Florida Power
CORPORATION

February 1, 1974

Donald F. Knuth, Director
The Directorate of Regulatory Operations
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: Crystal River Plant Unit #3
Docket 50-302

Dear Mr. Knuth:

In order to provide you with the necessary data to evaluate Florida Power Corporation's actions regarding the reported non-conformance discussed in our letter to you of December 27, 1973 we are enclosing copies of the following data:

1. GAI letter #FPC-9738, dated January 23, 1974.

2. GAI letter #FPC-9093, dated October 8, 1973.

3. FPC letter, dated November 5, 1973.

4. Crystal River Unit #3 Construction Procedure #JAJ-W52, Revision 2.

5. Signed Quality Control Checklist (Form #JAJ-132).

6. Field Changes 1 - 8 to Crystal River #3 Construction Procedure JAJ-W52.

These documents are the documentation referenced in our December 27th letter. The GAI letter #FPC-9738, dated January 23, 1974, is a formal transmittal of documentation that was originally at the site in the form of a telecopier communication to Florida Power Corporation. This is the reason for this letter being dated subsequent to the issuance of our final report on December 27th.

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General Office 3201 Thirty-fourth Street South • P O. Box 14042. St. Petersburg, Florida 33733 • 813—866-5151

We hope that this additional information will provide you with the necessary data to close this item of non-conformance. Please advise us if you require any further information.

Very truly yours,

J. T. Rodgers
Assistant Vice President

ldh

Enc.

cc: Norman C. Moseley
Director, Region II

This copy to:

GILBERT ASSOCIATES, INC.
G

January 23, 1974

FPC - #9738

Mr. W. A. Szelistowski
Director, Generation Engineering
Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33733

Re: Nuclear Services and Decay Heat
Sea Water System Analysis

Dear Mr. Szelistowski:

In reference to the above subject as it relates to the 48" underground sea water discharge lines, we have analyzed the in-situ condition to determine whether or not rectification would be required. Based on the information received from the field, GAI concludes that the pipeline can remain installed in the as-built condition. It is, however, assumed that FPC Construction can in fact document the details on the deviation between the original design and the as-built condition.

We feel that this brings to a close this subject unless we hear further from you.

Very truly yours,

E. R. Hottenstein
Project Manager

ERH:ejv

EVALUATION REPORT

1-23-74
Dr. C. Chen

NUCLEAR SERVICES AND DECAY HEAT

SEA WATER SYSTEM

Reference Drawings:
P-304-611
C-300-747
C-300-748

48" - SEA WATER DISCHARGE LINE SEISMIC DISTURBANCE ANALYSIS

The purpose of this investigation is to find out whether the 3" allowable movement is enough to warrant no spearation at pipe joints due to seismic disturbance. This analysis covers only the soil movement caused by the wave action of ground shaking. The other ground motions caused by surface faulting, land sliding and ground fissuring are avoided during the site selection. The consolidation of backfill soil is avoided by properly specifying the backfill material.

The basic tools used in the analysis are [illegible] formulae derived by Newmark (Ref. 1).

Axial strain $\varepsilon_m = V_m/C$ - - - - - - - - - - - - - - - (1)

Curvatural $1/R = A_m/C^2$ - - - - - - - - - - - - - - - - (2)

where V_m, A_m, and C are the particle velocity, acceleration and the wave velocity respectively.

The following site informations are furnished by Mr. W. J. Santamour of Civil Engineering Department after the reviewing of the Unit No. 2 Site Seismic Survey done by the Weston Geophysical Research Corporation.

Below Elevation 84: Dilatational wave velocity C_D = 6900 ft/sec
Shear wave velocity C_S = 2700 ft/sec
Poisson's ratio ν = 0.38

Above Elevation 84: Dilatation wave velocity C_D = 1600 ft/sec

The pipes are installed between elevation 94 and 96.

In order to perform the analysis, the following assumptions are made:

1. The soil particle velocity in the direction of wave propagation is caused by the dilatational wave and the longitudinal component of Rayleigh wave in a complex manner. The percentage of contribution from each component is difficult to estimate. For teleseismic waves, interpretations of different wave forms can be achieved because the great distance and long travel time makes different frequency wave component dispersed and cause natural separation of various wave types. However, the strong motion record, close to the source of energy release, is less obvious to interpret. Trifunac (Ref. 2) showed qualitatively that surface (Love and Rayleigh) may contribute significantly to strong, near field, ground motion.

   For an elastic half space, the Rayleigh wave velocity approaches shear wave velocity. For layered soil ~~and rock~~ the Rayleigh wave is dispersive; hence, its velocity is the function of periods and modes. For engineering purposes the wave velocity is Equation (1) will be taken as the average of the dilatational wave and the shear wave velocity. This is more conservative than just taking the dilatational wave velocity.

2. The soil particle acceleration perpendicular to the direction of wave propagation is caused by the shear wave and the Love wave in a complex manner. Since the Love wave velocity is sandwiched between the shear wave velocities of the upper and lower layer (Ref. 3), it is conservative to use upper layer shear wave velocity in Equation (2).

3. The site SSE value is 0.1G. For conservative reasons, this G value is assumed at the base rock. Assuming that the ground motion is effected by the local geology only and that SH wave propagates upwards verically, the soil will amplify base rock G value (Ref. 4, 5). However, other works (Ref. 7, 8, 9) indicated that the effects of source mechanism and travel path may overshadow the local geological effects. Nevertheless, the soil amplification will be assumed for conservative reason. From Tables 1 and 2 of Reference 6, the maximum amplification factor among various site condition is less than 3. Applying the ultraconservative factor of 3, the SSE value for soil will be 0.3G.

4. Wave velocity obtained by in SITU wave propagation test is for soil at very low strain level. The velocity will be reduced at higher strain. As shown in Equations (1) and (2), it is more conservative to use lower velocity. For conservative reason, the velocity will be reduced by a factor of 2.

5. Above elevation 84, the dilatational wave velocity is C_D = 1600 ft/sec. Assuming the Poisson's ratio ν = 0.35, the shear wave velocity is approximately C_S = 1600/2(1 + 0.35) = 600 ft/sec. The average of C_D and C_S is C = 1100 ft/sec, and C = 550 ft/sec at higher strain.

6. Based on the statistic data (Ref. 10), 1G acceleration corresponds to 48 in./sec velocity on alluvium.

7. The field test showed that the underground pipe will move with the surrounding soil with no appreciable relative displacement. Under this situation the pipes will not separate at the joints. The only way that the pipes may separate is under the unlikely assumption that one piece of the pipe moves with the ground and the adjacent one slips totally from the surrounding soil.

Based on the foregoing assumptions, the axial strain is

$$\varepsilon_m = 0.3 \times 48/(550 \times 12) = 0.00218$$

and curvature is

$$1/R = 0.3 \times 32.2/(550)^2 = 0.0000318/ft$$

By Taylor's series expansion

$$f(x) = f(b) + f'(b)\ (x - b) + f''(b)\ (x - b)^2/2 + - - - - -$$

where x - b is the pipe section length 18 ft, f'(b) is the axial strain,

f"(b) is the curvature. The relative displacement is $f(x) - f(b) = f'(b)(x - b) + f''(b)(x - b)^2/2 + - - - - -$. Since the total velocity and acceleration were used to calculate ε_m and $1/R$, it is justified to combine them by root sum square approach. However, the absolute sum will be used for conservative reason. Hence, the displacement is

$$D = 0.00218 \times 18 \times 12 + 0.0000318 \times 12 \times (18)^2/2$$

$$= 0.47 \text{ in.} + 0.062 \text{ in.} = 0.53 \text{ in.} \ll 3 \text{ in. allowable}$$

The conclusion of this investigation is that the pipes will not separate at joints during earthquake disturbance.

REFERENCES

1. Newmark, N. M., "Problems in Wave Propagation in Soil and Rock". Proceeding of International Symposium on Wave Propagation and Dynamic Properties of Earth Material, The University of New Mexico, August 1967.

2. Trifunac, M. D., "Response Envelope Spectrum and Interpretation of Strong Earthquake Ground Motion," BSSA*, Vol. 61, No. 2, P. 343-356, April 1971.

3. Fung, Y. C., "Foundations of Solid Mechanics," Prentice-Hall, 1969.

4. Roesset, J. M., "Fundamentals of Soil Amplification," in "Seismic Design for Nuclear Power Plants," Ed. R. J. Hansen, MIT Press, 1970.

5. Schnabel, P., H. B. Seed, and J. Lysmer, "Modification of Seismograph Records for Effects of Local Soil Conditions," BSSA, Vol. 62, No. 6, P. 1649-1664, December 1972.

6. Lysmer, J., H. B. Seed, and Schnabel, "Influence of Base-Rock Characteristics on Ground Response," BSSA, Vol. 61, No. 5, P. 1231-1231, October 1971.

7. Udwadia, F. E. and M. D. Trifunac, "Comparison of Earthquake and Microtremor Ground Motions in El Centro, California," BSSA, Vol. 63, No. 4, P. 1227-1253, August 1973.

8. Hudson, D. E., "Local Distribution of Strong Earthquake Ground Motions," BSSA, Vol. 62, No. 6, P. 1765-1786, December 1972.

9. Hall, W. J., N. M. Newmark, and D. B. Mohraz, "Comments on Earthquake Transmission from Basement Rock to Surface," Paper No. 83, 5th WCEE*, Rome 1973.

10. "A Study of Vertical and Horizontal Earthquake Spectra," by N. M. Newmark Consulting Engineering Service for USAEC, Wah-1225, April 1973.

11. Nasu, N., S. Kazama, T. Morioka, and T. Tamura, "Vibration Test of the Underground Pipe with a Comparatively Cross-Section," Paper No. 64, 5th WCEE, Rome 1973.

* BSSA: Bulletin of the Seismological Society of America.
WCEE: World Conference on Earthquake Engineering.

October 8, 1973

FPC#9093

Mr. W. A. Szelistowski
Director Generation Engineering
Florida Power Corporation
P.O. Box 14042
St. Petersburg, Florida 33733

Re: Crystal River Unit Three 48" Nuclear Service and Decay Heat Service Seawater System, Underground Concrete Discharge Piping
Ref: FPC-GAI-150, Telex from FPC dated October 5, 1973

Dear Mr. Szelistowski:

In reference to the above communications, GAI realizes the seriousness of your problem and will review the situation with a view to making every effort possible to determine a solution that will have the least total input on the Project.

We propose the following: An engineering analysis be made to determine, if infact, the pipe line as constructed can meet design criteria. Our basic concern is the ability of the pipe to withstand a seismic distrubance. The analysis will not commence before October 16, 1973. By November 1, 1973 an initial reply is expected provided that in-put information is available.

Concurrently with the above effort, we furthef propose to investigate alternative "fixes" should the analysis indicate such a course of action is required.

This letter has been telecopied to the site.

Very truly yours,

F. J. Tomazic
Project Control Analyst

FJT:dc

FLORIDA POWER CORPORATION
P. O. BOX 276 CRYSTAL RIVER, FLORIDA 32629

fcb
4-17-4
4-17-3

November 5, 1973

Gilbert Associates, Inc.
P. O. Box 1498
Reading, Pa. 19603

Attention: Mr. E. R. Hottenstein

Subject: Crystal River Unit #3
48" NSSW Concrete Pipe

In response to your 11-1-73 letter (FPC-9267) we transmit one copy of the procedure (JAJ-W52) used for installation of the 48" pipe. We specifically refer you to section 6.4.D of the procedure. We also transmit one copy of the completed, signed off Quality Control Check Lists (JAJ-132) for QC inspection of the pipe installation.

Should additional information be needed, please contact us.

J. E. Colby, Engineer

R. S. Burns, Manager Mechanical
& Structural Engineering

JFC/RSB/kah

cc: C. E. Jackson

J. A. JONES CONSTRUCTION CO.

COVER SHEET

DOCUMENT NUMBER:	ORIGINAL DATED:	ATTACHMENTS:
JAJ-W52	7/14/72	None

TITLE:
WORK PROCEDURE-INSTALLATION OF NUCLEAR SERVICE AND DECAY HEAT SEA WATER UNDERGROUND PIPING (Florida Power Corporation-Crystal River #3)

SCOPE OF REVISION:

Revision 1, dated 12/1/72

1. General Revision.

Revision 2, dated 12/21/72

1. Page 6: Paragraph 5.20 added. Section 6 changed. Paragraphs 7.0, 8.0, 8.1 and 8.2 deleted.
2. Exhibits 4,5,6 and 7 added.

APPROVAL DATES, SIGNATURES AND INITIALS

	ORIGINAL ISSUE	DATE	REV.NO.	INITIAL & DATE	REV.NO.	INITIAL & DATE
AUTHOR	[signature]	7/14/72	1	[signature] 11/22/72	2	RDO 12/19/72
JONES Q C	[signature]	7/14/72	1	[signature] 11/22/72	2	[signature] 12/19/72
JONES PROJECT	[signature]	7/14/72	1	[signature] 11/22/72	2	[signature] 12/19/72
FPC	[signature]	7/14/72	1	[signature] 12-1-72	2	[signature] 12-22-72

FORM JAJ 102

J. A. JONES CONSTRUCTION CO.

POST OFFICE BOX 966
CHARLOTTE, NORTH CAROLINA 28201

WORK PROCEDURE JAJ-W52

INSTALLATION OF NUCLEAR SERVICE AND DECAY HEAT SEA WATER UNDERGROUND PIPING

1.0 PURPOSE

1.1 To provide instructions for the installation of Nuclear Service and Decay Heat Sea Water Underground Piping.

2.0 SCOPE

2.1 This procedure includes the Nuclear Sea Water intake and discharge piping.

3.0 RESPONSIBILITY

3.1 The J. A. Jones Construction Co. Mechanical General Superintendent has the primary responsibility for implementation of this procedure.

4.0 REFERENCES

4.1 FPC-W8 Procedure for Warehouse Functions.

4.2 GAI Dwg, P-304-611, Nuclear Service and Decay Heat Sea Water Piping Plan and Sections

4.3 GAI Dwg, FD-302-611, System Flow Diagram

4.4 GAI Dwg, G-736-002, Plot-Main Plant Area

4.5 GAI Dwg, G-744-010, Intake and Discharge Canal-Excavation

4.6 GAI Dwg. SC-426-501, Instake Structure

4.7 GAI Dwg. SC-422-001, Nuclear Service Sea Water Pump Chamber

4.8 GAI Dwg. SC-422-015, Aux. Bldg.

4.9 GAI Dwg. P-304-613, Nuclear Service and Decay Heat Sea Water-Plan-Aux. Bldg.

4.10 RO-2766 Nuclear Services Seawater Piping

4.11 Nuclear Service and Decay Heat Suspended Seawater Piping, Gilbert Associates, Inc. RO-3018

4.12 FPC-W48, Work Procedure-Pipe Erection.

4.13 ES-111A American Cast Iron Pipe Company drawing.

4.14 Interpace Pipe Laying Schedule, Revision F, dated, 6/21/71

4.15 Interpace Instructions for Installation of Concrete Pressure Pipe with Rubber and Steel Joints.

4.16 GAI Dwg. SC-401-041, Rev. 1, Filter Blanket Decay Heat Pit.

4.17 P. C. Shah letter FPC-6924, dated 10/13/72.

4.18 Specification for Excavation and Placement of Structural Fill, Gilbert Associates, Inc., SP-5629.

4.19 TP-7-3-265-5, TP-7-3-266-4, Nuclear Services and Decay Heat Seawater Systems, Buried Ductile Intake Piping Hydrostatic Test.

4.20 TG-00046, Hydrostatic and Pneumatic Components.

5.0 INSTRUCTIONS-LAYING 48" CAST IRON INTAKE PIPE (DRY CONDITION)

5.1 Dewatering shall be effected using a filtered dewatering system. Water will collected from the trench through lines of 6", 8" or 10" perforated, galvanized pipe. Pipe size selection will depend on volume of water to be removed. One pipe will be run along each bottom corner of the trench as shown in Exhibit 1. If necessary, a third dewatering pipe will be laid down the middle of the trench as shown in Exhibit 1. Cross connections between the parallel dewatering lines will be laid as necessary to achieve efficient dewatering.

5.2 Excavation, placing of pipe, and fill shall be in accordance with Exhibits 1 and 2.

5.3 The trench bottom shall be excavated as close to grade as possible (at least 8" below the bottom of the pipe).

5.4 In the area of the pipe joints, over-excavation will be allowed to permit assembly and testing. Over-excavate for the dewatering pipe as shown in Exhibit 1.

5.5 Hold for Quality Control Check.

A. Prior to any backfilling, verify that all mud, sludge, sediment and poor fill material has been removed and that a general state of cleanliness exists.

B. Check Zone "A" material for conformance to Reference 4.16 prior to use in backfilling. On-site testing laboratory perform at least one gradation test for each 150 tons of fill.

5.6 General over-excavation shall be leveled with Zone "A" fill compacted to 98% maximum density. Maximum density shall be determined from Zone "A" test strip as described in PTL Report of September 1972.

5.7 A uniform layer of Zone "A" material shall be compacted per section 5.6 up to the elevation of the bottom of the pipe. The level of this Zone "A" material shall be carefully graded, by hand wherever necessary, to meet the design grade line.

5.8 Approximately 5 inches of Zone "A" material shall be compacted to 98% maximum density (see section 5.6) and subsequently cut to leave two trapezoidal trenches four feet wide in which the pipe will rest (see Exhibit 1).

5.9 Hold for Quality Control check. One compaction test shall be made for each 200 yards of fill.

5.10 Handling Pipe

A. Slings shall be rigged on the external surface of the pipe.

B. No temporary welds shall be made to the pipe to facilitate handling.

C. Each section of pipe shall rest on the shaped trench bottom for about one-half, or more, of its full length (except at the joints where over-excavation has been provided for assembly and testing) and shall be firmly held in position so that the invert forms a continuous grade with the invert of the section of pipe previously placed.

D. The angular deflection between centerlines of any two adjoining pipe sections shall not exceed one degree (equivalent to about 3" lateral deflection over 16' length).

E. All hub interiors and spigot ends shall be cleaned of loose dirt and sand.

5.11 Hold for Quality Control check of cleanliness per 5.10 E. Record on Form No. JAJ-131 (Exhibit 3).

5.12 Joining pipe sections

A. Cast Iron Mechanical (Locked Fastite) Joints

1. Clean the joint mating surfaces.

2. Insert the gasket into the gasket recess located in the socket end.

3. Melt the American Locked Fastite joint lubricant by heating and apply a thin coat of this heated lubricant to the plain end of the pipe with a brush. Caution is necessary to avoid overheating the lubricant. The melting point of the lubricant is 150 degrees F to 160 degrees F. The flash point is 525 degrees F. Do not use solvents or other substances, which might be injurious to the rubber gasket, for cleaning the joint or for thinning the lubricant.

4. With the joint reasonably straight, pull the plain end into the socket.

5. The mechanical joint shall be pulled up and torqued to 65 ft. pounds or to a ¼" gap in the joint at the closest point, whichever occurs first. Place two ¼" spacers, separated about 180 degrees in the joint to assure ¼" gap is maintained. The torque wrench shall be calibrated at least once every six months.

B. The four flanged cast iron pipe joints on the 90 degree ell sections shall be bolted in accordance with FPC-W48 and Ref. 4.2.

5.13 Hold for Quality Control check. Record on Form No. JAJ-131.

A. Verify thermal gap is ¼" minimum.

B. Verify alignment as performed by field engineers.

C. Verify 65 foot pound maximum torque has been applied; check 10% of the mechanical joint bolts.

D. Verify absence of loose material from the pipe.

E. Make inspection of the pipe liner for visually apparent cracks or loose lining. Cracks or loose lining shall be repaired per Manufacturer's instruction.

5.14 The joints shall be leak tested in accordance with Reference 4.19 and Reference 4.20 and section 3.06 of Reference 4.10.

5.15 Quality Control verify that leak test results are within requirements established by Reference 4.19. Record results of leak test on Form No. JAJ-131. (Exhibit 3, attached).

5.16 After successful leak test, each joint shall be wrapped in accordance with detail 5 of Reference 4.2. If practicable, leave water in pipe to add inertia during the backfilling operation called out in paragraph 5.18.

5.17 Hold for Quality Control check.

A. Verify that joints have been wrapped in accordance with detail 5 of Reference 4.2.

B. Verify that backfill materials called out in paragraph 5.18 meet requirements established in References 4.16 and 4.18.

5.18 Complete Backfill (see Exhibits 1 and 2)

A. A coarse, washed sand shall be sluiced in the trench beneath the pipe. In addition, sand shall be sluiced into the over-excavation for the joints. It is necessary that excess water used in sluicing be drained off. During subsequent backfilling operations sand will be used exclusively around joints to a point 2 feet above the top of the pipe.

B. Zone "A" fill shall be brought up to the pipe's springline. Thin (less than 12" loose) lift construction shall be used and after compaction the elevation of the top of each lift shall be uniform across the trench width in order to preclud[illegible]vement of the pipes. The Zone "A" fill material shall be compacted to 90% maximum density (see section [illegible].6).

C. Backfilling shall be continued using thin lift construction: Zone III fill material placed in horizontal layers of approximately twelve inches loose thickness. The fill shall be spread and graded to prevent excessive particle segregation. Compaction shall be 90% Modified. This method shall continue from springline to the elevation of the top of the pipe.

D. The next lift above the elevation of the top of the pipe shall be at least two feet thick and shall be placed all at one time using Zone III material compacted to 90% Modified.

E. Subsequent lifts shall utilize the thin (less than 12" loose fill) lift construction method using Zone III fill compacted to 90% Modified up to a height of 5 feet above the top of the pipe. This 5-foot "cushion" will be adequate to protect the pipe during standard compaction methods to be used for the remainder of the trench.

F. From 5 feet above the top of the pipe up to the surface, backfill with Zone III and compact to 95% Modified.

5.19 Quality Control checks shall be made and documented during the backfill operations. Reports shall be included in Quality Control files.

A. Verify gradation and plasticity index for Zone III material.

B. Verify gradation for Zone "A" material.

C. Verify that method of spreading and maximum amount of lift for Zone III materials meet requirements.

D. Make at least one compaction test per lift.

5.20 The On-site Independent Testing Laboratory shall make the inspections and tests called for by section 5 and submit results on the appropriate form for retention in the Quality Record files:

A. Form No. JAJ-131 (see Exhibit 3) for individual pipe sections,

B. Form No. FPC Q-009 for discrepancies, and

C. Special Pittsburgh Testing Laboratory forms (see Exhibits 5, 6 and 7) for reports of compaction, plasticity and gradation.

6.0 INSTRUCTIONS - LAYING 48" CONCRETE (DISCHARGE) PIPE SECTIONS

6.1 The requirements of sections 5.1 through 5.9 shall be met for concrete pipe. Before each section of pipe is laid, Quality Control shall check the bedding requirements and report completion of that inspection on Form No. JAJ-132 (see Exhibit 4) under "Bedding".

6.2 Handling Pipe sections

A. Reference 4.15 provides guidance for laying and joining concrete pipe.

B. Slings shall be rigged externally; no temporary welds.

C. The pipe sections are serialized. Each section shall be laid in its assigned location as designated in Reference 4.2.

D. Both ends to be joined shall be cleaned with rags or other suitable means and clear water before being joined.

E. Before being joined, both ends shall be lubricated with vegetable soap (about 7 ounces per joint).

F. The pipe section being laid shall be held in suspension after alignment until the joint has been thrust fully home.

G. The gasket shall be thoroughly lubricated by immersion in a viscous solution of vegetable soap, and stretched around the spigot to obtain an even tension in the circumferential groove. The gasket shall be placed so as to lie true in the groove without twists.

6.3 Hold for Quality Control check. Report completion of inspection of joint cleanliness, joint lubrication and gasket lubrication and placement under "Joint Preparation" on Form No. JAJ-132.

6.4 Joint Closure

A. As the joint is being closed, the closure shall be checked by two spacers (3/4" steel bar inserts held about 180° apart).

B. A feeler gague shall be used to detect any irregularities in the gasket by checking through the recess provided by the spacers.

C. If the gasket is out of place, the pipe section shall be backed out, the joint re-lubricated, an undamaged and lubricated gasket installed, and the sections re-closed to the spacers.

D. Given gasket alignment, the spacers shall be removed and the joint thrust fully home.

6.5 Hold for Quality Control check. Quality Control report verification of gasket placement, joint closure and alignment (as performed by field engineers) under "Joint Fitup Alignment" on Form No. JAJ-132.

6.6 The pipe joints shall be mortared from the outside at a convenient time. Follow instructions from the mortar manufacturer when applying mortar.

A. Outside joints shall be wrapped before mortaring with a special cloth strip which has metal reinforcing on each side. This strip shall be drawn tight around the pipe to provide a form to hold the mortar in the joint. Leave an opening across the top of the joint.

B. Mortar of a consistency which will flow into the joint shall be used. A wire curved to about a 24" radius shall be used to force the mortar into the lower portions of the joint recess.

C. Mortar of a thicker consistency shall be used to completely fill the joint recess across the top of the pipe.

6.7 Verify absence of loose material from the pipe. Make inspection of the pipe liner for visually apparent cracks or loose surface. Cracks or loose surface shall be repaired per Manufacturer's instructions. Report completion of foregoing inspections under "Pipe Condition" on Form No. JAJ-132. The pipe joints shall be mortared from the inside at a convenient time. These joints may be mortared using trowels. All excess mortar shall be removed. Follow instructions from the mortar manufacturer when applying mortar.

6.8 Quality Control check exterior mortaring for each joint and record completion of inspection in the "Exterior Joint Mortar" column of Form No. JAJ-132.

6.9 Quality Control check interior mortaring for each joint and record completion of inspection in the "Interior Joint Mortar" column of Form No. JAJ-132.

6.10 The requirements of sections 5.18 and 5.19 shall be met for concrete pipe subject to the following modifications:

A. The use of sand to protect joints is optional.

B. If Zone "A" material is no longer available, Zone III material may be substituted in backfilling to the pipe's springline.

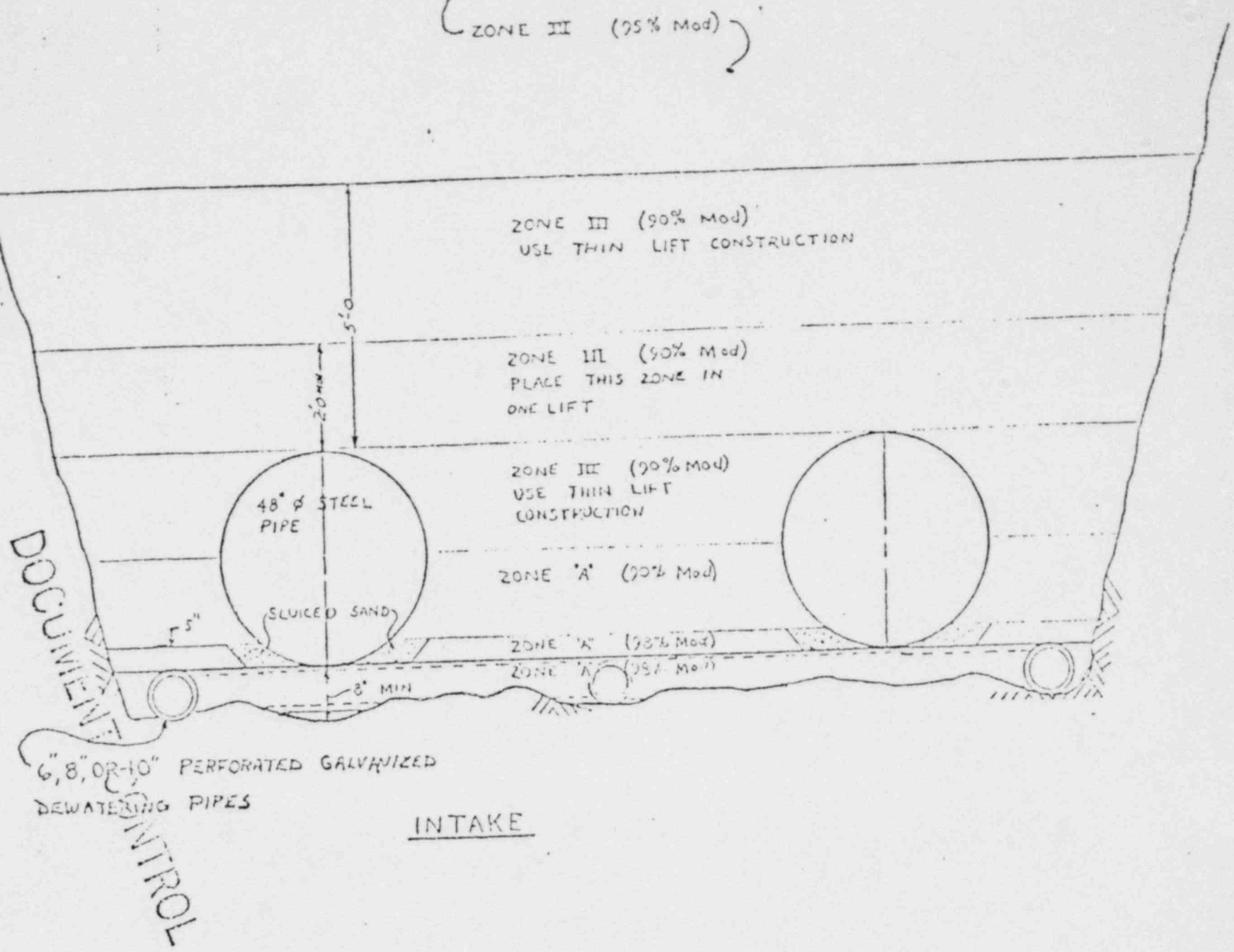
C. From two feet above the top of the pipe up to the surface, backfill with Zone III material and compact to 95% modified.

6.11 The On-site Independent Testing Laboratory shall make the inspections and tests called for by section 6 and submit results on the appropriate form for retention in the Quality Record files.

A. Form No. JAJ-132 (see Exhibit 4) for individual pipe sections,

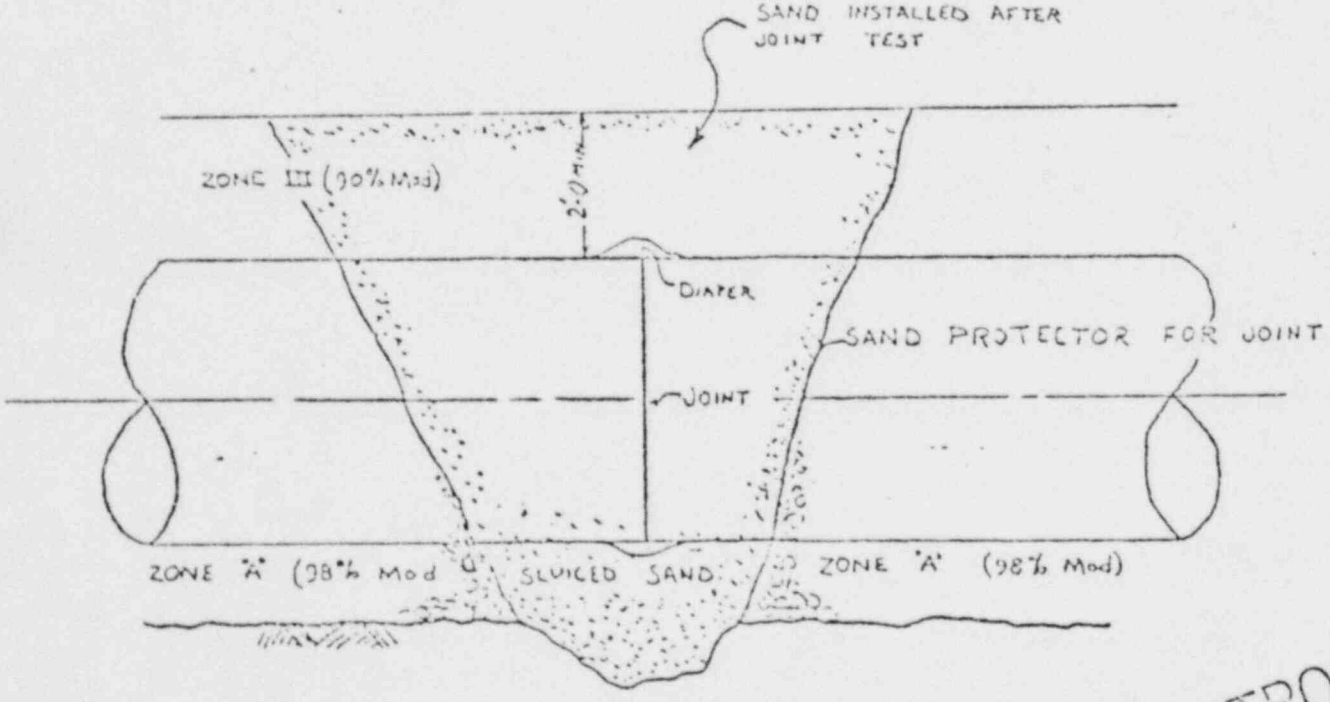
B. Form No. FPC Q-009 for discrepancies, and

C. Special Pittsburgh Testing Laboratory forms (see Exhibits 5, 6 and 7) for reports of compaction, plasticity and gradation.



BY DATE PIPING TRENCH SECTION JOB NO.

TYPICAL JOINT



TYPICAL JOINT
PLAN

J.A. JONES CONSTRUCTION CO.
FLORIDA POWER CORPORATION CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

Paragraphs	5.1 - 5.4	5.10 E. 5.13D.,E	5.12 A. 1.,2.,3.	5.12 A.5.	5.12 B.	5.14	5.16	5.18 A.	5.18 B.	5.18 C. E.,F.,G
Pipe Piece No.	Bedding	Readiness to join	Joint Fitup Alignmt.	Mech. Joint Bolting	Flanged Joint Bolting	Leak Test	Wrapping	Sluiced Sand	Zone A to Spring line	Zone [illegible]

Distribution: White — FPC Quality Engr.
Canary — PTA Chief Inspector
Pink — JAJ Quality Control
Golden rod — FPC Const. Supt.

Note: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two squares and record the inspection date just below the signature.

Form No. JAJ-131 Exhibit 3

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	Joint Preparation	JOINT FITUP ALIGNMENT	Pipe Condition	Exterior Joint Mortar	Interior Joint Mortar	Zone A/III to Springline	ZONE III

SUBCONTRACTOR CONTROL

Distribution:

White — FPC Quality Engr.
Canary — PTL Chief Inspector
Pink — JAJ Quality Control
Goldenrod — FPC Const. Supt.

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the squares and record the inspection date just below signature. Report discrepancies on Form No. FPC Q-009.

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
	J. Dillaway 12-22-72	N/A	N/A	J. Dillaway 12-22-72	N/A	N/A	N/A	N/A
107	J. Dillaway 12-22-72	N/A	N/A	J. Dillaway 12-22-72	N/A	N/A	N/A	N/A
52	J. Dillaway 12-22-72	J. Dillaway 12-22-72	J. Dillaway 12-22-72	J. Dillaway 12-22-72	N/A	N/A	N/A	N/A
51	J. Dillaway 12-22-72	J. Dillaway 12-22-72	J. Dillaway 12-22-72		N/A	N/A	N/A	N/A
50	J. Dillaway 12-22-72	J. Dillaway 12-26-72	J. Dillaway 12-27-72	J. Dillaway 12-27-72	N/A	N/A	N/A	N/A
106	J. Dillaway 12-26-72	J. Dillaway 12-26-72	J. Dillaway 12-26-72		N/A	N/A	N/A	N/A
105	J. Dillaway 12-26-72	J. Dillaway 12-26-72	J. Dillaway 12-26-72	J. Dillaway 12-26-72	N/A	N/A	N/A	N/A
104	J. Dillaway 12-26-72	J. Dillaway 12-26-72	J. Dillaway 12-26-72	J. Dillaway 12-27-72	N/A	N/A	J. Dillaway 2-2-73	J. Dillaway 2-2-73
49	J. Dillaway 12-27-72	J. Dillaway 12-27-72	J. Dillaway 12-27-72		N/A	N/A	J. Dillaway 2-2-73	J. Dillaway 2-20-73
48	J. Dillaway 12-27-72	J. Dillaway 12-27-72	J. Dillaway 12-27-72		J. Dillaway 1-8-73	J. Dillaway 1-23-73	J. Dillaway 2-10-73	J. Dillaway 2-22-73
47	J. Dillaway 12-27-72	J. Dillaway 12-27-72	J. Dillaway 1-2-73		N/A	N/A	J. Dillaway 2-20-73	J. Dillaway 2-22-73
46	J. Dillaway 12-27-72	J. Dillaway 12-27-72	J. Dillaway 1-2-73	J. Dillaway 1-2-73	J. Dillaway 1-8-73	J. Dillaway 1-23-73	J. Dillaway 2-10-73	J. Dillaway 2-20-73

* On each side piece

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C. 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
101	J. Dilbeck 1-3-73	J. Dilbeck 1-3-73	J. Dilbeck 1-3-73	J. Dilbeck 1-4-73	J. Dilbeck 1-8-73	J. Dilbeck 1-23-73	J. Dilbeck 2-12-73	J. Dilbeck 2-20-73
100	J. Dilbeck 1-3-73	J. Dilbeck 1-3-73	J. Dilbeck 1-3-73	J. Dilbeck 1-4-73	J. Dilbeck 1-8-73	J. Dilbeck 1-23-73	J. Dilbeck 2-12-73	J. Dilbeck 2-20-73
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
99	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
43	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
97	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two squares and record the inspection date just below the signature. Report discrepancies on Form No. FPC C-009.

Rare Cerny P-k

FPC Quality Engr.
PTL Chief Inspector
JAJ Quality Control

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.6	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
95	1-3-73	1-3-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73
C4	1-3-73	1-3-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73
93	1-3-73	1-3-73	1-4-73	1-4-73	N/A	N/A	N/A	2-26-73
98	1-4-73	1-4-73	1-4-73	1-4-73	1-18-73	1-23-73	2-12-73	2-26-73
92	1-4-73	1-4-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73
91	1-4-73	1-4-73	1-4-73	1-4-73	1-18-73	1-23-73	2-12-73	2-26-73
89	1-4-73	1-4-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73
88	1-4-73	1-4-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73
87	1-4-73	1-4-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73
90	1-4-73	1-4-73	1-4-73		1-18-73	1-23-73	2-12-73	2-26-73

NOTE: In each column, opposite each pipe piece ... shall sign in the upper of the two ... the

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
38								
37								
35								
34								
33				1-5-73				
86								
32				1-5-73				
85								
31								
84								

Initial each column opposite each pipe piece

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A III TO SPRINGLINE	ZONE III
29	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73	A Dilloway 1-23-73	A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
28	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
27	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
26	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
25	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
78	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
79	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
80	A Dilloway 1-19-73	A Dilloway 1-19-73	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
24	[illegible]	[illegible]	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73
23	[illegible]	[illegible]	A Dilloway 1-22-73		A Dilloway 1-29-73	A Dilloway 1-29-73	A Dilloway 2-12-73	A Dilloway 2-20-73

Distribution:

Andre — FPC Quality Engr.
Curtis — PTL Chief Inspector
Ford — JAJ Quality Control

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two squares and record the inspection date just below the signature. Report discrepancies on Form No. FPC C-009.

POOR ORIGINAL

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A (III) TO SPRINGLINE	ZONE III
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	1-22-73	1-22-73	1-23-73	1-23-730	1-24-73	1-24-73	2-12-73	2-12-73
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	1-22-73	1-22-73	1-23-73	[illegible]	1-24-73	1-24-73	2-12-73	2-12-73
	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]
20	1-22-73	1-22-73	1-23-73		1-24-73		2-12-73	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
19	1-22-73	1-22-73	1-23-73	1-23-73	[illegible]		2-12-73	2-12-73
	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
77	[illegible]	[illegible]	1-23-73		1-24-73	1-24-73	2-12-73	[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
76	1-22-73	1-22-73	1-23-73		1-24-73	1-24-73	2-12-73	2-12-73
	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
75	[illegible]	[illegible]	1-23-73		1-24-73	1-24-73	2-12-73	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
74	1-22-73	1-21-73	1-23-73	1-30-73	1-24-73	1-24-73	2-12-73	2-12-73
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
73	1-22-73	1-23-73	1-23-73	1-30-73	1-24-73	1-24-73	2-12-73	2-12-73
	[illegible]	[illegible]		[illegible]				
72	1-22-73	1-23-73						
	[illegible]	[illegible]						
71	1-22-73	1-23-73						
	[illegible]	[illegible]						
	1-22-73	1-23-73						

Distribution:

[illegible] FPC Quality Engr.
[illegible]

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two squares and record the inspection date just below the signature. Report discrepancies on

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
72	1-24-73	1-24-73	1-25-73	1-30-73	1-24-73		2-27-73	2-27-73
71	1-24-73	1-24-73	1-25-73		1-24-73		2-27-73	2-27-73
19	1-24-73	1-24-73	1-25-73	1-30-73	1-24-73		2-27-73	2-27-73
17	1-24-73	1-24-73	1-25-73	1-30-73	1-25-73		2-27-73	2-27-73
70	1-24-73	1-24-73	1-25-73		1-24-73		2-27-73	2-27-73
16	1-24-73	1-24-73	1-25-73	1-30-73	N/A	N/A	2-27-73	2-27-73
15	1-24-73	1-24-73	1-30-73		N/A	N/A	2-27-73	2-27-73
69	1-24-73	1-24-73	1-30-73	1-30-73	1-24-73		2-27-73	2-27-73
68	1-24-73	1-24-73	1-30-73	1-30-73	N/A	N/A	2-27-73	2-27-73
67	1-24-73	1-24-73	1-30-73		N/A	N/A	2-27-73	2-27-73

Distribution:

White — FPC Quality Engr.
Canary — PTL Chief Inspector
Pink — JAJ Quality Control
Goldenrod — PHC Const. Supt.

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two squares and record the inspection date just below the signature. Report discrepancies on Form No. FPC C-009.

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	5.1	6.3	6.5	6.7	6.8	6.9	5.13 B. 6.10 B.	5.13 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
14	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
66	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
13	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
15	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
12	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
64	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
11	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
63	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
10	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
62	[illegible] 9-25-73	[illegible] 9-25-73	[illegible] 9-25-73		J.D. Dilbeck 10-29-73			
1	[illegible] 9-21-73	[illegible] 9-21-73	[illegible] 9-21-73		H. Miller 10-23-73			
53	[illegible] 9-21-73	[illegible] 9-21-73	[illegible] 9-21-73		H. Miller 10-23-73			

Distribution:

White — FPC Quality Engr.
Canary — PTL Chief Inspector
Pink — JAJ Quality Control
Goldenrod — FPC Const. Supt.

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two squares and record the inspection date just below the signature. Report discrepancies on Form No. FPC 0-670

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.13 B. 6.10 B.	5.13 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A THRU TO SPRINGLINE	ZONE III
2	[illegible] 9-26-73	[illegible] 9-26-73	[illegible] 9-26-73		[illegible] 10-3-73			
54	[illegible] 9-26-73	[illegible] 9-26-73	[illegible] 9-26-73		[illegible] 10-3-73			
3	[illegible] 9-26-73	[illegible] 9-26-73	[illegible] 9-26-73		[illegible] 10-3-73			
55	[illegible] 9-26-73	[illegible] 9-26-73	[illegible] 9-26-73		[illegible] 10-3-73			
4	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73		[illegible] 10-3-73			
56	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73		[illegible] 10-3-73			
5	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73					
57	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73					
6	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73					
58	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73					
7	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73					
59	[illegible] 9-27-73	[illegible] 9-27-73	[illegible] 9-27-73					

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B. 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
8								
60								
5								
6								
7								
4								
57								
58								
59								
60								
61								
N/A								

Duty duties:

Name — FPC Quality Engr.
Comply — PTL Chief Inspector
Sign — JAJ Quality Control
[illegible] — FPC Const. Supt.

NOTE: In each column, opposite each pipe piece no., the inspector shall sign in the upper of the two square, and record the inspection date just below the signature. Report discrepancies on Form No. FPC C-009.

POOR ORIGINAL

J. A. JONES CONSTRUCTION CO.

FLORIDA POWER CORPORATION

CRYSTAL RIVER NO. 3

QUALITY CONTROL CHECK LIST FOR NUCLEAR SERVICE AND DECAY HEAT UNDERGROUND PIPING INSTALLATION

48" CONCRETE PIPE

PARAGRAPHS	6.1	6.3	6.5	6.7	6.8	6.9	5.18 B., 6.10 B.	5.18 C., 6.10 C.
PIPE PIECE NO.	BEDDING	JOINT PREPARATION	JOINT FITUP ALIGNMENT	PIPE CONDITION	EXTERIOR JOINT MORTAR	INTERIOR JOINT MORTAR	ZONE A/III TO SPRINGLINE	ZONE III
N/A	[illegible] 9-26-73	[illegible] 9-26-73	[illegible] 9-26-73		[illegible] 10-[illegible]-73			
~~[illegible]~~					~~[illegible]~~			
~~[illegible]~~ N/A					~~[illegible]~~			

FPC [illegible] TO [illegible]

R.B.J. JAN 11 '73

Construction Procedure No. JAJ-W32 Date 7/14/72

Field Change No. 1 D.A. OLIVER 1/10/73
Originator Date

Reason for Change:

Extreme difficulty is being encountered in compacting Zone III fill in the confined space between the Auxiliary Building and the alongside 48" cast iron pipe running south from the anchor block at the north end.

Description of Method:

Backfill requirements of paragraphs 5.18 C,D,E and F are changed for the space confined by the Auxiliary Building foundation, Auxiliary Building foundation overhang and the 48" cast iron nuclear services intake piping alongside the Auxiliary Building.

In this confined space, sand shall be sluiced in from the pipe's spring line up to the bottom of the building [illegible]erhang.

[illegible]sand shall be used outside the confined space where it is [illegible]cticable to compact Zone III fill.

Approved:
FPC Construction Supervisor C. Seeber 10 JAN 73

Concurrence:
FPC Quality Engineer R.S. Denise for D.N.P. 10 Jan 73

Notification:
Q.C. Dept. Representative J. L. Gentry 1/10/73

Review:
GAI/QA Dept. A. Ray Barrington 1/10/73

Comments:

FPC NUCLEAR PROJECT CONSTRUCTION PROCEDURES

Construction Procedure No. JAJ-W52 Date 7/14/72

Field Change No. 2

D.A. OLIVER
Originator Date

Reason for Change:

Hydrostatic tests of the Nuclear Service and Decay Heat Sea Water Underground Piping will be performed by the Florida Power Corp. Test Group and results recorded on FPC forms.

Description of Method:

The leak test requirement (section 5.14) and associated quality control reports (section 5.20 and the "Leak Test" column of Form No. JAJ-131, Exhibit 3) are deleted from JAJ-W52.

Approved:
FPC Construction Supervisor J.E. Hobbs, Jr. 1-11-73

Concurrence:
FPC Quality Engineer R.L. Davis for D.A.P. 16 Jan '73

Notification:
Q.C. Dept. Representative J. Crawford 1/16/73

Review:
GAI/QA Dept. A. Ray Cushing Jan 15/73

Comments:

Form No. Q-050
Date 6, 1972

Construction Procedure No. JAJ-W52 Date 7/24/72

Field Change No. 3 T. McAllister February 2, 1973
Originator Date

Reason for Change:

To define "visually apparent cracks" as stated in paragraph 6.7.
Reference: Letter from Lock Joint Pipe, Interpace Corporation, dated January 25, 1973.

Description of Method:

Minor or "hairline" cracks need not be reported, as this condition is considered normal by the manufacturer.

Approved:
FPC Construction Supervisor C Parker 2 FEB 73

Concurrence:
FPC Quality Engineer D. W. Roderick JR 2 FEB 1973

Notification:
Q.C. Dept. Representative H Conduit 2/2/73

Review:
GAI/QA Dept. L Ray Brantley Jr. 2/2/73

Comments:

Form No. Q-050
June 6, 1972

Construction Procedure No. JAJ-W12 Rev. 1 Date 7/14/72

Field Change No. 4 Originator J.R. Amundson Date 2/2/73

Reason for Change:

The Neolube lubrication requirement of section 7.1.2 of FPC-W48 does not apply for installation of the nuclear service and decay heat sea water underground piping.

Description of Method:

Add to Section 5.12 B: Neolube lubrication shall not be required.

Approved: FPC Construction Supervisor C. Paulson 2/2/73

Concurrence: FPC Quality Engineer D. W. Pedrick, Jr. 2/2/73

Notification: Q.C. Dept. Representative J. A. Curtis 2/2/73

Review: GAI/QA Dept. L. Ray Buckingham 2/2/73

Comments:

Form No. Q-050
June 6, 1972

Construction Procedure No. JAJ-WS-2 D. 7/21/72

Field Change No. 5 D. Shorr 2/14/73
Originator Date

Reason for Change:

Testing will not be required for the first joint (intake end) of the 48" Cast Iron Intake Pipe (Nuclear Service and Decay Heat Sea Water Piping) since this joint will be completely encased in concrete.

Description of Method:

Add to section 5.14: No leak test is required for the first joint at the intake end for both lines of pipe. These two joints will be completely encased in concrete.

Approved:
FPC Construction Supervisor C. Parker 2/14/73

Concurrence:
FPC Quality Engineer G.W. Redacted 2/14/73

Notification:
Q.C. Dept. Representative Redacted 2/14/73

Review:
GAI/QA Dept. Redacted 2/14/73

Comments:

Form No. Q-050
June 6, 1972

Construction Procedure No. NAI - W52 Date 7/14/73

Title Work Procedure - Installation of Nuclear Service and Decay Heat S.W. Water Underground Piping

Field Change No. _____ J. R. Swanson 9/27/73
Originator Date

Reason For Change: to add welding requirements of steel wedge ring. See attach Interpace Dwg. D-4-390 Rev. A.

Description of Method: welding in accordance with Mfg. Dwg. D-4-390 weld to be a 1/4" fillet weld around the circumference, except for the bottom 12 inches. The welding sequence to be the skip weld method as shown on D-4-390. Use qualified welders and a qualified welding procedure for this weld. Weld shall be visually inspected to assure the weld is a least 1/4 inch fillet and that the welds are free from cracks. The weld inspection will be reported on a Q-009 inspection report, and identified to the following example (piece #61 to #60).

Date

Route in order shown below:

(1) Approval: FPC Construction Supv. Signature 9-21-

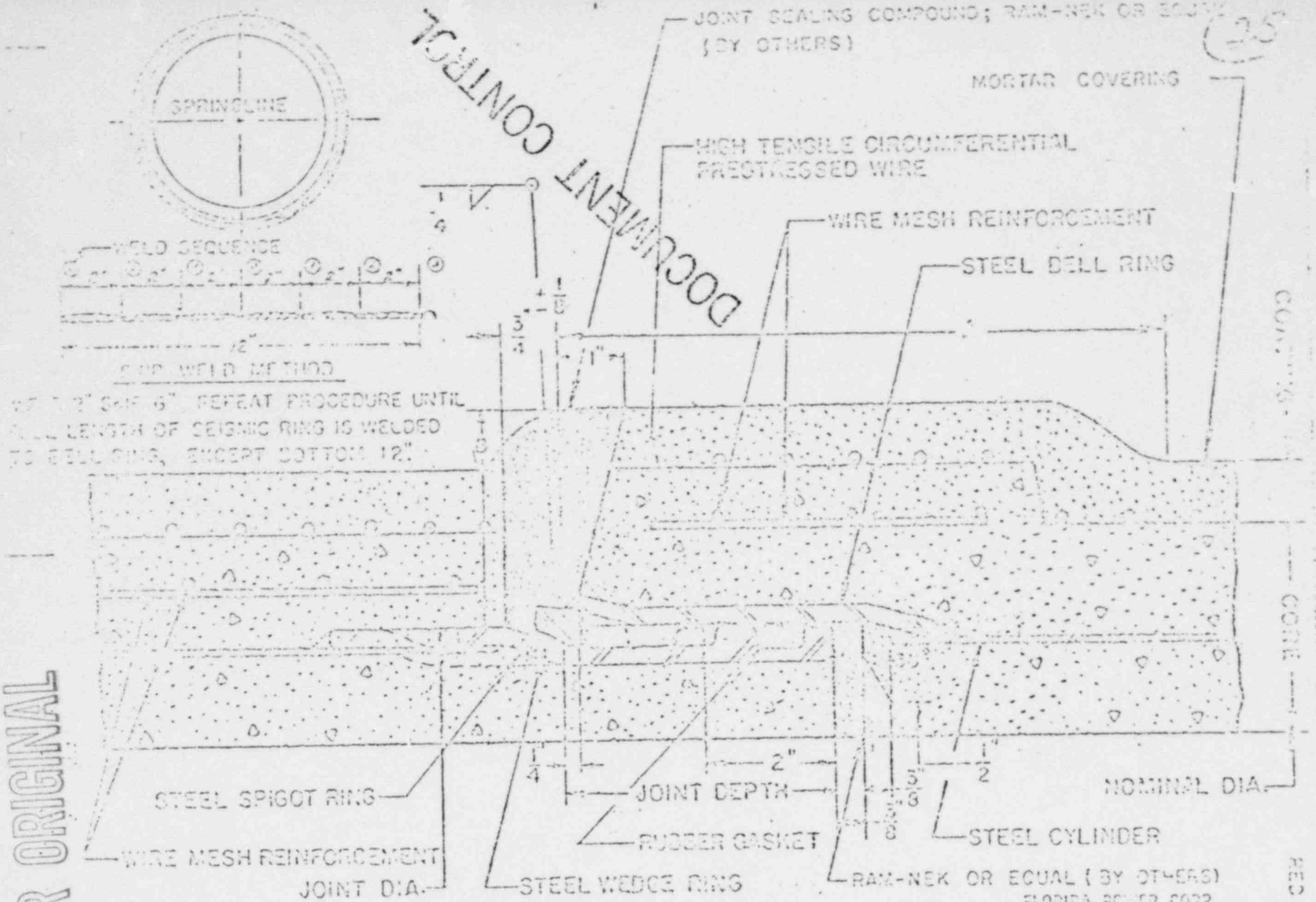
(2) Notification: QC Dept. Supv.

(3) Review: GAI/QA Representative

Concurrence: FPC Quality Engineer

5) Distrubution: Document Control

Form No. FPC Q-50



NOM. DIA.	CORE	JOINT DEPTH	JOINT DIA.	A	B	BELL O.D.
48"	3" OR 5"	4⅛"	51¼"	10" ±	2⅝"	59⅞"

WEDGE RING TO BE SUPPLIED IN ONE SECTION.

FLORIDA POWER CORP.
CRYSTAL RIVER PLANT UNIT 3
APPROVED
GILBERT ASSOCIATES, INC.
W. E. ALBERK
MAR 8 1973

REC'D E&EL

C-4-060

FIELD CHANGE TO CONSTRUCTION PROCEDURE

Construction Procedure No. JAJ-W52 Date July 14, 1972

Title Work Procedure - Installation of Nuclear Service and Decay Heat Sea

Field Change No. 7 J. R. Amundson (Originator) 10/5/73 (Date)

Reason For Change:

Void Field Change #6 to Procedure JAJ-W52, and write Field Change #7 to have the welding of the wedge ring to bell ring meet the vendors approved welding requirements.

Description of Method:

Weld the wedge ring to the bell ring, to the requirements of Interp drawing D-4-390, using E-6010 Electrodes.

Visually inspect the welds to assure the 1/4" Fillet or Flush weld is free of crack.

The welidng inspector will report the results of all acceptable welc on a Q-009 inspection form. Example (Piece #61 to 60).

AWS recommended Amperage for:

1/8" rod 75 to 125 AMPs
5/32 rod 110 to 170 AMPs

Route in order shown below: Signature

(1) Approval: FPC Construction Supv. [signature] 10

(2) Notification: QC Dept. Supv. [signature illegible] 11

(3) Review: GAI/QA Representative [signature illegible]

(4) Concurrence: FPC Quality Engineer [signature illegible]

(5) Distrubution: Document Control

Form No. FPC Q-50

Lock Joint Pipe

INTERPACE

260 CHERRY HILL ROAD / PARSIPPANY, NEW JERSEY 07054 / 201-335-1111 / TELEX: 136421 / CABLE: INTERPACE

September 28, 1973

Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33733

Attention: Mr. J. Landers

Subject: Job No. CO-69-15
Red Level, Florida

Gentlemen:

We have been requested by our Mr. Burdell to comment on the welding method used at the seismic joint end of the pipe.

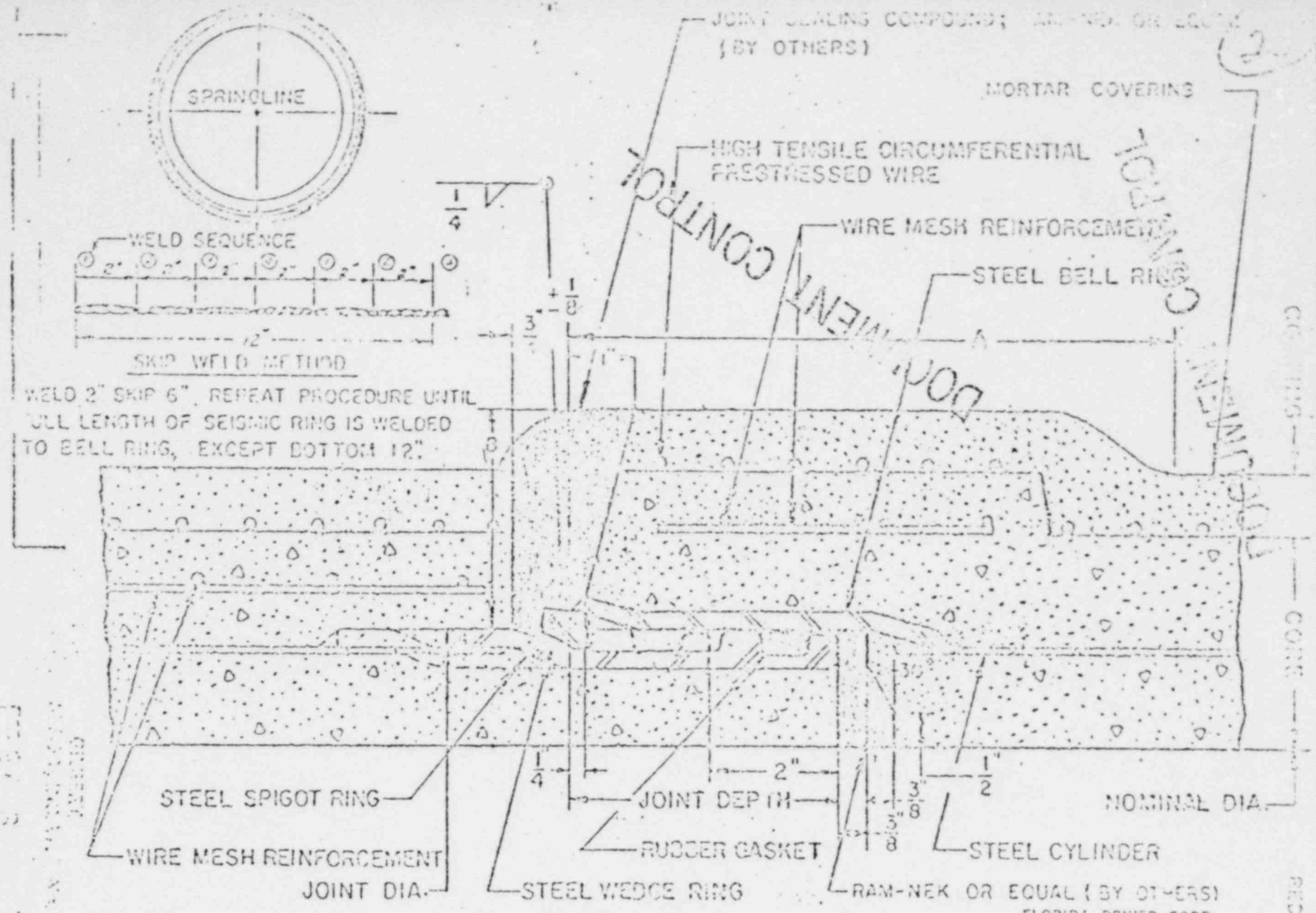
The seismic steel wedge ring may be welded with a flush weld rather than a fillet weld as shown on the drawings provided that the weld develops the full strength equivalent to a one-quarter inch fillet.

Very truly yours,

Harry W. Brenner

Harry W. Brenner
Project Engineer

HWB:cms



NOM. DIA.	CORE	JOINT DEPTH	JOINT DIA.	A	B	BELL O.D.
48"	3" OR 5"	4⅛"	51¼"	10" ±	2¾"	56¾"

WEDGE RING TO BE SUPPLIED IN ONE SECTION.

FLORIDA POWER CORP.
CRYSTAL RIVER PLANT UNIT 3
APPROVED
GILBERT ASSOCIATES, INC.
W. E. MECK
MAR 8 1973

D-4-330

POOR ORIGINAL

FIELD CHANGE TO CONSTRUCTION PROCEDURE

Construction Procedure No. JAJ-M52 Date July 14, 1972

Title Work Procedure - Installation of Nulcear Service & Decay Heat Sea Water Underground Pi

Field Change No. 8 J. R. Amundson (Originator) 10/18/73 (Date)

Reason For Change: Delete Para 6.6 and last four sentences of para. 6.7

Add: Pipe joint shall be sealed at a convenient time following the Manufacturers Drawing.

Ref. Drawings : D-3-682
SS-CO-69-15-7 & D-3-691
D-4-390 (See Field Change #7)

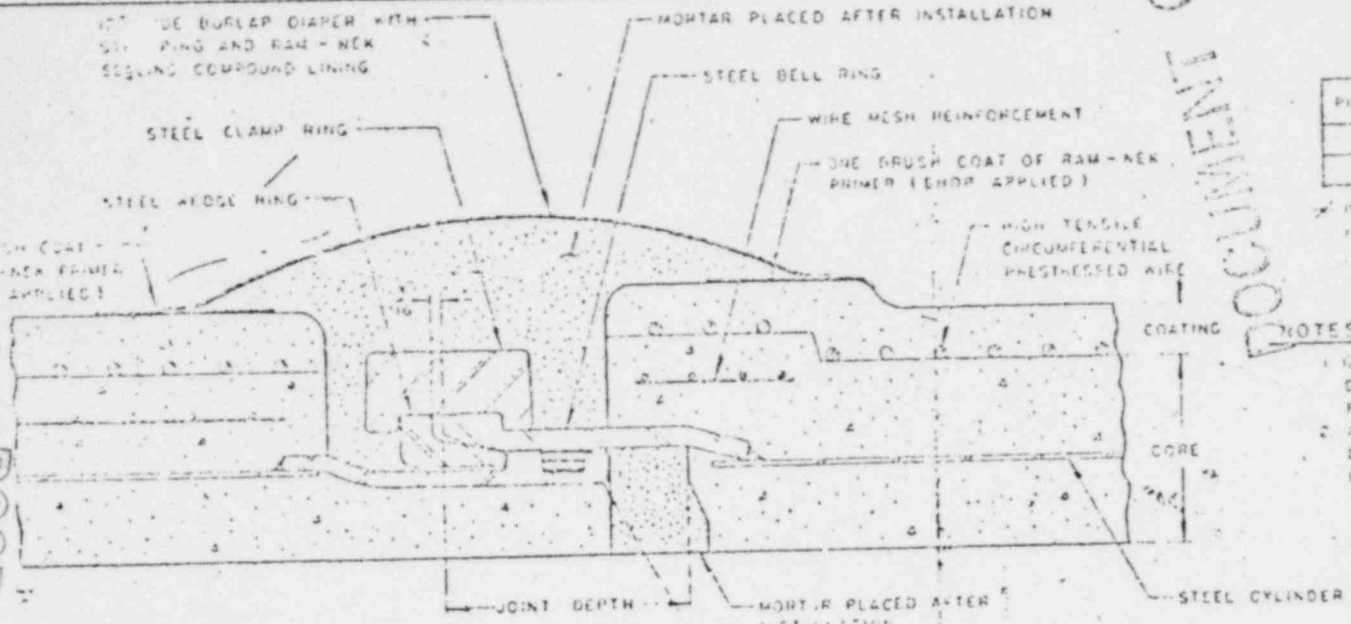
DOCUMENT CONTROL

Route in order shown below:	Signature	Date
(1) Approval: FPC Construction Supv.		10-18-73
(2) Notification: QC Dept. Supv.		10/18/73
(3) Review: GAI/QA Representative		10/18/73
(4) Concurrence: FPC Quality Engineer		10-18-73
(5) Distrubution: Document Control		

Form No. FPC Q-50
Rev. 5/4/73

POOR ORIGINAL

14/



PIPE DIA.	X AVERAGE LAID LENGTH	JOINT DEPTH	GAP AT LENGTH	GAPER
42"	19'-10"	4 1/2"	3/4"	3/8"
48"	19'-10"	4 1/2"	3/4"	3/8"

X PIPE HAVING ONLY THE STEEL END RING HAVE STANDARD LAID LENGTH

NOTES:

1. GASKET MUST BE CHECKED WITH FEELER GAGE DURING OPERATION AS IS THE SAME WAY AS FOR REGULAR JOINT.
2. ADD 0.08" TO LAID LENGTH OF SPIGOT END AND DEDUCT 0.04" FROM LAID LENGTH OF ... END OF STANDARD FITTINGS.

FLORIDA POWER CORP.
CRYSTAL RIVER STATION UNIT NO. 3

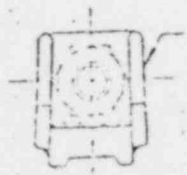
X
☐
☐

...NDE ASSOCIATES, INC.

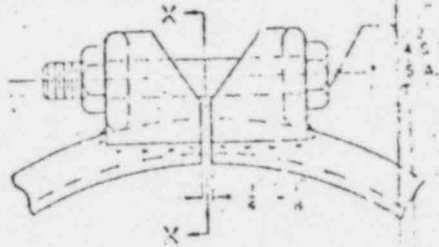
...BY ...

...DATE ...

...SPEC. NO.



SECTION XX



VIEW OF CLAMP RING AT CONNECTION

OPERATIONS TO BE PERFORMED IN THE FIELD

1. REMOVE CLAMP RING IF ATTACHED TO BELL.
2. MAKE JOINT PUSHING SPIGOT HOME UNTIL WEDGE IS IN CONTACT WITH BELL.
3. BOLT CLAMP RING INTO POSITION.
4. MEASURE GAP BETWEEN CLAMP RING SECTIONS. TOTAL OF TWO GAPS MUST BE 1/2" ± 1/4".
5. WRAP RAM-NEK DIAPER (WITH PAPER ATTACHED) ON PIPE AND TIGHTEN STRAPPING. GROUT JOINT WITH MORTAR.
6. REMOVE PAPER FROM SEPARATE 18" LONG RAM-NEK PATCH AND PLACE OVER OPENING TO COVER MORTAR WITH RAM-NEK.
7. WHEN LAID, JOINT ENDS ARE TO OVERLAP 2 5/8" FOR ALL PIPE SIZES.

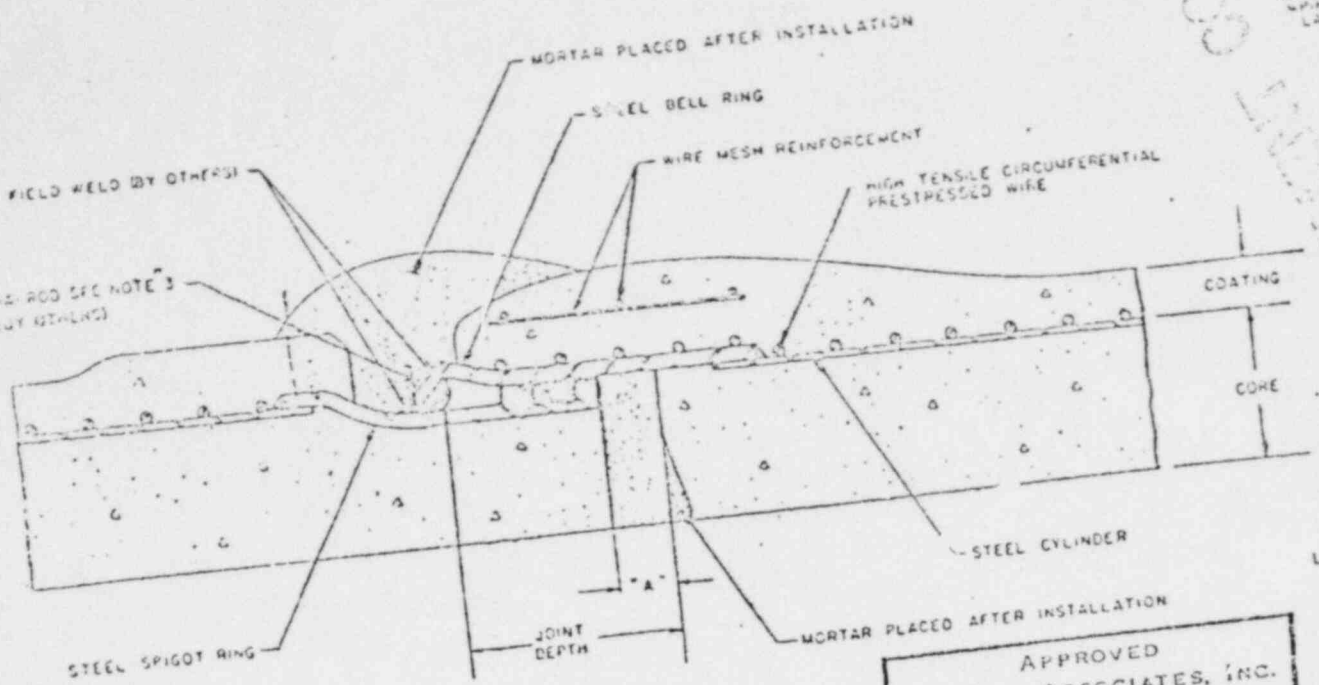
DESCRIPTION	REV.	DESCRIPTION

International Pipe & Ceramics Corporation
LOCK JOINT PIPE PRODUCTS

RUBBER & STEEL FLEXIBLE TYED JOINT
CLAMP TYPE 42" & 48"
PRESTRESSED CONCRETE EMBEDDED CYL. PIPE

SCALE 3" = 1'-0"				DRAWING NUMBER	REV.
DR. GRG	4-11-68	APP.	5-9-68	D-P-6883	
CH. JT	5-13-68	APP.			

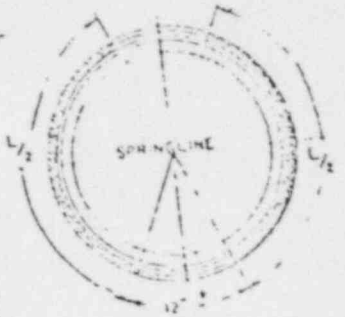
SPIGOT



PIPE DIAMETER	COVERAGE LAID LENGTH	JOINT DEPTH	SPIGOT LENGTH
42"	10'-00"	3 1/2"	10 1/2"
48"	10'-00"	3 1/2"	10 1/2"

*PIPE HAVING ONLY THE BELL END WELDED TO STANDARD LAID LENGTH.

PIPE SIZE	GA	A	B	C	D
42"	12	1/2"	1/2"	1/2"	1/2"
	10	1/2"	1/2"	1/2"	1/2"
48"	12	1/2"	1/2"	1/2"	1/2"
	10	1/2"	1/2"	1/2"	1/2"



WELD SEQUENCE

SKIP WELD METHOD

ALL 2 SKIPS FOLLOW SEQUENCE UNTIL FINAL LENGTH OF RING ARE WELDED TO RINGS.

GENERAL NOTES:
1. GASKET MUST BE CHECKED WITH FEELER GAGE THE SAME WAY AS FOR REGULAR JOINT
2. USE SKIP WELD METHOD
3. USE 8 DIA PLAIN ROD
4. USE E-6010 ELECTRODES
5. WHEN JOINT OPENINGS ARE USED WITH FIELD WELDED JOINTS, ONE SIDE OF THE JOINT SHOULD BE CLOSED AND THE OTHER SIDE KEPT AT THE "A" AMOUNT SHOWN ABOVE
6. INTERFACE WILL NOT BE RESPONSIBLE FOR WELDED JOINTS IF THE SKIP WELD METHOD IS NOT USED. HEAT CONCENTRATIONS FROM WELDING ARE SUFFICIENT TO MELT THE RUBBER GASKET IF EXTREME CARE IS NOT USED.
7. ADD 0.05" TO LAID LENGTH OF SPIGOT END OF STANDARD 42" FITTINGS AND .006 TO LAID LENGTH OF SPIGOT END OF STANDARD 48" FITTINGS.

APPROVED
GILBERT ASSOCIATES, INC.
W. E. MEEK
MAR 8 1973

FLORIDA POWER CORP.
CRYSTAL RIVER PLANT UNIT 3

RUBBER & STEEL TIED JOINT
FIELD WELDED TYPE
42" AND 48" PRESTRESSED CONCRETE CYLINDER PIPE

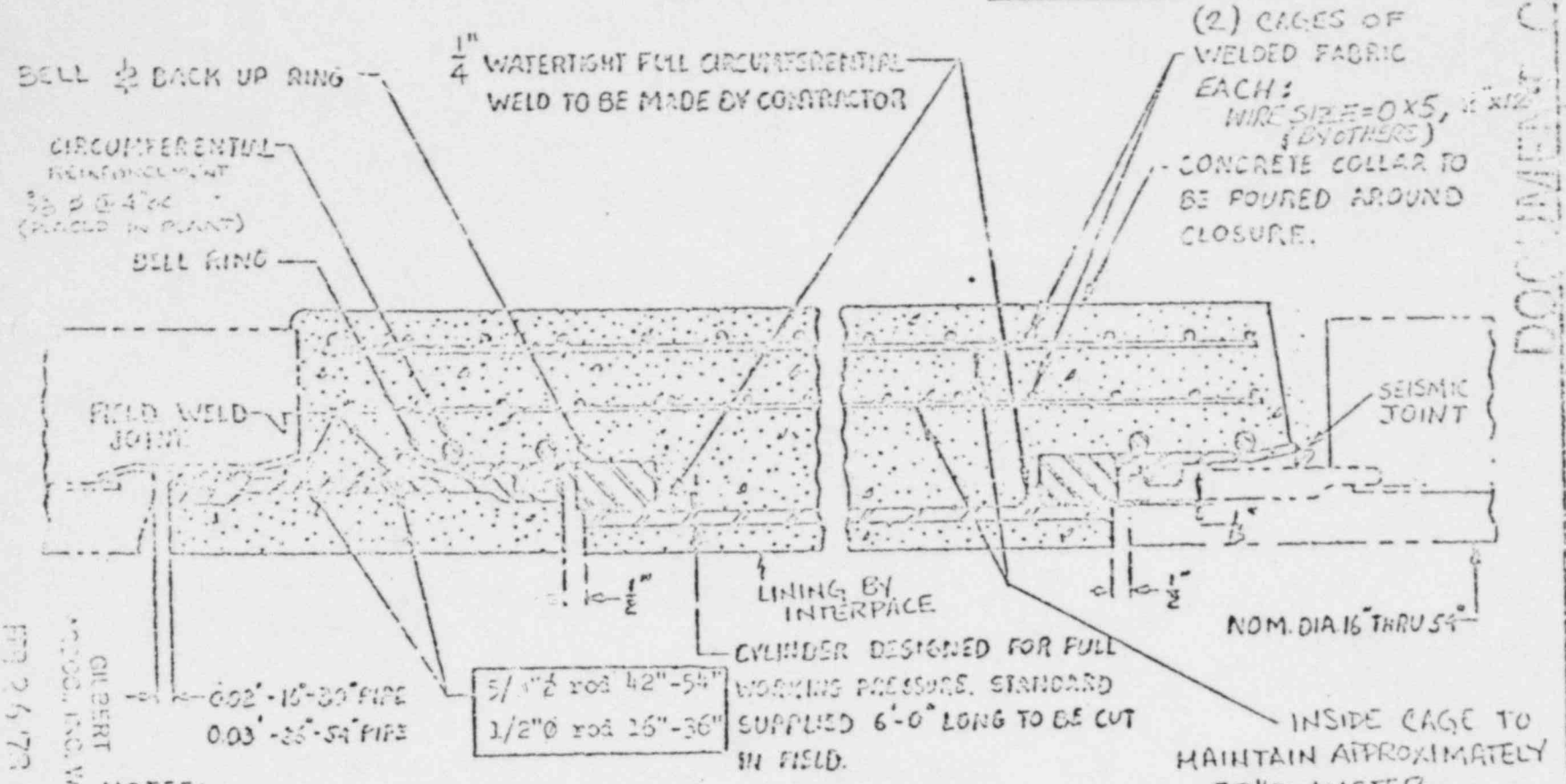
SCALE	DR C.	1-28-69	APP J.R.Z.	3-13-69	3-3-691
	CH J.C.P.	3-13-69	APP		

REV.	DESCRIPTION	DATE	NEXT ASSEMBLY	QTY	CH	APP	DATE
A	CHANGE AMOUNT OF WELD	11-26-68					

RED LEVEL, PA.

FLORIDA POWER CORP.
CRYSTAL RIVER PLANT UNIT 3

W. E. MEEK
MAR 8 1973



NOTES:

1. BELL & BACK UP RINGS TO BE SHIPPED ON STEEL CYLINDER. SLIDE BACK CLEAR OF ENDS BEFORE PLACING CLOSURE.
2. SEE INSTRUCTION SHEETS FOR INSTALLATION PROCEDURE.
3. PULL BELL RINGS HOME BY CHAIN HOIST AND CABLES.
4. FIELD WELD JOINT – SEE DWG D-3-691 (YOU LEVEL)

USE E6010 ELECTRODES

NOMINAL DIA. 48"
CYLINDER THICKNESS 5/8"

SS-CO-69-15-7

SCALE NTS