MEMO ROUTE SLI
Form AEC-93 (Rev. May 14, 1947) AECM 0240

See me about this.	For [illegible]urrence.	For action.
Note and return.	For signature.	For information.

TO (Name and unit)	INITIALS	DATE	REMARKS
IE Chief, FS&EB IE:HQ(4) Licensing(4) DR Central Files J. Rizzo, OMIPC			Wisconsin Public Service Corporation Kewaunee 50-305
A/D for Info. Processing Region I Region II PDR Local PDR			
NSIC TIC OGC, Beth, P-506A			

FROM (Name and unit)	PHONE NO.	DATE	REMARKS
G. Fiorelli IE:III		05-29-75	Attached is a copy of licensee's reply dated May 27, 1975, to IE Bulletin 75-05.

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 445-469

RO
(2)

WISCONSIN PUBLIC SERVICE CORPORATION

P.O. Box 1200, Green Bay, Wisconsin 54305

May 27, 1975

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Attention: Mr. James G. Keppler
Regional Director

Dear Mr. Keppler:

Reference: Docket 50-305
Operating License DPR-43
Letter from Mr. Keppler to Mr. James
dated April 14, 1975

The referenced letter transmitted IE Bulletin No. 75-05 requiring a review of the design and installation of the hydraulic restraint systems utilized at the Kewaunee Nuclear Power Plant.

The following information is provided as a result of the review of the design and installation of the hydraulic suppressors providing restraint for systems and components. This information is provided sequentially as it appears in the bulletin:

1a. Provide the design requirements which the various suppressors are intended to meet, such as velocity, acceleration, load, etc. Also, indicate the margin available between the design requirements and the requirements specified for purchase of these components.

Response

Design Requirements Used for Procurement Specifications

The hydraulic suppressors in the Kewaunee Nuclear Power Station are Grinnell's hydraulic Suppressors and Anker-Holth Suppressors. The former are used on the piping systems and the latter are used on the steam generator upper lateral supports. Both suppressors are velocity limiting devices used to minimize undesirable movements due to seismic events, flow pulsation, sway, or the thrust resulting from pipe rupture or safety valve discharge. These suppressors offer high resistance to rapid displacements caused by dynamic loads while permitting very gradual displacements such as that caused by the thermal expansion.

Figure 1 shows the general assembly of the Grinnell suppressors. The threshold velocities for the Grinnell suppressors are listed in Table 1 as "Locking Velocity." Piston displacement velocities lower than those shown in Table 1 can take place freely since the opposing frictional resistance is not over 1% of rated load.

Figures 2 and 3 show the general assembly and the reservoir assembly of the Anker-Holth hydraulic suppressors. The threshold velocities for Anker-Holth suppressors are displayed in Figure 4.

Design Margin

The design requirements of the suppressors are principally governed by the load carrying requirements. The maximum load requirements specified for each suppressor was established through analysis of the loading requirement for expected or postulated operating condition, normal operating, upset, seismic loading, emergency or faulted conditions as applicable to the design of the system. The maximum loads determined above were used in the selection of the suppressors. All suppressors were selected from the manufacturers catalog "normal rated" or "design" load carrying capabilities which in all cases exceeded the calculated maximum load requirements.

Based on selection and design capabilities, suppressors at the Kewaunee Nuclear Power Plant have a design margin varying from 50% to several hundred percent.

1b. Describe the testing of the hydraulic suppressors conducted by you or your supplier(s) prior to installation to assure their operation is in accordance with design requirements.

Response

Anker-Holth and four types of ITT Grinnell hydraulic suppressors, Model BH-1224, -1225, -1226, and -1227 have been installed in the Kewaunee Nuclear Power Plant. To assure that each hydraulic suppressor would meet its design requirements, each suppressor was cleaned (including component parts), inspected and tested before it was field installed. Details describing the testing and inspection of the hydraulic suppressors at Kewaunee are:

(1) Anker-Holth Hydraulic Suppressors

Each suppressor was statically tested when the units were charged with hydraulic fluid and the assembly dynamically tested on a special test stand before release from the vendor's shop. Each suppressor, filled with GE silicone fluid SF1154, was connected to a hydraulic pump through the vent ports of the control valve. Each suppressor was cycled 3 to 4 times by operating the pump. In each

cycle the suppressor underwent a complete stroke, bleeding as necessary to insure complete filling of the suppressor with hydraulic fluid. During this cycling test all units were inspected for piston rod free travel and any indications of leakage.

Dynamic testing subjected each suppressor to its full load capacity. Each suppressor when tested was equipped with its respective mounting bracket and clevis pins. The reaction rates and control valve actuation were verified both in tension and in compression. Restrained operating mode tests were conducted for both tension and compression for the full load capacity. Each unit after testing was inspected for structural soundness and any evidence of fluid leakage. Certified test reports for each suppressor supplied to the Kewaunee Nuclear Power Plant are on file at the manufacturer's facility. Each report identifies the suppressor by serial number and includes the test data.

(2) Grinnell Suppressors (BH-1224 through BH-1227)

Before the snubber valves were assembled all parts were inspected for cleanliness and for complete deburring. After assembly the valve was placed in flow test facility. Each valve was tested to verify proper bleed rate under load. This was accomplished by setting the required value for the locking velocity and then measuring the bleed rate under load. Each snubber valve conformed to bleed rates specified by the manufacturer. Snubber valves used in suppressor models BH-1226 and BH-1227 were assembled without the spring and were subjected to low flow, high pressure tests. This test verified that the spool moved freely to the closed position in each direction and the bypass flow in the closed position was within acceptable limits. Springs were installed in the valves and the valves were installed in the suppressor assembly. Log sheets for each valve are available at the manufacturer's facility documenting the recorded serial numbers and test results.

The piston rod was inspected for surface and subsurface discontinuities. Assembled cylinder piston rod assemblies were cycle tested for in excess of twenty minutes. Following component verification tests the suppressors were assembled as a complete unit.

After the valve was installed in the shock suppressor assembly the completed unit was mounted in a fill and test facility. The unit was filled and purged to insure snubbing movement within the acceptable limits, i.e., a total movement is less than 3/16" to reach the rated load. Data sheets are available at the manufacturer's facility for each suppressor furnished to the Kewaunee Nuclear Power Plant documenting the recorded serial number and test results.

1c. Describe the surveillance (including testing) programs now underway or planned by you to assure continued operability of the hydraulic suppressors under the design conditions throughout the life of the facility.

Response

All hydraulic suppressors associated with the Reactor Coolant System were inspected per the requirements of Section XI of the ASME Boiler and Pressure Vessel Code "Rules for Inservice Inspection of Nuclear Reactor Coolant Systems" Summer 1971 Addenda. Future inspections of these Reactor Coolant System related suppressors will also be in accordance with these requirements.

Hydraulic suppressors associated with systems not directly related to the Reactor Coolant System were visually inspected following completion of installation activities. The inspection verified proper installation and that the hydraulic seals were leak tight.

All hydraulic suppressors were re-inspected for proper installation and adjustment prior to unit startup. During the initial startup and power escalation all hydraulic suppressors were continually inspected for proper operation, alignment and adjustment. These inspections were documented.

Hydraulic suppressors associated with systems not directly related to the Reactor Coolant System will be inspected for leakage and evidence of failure or defects once every 10 years on a rotating schedule.

Hydraulic suppressors which indicate unacceptable seal leakage or evidence of defects or failure shall be repaired in accordance with vendor instructions with appropriate documentation of procedures and verification of operability as dictated by our established Operational Quality Assurance Program.

Very truly yours,

E. W. James
Senior Vice President
Power Supply & Engineering

EWJ:sna
Enc.
cc - Mr. Dwane Boyd, Resident Inspector
Asst Dir for Construction & Operations

GRINNELL

HYDRAULIC SHOCK AND SWAY SUPPRESSOR

FIG. 1

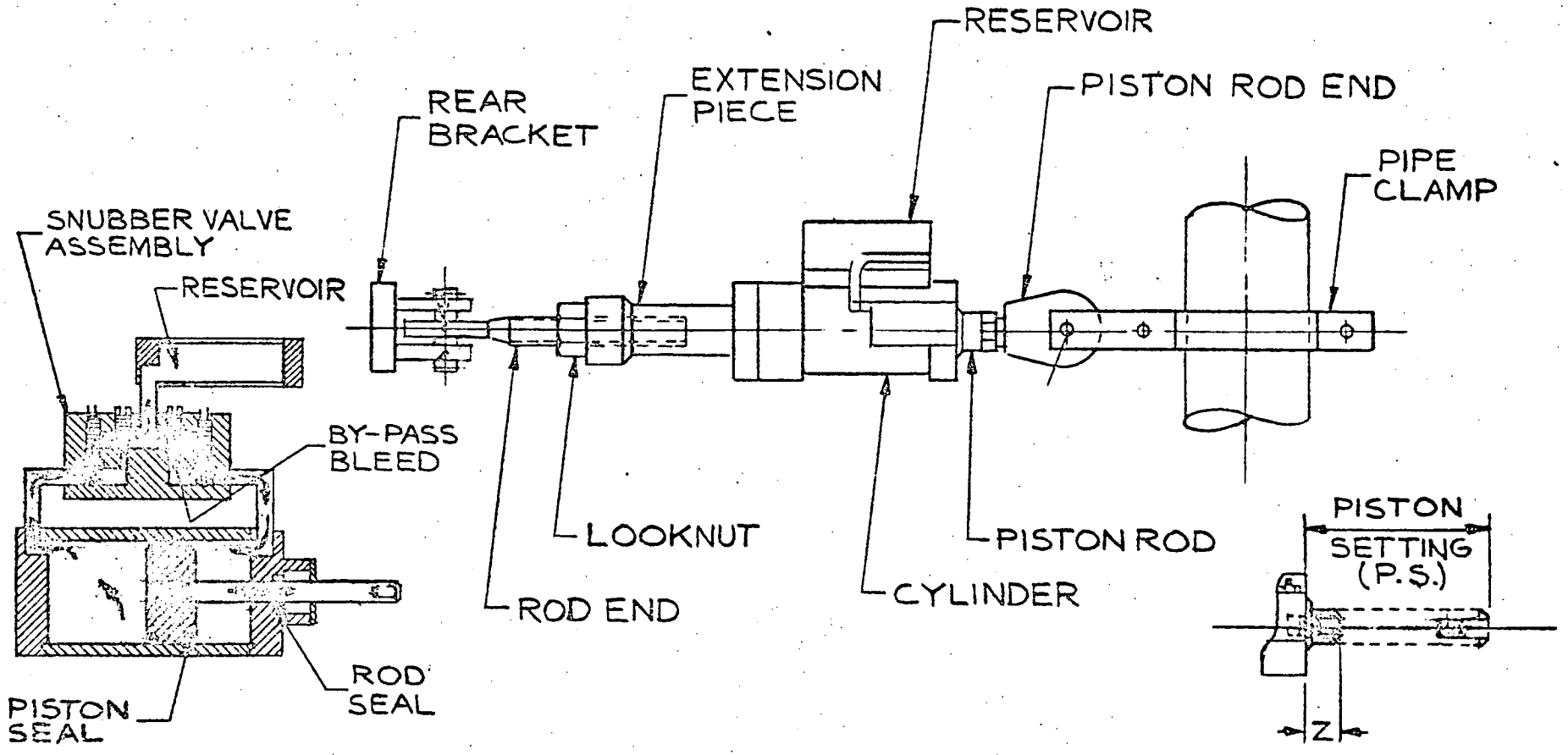


TABLE "1

A CHRONOLOGY OF SPECIFICATIONS FOR GRINNELL SHOCK SUPPRESSORS FOR NUCLEAR POWER PLANTS

THRU MID 1969

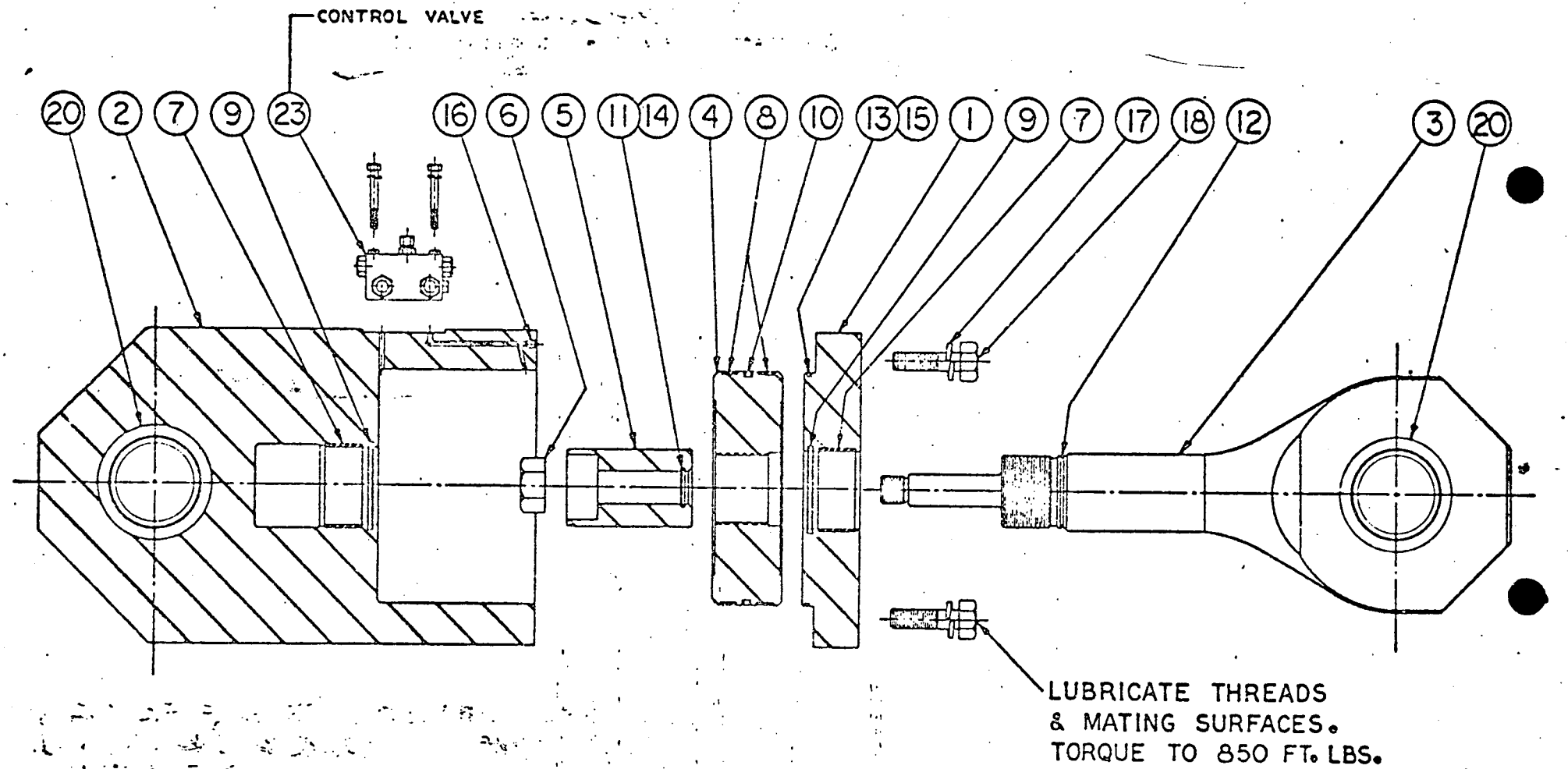
Cyl. Bore Inches	Normal Max. Oper. Load Pounds	Locking Velocity In/Min
2 1/2	11,000	30
3 1/2	21,000	15
4	35,000	12
5	50,000	9
6	72,000	6
8	130,000	3
10	200,000	1.5

MID 1969 - EARLY 1972

1 1/2	2,190	10
2 1/2	11,000	10
3 1/4	21,000	5
4	35,000	4
5	50,000	3
6	72,000	2
8	130,000	1
10	200,000	0.5

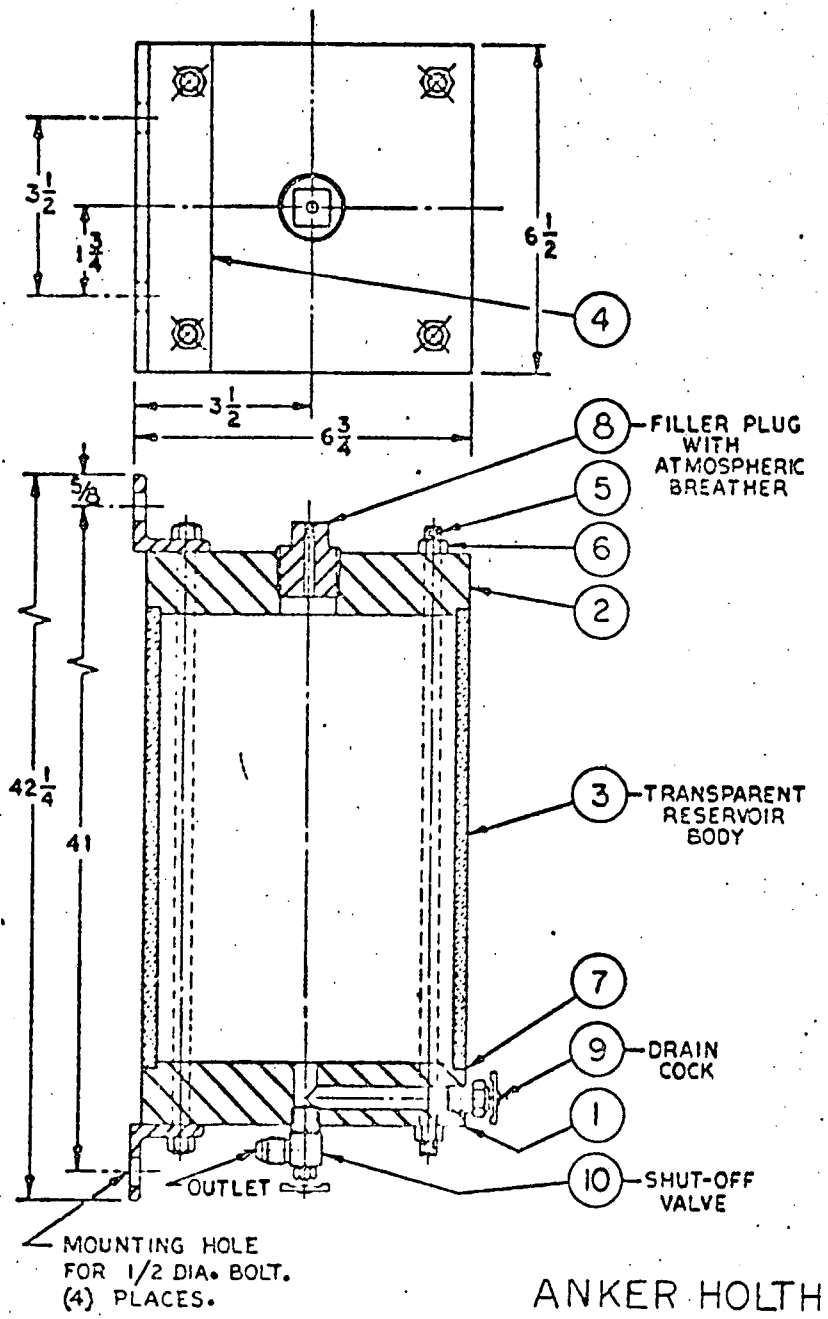
EARLY 1972 - PRESENT

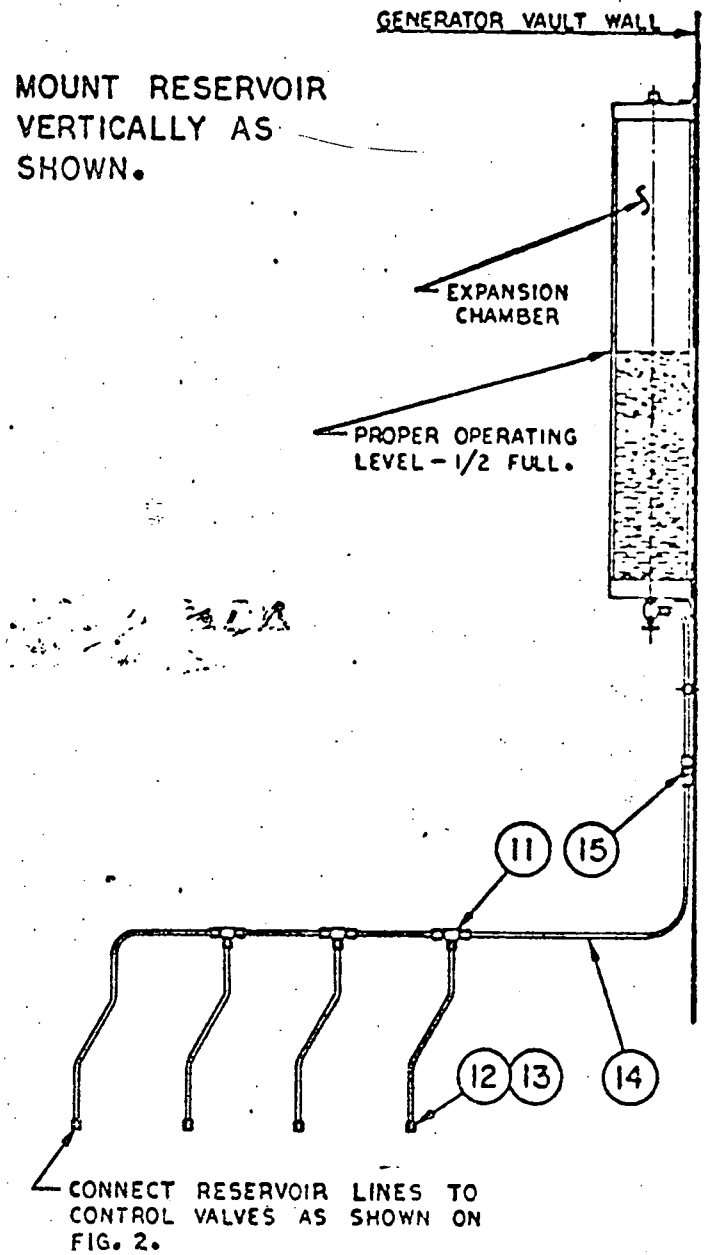
1 1/2	4,500	8
2 1/2	12,500	8
3 1/4	21,000	8
4	32,000	8
5	50,000	8
6	72,000	5
8	128,000	3
10	200,000	3



ANKER HOLTH SUPPRESSOR

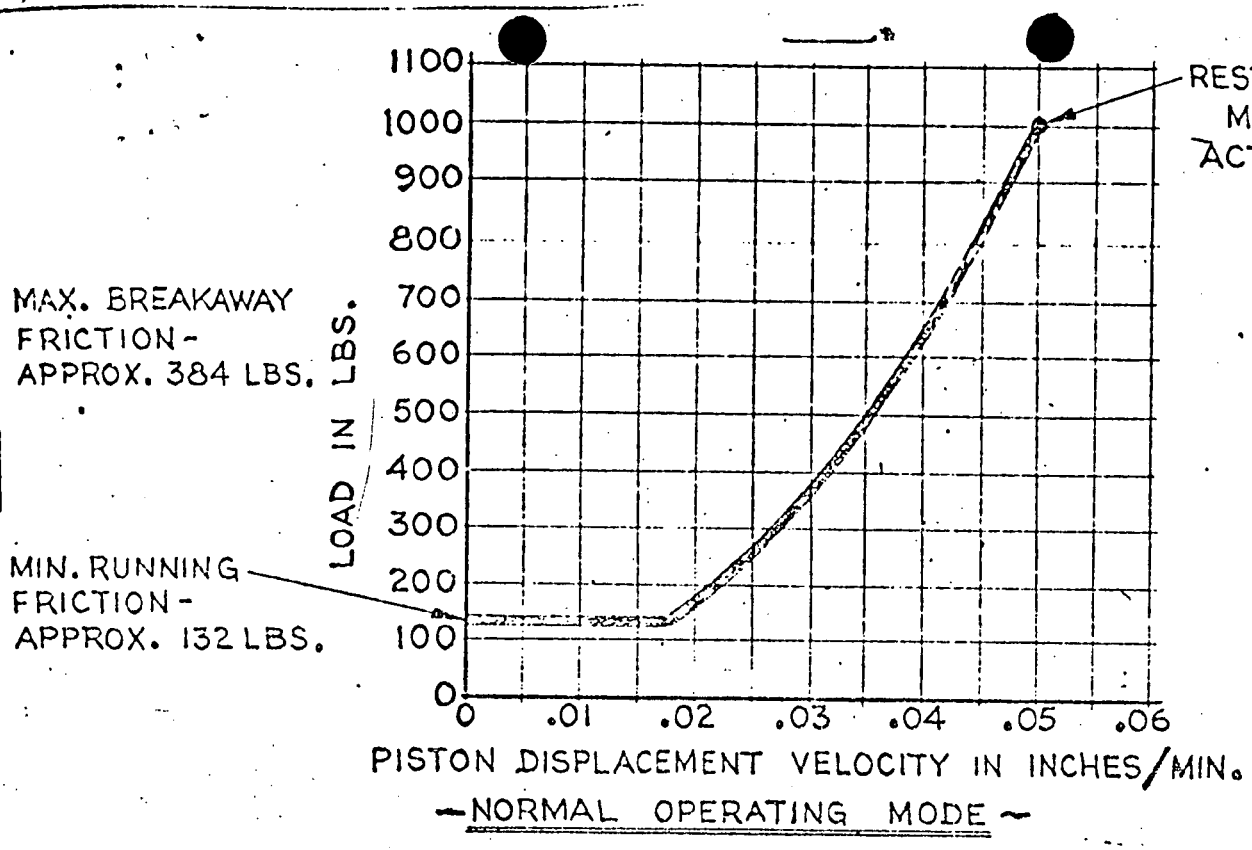
FIG. 2. GENERAL ASSEMBLY DIAGRAM

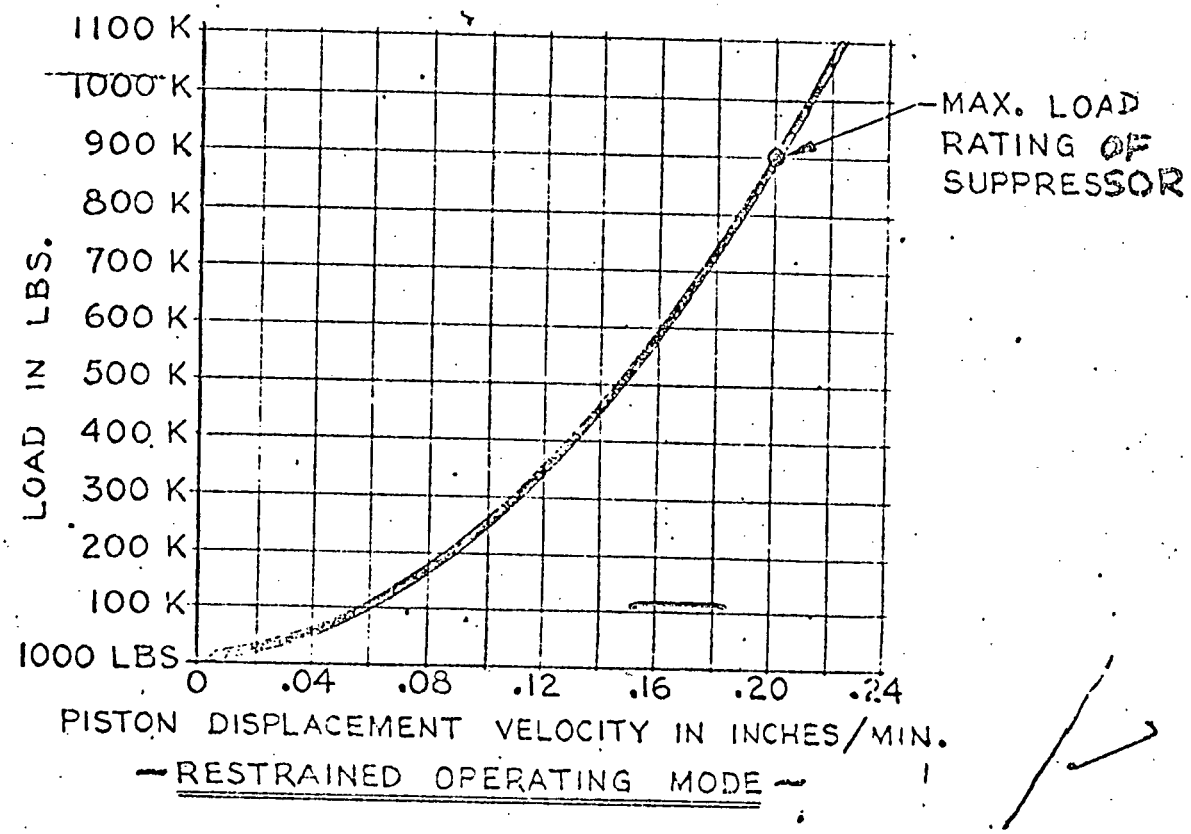




ANKER HOLTH SUPPRESSOR

FIG. 3. RESERVOIR ASSEMBLY





PISTON DISPLACEMENT VELOCITY VS. LOAD FOR ANKER HOLTH

FIG. 4.