PHILADELPHIA ELECTRIC COMPANY

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SHIELDS L. DALTROFF
VICE PRESIDENT
ELECTRIC PRODUCTION

September 28, 1984

Docket Nos. 50-277
50-278

Mr. John F. Stolz
Operating Reactors Branch #4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: Peach Bottom Atomic Power Station, Units 2 and 3, Request for Relief of Operating Restrictions on the Purge and Vent Valves

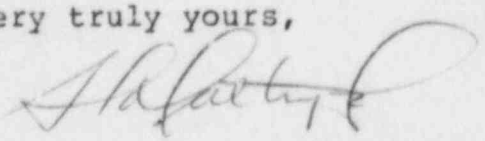
REFERENCE: Correspondence dated April 24, 1984, S. L. Daltroff (PECo) to J. F. Stolz (NRC)

Dear Mr. Stolz:

This letter formally transmits design data for the six and eighteen-inch containment purge and vent valves as requested by the NRC staff in a September 5, 1984, telephone conversation. The data consists of valve actuator torque output calculations as previously reviewed by the NRC's consultants. It is our understanding that the data was found to be acceptable to the consultant. This data relates to our request in the referenced correspondence to increase the maximum allowable open position on the containment purge and vent valves based on planned improvements to valve components.

Should you have any questions regarding this matter, please do not hesitate to contact us.

Very truly yours,



cc: A. R. Blough, Site Inspector

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1/1

Peach Bottom Atomic Power Station
Units 2 & 3

Calculations for Actual Actuator Torque Output for
6" & 18" Fisher Continental Division Butterfly Valves, 9200 Type

Serial Nos. 136937 thru 136954

Provided by: Bruce D. Hatton
Clifford B. Ives & Co., Inc.
Representative of Fisher Controls International, Inc.

Equation for the actual Actuator Torque Output:

$$T_N = M\,(Pa - \Delta_T\, B_S - 1.05\, Kt)$$

where T_N = Actual (Net) Torque Output

M = Moment Arm @ linkage

P = Max. Air Pressure

a = Diaphragm Area @ desired $\angle$

Δ_T = Initial Diaphragm Area

B_S = Initial Spring Compression Pressure

1.05 = Constant

K = Spring Constant

t = Spring Travel Distance

Calculation of Actuator Torque Output for the
6" Fisher Butterfly Valves, 9200 Type, S/N 136953 & 136954

656 Size 40 Net Torque Per Degree of Rotation

$T_N = M (Pa - \Delta_T B_S - 1.05 Kt)$

$= M (30a - 99.7(6) - 1.05\ 335t)$

$= M (30a - 598.2 - 351t)$

M, a, t from Table 1

Spring 1L2173
Size 40
30 Psi Supply
6.26 Bench

10° $T_N = 2.02 (30 \times 86 - 598.2 - 351 \times .33)$
$= 2.02 (1981.8 - 115.83)$
$= 3769.25$

20° $T_N = 2.25 (30 \times 78.5 - 598.2 - 351 \times .70)$
$= 2.25 (1756.8 - 245.7)$
$= 3399.97$

30° $T_N = 2.40 (30 \times 74.5 - 598.2 - 351 \times 1.11)$
$= 2.40 (1636.8 - 389.61)$
$= 2993.25$

40° $T_N = 2.46 (30 \times 72.6 - 598.2 - 351 \times 1.53)$
$= 2.46 (1579.8 - 537.03)$
$= 2565.21$

50° $T_N = 2.45 (30 \times 72.3 - 598.2 - 351 \times 1.96)$
$= 2.45 (1570.8 - 687.96)$
$= 2162.95$

60° $T_N = 2.37 (30 \times 72.5 - 598.2 - 351 \times 2.39)$
$= 2.37 (1576.8 - 838.89)$
$= 1748.84$

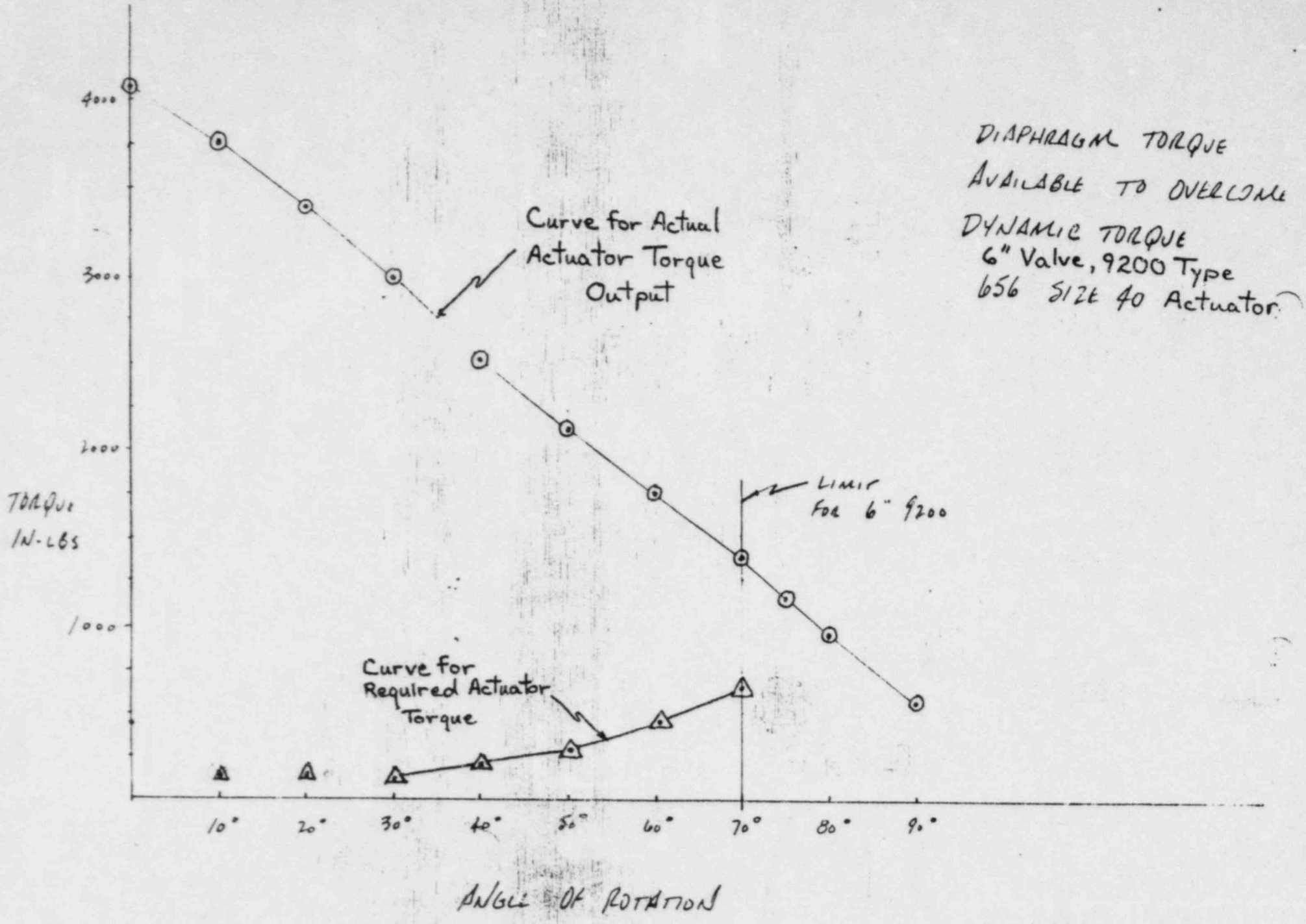
70° $T_N = 2.23 (30 \times 72.6 - 598.2 - 351 \times 2.79)$
$= 2.23 (1579.8 - 979.29)$
$= 1339.13$

80° $T_N = 2.02 (30 \times 72.2 - 598.2 - 351 \times 3.16)$
$= 2.02 (1567.8 - 1109.16)$
$= 926.45$

90° $T_N = 1.77 (30 \times 70.4 - 598.2 - 351 \times 3.49)$
$= 1.77 (1513.8 - 1224.99)$
$= 511.19$

0° $T_N = 1.72 (30 \times 99.7 - 598.2)$
$= 4115.61$

75° $T_N = 2.13 (30 \times 72.5 - 598.2 - 351 \times 2.98)$
$= 2.13 (1576.8 - 1045.98)$
$= 1130.64$


DIAPHRAGM TORQUE
AVAILABLE TO OVERCOME
DYNAMIC TORQUE
6" Valve, 9200 Type
656 SIZE 40 Actuator
Curve for Actual
Actuator Torque
Output
LIMIT
FOR 6" 9200
Curve for
Required Actuator
Torque
TORQUE
IN-LBS
4000
3000
2000
1000
10°
20°
30°
40°
50°
60°
70°
80°
90°
ANGLE OF ROTATION

Calculation of Actuator Torque Output for the
18" Fisher Butterfly Valves, 9200 Type, S/N 136937 thru 136952

656 Size 60 Net Torque Output

Spring 1K1628
30 psi Supply
6.26 Bench

$T_N = M (Pa - \Delta_T B_S - 1.05 Kt)$

$= M (30a - 214.9(6) - 1.05 (610)t)$

0° T_N = 2.06 (30 x 214.9 - 214.9(6) - 1.05x 610 x 0)
= 2.06 (5157.6)
= 10624.65

10^{0} T_N = 2.41 (30 x 181.5 - 1289.4 - 640.5 x .39)
= 2.41 (4155.6 - 249.79)
= 9413.0

20° T_N = 2.67 (30 x 171.2 - 1289.4 - 640.5 x .84)
= 2.67 (3846.6 - 538.02)
= 8833.90

30° T_N = 2.85 (30 x 165.5 - 1289.4 - 640.5 x 1.32)
= 2.85 (3675.6 - 845.46)
= 8065.89

40° T_N = 2.93 (30 x 164.5 - 1289.4 - 640.5 x 1.82)
= 2.93 (3645.6 - 1165.71)
= 7266.07

50° T_N = 2.92 (30 x 164.2 - 1289.4 - 640.5 x 2.34)
= 2.92 (3636.6 - 1498.77)
= 6242.46

60° T_N = 2.83 (30 x 164.5 - 1289.4 - 640.5 x 2.84)
= 2.83 (3645.6 - 1819.02)
= 5169.22

70° T_N = 2.65 (30 x 164.4 - 1289.4 - 640.5 x 3.32)
= 2.65 (3642.6 - 2126.46)
= 4017.77

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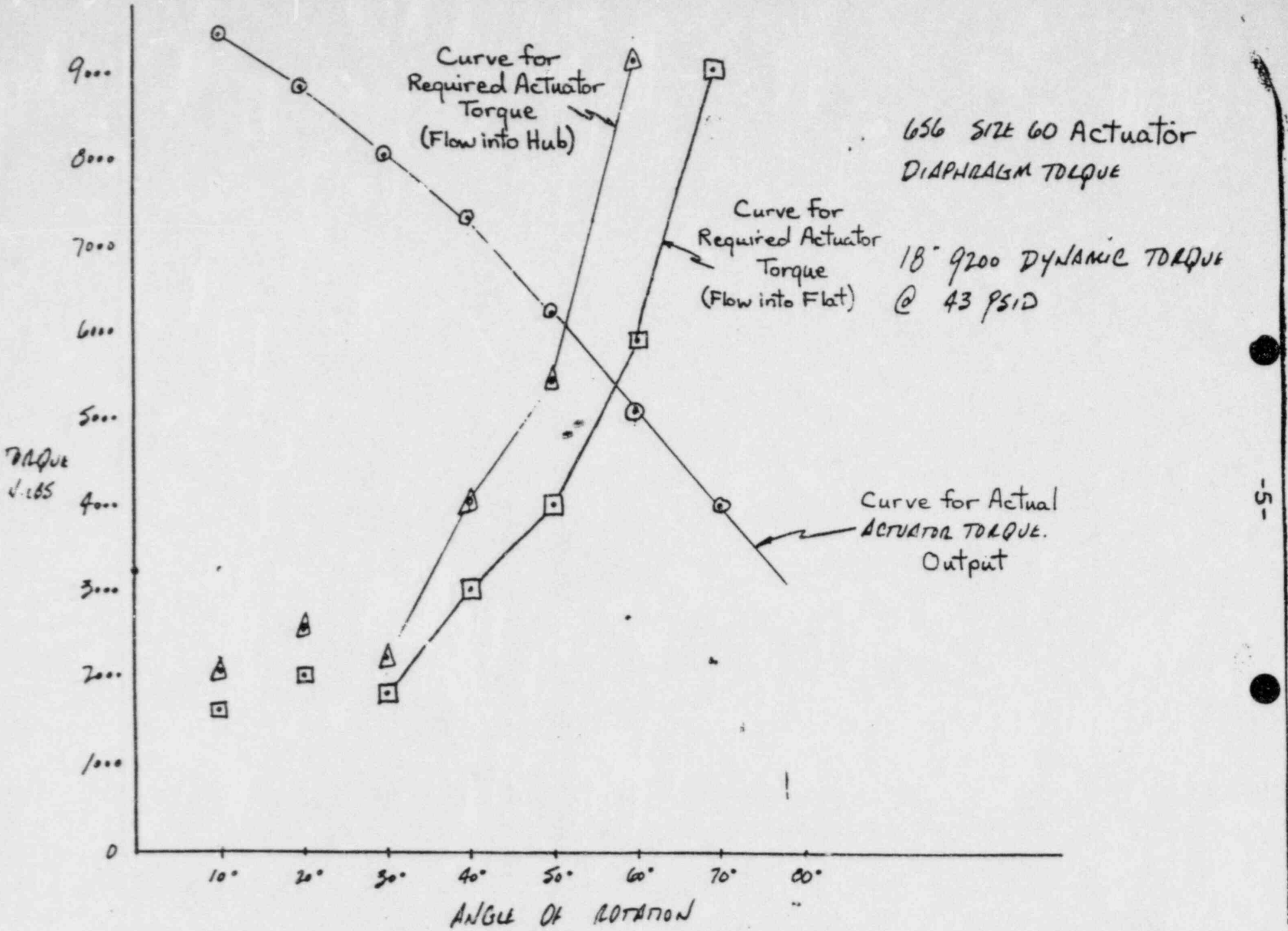
Curve for Required Actuator Torque (Flow into Hub)
Curve for Required Actuator Torque (Flow into Flat)
Curve for Actual ACTUATOR TORQUE. Output
656 SIZE 60 Actuator
DIAPHRAGM TORQUE
18" 9200 DYNAMIC TORQUE @ 43 PSID
TORQUE IN LBS
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
10°
20°
30°
40°
50°
60°
70°
80°
ANGLE OF ROTATION