

Georgia Power Company
Route 2, Box 299A
Waynesboro, Georgia 30830
Telephone 404 554-9961
404 724-8114

Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202
Telephone 205 870-6011



Vogtle Project

May 16, 1985

Director of Nuclear Reactor Regulation
Attention: Ms. Elinor G. Adensam, Chief
Licensing Branch #4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

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NRC DOCKET NUMBERS 50-424 AND 50-425
CONSTRUCTION PERMIT NUMBERS CPPR-108 AND CPPR-109
VOGTLE ELECTRIC GENERATING PLANT - UNITS 1 AND 2
REQUEST FOR ADDITIONAL INFORMATION: DSER OPEN ITEM 89

Dear Mr. Denton:

Your staff requested information during a teleconference on May 7, 1985. The information on the VEGP conformance to Regulatory Guide 1.140 with respect to the volumn reduction system is enclosed.

If your staff requires any additional information, please do not hesitate to contact me.

Sincerely,

J. A. Bailey
Project Licensing Manager

JAB/sm
Enclosure

xc: D. O. Foster
R. A. Thomas
J. E. Joiner, Esquire
B. W. Churchill, Esquire
M. A. Miller
B. Jones, Esquire (w/o enclosure)

L. T. Gucwa
G. Bockhold, Jr.
T. Johnson (w/o enclosure)
D. C. Teper (w/o enclosure)
L. Fowler
Vogtle Project File

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PDR ADOCK 05000424
E PDR

ADD. NSIC
M. Miller LB#4

HOO
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VOLUME REDUCTION SYSTEM OFF-GAS FILTERS AND
REGULATORY GUIDE 1.140

The VEGP volume reduction off-gas system as discussed in FSAR section 11.4 contains two dedicated parallel filters. Each filter consists of a HEPA/Charcoal/HEPA filter assembly housed in an ASME Section VIII pressure vessel. These filters are process filters integral to the volume reduction system and as such are designed to meet the guidelines of the volume reduction system and Regulatory Guide (RG) 1.143.

Regulatory Guide 1.140 covers the design, testing, and maintenance criteria for normal ventilation exhaust system air filtration and adsorption units of light-water-cooled nuclear power plants. The objective of this guide is to provide guidance such that the release of radioactive materials in gaseous effluent is suitably controlled. Although this guide is not specifically applicable to process type filtration units, it was used as guidance for the design of the off-gas filters because they are used to control the release of radioactive materials from the volume reduction system to the radwaste building ventilation system. Recent discussions with the NRC has focused on the applicability of the RG 1.140 testing requirements for the filters. The following paragraphs summarize the testing concerns and the justification for the VEGP design.

RG 1.140 position C.3.b deals with the dioctyl phthalate (DOP) qualification tests required for the off-gas HEPA filters. The original HEPA filters were procured and tested to meet these requirements. Replacement filters will also be procured in compliance with these requirements.

RG 1.140 position C.6 deals with the laboratory testing required for the adsorber. The initial tests outlined in this section are accomplished at the adsorber manufacturer. The need for laboratory testing at 18-month intervals, as required by Table 2, note C, of the regulatory guide is not applicable to the volume reduction system filters because of the expected 6-month changeout interval.

RG 1.140 position C.5 outlines four tests which are to be done upon initial filter installation;

- Visual Inspection
- HEPA Filter Airflow Distribution
- HEPA Filter DOP
- Adsorber Section Leakage

Each of the outlined tests references ANSI N510. The applicable visual inspection requirements of ANSI N510 can be accomplished during installation and are a part of the normal operating and maintenance procedures outlined for the system. As discussed in Appendix A of ANSI N510-1980 the factory tests determine the

efficiency of the filters. The in-place field tests of the individual HEPA and adsorber sections can only show the existence of system leakage. The specific design of the volume reduction system off-gas filters leads to a system with few potential leak paths as compared to normal ventilation exhaust systems.

As shown in attachment 1, the off-gas filters are housed in an ASME Section VIII vessel with a 6-inch inlet and outlet connection. The vessel is closed with 24 hex head bolts and a buna-N O-ring. The cartridge filter assembly consists of HEPA filters bolted to each end of an adsorber assembly. In the flow configuration, air enters the upper nozzle, flows down through the upstream HEPA filter and around the outer edge of the charcoal adsorber assembly. The air then flows inward through the charcoal adsorber, turns and passes through the downstream HEPA filter and out through the lower nozzle. With this configuration the potential for air bypass around the filters is small. The filter assembly is of welded, riveted, gasketed and bolted design. Only those connections that are required to be disconnected for replacement of the charcoal or HEPA filter removal and replacement are of bolted design. Attachment 2 indicates the five potential pathways where flow could bypass the filter media:

1. Bypass around the upstream HEPA through the seat into the outer adsorber section
2. Bypass through the charcoal fill bolt assemblies into the adsorber section
3. Bypass through the charcoal dump bolt assemblies into the lower flange area
4. Bypass around the downstream HEPA through the seat into the lower flange area
5. Bypass around the cartridge assembly itself through the seat of the assembly and mounting frame.

The following discusses the filter unit design that minimizes the leakage.

Pathways 1 and 4

The HEPA filters used are approximately 24" x 24" square with a gasket that mates with the adsorber assembly plate. As shown in attachment 3, the HEPA filter is held in place with four mounting clamps, compression springs, and mounting nuts. Procedurally, the mounting nuts are tightened to achieve 40-60 percent gasket compression. The placement of the HEPA filter guides and size of the HEPA filter lead to a sure fit.

Pathways 2 and 3

The fill and dump bolt assemblies consist of a 1-1/2" half coupling welded to the closure plate with a 1-1/2" hex head plug.

The thread engagement of the coupling and plug provide a high resistant flow path as compared to the normal flow.

Pathway 5

The filter vessel is 44 inches in diameter fabricated from 3/16" 304 stainless steel plate (attachment 4). The internal diameter is 43-5/8 inch. The filter cartridge assembly mounts on a 2 x 2 x 1/4 angle welded to the internal surface of the vessel. The cartridge assembly is 42-5/8 diameter with four 4 in. x 3/8 in. thick guides on both the top and bottom of the assembly. The assembly itself is fitted with a 3/8" thick x 1" wide silicon sponge rubber gasket. The weight of the assembly (~ 1150 lbs) provides the seating force for the gasket. The physical dimensions of the assembly, guides and vessel provide for a tight fit that would lead to even compression of the gasket to the mounting frame (see attachment 5).

The leak paths typically associated with a normal ventilation system include;

1. Bypass around the sliding trays of charcoal
2. Bypass through the manway openings
3. Bypass around multiple HEPA cells
4. Drainage system between chambers.

The following discusses the differences in the off-gas system filter unit and normal ventilation filtration unit pathways and justifies why the off-gas system filter air bypass is less than for normal ventilation filtration units.

Pathway 1

The charcoal adsorber sections of the volume reduction system, with the vertical fill design, do not have the sliding joints of a typical adsorber section and their associated leak paths.

Pathway 2

For maintenance purposes each section of typical ventilation units have large access manways. This dictates large lengths of gasket interface compressed only by minimal hold down clamps. This can lead to partial filtration and release into the area where the ventilation unit is housed.

The volume reduction system filter assembly design does not require access ports to each section and therefore does not have the associated potential leak paths. In addition the filter vessel is closed with 24 1/2-inch bolts torqued to 25 ft-lbs on a buna-N-gasket. The comparatively small length of gasket material, the ASME Section VIII vessel design and the means of uniform gasket compression lead to a small probability of leakage out of the vessel into the room.

Pathway 3

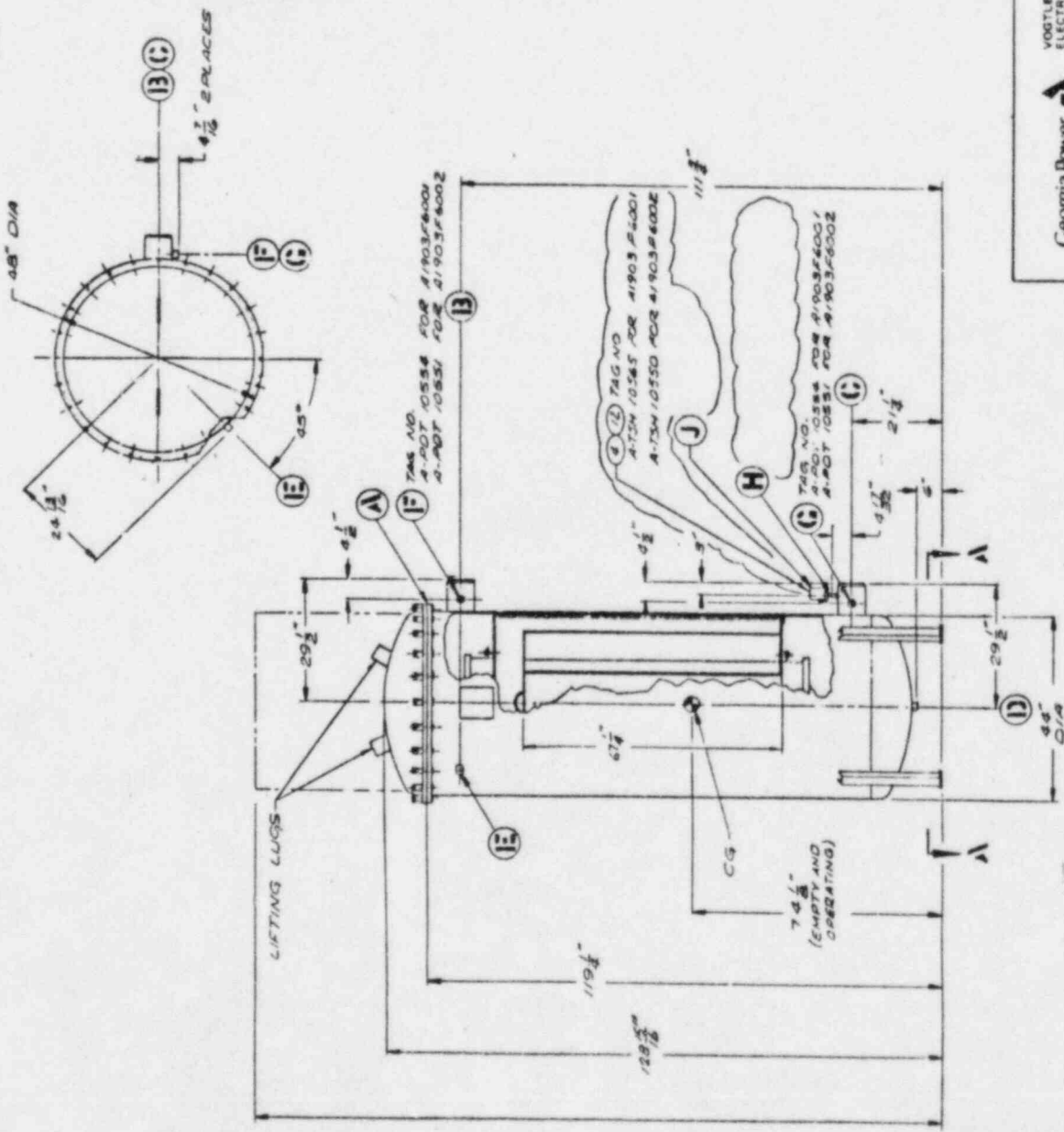
The typical ventilation units contain multiple HEPA filter cells arranged in a matrix. This arrangement leads to bypass where the HEPAs interface with the matrix frame. The off-gas filter assembly design has only the one gasketed seating surface where bypass could occur. As discussed previously, the gaskets on the HEPA filters are compressed 40 to 60 percent which leads to a low probability of leakage.

Pathway 4

To provide deluge capability in the case of fire typical ventilation, units contain deluge and drain connections between chambers. The volume reduction system filters have one deluge and one drain connection. Each piping connection has a normally closed gate valve in a hard-piped system. The potential for leakage is much less in the off-gas filter assemblies.

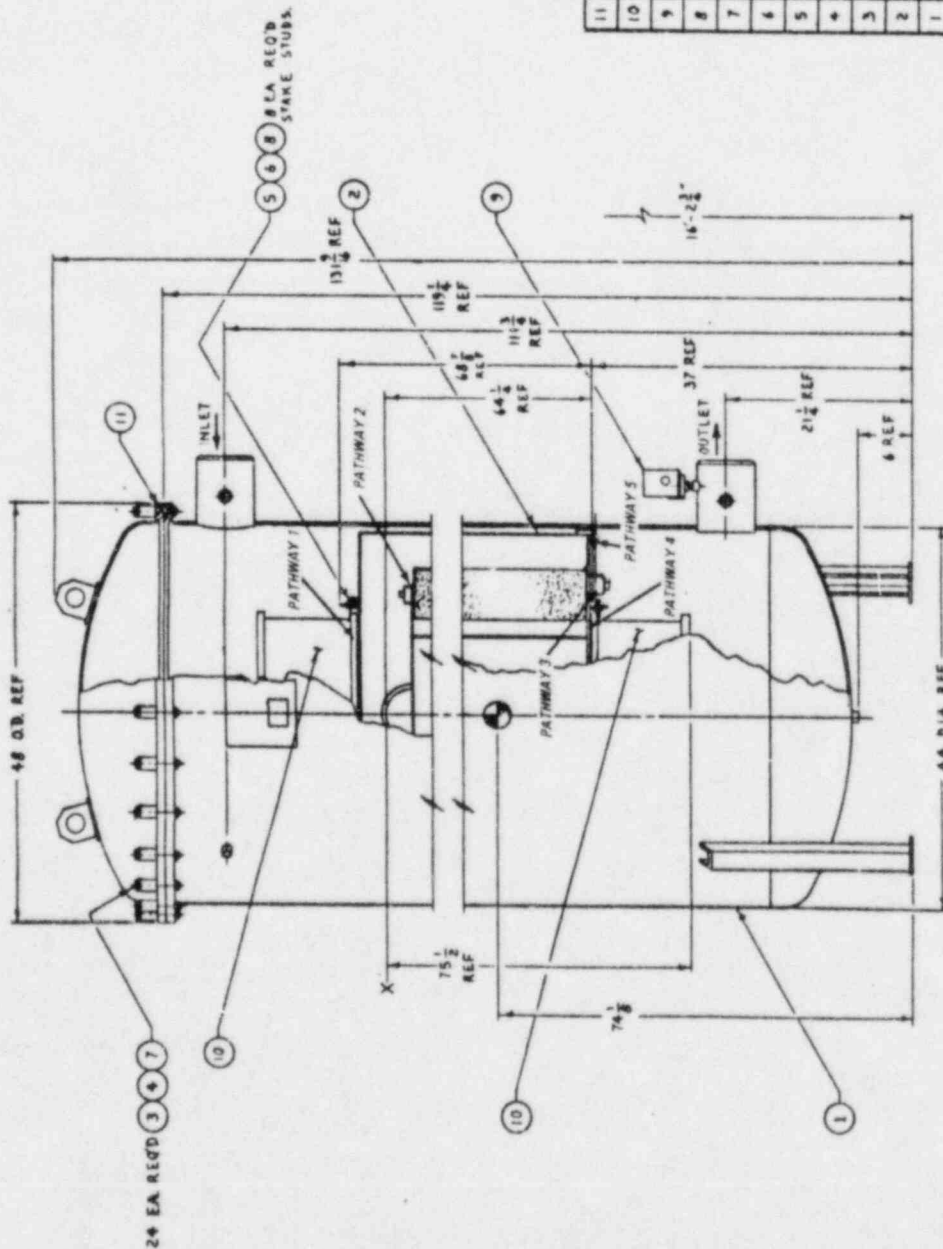
The replacement of a filter assembly will follow a detailed procedure consistent with the guidelines in ANSI 510 and incorporate the vendor requirements. These include individual filter inspection, and gasket inspection and replacement as required. To ensure uniform charcoal adsorber distribution the procedures include vibration during filling and additional vibration for 15 minutes. The adsorber section design includes a 6-inch overflow section to ensure that flow through the perforated sheet is through the adsorber media.

Based on the specific design and application of the volume reduction system off-gas filters, implementation of the in-place testing requirements of Regulatory Guide 1.140 does not significantly enhance the assurances that the release of radioactive material will be more suitably controlled.



J	I	1/2 NPT	ELECTRICAL CONDUIT	TEMPERATURE SWITCH
H	I	1/2"	150 LB SCREENED CPLG (FEMALE)	TEMP SWITCH
G	I	3/4"	3000 LB SW. CPLG	PRESSURE TAP
F	I	3/4"	3000 LB SW. CPLG	PRESSURE TAP
E	I	1" (40S)	WELD STUB	PIPE PROTECTION
D	I	1" (40S)	WELD STUB	DRAIN
C	I	6" (40S)	WELD STUB	GAS OUTLET
B	I	6" (40S)	WELD STUB	GAS INLET
A	I		FLANGE WITH ORING CLOSURE	VESSEL
SYM	SYM	NOMINAL PIPE SIZE (SCHEM)	INTERFACE	USAGE

DESIGN REQUIREMENTS	
CODE	ASME SECTION VIII, DIVISION I
TEMPERATURE	210°F
PRESSURE	12 PSIG
WIND SPEED	120 MPH
WIND TEMP	90°F
MATERIAL	304
CORROSION ALLOWANCE	1"



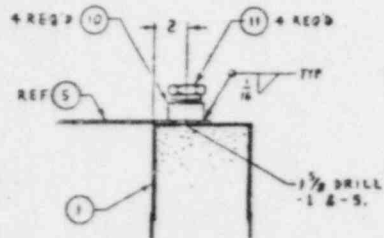
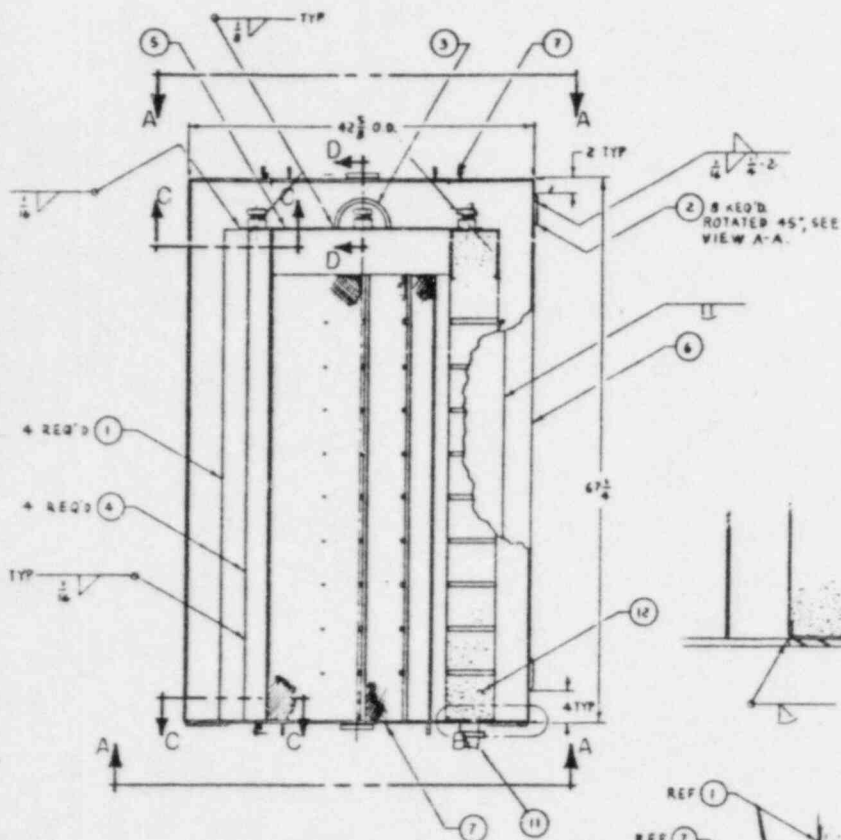
NO.	QTY	DESCRIPTION	UNIT
11	1	O-RING, 451B-451B-2, BUNAN	
10	2	AD24-1420-3 HEPA FILTER, HEPA CORR	
9	1	TEMP SWITCH, 200V-250V, HUMID 109	
8	8	HEX NUT, 1/2-16 UNC, ASME SA194, AEL1	
7	24	LC-047K-25 COMP SPRING, LER 1/2	
6	8	LC-047K-85 MOUNTING CLAMP	
5	8	A1377 WASHER	
4	24	A1375 HEX HD. BOLT	
3	24	A1374 ADSORBER ASSY	
2	1	B1358 PRESSURE VESSEL WELDMENT	
1	1	B1358	

VOGTLE
ELECTRIC GENERATING PLANT
UNIT 1 AND UNIT 2

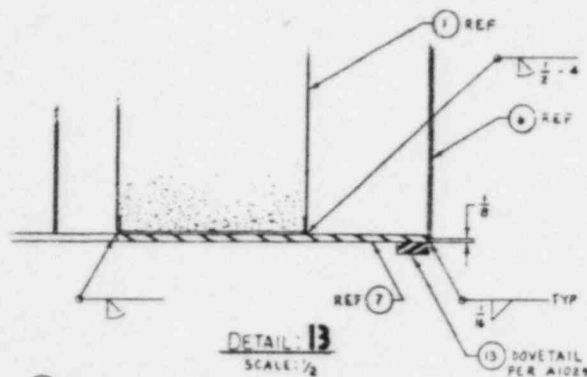
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OFF-GAS FILTER HOUSING

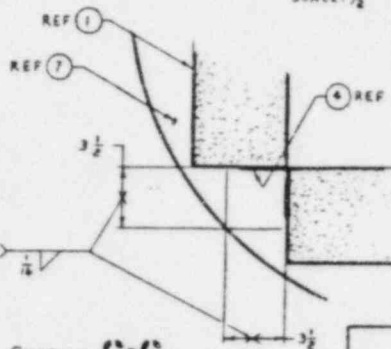
ATTACHMENT 2



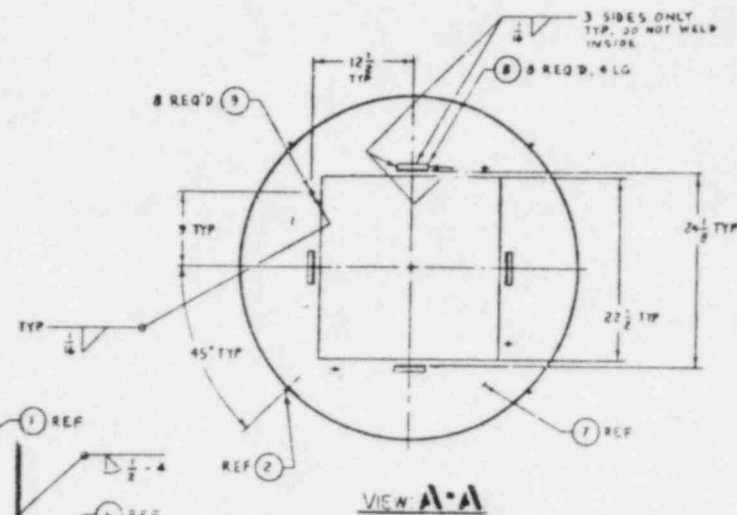
SECTION D-D
SCALE: 1/4



DETAIL B
SCALE: 1/2



SECTION C-C
SCALE: 1/4



VIEW A-A

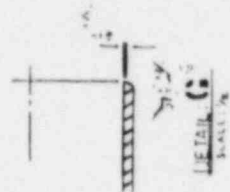
13	12		R10480	SILICONE SPONGE R-302A, 3/4" x 1/2" PER 1/4"
12	13			WATER-RESISTANT CARBONAL RADIATION RES.
11	4			COMPRESSION CARBONAL RADIATION RES.
10	4			818 ITEM, CARBONAL RADIATION RES.
9	8			HEX HD PLUG, 1/2" x 1/2" x 1/2" 304 S.S.
8	3			HALF CPG, 1/2" x 1/2" x 1/2" 304 S.S.
7	2			STUD, 1/2" x 1/2" x 1/2" 304 S.S.
6	1			ANGLE, 1/2" x 1/2" x 1/2" 304 S.S.
5	1			PLATE, 1/2" x 1/2" x 1/2" 304 S.S.
4	4			SHEET, 1/2" x 1/2" x 1/2" 304 S.S.
3	1			CLOSURE PLATE
2	8			ANGLE SPACER
1	4			LIFTING LUG
				GUIDE
				BED WELDMENT
ITEM	QTY	UNIT	DESCRIPTION	
NO.	REQ'D	PER UNIT		

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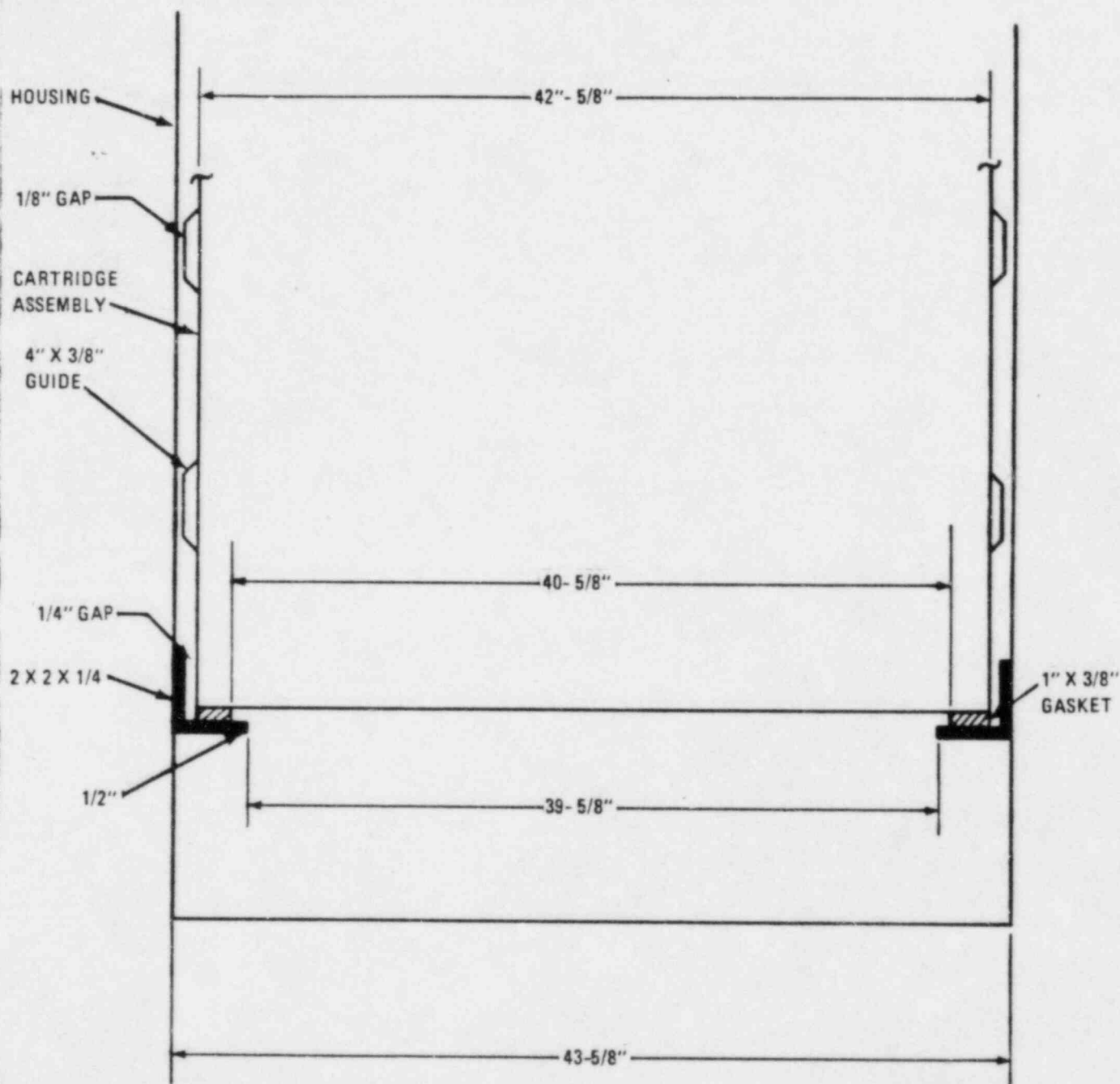
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ELECTRIC GENERATING PLANT
UNIT 1 AND UNIT 2


CARTRIDGE ASSEMBLY

ATTACHMENT 3



0-8-1967



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ALVIN W. VOGTLE
ELECTRIC GENERATING PLANT
UNIT 1 AND UNIT 2

OFF-GAS FILTER ASSEMBLY
AND HOUSING

ATTACHMENT 5