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MILLARD S. POLLOCK
VICE PRESIDENT - NUCLEAR

SNRC-853
March 5, 1983

Mr. Richard W. Starostecki, Director
Division of Project and Resident Programs
U. S. Nuclear Regulatory Commission, Region I
631 Park Avenue
King of Prussia, PA 19406

NRC Inspection No. 83-02
Shoreham Nuclear Power Station, Unit 1
Docket No. 50-322

Dear Mr. Starostecki:

This letter responds to your letter of January 21, 1983, which forwarded the report of your Special Team Inspection conducted by NRC I&E Region I representatives on January 10th - 15th, 1983 at the Shoreham Nuclear Power Station of activities authorized by NRC License No. CPPR-95. It supplements our letter of February 19, 1983 (SNRC-843).

With respect to activities apparently not conducted in full compliance with NRC requirements, we are providing herein additional information for each of the items noted in Attachment A of your letter (Attachments A through D of this letter). This information is primarily in the areas of corrective and preventative action although additional background information is also included which was not available at the time of our February 19, 1983 response.

Also included in this response as Appendix E is a summary of the additional measures implemented by LILCO in the Construction and FQC Inspection areas as committed to in W. J. Museler's memo of January 17, 1983 to J. Higgins, NRC Resident Inspector. We believe these measures are having a beneficial effect on the Inspection Program at Shoreham.

Our letter of February 25, 1983 (SNRC-849) provided you with the requested report on the Housekeeping Program required by the NRC (CAL 83-1 dated 1/19/83) and we believe that this Program is proceeding satisfactorily at this point.

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Mr. Richard W. Starostecki, Director
NRC Inspection No. 83-02

We believe this final response, in conjunction with our 2/19/83 preliminary response, adequately addresses the findings contained in NRC Inspection Report 83-02. If you require any additional information, please advise.

Very truly yours,

M. S. Pollock

M. S. Pollock
Vice President-Nuclear

WJM/ph

cc: Mr. J. Higgins
Parties Listed in Attachment 1

SUPPLEMENTAL RESPONSE TO NRC INSPECTION NO. 50-322/83-02

A(1) Control Rod Drive Hydraulic Piping Supports

• Supplemental Information

The one hundred (100) percent inspection of RCI CRD hydraulic piping supports was completed with the following results:

- a. Gaps were found to exist on eleven (11) welds on the support identified by the NRC Inspector in Inspection Report 83-02.
- b. Additional gaps (two (2)) were noted on two (2) of the fifty-six (56) RCI supports inspected. The fifty-six (56) supports inspected constituted one hundred (100) percent of all RCI supports having a strut/structural weld configuration.
- c. Over two hundred (200) welds were examined during this inspection and therefore the total number exhibiting a gap was thirteen (13) with eleven (11) of these located on the support originally identified by the NRC.

In our February 19, 1983 letter we indicated that a preliminary evaluation of the conditions noted in the field indicated that the support would not fail but that stress allowables might be exceeded. Six (6) test specimens were fabricated by RCI simulating the existing field conditions and these specimens were laboratory tested by RCI in San Jose, California. RCI has evaluated this additional data and determined that all specimens, and the existing field configurations, are within allowable stress parameters.

• Corrective Action

Since the installation existing in the field, including the gaps measured during the one hundred (100) percent support reinspection program, have been found to meet all performance requirements, no physical modifications are required in this case.

• Steps Taken to Prevent Recurrence

RCI will modify all appropriate procedures and/or drawings to ensure that a specific gap requirement is included for the appropriate weld configurations (specifically unistrut to structural steel joints).

A(1) Control Rod Drive Hydraulic Piping Supports (Continued)

• Date When Full Compliance Will Be Achieved

Full compliance will be achieved by May 1, 1983.

A(2) Pipe Support Bolting and Pipe Clamp/Lug Contact

• Supplemental Information

With respect to the finger-tight nuts on pipe support Ell-PSA-109, we are providing no supplemental information except in the "Steps to Prevent Recurrence" section as indicated below.

With respect to the pipe clamp/lug clearances on pipe supports Ell-PSSH-173 and Ell-PSSH-184, the following supplemental information is provided:

E&DCR 1748S required full-bearing at the time of installation to ensure that contact exists between lugs and clamps during operation. The term full-bearing, as used on E&DCR 1748S does not mean one hundred (100) percent full surface contact between the lug and clamp from an Engineering standpoint; it means contact on each lug. Full-bearing contact would require specific machining of clamp and lug surfaces which was not intended or required. It is correct however that Construction and FQC's interpretation of E&DCR 1748S indicated a one hundred (100) percent contact requirement and lug/pipe clamp interfaces of this type were appropriately shimmed during installation to achieve this goal. It is also true that the two (2) supports found by the NRC to have less than one hundred (100) percent contact did not meet this requirement and we have discussed in our February 19th letter, the reasons we believe it was not achieved in this case.

The purpose of shear lugs on a spring hanger riser clamp assembly is to prevent slippage of the pipe clamp on the riser. The lugs are designed to take the full dead weight load and no credit is taken for the friction that exists between the riser and the clamp itself. During installation the clearance between pipe clamp and lug is measured to ensure that contact is made. It is recognized by Engineering that pipe movement does occur during loading, heat up, cool down, and unloading. Therefore, gaps of a few thousandths of an inch would be expected at some lugs in the

A(2) Pipe Support Bolting and Pipe Clamp/Lug Contact

• Supplemental Information (Continued)

unloaded condition in a power plant. Upon re-application of the load, (i.e., filling of an empty pipe with water, system operation, etc.) a small amount of movement of the pipe clamp would be expected resulting in contact between the pipe clamps and lugs.

It should also be noted that further FQC and Construction inspections of these particular pipe supports performed subsequent to our February 19, 1983 letter indicated that small gaps (no contact) existed on one (1) lug during several different inspections. This condition is expected and also explains why the NRC Inspector noted one (1) lug as not being in contact while UNICO reported the lug as being in contact in our February 19th letter. In effect, the system does move slightly when unloaded and this situation is normal and expected.

The two (2) specific spring hangers observed by I&E Inspector (PSSH-173 and PSSH-184) have been re-evaluated by S&W Engineering. In each case the lug contribution to total stress in the pipe wall is small and code allowables are not exceeded even if the entire dead weight load were taken by one (1) of the four (4) lugs on each support. We would like to stress that all lugs will be in contact when the system is loaded and in operation. Since the design and installation requirements of the Shoreham configuration in question are essentially the same throughout the Industry, LILCO requested S&W to conduct a review of appropriate Industry documentation (primarily LERs) to ascertain whether any failures or other problems with this type of configuration (pipe clamps to lugs) have been experienced on other units. S&W's review of over one hundred (100) events which were provided by a key word search revealed only three (3) events relative to lugs and none of these three (3) related to pipe clamp/lug clearance.

A(2) Pipe Support Bolting and Pipe Clamp/Lug Contact

• Supplemental Information (Continued)

To summarize our conclusion on the pipe clamp/lug clearance issue, LILCO and S&W believe that the conditions observed at Shoreham are normal and expected for this type of design and that the pipe supports utilizing this configuration will perform as designed in the loaded and operational condition.

• Corrective Action

With respect to pipe support Ell-PSA-109, the bolts observed as being more than finger-tight were replaced during the course of I&E Inspection 83-02 and have been reinspected numerous times by LILCO, FQC, and NRC personnel. While the nuts are properly installed at this time, as explained in our February 19, 1983 letter, the bolts and nuts are occasionally found to be tight due to normal pipe movement. This does not affect the function of the support.

With respect to the pipe clamp/lug clearances, the conditions observed were evaluated and found to be normal and expected, and therefore no physical modifications in the field are required.

• Steps Taken to Prevent Recurrence

With respect to the finger-tight nuts on Ell-PSA-109 a note will be added to the design drawing to indicate that sufficient clearance is to be maintained so that the application of the lock nut will not result in the joint being more than finger-tight after the application of the lock nut. In essence, the bolt will be required to be movable either axially or rotationally after the application of the lock nut.

With respect to the pipe clamp/lug clearances, in order to provide added assurance that the Shoreham installations utilizing this particular configuration are adequate, all pipe supports utilizing this type of joint (approximately thirty-eight (38)) will be reinspected and the information provided to S&W Engineering for evaluation. If S&W's Engineering evaluation indicates that additional reverification of this joint is required during the Startup phase

A(2) Pipe Support Bolting and Pipe Clamp/Lug Contact

• Steps Taken to Prevent Recurrence (Continued)

when the systems are full, hot, and operating, this requirement will be added to the thermal movement program already scheduled during the power ascension phase of Shoreham.

FQC has conducted formal training sessions for all Inspectors affected by E&DCR 1748S to ensure proper interpretation of the design requirements contained therein.

• Date When Full Compliance Will Be Achieved

Full compliance will be achieved by May 1, 1983 for both of these items.

A(3) Cable Tray Support Configuration

• Supplemental Information

Fifty (50) additional cable tray supports were inspected in the field against the as-built drawings to verify that the appropriate number and location of cable trays on these supports was correct. In forty-nine (49) of the fifty (50) cases, all cable trays observed in the field were properly shown on the current as-built drawings, and in the case of the fiftieth (50th), the as-built drawing was being modified as the result of a modification and the in-process drawings correctly indicated the additional cable tray in this case also. Therefore, in all fifty (50) cases, the CABTRAP As-Built program properly reflected the field conditions. This relates specifically to the condition noted on support RB 100B.

An additional condition noted by the NRC on support RB 100B, not responded to in our 2/19/83 letter, was the presence of a lateral brace attached to the tray support which was not indicated on the as-built drawing. Further, in testimony before the ASLB, Mr. Arrington indicated that the brace was in that area but not physically attached to RB 100B. We reinspected the field condition again and have determined that the brace observed by the NRC Inspector is in fact attached to cable tray support RB 100B. Mr. Arrington observed an almost identical brace in the same area and this was the basis for his statement before the ASLB. The condition observed by the NRC Inspector and reported in Inspection Report 83-02 is accurate. The observed brace does not belong on support RB 100B and was installed in error. The brace in question was supposed to be installed on adjacent support RB 226B and it was improperly installed on that support. However, FQC during their normal inspection of RB-226B noted that the required lateral brace was installed opposite from that listed on the E&DCR. The brace was supposed to be attached to the east vertical leg but was instead attached to west vertical leg. An N&D was issued and dispositioned "Accept As Is". This process occurred prior to I&E Inspection 83-02. The extra brace on RB 100B was not noted by FQC however and this was the basis for the NRC inspection. We have subsequently evaluated the addition of the extra lateral brace on support RB 100B and found it to be acceptable. It will be left in place and properly indicated on the design drawings.

A(3) Cable Tray Support Configuration

• Supplemental Information (Continued)

The conditions observed in the area of cable tray supports, after Construction and Engineering evaluation, do not result in an inadequate installation in the field. The hardware was installed as required (except as noted in the case of RB 131 and the extra brace on RB 100B) and the observations relate to discrepancies between the as-built drawings and the actual field installation due primarily to drafting errors. We believe that the CABTRAP Program is achieving its required objective which is a field installation in accordance with design requirements, but we acknowledge that improvement in the as-built drawing area is warranted.

• Corrective Action

No hardware modifications are required as a result of these observations since all installations were either in accordance with original design requirements, or evaluated as being adequate as installed in the case of RB 131 and the extra brace on RB 100B.

The as-built drawings which exhibited minor differences from the actual field conditions will be revised to correct the noted differences.

• Steps Taken to Prevent Recurrence

FQC has conducted formal retraining of all inspectors involved in the CABTRAP Inspection Program to ensure proper attention to as-built drawing requirements. This training has already been completed.

UNICO Construction has instituted an additional three (3) tier one hundred (100) percent Construction inspection program for all supports not yet turned over to FQC for final inspection. This program is intended to accomplish two (2) objectives; namely to reduce the number of FQC findings in the CABTRAP area and also to achieve closer conformance of the as-built drawings to the actual field conditions.

In order to address all cable tray supports already inspected and accepted by FQC, all supports inspected and accepted by FQC prior to 2/1/83 will be field walked again and compared to the as-built drawings to

A(3) Cable Tray Support Configuration

• Steps Taken to Prevent Recurrence (Continued)

ensure configuration conformance. Specifically, the attribute differences noted in NRC Inspection Report 83-02 as well as other appropriate configuration attributes will be checked. Any differences found during this additional field check will be evaluated by Engineering. Approximately three hundred fifty (350) supports fall into this category and all will be field checked in the manner described above.

The electrical design group (draftsmen, checkers, and engineers) involved in the CABTRAP "as built" process will be reinstructed as to the importance of reviewing the final drawings for the configuration attributes noted in I&E Inspection 83-02.

• Date When Full Compliance Will Be Achieved

Full compliance will be achieved by June 1, 1983.

SUPPLEMENTAL RESPONSE TO NRC INSPECTION NO. 50-322/83-02

B Cold Set of Hangers

• Supplemental Information

No additional information of a general nature is being provided at this time. We believe that adequate background and general information was provided in our 2/19/83 letter.

• Corrective Action and Steps Taken to Prevent Recurrence

Corrective action and steps taken to ensure proper spring can configuration at Fuel Load will be as described in our 2/19/83 letter.

At the request of Mr. J. Higgins however, we are hereby confirming that the program described in our 2/19/83 letter does include the verification of the spring can cold set at the time that the pins are removed or verified as being removed. This was always our intent and the CIP form referenced in our 2/19/83 response does provide for the verification of this specific cold set attribute.

• Date When Full Compliance Will Be Achieved

Full compliance will be achieved prior to Fuel Load. We are not providing a specific calendar date in this case since we do not want to commence the program described in our 2/19/83 letter until pipe support work and rework in the Plant is essentially complete thereby ensuring that no additional changes will be made after the final inspections.

SUPPLEMENTAL RESPONSE TO NRC INSPECTION NO. 50-322/83-02

C(1) Notification of FQC Upon Rework of Previously Inspected Components

• Supplemental Information

We believe the information provided in our 2/19/83 response is adequate and only a clarification of statements made during the ASLB testimony on this item is required.

As part of the actions taken to prevent recurrence of this finding, FQC is tagging all structural steel which has been in-process and/or final inspected. The NRC requested a clarification as to the extent of this program and we are herein confirming that it applies only to structural steel. It is not necessary to apply this type of program to other components since structural steel is the only area where specific component numbers are not used to record and track inspection status by both Construction and FQC. For these specifically numbered components, the issue of any Engineering or QC documents (E&DCRs, revised drawings, N&Ds, etc.) automatically and specifically notifies both Construction and FQC of a required rework on a component.

• Corrective Action

The appropriate notification forms were provided to FQC for the two (2) conditions noted in I&E Inspection Report 83-02.

• Steps Taken to Prevent Recurrence

As noted above, FQC will tag in-process inspected as well as final inspected structural steel in order to provide Construction with visual identification of items requiring FQC notification under QCI 15.4 if rework is to be performed.

FQC will also notify Construction directly of the status of their inspection activities so that Construction will know when final inspections have been conducted.

C(1) Notification of FQC Upon Rework of Previously Inspected Components

• Steps Taken to Prevent Recurrence (Continued)

UNICO Construction and Contractor personnel were reminded of the requirement to provide FQC notification in accordance with QCI 15.4 whenever modifications to structural steel already inspected (either in-process or final) is being reworked. This was re-emphasized at several Construction Management meetings, including a special meeting called on 1/17/83 with representatives of UNICO Construction Management, Contractor Management, and Contractor Craft personnel all in attendance.

• Date When Full Compliance Will Be Achieved

We believe that the reinforcement of existing instructions to Construction personnel with regard to FQC notification in accordance with QCI 15.4 has already resulted in full compliance with this procedure. However, all measures referenced herein will be fully implemented by April 1, 1983.

C(2-3) E&DCR Posting on G.E. Drawings

• Supplemental Information

Both C(2) and C(3) are directly related to the same observed condition and will be addressed together. As noted in our letter of 2/19/83, we believe that Inspection Finding C(3) (outstanding E&DCRs not noted as exceptions in the Pre-operational Test package) was an acceptable condition since the E&DCRs are control design documents and were included in the package.

We have confirmed that S&W's design procedures with regard to E&DCR posting (on drawings and in the E&DCR log) require that E&DCRs be listed on the specific drawing to which the E&DCR applies. However, because of the particular configuration of G.E. design drawings noted in our response of 2/19/83 (multi sheet drawings all having the same G.E. drawing number but different S&W file code numbers), the S&W practice in this area has been to list the E&DCR against the specific sheet where possible and to list it on the lead sheet when the specific sheet could not be determined. The adequacy of the process is confirmed by the fact that we have determined that the E&DCRs (i) were properly implemented in the field, (ii) were verified in accordance with the E&DCR verification program, (iii) were properly incorporated into the Pre-operational Test procedures and, (iv) have been properly accounted for in plant operating procedures.

One of the major thrusts of our investigation into this finding was a concern that this situation could result in E&DCRs not being properly incorporated into the drawings as part of the drawing update program currently underway. We have verified that the observations made by the NRC would not impact the proper incorporation of the E&DCRs. General Electric performs the actual drafting of the drawing revisions and General Electric works from the initiating documents (G.E. FDDR and FDI) and does not utilize the site E&DCR log for determining which E&DCRs (and therefore which FDDR and FDI) require incorporation. G.E. incorporates the FDDR and FDI directly onto the appropriate sheet of the affected drawing. Further, S&W verifies proper incorporation of the changes that G.E. has made in accordance with its own procedures which require that the content of the E&DCR be properly incorporated in the G.E. design drawings. Therefore if the substance of the E&DCR (and therefore the FDDR and FDI)

C(2-3) E&DCR Posting on G.E. Drawings

- Supplemental Information (Continued)

cannot be accounted for in the S&W check of the G.E. drawings, this situation would be identified at that time. In essence, both the G.E. and S&W drawing update procedures depend on the verification of the content of the E&DCR and not simply a check of design change document numbers.

A validation of the above conclusions occurred automatically prior to the RAT inspection in accordance with G.E. and S&W programs in that revision G properly incorporated E&DCRs F-39112 and F-39190 in November and this revision was signed out of S&W Boston on December 4, 1982. It had not reached the jobsite at the time of the RAT inspection since it was still undergoing processing for additional reproducibles and prints prior to distribution into the field. It does however confirm our position in this matter.

We have also verified that this particular situation is applicable only to General Electric drawings. It is important to note however that the G.E. drawing system in this case does not in all cases permit "ready" identification of design change notices to a specific sheet and therefore we do not believe that it is feasible or proper to attempt to list every E&DCR applicable to these drawings to the specific sheet (and therefore S&W file code) number. In the "Steps to Prevent Recurrence" section, our position on this matter will be delineated.

- Corrective Action

Since E&DCRs in question had already been properly implemented into the G.E. drawing and will therefore subsequently be removed from the E&DCR log, no corrective action in the drawing revision area is required. Further, as will be seen in the next section, we also believe no generic backfit actions are required.

- Steps Taken to Prevent Recurrence

The existing Shoreham drawing update program will incorporate the vast majority of outstanding E&DCRs into the G.E. design drawings by June of 1983 and therefore these E&DCRs will be removed from the E&DCR log and the information will be contained

C(2-3) E&DCR Posting on G.E. Drawings

- Steps Taken to Prevent Recurrence (Continued)

directly on the appropriate sheets (and therefore the appropriate S&W file code numbered drawings).

However, in order to ensure that all Shoreham project personnel (Engineering, Construction, Startup, and Plant Staff) are fully aware of the practices which have been utilized for E&DCR logging and posting, S&W will prepare an addendum to the Project General Instructions reiterating the process which has been used and pointing out the appropriate reference locations for E&DCRs on G.E. drawings.

In addition, and in order to ensure a consistent practice for the plant in the operational stage, S&W will revise Project Procedure 51 to include the E&DCR logging and posting requirements for all G.E. drawings post Fuel Load. This procedure will require that all outstanding E&DCRs be posted on the lead drawing (first sheet) of the G.E. drawing and also logged against that lead drawing in the E&DCR log. Further, a note will be included on all sheets of the G.E. multi sheet drawings stating that all applicable E&DCRs are contained on the first or lead sheet of the G.E. drawing. We believe that this procedure will ensure consistent interpretation of E&DCR requirements. We also note however, that at the time of Fuel Load and thereafter, we do not expect a large number of E&DCRs to be outstanding against these drawings and LILCO's intention is to keep the number of E&DCRs outstanding against operational drawings to a minimum in the operational stage.

- Date When Full Compliance Will Be Achieved

Full compliance will be achieved by Fuel Load with our current calendar target for this effort being mid-June 1983.

SUPPLEMENTAL RESPONSE TO NRC INSPECTION NO. 50-322/83-02

D(1-2) Diesel Generator Turbocharger Support Repair/Rework R43-458

• Supplemental Information

Startup Support repair/rework records were checked to determine all other welds performed by the welder who performed the work on repair/rework R43-458 and it was determined that a total of six (6) welds were identified. All of these welds were inspected and found to be acceptable.

As noted in our letter of February 19, 1983, the welder, who had performed a number of welds of this type, thought he had satisfactorily completed this weld. Further, when asked, the welder stated that he was familiar with and complied with the requirement to obtain Engineering approval for deviations from design drawings. Accordingly, we believe this to be an isolated incident.

• Corrective Action

The existing weld configuration was actually correct for the particular angle (less than thirty (30) degrees) of the joint and therefore no field modifications are required.

The design document (E&DCR) will be modified by the incorporation of the appropriate weld symbol.

• Steps Taken to Prevent Recurrence

OQA Inspectors have received additional training with regard to inspection requirements for welds of the type involved in this finding.

LILCO MSD and LILCO Construction welders, even though qualified to existing construction procedures, will be given specific guidance concerning assignments, and special instructions if necessary, by Startup Support Construction Management personnel. Since Startup Support predominately utilizes Construction Craft personnel for its permanent plant work and since these personnel are familiar with and are trained in the same procedures and specification requirements as the base Construction organization, this will ensure that additional attention to requirements such as those noted in this finding are addressed whenever these welders are utilized by Startup Support.

D(1-2) Diesel Generator Turbocharger Support Repair/Rework R43-458 (Cont'd)

- Date When Full Compliance Will Be Achieved

Full compliance was achieved by March 1, 1983.

D(3) Turbocharger Support Bolt Installation

• Supplemental Information

In our 2/19/83 response we indicated that three (3) instances of A-490 bolt installations were identified out of two hundred fifty (250) pipe supports surveyed and that these installations were inspected and found to be correct. In addition, FQC identified thirty-seven (37) additional instances in the structural steel area where A-490 bolts were called for and verified by inspection that the appropriate washers were in place. Further, the Manager of Construction and Engineering interviewed an Ironworker Foreman and an Ironworker Apprentice (the predominant trade utilizing A-490 bolt material) and found that these personnel were thoroughly familiar with the non-retorquing and washer requirements of this bolting material. Further, standard construction procedures require requisitions for new material in the work package when A-490 bolts are called for (this was verified in the case of the three (3) supports referred to in our 2/19/83 letter) in order to provide additional assurance that the installing Craft personnel do not reuse A-490 bolts. Accordingly, we believe that the bolting finding in the turbocharger support area is limited to the three (3) supports being reworked at that time. It should be noted that high strength bolting material having the non-retorquing requirement is a rarity at Shoreham.

As in the case of finding C(1-2), we reviewed Startup Support records to determine other permanent plant work performed by the particular Startup Support crew (LILCO MSD/Construction) involved in the turbocharger supports. Six (6) duct supports were identified as having been modified by these personnel, and these six (6) supports were inspected and found to be acceptable.

• Corrective Action

All A-490 bolts in the three (3) turbocharger supports were removed and replaced with new material. In addition, washers were provided for all of these bolt joints.

• Steps Taken to Prevent Recurrence

If LILCO MSD and LILCO Construction personnel perform work on permanent plant equipment for Startup Support

D(3) Turbocharger Support Bolt Installation

• Steps Taken to Prevent Recurrence (Continued)

in the future, they will be given specific guidance. The work will be conducted under the direct supervision of a Test Engineer or Startup Support Construction Supervisor.

OQA Inspection personnel received specific formal training with regard to high strength bolt installation requirements.

In order to provide added assurance that OQA Inspection personnel are properly qualified for inspections being conducted under the Startup and Plant Staff programs, OQA will conduct a review of its training records to confirm that Inspector qualification is in accordance with Reg. Guide 1.58 and ANSI 45.2.6. The specific areas noted in I&E Inspection Report 83-02 Appendix A, paragraph D will be considered as will the specific areas of inspection assigned to each Inspector.

LILCO FQA will conduct an audit of OQA in this area once the OQA review has been completed.

• Date When Full Compliance Will Be Achieved

Full compliance will be achieved by June 1, 1983.

CONSTRUCTION AND FQC INSPECTION PROGRAM EVALUATION

SUMMARY

The overall objective of the Construction, Construction Inspection, and FQC Inspection programs is to assure that these efforts, when completed, actually result in system and hardware installations which assure the safety of the plant. This objective, the assurance that the hardware and system installations result in a safe plant, is being achieved at Shoreham and the details of the Construction and FQC Inspection program evaluation which follow support this conclusion.

The adequacy of any Construction and Inspection program must be judged in light of its effectiveness in achieving its overall objective of plant safety and the proper "weight" must be given to inspection findings. One would logically expect that an effective program, will have findings, but those findings will be relatively insignificant and predominantly clustered in areas unrelated to the ultimate safety of the plant. We believe this is the case at Shoreham.

The implementing programs and procedures which support the overall objective of plant safety contain detailed acceptance criteria which range from items having a direct impact on plant safety (the requirement that the hardware actually be capable of performing its intended function, for example) to details which are program requirements and are monitored but which do not have a direct bearing on the overall objective of plant safety (for example, minor dimensional differences in structures resulting from field adjustments necessary to achieve the required configuration).

With the foregoing in mind, the following summary statements relative to the extensive program evaluation conducted over the past two (2) months are provided:

1. An assessment of inspection findings for a two (2) month period prior to the RAT Inspection, when thoroughly analyzed, indicated that the number of findings requiring an N&D which resulted in actual field rework was low and in the five (5) percent range. The percentage of field rework at this level when compared to the number of inspections performed was actually in the two (2) percent range.

SUMMARY (Continued)

2. The second (2nd) level of inspection findings (DCOs) resulting in field rework is higher (approximately nine (9) percent when compared with total inspections during the same period) but the vast majority of these findings are minor in nature and have no bearing on the ultimate safety of the plant. They are however deviations from Shoreham program requirements.
3. In the case of both (1) and (2) above the fact that the discrepancies are being identified and corrected indicates that the program is functioning properly.
4. The number of findings in the cable tray support area requiring field rework was higher than other work categories investigated during this period and further attention in this area was warranted.
5. Increased attention to detailed program requirements subsequent to the RAT Inspection have resulted in a significant reduction in findings in the cable tray support effort.
6. The number and nature of the findings in the other areas (pipe supports and structural steel) indicate a normal Construction program with the expected, though undesired, minor discrepancies being noted.
7. Evaluation by LILCO and S&W of significant samplings of the findings during the period (one hundred (100) DCOs at one point for example) confirms our assessment that the inspection findings being experienced at Shoreham are indeed minor in nature and do not affect the adequacy or the safety of the hardware in the plant.
8. A large percentage of the specific findings (more than fifty (50) percent of DCOs for example) are not related to hardware at all. Many of them relate to documentation updating which would have taken place in the normal course of events under existing programs, and others relate only to temporary access restrictions.
9. Documentation requirements nevertheless have been identified as a result of this evaluation as requiring additional attention on the jobsite and significant measures have been taken in the cable tray support and pipe support efforts in this regard.

SUMMARY (Continued)

10. The overall rate of inspection findings for all areas has remained at an acceptable and relatively stable level for the past two (2) months despite an increase in the number of inspections (fifty (50) percent) primarily as a result of additional FQC Inspectors having been added to the jobsite. While it would be preferable to see a reduction in the rate of overall findings, it is, in our judgement, significant that the increased level of final Construction activities, as reflected in the number of inspections, has not resulted in an increase in the overall rate of findings at Shoreham.
11. The LILCO FQA field review of previously inspected components, while identifying a small number of minor discrepancies, is providing added confidence in the effectiveness of the FQC Inspection program. All findings will be thoroughly investigated and evaluated for possible supplemental inspection activity.

Our conclusion from the program evaluations performed to date is that the Shoreham Construction and FQC Inspection programs are resulting in a number of findings where our activities do not conform in all respects to our detailed program requirements. Our judgement however, which is backed up by substantial data and engineering evaluation, is that these programs are not permitting conditions adverse to the safety of the plant to occur; but rather are reflective of human experience in any extremely complicated and very detailed technical endeavor. Our programs are preventing significant deficiencies. Minor discrepancies are occurring at a rate which we consider to be normal and acceptable although a zero (0) discrepancy rate remains the goal and objective of all of these programs.

We intend to continue to work closely with the NRC Resident Inspector at Shoreham and with other NRC Region I representatives to follow through on the program enhancements which form a part of the "quality accountability" program, and we believe that this program provides added confidence in the ultimate safety of Shoreham.

CONSTRUCTION AND FQC INSPECTION PROGRAM EVALUATION

References:

1. R. W. Starostecki Letter to LILCO Dated 1/21/83
Subject: Inspection No. 50-322/83-02
Date: 1/21/83, Page 2, 4th Paragraph of Letter.
2. Appendix A, Notice of Violations, Response Instructions and Format, Page 3, Last Paragraph.
3. Inspection Report 50-322/83-02 Dated 1/10 to 1/15/83, Page 1, Section 2, Overall Assessment, 2nd and 3rd Paragraphs.
4. Letter to R. W. Starostecki From M. S. Pollock Dated 2/19/83, 4th Paragraph, Additional Measures.
5. Memo to J. Higgins From W. J. Museler Dated 1/17/83, Items 2, 3, 4, and 5 on Pages 2 and 3.

References 1 and 3 outline concerns relating to the identification of Field Quality Control findings during the Final Inspection phases. Our response to your concerns are provided here, covering the categories of additional measures outlined in References 3, 4, and 5 and in a format consistent with your instructions in Reference 2.

The categories of additional measures are:

- a. Construction Completion Prior to Inspection.
- b. Monitoring Work to Responsible Personnel.
- c. Analysis of FQC Findings Causing Rejections.
- d. Trends of FQC Findings and Assessment of Remedial Actions.
- e. FQA Sample Re-inspection Findings.
- f. Evaluation of Work Hours by FQC Inspectors.

Where applicable our responses to these categories of additional measures are in a format consistent with your instructions in Reference 2.

a. Construction Completion Prior to Inspection

a.1 Corrective Steps Taken and Results

The corrective steps taken are:

- The Manager of Construction and Engineering conducted a meeting on 2/17/83 with UNICO Superintendents, UNICO Assistant Superintendents and Contractor General Foremen to review the thoroughness of Construction completions prior to Final Inspections by FQC and to remind and reinforce to these key personnel the importance of minimizing FQC findings during Final Inspections.
- The Superintendent of Piping and Mechanical initiated supplemental surveillance of items rejected or returned from Field Quality Control. The individual Assistant Superintendents within this Department compile tabulated reports of rejections related to their work and these reports are examined weekly for unacceptable trends or corrective remedial action by the Piping and Mechanical Superintendent.
- The Superintendent of UNICO Electrical Department initiated supplemental field inspection steps by manual and non-manual personnel from the Electrical Contractor and from UNICO and steps were taken to ensure that these supplemental inspections were documented to identify inspection attributes and record the personnel involved. These actions were supplemented by additional meetings between the Electrical Contractor's Management personnel and UNICO Electrical Department personnel to ensure that the purpose and significance of these supplemental steps were understood.
- A UNICO Superintendent was assigned to investigate past and current Field Quality Control findings and establish a basis for evaluating and monitoring the areas of concern identified by the Readiness Assessment Team in Report 83-02. The nature of this assignment is outlined in Reference 5.

a. Construction Completion Prior to Inspection

a.1 Corrective Steps Taken and Results (Continued)

The results of these corrective steps are:

- Increased awareness by UNICO Construction and Contractor manual and non-manual personnel of the effectiveness levels required to achieve successful Final Inspections. This awareness has been conveyed to all Disciplines and Contractors.
- Improving trends or sustained acceptable levels of Field Quality Control findings which can be categorized as errors requiring corrective field work. For example, results reviewed through 3/04/83 which include data analyzed through 2/15/83 indicate that Electrical cable tray support findings which require rework show a percentage reduction greater than fifty (50) percent. Small Bore support findings requiring rework are currently six (6) percent overall and all findings analyzed requiring rework show a sustained level of eight point eight (8.8) percent of all findings.

a.2 Further Corrective Steps

- The steps initiated by the various Discipline Superintendents and Contractors will be continued through construction completion or until trends indicate that different actions are necessary or acceptable.
- Monitoring and analysis of Field Quality Control findings will continue on a regular weekly basis by the Discipline Superintendents and independently by the UNICO Superintendent assigned until completion or until inspection frequencies and/or the frequency of findings no longer require this elevated surveillance level. Corrective, preventative or remedial actions will be initiated immediately if trends or the frequency of findings become unacceptable. Previous levels of findings reviewed and analyzed will be used as a guide to monitor present and future trends.
- Electrical cable tray supports previously inspected and accepted will be reviewed for final configuration.

a. Construction Completion Prior to Inspection (Continued)

a.3 Date of Full Compliance

If necessary, these supplemental measures will be maintained through completion of FQC inspections for each category of work presently scheduled to complete by June 1983. Independent monitoring by the assigned UNICO Superintendent may be reduced or eliminated earlier if inspection and/or Field Quality Control findings are retained at acceptable levels. It will be our firm policy to assess conservatively whether to reduce or eliminate these supplemental measures to assure acceptable quality levels.

b. Monitoring Work to Responsible Personnel

b.1 Corrective Steps Taken and Results

The steps taken are:

- Existing methods of identifying individual personnel involved in work performance are very substantial and for most work categories, such as welding, piping, and mechanical installations, cable and raceway installations and the installation of supports, especially safety related work, are highly acceptable and in compliance with Engineering requirements, Codes and Guidelines. To augment existing methods and to permit management review of trends by individual, a "report card" system has been established as an integral part of the Quality Accountability Program. This "report card" method reviews quality findings from Field Quality Control by individual, by frequency of findings weekly, and by discrepancy type.
- Discipline Superintendents, Assistant Superintendents and Lead Discipline Supervisors are required to monitor inspection findings attributable to individuals and initiate corrective, preventative, or remedial actions, if warranted. To achieve this, these key Management and Supervisory personnel will utilize the existing identification methods for tracking responsible individuals, augmented as

b. Monitoring Work to Responsible Personnel

b.1 Corrective Steps Taken and Results (Continued)

necessary by findings or trends from the Quality Accountability "report card".

The results of these steps are:

- Individual Construction Supervisory personnel identified with Field Quality Control findings in selected work categories have been identified and the augmenting Management tracking system or "report card" has established ten (10) individuals associated with the highest number of findings requiring corrective field work.
- Discipline Superintendents are reviewing the finding trends for individuals. These reviews are ongoing and no specific results have occurred involving corrective, preventative, or remedial action. Discipline Superintendents reviewing these trends are aware and have been cautioned to carefully interpret the results since variations in work assignments, workscope, and quality attribute requirements occur among Disciplines and among individuals.
- Supplemental personnel training for Construction Supervisory personnel in welding requirements related to the Electrical Discipline have been reviewed and plans have been initiated to schedule training sessions in the immediate future (March). Additional supplemental training will be conducted in other work categories and for different personnel if warranted by the results of this monitoring program.

b.2 Further Corrective Steps

- The measures initiated, as described in Section b.1 above, will be continued until FQC Inspections in these safety related work categories are completed, or until the levels or trends of findings require or permit different actions.

b. Monitoring Work to Responsible Personnel (Continued)

b.3 Date of Full Compliance

FQC Inspections in these safety related work categories are projected to be completed by June of 1983. As indicated in Section b.2, these measures will be continued until that time.

c. Analysis of FQC Findings Causing Rejections

c.1 Corrective Steps Taken and Results

The corrective steps taken are:

- Existing methods of review and analysis of these findings by the individual UNICO Superintendents, Assistant Superintendents and Supervisors have been maintained and specific attention focused on work categories with most heavily concentrated efforts underway such as electrical cable tray supports, final pipe support inspections, final structural steel inspections and as-built drawing completion.
- The Quality Accountability Review analyzes FQC findings to ensure that UNICO Management is informed of finding trends and levels for selected work categories. The results of this analysis are issued on a weekly basis to the UNICO Superintendents and Assistant Superintendents for their review and evaluation.

The results of these steps are:

- One hundred eighty-eight (188) Field Quality Control findings documented and dispositioned on Non-conformance and Disposition reports were analyzed. One hundred seventy-eight (178) of these (ninety-four point five (94.5) percent) were dispositioned by Engineering as accepted. The remaining ten (10) or five point five (5.5) percent required corrective field work. The Non-conformance and Disposition report (N&D) is a third (3rd) or high level Quality Control document for documenting findings. The first (1st) level document is the Field Quality Control

c. Analysis of FQC Findings Causing Rejections

c.1 Corrective Steps Taken and Results (Continued)

Inspection Report (QCIR) and the second (2nd) level is the Deficiency Correction Order (DCO). N&Ds may be generated directly as a result of QCIR findings or as a consequence of findings documented on DCOs.

- Nine hundred fifty-six (956) Field Quality Control findings documented on Deficiency Correction Orders (DCOs) were analyzed. Four hundred ninety-four (494) of these or fifty-two (52) percent were found to be either documentation corrections required to reflect field conditions (thirty-seven (37) percent) or inspection access temporarily impeded by scaffolding; or painting coated, or insulated surfaces (fifteen (15) percent). The documentation errors were typically the updating of field logs to reflect current work documents and minor corrections to as-built drawings. Thirty-one (31) percent or two hundred ninety-nine (299) findings on these Deficiency Correction Orders resulted in corrective rework. An analysis of these findings was combined with the Field Quality Control Inspection and rejection rates and it was found that eight point eight (8.8) percent of the inspections resulted in corrective field work. This analysis was further examined and it was determined that the rate of overall rejections requiring correction prior to 1/5/83 and after 1/5/83 remained at eight point eight (8.8) percent. Individual Discipline rates vary from Discipline to Discipline and from week to week and these are monitored to assure acceptable levels or trends. This level (and we believe acceptable) rework rate is especially significant since the number of inspections per unit time actually increased approximately fifty (50) percent since the RAT Inspection took place.
- The types of findings are generally of a minor nature and this has been confirmed by a review of a sample (one hundred (100)) of findings conducted by Engineering personnel. It was found that many of the findings recorded on Deficiency Correction Orders and designated by Construction to be field corrected could have been analyzed and accepted by Engineering. However, schedule and cost effective

c. Analysis of FQC Findings Causing Rejections

c.1 Corrective Steps Taken and Results (Continued)

considerations relating to the very minor nature of these findings resulted in the option to perform corrective field work. In most cases, DCO corrections require an hour or two of field work, and the reissue of an E&DCR requires several times that.

c.2 Further Corrective Steps

- The measures initiated or continued as described above in Section c.1 will be continued further until FQC Inspections in these safety related work categories are completed or until the levels or trends of findings require or permit different actions.

c.3 Date of Full Compliance

FQC Inspections in these safety related work categories are projected to be completed by June of 1983. As indicated in Section c.2, these measures will be continued until that time.

d. Trends of FQC Findings and Assessment of Remedial Actions

d.1 Corrective Steps Taken and Results

The corrective steps taken are:

- Augment existing monitoring and review of these trends by individual Discipline Superintendents by incorporating trend analysis as an integral part of the Quality Accountability Program. These trends are computed, distributed, and reviewed with Discipline Superintendents and with UNICO Management. Trends for all types of Field Quality Control findings are reviewed with the Manager of Construction and Engineering and these trends are combined on a Discipline basis with FQC Inspection rates and finding rates to determine the trends by week and by Discipline of finding rates requiring corrective field work.

d. Trends of FQC Findings and Assessment of Remedial Actions

d.1 Corrective Steps Taken and Results (Continued)

- The measures described in Sections a, b, and c of this Appendix form an integral part of the measures taken to maintain acceptable levels of findings.

The results of these steps are:

- Weekly trends of findings reflecting corrective field work as a percentage of weekly inspection rates for electrical cable tray supports are declining overall by comparing the period prior to 1/5/83 and from 1/5/83 to 2/15/83. The reduction, based upon data analyzed, exceeds fifty (50) percent. The trend levels for this Discipline will be monitored closely as reiterated in Section d.2 since the levels of findings have been found to be consistently above the rate of findings in other Disciplines. Investigations of this reveal that this tendency results from the combined effects of three (3) factors: the detailed nature of the hardware involved such as spring nuts and unistrut and power strut components; the resulting detailed nature of inspections conducted by Field Quality Control inspectors; and the fact that the CABTRAP program recognized this situation and included provisions for at least two (2) FQC inspection cycles. Both of these cycles (the "Preliminary" and the Final) are included in the reject statistics.
- Large Bore pipe support findings resulting in corrective field work are consistently zero (0) percent for the results investigated so far. Since a small number of findings are not dispositioned in any given period, we believe some rework will eventually be identified, but we expect those numbers to be low. Also, the frequency of these findings is very low and does not appear to be a concern at this time. Structural steel inspection and rejection rates are also at a low level. Review and analysis of these trends will continue to avoid unacceptable trends developing.
- Small Bore pipe support findings resulting in corrective field work have remained at overall levels consistently less than seven (7) percent. One (1) weekly value during the week of 2/2/83 was computed

d. Trends of FQC Findings and Assessment of Remedial Actions

d.1 Corrective Steps Taken and Results (Continued)

to be ten (10) percent. The overall rate prior to 1/5/83 was computed at three point four (3.4) percent and for the period 1/5/83 to 2/15/83 this rate was six (6) percent. While this represents an increasing trend, an investigation of these results indicate that the area resulting in the greatest number of findings is Small Bore vents and drains for which minor differences in installation criteria from main piping and support runs such as attachments to other supports and pipes tend to cause minor findings to occur. Since final acceptance criteria for this category of support was in the developmental stage during much of the installation period, these findings are not surprising.

- Assessing remedial actions at this time is premature to produce meaningful results over a sustained period of time. The additional measures described in Appendix E, in our opinion, address the concerns raised by the results of the Readiness Assessment Team's inspections, however clear trends have not evolved yet which would conclusively demonstrate the effects of the measures. The assessment of these measures is further complicated by "in the pipeline" components released for inspection over a period of several weeks but, due to assigning inspectors in priority work areas, these inspections were deferred. Trends are likely to evolve by the end of March or early April.

d.2 Further Corrective Steps

- The measures initiated as described above and as referenced in Sections a, b, and c of this Appendix will be continued further until FQC Inspections in these safety related work areas are completed or until the trends or levels of findings require or permit different actions.
- Particular emphasis will be focused in the monitoring of electrical cable tray supports to ensure that measures described in Section a.1 and factors discussed in Section d.2 produce sustained acceptable trends.

d. Trends of FQC Findings and Assessment of Remedial Actions

d.2 Further Corrective Steps (Continued)

- Small Bore supports and in particular the vents and drains segment of this work category will be monitored closely by the Superintendent of Piping and Mechanical to ensure that FQC findings remain at acceptable levels and the findings trend downward in future weeks.

d.3 Date of Full Compliance

FQC Inspections in these safety related work categories are projected to be completed by June of 1983. These measures will continue until that time.

e. FQC Sample Reinspection Findings

e.1 Corrective Steps Taken and Results

The corrective steps taken are:

- A verification program was initiated to review inspections by Field Quality Control on a random sample basis within the four (4) work categories indicated in reference 5. The verification program is conducted and controlled by the LILCO Field Quality Assurance Manager and is performed within the LILCO Field Quality Assurance program procedures, using Corrective Action Requests to record findings when these are encountered.

The results of these steps are:

- Of verifications conducted to date, nineteen (19) attributes have been reviewed for Large Bore supports, sixteen (16) attributes for structural steel, ninety-five (95) attributes for Small Bore supports, and twenty-six (26) attributes for electrical. Overall total attributes verified are one hundred fifty-six (156) as of 3/4/83.
- Corrective Action findings initiated to date are: three (3) for Large Bore supports, zero (0) for structural, three (3) for Small Bore supports, and three (3) for electrical. Overall findings are nine (9). The acceptance rates for these work

e. FQC Sample Reinspection Findings

e.1 Corrective Steps Taken and Results (Continued)

categories are: Large Bore supports - 84.2%; structural - 100%; Small Bore supports - 96.8%; and electrical tray supports - 88.5%. Overall acceptance rates are ninety-four point two (94.2) percent.

- So far, two (2) of the nine (9) Corrective Action findings have been dispositioned. One (1) finding reports an electrical strut bolt bearing on the rear of the strut (P-1043A) member. In view of the minor nature of this finding, the C.A.R. has been dispositioned to correct the condition. The second (2nd) finding (an apparent bolt spacing discrepancy) has been referred to Engineering for evaluation.
- The remaining seven (7) are in the process of being dispositioned by FQC. These findings involve minor dimensional, fabrication, and hardware differences. For example, in one case a cable tray support bolt was slightly oversize and was bearing on another member. In another case, a 4-3/8" dimension on a support member was actually 5". While these seven (7) remaining findings have not yet been dispositioned, our evaluation to date indicates that no conditions adverse to plant safety are involved.
- All findings of the FQA review will be fully evaluated by the Managers of FQC, FQA, and Construction and Engineering. The NRC will be kept fully appraised of the findings at the preliminary and "dispositioned" stages, and also of LILCO and S&W's corrective actions (if required), and assessment of their significance.

e.2 Further Corrective Steps

- The verification program by Field Quality Assurance staff will be continued to monitor findings after inspection by Field Quality Control.
- The Managers of Construction and Engineering, Field Quality Assurance, and Field Quality Control will meet in early March 1983 to review Field Quality Assurance findings and determine actions of further steps as required.

e. FQC Sample Reinspection Findings (Continued)

e.3 Date of Full Compliance

Verification by Field Quality Assurance will be continued until Field Quality Control inspections are completed. This is presently projected to occur by June 1983 for the work categories being monitored.

f. Evaluation of Work Hours by FQC Inspectors

f.1 Corrective Steps Taken and Results

The corrective steps taken are:

- In accordance with existing monitoring methods, the Manager of Field Quality Control reviews weekly overtime trends by each individual Inspector through a weekly report. Lead Field Quality Control Supervisors monitor personnel performance for tell-tale signs of fatigue and personnel working extended work weeks are rotated to avoid seven (7) day weeks except where circumstances require and then on a voluntary basis.
- Supplemental FQC Inspectors (twenty-five (25) total) have increased the inspection forces to augment inspections during the final Construction completion phases.
- The supplemental Construction inspection steps described in Section a.1 will reduce the extent of re-inspections and thereby the need for a portion of the overtime hours.

The results of these steps are:

- Final sustained trends from the corrective steps taken are understandably not available yet, however present overtime trends show improvement.
- For the final two (2) weeks of February, Field Quality Control inspection personnel whose overtime hours were greater than twenty (20) hours dropped to less than ten (10) percent of the total number of personnel from over twenty (20) percent of the total number of personnel incurred during the first two (2) weeks of February. This is a significant improving trend. A similar trend is evident for personnel working more than fifteen (15) to twenty (20) hours of overtime per week. The percentage of personnel working fifteen (15)

f. Evaluation of Work Hours by FQC Inspectors

f.1 Corrective Steps Taken and Results (Continued)

to twenty (20) hours has dropped to approximately fifteen (15) percent from greater than forty (40) percent by comparing the periods 2/3/83 to 2/16/83 with 2/17/83 to 3/2/83.

- As a result of the reduction in the above categories, the percentage of personnel working ten (10) hours per week overtime or less has increased from approximately twenty (20) percent to over fifty-five (55) percent again by comparing the first two (2) weeks in February with the last two (2) weeks.

f.2 Further Corrective Steps

- Overtime trends will continue to be monitored by present methods and indications of personnel fatigue will also be watched carefully by Field Quality Control Management.

f.3 Date of Full Compliance

Overtime requirements at the final Construction stages for Field Quality Control Inspectors is a circumstance which typically exists on large commercial Nuclear power plants. The need for some overtime on a regular basis is expected to continue through June of 1983.

ATTACHMENT 1

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