

ITT GRINNELL VALVE CO., INC.
DIA-FLO DIVISION
33 CENTERVILLE ROAD
LANCASTER, PA 17603

QA CONDITION 1

DIV	STATUS	INIT.	DATE
CIVIL			
MECH	AA	CDB	
ELECT			

STATIC DEFLECTION TEST
4" ITT GRINNELL DIAPHRAGM VALVE
WITH
A 14NAT1 ROTORK FOR DUKE POWER

APPROVED
DUKE POWER CO.
DATE: DEC 17 1980
S. K. BLACKLEY, JR. -
CHIEF ENGINEER
By: MECHANICAL DIVISION

DOCUMENT
CONTROL DATE
NOV 24 1980
DUKE POWER COMPANY
DESIGN ENGINEERING

REPORT NO. W-156-A

PREPARED BY

Stephen M. Schmidt

Stephen M. Schmidt, Senior Prod. Eng.

APPROVED BY

Francis C. Rosch P.E.

P.E. #2855-E

Francis C. Rosch, Mgr. Prod. Eng.

SH1-6

CNM 1205.04-0335

10722

SEPTEMBER 1980

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A. Static Deflection Test Procedures ITT Grinnell Diaphragm Valves in Accordance with Duke Power Co. Specification No. CNS-1205.04-1	

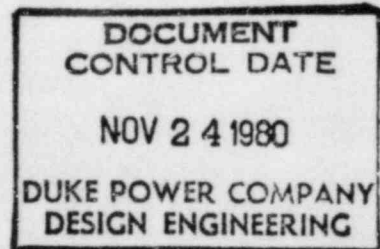
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1.0 INTRODUCTION

On September 17, 1980, a static deflection test was performed on a 4" ITT Grinnell buttweld end diaphragm valve with a model 14NAT1 Rotork electric actuator. The test was conducted at ITT Grinnell Dia-Flo Division, Lancaster, Pennsylvania, and witnessed by two (2) Duke Power Company representatives. The procedure for the test was covered by ITT Grinnell Report No. 2344, Rev. 2. Minor deviations to this procedure were made; they have been documented in the text of this report.



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2.0 List of Observers:

OPERABILITY TEST OBSERVERS

DATE: SEPT - 17 - 1980

LOCATION: ITT GRINNELL LANCASTER PA

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NAME	- COMPANY	TITLE
<i>Stephen Schmidt</i>	ITT GRINNELL	Senior Product Engineer
<i>Chris Schmitt</i>	ITT Grinnell	Techn.
<i>H. E. Edwards</i>	Duke Power	Design Engr
<i>C. D. Brandt</i>	Duke Power	Design Engr
<i>J. Bentley</i>	ITT Grinnell	Admin. Asst.
CNM	1205.04-0335	40822

3.0 TEST SET-UP

The set-up for the deflection test was identical to that described in section 5 of the test procedure with the following exceptions:

- a) The valve assembly was mounted in Dia-Flo's deflection test rig (Fig. 1). Note: valve was mounted in vertical plane; therefore, the applied force was greater than indicated in section 5.5.
- b) Force was applied via loadcell (Fig.3). Because the center of gravity of the actuator was not accessible, the tip of the loadcell was placed 19.25 inches above pipe centerline.



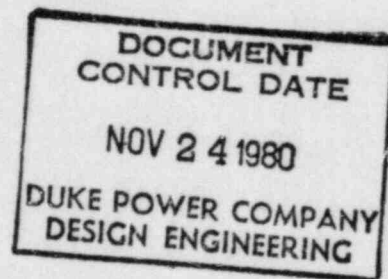
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4.0 PROCEDURE

The procedure was as described in section 6.0 of Report No. 2344, with exceptions noted in 3.0 of this report.

5.0 RESULTS

- 5.1 With the full load (1225 lbs.) applied above the actuator's center of gravity, the valve stroked from the fully open to fully closed position against 150 psi line pressure in 3.4 sec. (Fig. 2).
- 5.2 The valve was leak tight against 150 psi differential air pressure when closed.
- 5.3 A copy of the Operability Data Sheet was included in the 'Results' section.



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Project Duke Power

OPERABILITY SHEET

VALVE SIZE 4 IN

TESTER Stephen M. Schmidt

VALVE TYPE DIAPHRAGM VALVE

DATE SEPT 17 - 1980

OPERATOR MFG. ROTORK

APPROVED BY J. E. Edwards

OPERATOR MODEL NO. 14 NATI
Serial # B6078, B3

DATE 9-17-80

OPERATOR VOLTAGE 575 v

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Center of Gravity of Operator from Valve Center Line 17.2 IN

Weight of Valve Operator 231 LBS LB

Orientation of Operator with respect to Pipe Center Line MOTOR PERPENDICULAR TO PIPE AXIS

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Static Loading on Structure 1225

Line Pressure In Valve 150 PSI

Time Required from Close to Open 7.8 SEC

Time Required from Open to Close 3.4 SEC

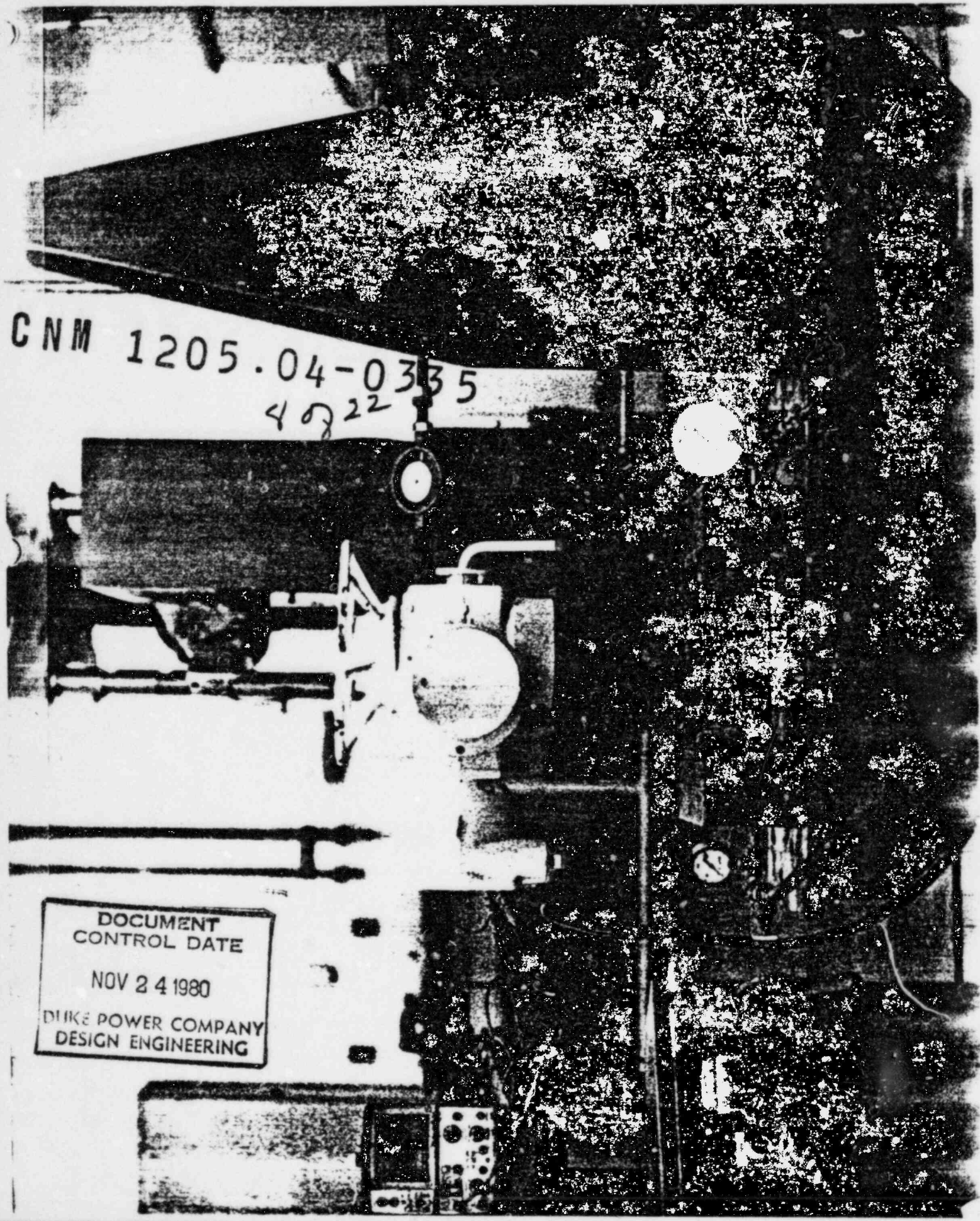
OBSERVATIONS: No Bending or hindrance of operation
No LEAKAGE AT END OF HOSE IN CLOSED POSITION

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FIG. 1

TEST SET-UP



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OSCILLOSCOPE MEASUREMENT
Operation Open to Close with 150 psi Line Pressure
Horizontal Axis .5 sec/div

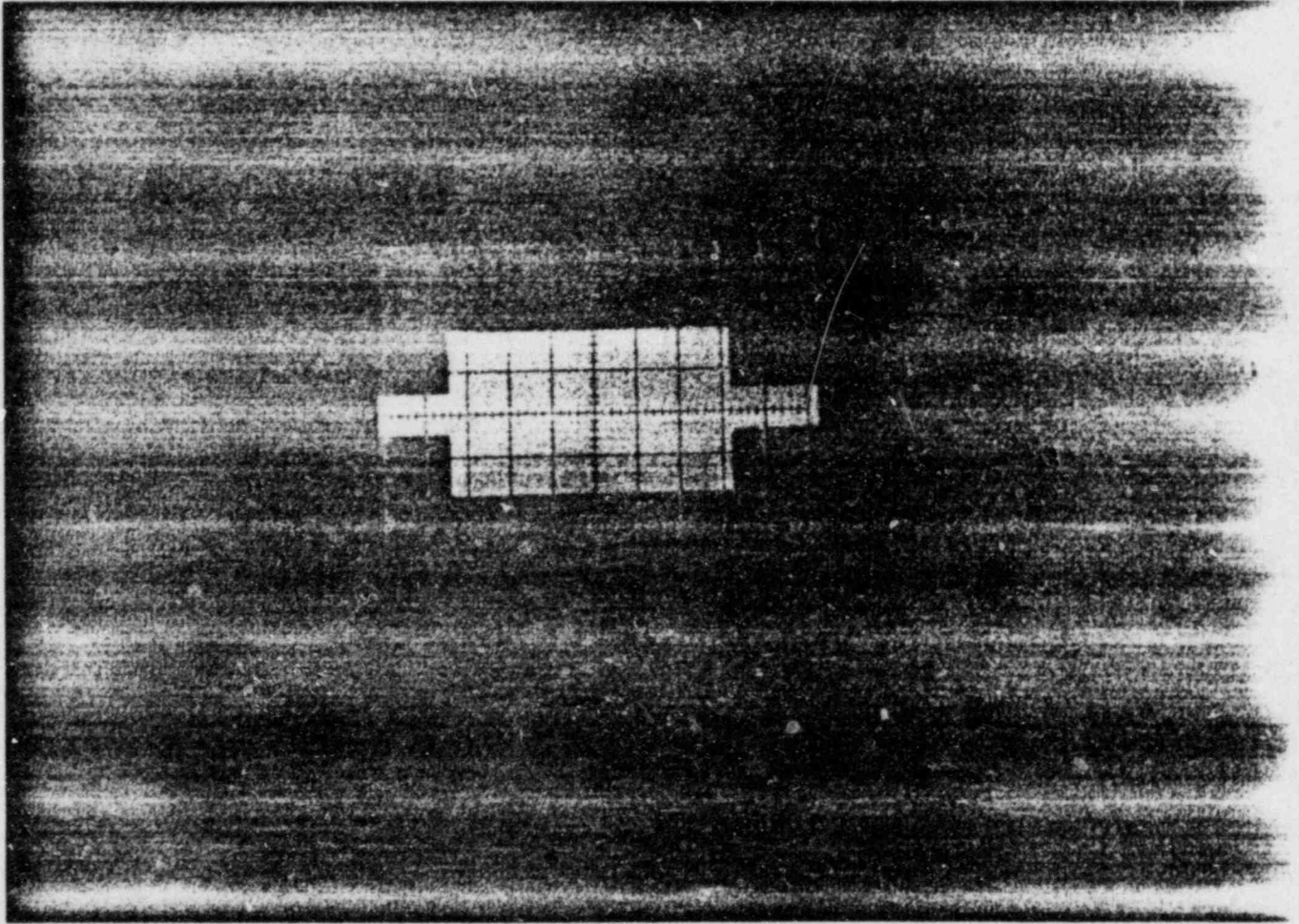


Fig. 2

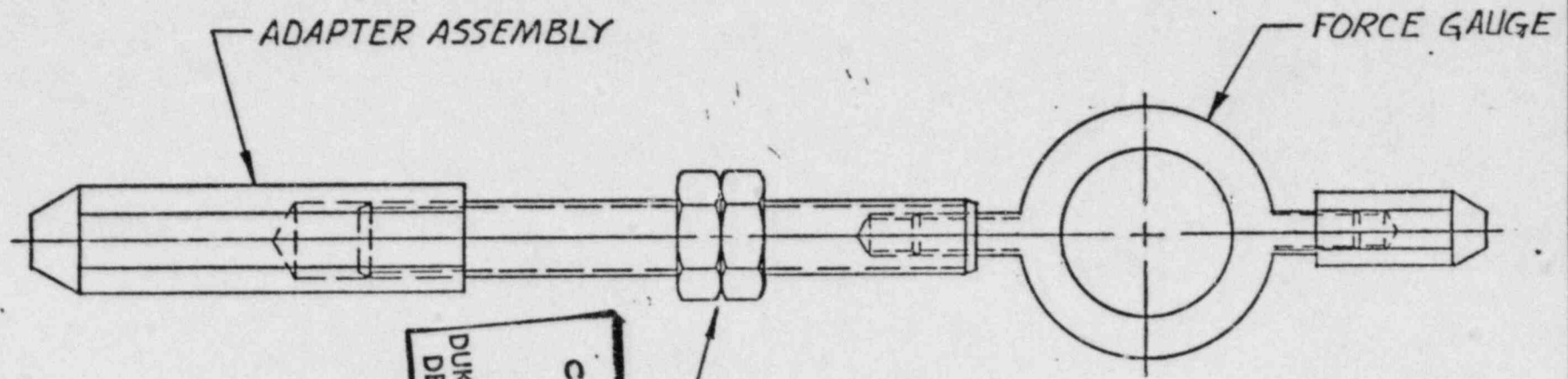
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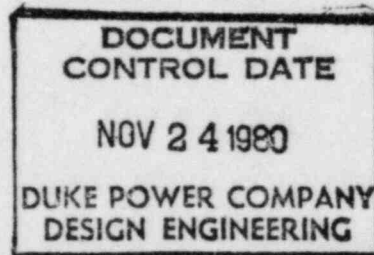
FORCE IS ADJUSTED BY
 ROTATING ADAPTER
 RELEATIVE TO GAUGE.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN PARENTHESES ARE MILLIMETERS

				TOLERANCES EXCEPT AS NOTED		DATE		BY		ITT Grinnell Valve Co., Inc. DIA-FLO DIVISION LANCASTER, PA. 17603				
				FRACTIONS ±		DRN. 5-17-80		JFW					FIGURE (3)	
				DECIMALS ±		CHK.								
				ANGLES ±		APPD								
				MILLIMETERS ±		WT.		LB.		DV A				
ALT. DATE WR NO. BY				RADIANS ±		KG.		SCALE				SUPERSEDES		

APPENDIX A

Static Deflection Test Procedures
ITT Grinnell Diaphragm Valves in
Accordance with Duke Power Company
Specification No. CNS-1205.04-1



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RESEARCH, DEVELOPMENT AND ENGINEERING DIVISION
ITT GRINNELL CORPORATION
PROVIDENCE, RHODE ISLAND

STATIC DEFLECTION TEST PROCEDURE
ITT GRINNELL DIAPHRAGM VALVES
IN ACCORDANCE
DUKE POWER CO. SPECIFICATION
NO. CNS-1205.04-1

DOCUMENT
CONTROL DATE
NOV 24 1980
DUKE POWER COMPANY
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July 24, 1979

Report No. 2344



ITT Grinnell Corporation
 Executive Offices
 260 West Exchange Street
 Providence, Rhode Island 02901
 Telephone (401) 831-7000

Research, Development and Engineering Division

PREPARED BY John Short
 DATE July 24, 1979
 CHECKED AND APPROVED BY Henry Sonderegger
 DATE July 31, 1979

REPORT NO. 2344-1
 DATE July 24, 1979

QA CONDITION 1

REV. NO.	DESCRIPTION	PREPARED BY	APPROVED BY
0	Initial Issue	John Short	Henry Sonderegger

APPROVED
 DUKE POWER CO.
 DATE DEC 17 1980
 S. K. BLACKLEY
 CHIEF ENGINEER
 By MECHANICAL DIVISION

DOCUMENT CONTROL DATE
 NOV 24 1980
 DUKE POWER COMPANY
 DESIGN ENGINEERING

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PROJECT STATIC DEFLECTION TEST

PROJECT NO. 2344-1

TABLE OF CONTENTS

1. Purpose of Test
2. Scope
3. Equipment
4. Test Set-Up
5. Procedure and Sequence
6. Test Report

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PROJECT STATIC DEFLECTION TEST

SHEET NO. 1 OF 6

PROJECT NO. 2344-1

1.0 Purpose of Test

Duke Power Company Specification No. CNS-1205.04-1, Attachment No. 5.6, Paragraph 3.4.2 requires a Static Deflection Test to verify operability conditions. The test described, herein, is designed to satisfy these requirements.

2.0 Scope

The test described, herein, is applicable to ITT Grinnell diaphragm valves supplied with extended operator structures.

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PROJECT STATIC DEFLECTION TESTSHEET NO. 2 OF 6PROJECT NO. 2344-1**3.0** Equipment

- 1) Riehle 300,000 lb. Tensile Testing Machine
- 2) Calibrated Load Cell
- 3) Calibrated Pressure Gage
- 4) Nitrogen Bottle or air supply
- 5) Regulator
- 6) Small Diameter Piping
- 7) Power Source for Electric Motor Operator
(Operator to be Supplied by Duke Power)

**DOCUMENT
CONTROL DATE**

NOV 24 1980

**DUKE POWER COMPANY
DESIGN ENGINEERING****4.0** Test Set-Up

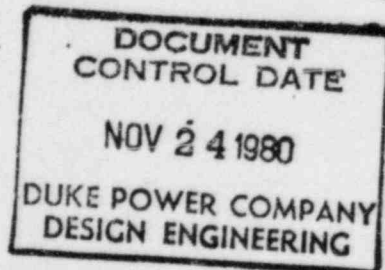
- 4.1 Butt weld body modified in accordance with Figure 1. The plates have a tapped hole so that the valve can be pressurized and seat sealing capability verified.
- 4.2 The operator is mounted on the valve body/ bonnet assembly with the most compliant direction of the extended structure in line with the pipe run.

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PROJECT STATIC DEFLECTION TESTSHEET NO. 3 OF 6PROJECT NO. 23444.0 Test Set-Up (Continued)

- 4.3 The assembly is clamped in the Riehle Tensile Test Machine with pieces of pipe placed between the welded plates and the test machine base and head. The pipe pieces have slots in order to allow piping to be tied into the tapped holes in the plate (Figure 2).
- 4.4 Small diameter piping is piped into the valve as shown in Figure 2. A nitrogen bottle or air supply, regulator, and calibrated test gage is attached to piping introduced into the lower end of the valve. The piping attached to the top end of the valve has a shut-off valve.
- 4.5 A strap is placed around the operator so that the applied load is in line with the center of gravity of the operator. A load cell is placed between the point of application of the load and a hoist.



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PROJECT STATIC DEFLECTION TEST

SHEET NO. 4 OF 6
PROJECT NO. 2344-1

4.0 Test Set-Up (Continued)

4.6 An appropriate power source and controls will be provided when actuator data is known (Duke Power to supply actuator).

5.0 Procedure and Sequence

5.1 The valve is positioned by the electric actuator in the closed position.

5.2 A vertical static load will be applied acting through the approximate center of gravity of the operator (Figure 2). The magnitude of the applied load will be the resultant of the loads resulting from the respective specified accelerations. The applied static load will take into account the horizontal orientation of the valve actuator assembly. The adjusted static load will be applied perpendicular to the valve stem axis, thereby, producing a conservative loading condition.

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5.0 Procedure and Sequence (Continued)

5.3 Shut-off valve on the small diameter piping is closed.

5.4 Test gage pressure from the Nitrogen bottle or air supply regulated to the specified line pressure.

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5.5 The valve is then cycled three complete open-close cycles with the valve body pressurized to the specified line pressure. When the valve closes, valve sealing capability will be demonstrated by the air under water method (Figure 2).

5.6 During cycling, the operation of the valve will be checked for visible binding or gross structural deformation of the operator structure.

5.7 A photograph of each valve set-up will be taken and included in the test report.

APPROVED
DUKE POWER CO.
DATE DEC 17 1980
S. K. BLACKLEY
CHIEF ENGINEER
By MECHANICAL DIVISION

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PROJECT STATIC DEFLECTION TEST

SHEET NO. 6 OF 6

PROJECT NO. 2344-1

6.0 Test Report

6.1 The report will comply with the requirements of Duke Power Company Specification No. P8151205. 29-00-0001, Attachment 5.13, as applicable.

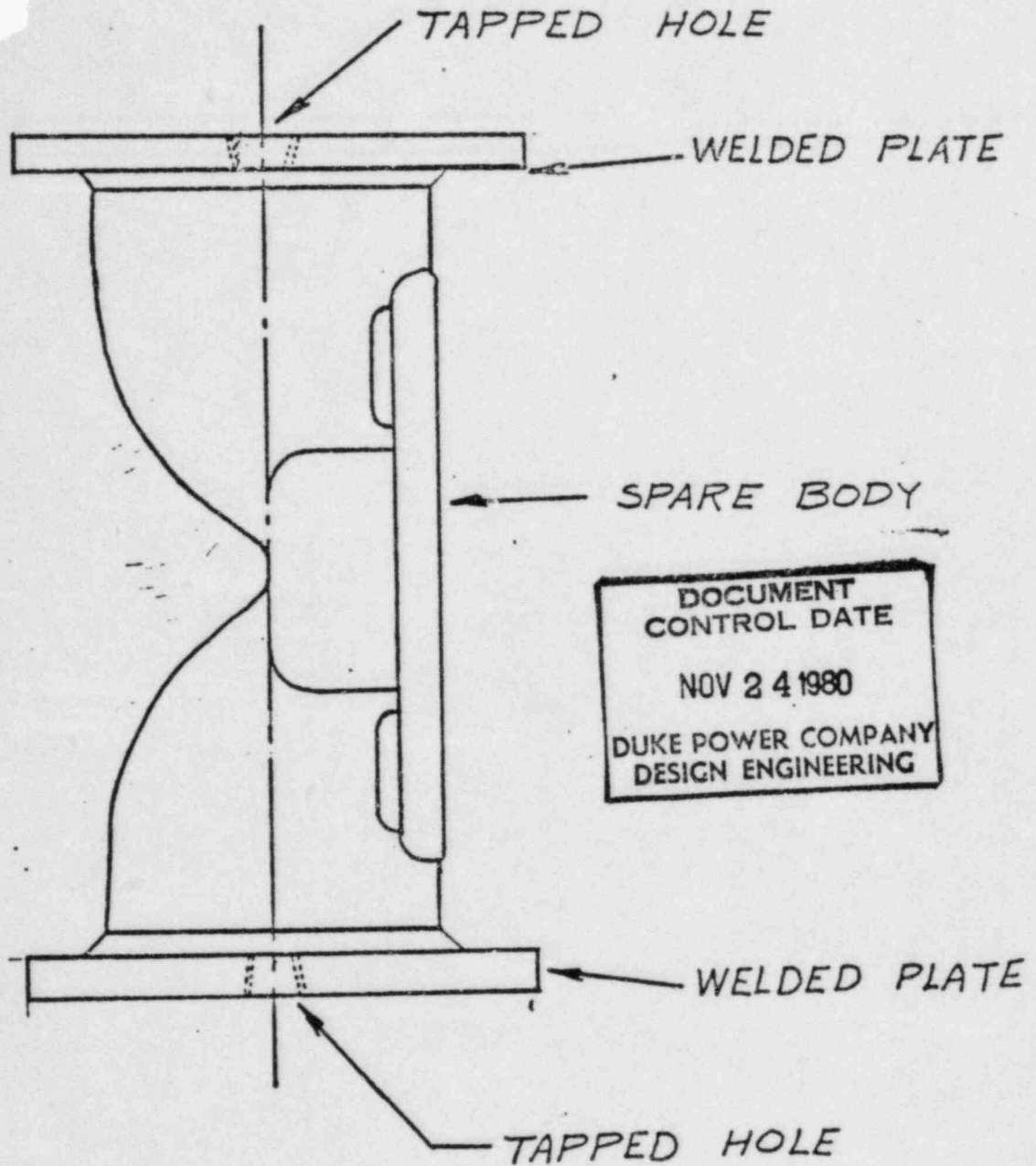
6.2 The report will include the procedure described herein, recorded test results and photographic documentation of the test.



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PROJECT STATIC DEFLECTION TEST

PROJECT NO. 2344



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NOV 24 1980
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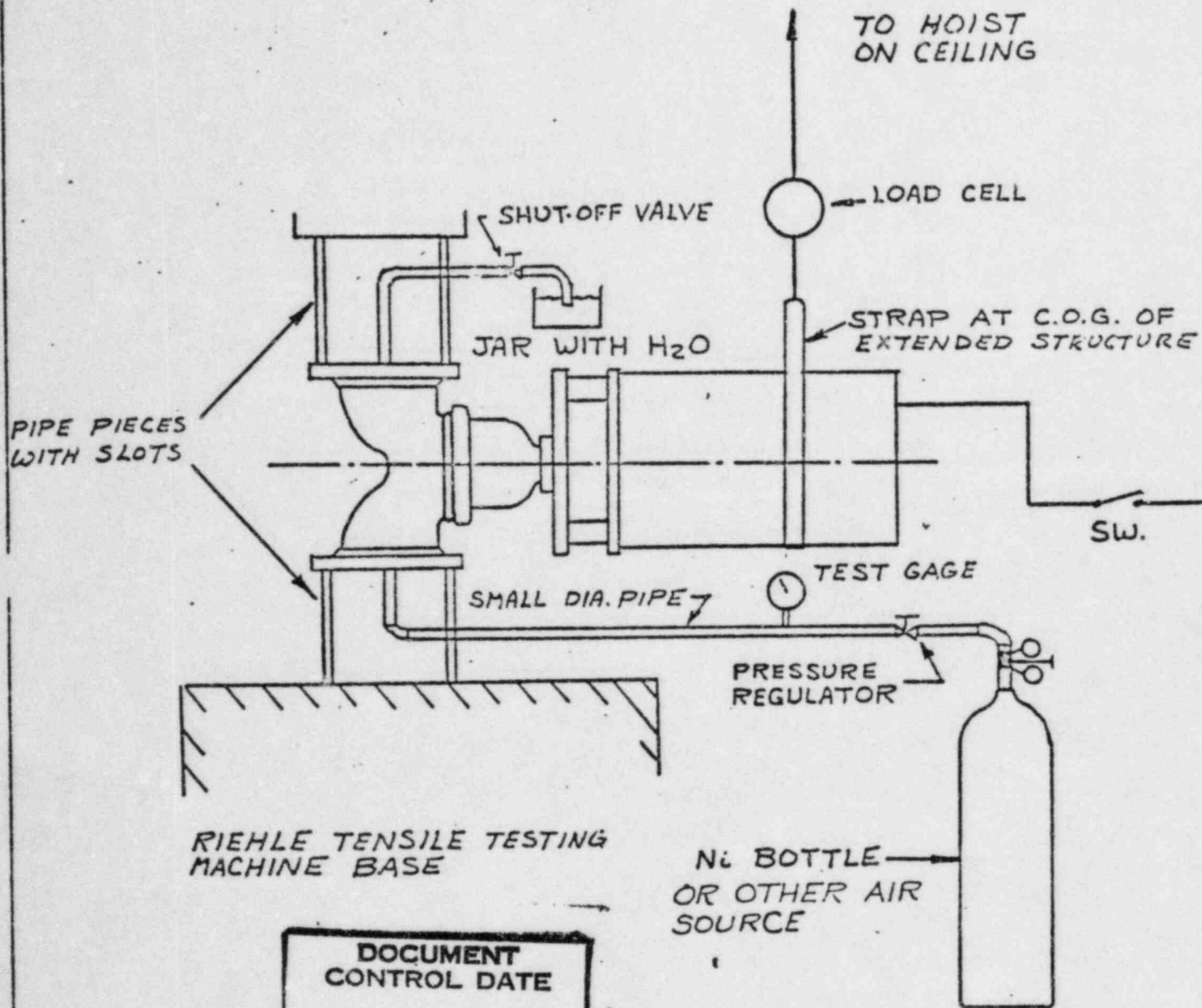
FIG 1

2108²²

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PROJECT STATIC DEFLECTION TEST

PROJECT NO. 2344



RIEHLE TENSILE TESTING
MACHINE BASE

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N₂ BOTTLE
OR OTHER AIR
SOURCE

FIG 2

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Attachment 5
Specification
for
Valves VQ3B and VQ15B