NY.6-4

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

Docket No. 040-07123 JUL 19 1996 License No. SUB-748 (Retired)

United States Department of Energy
Office of Environmental Restoration
ATTN: W. Alexander Williams, Ph.D.
EM-241 Cloverleaf Building
19901 Germantown Road
Germantown, Maryland 20874-1290

SUBJECT: NL INDUSTRIES, ALBANY, NEW YORK

Dear Dr. Williams:

We are aware that DOE is responsible for the former National Lead Company (NL Industries) facility near Albany, New York. During a recent review of retired AEC License No. SUB-748, we found records which provide additional information concerning the use of source material at the facility. Copies of AEC documents which describe activities at that facility are enclosed.

License No. SUB-00748 authorized possession of 38,000 pounds of uranium during the fabrication of a module replacement tank upper shield in 1964. Fabrication of all depleted uranium parts was conducted at the Albany, New York facility under New York State License No. 235-0482.

We hope the material enclosed will assist you in your activities. If you have any questions, please contact Andrew J. Schwartz at (610) 337-5237 or me at (610) 337-5200.

Sincerely,

Ronald R. Bellamy, Chief
Decommissioning and Lab Branch
Division of Nuclear Materials Safety

Docket No. 040-07123
License No. SUB-748 (Retired)

Enclosure(s):
Documents from License No. SUB-748 file

cc w/encl:
State of New York

40-7123

L&R File Copy

NATIONAL LEAD COMPANY

NUCLEAR METALS DIVISION - Industrial Department

1130 CENTRAL AVENUE, ALBANY 5, NEW YORK.

IV 9-4781

January 10, 1964

Mr. D. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Licensing & Regulation
U.S. AEC
Washington, D.C.

Subject: Application for Source License

References:

1. Purchase Order J-830-704
2. Procedure NLA-WAH-2 "The Fabrication of the Module Replacement Tank Upper Shield" (enclosed)
3. General Dynamics-Electric Boat Division Plan 26M72-039, Revision B, "S5W Refueling Module Replacement Tank Upper Shield". (enclosed)
4. Sketch of Shipping Container, (enclosed)

Dear Sir:

We were awarded the Reference (1) Purchase Order from General Dynamics-Electric Boat Division, Groton, Conn. This P.O. is for the purchase of (1) one Module Replacement Tank Upper Shield, to be fabricated following the Reference (2) Procedure in accordance with the Reference (3) drawing.

Complete fabrication of all depleted uranium detail parts, will be done by the National Lead Company, Nuclear Metals Division, Albany, New York under N.Y. State License 235-0482. However, the remainder of the fabrication will be done by subcontractors as follows:

Steel Fabrication - P. F. Avery Corporation
67 High Street
Billerica, Massachusetts

Lead Pouring - National Lead Company
Atlantic Branch
1050 State Street
Perth Amboy, New Jersey

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Compliance
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Although both of these subcontractors posses "By Product" Licenses, niether has a Source Material license for legal possession of Uranium. We have enclosed copies of References (2) and (3) so that the subcontractor contact with the depleted uranium may be throughly outlined. Referring to the Reference (2) procedure fabrication of details and subassemblies, etc. will be accomplished as follows:

1. Fabrication of all steel detail pieces in accordance with procedure NLA-WAH-2, Section A, Subsections I, II, III and IV, pages 3 through 6, will be accomplished at P. F. Avery Corporation, Billerica, Mass.

2. Fabrication of all depleted uranium pieces in accordance with procedure NLA-WAH-2, Section A, Subsection V, page 7, will be accomplished at National Lead Co., Nuclear Metals Division, Albany, N.Y.

3. Subassembly of steel pieces 1-32 and 1-34 in accordance with Procedure NLA-WAH-2, Section B, Subsection I, pages 8 and 9 will be accomplished at P.F. Avery Corporation, Billerica, Mass. This subassembly will then be shipped to National Lead Co., Albany, N.Y.

4. Subassembly of the depleted uranium rings to the above steel subasembly in accordance with Procedure NLA-WAH-2, Section B, Subsection II, pages 9 and 10, will be accomplished at the National Lead Co., Albany, N.Y. This subassembly will contain approximately 38,000 lbs. of depleted uranium metal. After completion, this subassembly will be trucked to P. F. Avery Corporation, Billerica, Mass.

5. Subassembly of piece 1-31 to the above subassembly in accordance with Procedure NLA-WAH-2, Section B, Subsection III, page 10 will be accomplished at P. F. Avery Corporation Billerica, Mass. This subassembly will then be shipped by rail to National Lead Co., Perth Amboy, N.J.

6. Lead Pouring in accordance with Procedure NLA-WAH-2, Section B, Subsection IV, pages 11, and 12 and 13, will be accomplished at the National Lead Co., Perth Amboy, N.J. After completion, the unit will be returned to P. F. Avery Corp.,,Billerica, Mass.

7. Final work in accordance with Procedure NLA-WAH-2, Section B, Subsection V, pages 13 and 14, will be accomplished at P. F. Avery, Corporation, Billerica, Mass.

Summarizing the above, our subcontractors will have only the following contract with exposed uranium metal:

A. Neither subcontractor will do any fabrication work on the uranium metal itself.

B. P. F. Avery Corp., Billerica, Mass will receive the assembly with only the O.D. and top of the uranium exposed, and will immediately start assembly of the outer steel shell to the unit, so that only the top of the uranium assembly will be exposed. (See paragraph 5, above).

C. National Lead Co., Perth Amboy, N.J. will receive an assembly with only the top of the uranium exposed, and will immediately lead fill, and then no part of the uranium metal will be exposed. (See paragraph 6, above).

D. This is a one(1) assembly unit (1) one time shipment.

Maximum exposure to radiation is estimated as follows:

P. F. Avery Corporation, Billerica, Mass (outer steel shell not in plac
3 weeks
maximum Gamma radiation rate (12" from outside surface)
2.0 MR per Hr.
maximum Beta-Gamma radiation rate (12" from outside surface)
20.0 MR per Hr.

National Lead Co., Perth Amboy, N.J. (outer steel shell in place)
1 week
maximum gamma radiation rate (12" from outside surface)
.7 Mr per Hr.
maximum Beta-Gamma radiation rate (12" from outside surface)
7.0 MR per Hr.

The above radiation levels were estimated by using the maximum readings obtained with a geiger Survey Meter in a preliminary check of a single

uranium ring and calculating the maximum raitos for the assembly of all rings, without the steel outer shell in place. Estimation of radiation rates with the outer steel shell in place were made using 1/2-value thickness tables. Actual readings of the whole assembly cannot, of course, be made until the unit is completed and ready for shipment.

A National Lead Representative will be in attendence as long as there is exposed uranium present, and he will ensure that health and safety procedures are followed as outlined in the Health and Safety Manual.

Shipment of the assemblies containing the depleted uranium will be made under the following conditions:

A. Exclusive carrier

B. All shipping will be done in a vertical position and the shipping container (see reference 4) shall consist of a 73" dia. x 3 3/4' thk. base plate (A) with a positioning ring (B) which locates in the ID of the base ring of the shield assembly (C) to prevent relative motion between the two pieces. An "X" frame structure (D) with a top plate (E) and positioning ring (F) is placed atop the shield assembly and locate in the I.D. of the inner steel shell of the shield assembly to prevent relative motion. This top plate is chain lagged (G) to the bottom plate to to form an integral structure. The unit is lagged to the shipping carrier from points (H) on the "X" frame at the top. During the shipment of the shield, before the outer s steel assembly is in place, 1/4" plywood will be wrapped and fastened around the exposed uranium. Preliminary radiation checks on one uranium ring with the wood shielding in place, were made using a Geiger Survey Meter. From these, readings, calculations for total radiation rates for the assembly of all rings were made, and maximum radiation rates are estimated for the entire assembly as follows:

12" from outer surface (Outer Steel Shell not in place - 1/4' plywood cover in place)
Gamma radiation rate - 1.10 MR per Hr.
Beta-Gamma radiation rate - 3.5 MR per Hr.

C. The shipment will be made using Red label Class D, Group I poison tags and Radioactive Material placards, in accordance

with the Handbook of Federal Regulations Applying to Transportation of Radioactive Materials, paragraphs 73.391 and 73.392 (f) and 73.393 (g). We would appreciate immediate action in that our present schedule requires shipment next week of the uranium-steel assembly to Perth Amboy, N.J.

Very truly yours,

C. J. Michel

C. J. Michel

WAH/CJM/bam
enc.

Trans 4/10-64 1HR

NATIONAL LEAD COMPANY
NUCLEAR METALS DIVISION
ALBANY, NEW YORK

NLA-WAH-2

THE FABRICATION OF THE MODULE REPLACEMENT TANK UPPER SHIELD

ROUGH DRAFT

Company	Reviewed By: Date	Approved By: Date
National Lead Company Nuclear Metals Division	C. J. Michels	C. J. Michels
P. F. Avery Corporation		
National Lead Company Atlantic Branch, Perth Amboy		
General Dynamics Corporation Electric Boat Division		

1

SCOPE: The purpose of this procedure is to detail the necessary steps required to fabricate a Module Replacement Tank Upper Shield.

REFERENCE:

(a) GD/EB Drawing No. 26M72-039, titled "SSW Refueling Module Replacement Tank Upper Shield.

(b) EB Division Specifications 1800 through 1805.

(c) Code of Federal Regulations, Title 10, Part 20 Standards for Protection Against Radiation Material.

(d) Code of Federal Regulations, Title 10, Part 40, Licensing of Source Material.

(e) Section 78.250, Specification 55, Part 78 of the Interstate Commerce Commission (49 CFR 78.250).

GENERAL REQUIREMENTS:

1. Reference (b) which supplements and sufficiently clarifies the requirements of Section S9-1 of the General Specifications for Ships of the U.S. Navy, dated 1 April 1959, shall be considered and used as a supplement to Note 1, Reference (a) wherein it is applicable as a supplement to Section S9-1.

2. Shims used to maintain root opening shall be made of stainless steel type 304. (Material may be Federal or Military specification grade). Check the identification of the CRES type 304 stainless steel in each application.

3. Spiders and Strongbacks used for positioning should incorporate stainless steel type 304 in those areas that are tack welded to the tank. (Material may be Federal or Military Specification grade).

4. All visual fitup inspection of joints to be welded shall be in accordance with Note 1 of Reference (a).

5. N.Q.C. Inspection Check Requirement shown as follows indicates approval of National Lead Company , Nuclear Metals Division Quality Control Department is required before continuing work.

N.Q.C. Inspec. Check ☐

6. General Dynamics/Electric Boat Division approval shall be obtained prior to any repair welding as a result of defects located when radiographing to Note 4 of Reference (a).

7. At the completion of each circumferential butt weld, check dimensional tolerances with centerline for conformance to the dimensional requirements of Reference (a).

8. Established standards for protection against radiation hazards must be followed in accordance with References (c) and (d) and all state and local regulations governing the handling of Source and Special Nuclear Materials.

9. Any shipping container used for transporting the finished Module Replacement Tank Upper Shield or any subassembly thereof which contains uranium shall be conspicuously and legibly impressed with the legend "CAUTION - RADIOACTIVE - SHIELDING - URANIUM" and shall meet the specifications of reference (e).

PROCEDURE:

SECTION A The Fabrication of Subsections 1-S1, 1-S2, 1-S3, 1-S4 and 3 of the Module Replacement Tank Upper Shield.

I. The Fabrication of Piece No. 1-S2 of the Module Replacement Upper Shield

1. Using stainless plate QQ-S-766 Class 30A Condition A (98-7/8" x 146-3/4" x 1/2"), machine a double beveled weld groove on the 103-1/4" edges in accordance with Detail 10-A of Reference (a). In calculation of proper length, allow for a minimum of 1/4" of extra material on all surfaces to be machined.

2. Roll piece 1-S2 to form the vertical double grooved butt joint at the 103-1/4" edge as indicated in Detail 10-A of Reference (a).

3. Using shims, maintain the proper root opening in the vertical double grooved butt joint formed in Step 2 above as required in Detail 10-A of Reference (a).

4. Position rigid spiders and strongbacks as necessary on the inside and outside diameter to ensure conformance to the tolerances required in Reference (a), Spiders and strongbacks will be designed so as not to restrict weld accessibility. Tack welding shall be in accordance with General Note 1 of Reference (a). Tack welds shall be free of cracks when visually inspected. Verify acceptability regarding dimensions, fitup and weld preparation. Correct and re-inspect if necessary. N.Q.C. Inspec. Check ☐

5. The welding of the vertical double grooved butt in plate 1-S2 shall be in accordance with the following requirements.

   A. Base Material Preparation - The base material prior to welding shall be cleaned in accordance with Note 5 of Reference (a) using aluminum oxide grinding wheels, silicon carbide burrs or stainless steel wire brushes which have been used only on stainless steel. Visual inspection of the prepared joint dimensions shall be in accordance with Reference (a).

   B. Welding - Welding shall be performed in accordance with Notes 1, 3 and 12 of Reference (a) and deposited according to the welding sequence outlined in Figure 1.

   C. Non-Destructive Testing -

      (1) Dye Penetrant - Dye penetrant examination will be performed in accordance with Note 2 of Reference (a). Prior to final dye penetrant examination, the weld shall be contoured to a finish of 125 RMS or better in accordance with General Note 13 of Reference (a).

      (2) Radiography - Radiography shall be performed in accordance with General Note 4 of Reference (a). Radiographic techniques shall be based on the finished machined weldment. All welds to be radiographed shall have a surface finish equal to or better than 125 RMS in accordance with General Note 13 of Reference (a).

II. The Fabrication of Piece No. 1-S1 of the Module Replacement Tank Upper Shield

1. Using stainless plate QQ-S-766 Class 304 Condition A (98-7/8" x 183-9/16" x 1"), machine a double bevel groove on the 98-7/8" edges of the plate in accordance with the requirements of Detail 10-A of Reference (a). In calculation of proper length, allow for a minimum of 1/4" of extra material on all surfaces to be machined.

2. Roll plate 1-S1 to form the vertical double grooved butt joint of the 98-7/8" edge as indicated in detail 10-A of Reference (a).

3. Using shims, maintain the proper root opening in the vertical double grooved butt joint formed in Step 2 above as required in Detail 10-A of Reference (a).

4. Position rigid spiders and strongbacks as necessary on the inside and outside diameter to ensure conformance to the tolerances required in Reference (a). Spiders and strongbacks will be designed so as not to restrict weld accessibility. Tack welding shall be in accordance with General Note 1 of Reference (a). Tack welds shall be free of cracks when visually inspected. Verify acceptability regarding dimensions, fitup and weld preparation. Correct and re-inspect if necessary

N.Q.C. Inspec. Check

5. The welding of plate 1-S1 vertical double grooved butt shall be in accordance with the requirements listed below. ☐

   A. Base Metal Preparation - Same as described for the fabrication of piece No. 1-S2, paragraph 5A.

   B. Welding - Welding shall be performed in accordance with Notes 1, 3 and 12 of Reference (a) and deposited according to the welding sequence outlined in Figure 1.

   C. Non-Destructive Testing -

      (1) Dye Penetrant - Dye Penetrant testing shall be performed in accordance with the same requirements as indicated in Subsection I, Step 5C.

      (2) Radiography - Radiography shall be performed in accordance with the same requirements as indicated in Subsection I, Step 5C.

III. The Fabrication of Piece No. 1-S4 of the Module Replacement Tank Upper Shield

1. Using stainless steel plate QQ-S-766 Class 304 Condition A or a stainless steel forging QQ-S-763 Class 304 Condition A (59-3/4" O.D. x 46-1/4" I.D. x 2-1/4"), machine all surfaces as specified in Step 2 below in accordance with Detail 9-A and all other specific detail dimensions of Reference (a). In calculations of proper stock size, allow for a minimum of 1/4" of extra material on all surfaces to be machined.

2. Rough machine all surfaces. Finish machine the top and bottom surfaces to obtain the 2-1/4" in accordance with Reference (a) but do not finish machine 57-1/2" O.D. x 1/4" step shown in the bottom surface. Finish machine the 57-1/8" O.D. x 54-1/8" I.D. x 1/2" Dp. groove in the top surface as shown in Reference (a). Finish machine the circumferential single bevels in accordance with Detail 9-A, Reference (a). The remainder of the finish machining operations will be performed after subassembly.

3. Verify acceptability regarding dimensions and surface finishes in accordance with Reference (a). N.C.C. Inspec. Check ☐

IV. The Fabrication of Piece No. 1-S3 of the Module Replacement Tank Upper Shield

1. Using stainless steel plate QQ-S-766 Class 304 Condition A (60-1/4" O.D. x 47-1/4" I.D. x 2-3/8") machine all surfaces as specified in Step 2 below in accordance with Detail 9-A and all other specific detail dimensions of Reference (a). In calculation of proper stock size, allow for a minimum of 1/4" of extra material on all surfaces to be machined.

2. Rough machine all surfaces. Finish machine the bottom surface in accordance with the dimensions of Reference (a). Finish machine the circumferential single bevels in accordance with Detail 9-A, Reference (a). The remainder of the finish machining operations will be performed after subassembly.

3. Verify acceptability regarding dimensions and surface finished in accordance with Reference (a). N.C.C. Inspec. Check ☐

V. The Fabrication of Pieces No. 3 of the Module Replacement Tank Upper Shield

1. Using uranium metal per S5W-MRT-2, cast a maximum of (9) uranium rings (57-1/8" O.D. x 47-5/8" I.D. x X") in accordance with General Note 6 and Detail 4-A of Reference (a). [redacted]

2. Verify acceptability of each casting regarding dimensions in accordance with Reference (a) [redacted]

3. Non-Destructive Testing

   A. Visually check each casting for primary and secondary pipe, surface porosity, cold shutts, laps and seams. This inspection shall be performed by a metallurgist who is versed in uranium casting technology, and is therefore qualified to accept or reject the casting. N.C.C. Inspec. Check ☐

4. Rough and finish machine bottom uranium ring No. 1 in accordance with the dimensions of Detail 4-A and the enlarged view showing the interface between this ring and Piece 1-S4 as given in Reference (a).

   A. Verify acceptability of uranium ring No. 1 regarding dimensions in accordance with Reference (a). N.C.C. Inspec Check ☐

5. Rough and finish machine rings No. 2 through No. (See General Note 6, Reference (a)) in accordance with the dimensions of Detail 4-A of Reference (a).

   A. Verify acceptability of uranium rings regarding dimensions in accordance with Reference (a). N.C.C. Inspec. Check ☐

6. Rough and finish machine top ring in accordance with the dimensions of Detail 4-A and pertinent other details relative to the uranium-lead interface as given in Reference (a).

   A. Verify acceptability of top ring regarding dimensions in accordance with Reference (a). N.C.C. Inspec. Check ☐

SECTION B - The Fabrication of the Module Replacement Tank Using Subsection Pieces 1-S1, 1-S2, 1-S3, 1-S4, 1-S5, 2 and 3.

I. The Butt Welding of Subsection Piece 1-S2 to 1-S4

1. Machine a single beveled edge on both edges of piece 1-S2 in accordance with Detail 9-A of Reference (a) and fitup one end of Piece 1-S2 and Piece 1-S4 in accordance with Detail 9-A of Reference (a). Fitup shall be visually inspected in accordance with General Note 1 of Reference (a). [redacted] Shims shall be accurately positioned to ensure conformance to the root opening specified in Detail 9-A of Reference (a). Using strongbacks, tack weld them to the tank to maintain conformance to dimensional tolerances as required by Reference (a). All strongbacks shall designed so as to not restrict weld accessibility. Tack welds shall be welded in accordance with General Note 1 of Reference (a) and shall be free of cracks when visually inspected. Verify inspection as in Section A, Subsection 1, Step 4.

N.C.C. Inspec. Check ☐

2. The welding of the circumferential butt shall be in accordance with the following.

A. Base Metal Preparation - The same as described in Section A, Subsection I, Step 5A.

B. Welding shall be performed in accordance with Notes 1, 3 and 12 of Reference (a) and shall be deposited according to the welding sequence outlined in Figure 2.

C. Non-Destructive Testing

(1) Dye Penetrant - Dye penetrant examination will be performed in accordance with Note 11 of Reference (a). Prior to final dye penetrant examination, the weld will have been machined to a finish of 125 RMS or better in accordance with General Note 13 of Reference (a).

3. Finish machine the above butt weld and the 30° bevels and the 46.250" I.D. (on Piece 1-S4) in accordance with the dimensions and finish requirements of Reference (a). Perform dye penetrant test of butt joint after machining as described above in Section B, Subsection I, Step 2C.

4. Verify acceptability in regard to dimensions in accordance with Reference (a). N.Q.C. Inspec. Check ☐

II. The Assembly of Subsection Pieces 3 to the Subassembly 1-S2, 1-S4

1. Assemble bottom uranium ring No. 1 to Subassembly 1-S2, 1-S4 as follows.

A. Preheat the bottom uranium ring No. 1 (Piece No. 3) to a temperature which produces a minimum of 0.100" thermal expansion on the I.D. (approx. 300° F)

B. Using a special ring lifting fixture, remove uranium ring No. 1 from the furnace and check the I.D. expansion with a special "Go-No Go" gage. Position the uranium ring over the Subassembly Weldment (Pieces 1-S2, 1-S4) and carefully lower the ring around Subsection Piece 1-S2 and seat against Subsection Piece 1-S4 to form the shrink fit on the 54-1/8" Dia. at the uranium-steel interface in accordance with Reference (a).

C. Inspect the subassembly to verify proper fit in accordance with Reference (a). N.Q.C. Inspec. Check ☐

2. Assemble each of the remaining uranium rings No. 2 through No. (See General Note 6, Reference (a)) to Subassembly 1-S2, 1-S4 as follows.

A. Preheat as in Subsection II, Step 1A above.

B. Using a special ring lifting fixture, remove the uranium ring from the furnace and check the I.D. expansion with a special "Go-No Go" gage. Position the uranium ring over the Subassembly Weldment (Pieces 1-S2, 1-S4) and carefully lower the ring around Subsection Piece 1-S2

and seat against the previous uranium ring so assembled to form the shrink fit on the 54.625" Dia. x 1/2" step interface between the adjacent uranium rings in accordand with Detail 4-A, Reference (a).

C. Inspect the subassembly of each ring using 0.005" Go and 0.016" No Go feeler gages to check the gap between the 54.625" Dia. and the O.D. at the step interface between the rings, and verify acceptance in accordance with Detail 4-A, Reference (a) N.Q.C. Inspec. Check ☐

III. The Butt Welding of Subsection 1-S1 to the Subassembly 1-S2, 1-S4, 3

1. Machine a single beveled edge on both edges of Piece 1-S1 in accordance with Detail 9-A of Reference (a) and position Piece 1-S1 on the Subassembly 1-S2, 1-S4, 3 in accordance with Reference (a). Fitup one end of Piece 1-S1 and Piece 1-S4 in accordance with Detail 9-A, Reference (a). Fitup shall be visually inspected in accordance with General Note 1 of Reference (a). Shims shall be accurately positioned to ensure conformance to the root opening specified in Detail 9-A of Reference (a). Adequate weldment and jigging shall be used to insure conformance to dimensional tolerances as specified in Reference (a). Tack welds shall be welded in accordance with General Note 1 of Reference (a) and shall be free of cracks when visually inspected. Verify Inspection as in Section A, Subsection I, Step 4. Note: During fitup, offset the vertical seam on Piece 1-S1 30° or more from the vertical seam on Piece 1-S2 in accordance with Reference (a). N.Q.C. Inspec. Check ☐
2. The welding of the circumferential butt shall be in accordance with the following.

A. Base Metal Preparation - The same as described in Section A, Subsection I, Step 5A.

B. Welding shall be performed in accordance with Notes 1, 3 and 12 of Reference (a) and shall be deposited according to the welding sequence outlined in Figure 2.

C. Non-Destructive Testing - Dye penetrant examination will be performed in accordance with Note 11 of Reference (a).

IV. The Pouring of Lead (Piece No. 1-S5) into the Subassembly of Pieces 1-S1, 1-S2, 1-S4, 3

1. Using oakum T-Q-56, Class 1, caulk the circumferential gaps between Subsection Piece 1-S1 and the top uranium ring Piece No. 3 and between Subsection Piece 1-S2 and the top uranium ring Piece No. 3, in accordance with Reference (a).

2. Preparation for lead pouring shall be as follows.

A. All components to be free of weld splatter and other foreign matter

B. All component weldments are to be furnished completely fabricated with all internal surfaces completely free of weld splatter and other foreign matter.

C. All shield weldments are to be placed in their proper position for pouring, leveled and braced to maintain a level attitude throughout the pour.

D. Weldment inspection shall be as follows

(1) A final check of the internal cavities of all weldments will be made for loose scale, weld splatter and other matter prior to lead filling.

N C I Ins. at Chem

(2) Dimensional checks of all critical weldment dimensions will be made in accordance with Reference (a).

E. The lead melting equipment is to have a capacity of at least 150% of the estimated lead required for a given pour and also have sufficiently powered pumping equipment to obtain rapid dross-free weldment filling by means of pot-bottom pumping

3. Lead pouring procedure shall be as follows

A. Using QQ-L-171 Grade C lead, heat to a minimum of 750° and a maximum of 850°F, depending on the size and type of weldment being poured. Exact lead pouring temperatures will be determined by our manufacturing

department prior to each pour based on current ambient temperatures. Such temperatures will be maintained and recorded throughout the pouring operation.

B. The steel weldments are to be preheated by means of gas torches, heating rings, or within a heated enclosure or by a combination of all such methods in such a manner that a uniform shell temperature of 400°F Min. - 450°F Max is obtained This minimum temperature is to be maintained above the solidification level of the lead by torches throughout the entire shrink-cooling operation (3-D) and controlled by magnetic temperature indicators or by temp-stik applications.

C. The shell of the unit is to be completely filled by a continuous pour with the following exception.

(1) The primary container with concentricity spacers properly located will be poured continuously to a point slightly above closure plate shoulder. The shrink-cooling operation (Step D) will be started and continued until the pour has been solidified

D. The lead-filled units are to be shrink-cooled by means of air convection permitting the heat to escape through the lower surfaces while heat is continuously applied to the upper surfaces. This will provide a reservoir of molten lead to feed the resultant solidification shrink reaction. Small amounts of additional lead are to be hand-ladled into the shell at frequent intervals to maintain a fully filled condition. The solidification level is to be checked at frequent intervals by means of a wire probe in order that the application of heat can be adjusted correctly to maintain the above mentioned molten lead reservoir. These operations are to be continued until no further solidification shrinkage is encountered.

4. Dimensional inspection after lead pouring shall be as follows:

   A. After the lead filled shell returns to ambient temperature, a check will be made to determine any dimensional variations that have occurred during the lead pouring operations, to verify that they are in accordance with Reference (a).

5. Perform Gamma Scanning Test of [illegible] in accordance with NLA-WAH-3 and General Note 4 of Reference (a).

6. Post Welding of Piece 1-S1 to [illegible]

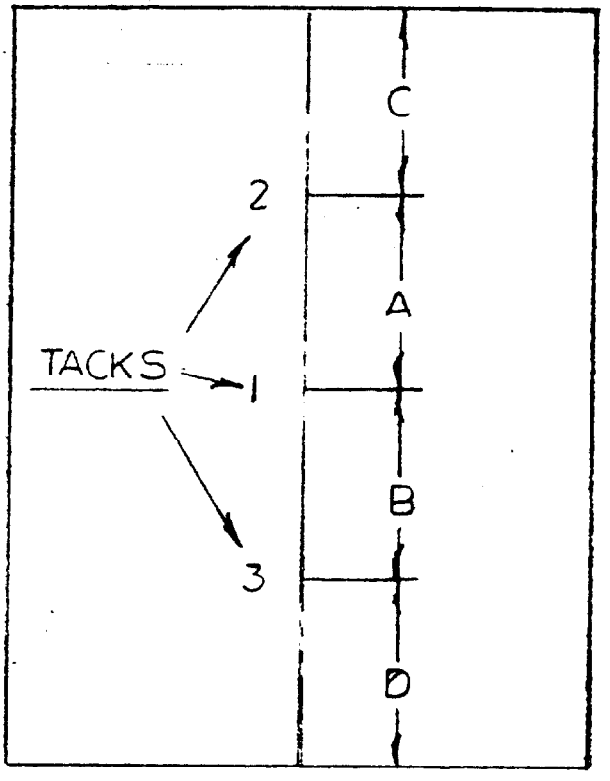
   Purge Pieces 1-S1 to the Subassembly [illegible] 1-S1, 1-S2 and 1-S3, in accordance with [illegible]. This requires screwing of the lead [illegible] a machine threaded hexagon Piece [illegible] and to purge the proper root opening [illegible] and Pieces 1-S1, 1-S2 in accordance with [illegible] Reference (e). Verify inspection as in Section A, Sub-[illegible] N.D.I. Procedure 7, Step 4.

7. The welding and non-destructive testing [illegible] Pieces 1-S1, 1-S2 and 1-S3 [illegible] Reference (e). [illegible] Step 6.

8. [illegible] Reference (a). Verify [illegible] agree to dimensions in accordance with Reference (a).

5.	Perform Helium Leak Test in accordance with General Note 8, Reference (e) using procedure NLA-WAH-4. Note final inspection of finished assembly to verify acceptance in accordance with Reference (e).	N.C.C. Inspec. Check ☐

VERTICAL BUTT WELDING SEQUENCE FOR PIECES 1-S1 AND 1-S2



NOTES 1. WELDING SHALL EMPLOY BACKSTEP AND CASCADE TECHNIQUES

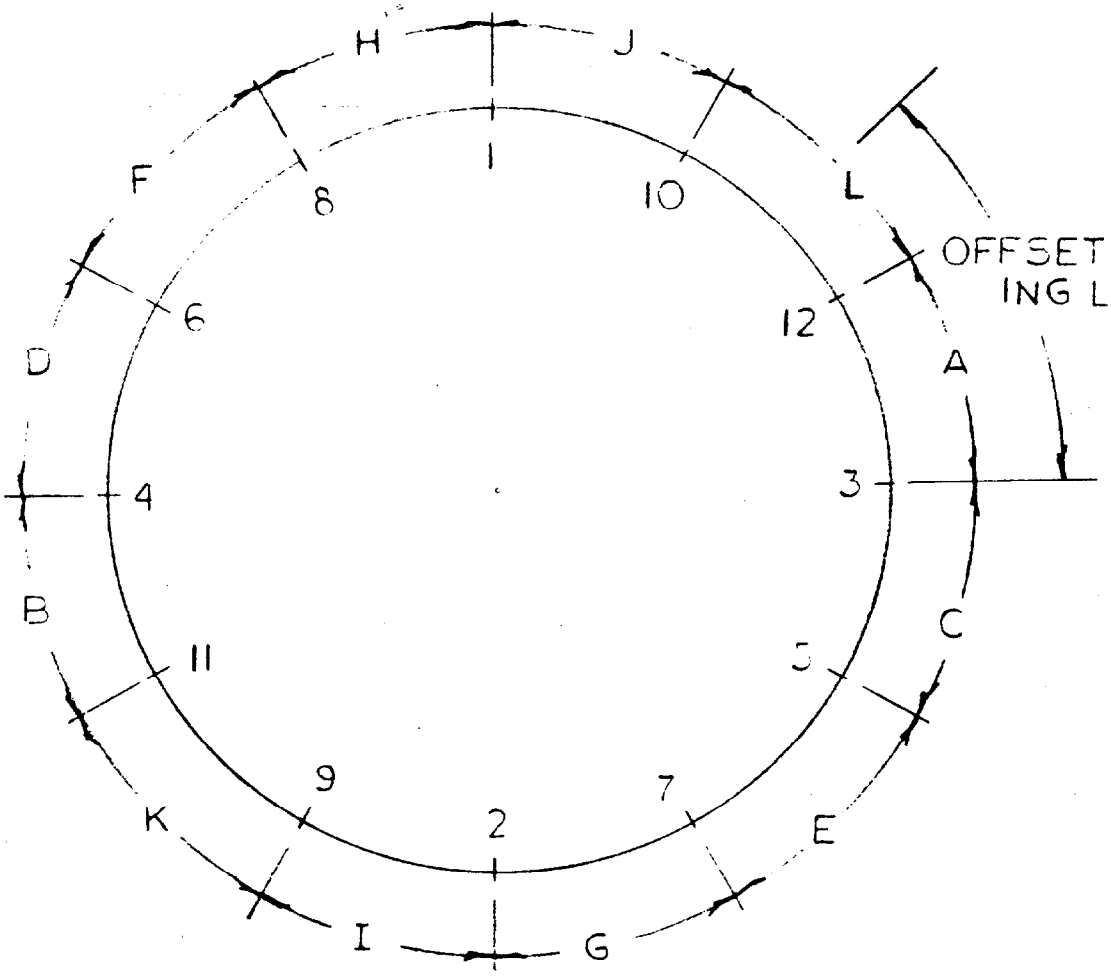
2. TACK WELDS SHOULD BE A MINIMUM OF 2" IN LENGTH

3. WELDING PIECES 1-S1 AND 1-S2 - THE DEPOSIT OF WELD METAL ON THE FIRST SIDE SHALL BE LIMITED TO 1/16" UNDERFLUSH AT WHICH TIME BACKGOUDING WILL BE STARTED.

FIG. 1

WELDING SEQUENCE TO BE USED FOR

ALL CIRCUMFERENTIAL BUTT WELDS



NOTES - SEE FIG 1 NOTES 1, 2, AND 3 ARE APPLICABLE HERE

1. INSPECTION TO MAKE CONTINUAL CHECK ON WELDING SEQUENCE.

FIG. 2

DLR:DFH
40-7123

1964

National Lead Company
Nuclear Metals Division
Industrial Department
1130 Central Avenue
Albany 5, New York

Attention: Mr. C. J. Michel

Gentlemen:

Enclosed is AEC Source Material License No. SUB-748.

DISTRIBUTION:
Doc. Rm.
Br. & Div. rfs
Compliance
Suppl.
D. Harmon, LR
Doulos, LR (3)
State Health (Lic. only)

Very truly yours,

Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials
Branch
Division of Licensing and Regulation

Enclosure:
SUB-748

OFFICE ▶	LR	LR				
SURNAME ▶	DHarmon/ic	DNussbaumer				
DATE ▶	1/16/64	1/1/64				

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Form AEC—410
(1-61)

UNITED STATES
ATOMIC ENERGY COMMISSION

SOURCE MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954, and Title 10, Code of Federal Regulations, Chapter 1, Part 40, "Licensing of Source Material," and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, possess and import the source material designated below; to use such material for the purpose(s) and at the place(s) designated below; and to deliver or transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission, now or hereafter in effect, including Title 10, Code of Federal Regulations, Chapter 1, Part 20, "Standards for Protection Against Radiation," and to any conditions specified below.

Licensee	3. License No.
1. Name National Lead Company	SUB-748
2. Address Nuclear Metals Division Industrial Department 1130 Central Avenue Albany 5, New York	4. Expiration Date March 31, 1964
	5. Docket No. 40-7123

6. Source Material	7. Maximum quantity of source material which licensee may possess at any one time under this license
Uranium	38,000 pounds.

CONDITIONS

8. Authorized use (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)

For use in accordance with the procedures described in the licensee's application dated January 10, 1964.

9. Authorized place of use: (1) P. F. Avery Corporation
67 High Street
Billerica, Massachusetts

(2) National Lead Company
Atlantic Branch
1050 State Street
Perth Amboy, New Jersey

10. A licensee's representative shall be present at each location of use while uranium is being possessed and used at that location.

Date of issuance 11/17/64 SUB-748 Dec 11/17/64

For the U. S. ATOMIC ENERGY COMMISSION

Donald A. Nussbaumer
Division of Licensing

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