MS16
P8

Committed To *Your* Success
06-30139-01

Severn Trent Laboratories
200 Monroe Turnpike
Monroe CT 06468
Tel: (203) 261-4458
Fax: (203) 268-5346

October 26, 1998

Ms. Judith A. Joustra
Nuclear Materials Safety Branch 3
US Nuclear Regulatory Commission, Region 1
475 Allendale Road
King of Prussia, PA 19406

Re: **Docket No. 030-33496**
Control No. 126081

Dear Ms. Joustra:

Severn Trent submits the following in response to your letter of October 6, 1998. The items numbers referenced are corresponding to the numbers of your letter.

Item No. 1:

As required, a Decommissioning Funding Plan that covers the costs of decommissioning both the Whippany, New Jersey and Monroe, Connecticut sites is enclosed.

Item No. 2:

A more detailed description of Mr. Nielson's training and experience that qualifies him to become the radiation safety officer for this license is enclosed.

Item No. 3:

Please modify the request for radionuclide usage to the following:

6. Byproduct, Source and/or Special Nuclear Material	7. Chemical/ Physical Form	8. Possession Limit
A. Hydrogen 3	Any	100 millicuries total: Not to exceed 25 millicuries at the Monroe, CT site

Designated "Official Record Copy"
Date 2/9/2001

Other Laboratory Locations:
- 149 Rangeway Road, North Billerica MA 01862
- 16203 Park Row, Suite 110, Houston TX 77084
- 120 Southcenter Court, Suite 300, Morrisville NC 27560
- 315 Fullerton Avenue, Newburgh NY 12550
- 11East Olive Road, Pensacola FL 32514
- Westfield Executive Park, 53 Southampton Road, Westfield MA 01085
- 628 Route 10, Whippany NJ 07981

a part of
Severn Trent Services Inc

126081
OCT 27 1998

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B. Any radioactive material with atomic number between 3 and 83	Any	200 millicuries total; No single isotope to exceed 10 millicuries at each site; not to exceed 20 millicuries total at the Monroe, CT site.
C. Nickel 63	Sealed sources	Up to 15 millicuries each, up to 15 sources at each site.
D. Barium 133	Sealed sources	Up to 20 microcuries, one source at Whippany NJ.
E. Any Special Nuclear Material	Any	10 microcuries at Whippany, NJ site only.
F. Any Byproduct Material with atomic number between 84 and 103 {Material will be in the form of environmental (Soil, Water) contaminants from accelerator produced waste.	Any	*100* microcuries at each of the Monroe, CT & Whippany, NJ sites.
G. Any Source Material	Any	10 millicuries total.
H. Americium 241	Standard solutions	Not to exceed 1 microcurie per source and 10 microcuries total.

If you have any questions regarding this amendment request, please contact Mr. Michael Bonomo at (203) 452-3253. Your help in expediting this matter would be appreciated.

Sincerely,

Michael V. Bonomo, General Manager
Severn Trent Laboratories

MVB:mjv

Attachment

DECOMMISSIONING FUNDING PLAN

FOR

SEVERN TRENT LABORATORIES

Nuclear Regulatory Commission License No. 06-30139-01

Prepared by

TELEDYNE BROWN ENGINEERING
Environmental Services

50 Van Buren Avenue

WESTWOOD • NJ • 07675

OCTOBER 1998

Table of Contents

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1.0 General Information & Overview

Severn Trent Laboratories
200 Monroe Turnpike
Monroe, Connecticut 06468

Severn Trent Laboratories
628 Route 10
Whippany, New Jersey 07981

Nuclear Regulatory Commission License No.: 06-30139-01

Contact: Erik C. Nielsen
Phone: (973) 428-8181

This document includes:

- A discussion of expected methods for performing the decommissioning of the facility.
- A description of the site and a discussion of its history.
- A project timetable.

2.0 Description of the Planned Decommissioning Activities

2.1 Decommissioning Objectives, Activities, Tasks, & Schedules

2.1.1 Decommissioning Objectives & Activities

The objective is to reduce radioactive contamination levels to below those specified in the Nuclear Regulatory Commission document "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 April, 1993. The activities that need to be performed include the following:

1) Characterization surveys to determine the extent of residual activity.

2) Decontamination, dismantling, demolition and/or packaging of contaminated objects & wastes from decontamination activities.

3) Arrange for the disposal of any radioactive items that cannot be decontaminated and any radioactive waste produced as a result of the decommissioning activities.

4) A final survey for compliance with the above referenced document.

2.1.2 Site History and Description

Severn Trent Laboratories obtained the laboratories previously owned and occupied by IEA, Inc. in both Monroe, Connecticut and Whippany, New Jersey.

Monroe, Connecticut

The Monroe site has been occupied by Severn Trent Laboratories and its predecessors since the building was completed in 1984. Severn Trent occupies approximately 17,000 square feet out of 28,000 total square feet in the building. The lab is equipped to analyze environmental samples for chemical contamination. In 1995, a radioactive materials license was obtained to allow analysis for chemical contamination in samples that may have been contaminated with radioactivity. All laboratory areas could have samples that have some level of radioactivity. This accounts for about 12,000 square feet.

Since the inception of the radioactive materials license in 1995, only about a half dozen projects have actually been performed that involved radioactive samples, and no samples showed significant activity levels. No samples are anticipated to be received with significant radioactivity levels. Based on this information, no major decontamination work is expected to be required.

2.1.2 Site History and Description

Whippany, New Jersey

Severn Trent occupies an approximately 15,000 square feet facility in Whippany, New Jersey that has been in operation since 1986. This lab is also equipped to analyze environmental samples for hazardous materials and was included on the radioactive materials license that was obtained in 1995. Only a few projects have been completed that involved minimal levels of radioactivity.

The license is being amended to allow more extensive radiochemistry to be performed at this site. All activities that were formerly performed at the Severn Trent Laboratories facility in North Carolina are being relocated to the Whippany site. Therefore, it is anticipated that one complete lab will need to be decontaminated at the time of decommissioning. The total area where radioactive samples could be used is about 12,000 square feet.

2.1.3 Procedures

The procedures that will be used will conform with NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination".

2.1.4 Schedules

The sequence of activities is as follows. The time allotted is from the beginning each activity:

Description of Activity	Monroe, CT	Whippany, NJ
1. Final Preparation of Decommissioning Plan	0.2 weeks	0.2 weeks
2. Disposal of accumulated waste	1 week	1 week
3. Surveys of the affected laboratories	0.8 weeks	0.8 weeks
4. Decontamination of affected labs	0.2 weeks	1 week
5. Disposal of the waste produced by decommissioning activities	0.2 weeks	0.5 weeks
6. Final surveys of decontaminated labs	1 week	1 week
Total time for decommissioning	3.4 weeks	4.5 weeks

2.2 Decommissioning Organization and Responsibilities

The person responsible for supervising the Decommissioning Plan is Erik C. Nielsen. He will be assisted by Joel Antkowiak of Teledyne Brown Engineering - Environmental Services. Resumes can be found as Attachments A and B. They will be responsible for every aspect of the Plan. If either of these persons are unavailable at the time of the decommissioning, persons with similar experience and qualifications will be used. Further personnel descriptions can be found in sections 2.3 Training and 2.4 Contractor Assistance.

2.3 Training

Teledyne Brown Engineering - Environmental Services personnel have been trained in accordance with their Radiation Safety Code & Quality Control Manual. In addition, all personnel supplied by Teledyne Brown Engineering - Environmental Services that will wear respirators, will have had respirator training. Included in this training is the use and care of full face air purifying respirators and Self-Contained Breathing Apparatus (SCBA). If any new procedures are developed for use during the Decommissioning Plan, personnel will be trained accordingly prior to the implementation of the new procedure. Teledyne Brown Engineering - Environmental Services personnel have also completed the 40-hours of training specified in the OSHA regulations found in 29 CFR 1910.120, as well as the required 8 hour refresher training.

2.4 Contractor Assistance

Throughout this Plan, Severn Trent Laboratories will rely on the expertise provided by Teledyne Brown Engineering - Environmental Services. A team of one Health Physics supervisor and one or more Health Physics technicians will be used for on-site work. Waste removal operations, if pertinent, will be performed by a Radwaste Supervisor and a Health Physics technician.

All on-site operations will be conducted under the Severn Trent Laboratories' Nuclear Regulatory Commission license and the off-site radwaste operations will be performed under Teledyne Brown Engineering - Environmental Services U.S. NRC License No. 29-00055-14. Laboratory analyses and material handling other than radwaste will be conducted under Teledyne Brown Engineering - Environmental Services U.S. NRC license No. 29-00055-06.

Contractor Information:

Teledyne Brown Engineering
Environmental Services
50 Van Buren Avenue
Westwood, NJ 07675

Joel Antkowiak, Health Physics Supervisor
201-664-7070 x229

3.0 Description of Methods Used for the Protection of Occupational and Public Health and Safety

3.1 Ensuring that Occupational Exposures are As Low As Reasonably Achievable

All activities will be conducted in a manner which will keep exposures to personnel and the environment as low as reasonably achievable. There is little chance of an occupational exposure in excess of 10% of the limits to radiation workers based on the history of the facility. In addition, when taking into consideration whether an item should be decontaminated or disposed, more weight will be given to the disposal option where the costs are roughly equivalent.

3.2 Health Physics Program

During any dismantling or demolition operations, Health Physics monitoring will include whole body TLD badges, urinalyses of radiation workers, air sampling for particulates, and the frisking of workers in and out of the exclusion zone . Smears will be taken around the exclusion zone at the end of each day that such activities are performed.

All decontamination, dismantling, demolition and/or packaging of contaminated objects and wastes from decontamination activities will be performed by Teledyne Brown Engineering - Environmental Services personnel.

Air samples will be taken if any operations generate dust and they will be analyzed by the method most appropriate for the suspected radionuclides. If levels greater than 10% of the DAC are observed, personnel will be required to wear full face respirators fitted with radionuclide cartridges, and disposable coveralls, boots, and gloves.

3.3 Contractor Personnel

See Sections 2.3 and 2.4.

3.4 Radioactive Waste Management

The packaging of all radioactive waste will be performed by Teledyne Brown Engineering - Environmental Services personnel.

4.0 Planned Final Radiation Survey

All compliance surveys will consist of radiation monitoring of the walls, equipment, floor and dust collecting surfaces following the guidelines set forth in NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination". Direct radiation surveys will be conducted with an Eberline Model PAC-4G-3 gas proportional survey meter (or equivalent) with a 50 cm^2 probe and 200 cm^2 floor monitor will be used to detect low energy beta radiation. Removable radioactive contamination surveys will consist of smear samples taken by wiping approximately 200 cm^2 of surface area with an absorbent material at representative areas of the facility. Diagrams will be provided to identify where smear samples were taken. Smear samples will be analyzed by liquid scintillation counting, or gross alpha or gross beta analysis, with standards traceable to the National Institute of Standards and Technology.

Also see section 3.2.

5.0 Physical Security Plan and Material Control And Accounting Plan Provisions in Place During Decommissioning

Due to the levels of activity allowed on this license and the security already in place to prevent unauthorized access to the facility, no additional precautions for security will be implemented during decommissioning activities. Currently, site security is maintained by manpower supplied at the main entrance to the building and also at the loading dock of the facility. All other doorways are for emergency exit only.

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ATTACHMENT A

RESUMES OF
SEVERN TRENT LABORATORIES
RADIATION SAFETY PERSONNEL

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ATTACHMENT B

RESUME: JOEL ANTKOWIAK

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RESUME

TELEDYNE BROWN ENGINEERING
Environmental Services

Joel Antkowiak - Health Physics Supervisor

Employment History
June 1990 - Current

TELEDYNE BROWN ENGINEERING - Environmental Services

Health Physics Technician Assumed the responsibility for the radiation safety surveys and resultant reports for over two hundred commercial labs each month. In addition, he performed numerous surveys of analytical, diagnostic and industrial x-ray equipment to determine compliance with state regulations.

Joel calibrates portable radiation detection equipment and counting systems using NIST traceable radioactive sources and a pulse generator. He has extensive experience in final site surveys, decontaminating & decommissioning laboratories, and HEPA filter replacements. He has also performed preliminary surveys of facilities prior to developing Decommissioning Funding Plans and Cost Estimates.

As a Project Supervisor, Joel is responsible for all the health physics duties when at specific job sites, including the health and safety of the technicians working on the job.

5/85 - 1/88

SINGER-KEARFOTT GUIDANCE & NAVIGATION DIVISION

Quality Assurance Engineer - Mr. Antkowiak's responsibilities included calibration and maintenance of spectrometers and radiometers. He used these instruments to calibrate Star Background Simulators. He was also responsible for the installation of the simulators in the field.

Education & Training

New York University
Tuxedo, NY
M.S. Environmental Health Science, May 1996

University of Pittsburgh
Pittsburgh, PA
B.S. Physics, April 1985

In February 1994, Mr. Antkowiak successfully completed a course entitled "Procedures and Practices for Asbestos Control" given by Centers for Education & Training of the Environmental and Occupational Health Sciences Institute (EOHSI) allowing him to perform asbestos related abatement projects.

In addition to one month's supervised on-the-job training at Teledyne Isotopes, he received formal training on the selection and use of air-purifying and supplied air respirators, the handling and transporting of radioactive material, and air sampling for radioactive contaminants. Joel has also received formal training in the operation of Packard Liquid Scintillation Counters.

In August of 1990 he satisfactorily completed a J J Keller course to become certified to transport hazardous waste in New Jersey and Maryland. This includes vehicle operation, emergency notification procedures as well as proper handling and manifesting of hazardous waste.

Mr. Antkowiak has also satisfied the OSHA 40 hour training requirements found in 29 CFR 1910.120, as well as 8 hour refresher course for 1996. In November of 1995, Mr. Antkowiak successfully completed the OSHA 8 hour supervisor's training.

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RESUME

TELEDYNE
BROWN ENGINEERING
Environmental Services

Joel Antkowiak - Health Physics Supervisor

Project Experience February - March 1993	Joel worked several weeks on-site as a health physics technician when TBE-ES was contracted by Schering Plough to perform the decontamination and final site surveys for their main pharmaceutical research facility in Bloomfield, NJ. The decontamination effort entailed the removal of the concrete floor in several radiochemistry laboratories using jack-hammers; the removal of several fume hoods and their associated ductwork; the removal of many areas of bench top; and the removal of several cabinets. The concrete was packaged in 55-gallon steel drums, while the other materials were packed in large metal containers, mostly B-25's. Metal wastes were sent to a radioactive waste processor to be melted, while all other wastes were sent to the low-level radioactive waste burial facility in Barnwell, SC.
May 1993	Joel worked several weeks on-site as a health physics technician when TBE-ES provided decontamination and decommissioning services to Ciba-Geigy Corporation in Summit, NJ. This project entailed identification and decontamination of affected areas and the final decommissioning survey of all radioisotope use areas in Buildings J, V and Z. All laboratories were surveyed because of a lack of suitable records to support the idea that radioisotopes were never used in those areas. In addition, many unaffected areas, such as the library and restrooms, were surveyed to confirm that no contamination had spread throughout the building.
September 1994 through January1995	TBE-ES provided decontamination and decommissioning services to Ciba-Geigy Corporation in Ardsley, NY. This project also entailed identification and decontamination of affected areas and the final decommissioning survey for all radioisotope use areas. All other laboratories were surveyed because of a lack of suitable records to support the concept that radioisotopes were never used in those areas.
July 1996 - August 1996	Supervised the final site decommissioning of the DuPont - Merck Pharmaceutical Company's facility in Glenolden, Pennsylvania. This project also entailed identification and decontamination of affected areas and the final decommissioning survey for all radioisotope use areas.
August 1996 - September 1996	Supervised the final site decommissioning of the Ciba - Additives facility in Ardsley, New York. This project also entailed identification and decontamination of affected areas and the final decommissioning survey for all radioisotope use areas. Due to the uncertainty in recordkeeping, every room of 2 buildings were surveyed.
October 1996 - February 1997	Supervised the decommissioning and decontamination of three radioactive hot labs at the Bristol Myers facility in Syracuse, New York.
	In addition, Joel has worked on and supervised numerous small projects. These range from performing industrial x-ray surveys to identifying the isotopes in waste materials and quantifying their activity by using a multichannel analyzer.

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TELEDYNE
BROWN ENGINEERING
Environmental Services

ATTACHMENT C

TELEDYNE BROWN ENGINEERING

ENVIRONMENTAL SERVICES

RSC&QCM PERTINENT SECTIONS

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II-8.0 RADIOACTIVE WASTE PACKAGING & DISPOSAL

Radioactive waste materials are disposed of by the Radiological Services Department in accordance with all federal, state and local regulations. The generators of the waste are trained in the proper method of packaging the waste and then tested on their knowledge to ensure compliance. The materials will be packaged using the "Classification of Radioactive Waste to be Packaged for Shipment" as a guide, and in conformance with the "Packaging Procedure for Radioactive Waste".

II-8.1 Safe Packaging of Radioactive Material - Training and Retraining

Any person engaged in the preparation of waste for disposal must be properly trained in all the DOT, NRC and burial site requirements for proper packaging. The training program is as follows:

8.1.1 Each person is given a copy of the current Radiation safety Code and Quality Control Manual. He is to study these procedures (II-8.2 and II-8.3) and then be tested on his knowledge of the material using Form IWL-RW-231, "Packaging of Radioactive Waste Examination".

8.1.2 Subsequent to the examination, each person will be physically supervised in the proper classification and packaging of waste in his area. Using Form IWL-RW-206, the supervisor will document such on-the-job training.

8.1.3 When the supervisor is satisfied the person has demonstrated a complete understanding of the procedures, he will notify the Radiation Safety Officer, who will authorize the individual to perform these procedures unsupervised and will document this on Form IWL-RW-206.

8.1.4 Retraining of the individual in the most current DOT, NRC, and burial site packaging requirements is to be performed at a maximum one year interval unless significant changes require immediate review. Retraining and review will be documented using Form IWL-RW-206, or by filing a memorandum in each trainee's training folder.

II-8.2 Classification of Radioactive Waste to be Packaged for Shipment

8.2.1 Characteristics of Material to be Packaged

- Isotope
- Activity (mCi)
- Physical State (solid, liquid, vials, carcasses, biological matter or gas)
- Concentration (mCi/gram)
- A1, A2 Values
- Form (Normal or Special)
- 10CFR Part 61 Class A, B, C Stable or Unstable
- Chemical Form

8.2.2 Proper Shipping Name and UN ID Number

- Radioactive Material, Excepted Package - Limited Quantity of Material, n.o.s. (UN2910)
- Radioactive Material, Low Specific Activity or LSA, n.o.s. (UN2912)
- Radioactive Material, n.o.s. (UN2982)
- Radioactive Material, Special Form, n.o.s. (UN2974)
- Radioactive Material, fissile, n.o.s. (UN2918)
- Radioactive Material, Excepted Package - Instruments *Or* Articles (UN2910)
- Uranyl Nitrate, solid (RQ-100 lbs.) (UN2981)

8.2.3 Determination of Shipment Specification

- What specification container is required.
- What labels are required.
- Whether a security seal is needed or not.
- mR/hr limits @ contact.
- Additional requirements.

II-8.3 Packaging Procedures for Radioactive Waste

8.3.1 General - All radioactive waste packaging procedures are in compliance with the current applicable regulations and license criteria of the respective processor or burial site to whom the package is intended. These procedures can be found as a separate document entitled, "Teledyne Brown Engineering - Environmental Services Radioactive Waste Packaging Procedures."

II-8.4 Radioactive Waste Interim Storage Plan

Radioactive waste will be placed into interim storage only if disposal is not available. As disposal is currently unavailable to facilities in NJ, it will be stored until it can economically be shipped off-site for volume reduction processing. After return from processing, the waste will be stored in our radioactive waste storage facility (see NRC License No. 29-00055-14 for details) until disposal becomes available. All interim stored wastes will have a 5 year storage limit (after return from processing). If at that time disposal is not available, we will discuss our options with the U.S. NRC at that time. When disposal becomes available, the materials will be shipped for final disposal within 6 months of that date.

All interim storage wastes will be stored in U.S. DOT approved steel containers. The containers will not be exposed to the weather except during movement to and from the facility. The facility is surveyed weekly for both direct radiation and removable contamination levels. All interim stored wastes will be physically removed from the facility every three months so that each pallet of four drums can be visually inspected. We will have over-pack containers readily available should one be needed.

All other considerations for security and safety of the materials are addressed in our U.S. NRC No. 29-00055-14 license.

II-8.5 Radioactive Waste Disposal by Decay-in-Storage

Radioactive waste containing isotopes with half lives less than 120 days may be held for decay-in-storage. These containers will be segregated and held for a minimum of 10 half-lives. After the decay-in-storage period, the containers will be surveyed to determine if any residual radiation levels remain. If the readings are indistinguishable from background, the container may be disposed without regard to its radioactivity.

5/9/97

SECTION II FORMS

All forms referenced in Section II follow. Forms referenced in Sections I & III can be found at the end of each individual section.

FORM NUMBER	TITLE
IWL-HP-04	Application for Radiation Source
IWL-HP-05	Shipping/Receiving Survey Form
IWL-HP-06	Isotope User Request Form
IWL-HP-07	Basic HP Training Course
IWL-HP-07A	Basic Radiation Safety Training Course for Ancillary Personnel
IWL-HP-08, 08a, 08b, & 08c	Sample Calibration Forms
IWL-HP-18	Radiation Detection Instruments List
IWL-RW-206	Retraining in Regard to Processing Generated Waste
IWL-RW-231	Packaging of Radwaste Exam

DIAGRAMS

Diagram of Warehouse - 103 Woodland Avenue
Diagram of Zones 1 & 2 - 50 Van Buren Avenue
Diagram of Zones 3 & 4 - 50 Van Buren Avenue
Diagram of Zones 5, 6 & 7 - 50 Van Buren Avenue
Diagram of 69 Woodland Avenue (Crystals Bldg.)
Diagram of Degussa Corporation - 3601 South Clinton Avenue, South Plainfield, NJ

TELEDYNE
BROWN ENGINEERING
Environmental Service

APPLICATION FOR RADIATION SOURCE(S)

Name _____ Date _____

Building _____ Position _____

Isotope(s) _____ Telephone Number _____

Quantity(ies) _____ Chemical Form _____

Present Inventory _____ Physical Form _____

Location of Use (Bldg. & Rm.) _____ Location of Storage _____

Proposed use (activity levels, special hazards, method of disposal of wastes, safety measures) Attach supplementary sheet if necessary.

_____

_____

_____

_____

Applicant's training and experience (relevant to use of radioisotopes):

_____

_____

Radiation detection instruments, facilities, and equipment that will be used: _____

_____

The applicant agrees to abide by the letter and spirit of all applicable regulations as recorded in theRadiation Safety Code & Quality Control Manual.

_____

Applicant's Signature

For Use of Health Physics Office Only

Comments of Health Physics Office _____

_____

Decision: _____

Date: _____ Signature _____

Please complete and return with Purchase Request to: Health Physics Office

TELEDYNE
BROWN ENGINEERING
Environmental Service

SHIPPING/RECEIVING SURVEY RECORD

Date Shipped _____ Date Received _____

From _____

To _____

Owner of Transport _____

Type of Package _____

Proper Shipping Name _____

Label Used: I, II, III, N/A

Nuclide	Activity (mCi)	Nuclide	Activity (mCi)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Reading at Contact _____ Reading at 3 ft. _____

Instrument _____ Ser. # _____ Cal. Date _____

Smear Survey (dpm/100 cm^2):

Gross Alpha _____ Gross Beta _____

Package Shipped Properly? Yes _____ No _____

If no, specify problem: _____

Routing:

White: No further Health Physics required
Green: Health Physics survey of inner package required
Blue: Health Physics survey of inner package required
Red: Store in cave (notify Health Physics prior to opening)

White ____ Green ____ Blue ____ Red ____ (Check One)

Surveyed By _____ Date _____

Approved By _____ Date _____

FORM IWL-HP-05 Revised 8/88

ISOTOPE USER REQUEST FORM

TO BE COMPLETED BY EMPLOYEE

Name _____ Social Security # _____

Birth Date _____ Contact Lenses: Yes_____ No_____

Highest Level of Education Completed ____ Teledyne Isotopes Employee # _____

Type of Training	Where Trained	Duration of Training	On the Job		Formal Course	
			Yes	No	Yes	No
a. Principles and practices of radiation protection						
b. Radioactive measurement standardization and monitoring techniques and instruments						
c. Mathematics and calculations basic to the use and measurement of radioactivity						
d. Biological effects of radiation						

EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use

TO BE COMPLETED BY SUPERVISOR

Radiation work for which authorization is sought: _____

Isotopes: _____ Physical & Chemical Form: _____

Activity: _____ millicuries Supervisor Requesting Authorization: _____

Safety Glasses Required: Yes ___ No ___

Safety Shoes Required: Yes ___ No ___ Date: _____

RAD. SAFETY OFFICE USE ONLY

Health Physics Comments _____

TLD Badge Required: Yes ___ No ___ Bioassay Required: Yes ___ No ___

Type _____ Analysis _____ Frequency _____

Authorization Date _____ By _____

Radiation Safety Officer

COPY DISTRIB.

Health Physics _____ Supervisor _____ TLD Badge Service _____

Original to Personnel Department _____ Chemical Safety Trainer _____

Form IWL-HP-06 (Rev. 9/91)

RSC/QCM 4.80

Date Approved

Rev'd

TELEDYNE
BROWN ENGINEERING
Environmental Service

BASIC HEALTH PHYSICS TRAINING COURSE

Name _____ Length of Course _____

Presented by _____ Test _____

Course Outline

I. Introduction

- A. Electromagnetic Spectrum
- B. Ionizing Radiation
  - 1) Alpha
  - 2) Beta
  - 3) Gamma
  - 4) X-rays

II. History of Uses

- A. Consumer Reports
- B. Medical
- C. Industry

III. Nuclear Constituents, Properties & Production

- A. Alpha Particles
- B. Beta Particles
- C. Fission
- D. Gamma & X-rays

IV. History of the Atom

- B. Modern Theory
- C. Application for Radiation

V. Radiation Protection

- A. Monitoring Instrumentation
  - 1) Film Badges
  - 2) Thermoluminescent dosimeters
  - 3) Portable survey meters
  - 4) Bioassay
- B. Effects
  - 1) Chemical change
  - 2) Biological
  - 3) High doses
  - 4) Low doses
  - 5) Incidence of disease
- C. Cause & Effect Relationships
- D. Risk Assessment
- E. Regulations
  - 1) ICRP
  - 2) NCRP
- F. Organizational Groups
- G. Prenatal Exposure: Regulatory Guide 8.13

I have received the training outline above, read the Radiation Safety Manual and Regulatory Guide 8.13 "Instruction concerning Prenatal Radiation Exposure", and understand its implications. Any questions I may have had were answered to my satisfaction.

Employee's Signature _____ Date _____

Remarks _____

TELEDYNE
BROWN ENGINEERING
Environmental Services

BASIC RADIATION SAFETY TRAINING COURSE FOR ANCILLARY PERSONNEL

Name _____ Length of Course _____

Presented by _____ Test N/A

Course Outline

I. Introduction

A. Electromagnetic Spectrum

B. Ionizing Radiation
1) Alpha
2) Beta
3) Gamma
4) X-rays

II. History of Uses

A. Consumer Reports

B. Medical

C. Fission

D. Gamma & X-rays

III. Radiation Protection

A. Postings

B. Warning Signs & Labels

C. What to do in an Emergency

D. Effects
1) Chemical change
2) Biological
3) High doses
4) Low doses
5) Incidence of disease

E. Prenatal Exposure
Regulatory Guide 8.13

I have received the training outline above and read Regulatory Guide 8.13 "Instruction concerning Prenatal Radiation Exposure", and understand its implications. Any questions I may have had were answered to my satisfaction.

Trainee's Signature _____ Date _____

Remarks _____

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE (mR/hr)	CALIBRATION POINT (millirem per hour)	READING (millirem per hour)

Calibration points were determined with a Victoreen Condenser R-meter with a calibration traceable to the National Institute of Standards and Technology

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE	CALIBRATION POINT (microrem per hour)	READING (microrem per hour)
	(counts per minute)	(microrem per hour)

Calibration points were determined with the pulse generator and a Victoreen Condenser R-meter with a calibration traceable to the National Institute of Standards & Technology.

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE	CALIBRATION POINT (counts per minute)	2 Pi READING (counts per minute)	EFFICIENCY (percent)

Calibration points are taken from electroplated disk sources with certification traceable to the National Institute of Standards and Technology.

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

CERTIFICATE OF CALIBRATION

CALIBRATED FOR:

MODEL No.: SOURCE USED:

SERIAL No.: SOURCE ID#:

RANGE	CALIBRATION POINT (counts per minute)	READING (counts per minute)

Calibration points were determined with an electronic pulse generator.

CALIBRATED BY: *DATE:*

APPROVED BY: _____ *DATE:* _____

SPECIAL NOTES:

RADIATION DETECTION INSTRUMENTATION

TELEDYNE BROWN ENGINEERING Environmental Services

The following instruments are currently available for field use or laboratory counting:

MANUFACTURER'S NAME	DESCRIPTION	MODEL NO.	NO. AVAILABLE.	TYPE RADIATION DETECTABLE	RANGE	WINDOW THICKNESS	USE
Eberline	Lin-Log Gas Proportional	PAC-4G	3	alpha	0-500,000 cpm	Aluminize Mylar	Surveying
Eberline Surveying	Alpha Counter	FM-4G		beta		0.85 mg/cm^2	Floor
Eberline	Lin-Log Gas Proportional Alpha Counter	PAC-4G-3	1	Tritium beta alpha	0-500,000 cpm	Aluminized Mylar 0.85 mg/cm^2	Surveying
Eberline	Beta-Gamma Survey Meter	E-120	4	alpha beta gamma	0-50 mR/hr	Mica 1.4 to 2 mg/cm^2	Surveying
Eberline	Gamma Radiographic Survey Meter	E-120G	1	gamma	0-1000 mR/hr	none	Surveying
Eberline	Gamma Radiographic Survey Meter	E-130G	3	gamma	0-1000 mR/hr	none	Surveying
Eberline	Beta-Gamma Survey Meter	E-530	1	alpha beta gamma	0-200 mR/hr	Mica 1.4 to 2.0 mg/cm^2	Surveying
Eberline	Beta-Gamma Survey Meter	E-140	2	alpha beta gamma	0-50 mR/hr	Mica 1.4 to 2.0 mg/cm^2	Surveying
Victoreen	Ion Chamber Survey Meter	V-440/V-440RF	2	alpha beta gamma x-ray	0-300 mR/hr	Mylar 1/4 mil	Surveying
Victoreen	Ion Chamber Survey Meter	V-471	1	alpha beta gamma x-ray	0-300 R/hr	Mylar 1.1 mg/cm^2	Surveying
Intertechnique	Liquid Scintillation	SL-30	1	low energy beta	0-1,000,000 total counts	none	Laboratory Counting
Eberline	Mini Scaler Laboratory	MS-2	2	alpha, beta, gamma		0-5000,000	Mylar
					total counts	0.9 mg/cm^2	Counting
Eberline	Alpha Counter	SAC-4	1	alpha	0-1,000,000 total counts	none	Laboratory Counting
Eberline	Alpha/Beta/Gamma Survey Meter/ Scaler	ESP-1	2	alpha	0-50,000 cps	Aluminized Mylar 0.5 mg/cm2	Surveying/ Counting
				beta	0-1000,000 cps	Mica 1.4 to 2.0 mg/cm^2	
				gamma	0-3R/hr	30 mg/cm^2	

RSC/QCM 4.80

Date Approved

Revd: _____ _____

R : _____ _____

TELEDYNE
BROWN ENGINEERING
Environmental Services

RETRAINING OF PERSONNEL
REGARDING PROCESSING OF GENERATED WASTE

DATE: / / INSTRUCTOR:

ATTENDEES: _____

_____

_____

_____

_____

SUBJECT OUTLINE:

TELEDYNE
BROWN ENGINEERING
Environmental Services

Packaging of Radioactive Waste Exam

Section I. Fill in the blanks - 3 points each

1. List 5 characteristics of the waste needed in order to determine the proper U.S. DOT "Proper Shipping Name":

_____ _____

_____ _____

_____

2. List 5 "Proper Shipping Names" typically used for radioactive waste shipments:

_____ _____

_____ _____

_____

3. The radiation limit at contact with the outside of a container cannot exceed _____ mR/hr.

4. Enter the appropriate numbers:

Label	mR/hr limits @ Contact
Radioactive White I	_____ to _____
Radioactive Yellow II	_____ to _____
Radioactive Yellow III	_____ to _____

5. The marking (label) needed on a package of LSA material (exclusive-use) should read _____.

6. The marking (label on a package of Radioactive devices should read _____.

7. The weight is required to be printed on a container when it is in excess of _____lbs., and it is a DOT-7A TYPE A container.

8. List the 6 categories of radioactive waste:

_____ _____

_____ _____

_____

9. Items in different categories_____be mixed.

10. All scintillation vial drums must be lined with a_____ .

11. The amount of absorbant added to any scintillation vial drum must be capable of absorbing _____ the volume of liquid in the drum.

12. Liquid Special Nuclear Material has to be _____ before disposal.

II. True or False (1 point each)

1. _____ All drums which have a Radioactive I, II or III label require security seals.

2. _____ 400 lbs is the maximum weight allowed in a 55-gallon container.

3. _____ Class A Stable is a DOT classification.

4. _____ Two 2-mil liners is an acceptable substitute for a single 4-mil liner.

5. _____ The pH range for acceptable liquids for incineration is 5.0-10.0.

6. _____ Animal carcasses are to be completely surrounded with rock salt and absorbant.

7. _____ Cement is an acceptable solidification media.

8. _____ Ra-226 is acceptable at the Washington burial site under certain conditions.

9. _____ Packaging regulations are under the direct control of the NRC only.

10. _____ The burial site's (or processor's) license requirements are of paramount consideration when determining how to package a given material.

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ATTACHMENT D

DECOMMISSIONING COST ESTIMATE

MONROE, CONNECTICUT

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TABLE 1 Labor Estimates	Facility Name: Facility Address: NRC License No.:	Severn Trent Laboratories Monroe, Connecticut 06-30139-01

Activities	Work Hours Manager or R.S.O.	H.P. Supv.	H.P. Tech.	R.W. Tech.	Clerical	Total Hrs.	Total Cost
#1: Final Update of Decom. Plan	4	8	0	0	4	16	$1,408
#3: Characterization of Radiological Condition of the Facility	4	32	32	8	2	78	$5,622
#2, 5: *See Below	-	-	-	-	-	-	-
#4: Decontamination, dismantling, demolition and/or packaging of contaminated objects & wastes from decontamination activities	8	8	8	2	0	26	$2,468
#6: Final survey	4	48	48		4	104	$8,208
LABOR TOTALS	20	96	88	10	10	224	$17,706

*Labor rates for disposal operations are included in the disposal costs. See Table 5 for estimated disposal costs.

TABLE 2	Facility Name:	Severn Trent Laboratories
	NRC License No.:	06-30139-01

Salary Rates Used In Table 1

Worker Classification:	Worker Cost/Hour
Manager	$135.00
H.P. Supv.	$86.00
H.P. Tech.	$70.00
R.W. Tech.	$70.00
Clerical	$45.00

Table 3 DECONTAMINATION and/or DISMANTLING of RADIOACTIVE FACILITY COMPONENTS	Facility Name:	Severn Trent Laboratories
	NRC License No.:	06-30139-01
	Room or Area:	On-site Waste & Sealed Source Disposal

Assumptions for this facility:

	Disposal	Decon
% Class A	95.0%	100.0%
% Class B	0.0%	0.0%
% Class C	5.0%	0.0%
% Contaminated Walls	10.0%	90.0%
% Contaminated Floors	10.0%	90.0%
% Contaminated Ductwork	100.0%	0.0%
% Contaminated Sinks & Drains	100.0%	0.0%
% Contaminated Hoods	50.0%	50.0%

We have assumed that from general contamination the equivalent of two laboratories will require decontamination and/or dismantling. All volumes in tables are stated as cubic feet.

The following pages each describe one of the below areas:

- On-site Waste & Sealed Source Disposal
- Waste genrated from minor decon activities

Table 3 DECONTAMINATION and/or DISMANTLING of RADIOACTIVE FACILITY COMPONENTS	Facility Name: NRC License No.: Room or Area:	Severn Trent Laboratories 06-30139-01 On-site Waste & Sealed Source Disposal

Assumptions for this area:

10CFR61 Waste Class:	Disposal	Decon
% Class A	95.0%	0.0%
% Class B	0.0%	0.0%
% Class C	5.0%	0.0%
Disposal vs. Decon Estimates:		
% Contaminated Walls	0.0%	0.0%
% Contaminated Floors	0.0%	0.0%
% Contaminated Ductwork	0.0%	0.0%
% Contaminated Sinks & Drains	0.0%	0.0%
% Contaminated Hoods	0.0%	0.0%
% Contaminated Equip. (See Below)	0.0%	0.0%

Note: If possible the Ni-63 sources will be sent back to the manufacturer, otherwise they will be disposed as Class-C waste.

Volume Estimates (cubic feet):

		10CFR Part 61 Waste Class		
Item:	Quantity	Class A	Class B	Class C
Fume Hoods	0.0	0.0	0.0	0.0
Lab Benches	0.0	0.0	0.0	0.0
Sink and Drains	0.0	0.0	0.0	0.0
Amount of Floor Space	0.0	0.0	0.0	0.0
Ventilation Ductwork	0.0	0.0	0.0	0.0
Miscellaneous waste from decon	0.0	0.0	0.0	0.0
On-site waste	7.5	7.5	0.0	0.0
Other: Sealed Sources	7.5	0.0	0.0	7.5
VOLUME TOTALS:	15.0	7.5	0.0	7.5

Note: Quantity is the total volume under consideration.

Table 3 DECONTAMINATION and/or DISMANTLING of RADIOACTIVE FACILITY COMPONENTS	Facility Name: NRC License No.: Room or Area:	Severn Trent Laboratories 06-30139-01 Waste from minor decon

Assumptions for this area:

10CFR61 Waste Class:	Disposal	Decon
% Class A	100.0%	100.0%
% Class B	0.0%	0.0%
% Class C	0.0%	0.0%
Disposal vs. Decon Estimates:		
% Contaminated Walls	50.0%	50.0%
% Contaminated Floors	100.0%	0.0%
% Contaminated Ductwork	100.0%	0.0%
% Contaminated Sinks & Drains	100.0%	0.0%
% Contaminated Hoods	50.0%	50.0%
% Contaminated Equip. (See Below)	100.0%	0.0%

Volume Estimates (cubic feet):

Item:	Quantity	10CFR Part 61 Waste Class Class A	Class B	Class C
Fume Hoods	0.0	0.0	0.0	0.0
Lab Benches	1.0	1.0	0.0	0.0
Sink and Drains	1.0	1.0	0.0	0.0
Amount of Floor Space	1.0	1.0	0.0	0.0
Ventilation Ductwork	1.0	1.0	0.0	0.0
Amount of Wall Space	0.0	0.0	0.0	0.0
Other:				
Misc. Equipment- see list on right	3.5	3.5		
VOLUME TOTALS:	7.5	7.5	0.0	0.0

Note: Quantity is the total volume under consideration.

The following equipment was considered:

1 - balance
1 - microfuge

TABLE 4

Facility Name: **Severn Trent Laboratories**

NRC License No.: **06-30139-01**

Equipment Costs

	Rental per day	Days	Rental Total	Purchase Total
Equipment/Supply:				
Health Physics Monitoring Equipment	$150.00	11	$1,650.00	
Miscellaneous Equipment Purchases	$1,000.00			$1,000.00

TABLE 5 — **Facility Name:** Severn Trent Laboratories; **NRC License No.:** 06-30139-01

Rad. Waste Disposal Costs

Container Type	Type	Vol.(ft3)	Quantity*	Unit Cost	Total Cost
55 gallon steel drums or B-25 boxes	A	N/A	15.00	$350.00	$5,250
55 gallon steel drums	B	0.00	0	$8,000.00	$0
55 gallon steel drums	C	0.00	1	$8,000.00	$8,000
					$13,250

*Quantity is in cubic feet for Class A waste and No. of drums for Class B & C.

Unit costs assume that the Class A waste will be super-compacted.

TABLE 6	Facility Name:	Severn Trent Laboratories
	NRC License No.:	06-30139-01

Summary of Costs

Total Labor Costs (from Table 1)		$17,706
Total Equipment Costs (from Table 4)		$2,650
Total Radwaste Disposal Costs (from Table 5)		$13,250
ESTIMATED TOTAL:		$33,606
Contingency Factor:	25%	$8,402
DFP TOTAL:		$42,008

ATTACHMENT E

DECOMMISSIONING COST ESTIMATE

WHIPPANY, NEW JERSEY

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TABLE 1
Labor Estimates

Facility Name: Severn Trent Laboratories
Facility Address: Whippany, New Jersey
NRC License No.: 06-30139-01

Activities	Work Hours: Manager or R.S.O.	H.P. Supv.	H.P. Tech.	R.W. Tech.	Clerical	Total Hrs.	Total Cost
#1: Final Update of Decom. Plan	4	8	0	0	4	16	$1,408
#3: Characterization of Radiological Condition of the Facility	4	32	32	4	4	76	$5,712
#2, 5: *See Below	-	-	-	-	-	-	-
#4: Decontamination, dismantling, demolition and/or packaging of contaminated objects & wastes from decontamination activities	8	40	40	12	4	104	$8,340
#6: Final survey	4	32	32		16	84	$6,252
LABOR TOTALS	20	112	104	16	28	280	$21,712

*Labor rates for disposal operations are included in the disposal costs. See Table 5 for estimated disposal costs.

TABLE 2	Facility Name:	Severn Trent Laboratories
	NRC License No.:	06-30139-01

Salary Rates Used in Table 1

Worker Classification:	Worker Cost/Hour
Manager	$135.00
H.P. Supv.	$86.00
H.P. Tech.	$70.00
R.W. Tech.	$70.00
Clerical	$45.00

Table 3	Facility Name:	Severn Trent Laboratories
DECONTAMINATION and/or DISMANTLING	NRC License No.:	06-30139-01
of RADIOACTIVE FACILITY COMPONENTS	Room or Area:	On-site Waste & Sealed Source Disposal

Assumptions for this facility:

	Disposal	Decon
% Class A	95.0%	100.0%
% Class B	0.0%	0.0%
% Class C	5.0%	0.0%
% Contaminated Walls	10.0%	90.0%
% Contaminated Floors	10.0%	90.0%
% Contaminated Ductwork	100.0%	0.0%
% Contaminated Sinks & Drains	100.0%	0.0%
% Contaminated Hoods	50.0%	50.0%

We have assumed that from general contamination the equivalent of one laboratory will require decontamination and/or dismantling. All volumes in tables are stated as cubic feet.

The following pages each describe one of the below areas:

- On-site Waste & Sealed Source Disposal
- Equivalent of one (1) standard laboratories

Table 3	**Facility Name:**	**Severn Trent Laboratories**
DECONTAMINATION and/or DISMANTLING	**NRC License No.:**	**06-30139-01**
of RADIOACTIVE FACILITY COMPONENTS		
	Room or Area:	**On-site Waste & Sealed Source Disposal**

Assumptions for this area:

10CFR61 Waste Class:	**Disposal**	**Decon**
% Class A	95.0%	0.0%
% Class B	0.0%	0.0%
% Class C	5.0%	0.0%
Disposal vs. Decon Estimates:		
% Contaminated Walls	0.0%	0.0%
% Contaminated Floors	0.0%	0.0%
% Contaminated Ductwork	0.0%	0.0%
% Contaminated Sinks & Drains	0.0%	0.0%
% Contaminated Hoods	0.0%	0.0%
% Contaminated Equip. (See Below)	0.0%	0.0%

Note: All sealed sources will, if possible, be sent back to the manufacturer, otherwise they will be disposed as Class-C waste.

Volume Estimates (cubic feet):

		10CFR Part 61 Waste Class		
Item:	**Quantity**	**Class A**	**Class B**	**Class C**
Fume Hoods	0.0	0.0	0.0	0.0
Lab Benches	0.0	0.0	0.0	0.0
Sink and Drains	0.0	0.0	0.0	0.0
Amount of Floor Space	0.0	0.0	0.0	0.0
Ventilation Ductwork	0.0	0.0	0.0	0.0
Amount of Wall Space	0.0	0.0	0.0	0.0
On-site waste	15.0	7.5	0.0	7.5
Other: Sealed Sources	0.0	0.0	0.0	0.0
VOLUME TOTALS:	15.0	7.5	0.0	7.5

Note: Quantity is the total volume under consideration.

Table 3	**Facility Name:**	**Severn Trent Laboratories**
DECONTAMINATION and/or DISMANTLING	**NRC License No.:**	**06-30139-01**
of RADIOACTIVE FACILITY COMPONENTS		
	Room or Area:	**Equivalent of one (1) standard lab**

Assumptions for this area:

10CFR61 Waste Class:	**Disposal**	**Decon**
% Class A	100.0%	100.0%
% Class B	0.0%	0.0%
% Class C	0.0%	0.0%
Disposal vs. Decon Estimates:		
% Contaminated Walls	50.0%	50.0%
% Contaminated Floors	100.0%	0.0%
% Contaminated Ductwork	100.0%	0.0%
% Contaminated Sinks & Drains	100.0%	0.0%
% Contaminated Hoods	50.0%	50.0%
% Contaminated Equip. (See Below)	100.0%	0.0%

Volume Estimates (cubic feet):

		10CFR Part 61 Waste Class		
Item:	**Quantity**	**Class A**	**Class B**	**Class C**
Fume Hoods	48.0	48.0	0.0	0.0
Lab Benches	7.5	7.5	0.0	0.0
Sink and Drains	7.5	7.5	0.0	0.0
Amount of Floor Space	7.5	7.5	0.0	0.0
Ventilation Ductwork	7.5	7.5	0.0	0.0
Amount of Wall Space	4.5	4.5	0.0	0.0
Other:				
Misc. Equipment- see list on right	38.0	38.0		
VOLUME TOTALS:	120.5	120.5	0.0	0.0

Note: Quantity is the total volume under consideration.

The following equipment was considered:

1 - refrigerator
1 - centrifuge
1 - fume hood and associated ductwork

TABLE 4	Facility Name:	Severn Trent Laboratories
	NRC License No.:	06-30139-01

Equipment Costs

	Rental per day	Days	Rental Total	Purchase Total
Equipment/Supply:				
Health Physics Monitoring Equipment	$150.00	13	$1,950.00	
Miscellaneous Equipment Purchases	$1,000.00			$1,000.00

TABLE 5 **Facility Name:** **Severn Trent Laboratories**
NRC License No.: **06-30139-01**
Rad. Waste Disposal Costs

Container Type	Type	Vol.(ft3)	Quantity*	Unit Cost	Total Cost
55 gallon steel drums or B-25 boxes	A	N/A	128.00	$350.00	$44,800
55 gallon steel drums	B	0.00	0	$8,000.00	$0
55 gallon steel drums	C	0.00	1	$8,000.00	$8,000
					$52,800

*Quantity is in cubic feet for Class A waste and No. of drums for Class B & C.

Unit costs assume that the Class A waste will be super-compacted.

TABLE 6	Facility Name:	Severn Trent Laboratories
	NRC License No.:	06-30139-01

Summary of Costs

Total Labor Costs (from Table 1)		$21,712
Total Equipment Costs (from Table 4)		$2,950
Total Radwaste Disposal Costs (from Table 5)		$52,800
ESTIMATED TOTAL:		$77,462
Contingency Factor:	25%	$19,366
DFP TOTAL:		$96,828

ATTACHMENT G

FACILITY DIAGRAMS

WHIPPANY, NEW JERSEY

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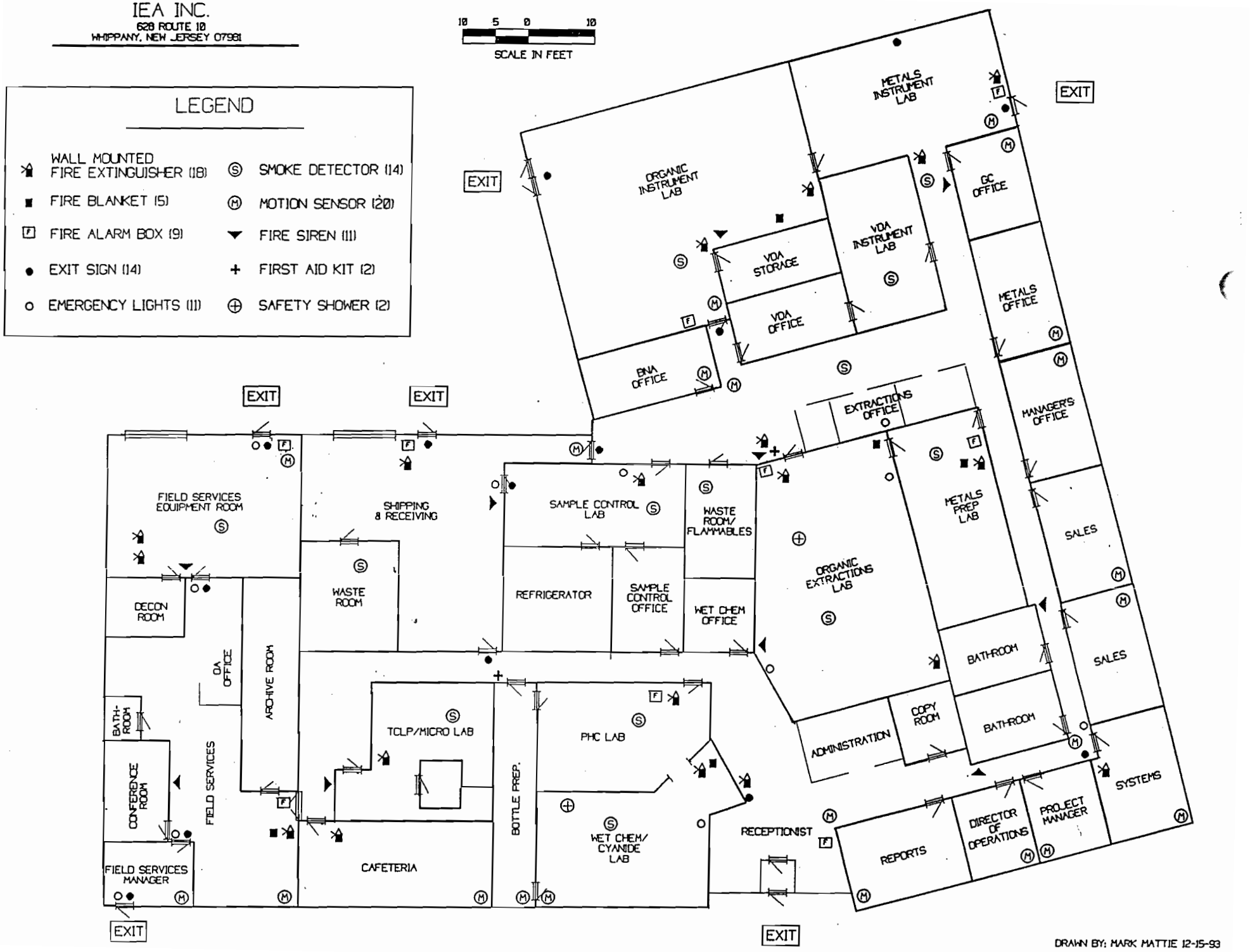
IEA INC.
628 ROUTE 10
WHIPPANY, NEW JERSEY 07981

10 5 0 10
SCALE IN FEET

LEGEND

- WALL MOUNTED FIRE EXTINGUISHER (18)
- FIRE BLANKET (5)
- FIRE ALARM BOX (9)
- EXIT SIGN (14)
- EMERGENCY LIGHTS (11)
- SMOKE DETECTOR (14)
- MOTION SENSOR (20)
- FIRE SIREN (11)
- FIRST AID KIT (2)
- SAFETY SHOWER (2)



DRAWN BY: MARK MATTIE 12-15-93

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ATTACHMENT F

FACILITY DIAGRAMS

MONROE, CONNECTICUT

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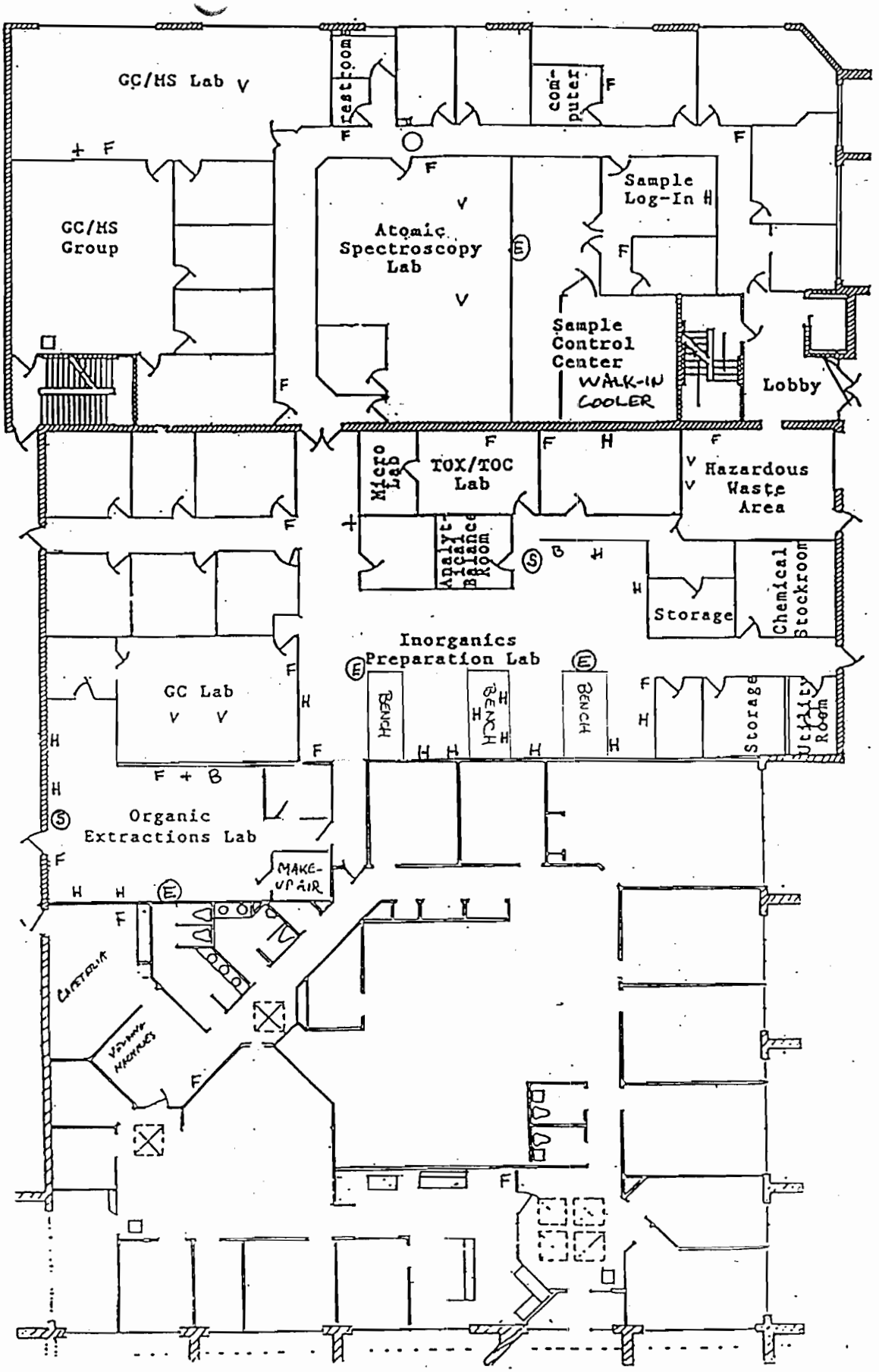

126081

First Floor

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PAYMENT SURETY BOND

Date bond executed: October 22, 1998

Effective date: October 22, 1998

Principal: **Severn Trent Laboratories, Inc.**
628 Route 10
Whippany, NJ 07981 , a Delaware Corporation.

NRC license number: **06-30139-01**
Name and address of facility(ies):
Severn Trent Laboratories, a facility located at 628 Route 10 Whippany, NJ 07981 and Severn Trent Laboratories, located at 200 Monroe Turnpike Monroe, CT 06468

and amount(s) for decommissioning activity guaranteed by this bond:
Whippany, NJ Facility: $98,000.00 Monroe, CT Facility: $42,000.00

Surety: **American Home Assurance Company**
70 Pine Street
New York, NY 10270
a corporation organized and existing under the laws of the State of New York and authorized to transact business in the State(s) of New Jersey and Connecticut, as Surety.

Surety's qualification in jurisdiction where licensed facilities are located: See attached Financial Statement.

Surety's bond number: [_____]

Total penal sum of bond: **$140,000.00**

Know all persons by these presents, That we, the Principal and Surety hereto, are firmly bound to the **U.S. Nuclear Regulatory Commission** (hereinafter called NRC), in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally; provided that, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety; but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

NONNEGOTIABLE

WHEREAS, the U.S. Nuclear Regulatory Commission, an agency of the U.S. Government, pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, has promulgated regulations in Title 10, Chapter I of the Code of Federal Regulations, Part [30, 40, 70 or 72], applicable to the Principal, which require that a license holder or an applicant for a facility license provide financial assurance that funds will be available when needed for facility decommissioning;

NOW, THEREFORE, the conditions of the obligation are such that if the Principal shall faithfully, before the beginning of decommissioning of each facility identified above, fund the standby trust fund in the amount(s) identified above for the facility;

Or, if the Principal shall fund the standby trust fund in such amount(s) after an order to begin facility decommissioning is issued by the NRC or a U.S. district court or other court of competent jurisdiction;

Or, if the principal shall provide alternative financial assurance and obtain the written approval of the NRC of such assurance, within 30 days after the date a notice of cancellation from the Surety is received by both the Principal and the NRC, then this obligation shall be null and void; otherwise it is to remain in full force and effect.

The Surety shall become liable on this bond obligation only when the principal has failed to fulfill the conditions described above. Upon notification by the NRC that the Principal has failed to perform as guaranteed by this bond, the Surety shall place funds in the amount guaranteed for the facilities into the standby trust fund.

The liability of the Surety shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligation of the Surety hereunder exceed the amount of said penal sum.

The Surety may cancel the bond by sending notice of cancellation by certified mail to the Principal and to the NRC provided, however, that cancellation shall not occur during the 90 days beginning on the date of receipt of the notice of cancellation by both the Principal and the NRC, as evidenced by the return receipts.

The Principal may terminate this bond by sending written notice to the ___NRC___ and to Surety 90 days prior to the proposed date of termination, provided, however, that no such notice shall become effective until the Surety receives written authorization for termination of the bond from the NRC.

The Principal and Surety hereby agree to adjust the penal sum of the bond yearly so that it guarantees a new amount, provided that the penal sum does not increase by more than 20 percent in any one year, and no decrease in the penal sum takes place without the written permission of the NRC.

If any part of this agreement is invalid, it shall not affect the remaining provisions which will remain valid and enforceable.

In Witness Whereof, the Principal and Surety have executed this financial guarantee bond and have affixed their seals on the date set forth above. The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the Principal and Surety.

Severn Trent Laboratories, Inc.
Principal

By: Kenneth J. Kelly Treasurer
Title

[Corporate Seal]

American Home Assurance Company
70 Pine Street, New York, NY 10270
Corporate Surety

State of Incorporation: New York

Liability limit: $140,000.00

By: Richard F. Smith
Richard F. Smith, Attorney-In-Fact

[Corporate Seal]

Bond Premium: $

American Home Assurance Company
National Union Fire Insurance Company of Pittsburgh, Pa.
Principal Bond Office: 70 Pine Street, New York, N.Y. 10270

POWER OF ATTORNEY

No. 01-B-09010

KNOW ALL MEN BY THESE PRESENTS:

That American Home Assurance Company, a New York corporation, and National Union Fire Insurance Company of Pittsburgh, Pa., a Pennsylvania corporation, does each hereby appoint
---Stanley Quirk, Richard F. Smith, Maryjean Wilson, Louis Balsamo: of Philadelphia, PA.---
its true and lawful Attorney(s)-in-Fact, with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, American Home Assurance Company and National Union Fire Insurance Company of Pittsburgh, Pa. have each executed these presents

this 5th day of August, 1996.

Kristian P. Moor, President
National Union Fire Insurance Company of Pittsburgh, PA.
Executive Vice President
American Home Assurance Company

STATE OF NEW YORK }
COUNTY OF NEW YORK }ss.

On this 5th day of August, 1996, before me came the above named officer of American Home Assurance Company and National Union Fire Insurance Company of Pittsburgh, Pa., to me personally known to be the individual and officer described herein, and acknowledged that he executed the foregoing instrument and affixed the seals of said corporations thereto by authority of his office

Carol Ragab

CAROL RAGAB
Notary Public, State of New York
No. 01RA5052011
Qualified in Kings County
Commission Expires Nov. 13, 1997

CERTIFICATE

Excerpts of Resolutions adopted by the Boards of Directors of American Home Assurance Company and National Union Fire Insurance Company of Pittsburgh, Pa. on May 18, 1976:

"**RESOLVED**, that the Chairman of the Board, the President, or any Vice President be, and hereby is, authorized to appoint Attorneys-in-Fact to represent and act for and on behalf of the Company to execute bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, and to attach thereto the corporate seal of the Company, in the transaction of its surety business;

"**RESOLVED**, that the signatures and attestations of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company when so affixed with respect to any bond, undertaking, recognizance or other contract of indemnity or writing obligatory in the nature thereof;

"**RESOLVED**, that any such Attorney-in-Fact delivering a secretarial certification that the foregoing resolutions still be in effect may insert in such certification the date thereof, said date to be not later than the date of delivery thereof by such Attorney-in-Fact."

I, Elizabeth M. Tuck, Secretary of American Home Assurance Company and of National Union Fire Insurance Company of Pittsburgh, Pa. do hereby certify that the foregoing excerpts of Resolutions adopted by the Boards of Directors of these corporations, and the Powers of Attorney issued pursuant thereto, are true and correct, and that both the Resolutions and the Powers of Attorney are in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of each corporation

this 22nd day of October, 19 98.

Elizabeth M. Tuck
Elizabeth M. Tuck, Secretary

126081

American Home Assurance Company

Executive Offices
70 Pine Street
New York, NY 10270

FINANCIAL STATEMENT

as of DECEMBER 31, 1997

ASSETS

Bonds	$5,023,975,857
Stocks	2,580,599,403
Collateral Loans	-
Cash & Short-Term Investments	139,589,975
Agents' Balances or Uncollected Premiums	2,119,762,116
Funds Held by Ceding Reinsurers	13,291,449
Reinsurance Recoverable on Loss Payments	504,691,548
Equities & Deposits in Pools & Associations	144,254,460
Other Admitted Assets	332,410,428
TOTAL ASSETS	$10,858,575,236

LIABILITIES

Reserve for Losses and Loss Expense	$5,507,311,490
Reserve for Unearned Premiums	1,606,703,898
Reserve for Expenses, Taxes, Licenses and Fees	37,803,385
Provision for Reinsurance	178,756,735
Funds Held Under Reinsurance Treaties	97,735,339
Other Liabilities	244,387,233
Capital Stock	4,237,635
Surplus	3,181,639,521
TOTAL POLICYHOLDERS' SURPLUS	3,185,877,156
TOTAL LIABILITIES AND POLICYHOLDERS' SURPLUS	$10,858,575,236

Bonds and stocks are valued in accordance with the basis adopted by the National Association of Insurance Commissioners. Securities carried at $974,232,635 in the above Statement are deposited as required by law.

CERTIFICATE

ELIZABETH M. TUCK, Secretary and MICHAEL J. CASTELLI, Comptroller of The American Home Assurance Company being duly sworn, each for himself deposes and says that they are the above described officers of the said Company and that on the 31st day of December, 1997, the Company actually possessed the assets set forth in the foregoing statement and that such assets were available for the payment of losses and claims and held for the protection of its policyholders and creditors, except as hereinbefore indicated, and that the foregoing statement is a correct exhibit of such assets and liabilities of the said Company on the 31st day of December, 1997, according to the best of their information, knowledge and belief, respectively.

Elizabeth M. Tuck
Secretary

Michael J. Castelli
Comptroller

STATE OF NEW YORK
COUNTY OF NEW YORK } SS.:

On this 1st Day of April, 19 98. Before me came the above named officers of the American Home Assurance Company, to me personally known to be the individuals and officers described herein, and acknowledged that they executed the foregoing instrument and affixed the seal of said corporation thereto by authority of their office.

Deborah A. Hayman

DEBORAH A. HAYMAN
Notary Public, State of New York
No. 01HA5081428
Qualified in Suffolk County
Commission Expires June 30, 1999

31078 (4/98)

2. a-d

Erik C. Nielsen

Qualifications for RSO and authorized user.

License History:

Quanterra Incorporated - Earth City, MO - NRC License Number 24-24817-01. Mr. Nielsen supervised the analyisis of radioactive materials by the radiochemistry section of the laboratory operating under this NRC license from April 1997 to September 1998. The license was never modified to reflect Mr. Nielsen as an authorized user. A copy of the license is enclosed.

Heritage Environmental Services - Romeoville, IL - IL License Number IL-01843-001. Mr. Nielsen initiated the license, supervised the radiochemistry section of the laboratory and was the RSO for the license from March 1993 to April 1997. This license was terminate in July of 1997. A copy of the license is enclosed.

Formal Training:

Canberra Industries, Quality Assurance for the Genie Spectroscopy System (8hrs), Genie Algorithms (8hrs), Haines City, FL 10-11 April 1995. Subject matter included measurement of gamma emitters, quality control and activity calculations. Certificates enclosed.

Oak Ridge Associated Universities, Environmental Monitoring for Radioactivity (40hrs), Oak Ridge, TN August 1989. Subject matter included: field instrumentation, survey and monitoring techniques, calculations of radiation fields and exposure. Certificate enclosed.

U.S. Occupational Health and Safety Administration (OSHA), Recognition, Evaluation and Control of Ionizing Radiation (80hrs), Des Plaines, IL August 1988, Instructor: Herbert Cember. Subjects: Dose calculations from sources, instrument theory and use, biological effects of radiation, shielding, and ALARA. Certificate enclosed.

U.S. Department of Energy (DOE), Transportation of Radioactive Materials (80hrs), Chicago, IL May 1988. Subjects: Packaging, labeling, surveying and receipt of radioactive materials packages. Transportation Regulations. Certificate enclosed.

NRC FORM 374
(7-94)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 10

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Quanterra	In accordance with letter dated December 20, 1996 3. License Number 24-24817-01 is amended in its entirety to read as follows:
2. 13715 Rider Trail North Earth City, MO 63045	4. Expiration Date May 31, 2002
	5. Docket or Reference No. 030-29601

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Any byproduct material listed in 10 CFR 33.100, Schedule A., except as specified below	A. Any	A. As specified in 10 CFR Part 33, Schedule A., Column II
B. Strontium-90	B. Any	B. 100 millicuries
C. Cesium-137	C. Any	C. 100 millicuries
D. Cobalt-60	D. Any	D. 100 millicuries
E. Hydrogen-3	E. Any	E. 3 curies
F. Plutonium	F. Any	F. 2 grams
G. Uranium-233	G. Any	G. 2 grams
H. Uranium-235	H. Any	H. 340 grams
I. Any byproduct material with Atomic Numbers between 84-103, inclusive	I. Any	I. 5 millicuries each radionuclide with a total possession limit of 100 millicuries
J. Natural uranium	J. Any	J. 136 kilograms (300 pounds)
K. Barium-133	K. Sealed sources	K. 2 sources, not to exceed 20 microcuries per source

License Number
24-24817-01

Docket or Reference Number
030-29601

Amendment No. 10

MATERIALS LICENSE
SUPPLEMENTARY SHEET

5. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
L. Nickel-63	L. Plated sources	L. 15 sources, not to exceed 15 millicuries per source
M. Natural Thorium	M. Any	M. 200 millicuries

9. Authorized Use:

A. through J. and M. To be used incident to the performance of chemical and radiochemical analysis of samples and as calibration standards for calibration of instruments.

K. To be used as internal calibration sources for liquid scintillation counters.

L. To be used in Gas Chromatographs for sample analysis.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at 13715 Rider Trail North, Earth City, Missouri.

11. The Radiation Safety Officer for this license is Donald Dihel.

12. Licensed material shall be used by, or under the supervision of, Don Hesse, John Powell, Roxanne Patterson, John Hudak, John Carpio, William Lesko or Donald Dihel.

13. In addition to the possession limits in Item 8, the license shall further restrict the possession of licensed material to quantities below the limits specified in 10 CFR 30.72 which require consideration of the need for an emergency plan for responding to a release of licensed material.

14. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.

B. Notwithstanding Paragraph A of this Condition, sealed sources designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

C. In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

D. Sealed sources need not be leak tested if:

(i) they contain only hydrogen-3; or

(ii) they contain only a radioactive gas; or

(iii) the half-life of the isotope is 30 days or less; or

(iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or

(v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

E. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region III, 801 Warrenville Road, Lisle, Illinois 60532-4351, ATTN: Chief, Nuclear Materials Safety Branch. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.

F. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
24-24817-01

Docket or Reference Number
030-29601

Amendment No. 10

15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 5 years from the date of each inventory, and shall include the quantities and kinds of byproduct material, manufacturer's name and model numbers, location of the sources and/or devices, and the date of the inventory.

16. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in 10 CFR 20.203(a)(1), the licensee is hereby authorized to label detector cells, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols.

17. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.

18. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

19. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

    A. Application dated December 20, 1991 (with attachments); and

    B. Letters dated May 14, 1992 and December 20, 1996 (with attachments, excluding procedure EHS 150).

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date 4/9/97

By Kevin A. Null
Nuclear Materials Licensing Branch, Region III

IDNS.FLM-004-01 (9/91)

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY

RADIOACTIVE MATERIAL LICENSE

DIVISION OF RADIOACTIVE MATERIALS
1035 OUTER PARK DRIVE
SPRINGFIELD, ILLINOIS 62704

Pursuant to the Illinois Radiation Protection Act and the rules and regulations in 32 Illinois Administrative Code promulgated thereunder, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess and transfer radioactive material(s) listed herein; and to use such radioactive material(s) for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Illinois Department of Nuclear Safety now or hereafter in effect and to any conditions specified in the license. This document confirms that the licensee has registered the sources of radiation listed below in accordance with Section 2 of the Radiation Installations Act.

LICENSEE	LICENSE NUMBER	EXPIRATION DATE
Heritage Environmental Services, Inc. Heritage Laboratories Division 1319 Marquette Drive Romeoville, Illinois 60441-4054	IL-01843-01 AMENDMENT NUMBER 3	March 31, 1998

Attention: Erik Nielsen
Radiation Safety Officer

In accordance with letter dated February 22, 1994, License Number IL-01843-01 is amended in its entirety. Previous amendments are void.

ITEM	RADIONUCLIDE	CHEMICAL and/or PHYSICAL FORM	MAXIMUM ACTIVITY* PER SOURCE	MAXIMUM POSSESSION LIMIT
A.	Ni-63	Plated Source - Hewlett-Packard Model 19233	15 mCi	As needed
B.	Ba-133	Sealed Source - External Standard	20 μCi	As needed
C.	Any radioactive material with half-life < 100 days	Any commercially available calibration source or reference standard	15 mCi	100 mCi
D.	Any radioactive material with half-life > 100 days	Any commercially available calibration source or reference standard	200 μCi	10 mCi
E.	Any radioactive material with Atomic Number 1-105 except as noted below:	Environmental samples	Not to exceed 10 mCi per radioisotope	100 mCi
	H-3	Environmental samples		500 mCi
	U-235	Environmental samples		57 g
	U-233	Environmental samples		33 g
	Pu	Environmental samples		33 g

* μCi-microcurie; mCi-millicurie; Ci-Curie; MBq-Megabecquerel; GBq-Gigabecquerel; TBq-Terabecquerel; g-gram; μg-microgram; kg-kilogram

APPROVED BY:	DATE	PAGE of PAGES
Joseph G. Klinger, Head of Licensing Section IL 473-0059	April 5, 1994	1 4

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY
RADIOACTIVE MATERIAL LICENSE

LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	EXPIRATION DATE
Heritage Environmental Services, Inc.	IL-01843-01	3	March 31, 1998

AUTHORIZED USE:

A. For use in Hewlett-Packard Model 5890 Series gas chromatographs for sample analysis.

B. For use in Packard Canberra Model 2550 TR A/B liquid scintillation counters for sample analysis.

C. and D. For use as instrument check and calibration sources, as reference standards incidental to sample analysis and for research and development.

E. For use as contamination incident to sample analysis and for research and development.

CONDITIONS

1. Radioactive material shall be used only at the licensee's facilities located at Heritage Laboratories, Inc., 1319 Marquette Drive, Romeoville, Illinois in accordance with statements, representations and procedures listed in other conditions of this license.

2. Radioactive material shall be used by, or under the supervision of, Frederic Winter, Erik Nielsen, or Kyle Sowatzke.

3. The Radiation Safety Officer for this license is Erik Nielsen.

4. A. Each sealed source shall be tested for leakage and/or contamination as specified in 32 Ill. Adm. Code 340.410. Tests for leakage and/or contamination shall be performed by persons specifically licensed to provide such services.

   B. Tests for leakage and/or contamination performed by the licensee shall be performed in accordance with procedures described in the application dated November 23, 1992, and letters, with attachments, dated January 26, 1993 and February 11, 1993. This license does not authorize this licensee to provide leakage and/or contamination tests as a customer service for other licensees except as specifically provided by other conditions of this license.

   C. The records of tests for leakage and/or contamination shall contain the manufacturer, model and serial number, if assigned, of each source tested, the identity of each source radionuclide and its calculated activity as of the date of the test or the activity and activity assay date, the measured activity of each test sample expressed in Bq or μCi, the date the sample was collected, the date the sample was analyzed, the identity of the individual who collected the sample(s) and the identity of the individual who analyzed the sample(s).

* μCi-microcurie; mCi-millicurie; Ci-Curie; MBq-Megabecquerel; GBq-Gigabecquerel; TBq-Terabecquerel; g-gram; μg-microgram; kg-kilogram

LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	EXPIRATION DATE
leritage Environmental Services, Inc.	IL-01843-01	3	March 31, 1998

5. Analysis of leak test samples as a customer service may be provided for Ni-63 sources owned by Heritage Environmental Services, Inc. in accordance with statement and representations made in application dated November 23, 1992, and letters, with attachments, dated January 26, 1993 and February 11, 1993.

6. The licensee shall have their radiation survey instrument(s) used to establish compliance with 32 Ill. Adm. Code calibrated by a person specifically authorized by the Department, an Agreement State, a Licensing State, or the U.S. Nuclear Regulatory Commission to perform such services. Records of radiation survey instrument calibrations shall be maintained for Department inspection.

7. The licensee shall not transfer possession and/or control of materials or products containing radioactive material except:

   A. By transfer as waste to an authorized recipient,

   B. By transfer to a specifically licensed recipient, or

   C. As provided otherwise by specific conditions of this license.

8. Sealed sources containing radioactive material shall not be opened.

9. Individuals who work in, or whose duties may require them to work in restricted areas, shall be instructed in the items specified in 32 Ill. Adm. Code 400.120 at the time of initial employment and at least annually thereafter. The licensee shall maintain records of initial and annual employee training for Departmental inspection for five years from the date on which the training was given. The record shall contain the names of the individuals receiving the training and the date(s) the training was received by the individuals.

10. The licensee shall conduct a physical inventory at intervals not to exceed six (6) months to account for each sealed source received and possessed under the license and shall maintain a record of such inventories. The inventory records shall include the radionuclide, activity, manufacturer, model and serial number, activity assay date, the location of the sealed source, date of the inventory and the identity of the individual(s) performing the inventory. Records of inventories shall be maintained for five years from the date of each inventory.

11. A. Foil, coated, or plated sources, when not in use, shall be stored in a closed container adequately designed and constructed to contain radioactive material that might be released during storage.

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY
RADIOACTIVE MATERIAL LICENSE

LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	EXPIRATION DATE
leritage Environmental Services, Inc.	IL-01843-01	3	March 31, 1998

11. (continued)

B. Foil, coated, or plated sources shall be considered as sealed sources with regards to testing for leakage and/or contamination, and shall be tested in accordance with the requirements of the leak test condition of this license.

12. The licensee shall measure the airflow rates initially and semi-annually thereafter to assure proper ventilation system performance. Records of the results of ventilation measurements, instruments used to perform measurements, and the person performing the airflow rate tests shall be maintained for Department inspection.

13. Detector cells containing radioactive material shall not be opened by the licensee.

14. Detector cells containing Ni-63 foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 400 degrees centigrade.

15. Gas chromatograph detector cells containing radioactive material, except those containing hydrogen-3, shall be considered to be sealed sources in regard to testing for leakage and/or contamination and shall be tested in accordance with the requirements of the leak test condition of this license.

16. Maintenance, repair, cleaning, replacement and disposal of foils contained in detector cells shall be performed by the detector cell manufacturer or other persons specifically authorized by the Department, an Agreement State, a Licensing State, or the U.S. Nuclear Regulatory Commission to perform such services.

17. Except as specifically provided otherwise by the license, the licensee shall possess and use radioactive material described in all schedules of this license in accordance with statements, representations and procedures contained in, referenced in, or enclosed with the documents listed below. The regulations contained in 32 Ill. Adm. Code: Chapter II, Subchapters b and d shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations. **The most recent statements, representations and procedures listed below shall govern if they conflict with previously submitted documents.**

A. Application dated November 23, 1992.

B. Letters, with attachments, dated January 26, 1993, February 11, 1993, March 11, 1993 and February 22, 1994.

C. Letter dated September 29, 1993.

JGK:DMP:sld

* μCi-microcurie; mCi-millicurie; Ci-Curie; MBq-Megabecquerel; GBq-Gigabecquerel; TBq-Terabecquerel; g-gram; μg-microgram; kg-kilogram

Canberra Industries, Inc.

Meriden, Connecticut, U.S.A.
presents this

Certificate of Achievement

to

ERIK NIELSEN

for successfully completing a course of instruction
for the GENIE ALGORITHMS

this 4TH *day of* APRIL *,19* 95 .

Instructor

President

CANBERRA NUCLEAR

Canberra Industries, Inc.

Meriden, Connecticut, U.S.A.

presents this

Certificate of Achievement

to

ERIK NIELSEN

for successfully completing a course of instruction

for the GENIE QUALITY ASSURANCE SOFTWARE

this 3RD *day of* APRIL *,19* 95 .

Mark Mercier
Instructor

Emily R. Olcott
President

CANBERRA NUCLEAR

OAK RIDGE ASSOCIATED UNIVERSITIES

This is to certify that

ERIK C. NIELSEN

has completed

A ONE-WEEK COURSE IN ENVIRONMENTAL MONITORING

conducted by Manpower Education, Research,
and Training Division of
Oak Ridge Associated Universities
Operating under contract with the Department of Energy

1ST day of SEPTEMBER, 1989

at Oak Ridge, Tennessee

Roger J. Cloutier

Director, Professional Training Programs

United States Department of Labor

Occupational Safety and Health Administration

This is to certify that

ERIK C. NIELSEN

has diligently and with merit completed

training in

RECOGNITION, EVALUATION AND CONTROL OF IONIZING RADIATION

Washington, D.C. AUGUST 19, *19* 88

Assistant Secretary of Labor

Radioactive Materials Training Course

Designated "Official Data" 8/4/2001

This is to certify that

ERIK NIELSEN

has completed the Radioactive Materials Training Course covering the Hazardous Materials Regulations of the United States Department of Transportation on this 19TH *day of* MAY, *19* 88 *at* CHICAGO, ILLINOIS

Roy F. Garrison

Manager, Transportation Operations and Traffic

1260181