VELKLEY & OLIVER ASSOCIATES, LTD.
CONSULTANTS IN RADIATION PHYSICS

DONALD E. VELKLEY, Ph.D., D.A.B.R.
DAVID E. CUNNINGHAM, Ph. D.
P.O. BOX 164
HERSHEY, PA. 17033

GEORGE D. OLIVER, JR., Ph.D.
P.O. BOX 27504
ST. LOUIS, MO. 63141

April 8, 1980

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

Re: License application Control No. 01628

Dear Mr. Bassin,

Please consider the following information to complete the license application submitted to you as requested in your letter of January 2, 1980.

Question I. Delete reference to using Cs-137 for evaluation of structural shielding of new diagnostic x-ray facilities.

Question II. A small Instrument Calibrator (Model 681) can be obtained with a 100 mCi Cs-137 source from Victoreen Instrument Company. This unit is manufactured by Tech-Op and has been approved by the U.S.N.R.C. equipment evaluation section.

Question III. Survey instruments owned and used by this calibration service organization will be calibrated every six (6) months and after each service repair. Customers survey instruments will be calibrated annually and after any repair. Specific radiation safety precautions when using the 681 instrument calibrator can be found under Item 11.C of the application submitted October 15, 1979.

Step 4 & 5 of 11.C describe the posting and establishment of a controlled "radiation area". If any area having 5 mrem/hr exists it will be restricted. If any area having 100mrem/hr exists, it will be designated and posted as "High Radiation Area". No one, except the monitored radiation worker, will be allowed within the "High Radiation AREa", if one exists. The highest exposure rate from the 681 is 330 mR/hr at one (1) foot from the barrel.

Question IV. Personnel will wear film badges (whole body type) when performing any radiation-associated duty, especially survey instrument calibration with the 681 . Searle Analytic Inc, Model 11,will be the supplier on a monthly exchange basis. Extremity monitoring, such as finger badges, will not be used since no sources will be exposed in the open. The calibrator has a barrel through which the source emits a beam which is used to calibrate the survey instruments.

Question V. The only area considered as a restricted area is the locked storage area. A radiation survey will be conducted to indicate that no radiation areas exist around this storage area. The exit doors are kept locked unless personnel are in the office. The radiation levels will be such that if adjacent areas are occupied any person would receive less than 5% of the quarterly MPD.

Question VI. The Victoreen Model 681 source calibrator has its own shielded housing which is used as the carrier packaging also. The exposure rate is 0.5 mR/hr at three (3) feet. This level is below a transport index (TI) of one (1). V&O Associates, LTD will carry this calibrator in a highway vehicle to field sites for survey instrument calibration. We will be classified as the shipper and carrier of a "special use" piece of equipment. The calibrator will be attached to the vehicle for proper care during transport. Placarding of the vehicle will not be necessary since the radioactive material does not qualify to bear a "Radioactive YELLOW-III" label (paragraph 174.541 (b) of D.O.T. regulations). Normal operations of the company personnel when using this calibrator would not require overnight stays. Therefore, no storage of the unit would occur except in the licensed facility of V & O Associated, LTD.

Before transport a radiation survey will be performed to determine the maximum exposure rate, maximum accessible exposure rate by any individual, exposure rate to the driver, and any possible passengers. This survey will be kept in the vehicle along with any transport license issued and record of activities required.

The dose calibrator reference sources will be kept in the vehicle alongside the 100 mCi cesium-137 source. The reference sources which are micro-curie levels will be kept in individual lead shielded containers, all of which will be locked in a steel container.

Question VII. The three listed individuals are the only responsible users who will handle the radioactive material considered in this application.

Question VIII. NRC-313M Supplement A is attached for the R.S.O. The attached duties and responsibilities describe the R.S.O.'s scope.

George D. Oliver, Jr., Ph. D.
for Velkley & Oliver Associates, LTD.

Dose Calibrator Reference Sources 07CC

NEN provides a set of low (122keV), medium (662keV), and high energy (>1MeV) radiation reference sources for daily checking the operation of dose calibrators. These reference sources are supplied in 20ml of active volume (cast epoxy) in the 27ml plastic vial E.

Vial E
20ml in a 27ml plastic vial.
30mm diameter x 63mm

Choose a single source...

to develop reference readings as an instrument performance check at all nuclide settings.

Cesium-137		
NES-356	200μCi nominal activity in Type E Vial	$92

Or a complete set to determine low, medium and high energy response...

Sources Supplied		
NES-360	300μCi of ^{57}Co, 50μCi of ^{60}Co and 200μCi of ^{137}Cs in Type E vials.	$248
NES-365	250μCi of ^{133}Ba, 300μCi of ^{57}Co, 50μCi of ^{60}Co and 200μCi of ^{137}Cs in Type E Vials.	$378

Or individual gamma reference sources...

Catalog No.	Radionuclide	Half-life	Nominal Activity	Package	Price
NES-358	Barium-133	10.5y	250μCi	Vial E	$176
NES-351	Cobalt-57	270d	300μCi	Vial E	$176
NES-352	Cobalt-57	270d	1mCi	Vial E	$184
NES-354	Cobalt-60	5.27y	50μCi	Vial E	$92

0766

681A/~~681B~~ Instrument Calibrator

- Meets DOT Specs as Shipping Container
- NRC Approved
- Low Operator Exposure

Specifications:
Source is fixed to the end of shielded operating rod moved from a completely shielded "OFF" position to an exposed "ON" position by means of operating handle from the back of the unit. Source travel time is less than one second in each direction. External radiation level is less than 5 mR/h at one foot from any surface in the "OFF" position and behind the calibrator in the "ON" position. Source is double encapsulated in SS and meets "Special Form" criteria. Units are calibrated with NBS traceable equipment, calibration and leak test certificates are furnished. NRC License data provided.

Model	Source	Radiation Level (nominal) at			Wt. in lbs.
		1 foot	1 meter	10 meters	
681~~A~~	100mCi ^{137}Cs	330mR/hr	30mR/hr	3mR/hr	60
~~681B~~	1.0Ci ^{137}Cs	3.3R/hr	300mR/hr	30mR/hr	100

FORM NRC-313M SUPPLEMENT A — U.S. NUCLEAR REGULATORY COMMISSION

(7-77)
10 CFR 50

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION PROTECTION OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION PROTECTION OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
George D. Oliver, Jr., Ph.D.	

3. CERTIFICATION

SPECIALITY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C

Experience:
Physicist, GS-7, Nuclear Defense Laboratory, Edgewood Arsenal, Md. DOD 1963-64
Assistant Physicist, The Univ. of Texas M.D. Anderson Hospital and Tumor Institute at Houston 1969-1972
Associate Professor, Mallinckrodt Inst. of Radiology, Wash. Univ., St. Louis, Mo. Medical Physicist and RSO in radiation therapy 1972-1973
Radiation Safety Officer, St. John's Mercy Hospital, St. Louis, Mo. 1973-present

Education:
B.Sc. in Physics, Lamar State Coll. of Technology, Beaumont, Texas 1959-1963, Physics (Math.)
M.Sc. in Health Physics, N. Carolina State Univ. at Raleigh, Raleigh, North Carolina (1963-1966), Physics (Radiation Physics)
Thesis: "Gamma-Ray Measurement by Semicondutor Analysis of Photo-electrons".
(see attached)

Education (continued)
Ph.D. in Medical Physics, Univ. of Oklahoma, Norman, Okla. (1966-1968) Radiation Physics. Thesis: "Fast Neutron Dosimetry of Californium-252"

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	LABORATORY COURSES (Hours) C	LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Refer to education		
b. RADIATION PROTECTION	Previously authorized and accepted by RSO under NRC license 24-00794-03		
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

April 8, 1980

Control No. 01628

Item 15 Radiation Safety Officer

The radiation Safety Officer is responsible for the use of all sources of ionizing radiations at Velkley & Oliver Associates, LTD.

A. DUTIES AND RESPONSIBILITIES

1. Evaluate all proposals for use of radionuclides and approve or disapprove proposal applications. Records of such actions will be kept.

2. Evaluate all proposed users' qualifications and authorize or disapprove the individual for use of radioisotopes. The criteria for evaluation of acceptable training and experience will adhere to those of Appendix A, "A Guide for Preparation of Applications for Medical Programs". The user must also be a member of the staff of the Corporation.

3. Prescribe special conditions that may be necessary for the safe handling of any source of ionizing radiation such as:

   a. Additional training
   b. Limitation of dosage in humans
   c. Designation of limited areas of use and their adequacy
   d. Proper disposal methods

4. To review annually the radiation safety program regarding personnel and area monitoring, accidents and their handling, records of procurement and disposal and all licensing matters.

5. Maintain written records of all radiation matters, actions, recommendations, and decisions.

6. Establish and maintain a program to train all individuals whose duties require them to work in the vicinity of radioactive material.