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**REYNOLDS ALUMINUM**  
REYNOLDS METALS COMPANY • RICHMOND, VIRGINIA 23261

84940000276

August 18, 1986

**Contains No CBI**

Ms. Roberta Wedge  
Staff Scientist  
TSCA Interagency Testing Committee  
c/o Dynamac Corporation  
11140 Rockville Pike  
Rockville, Maryland 20852

RE: Cryolite

Dear Ms. Wedge:

In response to your letter of March 19, 1986 requesting information on cryolite, Reynolds Metals Company has put the attached information together. If you have any questions, or need clarification of some of the data presented, feel free to call Mr. S. D. Ryan at (804) 281-3952.

Very truly yours,

*S. D. Ryan*  
Lawrence C. Tropen, Jr., P.E.  
Director, Environmental Control  
Environmental Control Department

LCT/SDR.stt

Attachment

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OPPI/CBIC  
24 JUL 14 AM '86

## CRYOLITE

### I. Production Volume and process data

Attachment A lists the cryolite production by Reynolds Metals Company for the last five years. Reynolds uses a caustic leach process to recover fluoride compounds from spent aluminum reduction cell cathodes. These cathodes, called potliners, are crushed and ground to 80% < 100 mesh using a jaw crusher, a hammermill, and a wet rod mill.

The resultant slurry is digested in a hot alkaline digester, in which the caustic soluble materials go into solution. These include cryolite, other fluoride compounds, and the caustic soluble alumina.

The solid undigested residue is gravity separated for disposal.

The digested liquor, heavy in fluoride compounds, is then transported to vessels called carbonators, where the caustic portion of the liquor is converted to sodium carbonate by addition of carbon dioxide. This shifts the liquors equilibrium, causing the cryolite to precipitate.

The precipitant cryolite is then filtered out, dried and cooled prior to bagging for eventual use back in the aluminum reduction process, or for sale to outside customers.

### II. Use information, including technical literature and Material Safety Data Sheets

Reynolds uses cryolite in the production of aluminum metal. We also sell it to outside customers for that same use, and to foundry operations that use it as a cover flux material.

Reynolds is providing, as Attachment B, our Material Safety Data Sheet for recovered cryolite.

### III. Unpublished toxicity data

Reynolds is not aware of any unpublished toxicity data that could be provided to the Agency.

### IV. Occupational exposure data

Attached is a small sample of occupational fluoride exposure data, indicative of the larger fluoride survey that Reynolds reduction plant employees undergo. When an employee is detected of having elevated urinary fluoride levels, follow up meetings are held with that employee to discover the cause of the elevated levels, and to propose solutions to minimize further exposure.

Also included is a sample of the urinary fluoride survey program form that is commonly used in our plants.

### V. Environmental Data

Reynolds is not aware of any specific environmental data involving cryolite.

**ATTACHMENT A**

**MINERAL METALS COMPANY**

**Coalita Production**

**1981 - 1985**

<b>YEAR</b>	<b>TONNAGE</b>
<b>1981</b>	<b>18297</b>
<b>1982</b>	<b>5372</b>
<b>1983</b>	<b>8295</b>
<b>1984</b>	<b>21624</b>
<b>1985</b>	<b>18911</b>



# MATERIAL SAFETY DATA SHEET

(Previously Similar to Form OSHA-20)  
**REYNOLDS METALS COMPANY**  
R-1007-19

DATE 07/24/85	REVISION DATE / /	MSDS # 124
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## SECTION I

**MANUFACTURER:** Reynolds Metals Company  
Industrial Hygiene Department  
4403 West Broad Street  
Richmond, Virginia 23261

**TELEPHONE NUMBER:**  
(804) 281-2709

**PRODUCT CLASS:** Fluoride

**MANUFACTURER'S CODE IDENTIFICATION**

**TRADE NAME:** Reclaimed Cryolite

Reclaimed Cryolite

## SECTION II - INGREDIENTS

Ingredient	Percent	PPH	TCV mg/m <sup>3</sup>	CAS NUMBER
Na <sub>3</sub> AlF <sub>6</sub>	> 83.0		2.5 (as F)	15096-52-3
Al <sub>2</sub> O <sub>3</sub>	< 10.0		10.0	1344-28-1
Na <sub>2</sub> SO <sub>4</sub>	< 9.5		NA	7757-82-6
Fe <sub>2</sub> O <sub>3</sub>	< 0.1			1309-37-1
SiO <sub>2</sub>	< 0.3			14808-60-7

## SECTION III - PHYSICAL DATA

**BOILING POINT:** Not established  
**EVAPORATION RATE:** N/A

**VAPOR DENSITY:** N/A  
**PERCENT VOLATILE BY VOLUME:** N/A

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

**FLASH POINT:** N/A

**LEL:** N/A

**EXTINGUISHING MEDIA:** This product is non-flammable.

### UNUSUAL FIRE AND EXPLOSION HAZARDS:

May emit toxic fluoride fumes, if heated to decomposition.

### SPECIAL FIRE FIGHTING PROCEDURES:

Use self-contained breathing apparatus in pressure demand mode.

## SECTION V - HEALTH HAZARD DATA

**THRESHOLD LIMIT VALUE:** 2.5 mg/m<sup>3</sup> for fluoride

### EFFECTS OF OVEREXPOSURE:

Acute overexposure may cause eye, skin, and pulmonary irritation. Chronic overexposure may cause increased bone density.

### EMERGENCY AND FIRST AID PROCEDURES:

**Eye Contact:** Wash eyes with copious amounts of water for 15 minutes. Seek medical advice, if irritation persists.

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SECTION VI - STABILITY DATA

STABILITY: Stable

INITIATION POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: High temperature

CONDITIONS TO AVOID: Strong acids

DECOMPOSITION PRODUCTS: Fluoride ions, Hydrogen fluoride

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:  
 Remove by dry-sweeping or vacuum.

WASTE DISPOSAL METHOD: For disposal of this material as a waste, act in accordance with all applicable Federal, state, and local waste management regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Where TLVs exceeded, use NIOSH-approved particulate respirator.

VENTILATION: Local exhaust to minimize dust.

PROTECTIVE GLOVES: As needed.

EYE PROTECTION: Safety glasses or goggles, as needed.

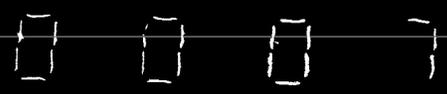
OTHER PROTECTION: None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: N/A

OTHER PRECAUTIONS: N/A

All statements, technical information and recommendations contained herein are based on tests and data which this Company believes to be currently reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use. Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.



**ATTACHMENT B**

Table 1  
**MARUMA REDUCTION PLANT**  
**CRYOLITE OPERATION**  
**TOTAL AIRBORNE DUST AND FLUORIDE SURVEY**  
**May 29 - July 18, 1979**

<u>SAMPLE DESCRIPTION</u>	<u>DATE SAMPLED</u>	<u>TOTAL AIRBORNE DUST mg/m<sup>3</sup> (TWA)*</u>	<u>TOTAL AIRBORNE FLUORIDE mg/m<sup>3</sup> (TWA)**</u>
Robert Carr	6/05/79	2.4	0.53
Roy Carrangi	7/18/79	4.8	0.86
Joseph DeFranco	6/05/79	1.4	0.34
Frank Flint (Operator)	5/29/79	3.4	0.83
Frank Flint (Operator)	7/12/79	3.3	1.05
Jim Fortin	6/05/79	1.5	0.29
Gary Harvey	5/29/79	4.8	0.62
Tony Maroon (Bagging)	7/12/79	10.4	3.79
Clarence Marlowe	5/29/79	1.6	0.18
Barney Marris (Operator)	7/18/79	3.7	0.68
Joseph Richard	7/18/79	1.6	0.33
Terry Peets	7/18/79	2.8	0.57
Sheryl Ploof	5/30/79	3.1	0.34
Shirley Prano	5/30/79	6.4	0.92
Dennis Scully	5/29/79	6.7	2.02
Denni. Scully	7/12/79	3.0	0.58
Daniel Swist	5/30/79	4.1	1.18
Philip Warriner	6/05/79	1.2	0.20
Robert Yaddow	5/29/79	4.2	1.22
Robert Yaddow	7/12/79	2.8	0.50

\* OSHA standard for Total Airborne Dust is 15 mg/m<sup>3</sup>, 8-hour time-weighted average exposure.

\*\* OSHA standard for Total Airborne Fluoride is 2.5 mg/m<sup>3</sup>, 8-hour time-weighted average exposure.

Table 2

MASSENA REDUCTION PLANT  
CRYOLITE OPERATION

<u>EMPLOYEE NAME</u>	<u>1978 URINARY FLUORIDE mg/l *</u>	<u>1979 URINARY FLUORIDE mg/l *</u>	<u>AIRBORNE FLUORIDE EXPOSURE mg/m<sup>3</sup> (TWA)**</u>
Dennis Scully	-	1.70	{ 2.02 9.58 0.20
Philip Warriner	1.50	1.40	
Frank Flint (Operator)	2.50	2.70	1.05
Barney Marrin (Operator)	4.00	4.50	0.68
Terry Peets	1.40	1.70	0.57
Roy Carringi	-	1.00	0.86
Tony Marceau (Bagging)	-	-	3.79

\* Recommended Urinary Fluoride pre-shift guideline: 4.0 mg/l

\*\* OSHA standard for Total Airborne Fluoride: 2.5 mg/m<sup>3</sup>, 8-hour time-weighted average exposure.

## MEMORANDUM FOR URINARY FLUORIDE PROGRAM

1. Corporate Medical and Industrial Hygiene personnel will meet with top supervision to outline and discuss the Urinary Fluoride Program.
2. In-plant supervisors will outline the program to 1st line supervisors, union officials, and to hourly workers - probably at regular safety meetings.
3. Plant Medical will get detailed briefing from Corporate Medical.
4. The Plant Personnel Department will be responsible for scheduling and notifying workers for the test and checking on compliance.
5. Supervision and collection of Urinary Fluoride Samples will be accomplished by the guard force with help from Personnel or Laboratory supervisors as needed.
6. Urinary Fluoride Program will include all hourly and salaried production employees. Head office employees will be excluded.
7. Samples will be collected before shift after at least 48 hours away from the plant.
8. Urine specimens will be collected at the guard office on the way into the plant under supervision of the guard force.
9. Sample will be collected in the containers provided and properly labeled with name, date, clock number, job classification, and time of day.
10. Employee shall be instructed to drop his trousers when giving sample to avoid any possible contamination.
11. Samples to be sealed immediately and sent to the plant laboratory for analysis.
12. Results of tests are to be sent to Medical for evaluation and follow-up.
13. The worker should be notified whether his specimen was normal or abnormal; if abnormal, he is to be checked by Medical for repeat tests.
14. Results of testing are to be filed in the Plant Medical Department and copy forwarded to the Corporate Medical Department on the monthly Urinary Fluoride Report Form provided.

## REYNOLDS ALUMINUM

REYNOLDS ALUMINUM COMPANY - HOUSTON, TEXAS 77002

September 12, 1974

Mr.

It is time again for the annual Urinary Fluoride Survey. The purpose of this survey is to maintain continuous up-to-date records which are needed to determine the effects, if any, from the environment in which we work. The urine sample is analyzed for fluoride content.

We urge you to participate in this survey. There is no cost to you and the benefits could prove quite valuable to you.

Our survey is scheduled for \_\_\_\_\_ thru \_\_\_\_\_. A sampling schedule is attached. Participants with normal fluoride levels will receive a report upon completion of sampling and analysis. Abnormalities, if any, are reported to Dr. \_\_\_\_\_ so that he may review them with you.

Personnel Manager

BBC/nfj

Enclosure

**URINARY FLUORIDE SPECIMEN**  
8475-02

**URINARY FLUORIDE SPECIMEN**

NAME \_\_\_\_\_  
CLOCK NO. \_\_\_\_\_ JOB CLASS. \_\_\_\_\_  
DATE \_\_\_\_\_ TIME \_\_\_\_\_

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