ARCO Petroleum Pro\ _ts Company

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June 2, 1983

U. S. Nuclear Regulatory Commission
Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

Gentlemen:

In reply to your letter of April 29, 1983 (Control No. 11721) regarding renewal of our License No. 12-00140-04, we have the following information.

1. Currently, there are two projects involving the use of radioisotopes at the Harvey facility outside of N-Bldg.

   a. $C^{14}O$ in about 2 microcurie per test quantities is used for about 40 tests per year to measure catalyst activity. The location of the laboratory equipment is shown in Attachments "A" and "B". The test work is being supervised by Lloyd A. Baillie (NRC qualified).

   b. Sc^{46} in about 10 microcurie per test quantities, in the form of Sc_2O_3 impregnated on catalyst, is used for about 50 tests per year to study separatory cyclone catalyst retention. The location of the laboratory equipment is shown in Attachments "A" and "C". The test work is being done by Lloyd A. Baillie (NRC qualified).

2. Health Physics Associates Ltd. (NRC License No. 12-09160-01) or Radiation Safety Services (when licensed) will calibrate our high level survey instruments.

3. The Am^{241} source consists of a small metal foil exposed to the inside of a 1 inch diameter by 5 inch long steel pipe. The steel pipe has two openings; an 1/8 inch pipe threaded fitting which is sealed with a steel pipe plug, and an 1/8 inch tubing fitting which is sealed with tape. The source is stored in a sealed half gallon wide mouth jar which is stored in a continuously running fume hood. At present, we have no specific use for the Am^{241} source.

4. Each N-Bldg. hood exhausts separately to the roof. Each hood exhaust has provision for an absolute filter. An absolute filter, which is 99.95% efficient on particles as small as 0.000012 inch, is in place in the hood used to handle particulates. A water manometer is installed across the filter to monitor filter plugging.

5. The isotopes most likely to become airborne would be concentrated isotopes handled in an open system such as tritium water, and isotopes impregnated on particulates such as Sc^{46} oxide.

An example of the first case would be opening at room temperature a vial containing 5 curies of tritium water with a concentration of 5 Ci/gm and having a 5 ml vapor space above the liquid. If the vapor space is saturated with tritium water vapor (24mmHg vapor pressure at 25°C), the following amount of tritium could escape into the hood.

$$\frac{24\text{mmHg}}{760\text{mmHg}} \times \frac{273^\circ\text{K}}{298^\circ\text{K}} \times \frac{\text{gm-mole}}{22{,}400\text{ml}} \times \frac{18\text{gm}}{\text{gm-mole}} \times \frac{5\text{Ci}}{\text{gm}} \times 5\text{ml} = 0.00058\text{Ci} = 580\mu\text{Ci}$$

The daily volumetric air flow in the hood used for this work is calculated as follows.

$$3\text{ ft} \times 2\text{ ft} \times \frac{100\text{ft}}{\text{min}} \times \frac{28{,}400\text{ml}}{\text{ft}^3} \times \frac{1440\text{min}}{\text{day}} = 2.5 \times 10^{10}\text{ ml/day}$$

The concentration of tritium averaged over one day in the hood effluent is as follows:

$$\frac{580\mu\text{Ci}}{2.5 \times 10^{10}\text{ml}} = 2.3 \times 10^{-8}\mu\text{Ci/ml averaged over one day}$$

This is well below the 10 CFR 20 Appendix B Table II limit of $2 \times 10^{-7}\mu$Ci/ml for tritium in air in an unrestricted area which may be averaged over one year.

An example of the second case would be handling a particulate material tagged with 100mCi of Sc^{46} oxide in a hood with an absolute filter which removes 99.95% of the airborne particulates. If 1% of the material becomes airborne, the following amount of Sc^{46} will escape in the hood effluent.

$$100\text{mCi} \times 0.01 \times 0.0005 = 0.0005\text{mCi} = 0.5\mu\text{Ci}.$$

The daily volumetric air flow in the hood used for this work is calculated as follows.

$$3\text{ ft} \times 2\text{ ft} \times \frac{100\text{ ft}}{\text{min}} \times \frac{28{,}400\text{ml}}{\text{ft}^3} \times \frac{1440\text{min}}{\text{day}} = 2.5 \times 10^{10}\text{ ml/day}$$

The concentration of Sc^{46} averaged over one day in the hood effluent is as follows.

$$\frac{0.5\ \mu\text{Ci}}{2.5 \times 10^{10}} = 2 \times 10^{-11}\ \mu\text{Ci/ml averaged over one day}$$

This is well below the 10 CFR 20 Appendix B Table II limit of 8×10^{-10} μCi/ml for insoluble Sc^{46} in air in an unrestricted area which may be averaged over one year.

6. It has been our continuing policy to minimize personnel exposures by thoroughly designing our test procedures to minimize personnel exposure and then reviewing the exposure records to seek areas where improvement may be needed. Similarly, it has been our continuing policy to minimize effluent releases by using the minimum practical amount of tracer to obtain accurate measurements. We carefully analyze the results of each test and are continuously seeking more efficient practical test methods so as to, if possible, decrease the amount of tracer needed for future tests.

Our actions taken to assure that personnel exposures and effluent releases are maintained ALARA are described in Item 15 (Radiation Protection Program) of the initial license renewal application.

In the event that personnel exposures or effluent releases exceed the limits specified in 10 CFR 20 by 10% or 1% respectively, we will immediately take the appropriate corrective action to remedy the situation. Due to careful planning, and the irregular and infrequent nature of our work, we have never approached the limits in 10 CFR 20 particularly in regard to personnel exposure.

Due to the impending retirement of the current Radiation Protection Officer, George A. Uhl, on July 1, 1983, and other recent changes; we would like to make the following changes in our license application.

Item 3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION.

Change to: John D. Phelps, Jr.,
Radiation Protection Officer

Item 6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL.

6a. Delete.

6c. Change to: John D. Phelps, Jr.,
Senior Engineer

Item 7. RADIATION PROTECTION OFFICER.

Change to: John D. Phelps, Jr.

Item 10. RADIATION PROTECTION INSTRUMENTS.

Delete: 1.

Add to list the following:

11.	GC Eberline	E-120	1	beta-gamma	0-50 mr/hr
12.	GC Dosimeter	3035-2	1	gamma	0-500 mr/hr

Item 15. RADIATION PROTECTION PROGRAM.

Part B. RADIOISOTOPE COMMITTEE

Delete: G. A. Uhl - Chairman

Add: John D. Phelps, Jr. - Chairman

Part G. RECORDS MANAGEMENT PROGRAM

Delete from list of persons responsible for keeping records:
G. A. Uhl

Part H. EMERGENCY PROCEDURES

Change Notification List to:

J. D. Phelps	[redacted]	676
L. A. Baillie		365
A. I. Snow		509

Ex. 6

Items 16 and 17. FORMAL TRAINING IN RADIATION SAFETY.

Delete: A. George A. Uhl

Add to listing C. John D. Phelps, Jr.:
Formal course in Radiation Safety including a, b, c, and d, 1 week, Oklahoma State University in 1982.

If you need more information, please contact me.

Yours very truly,

ARCO Petroleum Products Company

George A. Uhl

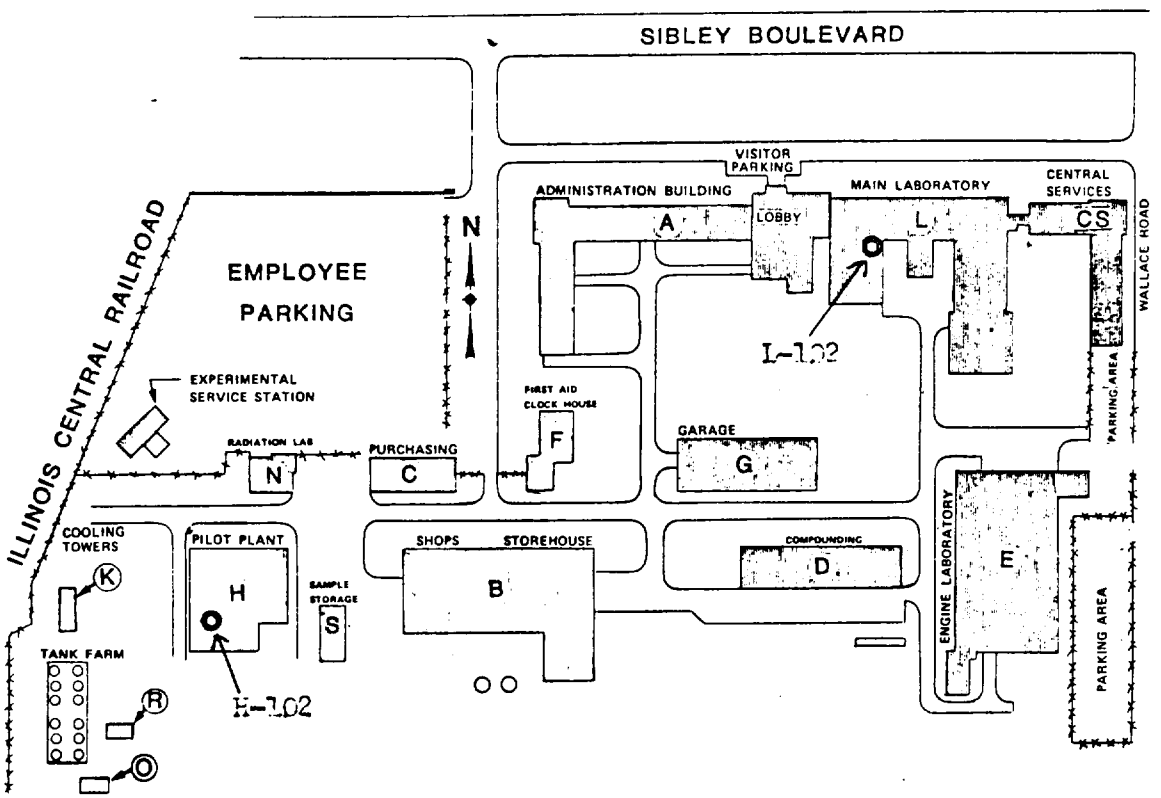
George A. Uhl
Radiation Protection Officer

JDP/msk

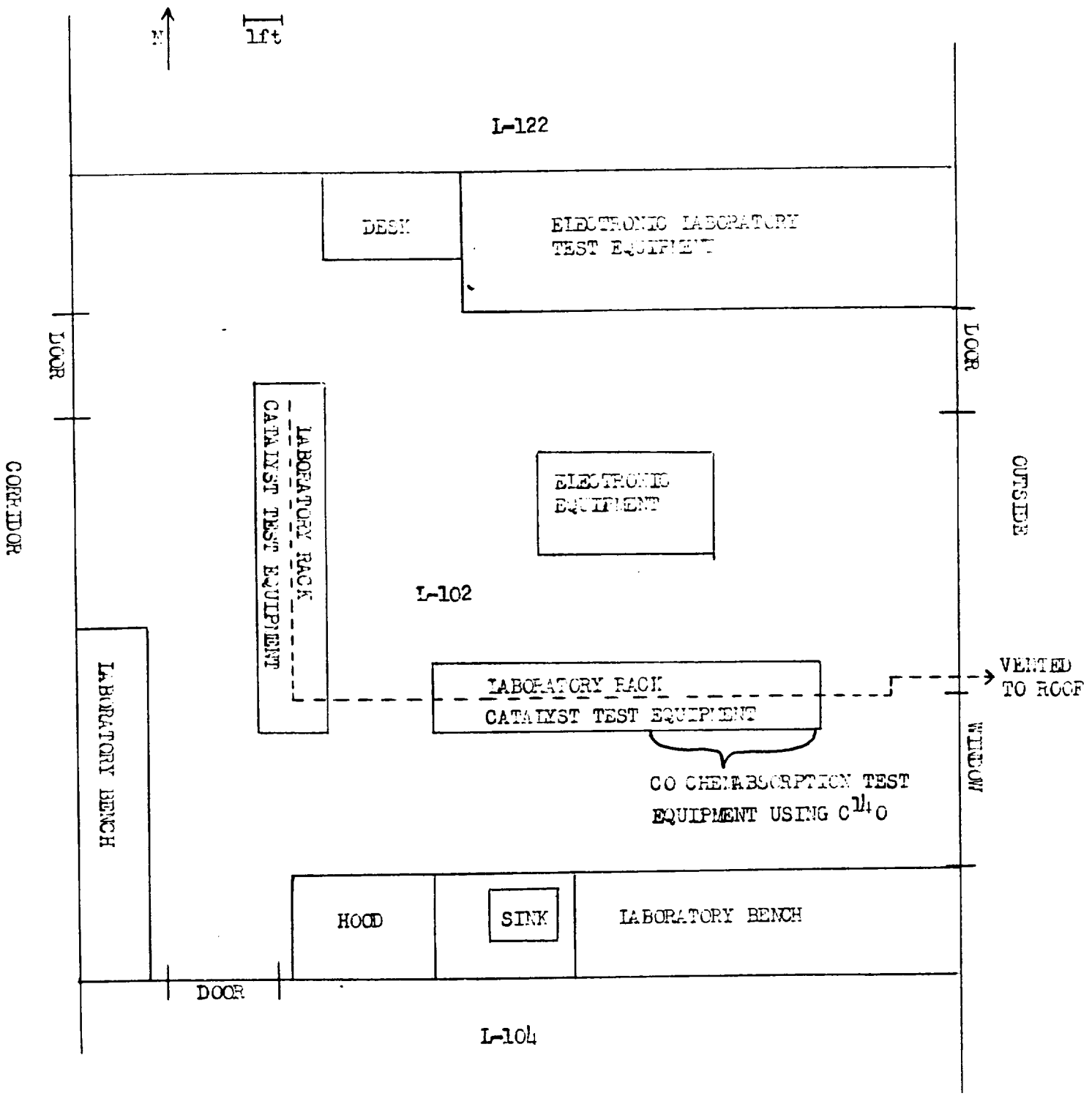
Attachments

Doc# 83153HTC0030

ATTACHMENT A
LOCATIONS OF OTHER LABORATORIES AT THE HARVEY TECHNICAL CENTER WHERE RADIOISOTOPES ARE USED.



ATTACHMENT B
LABORATORY CONTAINING CO CHEMABSORPTION TEST
EQUIPMENT USING $C^{14}O$



ATTACHMENT C
LABORATORY CONTAINING THE CYCLONE SEPARATOR TEST
EQUIPMENT USING Sc_2O_3 OXIDE ON PARTICULATE CATALYST