UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL RESEARCH LABORATORY – DULUTH
6201 CONGDON BOULEVARD
DULUTH, MINNESOTA 55804

1q 2214

8 October 1980

Mr. Paul R. Guinn
Materials Licensing Branch
Division of Fuel Cycle and Material Safety
Nuclear Regulatory Commission
Washington, D.C. 20555

In reference to our original application submitted on July 20, 1979, your letter dated February 22, 1980, our resubmission dated April 25, 1980, and your letter dated September 5, 1980 for renewal of License No. 22-13390-01, mail control no. 00797.

We will attempt to answer your seven questions, we felt these questions were answered satisfactorily and regret any inconvenience caused by this oversight.

1) Experience and Training of Individual Users

Since resubmission of our by-product materials license a decision was made that only people showing sufficient radio-isotope training, experience and licensing approval would be allowed to be primary investigators on radio-isotope research projects and all technicians involved on these projects would be required to attend a radio-isotope safety seminar. The three people in question would only be allowed to operate gas chromatographs until further training and experience is received. At which time their resume will be resubmitted for approval. See attached list of attendees and course outline of our Radio-isotope Safety Seminar held June 11 - 12 1980, attachment I.

2) Experience and Training of Our Radiation Protection Officer

Mr. Allan Batterman has received as much training as is available at this location, see attached course curriculum, (attachment I) and as the reapplication states he will attend an RSO safety course as soon as money is available. In the mean time Dr. Glen Christenson will be assisted by

Mr. Allan Batterman in functioning as the radiation protection officer.

3) Calibration of Instruments

The Survey Meter is also checked yearly by EPA, ORP-Las Vegas and along with the Surface Swipe Counter is used to Survey laboratory work areas.

4) Control of Effluent Releases

Air samples of volatile toxicants are taken and analyzed on the swipe counter giving activity per milliliter of air for any radio-isotope considered above the limits of 10 CFR part 20.203 and part 20 appendix B Table 1 column 1. See attached explanation of total achievable activity per milliliter of air, attachment II. All research personnel are requested to wear film badges, which are checked monthly, air samples are taken before; during, weekly or daily; and after each test if deemed necessary and all effluents are filtered through an accepted media which removes that toxicant.

5) Radiation Exposures

a) All radio-isotope, except working stock solutions, will be stored in a locked Radio-isotope Refrigerator Safe within the Hazardous Chemical Storage Room. Working stock solutions in sufficient quantity to maintain routine day-to-day needs of a toxicity experiment may be kept within a controlled access location at that experiment. All access to the Radio-isotope Safe will be allowed only in the presence of RSO or his designee.

b) The RSO is required to approve procurement requests for all radio-isotopes, inspect and log-in, all radio-isotopes as they are delivered or brought in by investigators, provide a running inventory sheet, make a quarterly inventory of all radio-isotopes, insure proper disposal and maintain disposal records, post signs

which identify the controlled access rooms, and label containers containing stock and disposed radio-isotopes. 2214

c) It is the policy of the ERL-D that there will be minimum health hazard from radio-isotopes in laboratory work areas: that the ALARA of radio-isotopes will be discharged from the laboratory and that there will be no discharge from the laboratory of water or air concentrations of radio-isotopes which exceed established criteria and or standards. To carry out this policy the potential hazards to health of employees and to the environment must be assessed for each substance used or studied in the laboratory.

The investigator is responsible for:

1) Estimates of toxicant concentrations in air and waste water leaving the pre-treatment unit (based on literature or pilot runs). This is to be provided to the RSO for his entry on the safety review sheet.
2) Testing volatile radio-isotopes in rigid test system enclosures to reduce the amounts of radio-isotope in exhaust air to the ALARA.
3) Pretreatment of waste water (including cleaning water and excess stock solution not otherwise detoxified) as it leaves the test system to reduce the amounts of radio-isotopes in waste water to the ALARA.
4) Recording in the test log book, along with test data:

a) Results of routine measurements before and after the pretreatment unit of amounts of radio-isotopes discharged in test system waste water; the analyses of waste water to be made on the same schedule as analyses of a given test water concentration.

b) Results of routine measurements of amounts of radio-isotopes in the air exhausted from the test system enclosures before and after treatment as may be required for the substance in use; the measurements of air concentrations to be made weekly or on a schedule determined by the RSO who will do the sampling.

c) The above results shall be available to the RSO at all times and shall be reported to the RSO monthly (at conclusion of short tests) in writing. The RSO will report monthly to the Deputy Director and Research Branch Chief.

5) Disposal via the RSO of all hazardous wastes including contaminated filter media, solutions, solids, excess stock solutions, etc., from test systems and laboratories into appropriate waste barrels in the hazardous waste storage area. Contact the RSO for specific procedures.

Because of the varied types of radio-isotopes used at this laboratory pre and post filtrate media will vary considerable. This will be addressed in the research protocol from most recent available knowledge and strictly adhered to. No system will be allowed to operate which is not filtered and this filtrate handled by radiological safety protocol.

6) Bioassay Program

Calculations determined for radioisotopes at levels seldom used in our toxicant research show that bioassay procedures are not necessary at our facility. See attachment III.

7) Radiation Protection Program

Laboratory air sampling equipment is of two basic types, personal air samplers (those worn by a researcher while doing his daily routine) and room high volume aerosol pumps (placed in a research area for a given unit of time.) These units are used as deemed necessary for the radioisotope if sufficient quantity is present to warrant a possible danger, see item 4 and 6.

Laboratory hoods, exhaust ducts, and airflows are scheduled on a monthly preventative maintenance check which involves checking air flow. These records are maintained by the Facilities Engineer. The hoods and test system enclosures are connected to an alarm system which designates where an air flow problem exists at which time this is corrected. The general laboratory exhaust is also connected to a separate alarm system which initiates a similar response. Each laboratory is equipped with an emergency air purge system which draws 2,400 CFM of outside air into the laboratory and which is exhausted via separate ducts.

Air sampling is done in each laboratory as stated in item 4.

We believe this addresses all the problems stated in your letter and are sorry that these areas were not addressed in the re-application.

Sincerely,

N A Jaworski

Norbert A. Jaworski
Director ERL-D

Attachment I

The following employees attended the International Institute of Safety and Health's Basic Radiation Hazard Control Course offered at this facility on 11 - 12 June 1980.

Batterman, A.	Anderson, C
Benoit, D.	Brooke, L.
Broderius, S.	Call, D.
DeFoe, D.	Hammermeister, D.
Hermanutz, R.	Huot, J.
Holcombe, G.	Jollymore, C.
Jarvinen, A.	Ahmad, N.
Kuehl, D.	Goeden, H.
Lemke, D.	Gerhart, E.
Leonard, E.	Portelle, G.
McCormick, J.H.	Felhaber, T.
McKim, J.	
Mueller, L.	
Norberg, T.	
Poldoski, J.	
Plumb, G.	

The course outline is attached.

INTERNATIONAL INSTITUTE
OF SAFETY AND HEALTH
BASIC RADIATION HAZARD CONTROL

11 - 12 June 1980

Day and Time	Subject	Course Moderator
12 June 1980	BASIC PRINCIPLES OF RADIATION DETECTION AND INSTRUMENTATION	
7:30 - 8:15	Basic Principles of Radiation Detection	Dr. Frank Haughey
8:15 - 9:30	Personnel Instuments and Survey Instruments	Mr. Neil Gaeta
9:30 - 9:45	COFFEE BREAK	
9:45 - 10:15	Laboratory Instruments-Sec. 10-13	Mr. Neil Gaeta
10:15 - 11:00	Handling, Transportation and Storage of Radioactive Materials	Mr. Neil Gaeta
11:00 - 11:45	NRC Licensing and Regulation	Mr. Michael Terpikak
11:45 - 12:30	Contamination Control Procedures, Monitoring Techniques and Decontamination	Dr. Frank Haughey
12:30 - 12:45	Certificates	Dr. Frank Haughey

Attachment II

Control of Effluent Release (Air)

Research Lab Module

dimensions 10 ft x 20 ft x 10 ft

2.0×10^3 ft^3

Research Lab Module Exhaust

General Exhaust for all research lab modules is 18,000 CFM or approximately 400 CFM/Lab Module. Test enclosures are provided with an additional independent exhaust of 150 CFM to 1000 CFM

Research Lab Module Volume

2.0×10^3 ft^3 x 2.83×10^{-2} m^3/ft^3= 5.66m^3

5.66m^3 x 1.0×10^9 ml/m^3= 5.66×10^9 ml

Total Radioisotope activity available

from supplementary sheet H(c) of the license application

Diluter Effluent Activity (total/day)

81.36 m Ci/day

assume this total activity is released to the air (an over-estimation since that volatile a solution would not be allowed)

Activity in the Air

81.36 m Ci/day ÷ 5.66×10^9 ml= 1.44×10^{-8} mCi/ml/day

1.44×10^{-8} mCi/ml/day x 10^3μ Ci/mCi= 1.44×10^{-5}μCi/ml/day

Since the air is being exhausted at a rate per module of approximately 500 CFM, more in some modules, this is the low estimate 2,000CFM

1.44×10^{-5}μCi/ml/day ÷ 24 hrs/day= 0.06×10^{-5} μCi/ml/hr

6.0×10^{-7} μCi/ml/hr x 4 hr= 2.4×10^{-6}μCi/ml (in one module air exchange)

.. Since each research module's air is exhausted at least six times per day this is the approximate total activity achievable in the air at any one time

2.4×10^{-6} μCi/ml

(assuming all activity of the test was emitted in the air/day)

Attachment III

Radioisotope stocks received in amounts of 1.0 mCi are diluted in a hood.

Stock Concentration Used:

1.13×10^{-5} mCi/injection

0.1 ml/injection

1000 ml stock bottle

assume complete volatility of radioisotope activity

1.13×10^{-5} mCi/injection x 1.0×10^{4} injection/stock bottle

1.13×10^{-1} mCi/stock bottle

∴ assuming complete volatility of the stock you would be just above the allowable limits. Since this is unlikely to happen, the amounts worked with are not at levels of activity which require Bioassay.