

POLICY ISSUE **(Notation Vote)**

August 2, 2001

SECY-01-0145

FOR: The Commissioners

FROM: Janice Dunn Lee, Director
Office of International Programs /RA/

SUBJECT: PROPOSED LICENSE TO EXPORT HEAVY WATER TO JAPAN FOR NON-NUCLEAR
END USE (XMAT0401)

PURPOSE:

To request Commission review of the proposed issuance of a license to Sigma-Aldrich Corporation involving the export of heavy water. The application is being referred to the Commission in accordance with 10 CFR 110.40(b)(3).

DISCUSSION:

On April 24, 2001, Sigma-Aldrich Corporation applied for a license (Attachment 1) to export 2,500 kilograms of heavy water, deuterium gas, and deuterium compounds to Japan over a three-year period for non-nuclear end use. The applicant plans to sell the various deuterium compounds to Sigma-Aldrich Japan and Nippon Sanso Corporation in Japan for further distribution into the Japanese medical, pharmaceutical, chemical, and industrial markets. Typically, the Sigma-Aldrich customers in Japan use these materials in relatively small quantities (i.e., less than 1 kg) for scientific research which may include identification of chemicals in reaction pathways, metabolic studies, or environmental analysis.

The applicant also noted that most of the products are sold to Japan in prepackaged units; however, some heavy water is sold to Nippon Sanso in bulk form for further labeling of compounds for distribution throughout Japan.

In response to NRC's request for views on the proposed export, the Executive Branch, in a letter dated July 9, 2001 (Attachment 2), recommends that the license be issued to Sigma-Aldrich. It is the Executive Branch judgment that the proposed export will not be inimical to the common defense and security of the United States, and is consistent with the provisions of the Atomic Energy Act of 1954, as amended by the Nuclear Non-Proliferation Act of 1978.

CONTACT: B.L. Wright, OIP
415-2342

The Executive Branch letter notes that, as a party to the NPT, Japan has committed itself to maintain IAEA safeguards on all its peaceful nuclear activities and has pledged not to produce or otherwise acquire any nuclear explosive device, therefore satisfying criteria (1) and (2) of section 109b of the Atomic Energy Act, as amended, for exports of nuclear components, substances and items. The remaining criterion, agreement not to retransfer any of the U.S.-supplied heavy water or deuterium gas without prior U.S. consent, has been satisfied by the receipt of generic assurance letters dated October 5, 1978, and February 28, 1979, from the Embassy of Japan, the subject of previous correspondence on exports of nuclear moderator material to Japan.

CONCLUSION:

The staff concurs with the Executive Branch judgment that the proposed export would not be inimical to the common defense and security of the United States and also meets the three specific export licensing criteria of Section 109b of the Atomic Energy Act of 1954, as amended. There are no applicable international safeguards or foreign physical protection requirements for the proposed export.

RECOMMENDATION:

That the Commission authorize the issuance of the requested license to Sigma-Aldrich Corporation.

/RA/

Janice Dunn Lee, Director
Office of International Programs

Attachments: 1. 4/24/01 Sigma-Aldrich Corp. Export License Application
2. 7/09/01 DOS Letter R.J.K. Stratford to JDLee

**APPLICATION FOR LICENSE TO EXPORT
NUCLEAR MATERIAL AND EQUIPMENT**

(See Instructions on Reverse)

Estimated burden per response to comply with this mandatory collection request: 2.4 hours. This submittal is reviewed to ensure that the applicable statutory, regulatory, and policy considerations are satisfied. Send comments regarding burden estimate to the Records Management Branch (T-8 E8), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0027), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. APPLICANT'S USE →		a. DATE OF APPLICATION 4/24/2001		b. APPLICANT'S REFERENCE SIAL-Japan		2. NRC USE →		11005266		XMAT0401			
3. APPLICANT'S NAME AND ADDRESS a. NAME Sigma-Aldrich Corp. and subsidiaries b. STREET ADDRESS (Facility Site) 3050 Spruce Street c. CITY St. Louis d. STATE MO e. ZIP CODE 63103						4. SUPPLIER'S NAME AND ADDRESS (Complete if applicant is not supplier) a. NAME b. STREET ADDRESS c. CITY d. STATE e. ZIP CODE							
f. TELEPHONE NUMBER (Area Code - Number - Extension) (314) 286-8337		5. FIRST SHIPMENT SCHEDULED 6/1/2001		6. FINAL SHIPMENT SCHEDULED 6/1/2004		7. APPLICANT'S CONTRACTUAL DELIVERY DATE As requested		8. PROPOSED LICENSE EXPIRATION DATE 7/30/2004		9. U.S. DEPARTMENT OF ENERGY CONTRACT NO. (if known)			
10. ULTIMATE FOREIGN CONSIGNEE a. NAME See Attached (Applicant Ref# SIAL-Japan) b. STREET ADDRESS (Facility Site) c. CITY d. COUNTRY						11. ULTIMATE END USE (include plant or facility name) See Attached (Applicant Ref# SIAL-Japan) Non-nuclear End-use 11a. DATE REQUIRED							
12. INTERMEDIATE FOREIGN CONSIGNEE a. NAME b. STREET ADDRESS (Facility Site) c. CITY d. COUNTRY						13. INTERMEDIATE END USE 13a. DATE REQUIRED							
14. INTERMEDIATE FOREIGN CONSIGNEE a. NAME b. STREET ADDRESS (Facility Site) c. CITY d. COUNTRY						16. INTERMEDIATE END USE 15a. DATE REQUIRED							
16. COM CODE		17. DESCRIPTION (include chemical and physical form of nuclear material; give dollar value of nuclear equipment and components)				18. MAX. ELEMENT WEIGHT		19. MAX. WT. %		20. MAX. ISOTOPE WEIGHT		21. UNIT	
		Deuterium Oxide Deuterium Gas Deuterium Compounds (see example 1 attached)				2500				MA X I M U M		K G	
22. COUNTRY OF ORIGIN Deuterium Oxide Canada				23. COUNTRY OF ORIGIN - SNM WHERE ENRICH OR PRODUCED N/A				24. COUNTRIES WHICH ATTACH SAFEGUARDS (if known) 629					
25. ADDITIONAL INFORMATION ON CONSIGNEES, END USES, AND PRODUCT DESCRIPTION (Use separate sheet if necessary) See Attached (Applicant ref# SIAL-Japan)													
26. The applicant certifies that this application is prepared in conformity with Title 10, Code of Federal Regulations; and that all information in this application is correct to the best of his/her knowledge.													
27. AUTHORIZED OFFICIAL						a. SIGNATURE James A. Kelly			b. TITLE Director of Compliance				



SIGMA-ALDRICH
CORPORATION

3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone (800)-521-8956 • (314)-771-5765
Fax (800)-325-5052 • (314)-771-5757
email: sig-ald@sial.com
visit us at www.sigma-aldrich.com

NRC Form 7 (4-2000) Attachment
Applicants Reference: SIAL-Japan

Below are explanations of attachment references made on the Sigma-Aldrich application to export deuterium oxide, deuterium (gas) and other deuterium compounds to Japan for non-nuclear end-use.

Box 10a. Ultimate Foreign Consignee

Sigma-Aldrich intends to use the two Ultimate Foreign Consignees identified below.

Distributors: {

1) Sigma-Aldrich Japan	2) Nippon Sanso Corporation
368 Oomachi	4-320-1 Tsukagoshi
Chiba-ken 272	Saiwai-Ku
Ichikawa, Japan	Kawasaki 210-8509, Japan

Box 11. Ultimate End Use

Sigma-Aldrich plans to sell the various deuterium compounds to the ultimate consignees above for further distribution into the Japanese medical, pharmaceutical, chemical and industrial markets. Their customers in Japan typically use these materials in relatively small quantities (i.e., less than 1 Kg) for scientific research. This type of research may include identification of chemicals in reaction pathways, metabolic studies or environmental analysis.

Most of the products are sold in the prepackaged units, however some heavy water is sold to Nippon Sanso listed above for further labeling of compounds for distribution throughout Japan. No material will be used in any activity related to isotope separation, heavy water production or in the fabrication of nuclear fuel.

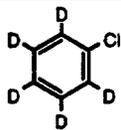
Box 25. Additional information on consignees, end uses, and product descriptions

The deuterium oxide is of Canadian origin.

Both consignees have warehouses where final product will be stored. The facilities are secured and monitored.

210 8509 012
MAY 1 11 3:29

Applicant Ref# SIAL-Japan
 Example #1, Box17 Description, Deuterium Compounds



Chlorobenzene-d₅

[3114-55-4]

FW 117.60 bp 130° n_D 1.5220 d 1.157 Fp 75°F (23°C)
 FT-IR 1(2), 1087C Safety 2, 738B R&S 1(2), 2935A
 FLAMMABLE LIQUID IRRITANT

Cat. No.	Isotopic Purity %	Name	Size	Pkg Type	Each
17,660-5	99	Chlorobenzene-d ₅	1g	ampule	\$29.65
			5g	ampule	98.80



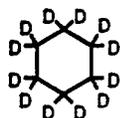
Chloroform-d

[865-49-6]

FW 120.39 mp -64° bp 60.9° n_D 1.4445 d 1.500
 Boil. 1(3), 63 FT-NMR 1(3), 620A FT-IR 1(2), 1074D Safety 2, 786B
 HIGHLY TOXIC CANCER SUSPECT AGENT

Cat. No.	Isotopic Purity %	Name	Size	Pkg Type	Each
15,185-8	100.0 (99.96 min)	Chloroform-d	10g	ampule	\$20.50
			50g	ampule	68.80
23,691-8	100.0 (99.96 min)	Chloroform-d	10 x 0.5mL	ampule	24.90
44,473-1	100.0 (99.96 min)	Chloroform-d	10 x 0.75mL	ampule	30.20
42,309-2	100.0 (99.96 min)	Chloroform-d	10 x 1.0mL	ampule	34.45
49,427-5	100.0 (99.96 min)	Chloroform-d contains 0.03% v/v TMS	10g	ampule	19.10
			50g	ampule	64.25
49,428-3	100.0 (99.96 min)	Chloroform-d contains 0.03% v/v TMS	10 x 0.75mL	ampule	30.10
43,191-5	100.0 (99.96 min)	Chloroform-d stabilized with 0.5 wt. % silver wire	10mL	ampule	31.95
			50mL	ampule	106.95
15,182-3	99.8	Chloroform-d	50g	screw-cap bottle	14.50
			100g	screw-cap bottle	24.30
			10 x 100g	screw-cap bottle	183.80
			150g	Sure/Seal™ bottle	32.70
			250g	screw-cap bottle	53.40
30,873-0	99.8	Chloroform-d	5 x 0.5mL	ampule	7.00
NEW 52,201-5	99.8	Chloroform-d	10 x 0.6mL	ampule	7.10
44,133-3	99.8	Chloroform-d	10 x 0.75mL	ampule	8.30
23,689-6	99.8	Chloroform-d	10 x 1.0mL	ampule	11.55
22,578-9	99.8	Chloroform-d contains 0.03% v/v TMS	100g	screw-cap bottle	25.30
			10 x 100g	screw-cap bottle	197.00
			150g	Sure/Seal™ bottle	33.70
			500g	screw-cap bottle	107.95
42,366-1	99.8	Chloroform-d contains 0.03% v/v TMS	10 x 1.0mL	ampule	11.55
43,487-6	99.8	Chloroform-d contains 0.1% v/v TMS	100g	screw-cap bottle	25.10
			10 x 100g	screw-cap bottle	194.90
			150g	Sure/Seal™ bottle	33.40
			500g	screw-cap bottle	106.90
15,183-1	99.8	Chloroform-d contains 1% v/v TMS	50g	screw-cap bottle	15.50
			100g	screw-cap bottle	26.10
			10 x 100g	screw-cap bottle	203.00
			150g	Sure/Seal™ bottle	34.75
			250g	screw-cap bottle	57.30
41,675-4	99.8	Chloroform-d stabilized with 0.5 wt. % silver foil	100g	screw-cap bottle	31.75
			10 x 100g	screw-cap bottle	285.50
			250g	screw-cap bottle	67.95

Sure/Seal is a trademark of Sigma-Aldrich Co.

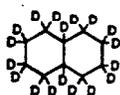


Cyclohexane-d₁₂

[1735-17-7]

FW 96.26 bp 78° n_D 1.421 d 0.893 Fp -1°F (-18°C)
 Beil. 5(3), 36 FT-NMR 1(3), 619A FT-IR 1(2), 1073B Safety 2, 959D
 FLAMMABLE LIQUID IRRITANT

Cat. No.	Isotopic Purity %	Name	Size	Pkg Type	Each
15,186-6	99.6	Cyclohexane-d ₁₂	1g	ampule	\$22.15
			5g	ampule	81.95
			10g	ampule	131.50
26,973-5	99.6	Cyclohexane-d ₁₂	10 x 1.0mL	ampule	162.15

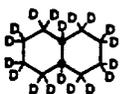


Decahydronaphthalene-d₁₈

[28788-42-3]

FW 156.40 bp 70-71°/13mm n_D 1.4750 d 1.014 Fp 135°F (57°C)
 FT-IR 1(2), 1073C Safety 2, 1011D
 HYGROSCOPIC IRRITANT

Cat. No.	Isotopic Purity %	Name	Size	Pkg Type	Each
NEW 21,713-1	99	Decahydronaphthalene-d ₁₈ mixture of <i>cis</i> and <i>trans</i>	1g	ampule	\$85.80



***cis*-Decahydronaphthalene-d₁₈**

[80997-90-6]

FW 156.40 bp 94-96°/30mm n_D 1.4761 d 1.015 Fp 137°F (58°C)
 FT-IR 1(2), 1073D Safety 2, 1011C
 HYGROSCOPIC IRRITANT

Cat. No.	Isotopic Purity %	Name	Size	Pkg Type	Each
22,679-3	98+	Decahydronaphthalene-d ₁₈	1g	ampule	\$195.25

Deuterium bromide, see Reagents, Acids, Bases and Buffers, page 24

Deuterium chloride, see Reagents, Acids, Bases and Buffers, page 24

Deuterium oxide

[7789-20-0]



FW 20.03 mp 3.8° bp 101.4° n_D 1.3280 d 1.107
 Merck Index 12, 2984
 HYGROSCOPIC

Cat. No.	Isotopic Purity %	Name	Size	Pkg Type	Each
19,170-1	100.00 (99.990 min)	Deuterium oxide	10g	ampule	\$60.45
			50g	ampule	152.00
45,335-8	100.00 (99.990 min)	Deuterium oxide	10 x 0.25mL	ampule	42.80
45,336-6	100.00 (99.990 min)	Deuterium oxide	10 x 0.5mL	ampule	51.40
19,234-1	100.0 (99.96 min)	Deuterium oxide low in paramagnetic impurities	10g	septum bottle	45.80
			30g	septum bottle	125.85
15,189-0	100.0 (99.96 min)	Deuterium oxide	10g	screw-cap bottle	28.50
			30 x 10g	screw-cap bottle	354.00
			50g	screw-cap bottle	85.30
			125g	Sure/Seal™ bottle	184.85
			250g	screw-cap bottle	229.65
		1kg	screw-cap bottle	682.05	
45,333-1	100.0 (99.96 min)	Deuterium oxide	10 x 0.25mL	ampule	17.10
26,978-6	100.0 (99.96 min)	Deuterium oxide	10 x 0.5mL	ampule	20.60
44,136-8	100.0 (99.96 min)	Deuterium oxide	10 x 0.75mL	ampule	29.00

Sure/Seal is a trademark of Sigma-Aldrich Co.



SIGMA-ALDRICH
CORPORATION

3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone (800)-521-8956 • (314)-771-5765
Fax (800)-325-5052 • (314)-771-5757
email: sig-ald@sial.com
visit us at www.sigma-aldrich.com

XMAT0401
11005266

April 24, 2001

Deputy Director
Office of International Programs
U.S. Nuclear Regulatory Commission
2120 L. Street, NW
Washington, DC 20037

Dear Deputy Director:

Enclosed is **NRC Form 7, Application for License to Export Nuclear Material**. The license application is to export deuterium oxide, deuterium gas and various deuterium compounds to Japan for Non-nuclear end uses.

Should you have any questions regarding this license application please contact me at 1-800-521-8956 ext. 2710 or (314) 286-8337.

Sincerely,

Timothy A. Klages
Director of Compliance
Sigma-Aldrich Corporation

2001 MAY 1 PM 3:29
CIP

TKK
04/24/01

We are Committed to the Success of our Customers, Employees and Shareholders through Life Science, Technology and Service.



United States Department of State

Washington, D.C. 20520

July 9, 2001

Ms. Janice Dunn Lee
Director, International Programs
United States Nuclear Regulatory Commission
Rockville, Maryland

Docket

11005266

Dear Ms. Lee:

I refer to the letter from your office dated May 11, 2001, requesting the views of the Executive Branch as to whether issuance of an export license in accordance with the application hereinafter described meets the applicable criteria of the Atomic Energy Act of 1954, as amended:

NRC No. XMAT0401 -- Sigma-Aldrich Corp. has applied for authorization to export to Japan 2,500 kilograms of heavy water, deuterium gas and deuterium compounds over a three year period for non-nuclear end-use. The materials will be exported to Sigma-Aldrich Japan and Nippon Sanso Corporation for distribution to the Japanese medical, pharmaceutical, chemical and industrial markets. Sigma-Aldrich customers in Japan typically use these materials in relatively small quantities (i.e., less than 1 kg) for scientific research. Most of the products will be sold to Japan in prepackaged units; however, some heavy water will be sold to Nippon Sanso in bulk form for further labeling of compounds for distribution throughout Japan.

It is the judgment of the Executive Branch that the proposed export will not be inimical to the common defense and security of the United States, and is consistent with the provisions of the Atomic Energy Act of 1954, as amended by the Nuclear Non-Proliferation Act of 1978.

As a party to the NPT, Japan has committed itself to maintain IAEA safeguards on all of its peaceful nuclear activities and has pledged not to produce or otherwise acquire any nuclear explosive device, therefore satisfying criteria (1) and (2) of Section 109b of the Atomic Energy Act, as amended, for exports of nuclear components, substances and items. The remaining criterion, agreement not to retransfer any of the U.S.-supplied heavy water or deuterium gas without prior U.S. consent, has been satisfied by the receipt of generic assurance letters dated October 5, 1978 and February 28, 1979 from the Embassy of Japan, the subject of previous correspondence on exports of nuclear moderator material to Japan.

On the basis of the foregoing, the Executive Branch recommends that the license be issued.

Sincerely,

Richard J.K. Stratford

Director

Nuclear Energy Affairs

2001 JUL 10 AM 11:28

RECEIVED OIP