NRC FORM 313
(7-86)
10 CFR 30, 32, 33, 34, 35 and 40

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY OMB
3150-0120
Expires: 5-31-87

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS. IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIALS SAFETY SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
NUCLEAR MATERIALS SAFETY SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
NUCLEAR MATERIALS SAFETY SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR (*Check appropriate item*)

- [ ] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER ____
- [X] C. RENEWAL OF LICENSE NUMBER SNM-791

2. NAME AND MAILING ADDRESS OF APPLICANT (*Include Zip Code*)

Isotopic Analysis, Inc.
P. O. Box 35622
Tulsa, OK 74153

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED:

8335A E. 51st Street
Tulsa, OK 74145

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION: Jon W. Harrison

TELEPHONE NUMBER: 918-622-2464

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)
FEE CATEGORY: 1.K
AMOUNT ENCLOSED: $ 350.00

13. CERTIFICATION. (*Must be completed by applicant*) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN, IS TRUE AND CORRECT TO THE BEST OF THEIR 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.

SIGNATURE-CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
for W. Harrison	Jon W. Harrison	President	3/19/87

14. YOU MAY BE REQUIRED BY ECONOMIC DATA

a. ANNUAL RECEIPTS

- [X] <$250K
- [ ] $250K–500K
- [ ] $500K–750K
- [ ] $750K–1M
- [ ] $1M–3.5M
- [ ] $3.5M–7M
- [ ] $7M–10M
- [ ] >$10M

b. NUMBER OF EMPLOYEES (*Total for entire facility excluding outside contractors*): 4

c. NUMBER OF BEDS: 0

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (*Dollar and/or staff hours*) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (*NRC regulations permit it to protect confidential commercial or financial–proprietary–information furnished to the agency in confidence*)

- [X] YES
- [ ] NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
Renew	Apr-1-IE	1K	8810190223 880516 REG4 LIC70 SNM-0791 PNU	M. Meisner
AMOUNT RECEIVED	CHECK NUMBER			DATE
$350	3839		46/1440	4/3/87

March 15, 1987

1. Identification of Applicant

Isotopic Analysis, Inc was incorporated in the State of Oklahoma on December 24, 1975 by the Secretary of State.

The office and laboratory of Isotopic Analysis, Inc. are located at 8335 East 51st Street, Tulsa, Oklahoma 74145. The mailing address is P. O. Box 35622, Tulsa, Oklahoma 74153.

The officers of the Corporation are:

Name and Title	Address	Citizenship
Jon W. Harrison President and Operations Manager	4993 East 26th Place Tulsa, Oklahoma 74114	USA
Thomas C. Westmoreland Vice President	5959 South Birmingham Ave Tulsa, Oklahoma 74105	USA
Richard W. Johnson Secretary-Treasurer and Mass Spectroscopist	4808 S. 267th East Ave Broken Arrow, Oklahoma 74012	USA

Isotopic Analysis, Inc. is completely owned by the above three officers, and no additional stock has been issued. No control is exercised over the applicant by any client, foreign corporation, or foreign government.

2. Activity to be Performed

This facility has been established to provide mass spectrographic analysis of nuclear materials. The special nuclear materials received under this license shall consist of (1) samples of enriched uranium from core manufacturers and from prime contractors engaged in monitoring military and civilian reactor programs. (2) a small quantity of U-233 for use as an internal standard in trace analyses, and (3) NBS uranium standards of various enrichment levels. The processing of this material will consist of four steps: (1) chemical separation of the uranium from interfering elements by extraction or ion exchange techniques, (2) loading microgram quantities of the purified uranium onto filaments for analysis on the mass spectrometer, (3) analysis of the material on the mass spectrometer, and (4) salvage of unused samples for return to the customer if recoverable or for burial if non-recoverable.

All processing of enriched uranium shall be done in chemical hoods. All processing of U-233 shall be done in glove boxes up to the point where quantities less than 50 micrograms are to be handled. These quantities shall then be handled in chemical hoods over absorbent paper.

This operational activity shall be conducted at 8335 East 51st Street, Tulsa, Oklahoma 74145.

3. Duration of License

The license is requested for a period of five (5) years.

4. Type and Quantity of special Nuclear Material

Uranium enriched in the 235 isotope will be received in solid form as oxide, alloy or pure metal, and in solution as nitrate or sulfate with various impurities such as iron, chromium, nickel, and zirconium. The total quantity of enriched uranium possessed at any one time will not exceed 200 grams of Uranium-235.

Uranium-233 shall be received in solid form as oxide, or nitrate solution. A maximum of 10 grams shall be possessed at any one time.

5. Qualifications of Supervisory and Technical Personnel

Mr. Jon W. harrison shall be designated Operations Manager and Radiation Safety Officer. Mr. Harrison possesses a B.S. Degree in Chemistry, and 21 years experience working with Special Nuclear Materials. He was employed for 10 years at Kerr McGee Nuclear Corporations' Cimarron facility, Crescent, Oklahoma where he held the position of Supervisor of the Mass Spectrographic Laboratory. He has been employed by Isotopic Analysis, Inc. for the past 11 years.

Mr. Richard W. Johnson shall be designated Security Officer and Document Custodian. Mr. Johnson has 20 years experience working with Special Nuclear Materials, including 10 years with the Tulsa Operation of Avco Corporations' Electronics Division, in the Mass Spectrographic Services Laboratory. He has been employed by Isotopic Analysis, Inc. for the past 11 years.

Mrs. Grace Williams is designated as Office Manager, Document Custodian, and alternate Security Officer. Mrs. Williams has been employed by Isotopic Analysis for 5 years.

6. Facilities and Equipment

Reference drawings of the laboratory are attached as Drawings 1 and 2. These drawings indicate the location of the chemical hoods, glove boxes, ventilation system, airborne radioactivity sampling stations, sample storage areas, fire-fighting equipment, holding tank, airlock, shower, laundry equipment, mass spectrometer, and personnel monitoring stations.

a. General Construction Details

The facility is divided into four areas as follows (Drawing 1): (1) office area, (2) cold laboratory, (3) instrument room, and (4) the hot laboratory for radioactive material preparation. Outer walls in all areas are of windowless concrete construction (except for windows in office area) with sheet rock interior surfaces. Ceilings are of precast metal panels with caulked joints and asphalt and gravel outer surfaces. For security reasons, the Restricted Area walls extend from floor to outer ceiling up through the acoustical ceiling drop on all four sides. This was also necessary in the hot laboratory because it is a negative pressure area. The entire area is of fireproof construction. All services, ducts, and joints have been sealed with plaster or caulking with a phenolic sealing compound to render them dust and air tight. The floor of the hot laboratory and air lock is covered with an epoxy coating which is scrubbed weekly. The floor of the instrument room is covered with vinyl tile, which is scrubbed weekly.

The walls of the hot laboratory are covered with two coats of oil base enamel paint for scrubability. There are no floor drains in the hot laboratory. All water from the hot laboratory and washer laundry is transferred to a 300 gallon holding tank in the hot laboratory area. Sampling outlets are provided which permit analysis of all effluent before it is released into the sanitary sewer system. (Permissible dumping limits are discussed in Section 7.g.)

All cooling water for the hot laboratory analytical equipment is provided by a closed loop refrigeration unit. The water from this unit shall be transfered to the holding tank if a change is necessary.

b. Personnel Monitoring Stations and Clothes Changing

Personnel monitoring stations are located between the hoods in the hot laboratory and at the exit to the instrument room as shown in Drawing 1. Personnel leaving these areas are required to monitor their clothing and person with the Ludlum alpha survey meters described in Section 6.e. (2) Maximum permissible contamination is called out in Section 7.c.

Covered metal containers and plastic bags are provided for contaminated clothing. Section 7.c. calls out procedures and limits for changes and laundering or disposal of contaminated clothing.

c. Glove Boxes, Hoods and Ventilation

461440

Two chemical fume hoods are located in the hot laboratory. These are Lab-Con-Co Advance 70 Fiberglass and epoxy units designed especially for handling radioactive materials. The hoods are of constant volume minimum turbulence design and are operated at a minimum linear face velocity of 150 FPM.

A line of glove boxes is located in the preparation area. One of these boxes is operated without gloves as a minimum opening box. The glove boxes are operated at a negative pressure of 1/2 inch of water relative to the room and with an air change of 50 cfm per three-foot box. The minimum opening box is oprated at a minimum linear face velocity of 150 FPM.

Details of the exhaust and supply system, as well as the filters used, are shown in Drawing 2. The incoming air in the hot lab is filtered through absolute filters which prevent backstreaming in the event of an exhaust blower failure. The instrument room exhausts through the air lock into the hot lab. The door between the airlock and the hot lab is fitted with special gasketing and an absolute filter so that it may be sealed off to prevent backstreaming in the event of an exhaust blower failure. The system is designed to maintain a negative pressure of 0.06 inches of water in the airlock and 0.25 inches of water in the hot lab relative to the instrument room.

The hot lab exhausts through the hoods and glove boxes to a pre-filter and an absolute filter to a separate duct and blower which serve only this area. Two emergency switches are located in the hot lab (one switch) and the instrument room (one switch) to permit emergency shutdown of the exhaust blower. The pre-filter in the exhaust system is located at the exhaust vents of the individual hoods. The absolute filters are located just ahead of the exhaust blower. The absolute filters discussed in this section are replaceable Cambridge filters capable of removing 99.95% of particulate matter 0.3 microns or larger. All filters have Underwriters Laboratory Class II fire resistance ratings. All pre-filters are the rough Fiberglas type used to prolong the useful life of the absolute filter.

The pre-filters are checked monthly and changed if they appear to need so. In the past, our type of laboratory operation has found it necessary to change the absolute filters usually on an annual basis. the linear face velocity of the hoods and glove boxes is checked monthly to determine the effective operation of the filtering system pursuant to Regulatory Guide 8.24.

d. Air Sampling Stations

Eight (8) permanent air sampling stations are located as shown in Drawing 1. These stations provide adjustable flow rates and are fitted with quick-change heads. In addition, a portable air sampler (STAPLEX High Volume) is available for evaluation of new operations and special hazards such as spills or glove failures. Air sampling schedules and maximum permissible levels are discussed in Section 7.d.

e. Radiation Instrumentation

(1) Personnel Monitoring Devices

Manufacturer:	Eberline
Type Instrument:	Thermoluminescent Badge
Sensitivity:	Beta-Gamma
When Checked:	Monthly (Eberline will read badges and provide exposure reports)

(2) Radiation Protection Instruments

Description	Radiation Detected	Range
Ludlum Scaler/Ratemeter with Sample Holder and gas proportional Detector Model 2200	Alpha,Beta	0 to 10^8 counts
Technical Associates Proportional Gas Flow Counter	Alpha,Beta	0 to 10^8 counts
Ludlum Model 2 Portable Survey Meter	Alpha,Beta, Gamma	0-100K cpm, 0-50 mR/hr, in 4 ranges
Ludlum Model 12 Portable Survey Meter	Alpha	0-5K cpm, in 4 ranges
Ludlum Model 16 Portable Survey Meter	Alpha,Beta, Gamma	0-500K cpm, 0-250K mR/hr, in 4 ranges
STAPLEX High Volume Air Sampler	Not Applicable	Not Applicable

At least one of the Beta-Gamma Survey meters shall be calibrated once each calendar quarter by an NRC regulated facility using a Cesium-137 source. The Alpha Survey meters and the Alpha-Beta gas proportional counters shall be calibration checked in-house each day that they are in use, using Uranium Alpha standards prepared by Eberline Instrument Corporation,

Albuquerque, New Mexico, and traceable to NBS standards.

f. Fire Fighting Equipment

Three (3) 15-pound carbon dioxide fire extinguishers are located as shown in Drawing 1. Because metal quantities shall not exceed 1.0 gram per sample, it is ' lt that no metal extinguishers shall be required as long as processing is limited.

g. Protective Clothing

Laboratory coat, coveralls, surgeons caps, booties, respirators, and rubber gloves are provided for each individual. Use requirements and change schedules are discussed in Section 7.c.

h. Storage Area

Enriched uranium samples are stored in a locked metal NRC approved safe in the sample preparation area. This cabinet is fabricated of steel and has a baked enamel finish. all samples are stored in polyethylene bottles or glass ampules.

i. General Supplies

Absorbent paper, plastic bags, chemwipes, masking tape, metal cans, and laboratory trays are provided for use where necessary for contamination control.

7. Operational and Radiation Control Procedures

a. Receipt of Samples

Samples received shall include uranium as solids and as acid solutions. Samples shall be individually contained in sealed glass or polyethylene bottles. The individual samples shall be packed inside a container with vermiculite or other absorbing material separating them. The container shall be plainly marked with appropriate radiation warning signs. This container shall then be packed in an approved cardboard, wooden, or metal shipping container. In all cases, packages received which contain uranium samples must comply with all applicable NRC regulations pursuant to Title 10, Code of Federal Regulations, part 71. The samples will be material from fuel manufacturers which has no appreciable beta-gamma contamination. When received, the shipping container shall be monitored and smeared (unless the package contains an exempt quantity of material as specified in Title 10, Code of Federal Regulations, Part 20, Paragraph 20.205) to assure that the beta-gamma rate does not exceed 200 mr/hr at the

surface and that the fixed and removable alpha contamination does not exceed 500 DPM per 100 square centimeters. When the container is known to meet these criteria, it will be taken into the sample preparation room. The samples shall then be placed in the previously described storage safe until ready for analysis. The shipping containers shall be monitored inside and out and, if necessary, decontaminated to below 200 mr/hr beta-gamma and 10 DPM per 100 square centimeters alpha. Containers and packing material which cannot be decontaminated shall be discarded as hot waste for burial at an approved burial site.

b. Processing of Material

Analyses involving two types of special nuclear materials shall be carried out. These are (1) isotopic analysis of enriched uranium, and (2) trace analysis for enriched uranium using U-233 as an internal standard.

(1) Enriched Uranium

Laboratory coats shall be worn or preparation of these samples. Respirators, coveralls, booties, surgeon caps, and rubber gloves shall be available for use when cleaning up spills and other operations where air and surface contamination levels exceed those called out in Section 7.d. Samples in batches not to exceed ten (10) samples shall be removed from the storage cabinet and taken to the chemical hood. (Individual samples as received will ususally not exceed 1.0 gram contained uranium.) Appropriate aliquots (0.05 to 0.25 gram) will be removed from the sample container for purification. The unused sample shall be returned to the storage safe. The uranium in the sample aliquots shall be purified by acid fuming, liquid-liquid extraction, ion exchange or electro-deposition. The end product will be a solution of pure uranyl nitrate. This solution shall be transferred to the previously described minimum opening glove box where up to 100 micrograms of the uranyl nitrate will be evaporated to dryness on a tungsten filament. The loaded tungsten filament shall be transferred to the loading hood in the mass spectrometer room in a closed disposable ice cream carton. The filament shall be loaded into the mass spectrometer source for analysis. After the analysis is completed, the spent filament shall be removed from the mass spectrometer and discarded in a covered container for eventual shipment to an approved burial site as non-recoverable waste. The unused sample and any recoverable liquid waste resulting from its

purification shall be salvaged into a polyethylene salvage bottle and returned to the customer for purification and recovery. Shipments of radioactive material shall be made in accordance with all applicable NRC and DOT regulations. Any low level non-recoverable water solutions shall be discarded into a screw cap polyethylene salvage container within the hood. When full, the container shall be analyzed. If the radioactivity level does not exceed the limits called out in Section 7.g., it shall be dumped in the sanitary sewer. If the level exceeds these limits, it shall be concentrated and shipped to a licensed burial site. All solid waste, absorbent paper, and salvage shall be placed in the proper containers and work surfaces decontaminated below the levels called out in Secion 7.d. before proceeding with the next batch of samples.

(2) Trace Uranium

Protective clothing requirements for this operation are the same as those described for enriched uranium. The major difference in this process involves the preparation of the U-233 internal standard. The desired quantity of U-233 shall be weighed out in the glove box in the uranium preparation room. It shall then be dissolved in nitric acid and diluted to a solution concentration of approximately 200 micrograms U-233/ml. Up to 10 aliquots containing 200 micrograms U-233 each shall then be transferred into polyethylene centrifuge tubes. These polyethylene centrifuge tubes shall be capped and transferred to the chemical fume hood. Aliquots of unknown sample containing up to 50 micrograms of enriched uranium shall be added to each beaker. From this point on, the processing is identical to the previously described enriched uranium. The total purified uranium is evaporated to dryness on the filament for analysis in the mass spectrometer. The remaining U-233 standard solution is retained for future use. At no time will the total U-233 content of the box exceed 10 grams.

c. General Procedures

Protective disposable laboratory coats for uranium processing will be discarded whenever monitoring indicates an alpha contamination level greater than 50 DPM per 100 square centimeters. These laboratory coats

will never be worn outside the restricted area

described in Section 7.h.

If, during personnel monitoring, protective clothing is found to be contaminated in excess of the above limits, the following procedures shall be followed. If contamination is not in excess of 1000 CPM, the individual shall proceed to the change area and change clothing, placing the contaminated clothing in the plastic bag provided. If contamination in excess of 1000 CPM is observed, a change of clothing shall be brought to the individual in the sample preparation room. Any persoal clothing with contamination of less than 5000 CPM shall be placed in a plastic bag for special laundering and monitoring. Clothing contaminated in excess of 5000 CPM shall be placed in a plastic bag and sealed for eventual shipment to a licensed burial site. An immediate check of the preparation room shall be performed to determine the source of the contamination whenever contaminated clothing in excess of 50 DPM per 100 square centimeters is observed.

Respirators shall be made readily available to all personnel. Respirators shall be worn during box glove changes, hood filter changes, in the event of any uranium spill outside the chemical hoods or glove boxes, or whenever the routine or special air sample checks indicate and airborne radioactivity concentration above the maximum permissible concentration for uranium in a restriced area as specified in 10 CFR, Part 20, Paragraph 20.103. In general, respirators shall be selected, stored, maintained and used pursuant to Regulatory Guide 8.15.

Samples shall be processed in batches as previously described. All salvage and cleanup operations shall be completed for one batch before the next batch is started. A portable alpha survey meter will be placed in the uranium preparation area, and another in the mass spectrometer room to permit immediate checking of hands, gloves, equipment, and work surfaces when required.

d. Radiation Surveys

Eight (8) permanent air sampling stations are provided, as described in Section 6.d. The air sampling stations shall be in operation whenever personnel are working within the Restricted Area. The filter heads are changed and the filers analyzed on a weekly basis. The sampling head flow rate shall be measured and adjusted weekly, and corrections for accumulative flow rate loss shall be applied pursuant to Regulatory Guide 8.24, Section C.1.3.. Maximum airborne radioactivity levels shall not be permitted to exceed 1×10^{-10}

461440

microcuries per ml, the maximum permissible concentration for Uranium-235 in Title 10, CFR, Part 20, Appendix B. Respirators shall be required for any emergency, such as a spill where levels in excess of these limits are known to exist for short periods of time. Any operation such as a new operation, bag or glove change, which could result in exceeding these limits shall be monitored with the portable air sampler.

Air samples of the effluent air from the hot lab exhaust system shall be taken at least once a week over an 8 hour work day to assure that the airborne radioactivity in the effluent air does not exceed 4 x 10^{-12} μci/ml for uranium-235 as stated in Title 10, CFR, Part 20, Appendix B.

Weekly smears of all floors and working surfaces shall be taken. Fixed and removable aplha contamination levels shall be held to the lowest possible level, but removable alpha contamination levels shall not be permitted to exceed 200 DPM per 100 square centimeters in any case. Smears shall be scheduled so that they are taken just before the weekly scrubbing. All scrub water shall be dumped into the hot lab sink for transfer to the holding tank to guarantee that no effluent can be released without first being analyzed. The scrub equipment used in this area shall not be used for other areas of the facility.

The radiation survey program shall be implemented in accordance with the "as low as is reasonably achievable" (ALARA) philosophy, and with reference to Regulatory Guides 8.10 and 8.25.

Permanent records of the results of all radiation surveys shall be maintained.

e. Personnel Monitoring

All personnel working in the Restricted Area shall be required to wear film badges. These badges shall be changed and evaluated on a monthly basis. Bioassays by urinalysis will be performed pursuant to Regulatory Guide 8.11 for Restricted Area employees initially upon employment, quarterly thereafter, and upon termination of employment. Additional bioassays shall be requested if there is reason to suspect high exposure. Examples of incidents requiring additional bioassays are spills, high air counts, and cuts while handling special nuclear materials. Permanent records of the results of these surveys shall be maintained for each individual.

Monitoring meters shall be provided in the locations

previously described in Section 6.b. Alpha survey meters are used at these stations. Personnel shall be required to monitor their protective clothing whenever leaving the sample preparation room for the mass specrometer room. Personnel shall be required to monitor their personal clothing and all exposed areas of the body whenever leaving the restricted area as designated in Section 7.h. for other areas of the building.

Contamination levels of personal clothing shall not exceed 50 DPM per 100 square centimenters. Contamination levels on skin shall not exceed 0 DPM per square centimeters. Decontamination of skin shall be done in accordance with Regulatory Guide 8.24, Section C1.6..

f. Decontamination of Equipment

No equipment or materials shall be removed from the restricted area described in Section 7.h. unless monitored by the Radiation Safety Officer or his assistant and found to have less than 50 DPM per 100 square centimeters total fixed and removable alpha contamination. All waste material to be shipped to a licensed disposal site shall be monitored and inspected by the Radiation Safety Officer or his assistant. No such materials shall be removed from the restricted area unless accompanied by a signed statement from the Radiation Safety Officer or his assistant that the packaging and contamination levels conform to standards established by the DOT and Title 10, CFR, Part 20. Release of any equipment or material for unrestricted use shall be in accordance with Annex A "Guidelines for Decontamination of facilities and Equipment Prior to Release for unrestricted Use or Termination of Licenses for Byproduct, source or Special Nuclear Material," dated November 1976.

g. Waste Disposal

As previously described, the laundry water and hot lab sink waste shall be held in the holding tank. When full, the contents of the holding tank shall be analyzed on the previously described proportional gas flow counter. If the total alpha activity of the holding tank does not exceed 3×10^{-5} microcuries per ml, the maximum permissible concentration for u[illegible]-235 in Title 10, CFR, Part 20, Appendix B, the c[illegible]s of the tank shall be released into the sanitary [illegible]. This material shall be further diluted by a factor of 10 to 1 by a quantity of water released into the sewer by the applicant. A permanent record of the results of these analyses will be maintained.

All non-recoverable waste which exceeds the contamination levels permissible for uranium-235 established by Title 10, CFR, Part 20 shall be packaged and shipped to a NRC approved burial site for disposal. The packaging and shipping of this waste shall be in accordance with all applicable NRC requirements of 10 CFR, including Parts 19 through 71, all applicable DOT requirements of 49 CFR, including Parts 170 through 179, and pursuant to I E Bulletin No. 79-19.

h. Restricted Area

The instrument room and the hot lab area shall be designated as the "Restricted Area". The applicant limits access to this area to authorized personnel only. These areas are posted in accordance with 10 CFR, Parts 19 and 20.

i. Security Against Unauthorized Use of Special Nuclear Materials

All uranium samples shall be stored in the previously described storage safe. The cabinet shall be locked except when samples are being transferred. The sample preparation hot lab is locked except when under the surveillance of authorized laboratory personnel. Keys and combinations to the storage safe and sample preparation room shall be maintained only by laboratory supervision. The Restricted Area is also locked with NRC approved combination locks during off-shift hours to prevent unauthorized entry.

j. Indoctrination Procedures

Copies of the Isotopic Analysis, Inc., Standard Procedures for Radiation Safety, individual processing procedures, fire fighting and emergency procedures, and selected reading topics describing general procedures for handling radioactivity shall be required reading for all new personnel assigned to this area. Annual reviews and audits of all procedures assure periodic reinstruction of all personnel. Records of all audits shall be maintained.

k. Fire and Emergency Procedures

To limit the likelihood of fires, all flammable organic solvents shall be stored in one specific metal storage cabinet. No combustible materials shall be stored in the chemical hoods or glove boxes. Most of the material received will not be in metallic form. However, the following procedures have been established for handling metal. Total uranium metal content in a hood shall be limited to 3 grams in individual and separated aliquots of 0.3 grams. All metal shall be

handled in platinum crucibles which shall contain the metal in the event of fire.

The following emergency procedures shall be adopted in the event of a major spill or fire within the process area:

(1) Shut down all exhaust fans within the immediate laboratory area. (This is done with either of two master switches located within the area as shown on Drawing 1.)

(2) Evacuate the preparation area.

(3) Notify the Radiation Safety Officer and seal off the area to prevent unauthorized entrance. (An emergency call list is posted on the door outside the restricted area and at the event of an emergency, this list contains the names, addresses, and telephone numbers of the members of the damage control team and the order in which they are to be called.)

(4) A damage control team under the direction of the Radiation Safety Officer will re-enter the area, if safe, to combat the emergency. Personnel assigned to the damage control team have been instructed in the methods of fighting fires and warned of the dangers involved in pressurizing glove boxes and hoods with extinguishing agents. Because of the small quantities of metal involved, fire control efforts of metal fires will be directed primarily to isolating the material rather than extinguishing it.

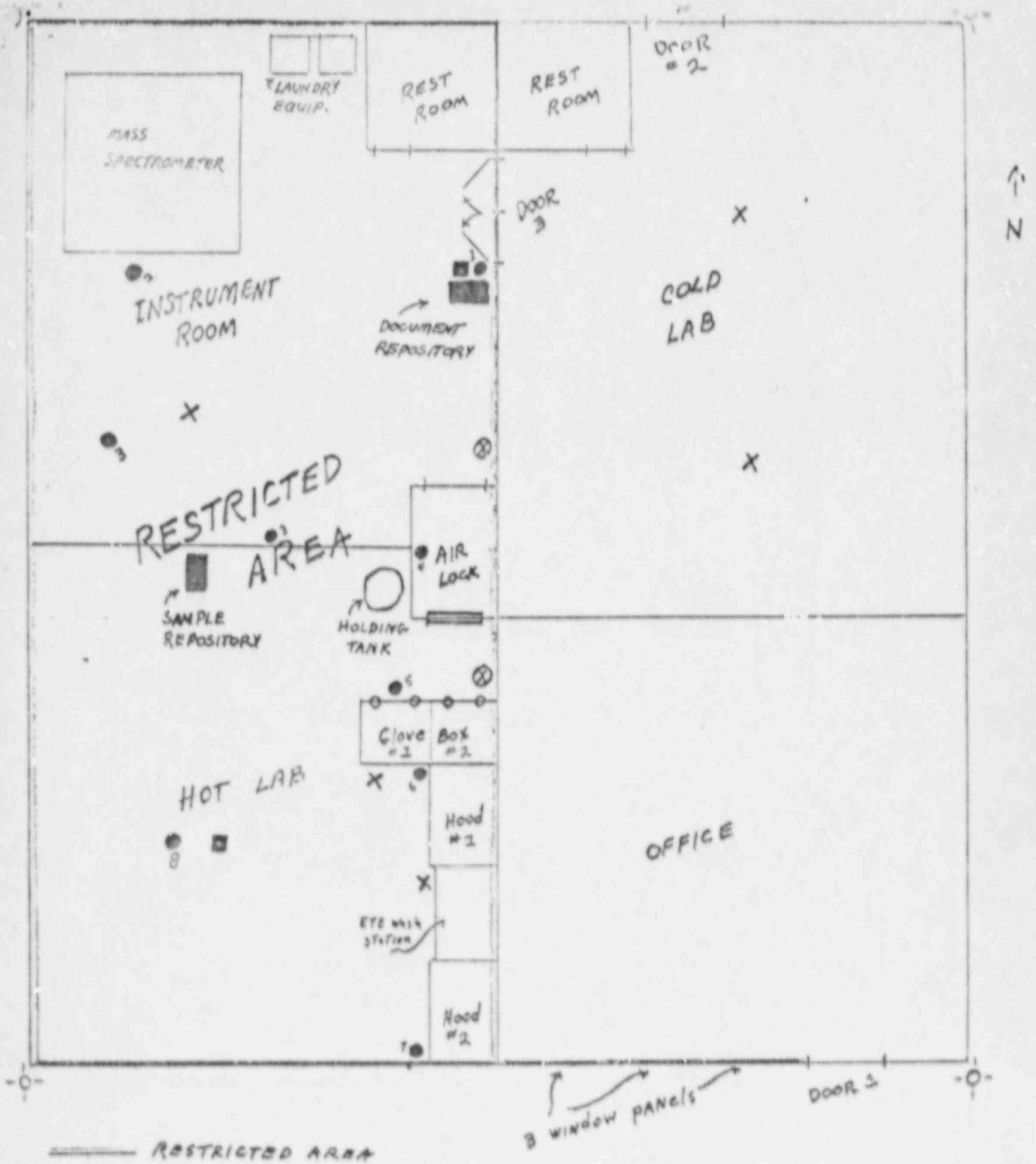
Copies of the emergency procedure are provided to local fire fighting and police rescue units. Members of the local fire department and police rescue units have been guided through the facility and the potential hazards discussed with them.

1. Radiation Safety Officer - Duties and Responsibilities

The Radiation Safety Officer shall be responsible for all operations related to radiation safety, including but not limited to the following:

1. Personnel indoctrination and training in areas related to radiation safety.
2. Operation and calibration of radiation protection equipment and instrumentation.
3. Operation of ventilation and air filtration systems.
4. Radiation Surveys.
5. Personnel monitoring.
6. Fire and emergency procedures.

7. Waste disposal.
8. Effluent monitoring.



DRAWING #1

isotopic analysis, inc.
8335 E. 51st St.
Tulsa, OK 74145

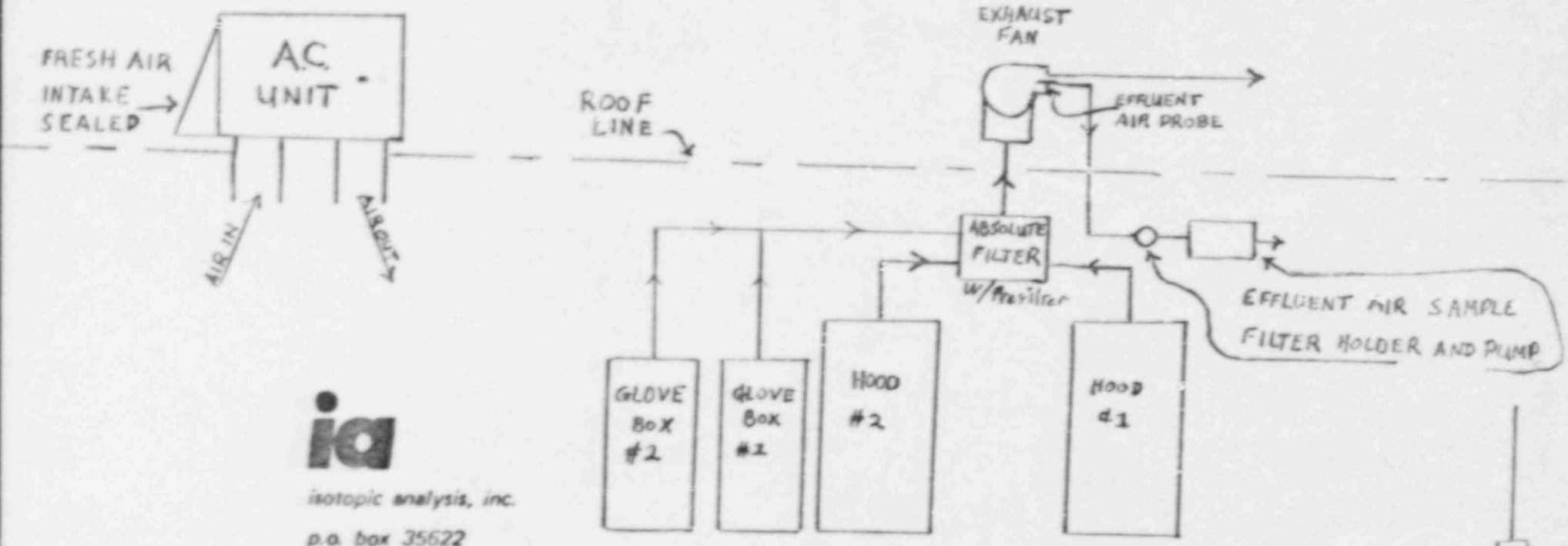
46/46

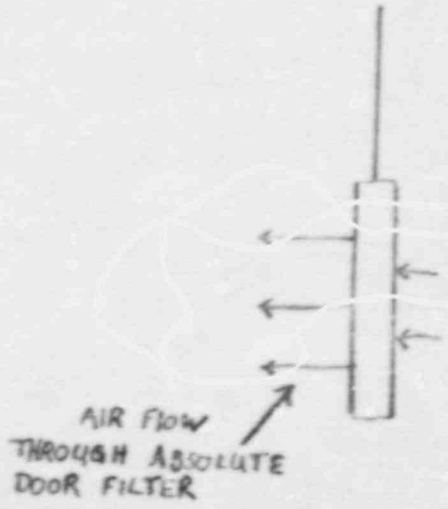
EAST 51ST Street

DRAWING #2

HOT LABORATORY EXHAUST SYSTEM

EQUIPMENT:
Exhaust fan: Barry Blower #609 2900CFM
6.2" SP @3200 RPM
Filter: Cambridge #1E-990 absolute with
Air Kontrol #MP-40 pre-filter
Filter Box: Cambridge #SABD 24X24
sidelock housing.





isotopic analysis, inc.
p.o. box 35622
tulsa, ok. 74135

HOT LABORATORY
EXHAUST SYSTEM SCHEMATIC