

DL-112994-01



NORSHIPCO

NORFOLK SHIPBUILDING & DRYDOCK CORPORATION

PO BOX 2100 • 750 WEST BERRY AVENUE
NORFOLK VIRGINIA 23501-2100
CABLE: NORSHIPCO
Telephone: 804 494 4000

Serial #NSQA-94-1311
November 29, 1994

US Nuclear Regulatory Commission
Region 11
Suite 2900
101 Marietta St. NW
Atlanta, Georgia 30303

Attn: Mr. Charles Hosey, Chief
Nuclear Material Safety

Ref: Nuclear Regulatory Commission Letter Dated 06/01/89,
License #: 45-12042-01, Expiration date: 09/30/89,
Program Code 03320

Subj: Renewal for Byproduct Material License

Gentlemen:

Please find enclosed a copy of the application for renewing our
Material license.

As per the application, items five (5) through nine (9) and
eleven (11) are enclosed under separate cover. For item ten (10)
of the application, we have enclosed two (2) revised copies of
our Industrial Radiography and Emergency Procedure (Revision 7).

Also enclosed please find a check for \$2,900.00 for renewal fees.
If I can be of further assistance to you, please contact me at
(804) 494-2951.

Very truly yours,

NORFOLK SHIPBUILDING & DRYDOCK CORPORATION

C. A. Cherry
Quality Assurance Engineer

256237

Enc.

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

BOARD OF DIRECTORS

John L. Roper, III
John L. Roper, IV
Carlos E. Agnese
Frederick V. Martin
O. Raymond Yates, Jr
Charles Zeien

John L. Roper, III	President and Chief Executive Officer
John L. Roper, IV	Executive Vice President, Operations, Secretary & Assistant Treasurer
Carlos E Agnese	Executive Vice President, Business Development, Marketing, Estimating & Contract Administration
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Robert D. Twine, Sr.	Vice President Production

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ITEM 5

RADIOACTIVE MATERIAL

ITEM #5A RADIOACTIVE MATERIAL

<u>BYPRODUCT MATERIAL ELEMENT AND MASS NO.</u>	<u>SOURCE MODEL NO.</u>	<u>NAME OF MANUFACTURER</u>
IRIDIUM 192	AMERSHAM A-424-9	AMERSHAM SENTINEL DIV
COBALT 60	AMERSHAM SEALED SOURCE/CALIBRATOR MOBIL KIT	TECHNICAL OP
IRIDIUM 192	RTS TECHN # 702	RTS TECHNOLOGY INC

ITEM #5A RADIOGRAPHIC EXPOSURE DEVICE

<u>MODEL NUMBER</u>	<u>NAME OF MANUFACTURER</u>
AMERSHAM 650B	AMERSHAM SENTINEL DIV
T.O. 571 METER CALIBRATION KIT	TECHNICAL OPERATION

ITEM #5A RADIOGRAPHIC SOURCE CHANGERS

AMERSHAM 650 SOURCE CHANGER AMERSHAM SENTINEL DIV
TECHNOLOGY 424 SOURCE CHANGER RTS TECHNOLOGY INC

ITEM #5B FORM

PHYSICAL - IRIDIUM 192
PHYSICAL - COBALT 60

ITEM #5C MAXIMUM ELEMENT OF RADIOACTIVE MATERIAL PER SOURCE

100 CURIES - IRIDIUM 192
15 MILLICURIES - COBALT 60

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ITEM 6

PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED

IRIDIUM 192

For use in AMERSHAM Model 660B exposure device for industrial radiography.

COBALT 60

For use in technical Operations Mode 571 Calibration Kit for instrument calibration.

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ENCLOSURE ONE SECTION 1

DUTIES AND RESPONSIBILITIES

LIST OF PERSONNEL

1. OVERALL RESPONSIBILITIES FOR RADIATION PROGRAM

1.1 Quality Assurance Engineer

C. A. Cherry
Phone: 494-2951
Home Phone: 479-0730

2. ADVISER OF INDUSTRIAL RADIOGRAPHY

2.1 F. W. Duvall

Phone: 494-4343
Home Phone: 482-4016

2.2 C. A. Cherry

Phone: 494-2951
Home Phone: 479-0730

3. GENERAL SUPERVISOR OF WORK

3.1 Supervisor

L. T. Eure, Jr.
Phone: 494-4387
Home Phone: 919-441-9316

4. INTERNAL AUDIT OF SAFETY PHASES OF PROGRAM

4.1 Quality Assurance Engineer

C. A. Cherry
Phone: 494-2951
Home Phone: 479-0730

4.2 Resident Industrial Hygienist/Environmental
Safety & Health Engineer

T. L. Beacham
Phone: 494-4563
Home Phone: 420-8407

4.3 RADIOACTIVE MATERIAL CONTROL COMMITTEE:

Resident Industrial Hygienist/Environmental
Safety & Health Engineer

T. L. Beacham
Phone: 494-4563
Home Phone: 420-8407

4.4 WORKER'S COMPENSATION COORDINATOR

A. L. Walker

Phone: 494-4575
Home Phone: 482-5907

5. PERSONNEL RADIATION EXPOSURE, EVALUATION OF

5.1 RADIATION SAFETY OFFICER

McConnell Baker
Phone: 494-4388
Home Phone: 545-8942

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE SECTION 2

Carl A. Cherry

Advisor of Industrial Radiography/Radiographer/Quality Assurance
Engineer

Type of Training

1. Principles and Practices of Radiation Protection:

- 1.1 Where Trained: NORSHIPCO
- 1.2 Duration Of Training: 25 1/2 years
- 1.3 On-The-Job (Yes):
- 1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

- 2. Isotopes: Iridium 192 & Cobalt 60
- 2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies
- 2.2 Where Experience Was Gained: NORSHIPCO
- 2.3 Duration of Experience: 25 1/2 years
- 2.4 Type of Use: Industrial Radiography
- 3. Personnel Training:
- 3.1 Attended Radiographic Inspector Course conducted by Norfolk Naval Shipyard. A total course hours for Radiographic Inspector is 160 hours. Duration of experience fourteen (14) years.
- 3.2 Radiological Monitoring for Instructors Course conducted by the Virginia Civil Defense Administration. Total hours of course 40 hours.
- 3.3 Radiological Defense Officer Course conducted by the Virginia Civil Defense Administration. Total hours of course 40 hours.
- 3.4 Shelter Management for Instructors conducted by the Virginia Civil Defense Administration. Total hours of course 40 hours.
- 3.5 Attended seminars on the administration of isotope Radiography Safety Programs. Tech/ops: Time (24) hours.
- 3.6 Attended classroom and laboratory on leak testing of radioactive sources. Tech/ops time (32) hours.

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STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

**ENCLOSURE ONE
SECTION 2**

Carl A. Cherry (cont)

- 3.7 A.S.N.T Level III Examiner duration of experience ten (10) years.**
- 3.8 Attended seminars on the administration of isotope Radiography Safety Programs. Tech/ops; MAY 1986 (16 hours)**
- 3.9 Attended seminars on the administration of isotope Radiography Safety Programs. RTS Technology, Inc. April 1988, (16 hours)**

4. AFFILIATIONS

- 4.1 American Society for Non-Destructive Testing**
- 4.2 Shipbuilding Council of American - Quality Assurance Subcommittee**
- 4.3 American Society for Quality Control**
- 4.4 South Tidewater Association of Ship Repairers, Inc.**

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STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE SECTION 2

McConnell Baker
Radiation Safety Officer & Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

- 1.1 Where Trained: NORSHIPCO
- 1.2 Duration Of Training: 27 years
- 1.3 On-The-Job (Yes):
- 1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

- 2. Isotopes: Iridium 192 & Cobalt 60
- 2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies
- 2.2 Where Experience Was Gained: NORSHIPCO
- 2.3 Duration of Experience: 27 years
- 2.4 Type of Use: Industrial Radiography

3. Personnel Training:

- 3.1 Attended radiographic interpretation course conducted by Magnaflux Corporation, Chicago Illinois, Classroom and Laboratory Time (40) Hours Duration of Experience eleven (11) years and eleven (11) months. Date, Jan 1977.
- 3.2 Attended seminar in radiation safety for industrial radiographer. Sponsored by- United States Nuclear Regulator Commission, Atlanta, Georgia. Nov 1978.
- 3.3 Attended seminar on the administration of Isotopes Radiography safety programs. Technical operations incorporated time (92) hours.
- 3.4 Attended classroom and laboratory on leak testing of radioactive sources. Tech/ops time (8) hours.
- 3.5 A.S.N.T Level III Examiner and Radiation Safety Instructor duration of experience fifteen (15) years.
- 3.6 Radiation Safety Officer duration of experience fifteen (15) years.
- 3.7 Attended the continuing education course and has satisfactory completed program objectives on the subject of SNT-TC-1A: "Its use and abuse".

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE SECTION 2

McConnell Baker
Radiation Safety Officer & Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

- 1.1 Where Trained: NORSHIPCO
- 1.2 Duration Of Training: 27 years
- 1.3 On-The-Job (Yes):
- 1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

- 2. Isotopes: Iridium 192 & Cobalt 60
- 2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies
- 2.2 Where Experience Was Gained: NORSHIPCO
- 2.3 Duration of Experience: 27 years
- 2.4 Type of Use: Industrial Radiography

3. Personnel Training:

- 3.1 Attended radiographic interpretation course conducted by Magnaflux Corporation, Chicago Illinois, Classroom and Laboratory Time (40) Hours Duration of Experience eleven (11) years and eleven (11) months. Date, Jan 1977.
- 3.2 Attended seminar in radiation safety for industrial radiographer. Sponsored by- United States Nuclear Regulator Commission, Atlanta, Georgia. Nov 1978.
- 3.3 Attended seminar on the administration of Isotopes Radiography safety programs. Technical operations incorporated time (92) hours.
- 3.4 Attended classroom and laboratory on leak testing of radioactive sources. Tech/ops time (8) hours.
- 3.5 A.S.N.T Level III Examiner and Radiation Safety Instructor duration of experience fifteen (15) years.
- 3.6 Radiation Safety Officer duration of experience fifteen (15) years.
- 3.7 Attended the continuing education course and has satisfactory completed program objectives on the subject of NRC-1A: "Its use and abuse".

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ENCLOSURE ONE
SECTION 2

McConnell Baker (cont)

- 3.8 Attended seminars on the administration of isotope Radiography Safety Programs. AMERSHAM. Year and time: October 1993 (20 hours)
- 3.9 Attended seminar on the administration of Isotope Radiography Safety Programs, RTS Technology, Inc. Year and time: April 1988 (16 hours)
- 4. AFFILIATIONS
- 4.1 American Society for Non-Destructive Testing

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STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

Thomas L. Beacham
Resident Marine Chemist

Advisor to Radiations Safety Officer

All sealed source leak testing performed by NORSHIPCO will be monitored by Mr. T. L. Beacham.

The following resume outlines Mr. Beacham's schooling, professional experience, and certification.

Schools

University of Georgia - B. S. Chemistry, 1973
Old Dominion University - M. S. Chemistry, 1975

Experience

Twenty (20) years in Chemistry and related disciplines. Completed graduate courses in radiation theory, applications, and measurements. Chief analytical chemist for eighteen (18) years. Member of Marine Chemist Association and American Chemical Society

Certification

Certified by National Fire Protection Association - Marine Chemist #635
Certified by American Board of Industrial Hygiene - CIH #3993

Present Position

Resident Marine Chemist
Chief Analytical Chemist
Resident Industrial Hygienist
Environmental Engineer
Advisor to Radiation Officer

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

Frank W. Duvall

Radiographer and Advisor of Industrial Radiography Engineer

Type of Training

1. Principles and Practices of Radiation Protection:

- 1.1 Where Trained: NORSHIPCO
- 1.2 Duration Of Training: 26 1/2 years
- 1.3 On-The-Job (Yes):
- 1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60
- 2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies
- 2.2 Where Experience Was Gained: NORSHIPCO
- 2.3 Duration of Experience: 26 1/2 years
- 2.4 Type of Use: Industrial Radiography

3. Personnel Training:

- 3.1 Attended seminar in radiation safety for industrial radiographer. Sponsored by United States Nuclear Regulator Commission, Atlanta, Georgia. Nov 1978.
- 3.2 A.S.N.T Level III Examiner (Instructor) 10 years Radiation safety Instruction.
- 3.3 Attended seminars on the administration of isotope Radiography Safety Programs. Tech/ops; Time (72) hours.
- 3.4 Attended seminars on the administration of isotope Radiography Safety Programs. RTS Technology; NOV 1987 (16 hours)
- 3.5 Attended seminars on the administration of isotope Radiography Safety Programs. RTS Technology; JUNE 1989, (16 hours)

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ENCLOSURE ONE
SECTION 2

L. T. Eure

Supervisor & Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

- 1.1 Where Trained: NORSHIPCO
1.2 Duration Of Training: 12 years
1.3 On-The-Job (Yes):
1.4 Formal Training (Yes) 330 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60
2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies
2.2 Where Experience Was Gained: NORSHIPCO
2.3 Duration of Experience: 12 years
2.4 Type of Use: Industrial Radiography

3. Personnel Training:

- 3.1 Attended seminar on the administration of Isotope Radiography Safety Programs. RTS Technology, Inc; APRIL 1988, 16 hours.
3.2 Attended seminar on the administration of Isotope Radiography Safety Programs. RTS Technology, Inc; JUNE 1989, 16 hours.
3.3 Attended seminar on the administration of Isotope Radiography Safety Programs. AMERSHAM; OCT 1993, 20 hours.

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ENCLOSURE ONE
SECTION 2

A. P. Nelson, SR.

Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

1.1 Where Trained: NORSHIPCO

1.2 Duration Of Training: 14 years

1.3 On-The-Job (Yes):

1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60

2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies

2.2 Where Experience Was Gained: NORSHIPCO

2.3 Duration of Experience: 14 years

2.4 Type of Use: Industrial Radiography

3. Personnel Training:

3.1 Attended Level I and Level II Ultrasonic Ultrasonics Shear Wave Course
Conducted by Krautkramer - Branson, Inc, 80 hours.

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ENCLOSURE ONE
SECTION 2

D. E. Williams, Jr.

Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

1.1 Where Trained: NORSHIPCO

1.2 Duration Of Training: 13 years

1.3 On-The-Job (Yes):

1.4 Formal Training (Yes) 330 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60

2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies

2.2 Where Experience Was Gained: NORSHIPCO

2.3 Duration of Experience: 13 years

2.4 Type of Use: Industrial Radiography

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

John T. Sires

Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

1.1 Where Trained: NORSHIPCO

1.2 Duration Of Training: 19 years

1.3 On-The-Job (Yes):

1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60

2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies

2.2 Where Experience Was Gained: NORSHIPCO

2.3 Duration of Experience: 19 years

2.4 Type of Use: Industrial Radiography

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

L. Stewart

Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

1.1 Where Trained: NORSHIPCO

1.2 Duration Of Training: 19 years

1.3 On-The-Job (Yes):

1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60

2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies

2.2 Where Experience Was Gained: NORSHIPCO

2.3 Duration of Experience: 19 years

2.4 Type of Use: Industrial Radiography

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

R. Ferguson

Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

1.1 Where Trained: NORSHIPCO

1.2 Duration Of Training: 25 years

1.3 On-The-Job (Yes):

1.4 Formal Training (Yes) 330 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60

2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies

2.2 Where Experience Was Gained: NORSHIPCO & US NAVY

2.3 Duration of Experience: 25 years

2.4 Type of Use: Industrial Radiography

3. PERSONNEL TRAINING

3.1 Attended Radiation Safety Course 120 hours US Navy School/SD, CA

3.2 Attended Radiographer Training Class 6904, SD,CA for NSTM 9922 and NAVSHIPS 250-1500-1 120 hours.

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STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

Ronald Speight

Radiographer

Type of Training

1. Principles and Practices of Radiation Protection:

1.1 Where Trained: NORSHIPCO

1.2 Duration Of Training: 16 years

1.3 On-The-Job (Yes):

1.4 Formal Training (Yes) 390 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60

2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies

2.2 Where Experience Was Gained: NORSHIPCO

2.3 Duration of Experience: 16 years

2.4 Type of Use: Industrial Radiography

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE
SECTION 2

A. Lancaster

Radiographer Assistant

Type of Training

1. Principles and Practices of Radiation Protection:

- 1.1 Where Trained: NORSHIPCO
- 1.2 Duration Of Training: 6 years
- 1.3 On-The-Job (Yes):
- 1.4 Formal Training (Yes) 138 hours

Experience with Radiation:

2. Isotopes: Iridium 192 & Cobalt 60
- 2.1 Maximum Amount: Iridium 192 - 100 Curies
Cobalt 60 - 50 Curies
- 2.2 Where Experience Was Gained: NORSHIPCO
- 2.3 Duration of Experience: 6 years
- 2.4 Type of Use: Industrial Radiography

ITEM 8

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**IDENTIFICATION OF INDIVIDUALS WHO WILL INSTRUCT AND TRAIN PROSPECTIVE
RADIOGRAPHER AND RADIOGRAPHER ASSISTANTS**

McConnell Baker

**RADIATION SAFETY OFFICER LEVEL III EXAMINER
SUPERVISOR AND RADIOGRAPHER**

1. PRINCIPLES OF RADIATION AND RADIATION SAFETY

1.1 WHERE TRAINED	WHEN	BY WHOM
a) NORSHIPCO	1967-68	J. L. Brown
b) Atlanta, GA	1978	NRC
c) Tech/ops	1979	John J. Munro, III
Tech/ops	1980	Francis E. Roy & John J. Munro, III
Tech/ops	1983	R. A. Linkus & John J. Munro, III
Tech/ops	1986	Cathleen Roughan & John J. Munro, III
d) RTS Tech Inc.	1988	John J. Munro, III
e) AMERSHAM	1993	Cathleen M. Roughan & Robert L. Kelly

1.2 The actual performance of radiography:

1.3 Where trained: NORSHIPCO

1.4 When: 1967-68

1.5 By: J. L. Brown

Frank Duvall

SUPERVISOR, RADIOGRAPHER AND ADVISOR OF INDUSTRIAL RADIOGRAPHY

1. PRINCIPLES OF RADIATION AND RADIATION SAFETY

1.1 WHERE TRAINED	WHEN	BY WHOM
a) NORSHIPCO/NNSY	1966-67	D. D. Diddle T. J. Grimes J. L. Brown
b) Atlanta, GA	1978	NRC
c) Tech/ops	1979	John J. Munro, III
Tech/ops	1980	Francis E. Roy
Tech/ops	1982	Brian E. Cole
d) RTS Tech Inc.	1987	John J. Munro, III
RTS Tech Inc.	1989	John J. Munro. III

1.2 The actual performance of radiography:

1.3 Where trained: NORSHIPCO

1.4 When: 1966-67

1.5 By: J. L. Brown

L. T. Eure

SUPERVISOR, LEVEL III EXAMINER AND RADIOGRAPHER

1. PRINCIPLES OF RADIATION AND RADIATION SAFETY

1.1 WHERE TRAINED	WHEN	BY WHOM
a) NORSHIPCO	1981	M. Brown F. Duvall
b) Thomas Nelson Community College	1982	L. S. Morris
c) RTS Tech Inc	1988	John J. Munro, III
RTS Tech Inc.	1989	John J. Munro, III
d) AMERSHAM	1993	Cathleen M. Roughan Robert L. Kelly

1.2 The actual performance of radiography:

1.3 Where trained: NORSHIPCO

1.4 When: 1982-84

1.5 By: M. Baker
L. A. Stewart (Radiographer)

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ENCLOSURE ONE SECTION 3

Outline of Training for Radiographer's Assistants - as Revised

LECTURE AND TRAINING PROGRAM TO READ AS FOLLOWS:

- 3.1 Fundamentals of radiation safety-minimum (32) thirty-two hours.
 - 3.1.1 Characteristics of gamma radiation.
 - 3.1.2 Units of radiation dose (mrem) and quantity of radioactivity (curie)
 - 3.1.3 Hazards of excessive exposure to radiation. How excessive exposure can occur internal and external exposure, effect on tissue.
 - 3.1.4 Levels of radiation from licensed materials.
 - 3.1.5 Methods of controlling radiation dose.
 - 3.1.5.1 Working time.
 - 3.1.5.2 Working distance.
 - 3.1.5.3 Shielding.
- 3.2 Radiation detection instrumentation to be used minimum (10) ten hours.
 - 3.2.1 Use of Eberline 130-A and 130-G gamma radiation survey meters.
 - 3.2.2 Operation of radiation survey instruments.
 - 3.2.3 Calibration of survey instruments.
 - 3.2.4 Limitation of survey instruments.
 - 3.2.5 Survey techniques.
 - 3.2.6 Use of radiac instruments.
 - 3.2.7 Establishment of high radiation areas and radiation areas before exposure, by source data survey and monitoring exposure of the source.
 - 3.2.8 Detection of scatter or secondary radiation.
 - 3.2.9 Personnel monitoring device.
 - 3.2.10 Film badges-instruction for wearing, care and purpose.
 - 3.2.11 Pocket dosimeter for wearing care, reading excessive exposure and changing.
 - 3.2.12 Alarm ratemeter for wearing, care and purpose.

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ENCLOSURE ONE SECTION 3

- 3.3 Radiographic equipment to be used minimum sixteen (16) hours.
 - 3.3.1 The iridium 192 camera and radiation patterns.
 - 3.3.2 The cobalt calibration kit and radiation patterns.
 - 3.3.3 The radiographic equipment will be by demonstration to all radiographer's assistant by a qualified instructor for training of assistant radiographer's and radiographer.
 - 3.3.4 Radiographer's assistant will be permitted to use radiographic equipment "only" under the "ersonnel supervision" of a radiographer, at the site where sealed source are being used and when the assistant uses radiographic exposure devices, sealed sources or related source handling tools, or radiation survey instruments in radiography.
 - 3.3.5 Posting and establishing radiation areas.
 - 3.3.6 Proper use of cameras, tubes, collimator and control cables when making exposures.
 - 3.3.7 Monitoring the restricted area.
 - 3.3.8 ... t constitutes an emergency.
 - 3.3.9 Shielding radioactive source and building where source is stored.
- 3.4 Instruction and training for previous experience radiographer's assistants minimum (8) hours.
 - 3.4.1 Written examination in the safe handling and use of radioisotopes.
 - 3.4.2 The assistant will be issued and given instruction in NORSHIPCO operating and emergency procedure.
 - 3.4.3 The assistant will be instructed in use of our radiographic equipment as stated in para. 3.3 of this section.
 - 3.4.4 Review NRC standards for protection against radiation 10 CFR part 20 and 10 CFR part 34.
- 3.5 Refresher training program will be held once annually in radiation safety for all radiographer's assistants and radiographer, minimum 10 hours.
- 3.6 Re-Instruction on questions missed on all examination. Minimum (1) hour.
 - 3.6.1 All radiographer's assistants and radiographer will be re-instructed and given the corrected answers to all questions missed on all examination, no later than (2) days after the examination.

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STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE SECTION 3

- 3.7 **Transportation requirements in transporting radioactive sources. minimum (1) hour.**
- 3.8 **Review the requirements of Federal (NRC) regulations. Minimum (6) hours.**
- 3.9 **Review NORSHIPCO operating and emergency procedure. Minimum (2) hours.**
- 3.10 **Follow up records, keeping for completeness and accuracy of records of exposure, monitoring and dosimeter readings. Minimum (1) hour.**
- 3.11 **Training and testing for Radiographer's assistants with no previous experience.**
 - 3.11.1 **Training period of radiation Safety and Industrial Radiography.**
 - 3.11.2 **Training time for radiographer's assistants with no previous experience is a minimum of sixty eight hours required for class room lectures, demonstrations and discussions. On the job training shall consist of placing the trainee with a certified radiographer for a minimum of three months. A trainee shall not be designated an assistant to the radiographer on the job until he has shown skill and demonstrated competence and willingness to accept responsibility during the class room lectures, demonstrations and discussions and pass a written examination making a grade of seventy (70) or higher.**

STANDARD PROCEDURES NORSHIPCO/RT (REV 7)

ENCLOSURE ONE SECTION 3A

Outline of Training for Radiographer

LECTURE AND TRAINING PROGRAM TO READ AS FOLLOWS:

- 3.1 Fundamentals of Radiation Safety-minimum thirty-two (32).
 - 3.1.1 Characteristics of gamma Radiation.
 - 3.1.2 Units of Radiation does (mrem) and quantity of radioactivity (curie)
 - 3.1.3 Hazards of excessive exposure to Radiation. How excessive exposure can occur internal external exposure, effect on tissue.
 - 3.1.4 Levels of Radiation from licensed materials
 - 3.1.5 Methods of controlling Radiation dose.
 - 3.1.5.1 Working time.
 - 3.1.5.2 Working Distance.
 - 3.1.5.3 Shielding.
- 3.2 Radiation detection instrumentation to be used minimum ten (10) hours.
 - 3.2.1 Use of Eberline 130-A and 130-G gamma Radiation survey meters.
 - 3.2.2 Operation of Radiation survey instruments.
 - 3.2.3 Calibration of survey instruments.
 - 3.2.4 Limitation of survey instruments.
 - 3.2.5 Survey Techniques.
 - 3.2.6 Use of Radiac instruments.
 - 3.2.7 Establishment of high Radiation areas and Radiation areas before exposure, by source, by source data survey and monitoring exposure of the source.
 - 3.2.8 Detection of scatter or secondary Radiation.
 - 3.2.9 Personal monitoring devices.
 - 3.2.10 Film badges, instruction for wearing care and purpose.
 - 3.2.11 Pocket dosimeter for wearing, care, reading excessive exposure and charging.

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- 3.3 Radiographic equipment to be used minimum sixteen (16) hours.
 - 3.3.1 The Iridium 192 camera and Radiation patterns.
 - 3.3.2 The Cobalt-60 calibrator kit and Radiation patterns.
 - 3.3.3 The Radiographic equipment will be by demonstration to all radiographer's assistant by a qualified instructor for training of assistant Radiographer's and Radiographer.
 - 3.3.4 Radiographer's assistant will be permitted to use Radiographic equipment "only under the personal supervision" of a Radiographer, at the site where sealed sources are being used and when the assistant uses Radiographic exposure devices, sealed sources or related source handling tools, or Radiation survey instruments in Radiography.
 - 3.3.5 Posting and establishing Radiation areas.
 - 3.3.6 Proper use of cameras, tubes, collimator and control cables when making exposure.
 - 3.3.7 Monitoring the restricted area.
 - 3.3.8 What to do in case of an emergency and how and to whom you will report the emergency to.
- 3.4 Instruction and training for previous experience Radiographer's minimum eight (8) hours.
 - 3.4.1 Written examination in the safe handling and the use of Radio-isotopes.
 - 3.4.2 The Radiographer will be issued and given instruction in NORSHIPCO Operating and Emergency Procedure.
 - 3.4.3 The Radiographer will be instructed in use of our Radiographic equipment listed in para. 3.3 of this section.
 - 3.4.4 The Radiographer's will be issued and given instruction in the applicable section of parts 34, 19, 20, and 21 of Federal regulations.
 - 3.4.5 Transportation requirements in transporting Radioactive sources.
- 3.5 Refresher training program will be held once annually in Radiation safety for all Radiographer and Radiographer assistants minimum ten (10) hours.
- 3.6 Re-Instruction on questions missed on all examination minimum one (1) hour.

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- 3.6.1 All radiographer and Assistant Radiographer will be re-instructed and given the correct answers to all questions missed on all examination, no later than two days after the examination.
- 3.7 Records, Reports and notification minimum one (1) hour.
 - 3.7.1 Records of surveys and monitoring.
 - 3.7.2 Reports of theft or loss.
 - 3.7.3 Notification of incidents.
- 3.8 Fundamentals of Radiography minimum two (2) hours.
 - 3.8.1 Sensitivity
 - 3.8.2 Subject contrast.
 - 3.8.3 Radiation Quality.
 - 3.8.4 Type of material.
 - 3.8.5 Thickness differences of specimen.
 - 3.8.6 Scatter radiation.
 - 3.8.7 Selection of film.
 - 3.8.8 Selection of source to film distance.
 - 3.8.9 Selection of Photographic density.
 - 3.8.10 Selection of pentameters.
 - 3.8.11 Selection of shims.
 - 3.8.12 Screens and cassettes.
 - 3.8.13 Exposure Calculation.
- 3.9 Training and testing for Radiographer with no previous experience.
 - 3.9.1 Training of Radiation safety and Industrial Radiograph.
 - 3.9.2 Training time for a Radiographer is a minimum of seventy hours required for class room lectures, discussions and on the job training as an assistant for a period of three months.

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- 3.10 Method of determining Competence.
- 3.10.1 A written examination is given to all Radiographer personnel. Those persons making a grade of 70 or higher on this examination, and who are willing to accept the responsibilities of the position, are selected for further training and demonstration of competence for qualification as Radiographer.
- 3.10.2 A Radiographer who is found to be deficient in certain areas is retrained in classroom discussion by their supervisor from time to time on their knowledge and understanding of their method of operation. All Radiographer are spot checked on field operation for correct use of remote handling equipment, storage containers and survey meters and for compliance with safety regulations.

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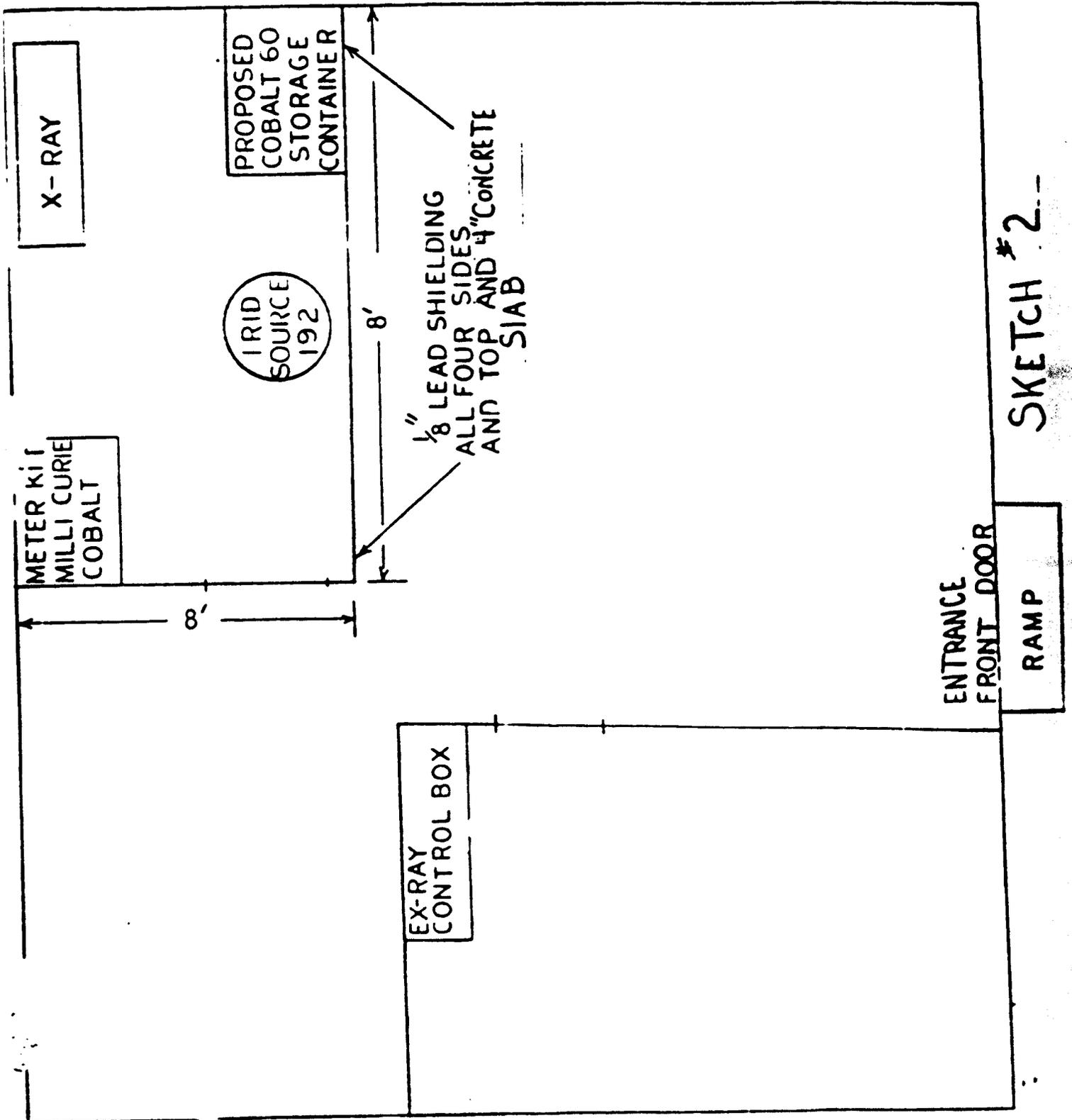
ITEM 9

EQUIPMENT

1. AMERSHAM/660B Portable Radiographic Unit
2. T.O/571 Meter Calibration Kit
3. 3" NORSHIPCO Lead Collimator
4. 1 1/2" NORSHIPCO Lead Pipe Collimator
5. Pocket Dosimeters 0-200 Milliroentgen
6. Alarm Ratemeter
7. Dosimeter charger
8. Survey Meters
9. Portable Lead Screens
10. Radiation Signs

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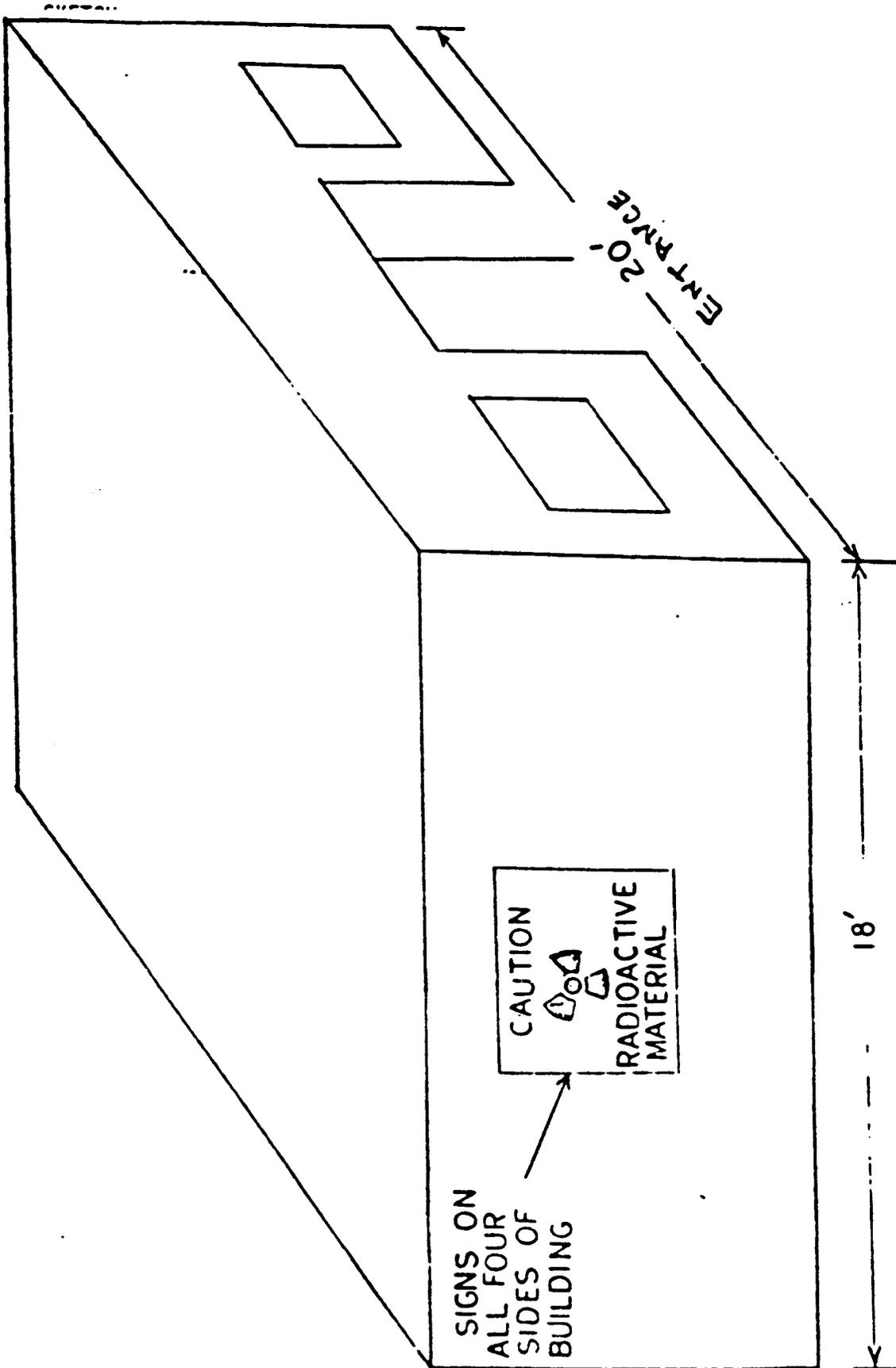
FLOOR PLAN OF PRESENT RADIOACTIVE SOURCE
STORAGE BUILDING



Item 9

ENCLOSURE TWO

SECTION 1



SOURCE STORAGE BUILDING
SKETCH #2

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ITEM 11

WASTE MANAGEMENT

Disposal of licensed material are shipped back to the original supplier for final disposition at:

Amergham Sentinel Division
Radiation Products Division
40 North Avenue
Burlington, MA 01803
(617) 272-2000