



# City of Cambridge

Communication No. 5

IN CITY COUNCIL

January 30, 1984

COUNCILLOR DAVID SULLIVAN

ORDERED: That the report of the State Department of Public Health concerning Arthur D. Little, Incorporated's toxic materials laboratory, dated December 22, 1983 be and hereby is referred to the Scientific Advisory Committee of the City Council when constituted, for discussion and report.

In City Council January 30, 1984.  
Adopted by the affirmative vote of 9 members.  
Attest:- Paul E. Healy City Clerk.

A true copy;

ATTEST:-

A handwritten signature in black ink, reading "Paul E. Healy", is written over a horizontal line.

Paul E. Healy, City Clerk.



# City of Cambridge

15.

IN CITY COUNCIL

October 24, 1983

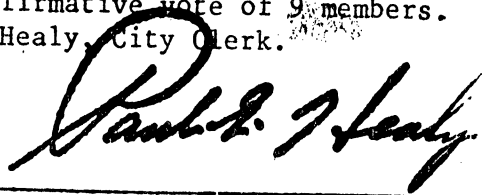
MAYOR VELLUCCI  
COUNCILLOR DANEHY

- WHEREAS: Many difficult local, national and global problems directly affect the citizens of Cambridge; and
- WHEREAS: A better understanding of these problems is a necessary first step to their solution; and
- WHEREAS: These problems are often further complicated by a failure of various levels of government to recognize, analyze and act to solve them; and
- WHEREAS: There are more schools, colleges, universities and institutions of higher learning in and around Cambridge than any other spot on the globe; and
- WHEREAS: The City of Cambridge is therefore in a unique position to take advantage of the expertise of its citizens; and
- WHEREAS: The Cambridge City Council has at times in the past recognized its unique position by confronting some of the most difficult questions concerning the effects of science and technology on society; and
- WHEREAS: Cambridge in some of these areas, such as recombinant DNA research, and the nuclear weapons problem, has indeed made major contributions to the understanding and civic health of the entire nation and even the world; and
- WHEREAS: We have often seen discussion of complex problems move from the Cambridge City Council directly into the national media and the Congress; and
- WHEREAS: It is clear from this pattern that the Cambridge City Council is fulfilling a real local, national and global need when it performs this function; now therefore be it
- RESOLVED: That the Cambridge City Council should establish and appoint a Citizen's Scientific Advisory Board to inform the City Council and the Mayor on questions of public policy.

In City Council October 24, 1983.  
Adopted by the affirmative vote of 9 members.  
Attest:- Paul E. Healy, City Clerk.

A true copy;

ATTEST:-

A handwritten signature in cursive script, reading "Paul E. Healy", written over a horizontal line.

Paul E. Healy, City Clerk.



# CAMBRIDGE CITY COUNCIL

CITY HALL, CAMBRIDGE, MASSACHUSETTS 02139

(617) 498-9094

David E. Sullivan  
City Councillor

January 27, 1984

To the Honorable, the City Council,

I recently obtained the attached report of the State Department of Public Health, concerning the Arthur D. Little, Inc. toxic materials laboratory. The report indicates that the laboratory will be handling certain highly toxic "nerve agents" and "blister agents".

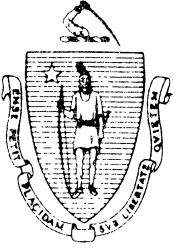
I believe that the Scientific Advisory Committee created last fall, which to my knowledge has not yet been appointed, should quickly recommend regulations to protect the public health of the citizens in Cambridge and surrounding communities.

Sincerely,

David E. Sullivan

DES/dl

Encs.



*The Commonwealth of Massachusetts*  
*Executive Office of Human Services*  
*Department of Public Health*

BAILUS WALKER, Jr, Ph.D, M.P.H.  
*Commissioner*

*150 Tremont Street*  
*Boston 02111*

Subject: Arthur D. Little, Inc.  
Acorn Park  
Cambridge, MA

Persons

Interviewed: Mr. D. Reid Weedon, Vice President  
Mr. Scott Stricoff, Industrial Hygienist

By: Mr. Comproni

Date: December 22, 1983

Accompanied by Gerald Parker and Elaine Krueger, Department of Public Health, a visit was made to this facility on November 2, 1983, to inspect the newly constructed toxic materials laboratory.

According to Mr. Weedon, Vice President, the laboratory was constructed primarily to handle highly toxic materials. A considerable part of the activity will be contract work for the military. The remaining activities will be contract work for private enterprise.

The company will develop analytical methods to detect very low levels of various chemical agents, some of which are used by the military. These techniques will be used mainly to analyze soil and water samples for low levels of contamination.

The inventory of chemical agents on site will change from time to time, but the laboratory safety rules will remain in effect for all chemicals in the laboratory area at any time.

A total of one half liter of highly toxic chemicals will be allowed in the laboratory area at one time, and no more than ten gallons of flammable material will be allowed in the laboratory. In actual practice it is expected that the quantities present will be considerably less.

The toxic materials will be transported by the military from Bedford Airport to the laboratory in Cambridge by government vehicle and it is expected that no more than two such shipments will be made per year. This will be coordinated by the military with the Massachusetts State police for escort vehicles, and local fire and police departments for emergency response in the event of a highway accident.

The material is packaged in 10 ml sealed vials which are in turn packed inside one quart cans provided with enough absorbant material to absorb all of the chemical in the event of a spill. The one quart cans are packed in absorbant material inside a locked steel pig. The pig is delivered to the laboratory by the military personnel. No biological agents or radioactive materials are allowed inside the laboratory.

The following materials are expected to be received in the foreseeable future;

|         |   |                          |
|---------|---|--------------------------|
| Soman   | - | GD (nerve agent)         |
| Sarin   | - | GB (nerve agent)         |
|         |   | VX (nerve agent)         |
| Mustard | - | HD (blister agent)       |
|         |   | Lewisite (blister agent) |

The physical, chemical and toxic properties of these materials are listed on the attached sheets. The table of contents of the laboratory safety manual is attached.

This is a third floor laboratory in a three story building that occupies approximately 1800 square feet. The space is partitioned into three separate laboratories provided with glass windows for viewing all activities from a separate observation area as well as from each laboratory.

This is a secure work area that is kept locked at all times. Only authorized personnel are allowed to enter under the direct supervision of the laboratory director. There is only one entrance which is through the clothing change area, and one exit which is through the shower and clothing change area.

Ventilation is provided for the three laboratories through the chemical hoods. The exhaust for the hoods is self balancing, which maintains a constant face velocity at the hood entrance and a constant ventilation rate for each laboratory. There are three levels of negative pressure for the three areas, with the highest degree of negative pressure for the storage and dilution laboratory.

The exhaust blowers and filter systems are located on the roof. There are two separate systems in parallel connected by a damper arrangement. One of the blowers is powered by a natural gas fired generator for use in the event of a power failure. The natural gas powered system can be brought on line in thirty seconds.

The filter systems consist of a roughing filter, an absolute filter and a charcoal filter bank. The backup system will be used during routine maintenance and filter changes. The filter changes will be made in a closed bag type arrangement, which is designed to prevent the escape of any contaminants. The filters will be disposed of as hazardous waste in compliance with EPA/DEQE regulations.

The laboratories are provided with automatic fire protection and the hoods have a spill capacity of 40 liters each. This capacity is far in excess of any expected use of these hoods. The fire alarms are connected directly to the Cambridge Fire Department as well as the plant fire control office. Fire extinguishers are also located in each of the work areas.

The Arlington and Belmont Fire Departments have also been informed of the activities in this laboratory facility. The firefighting personnel have been instructed not to enter the laboratory. In the event of fire they are instructed to let the laboratory burn and only contain the fire from the outside.

The laboratory floor drains are piped to two 360 gallon stainless steel holding tanks for testing and treatment prior to discharge into the MDC sewer system. There is no direct connection to the sewer so that the tanks must be pumped into the sewer after treatment. The MDC is in the process of issuing the required permit for this facility which will take approximately two weeks.

According to the Division of Water Pollution Control, DEQE, they do not require a permit if the discharge is less than 2000 gallons per day, which is the case of the facility. However, they have asked the company for information on the facility for their review.

The Division of Air and Hazardous Materials, DEQE, has only recently been contacted. This was due to a misinterpretation of the regulations by the Company's legal department. The application for plan approval for the ventilation system discharge is presently being made and is expected that approval will be granted in the near future.

There are four workers presently employed in this laboratory and the staff is expected to increase to six in the near future. The workers are given preemployment physical examinations that will be repeated annually. This includes a complete blood study, EKG, chest X-ray and serum cholinesterase test. The cholinesterase test will be repeated semi-annually. The workers will have to be signed off by the occupational health physician after each physical examination before returning to work.

The work areas will be monitored by air tests at the start of each project and repeated quarterly unless more frequent testing is indicated.

The workers at the dilution hood will be required to wear respiratory protection, Tyvek garments, head covers, shoe covers, safety glasses, two pairs of gloves and a rubber apron.

Workers at the regular hoods will not be required to wear an apron or respirator and will be required to wear only one pair of gloves.

The military requires that the company provide a laboratory safety manual. This document is available for review on the premises but cannot be taken off site.

The company agreed to inform the Department if any changes occur in the type or volume of activity at this facility.

EMC:bj

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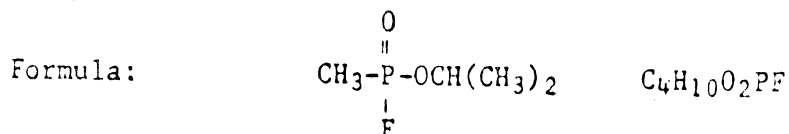
|                                                                |                                     |
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TABLE 1

SUMMARY OF PROPERTIES AND EFFECTS OF GB  
(Nerve Agent)

Physical/Chemical Properties



Chemical Name: Isopropyl methylphosphonofluoridate

Physical State: Colorless, odorless liquid with high vapor pressure

Vapor Density: 4.86 (vs air=1)

Vapor Pressure: 2.9 mm Hg at 25°C

Saturated Vapor Concentration: 22,000 mg/m<sup>3</sup> at 25°C

Effects of Acute Exposures

Median Lethal Dose: 100 mg-min/m<sup>3</sup>

Median Incapacitating Dose: 70 mg-min/m<sup>3</sup> for collapse, paralysis, convulsions

Median Effective Dose: 15 mg-min/m<sup>3</sup> for miosis

Symptoms:

- on parasympathetic nervous system: miosis, runny nose, tightness in breathing
- on skeletal muscle: initial massive stimulation, contractions, fatigue, paralysis
- on central nervous system: thought disturbance, convulsions, coma, lethal depression.

Rate of Action/Detoxification:

- Very rapid action; low detoxification rate
- Sequence and severity of symptoms depend on route of exposure (GI >inhalation>skin) and concentration as well as dose
- Recovery from non-lethal dose ca 10% day as measured by plasma cholinesterase levels

TABLE 1 (Continued)

SUMMARY OF PROPERTIES AND EFFECTS OF GB  
(Nerve Agent)

Effects of Chronic Exposures

"No death" Dose: 10 mg-min/m<sup>3</sup>

"No muscular effects" Dose: 4 mg-min/m<sup>3</sup>

"No observable effects" Dose: 0.5 mg-min/m<sup>3</sup>

TLV for unmasked workers:    0.001 mg/m<sup>3</sup>    1 hr ave  
                                  0.0003            8 hr  
                                  0.0001            indefinite

Gen'l population guidelines:  $\leq 0.1 \mu\text{g}/\text{m}^3$     1 hr ave  
                                   $\leq 0.003 \mu\text{g}/\text{m}^3$     72 hr ave

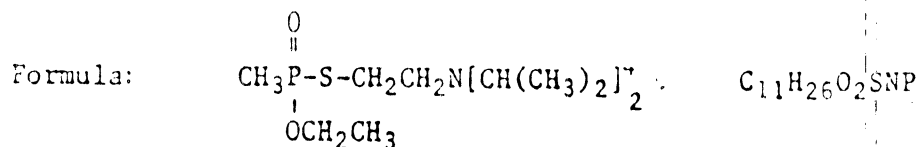
Symptoms: No evidence for mutagenic, teratogenic or carcinogenic effects  
                  in laboratory animals.

No known long term effects on blood, liver, kidney.

TABLE 2

SUMMARY OF PROPERTIES AND EFFECTS OF VX  
(Nerve Agent)

Physical/Chemical Properties



Chemical Name: S-(2(diisopropylamino)ethyl methylphosphonothioic acid,  
O-ethylester

Physical State: Amber, odorless liquid with modest vapor pressure

Vapor Density: 9.2 (vs air=1)

Vapor Pressure: 0.0007 mm Hg at 25°C

Saturated Vapor Concentration: 10.5 mg/m<sup>3</sup> at 25°C.

Effects of Acute Exposures

Median Lethal Dose: 100 mg-min/m<sup>3</sup>

Median Incapacitating Dose: 50 mg-min/m<sup>3</sup>

Median Effective Dose: 0.6 mg-min/m<sup>3</sup> (miosis)

Symptoms: The same as GB (Table IV-2)

Rate of Action/Detoxification:

- Very rapid action; low detoxification rate
- Sequences and severity of symptoms vary (See Table IV-2)
- Recovery, as measured by plasma CHE levels, 20-50% in 5 days; 1% per day 12-120 days.

TABLE 2 (Continued)

SUMMARY OF PROPERTIES AND EFFECTS OF VX  
(Nerve Agent)

Effects of Chronic Exposure

"No detectable effects" Dose: 0.47 mg-min/m  
(0.1 µg/kg body weight intravenously)

|                           |             |          |
|---------------------------|-------------|----------|
| TLV for unmasked workers: | 0.0005 mg/m | 1 hr ave |
| (with eye protection)     | 0.0002      | 8 hr     |
|                           | 0.0001      | indef.   |

|                             |             |          |
|-----------------------------|-------------|----------|
| Gen'l Population Guidelines | 0.01 µg/m   | 1 hr ave |
|                             | 0.0003 µg/m | 72 hr    |

Symptoms: No data on carcinogenicity

No evidence of delayed neurotoxicity.

Anecdotal reports of teratogenic effects in sheep; not statistically significant.

TABLE 3

SUMMARY OF PROPERTIES AND EFFECTS OF MUSTARD  
(HD; Blister Agent)

Physical/Chemical Properties

Formula:  $\text{ClCH}_2\text{CH}_2\text{SCH}_2\text{CH}_2\text{Cl}$        $\text{C}_4\text{H}_8\text{SCl}_2$

Chemical Name: bis(2-chloroethyl)sulfide

Physical State: Colorless to brown (depending on purity) oily liquid  
with high vapor pressure; garlic odor

Vapor Density: 5.4 (air=1)

Vapor Pressure: 0.072 mm Hg at 20°C

Saturation Vapor Concentration: 610 mg/m<sup>3</sup> at 20°C

Effects of Acute Exposures

Median Lethal Dose: 1500 mg-min/m<sup>3</sup> (inhalation)  
10,000 mg-min/m<sup>3</sup> (skin absorption)

Median Incapacitating Dose: 200 mg-min/m<sup>3</sup> (eye injury)  
2000 mg-min/m<sup>3</sup> (skin absorption)

Median Effective Dose: 100 mg-min/m<sup>3</sup> (eye effects)

Symptoms:

- on eyes: mild conjunctivitis to severe or total impairment of vision
- on skin: sunburn-like erythema to severe blistering
- on respiratory tract: damage to laryngeal and tracheo-bronchial mucosa - predisposes to secondary respiratory infections and bronchopneumonia
- systemic: symptoms similar to radiation poisoning from high exposure (gross contamination or ingestion)

Rate of Action/Detoxification

- Latent period (6-24 hrs) between exposure and effects. None to very little pain at time of exposure
- Detoxification slow; injuries heal slowly
- Sensitization reported; effects of second exposure more severe than first

TABLE 3 (Continued)

SUMMARY OF PROPERTIES AND EFFECTS OF MUSTARD  
(HD: Blister Agent)

Effects of Chronic Exposures

"No effect" dose: 2 mg-min/m<sup>3</sup> (no eye or other symptoms; for short exposure only).

0.001 mg/m<sup>3</sup> for 52 weeks (no overt effects)

TLV for unmasked workers: 0.4 mg/m<sup>3</sup> Ceiling  
0.01 3 hr ave  
0.005 8 hr  
0.003 indefinite (5 days)

Gen'l Population Guidelines: 10 µg/m<sup>3</sup> Ceiling  
.33 µg/m<sup>3</sup> 3 hr ave  
.1 µg/m<sup>3</sup> 72 hr ave

Symptoms: HD is a suspected human carcinogen.

Mutagenic in insects, birds, rodents

Neoplastic tumors in laboratory animals.  
High frequency of skin cancer in rats after  
12 months exposure to 0.1 mg/m<sup>3</sup>. At 1 µg/m<sup>3</sup>  
no significant increase over controls.

Communication received from Councillor David Sullivan transmitting a report from the State Department of Public Health, concerning the Arthur D. Little, Inc. toxic materials laboratory.

Copy of order referring the report to the Scientific Advisory Committee, a copy of the report + copy of October 24 '83 order establishing the Committee put aside for Committee when constituted 2/1/84

Copy of order referring it to the Committee + copy of order establishing Committee sent to City Mgr. + Council office 2/1/84  
1 copies of both of these to be sent to all Councillors in their packages for Friday  
February 1, 1984  
In City Council,  
January 30, 1984

Referred to the  
Scientific Advisory  
Committee when  
Constituted -  
on Motion of  
Councillor D. Sullivan