



NEI Peebles - Electric Products, Inc.

17045 Euclid Avenue
Cleveland, Ohio 44112
Telephone: (216) 481-1500
Telex: 241564
Facsimile: (216) 481-8386

February 27, 1992

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

SUBJECT: "Reply To Notice Of NonConformance"
Docket No. 9900772
Inspection of a Safety Related Power
Generator Supplied to Diablo Canyon
Nuclear Power Plant Unit 2

Gentlemen:

The document following with its attachments constitutes our reply to the Notice of NonConformance dated January 15, 1992. The audit team was helpful in providing us with a clearer understanding as to the interpretation and criteria of the NRC Quality Requirements of 10 CFR 50, Appendix B, which we feel will aid us in servicing the needs of the industry.

We hope that this reply is in the format and extent that you desire.

If these replies are insufficient, we stand ready to rectify the situation.

Sincerely,

NEI Peebles - Electric Products, Inc.
R. B. Politi
Vice President & General Manager

/Enclosure (1) Reply to NonConformance (-01,-02,-03,-04)
Attachments

cc: Chief Vendor Inspection Branch
Division of Reactor Inspection & Safeguards
Office of Nuclear Reactor Regulation

Mr. Peter R. Holroyd
Peebles Electrical Machines
Edinburgh

9203040189 920227
PDR GA999 EMVPPPEP
99900772 PDR

TE09 1/2

Nonconformance 99900772/91-01-01

Contrary to Criterion III, "Design Control"....P-EP failed to :

(1) establish adequate measures to control changes in design, materials, and manufacturing processes commensurate with those controls applied to the original design or

(2) provide for performing design verifications of the changes in design, materials, and manufacturing processes

In the design-basis reconciliation...P-EP failed to:

(3) demonstrate that the changes in design were controlled commensurate with the design controls applied to the original design.

(4) demonstrate that the original design basis had been correctly translated into the revised specifications, drawings, procedures, and instructions.

In support of these findings (Section 3.4.1) the NRC states that PG & E 's PO required that the generator be like-for-like to the 1986 spare generator and the five existing operating power generators (original 1969 design base). ... It was felt that QAM - 100 did not provide for reconciling changes ... to the original design base. In addition as changes were documented and verified only to 1984, we could not substantiate that the new generator was like-for-like with the five operating generators.

COMMENT

We would agree that we did not demonstrate change evaluation to the extent that the new generator is like-for-like with the original machines, but rather constituted of similar items which result in the generator being identical in form, fit, and function to the originals. We strove to provide reasonable assurance that this machine and its constituent parts will perform their safety related function.

We would first like to take exception to some of the above findings and then address the "demonstrations." We evidently did not satisfactorily convey the operation of the QAM-100 Quality Assurance Program to the inspection team.

(1) and (2) We feel that the QAM - 100 established these control measures and provided for design verification of changes. As evidence of this Section 3 Design Control, Subsection 3.6 Design Change Control, states that EQ 2.10.1 and form #1255 establish a uniform procedure for processing and controlling changes in design and procurement documents. Form #1255 is the form still used today, and EQ 2.10.1 explains its use. (Attached). EQ 2.10.1 specifically states that form #1255 when functioning as a Drawing Change Request (DCR) is a tool for evaluating changes to drawings. As a material substitution (MS) it proposes an alternative for evaluation

by engineering... if such is technically feasible. Further on it defines the engineering action as consisting of either a rejection or approval of a substitution after the technical impact of the change was fully investigated.

We would agree with the inspection team (and PG & E auditors) that evidence of the required evaluation be documented. We would also agree that latitude was given to designers to determine whether a change to a drawing constituted a "design change" or whether it was a simple correction or clarification not requiring formal evaluation.

- (3) To demonstrate whether these above controls are commensurate with those in place at the time of construction of the original construction (1969), we must investigate Q9858A. PEP supplied a variety of products to the military, so the Quality Assurance Program at that time was written in compliance to the Military Specification Quality Program Requirements. With regard to control of changes (design drawings and design specifications), the Mil Spec requires that "a procedure shall be maintained that shall provide for the evaluation of their engineering adequacy and an evaluation of the adequacy of proposed changes. The evaluation shall encompass both adequacy in relation to standard engineering and design practices and the adequacy with respect to the design and purpose of the product to which the drawing relates." We feel that the approach to design changes, i.e. that they are controlled and reviewed by competent engineers with an evaluation based upon good engineering practice which considers the application, has been consistent throughout the time period in question.
- (4) To demonstrate that the original design basis has been correctly translated to the revised specifications etc. for the new machine, we must reexamine the original design basis. Design Basis: P.O. D-22839 placed on Electric Products Co. by Alco Engine which included Specification 8764 written by Pacific Gas and Electric Co., dated April 5, 1969. By acceptance, dedication as a basic component, and use, the original five generators meet the design basis, to the best of our knowledge. The documents constituting that design were re-issued in 1986. The thought at that time was that these drawing, specifications, and instructions preserved the critical aspects of the design, thus enabling PEM to produce a machine identical in form, fit, and function to the original five, as was required by that contract. We have no reason to believe anything to the contrary. By the acceptance of PG & E of that generator at that time, and the lack of any nonconformance findings by the NRC at that time (99901065/86/01), the documentation at that time was established as an equivalent design base. This design base was used by mutual agreement of PG & E and P-EP when conducting design verification on the current generator. In the opinion of P-EP, the retrospective verification of 15 years (1969 to 1984) of design control activities would not significantly increase the assurance that the new generator is

equivalent to the originals.

Mr. Joseph Pospisil, Chief Engineer at P-EP, who was an internationally recognized expert on rotating electrical machinery, approved the 1986 design. He is recently deceased. He was forceful in his conviction that the interpretation of like-for-like criteria was often misinterpreted to the detriment of good design control. His opinion was that engineering documentation if true to physical reality, must account for tolerable differences in parts (hence tolerances) and material specifications likewise must account for similar differences. We were also of the opinion that an application of a British Standard material does not constitute a design change. We had in the course of our review, verified that the materials selected, did meet the criteria established by the PEP Material specifications. Save for a few instances, the equivalency was verified.

RESPONSE

(1) Steps to be taken to correct non-conformance.

We will review the documentation and engineering evaluations which were previously reviewed, and augment and clarify the evaluations themselves as required. We will then ask P G & E to review this effort.

(2) Steps taken to prevent recurrence.

In the area of change verification the Engineering Quality Standard EQ 2.10.1 has been clearly written to mandate that verification be documented as part of the Quality Assurance Activity. This includes a review of the impact on the exiting qualification for the part if it is a dedicated commercial grade part or a basic component.

(3) Dates of corrective actions.

The EQ Specification was written 2-13-92 and is now implemented. It will be specifically referenced in the April, 1992 review and revision of QAM 101.

The reconciliation of the P G & E generator will commence March 1. Review sheets will be sent to P G & E by the end of April, 1992.

Contrary to Criterion III, "Design Control"... P-EP failed to:

- (1) establish adequate measures to control the design interface between it and its sister organization, Peebles Electric Machines (PEM) of Edinburgh, Scotland, that consisted of the review, approval, release, distribution, and revision of design documents affected by their design interface.
- (2) demonstrate that the results of PEM's design translation activities were equivalent to the design requirements specified by P-EP.
- (3) adequately document the critical requirements or acceptance criteria during the equivalency evaluation.
- (4) adequately document the results of the equivalency or other bases to support P-EP conclusion that PEM's procedures and specifications were equivalent.

In support of these findings (Section 3.4.2) the NRC states that much of the equivalency evaluation postdated the completion of the machine. Also that the equivalency evaluations were not auditable because (1) PEM's specifications were not always available and (2) P-EP's evaluation were brief summaries. P-EP failed to document the critical requirements and acceptance criteria and results of the evaluation supporting the conclusion of equivalence.

COMMENT

We accept the fact that in the future all required evaluations should precede the quality related activity which are affected. We feel that the remainder of the nonconformance deals with the degree to which said evaluations were conducted. This has been a learning process for P-EP and the criticism is constructive. The rectification process has also been ongoing and is improving.

RESPONSE

(1) Steps to be taken to correct non-conformance.

As this activity is ongoing we believe that the evaluations are now more auditable than they were. We need to re-examine the evaluations to include the points mentioned. One caution must be noted. In the case of materials, criteria are not universally applicable. Engineering decisions often involve compromise. These evaluations must be summaries, by their very nature. As stated in EQ 2.10.2 now re-issued, all evaluations for changes on form 1255 must be documented (excluding obvious corrections). These documentations will be included in the evaluation library. Steps have also been taken to improve the control of PEM standards held by P-EP. We maintain a library of the controlled PEM standards and British Standards that we hold. When any questions arise as to the availability of standards, they are faxed to us. PEM

engineering has been helpful in proving the back up documentation required, by supplying it with their Engineering Change Requests.

Our Audit of PEM in October of 1990, (AFR 9003-4) found that that the interface between the organizations relative to design control needed to be formalized. This AFR was closed out based upon the implementation of DPO3A004. During that audit nine drawing and seven procedures were examined and found to be properly controlled. Seven drawings were evaluated relative to changes, and it was found that none of the changes affected the design of the machine.

(2) Steps taken to prevent recurrence.

Document control of PEM standards and British Standards held by P-EP have been improved through indexing. Future engineering action involving evaluation shall include documented evaluations. Additionally the documented evaluation shall be included in the response to PEM request.

Now P-EP reviews and approves all PEM generated drawings for P-EP contracts. We are formalizing the interface activities by P-EP via a revision to QAM 101 which includes QA 1.10.4 "Control of Design Interface Between P-EP and PEM".

(3) Dates of corrective actions.

The above actions have been implemented. The re-evaluation of equivalencies will commence March 1, and will be sent to P G & E by the end of April. QA 1.10.4 will be implemented March 15, 1991.

Contrary to Criterion III "Design Control" and Criterion VII "Control of Purchased Materials, Equipment, and Services," P-EP failed to adequately (1) establish measures to provide for the selection and review for suitability of the application for materials, parts, and equipment that were procured as commercial grade items and were essential to the generator's ability to perform its intended design and safety related function, (2) ensure suitability of stator coil resistance temperature detectors (RTD), slip rings, adhesives, and mounting sleeve insulator for the slip ring, and (3) ensure the suitability of the materials, parts, and equipment PEM procured.

(1) Steps taken to correct this non-conformance.

NEI P-EP has always dedicated parts through inspection and functional test. NEI P-EP did not, however, have a formalized dedication program during the P G & E procurement. NEI P-EP dedicated a series of items through inspection and test.

A documentation package was sent to P-EP by P.E.M. For the P G & E generator. The package was reviewed by P-EP engineering and quality assurance. This documentation package was tied to individual items. This provides P-EP with reasonable assurance that P.E.M. has supplied the items specified by P-EP.

NEI P-EP engineering reviewed their drawings and specifications to the extent possible for changes to establish equivalency between the 1986 P G & E generator and the most recent one.

The results of this review were that there were no significant change designs that would have an adverse effect on the function on the present generator.

NEI P-EP engineering then compared P-EP specifications and procedures against Peebles Electrical Machine procedures and specifications. This was done to verify the equivalency between P.E.M. Procedures and methods and P-EP procedures and methods. This review established that equivalency.

In October of 1990, P-EP performed a quality audit of P.E.M. (Audit No. 9003). This was done with the help of P G & E. That audit provided objective evidence that the P.E.M. Quality Program was adequate to control the manufacture the P-EP Class 1E design. The audit did provide six (6) audit findings. These findings were addressed and corrected by P.E.M.

Implementation of P.E.M.'S corrective action was verified during a visit of P.E.M. From January 27, 1992 through February 1, 1992, by the P-EP Quality Assurance Manager. During this visit, all audit finding corrective actions were found to be satisfactory.

Based on the before mentioned design review, equivalency review and audit of P.E.M., NEI P-EP is confident that the generator is suitable for use as a component in a Class 1E safety related system to the extent of our knowledge and responsibility. Support of this suitability is in the documentation of inspection and test of the 27 items considered critical to the generator. The list was the result of a combined effort between P G & E, P.E.M. and P-EP. This documentation provides reasonable assurance that the generator is, in fact, acceptable.

(2) **Steps taken to prevent recurrence.**

On February 1, 1991, QAM-101 was issued. QAM-101 supersedes all revisions of QAM-100. The quality program outlined and controlled by QAM-101 has grown and improved in the last year. The manual has been revised twice in that time, with the most recent edition being revision 2, dated 10/24/91.

QAM-101 is the bases for our quality program. The details of the program are contained in related documents such as:

- DED-100 - Dedication Program
- QA 1.10.4 - Control of design interface P-EP/P.E.M.
- QA 2.C - Critical items listing for Class 1E generator

The above documents are only part of P-EP's improved quality assurance system. They are mentioned here because they correct the non-conformances mentioned in 99900772/91-01-03.

Present document QAM-101
Previous document QAM-100

QAM-100, when properly placed and implemented with related documents, was capable of establishing the controls necessary to the Appendix B program. QAM-100 was too detailed for a company the current size of P-EP to implement and, as a result, became inadequate.

QAM-101 is written to be an outline of our Appendix B program. This manual provides P-EP with more flexibility than QAM-100 did.

Qam-101 addresses dedication. This was not covered by QAM-100, but in associated EQ Standards. EQ 1.4 addressed dedication, stating that final dedication of commercial grade items occurs when the item is integrated into the safety related system and accepted.

QAM-101 is the bases for our present quality assurance program. It has been improved with each review. The reviews enable us to improve on weaknesses found during audits by the utilities, the NRC, the government (defense), and other customers.

Present document - DED-100
Previous document - none

On August 1, 1991, DED-100 was approved and issued to control the dedication of commercial grade items. DED-100 will be revised by 3-15-92. It will be revised to document the fact that the qualification is used to establish the critical characteristics that need to be verified to properly dedicate a commercial grade item. DED-100 is written to comply with EPRI 5652 and closely defines our dedication program.

Present document - Q.A. 1.10.4
Previous document - none

This specification is written to better define the design interface. It will be referenced in section III of QAM-101. Q.A. 1.10.4 will also be referenced on the purchase order to P.E.M.

This document provides a closed loop tie into P.E.M. Procedure DE-03A004. It will also provide the criteria necessary for an effective equivalency evaluation program. QA 1.10.4 Controls the equivalence of:

- Drawings
- Material Specification
- Engineering Specification
- Production Specification

This specification will provide assurance that P.E.M. is manufacturing to the P-EP design.

Present document - Q.A. 2.0
Previous documents - EQ 2.2.3

Q.A. 2.0 is a listing of items considered by NEI P-EP to be vital to the safety related operation of the generator. The critical characteristics chosen for each critical item are derived from the environmental and seismic qualification for that particular generator. The original standard written in 1976 listed documentation requirements for various critical components and was written for a particular customer

(3) Dates of corrective action

Q.A.M. 101 - 2-1-91. This manual will be revised again in April of 1992 to include corrective actions outlined in this reply.

DED-100 - 8-1-91. DED-100 will be reviewed and revised in March to increase its effectiveness.

Q.A. 2.0 - 9-19-91.

Q.A. 1.10.4 - 3-15-92.

Comments on Specific Items

Items under (2) supplied by P-EP to PEM.

- (a) RTD's not safely related in function. The various failure modes have been analyzed and determined to have no effect on the safety function of the generator.
- (b) Slip rings were ordered, received, documented by a c-of-c, inspected in a manner commensurate with the original quality control measures. The slip rings are critical components as they supply power to the field windings. The plausible failure mode is wear (pitting, grooving, or a carbon and dust film) caused by worn brushes, improper brush pressure, or contamination. This type failure is a minor degradation where the situation very slowly degrades and is readily observable with routine maintenance. The critical function of the item is readily observable and verifiable during functional testing.
- (c) The adhesive was a concern of P G & E. They had it independently tested and it was found to be within the specified strength.
- (d) The slip ring insulating mounting sleeve is critical to the extent that it support the voltage difference of the slip rings. Its functionality was verified by functional testing of the machine to IEEE 115. This slip ring and insulation design is not unique, and has proven reliability through years of use without any known failures. The stresses of operation under a design base event are not significantly greater than those of normal operation.

Nonconformance 99900772/91-01-04

Contrary to Criterion V, "Instruction, Procedures, and Drawings," P-EP failed to establish adequately measures to ensure (1) that activities affecting quality were prescribed by documented instructions, procedures, drawings (2) that activities affecting quality were accomplished in accordance with these instructions, procedures, drawings; (3) that instructions, procedures, or drawings include appropriate quantitative or qualitative acceptance criteria for determining that important activities were satisfactorily accomplished. NRC cites (1) fit of rotor poles to rotor spider, (2) brazing on rotor spider, (3) brazed joint in field coil.

Docket No. 99900772-01-04 indicates that QAM-100 did not provide the necessary ingredients to adequately control the quality of the PG & E generator. NEI P-EP feels that the controls existed, but that we failed to adequately demonstrate this. QAM-100 was a detailed manual which, along with its supporting documents, outlined an adequate quality system. We do agree that a formalized dedication system was not defined.

NEI P-EP did not effectively implement QAM-100 to control the quality of components. It must be noted that NEI P-EP considers this generator to be mechanically and electrically correct. NEI P-EP's failure was only in its ability to provide documented proof that the generator was correct. NEI P-EP did not ship a generator that was misrepresented in anyway.

- (1) NEI P-EP's communication with P.E.M. during the PG & E generator procurement was informal and did not comply with our past or present Quality Assurance Programs, Reference QAM-100 and QAM-101.

When P.E.M. manufactures a Class 1E generator as a basic component, they must be controlled as such. New documents have been implemented to provide the control necessary to effectively control P.E.M. during the manufacture of a Class 1E generator.

NEI P-EP put forth a great deal of effort to resolve the inadequacies associated with the PG & E procurement. NEI P-EP Engineering evaluated drawings, procedures and specifications to establish equivalencies between NEI P-EP and P.E.M. Although most of the evaluations were performed after the fact, there were no differences discovered that would indicate a problem with the generator.

These equivalencies were performed to prove that the generator was manufactured to and meets the design requirements.

NEI P-EP would like to emphasize that the final functional test of the generator is quite extensive and is the ultimate proof of compliance to design parameters. These functional tests were performed on this generator and approved by NEI P-

EP Engineering.

(2) **CORRECTIVE ACTION**

NEI P-EP's present Quality Assurance system provides much stricter controls of P.E.M.'s QAM-101 and its supporting documents define the controls necessary for P.E.M. to manufacture a NEI P-EP designed Class 1E generator.

During the week of January 26, 1992, NEI P-EP Quality Assurance visited P.E.M. The purpose of this visit was to:

(a) Close out the NEI P-EP audit P.E.M. conducted in October 1990.

(b) Review documentation of the WPPSS generator to prove the additional controls of P.E.M. by NEI P-EP were properly implemented.

During the one week audit close-out, the following information was reviewed and evaluated:

(a) A sample of engineering equivalencies were reviewed to determine proper and complete reviews by P.E.M. Engineering and NEI P-EP Engineering. They were performed to assure control and coordination between P.E.M. and NEI P-EP. The review showed that each equivalency is documented and approved by both P.E.M. and NEI P-EP Engineering. Each equivalency is documented on a serialized form by P.E.M. and NEI P-EP. These documents reference each other to provide the necessary tie-ins for the equivalency evaluation.

(b) A copy of Specification Q.A. 2.0 (Critical Item Listing and Critical Characteristic Criteria) was sent to P.E.M. for the WPPSS generator. The specification was found with the Quality Engineer assigned to the WPPSS assignment. P.E.M. is using the specification to determine critical items and characteristics. A review of the documentation on the WPPSS generator found the information required by Q.A. 2.0 was being provided by P.E.M.

NEI P-EP has also written new documents to provide better control of procurements made from P.E.M. These documents are EQ 2.10.1 and Q.A. 1.10.4. EQ 2.10.1 defines the criteria for filling out a Change Notice Form 1255. It outlines the requirement for processing and approval of changes.

QA 1.10.4 defines the design interface between NEI P-EP and P.E.M.

(3) **Dates of corrective actions**

All corrective action will be implemented and effective by May 1, 1992.

Comments of Specific Issues

- (a) Procedures governing the fit of rotor poles to the rotor spider were deemed inadequate. While we accept this as an example of programmatic deficiencies, we do not consider this a critical omission that would jeopardize the function of the generator. The fact that P-EP did not have a corresponding procedure should indicate that this is a standard shop procedure capable of being executed by any group familiar with rotating machinery. Spare poles are supplied by manufacturers to utilities for installation by maintenance personnel. The quality of the activity is controlled and verified by balancing and vibration analysis conducted on the rotor assembly. As a matter of manufacturing efficiency, PEM requested guidance from P-EP on this subject in 1987 and P-EP responded. We certainly feel that the issuance of R-6097 is an improvement in the quality control system. As PEM has an extensive quality program, we at P-EP cannot approve every standard or procedure individually that may be applied to an item subcontracted to them to build for P-EP. By acceptance as PEM as a qualified vendor of P-EP, we approve their system of quality control in general, and acknowledge their ability and expertise to develop standards. Through the implementation of DPO3A004 by PEM, governing engineering changes, P-EP certainly has more control and input into the manufacturing processes, procedures, and approval of same than would be possible with any other vendor.
- (b) Brazing of ammotisseur bars was called out on P-EP Dwg. to be to EB-4.4. This standard was duplicated by production engineering and called PS-3006. PS-3006 was addressed in the equivalency review and EO No. 1457 of 5-10-91 accepted the equivalence of R-6095 (PEM SPEC). R-6095 references R-6092 which is their brazing specification. The Engineering Evaluation is attached.
- (c) We know we had no such connections on the P G & E generator. Note in the Inspection Report, the P-EP Procedure was referred to as R-6028. The P-EP Production Procedure is PS-6028. The PEM Procedure is R-6101. The Engineering Evaluation is attached.

Conclusion.

We at NEI P-EP are dedicated to servicing the Nuclear Power industry, and look upon the criticisms raised as an guide to improving this service. When judging the significance of the non-conformances, we would trust that the reviewers acknowledge the reliability of our generators and that of generators as a whole. Studies such as NUREG/CR-4590, Aging of Nuclear Station Diesel Generators: Evaluation of Operating and Expert Experience, issued in 1987 and studying almost 2000 failures of D-G systems from 1965 to 1984, found less than 1.4% were attributed to the generators.

ATTACHMENTS

EQ 2.10.1 CHANGES, FORM 1255, JUNE 16, 1977

EQ 2.10.1 DESIGN AND DOCUMENT CONTROL - USE OF FORM 1255,
2/12/92

ENGINEERING EVALUATION - BRAZING (AMORTISSEUR BARS)

ENGINEERING EVALUATION - POLE WINDING JOINT

ISSUED: June 16, 1977

EQ 2.10.1
FILE NO.: SPA-31

Supersedes: September 1, 1975

Subject: Changes, Form 1255
Page 1 of 5 pages

The purpose of this Standard Practice is to establish a uniform procedure for processing and control of changes of design, manufacture and procurement documents by means of Form #1255. EXHIBIT "D". It can also be used as a vehicle for conveying corrective action on repair.

1. Form #1255 is a multiple purpose form serving any one or a combination of the following functions:

- a. Drawing Change Request
- b. Advance Drawing Change
- c. Engineering Order or repair work assigned against D.R. only.
- d. Material Substitution Request

2. The four basic functions listed above are defined as follows:

- a. Drawing Change Request is an instrument of requesting, evaluating, approval or rejection and recording all changes of active drawings of parts and any other technical documents normally issued by Engineering for purposes of production, quality control and record.
- b. Advance Drawing Change provides a means of alerting particular work stations of the Manufacturing, Quality Control and Vendors that a drawing change or other document change affecting parts or materials in process is forthcoming. It also serves to convey the description of such changes in advance of the physical change of drawings and documents in order to correct the affected parts without upsetting schedules.
- c. Engineering Order provides a vehicle for conveying specific instructions to Manufacturing and Quality Control Departments on all such matters that fall outside the normal scope of drawings and other technical documents. It also serves the purpose of effecting and recording physical modifications of parts under specific circumstances when drawings and other documents cannot be changed without affecting other parts. Finally, it is instrumental in contracting services of Manufacturing and Quality Control Departments in support of some specific Engineering activity, such as technical investigations, measurements, rig up, repair work, etc.
- d. Material Substitution Request serves as a formal notification that the originally specified material cannot be procured within the time or cost frame necessary for successful completion of the order. It proposes an alternative for evaluation by Engineering and Manufacturing Departments and requests that a temporary substitution of material be made in order to meet the planned objectives, if such substitution is technically feasible.

3. Form #1255 can be originated as a Drawing Change Request by any member of the Engineering, Manufacturing and Quality Control Departments, however, only the personnel specifically authorized by the department manager can originate the Form #1255 as an Advance Drawing Change. Useage of the Form #1255 as an Engineering Order is restricted solely to the authorized personnel of Engineering and useage as a Material Substitution Request to the authorized personnel of Purchasing.
4. Any Form #1255 is an authorization of some rework, or added work, that must be properly controlled and accounted for under a Discrepancy Report System. Form #1289-B must be prepared to cover any Form #1255 processed through Engineering. The D-Number must appear next to the words "Description of Change" on any processed Form #1255.
5. Form #1255 is prepared in triplicate (white, pink and yellow), and processed as follows under 5.1, 5.2 or 5.3 depending on the department of origin:
 - 5.1-Form #1255 Origination Outside of Engineering (see 1.a and 1.b)
 - a. Originator fills the blanks provided for Serial (S.O.) No., Drawing No. and Name, checks the function in accordance with the definitions 2.a or 2.b above, specifies a brief reason for the change and gives an accurate description of the change requested starting with the D-number (Form 1289-B) immediately following the words "Description of Change". No signature is placed in the space provided above the double line separating the processing record blocks. Originator then fills the blanks provided in the top left hand corner of the processing record block giving his name, department and date. The supervisor's signature must appear in the space provided, unless the originator's name appears on the list of authorized personnel.
 - b. Yellow copy shall then be detached by the originator and retained for departmental record purposes. The white and pink copies shall be submitted for Manufacturing Department approval.
 - c. The Chief Industrial Engineer, or his designee, examines the requested change, and approves or rejects it. Proper boxes must be checked and a brief reason for rejection given, as applicable. The Director of Materials determines the disposition of stock, if applicable, prior to approval by the Chief Industrial Engineer.
 - d. Approved white and pink copies are then submitted to Engineering Department for approval and execution. Rejected white and pink copies are returned to the originator.
 - e. The Assistant Chief Engineer, or his designee, assigns the current record number in the upper right hand corner of the form and enters it into Engineering schedule.
 - f. Engineering action consists either of a rejection by an authorized engineer, or of an approval and execution of the Engineering phase, requested changes. Only the bottom left hand block is filled out when the change is rejected with a brief reason given.

- g. Expended Engineering time is accounted for on the corresponding Form #1289-B, and the white copy is issued to Manufacturing Department for implementation. Green prints of the revised drawings accompany the approved Form #1255. Pink copy is retained in Engineering files.

5.2-Form #1255 Originating in Engineering (see 1.a through 1.c):

- a. Identical with step 4.1.2, except including functions defined under 2.a, 2.b, as well as 2.c, as applicable.
- b. Identical with step 5.1.e.
- c. Yellow copy shall then be detached and retained in the Model Folder or Project Folder as applicable.
- d. Engineering action consists of executing the Engineering phase of requested changes and completing the entire left and right hand sections of the processing record blocks.
- e. When Form #1255 is used as an Advance Drawing Change or an Engineering Order, an authorized engineer's signature must appear in the space provided above the double line separating the processing record block.
- f. Identical with step 5.1.g, except that Manufacturing Department approval is required before implementation of changes indicated.
- g. White copy of the rejected Form #1255, properly completed in the center section of the processing record block and bearing the signature of the Chief Industrial Engineer, shall be returned to Engineering.

5.3-Form #1255 Originating in Purchasing (see 1.d):

- a. Originator fills the blanks provided for Serial (S.O.) No., Drawing No. and Name, checks the function in accordance with the definition 2.d above, specifies a brief reason for the substitution request and gives an accurate description of the material substitution, defining the originally specified material as well as the proposed alternate, starting on the line immediately below the words "Description of Change". The line to the right of the words "Description of Change" must be left blank for insertion of D-number (Form 1289-B) by Engineering. No signature is placed in the space provided above the double line separating the processing record blocks. Originator then fills the blanks provided in the top left hand corner of the processing record block, giving his name, department and date. The supervisor's signature must appear in the space provided, unless the originator's name appears on the list of authorized personnel.
- b. Yellow copy shall then be detached by the originator and retained for departmental record purposes. The white and pink copies shall be submitted to Engineering Department for approval.
- c. The Assistant Chief Engineer, or his designee, assigns the current record number in the upper right hand corner of the form and enters it into Engineering schedule.

- d. Engineering action consists either of a rejection by an authorized engineer, or of an approval of the proposed substitution after the technical impact of the change was fully investigated. In some instances, the investigation must include an evaluation of the manufacturing technology prior to Engineering implementation of the design and drawing changes. This may require a consultation with the Chief Industrial Engineer, or his designee, prior to filling out the bottom left hand block of the form. In the case of rejection, a brief reason must be given in the space provided.
 - e. Implementation of the Engineering phase of the material substitution may require a design and/or drawing change as well as other document changes if, and only if, such substitution necessitates a dimensional or quantitative change of any part. Under no circumstances must a permanent drawing change be made to record a change of vendor's designation, trade name, material spec. number, etc., unless the material substitution is permanent and represents a design change.
 - f. The white and pink copy accompanied by Green Prints of revised drawings, if any, shall be submitted for Manufacturing Department approval and implementation, if approved by Engineering. If rejected by Engineering, the white copy is returned to the originator and the pink copy is retained in Engineering files.
 - g. The Chief Industrial Engineer, or his designee, examines the requested substitution as well as document changes, if any, and approves or rejects it. Proper boxes must be checked and a brief reason for rejection given as applicable. The pink copy accompanied by the Green Prints is returned to Engineering regardless of the approval status. The rejected white copy is returned to the originator.
 - h. The approved white copy is retained by the Manufacturing Department for implementation as outlined in Para. 7.a. through e.
6. Rejected Forms #1255 that were approved either by Engineering or Manufacturing shall be subject to arbitration by the General Manager at the option of the department of origin.
7. Implementation of the approved Form #1255 is the responsibility of the Manufacturing Department and consists of the following essential steps:
- a. Revision of the affected processing documents, such as Manufacturing Order, Sequence, Purchase Order, etc., in accordance with revised drawings and instructions.
 - b. Disposition of the affected parts in stock and/or on the order as instructed by the Director of Materials, and recording costs on corresponding Form #1289-B.
 - c. Reproduction of the white copy and distribution to proper work stations with corresponding work orders, etc.

- d. Entering the change record numbers in the space provided in the upper right hand corner of the Sales Order.
 - e. Retaining the white copy of Form #1255 in the numerical file for the permanent Manufacturing Department record and filing the returned work station copies in the S.O. folders.
8. Production Planning is notified by a Xerox copy of every Form #1255 that reaches the implementation stage in the Manufacturing Department. It is the Production Planning responsibility to monitor the impact of all changes (Form 1255) on the established schedules
9. After implementation of the change by the Manufacturing Department, the Quality Assurance Department will examine the repaired or reworked part for compliance to the change order.

cc: DBR - JFS - CMcF - AWK - CWE - HR - JVP