

PDR 71-9135

A DIVISION OF
NUCLEAR SYSTEMS

Gamma Industries

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February 27, 1980

Mr. Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and Material Safety
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

U.S. NUCLEAR REGULATORY COMMISSION

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RECEIVED

REFERENCE: Docket No. 71-9135

Dear Mr. MacDonald:

Enclosed are items to be inserted into the application for NRC Certificate of Compliance application on "Century" model devices manufactured by Gamma Industries.

These enclosures should allow you to complete the review process of this application. We have specifically responded to each requirement on the following pages:

1. Delete detailed drawings - Appendix C
Replace all drawings in Appendix C with enclosed drawings.

821-1001-438	Original	Century S
821-1001-439	Original	Century SA
821-1001-440	Original	Universal S
821-1001-441	Original	Universal SA

2. Revision for page 0.2
This revision deletes specific drawing numbers for components.
Denotes nominal weight for these packages.

THE REPORT

add'l info

15638

Mr. Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and Material Safety
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Page -2-

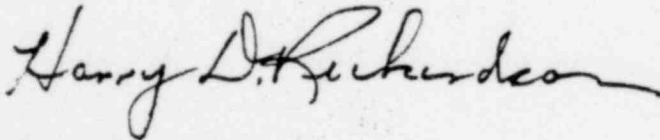
February 27, 1980

3. Revision for pages 7.7A and 7.7B
This revision addresses the rationale for specific impact points for the drop and puncture test. Page 7.7B is a graphic showing the orientation of the device in both the drop and the puncture test.

Thank you for your prompt consideration of these revisions, we urgently need these approval.

Yours truly,

GAMMA INDUSTRIES



Harry D. Richardson
Radiation Safety Officer

HDR/dt

Enclosures

Packaging specifications along with analysis and test results are detailed within this document.

0.2 Package Description

All devices presented in this report are similar. They are comprised of common major items.

1. Depleted uranium shielding containing an "S" tube of stainless steel or zircaloy.
2. Steel cylindrical casing
3. Cellular polyurethane foam to fill cavity between the casing and uranium.
4. Lock box assembly
5. Handle
6. Nameplate

Nominal weight of the package in the proper shipping configuration is 45 pounds.

Additional information requested by Mr. Charles E. MacDonald
on September 11, 1979 -

1. Provide justification that the hypothetical accident 30-foot drop and puncture tests were performed such that maximum damage to the lock-box assembly was sustained.

INTRODUCTION

Large numbers of these devices have been used for many years. In accident conditions on highways and construction projects these "Century" models have been run over by trucks and tractors, dropped onto concrete slabs from heights approaching 100 feet, dropped into ocean depths from pipeline barges, et al with no breaches of shielding integrity being reported to Gamma Industries. Devices with similar construction are being used at ocean depths exceeding 1,000 feet. It is believed that the stresses imposed in these situations is greater than those stresses imposed by the drop test and puncture test.

The rationale for selecting impact conditions for imposing maximum damage to shielding integrity follows:

- a. Drop Test from 30 feet

The device was suspended and dropped with an attitude that the lockbox safety cap would be the initial impact point with the device center of gravity vertically above the impact point. It is believed this would cause maximum stress upon the lockbox and the bolts which secure the lockbox to the steel housing. Any other attitude would result in generating a moment causing rotation about the impact point, thereby decreasing the stresses upon the lockbox, bolts, and the housing.

- b. Puncture

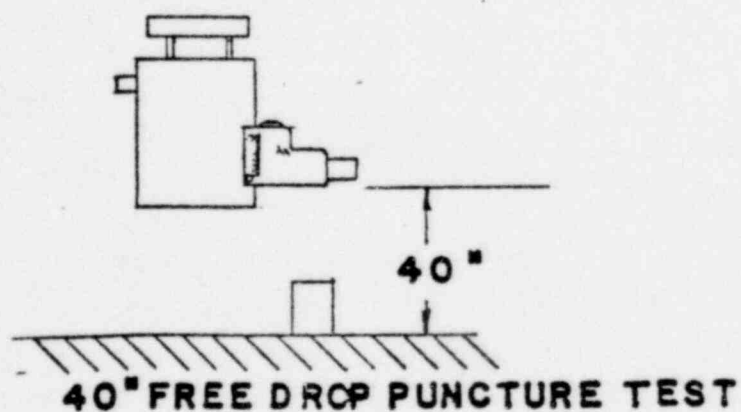
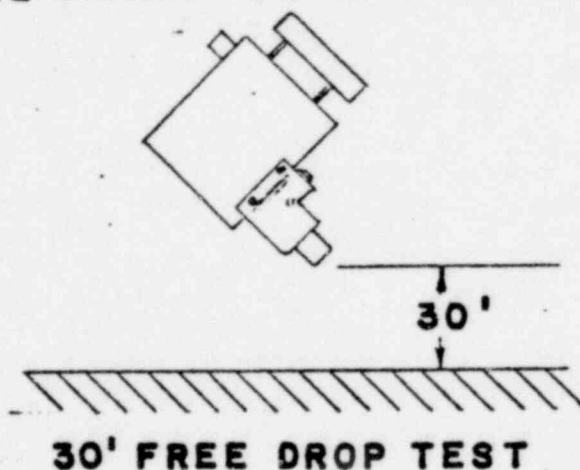
First, it is inconceivable that the drop from 40 inches upon a 6 inch diameter steel bar could cause any damage to a device like the "Century".

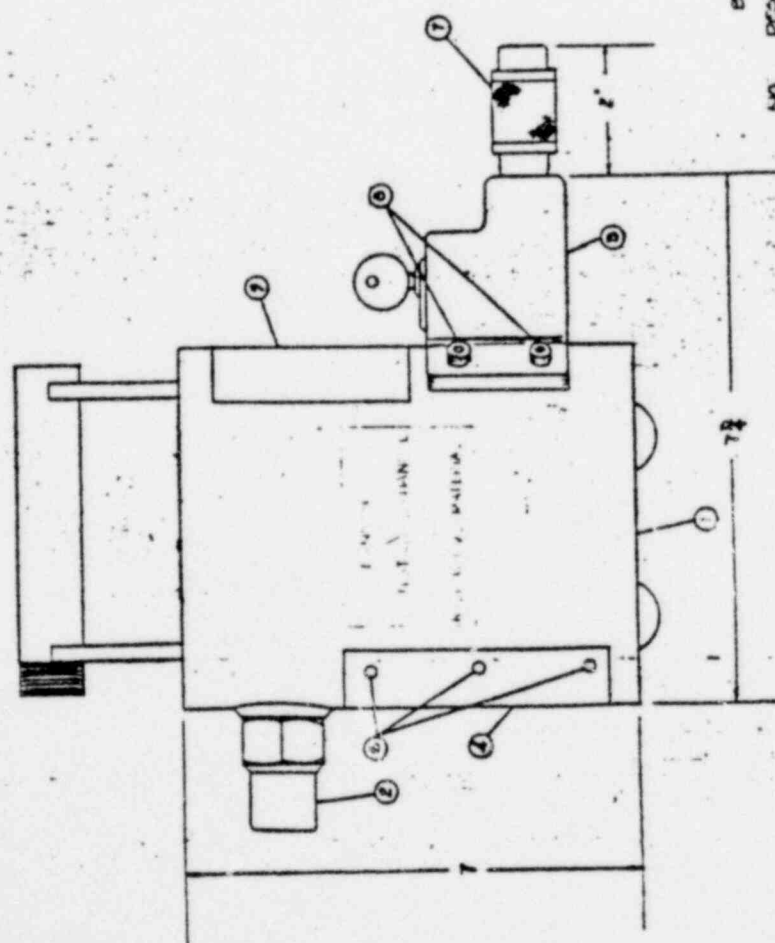
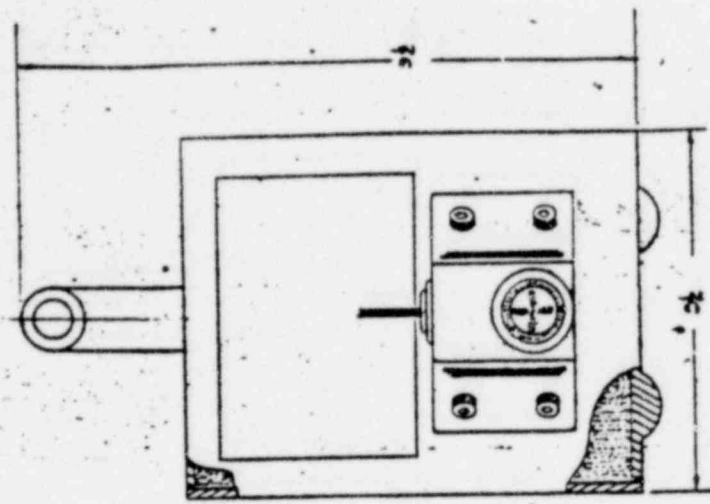
Second, in attempting to determine which impact point would be likely to inflict the most damage, it was believed appropriate to select a drop from 40 inches

with a direction and attitude which would cause maximum stress on the lockbox "flanges" and the bolts. The drop was made in such a manner that the initial impact point upon the steel bar was near the outer end of the lockbox. This would provide the maximum bending moment upon the lockbox and also provide shear stresses upon the bolts.

No adverse results to holding integrity were observed after these tests were completed.

PUNCTURE-IMPACT ORIENTATION TESTS





BILL OF MATERIALS

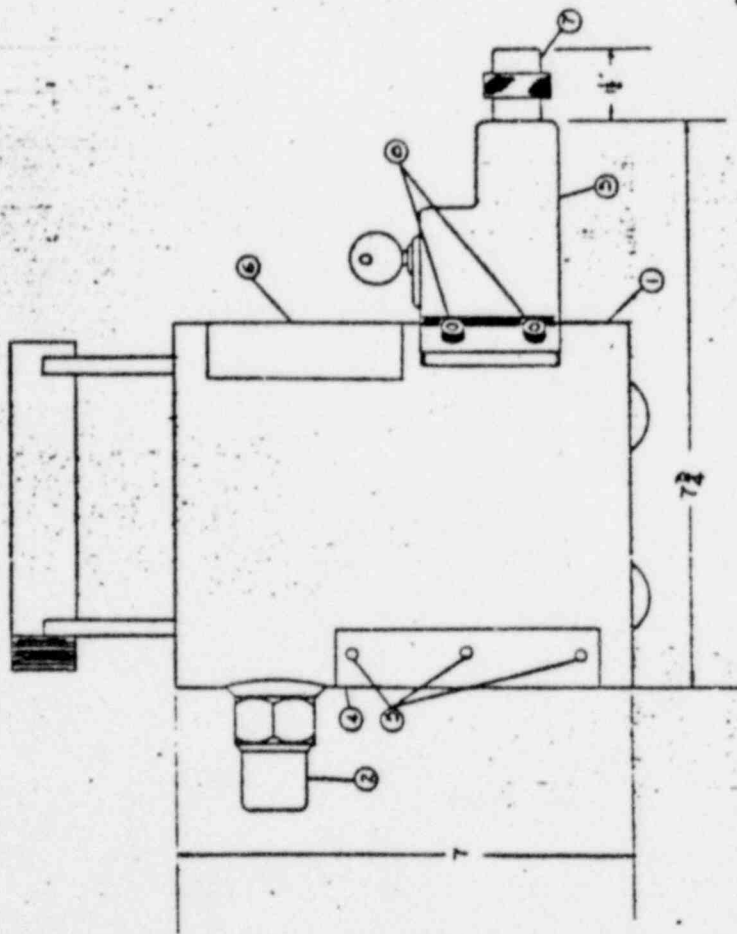
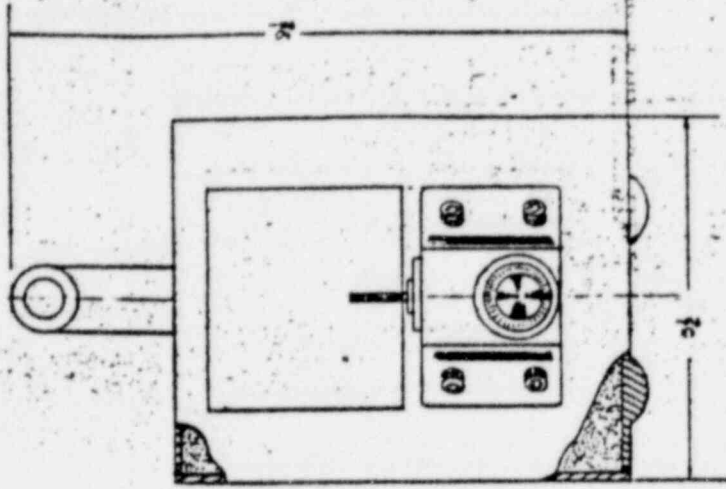
NO	DESCRIPTION	MATERIAL	QTY
1	HEAD ASSY	MILD STEEL	1
2	SAFETY PLUG ASSY	BRASS	1
3	LOCKBOX ASSY	BRASS	1
4	NIH-C PLATE	STAINLESS STEEL	1
5	NIH-C PLATE	STAINLESS STEEL	1
6	PHR SCR. TYP. 1/8" X 1/2"	STAINLESS STEEL	4
7	LOCKBOX SAFETY CAP	BRASS	1
8	SCR CAP PHR. 5/16" X 1/2"	STAINLESS STEEL	4

NOTE:
 STEEL CASE OF A TUBING
 IS TO BE USED
 TO THE BOTTOM PLATE OF
 CONCRETE. 23" X 23" X 1/2" X 1/2"
 CONCRETE. 23" X 23" X 1/2" X 1/2"
 WITH ZINC-ALLOY OF 65 PPM SOURCE P/100A
 ASSY. P/100A
 TOTAL WEIGHT APPROX. 45 LBS.

GAMMA INDUSTRIES BR. LE.
 MADE IN U.S.A.
 2 1/2" X 5"
 HEAD ASSY.
 CENTURY '5

821-1001-438

POOR ORIGINAL



BILL OF MATERIALS

NO	DESCRIPTION	MATERIAL	QTY.
1	HEAD ASSY	MILD CARBON STEEL	1
2	SAFETY PIN ASSY	BRASS	1
3	LOCKBOX ASSY	BRASS	1
4	NAME PLATE	STAINLESS STEEL	1
5	DRIVE SCR. TYP. U. LD. 6x1	STAINLESS STEEL	6
6	NAME PLATE	STAINLESS STEEL	1
7	LOCKBOX SAFETY CAP	BRASS	1
8	SCREWS ASSY. NO. 20-1/2	STAINLESS STEEL	4

NOTE
 STEEL COOK OFFS THINNING
 24" x 120" WALL
 TOP/BOTTOM PLATE OF
 CORNER STEEL 120" THICK AND WELDED
 SEPARATED ALUMINUM DRIVES INTERNALLY AND
 WITH XEROLOGY OR AS FOR DOUBLE OF THE
 ASSY ASSEMBLY
 COMPLETE ALUMINUM DRIVES WEIGHT APPROX 26 LBS
 TOTAL WEIGHT APPROX 49 LBS

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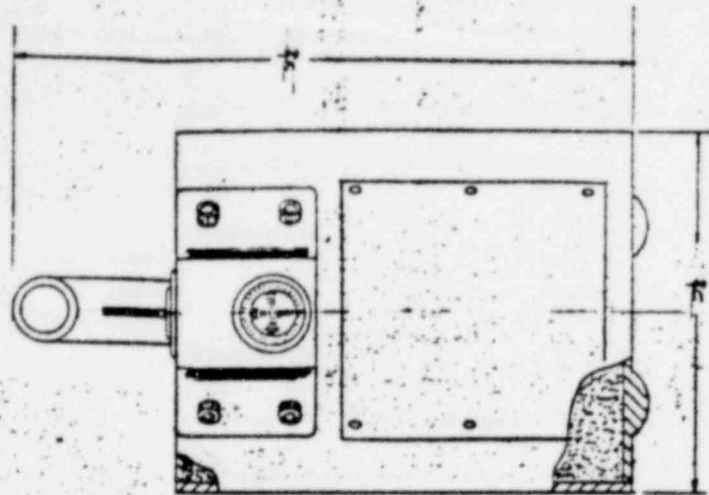
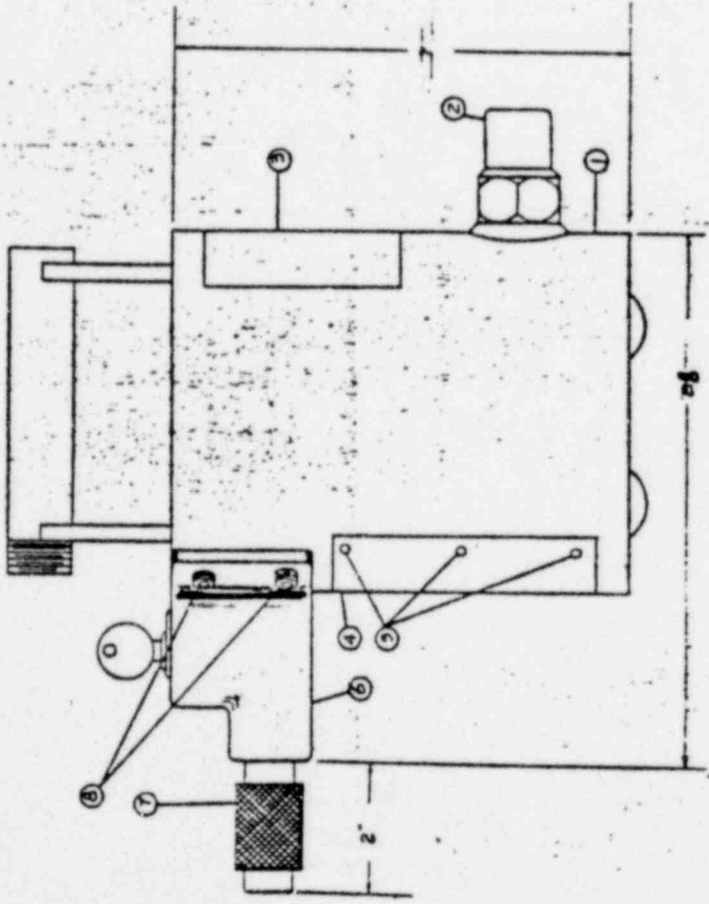
W. K. K. K.

COMPLETE HEAD ASSY

COUNTRY '68

821-1001-439

POOR ORIGINAL



BILL OF MATERIALS

NO	DESCRIPTION	MATERIAL	QTY
1	HEAD BODY	MILLED CARBON STEEL	1 EA
2	SAFETY PLUG BODY	BRASS	1 EA
3	NAME PLATE	STAINLESS STEEL	1 EA
4	NAME PLATE	STAINLESS STEEL	1 EA
5	FRONT SCREW 1/4" x 1/2"	STAINLESS STEEL	6 EA
6	LOCKBOX BODY	BRASS	1 EA
7	LOCKBOX SAFETY CAP	BRASS	1 EA
8	LOCK CARTRIDGE 1/2" x 1/2"	CHEMICAL STEEL	4 EA

*NOTE: OVER COSE OF CS TUBING
 2 1/2" x 120" WALL
 TOP BOTTOM PLATE OF
 CARBON STEEL 120 THICK AND MILKING
 CORRECTED CARBON STEEL INTERNALLY LINED WITH
 ZINCALLOY OR CS FOR SOURCE MATERIAL
 ASSEMBLY
 WEIGHT CARBONUM OVERHEAD WEIGHT 2400 LB
 TOTAL WEIGHT 2400 LB

GOMMA INDUSTRIES BR LA

W. L. Ladd

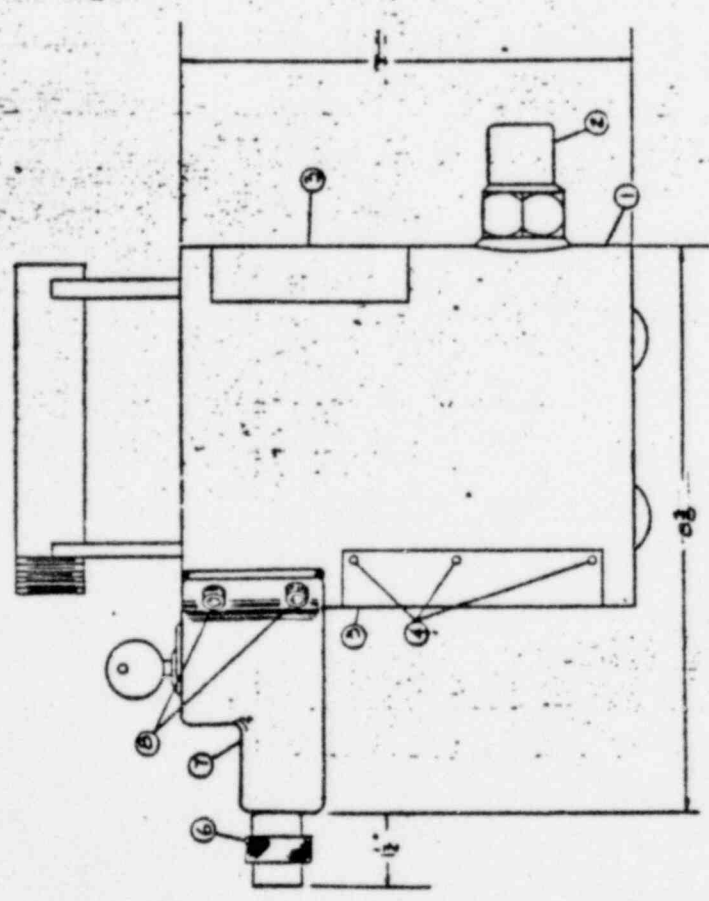
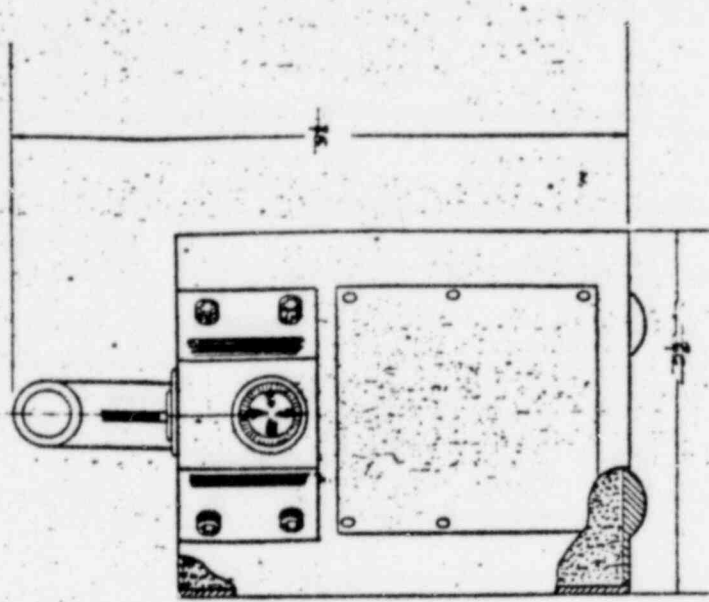
DATE 11-1-50

SCALE 1/2" = 1"

UNIVERSITY OF CALIFORNIA

POOR ORIGINAL

Ohh-1001-128



BILL OF MATERIALS

NO	DESCRIPTION	MATERIAL	QTY
1	HEAD BODY	HEATED CARBON STEEL	1 EA
2	SAFETY PLUG BODY	SAF 55	1 EA
3	NAME PLATE	STAINLESS STEEL	1 EA
4	DRIVE SCR TYPE "B-1"	STAINLESS STEEL	4 EA
5	NAME PLATE	STAINLESS STEEL	1 EA
6	LOCKBOX SAFETY CAP	BRASS	1 EA
7	LOCKBOX BODY	BRASS	1 EA
8	DRY CAP FOR DOC. # 2014	STEEL W/SS STEEL	4 EA

NOTE:
 STEEL CASE OF C.A. TUBING
 5/8" OD x 1/8" WALL
 TOP PORTION PLATE OF
 CARBON STEEL - 750 THICK AND HEATED
 DELETED. UNLESS SHOWN OTHERWISE
 LISTED WITH ENOUGH OR AS PER DRAWING
 PARTIAL BODY POSSIBLE.
 EXPLODED DRAWING. FIELD WEIGHT APPROX 65 LBS
 TOTAL WEIGHT APPROX 45 LBS

GAMMA INDUSTRIES 4414

DATE 2-19-60

DRAWN BY *W. L. Ladd*

CHECKED BY

APPROVED BY

PROJECT NO. 4300

LANSFORD, PA.

14h-1001-128

POOR ORIGINAL

15638