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July 6, 1979

United States Nuclear Regulatory Commission
Attention: Boyce H. Grier, Director
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334
License No. DPR-66
Response to IE Bulletin 79-02

Dear Mr. Grier:

Attached is our response to the subject Bulletin. Please note that the entire inspection program will not be complete before the anticipated plant start-up, however, since there has been a significant sampling with the acceptable results shown in the attached report, we consider it safe to start-up the plant. We believe that the inspection program will continue to have a high success rate. Additional information will be forwarded to you upon completion of the inspection program.

If you have any questions regarding this response, please contact my office.

Very truly yours,

C. N. Dunn
Vice President, Operations

Attachment

cc: United States Nuclear Regulatory Commission
Office of Inspection and Enforcement
Division of Reactor Operations
Washington, D. C. 20555

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DUQUESNE LIGHT COMPANY
ENGINEERING AND CONSTRUCTION DIVISION
STRUCTURAL ENGINEERING DEPARTMENT

J.O. 12690.88

The following report of the Duquesne Light Company's program to address IE Bulletin 79-02 as it applies to the Beaver Valley Power Station Unit 1 (BV1) is presented in three parts. Part I describes the analytical and inspection criteria developed and implemented to address the specific paragraphs of the bulletin. Part II delineates the criteria established to conduct personnel training, equipment calibration and field inspections. Part III of the report addresses the schedule and the status of the work performed to date.

Duquesne Light Company has a program underway to identify, inspect, analyze and perform, as required, modifications on pipe support baseplates that use concrete expansion anchor bolts in Seismic Category I systems as defined by Regulatory Guide 1.29 "Seismic Design Classification", Revision I, dated August, 1973. Small diameter lines, 2 1/2 inches diameter and smaller, which were analyzed using conservative and calculated methods in lieu of a computer analysis are not included in this effort.

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PART I - ANALYTICAL AND INSPECTION CRITERIA

Attachment A to this report identifies those large diameter Seismic Category I piping lines, pipe supports and base plates which must be analyzed and inspected to I/E 79-02 criteria. This attachment further identifies piping lines which are safe shutdown systems and inaccessible during operations.

The piping systems are divided into piping lines which lie between penetrations, anchors, motor operator valves, manifolds and piping size changes. Based on a preliminary review of the applicable drawings and field purchases for BV-1 it has been determined that most of the concrete expansion anchors used for the BV-1 pipe supports are the self-drilling shell type or the externally threaded wedge type. The anchor inspection programs shown in Attachment B specifically address these types of anchors. The procedures will be modified to include inspection plans for other type anchors if they are encountered.

This program addresses the following items as a plan of action for compliance with IE Bulletin 79-02. The item numbers listed below are referenced to similarly numbered items in IE Bulletin 79-02.

ITEM 1

Verify that pipe support flexibility was accounted for in the calculation of anchor bolt loads.

A procedure has been developed which can be applied to common plate configurations to verify that plate flexibility has been accounted for in determining the loads induced in the drilled-in anchor bolts.

This procedure includes load factors to be applied to anchor bolt loads to provide for the effects of plate flexibility. The load factors were developed using finite element analysis techniques. The finite element techniques are also used for individual plates which are not enveloped by the common plate configuration procedure.

The finite element model considers plate flexibility, anchor stiffness, stiffening effect of member attached to the plate, as well as concrete flexibility. The contact boundary conditions at the interface of the plate and concrete and plate and drilled-in anchors are satisfied in the solution.

Prior to applying the model, sensitivity studies were conducted on both finite element grid size and concrete stiffness. A grid size suitable for application and one which produces reliable results was selected. The concrete stiffness is represented in the model by linearly elastic springs (i.e., a Winkler foundation). An analysis was performed which shows compressive stiffness to be much greater than the drilled-in anchor plate assembly. Varying spring stiffness over three orders of magnitude resulted in negligible changes in the drilled-in anchor loads.

The ANSYS III finite element package is being used for analysis. Both the "rectangular plate", (elastic capabilities only) and the "elastic flat triangle" elements are being used to model the base plate. These elements model pure plate bending, appropriate for the analysis of the flexible base plates. The concrete and drilled-in anchors are both modeled with the "combination" gap elements which both model the stiffness of these components and represent the contact boundary condition discussed previously. The stiffening effect of the attached members are represented with "elastic 3-D beam" elements. The grid is constructed such that beam elements are adjacent to the edge of plate elements and both connected to common nodes. The displacement equation used in the formulation of both the beam and plate elements are the same, assuring compatibility of displacements at this interface. Finally, forces are applied as couples and axial forces distributed to nodes at the intersection of the attached member and plate.

The above procedure accounts for the effects of shear-tension interaction.

The design adequacy of those bolts installed to less than the minimum edge distance requirements or minimum bolt spacing will be addressed on a case-by-case basis depending on the results of the field inspection program.

Engineering in parallel with field inspections has completed the flexibility analysis described above for 80 plates. This effort was undertaken to prove out procedures and train personnel recognizing that the results of the field inspections could void a completed flexibility analysis. Attachment A identifies for information these systems and lines in which the base plate flexibility analysis was performed.

ITEM 2

Verify that concrete expansion anchor bolts have the following minimum factor of safety between bolt design load and bolt ultimate capacity:

- a. Four - for wedge and sleeve type anchor bolts
- b. Five - for shell type anchor bolts

The maximum allowable bolt loads used for the base plate analysis referenced in Item 1 use a factor of safety of five (5) for shell type anchor bolts and four (4) for the wedge type anchor bolts. The factor of safety is based on the anchor manufacturer's published average ultimate loads adjusted to the in-place concrete strength. Determination of the in-place concrete strength will be based on the results of the 28-day compressive strength tests taken during construction of BV-1 and an in-place concrete strength determination as required.

The concrete for BV-1 was designed to attain 3000 psi compressive strength in 28 days. The average 28-day compressive strength for all concrete placed in BV-1 exceeded 4000 psi, therefore this value is acceptable for use in determining the maximum allowable bolt loads.

The in-place concrete strength tests will be used to verify normal concrete strength gain beyond 28-days for those areas where 28-day compressive strengths were between 3000 psi and 4000 psi.

ITEM 3

Describe the design requirements for cyclic loads.

The anchor bolts were designed to withstand the maximum forces applied by seismic loads along with other applicable loads. Properly installed drilled-in anchors are capable of withstanding these design loads for the cycles which would be expected from a seismic event.

ITEM 4

Verify from existing QC documentation that design requirements have been met for each anchor bolt in that cyclic loads have been considered and the specified design type is correctly installed. If sufficient documentation does not exist, then initiate a test program to assure that each Seismic Category I system will perform its intended function.

Duquesne Light Company has begun an anchor inspection program which is being conducted concurrently with an as-built base plate inspection program. The purpose of the anchor inspection program is to verify the size, type and adequacy of the anchor installation.

The efforts discussed in Items 1 and 2, namely, the development of bolt loads as a result of the flexible base plate analysis and the development of the maximum allowable anchor design loads form the basis for anchor inspection program. The flexible base plate analysis will verify that the design loads do not exceed the maximum allowable anchor design load. The present procedures for the anchor inspection program require that each anchor in each base plate be inspected for size and embedment depth, inspected to determine the position of the shell relative to the back of the plate, torqued to at least the maximum allowable anchor design load, reinspected to verify that the anchor has remained in position, and retorqued to at least the maximum allowable anchor design load.

A program is underway to correlate the torque applications described above to corresponding bolt tensions. The correlation tests are being conducted on a series of self-drilling shell anchors which were installed in a concrete wall on the BV-1 site for testing purposes. The base plate inspections conducted thus far indicate an extensive use of threaded studs and nuts in the self-drilling shell type anchors. Torque-tension correlation tests for this application are presently underway and the results are being assembled. The remaining correlation tests for the bolt-in-anchor application and the test of the anchors to their ultimate capacity will be conducted subsequently. The results of these tests will be submitted as a supplement to this report as they are completed and the results assembled.

PART II - FIELD INSPECTION PROGRAM

The investigation and testing of base plates and anchors installed at the Beaver Valley Power Station Unit No. 1 in accordance with the requirements and intent of the IE Bulletin 79-02 was implemented in a manner to minimize personnel exposure and maximize craft productivity. A controlled program was developed to prevent unnecessary rework and to insure complete document traceability. This program is applicable to the inspection of pipe support base plates that use concrete expansion anchor bolts in seismic Category I systems.

Each of the lines listed in Attachment A were separated into line packages to facilitate field inspection. Each inspection package contains the drawings of record, reference information and the required inspection documentation. Each hanger identified in these packages is then inspected to verify the as-built conditions of the base plate (Procedure 7902-01 in Attachment B) and the adequacy of the concrete expansion anchor bolts (Procedure 790202 and 03 in Attachment B).

Attachment C is a copy of a completed line package inspection.

The initial testing and inspections (Phase I) were performed under controlled conditions to verify the procedure and obtain the maximum amount of data in the shortest time span. The inspections and tests were limited to an area which met the following criteria:

1. Low radiation area
2. Wall or ceiling base plate
3. No floor mounted or grouted base plate
4. Base plates and piping that could be moved to allow the installation of shim. Include temporary support when required.
5. Systems that could be shutdown or were already shutdown.
6. Base plates with 4 or 6 bolts.
7. No wedge type anchors

This criteria was followed for the first 49 base plates which shows an overall acceptability of more than 95 percent.

Based on the results of the Phase I shimming procedure and the resultant high confidence factor, the testing was modified (Phase II). The modified program deleted the requirement for shimming the plate away from the concrete. This Phase II program has the following criteria:

1. Low radiation area
2. Wall or ceiling base plates without grout
3. No floor mounted supports which are grouted
4. Systems that do not need to be shutdown or were already shutdown

The testing of floor mounted/grouted base plates was reviewed and a procedure developed which as yet requires field review and trouble shooting. The equipment needed for this testing program is presently being fabricated.

The following summary outlines how and when the above was implemented and accomplished.

6/4 to 6/11 The procedure was reviewed and revised based on questions and concerns obtained during meeting for the scheduling of work and personnel as well as the orientation of personnel. Training sessions (orientations) were held for the following personnel to assure the purpose and requirements for the performance of this work was understood.

1. Contractor Schneider, Inc.,
Supervisors and Crafts
2. Duquesne Light Company, Supervisors
Construction Department Nuclear
3. Beaver Valley Power Station Unit No.
1, Nuclear Site Quality Control
4. Stone & Webster Engineering
Corporation, Site Engineers
5. Beaver Valley Power Station Unit No.
1, Operations

Equipment and materials were assembled and calibrated as required by the controlled procedures.

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Supporting personnel were scheduled and informed of the task to allow work to perform in minimum time span.

6/11 to 6/20 Phase I was implemented with 49 base plates having tests performed. During Phase I approximately 250 hangers were reviewed but were not tested due to Phase I criteria. Approximately 80 base plates had as-built, (i.e. visual comparison to support sketches) measurements performed.

6/20 to Present Phase II inspection plan was implemented and is presently in progress.

6/26 to Present A procedure for testing and verification of floor mounted and grouted base plates was developed and associated equipment is now being assembled or fabricated.

Attachments D and E detail the flow of data and sequence required to complete a field inspection.

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PART III - SCHEDULE AND STATUS OF WORK PERFORMED TO DATE

The results of the inspection are shown on Attachment F. This is an on-going inspection and has not been completed. This Attachment will be periodically updated as the inspection progresses. The proposed schedule for completion of this effort is shown in Attachment E. This schedule is based on 40 days operation for BV-1 prior to September 1, 1979, during which time this effort would be discontinued. Our intention is to continue the anchor inspection program until BV-1 resumes operation and resume and complete the anchor inspection program after 40 days of operation for BV-1

Safe shutdown systems in inaccessible areas during operation as indicated in Attachment A shall be inspected and analyzed first. Current procedures and inspection results are available at Beaver Valley I for your use and information.

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ATTACHMENT A
CATEGORY I SYSTEM LISTING
FOR PIPE SUPPORT BASEPLATES
THAT USE CONCRETE EXPANSION ANCHOR BOLTS
IN SEISMIC CATEGORY I SYSTEMS

Beaver Valley Power Station - Unit No. 1
Duquesne Light Company
Pittsburgh, Pennsylvania

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Stone & Webster Engineering Corporation
Boston, Massachusetts

CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

PAGE 1 OF 12

Line No.	R3 FLEX. ANALYSIS COMPLETE	R3 COMPL UNDER O/PNO - CECURE	R3 COMPL UNDER 02803 PROCEDURE	R3 DEF- ERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
AJA - AIR EJECTOR DISCHARGE TO ATMOSPHERE					
AJA SYSTEM					
4"-AJA - 2-151-Q3					
6"-AJA - 3-151-Q3					8
6"-AJA - 17-151-Q3					4
BR - BORON RECOVERY					
BR SYSTEM					
3"-BR - 2-152-Q3		#			2
3"-BR - 10-152-Q3		#			
3"-BR - 26-152-Q3		#			3
3"-BR - 75-152-Q3		#			
CC - COMPONENT COOLING					
CC SYSTEM					
6"-CC - 23-151-Q3	7	6	6		10
4"-CC - 228-151-Q3		#			1
3"-CC - 186-151-Q3		2	2		2
3"-CC - 187-151-Q3		#			4
3"-CC - 209-151-Q3		#			
3"-CC - 225-151-Q3		#			
3"-CC - 226-151-Q3		#			
4"-CC - 184-151-Q3		#			
4"-CC - 203-151-Q3		#			
4"-CC - 219-151-Q3		#			
4"-CC - 246-151-Q3		#			1
4"-CC - 247-151-Q3		#			5
4"-CC - 250-151-Q3		#			4
6"-CC - 178-151-Q3		1	1		3
6"-CC - 262-151-Q3		#			3
6"-CC - 263-153-Q3		#			4
3"-CC - 195-151-Q3		#			
3"-CC - 210-151-Q3		#			
3"-CC - 232-151-Q3		#			2
4"-CC - 251-151-Q3		#			2
4"-CC - 252-151-Q3		#			2
4"-CC - 253-151-Q3		#			2

* Indicate safe shutdown lines

Indicate inaccessible areas

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POOR ORIGINAL

CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

PAGE 2 OF 13

Line No.	R ³ FLEX. ANALYSIS COMPLETE	R ³ COMPL. UNDER OI PROCED- URE	R ³ COMPL. UNDER O2 & O3 PROCEDURE	R ³ DEFERRED DUE TO SITE CRIT- ERIA	Number of Base Plates That Apply to 79-02
4 th -CC - 324-151-Q3					1
4 th -CC - 325-151-Q3		*			3
4 th -CC - 326-151-Q3		*			
4 th -CC - 327-151-Q3		*			2
4 th -CC - 354-151-Q3		*			2
4 th -CC - 355-151-Q3		1			3
4 th -CC - 357-151-Q3		2			2
4 th -CC - 359-151-Q3		2	2		2
4 th -CC - 384-151-Q3		*			2
4 th -CC - 385-151-Q3		*			2
4 th -CC - 386-151-Q3		*			1
4 th -CC - 387-151-Q3		*			4
4 th -CC - 388-151-Q3		*			1
6 th -CC - 248-151-Q3		*			
6 th -CC - 470-151-Q3					2
6 th -CC - 534-151-Q3		*			
3 rd -CC - 204-151-Q3		*			2
4 th -CC - 208-151-Q3		*			1
6 th -CC - 245-151-Q3		*			
6 th -CC - 60-151-Q3		1	*		2
18 th -CC - 114-151-Q3		*	*		15
18 th -CC - 116-151-Q3		1	*	1	4
18 th -CC - 118-151-Q3	2	*	*		14
18 th -CC - 130-151-Q3		*	*		1
8 th -CC - 255-151-Q3		*	*		
8 th -CC - 256-151-Q3		*	*		
8 th -CC - 260-151-Q3		*	*	1	1
24 th -CC - 22-151-Q3		5	5		6
8 th -CC - 476-151-Q2		1	*		1
6 th -CC - 56-151-Q3		1	*		1
6 th -CC - 54-151-Q3		1	*	1	3
6 th -CC - 53-151-Q3		1	*		1
6 th -CC - 257-151-Q3		*	*		3
6 th -CC - 261-151-Q3		*	*		2
18 th -CC - 102-151-Q3			*		6
18 th -CC - 101-151-Q3			*		3
18 th -CC - 106-151-Q3			*		4
8 th -CC - 51-151-Q3	2	9	* 7		9
18 th -CC - 109-151-Q3		1	1		1

* Indicate safe shutdown lines
Indicate inaccessible areas

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CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

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Line No.	R FLEX ANALYSIS COMPLETE	R COMP UNDER O ₁ PROCEDURE	R COMP UNDER O ₂ & O ₃ PROCEDURE	R DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
3"-CC - 14-151-Q3					1
8"-CC - 465-151-Q3		1	1		1
8"-CC - 466-151-Q3		1	1		1
18"-CC - 4-151-Q3		1	1		1
18"-CC - 105-151-Q3	1	1	1		1
18"-CC - 1-151-Q3					
24"-CC - 2-151-Q3	1	7	7		14
24"-CC - 5-151-Q3		3	3		5
8"-CC - 6-151-Q3		2	1		4
8"-CC - 8-151-Q3	2	5	5		5
8"-CC - 19-151-Q3		1 #	1		1
8"-CC - 35-151-Q3		4 #	4		8
8"-CC - 321-151-Q3					1
6"-CC - 42-151-Q3	2	1 #	1	3	4
3"-CC - 38-151-Q3		1 #	1	1	2
6"-CC - 41-151-Q3		#		4	5
3"-CC - 37-151-Q3		#2	2	2	6
14"-CC - 45-151-Q3	1	1	1		1
18"-CC - 3-151-Q3		1			1
10"-CC - 20-151-Q3		1	1	2	10
12"-CC - 46-151-Q3	2	3	1		5
10"-CC - 48-151-Q3		1	1		1
18"-CC - 103-151-Q3					
18"-CC - 104-151-Q3		1	1		1
18"-CC - 107-151-Q3					
18"-CC - 108-151-Q3					2
24"-CC - 112-151-Q3	2	2	2		15
8"-CC - 323-151-Q3					4
6"-CC - 92-151-Q3					1
24"-CC - 113-151-Q3	1				2
3"-CC - 235-151-Q3		#			
4"-CC - 197-151-Q3		#			1
6"-CC - 202-151-Q3		#			2
6"-CC - 249-151-Q2		# *			1
24"-CC - 125-151-Q3		4	4		4
6"-CC - 510-151-Q3		1			1
6"-CC - 511-151-Q3					1
24"-CC - 266-151-Q3					2
8"-CC - 58-151-Q3	1	7	7		7
6"-CC - 515-151-Q3	1				1
6"-CC - 513-151-Q3					8

* Indicate safe shutdown lines

Indicate inaccessible areas

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CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

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Line No.	R's FLEX ANALYSIS COMPLETE	R's COMPL. UNDER OI PROCEDURE	R's COMPL. UNDER O2 & O3 PROCEDURE	R's DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
8"-CC - 468-151-Q3					1
8"-CC - 259-151-Q3		#			
8"-CC - 517-151-Q2		# *			1
6"-CC - 480-151-Q2		2 # *			2
6"-CC - 481-151-Q2		3 # *	1		3
3"-CC - 523-151-Q3	1	2	-	1	2
4"-CC - 525-151-Q3		1			3
6"-CC - 258-151-Q3		#			8
6"-CC - 265-151-Q3		#			8
6"-CC - 177-151-Q3		#			1
6"-CC - 175-151-Q3		#			2
6"-CC - 518-151-Q3		#			1
6"-CC - 519-151-Q3					1
6"-CC - 526-151-Q3	1	4	4		4
6"-CC - 512-151-Q3		1	1		2
6"-CC - 479-151-Q3		5			5
3"-CC - 145-151-Q3		#			
3"-CC - 146-151-Q3					

CH - CHARGING AND VOLUME CONTROL

CH SYSTEM

3"-CH - 11-153W-Q2		# *			
3"-CH - 81-1503-Q2		1 # *	1		7
3"-CH - 109-153W-Q2		# *			1
3"-CH - 133-153W-Q2		# *		2	3
3"-CH - 175-153W-Q3		# *			3
3"-CH - 6-153W-Q2		# *			6
3"-CH - 7-153W-Q2		# *			11
8"-CH - 15-153W-Q2	2.	# *			2
6"-CH - 63-153W-Q2	2	3 # *	3		3
6"-CH - 67-153W-Q2	2	1 # *			3
6"-CH - 68-153W-Q2	1	3 # *	3		3
3"-CH - 125-1503-Q1		# *			24
3"-CH - 125-1503-Q2					
3"-CH - 110-153W-Q2		# *			7
3"-CH - 108-153W-Q2		# *			8
3"-CH - 73-1503-Q2		# *			1
3"-CH - 69-1503-Q2		1 # *	1		1

* Indicate safe shutdown lines
Indicate inaccessible areas

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CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

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Line No.	R'S FLEX ANALYSIS COMPLETE	R'S COMPL. UNDER OI PROCEDURE	R'S COMPL. UNDER Q2 & Q3 PROCEDURE	R DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
3"-CH - 70-1503-Q2		# *			1
4"-CH - 72-1503-Q2		1 # *	1	5	7
3"-CH - 74-1503-Q2		# *			1
4"-CH - 76-1503-Q2		# *			4
3"-CH - 126-1502-Q1		# *			18
4"-CH - 14-153W-Q2		# *			8
3"-CH - 226-153W-Q2		# *			12
3"-CH - 8-153W-Q2		# *			1
3"-CH - 13-153W-Q2		# *			1
3"-CH - 114-153W-Q2		# *			10
3"-CH - 80-1503-Q2		# *		9	9
3"-CH - 71-1503-Q2	1	1 # *	1		1
3"-CH - 75-1503-Q2		# *			1
3"-CH - 106-153W-Q2		# *			10
3"-CH - 107-153W-Q2		# *			1

CV - CONTAINMENT VACUUM

CV SYSTEM

8"-CV-8-151-Q2		4 # *	4		4
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CVP - CONTAINMENT VENTILATION AND PRESSURIZATION

CVP SYSTEM

8"-CVP - 3-121-Q2		*			3
18"-CVP - 5-121-Q2		*			5

DG - COOLANT SYSTEM LOOP DRAINS

DG SYSTEM

3"-DG - 65-152-Q3		#			
3"-DG - 237-152-Q3		#			2

FC - FUEL POOL COOLING AND PURIFICATION SYSTEM

FC SYSTEM

6"-FC - 38-152-Q3					
10"-FC - 1-152-Q3		1	1		7

* Indicate safe shutdown lines
Indicate inaccessible areas

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**CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)**

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Line No.	R'S FLEX ANALYSIS COMPLETE	R'S COMPL UNDER OI PROCEDURE	R'S COMPL. UNDER OZ & O3 PROCEDURE	R'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
6"-FC - 4-152-Q3					1
6"-FC - 5-152-Q3		3	3		3
6"-FC - 8-152-Q3		2	2		2
6"-FC - 9-152-Q3		8	7		8
6"-FC - 31-152-Q3					2
6"-FC - 2-152-Q3					
4"-FC - 24-152-Q3					3
GW - GAS WASTE GW SYSTEM					
10"-GW - 34-154-Q3					2
10"-GW - 41-154-Q3					
8"-GW - 47-152-Q3		1	1		1
8"-GW - 49-154-Q3					
8"-GW - 50-154-Q3					
8"-GW - 51-154-Q3					
3"-GW - 42-152-Q3					
NSL - NEUTRON SHIFLD TANK COOLING NSL SYSTEM					
6"-NSL - 1-152-Q3		#			7
6"-NSL - 2-152-Q3		#			5
OL - DIESEL GENERATOR OIL LINE OL SYSTEM					
3"-OL - 47-151-Q3		4 #	* 3		7
3"-OL - 46-151-Q3		3 #	* 3		4
QS - QUENCH SPRAY QS SYSTEM					
6"-QS - 31-153B-Q3			*		5
12"-QS - 2-153B-Q3	3		*		5
12"-QS - 1-153B-Q3		2	* 2	1	6
10"-QS - 3-153B-Q3		1 #	* 1		28

* Indicate safe shutdown lines

Indicate inaccessible areas

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CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

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Line No.	Q'S FLEX ANALYSIS COMPLETE	Q'S COMPL UNDER OI PROCEDURE	Q'S COMPL UNDER O2 & O3 PROCEDURES	Q'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
10 ⁿ -QS - 4-153B-Q3		16 # *	15		21
8 ⁿ -QS - 23-153A-Q3		# *			
4 ⁿ -QS - 6-153B-Q3		# *			
8 ⁿ -QS - 22-153A-Q3		# *			
RC - REACTOR COOLANT RC SYSTEM					
8 ⁿ -RC - 19-2501R-Q1		# *			
8 ⁿ -RC - 29-2501R-Q1		# *			
8 ⁿ -RC - 39-2501R-Q1		# *			
14 ⁿ -RC - 86-2501R-Q1		# *			2
6 ⁿ -RC - 98-1502-Q1		# *			2
6 ⁿ -RC - 99-1502-Q1		# *			2
3 ⁿ -RC - 105-1502-Q1	1	# *			2
3 ⁿ -RC - 107-1502-Q1	1	# *			3
3 ⁿ -RC - 106-1502-Q1	4	# *			4
4 ⁿ -RC - 71-1502-Q1	1	# *			10
4 ⁿ -RC - 72-1502-Q1	3	# *			15
8 ⁿ -RC - 37-2501R-Q1		# *			
6 ⁿ -RC - 104-1502-Q1		# *			3
6 ⁿ -RC - 97-1502-Q1		# *			2
3 ⁿ -RC - 23-1502-Q1		# *			1
3 ⁿ -RC - 33-1502-Q1		# *			3
3 ⁿ -RC - 13-1502-Q1		# *			1
3 ⁿ -RC - 160-153WQ2		2 # *	2		2
RH - RESIDUAL HEAT RH SYSTEM					527 105
14 ⁿ -RH - 1-1502-Q1	2	# *			9
14 ⁿ -RH - 2-602-Q2	2	# *			3
10 ⁿ -RH - 4-602-Q2		# *			2
10 ⁿ -RH - 5-602-Q2		# *			6
12 ⁿ -RH - 9-602-Q2		# *			6
10 ⁿ -RH - 17-602-Q2	1	# *			1
14 ⁿ -RH - 18-602-Q2	4	4 # *	4		13
10 ⁿ -RH - 23-1502-Q1		# *			1
10 ⁿ -RH - 24-1502-Q1		# *			4
10 ⁿ -RH - 16-602-Q2		# *			14

* Indicate safe shutdown lines

Indicate inaccessible areas

POOR ORIGINAL

**CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)**

PAGE 8 OF 13

Line No.	R'S FLEX ANALYSIS COMPLETE	R'S COMPL UNDER O/I PROCEDURE	R'S COMPL UNDER O2 & O3 PROCEDURE	R'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
12"-RH - 6-602-Q2		# *			2
10"-RH - 7-602-Q2		# *			1
10"-RH - 8-602-Q2		# *			2
10"-RH - 10-602-Q2		# *			3
12"-RH - 12-602-Q2	4	# *			18
6"-RH - 14-152-Q2		# *			6
4"-RH - 25-152-Q2		# *			2
RS - RECIRCULATION SPRAY					
RS SYSTEM					
4"-RS - 16-153B-Q2		# *			
3"-RS - 21-153A-Q2		# *			
8"-RS - 22-153A-Q2		# *			
8"-RS - 23-153A-Q2		# *			
8"-RS - 24-153A-Q2		# *			
12"-RS - 11-153B-Q2		# *			3
12"-RS - 4-153B-Q2		# *			3
10"-RS - 1-153B-Q2		# *			7
10"-RS - 2-153B-Q2		# *			2
12"-RS - 12-153B-Q2		# *			14
10"-RS - 26-153B-Q2		# *			
10"-RS - 25-153B-Q2		# *			3
12"-RS - 3-153B-Q2		# *			15
10"-RS - 9-153B-Q2		*			8
10"-RS - 10-153V-Q2		*			4
4"-RS - 15-153B-Q2		*			
SDHV -STEAM DELAY HEAT LINE CONTROL VALVE					
SDHV SYSTEM					
3"-SDHV - 1-601-Q2		*			
3"-SDHV - 2-601-Q2		*			
3"-SDHV - 3-601-Q2		*			
4"-SDHV - 4-601-Q2		*			2

* Indicate safe shutdown lines
Indicate inaccessible areas

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POOR ORIGINAL

CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

PAGE 9 OF 13

Line No.	R'S FLEX. ANALYSIS COMPLETE	R'S COMPL UNDER 01 PROCEDURE	R'S COMPL. UNDER 02 & 03 PROCEDURE	R'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
SHP - HIGH PRESSURE STEAM					
SHP SYSTEM					
3"-SHP - 27-601-Q2		#			4
32"-SHP - 56-601-Q2		#			
32"-SHP - 57-601-Q2		#			
32"-SHP - 58-601-Q2		*			2
3"-SHP - 25-601-Q2		4	*		4
3"-SHP - 26-601-Q2		3	*	3	3
3"-SHP - 31-601-Q2		2	*	2	10
SI - SAFETY INJECTION					
SI SYSTEM					
3"-SI - 35-152-Q3		*			5
6"-SI - 72-1502-Q1		#	*		10
4"-SI - 128-1503-Q2		*			1
12"-SI - 1-153W-Q3		*			6
8"-SI - 2-153W-Q3	1	1	*	1	15
12"-SI - 6-153A-Q2		*			8
10"-SI - 16-153W-Q2		*			4
12"-SI - 101-1502-Q1		#	*		14
12"-SI - 110-602-Q2		#	*		3
12"-SI - 111-1502-Q1		#	*		2
12"-SI - 121-1502-Q1		#	*		14
6"-SI - 40-153W-Q2	4	2	#	2	27
6"-SI - 41-153W-Q2	2		#	*	2
6"-SI - 44-153W-Q2		8	*	8	9
12"-SI - 5-153A-Q2		#	*		2
12"-SI - 7-153A-Q2		#	*		
12"-SI - 8-153A-Q2		#	*		
10"-SI - 18-1502-Q1		*			1
10"-SI - 28-1502-Q1		*			
10"-SI - 26-153W-Q2		*			1
6"-SI - 32-1502-Q1		#	*		3
6"-SI - 20-1502-Q1		#	*		6
3"-SI - 145-153W-Q3		*			8
3"-SI - 81-1503-Q1		#	*		12
6"-SI - 73-1502-Q1		#	*		12
6"-SI - 74-1502-Q1		#	*		4

* Indicate safe shutdown lines

Indicate inaccessible areas

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POOR ORIGINAL

CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

PAGE 10 OF 13

Line No.	R'S FLEX ANALYSIS COMPLETE	R'S COMPL UNDER OI PROCEDURE	R'S COMPL UNDER Q2 & Q3 PROCEDURE	R'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
3"-SI - 140-1503-Q1		* *			6
6"-SI - 30-1502-Q1		* *			16
6"-SI - 29-1502-Q1		* *			5
3"-SI - 56-1503-Q2		*			2
4"-SI - 75-1503-Q2		*		1	4
3"-SI - 130-1503-Q1		*			5
3"-SI - 81-1503-Q2		5 * *		3	9
3"-SI - 60-1503-Q2		* *			2
3"-SI - 130-1503-Q2		* *			7
3"-SI - 141-1503-Q2		*			
3"-SI - 134-1503-Q1		* *			5
3"-SI - 133-1503-Q2		* *	1	3	9
WAPD - STEAM GENERATOR AUXILIARY FEEDWATER PUMP DISCHARGE					
WAPD SYSTEM					
3"-WAPD - 9-601-Q3		*			2
3"-WAPD - 14-601-Q3		*			
6"-WAPD - 1-601-Q3	6	*			9
6"-WAPD - 2-601-Q3	3	*			6
4"-WAPD - 4-601-Q3	1	*			1
4"-WAPD - 5-601-Q3		*			2
4"-WAPD - 6-601-Q3	1	*			1
3"-WAPD - 13-601-Q3		*			3
3"-WAPD - 11-601-Q3		*			3
VG - HYDROGENATED VENTS					
VG SYSTEM					
4"-VG - 3-152-Q3					10
4"-VG - 5-152-Q3					4
4"-VG - 9-152-Q3					7
VS - CONTROL ROOM VENTILATION SYSTEM					
VS SYSTEM					
4"-VS - 28-151-Q3					6

* Indicate safe shutdown lines
Indicate inaccessible areas

POOR ORIGINAL

**CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)**

PAGE 11 OF 13

Line No.	R'S FLEX ANALYSIS COMPLETE	R'S COMPL UNDER DI PROCEDURE	R'S COMPL UNDER DI & O3 PROCEDURE	R'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
WD - DEMINERALIZED WATER					
WD SYSTEM					
8"-WD - 22-151-Q3		*			11
6"-WD - 23-151-Q3		*			6
4"-WD - 41-151-Q3		*			2
6"-WD - 24-151-Q3		*			10
6"-WD - 25-151-Q3	2	*			8
WFPD - STEAM GENERATOR FEEDWATER PUMP DISCHARGE					
WFPD SYSTEM					
16"-WFPD - 23-601-Q2		# *			2
16"-WFPD - 24-601-Q2		# *			2
16"-WFPD - 22-601-Q2		# *			2
WGCB - GENERATOR WATER BLOWDOWN					
WGCB SYSTEM					
3"-WGCB - 12-601-Q2		# *			7
3"-WGCB - 8-601-Q2		# *			8
3"-WGCB - 4-601-Q2		# *			5
6"-WR - 215-151-Q3		1			1
WR - RIVER WATER					
WR SYSTEM					
6"-WR - 43-151-Q3					3
3"-WR - 44-151-Q3					2
3"-WR - 45-151-Q3					2
3"-WR - 52-151-Q3					
6"-WR - 53-151-Q3		6	6	1	7
3"-WR - 54-151-Q3					
6"-WR - 55-151-Q3		2	2		7
3"-WR - 56-151-Q3					13
3"-WR - 57-151-Q3					8
4"-WR - 92-151-Q3		#			2

* Indicate safe shutdown lines
Indicate inaccessible areas

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POOR ORIGINAL

**CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)**

PAGE 12 OF 13

Line No.	R'S FLEX ANALYSIS COMPLETE	R'S CORAL UNDER O/ PROCEDURE	R'S CORAL UNDER O2 & O3 PROCEDURE	R'S DEFERRED DUE TO SITE CRITERIA	Number of Base Plates That Apply to 79-02
4"-WR - 93-151-Q3		#			
4"-WR - 94-151-Q3		#			4
4"-WR - 95-151-Q3		#			2
4"-WR - 96-151-Q3					1
4"-WR - 97-151-Q3					3
6"-WR - 98-151-Q3					1
6"-WR - 212-151-Q3					2
6"-WR - 213-151-Q3		1			1
3"-WR - 58-151-Q3					
3"-WR - 60-151-Q3					
3"-WR - 108-151-Q3					5
3"-WR - 110-151-Q3					
6"-WR - 118-153A-Q3		#			
6"-WR - 119-301-Q3		9	#	4	3
6"-WR - 181-151-Q3					1
6"-WR - 182-151-Q3					1
WR - RIVER WATER					
WR SYSTEM					
14"-WR - 64-151-Q2		#	*		3
14"-WR - 82-151-Q2		#	*		3
14"-WR - 87-151-Q2		#	*		2
14"-WR - 89-151-Q2		#	*		3
8"-WR - 228-151-Q3			*		1
8"-WR - 229-151-Q3			*		1
24"-WR - 99-151-Q3		#			1
24"-WR - 100-151-Q3		#			4
14"-WR - 28-151-Q3					
24"-WR - 29-151-Q3					12
30"-WR - 17-151-Q3					42
24"-WR - 19-151-Q3					20
24"-WR - 20-151-Q3					36
24"-WR - 8-151-Q3					6
24"-WR - 7-151-Q3					10
24"-WR - 9-151-Q3					1
8"-WR - 234-151-Q3		1		1	1
6"-WR - 214-151-Q3		2			2

* Indicate safe shutdown lines
Indicate inaccessible areas

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POOR ORIGINAL

CATEGORY I SYSTEM LISTING
(LARGE BORE PIPING ONLY)

PAGE 13 OF 13

Line No.Number of Base
Plates That Apply
to 79-02Total Number
of LinesTotal Number of
Plates That Apply
to 79-02

360

1,466

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- * Indicate safe shutdown lines
- † Indicate inaccessible areas

DUQUESNE LIGHT COMPANY

Beaver Valley Power Station - Unit No. 1

Procedure No. 11959/20148-P1 OFE/EM No. 11959/20148
 Revision No. 2 Purchase Requisition No. NA
 DCP No. NA Purchase Order No. NA

APPROVALS:

Struct. Engr.	Mech. Engr.	Elect. Engr.	Q/A Mgr.	PSE	SSE
<i>SMIA</i> 6-20-79	<i>PS</i> 6/20/79	—	—	<i>RJB</i> 6/20/79	<i>MS</i> 6/20/79

PROCEDURE FOR INSPECTION OF PIPE SUPPORT
 BASEPLATES THAT USE CONCRETE EXPANSION
 ANCHOR BOLTS IN SEISMIC CATEGORY I SYSTEMS

DATED June 4, 1979
 Rev. 1 June 7, 1979
 Rev. 2 June 20, 1979

527 112

- BV1, 7902-01 Procedure for Field Inspection of Drawing of
Record Verifications
- BV1, 7902-02 Procedure for Field Inspection of Self-Drilling
(Shell) Concrete Expansion Anchors
- BV1, 7902-03 Procedure for Field Inspection of Drilled-In
Expansion Type (External Thread-Wedge) Concrete
Anchors

Base Plate Work Authorization

POOR ORIGINAL

JUNE 4, 1979
Rev. 1 June 7, 1979
Rev. 2 June 20, 1979

PROCEDURE FOR

INSPECTION OF PIPE SUPPORT BASEPLATES
THAT USE CONCRETE EXPANSION ANCHOR BOLTS
IN SEISMIC CATEGORY I SYSTEMS

Beaver Valley Power Station - Unit No. 1
Duquesne Light Company
Pittsburgh, Pennsylvania

527 113

Stone & Webster Engineering Corporation
Boston, Massachusetts

BEAVER VALLEY POWER STATION - UNIT NO. 1
DUQUESNE LIGHT COMPANY

INSPECTION OF PIPE SUPPORT BASEPLATES
THAT USE CONCRETE EXPANSION ANCHOR BOLTS
IN SEISMIC CATEGORY I SYSTEMS

I. PURPOSE

This procedure establishes guidelines for the inspection of pipe support baseplates that use concrete expansion anchor bolts in seismic Category I systems as outlined in IE Bulletin No. 79-02 dated March 8, 1979, U.S. Nuclear Regulatory Commission Office of Inspection and Enforcement.

II. ATTACHMENTS

- A. Procedure for field inspection of drawing of record verification, BV-1, 7902-01.
- B. Procedure for field inspection of Self-drilling (Shell) Concrete Expansion Anchors, BV-1, 7902-02.
- C. Procedure for field inspection of Drilled-in Expansion Type (Externally Threaded Wedge) Concrete Anchors, BV-1, 7902-03.
- D. Base Plate Work Authorization

III. INSPECTION

The inspection shall be performed to verify that the as-built condition of the pipe support base plates that use concrete expansion anchor bolts in Seismic Category I systems is consistent with the drawings of record and that the concrete expansion anchor bolts are installed properly to achieve bolt integrity.

The inspections and measurements shall be performed by personnel trained in the use of devices necessary to determine the properties required in the above attachments.

The information compiled shall be complete and uniform for possible further analysis. The information compiled shall consist of verification, dimensioning, certification and review as required by the above attachments.

IV. DOCUMENTATION

The data shall be compiled by the Stone & Webster Engineering Corporation SEO representative or Duquesne Light Company representative and shall be forwarded to Stone & Webster Engineering Corporation Beaver Valley Unit No. 1 Task Force Project Engineer (TPE) Boston office for evaluation. One copy of all records shall be maintained at the site by DLC.

The basic documentation shall consist of drawings of record, and documentation/data sheets. Each line package originates from BV-1 11700 line designation table. Each piping line is designated into portions that are between penetrations, anchors, motor operator valves, manifolds, class change or piping size change.

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POOR ORIGINAL

All inspections shall be performed and certified by the inspector as to the verification, dimensioning and testing as required by the above attachments.

When all items have been performed and certified, the line package including documentation shall be reviewed and signed by the reviewer that all items have been verified, dimensioned, certified and tested before the packages are transmitted to the TPE.

V. Work Authorization

No work shall be started until Baseplate Work Authorization sheet has been signed by all parties.

VI. Support Clearances

After final installation torques per procedures BV1, 7902-02 and BV1, 7902-03, the clearances on the support as required by as-built sketch shall be verified. If not in compliance, this shall be recorded and forwarded to Engineers for action.

VII. Baseplate Orientation

Prior to torque test, the outline of the plate shall be determined by placing tape on wall or ceiling on two (2) perpendicular sides of the baseplate. If final installation orientation does not comply with original orientation, this shall be forwarded to Engineers for action.

PROCEDURE FOR FIELD INSPECTION OF
DRAWING OF RECORD VERIFICATION

I. PURPOSE

This procedure covers the inspection and documentation required to verify the as-built condition of the pipe support base plates that use concrete expansion anchor bolts with the drawing of record.

II. ATTACHMENTS

- A. Form No. 12690.88A
- B. Form No. 12690.88B

III. INSPECTION AND DOCUMENTATION RECORD

The inspection and documentation record shall be performed to establish that the as-built condition of the pipe support baseplates that use concrete expansion anchor bolts in seismic Category I systems is consistent with the drawing of record and that the information compiled is complete and uniform for possible further analysis. The information compiled shall consist of verification, dimensioning, and certification as required by the attached Form 12690.88A.

The inspection shall include baseplates, anchor bolts, pipe supports, and attachments to and interferences with the baseplates. Any deviation from the drawing of record shall be recorded on the drawing of record and where additional as-built sketches are required Form 12690.88B shall be used. The type of anchor i.e. bolts (B), threaded rod and nut (T), or wedge type (W) shall be listed on the as-built sketch.

Tolerances for dimensioning of plate sizes, bolt location and location dimensions shall be considered acceptable to within 1/16 in.

Tolerances for orientation of support to baseplate shall be considered acceptable if within + 3 degrees. The angular measurement shall be obtained by placing or siting along the instrument and measuring the angle of the support with respect to the baseplate. Measurements shall be taken in two directions which are perpendicular to each other. Measurements shall be recorded on the as-built sketch.

FIELD INSPECTION PROCEDURE FOR CAT I PIPE SUPPORTS WITH CONCRETE EXPANSION ANCHOR BOLTS

CLIENT: DUQUENSE LIGHT COMPANY PROJECT: BEAVER VALLEY POWER STATION UNIT NUMBER 1JOB NUMBER 12690.88 FORM NO. 12690.88A

LINE NO. _____ ISO NO. _____ RP DWG. NO. _____

HANGER NO. _____ SUPPORT NO. _____ SUPPORT DWG. NO. _____

BUILDING _____ FLOOR ELEVATION _____ LOC. _____

INSPECTION AND DOCUMENTATION RECORD		VERIFIED*	DIMENSION**	CERTIFIED***	
				BY SIGNATURE & DATE	CHECK (✓) IF CHANGE REQUIRED
1.	<i>BASE PLATES</i> SIZE (WIDTH AND LENGTH)	X			
2.	THICKNESS	X			
3.	ORIENTATION OF PLATE WITH RESPECT TO PIPE (IF DIFFERENT SHOW ON SKETCH)	X			
4.	GUSSET PLATES AND OTHER ATTACHMENTS (IF DIFFERENT SHOW ON SKETCH)	X			
5.	EXTRA HOLES (LOCATION AND SIZE)		X		
6.	ENLARGED HOLES (LOCATION AND SIZE)		X		
7.	DISTANCE FROM TOP OF PLATE TO CONCRETE AT FOUR CORNERS, INDICATE GROUT		X		
8.	<i>ANCHOR BOLTS</i> NUMBER OF BOLTS	X			
9.	TYPE (BOLT HEAD OR STUD)	X			
10.	BOLT DIAMETER	X			
11.	CONFIGURATION (IF DIFFERENT SHOW ON SKETCH)	X			
12.	SPACING - CENTER TO CENTER EACH WAY	X			
13.	EDGE DISTANCE FROM NEAREST BOLT (¢) TO EDGE OF CONCRETE OR OPENING IF LESS THAN 8 INCHES		X		
14.	DISTANCE FROM BOLT (¢) IN ADJACENT BASE PLATES TO NEAREST BOLT IF LESS THAN 11 INCHES		X		
15.	<i>PIPE</i> DISTANCE FROM EDGE OF PLATE TO CENTERLINE OF PIPE	X			
16.	LOCATION OF SUPPORT ON THE BASE PLATE (IF DIFFERENT SHOW ON SKETCH) & angular orientation	X			
17.	<i>ATTACHMENTS</i> INTERFERENCES THAT EXIST WITHIN 6 INCHES OF PLATE	X			

* VERIFIED - DIMENSIONS CHECKED WITH THOSE SHOWN ON DRAWINGS OF RECORD.

** DIMENSION - REQUIRED DIMENSION OR SKETCH AS REQUIRED.

*** CERTIFIED - AS IN COMPLIANCE WITH THIS PROCEDURE TO HAVE VERIFIED, DIMENSIONED OR SHOWN ON SKETCH.

REVIEWER SIGNATURE: _____

DATE: _____

SAMPLE

POOR ORIGINAL

3/4" READHEAD
SELF DRILL

3/4" READHEAD
SELF DRILL (TYP)

TS 2 X 2

PL 3/8"
W/ 1/2" GROUT

B. PL FLUSH
W/ GROUT

CL PL

ORIENTATION ③

EDGE OF CONG.

ENLARGED HOLE

DIAM

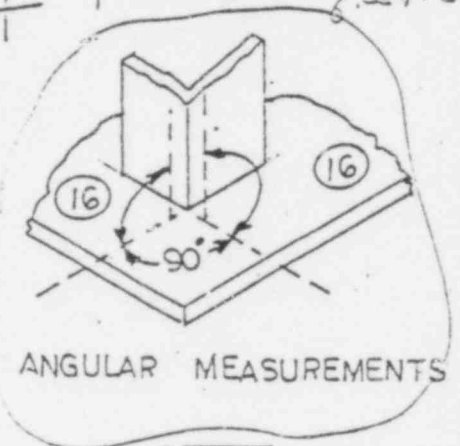
EXTRA
HOLE

CL PL & TS

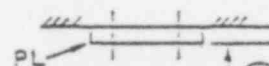
1" CONDUIT
FLUSH W/ PL

PLAN

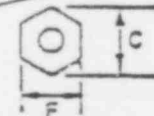
(LOOKING DOWN)



ANGULAR MEASUREMENTS



CL PIPE
ELEV.



STANDARD DIMENSIONS FOR BOLT HEADS				
DIAM. OF BOLT	HEX	HEAVY HEX	HEAVY HEX	HEAVY HEX
1/2	3/4	7/8	7/8	1
5/8	15/16	1 1/16	1 1/16	1 1/4
3/4	1 1/8	1 5/16	1 1/4	1 7/16
7/8	1 5/16	1 1/2	1 7/16	1 11/16

⑦ FOUR CORNERS.

TOP LEFT	TOP RIGHT	BOT. LEFT	BOT. RIGHT

⑧ NO. OF BOLTS _____

⑨ TYPE (BOLT HEAD OR STUD) _____

⑩ BOLT DIAMETER _____

⑪ INTERFERENCES THAT EXIST WITHIN 6 INCHES. YES _____ NO _____

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SIGNATURE			TITLE: PIPE SUPPORT BASE PLATES USING CONCRETE EXPANSION ANCHOR BOLTS	CLIENT DLC PROJECT BY-UNIT NO. 1 J.O. NO. 12590.88
	BY	DATE		
PREPARER			AS BUILT SUPPORT NO. _____	SKETCH NUMBER ZSK-
REVIEWER				
REVISIONS				

527 119

SIGNATURE			TITLE: PIPE SUPPORT BASE PLATES USING CONCRETE EXPANSION ANCHOR BOLTS AS BUILT SUPPORT NO. _____	CLIENT DLC
	BY	DATE		PROJECT BV-UNIT NO. 1
PREPARER				J.O. NO. 12690.88
REVIEWER				SKETCH NUMBER
REVISIONS				ZSK-

PROCEDURE FOR FIELD INSPECTION OF SELF-DRILLING (SHELL)CONCRETE EXPANSION ANCHORS

(7902-02)

I. PURPOSE

This procedure covers the inspection and documentation required to verify the integrity of self-drilling (shell) concrete anchor installation.

II. ATTACHMENTS

A. Pipe Support evaluation, 7902-02 Attachment A.

III. INSPECTION AND DOCUMENTATION RECORD

The following inspections and measurements shall be performed by personnel trained in the use of the devices necessary to determine the properties shown in the attached Table (Attachment A). The required information for each support shall be recorded by filling out a separate sheet.

In the detailed instructions which follow, the paragraph numbers correspond to the column heading in the table. In column number 8, record the column number of any characteristic for each anchor in the support which fails to comply with the requirements for that characteristic.

1. Record the numerical identity of each anchor in the plate as illustrated on the sketch. Supports which do not contain the proper number of anchors as indicated by design drawings or are missing bolts shall be indicated in column 8.

For anchors which are missing bolts, a new bolt of required length shall be inserted and torqued to the minimum requirements of paragraph 7 herein.

2. Record the anchor size by measuring the bolt or threaded rod and indicate whether that size is typical or indicate the appropriate size when it varies. Anchors of a different size than drawing shall be indicated in column 8.
3. Bolt head or nut back-off and/or installation torque shall be accomplished using a calibrated manually-operated torque wrench (calibrated interval not to exceed two months). A calibration variation of $\pm 4\%$ of full scale is acceptable.

Record required installation torque for each bolt or nut as shown by table in paragraph 7.

4. During initial disassembly of anchors, the back-off torque shall be determined and recorded. The values shall be determined by setting the torque wrench at the required installation torque listed in paragraph 7. If installation torque listed is met or exceeded, list as Acceptable (A) in column 4. If installation torque is not obtained, list as Rejected (R) in column 4.

For the first five plates, one bolt on each plate shall have a back-off torque value established following the shim torque test. (See paragraph 9). This shall be established by setting at the installation torque and increasing in 5 ft-lbs increments. This information shall be recorded in comment section of Pipe Support Evaluation Sheet. The last bolt torqued for the shim test shall be the one used for the back-off torque.

5. Remove one bolt or nut and threaded rod (See paragraph 8) at a time and visually observe location of shell. Record location of shell as into concrete (I), flush with concrete (F), or projecting out from concrete (P) in column 5A. Measure and record in Column 5B the distance from the top of the baseplate to the top of the shell. Also measure and record in column 8* the distance from the top of the baseplate to the top of the plug.

If the threaded rod cannot be removed, then the depth of the shell shall be measured with the rod in-place. If impossible to measure, a visual observation may be performed for the shell location as noted above in column 5A.

If the shell is not touching the baseplate, install the nut or bolt and torque to the installation torque requirements. Remove the nut or bolt and verify by the same method used above that the shell has not moved. If the shell distance is equal to or less than that recorded in column 5B by 1/16" or less or is not touching the bottom of the plate by visual observation then record as acceptable (A) in column 5C. If the shell distance is less than that recorded in column 5B by more than 1/16" or is touching the bottom of the plate by visual observation then record as reject (R) in column 5C.

If the shell is initially in contact with the baseplate note as touching (T) in column 5A. Then install nut or bolt and torque to the installation torque requirements while noting NA in columns 5B and 5C and action item in column 8.

6. Record the thread engagement length of each bolt which does not have a minimum thread engagement equal to the diameter of the bolt plus 1/8 inch. Calculate measurement by subtracting from the length of the bolt the sum of the thickness of the attachment (base-plate), any washers/shims, grout thickness, plus the distance to the outer end of the shell when it extends into the concrete. The length of the bolt is measured from the underside of the head to the end of the bolt. Bolts not having the proper thread engagement shall be replaced with bolts of adequate length, retorqued as required in paragraph 5, and shall be indicated in column 8 as being replaced with the notation "repl".
7. Bolts and threaded rods with nuts shall be reinstalled after performing the other inspections as required herein. For double nut installations, after reinstallation of the threaded rod and torquing of the inner nut to the foregoing criteria, the outer nut shall be installed to 1/4 turn past the finger tight position. Reinstall the bolts to the installation torque as follows:

<u>Size, In.</u>	<u>Installation Torque, ft-lbs</u>
3/8	20
1/2	30
5/8	45
3/4	70
7/8	95

When reinstalled to required installation torque record as acceptable (A). If required installation torque is not obtainable, record reject (R).

8. When a threaded rod and nut installation is encountered, it shall be verified that it is a stud and nut, not a wedge type anchor. If it is determined to be a wedge type anchor, use BV-1, 7902-03 for tests and documentation.
9. The following shimming method to verify anchor installation shall be used initially to establish baseline data and later as directed by the Engineers.

- a) Remove all piping load on plate and provide adequate supports for these loads. The temporary supports shall be as per Stone and Webster sketches, or as modified in situ by Stone and Webster.
- b) Loosen all nuts or bolt heads on the plate, determining back-off torque as described in paragraph 4. Loosen all nuts or bolts, one at a time, a maximum of 1/16" from plate. Note the sequence of bolt loosening. Observe any movement of the support as each bolt is loosened. If plate has moved, inspect support to determine if pipe is still loading support. If this is the case, adjust or revise temporary supports to pick-up pipe loads. Loosen bolts further by turning each bolt one full turn, one at a time, in the same sequence as above until it is determined that the pipe is no longer loading support and temporary support is adequate.
- c) Insert four 1/4 inch minimum steel shim plates no smaller than eight square inches per shim in between the baseplate and the face of the concrete.
- d) Tighten all nuts or bolt heads adequately so that the baseplate is snug against the shims.
- e) Prior to torquing to the installation torque requirements and removing one bolt at a time (allowing no more than one bolt out of a plate at any time), measure the distance from the top surface of the baseplate to the top of the shell and record in column 5B. Measure the distance from the top of the baseplate to the anchor plug and record in column 8*. The baseplate shall be snug at this time.

After torquing to the installation requirements (See paragraph 9f) and with the plate torqued, remove one bolt at a time - Note: Determine back-off torque for first five (5) plates as described in paragraph 4 - (again allowing no more than one bolt out of a plate at any time) and remeasure the distance from the top of the baseplate to the top of the shell.

If the shell distance is equal to or less than that recorded in column 5B by 1/16" or less, then record as acceptable (A) in column 5C. If the shell distance is less than that recorded in Column 5B by more than 1/16", then record as reject (R) in column 5C.

- f) Bolts shall be tightened to the installation torque values using a diagonal sequence. The bolts for shim torque test do not have to be original bolts. The bolts shall be of a proper length to assure minimum thread engagement and to prevent bottoming of threads.
- g) If the shells/bolts are acceptable the shims shall be removed, baseplates reinstalled and bolts torqued to final installation torque requirements.

The final installation torque after shimming shall be accomplished in increments as shown in the table below:

<u>Size</u>	<u>Initial Torque (ft-lbs)</u>	<u>Increments (ft-lbs)</u>
3/8	10	15-20
1/2	10	15-20-25-30
5/8	10	20-30-45
3/4	30	40-50-60-70
7/8	30	40-50-60-70-80-95

NOTE: The first five (5) baseplates shall have the time required to torque recorded (in minutes). This shall be noted in "comment" section of Pipe Support Evaluation Sheet.

The final installation torque shall be performed twice to assure that all bolts are set at the final installation torque.

When torqued properly, record acceptable (A) in column 4. If torque is not obtainable, record reject (R) in column 4. The bolts shall be the original bolts providing minimum thread engagement.

- h) If the shells/bolts are rejected, the corrective action shall be determined by the Engineers.
- i) Remove the temporary supports.

PIPE SUPPORT EVALUATION

6-4-79

ISO = 162

Line No. 184

Plate No. H164

INSPECTION DATE

PW Ward

INSPECTION SIGNATURE

11700-AZ-21D-160-1
SKETCH NUMBER

692A-7902

TOP OF WRENCH INSTRUMENT NO.

OW Lowe

REVIEWER SIGNATURE

4-1/2"φ

+1	+2
+4	+3

SELF DRILLING (SHELL) CONCRETE EXPANSION ANCHORS

1	2	3	4	7	16	5A	5B	5C	8	*
Anchor Ident.	Anchor Size	Required Install. Torque	Back Off Torque	Accept/Reject Torque	Thread Engagemt.	(A)	Shell Depth	(B)	Deficient Charact.	
1	1/2	30	A	A	A	I	13 1/6	A		2
2	1/2	30	A	A	A	F	34	R	5C	1 1/2
3	1/2	30	A	R	A	P	11 1/6	A	7	70
4	1/2	30	A	A	7 1/6	I	78	A	6	1 1/2

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* DISTANCE FROM TOP OF BASE PLATE
TO ANCHOR PLUG

COMMENTS

(A) Shell Location

(B) Shell Accept/Reject

5C SHELL MOVED 3 1/6" NEW DEPTH 9 1/6"

7 OBTAINABLE TORQUE 25' #

6 REPL. BOLT FOR MIN. THREAD ENGAGEMENT.

PROCEDURE FOR FIELD INSPECTION OF DRILLED-IN
EXPANSION TYPE (EXTERNALLY THREADED WEDGE)
CONCRETE ANCHORS
7902-03

I. PURPOSE

This procedure covers the inspection and documentation required to verify the integrity of drilled-in expansion type (externally threaded wedge) concrete anchor installation.

II. ATTACHMENTS

- A. Pipe Support Evaluation, 7902-03 Attachment A
- B. Ultrasonic Determination of Installed Anchor Bolt Lengths, 7902-03 Attachment B.

III. INSPECTION AND DOCUMENTATION RECORD

The following inspections and measurements shall be performed by personnel trained in the use of the devices necessary to determine the properties shown in the attached table (Attachment A). The required information for each support shall be recorded by filling out a separate sheet.

In the detailed instructions which follow, the paragraph numbers correspond to the column heading in the table. In column number 8, record the column number of any characteristic for each anchor in the support which fails to comply with the requirements for that characteristic.

1. Record the numerical identity of each anchor in the support as illustrated on the sketch. Supports which do not contain the proper number of anchors as indicated by design drawing or have missing anchors shall be indicated in column 8.

For anchors which are missing, a replacement anchor of correct size shall be obtained and installed after verifying by measurements the hole diameter and depth. The notation "repl" shall then be added to column 1.

2. Indicate the number of the anchor which does not have full thread engagement of the nut (nut at least flush with end of anchor). Record as "Full" or "Partial", or indicate whether the nut is "missing", as applicable. Anchors which do not meet the nut engagement requirement shall be indicated in column 8. For anchors which are missing nuts, a new nut shall be installed and torqued to the minimum requirements of paragraph 7 and noted as replaced ("repl"). If the nut is only partially engaged, then the amount of thread engagement shall be determined and listed in the "comment" Section of the Pipe Support Evaluation Sheet. This information shall be forwarded to the Engineers for action.

If a double nutted anchor with partial thread engagement is found list as "top nut partial" (TNP) and measure thread engagement for the top nut, list in "Comment" Section of the Pipe Support Evaluation Sheet and proceed with test.

3. Record the anchor size by measuring the diameter of the anchor. Supports which contain anchors of less than required size shall be indicated in column 8.
4. Record each anchor length after determination in accordance with a procedure similar to Attachment B, Ultrasonic Determination of Installed Anchor Bolt Lengths. If the original installation Ultrasonic Determination of installed anchor bolt lengths are traceable to the anchors being inspected, then the new UT test may be WAIVED and the previous UT test report attached to the Pipe Support Evaluation Sheet.

5. Record the projection of each anchor beyond the face of the concrete. This dimension shall be calculated by adding the thickness of the attachment (base plate), and grout to the measured projection of the anchor from the face of the attachment (base plate).
6. Calculate and record the embedded depth of each anchor. This dimension is item 4 minus item 5. Anchors which have an embedded depth less than the following minimum embedments shall be indicated in column 8.

<u>Anchor Size, In.</u>	<u>Minimum Embedment, In.</u>
3/8	1 5/8
1/2	2 1/4
5/8	2 3/4
3/4	3 1/4
7/8	4
1	4 1/2

7. Record the individual torque values for those anchors which do not meet 80 percent of the installation torque values herein. The torque testing may be terminated when the torque value for that size anchor is met. The anchor shall be considered acceptable if during the test, (a) the anchor does not slip as would be evidenced by continuous turning of the nut without appreciable increase in torque value, or (b) the minimum torque can be reached before the nut rotates one complete turn.

Torquing shall be accomplished using calibrated, dial, type, manually-operated torque wrenches (calibration interval not to exceed two months). A calibration variation of $\pm 4\%$ of full scale is permissible. Before torquing, the exposed threads of the anchor shall be cleaned by hand wire brushing. Where two nuts are encountered, the outer nut shall be removed while holding the inner nut with a wrench so that it is not disturbed while removing the outer nut. The torque testing may proceed. When torque testing has been completed, the outer nut shall be re-installed to 1/4 turn past the finger tight condition.

<u>Anchor Size, In.</u>	<u>Installation Torque, ft-lbs.</u>
3/8	30
1/2	50
5/8	70
3/4	150
7/8	200
1	250

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Anchors which do not meet the minimum torque values shall be indicated in column 8. Any anchor which is shown to be deficient in torque value shall be retorqued to the applicable installation torque values shown above and shall be indicated as being retorqued in column 8 with the notation "retq".

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PIPE SUPPORT EVALUATION

<u>1-18-79</u> INSPECTION DATE	ISO NO <u>320</u> LINE NO <u>195</u> R NO. <u>H18</u>
<u>PW Ward</u> INSPECTION SIGNATURE	
<u>11700-AZ 16-82-1</u> SKETCH NO	
<u>754-7902</u> TORQUE WRENCH INST. NO.	
<u>AW Lowe</u> REVIEWER SIGNATURE	

DRILLED-IN EXPANSION TYPE (WEDGE) CONCRETE ANCHORS

1	2	3	4	5	6	7	8
ANCHOR IDENT.	NUT ENGAGEMENT	ANCHOR SIZE	ANCHOR LENGTH	ANCHOR PROJECTION	EMBED. DEPTH	TORQUE	DEFICIENT CHARACTERISTICS
1	FULL	1/2	4 1/2	2 1/4	2 1/4	40 MIN	
2	NA	NA	NA	NA	NA	NA	(1)
3	MISSING	1/2	4 1/2	2 1/8	2 3/8	NA	(2-RED)
4	PARTIAL	1/2	4 1/2	2 3/16	2 5/16	35	(2)(7)
5	FULL	1/2	4 1/2	2 1/4	2 1/4	40 MIN	
6	FULL	1/2	4 1/2	2 3/8	2 1/8	25	(6)(7 RETG)
7	NA	NA	NA	NA	NA	NA	(1)
8	PARTIAL	1/2	4 1/2	2 1/8	2 3/8	30	(2)(7)
<div style="position: relative;"> 5 A POOR ORIGINAL </div>							
						527	131

COMMENTS

ANCHORS 1, 3 & 5 ARE OK
 ANCHOR 2 WAS MISSING & THERE WAS NO HOLE IN PL FOR ANCHOR 7
 ANCHORS 4 & 8 BOTH HAD PARTIAL ENGAGEMENT & LOW TORQUE- &
 WERE NOT RETORQUED BECAUSE OF THAT
 ANCHOR 6 HAD AN EMBEDMENT LESS THAN REQUIRED MINIMUM.

ULTRASONIC DETERMINATION OF
INSTALLED ANCHOR BOLT LENGTHS

1.0 PURPOSE AND SCOPE

- 1.1 This document establishes the procedure for ultrasonic determination of nominal length of installed anchor bolts and provides specific requirements for equipment, technique, documentation system and test operator qualifications.
- 1.2 This procedure is applicable to bolts of all sizes.

2.0 REFERENCES

- 2.1 ASME BOILER AND PRESSURE VESSEL CODE, Section V, NONDESTRUCTIVE TESTING
- 2.2 OCCUPATIONAL SAFETY AND HEALTH STANDARDS (OSHA) TITLE 29 CFR 1910, Department of Labor

3.0 GENERAL

3.1 Definitions

- 3.1.1 Calibration: Comparison with and/or adjustment to meet the accuracy and precision of a standard or calculated quantitative values or qualitative conditions which have a known degree of credibility and reliability.
- 3.1.2 Certification: Objective evidence of qualification.
- 3.1.3 Contractor: Any organization or individual supplying components, materials or services to Stone & Webster Engineering Corporation either directly or indirectly through a third party.
- 3.1.4 Nondestructive Testing: A means of examination whereby a quantitative or qualitative assessment or mechanisms or material nature or characteristics is performed by methods which impart no immediate or latent deleterious effects.
- 3.1.5 QA-MDT: Stone & Webster Engineering Corporation Non-destructive Test Group, Quality Assurance Department, Boston.

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- 3.1.6 Qualification: Capability as indicated by comparison to an established or defined standard of performance.
- 3.1.7 Test Equipment: The apparatus, instrumentation and materials that are used to generate test data and the performance of which, when used in testing, can influence the credibility of test results.
- 3.1.8 Test Method: A testing discipline as defined by the physical energy or principal employed.
- 3.1.9 Test Personnel: Those persons whose involvement in the operation and/or administration of a test can influence the credibility of the test result.
- 3.1.10 Test Procedure: A presentation of requirements set forth in sufficient detail to guide and control a testing operation.
- 3.1.11 Test Standards: Material samples or devices which provide a source of known and reliable information.
- 3.1.12 Test Technique: The specific manner, including materials and equipment used, in which a test is performed.
- 3.1.13 Test Validation: The process of providing the objective truth that a test procedure will provide the required information and is feasible of application.

3.2 Responsibility

The Quality Assurance Department is responsible for the implementation and maintenance of this procedure.

3.3 Safety

The test instrumentation utilized in accordance with this procedure is powered by self-contained batteries and thus presents no electric shock hazard during normal operation. Under no circumstances should operation be attempted with any part of the protective casing removed; as high voltages do exist in the internal wiring of the instrument. During periods of battery charging, the three-wire power cord of the charger shall be connected only to a three-wire receptacle which has been properly grounded in accordance with the requirements of Reference 2.2.

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3.4 Personnel

Personnel who perform ultrasonic measuring shall be qualified and certified in accordance with Stone & Webster Engineering Corporation Procedure QC-14.4, NDT PERSONNEL QUALIFICATION, CERTIFICATION AND TRAINING. All interpretation and/or evaluation of instrument presentation shall be conducted by personnel who are qualified and certified to Level II or Level III.

3.5 Equipment

3.5.1 Instrumentation: SONIC FLAW/THICKNESS SCOPE, Model FTS Mark I or equivalent.

3.5.2 Transducer: 1 to 5 MHZ, 3/8 inch to 1 inch straight beam

3.5.3 Couplant: P/G-001, Supplied by Sonic Instruments, Incorporated

3.5.4 Reference Standards:

a. Carbon Steel Reference Block C/S 1 or equivalent

b. Stainless Steel Reference Block S/S 1 or equivalent

3.6 Technique of Measurement

Surface Condition - Surfaces shall be smooth, free of dirt, grease, loose scale, weld spatter and embedded sand.

4.0 PROCEDURE

4.1 Test Calibration

The instrument shall be set up for determinations using an expanded range as follows:

4.1.1 Allow at least two minutes for warm up time after turning on the instrument.

4.1.2 Set frequency selector on B and apply the transducer to the 2 inch dimension on the appropriate stainless or carbon steel reference standard, using a small amount of couplant (see figure 1, Attachment 5.1).

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- 4.1.3 Identify the initial pulse and set the DELAY control such that it corresponds approximately with the zero mark on the instrument gradicule (scope screen).
- 4.1.4 Adjust the MATERIAL CALIBRATION and DELAY controls such that the horizontal range of the sreen is calibrated from zero to a range appropriate to the expected length of the bolt to be measured.

4.2 Measuring Procedure

- 4.2.1 A minimum of two minutes shall be allowed for warm up of the instrument after it is switched on.
- 4.2.2 Prior to inspection, accuracy of measurement shall be verified utilizing a bolt or bolts of comparable size and material as the bolt or bolts to be tested.
- 4.2.3 Using a sufficient amount of couplant, apply the transducer to the end of the bolt to be measured and read the indicated length.
- 4.2.4 The following data shall be recorded on the Ultrasonic Examination Report, Form 5040.50.
 - a. Appropriate test data as indicated on the form
 - b. Bolt identification
 - c. Measured length
 - d. Specified length of the bolt (for comparison with c.)

4.3 Post Cleaning

The surface shall be wiped clean of couplant following examination.

4.4 Documentation

All records of test furnish evidence of activities which affect quality. The records shall be considered as contract related material and must be maintained at the locations and for the period of time which is required by the contract.

4.5 Acceptance Criterion

The acceptable minimum nominal bolt length shall be as designated in the applicable specification.

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5.0 ATTACHMENTS

- 5.1 Figure 1, REFERENCE STANDARDS
- 5.2 Ultrasonic Examination Report, Form 5040.50
- 5.3 Ultrasonic Examination - Procedure Validation

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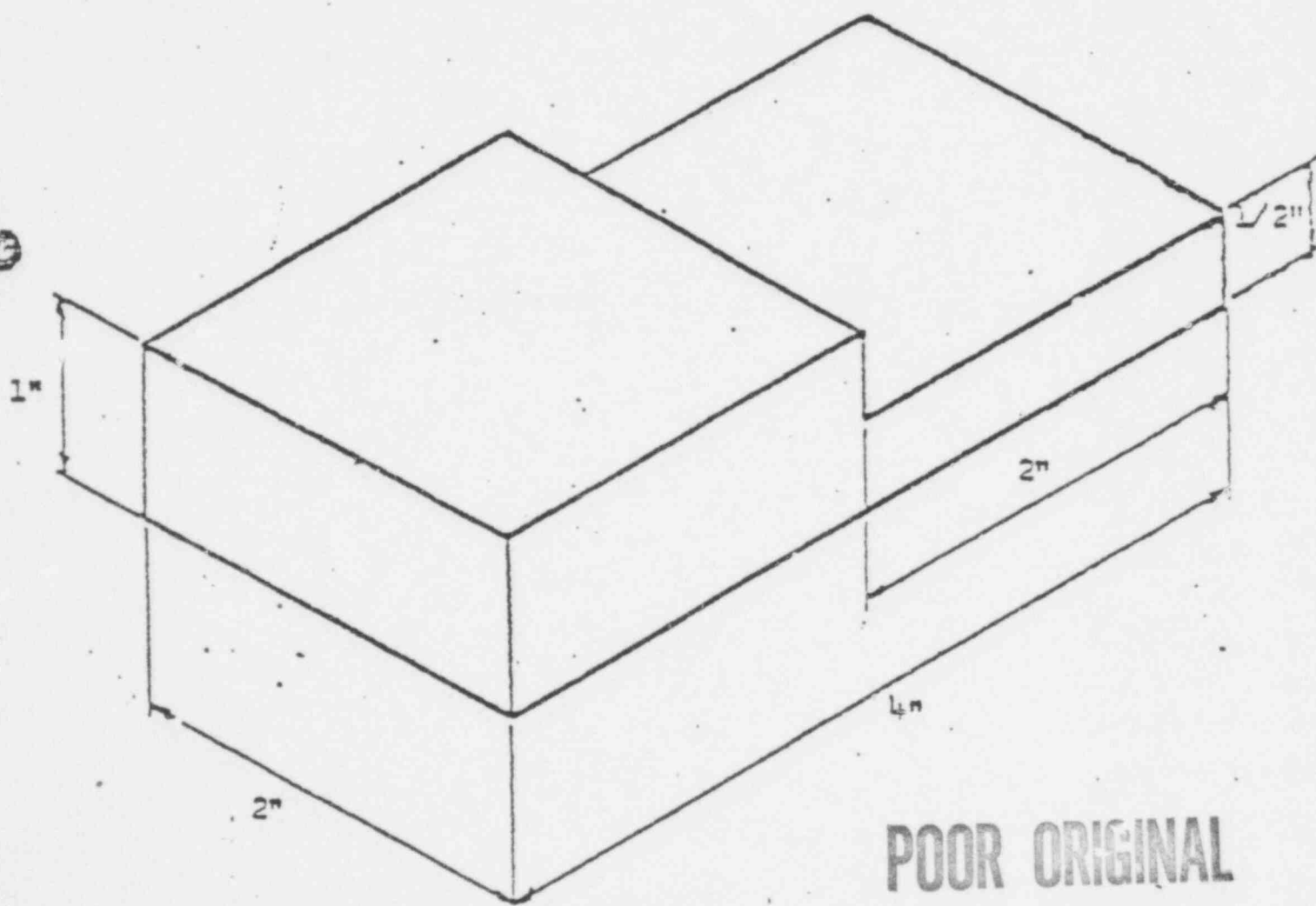
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Reference Standards

1 - Carbon Steel marked C/S

1 - Stainless Steel marked S/S

All dimensions to be accurate to $\pm .002$ inches



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FIGURE 1

STONE & WEBSTER ENGINEERING CORPORATION

ULTRASONIC EXAMINATION REPORT

COMPONENT OR SYSTEM		ISO/DRAWING/WELD MAP		WELD/ITEM NO.		DATE	
SUPPLIER		JOINT DESIGN		CODE SECTION		J.O. OR W.O. NO.	
STAGE OF MFG.		BACKING RING <input type="checkbox"/> INSERT <input type="checkbox"/> OPEN <input type="checkbox"/> MATL _____		ASME VIII <input type="checkbox"/> ASME III <input type="checkbox"/> B31 _____ <input type="checkbox"/> OTHER _____		ULTRASONIC PROCEDURES) COUPLANT	
EXAMINED BY: (COJ)							
TRANSDUCER		INSTRUMENT		REFERENCE STANDARD (IDENTIFICATION OR DESCRIPTION)			
TYPE		MAKE					
SIZE		MODEL					
FREQ.							
BEAM ANGLE							
OTHER							

REMARKS: (SKETCH INSPECTION AREA AND INDICATE RELEVANT INDICATIONS)

Attachment 5.2

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DISPOSITION

☐ ACCEPT

INTERPRETATION BY

NOT LEVEL

DATE

STONE & WEBSTER ENGINEERING CORPORATION ATTACHMENT B
ULTRASONIC EXAMINATION - PROCEDURE VALIDATION

A 5040.105

Page 8 of 9

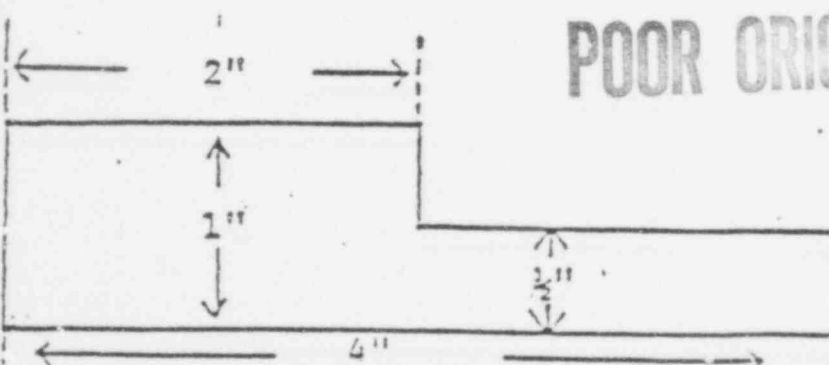
A. MATERIAL		TYPE (1) CARBON STEEL			
CROSS-SECTION THICKNESS (2) _____	MAX. NOM. 1 1/2 IN.	MIN. NOM. 3/4 IN.	GEOMETRY (3) _____	<input type="checkbox"/> PIPE	<input type="checkbox"/> PLATE <input checked="" type="checkbox"/> ROD <input type="checkbox"/> OTHER *
FABRICATION PROCESS (4) _____	<input type="checkbox"/> CAST	<input type="checkbox"/> WELDED	<input type="checkbox"/> WORKED	<input checked="" type="checkbox"/> OTHER *	FABRICATION STATUS (5) _____
SURFACE CONDITION (6) _____	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> GROUND	<input type="checkbox"/> AS FABRICATED	<input type="checkbox"/> OTHER *	HEAT TREAT STATUS (7) _____
					INSTALLED
					N/A

Studs, Nominal sizes 1/2" to 1 1/2" in diameter and 2 3/4" to 12" in length.

(8) * SKETCH OR OTHER DETAIL

B. PROCEDURE		PRE-EXAMINATION SURFACE CONDITIONING (1) _____		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
TRANSDUCER (2) _____	SIZE 3/4"	FREQUENCY 5 MHZ	MODE <input checked="" type="checkbox"/> LONGITUDINAL <input type="checkbox"/> SURFACE <input type="checkbox"/> SHEAR	ANGLE 0
OPERATION (3) _____	<input type="checkbox"/> ED <input checked="" type="checkbox"/> BROADBAND	<input checked="" type="checkbox"/> PULSE ECHO	<input type="checkbox"/> THROUGH TRANSMISSION	
REFERENCE STANDARD * (4) _____	FLAT BOTTOM HOLE <input type="checkbox"/>	NOTCH * <input type="checkbox"/>	SIDE DRILLED HOLE <input type="checkbox"/>	DIMENSIONS See Below
COUPLANT (5) _____	TYPE SONIC PG-001	PURITY REQUIREMENT _____	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
DISTANCE AMPLITUDE CURVE (6) _____	<input type="checkbox"/> YES	<input type="checkbox"/> MANUAL	<input type="checkbox"/> ELECTRONIC	<input checked="" type="checkbox"/> N/A
TRANSFER CORRECTION (7) _____	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	VELOCITY CORRECTION (8) _____	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	POST EXAM CLEANING (9) YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

(10) * SKETCH OR OTHER DETAIL



POOR ORIGINAL

Attachment 5.3
Page 1 of 2

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(12) VALIDATION STAMP

THIS STAMP IS TO BE USED TO VALIDATE THE RESULTS OF THE EXAMINATION. IT IS TO BE FILLED OUT BY THE EXAMINER AND SIGNED BY THE SUPERVISOR. IT IS TO BE KEPT WITH THE EXAMINATION RECORDS.

DATE 6/1/74

EQUIPMENT (11) MANUFACTURER MODEL

EVALUATION

REPORT BELOW DATA OBSERVED AND THE PERTINENT INFORMATION
REQUIRED INCLUDING THE MEANS USED TO CONFIRM CORRECTNESS
OF THE EVALUATION.

1 Nominal Inches	2 Measured Value	2 Nominal Inches
2 3/4	2.80	2 3/4
3 3/4	3.80	3 3/4
4 3/4	4.20	4 3/4
4 3/4	4.60	4 3/4
5 3/4	5.60	5 3/4
6 3/4	6.00	6 3/4
7 3/4	7.00	7 3/4
8 3/4	8.00	8 3/4
8 3/4	8.60	8 3/4
9 3/4	9.00	9 3/4
10 3/4	10.00	10 3/4
12 3/4	12.00	12 3/4

D. CRITERIA

(1) APPLICABLE CODE(S): H/A

(2) OTHER: Nominal Length of Studs

(3) SKETCH OR OTHER DETAIL

As the nominal length of these studs is expressed in increments of 1/4 in. the nominal length as measured will be the difference in column #2 to the nearest 1/4 in. (See column #3)

NOTE

On studs 1 1/4 in. in diameter and 9 in. in length the 2nd highest reflection is the actual length. The 1st reflection will be the shoulder.

POOR ORIGINAL

Attachment 5.3

Page 2 of 227

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E. ATTEST

THE PROCEDURE OF EXAMINATION HEREIN DESCRIBED COMPLIES WITH
ALL REQUIREMENTS SET FORTH IN HOT PROCEDURE
AND INFORMATION HEREIN PROVIDED IS TRUE AND ACCURATE.

BASEPLATE WORK AUTHORIZATION

LINE NO. _____ HANGER NO. _____ ISO NO. _____

APPLICABLE PROCEDURES

BV-1, 7902-01 _____

BV-1, 7902-02 _____

BV-1, 7902-03 _____

TEMPORARY SUPPORT SKETCH
REQUIRED

YES ☐

NO ☐

STONE & WEBSTER ENGINEERING CORPORATION-DESIGN

Signature Date

DUQUESNE LIGHT COMPANY
OPERATIONS - SHIFT SUPERVISOR

Signature Date

DUQUESNE LIGHT COMPANY - QUALITY CONTROL

Signature Date

DUQUESNE LIGHT COMPANY - CONSTRUCTION

Signature Date

SCHNEIDER, INCORPORATED - CONSTRUCTION

Signature Date

ADDITIONAL REQUIREMENTS

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STONE & WEBSTER ENG CORP
DUQUESNE LIGHT CO
B.V. 1

FLEXIBLE BASE PLATE ANALYSIS
IE BULLETIN 79-02
JOB NO. 12690.88

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DUQUESNE UNIT

11700 SUPPORT TABLE ISO NO 277

○ LINE NO	SUPPORT NO	REF SKETCH NO	REV.	TYPE SUPT	REMARKS
6" CH-63	H-1	4100	3	V.C.	AXIAL C
↓	H-5	4104	1	N.S.	CONSTR
6" CH-67	H-6	4105	2	V.C.	AXIAL C
↓	H-6A	11700-AZ-10B-41	2	N.S.	CONSTR
6" CH-68	H-8	4107	2	V.C.	AXIAL C
↓	H-10	4109	1	N.S.	CONSTR
8" CH-15	H-7A	11700-AZ-10B-39	2	V.C.	
↓	H-7	4106	1	ANCHOR	
↓	H-229	4273	2	V.C.	
○ 8" SI-2	H-11	11700-AZ-10B-12	2	ANCHOR	
	H-171A	11700-AZ-10B-40	2	SH	
	H-18	4117	2	V.C.	LAT. C
↓	H-17	4116	2	V.C.	AXIAL C
6" SI-44	H-172	11700-AZ-10H-6	1	V.C.	
↓	H-34	4132	2	V.C.	AXIAL C
↓	H-33	4131	1	V.C.	

POOR ORIGINAL

11700 624 277 SH 2
 BEAVER VALLEY POWER STATION
 UNIT ONE - DUQUESNE LIGHT
 COMPANY VENDOR
 FILE NO. - 11700-624-277.2

BASEPLATE WORK AUTHORIZATION

LINE NO. 6-CH-63-153-Q2 HANGER NO. H-1

ISO NO. 277

APPLICABLE PROCEDURES

BV-1, 7902-01 ✓

BV-1, 7902-02 ✓

BV-1, 7902-03

TEMPORARY SUPPORT SKETCH REQUIRED

YES ☒ 7, 8

NO ☐

STONE & WEBSTER ENGINEERING CORPORATION-DESIGN

Ray A. Hart 6/10/79
Signature Date

DUQUESNE LIGHT COMPANY

OPERATIONS - SHIFT SUPERVISOR

John Turner 6/10/79
Signature Date

DUQUESNE LIGHT COMPANY - QUALITY CONTROL

J. J. Zeller 6/10/79
Signature Date

DUQUESNE LIGHT COMPANY - CONSTRUCTION

C. P. Miller 6-10-79
Signature Date

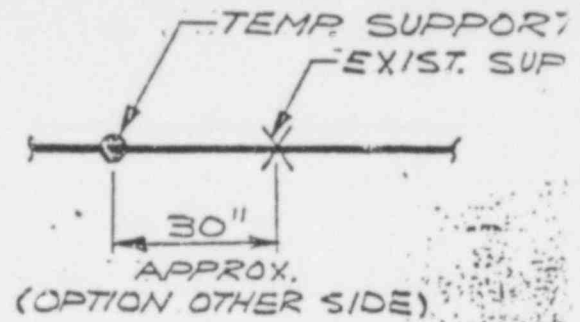
SCHNEIDER, INCORPORATED - CONSTRUCTION

D. M. Lahan 6-10-79
Signature Date

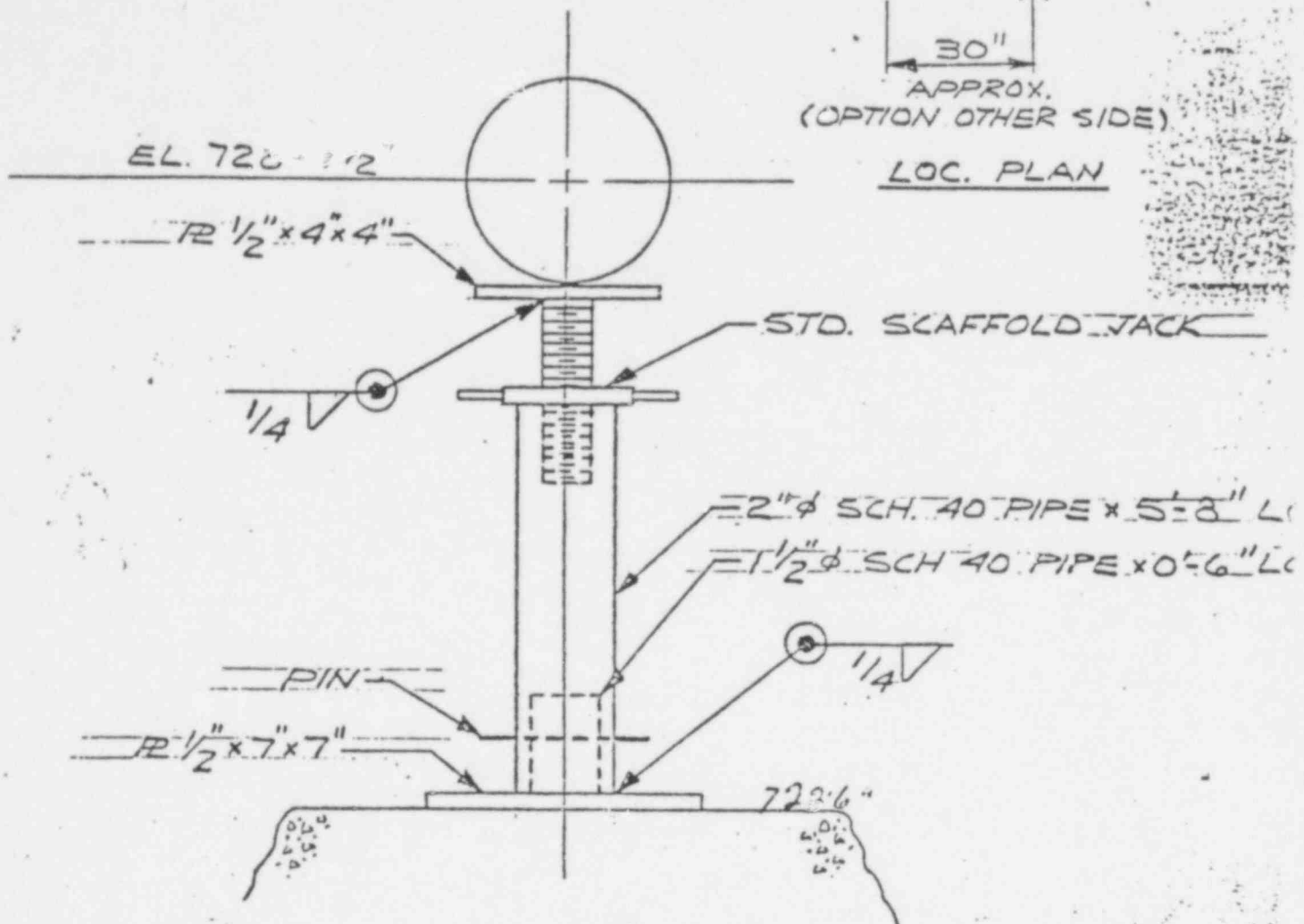
ADDITIONAL REQUIREMENTS

527 145

LR=2000#



LOC. PLAN



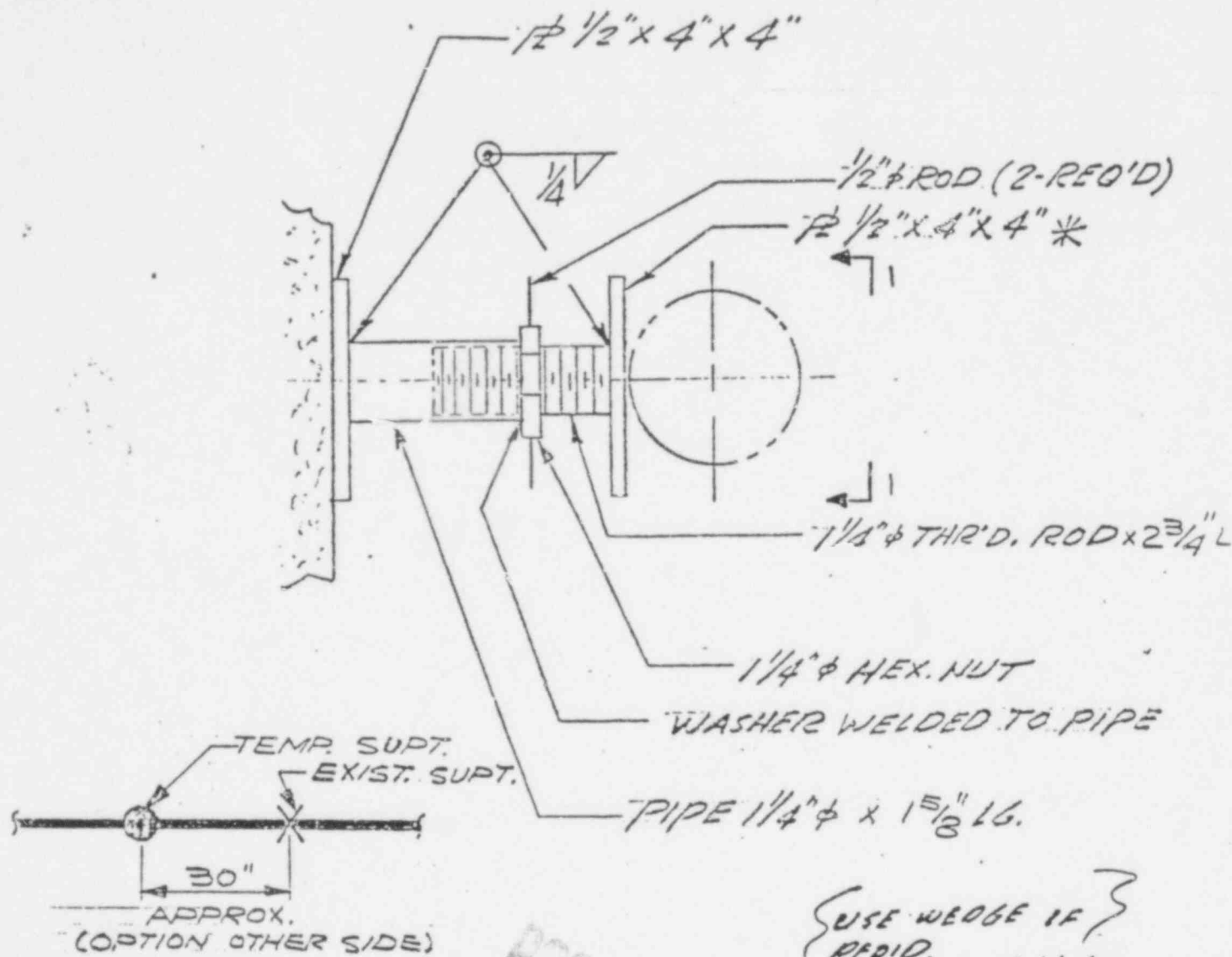
POOR ORIGINAL

527-146

* NOTE:
WHEN USED WITH S
PIPE, WRAP CONTACT
POINT ON SUPPORT
WITH PROTECTIVE TAP

NO. G-CH-63-753W-Q2
277
NO.
10B
NO.
VT=684#

				6-9-79	TITLE:	REF:
					TEMPORARY	
					SUPPORT	
					TYPE "C"	
3	2	1	6K		SKETCH	
			WV		12690.83-SK	



{ USE WEDGE IF }
 REQ'D.
 GK. 4/10/79

PCOR ORIGINAL
 527 147

* NOTE:
 WHEN USED WITH S.S.
 PIPE WRAP CONTACT
 POINT ON SUPPORT
 WITH PROTECTIVE
 TAPE

LINE # 6" CH-63-153W-Q2
 150. # 277
 SK.
 RP # 103
 HANGER

GK 4/10/79

DATE						6-9-79	TITLE:	STANDARD PIPE WEDGE TYPE "B"	REF:
PREP.									
CHECK	5	4	3	2	1	GK			SKETCH
APPR.						CV			12690.88.5.

ACTION ITEM REPORT
Pipe Support/Anchor Verification Program
Beaver Valley Power Station-Unit No. 1

S&W Task No. 7902
Line No. 6"CH-63-153W-92
Hanger No. H-1
ISO No. 277

Description of Information/Action Needed:

- ① Baseplate to \pm Pipe $6\frac{1}{2}$ "
- ② Baseplate 12"sq.
- ③ Holes 143 $15\frac{1}{8}$ " from Edge to \pm Head & Vent
- ④ \pm of 6" Pipe $6\frac{1}{2}$ " from edge of Baseplate

D. M. Sullivan
Initiator

Response:

Noted: No further measurements or actions
required for this AIR # 037

POOR ORIGINAL

527 148

Chen Date: 6-17-

Disposition Completed:

N/A Schneider, Inc. Superintendent D. M. Sullivan Date: 6/17
NSQC [Signature] Date: 6/17
DLC-CEN [Signature] Date: 6/17

GRINNELL
SOUTHWEST FABRICATING CO.

CUSTOMER _____
ORDER OR CONT. NO. 9209-1
ME BEAVER VALLEY PWR. STA. 51

E&D P-1413A

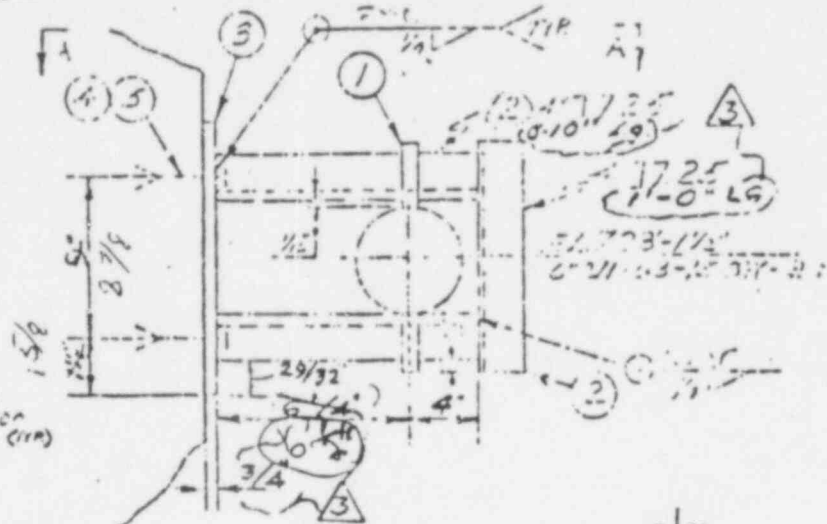
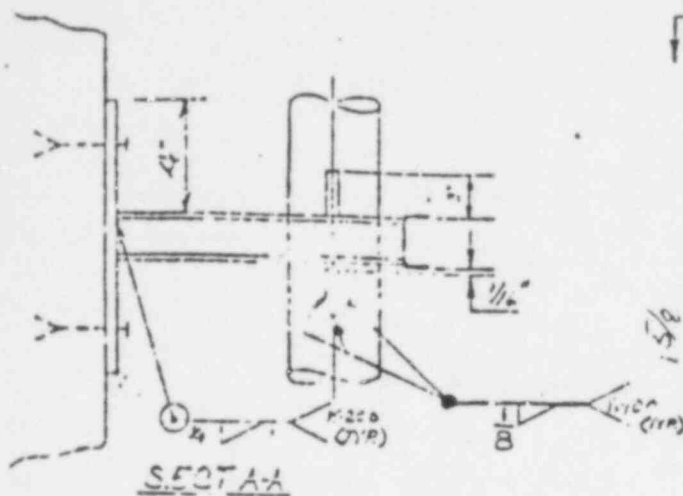
E&D 4183

E&D P-1413D&F

PIPE HANGER DEPARTMENT

DRAWN BY K.L.L. DATE 7-1-78

REVISED BY GED DATE 6-23-78



SNIP 45° X 1/2"

PL 1/2 X 2 X 3

LUG DET.

FOR
LOCATION SEE
150 277

AS-BUILT PER E&D P-1413F

HYDRO L.D. = 68'-4"

DESIGN L.D. =

Fx =

Fy = 2800# E&D P-1413D&F

Fz = 2300#

E&D P-1413A

MATERIALS AND OPERATIONS

PIPE GUIDE CONSISTING OF:

ITEM NO.	DESCRIPTION	QUAN.	SHIP.
1	Traceable Lug (See Det)	1	
2	Bracket as detailed above	1	
3	H.S. 40, C.S., 1-2 1/2", 1-1 1/2", T-1 1/2", A=9", B=1 1/2"	1	
4	C-2", H=9/16" T.W.=20#	1	
5	1/2" Dia. 3-12 Concrete Anchors T.W.=.75"	4	
6	1/2" H 1 1/4" Top Bolts T.W.=.45"	4	
	Hanger Assembly Sketch & Engineering	1	
	Bundle & Tag	1	

Mark: CH-R-1

BEAVER VALLEY POWER STATION
FIELD DESIGN

AS-BUILT

JOB NO. 11700

PIPE #11700-2400-4

SEE DRAWG. NO.

1. 11700-2400-4

11700-RC-2430

MARK NO. CH-R-L

SKETCH NO. 4100

REV. 3

FIELD INSPECTION PROCEDURE FOR CAT I PIPE SUPPORTS WITH CONCRETE EXPANSION ANCHOR BOLTS

CLIENT: DUQUENSE LIGHT COMPANY PROJECT: BEAVER VALLEY POWER STATION UNIT NUMBER 1
 JOB NUMBER 12690.88 FORM NO. 12690.88A
 LINE NO. 6 "CH-63" ISO NO. 277 RP DWG. NO. 10-B
 HANGER NO. CH-B-1 SUPPORT NO. H-1 SUPPORT DWG. NO. H-204100
 BUILDING PRIMARY AUX. FLOOR ELEVATION 722 LOC. ELEV 731'0"

INSPECTION AND DOCUMENTATION RECORD		VERIFIED*	DIMENSION**	CERTIFIED***	
				BY SIGNATURE & DATE	CHECK (✓) IF CHANGE REQUIRED
1.	BASE PLATES SIZE (WIDTH AND LENGTH)	X		B.R.H. 4/10/79	
2.	THICKNESS	X		B.R.H.	
3.	ORIENTATION OF PLATE WITH RESPECT TO PIPE (IF DIFFERENT SHOW ON SKETCH)	X		B.R.H.	
4.	GUSSET PLATES AND OTHER ATTACHMENTS (IF DIFFERENT SHOW ON SKETCH)	X		B.R.H.	
5.	EXTRA HOLES (LOCATION AND SIZE)		X	B.R.H.	
6.	ENLARGED HOLES (LOCATION AND SIZE)		X	B.R.H.	
7.	DISTANCE FROM TOP OF PLATE TO CONCRETE AT FOUR CORNERS, INDICATE GROUT		X	B.R.H.	
8.	ANCHOR BOLTS NUMBER OF BOLTS	X		B.R.H.	
9.	TYPE (BOLT HEAD OR STUD)	X		B.R.H.	
10.	BOLT DIAMETER	X		B.R.H.	
11.	CONFIGURATION (IF DIFFERENT SHOW ON SKETCH)	X		B.R.H.	
12.	SPACING - CENTER TO CENTER EACH WAY	X		B.R.H.	✓
13.	EDGE DISTANCE FROM NEAREST BOLT (¢) TO EDGE OF CONCRETE OR OPENING IF LESS THAN 8 INCHES		X	B.R.H.	
14.	DISTANCE FROM BOLT (¢) IN ADJACENT BASE PLATES TO NEAREST BOLT IF LESS THAN 11 INCHES		X	B.R.H.	
15.	PIPE DISTANCE FROM EDGE OF PLATE TO CENTERLINE OF PIPE	X		B.R.H.	✓
16.	LOCATION OF SUPPORT ON THE BASE PLATE (IF DIFFERENT SHOW ON SKETCH) & angular orientation	X		B.R.H.	
17.	ATTACHMENTS INTERFERENCES THAT EXIST WITHIN 6 INCHES OF PLATE	X		B.R.H.	✓

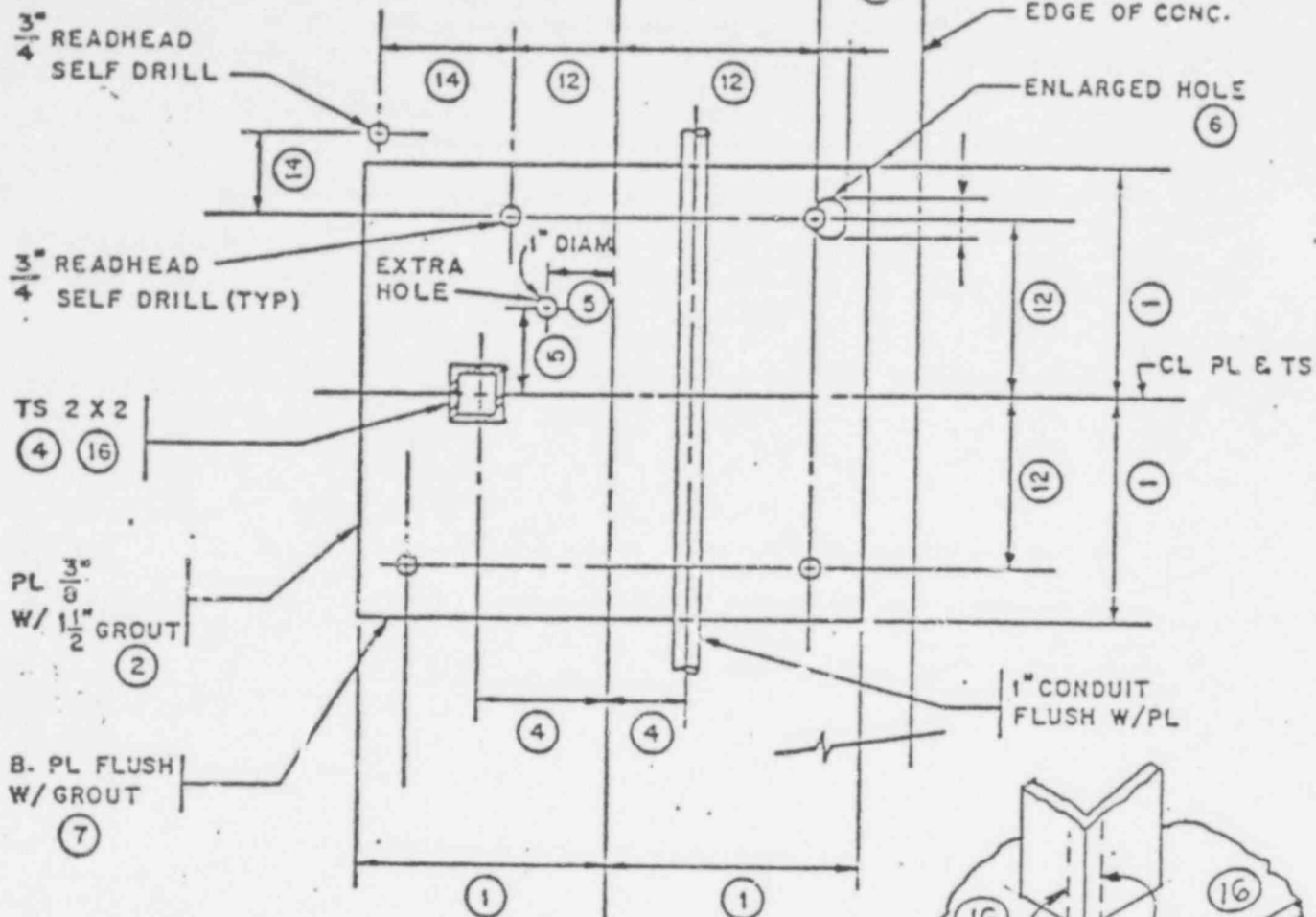
* VERIFIED - DIMENSIONS CHECKED WITH THOSE SHOWN ON DRAWINGS OF RECORD.

** DIMENSION - REQUIRED DIMENSION OR SKETCH AS REQUIRED.

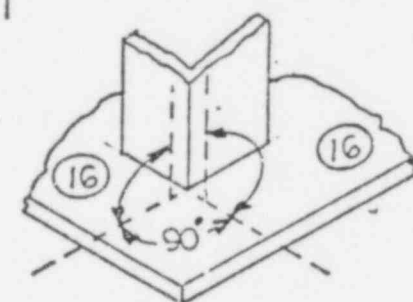
*** CERTIFIED - AS IN COMPLIANCE WITH THIS PROCEDURE TO HAVE VERIFIED, DIMENSIONED OR SHOWN ON SKETCH.

REVIEWER SIGNATURE: J. B. Cochran DATE: 6/18/79

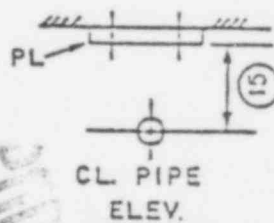
FOOT ORIGINAL



PLAN
(LOOKING DOWN)



ANGULAR MEASUREMENTS



STANDARD DIMENSIONS FOR BOLT HEADS				
DIAM. OF BOLT	1/2	3/4	7/8	1
1/2	3/4	7/8	7/8	1
5/8	15/16	1 1/16	1 1/16	1 1/4
3/4	1 1/8	1 5/16	1 1/4	1 7/8
7/8	1 5/16	1 1/2	1 7/16	1 11/16

7 FOUR CORNERS

TOP LEFT	TOP RIGHT	BOT. LEFT	BOT. RIGHT
3/4	13/16	3/4	13/16

8 NO. OF BOLTS 4

9 TYPE (BOLT HEAD OR STUD) STUDS

10 BOLT DIAMETER 1/2"

17 INTERFERENCES THAT EXIST WITHIN 6 INCHES YES NO

527 151

SIGNATURE

BY

DATE

TITLE: PIPE SUPPORT BASE
PLATES USING CONCRETE
EXPANSION ANCHOR BOLTS

AS BUILT SUPPORT NO. H-1

CH 63-CH R-1

CLIENT DLC

PROJECT SV-UNIT NO. 1

J.O. NO. 12590.88

SKETCH NUMBER

ZSK-4100

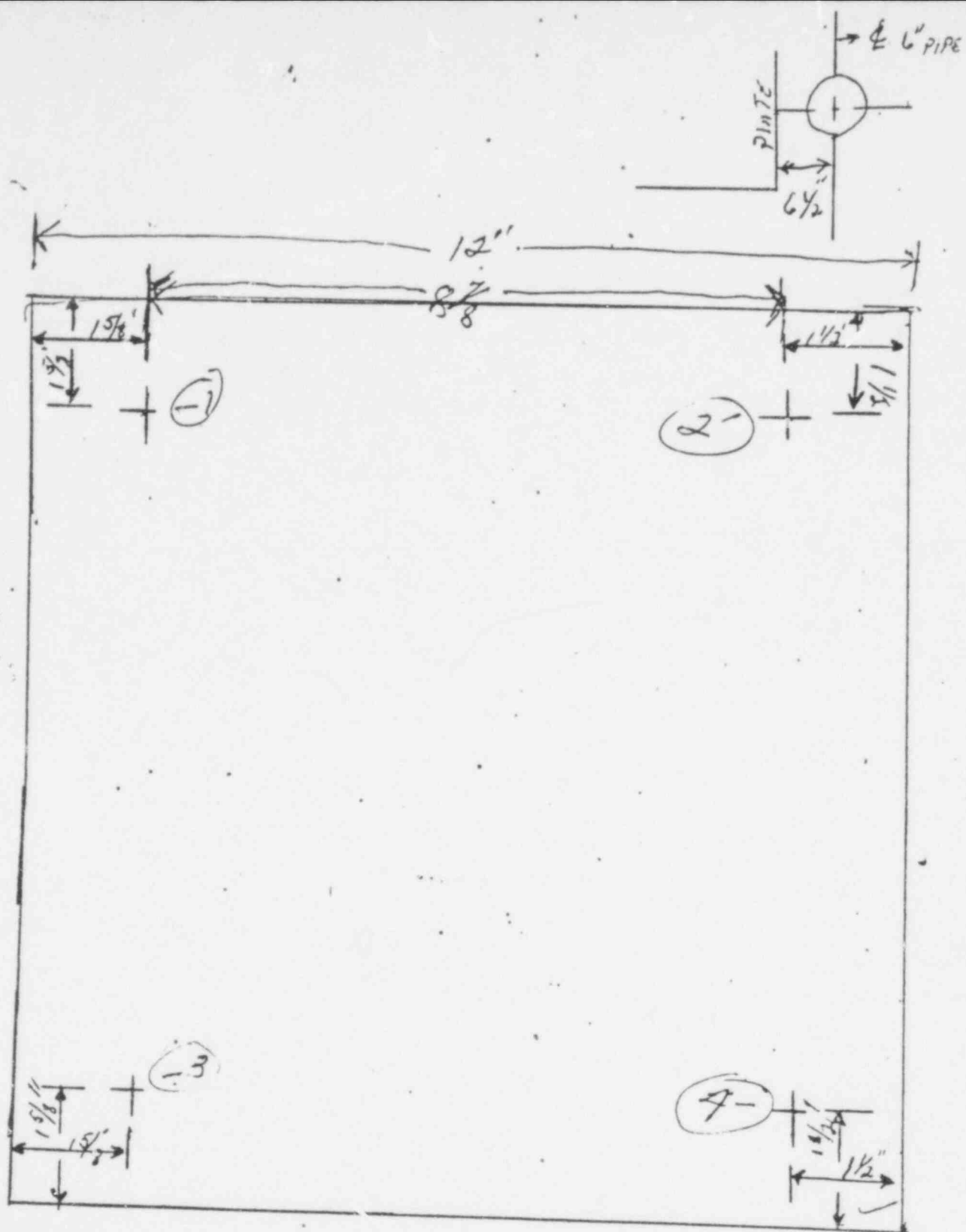
PREPARED BY

B. L. V.

6/10/79

REVIEWER

REVISIONS



527 152

POOR ORIGINAL

AS BUILT DEFICIENCY

SIGNATURE			TITLE: PIPE SUPPORT BASE PLATES USING CONCRETE. EXPANSION ANCHOR BOLTS	CLIENT DLC	
BY	DATE			PROJECT BV-UNIT NO. 1	
PREPARER	B.R.H.	6-10-79		J.O. NO. 12690.88	
REVIEWER				SKETCH NUMBER	
REVISIONS				ZSK-4100	

AS BUILT SUPPORT NO. H1

6" CH. 63 CH-R-1

PIPE SUPPORT EVALUATION

6-10-79
INSPECTION DATE

ISO # 277

Line No. 62H 63 Plate No. 1

H. E. Dumbough
INSPECTION SIGNATURE

SKETCH NUMBER 4100

MD-1-TW-007
TORQUE WRENCH INSTRUMENT NO

J. B. Cochran
REVIEWER SIGNATURE

up \uparrow

+(1)	+(2)
+(3)	+(4)

SELF DRILLING (SHELL) CONCRETE EXPANSION ANCHORS

1	2	3	4	5	6	7A	7B	7C	8
Anchor Ident.	Anchor Size	Required Install. Torque	Back Off Torque	Accept/ Reject Torque	Lead Engagemt.	(A)	Shell Depth	(B)	Deficient Charact.
1	1/2 type	30#	R	A	A	I	1 1/4"	A	4
2	1/2"	30#	R	A	A	I	1 1/8"	A	4
3	1/2"	30#	R	A	A	I	1 3/16	A	4
4	1/2"	30#	R	A	A	I	1 1/8	A	4

POOR ORIGINAL

527 53

* For first 25 list top of
baseplate to plug depth

COMMENTS

(A) Shell Location

(B) Shell Accept/Reject

4 - ALL 4 BOLTS LOOSE ON FIRST BACK OFF.
BOLT BACK OFF TORQUE PERFORMED ON #4 BOLT, BACKED OFF AT 3

BASEPLATE WORK AUTHORIZATION

LINE NO. 6-CH-63-13W-Q2 HANGER NO. H-5

ISO NO. 277

APPLICABLE PROCEDURES

BV-1, 7902-01 ✓
 BV-1, 7902-02 ✓
 BV-1, 7902-03

TEMPORARY SUPPORT SKETCH REQUIRED

YES ☐

NO ☒ sufficient clearance
& NO DWT

STONE & WEBSTER ENGINEERING CORPORATION-DESIGN

Chambers 6-9-79
 Signature Date

DUQUESNE LIGHT COMPANY
 OPERATIONS - SHIFT SUPERVISOR

John W. [Signature] 6/10/79
 Signature Date

DUQUESNE LIGHT COMPANY - QUALITY CONTROL

[Signature] 6/10/79
 Signature Date

DUQUESNE LIGHT COMPANY - CONSTRUCTION

[Signature] 6-10-79
 Signature Date

SCHNEIDER, INCORPORATED - CONSTRUCTION

S. M. [Signature] 6-10-79
 Signature Date

ADDITIONAL REQUIREMENTS

POOR ORIGINAL

527 154

ACTION ITEM REPORT
Pipe Support/Anchor Verification Program
Beaver Valley Power Station-Unit No. 1

S&W Task No. 7402
Line No. 6" CH-63-153W-Q2
Hanger No. H-5
ISO No. 277

Description of Information/Action Needed:

- ① 1 L 1'-6" 2nd L 1'-5 9/16"
- ② 1" Anchor 2 3/4" From Top L
- ③ 1 1/2" Gap Top of Pipe to L
- ④ Conduit ≈ 1" From L
- ⑤ Studs #3 & 4 could not be ~~loosened~~ loosened - no pull test made

D. M. Loh
Initiator

Response:

Noted: NO further action or measurements
required for this AIR # 038.

POOR ORIGINAL

527 155

Chouin Date: 6-17

Disposition Completed:

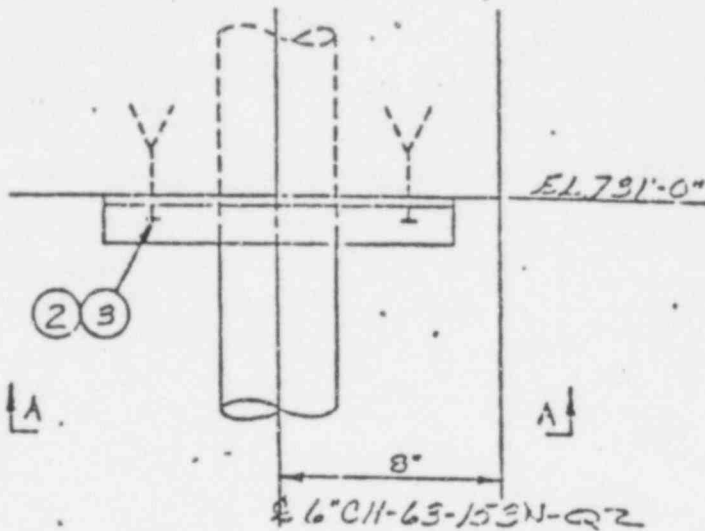
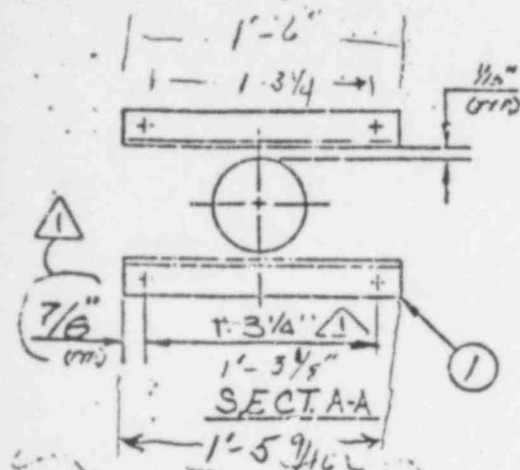
N/A Schneider Inc. Superintendent D. M. Loh Date: 6/17/79
NSQC [Signature] Date: 6/17/79
DLC-COM [Signature] Date: 6/17/79

SOUTHWEST FABRICATING CO.

CUSTOMER: 9209-1
 ORDER OR CONT. NO.
 NAME: DEAFER VALLEY PWR STA: #1

PIPE HANGER DEPARTMENT
 DRAWN BY: K. L. H. DATE: 7-12-72
 REVISED BY: DATE:

EED # P-1413D



ELEV LKG NORTH

H-5

DESIGN LD

F212 451 #

AS BUILT PER EED P-1413D

EED # P-1413D

FOR LOCATION SEE
 150 277

MATERIALS AND OPERATIONS

PIPE GUIDE CONSISTING OF:

1 Spec. U.S. 50, 3 X 3 X 3/8" angle, E=1' 5" LG, C-C=1' 0"
 2 1 1/4" C-1 3/4", H=13/16, TW=17/8
 3 3/4" Fig. 3-34, conc. fast., TW=2 1/4
 3 3/4" X 1 1/2" tap bolts, TW=2 1/4
 Hanger Assembly Sketch & Engineering
 Bundle & Tag
 Mark: CH-R-5

QUAN. CHIP.

ONE

2

4

4

1

1

11700 624 277 SH4

ALPHA COPY OF THIS CHART TO ALL MATERIAL DEPT. HEADS,
 WHICH SHALL BE KEPT WITH A GOOD PRACTICE.

1. DRAW. NO. PIPE #
 2. MARK NO. CH-R-5

SKETCH NO. 4104

REV 1

POOR ORIGINAL

FIELD INSPECTION PROCEDURE FOR CAT I PIPE SUPPORTS WITH CONCRETE EXPANSION ANCHOR BOLTS

CLIENT: SUNSHINE LIGHT COMPANY PROJECT: BEAVER VALLEY TOWER STATION
 JOB NUMBER: 12000-1A FORM NO. 17-10-000
 TITZ NO. 6-CH-63 ISO NO. 277 HP DWG. NO. Rm 37A + RP 10L
 WAGER NO. H-5 SUPPORTING CH-R-5 SUPPORT DWG. NO. 4104
 SUB DWS PA BLDG FLOOR ELEVATION 722'6" ELEV 731'0"

POOR ORIGINAL

INSPECTION AND DOCUMENTATION RECORD		VERIFIED	CERTIFIED	BY SIGNATURE & DATE	REVIEW IF CHANGE REQUIRED
1.	BASE PLATES SIZE (WIDTH AND LENGTH)	X		B.R.H. 6/11/79	
2.	THICKNESS	X		B.R.H.	
3.	ORIENTATION OF PLATE WITH RESPECT TO PIPE (IF DIFFERENT SHOW ON SKETCH)	X		B.R.H.	
4.	GUSSET PLATES AND OTHER ATTACHMENTS (IF DIFFERENT SHOW ON SKETCH)	X		B.R.H.	
5.	EXTRA HOLES (LOCATION AND SIZE)		X	B.R.H.	
6.	ENLARGED HOLES (LOCATION AND SIZE)		X		
7.	DISTANCE FROM TOP OF PLATE TO CONCRETE AT FOUR CORNERS, INDICATE GROUT		X	B.R.H. 6/11/79	
8.	ANCHOR BOLTS NUMBER OF BOLTS	X		B.R.H.	
9.	TYPE (BOLT HEAD OR STUD)	X		B.R.H.	
10.	BOLT DIAMETER	X		B.R.H.	
11.	CONFIGURATION (IF DIFFERENT SHOW ON SKETCH)	X		B.R.H.	
	SPACING - CENTER TO CENTER EACH WAY	X		B.R.H.	✓
13.	EDGE DISTANCE FROM NEAREST BOLT (S) TO EDGE OF CONCRETE OR OPENING IF LESS THAN 6 INCHES		X	B.R.H.	
14.	DISTANCE FROM BOLT (S) IN ADJACENT BASE PLATES TO NEAREST BOLT IF LESS THAN 4 INCHES		X	B.R.H.	✓
15.	PIPE DISTANCE FROM EDGE OF PLATE TO CENTERLINE OF PIPE	X		B.R.H.	✓
16.	LOCATION OF SUPPORT ON THE BASE PLATE (IF DIFFERENT SHOW ON SKETCH) & angular orientation	X		B.R.H. N/A	
17.	ATTACHMENTS INTERFERENCES THAT EXIST WITHIN 6 INCHES OF PLATE	X		B.R.H.	✓

* VERIFIED - DIMENSIONS CHECKED WITH THOSE SHOWN ON DRAWINGS OF RECORD.

** DIMENSION - REQUIRED DIMENSION OR SKETCH AS REQUIRED.

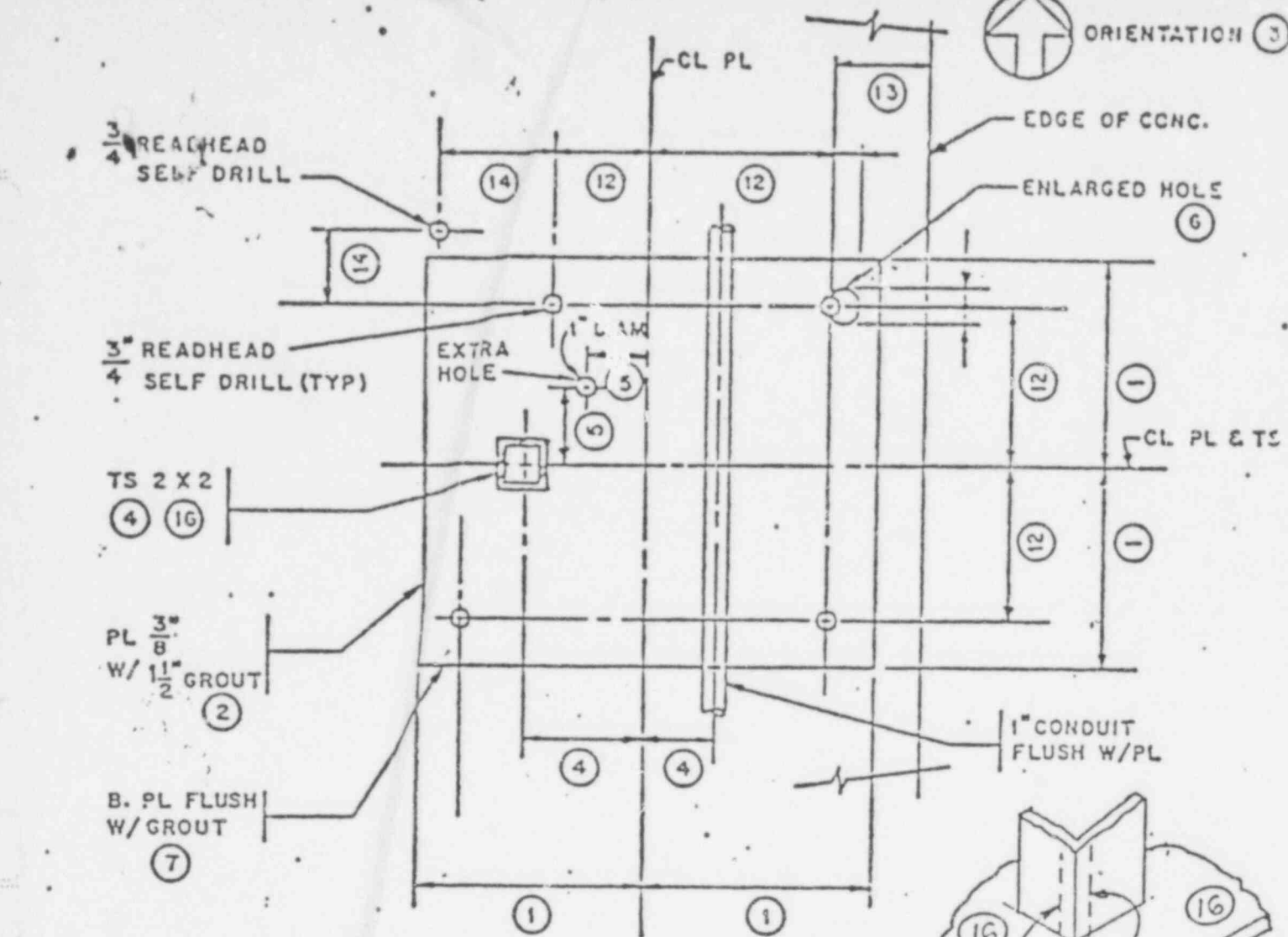
*** CERTIFIED - AS IN COMPLIANCE WITH THIS PROCEDURE TO HAVE VERIFIED DIMENSIONS OR DRAWING OF SKETCH.

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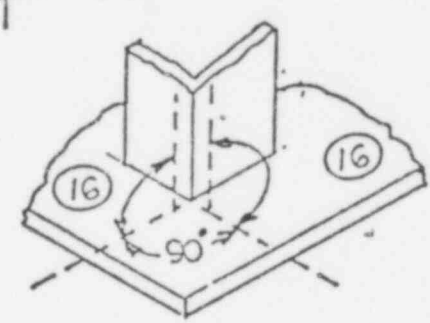
J.B. Cochran

DATE: 6/18/79

527 157



PLAN
(LOOKING DOWN)

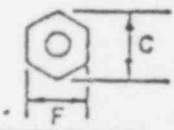
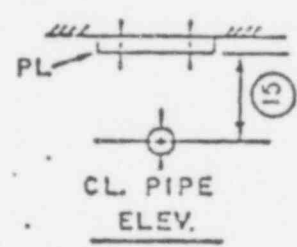


ANGULAR MEASUREMENTS

7 FOUR CORNERS

TOP LEFT	TOP RIGHT	BOT. LEFT	BOT. RIGHT
3/8	3/8	3/8	3/4

- 8 NO. OF BOLTS 4
- 9 TYPE (BOLT HEAD OR STUD) STUDS
- 10 BOLT DIAMETER 3/4"
- 17 INTERFERENCES THAT EXIST WITHIN 6 INCHES YES ☒ NO ☐



527 15

STANDARD DIMENSIONS FOR BOLT HEADS				
DIAM. OF BOLT	1/2	3/4	1	1 1/2
1/2	3/4	7/8	7/8	1
5/8	15/16	1 1/16	1 1/16	1 1/4
3/4	1 1/8	1 5/16	1 1/4	1 7/8
7/8	1 5/16	1 1/2	1 7/16	1 11/16

POOR ORIGINAL

SIGNATURE		TITLE: PIPE SUPPORT BASE PLATES USING CONCRETE EXPANSION ANCHOR BOLTS	CLIENT CLC
BY	DATE		PROJECT SV-UNIT NO. 1
PARER	B. R. H.	16/11/74	J.O. NO. 12590.88
REVIEWER		AS BUILT SUPPORT NO. <u>H-5</u>	SKETCH NUMBER
REVISIONS		6'CH-63-CH-R-5	ZSK-4104

COND. RUNNING PARALLEL
w/ ANGLE



SAME AS SEC AA

SIGNATURE		TITLE: PIPE SUPPORT BASE	CLIENT D/C
BY	DATE	PLATES USING CONCRETE.	PROJECT BY-UNIT NO. 1
PREPARED	B. A. 4/6-11-77	EXPANSION ANCHOR BOLTS	J.O. NO. 12090.88
REVIEWER		AS BUILT SUPPORT NO. H-5	SKETCH NUMBER
REVISIONS		6" CH. 63 - CH. R. 5	ZSK- 4104

PIPE SUPPORT EVALUATION

<p style="font-size: 1.5em; font-weight: bold;">6-11-79</p> <p>INSPECTION DATE</p> <p style="font-size: 1.2em; font-weight: bold;">E. J. Donough</p> <p>INSPECTION SIGNATURE</p> <p>SKETCH NUMBER 4104</p> <p style="font-size: 1.2em; font-weight: bold;">SI-#10-TW</p> <p>TORQUE WRENCH INSTRUMENT NO</p> <p style="font-size: 1.2em; font-weight: bold;">J. B. Cochran</p> <p>REVIEWER SIGNATURE</p>	<p>ISO # <u>277</u> Line No. <u>CH-63</u> Plate No. <u>5</u></p> <div style="display: flex; align-items: center; justify-content: center; margin-top: 20px;"> <div style="text-align: center; margin-right: 10px;"> <p>SOCKET</p> <p>UP</p> </div> </div>
---	---

SELF DRILLING (SHELL) CONCRETE EXPANSION ANCHORS

1	2	3	4	5	6	7A	7B	7C	8	*
Anchor Ident.	Anchor Size	Required Install. Torque	Back Off Torque	Accept/Reject Torque	Thread Engagemt.	(A)	Shell Depth	(B)	Deficient Charact.	
1.	3/4	70	R	A	A	I	1 1/8	A		3 7/8
2.	3/4	70	R	A	A	I	1 5/16	A		3 7/8
3.	3/4	70	R	A	-	I	-	-	-	
4.	3/4	70	R	A	-	I	-	-	-	
POOR ORIGINAL										
							527	160		

* For first 25 list top of baseplate to plug depth

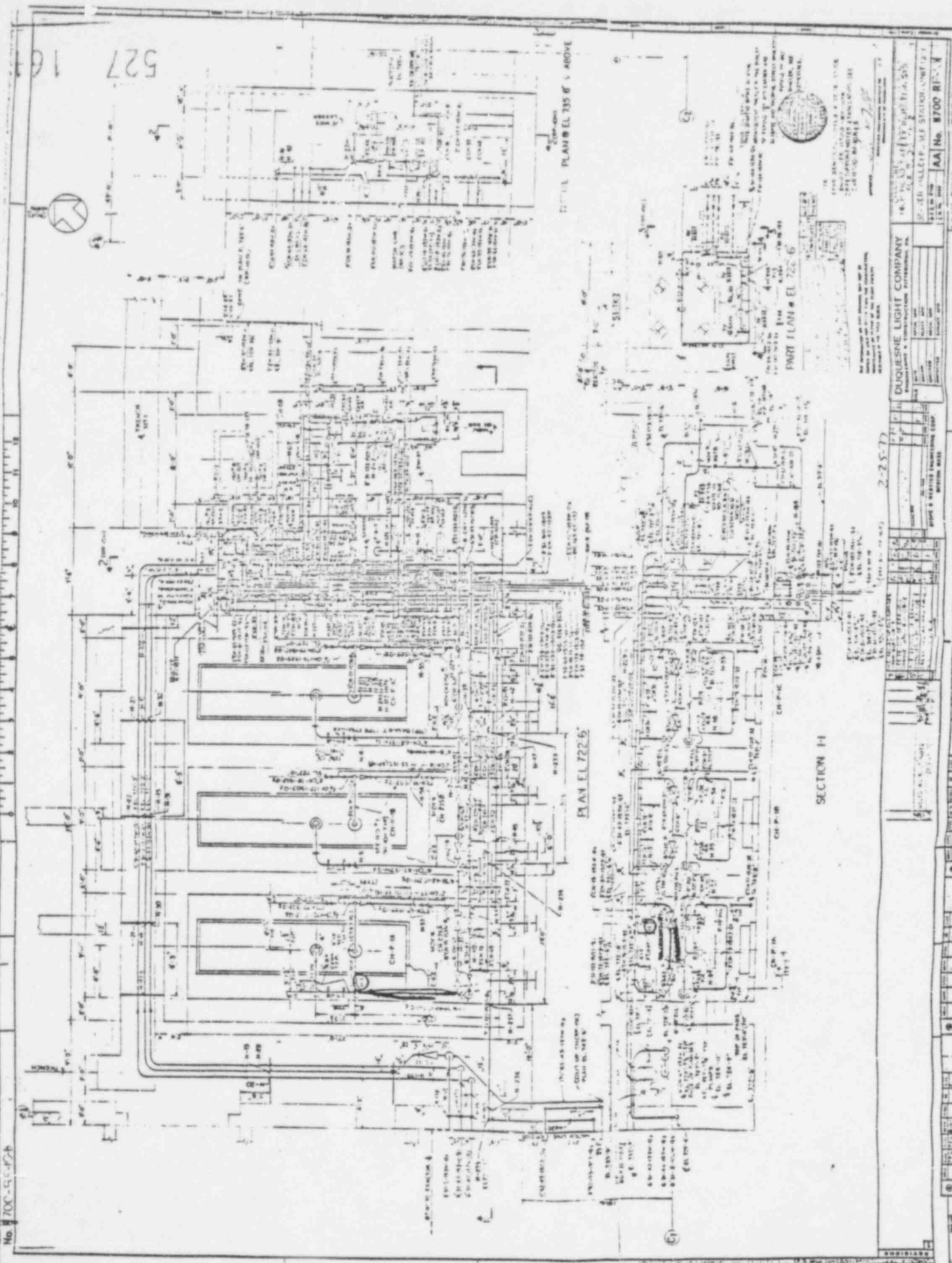
COMMENTS

(A) Shell Location
(B) Shell Accept/Reject

4- ALL BOLTS BACKED OFF AS LESS THEN 70 FT. LBS.

6- 7A-7B-7C WERE UNABLE TO REMOVE STUDS ON NO. 3 & 4 HOLES PERFORMED TORQUE TEST WITH SHIMS AND RETORQUE BOLTS

POOR ORIGINAL



No. 200-100-100

527

PLAN # EL 735.6 & ABOVE

PLAN # EL 722.5

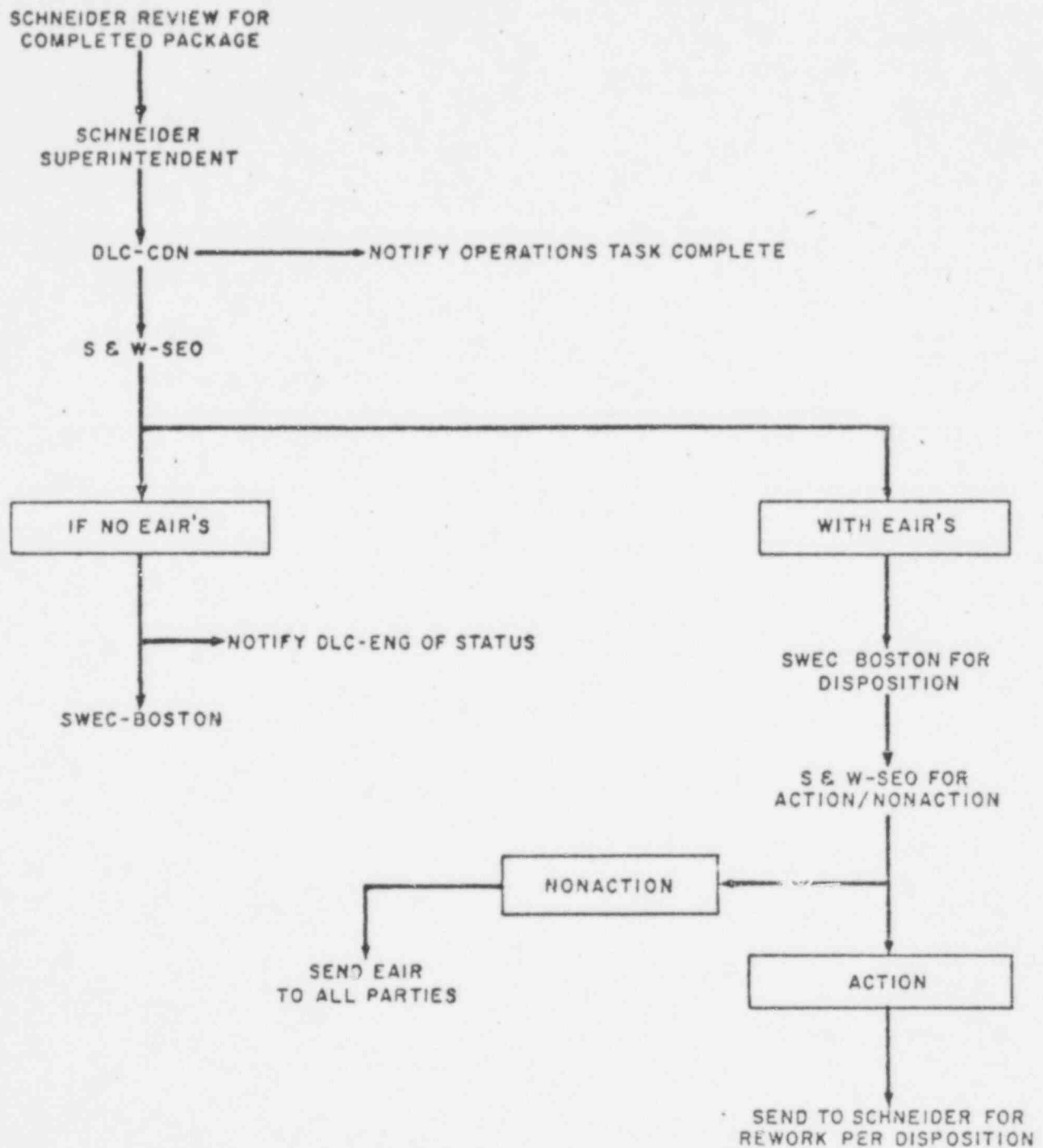
SECTION H



DUQUESNE LIGHT COMPANY	
ENGINEERING & CONSTRUCTION DEPARTMENT	
PROJECT NO.	AA No. 8700 R.P.C.
DATE	2-25-77
BY: [Signature]	
CHECKED BY: [Signature]	
APPROVED BY: [Signature]	

S&W DWG. NO. 1 700 R.P.C.

FLOW CHART FOR COMPLETED PACKAGES



527 164

TASK FORCE
LINE PACKAGE GUIDELINE
FOR IE BULLETIN 79-02

79-02 BULLETIN

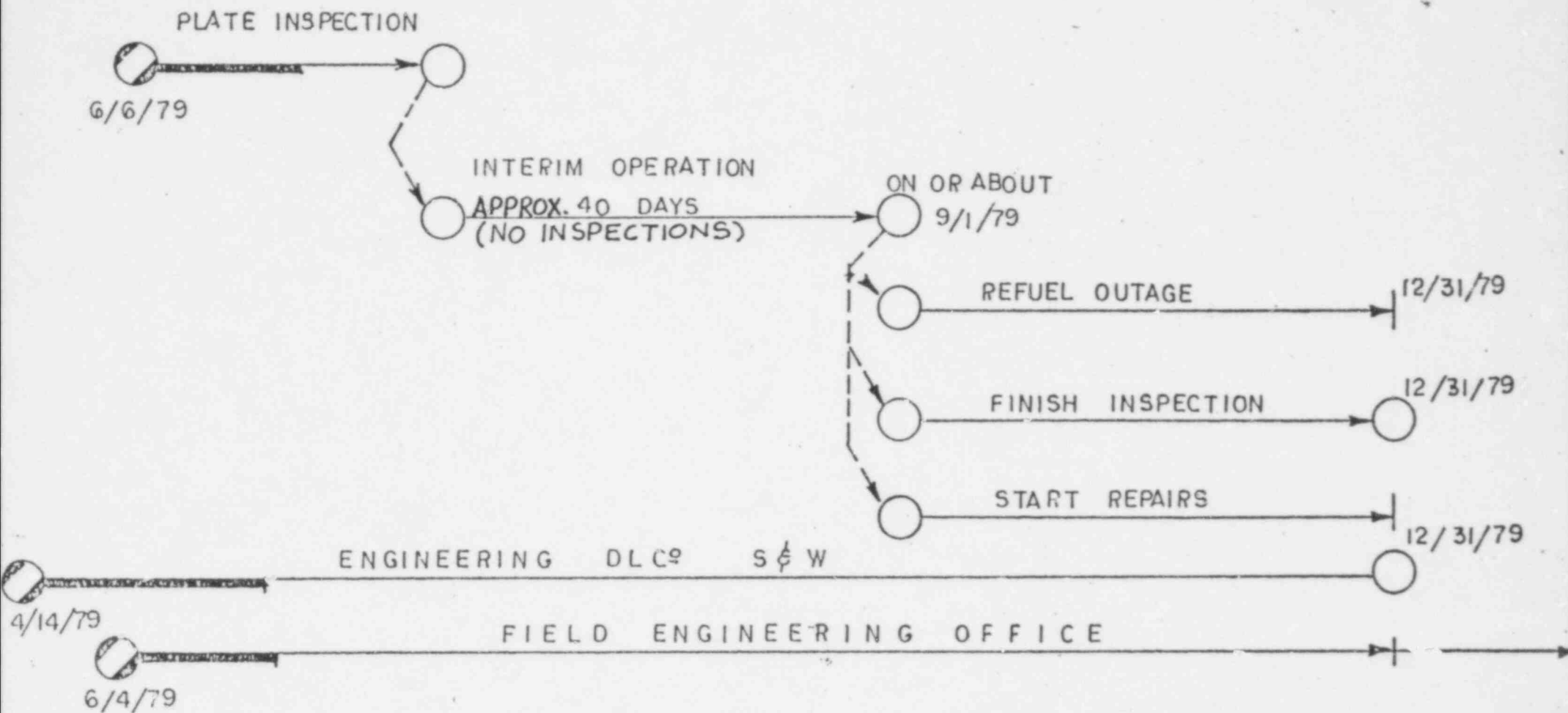
DATE JULY 2 1979

ATTACHMENT F

* CONTAIN SAFE

SHUT DOWN

SYSTEM	TOT. R.S.	79-02-01 VISUAL INSPECTION	79-02-02-03 TORQUE/TENSION TESTED A.	PLATES	R'S	ANCH.	PLATES DEFERRED	REQ. ENG. EVAL.	UATION B.	FAILING C.	PERCENT ACCEPTED
79-02-01 VISUAL INSPECTION	108	79	409	15	25	27	93				
79-02-02-03 TORQUE/TENSION TESTED A.	11	10	34	16			100				
79-02-02-03 TORQUE/TENSION TESTED A.	4	4	54		9		100				
79-02-02-03 TORQUE/TENSION TESTED A.	8										
79-02-02-03 TORQUE/TENSION TESTED A.	26	14	13	50	9		100				
79-02-02-03 TORQUE/TENSION TESTED A.	3	1	1	6	2		100				
79-02-02-03 TORQUE/TENSION TESTED A.	12										
79-02-02-03 TORQUE/TENSION TESTED A.	11	7	6	24	2		91.7				
79-02-02-03 TORQUE/TENSION TESTED A.	65	19	18	94	6		100				
79-02-02-03 TORQUE/TENSION TESTED A.	52	2	2	10	5		100				
79-02-02-03 TORQUE/TENSION TESTED A.	93	4	4	26	1		100				
79-02-02-03 TORQUE/TENSION TESTED A.	59										
79-02-02-03 TORQUE/TENSION TESTED A.	2										
79-02-02-03 TORQUE/TENSION TESTED A.	23	9	5	19	3		84.2				
79-02-02-03 TORQUE/TENSION TESTED A.	239	17	12	67	10		100				
79-02-02-03 TORQUE/TENSION TESTED A.	21										
79-02-02-03 TORQUE/TENSION TESTED A.	6										
79-02-02-03 TORQUE/TENSION TESTED A.	21										
79-02-02-03 TORQUE/TENSION TESTED A.	VS										
79-02-02-03 TORQUE/TENSION TESTED A.	WAPD										
79-02-02-03 TORQUE/TENSION TESTED A.	WD										
79-02-02-03 TORQUE/TENSION TESTED A.	WFPD										
79-02-02-03 TORQUE/TENSION TESTED A.	WCCB										
79-02-02-03 TORQUE/TENSION TESTED A.	WR	22	13	71	4	1	2	97.1			
79-02-02-03 TORQUE/TENSION TESTED A.	TOTAL	218	167	864	46	68	34	95.7			



527 166

BEAVER VALLEY UNIT NO. 1
NRC I/E BULLETIN 79-02
PIPE SUPPORT BASE PLATE
COMPLIANCE PROGRAM
W.F.F. 6/27/79

ATTACHMENT G