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June 2, 1982

PRINCIPAL STAFF	
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REP&OS	File

Mr. James G. Keppler, Regional Administrator
Directorate of Inspection and
Enforcement - Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Systematic Assessment of Licensee Performance
(SALP)
Commonwealth Edison Company Comments
LaSalle County Station Units 1 and 2;
Byron Station Units 1 and 2; and
Braidwood Station Units 1 and 2
NRC Docket Nos. 50-373/374, 50-454/455,
and 50-456/457

- References (1): 47 FR 12240, dated March 22, 1982
- (2): J. A. Hind letter to Cordell Reed dated
May 6, 1982 (LaSalle County Station)
- (3): J. A. Hind letter to Cordell Reed dated
May 7, 1982 (Byron Station)
- (4): J. A. Hind letter to Cordell Reed dated
May 5, 1982 (Braidwood Station)

Dear Mr. Keppler:

The purpose of this letter is to transmit comments as allowed in Reference (1) in response to the Systematic Assessment of Licensee Performance (SALP) reports provided in References (2), (3), and (4). Specific detailed comments for each of the subject sites were presented to your staff at the public meeting on May 18, 1982, and are documented in the enclosures to this letter.

There are two general observations that we believe need to be made relative to the SALP process which are evidenced by our specific comments. First, it is very difficult for this licensee to understand how the evaluation criteria are applied to categorize activities. We are unable to understand what constitutes the threshold for any of the categories; but most importantly, we see no objective standard for a finding that an area is Category 1 (Reduced NRC attention may be appropriate). Although functional area 2 at Byron Station was identified as Category 1, our review of your bases for that finding as opposed to the findings for

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functional areas 4, 9 and 13 at LaSalle County (all Category 2) provided no basis for distinction. If we are to devote the resources to improve our performance, as evaluated by your staff, we must have a better understanding not only of the criteria you use but also of the way in which these criteria are applied to reach decisions. It is not enough to say that Category 2 performance is acceptable. We are firmly committed to improve our performance and feel justified in this request for clarification of the bases upon which we will be judged.

Second, the application of the Category 3 designation in at least two instances - LaSalle County Area 17 and Byron Area 6 - does not appear consistent with the definition of this category provided in Section II of Enclosure 2 of the SALP Reports. Specifically, the definition indicates that both NRC and licensee attention should be increased, presumably, beyond that attention then being applied at the time the SALP report is issued. In the case of the two referenced areas, performance at the time of the SALP report was categorized as "more than adequate" and improved from early in the evaluation period. It is our understanding, based on comments by your staff, that our performance at the time of the SALP report for both stations and, in the case of Byron Area 6, at the time the SALP period ended, would have been acceptable. In both instances, we know of no increased licensee attention that could or necessarily should be applied in these areas. We request that you clarify your position relative to any future action on our part judged necessary by your office.

You will also see in reviewing our specific comments on the Category 3 designation for Braidwood Functional Area 9, that we believe this finding is not justified by the facts, which we have attempted to summarize in the enclosure. We would greatly appreciate any additional attention you may devote to this area. At a minimum, we request a more comprehensive discussion of the bases upon which the SALP finding was made.

We are available at your convenience to discuss these comments. Should you have any questions, please direct them to this office.

Very truly yours,

C. Reed

Cordell Reed
Vice President

4228N

ENCLOSURE 1

Comments on Byron and Braidwood SALP Reports

1. Functional Area 8 - Licensing Activities

The analysis fails to note that NRR's review of the Byron/Braidwood SER was conducted on a very short schedule because NRR resources were devoted to other projects. The bulk of the work done in this eighteen month reporting period was done in the last four months. Continuity in this period was poor because the NRR Licensing Project Manager was changed at least six times. Most of the review work was completed in accordance with a new Standard Review Plan that wasn't issued until September, 1981. Given these circumstances, the conclusions regarding responsiveness to NRC initiatives seem unwarranted.

2. Byron Functional Area 10 - Quality Assurance

Four problems were identified in the discussion of the April, 1982 special team inspection at Byron. The fourth item listed contains an unnecessary broad characterization of the deficiency found in discrepancy tracking. Based on the information given to us in the exit meeting, only two contractors were involved.

3. Braidwood Functional Area 9 - Quality Assurance

The conclusion regarding our performance in this area is based upon an unfair expansion of a single auditor's findings. Most of those findings are in dispute. Reconsideration of this rating is requested. The following comments address specific concerns highlighted in the analysis:

Concern (1): Failure to plan ahead for corrosion inspection of post tensioning tendons, and to provide written procedures and checklists in accord with the policies established by the Quality Assurance Topical Report.

Comment: At the time of the NRC inspection (11/18-20/81) tendons which had been (or were soon to be) installed over 90 days were inspected for corrosion in accordance with NSCI procedure 7B, Rev. 5, Appendix "A" (attached). The inspections were documented in the form of memos to file.

Concern (2): Failure to understand and currently interpret previously established inspection requirement terms such as random sample, monthly, withdrawn, signs of corrosion, and rejected. When an inspection procedure for inspecting tendons installed over 90 days was prepared, the actual inspection included no tendons installed over 90 days, indicating that the most convenient sample was chosen rather than a representative sample.

Comment: Site personnel understood previously established inspection requirements terms such as random sample, withdrawn and signs of corrosion. To minimize the possibility of misinterpretation NSCI's procedure 7B, Rev. 6, (attached) was revised to define these terms. This was done at the NRC Inspector's request. However, when this was done the Inspector implied that the inspection requirements had been reduced to suit field practices.

The inspections that were performed on ungreased, horizontal tendons installed over 90 days are shown below. It should be noted that of 191 inspections performed, no detrimental corrosion was observed. The 10% inspection requirement was achieved as shown below:

- a) Of the 199 ungreased tendons that were installed over 90 days 29 were inspected for corrosion between the 74th day and the 118th day. 21 tendons were inspected after the 90th day with 20 (10% of 199) being required to be inspected.
- b) Of the 199 ungreased tendons that were installed over 120 days 47 were inspected for corrosion between the 121st day and the 149th day. 20 tendons (10% of 199) were required to be inspected.
- c) Of the 176 ungreased tendons that were installed over 150 days 80 were inspected for corrosion between the 151st day and the 180th day. 18 tendons (10% of 176) were required to be inspected.
- d) Of the 98 ungreased tendons that were installed over 180 days 35 were inspected for corrosion between the 181st day and the 200th day. 10 tendons (10% of 98) were required to be inspected.

The above inspections are a combination of those inspections that were performed on tendons prior to stressing and during stressing. They are documented on NSCI's Form NS-19 and the Installation Cards.

Concern (3): Failure to respond in a timely way as the 90 day inspection was reached and exceeded for tendons that had not been greased.

Comment: It was anticipated by Braidwood Site that the ungreased tendons would be in place for over 90 days. This condition was and is accounted for in the tendon installation specification F/L-2722, para. 13-508.2 (attached). Consequently the inspections listed in (2) above were performed as required.

Concern (4): Failure to get advance approvals of inspection activity actually conducted on tendons and on the acceptability of the inspection records.

Comment: As stated in (1) above, corrosion inspections were performed in accordance with NSCI procedure 7B, Appendix "A". This procedure was reviewed and approved by the Project Construction Department, the Site Q.A. Department, and by Engineering.

Concern (5): Failure to recognize that they had exceeded the 180 day limit of the specification for tendon greasing and to consider the 50.55(e) implications after exceeding the limit. An extensive review of the results is not yet complete.

Comment: Failure to recognize that some tendons exceeded the 180 day limit was due to NSCI misinterpreting the specification requirements. It was NSCI interpretation that the 28 day limit on stress-to-grease was additive to the 180 day limit on place-to-grease. Contractor personnel have been made aware of the correct interpretation. The requirements of 10 CFR 50.55(e) have been considered and found not to be applicable to this situation.

Concern (6): Failure to follow a controlled approach to changes to an audit checklist.

Comment: When the audit checklist for CECO audit #20-81-31 was developed, only part of the acceptance criteria was included in one of the questions. This situation was identified during the conduct of the audit. The auditor added the omitted criteria to the checklist and referenced the design document from which it came. Such corrective measures are permitted by an auditor and are subject to approval of the lead auditor and the supervisor, where applicable, who review the objective evidence of the audit checklist and approve the audit report. The entire audit report was later reviewed and accepted by the lead auditor and the Q.A. Superintendent before issuance.

Concern (7): In addition, the licensee's approach to resolving some of the problems identified was to propose and attempt to change the specifications and procedures to reflect the work as completed rather than pursue the overall Q.A. program objective of corrective action to bring the work and results into conformance. One example of this was the attempt to resolve a Q.A. audit finding regarding safety-related equipment lifting procedures by eliminating

Concern (7): the procedure. After complete review and approval
(Cont'd) by station construction, Sargent & Lundy and
Station Q.A. to eliminate the procedure, the
identifying auditor pointed out that this
procedure is required by ANSI.

Comment: CECo Audit #20-81-22 of PGCo. found that the
contractor did not generate special lift procedures
for equipment which weighed in excess of 20,000 lbs.
In response to this deficiency the contractor submit-
ted a revised procedure eliminating the requirement
of having special lift procedures for large equip-
ment. The weight of a piece of equipment was not
thought to be reason enough to generate special
procedures. This procedure went through the review
and approval cycle. When the auditor performed a
follow-up surveillance on this audit deficiency, he
found the corrective action to be inadequate. As a
result, PGCo. withdrew the revised procedures and
re-committed to generate special lifting procedures
for lifts over 20,000 lbs. This is an example of the
effectiveness of Commonwealth Edison's Q.A. program,
not a deficiency.



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Braidwood Station
Units 1 & 2
Post-Tensioning Tendons
Quality Control Procedure

Procedure 7B
Approved C. Zavada
Revision 5
Date November 10, 1980

POST-TENSIONING TENDON INSTALLATION

7B-1.0 - SECTION SCOPE

7B-1.1 - This procedure implements the NSCI Quality Assurance Manual, Sections 1.0 and 4.8 for the control of post-tensioning tendon installation. Reference S & L Specification L-2722, Division 13.

7B-2.0 - GENERAL

7B-2.1 - The purpose of this procedure is to insure that post-tensioning tendon installation is done in accordance with approved plans, specifications, and applicable codes and standards.

7B-3.0 - GROUND PREPARATION PROCEDURE

7B-3.1 - The tendon bag shall be removed and the tendon checked for the following conditions: (If any irregularities are found, proceed as in 7A-4.3.

7B-3.1.1 Broken or damaged wire.

7B-3.1.2 Corrosion of wire and anchorhead (See Appendix A for wire criteria).

7B-3.1.3 Presence of foreign matter, water, or sand.

7B-3.1.4 Identification Tags.

7B-3.2 - Place the pull back sleeve on the shop anchor head.

7B-3.3 - Remove only the necessary bands to free about six feet of

the unbutton headed end from the coil. Remove Rack uprights as necessary.

- 7B-3.3.1 Remove bundle bands in this six foot length.
- 7B-3.3.2 Clean the grease from about four feet of this end using industrial solvent #16 or equal. Wipe dry.
- 7B-3.3.3 If the nose cone will enclose all 170 wire ends, bundle the wires, put nose cone on end, and tape nose cone in place.
- 7B-3.3.4 If the nose cone will not enclose all 170 wire ends, make a sheet metal sleeve to completely enclose all 170 wire ends. Place the sleeve inside the nose cone and place over the wire ends. Tape all joints securely. Tape the nose cone-sleeve combination to the wires.
- 7B-3.4 - Tightly wrap this end of the tendon with about five feet of rubber material. Use a 50 per cent overlap on each turn. Tape securely start and finish end of the rubber material.
- 7B-3.5 - Place Kellums grip over the tendon end. Insure that the nose cone is firmly in the head of the Kellums grip. Secure tail of Kellums grip with two or three individual bands. Cover bands with tape, especially any rough or jagged edges.
- 7B-3.6 - Steps 7B-3.3.2 through 7B-3.5 shall apply to horizontal, dome, and vertical tendons which require the use of the tugger. Vertical tendons installed without the aid of the tugger will be prepared with steps 7B-3.3.3 and 7B-3.3.4 only.
- 7B-3.7 - Rig tendon with NYLON sling for hoisting. Sling shall be rated for 10,000 pounds for horizontal tendons and 7,000 pounds for all others.
- 7B-4.0 - INSTALLATION
- 7B-4.1 - As the tendon is lifted free, the bottom side of the tendon shall be checked for damage or corrosion. If any damage is found, proceed as in 7A-4.3.
- 7B-4.2 - The tags attached near the shop head indicate the tendon mark number or location and the tendon length. After the tendon is in the uncoiler, the tags shall be removed and their information recorded on the Tendon Pulling Card, Form 780.64-60.

- 7B-4.3 - The tendon mark or number location shall be verified against the tendon number on the concrete next to the trumplate to insure proper placement.
- 7B-4.4 - The trumplate and bearing plate shall be clean of rust and loose scale prior to the installation of the tendons.
- 7B-4.5 - Prior to the installation of the tendons, a cloth "rabbit" shall be pulled through the void to check for moisture. This shall be repeated until the "rabbit" comes out dry.
- 7B-4.6 - The uncoiler shall be postioned to provide a fairlead from the exit hole of the uncoiler to the tendon void. This is to avoid pulling the tendon on sharp edges and damaging the wire.
- 7B-4.7 - The bands shall be removed while tendon is being pulled into the void. The quadrant and bundle bands should be cut last. As necessary, all bands shall be removed before the tendon enters the void except those bands that protrude far enough to be removed after installation. These bands will be removed during installation of the field anchor head.
- 7B-4.8 - Before the tendon installation, the tendon shall be inspected for any signs of damage or corrosion, as noted in Section 7B-3.1. If any damage or corrosion is found proceed as in Section 7A-4.3.
- 7B-4.9 - The initial protrusion of the unbutton headed wires exiting from the tendon void shall be recorded in the Comments section of the Tendon Pulling Card. This measurement is taken when the front face of the shop anchor head is flush with the bearing plate.
- 7B-4.10- Any significant occurrences, such as bent or broken wires, during tendon installation shall be noted on the Tendon Pulling Card.

Rev. 4

Rev. 4

7B-5.0 - END PROTECTION

7B-5.1 - VERTICAL TENDONS

- 7B-5.1.1 Lower shop head with pull back cap into bottom of trumplate. Disconnect cable. Seal void with temporary covers with rubber gaskets, or install grease cans as described in Section 7C-13.0.
- 7B-5.1.2 When necessary remove Kellums grip, nose cone, tape and rubber from tendon. Recoat the bare wires with Visconorust 2090P4, 1601, 1702 or an approved equal.

7B-5.1.3 The end shall be covered with a plastic bag which is of adequate thickness to prevent wind damage. The bag must be placed and taped to the bearing plate to seal the void completely.

7B-5.1.4 These temporary covers can remain in place in the tendon tunnel until grease cans are installed as described in Section 7C-13.0.

7B-5.2 - DOVE AND HORIZONTAL TENDONS

7B-5.2.1 The shop end of the tendon shall be protected as soon as possible by installing temporary covers with rubber gaskets. These covers to remain in place until installation of grease cans as described in Section 7C-12.0.

7B-5.2.2 The Kellums grip, nose cone, tape and rubber stripping shall be removed from the field end of the tendon, and the bare wires recoated with Visconorust 2090P4, 1601, 1702, or an approved equal.

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7B-5.2.3 The end shall be covered with a plastic bag which is of adequate thickness to prevent wind damage. The bag must be placed and taped to the bearing plate to seal the void completely.

7B-5.2.4 These temporary plastic covers shall be utilized for a period of thirty (30) days until buttonheading is completed and grease cans installed as in Section 7C-13.0.

7B-5.3 DOCUMENTATION

7B-5.3.1 Record all data as listed on the Tendon Pulling Card, Form 780.64-60 plus in the comment section note the protrusion length, if the tendon was installed without the use of the tugger, if any wires were bent or broken during installation, and if the tendon was placed on hold and action taken as in Section 7A-4.3. Rev.4

7B-6.0 - SPECIAL INSTRUCTIONS

7B-6.1 - Where job site conditions prevent immediate placement of the uncoiler next to the trumplate, i.e. horizontal tendons in lower buttresses, special care must be taken to provide a system to install these tendons.

7B-6.2 - The tendon must never be allowed to drag over a sharp edge. Some form of roller or guide must be used to insure a gentle sweep or curve to the hole with caution taken not to remove grease from tendon.

7B-7.0 TENDON RESTORAGE

7B-7.1 - Tendons removed from storage rack to gain access to other

tendons underneath shall be placed in an empty shipping rack or preparation rack.

- 7B-7.2 - Any tendons that must be returned to storage shall be covered completely, similar to original storage condition. They shall be stored only in racks.

7B-8.0 - SPECIFICATION

- 7B-8.1 - The tendon must be greased within ninety (90) days from installation or within seven (7) days after stressing. Time from stressing to greasing may be extended from seven (7) days to twenty-eight (28) days provided the tendon grease caps are installed immediately after stressing to keep out moisture and prevent corrosion.

Rev. 4

APPENDIX "A"

ACCEPTANCE/REJECTION CRITERIA OF WIRE

INSPECTION

All wire will be visibly inspected for rust. Acceptance or rejection will be based on the following criteria:

A wire in categories A, B, or C is acceptable.

A wire in categories D or E is rejected.

Check for wire identification.

LEGEND: VISUAL CHECK OF DEGREES OF CORROSION

CRITERIA FOR ACCEPTABILITY:

- A. Temporary Corrosion Material in tact, no visible oxidation.
- B. Light, thin, removable oxide on wire.
- C. A heavy red oxide dust, still removable by wiping.

CRITERIA FOR REJECTION OF WIRE:

- D. Patches of red oxide, not removable and/or leaving noticeable pits.
- E. Heavy rusting, dark red which when removed leaves very noticeable pitting.

NOTE: If other conditions from the above appear, please indicate in the comments section of the Tendon Pulling Card.

TENDON PULLING CARD

JOB NO.: _____

JOB: _____

TENDON LOCATION _____ DATE: _____

TENDON MARK NO. (FROM TAG) _____

TENDON LENGTH (FROM TAG) _____

WIRE CONDITION _____ A _____ B _____ C _____ D _____ E _____
(CIRCLE ONE)

TENDON ENDS PROTECTED (CHECK) _____

COMMENTS _____

FOREMAN _____ O.C. INSPECTOR _____ DATE _____

FORM 780.64-60

FEB. 1979



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Braidwood Station
Units 1 & 2
Post-Tensioning Tendons
Quality Control Procedure

Procedure 7B
Approved C. Zucchi
Revision 6
Date November 30, 1981

POST-TENSIONING TENDON INSTALLATION

7B-1.0 - SECTION SCOPE

7B-1.1 - This procedure implements the NSCI Quality Assurance Manual, Sections 1.0 and 4.8 for the control of post-tensioning tendon installation. Reference S & L Specification L-2722, Division 13.

7B-2.0 - GENERAL

7B-2.1 - The purpose of this procedure is to insure that post-tensioning tendon installation is done in accordance with approved plans, specifications, and applicable codes and standards.

7B-3.0 - GROUND PREPARATION PROCEDURE

7B-3.1 - The tendon bag shall be removed and the tendon checked for the following conditions: (If any irregularities are found, proceed as in 7A-4.3.

7B-3.1.1 Broken or damaged wire.

7B-3.1.2 Corrosion of wire and anchorhead (See Appendix A for wire criteria).

7B-3.1.3 Presence of foreign matter, water, or sand.

7B-3.1.4 Identification Tags.

7B-3.2 - Place the pull back sleeve on the shop anchor head.

7B-3.3 - Remove only the necessary bands to free about six feet of

the unbutton headed end from the coil. Remove Rack uprights as necessary.

7B-3.3.1 Remove bundle bands in this six foot length.

7B-3.3.2 Clean the grease from about four feet of this end using industrial solvent #16 or equal. Wipe dry.

7B-3.3.3 If the nose cone will enclose all 170 wire ends, bundle the wires, put nose cone on end, and tape nose cone in place.

7B-3.3.4 If the nose cone will not enclose all 170 wire ends, make a sheet metal sleeve to completely enclose all 170 wire ends. Place the sleeve inside the nose cone and place over the wire ends. Tape all joints securely. Tape the nose cone-sleeve combination to the wires.

7B-3.4 - Tightly wrap this end of the tendon with about five feet of rubber material. Use a 50 per cent overlap on each turn. Tape securely start and finish end of the rubber material.

7B-3.5 - Place Kellums grip over the tendon end. Insure that the nose cone is firmly in the head of the Kellums grip. Secure tail of Kellums grip with two or three individual bands. Cover bands with tape, especially any rough or jagged edges.

7B-3.6 - Steps 7B-3.3.2 through 7B-3.5 shall apply to horizontal, dome, and vertical tendons which require the use of the tugger. Vertical tendons installed without the aid of the tugger will be prepared with steps 7B-3.3.3 and 7B-3.3.4 only.

7B-3.7 - Rig tendon with NYLON sling for hoisting. Sling shall be rated for 10,000 pounds for horizontal tendons and 7,000 pounds for all others.

7B-4.0 - INSTALLATION

7B-4.1 - As the tendon is lifted free, the bottom side of the tendon shall be checked for damage or corrosion. If any damage is found, proceed as in 7A-4.3.

7B-4.2 - The tags attached near the shop head indicate the tendon mark number or location and the tendon length. After the tendon is in the uncoiler, the tags shall be removed and their information recorded on the Tendon Pulling Card, Form 780.64-60.

- 7B-4.3 - The tendon mark or number location shall be verified against the tendon number on the concrete next to the trumplate to insure proper placement.
- 7B-4.4 - The trumplate and bearing plate shall be clean of rust and loose scale prior to the installation of the tendons.
- 7B-4.5 - Prior to the installation of the tendons, a cloth "rabbit" shall be pulled through the void to check for moisture. This shall be repeated until the "rabbit" comes out dry.
- 7B-4.6 - The uncoiler shall be positioned to provide a fairlead from the exit hole of the uncoiler to the tendon void. This is to avoid pulling the tendon on sharp edges and damaging the wire.
- 7B-4.7 - The bands shall be removed while tendon is being pulled into the void. The quadrant and bundle bands should be cut last. As necessary, all bands shall be removed before the tendon enters the void except those bands that protrude far enough to be removed after installation. These bands will be removed during installation of the field anchor head.
- 7B-4.8 - Before the tendon installation, the tendon shall be inspected for any signs of damage or corrosion, as noted in Section 7B-3.1. If any damage or corrosion is found proceed as in Section 7A-4.3.
- 7B-4.9 - The initial protrusion of the unbutton headed wires exiting from the tendon void shall be recorded in the Comments section of the Tendon Pulling Card. This measurement is taken when the front face of the shop anchor head is flush with the bearing plate.
- 7B-4.10 - Any significant occurrences, such as bent or broken wires, during tendon installation shall be noted on the Tendon Pulling Card.
- 7B-5.0 - END PROTECTION
- 7B-5.1 - VERTICAL TENDONS
 - 7B-5.1.1 Lower shop head with pull back cap into bottom of trumplate. Disconnect cable. Seal void with temporary covers with rubber gaskets, or install grease cans as described in Section 7C-13.0.
 - 7B-5.1.2 When necessary remove Kellums grip, nose cone, tape and rubber from tendon. Recoat the bare wires with Visconorust 2090P4, 1601, 1702 or an approved equal.

7B-5.1.3 The end shall be covered with a plastic bag which is of adequate thickness to prevent wind damage. The bag must be placed and taped to the bearing plate to seal the void completely.

7B-5.1.4 These temporary covers can remain in place in the tendon tunnel until grease cans are installed as described in Section 7C-13.0.

7B-5.2 - DOME AND HORIZONTAL TENDONS

7B-5.2.1 The shop end of the tendon shall be protected as soon as possible by installing temporary covers with rubber gaskets. These covers to remain in place until installation of grease cans as described in Section 7C-12.0.

7B-5.2.2 The Kellums grip, nose cone, tape and rubber stripping shall be removed from the field end of the tendon, and the bare wires recoated with Visconorust 2090P4, 1601, 1702, or an approved equal.

7B-5.2.3 The end shall be covered with a plastic bag which is of adequate thickness to prevent wind damage. The bag must be placed and taped to the bearing plate to seal the void completely.

7B-5.2.4 These temporary plastic covers shall be utilized for a period of thirty (30) days until buttonheading is completed and grease cans installed as in Section 7C-13.0.

7B-5.3 DOCUMENTATION

7B-5.3.1 Record all data as listed on the Tendon Pulling Card, Form 780.64-60 plus in the comment section note the protrusion length, if the tendon was installed without the use of the tugger, if any wires were bent or broken during installation, and if the tendon was placed on hold and action taken as in Section 7A-4.3.

7B-6.0 - SPECIAL INSTRUCTIONS

7B-6.1 - Where job site conditions prevent immediate placement of the uncoiler next to the trumplate, i.e. horizontal tendons in lower buttresses, special care must be taken to provide a system to install these tendons.

7B-6.2 - The tendon must never be allowed to drag over a sharp edge. Some form of roller or guide must be used to insure a gentle sweep or curve to the hole with caution taken not to remove grease from tendon.

7B-7.0 TENDON RESTORAGE

7B-7.1 - Tendons removed from storage rack to gain access to other

tendons underneath shall be placed in an empty shipping rack or preparation rack.

7B- 7. 2 - Any tendons that must be returned to storage shall be covered completely, similar to original storage condition. They shall be stored only in racks.

7B- 8. 0 - SPECIFICATION

7B- 8. 1 - The tendon must be greased within ninety (90) days from installation or within seven (7) days after stressing. Time from stressing to greasing may be extended from seven (7) days to twenty-eight (28) days provided the tendon grease caps are installed immediately after stressing to keep out moisture and prevent corrosion.

7B- 8. 2 - Time from initial placement of tendons to greasing may be increased to 180 days provided a random sample of 10% of the tendons are withdrawn monthly between the 90 and 180 day period inspected for corrosion. (Withdrawn in this case is as defined in 7B-9.3, below.)

7B- 9. 0 - IN PLACE TENDON INSPECTION (90 to 180 days)

7B- 9. 1 - The 10% of tendons which are to withdrawn within the 90 and 180 day period shall be grouped for inspection as follows:

1. First month-inspection group of tendons-91 to 120 days from date of installation.
 2. Second month-inspection group to tendons-91 to 150 days from date of installation.
 3. Third month-inspection group of tendons-91 to 180 days from date of installation.
- Tendon inspection for each group can be conducted at any time within the noted limits.

7B- 9. 2 - Tendons selected for the 10% random sample monthly inspection shall represent a cross section of containment building elevations and/or azimuth locations. The random sample shall be a simple sample of the tendons applicable to the 90 thru 180 day criteria.

REV. 6

7B- 9. 3 - Tendon inspection shall be conducted as follows:

1. Pull back cap placed on shop end.
2. The field end of the tendon pulled out as far as pull back cap protrudes inside trumplate.
3. Exposed tendon wires on field end cleaned with solvent and wires inspected for corrosion as per Appendix "A".
4. After inspection is completed re-coat tendon wires with INRYCU approved grease and push tendon back into void.
5. If wire is rejectable, CECO P.C.D. will be notified immediately. Tendon to be placed on "HOLD" pending C.E.C.O. resolution.
6. Documentation to be completed on NSCI "Tendon in Place Inspection Card". Form NS-19.

7B- 9. 4 - CECO P.C.D. will be notified within two weeks of the date when tendons exceed the 180 day limit.

APPENDIX "A"

ACCEPTANCE/REJECTION CRITERIA OF WIRE

INSPECTION

All wire will be visibly inspected for rust. Acceptance or rejection will be based on the following criteria:

A wire in categories A, B, or C is acceptable.

A wire in categories D or E is rejected.

Check for wire identification.

LEGEND: VISUAL CHECK OF DEGREES OF CORROSION

CRITERIA FOR ACCEPTABILITY:

- A. Temporary Corrosion Material in tact, no visible oxidation.
- B. Light, thin, removable oxide on wire.
- C. A heavy red oxide dust, still removable by wiping.

CRITERIA FOR REJECTION OF WIRE:

- D. Patches of red oxide, not removable and/or leaving noticeable pits.
- E. Heavy rusting, dark red which when removed leaves very noticeable pitting.

NOTE: If other conditions from the above appear, please indicate in the comments section of the Tendon Pulling Card.

TENDON PULLING CARD

JOB NO.: _____

JOB: _____

TENDON LOCATION _____ DATE: _____

TENDON MARK NO. (FROM TAG) _____

TENDON LENGTH (FROM TAG) _____

WIRE CONDITION A B C D E
(CIRCLE ONE)

TENDON ENDS PROTECTED (CHECK) _____

COMMENTS _____

FOREMAN _____ O.C. INSPECTOR _____ DATE _____

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Inryco

an Inland Steel company

JOB NO.: _____

JOB: _____

TENDON MARK NO. _____

[illegible]

Date of Tendon Installation _____

COMMENTS _____

FOREMAN _____ Q.C. INSPECTOR _____ DATE _____

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- 13-507.7 Field button-heading shall conform to the following requirements: R14
- a. Button-heads shall be cold-formed after threading wires through wire holes of anchor heads.
 - b. Contractor shall submit for approval, procedures for field button-heading based upon acceptance criteria established by Supplier and reviewed by Consulting Engineers. R14
 - c. Button-heads shall be formed symmetrically about the axis of wires and shall be free from harmful seams, fractures or flaws. No heading procedures shall be used that cause serious indentations in the wires; any wires so damaged will be rejected on inspection.
- 13-508. INJECTION OF CORROSION PREVENTATIVE GREASE
- 13-508.1 Prior to injecting grease, Contractor shall submit a detailed procedure, including a list of proposed equipment, for approval, and shall not start work until approval is received.
- 13-508.2 Each tendon shall be protected from corrosion within one week after it is stressed by injecting grease into the sheathing. In addition, each tendon which is not stressed within 90 days after it is installed in its sheathing, shall be greased within that 90 day period. If grease is injected prior to stressing, any grease loss during post-tensioning shall be replaced within one week after it is stressed. Time from stressing-to-greasing may be extended from seven days to 28 days, provided the tendon grease caps are installed immediately after stressing to keep out moisture and prevent corrosion (see 13-509). Time from initial placement of the tendons to greasing may be increased to 180 days, provided a random sample of 10% of the tendons are withdrawn monthly between the 90 and 180 day period and inspected for corrosion. Tendons which show signs of corrosion during the 90 to 180 day period shall be rejected. R14
- 13-508.3 Inject grease into sheathing through the grease retaining cap under minimum pressure not to exceed 100 psi, as approved, measured at the anchorage inlet at an optimum placement temperature as recommended by grease manufacturer.
- 13-508.4 Inject grease by circulation method from one end of each sheathing, and continue injecting until it flushes out at opposite end without air bubbles.
- 13-508.5 Entire injection procedure shall be in accordance with grease manufacturer's recommendations, as contained in Contractor's approved procedures. R14
- 13-508.6 Exercise extreme care during all greasing operations to avoid contaminating concrete or other surfaces. Any grease that is spilled on these surfaces shall be immediately removed, to complete satisfaction of Purchaser, at Contractor's expense.