following:

   a. It is directly associated with the operability or availability of the reactor coolant system independent of redundancy or backup.

   b. It is located outside containment.

   c. It is especially designed equipment.*

   Examples: (1) Instrumentation equipment outside containment portion of the reactor instrumentation system, nuclear instrumentation system, steam generator water level control system, pressurizer control system, rod position indication system, etc.

   (2) Specially designed valve operators located outside the containment directly associated with the operability of the reactor coolant system, specially designed main steam valve operators.

5. Category 2 applies to electrical instrumentation in control equipment which meets all of the following:

   a. It is directly associated with the operability and availability of plant safety systems independent of redundancy or backup.

   b. It is located outside containment.

   c. Specially designed equipment.*

---

* Specially designed equipment is defined as equipment of a design unique to plant, or which has not proven by extensive use in equivalent service and environment conditions. Note: No examples of this equipment are shown.

Category 3

The categories for electrical instrumentation and control equipment closely correspond to the categories used for pressure containing components and systems and mechanical machinery. There are four levels defined for use in mechanical area for simplicity. The same level number is chosen for the most nearly corresponding level in the electrical area. There is no level for electrical instrumentation and control equipment corresponding to Category 3 defined for mechanical equipment.

Category 4

1. Categroy 4 applies to all other electrical instrumentation, control of equipment. Items to be covered by Category 4 are equivalent and systems which are located outside containment and which, in general, meet the following additional conditions.

   a. Are normally accessible to operating and maintenance personnel.

   b. Have no unusual design conditions, other then seismic.

   c. Have redundant components and/or systems backing them up should they fail to function properly.

   d. Are routinely tested to insure that their required performance is not deteriated with the life.

   Therefore, this equipment is considered unvital to plant safety or operability. The failure of this equipment would not create a legal or safety hazard.

2. With regard to the last category, the pertinent quality control requirements are to be applied in the individual equipment specifications rather then by using the generic quality control specification, as is the case for Categories 1 and 2. In essence, the QC for this category is tailored to the individual components and systems. For examples, commerical standards, quality controls procedures could be used to control manufacture of the equipment and, in addition, specific functional test requirements may be laid on to insure the performance requirements are met.

   Examples: The emergency diesel generators, electrical switch gear, pump motors located outside containment, valve operators and auxiliary systems external to containment, auxiliary systems, instrumentation and control equipment, electrical wiring cables, etc.

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Attachment III

Comparison of "Quality Assurance Requirements for JCP&L Company Contractors and Vendors" To Appendix B 18 QA Criteria

## Criterion I - Organization

### Nuclear Category 1

Formal organization required in Section III, 1.0, "Organization" and appears to meet the intent of this criterion.

### Nuclear Categories 2 and 3

No formal organization required; however, Section I,7.5 states:

> "The contractor/vendor shall clearly define authority and responsibilty of those people in charge of design production, testing and inspection of Quality."

Organizational freedom and independence of persons performing QC is not specifically designated for these categories.

## Criterion II - Quality Assurance Program

### Nuclear Categories 1, 2, and 3

Section I, 7.0 "General Requirements" outlines general requirements consistent with this criterion.

## Criterion III - Design Control

### Nuclear Category 1

Section III, 2.0 "Initial Quality Planning and Design Review" meets the general intent of this criterion. Control of field changes appears to be adequately controlled by Section III, 15.0 "Nonconforming Material."

### Nuclear Categories 2 and 3

Requirements of this criterion are not imposed on these categories. Control of field changes is maintained as stated above.

Criterion IV - Procurement Document Control

Nuclear Categories 1 and 2

Section III, 4.0 "Procurement Document Control" generally meets the intent of this criterion.

Nuclear Category 3

No specific requirements; however, GPU document "Quality Assurance Requirements for Contractors/Vendors" and CE WQC-11.1 are a part of all purchase documents and appear to meet the intent of this criterion.

Criterion V - Instructions, Procedures, and Drawings

Nuclear Categories 1, 2, and 3

Section I and Section III adequately cover all categories and appear to meet the intent of this criterion.

Criterion VI - Document Control

Nuclear Category 1

Section III, 3.1(d) "Work Instructions", 5.1 "Control of Special Processes, Tests, and Inspections", 8.1 "Revision to Manufacturing/QA Plans", and 11.1 "Documentation Facilities and Standards" are applicable and appear to satisfy the intent of this criterion.

Nuclear Category 2

Same as category 1 except for Section III, 3.1(d) "Work Instructions." Appears to satisfy the intent of this criterion.

Nuclear Category 3

Section III, 5.1 "Control of Special Processes, Tests, and Inspections" is applicable to this criterion. Requirements for current instructions are part of this section; however, formal review and approval are not specified for this category as required by Criterion VI.

Criterion VII - Control of Purchase Material, Equipment, and Services

Nuclear Category 1

Section I, 7.0 "General Requirements and Section III, 3.1 "Work Instructions", 10.0 "Corrective Action", 12.0 "Control of Purchases" are applicable and appear to meet the intent of this criterion.

Nuclear Categories 2 and 3

Same as above except for Section III, 3.1 "Work Instructions." Appears to meet intent of this criterion.

Criterion VIII - Identification and Control of Material, Parts, and Components

Nuclear Categories 1, 2, and 3

Section III, 6.0 "Control and Identification of Material/Parts/Components" is applicable and appears to meet the intent of this criterion.

Criterion IX - Control of Special Processes

Nuclear Categories 1, 2, and 3

Section III, 5.0 "Control of Special Precesses, Tests, and Inspection" is applicable to all three categories appears to meet the intent of this criterion.

Criterion X - Inspection

Nuclear Categories 1 and 2

Section III, 5.0 "Control of Special Processes, Tests, and Inspections", 7.0 "Production Processing and Fabrication", 8.0 "Revision to Manufacturing/Quality Control Plans", and 9.0 "Records" are applicable for these categories and appear to meet the intent of this criterion.

NOTE: Words to the effect that inspection shall be performed by individuals other than those who performed the activity are not implicitly stated.

Nuclear Category 3

Same as above except for Section III, 8.0 and 9.0 are not applicable to this category. Appears to meet the intent of this criterion except as in note above.

Criterion XI - Test Control

Nuclear Categories 1 and 2

Section III, 5.0 "Control of Special Processes, Tests and Inspections", 7.0 "Production, Processing and Fabrication", 8.0 "Revision to Manufacturing/Quality Control Plans", 9.0 "Records", and 21.0 "Data Submittals" are applicable to these categories and appear to meet the intent of this criterion.

Nuclear Category 3

Same as above except for Section III, 7.0 and 8.0. Appears to meet the intent of this criterion.

Criterion XII - Control of Measuring and Test Equipment

Nuclear Category 1

Section III, 3.0 "Work Instructions", 11.0 "Documentation/Facilities/Standards" are applicable to this category and appear to meet the intent of this criterion.

Nuclear Category 2

Section III, 11.0 "Documentation/Facilities/Standards" is applicable to this category and appears to meet the intent of this criterion.

Nuclear Category 3

It appears the intent of this criterion is not be be met by this category.

Criterion XIII - Handling, Storage, and Shipping

Nuclear Category 1

Section III, 3.0 "Work Instructions, 14.0 "Handling, Storage and Delivery", and 18.0 "Coordinated JCP&L (Or Agent) Supplier Actions" are applicable and appear to meet the intent of this criterion.

Nuclear Categories 2 and 3

Same as above except for Section III, 3.0. Appears to meet the intent of this criterion.

Criterion XIV - Inspection, Test, and Operating Status

Nuclear Categories 1 and 2

Section III, 6.0 "Control and Identification of Material/Parts/Components", 13.0 "Manufacturing Control", 17.0 "Indication of Inspection Status", and 21.0 "Data Submittals" are applicable and appear to meet the intent of this criterion.

Nuclear Category 3

Same as above except for Section III, 13.0 and 17.0. Appears to meet the intent of this criterion; however, does not specifically require indication of inspection status.

Criterion XV - Nonconforming Material, Parts, or Components

Nuclear Categories 1, 2, and 3

Section III, 15.0 "Nonconforming Material" and all of Section IV "Nonconforming Material Contract Deviations" are applicable and appear to meet the intent of this criterion.

Criterion XVI - Corrective Action

Nuclear Categories 1, 2, and 3

Section III, 10.0 "Corrective Action" is applicable to these categories and appears to meet the intent of this criterion.

Criterion XVII - Quality Assurance Records

Nuclear Category 1

Section III, 7.0 "Production Processing and Fabrication" and 9.0 "Records" are applicable and appear to meet the intent of this criterion.

Nuclear Categories 2 and 3

Section III, 9.0 "Records" is applicable and appears to meet the intent of this criterion.

Criterion XVIII - Audits

Nuclear Categories 1, 2, and 3

Section III, 22.0 "Audits" is applicable to these categories and appears to meet the intent of this criterion.

NOTE: Nuclear Category 4 QC requirements will be specified in the purchase order or contract.

ATTACHMENT II

# QUALITY ASSURANCE REQUIREMENTS

*for*

## *JERSEY CENTRAL POWER & LIGHT Co.*

## *CONTRACTORS & VENDORS*

**FORKED RIVER NUCLEAR STATION UNIT I**

APPROVED BY:

B.G. AVERS
Manager
Quality Assurance

R.W. HEWARD Jr.
Project Manager
Forked River - unit 1

GPU ELECTRIC POWER COMPANIES

•INITIAL RELEASE: SEPTEMBER 26, 1970

•REVISED:

•ISSUED TO –

•DATE ISSUED –

# QUALITY ASSURANCE REQUIREMENTS FOR CONTRACTORS/VENDORS

## SECTION I

## GENERAL OUTLINE

### 1.0 PURPOSE

1.1 This document outlines the general and specific requirements for Quality programs of JCP&L's or its agent's contractors and vendors, and defines the minimum Quality Program requirements which a Contractor/Vendor must establish and maintain to assure compliance with applicable contracts and purchase documents.

### 2.0 SCOPE

2.1 The contents provided herein are for use in establishing an effective/economical Quality program compatible with the individual Contractor's or Vendor's operation and are not intended to rigidly define or restrict the methods employed by the Contractor or Vendor in implementing these requirements.

### 3.0 APPLICABILITY

3.1 All Contractors/Vendors who supply parts/material/products or perform services for JCP&L or its agents are subject to all general and applicable specific requirements designated for the appropriate category of material, as outlined in Paragraph 6.0.

3.2 In the event of a conflict between the Purchase Order, product specification and/or the requirements stated herein, the order of precedence shall be the Purchase Order, product specification and this document, unless otherwise stipulated by JCP&L or its agents.

Note: All such conflicts shall promptly be brought to the attention of JCP&L or its agents.

3.3 The specific sections of this document which apply to a given contract are defined by classification and category in the Purchase Order or contract, unless otherwise stated in writing by JCP&L or its agents.

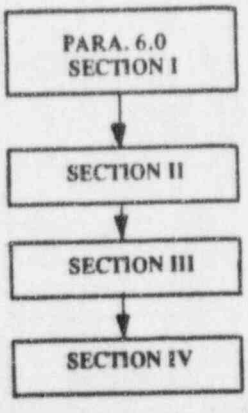
### 4.0 CONTRACTUAL INTENT

4.1 Quality program requirements as outlined herein shall be developed by the supplier and will be subject to review by, and resolution(s) satisfactory to, JCP&L and/or its agents. These requirements shall include procedures, processes and any other documents used to describe the Contractor's/Vendor's Quality program.

4.2 The Contractor's/Vendor's Quality program shall meet the applicable requirements specified by this document. In the event the Contractor's/Vendor's procedures or methods do not accomplish their objectives, they shall be corrected and resolved to the satisfaction of JCP&L or its agents.

### 5.0 INTERPRETATION OF DOCUMENT REQUIREMENTS

5.1 The following is a flow diagram and overall outline which should be followed by the Contractor/Vendor in interpreting which specific requirements within this document apply to his respective bid and/or Purchase Order agreement with JCP&L or its agents:




defines the material classifications/categories used by JCP&L or its agents in determining the relative importance of, and requirements for, control of purchases. e.g., Nuclear Classification Category 1, 2, 3, or 4, or Non-Nuclear Classification.

defines in tabular form the minimum Quality program requirements for each material classification/category. (These requirements are listed numerically from 1 through 22).

defines the detailed requirements for each of the 22 requirements listed in Section II.

defines the specific method for Contractor/Vendor review, submittal and handling of non-conforming material and deviations from contract requirements.

5.2 The following guidelines shall be used by the Contractor/Vendor in determining the extent of participation and/or compliance required on his part to meet the requirements of this document:

A. Using the appropriate material classification/category specified in the request for bid or Purchase Order, refer to Section II which defines each of those 22 requirements applicable to the specific bid or Purchase Order agreement.

B. Upon establishing which numbers (1 through 22) apply to the classification/category of material to be provided, the Contractor/Vendor shall review the specific requirements for each of these items, as shown in detail in Section III, to determine their effect and/or applicability to his overall Quality system.

C. Prepare or adapt a Quality program to meet these specified requirements.

D. Submit his Quality program for review to JCP&L or its agents. (Ref. Sec. III, Para. 21.1).

E. When the Quality program submitted has been reviewed and problems which have arisen are mutually resolved, implement the applicable requirements during the entire performance of the contract/Purchase Order agreement.

Note: In the event the Contractor/Vendor requires assistance in interpreting any of the contents specified in this document, he may request clarification and assistance from:

Quality Assurance Manager
Quality Assurance Section
Power Department
General Public Utilities Corporation
260 Cherry Hill Road
Parsippany, New Jersey 07054
Tel: (201) 539-6111, Ext. 651

## 6.0 MATERIAL CLASSIFICATION/CATEGORY DESIGNATIONS

6.1 Two general Material Classifications shall be assigned to all JCP&L or its agent's Purchase Orders to identify the appropriate end use of the product or service being furnished under a respective contract and/or project:

Classifications:
A. "Nuclear Related" B. "Non-Nuclear Related"

6.2 Determination as to the degree of Contractor/Vendor compliance required to meet quality requirements are considered on an individual basis depending on the items function, order of importance, relation and effect on specific project requirements.

6.3 The Nuclear-related Material Classification is divided into four (4) distinct Categories and will be reflected on the applicable Purchase Order and/or Contract document by one of the following entries:

"Nuclear Category 1" "Nuclear Category 2" "Nuclear Category 3" "Nuclear Category 4"

6.4 The Category designations within the "Non-Nuclear Classification" are not defined due to the multitude and variety of items falling under this classification. However, Quality requirements for use in control of "Non-Nuclear" items or services will be specified on the individual Purchase Order and/or respective specification.

## 7.0 GENERAL REQUIREMENTS

7.1 The Contractor/Vendor shall establish an effective/economical Quality program planned and developed in consonance with the Contractor's/Vendor's other administrative and technical programs.

7.2 The program shall be based upon consideration of the technical and manufacturing aspects of production, related engineering design, materials and their effects upon the operation of a nuclear steam generating plant.

7.3 The Contractor's/Vendor's Quality program shall include provisions for:

7.3 The Contractor's/Vendor's Quality program shall include provisions for:



7.3.1 Assurance that adequate quality is maintained throughout all areas of contract performance; for example, design, development, fabrication, processing, assembly, inspection, test, maintenance, packaging, shipping, storage, and site installation, as applicable.

7.3.2 Control of all supplies and services, under the contract, whether manufactured or performed within the Contractor's/Vendor's plant or at any other source. Such control shall be maintained at all points necessary to assure conformance to Purchase Order and Contract requirements.

7.3.3 Provide for the prevention, ready detection and recording of non-conformance and for timely and positive corrective action.

7.3.4 Positive control of instructions and records for Quality.

7.3.5 Definition of a system for assuring that all appropriate personnel are informed of current changes in engineering drawings, specifications and Quality Control procedures.

7.3.6 Proper identification of purchased material and subcontracted work.

7.3.7 Complete control of manufacturing, fabrication and assembly work within the Contractor's/Vendor's plant.

7.3.8 Proper management of facilities and standards such as drawings, engineering changes, measuring equipment and related items which are necessary for the creation of required quality.

7.4 The Contractor/Vendor shall make Objective Evidence of Quality conformance readily available to JCP&L or its agents. (Reference Para. 8.4 Definitions)

7.5 The Contractor/Vendor shall clearly define the authority and responsibility of those people in charge of the design, production, testing and inspection of Quality.

7.6 The term "Specific Q.C. Program requirements" as defined in Section III identifies the collective requirements applicable to the Contractor/Vendor, which are a breakdown of the overall responsibilities cited in these general requirements.

7.7 Except for those specific requirements for inspections and tests necessary to determine product acceptance and/or the satisfactory performance and accomplishment of services and special processes performed under the contract, the Contractor/Vendor may fulfill certain other requirements of this document or delegate their performance to individuals or functions within their organization, other than their own Quality organization, provided that:

A. Final responsibility in assuring Quality for these functions rests with the Contractor's/Vendor's Quality organization.

B. Delegation of authority for performing such functions are defined in the Contractor's/Vendor's Quality Control procedures.

## 8.0 DEFINITIONS & ABBREVIATIONS

8.1 JCP&L – denotes Jersey Central Power & Light Company; for contract purposes, is synonymous with Buyer, Purchaser, Owner, etc.

8.2 AGENT(S) – denotes persons or companies authorized to act in behalf of JCP&L.

8.3 CONTRACTOR/VENDOR – denotes any manufacturer, contractor, seller, outside purchaser, outside source, supplier or vendor; includes any person or firm supplying material, parts, assemblies, sub-assemblies and/or services to JCP&L or its agents.

8.4 OBJECTIVE EVIDENCE – consists of, but is not limited to, any applicable records, logs, data sheets, mill certifications, test results, automatic data recorder print-out, etc. which substantiates and/or verifies product conformance or satisfactory performance of services to product specification and/or contract requirement.

## 9.0 RELATION TO OTHER CONTRACT REQUIREMENTS

9.1 This document and any procedure or document executed in implementation thereof, shall be a part of, but not necessarily a duplication of, other Contract requirements.

9.2 The Quality program requirements set forth in this document shall be satisfied in addition to all detail requirements contained in the statement of work or in other parts of the contract.

9.3 The Contractor/Vendor is responsible for compliance with all provisions of the contract and for furnishing specified supplies and services which meet all the requirements of the contract. If any inconsistency exists between the contract or its general provisions and this document, the contract and general provisions shall control.

9.4 The Contractor's/Vendor's Quality program shall be planned and implemented in a manner conducive to effectively supporting JCP&L's or its agent's program requirements.

## 10.0 AMENDMENTS AND REVISIONS

10.1 Whenever this document is amended or revised subsequent to its contractually effective date (normally Purchase Order acceptance date), the Contractor/Vendor may follow or authorize his sub-contractors or sub-tier vendors to follow the amended or revised document provided no increase in price or fee is required.

# SECTION II

## 1.0 SPECIFIC Q.C. PROGRAM REQUIREMENTS FOR MATERIAL CLASSIFICATIONS & CATEGORIES

1.1 Table I defines the minimum specific quality control elements needed to meet the material classifications/categories outlined in Section 1, Para. 6.0. Contractor/Vendor Q.C. programs shall be adapted to meet all items marked by (*) asterisk within the applicable material classification/category.

| SEC. II ITEM NO. | QUALITY PROGRAM REQUIREMENTS | CLASSIFICATIONS | | | | |
|---|---|---|---|---|---|---|
| | | Non Nuclear | Nuclear Categories 1 | 2 | 3 | 4 |
| 1 | Organization | | * | | | |
| 2 | Initial Q.C. Planning & Design Review | | * | | | |
| 3 | Work Instructions | | * | | | |
| 4 | Procurement | | * | * | | |
| 5 | Control of Special Processes, Tests & Inspections | | * | * | * | |
| 6 | Control & Identification of Material/ Parts/Components | | * | * | * | |
| 7 | Production Processing and Fabrication | | * | * | | |
| 8 | Revision to Manufacturing/Quality Control Plans | | | | | |
| 9 | Records | | * | * | * | |
| 10 | Corrective Action | SEE 2.0 | * | * | * | SEE 2.0 |
| 11 | Documentation/Facilities/Standards | | * | * | | |
| 12 | Control of Purchases | | * | * | * | |
| 13 | Manufacturing Control | | * | * | | |
| 14 | Handling/Storage/Delivery | | * | * | * | |
| 15 | Non-Conforming Material | | * | * | * | |
| 16 | Statistical Quality Assurance & Analysis | | | * | * | |
| 17 | Indication of Inspection Status | | * | * | | |
| 18 | Coordinated JCP&L (or agents) Supplier Actions | | * | * | * | |
| 19 | Reference Data | | * | * | * | |
| 20 | JCP&L Quality Control Surveillance | | * | * | * | |
| 21 | Data Submittals | | * | * | * | |
| 22 | Audits | | * | * | * | |

## 2.0 NON-NUCLEAR/NUCLEAR CATEGORY IV

2.1 Quality requirements for these classifications including any other documentation which may be required will be specified in the Purchase Order or Contract.

2.2 The kind and amount of control and/or program requirements for these classifications will be determined by the Owner or its agent's Quality Assurance Department prior to final release of the applicable Purchase Order. Determination of Q.C. requirements will be based on the nature of the product/service and the amount of engineering and/or quality assurance participation required to assure conformance to contract and product/service effect on overall project requirements.

# SECTION III
# SPECIFIC Q.C. PROGRAM REQUIREMENTS

## 1.0 ORGANIZATION

1.1 The Contractor/Vendor shall have a Quality organization which has the authority and responsibility for assuring that the Contractor's/Vendor's Q.C. program is established, planned and implemented in accordance with the applicable requirements defined in this document.

1.2 The Quality organization shall define in writing the responsibilities and duties of personnel involved in the Quality program.

1.3 Personnel performing Quality functions shall have sufficient, well defined responsibility, authority and organizational freedom to identify and evaluate and to initiate, recommend or provide solutions to Quality problems. These personnel shall be fully qualified, properly trained and shall have adequate knowledge of the specific function which they are responsible to perform.

## 2.0 INITIAL QUALITY PLANNING AND DESIGN REVIEW

2.1 The Contractor/Vendor, prior to award of the contract, shall conduct a complete review of the requirements of the contract to identify and take timely action for assuring that the special controls, processes, test equipment, fixtures, tooling (used as an acceptance media), and skills required for assuring product Quality are defined, and procedures for control of Quality are established, available for review and are in effect prior to their use.

2.2 As part of his initial planning, the Contractor/Vendor shall review the requirements of the contract to insure that all necessary Quality procedures and instructions are established in accordance with the applicable specifications, codes and/or standards specified in the contract.

2.3 The Contractor/Vendor shall have written procedures which will provide for verifying or checking the adequacy of design and subsequent changes or revisions thereto, such as by performance of design reviews, alternate or simplified calculational methods, or by the performance of a suitable testing program. The verifying or checking process shall be performed by individuals or groups other than those who performed the original design but who may be from the same organization.

## 3.0 WORK INSTRUCTIONS

3.1 The Contractor's/Vendor's Quality program shall assure that all work affecting Quality shall be prescribed in clear and complete documented instructions of a type appropriate to the respective circumstance(s). Included in this requirement are the following areas:

A. Control of purchased equipment, supplies and services.
B. Material Handling, Storage and Preservation.
C. Machining.
D. Submittal of documents and/or changes requiring approval by JCP&L or its agents (e.g., changes to welding procedures, engineering specs., etc.)
E. Control and governing of measurement, inspection and test equipment (including calibration, accuracy and re-calibration frequency requirements).
F. Assembly
G. Fabrication
H. Special Processes
I. Inspection
J. Testing
K. Modification
L. Installation
M. Construction Procedures
N. Any other treatment of product, facilities, standards, or equipment from the ordering of materials to dispatch shipments (when the use of such items are needed for verifying, assuring or substantiating product Quality).

3.2 Such instructions shall provide the criteria for performing work functions and shall be compatible with criteria specified for acceptable workmanship in accordance with the applicable contract requirement. These instructions shall also be intended to serve for supervising, inspection and managing of work.

3.3 The preparation, maintenance of and compliance with work instructions shall be monitored by the Contractor/Vendor as a function of the Quality program.

3.4 The Contractor's/Vendor's Quality program and organizational breakdown shall be documented by means of a Quality Control manual or other appropriate format which describes the overall program in continuity with the Quality Control requirements specified in Section 1, Paragraph 6.0 of this document.

## 4.0 PROCUREMENT DOCUMENT CONTROL

4.1 The Contractor/Vendor shall have written procedures providing for the review and monitoring of procurement documents to assure that the applicable regulating contract requirements, design bases, and other requirements necessary for assuring adequate Quality are incorporated or referenced in documents for procuring of material, equipment and/or services. This review and monitoring shall be performed as a part of the initial procurement documentation and all subsequent changes thereto.

## 5.0 CONTROL OF SPECIAL PROCESSES, TESTS & INSPECTIONS

5.1 Special Processes:

5.1.1 The Contractor/Vendor shall have clear, complete and current written procedures and instructions for control of all special fabrication processes used. Examples are: items such as welding, heat treatment, cleaning, control of tools and fixtures used or an acceptance media, weld electrode control, concrete production and placement and equipment installation at construction site.

5.2 Inspections:

5.2.1 The Contractor/Vendor shall have clear, complete and current written procedures for control of inspections performed. These procedures shall cover such items as: nondestructive inspections (radiography, magnetic particle, liquid penetrant, ultrasonic, etc.), soap bubble inspections, weld fit-up inspections, inspection of concrete production and placement. These procedures shall also include acceptance/rejection criteria for inspections.

5.3 Tests

5.3.1 The Contractor/Vendor shall have clear, complete and current written procedures for control of the required testing. Examples are: procedures for such items as hydrostatic tests, functional tests, acceptance tests. These procedures shall also include acceptance/rejection criteria for the tests.

5.4 Hold and Witness Points:

5.4.1 JCP&L or its agents reserve the right to impose witness and/or hold points on supplies and products during processing.

5.4.2 Any hold or witness points will be identified prior to start of work.

5.4.3 Witness points require five (5) working days' notice (normally Monday through Friday) except in cases where JCP&L or its agent's Quality Control representative is in residence at the Contractor's/Vendor's facility, in which case eight (8) hours shall be deemed sufficient notification. This requirement may only be waived at the discretion of JCP&L or its agent's Quality representative.

Note: The Contractor/Vendor shall not be required to hold up work if the JCP&L representative does not appear within four (4) hours after the agreed time of the event to be witnessed.

5.4.4 Hold points are those points in a process that may not be passed without JCP&L or its agent's concurrence and release.

5.4.5 Witness and hold points will be imposed on those items where safety and performance is of special consideration or may be compromised; however, all such inspections and reviews will be made so as to provide a minimum delay or impact on the Contractor's/Vendor's schedules.

5.4.6 In addition to providing instructions, the Contractor's/Vendor's special processes such as welding, plating, nondestructive testing, heat treating, etc. shall require qualification and/or certification of both equipment and personnel when specified in the applicable specification or Purchase Order.

5.4.7 When qualification or certification is required by applicable specification(s) or its references, only personnel thus qualified shall be permitted to perform such operations or inspections. Records of qualifications and certifications shall be on file and available for JCP&L or its agent's representatives review at all times. The Supplier shall submit to JCP&L or its agents for approval, copies of all special processes and their certification requirements when required by purchase order or product specification.

5.4.8 The use of automatic recording equipment shall be utilized when applicable. Charts and data sheets shall be identified as to components processed and shall be checked, approved, by a qualified Quality representative. (Such checks and approvals shall be signed and dated by the Quality representative making the check).

5.4.9 The Contractor/Vendor shall provide inspection coverage for all special processes.

## 6.0 CONTROL AND IDENTIFICATION OF MATERIAL/PARTS/COMPONENTS

6.1 The Contractor/Vendor shall provide a written procedure which describes controls established for identification, and storage of materials, welding materials, parts, and/or components used in the item or service furnished under contract. This shall also include material certification records as required by the applicable specification for the item under contract.

6.2 All documentation for certifying material, services or tests must indicate the item's end use by part or catalog name and/or part number or engineering number, when called for in the applicable specification, and must reflect at least the owner's or agent's contract number for which the item or service is furnished.

## 7.0 PRODUCTION PROCESSING AND FABRICATION

7.1 The Contractor's/Vendor's Quality program must assure that all machining, wiring, batching, shaping, and all basic production operations of any type, together with all processing and fabricating of any type are accomplished under appropriately controlled conditions. Controlled conditions include documented work instructions, adequate production equipment, and any other special working environment. Documented work instructions are considered to be the criteria for much of the production, processing and fabrication work.

7.2 Inspection by machine operators, automatic inspection gages, set up of first piece approval, production line inspection, station inspection or test department, roving inspector – any other type of inspection – shall be employed in any combination desired, by the Contractor/Vendor, which will effectively protect product quality and the integrity of processing, provided such methods and actions are documented and become a part of the final inspection and acceptance records for the item or service furnished under contract.

## 8.0 REVISION TO MANUFACTURING/Q.C. PLANS

8.1 When manufacturing procedure revisions result in the need to revise or eliminate mandatory inspection points on previously approved inspection procedures, the changes to (or elimination of) inspection instructions and mandatory inspection points must be submitted to and approved by JCP&L or its agents.

## 9.0 RECORDS

9.1 The Contractor/Vendor shall maintain adequate records of all inspections and tests. The records shall indicate the nature and type of acceptances and deficiencies found, the quantities approved and rejected and the nature of corrective action taken as appropriate. These records shall be available for review by the JCP&L or its agent's representative. The following records will be supplied to JCP&L or its agents as required by the product specification or Purchase Order:

1. Material certification data
2. Heat treat charts (or evidence of review and approval)
3. Plating certifications

4. As-built dimensional data as required by drawing or spec.
5. Evidence of other dimensional inspection
6. Evidence of satisfactory completion of
   (a) Radiographic inspection
   (b) Dye penetrant inspection
   (c) Ultrasonic inspection
   (d) Magnetic particle inspection
   (e) Helium leak testing
   (f) Hydrostatic testing
7. Approved fabrication process outlines (e.g., shop travelers)
8. Approved weld procedures (including weld repair methods and procedures)
9. Weld History and location records (e.g., weld maps), including weld repairs
10. Nondestructive testing procedures
11. Approved DCR's (Deviation(s) from Contract Requirements)
12. Evidence of all personnel certifications (as required by Purchase Order, specification, design drawing and code).

Unless otherwise stated in the Purchase Order or product specification, the Contractor/Vendor shall retain all records attesting to the Quality of the supplied material in accordance with the Contractor's/Vendor's own record retention procedures and schedule. Upon conclusion of the retention period, the Contractor/Vendor shall obtain instructions from JCP&L or its agents regarding disposition of records. The Contractor/Vendor shall notify JCP&L or its agents at the initiation of an order regarding its retention schedule.

## 10.0 CORRECTIVE ACTION

10.1 The Contractor's/Vendor's Quality program shall detect and correct assignable conditions adverse to quality. Records of corrective action shall be available for review by JCP&L or its agents.

10.2 Design, purchasing, manufacturing, testing or other operations which could result in, or have resulted in, defective supplies, services, facilities, technical data, standards or other operations which could create excessive losses or costs must be identified and changed as a result of the Quality program.

10.3 Corrective action will extend to the performance of all Contractors/Vendors and their sub-contractors or sub-tier vendors and will be responsive to data and products forwarded from users.

10.4 Corrective action shall include as a minimum:

A. Analysis of data and examination of product(s) scrapped or reworked to determine extent and causes.

B. Analysis of trends in process or performance of work to prevent further recurrence of non-conforming products, services or related problems.

C. Introduction of required improvements and corrections, an initial review of such measures and monitoring of the effectiveness of corrective action(s) taken.

## 11.0 DOCUMENTATION, FACILITIES AND STANDARDS

11.1 Drawings, Documentation and Changes:

11.1.1 The Contractor/Vendor shall establish, define and maintain a procedure which assures that only the latest applicable drawings, specifications and instructions required by contract, as well as changes thereto, are used for fabrication and testing.

11.2 Measuring & Test Equipment:

11.2.1 The Contractor/Vendor shall provide and maintain gages and other measuring and testing devices necessary to assure that supplies conform to technical requirements. In order to assure continued accuracy, these devices shall be calibrated at reasonable established intervals against certified standards which have known valid relationships and traceability to the National Bureau of Standards or other recognized national authority.

11.2.2 If production tooling, such as jigs, fixtures, templates, and patterns are used as media of inspection, such devices shall also be checked and proved for accuracy at reasonable established intervals. Records of such actions shall be maintained for verification purposes.

When required, the Contractor's/Vendor's measuring and testing equipment shall be made available for use by the JCP&L or its agent's representatives to determine conformance of product with contract requirements. If conditions warrant, the Contractor's/Vendor's personnel shall be made available for operation of such devices and for verification of their accuracy and condition. The use of inspection measuring equipment shall meet the requirements of the applicable specification.

## 12.0 CONTROL OF PURCHASES

12.1 The Contractor/Vendor is responsible for assuring that all supplies and services procured from his subcontractors and sub-tier vendors conform to all contract requirements, including those specified in this document.

12.2 JCP&L or its agents shall retain the right of source inspection visitations for it and/or its representatives and may require the submittal of Quality plans and documentation from the Contractor's/Vendor's sub-contractors and/or sub-tier vendors to ascertain source inspection and/or approval requirements for these suppliers.

12.3 JCP&L or its agents reserves the right of prior approval for all sources of supplies and services procured by the Contractor/Vendor from sub-contractors and/or sub-tier vendors.

## 13.0 MANUFACTURING CONTROL

13.1 Materials and Material Control

13.1.1 The Contractor's/Vendor's Quality program shall assure that raw material to be used in fabrication or processing of products conforms to the applicable physical, chemical, and other technical requirements. Laboratory testing shall be employed as necessary.

13.1.2 Identification of all material shall be maintained throughout all operations as required by applicable contract and/or specification requirements. Such identification shall be accomplished by job number, heat number or any other suitable identification means and shall be recorded on proper inspection records for each component.

## 14.0 HANDLING, STORAGE AND DELIVERY

14.1 The Contractor's/Vendor's Quality program shall provide adequate work and inspection instructions for handling, storage, preservation, packaging, and shipping to protect the quality of products and prevent damage, loss, deterioration, degradation, or substitution of parts.

## 15.0 NON-CONFORMING MATERIAL

15.1 The Contractor/Vendor shall have written procedures governing the identification, control and disposition of materials, welding materials, parts, equipment and/or workmanship for any item or service under the contract which does not meet the specification requirement(s). Repair or rework of non-conforming material shall be in accordance with documented procedures and techniques acceptable to JCP&L or its agents. A thorough evaluation and justification, in writing, shall be required for each case.

Note: The requirement for control of non-conforming material and submittals for deviations from contract requirements are specified in Section IV of this document.

## 16.0 STATISTICAL QUALITY CONTROL AND ANALYSIS

16.1 Statistical Quality Control procedures may be utilized whenever specified by Purchase Order or product specification. Any sampling plans selected, although based upon recognized industry practices and procedures, must be submitted to JCP&L or its agents for approval prior to use and implementation.

16.2 These plans shall require documented historical data of the Contractor's/Vendor's experience with the specific item for which use of sampling plans are desired.

## 17.0 INDICATION OF INSPECTION STATUS

17.1 The Contractor/Vendor shall maintain a positive system for identifying the inspection status of products. Identification may be accomplished by means of stamps, tags, routing cards, or other normal control devices. If metal stamping or marking other than allowed or specified by applicable codes or specification requirements are used, the method of marking and location shall be approved by JCP&L or its agents prior to use.

## 18.0 COORDINATED JCP&L (OR AGENTS) SUPPLIER ACTIONS

18.1 Material Furnished by JCP&L or its Agents.

18.1.1 When material is furnished by JCP&L or its agents, the Contractor's/Vendor's procedures shall include as a minimum the following:

A. Examination upon receipt, consistent with practicability to detect damage in transit.
B. Inspection for completeness and proper type.
C. Verification of quantity and quality in writing to JCP&L or its agents within twenty (20) days or before Contractor/Vendor use, whichever is earlier.
D. Examination and acceptance for conformance to contract requirements (normally verified by a review of documentation accompanying or preceding shipment).
E. Periodic inspection and precautions to assure adequate storage conditions and to guard against damage from handling and deterioration (e.g., shelflife, rust, etc.) during storage.
F. Functional testing, either prior to or after installation, or both, as required by contract to determine satisfactory operations.
G. Identification and protection from improper use or disposition.

18.1.2 At the time of installation or shipment of the respective unit or assembly, the Contractor/Vendor shall provide JCP&L or its agents with a written certification that the material used in the respective unit or assembly is in fact that which was furnished by JCP&L or its agents.

18.1.3 The Contractor/Vendor shall report in writing to the JCP&L or its agent's Project and/or Quality Control representatives any JCP&L furnished material found damaged, malfunctioning, or otherwise unsuitable for use, at receipt, during or after installation. The Contractor/Vendor shall determine and record probable cause and necessity for withholding material from use. The material shall not be used without written authority from JCP&L or its agents.

## 19.0 REFERENCED DATA

19.1 All documents and referenced data applying to JCP&L's or its agent's contract(s) and purchases shall be available for review by the JCP&L or its agent's representative to determine compliance with such requirements.

## 20.0 JCP&L QUALITY CONTROL SURVEILLANCE

20.1 All processing, testing and inspection operations taking place in the Contractor's/Vendor's or his sub-contractor's facilities within the scope of the contract work shall be subject to JCP&L or its agent's quality surveillance and verification at all reasonable times.

## 21.0 DATA SUBMITTALS

21.1 The Contractor/Vendor shall submit, for consideration and evaluation, four (4) copies of the following to JCP&L or its agents with his bid package:

A. Quality Control manual and/or other documents which describe the Contractor's/Vendor's Quality program and organization, including administrative policies and procedures affecting Quality.

B. Other supporting data and descriptions of the Contractor's/Vendor's capabilities and limitations (e.g., metrology limitations, number of Q.C. personnel employed, etc. when applicable).

21.2 Upon acceptance for a contract or for supply of items or services to JCP&L or its agents, the Contractor/Vendor shall submit four (4) copies of the following items (as applicable) to JCP&L or its agents for review and resolution of problem areas and comments (to the satisfaction of JCP&L or its agents):

A. Manufacturing and Quality Control plan (when required)
B. Special Process Procedures (welding, heat treating, etc.)
C. Procedures for certification of manufacturing and inspection personnel for special processes performed under the contract or Purchase Order.
D. Evidence of personnel certifications.
E. Written description of the Contractor's/Vendor's records retention program (which shall include procedures describing accumulation, storage and retrieval methods for control of records).
F. List of all records which shall be accumulated under the contract. This list shall contain a breakdown of the following:
(a) [illegible] material and/or services
(b) records which the Contractor/Vendor will retain until completion of the contract and subsequently turn over to JCP&L or its agents for the duration of plant life.
G. Inspection and Test Procedures (including nondestructive test procedures)
H. Sampling Plan Details (if applicable)
I. Special Inspection gaging, test equipment, and instrumentation (descriptions and/or drawings)
J. Marking and identification procedures (if not already specified by JCP&L or its agents)
K. Material and/or subcontracted work purchase orders (unpriced)
L. Contractor's/Vendor's sub-contractor procedures and plans for control of Quality (when required by JCP&L or its agents)

## 22.0 AUDITS

22.1 The Contractor/Vendor shall have a comprehensive system of planned and periodic audits and shall carry out these audit plans to verify compliance with all aspects of his own Quality program and its effectiveness.

22.2 These audits shall be performed in accordance with written procedures or checklists developed by the Contractor/Vendor and shall be conducted by Contractor/Vendor personnel not having direct responsibilities in the areas being audited. Audit results shall be documented and reviewed by Management having responsibility in the area audited.

22.3 Follow-up action, including re-audit of deficient areas, shall be taken where indicated and as necessary to assure correction.

# SECTION IV

## CONTROL OF NON-CONFORMING MATERIAL/DEVIATIONS FROM CONTRACT REQUIREMENTS

### 1.0 SCOPE

1.1 This section specifically defines the requirements necessary for Contractor/Vendor compliance to Section III, Item 15 entitled, "Non-Conforming Material."

### 2.0 DEFINITIONS

2.1 NON-CONFORMING MATERIAL – any material, part of product in which one or more characteristics do not conform or cannot be made to conform to original requirement specified by contract, specification, code, drawing or other applicable product description.

### 3.0 IDENTIFICATION

3.1 When material is first found to depart from requirements, it shall be properly identified and when practical, withheld or removed from normal production channels. A means for recording each action will be provided and maintained reflecting the condition of material and action(s) taken to correct the condition. Provision will also be made for recording the disposition action taken (i.e., "use as is," rework, repair).

### 4.0 REWORK

4.1 Material which has incomplete or omitted operations or contains variations from engineering requirements may be reworked or completed to meet "all" specified requirements. This would normally include standard repairs when specified in the applicable component specification or other engineering requirement.

### 5.0 REPAIR

5.1 Material that can be modified by the use of additional non-standard operations and/or processing may be repaired, provided such repair is accomplished under a procedure or process acceptable to JCP&L or its agents.

### 6.0 "USE AS IS"

6.1 Material may be dispositioned "USE AS IS" when the discrepancy is such that no adverse conditions will result and the applicable engineering form, fit and function requirements are satisfied and/or rework is impractical or would not improve the condition. Such dispositions, however, must be determined and approved by JCP&L or its agents.

### 7.0 SCRAP

7.1 Material which is unfit for its intended use and/or is not economically repairable shall be considered as "scrap" and shall not be installed in or used in connection with material or services furnished under the contract. If JCP&L's or its agent's material is furnished, the Contractor/Vendor must obtain approval and instructions from JCP&L or its agents prior to disposal of the respective item.

### 8.0 SALVAGE

8.1 Parts, components or assemblies which are contained in material designated as unfit for intended use or not economically repairable may be reclaimed through disassembly procedures and used only if such action is approved by JCP&L or its agents.

Jersey Central Power and Light Company
Forked River No. 1

Feeder Report
CO Report No. 363/70-2

Date of Inspection: November 2 and 3, 1970

Feeder Report by: J. H. Tillou, Reactor Inspector (Construction) 1-14-71 Date

## SCOPE

The intent of this inspection was to evaluate the applicant's efforts in preparing and implementing a QA program to meet the PSAR commitments and Appendix B, 10 CFR 50, (PI 4000).

The author's assignment was restricted to the provisions of these QA efforts as related to the field and construction activities.

## SUMMARY

The preliminary draft status of the GPU (JCP&L), Stearns-Roger, Burns and Roe, and Combustion Engineering QA/QC programs, precludes any firm conclusions as to their adequacy, in this area of the inspection.

A cursory review of the "drafts" for the QA/QC programs indicates the following:

In general, the licensee and the primary contractors seem to be familiar with the responsibilities assigned in the GPU document, "Project Organization and Responsibilities", as well as the Figure 1.10 of the PSAR.

Neither JCP&L nor CE have addressed themselves to Criterion XIII, "Control of Measurement and Test Equipment" although this may be included in the final approved QA/QC plans.

The JCP&L document, "QA Requirements for Contractors and Vendors" does not meet Criterion VII, "Documentary evidence for materials etc. . . . shall be available at the reactor site, prior to installation or use . . ."

Persons Contacted -

Jersey Central Power and Light/General Public Utilities

B. G. Avers, Quality Manager
N. Goodenough, Assistant Quality Manager
E. Fisher, GPU Quality Engineer

B/431

Stearns-Roger

D. Frost, Project QA Manager (Denver)
M. Kurlander, Site QA Supervisor
E. Hill, Forked River Project Manager

Burns & Roe Corporation

Frank Meckle, Quality Assurance Coordinator

Combustion Engineering

J. Moulton, Project Engineer

MPR Associates (Mandel, Pannoff and Rockwell)

H. Panoff, Senior Partner
M. Cole, QA Consultant, Forked River 1

## DETAILS

### A. Forked River Quality Assurance Program (General)

The GPU/JCP&L quality assurance program for Forked River 1 is being developed within the framework of the outline in their PSAR, Section 1.6.

JCP&L has selected three primary contractors for the nuclear related portions of Forked River Unit 1. They are:

1. Combustion Engineering as the supplier of the nuclear steam supply system.

2. Burns & Roe as architect-engineer.

3. Stearns-Roger Corporation as the site construction manager.

The quality assurance manager of GPU (JCP&L) has established a three level quality assurance program where the vendors, contractors and sub-contractors conduct Level I quality control according to their respective approved QC procedures and program. The primary contractors,as Level II QC surveillance agents, Burns and Roe, Combustion Engineering, and Stearns-Roger, will periodically audit the sub-contractors, vendors, and contractors. In addition, these three primary contractors will conduct internal audits of their own site construction activities.

Level III - Jersey Central Power and Light or their quality consultant, MPR Asscciates, will periodically and regularly audit the Level II quality activities of the three primary contractors. In addition, MPR Associates will regularly audit the Jersey Central Power and Light quality organization for conformance to their own QA plan and the commitments of the PSAR.

B. Status of QA/QC Plans and Programs for the Forked River 1 Nuclear Generating Station

1. GPU has released, with full approvals, a document covering the Forked River 1 Project Organization and Responsibilities, of each individual or organization.

2. The GPU Forked River QA/QC plan implementing the above responsibilities is in draft status.

3. The document, "Quality Assurance Requirements for JCP&L Contractors and Vendors" has been released with full approvals, and has been used for the selection of the primary contractors, although it completely ignores the requirements of Criterion VII, "Documentary evidence for materials, components, etc. . . . shall be available at the reactor site, prior to installation, . . ." (Reference; Attachment I)

4. The Stearns-Roger QA plan for Forked River 1 is in draft status.

5. The Burns & Roe QA plan for Forked River 1 is in outline draft status.

6. Combustion Engineering QA plan for Forked River 1 is also in draft status. Their document is entitled,"Manufacturing Services, Quality Control; Combustion Engineering Division." In its introduction, this document states that the program is a general description for Forked River 1 and is in the format of 10 CFR 50, Appendix B. The purpose of this document is stated to be how Combustion Engineering Complies with each of the 18 criteria.

C. The 18 Criteria (Field Activities)

1. Criterion I - Organization

a. Jersey Central Power and Light Company

The applicant has prepared a functional quality assurance organization chart (Figure 1.10 and 1.11) of the PSAR, which provides for a site quality assurance group. It was stated by the GPU quality assurance manager that this group is planned to consist of from one to five quality control engineers as the progress of the job dictates. The organization charts show this group reporting directly to the manager of quality assurance and completely independent from control by the manager of project engineering or of construction activities. It has full authority to report and act on any quality problems which may come up throughout the construction or operation of this plant. Jersey Central Power and Light intends to control the site quality activities by frequent and periodic audits of the quality activities of the three major contractors, as well as spot audits of vendors supplying material and internal audits within their own group.

b. Stearns-Roger

The Stearns-Roger QA/QC program is also outlined in the QA organization chart for Forked River 1 on Figure 31 of the PSAR. A site quality assurance supervisor has been appointed and it is anticipated that there will be at least one quality assurance engineer for each of the various construction disciplines with a staff of quality assurance surveillance inspectors to provide the on site inspection and auditing activities over the Level I contractors, etc. A review of the Stearns-Roger plan indicates they have made provisions for their responsibilities by the preparation of procedure QA-1, covering the qualifications and responsibilities of QA personnel, procedure QA-7 entitled "Internal Audits" which establishes methods of procedures for conducting and documenting audits on the activities of the first level contractors and QC-10, "Receiving Inspection, Handling and Storage of Materials," which details the procedure requirements for the implementing and receiving inspection and maintaining control over all site materials, supplies, equipment, systems and services.

c. Burns & Roe

Burns & Roe QA plan draft, as revised on August 13, 1970, provides a procedure, SP-84-2, which provides a procedure for the quality audit programs to be performed on both manufacturing and site construction contractors. Procedure SP-84-29 outlines the filing and record system to be used in the field office for the compilation of all project records. Procedure No. SP-84-29 develops a detailed system for auditing field quality assurance activities, while procedure SP-84-30 outlines the requirements for orientation and training of quality assurance field engineers. The entire Section 2 of this program covers detailed procedures for the conduct of quality assurance activities at the construction site and the daily or periodic reports covering the surveillance. Procedure SP-84-20 provides specific check lists based on the types of equipment and construction practices to be used by the QA engineers for their surveillance during site construction.

Burns and Roe have been assigned the responsibility to provide quality assurance surveillance Level II at the site whenever Stearns-Roger act on the site as a construction contractor.

d. Combustion Engineering

The draft of the Combustion Engineering quality assurance plan contains a section "Manufacturing Services, Quality Control, Combustion Engineering Division," In its introduction, it states this QA program is a description for Forked River 1 and is in the format of 10 CFR 50, Appendix B. The purpose of this document is to describe how CE complies with each of the 18 criteria. CE will have no quality assurance or quality control personnel on site; however, it is their general practice and intent to provide technical advisory service to the owner,

his engineers and constructors during the shipment, erection, checkout and startup of all CE supplied equipment.

CE is preparing a document, CENP-353, entitled "Receiving, Field Handling, Maintenance and Storage Requirements for Combustion Engineering Furnished Equipment." This will be provided to Stearns-Rogers for their guidance in receiving, handling, and erection of CE supplied items. In addition to providing this document, the CE project engineer states that Combustion Engineering will assist, by participating in a review of the Stearns-Roger prepared procedures, covering the same subjects.

CE does not participate directly in the QA/QC functions at the site; however, it will maintain a staff of three to five technically oriented specialized personnel on the site throughout installation to verify that the CE supplied equipment meets all the design and installation requirements for these items.

e. Findings

Although no documents are yet officially released, a review of the preliminary drafts prepared by the applicant and his major contractors indicates that the three level quality organization, which the applicant has committed himself to, with responsibilities assigned in accordance with the functional QA organization chart, will provide sufficient quality assurance coverage to assure that the PSAR committments are maintained throughout construction.

2. Criterion II - Quality Assurance Program

a. The QA/QC program prepared by JCP&L is incomplete and in a preliminary draft form. It does, however, outline in detail the responsibilities and requirements for first level quality control by the vendor and contractor, the second level of quality control to be accomplished by the site primary contractors and the third level of quality control by audits of the second level contractor's quality activities by both the licensee and his QA/QC consultant.

b. Stearns-Roger

Stearns-Roger have been assigned the quality responsibility for the construction and erection of Forked River 1 and their QA/QC program is being prepared to include detailed procedures for the implementation of the program to satisfy all 18 criteria.

c. Burns & Roe

The Burns & Roe quality assurance plan, for the most part, emphasizes quality control activities within the home office; however, since under certain circumstances they will be required to accept the responsibilities for the Level II quality control activities at site, they will have in their program a complete set of site related procedures for the accomplishment of this Level II responsibility.

d. Combustion Engineering

The Combustion Engineering quality assurance program is, for the most part, directed toward vendor manufacturing services and quality control, while the Windsor-Locks Division (Contractor to Jersey Central Power and Light) have an essentially Level II responsibility. Combustion Engineering has no responsibility for quality control on site where they are committed solely to providing adequate technical personnel to guide the Stearns-Rogers quality control people in their evaluation of the erection activities.

e. Findings

Although none of the QA programs for JCP&L or their prime contractors are in final released form, their contents indicates that the three level QA/QC program established by JCP&L is the heart of each program and each contractor is preparing to accept the responsibilities assigned to him by the QA organization chart (Figure 1.10 and 1.11) in the PSAR.

3. Criterion III - Design Control (Field Changes)

a. Jersey Central Power and Light Company

The JCP&L Forked River 1 project organization and responsibility in Section 2.1.2.5, entitled "Field Changes", discusses the detailed method by which changes may be originated, their evaluation, their approval, and their permanent recording for incorporation into "as-built" drawings.

b. Stearns-Roger

Section 5.2.3, "QC Procedures" of the Stearns-Roger QA/QC plan for Forked River, to date, contains no procedure for the initiation, evaluation, control or recording of field generated changes.

c. Burns and Roe

Although this contractor is the architect-engineer and his site personnel may initiate field changes to existing and approved design drawings, there was no evidence available in the Burns and Roe project

QA/QC program that they have to date prepared a procedure to cover the initiation, review, approval and handling of field generated changes. The QA coordinator stated that it was their intent to handle this subject under the Burns and Roe procedure 2700-EDP-1, "Control Specifications, Drawings, Calculations, etc, for Engineering Design and Design Review." This procedure was not available for the writer's review.

d. Combustion Engineering

Combustion Engineering intends to handle required field engineering changes according to the Stearns-Roger procedure for nonconforming material and workmanship criteria, which provides a means for reporting, dispositioning and documenting instances of nonconformances or deviations from engineering specifications or drawings. These deficiency reports will be referred to the Combustion Engineering site representatives for either disposition or transmittal to the Combustion Engineering project manager for handling in accordance with Combustion Engineering procedure NPT-NPI-2, "Control of Engineering Drawings." This document provides a routine procedure for the preparation, release and revision of engineering drawings,together with the distribution of revised prints.

e. Findings

Although the preliminary draft of the Stearns-Roger, Burns and Roe and CE QA/QC programs for Forked River 1 are not especially specific regarding the handling of field changes, JCP&L has a very specific requirement, both in their project organization and responsibility document and in their quality assurance requirements for JCP&L contractors and vendors (Section III, "Specific QC Program Requirements", paragraph 2.0 and 3.0). It seems safe to assume that prior to approval of the contractor QC programs by the applicant, that this subject will be covered with acceptable procedures in each case.

4. Criterion IV - Procurement Document Control

Since this subject is completely covered by another member of the inspection team, it was not included in the "field activities" survey.

5. Criterion V - Instructions, Procedures and Drawings

a. Jersey Central Power and Light Company

The "Quality Assurance Requirements",for JCP&L contractors and vendors, Section III, paragraph 3, entitled, "Work Instructions", clearly states that the contractor's quality program shall include clear and completely documented instructions covering a comprehensive listing of functions necessary to meet the requirements of the 18 criteria. It further states that these instructions are intended to serve for the supervision, inspection, and the managing of the work and include

criteria for acceptable work and workmanship in accordance with the applicable contract requirements.

It further states that the contractor shall have written procedures that control all of special fabricating processes, inspections, and testing. In each case, they are required to include the workmanship and acceptance or rejection criteria.

b. Stearns-Roger

The draft of the S-R QA/QC program for Forked River 1 includes procedure QA-8, "The Preparation, Issue, Revision, and Maintenance of QA Procedures" which establishes a system to assure the availability and use of current QA/QC procedures at the site.

The entire Section 5.2.3 of the S-R QA/QC program is devoted to a series of QC procedures to meet the requirements of this criteria.

c. Burns and Roe

Burns and Roe has prepared a procedure 2700-EDP-1, "Control Specifications, Drawings, Calculations, Procurement, Pre-Qualification of Vendors, PSAR Deviations, and Vendor Drawings", which is designed for use in control and guidance of quality assurance activities within their home office.

The Burns and Roe quality assurance plan (draft) for Forked River 1 is revised August 13, 1970, and submitted to GPU for approval contains a series of special procedures 84-1 through 84-32. These procedures each contain instructions and checkoff sheets, as well as detailed procedures for the control of quality activities during the surveillance of equipment suppliers and for audit of site activities in their role as second level quality assurance. These procedures require that the QC engineers assigned by B&R to the site be familiar with the applicable procedures, instruction sheets, check lists, and auditing forms necessary to provide a documented record of their activities as second level quality control personnel.

d. Combustion Engineering

Combustion Engineering manual, entitled "Manufacturing Services, Quality Control, Combustion Engineering Division", states that the purpose of this document is to describe the Combustion Engineering efforts to comply with each of the 18 points of the reference criteria. It further describes the Combustion Engineering procedures, instructions and auditing forms applicable to the quality assurance plan for the NSSS component fabrication. The manufacturing services quality control group has been assigned the responsibility for assuring that all Combustion Engineering Division plants maintain a quality program consisten

with the Combustion Engineering Division Quality Systems Instruction Manual. It further establishes special witnessing and hold points for the NSSS systems and the list of quality control records to be retained as documentation of the quality level for each item.

Combustion Engineering has prepared a "Field Handling, Maintenance, and Storage Guide" to establish the requirements necessary for these activities on NSSS components at the plant site. It covers detailed instructions and checklists for receiving inspection, rigging, storage, equipment disassembly and reassembly, as well as CE approved site construction practices for erection, cleanliness, flushing procedures, hydrostatic testing, etc.

CE also has established a file of "Quality System Instructions", particularly applicable to the Forked River Nuclear Station, which are procedures to cover quality activities regarding NSSS components on site. These actually are additional and supplementary information for quality personnel to assist in the implementation of the document CENP-353, "Field Handling, Maintenance Storage Requirements for Combustion Engineering Furnished Equipment, Etc.". This CENP-353 document will be provided to Stearns-Roger for their guidance in the preparation of detailed work procedures covering receiving and handling of CE supplied items at the site.

e. Findings

It appears that Jersey Central Power and Light, Stearns-Roger, Burns and Roe, and Combustion Engineering all have directly addressed themselves to the requirements of Criterion V and their efforts, when finally released and approved, should cover the intent of this criterion.

6. Criterion VI - Document Control

a. Jersey Central Power and Light Company

In the JCP&L "Forked River Project Organization and Responsibility" document, in Section 2.1.2.5, "Field Changes", there is a procedure and a special form to be used for changes initiated by either JCP&L, Burns and Roe, Combustion Engineering, Stearns-Roger, or field contractors. Numbers will be assigned to these forms by the GPU engineer on site. It will be his responsibility to maintain a log of every field change. It will be the responsibility of the JCP&L construction engineer to coordinate the evaluation and approval of requested changes throughout all groups or organizations participating in approvals of the original drawing. It will then be the responsibility of Stearns-Roger to implement these changes and to prepare "as-built" drawings to provide documentation covering the approved changes.

b. Stearns-Roger

Stearns-Roger QA/QC plan for Forked River contains a procedure QA-4 entitled "Drawings, Specifications, Purchase Order and Document Control." This contains detailed instructions and procedures for establishing lines of flow through concerned organizations, as well as the review and distribution of new information.

The Stearns-Roger procedure QA-8, "Issue,Revision,and Maintenance of QA Procedures" establishes a detailed system which will currently assure the use of up to date QA/QC procedures on site.

c. Burns and Roe

The draft of the Burns and Roe QA plan for Forked River 1 contains procedure SP-84-14, which outlines in detail, the distribution, filing and record system to be used by the field office in the compilation of current project records, procedures, drawings and instruction. It further contains a procedure 84-29 which provides a detailed system for auditing the field quality assurance records, filing and drawings systems, in accordance with 84-14 described above.

d. Combustion Engineering

The Combustion Engineering quality assurance plan for Forked River 1 contains an Appendix C, which provides special procedures and instructions for maintaining document control at the Forked River plant. Their procedure, NPD-NPI-2, "Control of Engineering Drawings", provides a procedure for the preparation, release, revision and distribution of engineering drawings and approved blueprints. Their procedure NPD-NPI-3, "Engineering Specification Revision" establishes a unifor procedure for making revisions to engineering drawings or specifications which originate within the nuclear power department. Their procedure NPD-NPI-18, "Quality Assurance of Design", establishes requirements that the safety related systems and drawings be independently reviewed by a planned and systematic method to provide confidence that the design will meet pre-determined requirements.

e. Findings

The Jersey Central Power and Light quality document contains requirements that each of the primary contractors address themselves to each of the 18 criteria. The three primary contractors each have submitted preliminary drafts of QA/QC programs which contain instructions covering the implementation and administration of this criterion. Criterion VI has been covered in each of the proposed QA/QC programs submitted by the above contractors.

7. Criterion VII - Control of Purchased Material, Etc.

This criterion was covered in detail by an accompanying inspector under all activities concerned with purchasing.

8. Criterion VIII - Identification and Control of Material, Parts, and Components

a. Jersey Central Power and Light Company

The JCP&L project organization and responsibility document covers this criterion by requiring that each of the primary contractors as well as subcontractors and site construction contractors have detailed procedures covering this subject.

b. Stearns-Roger

The Stearns-Roger QA/QC plan (draft) in Section 5.2.3 contains a procedure QA-2, "Contractor Surveillance", which establishes the surveillance program to be conducted by S-R in their role as second level quality control over the first level contractors and vendors. Procedure QC-10, "Inspection, Handling and Storage of Materials", provides the details and requirements for the implementation of inspection and control over all materials, supplies, equipment, systems, sub-systems, and services delivered to and stored at the site. QA-3, "Vendor Evaluation and Selection", outlines the procedure to be used in evaluating supplier's ability to perform the needed service or supply specified material in accordance with the detailed requirements of the 18 criterion in Appendix B, 10 CFR 50.

c. Burns and Roe

Procedure SP-84-20, provides specific check lists for the site QC personnel to be filled in during their surveillance activities on the identification and control of materials. Procedure SP-84-29 outlines a system for auditing the field quality assurance activities of the Level I quality personnel in accordance with the site contractor's QC program for identification and control of site construction material, parts, or components. Procedure SP-84-29, outlines a system for the periodic audit of the field quality assurance activities of the Level I contractor's QC personnel and specifically addresses itself to a check list covering the identification and control of materials, parts, and components.

d. Combustion Engineering

In Section VII of the CE "Manufacturing Services Quality Control, Combustion Engineering Division", is found a series of check lists and

written instructions which provide uniform guidance to the quality control personnel for verification of the identification and control of materials, parts, and components.

e. Findings

After a review of the JCP&L quality assurance responsibilities and the draft copies of the QC plans as presented by the three primary contractors, it appears that this criterion has been given attention by all concerned contractors sufficient to predict an acceptable control over the substance of this element.

9. Criterion IX - Control of Special Processes

a. Jersey Central Power and Light Company

The Forked River Nuclear Generating Station Project Organization and Responsibility, as well as the GPU (draft) Forked River QA Plan, require that each of the primary contractors, their contractors, their vendors, and their sub-contractors for each of the above organizations shall have a quality control plan to verify that any special processes such as welding, nondestructive testing, etc., will be controlled and accomplished by qualified personned, using qualified procedures, to acceptance criteria established by codes, standards, or the product specifications.

b. Stearns-Roger

Section 5.2.3, "QC Procedures", includes a procedure QA-1, "Qualification Requirements and Responsibilities of Stearns-Roger QC Personnel." This procedure covers the qualification requirements and procedures for site personnel who have been assigned to accomplish special processes. Procedure No. QA-2, "Contractor Surveillance", establishes the scope of the QA surveillance program to be conducted by the Stearns-Roger quality assurance organization (Level II).

Section 5.3 of the Stearns-Roger QC Manual, "Quality Control Requirements" states:

> ". . . Manufacturing contractors and site construction contractors shall each be required to have a QC program which is in accordance with the applicable equipment or construction specifications, including . . . control of special in-process and final inspection processes."

The Stearns-Roger QC plan requires each site constructor and his sub-tier contractors have a program which covers all elements of the 18 criteria of Appendix B, 10 CFR 50.

c. Burns and Roe

The draft of the B&R quality assurance plan for Forked River No. 1 in procedure SP-84-10, includes a system by which the site contractor's special processes will be audited during manufacture and/or construction. Procedure SP-84-29 outlines a system for the B&R audit of the field quality assurance activities of the Level I site contractors. Procedure SP-84-15 outlines the method and records to be kept following the daily and periodic reports of the surveillance performed on site contractor's quality control programs.

d. Combustion Engineering

The CE QA plan for Forked River 1, "Manufacturing Services Quality Control, CE Division", contains a section entitled, "Control of Special Processes." This requires that any equipment vendors or erection contractors submit to CE copies of any special processes as well as the personnel qualification requirements and acceptance criteria for each. The records of qualification or certification for the processes and personnel will be filed by CE and be available for review by any authorized person. Furthermore, it is required that such procedures and qualification records be available to operating personnel and that they each be referenced on the process instruction sheets with provisions for each operator to sign off attesting his compliance with the procedure.

e. Findings

It appears that JCP&L as well as the other three primary contractors for Forked River 1 have taken all preliminary steps necessary to assure compliance with this criterion.

10. Criterion X - Inspection

a. Jersey Central Power and Light Company

In the JCP&L Forked River QA Project Organization and Responsibilities, it states that Level I inspection will be accomplished by the supplier of material or equipment or the site constructor according to the approved QA program submitted to JCP&L prior to acceptance of the bid figures. It further requires that such inspections be performed by qualified personnel in accordance with approved instructions, procedures, or drawings and to acceptance criteria which meet the applicable codes or specifications. The implementation of these inspection activities shall be verified to be in accordance with the approved QC program for the particular contractor or supplier by a Level II surveillance conducted by the primary contractor who engaged the supplier or the site constructor.

b. Stearns-Roger

The S-R plan (draft), in Section 5.2.3, procedure QA-1, "Qualification Requirements and Responsibilities of Personnel", defines the education, experience, and training requirements for the qualification of QA personnel assigned to surveillance responsibility over either suppliers or site constructors. Procedure QA-2, "Constructor Surveillance", establishes the scope and provides check lists for the quality assurance surveillance program to be conducted by S-R in carrying out its responsibilities as Level II QA.

In Section 5.3 of the Stearns-Roger QC manual, "Quality Control Requirements", it states that each site construction contractor is required to have a QC program and trained personnel which shall be in accordance with the construction specification and will meet all the requirements of the QA criteria listed in Appendix B of 10 CFR 50.

c. Burns and Roe

The Burns and Roe QA plan for Forked River 1 includes procedure SP-84-2, which outlines in detail the quality audit programs to be performed on manufacturers or construction contractors. Procedure SP-84-20, provides specific check lists for the Burns and Roe QA personnel use,based on the type of equipment and construction practices to be used. Procedure SP-84-29 further outlines the overall system and record keeping requirements for auditing the field quality assurance activities of the lower echelon site constructors. Procedure SP-84-30 outlines a program for the orientation and training of quality assurance engineers and inspectors.

d. Combustion Engineering

Inspection (Level I quality control) as described in the Combustion Engineering "Manufacturing Services Quality Control Manual" is restricted to the quality control and inspection activities at the various CE manufacturing plants. At these facilities, the quality control and inspection is an independent function supervised by a QA manager who reports directly to the general manager for the product being manufactured.

Those items which Combustion Engineering buy from their suppliers, and which are shipped directly to the field site are controlled by approved quality programs appropriate for the particular item being produced.

CE (Windsor Locks Nuclear Division) has established quality assurance requirements in their specification WQC-11.1. Here CE maintains control by performing a detailed QA surveillance over the individual suppliers, QC, and inspection programs. The CE quality organization (Windsor Locks Nuclear Division) reviews and approves the quality con-

trol procedures for each associated CE manufacturing plant or outside suppliers. These quality control programs for individual components are coordinated by integrating the manufacturing and QC plans and listing the applicable manufacturing and process procedures. The standard repair programs in each case outline the fabrication and inspection sequence, including hold points.

e. Findings

It appears that the quality programs established by JCP&L, S-R, B&R, and as well as CE, each contain procedural requirements for adequate inspection activities to cover the details of this criterion.

11. Criterion XI - Test Control

a. Jersey Central Power and Light Company

The Forked River 1 Project Organization and Responsibilities document, in Section 3, outlines requirements for direct participation by the licensee in all test programs covering structures, systems, and system components and further requires that the responsible primary contractor and/or his subcontractors submit written test procedures containing acceptance criteria which meet the applicable design specifications. Proof tests of the systems and components are subject to spot-check monitoring by engineering representatives and QA personnel from JCP&L. Primary responsibility, however, for all testing rests with cognizant primary contractors for the materials, systems, or components.

b. Stearns-Roger

The Stearns-Roger QC plan, in Section 5.2.3, "QC Procedures" contains procedure QC-15 which details the administrative QC and inspection programs to be followed and to ensure compliance with the applicable specifications including the testing of mechanical and electrical equipment prior to its installation as well as after it becomes part of the system. Procedure QC-19, "Testing Performance and Surveillance" establishes detailed procedures for S-R participation in the performance and documentation of all testing accomplished on material, components, or systems.

Section 5.3 of the S-R QA/QC Manual, "Quality Control Requirements", further delineates the S-R responsibilities during the fabrication, installation, and testing of the nuclear related portions of the plant.

This same section of the S-R QA/QC Manual requires that the subcontractor provide detailed procedures for tests that verify compliance to the applicable specifications, drawings, procedures, or other inspection instructions.

c. Burns and Roe

The Burns and Roe QA plan for Forked River 1 includes a procedure SP-84-3 which outlines the detailed surveillance over the suppliers of materials and components and includes witnessing specified testing in accordance with a "hold point" schedule previously established. Procedure SP-84-20 establishes specific check lists for categorized types of equipment and construction activity for the guidance of the quality personnel during manufacture or site construction testing. Procedure SP-84-29 outlines a system for auditing all field QA activities by the Level I inspection personnel including the acceptance testing of components, materials, or systems.

d. Combustion Engineering

The CE quality specification WQC-11.1 establishes frequency schedules and hold points for the audit surveillance of each component within the primary system. Each of these is required to be accomplished by one of the CE quality personnel who thereby become responsible for the individual suppliers, QC, and inspection program.

The CE quality assurance plan, "Manufacturing Services Quality Control" requires that CE prepare a comprehensive guide for S-R guidance in their preparation of procedures for receiving, handling, storage, cleaning, and testing at the site of NSSS components and completed systems.

CE does not participate directly in the QA/QC functions at the site. However, they will maintain a staff of three to five technically oriented personnel at the site throughout the installation, erection, and testing of those portions of the plant for which CE is primarily responsible.

e. Findings

Provided the JCP&L, S-R, B&R, and CE programs are approved without substantial change, each seems to provide acceptable surveillance over this criterion.

12. Criterion XI - Control of Measuring and Test Equipment

a. Jersey Central Power and Light Company

In the Forked River QA plan and project organization, the responsibility of this criterion is placed entirely in the hands of Stearns-Roger as the JCP&L agent for quality activities at the site.

b. Stearns-Roger

The S-R QC plan for Forked River 1 contains a procedure QC-13, "Tool, Gauge, and Instrument Control." This procedure assigns the detail responsibility for the calibration, accuracy, and control of measuring

devices to the site contractors and, in addition, provides audit frequencies and check lists to be used by the S-R QC personnel to verify that the subcontractors are meeting the responsibilities for this criterion.

c. Burns and Roe

The B&R QA plan, procedure SP-84-2, outlines the detailed check lists for quality audit programs to be performed on site covering the quality activities of the construction contractors. Procedure SP-84-20 includes specific check lists covering construction practices at the site during the construction phase. This procedure includes audit schedules for the control of Criterion XII, regarding calibration of gauges, equipment, etc.

d. Combustion Engineering

Since CE has no responsibility under the JCP&L QA responsibility document for quality control at site, they have prepared no procedure nor audit activity to handle this criterion at the site.

e. Findings

The JCP&L and CE failure to specifically participate in this criterion may be corrected when GPU detailed QA/QC plan for Forked River is approved and released. The S-R and B&R programs appear to be adequate for Level II surveillance over Level I activities on this element of the 18 criteria.

13. Criterion XIII - Handling, Storage and Shipping

a. Jersey Central Power and Light Company

The JCP&L Forked River QA plan and project organization delegates the responsibility for the site activities for handling, storage, and shipping of materials directly to the site primary contractors. JCP&L will participate entirely on an audit basis.

b. Stearns-Roger

The S-R QC plan for Forked River 1 contains a procedure QC-10, "Receiving Inspection, Handling, and Storage of Materials." This procedure covers the general activities at the reactor site and will be supplemented by other specialized procedures covering the same area for those items which are supplied by CE. Procedure QA-2, "Contractor Surveillance" established a scheduled surveillance program for the S-R quality organization to maintain and verify that first level contractors and vendors are meeting the requirements of the previously referenced S-R procedure.

c. Burns and Roe

The B&R QA/QC manual contains procedure SP-84-5 which outlines and establishes the detailed requirements for auditing the site contractor's Level I activities covering receiving, storage, and handling of equipment at the site. Procedure SP-84-29 outlines a detailed system for auditing field quality assurance activities of all site contractors.

d. Combustion Engineering

CE does not participate directly in the QA/QC functions at the site as described by this criterion. However, they have prepared an engineering document CENP-353, "Field Handling and Maintenance and Storage Requirements for Combustion Engineering Furnished Equipment." This document will be provided for Stearns-Roger for their guidance in their preparation of detailed procedures for the handling, storage, and shipping of CE furnished equipment at the reactor site. The S-R documents covering this subject will be reviewed and approved by CE prior to their use.

e. Findings

JCP&L have only addressed this subject in a very general manner, i.e., responsibility for Level III audit. It was stated that a more detailed procedure will be included in the "GPU QA/QC Plan for Forked River 1".

Primary contractor programs seem to provide adequate Level II control.

14. Criterion XIV - Inspection, Test, and Operating Status

a. Jersey Central Power and Light Company

The Forked River QA plan and Project Organization Responsibilities document assigns complete responsibility for Criterion XIV to S-R. The JCP&L participation will be entirely by an audit program.

b. Stearns-Roger

The S-R QC plan for Forked River 1, in Section 5.2.3, contains a procedure QC-15. This details the administrative QC and inspection program to be followed in controlling the installation, identification, and test status of all mechanical and electrical equipment during its handling, installation, and test.

In Section 5.3 of the S-R QA/QC Manual, it states that all vendor and manufacturing contractors as well as site construction contractors shall be required to have a quality control program which includes control of in-process and final inspection as well as inspection test

status. They further are required to maintain identity and quality control records to support any identification, tags, or codes on the actual systems proper.

c. Burns and Roe

The B&R quality assurance plan contains procedure SP-84-2 which outlines the quality audit program including check lists to be performed on site over the Level I efforts of the construction contractor. Procedure SP-84-20 includes specific check lists based on types of equipment and construction practices which are scheduled to be kept under surveillance during site construction. Procedure SP-84-29 outlines a detailed system for auditing the field contractor's quality assurance activities. Procedure SP-84-15 outlines the method and establishes frequency schedules for the daily and periodic reports on the surveillance activities performed on site contractor's QC programs.

d. Combustion Engineering

CE does not participate directly in the QA/QC functions at the site; however, their staff of three to five technical personnel at the site throughout the installation of CE equipment maintains an informal surveillance over the CE supplied equipment and design systems, thereby assuring that the NSSS systems meet all requirements of the applicable CE specifications.

e. Findings

S-R, who have been assigned primary responsibility for implementing this criterion, have a workable program in their plan. B&R does not presently have a procedure but it was stated that they intend to develop a detailed audit program. JCP&L have no audit procedures but intend to develop procedures and check lists to cover their Level III responsibilities.

15. Criterion XV - Nonconforming Materials

a. Jersey Central Power and Light Company

The JCP&L Forked River QA plan and project organization document assigns the complete QC at site to Stearns-Roger; however, they retain for themselves, an auditing function over this criterion.

b. Stearns-Roger

The S-R QC plan for Forked River 1 in Section 5.2.3, "QC Procedures" contains a procedure QC-11, "Nonconforming Material and Workmanship." This document provides the means for reporting, segregating, dispositioning and documenting the instances of nonconformance to either specifications, drawings, or other requirements covering the quality of materials, or workmanship.

c. Burns and Roe

To date, the B&R quality plan had no specific procedures for the handling of nonconforming materials, parts, or components. It was stated that this will be handled according to the procedure SP-84-20 which includes a specific check list for construction practices to be used for guidance of the B&R QA representative on site. Procedure SP-84-29, outlines a system for auditing all field quality assurance activities in their capacity as a Level II auditor. Procedure SP-84-5 outlines the auditing of the contractors Level I QC program for receiving, storing, and handling equipment on site. It was stated that this procedure includes detailed instructions for the identification and segregation of discrepant material.

d. Combustion Engineering

The CE quality assurance plan for Forked River 1 contains a procedure for nonconforming material, parts, or components. Where applicable, the CE site engineers will prepare a deficiency report to be referred to Combustion Engineering office for disposition of any materials or workmanship problems described. These deficiency reports will be originated by the S-R quality control personnel and routed to the CE site representatives for disposition.

e. Findings

It appears that the three primary contractors each have adequate procedures to handle and identify nonconforming materials. The licensee will conduct Level I, II and III audits of this element according to schedules and procedures to be included in the "GPU QA/QC Plan for Forked River 1."

16. Criterion XVI - Corrective Action

a. Jersey Central Power and Light Company

The JCP&L Forked River QA plan and project organization responsibilities have assigned complete Level I quality activity to the site subcontractors. They have further assigned the Level II quality surveillance and audits to either S-R or B&R.

b. Stearns-Roger

S-R, who have been delegated the site construction QA/QC responsibility, in their QC plan for Forked River 1, Section 5.2.3, have prepared a procedure QC-20, "Internal Audits and Corrective Action." This procedure establishes a scheduled audit program to investigate the degree of compliance with the applicable specifications for particular systems, procedures, products, to identify deficiencies, to investigate the cause, and to document the deficiency as well as the approved corrective action taken.

c. Burns and Roe

The B&R QA plan for Forked River 1 contains a procedure SP-84-13, which outlines a detailed system used to obtain corrective action, either within B&R, their suppliers, or construction contractors.

d. Combustion Engineering

The CE QA plan for Forked River 1, "Manufacturing Services Quality Control, CE Division", states that any nonconforming material, component or workmanship on CE supplied items will be documented with a deficiency report, which shall be referred to CE site representatives for disposition. These site personnel will report the details and discrepant conditions to the CE project manager, who will record and review the discrepancy, with the appropriate engineering departments, the purchasing departments, and the supplier or contractor. Corrective action and/or approved repair procedures will be transmitted to the field office by the project manager where the CE site representatives will assist in the implementation of the repairs or corrective actions.

CE has additional procedures covering various facets of this criteria. Procedure NPD-NPI-6, "CE NPD Procedure for Disposition of Material or Workmanship Deficiencies", establishes the procedure for the manufacturing or contractor facility to prepare and submit a proper form to CE for disposition. Procedure NPD-NPI-7, "CE NPD Disposition of Technical Change Requests", establishes a CE Nuclear Power Department procedure for the disposition of technical change requests submitted by manufacturing or contractor groups. Procedure NPD-NPI-8, "CE Disposition of Deviations form Contract Requirements", establishes the CE policy and procedure for processing and disposing of deviations from contract requirements submitted by either the supplier or site contractor.

e. Findings

JCP&L, together with S-R, B&R, and CE, all appear to have adequate procedures to meet Criterion XVI. The detailed audit check procedures for Level III audits are being prepared for inclusion in the "GPU QA/QC Plan for Forked River 1" per the GPU QA manager.

17. Criterion XVII - QA Records

a. Jersey Central Power and Light Company

The JCP&L document, "Quality Assurance Requirements for Contractors and Vendors", states in Section 9, "Records", that each contractor and vendor will maintain complete records as delineated by a twelve item list, includes such items as material certification, processing, welding, weld histories, NDT procedures, histories of deviations, personnel

certification, and NDT results. These records shall at all times be available for review by JCP&L, its agents, representatives, or regulatory representatives. (Reference Attachment I)

b. Stearns-Roger

The S-R QC plan for Forked River 1 contains a procedure QC-22, "QA Records." This document contains the procedures, contents, and requirements for the establishment and maintenance of a permanent plant site quality history file.

c. Burns and Roe

The B&R QA plan for Forked River 1 contains procedure SP-84-14. This procedure outlines the filing and record system to be used in both the home office and field office for the compilation of project records and their convenient retrievability.

Section II of this manual states under "Quality Assurance Activities at the Construction Site", that the B&R quality assurance group will maintain a complete QC history file of the records for [illegible] manufactured components as well as records of their surveillance effort [illegible] site construction items wherever Stearns-Roger is a site constructor. This file will be transferred to JCP&L at the site upon the completion of any activity where B&R are the primary Level II QC agents.

d. Combustion Engineering

The CE quality assurance plan for Forked River 1, "Manufacturing Services Quality Control, CE Division" requires that the QC program for any individual component or material including the NSSS system will contain a list of the manufacturing and QC records to be retained by the supplier or contractor quality control office. After shipment of the component or completion of installation and erection activities at the site, completed records are to be turned over to the CE QA organization for permanent retention.

In the JCP&L document, "Quality Assurance Requirements for Contractors and Vendors", it states in Section IX, "Records", that all such objective evidence of compliance to codes, specifications, and procedures shall be turned over to JCP&L upon completion of the contractor/vendors contractual obligation to the licensee.

e. Findings

A cursory review of the above referenced procedures in subparagraphs a, b, c, and d indicate that both the licensee and his primary contractor have all established procedures for the retention of adequate records to verify that this plant is being built in accordance with the requirements of Criterion XVII.

18. Criterion XVIII - Audits

a. Jersey Central Power and Light Company

The Forked River QA plan and project organization and responsibilities document specifically assigns a Level III auditing responsibility to JCP&L, their agents-MPR Associates, and the GPU QA staff.

These Level III audits will cover internal audits of the JCP&L efforts and the Level II activities of S-R, B&R, and CE.

In addition, JCP&L have committed themselves in the PSAR and their quality plan to conduct unannounced surveillance activities over the Level I efforts of site contractors and vendors or suppliers.

Detailed audit schedules, check lists, and procedures are not yet available at this time but the GPU quality assurance manager states that their work schedule has been arranged to have these necessary guidance documents available as required throughout the life of the construction program.

b. Stearns-Roger

The S-R QC plan, in Section 5.2.3, procedure QA-1, "Qualification Requirements and Responsibilities of Personnel", establishes the education and experience requirements and a training program for such personnel are as assigned to either QA audits or inspection functions. Procedure QA-2, "Contractor Surveillance", establishes the scope of the quality assurance program to be conducted by S-R QA organization as applied to the first level contractors and vendors. Procedure QA-5, "Fabrication and Construction Surveillance", establishes the scope and provides detailed check lists for the quality assurance and audit for all site activities, particularly as it relates to general fabrication and construction work of the nuclear related portions of the Forked River 1 construction site.

Procedure QA-7, "Internal Audits", establishes methods and procedures as well as check lists and other guidance for conducting and documenting audits of their own as well as the first level contractor's QC activity.

Section 5.3 of the S-R QA/QC manual, in the paragraph entitled "Quality Control Requirements", states that all equipment manufacturing contractors and site construction contractors shall be required to have a QC program which shall be in accordance with the applicable equipment and construction specifications. The QC programs shall receive prior approval by both S-R and JCP&L.

c. Burns and Roe

B&R quality assurance plan for Forked River 1 contains a procedure SP-84-2, which develops in great detail, the entire quality audit programs which must be performed on each manufacturing or construction contractor. Procedure SP-84-10, outlines the program by which the manufacturer's special processes will be audited and approved prior to and during manufacture or construction. Procedure 84-20, establishes specific check lists based on the type of equipment being procured or the construction practice to be used for auditing during manufacture and site construction. Procedure SP-84-29 outlines a frequency schedule and a system for auditing field quality assurance activities of Level I constructors. Procedure SP-84-30 outlines a procedure and a program for the orientation and training of quality assurance engineers assigned to B&R auditing functions.

In Section 2 of the B&R Manual, procedure SP-84-5 outlines the detailed instructions for auditing, receiving, storing and handling of equipment at the site. Procedure SP-84-11 provides guidance and check lists for auditing the site contractor's QC program for the production of the delivery of concrete. Procedure SP-84-12 provides guidance for the auditing of the site contractor's QC program for the installation of electrical equipment, conduit, and cable. Procedure SP-84-17 provides the general and specific guidance required for auditing the site contractors QC efforts during the installation of mechanical equipment and piping. Procedure SP-84-15 outlines the forms and requirements for the daily and periodic reports on audits performed over site contractor's QC programs.

d. Combustion Engineering

Since CE has no quality assurance or quality control responsibilities at the site, participation in site QA/QC activities is confined to the general surveillance maintained by the technically oriented personnel assigned to the site during erection of CE supplied equipment and systems.

e. Findings

It is concluded that both JCP&L and their primary contractors have or are developing programs which will meet the intent of Criterion XVIII for the areas of responsibility covered by each.

Jersey Central Power and Light Company
Forked River No. 1

Feeder Report
CO Report No. 363/70-2

Date of Inspection: November 2 and 3, 1970

Feeder Report by: R. F. Heishman, Reactor Inspector (Principal) 1/14/71 Date

Proprietary Information: Contractual Arrangements of Combustion Engineering

SCOPE

The inspection was conducted in accordance with PI 4000 (draft). This feeder report covers Criteria I, II, and XVIII of Appendix B, 10 CFR 50.

Personnel Contacted During Inspection Activities

Jersey Central Power and Light/General Public Utilities

R. W. Heward, Jr., Project Manager, Forked River 1
B. G. Avers, Manager, Quality Assurance, GPU
S. B. Palmeter, Manager of Construction, GPU
S. Bartnoff, Manager of Engineering, GPU
E. S. Fisher, Forked River Quality Engineer, GPU
M. Goodenough, Quality Assurance Engineer, GPU
M. K. Pastor, Assistant Project Manager, Forked River 1
J. R. Thorpe, Manager of Safety and Licensing, GPU
E. G. Roome, Safety and Licensing Engineer, GPU

MPR Associates

H. M. Panoff, Senior Partner
N. M. Cole, Engineer

Combustion Engineering Incorporated

J. C. Moulton, Project Manager, Forked River 1
T. H. Gamon, Manager Quality Control
T. R. Colandrea, Manager Quality Systems

B/432

Burns and Roe Incorporated

R. P. Giloth, Project Manager, Forked River 1
F. C. Meckle, Quality Assurance Leader

Stearns-Roger Corporation

E. D. Hill, Project Manager
T. S. Frost, Quality Assurance Manager
M. Kurlander, Quality Assurance Site Supervisor

## DETAILS

### Project Status

A. Engineering

1. Nuclear Steam Supply System (CE)

The licensee reported the engineering design of the nuclear steam supply system to be approximately 7% complete as of the time of the inspection. The approval of the design by the licensee was reported to be 0%.

2. Balance of Plant (B&R)

The licensee reported the engineering design of the "balance of plant" to be approximately 8% complete as of the time of the inspection. The licensee had not approved any of the design in this area.

B. Procurement

1. Nuclear Steam Supply System (CE)

The following items were reported by the licensee to have been released for procurement.

a. Reactor Vessel, Steam Generators and Pressurizers

Released to CE, Chattanooga for design. "Long lead" plate and forgings released for procurement.

b. Reactor Internals

Released for design and procurement of materials to P. F. Avery, Inc.

2. Balance of Plant (JCP&L)

The turbine-generator has been contracted to the Brown-Boveri Corporation, North Brunswick, New Jersey, by JCP&L.

C. Construction

No construction has been started and current plans are to start excavation and dewatering in early 1971.

Criterion I - Organization

1. Discussion

a. JCP&L/GPU

The organization of JCP&L/GPU was found to be as shown in Figures 1-10 and 1-11 of the PSAR. The QA manager reports to the director of the GPU Service Company, thus providing sufficient organizational freedom to identify, provide solutions, and verify implementation. Objective evidence was found to verify independence between QA and design, procurement and construction. The QA manager of the A-E and construction manager organizations are responsible to the JCP&L/GPU QA manager for QA activities. JCP&L/GPU retain approval authority on QA matters. Delegation of responsibilities to contractors is in writing and appears adequate. Evidence of implementation was found in some cases. MPR Associates has been retained by JCP&L/GPU to provide QA assistance as requested by the QA manager, JCP&L/GPU. The contract documents represent the scope of work for MPR.

b. Burns and Roe (B&R)

The QA organization of B&R was found to be as shown in Figures 1-10 and 1-11 of the PSAR. The authority and duties of QA personnel were found to be delineated in writing and appear to have the authority and organizational freedom to identify quality problems and verify implementation of solutions. B&R has been delegated the responsibility for quality in design of "balance of plant", which excludes NSSS, incorporated into procurement documents prepared by B&R, surveillance of vendors for B&R designed items, and surveillance of Stearns-Roger Corporation (S-R) when S-R acts as a site construction contractor. Objective evidence of planning was found by the inspectors commensurate with progress of the contract. No detailed schedule of completion of instructions, procedures, or plans was found.

c. Combustion Engineering (C-E)

The QA organization of C-E was found to be as shown in Figures 1-10 and 1-11 of the PSAR. The authority and duties of QA personnel were found to be in writing as a part of the quality plan and other internal procedural documents. C-E has been delegated the responsibility for quality in design and

procurement of the nuclear steam supply system. This includes vendor surveillance on C-E procured items. Objective evidence was found by the inspectors of quality planning in the form of internal procedures and the quality assurance plan (draft). Evidence of organizational freedom to identify quality problems and verify implementation of corrective action was found by a review of internal documents provided by C-E.

d. Stearns-Roger (S-R)

The QA organization of S-R was found to be as shown in Figures 1-10 and 1-11 of the PSAR. The authority and duties of QA personnel were found to be in writing as a part of the quality assurance plan and other internal documents. S-R is reponsible for surveillance of site construction contractors and for quality control and inspection when S-R functions as construction contractor. JCP&L/GPU stated the plan is to sub-contract all work on site, hence S-R will provide surveillance over subcontractor's quality control personnel on site. The S-R organization appears to have the organizational freedom to identify quality problems and verify implementation of corrective action.

2. Findings

The JCP&L/GPU, B&R, CE and S-R organizations appear to meet the intent of Section I of Appendix B, 10 CFR 50 and the PSAR.

Criterion II - Quality Assurance Program

1. Discussion

a. JCP&L/GPU

The JCP&L/GPU quality assurance program has been developed and is being implemented generally as outlined in the PSAR. The QA program is being implemented commensurate with progress of the project according to written policies and procedures. These policies and procedures were inspected in the form of the Forked River QA plan, the Forked River project organization and responsibility document, and the quality assurance requirements for contractors and vendors. The main event time scale schedule provides a time base for development of future procedures and instructions. No schedule for JCP&L approval of contractor QA plans was available; however, draft copies of these plans were reviewed by the inspectors and are discussed in this report. The JCP&L "Quality Assurance Requirements for Contractors and Vendors" document establishes a system of classification of structures, systems and components and assigns QA requirements for each. This document or the equivelant has been made a part of each contract and must be included in procurement documents by CE, B&R, and S-R. A QA Matrix is attached as Figure 1 for the Forked River project.

b. Burns & Roe

The Forked River quality assurance plan has not been approved by JCP&L. The draft plan was inspected and found to generally conform to Appendix B 10 CFR 50. The JCP&L/B&R contract requires a QA plan to be written by B&R and approved by JCP&L. The contents of the plan must conform to the JCP&L"Quality Assurance Requirements for Contractors and Vendors" and the intent of Appendix B, 10 CFR 50. In addition to the draft QA plan, B&R made available for inspection internal procedures and instructions to be utilized in fulfilling the commitments of the contract. No schedule for completion of the procedures and instructions not yet written was available. The documents inspected appeared to be commensurate with the project status. B&R stated 10 of 32 procedures were updated and completed in the quality instructions.

c. Combustion Engineering

The CE Forked River quality assurance plan has not been approved by JCP&L. The draft QA plan was inspected and found to generally conform to Appendix B, 10 CFR 50. The contract between JCP&L and CE requires a QA plan to be developed by CE and approved by JCP&L which meets or exceeds the intent of Appendix B, 10 CFR 50. Specification 2700-1, which is a part of the JCP&L/ CE contract contains the requirements for the quality program to be applied to the CE performance under the contract. The following documents were made available for inspection by CE:

(1) Draft Forked River Plan (QAP)

(2) Quality System Instructions (QSI)

(3) Methods and Procedures Instructions (MPI)

Documents inspected appeared to be commensurate with project status. CE stated all instructions and procedures would be completed prior to the actual required use. No formal schedule for completion was available.

d. Stearns-Roger

The S-R Forked River QA plan has not been approved by JCP&L. The draft plan was inspe cted and found to generally conform to Appendix B, 10 CFR 50. S-R is committed by contract to the JCP&L "Quality Assurance Requirements for Contractors and Vendors." The following information was presented to the inspector to demonstrate the method of compliance with Appendix B, 10 CFR 50.

MATRIX:
ATOMIC ENERGY COMMISSION
10 CFR 50
18 POINT CRITERIA
TO
STEARNS-ROGER
QA-QC PROCEDURES

| AEC REQUIREMENT: | | QA-QC PROCEDURE: |
|---|---|---|
| I | Organization | QA Plan, QA-1 |
| II | Quality Assurance Program | QA Plan |
| III | Design Control | QC-21 |
| IV | Procurement, Document Control | QC-12, QC-22 |
| V | Instructions, Procedures & Drawings | QA-4, QC-8, QC-22 |
| VI | Document Control | QC-8, QC-22 |
| VII | Control of Purchased Material Equipment and Services | QC-10, QC-12 |
| "III | Identification & Control of Materials, Parts and Components | QC-10, WC-12, QC-15 |
| IX | Control of Special Processes | QC-16, QC-17, QC-18 QC-22 |
| X | Inspection | QC-10 |
| XI | Test Control | QC-19 |
| XII | Control of Measuring & Test Equipment | QC-13 |
| XIII | Handling, Storage & Shipping | QC-10 |
| XIV | Inspection, Test and Operating Status | QA-5, QA-6, QC-9 |
| XV | Nonconforming Materials, Parts or Components | QC-11 |
| XVI | Corrective action | QA-20 |
| XVII | QA Records | QC-22, QC-10, |
| XVIII | Audits | QA-2, QA-20, QC-7, QA-3 |

STEARNS-ROGER QA/QC
PROCEDURES

| | |
|---|---|
| QA-1 | Qualification Requirements and Responsibilities |
| QA-2 | Contractor Surveillance and Audits |
| QA-3 | Vendor Evlauation and Selection |
| QA-4 | Drawings, Specification and Purchase Order Document Control |
| QA-5 | Fabrication and Construction Surveillance |
| QA-6 | System and Component Conformance Review |
| QC-7 | Internal Audits (1st Level) |
| QC-8 | Issue, Revision and Maintenance of QA/QC Procedures |
| QC-9 | Work Stoppage |
| QC-10 | Receiving Inspection, Handling and Storage Materials |
| QC-11 | Nonconforming Materials and Workmanship |
| QC-12 | Material Control |
| QC-13 | Tool, Gage and Instrument Control |
| QC-14 | Welding and Welding Rod Control |
| QC-15 | Mechanical and Electrical Equipment |
| QC-16 | Cleaning and Cleanliness Control |
| QC-17 | Concrete Production and Delivery |
| QC-18 | Concrete Placement |
| QC-19 | Testing Performance and Surveillance |
| QC-20 | Internal Audits and Corrective Action |
| QC-22 | QA/QC Records |

The above procedures were being written and a schedule for completion was presented which, if followed, will provide the required written instructions commensurate with project progress.

2. Findings

The quality assurance programs of JCP&L, B&R, CE and S-R, when completed and implemented, appear to meet the intent of Appendix B, 10 CFR 50 and the PSAR. The programs at present appear to meet the requirements for the status of the project. Schedules for completion of the details of the program were not available.

Criterion XVIII - Audits

1. Discussion

a. JCP&L/GPU

The GPU Power Department QA manager has been assigned the responsibility for preparation of detailed procedures for auditing the various contractors QA operation. The QA manager will be assisted as required by the engineering staff of GPU Service Company. In addition, MPR will be utilized as agent of JPC&L/GPU as required in the auditing and to conduct internal audits of GPU QA and engineering groups at least yearly. Objective evidence of audits were reviewed in the form of an audit report of B&R on August 11, 1970. Procedures for use by auditors were reviewed by the inspectors. An audit schedule was not available at the time of the inspection. The audit program appears to be commensurate with the project status.

b. Burns and Roe

B&R is required by contract to have a comprehensive system of planned and periodic audits and to carry out these audit plans to verify compliance with all aspects of their QA program. The audits are to be performed in accordance with written procedures or check lists and conducted by personnel not having direct responsibilities in the areas being audited. Audit results are to be documented and reviewed by management having responsibility in the area being audited. Followup action including reaudit must be taken when indicated. B&R project management procedures require internal audit by the project manager on designee at least yearly with reaudit of deficiencies one month later. The project management audit check list was reviewed and deemed adequate. An audit schedule for vendors was not yet available; however, evidence of planning for vendor audits was inspected in the form of procedures and check lists. The audit program appears commensurate with the project status.

c. Combustion Engineering

Specification 2700-1 requires CE to conduct audits of vendors and internal audits necessary to comply with Section XVIII of Appendix B, 10 CFR 50. CE has developed a system of vendor audits to include procedures, check lists, and the necessary corrective action. Objective evidence was found of the above. No procedure for internal audits was available but the inspectors were informed by CE that a draft procedure was being reviewed by CE management and a system of internal audits would be implemented in the near future. The CE system of vendor audits is scheduled on the manufacturing plan required by the purchase order and is related to witness and hold points which are selected by CE vendor quality control section. The CE audit program appears to be commensurate with the project status except for the internal audit procedure which is not yet implemented.

d. S-R

S-R like B&R is committed to the JCP&L "Quality Assurance Requirements for Contractors and Vendors" which requires both vendor audits and internal audits. S-R has four procedures which address the subject as follows:

(1) QA-2 Contractor Surveillance and Audits

(2) QA-3 Vendor Evaluation and Selection

(3) QC-7 Internal Audits (1st Level)

(4) QC-20 Internal Audits and Corrective Action

The above procedures were in various stages of completion at the time of the inspection. A schedule of completion was presented which indicated approval and implementation prior to start of construction. Verification of implementation will be required during subsequent inspections.

2. Findings

The audit programs for JCP&L and its major contractors appear to be commensurate with project status; however, schedules and implementation of plans will require followup during subsequent inspections.

Figure 1
CO Report No. 363/70-2

# Quality Assurance Criteria for Nuclear Power Plants

| Requirement | Document |
|---|---|
| I. Organization | QA PO Attachment<br>Project Organization and Responsibility Document |
| II. QA Program | Forked River QA Plan<br>QA PO Attachment |
| III. Design Control | QA PO Attachment<br>Proj. Org. & Resp. Document<br>CE Design Review Proc.<br>B&R Design Review Proc.<br>PSAR Deviation Proc. |
| IV. Procurement Document Control | QA PO Attachment<br>Proj. Org. & Resp. Docu. |
| V. Instructions, Procedures, and Drawings | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>B&R QA Plan<br>CE QA Plan |
| VI. Document Control | QA PO Attachment<br>Proj. Org. & Resp. Docu.<br>GPU Document Control Proc.<br>S-R Document Control Proc.<br>B&R Document Control Proc.<br>CE Document Control Proc. |
| VII. Control of Purchased Material, Equipment, and Services | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>CE QA Plan |
| VIII. Identification and Control of Materials, Parts, and Components | Forked River QA Plan<br>QA PO Attachment<br>CE QA Plan<br>S-R QA Plan<br>CE Material Control Proc.<br>S-R Material Control Proc. |
| IX. Control of Special Processes | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>CE QA Plan |

Figure 1
CO Report No. 363/70-2

| Requirement | | Document |
|---|---|---|
| X. | Inspection | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>CE QA Plan |
| XI. | Test Control | Forked River QA Plan<br>QA PO Attachment<br>Project Organization and Responsibility Document |
| XII. | Control of Measuring and Test Equipment | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>CE QA Plan |
| XIII. | Handling, Storage and Shipping | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>CE QA Plan |
| XIV. | Inspection, Test, and Operating Status | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>CE QA Plan<br>Proj. Org. & Resp. Document |
| XV. | Nonconforming Materials, Parts or Components | Forked River QA Plan<br>QA PO Attachment<br>S-R QA Plan<br>B&R QA Plan<br>CE QA Plan |
| XVI. | Corrective Action | Same as XV |
| XVII. | Quality Assurance Records | " " " |
| XVIII. | Audits | " " " |



Attachment "B"
10-5-70