CONSOLIDATED
ALUMINUM

618-452-5190
TWX 910-756-2393

April 20, 1982

Director of the Division of Fuel Cycle and Material Safety
Office of Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Attached are the required quadruplicate copies of our application for the renewal of NRC License No. STB-1097. This license expires on May 31, 1982 and the attached information is directed toward the renewal of that license.

After you have had an opportunity to review the application, we would be most happy to answer any questions you may have or furnish any further information that may be needed.

Very truly yours,

CONSOLIDATED ALUMINUM CORPORATION

George E. Stein
Engineering & Technical Manager

GES:pas

Attachments 4

002005 $70 2D
Renewal
5/13/82

8702270118 861003
REG3 LIC40
STB-1488 PDR

Consolidated Aluminum Corporation College and Weaver Streets Madison, Illinois 62060

FORM NRC-2
(7-77)
10 CFR 40

Approved by GAO
R0203

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one)
- ☐ (a) New license
- ☐ (b) Amendment to License No. _____
- ☒ (c) Renewal of License No. STB-1097
- ☐ (d) Previous License No. _____

2. NAME OF APPLICANT
Consolidated Aluminum Corporation

3. PRINCIPAL BUSINESS ADDRESS
11960 Westline Industrial Drive
St. Louis, MO 63141

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Madison Plant
College & Weaver Sts., Madison, IL 62060

5. NAME OF PERSON TO BE CONTACTED CONCERNING THIS APPLICATION
George E. Stein, Engineering & Technical Mgr.

6. TELEPHONE NO. OF INDIVIDUAL NAMED IN ITEM 5
(618) 452-5190

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Manufacture of magnesium base alloys containing up to 4% thorium. These alloys are sold for use in structural applications or further processing in the cast, extruded and rolled sheet/plate.

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (*Including % U or Th.*)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (*kilograms*)
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	Thorium Metal, Mg-Th Hardener Magnesium Sludge	97% Thorium 40% Thorium 0-4% Thorium	1,350 kg 13,500 kg 1,500,000 kg

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (*kilograms*)
14,850 kg + sludge storage of approximately 1,500,000 kg

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES

See attachment, Item 9.

10. LIST THE NAMES AND ATTACH A RESUME OF THE TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE OF APPLICANT'S SUPERVISORY PERSONNEL AND THE PERSON RESPONSIBLE FOR THE RADIATION SAFETY PROGRAM (OR OF APPLICANT IF AN INDIVIDUAL).
George E. Stein - Engineering & Technical Manager
Richard J. Moder - Chief Metallurgist
Robert L. Holshouser - Casting Superintendent (See attached Item 10)
Alfred J. Weider - Safety & Training Supervisor

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument).
Program includes use of air sampling equipment, film badges, geiger rate meter, scaler timer and probe. See "Procedures" attached, Exhibit "A".

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE. (INCLUDING ANY OTHER EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).
Survey meters are calibrated with a known radium source prior to each use for survey purposes. Film badges furnished and read by Searle Diagnostics, Inc. Air samples calibrated with a Fisher-Porter Flowrator Kit.

28695

11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT

See attached Item 11(c).

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS

See attached copy of "Procedures For The Storage, Handling and Processing of Magnesium-Thorium Alloys and By-Products" (Exhibit "A")
See attached copy of "Radiological Survey," conducted 8/10/81 (Exhibit "C")

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

Standard magnesium fire control procedures are followed.

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See attached copy of "Procedures For The Storage, Handling and Processing of Magnesium-Thorium Alloys and By-Products."

13. WASTE PRODUCTS: *If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here* ☒ *and explain on a supplemental sheet:*

(a) Quantity and type of radioactive waste that will be generated. See attached Item 13.

(b) Detailed procedures for waste disposal.

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS *(Specify instrument used, date of calibration and calibration technique used)* AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(This item must be completed by applicant)

15 *The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.*

BY: _____
(Signature)

Dated 4/20/82

Gerard B. Leconte
(Print or type name)

Vice President of Planning & Strategy
(Title of certifying official authorized to act on behalf of the applicant)

WARNING: 18 U.S.C. Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

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9. Alloying of magnesium in the molten form, with up to 4% thorium, using a 40% Th hardener. Maximum usage of thorium hardener at any one time could be 2800 kg in a 24-hour period. Alloyed magnesium-thorium is cast into rolling ingot, extrusion billet or forging ingots. These forms are subsequently processed at temperatures well below the solidus into sheet and plate, extrusion shapes or forged parts.

   Potential radioactivity from the products of the thorium decay chain (i.e., radium 228 and the other short-lived daughter products), which may become airborne as fumes or particulate matter, have been surveyed at this location over the years, since 1953, and have shown actual exposure to the worker in this alloying process to be well below permissible limits for continual exposure.

   A mechanical sludging device attached to a fork truck allows the operation to be performed with the operator removed from any direct fumes generated during sludging.

   This alloying process is normally carried out only two to three times (24 hours per occurrence) a year, which also minimizes exposure.

   Previous studies are documented in "The Dow Chemical Company File for Source Material License, No. STB-527, Docket No. 40-17."

10. Mr. Stein, the Engineering and Technical Manager, has had 28 years' experience in the aluminum and magnesium industry. A graduate metallurgist with a Master of Science degree, he attended a one-week course on "Radiation Protection" at Santa Fe in 1979.

    Mr. Moder, the Chief Metallurgist, has had 25 years' experience at the Madison Plant in aluminum and magnesium metallurgy and operations. He has worked with Mg-Th alloys since their development.

    Mr. Holshouser, Casting Superintendent, has had 25 years' experience in casting and the supervision of Mg-Th alloys.

    Mr. Weider, Safety and Training Supervisor, has coordinated our radiation safety and training over the last 25 years.

    All casting supervisors have been associated with the casting of Mg-Th alloys for 10-25 years, as have most of the hourly operating employees.

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11c. The Casting Plant layout is shown in the attached print (Exhibit B), K11857. This shows three (3) separate melting and casting facilities. Only one of the units would be used for processing Mg-Th alloys at any one time. As an example: The unit showing pots numbered 30 through 39 is used to produce rolling ingot. The numbers 30-39 refer to ten (10) open pots of 6000 pounds magnesium capacity. Pot numbers 36 and 39 are used as basic melters for melting pure magnesium ingot. Thorium is alloyed to liquid magnesium in pots #32, 35, 37 and 38. Pots 33, 34, 31 and 30 are used to settle, cleanse, adjust temperature and supply an inventory of alloy to the slab mold located next to pot #30.

There is a common ventilation system used in the Magnesium Casting Plant during all melting, alloying and sludging operations. This system consists of the following:

a) Twelve (12) roof exhaust fans designed to change the air at a rate of 655,100 CFM.

b) Four (4) blowers are provided for moving 243,800 CFM of outside air into the basement area beneath the melting floor. An air space is provided around each pot setting which permits this basement air to rise as an air curtain, past the work area and up to the roof exhaust fans and/or monitors.

c) Open roof monitors exhaust large quantities of air, dependent upon atmospheric pressure and outside wind velocity.

d) In addition, the Cast House has an unusually high roof - 60 feet - which also helps exhaust fumes.

13. Since we recycle the Mg-Th alloy scrap back through the casting process, we generate a minimal amount of waste product. This waste product is a dry sludge consisting primarily of magnesium oxide and chloride, with a 0-4% thorium content as metal or oxide. Approximately one (1) pound of sludge is generated for each five (5) pounds of product.

Sludge which has accumulated at the Madison Plant during the past 20 years of operation is stored on our premises in an area shown on Exhibit "D." This storage area is an asphalt pad with curbs. The material stored on the pad is completely covered with hyperlon plastic.

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Currently generated waste is being disposed of at available off-site facilities. Current disposal is by Chem-Nuclear Company at the disposal site in Barnwell, S.C.

EXHIBIT "A"

MADISON PLANT

CONSOLIDATED ALUMINUM CORPORATION

PROCEDURES
FOR THE
STORAGE, HANDLING, AND PROCESSING OF MAGNESIUM-THORIUM ALLOYS AND BY-PRODUCTS

CONTENTS

Prepared by _____
R. J. Moder

Approved by _____
G. E. Stein

Approved by _____ 3/21/80
J. J. Levanowicz

Approved by _____
W. T. Bosworth

3/21/80
Rev: 0

Introduction

The Nuclear Regulatory Commission requires licensing for the possession or processing of Thorium. Any material containing greater than 0.05 percent Thorium is defined as "source material." Consolidated Aluminum is licensed for the possession of such materials and, as such, is required to have documented procedures for the proper storage, inventory, handling, processing and disposal of these materials. This manual outlines the procedures to be followed.

Responsibility

The Madison Plant Manager is responsible for seeing that proper procedures are instituted and followed. He has assigned the specific responsibility to the Technical Manager. The Production Manager is responsible for following this procedure during the production of Mg-Th product.

I. STORAGE AND INVENTORY

A. Alloying Elements

1. Locked and posted storage is provided in the northwest corner of #8 Bldg.-Annex for the following materials:

   a. Thorium metal

   b. Magnesium-Thorium hardener (40% Thorium)

   c. In-process sludge in steel drums waiting permanent disposition or disposal.

2. This "storage cage" will be posted as "Caution - Radioactive Area."

3. Two (2) keys are available for access to this storage. They are maintained by:

   a. The Plant Manager

   b. The Technical Manager

4. The Production Control Manager shall be responsible for maintaining proper inventory records.

   a. A copy of the current inventory of alloying material and in-process sludge shall be posted in the "storage cage" at all times.

   b. Removals or additions shall be noted with dates as this action occurs.

5. The Plant Technical Manager shall be notified as to the expected receipt and arrival of all materials requiring locked storage.

B. Magnesium-Thorium Alloy (HM21A, HM31A, HK31A)

1. All scrap materials shall be returned to the Cast House for storage in an area approved by the Technical Manager and properly marked and posted. Such materials include the following:

   a. Scrap ingots

   b. Scrap billets

   c. Scalper and saw chips

   d. Scrap sheet and plate

   e. Scrap extrusions

2. All finished goods will be properly marked and stored in a properly posted area approved by the Technical Manager. This will include:

   a. Finished sheet and plate

   b. Finished extrusions

   c. Excess Mg-Th ingots

C. Sludge Storage and Disposal

1. All sludge generated from the melting of Magnesium-Thorium alloys will be placed in heavy steel drums with lids, properly marked and moved to locked storage (see I.A.1.c.).

2. Subsequent disposal will be made as follows:

   a. Wrap each container in heavy plastic bags and move to the sludge disposal pad located in the northeast corner of the plant property and put under the available hyperlon cover.

   b. Ship to authorized disposal sites. (Note: Such sites and availability need to be determined).

III. PERSONNEL TRAINING

A. All personnel involved with the casting and handling of Magnesium-Thorium alloys in the Cast House will receive a 30-minute training and orientation program within the 30 days preceding the first casting run in a year and at least yearly after that.

B. The program will be prepared and presented by the Plant Safety Supervisor with the approval of the Technical Manager and will include:

1. A discussion of radiation hazards.
2. The particular materials to be handled.
3. Safety clothing and equipment.
4. Review of procedures.

C. All persons to be utilized in the processing must attend the training sessions.

D. All persons in attendance must sign an attendance list indicating their presence.

III. HANDLING AND PROCESSING

A. Processing Steps

1. Start with clean melting pots.
2. Melting in P01 cell magnesium.
3. Transport Mg-Th scrap and Mg-Th hardener from posted Thorium area into pot room (See I.A.1. & I.B.1.).
4. Load scrap into melting pots and melt.
5. Flux refine.
6. Check composition - Determine Mg-Th hardener and other necessary additions.
7. Mg-Th hardener additions are made using an alloying basket.
8. Remove sludge; place in heavy steel drums - Cap. with a lid - Label properly and send to Restricted Area in the northwest corner of #8 Bldg.-Annex (See I.A.1.).
9. Start casting.
10. Saw into ingots - Collect saw chips.
11. Remove ingots and saw chips from sub-basement.
12. Identify saw chips as to alloy and send to Mg-Th scrap storage area.
13. Wash pots with wash metal (Run Spectrographic analysis).

14. Collect all casting equipment.

15. Clean the casting area.

16. Collect personnel clothing, equipment and film badges.

17. Wash pumps in flux bath.

18. Ingots are scalped - faces and edges. Collect chip, identify properly and send to Mg-Th scrap storage area.

19. Send ingots to Rolling Mill or Extrusion for processing into final product.

20. Identify all process scrap and send to Mg-Th scrap storage area.

21. Ship product to customer.

B. Records of Magnesium-Thorium Processing

Type	Responsibility
Receiving Records	Prod. Control
Inventory Record	Prod. Control
Process Sheets - Casting Dept.	Casting
*Activity Sheets - Casting Dept.	Casting
Slice Inspection	Casting
Spectrographic Analysis	Technical
Scalping Records - Casting Dept.	Casting
Process Sheets - Rolling Mill	Rolling Mill
*Various Activity Sheets - Rolling Mill	Rolling Mill
Shipping Records	Rolling Mill & Traffic
Sales Orders	Prod. Control
Invoices	Accounting
Property Test Results	Technical
Radiation Records	Technical

*Process Record Sheets are titled, "Activity Sheets"

All records must be dated and signed.

C. Radiation Records

1. Prior to casting run:

   a. Magnesium Pot Room - Measure and record base-line levels of:

a-1) Direct alpha and beta-gamma.

a-2) External gamma.

a-3) Alpha activity in the air.

b. Pot Room Roof - at exhaust and ventilation dormers - measure and record same as (a) above.

c. Sub-basement - chip collection area - Measure and record same as (a) above.

2. During casting run:

a. Measure and record same as in (1) above.

During:

a-1) Addition of magnesium-thorium miscellaneous scrap to melt.

a-2) Addition of thorium hardener to melt.

3. After normal clean-up and changeover to other casting:

a. Clean the casting area.

b. Measure and record same as in (1) above.

4. Personnel Clothing and Equipment - all items of outer clothing, including gloves and hard hats must be collected after casting run. Any contaminated clothing will be disposed of separately.

5. Casting Equipment, External to Cast Pot and Mold - Collect alloying basket, liquid metal pump and casting lines, shovels, hand tools, fork trucks, sludgers, etc. Check for contamination.

6. Clean equipment in flux bath:

a. Check for contamination.

b. Check flux bath for contamination.

IV. MONITORING EQUIPMENT

A. Personnel Monitoring - Film Badges

Use for each employee entering casting pot room during Magnesium-Thorium casting.

B. Area Monitoring

1. Scaler-Timer and probes.

2. Geiger rate meter.

3. Air sampling pumps - 20 liters per minute thru filter 1 to 1.5" diameter.

EXHIBIT "C"

CONSOLIDATED ALUMINUM CORPORATION

MADISON PLANT

TITLE

RADIOLOGICAL SURVEY CONDUCTED DURING THE

8/10/81 HM21A CASTING CAMPAIGN

PREPARED BY: Teri S. Johnson Date: 9/10/81

Introduction

This survey was conducted by Consolidated Aluminum to monitor radiation levels at Madison during the 8/10/81 HM21A casting campaign. This report includes sampling data before, during and after the alloy processing, and confirms that this work does not present a significant radiological hazard to employees involve

Methods and Results

External radiation measurements were gathered with a W. B. Johnson GP-90 Geiger Probe and a GSM-5 survey meter, according to the operating procedures described in the W. B. Johnson Instruction Manual.

These measurements are listed in Table I:

a) background readings
b) readings during processing
c) readings during cleanup
d) readings after cleanup
e) final readings in storage areas

Figure 1 is a layout of the magnesium-thorium metal and scrap storage in Building #7 Annex as of 8/10/81.

Based on the data gathered during this casting run, it is concluded that all radiation levels were well within the allowable limits. The report of the radiation exposure on the film badges worn by the employees in the casting area during production of HM21A has not been returned from the detection and testing facility.

Prior to the run, background measurements were made in the vicinity of the melting pots, ingot sawing, scalping area, flux baths, roof and scrap storage bins. Levels in all areas, except near the thorium scrap bins and storage annex, were 0.01 to 0.05 mR/hr. Near the storage area and scrap bins, the readings were 0.7 mR/hr at one foot and 0.1 to 0.20 at ten feet.

During processing, measurements were made in various areas of the cast house. The only levels measured which were above normal background were near the scrap bins and thorium hardener containers.

Clothing and gloves were collected from each crew member and placed in plastic bags. External radiation levels were checked on these items and only background levels were recorded.

The casting pot area was checked after the pots were cleaned and higher than background levels were found (0.05 to 0.10 mR/hr) near the pots. These readings were caused by HM21 metal spills on the rims of the pots. After a more thorough cleanup, the readings were found to be that of normal background levels.

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1.0 INTRODUCTION

Consolidated Aluminum Corporation is the holder of NRC License STB-1097 for the use of thorium (232), a source material used in the manufacture of magnesium base thorium alloys, and for long-term storage of thorium-magnesium sludge at its Madison Plant located at College and Weaver Streets, Madison, Illinois.

Although Consolidated Aluminum Corporation has no immediate intention of discontinuing operations under the above license as amended, it is submitting this decommissioning plan in compliance with Condition 13 of the above license. All on site low level radiation waste is stored under hyperlon cover consistent with all applicable regulations and standards for the protection against radiation. No hazards to either plant personnel or the general public are present. This plan sets forth a method by which decommissioning and decontamination can be accomplished to release this area for unrestricted use.

Methods and techniques different from the one described herein may be employed at the time of actual decommissioning and decontamination, dependent on regulations and opportunities which might then exist to obtain the Performance Objectives.

2.0 PERFORMANCE OBJECTIVES

The objective of this document is to provide a plan, solely for decommissioning purposes, to establish a means for decontaminating the facility to levels which do not exceed those in Table 1 (attached) of the Guidelines for Decontamination by the U. S. Nuclear Regulatory Commission, so as to enable eventual release of the property for unrestricted use.

3.0 PLAN

Magnesium-thorium sludge has been stored at this site since 1952. The following plan considered for decommissioning purposes is to remove all low level radiation material subject to the above license from the site and restore the area for unrestricted use. In preparation of the following plan, Consolidated Aluminum Corporation has contacted various experts in the field of low level radioactive waste disposal from such sources as the NRC, Radiation Management Corporation, and Chem-Nuclear Systems, Inc., etc. to verify the viability of the plan as submitted.

3.1 General Considerations

All thorium solid metal and/or magnesium-thorium hardner will be consumed in the process to manufacture magnesium base thorium alloys. Magnesium-thorium sludge generated over the past twenty years is stored on a curbed asphalt pad and covered with hyperlon. Currently generated waste is being disposed of at available waste site facilities. All areas of the plant, other than the magnesium-thorium sludge pile, are at normal background radiation for this locale. It is believed this decommissioning plan to remove the magnesium-thorium waste will accomplish the decontamination desired and restore all areas consistent with background levels.

3.1.1 There are no structures involved with the radioactive sludge.

3.1.2 The area used for storage is covered and is duly posted in accordance with applicable regulations, thus restricting access to the area pending ultimate decontamination.

3.2 Procedure

3.2.1 A pre-radiological survey of the area has previously been conducted by a qualified independent consulting firm.

3.2.2 Permits will be obtained for transportation and burial of said materials at a licensed site now in operation or at any licensed local sites which may become available at the time of decommissioning.

Upon decommissioning, burial space will be requested and removal of material will be made when space allocations are obtained from the burial site. The magnesium-thorium sludge will be properly contained, documented, labeled, and transported for burial per the applicable regulations in effect at the time of the decommissioning.

3.2.3 A post-radiological survey will be conducted at the storage area to determine that removal has accomplished the decontamination levels as stipulated in Table I.

3.3 Final Report and Application for Release of Area to Unrestricted Use

A final report will be submitted to the NRC for release of the area for unrestricted use at the time of license termination and prior to discontinuance of plant operation by Consolidated Aluminum.

3.3.1 Report will include:

a. Identity of premises and license
b. Description and location of area of survey
c. Description of scope of survey and procedures followed
d. Record of final radiological results with a comparison of local background radiation
e. Request of the NRC for approval and release for unrestricted use

4.0 FINANCIAL COST ESTIMATE

4.1 (Anticipated Costs at Present Rates - based on burial at existing sites in Barnwell, S. C. and/or Hanford, Washington and transportation via licensed carrier such as Tri-State)

Material Transportation Costs	$ 600,000
Material Burial Costs	$ 675,000
Post Radiological Survey and Permitting	$ 25,000
Total	$1,300,000

5.0 ACKNOWLEDGEMENT OF PLAN

(Signature)

V. P. Fabricated Operations Group
(Title)

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b c f]	MAXIMUM[b d f]	REMOVABLE[b e f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm²	15,000 dpm α/100 cm²	1,000 dpm α/100 cm²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm²	300 dpm/100 cm²	20 dpm/100 cm²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm²	3000 dpm/100 cm²	200 dpm/100 cm²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except SR-90 and others noted above.	5000 dpm βγ/100 cm²	15,000 dpm βγ/100 cm²	1000 dpm βγ/100 cm²

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm².

[e] The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of tissue absorber.

Conclusions

Measurements made during the Mg-Th alloy processing verify that no significant radiological hazards exist during these runs. External radiation levels are very low. The employees have received prior orientation and are provided with protective clothing and personnel monitoring devices. The alloys, hardener and wastes are controlled, handled and stored in an appropriate manner.

TABLE I

Date	Time	Location and Remarks	Readings
	A. Background Readings		
8/6/81	1:19 P.M.	On roof above vents from pot room	.01-.03 mR/hr
	1:32	12 inches from HM scrap slabs for alloying	0.6-0.7 "
	1:34	10 ft. from scrap slabs	0.1-0.16 "
	1:39	3 ft. from clean, empty casting pot	0.02-0.03 "
	1:40	3 ft. from melting pot	.03-.0.05 "
	1:46	Within 3 ft. of saw in basement (near chip bin)	0-0.01 "
	3:00	At barrel full of 38% Th hardener	19.0-20.0 "
	B. Readings During Processing		
8/10/81	3:00 A.M.	HM scrap on pot room floor, 3'	0.5-0.6 "
		Reading at each pot, 3'	0.05-0.13 "
		At closed hardener drum on floor	1.7 "
		At Th-Hardener drum open	15.0 "
		2' from full drum	2.0-3.0 "
		Pot with hardener melting	0.1-.15 "
	8:25 A.M.	Each pot at rim,1'	0.05-0.3 "
		Each pot at rim,3'	0.05-0.10 "
	8:40 A.M.	Balance area used for weighing the harderer (6 barrels nearby, 1')	0.10-0.20 "
	8:50 A.M.	Roof near vents	0.01-0.05 "
	9:16 A.M.	Pot with hardener melting, 3'	0.1-0.15 "
	1:40 P.M.	Casting table before molten metal	0.01-0.05 "
	1:45 P.M.	Started casting	
	1:55 P.M.	Casting table while casting 3'	0.01-0.05 "
	2:45 P.M.	In saw chip scrap box	0.05-0.08 "
	2:48 P.M.	3' from scrap box	0.01-0.04 "

TABLE I
(Cont.)

Date	Time	Location and Remarks	Readings
8/11/81	C. Readings During Cleanup		
	8:10 A.M.	Casting table, 3'	.03-.05 mR/hr
		Gloves, coveralls (inside plastic bag)	.01-.03 "
		Pots with metal spills on rims, 3'	.05-.20 "
		Hand tools	.03-.05 "
		Flux pot after sludging, 3'	.03-.05 "
	9:16 A.M.	Roof at vents and fans	.01-.03 "
	9:30	Basement saw area	.01-.03 "
	D. Readings After Cleanup		
	2:30 P.M.	Spills cleaned from pot rims, 3'	.03-.06 "
		Hand tools	.02-.03 "
	E. Final Readings in Storage Areas		
	2:55 P.M.	At cage door	1.2-1.4 "
		6' from gate	0.9-1.1 "

INVENTORY RECORD

	Total Usage (lbs)	
Cell Magnesium	46995	
HM21A Scrap	32368	
35% Th Hardener	3204	
Total Usage	82567	82567

	Total Production (lbs)	
18 Ingots	50092	
Sows	26622	
Total Production	76714	76714
	Melt Loss	5853 (7.09%)

Final Inventory (lbs)

Scrap from production run		15177
Saw Losses (slices, etc.)		4768
Scalper chips		9755
Scalped ingot for rolling		16446
Ingot on hand		30568
	Total	76714