

VOID SHEET

~~Nov 10~~  
38  
112158

TO: License Fee Management Branch

FROM: Region I

SUBJECT: VOIDED APPLICATION  
Abandoned

Control Number: 112158

Applicant: Iodo Products, Inc.

Date Voided: 10-09-90

Reason for Void: Applicant did not respond to our letter  
dated 5-9-90 asking for additional information.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Rebecca J. Brown  
Signature

10-9-90  
Date

Attachment:  
Official Record Copy of  
Voided Action

FOR LFMB USE ONLY

Final Review of VOID Completed:

Refund Authorized and processed

No Refund Due

Fee Exempt or Fee Not Required

Comments: After Review  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Log completed  
Processed by: sk

OCT 09 1990

Docket No. 030-3162  
Control No. 112158

Iodo Products, Inc.  
ATTN: Norman Shapiro  
Vice President  
80 Bacon Street  
Waltham, Massachusetts 02154

Gentlemen:

Your request for a new license dated March 2, 1990 has been voided because you did not respond to our letter dated May 9, 1990.

The fee you paid will not be refunded because time and effort were spent in review and evaluation of your request.

If you need further clarification regarding your fee or the possibility of reactivating your application, you may contact Glenda Jackson, Chief, License Fee and Debt Collection Branch, 301-492-8740.

Sincerely,

**Original Signed By:**  
**Francis M. Costello**

Francis M. Costello  
Nuclear Materials Safety Section B  
Division of Radiation Safety  
and Safeguards

FMC  
RI:DRSS  
Costello:jd

  
DRSS  
Inneman

09/27/90

10/3/90

OFFICIAL RECORD COPY

ML 400 COSTELLO - 0001.0.0  
09/25/90

ML 10

MAY 09 1990

Docket No. 030-31612  
Control No. 112158

Iodo Products, Inc.  
ATTN: Norman Schapiro  
Vice President  
80 Bacon Street  
Waltham, Massachusetts 02154

Gentlemen:

This is in reference to your application dated March 2, 1990, for a byproduct material license. In order to continue our review, we need the following additional information:

1. Your application requests authorization for a large quantity of radioactive iodine for iodinations and this requires that the authorized user have substantial experience with similar quantities for similar uses. In your application, it appears that the proposed user's training and experience are not commensurable with your proposed maximum possession limits. Please provide information that includes the type (on-the-job or formal course work), location, and duration of the training. Training should cover (a) principles and practices of radiation protection, (b) radioactivity measurements, standardization, and monitoring techniques and instruments (c) mathematics and calculations basic to the use and measurement of radioactivity, and (d) biological effects of radiation. The description of the use of radioactive materials should include the specific isotopes handled, the maximum quantities of materials handled, where the experience was gained, the duration of experience, and the type of use. We will be unable to issue you a license for this quantity of material unless there is a qualified individual to be the authorized user.
2. Submit a description of the duties and responsibilities of your Radiation Safety Officer. The typical duties of a Radiation Safety Officer would be:
  - a. To ensure that the use of radioactive material is by or under the direct supervision of individuals specifically listed on your license.
  - b. To ensure that all users (where appropriate) wear personnel monitoring equipment when using radioactive materials.
  - c. To ensure that radioactive materials are properly secured against unauthorized removal at all times when not in use.

- d. To perform routine inspections of all laboratories using or storing radioactive materials.
  - e. To ensure that the terms and conditions of your license are met, and that all required records are maintained.
3. In your application, you didn't describe a training program for ancillary personnel (maintenance, security, etc.) and personnel involved in radionuclide work. Please describe a program that it will:
- (a) be of sufficient scope to ensure that all personnel using radioactive materials receive proper instruction in accordance with 19.12 of 10 CFR Part 19 (enclosed);
  - (b) provide for personnel to be properly instructed before assuming duties with, or in the vicinity of, radioactive materials with retraining as necessary.

The training given to each group should be commensurate with the duties and responsibilities of the group and need not be the same for each group.

4. Please describe the method and frequency for testing the face velocity of your hood.
5. Your equipment should include a survey instrument with a NaI detector probe to detect I-125 contamination. Please specify the instrument that will be used for this purpose.
6. In your application, you did not specify the instrument used for determining activity in the thyroid. If you are using a consultant to determine the activity in the thyroid, please specify their instrumentation, calibration procedures and the type of phantom they are using.
7. Please provide a description of the routine survey program, including the areas to be surveyed, the types and levels of radiation and contamination considered to be acceptable, and provisions for maintaining records of surveys. The individual user should supplement the surveys performed by the radiation staff. Regularly used laboratories should be surveyed for contamination at the end of each workday (except when quantities less than those in Appendix C to 10 CFR Part 20 are handled by an employee at any one time), and the user should maintain records of such surveys in units required by 10 CFR Part 20, even if only a single measurement is necessary.
8. Please provide a copy of your laboratory instructions. Typical instructions should include:
  - a) Wear laboratory coats or other protective clothing at all times in areas where radioactive materials are used.
  - b) Wear disposable gloves at all times while handling radioactive materials.

- c) Either after each procedure or before leaving the area, monitor your hands for contamination in a low-background area.
  - d) Do not eat, drink, smoke or apply cosmetics in any area where radioactive material is stored or used.
  - e) Do not store food, drink, or personnel effects in areas where radioactive material is stored or used.
  - f) Wear personnel monitoring devices at all times while in areas where radioactive materials are used or stored.
  - g) Dispose of radioactive waste only in designated, labeled and properly shielded receptacles.
  - h) Never pipette by mouth.
  - i) Wipe-test radioactive material storage, preparation and use areas weekly from contamination. If necessary, decontaminate or secure the area for decay.
  - j) Refrigerators shall not be used jointly for foods and radioactive materials.
  - k) Confine radioactive solutions in shielded containers that are clearly labeled.
  - l) Secure all radioactive material when not under the constant surveillance and immediate control of the authorized users.
9. In your application, you did not indicate how you will secure licensed material (10 CFR 20.207). Please specify how you will preclude the unauthorized removal of licensed material from the place of storage.
10. In your application, no mention was made of establishing and posting emergency procedures. Regulatory Guide 10.7 recommends that licensees establish emergency procedures that address immediate actions to be taken and persons to be contacted (including appropriate phone numbers). Please confirm that you will draft and post a set of emergency procedures. It is recommended that such procedures contain:
- a. Instructions to be followed during minor spills.
  - b. Instructions to be followed during major spills.

Your radiation safety officer's name, his office phone number, and a phone number to be used during off hours.

11. In your application, you didn't specify the procedures for decay-in-storage. Please confirm that you will hold the radioactive waste in storage for at least 10 half-lives. Survey the waste in a low background area with a low-level survey meter and with all the shielding removed. Also, please confirm that you will not dispose of the waste as normal trash unless the radiation level is at background.
12. Please provide procedures for examining incoming packages for leakage, contamination, or damage and for safely opening packages in accordance with 20.205 of 10 CFR Part 20. The monitoring should be performed as soon as practicable after receipt of the package of radioactive material. The procedures may vary depending upon the quantity of radioactive material received, but should, at a minimum, include instructions for surveying packages, wearing gloves while opening packages, and checking packing material for contamination. Even though 20.205 of 10 CFR Part 20 exempts certain packages from immediate monitoring, all packages should be monitored before they are opened.
13. Please describe your procedures for ordering radiation materials, for receipt of materials, and for notification of responsible persons upon the receipt of radioactive material. Please specify these procedures and state who has the responsibility in these situations.
14. 10 CFR 20.103(b)(2) requires that licensees make evaluations and take actions to assure against recurrence whenever an intake of radioactive materials exceeds the intake which would result from inhalation of such material for 40 hours at the concentration specified in 10 CFR 20, Appendix B, Table 1, Column 1. This intake of radioactive materials is frequently referred to as "40 MPC - hours". Please describe how your bioassay procedure will be able to detect an intake of 40 MPC hours and confirm that, when such an intake is identified, you will make the required evaluation and take the actions necessary to assure against recurrence.
15. In support of your request for 1000 millicuries of iodine-125 and 500 millicuries of iodine-131, you should develop and submit special safety instructions to be provided to individuals using millicurie quantities of radioiodine. We recommend that your procedures include, but not be limited to, the following:
  - a. A mandatory radiation survey and wipe test procedures after each use.
  - b. Bioassay procedures for individuals working with millicurie quantities of radioiodine.
  - c. The use of vented hoods for iodination and for the storage of millicurie quantities of radioiodine.
  - d. The use of dry run prior to the performance of unfamiliar procedures in order to preclude unexpected complications. In addition, it is recommended that the radiation protection officer be present during new procedures.

- e. Procedures for measuring the concentration of radioiodine from the hoods where radioiodine is stored and where iodinations are performed.

We will continue our review upon receipt of this information. Please reply in duplicate to my attention at the Region I office and refer to Mail Control No. 112158.

If we do not receive a reply from you within 30 calendar days from the date of this letter, we shall assume that you do not wish to pursue your application.

Sincerely,

**Original Signed By:**

**Francis M. Costello**

Francis M. Costello  
Nuclear Materials Safety Section B  
Division of Radiation Safety  
and Safeguards

Enclosures:

1. 10 CFR Parts 19, 20 and 30
2. Regulatory Guides 8.20 and 10.7

*FMC*  
RI:DRSS  
Costello

04/ /90

OFFICIAL RECORD COPY

ML 252 COSTELLO - 0005.0.0  
04/23/90

IODO Products  
80 Bacon Street  
Waltham, Ma 02154

L8 28497

030-

Program Code: 03620

March 2, 1990

U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Rd.  
King of Prussia, PA 19406

Attn: John Kinneman

Dear Sir,

I have attached, in duplicate, the NRC Form #313 I and a check for \$460.00.

We had an NRC license #SMB-1419, priority III category E from 1982-1986 under the name of Resource Engineering, Inc. The license allowed us to conduct analytical research on depleted uranium. We requested to terminate this license on 2/2/86 because we were no longer in this business.

We are presently planning to start an additional venture to manufacture iodinated products. We are also planning to repackage <sup>125</sup>I and <sup>131</sup>I in small quantities. We will apply for a distribution license once we receive a manufacturing license.

If you have any questions or suggestions please feel free to call on me at 617-894-6720.

Thank you.

Sincerely,

*Norman Schapiro*

Norman Schapiro  
Vice President

NS/vs

Enc.

NRC  
NIGHT  
BRANCH

01-10

15:28 5-22-86

RECEIVED-REGION I

License Fee Information

on Application

112158

OFFICIAL RECORD COPY ML1B

MAR 05 1990



APPLICATION FOR BYPRODUCT MATERIAL LICENSE  
INDUSTRIAL

- X a. NEW LICENSE  
b. AMENDMENT TO LICENSE NUMBER  
c. RENEWAL OF LICENSE NUMBER

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

2. APPLICANT'S NAME (Institution, firm, person, etc.)

1000 Products

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION  
(617) 894-6720

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

Dr. Norman Schapiro

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION  
(617) 894-6720

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)

(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)

80 Bacon Street  
Waltham, MA 02154

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code)

80 Bacon Street  
Waltham, MA 02154

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL (See Items 16 and 17 for required training and experience of each individual named below)

FULL NAME		TITLE
a.	Dr. Norman Schapiro	Vice President
b.		
c.		

Log March 10

Remitter \_\_\_\_\_

Check No. 104

Amount \$ 460

Fee Category 3B

Date Completed 3/20/90

APD  
AK

7. RADIATION PROTECTION OFFICER

Dr. Norman Schapiro

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under the Act.

B. LICENSED MATERIAL

LINE NO.	ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(11)	$^{125}\text{I}$	$\text{NA}^{125}\text{I}$ /liquid	N/A	1.0 curie
(12)	$^{131}\text{I}$	$\text{NA}^{131}\text{I}$ /liquid	N/A	0.5 curie
(13)				
(14)				

DESCRIBE USE OF LICENSED MATERIAL  
E

- (11)  $\text{NA}^{125}\text{I}$  and  $\text{NA}^{131}\text{I}$  will be repackaged for small quantity users.  $\text{NA}^{125}\text{I}$  and  $\text{NA}^{131}\text{I}$
- (12) will also be tagged to various peptides, hormones, and other precursors to produce
- (13) radionated products. We will manufacture Bolton Hunter Reagents using 100 mCi of  $\text{NA}^{125}\text{I}$ . The product will be purified by HPLC System, or other appropriate systems.

112:58

**9. STORAGE OF SEALED SOURCES**

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	N/A	N/A	N/A
(2)			
(3)			
(4)			

**10. RADIATION DETECTION INSTRUMENTS**

LINE NO.	TYPE OF INSTRUMENT A.	MANUFACTURER'S NAME B.	MODEL NUMBER C.	NUMBER AVAILABLE D.	RADIATION DETECTED (alpha, beta, gamma, neutron) E.	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F.
(1)	Scaler	Ludlum	2000	1	Gamma	44-2 and 44-3 0 to 10 <sup>6</sup> cpm.
(2)	Survey Meter	Ludlum	14C	1	Gamma	44-9 0-50 mR/hr Interval 0-2 R/hr
(3)	Ion Chamber	Capintec	CRC 10R	1	Gamma	0.1 mCi to 200 Ci
(4)						

**11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10**

<input checked="" type="checkbox"/> <b>a. CALIBRATED BY SERVICE COMPANY</b> NAME, ADDRESS, AND FREQUENCY Neil A. Gaeta Lic.#20-20743-01 35 Grove St., Medford, MA 02155	<input type="checkbox"/> <b>b. CALIBRATED BY APPLICANT</b> Attach a separate sheet describing method, frequency and standards used for calibrating instruments.
--	--

**12. PERSONNEL MONITORING DEVICES**

TYPE (Check and/or complete as appropriate.) A.	SUPPLIER (Service Company) B.	EXCHANGE FREQUENCY C.
<input type="checkbox"/> (1) FILM BADGE <input checked="" type="checkbox"/> (2) THERMOLUMINESCENCE (WB and DOSIMETER (TLD) finger) <input type="checkbox"/> (3) OTHER (Specify): _____ _____ _____	Radiation Detection Co., Sunnyvale, CA	<input type="checkbox"/> MONTHLY <input checked="" type="checkbox"/> QUARTERLY <input type="checkbox"/> OTHER (Specify): _____ _____

**13. FACILITIES AND EQUIPMENT** (Check where appropriate and attach annotated sketch(es) and description(s).)

- a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
- b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
- c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
- d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

**14. WASTE DISPOSAL**

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED  
**ADCO Services, Inc.**

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE

N/A

**INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17**

Describe in detail the information required for items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

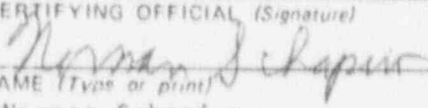
15. **RADIATION PROTECTION PROGRAM.** Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
  
16. **FORMAL TRAINING IN RADIATION SAFETY.** Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
  - a. Principles and practices of radiation protection.
  - b. Radioactivity measurement standardization and monitoring techniques and instruments.
  - c. Mathematics and calculations basic to the use and measurement of radioactivity.
  - d. Biological effects of radiation.
  
17. **EXPERIENCE.** Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

**18. CERTIFICATE**

*(This item must be completed by applicant)*

*The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.*

**WARNING.**—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

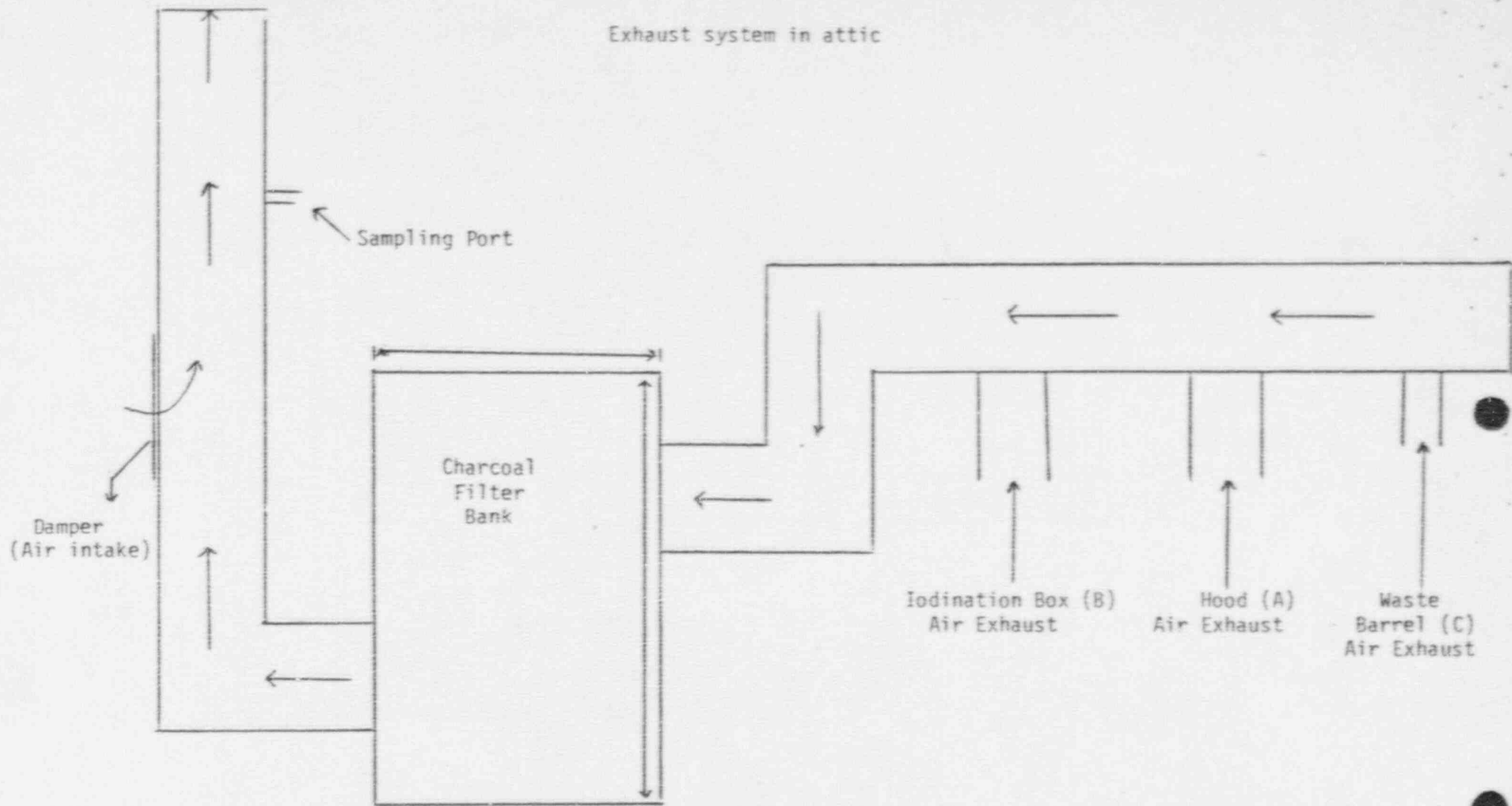
a. LICENSE FEE REQUIRED (See Section 170.31, 10 CFR 170)	b. CERTIFYING OFFICIAL (Signature) 
	c. NAME (Type or print) Norman Schapiro
(1) LICENSE FEE CATEGORY:        3B	d. TITLE Vice President
(2) LICENSE FEE ENCLOSED: \$460.00	e. DATE March 2, 1990

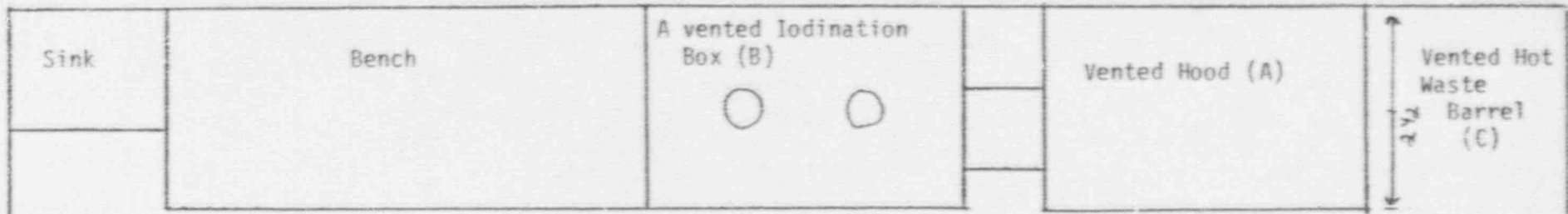
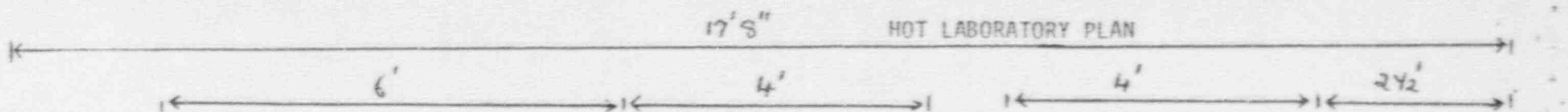
13. Facilities and Equipment

- a. 1. See attached diagram
2. The laboratory will be designated as a hot laboratory with one entrance. The entrance will be through the change area which will be equipped with a monitor.
3. Material received and finished products will be checked for contamination.
4. The starting material and finished products will be stored in a vented hood (A) see diagram.
5. Starting material will be processed in a vented iodination box (B) behind lead bricks.
6. Iodination box will have negative pressure and air will enter from the hood. Iodination box will be totally sealed.
7. Iodination box and hood and waste barrel (C) will be connected and the air will be exhausted through a charcoal filter.
8. Air flow through the hood (A) will be approximately 100 cu ft/minute.
9. The hood face will have approximately one square ft. opening.
10. Exhaust air from the iodination box will be approximately 80 cu ft/min. and hood exhaust air will be approximately 20 cu ft/min.
11. The entire "hot" laboratory will be under negative pressure.
12. Air will enter only through laboratory door.
13. Exhaust fan will operate 24 hours, 7 days a week.
14. Before exhausting air into the environment, air samples will be collected continuously in a charcoal trap.
15. The laboratory will process only a maximum of 100 mCi Na <sup>125</sup>I and 50 mCi Na <sup>131</sup>I respectively at any one time.
16. The laboratory wall, floor and ceiling will be covered with impregnable color coating.
17. A reaction vial containing a syringed charcoal trap will be located in the primary box (D). This trap will collect free iodide present in the vial. The Berney-Chenny charcoal trap on top of the box (D) will also absorb free iodide. The Berney-Chenny trap contains a motor that will circulate the air within primary box. The remaining iodide will be absorbed by the charcoal filter bank located in the attic.

18. The entire exhaust air system for the laboratory will utilize a 2800 cfm rated fan. Exhaust flow from hot laboratory will be operated at a rate of 100 cfm. Make up air will be taken from the attic area, downstream of the charcoal filters and upstream of the exhaust fan. This air intake will be controlled by a damper. This should provide additional dilution of exhausted air from the laboratory.
19. A change area will be located adjacent to the laboratory door. The air will enter from the change area to the laboratory and through hood to outside.
  - b. 1. Incoming products will be stored in 1/2" lead pigs. Finished product will be stored in 1/8" lead pigs. The waste barrel will be covered with 1/8" lead.
  - c. None
  - d. None
15. Daily exposure rate measurement.  
Daily swipe of all the affected area.  
Hood floor (A) would be covered with impregnable paper and diapers that will be changed daily or after each use.  
The hood and iodination box will be cleaned and inspected daily or after each use.
16.
  1. Norman Schapiro
  2. Norman Schapiro will receive yearly training per NCR regulations.
17. Resume (N. Schapiro enclosed).

Exhaust system in attic





Laboratory floor, ceiling and wall will be covered with impregnable color coating.

Fresh air will enter into laboratory through change area only.

Air will be exhausted through hood and waste barrel only.

Air will be entered into iodination box through hood only.

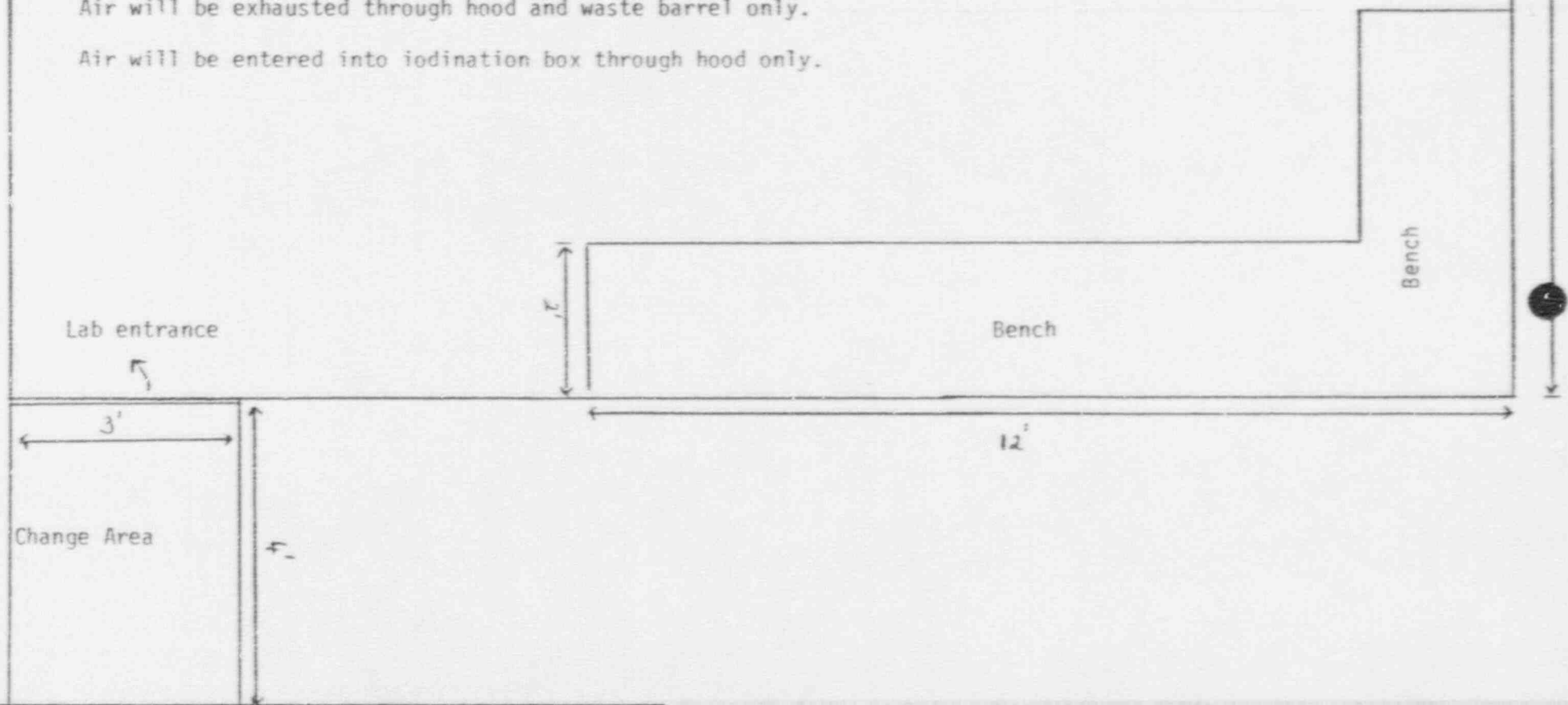
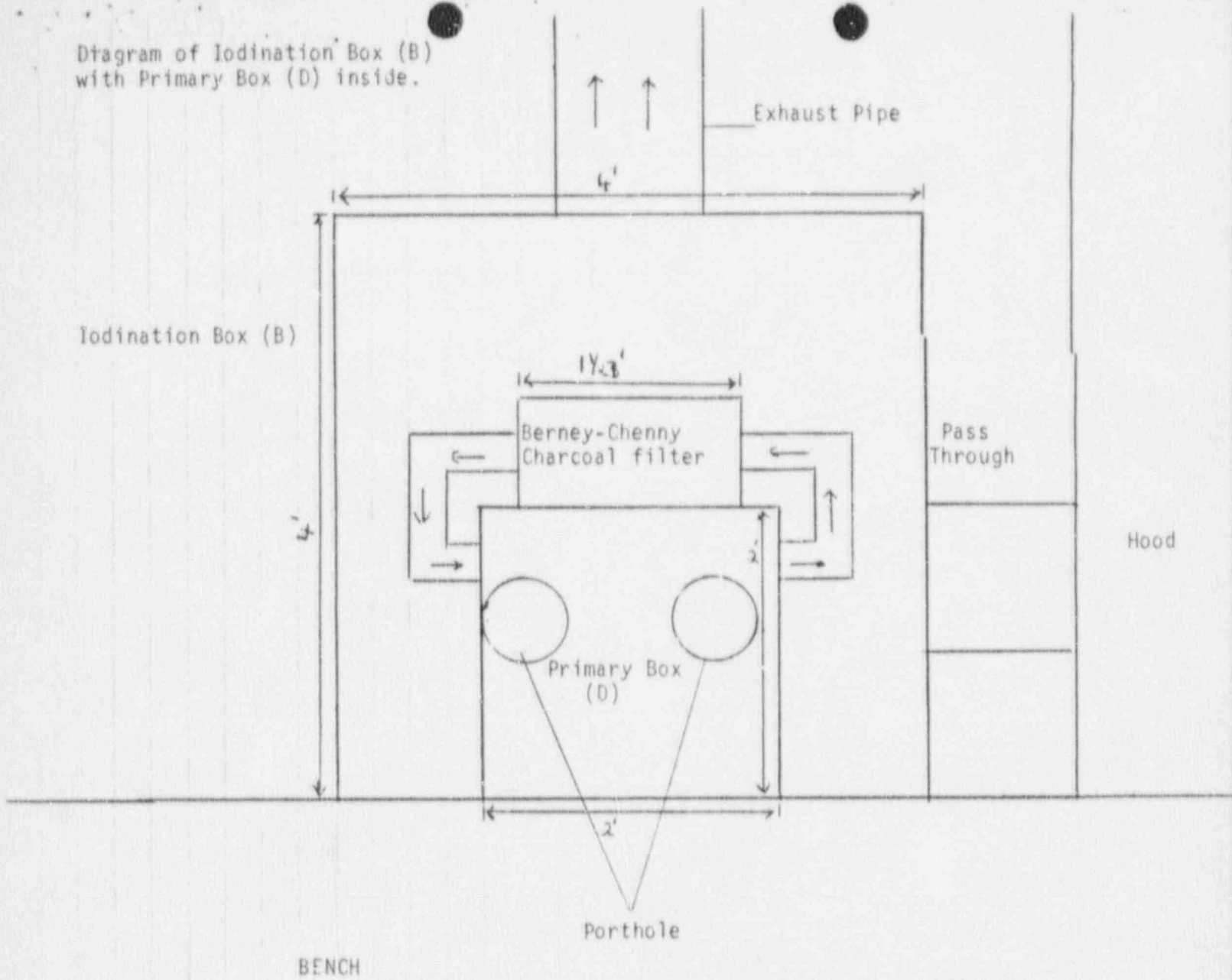


Diagram of Iodination Box (B)  
with Primary Box (D) inside.





## NORMAN SCHAPIRO

### Education

B.S., Geology (1950)  
Brooklyn College

M.S., Geology (1952)  
Ohio State University

Ph.D., Geology (1955)  
West Virginia University

### Summary

Thirty five years experience in initiating and managing high level programs in coal, mineral, and uranium utilization. Instrumental in the development of the process petrography approach to study the physical, chemical, mineral, and rheological properties of raw materials to their behavior in various processes.

### Experience

#### Uranium

Conducted petrographic and chemical evaluation of various uranium ores for a major steel company, to determine if these ores can be economically beneficiated. Participated in the study of in-situ mining of uranium for a large copper corporation. Directed the analytical research of depleted uranium at REI, under contract with Nuclear Metals Inc., from 1982 to 1985. Research engineering was authorized by NRC License #SMB-1419 to use up to 100 kilograms of depleted uranium in both solid and liquid form for research and analysis.\* Developed analytical procedures and a quality assurance program to detect the extent of radioactive material on smoke detector surfaces. These smoke detectors are distributed by Randix Industries, Ltd. The smoke detector is distributed in the U.S. under NRC License #20-21229-1. The radioactive material present in these detectors is Americium 241, A Ludlum #200 scale rate meter is the Geiger counter used. Batches of these smoke detectors were evaluated quarterly.

#### Na <sup>131</sup>I

Developed method using Sodium <sup>131</sup>I for tracing sewer effluent within a plant plumbing network of a papermill. The Na <sup>131</sup>I was then monitored at predetermined points using a Sodium Iodide probe. The volatility of Na <sup>131</sup>I was evaluated in terms of the effect of pH. A special charcoal filter ventilation system was proposed to minimize the contamination due to volatility of iodide during storage. The total activity used at time was approximately 40 mCi.

### Coal

Evaluated coal properties and active mining operations for acquisition and export potential. Selected coals for oil to coal conversion of utilities. Conducted market research studies of coal preparation equipment. Planned exploration drilling program for coal exploration. Selected coals for coal-oil mixtures. Developed groups to evaluate coal reserves for maximum profitability. Planned and directed a research program in coal gasification. Advised management on combustion, gasification, liquefaction, and carbonization potential of their major coal reserves, which resulted in profit potential of over \$50 million for a major development project. Petrographic evaluation and characterization of coal and coke for the selection of coals to be used in the production of metallurgical coke. Provided technical assistance to coke plants in problems concerning quality and productivity. Development of petrographic technique to characterize the properties of tars, pitches, etc., that could affect their use in road paving materials used in the production of activated carbons, plastic-fillers and extenders. Conducted mapping and correlative studies of coal seams.

### Carbon

Determined properties of carbon products and selected appropriate coals for enhancing process yields. Developed various evaluation methods for determining quality of carbon products.

### Minerals

Initiated the application of petrographic analysis to solution of mineral processing problems. Also responsible for corporate level work in two major areas, (1) New resource development, and (2) Process petrography.

The new development involved overall evaluation of mineral deposits from a study of the literature and selected samples, to define their suitability for the application of natural materials, including work on major programs such as in-situ mining, manganese nodules and geologic prediction of roof conditions in underground coal mines. Characterization of iron ores, coal; limestone and binder. The data obtained was correlated with performance of the raw materials in full scale sinter pelletizing plants and other iron and/or steelmaking facilities. Conducted characterization studies of electric furnace refractories. Conducted petrological and mineralogical study of alterations and structural features of metamorphosed and unmetamorphosed igneous rocks.

Employers

Resource Engineering Incorporated  
Vice President (78- )

Kennecott Copper Corporation  
Section Head (76-78)  
Group Leader (75-76)  
Senior Earth Scientist (70-75)

Adjunct Professor of Geology, Boston University, 1975-1977.

United States Steel Corporation  
Section Supervisor (63-70)  
Section Head (55-62)

West Virginia Geological Survey  
Geologist (53-54)

\* In 1985 REI personnel were given safety training for a total of 40 hrs. by the Health Physics staff of Nuclear Metals. In addition, quarterly refresher courses were provided by the Nuclear Metals staff. The topics covered in these safety programs were as follows:

- a.) background radiation;
- b.) properties of depleted uranium;
- c.) regulatory requirements;
- d.) monitoring of dosimeter badges and urinalysis;
- e.) protective devices;
- f.) principles of radiation detection equipment and their use;
- g.) personal hygiene; and
- h.) radiation biological effects.

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM  
AND  
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)  
INFORMATION FROM LTS

PROGRAM CODE: 03620  
STATUS CODE: 3  
FEE CATEGORY:  
EXP. DATE: 0  
FEE COMMENTS:

LICENSE FEE TRANSMITTAL

A. REGION

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: IODD PRODUCTS, INC.  
RECEIVED DATE: 900305  
DOCKET NO: 3031612  
CONTROL NO.: 112158  
LICENSE NO.:  
ACTION TYPE: NEW LICENSEE

RI:

Isn't this more  
manufacturing  
(processing)  
than research?

2. FEE ATTACHED

AMOUNT: \$460<sup>00</sup>  
CHECK NO.: 104

3. COMMENTS

SIGNED  
DATE

M. Weisenberger  
3-14-90

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1-1)

1. FEE CATEGORY AND AMOUNT: 3B \$460

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT  
RENEWAL  
LICENSE

3. OTHER

SIGNED  
DATE

S.K.  
3/20/90