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DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
EDGEWOOD CHEMICAL BIOLOGICAL CENTER
5183 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MD 21010-5424

REPLY TO
ATTENTION OF

RDCB-DPS-RS

27 AUG 14

AUG 27 2014

MEMORANDUM THRU Director, Edgewood Chemical Biological Center, (RDCB-D/Mr. Joseph Wienand), 5183 Blackhawk Road, Aberdeen Proving Ground, Maryland 21010-5424

FOR Defense Technical Information Center, 8725 John J. Kingman Road, Ft Belvoir, VA 22060

SUBJECT: Internal Request for Change in Distribution

1. This action is in response to an Edgewood Chemical Biological Center (ECBC) Internal Request for a Change in Distribution on documents related to cyanogen chloride.

2. The listed documents in the attachment have been reviewed by ECBC Subject Matter Experts and deemed suitable for the change in distribution to read "Approved for Public Release; distribution unlimited."

3. The point of contact is Adana L. Eilo, ECBC Security Specialist, (410) 436-2063, adana.l.eilo.civ@mail.mil.

Encl

MATTHEW A. SPAULDING
Security Manager

Cyanogen Chloride References

[1] Armstrong, GC, *Toxicity of Cyanogen Chloride to White Mice by Inhalation,* War Department, Chemical Warfare Service, Edgewood Arsenal, MD, 03 March 1933. Unclassified, Dist. D. DoD/Contractors. AD# B956466.

[2] Fuhr, I., Krackow, E.H., *Cyanogen Chloride LC 50 for Rats: 2 min. Exposure,* **TRLR-27,** . Edgewood Arsenal, Aberdeen Proving Ground, MD, 12 April 1944, Unclassified, Dist. D, DoD/Contractors. AD# B967754

[3] E.H. Krackow, Fuhr, I., *Cyanogen Chloride LC 50 for Rabbits: 2 min. Exposure*, **TRLR-33**, Edgewood Arsenal, MD, 31 May 1944, Unclassified, Dist. D, DoD/Contractors. AD# B967782.

[4] Bass, A.D., Tucker, V.J., *Cyanogen Chloride, Informal Progress Report No. 37,* **CB-186516,** National Defense Research Committee of the Office of Scientific Research and Development, Washington, DC, 22 June 1943, Unclassified, Dist. E, DoD Only.

[5] Kolls, AC, Kuhn, HA, and Todd, AJ, *Report on Toxicity Tests on Mice*, **Report No. 33** in Marshall, EK ed., **Pharmacological and Research Section Monographs**. War Department Chemical Warfare Service, Research Division, American University Experiment Station, Washington, DC, c. 1917. On file with the Historical Research and Response Team, Research, Development and Engineering Command, Aberdeen Proving Ground, MD. Unclassified, Dist. E, DoD Only.

[6] Franklin, R.C., Wilding, J.L., Stone, W., Franklin, R.T., *A Study of Short Interval Exposures of Goats to Cg, Ck, and Ac*, **CB-004057**, Dugway Proving Ground, UT, 28 November 1945, Unclassified, Dist. B, U.S. Gov't Agencies Only.

[7] Kolls, AC, Kuhn, HA, and Todd, AJ, *Report on Toxicity Tests on Mice*, **Report No. 41** in Marshall, EK ed., **Pharmacological and Research Section Monographs**. War Department Chemical Warfare Service, Research Division, American University Experiment Station, Washington, DC, c. 1917. On file with the Historical Research and Response Team, Research, Development and Engineering Command, Aberdeen Proving Ground, MD. Unclassified, Dist. E, DoD Only.

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PHARMACOLOGICAL AND RESEARCH SECTION

E. K. MARSHALL, IN CHARGE

REPORTS 1 to 50

NO. 33.

REPORT ON TOXICITY TESTS ON MICE

BY

A. C. KOLLS, H. A. KUHN, AND A. J. TODD

REPORT OF TOXICITY TESTS ON MICE.

BY

A.C. KOLIS, H.A. KUHN, AND A.J. TODD.

G-76 Diphenylchlorarsine Volatility 3

Conc. in Mgm. per liter	No. Mice exposed	No. Mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
2.5	4	0	0	0	0
1.0	2	0	0	0	0
0.5	2	0	0	0	0
1.0	2	2	100	0	0
0.3	2	1	50	0	0
0.15*	2	2	100	0	0

Toxic concentration is under 0.15 mgm. per liter.

SYMPTOMS:

Slight nasal and marked lachrymal irritation is shown. Dyspnoea occurs in a few minutes. Later about every tenth breath is a gasp.

N.B. The great discrepancy in the summaries above is undoubtedly due to a volatile impurity which was given off in the earlier experiments, resulting in a marked loss of weight of material. Since the loss of weight during the experiment is our method of calculating the concentration, the results are very misleading.

* Lack of material prevented further experiments.

S-28 Titanium tetrachloride Volatility 20

Conc. in Mgm. per liter	No. mice exposed	No. mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
2.3	2	2	100		
2.0	2	2	100		
1.1	4	0			
0.6	8	2	25		
0.5	4	0			
0.3	4	0			

Toxic concentration lies between 1.0 and 2.0 mgms. per liter, probably about 1.5 mgms. per liter.

SYMPTOMS:

Eyes are closed tightly, and a lachrymal discharge occurs. Eyelids are soon sealed by the Hydrolysis of the gas in contact with the moisture around the lids. Nose is rubbed continually, and in some cases nostrils seem partially clogged by the oxidation of the gas. Noses are cyanotic in appearance. There is a frothy secretion from the mouth after six or eight minutes of exposure. The respiration, rapid and shallow with occasional gasping, soon becomes deep and labored with continuous gasping. There is great depression, and mice are comatose for some time after gassing. Death occurs within twenty-four hours after gassing.

Trichloracetyl flouride Volatility 200

Conc. in Mgm. per liter	No. mice exposed	No. mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
20.0	2	2	100		
4.0	4	3	75	--	--
2.0	4	2	50	--	--
1.5	2	0	--	--	--
1.0	2	0	--	[illegible]	--
0.3	2	0	--	1	50

Toxic concentration is 2 mgms. per liter.

SYMPTOMS:

The first symptom was a lachrymal discharge. The eyes were tightly closed almost immediately, but in one case were only partially closed with the result that the cornea became white. Nose was rubbed vigorously and a nasal discharge also occurred. Breathing was rapid and shallow with occasional gasping. Depression was very marked and mice became very weak. This depression and weakness continued for some time after exposure.

Death usually occurred within 24 hours after exposure.

o G-178 *Cyanogen chloride* Volatility 340

Conc. in Mgm. per liter	No. mice exposed	No. mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
0.6	2	2	100		
0.4	2	2	100		
0.3	2	0	--	1	50
0.04	2	0	--	--	--

Toxic concentration is 0.4 mgms. per liter.

SYMPTOMS:

Mice rub their noses occasionally but do not show signs of very marked nasal irritation. Their eyes, however, are tightly closed and a lachrymal discharge occurs. The respiration becomes slow and labored. Mice become depressed and are soon prostrated. Inspiration becomes convulsive in character. The eyes are now open and protruding. Death is preceded by a convulsion and usually occurs during the exposure.

G-166 *Trichloracetonitrile* Volatility 127

Conc. in Mgm. per liter	No. mice exposed	No. mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
7.5	2	2	100		
6.0	4	4	100		
3.5	4	4	100		
3.0	2	2	100		
1.5	2	2	100		
1.2	2	1	50	1	50
0.8	2	0	--	--	--

Toxic concentration is 1.2 mgms. per liter.

SYMPTOMS:

The eyes are closed tightly immediately and nose is rubbed vigorously. Both nasal and lachrymal discharges occur. Breathing is short and rapid soon becoming convulsive. Trembling is noted and soon becomes convulsive jerking. These tremors gradually cease and mice become depressed. Depression continues to death which usually occurs within an hour after exposure.

G-169 *Benzoyl fluoride* Volatility 4

Conc. in Mgm. per liter	No. mice exposed	No. mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
4.0	2	2	100		
3.5	2	0	0	1	50
3.0	4	2	50	1	25
2.6	2	2	100		
2.4	4	1	25	1	25
0.5	4				
0.2	2	--			

Toxic concentration is 2. 6 mgms. per liter.

SYMPTOMS:

Eyes were closed very quickly and a lachrymal discharge occurred. Mice rubbed their noses, indicating probable irritation as a nasal discharge also occurred. The respiration, short and rapid at first, gradually grows deep and labored, occasionally becoming a gasp. Death is preceded by a brief convulsion.

S-25 *Stannic chloride* Volatility 18

Conc. in Mgm. per liter	No. mice exposed	No. mice died in 48 hrs.	Per cent died	Delayed deaths	Per cent died
1.5	4	3	75		
1.2	2	2	100		
0.9	4	1	25		
0.5	4	0	--		
0.2	6	0	--		

The eyes are closed at once. Often at the beginning of the test brief convulsions are noted. The mice rub their noses vigorously, breathing becomes deep and labored, and depression occurs. Death takes place within thirty-six hours.