iNS corp
INTERSTATE NUCLEAR SERVICES
2903 Millwood Ave., P.O. Box 50164
Columbia, SC 29250-0164
(803) 771-4600

June 15, 1987

'87 JUL -6 A9:11

U.S. NRC Region 1
Attn: Mr. J. Kinneman
631 Park Avenue
King of Prussia, PA 19406

Dear Mr. Kinneman:

SUBJECT: Replacement in Entirity, License No. 37-23341-01.

Please find enclosed (3) copies of a document designed to replace all previous versions of License No. 31-21168-01 in its entirity. An attempt was made to include all substantive and relevant material from all previous license versions and correspondence, so that no previous material need be referenced in any manner.

As one major change, we are making this application under dual categories of Nuclear Laundry and Waste Processor. This categorization was suggested by your personnel, based on our desire to free release laundered and monitored plastic material for non-radioactive burial at sanitary landfills, contingent upon applicable state approval. At the request of Mr. Van Scoville, of your office, we are sending under seperate cover a copy of our detailed procedures for plastic monitoring which we wish to hold proprietary and confidential. Neither the form nor content of these procedures are to be referenced by the license because they are subject to frequent revision of the many minor details.

As a second major change, a new wastewater processing system is installed, a system with which several of your personnel are already familiar. It is a substantial improvement over the previous system.

As a third major change, quarterly chest counting has been substituted for termination urinalysis as our bioassay program. A position paper on the subject will also be provided for your information, also under seperate cover. This change was originally suggested and encouraged by NRC Region II representatives, and has already been implemented elsewhere. Additionally, it has been condoned by our nuclear insurors as an improvement over urinalysis.

~~107440~~ License Fee Information on application

107446 23 JUN 1987

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37-23341-01 PNU

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Please insure that the list of outdated and inapplicable correspondence is no longer referenced and that an actual replacement in entirity takes place. Reference to correspondence concerning conditions, facilities, equipment and personnel which no longer exist is inappropriate.

Excepting the resubmittal of June 8, 1987, no commitment, statement, representation or procedure is made or implied concerning the use of radioactive materials at our facility at Royersford in any other letter or application. We will continue operations under the existing license until such time as the replacement license is approved. All substantive commitments identified from previous correspondence have been incorporated into the appropriate position in the body of the license resubmittal itself, which supercedes and replaces all previous material. By limiting the license to a single organized document, we hope to insure clear interpretation and usability as well as to facilitate inspection and enforcement by your agency. The resubmittal also is as similar to our other eleven facility licenses as possible, which are all written around basically identical NRC, or NRC compatible, regulations. For conciseness some redundant, conflicting, or non-substantive material has been eliminated from the document.

I hope you find the document sufficient. However, I will be happy to provide substitution pages if any revision is necessary, so that a single document with no referenced external correspondence is achieved.

Please advise as to how to calculate any difference in fees required for the dual categories. If there are any questions, I am always at your disposal.

Sincerely,

Guy Wilson

Guy Wilson
Manager,
Corp. Health Physics

L#L= 37055

NRC FORM 313
(1-84)
10 CFR 30, 32, 33, 34, 35 and 40

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

APPLICATION FOR MATERIAL LICENSE

030-30083

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

FEDERAL AGENCIES FILE APPLICATIONS WITH:

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

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

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

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

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

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

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

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

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

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
MATERIAL RADIATION PROTECTION SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

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

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*
- [ ] A. NEW LICENSE
- [XX] B. AMENDMENT TO LICENSE NUMBER 37-23341-01
- [ ] C. RENEWAL OF LICENSE NUMBER ______

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip Code)*
INS Corp.
Attn: Guy Wilson
P.O. Box 50164
Columbia, SC 29250

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.
INS Corp.
401 North Third Ave.
Royersford, PA 19468

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION: Guy Wilson
TELEPHONE NUMBER: (803)771-4600

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

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time. (see page 2)

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED. (see page 2)

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE. (see page 3 & App. E)

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS. (see App. D)

9. FACILITIES AND EQUIPMENT. (see App. B)

10. RADIATION SAFETY PROGRAM. (see App. D)

11. WASTE MANAGEMENT. (see App. C)

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)* CAT: Nuc Laundry& Waste Proc. FEE:

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

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

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

SIGNATURE—CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
Guy Wilson (signature)	Guy Wilson	Manager, Corp. Health Physics	6/15/87

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS
- [ ] <$250K
- [ ] $250K–500K
- [ ] $500K–750K
- [ ] $750K–1M
- [ ] $1M–3.5M
- [ ] $3.5M–7M
- [ ] $7M–10M
- [ ] >$10M

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

c. NUMBER OF BEDS

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION *(Dollar and/or staff hours)* ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? *(NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)*
- [ ] YES
- [ ] NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
APP	Jul. 2 I	6A, (4B)	"4B" withdrawn after review - See 10/6/87 telecon & 10/9/87 Ltr. Deposited LYRM	~~107440~~ 107446
AMOUNT RECEIVED: $1,400	CHECK NUMBER: 021758		"OFFICIAL RECORD COPY" ML10	DATE: 23 JUN 1987; 8/24/87

8709030074 REG1 LIC30 37-23341-01 PNU

INS Corporation

Application for Amendment

to License No. 37-23341-01

submitted 6/15/87

107440

Date: 6/15/87 License: 37/23341/01

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ITEM 5
a, b, and c

a. Radioactive Material		b. Physical Form	c. Possesion Limit
5.1	Any radioactive material other than that listed in 5.2 and 5.3	Contaminated garments and other launderable items, equipment, machinery, protective devices, and associated decontamination wastes.	2.5 Curies
5.2	Source material	" "	100 kilogm
5.3	Special Nuclear Material	" "	50 gms
5.4	Any radioactive material	Miscellaneous Radiation Standards (SRMs) from the National Bureau of Standards or other suppliers	Total activity of all SRMs not to exceed 5 milli-curies or 1 mCi/Source.

ITEM 6

Purpose for which
licensed materials shall be used

a. The radioactive materials listed in 5.1, 5.2, and 5.3 are in the form of contaminated garments, plastics, PVC and other launderable items, equipment, machinery, protective devices, and resulting decontamination wastes. Operations include the transportation of contaminated articles, decontamination by laundry, dry cleaning, or other industrial cleaning processes, and testing and monitoring of items.

b. Radioactive materials listed in 5.4, are to be used for instrument calibration.

ITEM 7

Individuals Responsible for Radiation Safety Program

See Appendix E for Training and Responsibilities of the individuals listed.

Randy L. Thomas, Royersford Plant Mgr./RSO
Michael D. Flynn, Assistant Plant Manager/Alternate RSO
George J. Bakevich, General Manager
Guy R. Wilson, Manager Corporate Health Physics
William C. Moser, Operations Manager/Alternate RSO
William R. Roschewski, Operations Manager/Alternate RSO
Leslie B. Case, Corp. Engineer
Gregg A. Johnstone, Mgr., Tech. Sales and Marketing
Susan L. Fanelli, Health Physicist
Alfred A Richard, Morris Plant Manager/Alternate RSO
Robert L. Zimmerman, Health Physics Consultant
Michael S. Terpilak, Health Physics Consultant
R.F. Coley, Health Physics Consultant
Victor M. Crusselle, Radiation Specialist
Steven M. Eno, PVRS Mgr.
Thomas B. Nally, Alternate RSO
Michael J. Gerstner, Alternate RSO
Bartlett L. Mock, Alternate RSO
Phillip A. Rumian, Alternate RSO
John R. Reed, Alternate RSO
Brian Dean Fischer, Alternate RSO

Users at the plant include all RSO/Alternate RSO individuals.

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APPENDIX A

INTERSTATE NUCLEAR SERVICES

INSTRUMENT CALIBRATION REQUIREMENTS

The purpose of this appendix is to provide guidelines which are to be followed when calibrations are performed by INS personnel or its consultants using INS calibration equipment and sources. These guidelines do not apply to instruments which are contracted to outside agencies for calibration.

I. CALIBRATION REQUIREMENTS

A. Equipment Required for Calibrations

1. Pulser

The pulser shall be:

a. of suitable capacity to be able to check all ranges of instruments.

b. calibrated on a frequency not to exceed 6 months (and traceable to National Bureau of Standards).

c. able to provide an adequate range of pulse amplitudes for all instruments to be checked.

2. Sources

The sources shall:

a. be traceable to the National Bureau of Standards (certificates of traceability shall be maintained on file).

b. provide appropriate types of radiation which instruments may encounter during use.

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c. be of appropriate activity to determine efficiencies of instruments.

3. Voltage Meter

a. The voltage meter shall be suitable to measure voltages from 0 to 2500 volts and of sufficient internal resistance to preclude unnecessary loading of circuit being measured.

4. Technical Manuals

a. The technical manuals shall be used for calibration procedures for each particular instrument type. In lieu of technical manuals, calibrations shall be performed only per procedures approved by the INS Corporate Engineer.

5. Miscellaneous Equipment

a. necessary cables and connectors for proper hookups of instruments.

b. lead shielding when necessary

c. source holders to provide a repeatable geometry

d. graph paper

e. certificate of calibration

f. individual calibration labels

B. Methods for Calibration

1. Follow steps for calibration as listed in the appropriate technical manual for the instrument to be calibrated, or as specified by the INS Corporate Engineer if no manual is available.

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2. Certificate of calibration shall be completed recording all pertinent information.

3. Attach a label to the instrument certifying calibration of instrument, date performed and date next calibration due.

C. Special Calibration For instruments that are used for more than one type detector.

1. Calibrate the instrument as outlined above.

2. Calculate the operating voltage for each detector used, by plotting a voltage plateau (cpm vs voltage graph).

3. It may be necessary to shield detector probe using lead.

4. Set the gain at appropriate voltage for detection.

5. When completing certificate of calibration, insure distinctions are made for all detectors which the instrument may use.

D. Required Calibration Frequency
As a minimum, instruments shall be calibrated on a semi-annual basis, following all repairs, and whenever faulty operation is suspected.

E. Daily Efficiency Check
The efficiency of laboratory instruments (SAC-4 and BC-4) is determined as follows:

An appropriate source is counted for one minute to verify that the efficiency has not varied by more than 5% since the last calibration. If the efficiency has varied by greater than 5%, the instrument is recalibrated. This count is done daily and the efficiency obtained is used in performing all calculations for that day. Examples of appropriate sources include: .005 uCi Th-230 source or a .005 uCi Tc-99, or .0209 uCi Sr-90 source (BC-4).

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APPENDIX B

FACILITIES AND EQUIPMENT

The INS Corp, North Third Avenue, Royersford, PA, 19468, is a division of Unifirst Corp., Woburn, MA.

The principal officers are:

Aldo Croatti, President (citizen)
Unifirst Corporation
15 Olympia Ave.
Woburn, MA 01888

Ronald Croatti, Vice President (citizen)
Unifirst Corporation
15 Olympia Ave.
Woburn, MA 01888

George J. Bakevich, General Manager (citizen)
295 Parker St.
Springfield, MA 01151

The laundry is established to decontaminate clothing and other launderable items received from users of special nuclear, source, and by-product material. The material will be in the form of contamination from various customers.

The laundry is located on the west side of North Third Ave., Royersford, PA. The building is a one and a half story concrete and steel structure on approximately 12 acres of land. Figure B-1 shows the plant and surrounding property. The nuclear portion of the laundry building contains approximately 21,000 square feet of floor space.

The equipment employed in the decontamination laundry includes, but is not necessarily limited to,washer extractors, dryers, a sorting table, plastic handling equipment, a plastic densifier, radioactive liquid waste processing system, spray down lint collectors, a waste compactor with tent enclosure and HEPA air unit, and a HEPA air unit for the plastics area.

See Figure B-2 for a typical layout of the nuclear laundry portion of the facility.

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A. Work-flow of Radioactive Materials

1. Launderable Items for Reuse

Figure B-3 shows the general areas in which radioactive material is handled. Incoming contaminated apparel items and other reusable items are off-loaded from the truck. This material is taken directly into the plant where articles may be stored prior to washing. Containers are surveyed and segregated according to levels of radiation. Any container reading over 50 mr/hr on contact shall be returned to the customer unopened. The containers are moved into the sorting area where they are opened, sorted, and loaded into washers. All sorting of unwashed items takes place beneath a ventilated hood designed to minimize the possibility of inhalation of particulate material. A continuous air flow is maintained into the hood, which draws particulates away from the breathing zone. Persons handling items having loose contamination are required to wear protective clothing as outlined in a Protective Clothing Chart, approved by the Plant Manager/RSO. Figure D-1 provides an example of the content of a chart. Launderable reusable items are then washed, removed from the washers, and placed in the dryers. Following drying, garments are transferred to the monitoring/ folding room to be monitored, folded, sorted and packaged, as required by the customer. Containers are surveyed for fixed and loose contamination prior to being loaded on the truck for shipment back to a customer. Packaging and shipments are performed in compliance with DOT regulations.

2. Launderable Non-Reusable Items (Plastic)

Non-Reusable items such as plastic bags are processed with the intent of separating material by reason of disposal method. Disposal of such items as plastic bags is often desirable because such items will often not structurally tolerate washing and reuse. This material is off-loaded at receiving area 2, shown in Figure B-3.

This material is stored in the receiving area or other areas prior to processing. Processing begins with sorting in the upper level of the plastic area. A constant air flow is applied to carry potential airborne contamination away from personel.

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Figure B-1

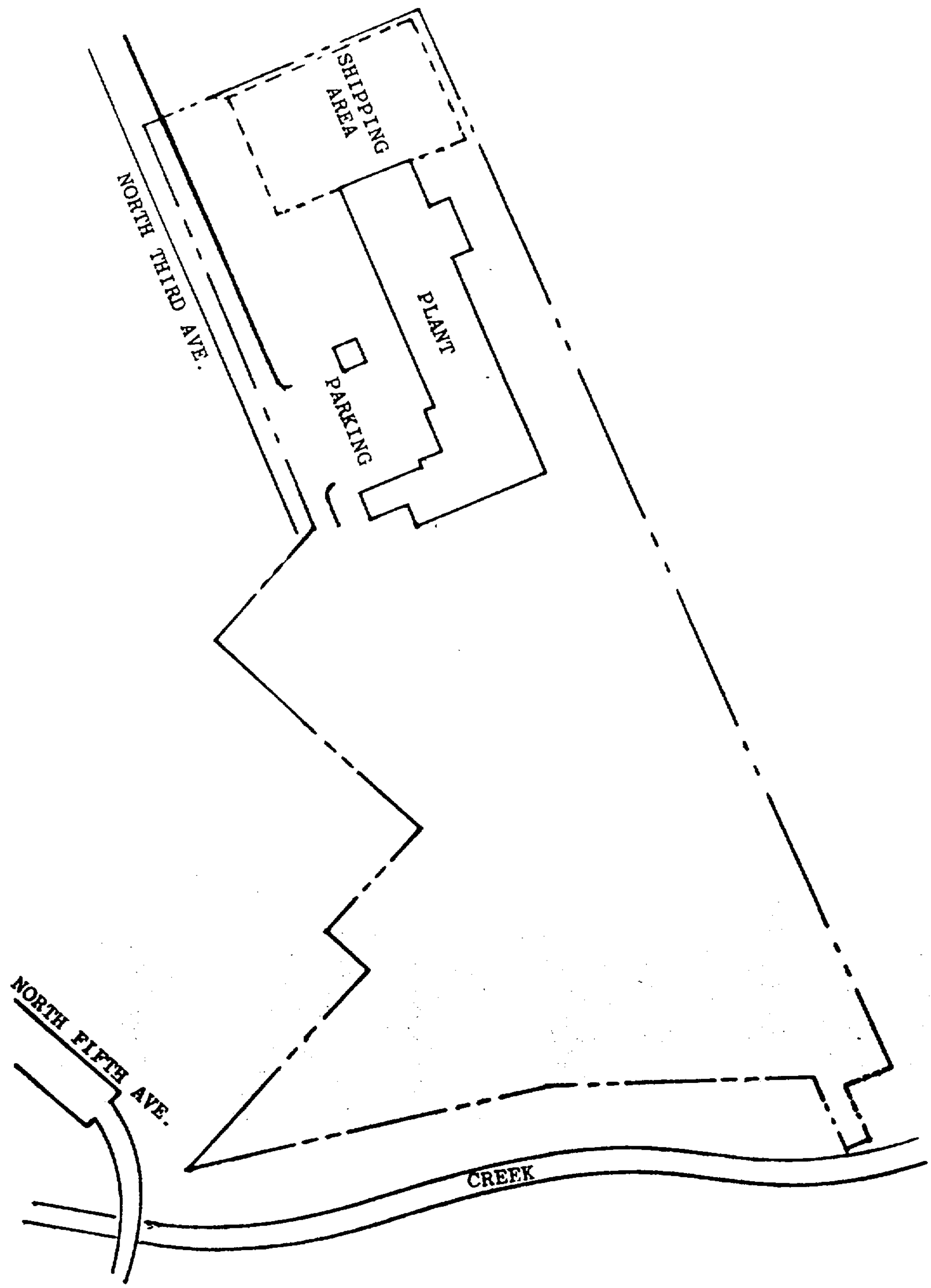
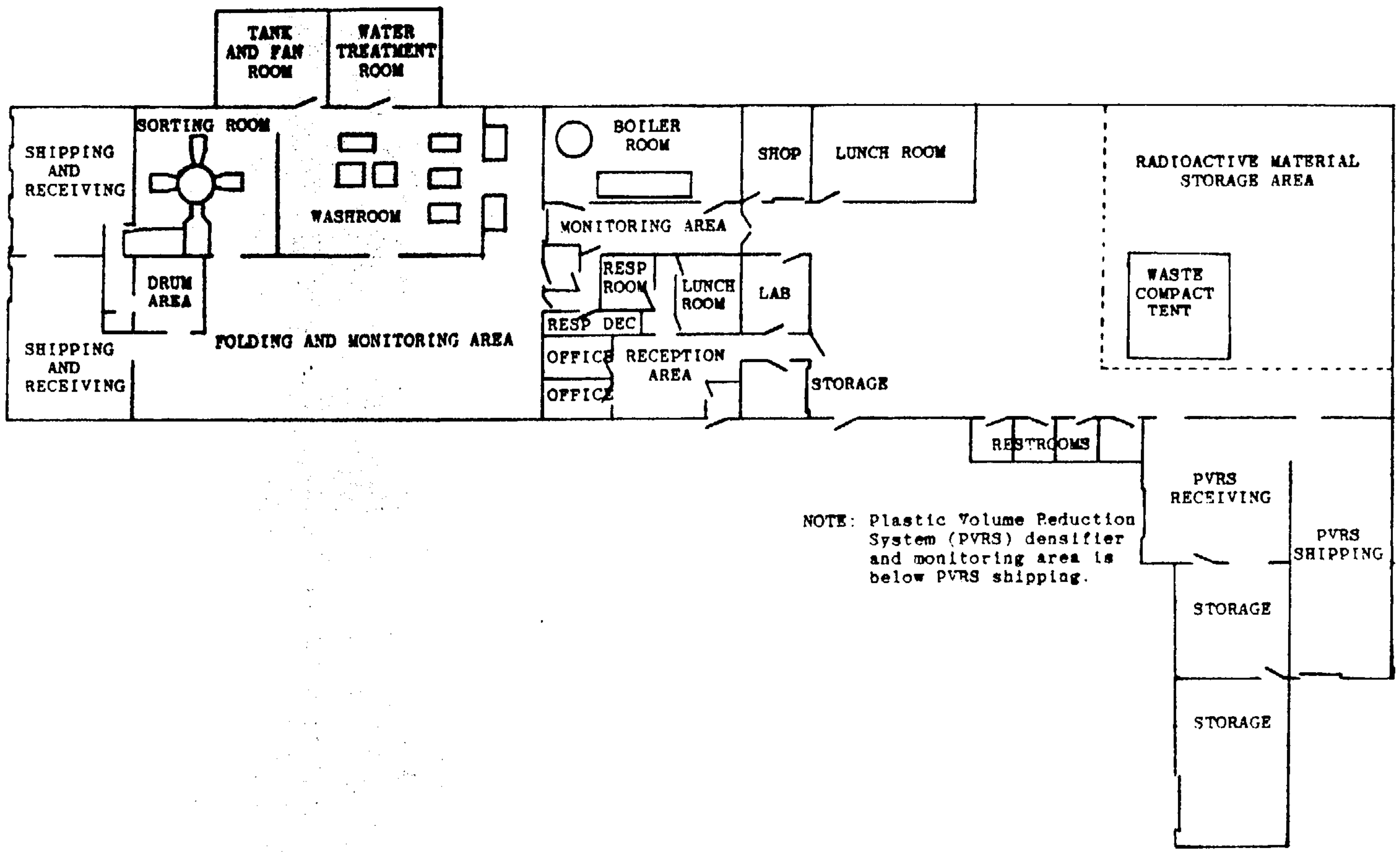


Figure B-2



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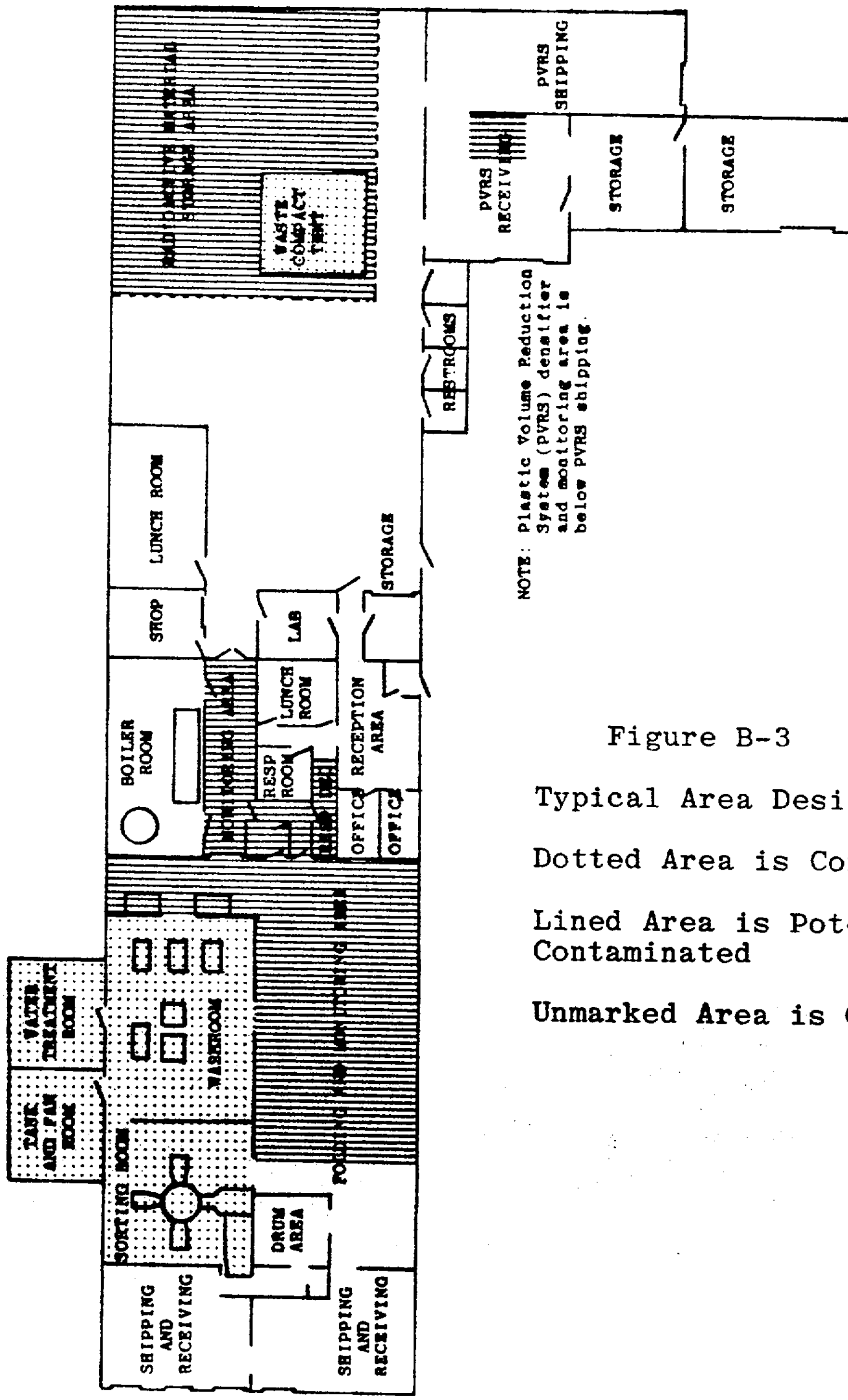

Figure B-3

Typical Area Designations

Dotted Area is Contaminated

Lined Area is Potentially Contaminated

Unmarked Area is Clean

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Following sorting, the material may be carted to the washroom, washed, dried and returned to the plastics area where it is granulated to facilitate belt monitoring in a low background area. The material is conservatively monitored to the limits specified in Table F-1 by both belt and cave monitors. Rejected material is marked radioactive and returned to customers. Material found to be below the limits specified in Table F-1 may be returned to customers or disposed of (subject to state approval) at a PA DER approved land fill.

B. Controlled Areas

The areas within the walls of the facility and fence are considered the Restricted Areas. These areas are subdivided as follows:

1. Non-contaminated areas - areas in the plant where loose contamination is not present and areas outside the plant but within the facility bounds. This includes the receiving area, the office and lavatory, and the clean equipment/chemical storage area.

2. Potentially contaminated areas - areas where laundered items are handled. This is the folding/monitoring area, the plastic monitoring area, and the hot storage area.

3. Contaminated areas - areas where unlaundered items are handled. This is the apparel sorting area, washer/dryer area and the plastics sorting area.

These areas shall also be posted as appropriate in accordance with 10CFR20.203.

C. Radiation Detection

The following tabulation specifies the minimum instruments and equipment available when the facility is in operation. Similar instruments by other manufacturers may be substituted for those listed below. Whenever similar instruments of different manufacturer are substituted, the correct technical manual will be used for calibration, or the INS Corporate Engineer will be consulted for instruction in the appropriate calibration method.

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TABLE B - 1

RADIATION DETECTION INSTRUMENTS AND LABORATORY EQUIPMENT

QTY.	INSTRUMENT TYPE	RADIATION DETECTED	SENSITIVITY RANGE	PRIMARY USES
(1)	Eberline E-120 w/HP-177	Beta, Gamma	0-50 mr/hr in 3 ranges	Garment monitoring and area surveying
(1)	Eberline RM-14 w/HP-210	Alpha, Beta Gamma	0-50k cpm in 3 ranges	Frisking and garment monitoring
(1)	Eberline BC-4	Beta/Gamma	Scaler 0 to 1E6	Laboratory measuring of beta/gamma
(1)	Eberline SAC-4	Alpha	Scaler 0 to 16	Laboratory measuring of alpha

ADDITIONAL EQUIPMENT

EQUIPMENT	DESCRIPTION	PRIMARY USE
(1) Air pump, with flowmeters and filter heads at various locations	Air sampling system	Continuous In-plant and environmental air sample collection during operation.
(1) Hot Plate	Adjustable evaporation	Water sample
(1) Infra-red lamp	Adjustable evaporation	Water sample

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D. Mobile Dry-cleaning Operations

The Royersford facility maintains and operates mobile decontamination cleaning units for operation, on a contract basis, at licensed nuclear facilities, both in Pennsylvania and in other states. While operating at the Royersford facility, all radiation protection and control procedures and practices in this license are applicable. While operating off-site, the requirements of the contractor's license are applicable.

Figure B-4 is a typical mobile laundry decontamination unit. Units for decontaminating respirators are also maintained at the Royersford facility.

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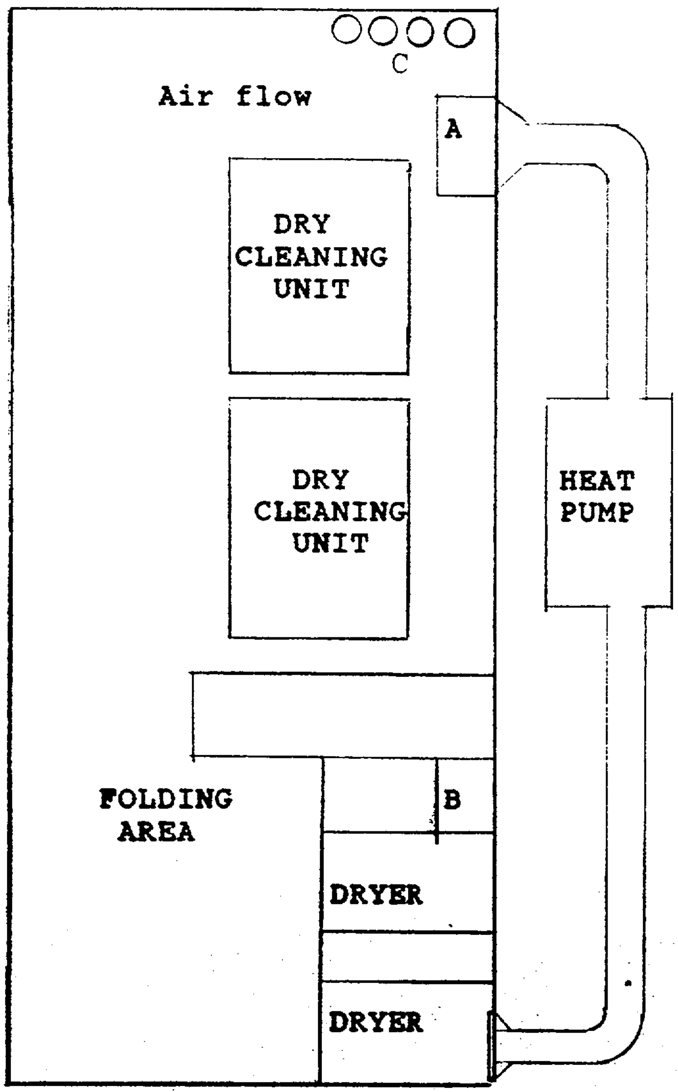
Figure B-4



TYPICAL MOBILE DRY-CLEANING UNIT

A. Room air hepa

B. Dryer hepa

C. Cartridge filters

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APPENDIX C

I. WASTE DISPOSAL & EFFLUENT TREATMENT

A. Solid Waste

All solid waste such as lint, cloth, filters, and other laundry solids will be placed in DOT approved shipping containers, monitored, sealed, labeled, and disposed of at the appropriate licensed low level radioactive waste disposal facility. Waste items may also be returned to the customer, depending on contractual arrangements.

B. Liquid Waste

The wastewater system is designed to assure that releases are properly treated, and sampled prior to discharge. Figure C-1 is a schematic diagram of the wastewater processing system.

The liquid waste system is designed to operate on the batch system to assure that liquids are not released to the sanitary sewer until sampling and anlysis have been conducted to determine that effluents meet applicable discharge limits. Treatment facilities are provided so that the radioactive content of effluents shall be as low as reasonably achievable (ALARA).

The wash room is equipped with a liquid waste primary settling pit. Wastewater from the washer extractors is gravity drained to the pit via a drain trough. Overflow from the washers is drained by the same route to this pit.

The floor of this primary pit is sloped to facilitate periodic removal of settled solids. The waste water then gravity drains to one of two equalization tanks from the equalization pit. A level activated pump transfers the waste water via a pressure line to rapid mixer No.1, where cationic polyelecetrolyte is added by a metering pump. The wastewater then passes through a series of mixing chambers designed to promote the growth of floc by controlled velocity gradients. These chambers include a second rapid mixer and two flocculators with variable speed gear motors. Provision is allowed for charge re-reversal in the secondary flocculator via metered addition of anionic polyelectrolyte. Use of this chemical is discretionary for the operator, and is intended to control excessive solids carryover from the phase separator to the filters downstream. Effluent of the secondary flocculator passes into the entrance structure of the lamella phase separator at velocities below 1FPS to prevent floc damage. Heavier floc traversing the entrance structure continues downward into the lower conical area to await periodic discharge. Better suspended floc travels upward where settling occurs over the large area provided by the close packed lamella plates. Settling material may travel along the plates, whose design angle encourages "sloughing" as sedimentation occurs. Periodically, solids are hydraulicly flushed from the conical accumulation area by opening a valve below the phase separator. This sludge is dumped onto drying beds for dewatering and drying, which may be enhanced by addition of infrared heat. Dried material is packaged per regulations and requirements imposed by burial site operators and pertinent governing and regulatory bodies of the destination state, Federal Government, and all applicable affected government entities.

Supernatant wastewater from the lamella separator exits through a flow equalization structure, designed to minimize short circuiting & equalize flow across the plates. Exiting supernate gravities to one of two multi-media granular filters for polishing, and on to a final holdup tank. A continuous sample spigot diverts liquid to a collection container located near the bottom of the gravity line between the polishing filters & the final holdup tank. The sample is analyzed as described in Appendix D of this license. No

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discharges will be made above any limit stipulated in this license or applicable regulations. For analyses indicating excessive concentration limits will be met preferentially by additional filtration, or if necessary, by dilution with potable water. The latter practice is for unusual circumstances only and will never be practiced routinely. When the analysis shows that the water concentrations are less than the plant release limit (see Section B(2) of Appendix D) the contents of the hold-up tank are pumped directly to the municipal sewer. The entire system is microprocessor controlled and operable from a Main Control panel. Operation is procedurally and administratively governed by the Manager of Corporate Health Physics, and is performed by trained individuals with written procedures.

C. Air Effluent

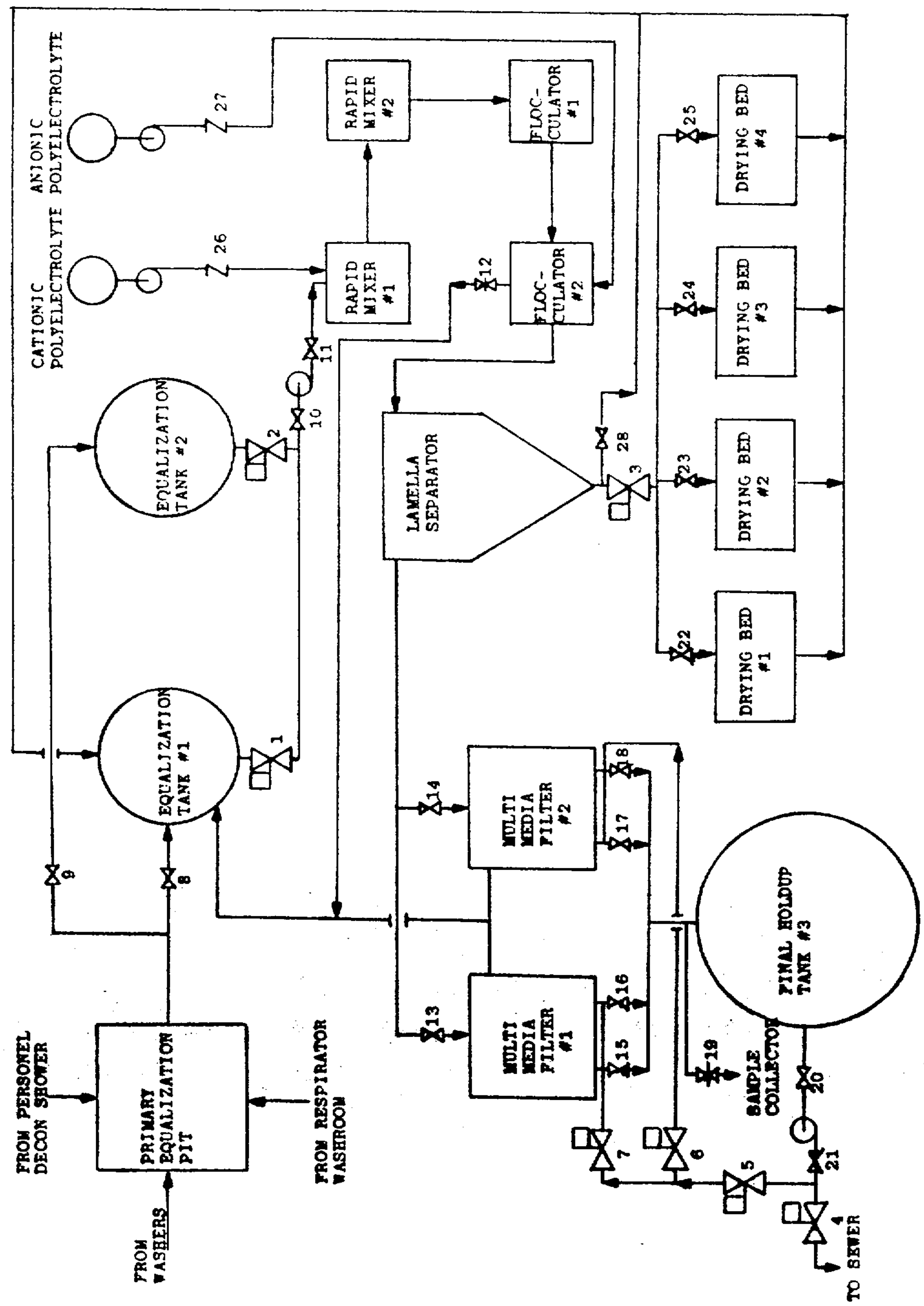
To reduce exposure to airborne contamination, a ventilation system is provided which encourages a pattern of air flow in a clean-to-contaminated direction and provides adequate filtration prior to discharge.

Laundry room air is monitored in the principal work areas in the plant, (i.e. the wash and sorting areas and the folding and monitoring areas). The air sample system is operated continuously from the time when contaminated garments are processed for washing until the wash cycle and drying is complete.

Air exhausted from the dryers passes through the lint collector, a scrubber type system designed for particulate removal. A separate system with a second lint collector is used to insure adequate ventilation for the sorting table. Representative effluent sampling is performed downstream of the lint collector in the discharge stack at a point prior to exhaust. The particulate sampler head is oriented with respect to the air stream such that near isokinetic conditions are achieved. Air velocity inside the sampling inlet nozzle is slightly less than the surrounding air velocity. This results in assurance that any sampling errors due to particle inertia are conservative.

Figure C-2 schematically depicts the air system. Air samples are counted for alpha and beta-gamma activity with the SAC-4 and BC-4 laboratory counters, respectively. Permanent records of air sampling results are maintained.

Figure C-1



Wastewater Processing
System

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Date: 6/15/87

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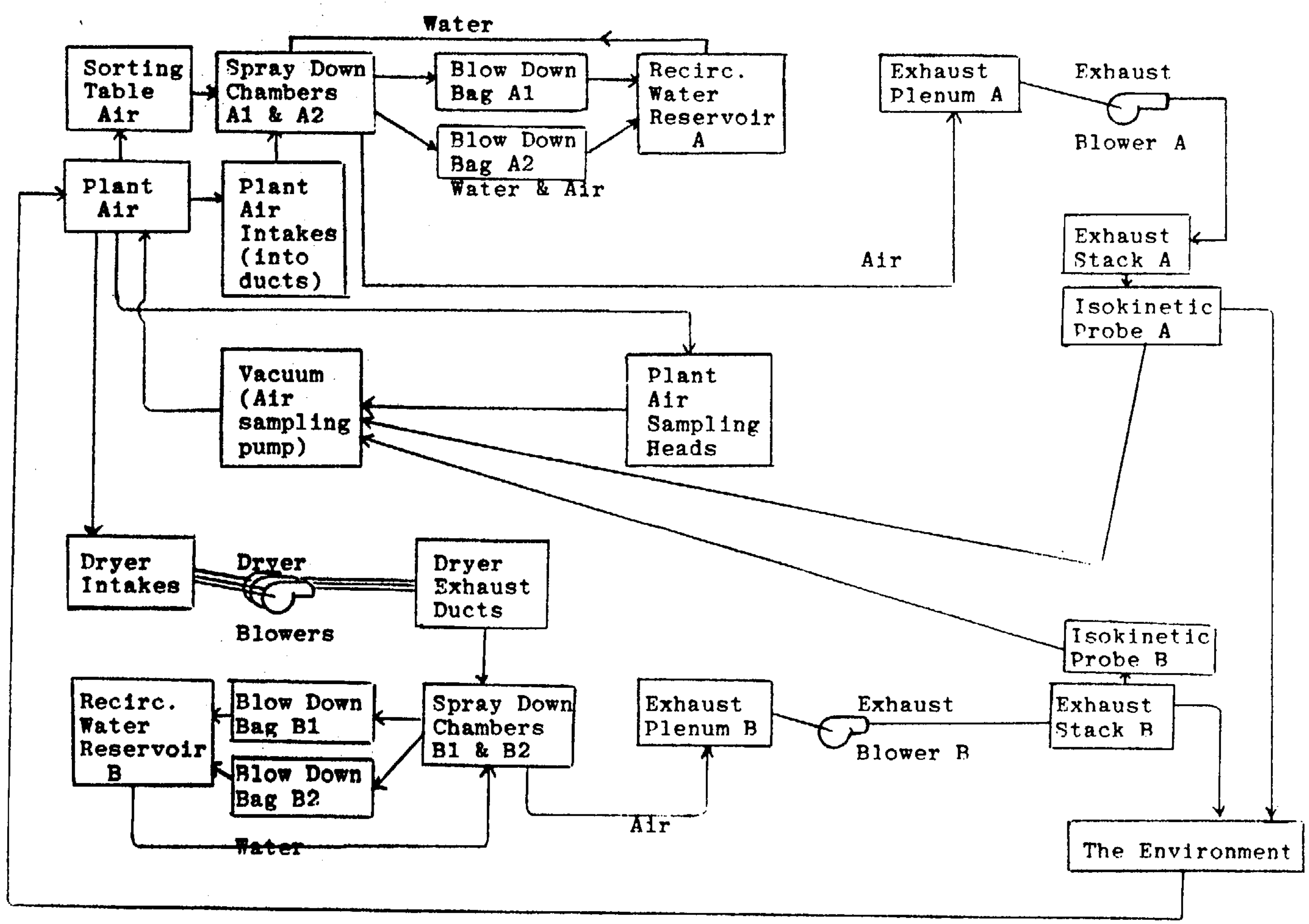

Figure C-2

Air Systems

Date: 6/15/87 License: 37/23341/01

APPENDIX D

Radiation Safety Program

A. General

The radiation safety program has been developed primarily to minimize ingestion, inhalation, or other modes of entry of radioactive material into the body, since exposure from external sources is typically low. Good housekeeping shall be strictly enforced.

The decontamination facility is restricted to everyone other than trained operating personnel and escorted or trained visitors. Details of Plant Security are specified in Section I of this appendix.

B. Maximum Permissible Exposures and Concentrations

1. Occupational Dose Limits from External Exposure

	Allowable Exposure *Rem per Calendar Qtr.	INS Action Level Rem per Calendar Qtr.
Whole Body	1.25	1.00
Hands, Forearms, Feet and Ankles	18.75	14.00
Skin of the Whole Body	7.50	5.50

*** These limits are specified in the 10 CFR 20.101. The whole body limit may be exceeded only if the conditions of 10 CFR 20.101 are met.**

2. Maximum Permissible Concentrations for Air and Water

a. Wastewater

(i) **Discharges of wastewater into a sanitary** sewer system shall be made in accordance with 10 CFR 20.303. or more conservative than requirements set forth in 10 CFR 20 Appendix B, Table I, Column 2. The sum of the ratios of each radionuclide present to its MPC shall conform to the following relationship:

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$$\frac{Ca}{MPCa} + \frac{Cb}{MPCb} + \frac{Cc}{MPCc} + \ldots <= 1$$

(ii) For discharges where the identity of each radionuclide is known* but the concentration of one or more of the radionuclides is not known, the gross concentration limit is the limit specified in 10 CFR 20 Appendix B, Column I, Tables 1 or 2, as appropriate, for the radionuclide having the lowest concentration limit.

(iii) When the concentrations are not known but identities, and gross beta measurements are known, discharge may be made by conservatively attributing all gamma activity to the most restrictive gamma emitter, and attributing the difference in gross gamma and gross beta to the most restrictive pure beta emmitter and meeting the limitations delineated in (i).

(iv) If concentrations are not known but; radionuclide identities are such that it is known that Sr-90, I-125, I-126, I-129, Pb-210, Po-210, Ra-223, Ra-226, Ra-228, Pa-231, Th-nat, Cm-248, Cf-254, and Fm-256 are not present, the limit shall be 6E-5 uCi/ml.

(v) For purposes of this license, a radionuclide may be considered as not present in a mixture if:

(a) The ratio of the concentration of that radionuclide in the mixture (Ca) to the concentration limit for that radionuclide specified in Table I, Column 2 of Appendix "B" (MPCa) does not exceed .1 (i.e., Ca/MPCa is less than or equal to 1/10); and

(b) The sum of such ratios for all radionuclides considered as not present in the mixture does not exceed 1/4, (i.e., Ca/MPCa +Cb/MPCb +.......is less than or equal to 1/4).

*Identity of radionuclides is known by utilizing the DOT certified shipping papers received from the customers. Radionuclides are assumed present unless confirmed to be absent by composite air and water samples performed by INS. Composite analysis will be performed at least annually.

3. Loose Surface Contamination Action Level

a. Noncontaminated areas

Action Level: The removable levels listed in Table F-1, Appendix F of this application.

b. Potentially contaminated areas

Action Level: Five times the levels listed in Table F-1, Appendix F of this license.

c. Contaminated areas

Action Level: Ten times the removable levels listed in Table F-1, Appendix F of this license.

In keeping with the ALARA philosophy, the RSO shall review records for potential problems & take appropriate corrective action if necessary.

C. Radiation Signs and Symbols

1. **The standard radiation symbol is a magenta three bladed design on yellow background. It shall appear on all radiation or radioactive material warning signs. Special instructions and precautionary procedures that are to be followed within the area shall be included. The particular circumstances shall determine the conditions for posting signs in accordance with 10 CFR 20.**

2. **Area Classification**

a. **Restricted area - Definition**

"Restricted area" means any area to which access is controlled by the licensee for the purpose of security and protection of individuals from exposure to radiation and radioactive material. The area within the fence and the building is the restricted area.

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b. Restricted area - Designation

The restricted area for contamination control purposes shall be divided into three areas; a noncontaminated area, a potentially contaminated area and a contaminated area: These areas are defined as follows:

(i) Noncontaminated areas are areas of the facility in which radioactive items are not processed, such as the offices and lounge. No protective clothing is worn in these areas.

(ii) Potentially contaminated areas are areas where cleaned items are handled. A potential for contamination exists in these areas, and some protective clothing may be required.

(iii) Contaminated areas are the portions of the facility where the laundry is washed and dried. Protective clothing is required in this area (See Figure D-1). Figure B-3 shows the initial layout of facility and area designations, which may be modified only with RSO approval, including written update of facility maps on hand.

3. Contamination Control

To prevent the spread of loose contamination, and to protect individuals from being contaminated, there are parts of the Plant where protective clothing must be worn. For example, in washing area, coveralls and protective shoe covering must be worn by workers. Gloves must be worn while loading the washing machines or sorting contaminated laundry. These garments must be worn only in the designated areas, and must be removed immediately upon exiting that area. A line or other physical boundary is present outside of which this protective clothing must not be worn. A Protective Clothing Chart, (Figure D-1), which may be altered only by the Plant Manager or RSO, describes the protective clothing that is to be worn in normal production and maintenance jobs. For activities not listed on the chart, the employee shall report the nature and location of the activity to health physics personnel or to the RSO, who will determine the appropriate protective clothing to be worn. The chart may be modified only with RSO approval, including written update of facility maps on hand.

D. Personnel Monitoring

1. Radiation Dosimeters

All employees and visitors who enter the radiation control area under such circumstances that they are likely to receive a dose in any calendar quarter at or in excess of 25% of the allowable exposure limits specified in Appendix D (B) (1) herein are issued a film or TLD badge. Badges are kept with a control badge in a low-background area when not in use. Badge services are provided by a NVLAP certified dosimetry lab. Records are maintained at the Royersford facility.

Self reading pocket dosimeters will be issued to visitors who enter the portions of the restricted area which are posted as radiation areas. Film or TLD badges may be used in lieu of pocket dosimeters.

2. Bioassay Program

a. **New Employees**

All new employees who work in a contaminated area shall be required to participate in a baseline gross gamma chest count.

b. **During Operations**

Personnel who work in contaminated areas shall be required to participate in gross gamma chest counts quarterly.

c. **Terminating Employees**

All employees who have ever worked in the contaminated area shall be required to participate in termination gross gamma chest counts. Refusal to participate will be documented.

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d. Procedures

All gross gamma chest counts are performed by INS Corp. at the Royersford facility in a low background area.

e. Action Levels

The purpose of the bioassay program is to periodically confirm the effectiveness of the facility's practices in controlling the internal intake of radioactive material. As inhalation is the predominant mode of entry of radioactive material into the body, bioassay results are a reflection of the air handling and sampling system. That system is primarily relied on for personnel protection, with the bioassay program and internal action levels serving as a check on the air handling processes. Action levels for mixed fission products are derived from the models and retention functions established in Report 30 of the International Commission on Radiation Protection (ICRP). Should any sample exceed the applicable action level, resampling will be immediately required. If the resample indicates continuing activity above the action limit, the employee will not be permitted to work in areas where loose contamination is present until the matter is investigated and an acceptable plan is developed.

3. Records

Records of dosimetry and bioassay results shall be kept at the facility. Upon termination of employment, a complete record of exposure and bioassay data shall be compiled. Such records shall be available to the employee upon request. All records are available for inspection. Records shall be reviewed periodically by Corporate Health Physics personnel.

E. Radiation Monitoring

1. Clothing

Monitoring of processed clothing varies by customer contractural stipulations.

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2. Air Sampling

Since inhalation and ingestion are the principle means of radionuclide entry into the body, it is important that airborne radioactivity be measured and controlled. All results of air samples analyses shall be maintained. Within the facility, sufficient representative air samples are taken to determine that the concentration of radionuclides in the air in the work areas, and that discharged to the environment, does not exceed the limits set forth in 10 CFR 20.

Air is continuously sampled in the work area and analysis is performed following a minimum twenty-four hour period for decay of natural daughters. Air sample holders are located in areas of the breathing zone which are likely to contain airborne contamination. See Figure D-2 for typical air sample locations. Locations may be changed as equipment configurations change, and air sample heads may likewise be relocated in a manner to conservatively represent breathing air.

Effluent air is sampled continuously whenever air is being exhausted (i.e. whenever the dryers are in use). The air sample filter papers are analyzed weekly (at a minimum) during operations throughout the plant, following a minimum 24 hour decay of short lived radon progeny.

Composite effluent air samples shall be analyzed for gross alpha and gross beta. Gamma spectrometry shall be performed on an annual basis by INS Corp. or a qualified vendor.

3. **Water Sampling**

An in line composite water sample is drawn from the gravity line upstream of the final holdup tank. This composite is continuously drawn into a container during liquid transfers. When the final holdup tank is ready for discharge, 50 ml is taken from the container immediately following intense agitation. That is evaporated in a beaker to approximately 10 ml. The contents are then transferred to a planchet for complete evaporation under a heat lamp or on a hot plate. Care is taken to assure that all the contents of the beaker are transferred to the planchet. The sample is then counted in the BC-4 for gross beta-gamma activity. The activity is then compared to the MPC's as determined in section B(2)(b) of this appendix. Only tanks with concentration levels less than those prescribed in this section shall be discharged to the sanitary sewer. When sampling indicates excessive volumetric activity, waste-water will be returned to the treatment system for additional treatment.

An annual composite is also maintained from combining proportionate volumes representative of all discharges. It shall be analyzed for gross alpha and gross beta activity. Gamma spectroscopy shall also be performed on this sample to determine the identity of gamma emmitting radionuclides.

4. Standard Survey Program

When the Plant is in operation, a radiation and contamination survey is conducted weekly. The purpose of the survey is to detect any anomalous occurrence or increase in levels of surface contamination, to monitor the effectiveness of radiation safety and control practices, and to implement appropriate corrective actions that reduce radiation exposure to workers in a timely manner.

a. Radiation Survey

(i) Using an appropriate, calibrated, beta-gamma survey instrument, the general radiation levels in areas normally occupied by workers are determined weekly. A survey for "hot spots" on machinery, filters, pipes, storage facilities, and waste or laundry containers is made. Survey results are recorded on the appropriate form.

(ii) If significant hot spots or materials are discovered, they are reported to Plant Management for removal from occupied areas, decontamination, shielding, or posting as appropriate.

(iii) A facility survey, including areas outside of the Plant but within the Restricted Area, is performed monthly.

b. Loose surface contamination survey

(i) At least five smears are taken each day of operation. Floors, walls or machinery in contaminated areas shall be smeared. Special attention is given to the washroom and sorting area floors and step-off areas.

(ii) Smear results are recorded on the appropriate plant survey form. Should any smear exceed action levels, results are reported to Plant Management for decontamination. Should smear results reflect the spread of contamination to low or noncontaminated areas, an investigation of the cause of such contamination shall be made.

(iii) Action Levels - Areas shall be cleaned if the removable contamination limits specified in Appendix F, Table F-1 of this license are exceeded in the noncontaminated areas, 5 times these values for the potentially contaminated areas, and 10 times these values for the contaminated areas.

c. Vehicle Surveys

Trucks shall be surveyed for both radiation levels and loose surface contamination prior to leaving with a load of laundered items to assure compliance with DOT regulations.

F. Access Procedure

All personnel entering the decontamination laundry must be trained employees of the INS Corporation or have permission from the Plant Manager or Radiation Safety Officer.

1. Employees

Employees shall only enter through the employee entrance door. Employees shall don protective clothing as necessary prior to entering the contaminated area. Shoe covers as a minimum shall be worn in the contaminated area. Personnel shall monitor themselves and/or their clothing prior to leaving the restricted area.

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All personnel leaving the contaminated areas shall:

a. Remove shoe covers before going to noncontaminated areas.

b. Remove any additional protective clothing before leaving the contaminated area.

c. Monitor their person and clothing before leaving the restricted area.

2. Visitors

All visitors must be accompanied by the RSO or an INS trained radiation worker. At a minimum, self-reading pocket dosimeters will be issued to visitors who may enter posted radiation areas.

3. Contractors

Contractors performing work unescorted in the restricted area shall receive radiation worker training commensurate with the tasks they are to perform.

G. Procedures for Handling Contaminated Garments

1. All incoming and outgoing shipments of radioactive materials are packaged in containers meeting Department of Transportation requirements.

2. Prior to unloading a shipment of radioactive materials, an examination of the incoming Radioactive Shipment Record (RSR) is made to determine the listed radiation levels of the shipment. Unless all packages in a shipment possess very low contact readings, for example shipments made as Radioactive Materials, Limited Quantity, packages are to be surveyed as they are removed from the vehicle. Any package exceeding 50 mr/hr at 1 foot is to be segregated, placed away from the immediate working area, and returned to the shipper unopened. Upon discovery of package damage (wetness, crushed, etc.) the RSO will be contacted. Gloves will be worn while unpacking contaminated materials and during all sorting activity. Additional segregation of packages by radiation level may be necessary to permit the more contaminated items to be processed separately.

3. Handling, sorting and surveying of individual items is to be done in the sorting area, where appropriate anti-contamination clothing is to be worn at all times. A positively ventilated hooded sorting table is used to insure that any airborne particulate released during the sorting process is expeditiously removed from the area, so that minimal activity is contributed to the breathing zone.

4. Any equipment, tools, drums, clothing or other articles to be moved from a contaminated area to a noncontaminated area must either be decontaminated or placed in plastic bags or other suitable enclosures. All outgoing containers of decontaminated laundry are to be wiped down prior to being moved into the loading area.

5. All radioactive labels on surveyed, non-contaminated packing material are destroyed prior to discarding in non-radioactive trash.

H. Training

1. Radiation Protection Outline

The following topics are to be covered in a new employee's initial training session:

Types and characteristics of radiation: Instruction in the differences between alpha, beta, and gamma radiation.

Sources of radiation: Instruction in manmade and natural sources of radiation.

Activity and Dose: Instruction on the differences between activity and dose and dose rate.

Biological Effects: Instruction in the biological effects of radiation, and the reasons for keeping exposures ALARA.

Dosimetry: Instruction in the proper use of a film badge or TLD, and the use of bioassays in determining internal exposure.

Dose Limits: Instruction concerning annual NRC and company dose limits. Instruction on dose limits to pregnant employees.

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Contamination and Control: Instruction in the difference between loose and fixed contamination. Use of protective clothing and the ALARA concept.

Eating, Drinking and Smoking: Instruction on the acceptable and unacceptable areas for eating, drinking and smoking.

Personnel Frisking: Instruction in the use of the frisker and reasons for its use.

Handling contaminated articles: Instruction in the handling of incoming contaminated articles, RSR's, etc.

Documents: Presence of the RAM license, NRC regulations 10 CFR 20, 10 CFR 19, Reg Guide 8.13, Reg Guide 8.29, and other documents available for inspection upon employee's request. Reg Guide 8.13 provided to all females.

Emergency Procedures: Instruction in the procedures to follow in case of an emergency.

Area posting: Instruction in the control of access to the plant area for reasons of radiation protection and security and visitor policies discussed.

2. The above topics shall be covered with all new employees prior to allowing them to work in the contaminated area unescorted. All employees who work in the restricted area shall attend retraining on selected topics. Training is to be conducted by a qualified employee or consultant. Retraining shall be held as a minimum annually for all employees continuously employed.

3. New employees shall be required to answer questions asked by the instructor on the subject matter. Incorrect answers shall initiate retraining and further questioning until the employee understands the material.

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I. Plant Security

The area within the fence is a restricted area. As such, access is controlled for security and radiation protection purposes. Gates are to remain locked at all times other than when in actual use. Any employee opening a gate must either lock the gate immediately upon exit or if unlocked, maintain direct surveillance. Visitors are permitted into the restriced area only for official business. All visitors must be escorted until they have demonstrated an understanding of company procedures. If a visitor is to enter a radiation or contamination control area, the health physics technician or RSO must assign a dosimeter and assure that the visitor is properly logged in and out. To prevent the unauthorized use of radioactive material, radioactive sources used for instrument calibration are maintained by the RSO and are kept in a specific area of the laboratory when not in use. The truck storage area for trucks containing radioactive material shall be locked at all times, except when loading and unloading.

J. Transportation of Radioactive Materials

The transportation of radioactive materials shall be in compliance with U.S. Department of Transportation Regulations 49 CFR 390-399 with respect to drivers' qualifications, hours of operations and carriers' requirements and 49 CFR 170-189 with respect to shippers' requirements and the proper packaging and shipping of radioactive materials. Additional requirements may be imposed by affected states, particularly in the shipment of radioactive wastes to licensed burial facilities. All employees associated with the transportation of radioactive materials are given classroom instruction in the regulatory requirements of their duties. In addition to training and experience in handling radioactive materials on site, all drivers who tran sport hazardous materials shipments are required to complete DOT certification requirements.

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K. Corporate Radiation Protection Program

1. Management Organization

The INS Corporate Health Physics staff provides guidance to all INS facilities in the radiation protection area. The Manager of Corporate Health Physics is independant of Operation and Sales and reports directly to the General Manager, highest level official in INS Corporation. The Manager of Corporate Health Physics is responsible for reporting and providing consultation to the General Manager on all health and safety issues. Figure D-3 schematically depicts the upper management organization of INS Corporation. Resumes of the individuals referenced in this section are all provided in Appendix E of this license.

2. Corporate Audits

Corporate audits of INS facilities are performed by the Manager of Corporate Health Physics, Health Physicist, Radiation Specialist or an independant health physics consultant. These audits include an evaluation of the radiation protection program for compliance with regulatory, license, and insuror committments, as well as overall safety conditions at the plant. Any radiation worker is free to communicate directly with Corporate Health Physics personnel at any time and direct interviews are sometimes held during unannounced audits. When audits are provided by health physics consultants, a capable individual is selected to perform the radiation safety program evaluation without regard to format or precedence of INS Corporate auditors. In this manner, total independance is insured.

3. Engineering

The Corporate Engineer provides design support to Operations to insure minimization of employee exposure due to design and operational procedures. The Corporate Engineer also specifies and/or approves all radiation detection equipment.

PROTECTIVE GARMENT CHART

AREA/TASK	R. SHOES	LABCOAT	COVERALL	GLOVES	CAP	TAPE
DRYING/WASHING AREA CLEANING EXHAUST DUCTS	XX		XX	XX	XX	
SORTING AREA CLEANING AIR FILTERS	XX		XX	XX		
WASHING AREA CHANGING WATER FILTERS	XX		XX	XX		
WASHING/DRYING AREA UNLOADING W./LOADING D.	XX	XX				
WASHING/SORTING AREA HANDLING CONTAM. GARMENTS	XX		XX	XX		
WASHING AREA LOADING WASHERS	XX		XX	XX		
MONITORING AREA FOLDING, MONITORING		XX				
SORTING AREA CLEANING LINT TRAPS	XX		XX	XX		
SORTING AREA CLEANING PIT	XX		XX	XX		XX
WASHING AREA COLLECTING WATER SAMPLE	XX	XX		XX		

FORM MAY BE CHANGED WITHOUT LICENSING APPROVAL

Figure D-1

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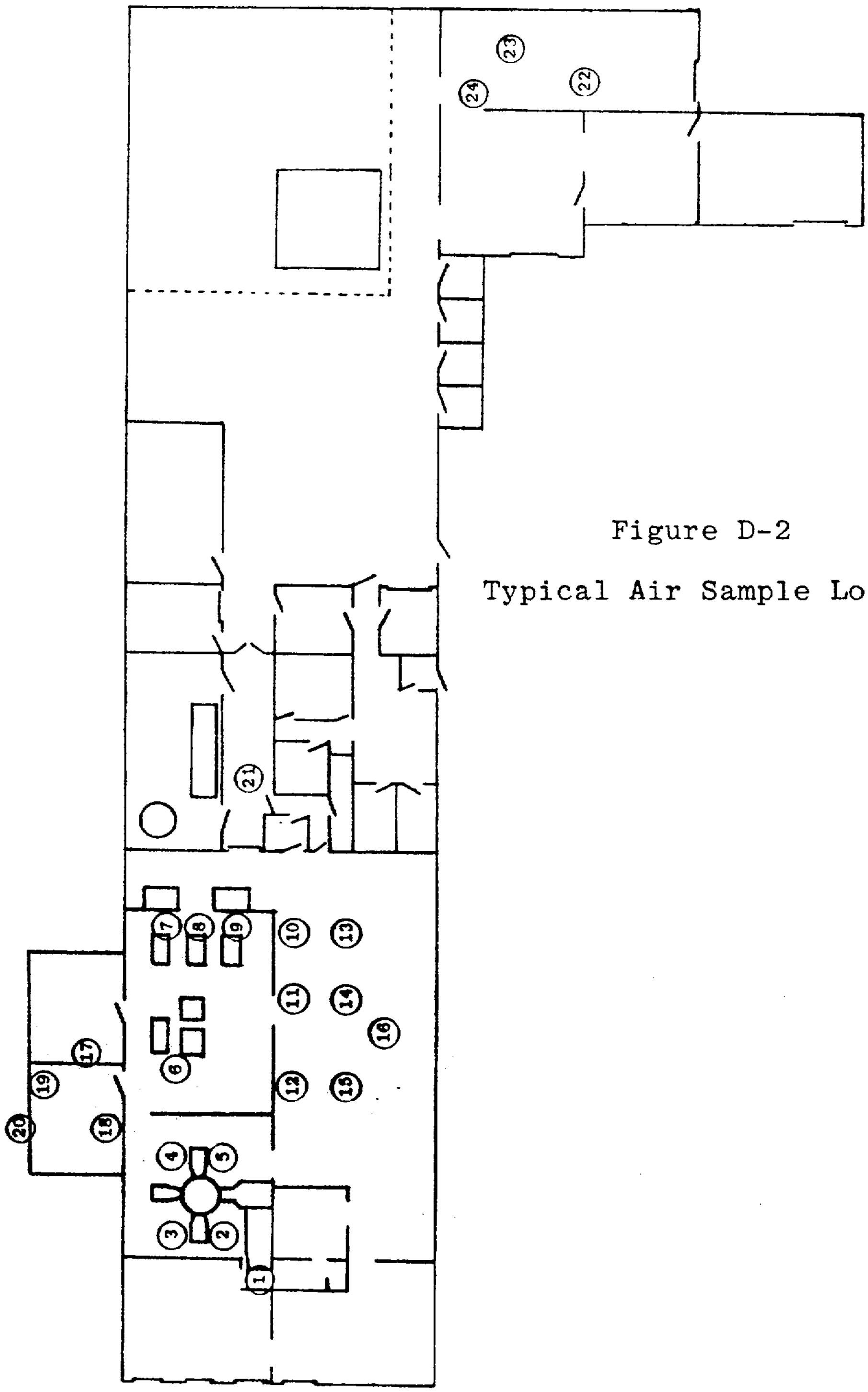

Figure D-2

Typical Air Sample Locations

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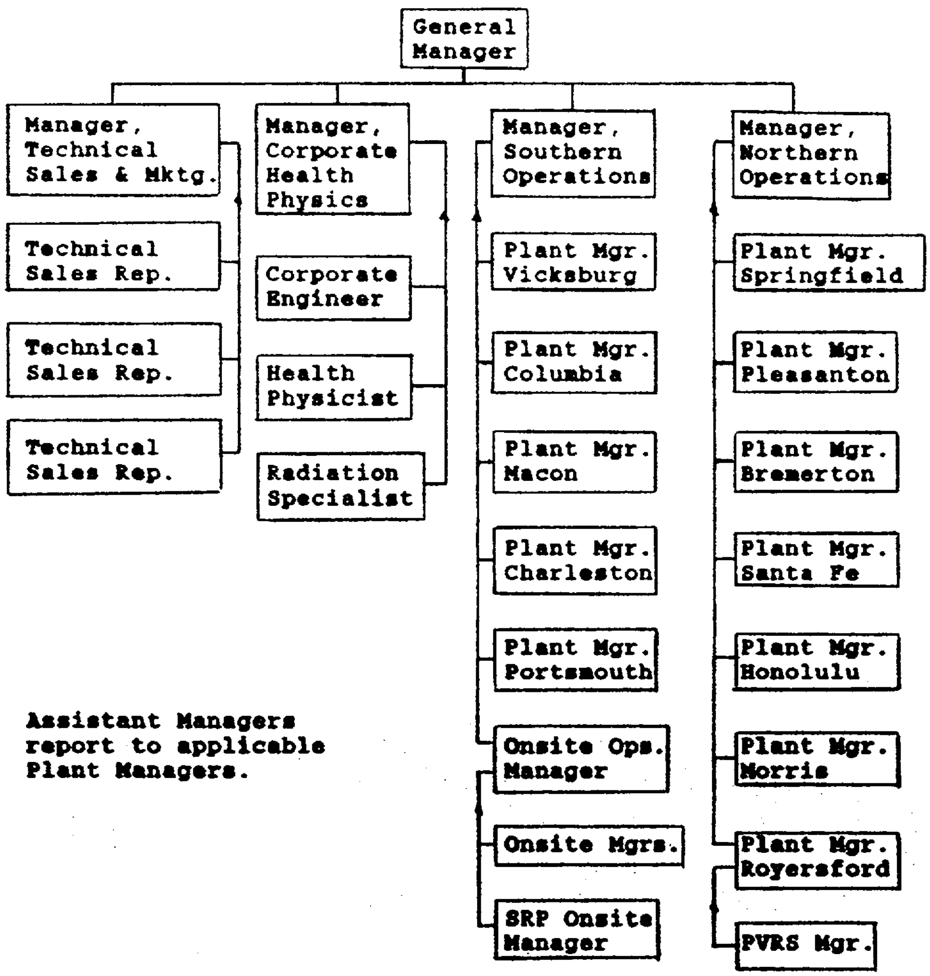
Interstate Nuclear Services Corporation
Management Organization

Figure D-3



Assistant Managers report to applicable Plant Managers.

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APPENDIX E
(Items 16 and 17)

I. Training and Experience for Authorized Users

A. Responsibilities

Radiation safety responsibility is shared by the Manager of Corporate Health Physics, the Plant Manager, Radiation Safety Officer (may be the same as Plant Manager), and the operating crew. Each individual must strive to keep his own exposure, as well as the exposure of others, as low as possible. Individual responsibilities are outlined as follows:

1. Radiation Safety Officer

a. Implement and enforce a radiation safety program for the laundry facility.

b. Advise and review health physics procedures and survey results with the Plant Managers.

c. Instruct employees in proper and safe techniques and approved health physics and safety practices.

d. Set up a schedule of necessary physical examinations, bioassays, etc. for all employees.

e. Make certain that proper records are maintained for air, water, swipe and radiation surveys, personnel exposures and bioassays.

f. Assure that the radiation detection equipment is periodically calibrated to insure accurate performance.

g. Assure that the radioactive solid waste is packed in an approved manner for disposal by a licensed commercial waste disposal company.

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2. Plant Manager (may be RSO also)

   a. Consult with the Radiation Safety Officer on all matters pertaining to radiation and contamination control.

   b. Inform the Manager of Corporate Health Physics of any contemplated changes in equipment or procedures.

   c. Make certain proper radiological surveys and records of air, water and the environs are performed and filed.

   d. Arrange for the instruction of employees in the proper and safe methods of working.

   e. Schedule necessary physical examinations, bioassays, etc. for all employees.

3. Health Physics Technician/(may be RSO also)

   a. Perform radiation and contamination surveys in accordance with the license.

   b. Perform air and water surveys to assure compliance with applicable federal and state requirements.

   c. Record the surveys performed in Items 1 and 2 above on the appropriate forms.

   d. Assure monitoring equipment is calibrated and operating correctly.

4. Manager of Corporate Health Physics

   a. Define and prescribe a radiation safety program for the laundry facility.

   b. Furnish consulting service on all aspects of radiation protection and decontamination.

c. Suggest prescribed methods of decontamination.

d. Assure that a technically sound program of air sampling, smear sampling and radiation monitoring is maintained.

e. Evaluate potential radiation and contamination problems and assure follow-up.

f. Evaluate the Health Physics Training Program for all employees as required.

g. Keep the Plant Manager/RSO advised on all aspects of the decontamination laundry requiring health physics procedures or conformance with regulations.

h. Evaluate the radiation protection program at least annually. As an option, INS Corp. may elect to use an outside radiation protection consulant or INS personnel designated by the Manager of Corporate Health Physics for health physics audits. **Other than consultants listed as authorized users in this license, only ABHP Certified individuals will be used for consultant health physics audits.**

5. Operations Crew

a. **Observe all rules regarding the control of radiation and contamination.**

b. **Maintain a clean working area, observing contamination control limits.**

c. Report all suspected radiation or contamination incidents.

d. Observe the rules prohibiting eating and smoking in restricted areas.

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e. Carry out recommendations of the Plant Manager or the Manager of Corporate Health Physics for decontamination as well as other control measures.

f. Properly package solid contaminated waste in DOT-approved shipping containers, seal, store, and label as prescribed by the Plant Manager.

Royersford Plt.Mgr./RSO Randy L. Thomas

EDUCATION: Attended Aeronautics School, San Bernardino Valley College

Short Courses: Occupational and Environmental Radiation Protection course, Harvard University

EXPERIENCE: INS Corp (9/86-pres.) Plant Manager. Supervised personnel & daily operations. Performed daily health physics measurements & responsible for personnel safety during operations, including radiation safety. Responsible for HP record generation and maintenance.

INS Corp (5/86-9/86) Assistant Plant Manager. Assistant Radiation Safety Officer. Supervises daily operations. Manages personnel. Performs daily Health Physics & measurements. Completes & maintains HP records. Responsible for personnel safety during operations, including radiation safety.

Paul Monroe Hydraulics (10/81-3/86) Manufacturing Supervisor. Responsible for conformance to 10 CFR regulations and QA program. Tested plant equipment and instrumentation throughout the plant.

Parker Hannifin Corp. (2/81-10/81) Senior Engineering Technician. Performed prototype assembly and qualification testing on flight control untis.

Paul Monroe Hydraulics, Inc. (1/80-2/81) Engineering test technician. Performed engineering tests on valves, snubbers, and fluids. Responsible for ASME code item inventory, overhaul and testing of equipment.

United States Air Force (3/74-4/79) Supervisor. Responsible for flight-line repair of all hydraulic/pneumatic systems, including flight control and landing gear. Interfaced with vendors and maintenance personnel.

Assistant Plant Mgr/Alt.RSO <u>Michael D. Flynn</u>

EDUCATION: Navy Nuclear Power School

EXPERIENCE: INS Corp. (10/86-pres.) - Assistant Plant Manager. Royersford, PA. Supervises daily operations. Manages personnel. Performs daily Health Physics & measurements. Completes & maintains HP records. Conduct training classes in radiation safety for new employees. Direct maintenance of plant machinery. Responsible for personnel safety during operations, including radiation safety.

US Navy (4/76-7/86) - Naval Nuclear Prototype. One year as divisional maintenance supervisor. Plant coordination of divisional maintenance during major shutdown periods. Administrator, Staff Training Group, one year. Instructor for the overall training of officer, enlisted and civilian staff crew members in mechanical theory, systems, and equipment. Nuclear attack submarine, 2/79-3/83. Machinery division member; operated and maintained mechanical systems.

General Mgr: George J. Bakevich

EDUCATION: B.S.Mathematics major, Nuclear Engineering minor. Worcester Polytechnic Institute
M.S.Nuclear Engineering major, Univ. of Utah

Thesis-"Neutron Radiography with Californium-252 & a Subcritical Neutron Multiplier" at National Reactor Testing Station in Idaho under AEC Fellowship.

EMPLOYMENT: INS Corp. (80-present)-General Manager for 11 nuclear decontamination facilities including profit & loss responsibility, growth of business, construction & planning of new facilities. Directly supervises managers of Op. & Corp. HP. Enforces reg. & HP requirements suggested by the Manager of Corp. Health Physics.

Combustion Engineering,Inc.,(11/79-5/80)-Manager, Nuclear Licensing, Safety & Accountability, total resp for compliance with NRC, DOT, & OSHA reg. at CE's uranium fuel fab. facility . Responsible for all licensing submittals & management of: Nuclear criticality safety, HP, industrial safety, RAM trans. & accountability, emergency preparedness. Responsibile for audits of CE's oxide conversion facility in Hematite, Missouri & R & D Labs in Windsor, CT. Member of Nuclear Speakers Service.

Nuclear Licensing & Safety Supervisor(2/77-11/79)-Resp. for all aspects of licensing at fuel fab. facility, including criticality safety analysis. Responsible for HP monitoring prog. & Industrial Safety prog. to assure compliance with reg; audit of manufacturing ops. & supervision of HP personnel.

Idaho National Engineering Lab., Idaho Falls, Idaho, (74-77)-Criticality Safety Engineer/HP. Responsible for criticality safety evaluations (including computer analysis with KENO-IV, DOT, etc.) for unirradiated & spent fuel storage, fuel transport casks, & nuclear waste burial.

Health Physics experience at several large test reactors, including monitoring of high radiation fields & fission product contamination control.
Member of Qualifications Review Committee; Completed ERDA System Safety Training (Management oversight & Risk Tree).

AEC,(73-74)-Assistant Project Engineer. Responsible for appraisal & direction of contractor activities in areas of HP, Critical Facilities & dev. stages of the Light Water Breeder Reactor; procedure approval.

Mgr.Corp HP: Guy R. Wilson

EDUCATION: B.S. Mathematics major, Louisiana State University
M.S. Environmental Engineering major, Mississippi State University

Thesis: A Gamma Radiation Dose Model for Comparison of Normal Risk Between Alternative Routes for Highway Transportation of Radioactive Materials & Waste. Includes development of mathematical dosimetry model

Graduate studies include coursework in environmental radioactivity, radwaste treatment & disposal, 9 hrs. surface & groundwater transport, 6 hrs. chemical, physical & biotreatment design, & 3 hrs. geophysics.

Short Courses: BWR Systems for Engineers (5 weeks), BWR Systems (4 wks), Nuclear Power Plant Accident Assessment (1 wk), Rad Emergency Response Ops (2 wks Nevada Test Site), Rad materials transportation workshops & several minor seminars in HP.

EXPERIENCE: INS Corp.(11/86-present)-Manager, Corporate Health Physics-responsible for overall administration of radiation safety program for over 400 radiation workers. HP audits, procedure & design generation, review & approval; licensing of facilities; regulatory interface & direct supervision of corporate HP staff.

INS Corp.(2/86-11/86)-Senior Radiological Engineer. Resp. for ALARA design, const. management & operating procedure develpment for nuclear waste water processing systems for nation's largest fixed facility decon business. Resp. for reg compliance & HP audits at a fraction of INS facilities.

MS. Dept. of Health, Rad Health (rad control/agreement state agency 7/83-2/86). Environmental Engineer/Branch Dir.,Rad Waste & Trans. Reviewed proposed mods of tech specs governing operation of GGNS (BWR-6 design). Developed & instructed an HP course for dept. Technical advisor to SE LLW Compact Commission. Developed new state regs trans. of RAM.

MP&L Co.(3/82-4/83). Nuclear Licensing review of proposed mods to nuclear waste water processing sys. for GGNS. Software design & mods. for Nuclear Lic. mod. computer based tracking sys. for reg. compliance, tech specs, & licensee event reports. Dev. rad assess software used in emergency exercises for GGNS by MP&L.

(73-82) Design calc & survey management as consultant with several large design groups, spec in industrial & municipal wastewater treatment.

Ops Mgr/Alt RSO: William C. Moser

EDUCATION: B.A. Furman University
J.D. University of South Carolina School of Law

Short Courses: HP training under R.L. Zimmerman, Certified Health Physicist & LB Case, RSO of Southern Space, Inc. Radioactive Waste Packaging, Transportation & Disposal,(27 hrs.-Chem Nuclear Systems).

EXPERIENCE: INS Corp.(85-present)-Southern Operations Manager. Responsible for operations of INS Southern division, directly supervises all plant managers in region. Generates & approves procedures for operation.

Southern Space,Inc.(84-85)-Chief Executive Officer. Overall responsibility for administration of nuclear decontamination business with sales exceeding five million annually.

Southern Space,Inc.(81-84)-Regulatory Compliance Officer. Responsible for interpretation & enforcement of regulations within the corporation, federal, state, and local.

State of South Carolina, Water Resources Commission (74 to 81). Attorney for state.

Ops Mgr/Alt RSO: William R. Roschewski

EDUCATION: Navy Nuclear Power School.

Short Courses: RSO train-ing program at INS, (40 hrs. under GJ Bakevich).

EXPERIENCE: INS Corp.(85-present)-Operations Manager for Northern division. Generates & approves procedures for operations. Directly supervises all plant managers of region.

INS Corp.(82-84)-Pleasanton California Plant Manager/ RSO. Responsible for management of employees, daily operations, & personnel safety including radiation safety for plant. Performed health physics measurements & activities essential to operation of nuclear laundry. Instrument calibrations. Radwaste reduction.

INS Corp.(80-82)-Bremerton, WA Plant Manager/RSO. Responsible for management of employees, daily health physics measurements, & radiation safety at plant.

US Navy (74-80), NPTU Idaho. Participated in S1W prototype maintenance, including resin discharge, main coolant pump replacement, radiography, flux wire irradiation, controlled pure water system installation. Instructor reactor physics & safety, chemistry/metallurgy.

US Navy (74-76)-Mechanical Operator. Qualified as Engine room supervisor. 15 Mo. refueling overhaul at Mare Island shipyard, watch operations & HP duties.

Corp Engineer: <u>Leslie B. Case</u>

EDUCATION: B.S. Physics, Loyola University
M.S. Physics, University of South Carolina

Thesis: Nuclear Physics

Short Courses: Oak Ridge Associated Universities Radioisotope Laboratory, 1974; Summer session, Health Physics, Imperial College, London, England; Georgia Institute of Technology HP Certification Training course, 1971; Radiation Worker Training courses at several power companies.

EXPERIENCE: INS Corp (9/85-pres.) Corporate Engineer. Responsible for the design of all plant modifications and new systems corporate-wide, including ALARA design modifications. Designed and supervised construction of Plastic Volume Reduction System and Automated Laundry Monitoring systems. Specifies and/or approves all radiation detection instrumentation corporate-wide. Supervises and instructs technicians performing radiation detection instrumentation calibration. INS procedure writing.

Southern Space, Inc. (1971 -9/85) Radiation Safety Officer. Responsible for the administration of radiation safety program for approximately 120 radiation workers. Designed and built Automated Monitoring Systems to assure better product quality. Experience in all areas of Nuclear Laundry operation, including licensing of facilities, operation and calibration of instrumentation, and handling of contaminated materials and waste.

Mgr.,Tech. Sales & Mkt. Gregg A.Johnstone

EDUCATION: B.S.-Physics, Muhlenberg College
M.S.-Radiation Science, Rutgers

Critical Essay-"Low Level Radioactive Waste Disposal" with emphasis on shallow-land burial & waste management criteria" at Brookhaven National Lab. under DOE fellowship.

Short Courses: Health Physics Training Program,(6/78-8/78)-Brookhaven National Laboratory.
Critically Safety Short Course,(5/81)-Univ. of New Mexico, Alburquerque,NM. Certified member of the National Registry of Radiation Protection Technologists.

EXPERIENCE: INS Corp.(11-86-present). Manager Technical Sales & Marketing. Technical sales presentations on state of the art decon technology and monitoring. Adminitrates sales department in excess of $11 million in business annually. Interfaces with HP & Corp. engineer on current decon/monitoring methodology & procedures.

INS Corp.(83-86)-Corp. Health Physicist. Responsible for licensing & regulatory compliance for all of INS facilities. Conduct annual Health Physics audits of all facilities to assure adequate radiation protecttion programs.

General Electric Co.Inc.(81-83),Knolls Atomic Power Laboratory, Windsor, CT. Radiological Controls Engineer. Responsible for REM Management Program for refueling/overhaul at SIC prototype reactor assuring ALARA compliance. Directed the incorporation of radiological controls in operating procedures.

Combustion Engineering,Inc.(79-81),Low Enriched Fuel Fabrication Facility, Windsor,CT.-Supervisor, Health Physics & Safety. Responsible for compliance with NRC, DOT, and OSHA regulations. Licensing submittals & management of Health Physics, radiation & industrial safety programs. Performed audits of CE's oxide conversion facility & Research & Development Labs.

Radiac Research Corp.(74-77),Brooklyn, NY.-Health Physics Technician. Established a radioactive disposal service program for customers in accordance with DOT Regulations.

Health Physicist: <u>Susan L. Fanelli</u>

<u>EDUCATION:</u> B.S. Chemistry major, Clarkson University.

Short Courses: Internal Radiation Dosimetry, Dr. K. W, Skrable, June,1984, Respiratory Protection, Central Connecticut State University, October,1985.

<u>EXPERIENCE:</u> INS Corp. (10/85-present) Health Physicist. Responsible for maintaining radiation dosimetry programs, computer data bases, and corporate-wide training program. Supervise HP technicians. Generates training material. Procedure writing. Researches and advises Manager of Corp. HP on internal dosimetry and bioassay.

Southern Space, Inc. (5/82-10/85) Health Physics/QA Manager. Managed HP technicians corporate wide. Maintained compliance with government regulations for handling radioactive material. Designed and implemented new QA programs for all employees. Developed procedures for instrumental analysis of effluent, environmental, and biological samples. Performed internal audits, worked with regulatory agencies and insurance auditors.

Southern Space/INS Corp. (5/84-12/86) Product Manager. Manage technicians in a respirator filter recertification program in compliance with government regulations. Scheduled, maintained production and assured the output of a quality product. Handle technical services and QA audits.

Masonic Medical Research Laboratory (9/81-4/82) Research Assistant. Developed and carried out experiments aimed at determining the causes of aging. Prepared graphic material for publication, performed statistical interpolation, and computer programming.

Indium Corporation of America (2/81-9/81) Analytical Chemist. Analyzed metallic alloys, for use in the electronic industry using an Atomic Absorption Spectrophotometer.

Avon Products, Inc. (9/79-6/80) Quality Control Chemist. Responsible for testing raw ingredients for use in the cosmetic industry using instrumental and wet analyses.

Morris Plt.Mgr./Alt.RSO Alfred A. Richard

EDUCATION: ABA Business Administration, Fisher Junior College

Navy Nuclear Power School - Top 25% of class

Short Courses: Health Physics, Internal Dosimetry, University of Lowell, MA.; Various industrial courses in dosimetry.

EXPERIENCE: INS Corporation (10/84-pres.) Technical Sales Representative. Responsible for sales of clothing, decontamination, and services. Assisted in design of Plastic Volume Reduction Program.

INS Corp. (8/84-10/84) - Assistant Plant Manager. Royersford, PA. Supervised daily operations. Managed personnel. Performed daily surveys. Completed & maintained HP records. Conducted training classes in radiation safety. Responsible for personnel safety.

Hydro Nuclear Services (9/82-8/84) - Health Physics Consultant. Developed and implemented dosimetry program at Susquehanna SES. Member of Emergency Drill Task Force.

Columbia-Montout Vo-Tech School (9/82-5/83)- Instructor. Instructed adult education class entitled "Radiation Monitoring".

Boston Edison Co. (8/77-9/82) - HP Supervisor. Supervised HP Technicians during operations and outages. Responsible for in-plant radiological protection.

Boston Edison Co (1/78-10/79) - Dosimetry Supervisor. Supervised internal and external dosimetry programs.

Boston Edison Co. (8/77-12/78) - HP Technician. Perofrmed surveys, responsible for setting radiaiton protection requirements.

Numanco, Inc. (6/77-7/77) - HP Technician. Responsible for radiaiton protection and surveys during refueling outage.

US Navy - (9/74-5/77) - Lead Engineering Lab Technician. Supervised Chemistry and Radiaiton Protection.

US Navy - (10/69-7/77) - Instructor. Taught Chemistry and Radiation Protection in classroom and operating plant.

HP Consultant: **Robert L. Zimmerman**

EDUCATION: B.S. Biology, Rensselear Polytechnic Institute
M.S. Industrial Management, Georgia Institute of Technology.

Short Courses: Health Physics Training course, Oak Ridge National Laboratory.

Certified, American Board of Health Physics

EXPERIENCE: Phoenix Technology, Inc. (1974-pres.) President. Health Physics Consultant for private-sector industrial and medical facilities. Perform health physics audits, assist in the formation of Health Physics Programs.

Georgia Institute of Technology (1961-1974) Radiaiton Safety Officer.

Republic Aviation Corp. (1959-1961) Health Physicist.

Savannah River Plant (1952-1959). Shift Supervisor, Health Physics

HP Consultant: Michael S. Terpilak

EDUCATION: A.B. Pre-med, New York University.

Graduate Training, Biochemistry, New York University.

AEC Fellowship Program, Radiological Physics, New York University Medical School.

PHS Fellowship - Nuclear Engineering, Catholic University.

EXPERIENCE: Bureau of Radiological Health, Rackville, MD (1980-pres). Senior Health Physics Advisor.

DOC, Bureau of Radiological Health, Rockville, MD (1975-1980). Chief, Standards and Regulations Branch.

Environmental Protectin Agency, Region II (1971-1975). Chief, Environmental Radiation Branch.

Bureau of Radiological Health, Rockville, MD (1969-1971). Assistant Director of operations, Division of Environmental Radiation.

Bureau of Radiological Health, Rockville, MD (1965-1969). Assistant Chief, Radiological Health Training Service.

Niagara Mohawk Power Corporation (1964-1965). Senior Health Physicist, Nuclear Engineering section.

Combustion Engineering (1959-1964). Health Physicist, Training and Technical group supervisor, naval reactors division.

New York City Department of Health (1953-1959). Public Health Sanitarian, Office of Radiation Control.

Areas of Expertise: Standards and regulation setting activities, environmental radiation, training, health physics and radiation safety, and emergency planning.

Numerous Honors and publications.

HP Consultant **R.F. Coley**

EDUCATION: B.S. Chemistry, St. Procopius College
PhD. - Physical and Inorganic Chemistry, Iowa State University

EXPERIENCE: RLD Consulting-(1985-present); President. Actively involved in the nuclear power industry. Experience includes in-plant assignments in Radiation Protection, Chemistry Control, and Radwaste. Involved in several power reactor start-ups and refueling outages. Worked extensively with the various process and effluent radiation monitoring systems. Consultant to decontamination business.

Commonwealth Edison Company-(70-85); Various capacities. Supervised a combined technical and administrative staff of 45 persons. Responsible for chemistry, radiochemistry, and radwaste activities at all six Edison nuclear stations.

Argonne National Laboratory-(69-70); Involved with activation studies, radiation detector design, radiography, dosimetry, and neutron capture therapy for cancer. Studied the effects of low-level radiation, and applied a monte carlo program for computing neutron and gamma dose from various sources of radiation. Results published and verified by NBS. Involved in the development of various tissue-equavalent materials and studies of depth dose determinations using standard-man phantoms.

Ames Laboratory-(63-69); of the Atomic Energy Commission. Taught radiochemistry, worked extensively with instrumental methods of analysis, and developed detailed methods for least squares treatment of data.

Member of the National Committee on Radiation Instrumentation subcommittee N42.2 for several years. Actively participated in the development of ANSI consensus standards for liquid scintillation, ionization chamber, sodium iodide, and germanium detector instrumentation systems. Continues to work with this group in their consideration of "traceability to the NBS" as applied to radioactivity.

Invited to speak at the NBS Center for Radiation Research in 1974; an invited contributor to the book entitled "Computer Networks in the Chemical Laboratory", and a member of the invited faculty for the Health Physics Society Summer School on Selected Topics in Reactor Health Physics, 1981.

Radiation Specialist: <u>Victor M. Crusselle</u>

EDUCATION: Coursework Mechanical Engineering, University of South Carolina.

Naval Nuclear Power School

Short Course: Radioactive Material Transportation, Department of Energy.

EXPERIENCE: INS Corp. (4/87-pres.) - Radiation Specialist. Responsible for regulatory compliance on all radioactive materials transportation issues. Perform periodic Health Physics Corporate audits. Procedure writing and editing. Assit Manager Corporate Health Physics in prescription and execution of radiation safety program corporate wide.

INS Corp. (3/86-4/87) - Plant Manager, Pleasanton CA. Supervised personnel and daily operations. Performed daily health physics measurments and responsible for personnel safety during operations, including radiation safety. Responsible for HP record reneration and maintenance.

INS Corp. (12/85-3/86) - Plant Manager trainee, Vicksburg MS. Supervised daily operations. Trained in all aspects of plant operation.

Naval Nuclear Power Training Unit (8/82-12/85)- Radiological Controls Shift Supervisor/Instructor. Responsible for radiological controls during major refueling overhaul. Taught chemistry and radiological controls theory and pratical applications for student training on nuclear power plants.

Naval Submarine Tender (8/80-8/82) - Radiological Controls Shift Supervisor. Responsible for radioactive waste processing and transportation, laundering of protective clothing, and decontamination of highly contaminated articles.

Naval Nuclear Submarine (8/78-8/80) - Leading Engineering Laboratory Technitian. Responsible for performing all radiological and chemistry controls associated with operating a nuclear power submarine.

PVRS Mgr. **Steven M. Eno**

EDUCATION: B.S. Agricultural Mechanization, Pennsylvania State University.

EXPERIENCE: INS Corporation (3/86-pres.) Plastic Volume Reduction Supervisor. Responsible for the maintenance and use of corporate Plastic Volume Reduction System. Supervises daily operations of the system.

Bechtel Power Corp. (12/84-3/86) Radwaste Specialist, Limerick Generating Station. Planned, supervised, and coordinated decontamination activities. Processed and prepared radioactive wastes for shipment. Supervised work crews for plant housekeeping in the reactor enclosure.

Victor F. Weaver, Inc.(11/82-12/84) - Maintenance Mechanic. Fabricated and modified machinery for processing. Perform preventive maintenance on all machinery. Repair of mechanical, electrical, hydraulic and pneumatic systems. Experience in welding.

Treatment Plant Operator - Monitored all stages of wastewater treatment. Collect samples and perform chemical analyses.

Alternate RSO: Thomas B. Nally

EDUCATION: B.S. Industrial Management major, Worcester Polytechnical Institute.

Short Courses: Industrial Engineering & Supervisory Training; Norton Co., Worcester, Mass. Radiation Protection Technology; Rockwell Int'l. Environmental & Occupational Radiation Protection(1 week HP course), Harvard School of Public Health. Packaging, transportation & disposal workshop, Chem-Nuclear Systems, Inc.(27hrs.), Waste Management at Nuclear Facilities-Center for Nuclear Studies.

EXPERIENCE: INS Corp.(82-present), Springfield, MA plant. Plant manager/Radiation Safety Officer. Supervised personnel & daily operations. Performed daily health physics measurements & responsible for personnel safety during operations, including radiation safety. Responsible for HP record generation and maintenance.

INS Corp.(81-82), Springfield, MA plant. Radiation Safety Officer. Responsible for health physics compliance program for protective clothing decontamination facility, including: air, water & smear sampling, new employee training, packaging & transportation of radioactive material(including rad waste shipments), personnel monitoring & bioassay, selection & calibration of monitoring instruments, maintenance of all health physics records.

Norton Co.(2/80-5/81), Worcester Mass. Standards Administrator-Responsible for production control in Refractories Division through various incentive systems. (10/79-2/80)-Production Supervisor. Responsible for production in Industrial Ceramics Division. (7/73-10/79)-Production Planner. Responsible for production & inventory control planning for various groups within the Refractories Division.

U.S. Army (9/68-7/71)-Attained rank of E-4, Vietnam Veteran, Food Inspection Specialist, honorably discharged.

Alternate RSO: Michael J. Gerstner

EDUCATION: 2 yrs. on B.S. in Mechanical Engineering.

Short Courses: Rad worker courses, Indian Point, TMI, Calvert Cliffs; Instrumentation & Calibration, TMI (8hrs.); DOT Regs, TMI (16hrs.); Basic HP Course, Michael Terpilak, CHP (1week); Gamma Spectroscopy, Canberra.

EXPERIENCE: INS Corp.(85-present)-Plant Manager/Radiation Safety Officer, INS-Santa Fe, New Mexico plant. Supervised personnel & daily operations. Performed daily health physics measurements & responsible for personnel safety during operations, including radiation safety.

Environmental Laundries(83-85)-HP Tech. Routine Health Physics measurements & record keeping. Radwaste processing.

Tri-State Industrial Laundries (11/82-1/83)-Site coordinator for mobile decon unit, Calvert Cliffs Nuclear Station. Worker with site HP personnel to insure radiologically sound decontamination operations. Supervised laundry personnel.

Tri-State Industrial Laundries(7/81-9/82)-Site coordinator on mobile decon unit, TMI Nuclear Station.

Tri-State Industrial Laundries(12/80-4/81)-Assistant supervisor on mobile decon unit at Indian Point II nuclear station.

Alternate RSO **Bartlett L. Mock**

EDUCATION: Two-year college equivalency certificate, U.S. Armed Forces Institute, 1955

Short Courses: HP training under R.L. Zimmerman, CHP and Leslie B. Case, RSO of Southern Space, Inc.

EXPERIENCE: INS Corp. (85-present) Portsmouth, VA plant. Plant Manager/Radiation Safety Officer. Supervised personnel and daily operations. Performed daily health physics measurements and responsible for personnel safety during operations, including radiation safety. Responsible for HP record maintenance.

Weyerhaeuser Co. (1967-1984), Chesapeake, VA. Plant Manager. Responsible for sales, manufacturing and plant production.

Evans Product Co. (1961-1967), Chesapeake, VA. Quality control foreman.

Sears and Roebuch Co. (1958-1961), Norfolk, VA. Salesman.

U.S. Army (1949-1958).

Alternate RSO: <u>Phillip A. Rumian</u>

<u>EDUCATION:</u> Navy Nuclear Power School. Specialized training in radiological controls and radiochemistry.

Short Courses: RSO Training Program (15 hrs. under G.A. Johnstone).

<u>EXPERIENCE:</u> INS Corp. (85-present)-Assistant Plant Manager & Assistant Radiation Safety Officer. Daily operation supervisor. Manages personnel, performs daily health physics measurements & responsible for personnel safety.

INS Corp. (83-85)-Plant Manager/RSO. Supervised personnel & daily operations. Performed daily health physics measurements & responsible for personnel safety during operations, including radiation safety. Responsible for HP record generation and maintenance.

US Navy (81-83). Engineering Lab Technician, USS Los Angeles. Responsible for radiological controls associated with propulsion plant.

US Navy (79-81) Engineering Lab Technician, USS Sargo. Responsible for radiological controls. Sealt with governing bodies such as NAVSEA.

Alternate RSO: John R. Reed

EDUCATION: Navy Nuclear Power School.

Short Courses: Radiation Protection Training, Radiation Safety Associates (20 hrs), INS RSO Training Program (40 hrs., GA Johnstone) Gamma Spectroscopy, Canberra, Inc.(40 hrs.)

EXPERIENCE: INS Corp.(85-present)-Plant Manager/Radiation Safety Officer at Honolulu Hawaii plant. Supervises daily operations. Manages personnel. Performs daily Health Physics & measurements. Completes & maintains HP records. Responsible for personnel safety during operations, including radiation safety.

INS Corp.(84-85)-Assistant Plant Manager/Assistant Radiation Safety Officer, Royersford, PA. Supervises daily operations. Manages personnel. Performs daily Health Physics & measurements. Completes & maintains HP records. Responsible for personnel safety during operations, including radiation safety.

Alternate RSO: **Brian Dean Fischer**

EDUCATION: Coursework, Northeastern Jr. College, Sterling,CO. Navy Nuclear Power School

EXPERIENCE: INS Corp.(5/87-present)-Plant Manager; Pleasanton, CA. Supervised personnel & daily operations. Performed daily health physics measurements & responsible for personnel safety during operations,including radiation safety. Responsible for HP record generation and maintenance.

INS Corp.(11/86-5/87)-Plant Manager Trainee; Springfield,MA. Supervised personnel & daily operations. Performed daily health physics measurements & responsible for personnel safety during operations, including radiation safety. Responsible for HP record generation and maintenance. OJT under Phil Rumian, Vic Cruselle, RSO's.

U.S. Navy Nuclear Power Training Unit (1/85-11-86)-Chemistry & Rad. Controls Classroom Instructor. Resp. for instructing Navy & contractor personnel in proper chem. & rad. controls & lab. practices. Classroom phase lectures & lab instruction. Upgrading of lecture & exam material.

U.S. Navy (7/79-5/81)-Leading Engineering Lab. Tech.; Supervised overall reactor & steam plant chemistry & radcon controls. Resp. for the supervision of a five man chem./radcon division. Prepared & reviewed radiological work procedures for maintenance & ensured prompt completion of the work. Training Division Leading Petty Officer; Coordinated the qualification of all enlisted students while in crew. Developed upgrading programs for students with unsatisfactory retention. Engineering Watch Supervisor; Supervised overall reactor & secondary plant operations & maintememce in engineering spaces. Evaluated Navy & contractor EWS students watchstanding during frequent/infrequent plant operations & casualities. Quality Assurance Petty Officer; Prepared & reviewed nuclear & subsafe work procedures for maintenance. Responsible for supervision of fifteen quality assurance workers.

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APPENDIX F

I. Decommissioning Guidelines

A. Guidelines for Decontamination of Facilities and Equipment Prior to Release of Unrestricted Use or Termination of Licenses for By-product, Source, or Special Nuclear Materials*

The instructions in this appendix, in conjunction with Table F-1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table F-1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. INS shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented are below the limits specified in Table F-1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or duct work shall be determined by making measurements at all traps, or other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or duct work. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

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TABLE F-1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES [a]	AVERAGE [bcf]	MAXIMUM [bdf]	REMOVABLE [bef]
U-nat, U-235, & associated decay products	5,000 dpm 100 cm2	15,000dpm 100 cm2	1,000 dpm 100 cm2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm 100 cm2	300 dpm 100 cm2	20 dpm 100 cm2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232,I-126, I-131, I-133	1,000 dpm 100 cm2	3,000 dpm 100 cm2	200 dpm 100 cm2
Beta-gamma emitters (nuclides with de-cay modes other than alpha emmission or spontaneious fission) except Sr-90 and others noted above.	5,000 dpm 100 cm2	15,000 dpm 100 cm2	1,000 dpm 100 cm2

(a) **Where surface contamination by both alpha and beta-gamma emitting nuclides exists, the limits established for alpha and beta-gamma-emitting nuclides should apply independently.**

(b) **As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.**

(c) Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

(d) The maximum contamination level applies to an area of not more than 100 cm2.

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(e) The amount of removable radioactive material per 100 cm2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

(f) The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

4. Upon request, NRC may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests shall:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

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5. Prior to release of premises for unrestricted use, INS shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the NRC. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

   Following submittal of the report, the facilities shall be made available for the NRC to perform an inspection and surveys to confirm the surveys performed by INS.

*These guidelines were taken from a document of the same title written by the U. S. Nuclear Regulatory Commission Division of Fuel Safety, Washington, D.C. dated July 1982.

B. Decommissioning Plan

The Royersford facility began operation by INS in 1984 and occupies approximately 21,000 square feet. The outline shown below is written to give general guidance to the facility RSO in decommissioning this facility so that it can be free-released.

1. Removal of extraneous items and/or minor equipment. Such items as carts, laundry supplies, tables should all be wiped down completely and the following surveys performed:

   - smear survey to be counted for both alpha, and beta-gamma contamination

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- a direct frisk for fixed contamination
- the NRC guidelines for decommissioning of facilities shall be used (See Table F-1)

2. Removal of major equipment

All major equipment such as washers and dryers and filter systems shall be totally wiped down and cleaned. Following wipe down and cleaning of the exterior, smear and fixed contamination surveys of the exterior and accessible interior portions of the machinery shall be performed. This equipment may either remain as contaminated equipment for contaminated use at another INS facility or be disassembled. Disassembled items which do not meet free-release criteria will first be decontaminated. If they do not meet the requirements of Part A of this section, they will be disposed of as radioactive waste to a licensed burial facility or re-used at another INS facility.

3. Clean Up of Ceiling and Walls

Ceilings and walls shall be cleaned using a pressurized water spray. This water will be collected in the normal waste water processing trench and pits, and will be sampled and analyzed prior to discharge.

Once the walls and ceiling have been cleaned, swipe and fixed representative surveys should be initiated and documented to confirm compliance with Table 1. Following this, any piping which carried radioactive or potentially radioactive water shall be removed, cleaned as much as practicable, cut up and shipped for disposal.

4. Floor Areas

All floor areas shall be cleaned, starting from the restricted clean areas and working towards the washroom (contaminated area). Any waste water generated shall be processed through the normal waste water processing procedure.

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5. Waste water trench, dumps and holding pit

These areas shall be initially pumped dry following the requirements listed below:

a. Pit to be adequately ventilated for 15 minutes prior to entry.

b. Minimum initial entry protective clothing will be full body protective clothing, boots, and rubber gloves, taped.

c. An initial entry air sample will be taken for 10 minutes and analyzed prior to entry.

d. An initial radiation survey will be performed to assess potential exposure or the need for stay time calculations.

The pit shall be cleaned with a high pressure water lance. Any particulate which settles out in the holding pit will be removed, dried, and packaged for disposal in accordance with applicable regulations and burial site criteria.
The pit shall then be surveyed and further decontaminated using a pneumatic scaler unit. The areas to be scaled shall be continuously wet down and all chipping should be done from the noncontaminated initial chipped area (from behind). Final surveys will be performed using both an alpha scintillation probe and portable GM frisking instrument. Mr/hr readings will be derived using a calibrated GM survey meter.

6. Survey of Sewer Lines

The following surveys shall be performed and documented:

a. Mr/hr with GM survey meter at exit point from the facility and in accessible man holes.

b. Sludge samples from any identified sedimentation or likely reconcentration point shall be taken and gamma spectral

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analysis performed. Gamma spectroscopy will be performed by INS or a qualified vendor.

c. Portable alpha surveys shall be performed and documented in these areas.

7. Survey of Roof

A detailed survey of the roof shall be performed and documented. A GM frisker calibrated in CPM should be used to perform the survey.

8. Environmental Surveys

Soil samples shall be obtained from the surrounding grounds and gamma spectra analysis performed. Gamma spectroscopy will be performed by INS or a qualified vendor.

9. Radiological Precautions to be taken throughout the decommissioning.

a. Air samplers located throughout the facility shall be running continuously during all operations and analyzed weekly. They should be analyzed immediately if any suspected airborne contamination has occurred.

b. Entrances and exits to the restricted areas shall be smear surveyed daily. A complete facility smear survey shall be performed weekly.

c. An air sample is to be run continuously during work in the pit.

d. All records shall be kept and maintained and shall include instrument model number, type and serial number, date and initials of person performing the survey.

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APPENDIX G

I. Emergency Plan

A. General Guidance

A primary concern in most emergencies is to protect the health and safety of persons on or off the premises. If personal injury is not a consideration, take any action which will reduce property damage. Remain calm, administer any assistance you are capable of, and obtain appropriate support or assistance. Quickly follow the instructions of your supervisor. If the presence of radioactive material is suspected, special care should be taken to limit the spread of contamination. Potentially contaminated persons may be required to report to and remain in a designated area at a safe distance until they can be monitored and cleared.

B. Personal Injuries

1. Take appropriate steps to aid injured persons. Notify Plant Management and call for outside medical assistance if necessary.

2. If the presence of radioactive material is suspected, survey the injured person. If radioactivity is detected, and the injury will not be aggravated, rinse the contaminated area or remove the contaminated clothing. An employee receiving a cut or open wound may not return to a contaminated area until properly bandaged.

3. Notify Plant Management so that proper identification may be given to local, state, federal or insurance authorities, as appropriate.

C. Unplanned Releases

1. Locate the source of the release and if possible terminate the release. If the release has already occurred but is not continuing, assess the extent and probable radiation hazard.

2. Notify Plant Management so that proper notification may be given to local, state, federal or insurance authorities, as appropriate.

D. Loss of Radioactive Material

1. If radioactive materials are lost, determine the nature or activity of such materials and probable locations of the loss.

2. Notify Plant Management so that proper notification may be given to local, state, federal or insurance authorities, as appropriate.

E. Fires

1. Take appropriate action to avoid personal injury to employees or members of the public.

2. To the extent possible, extinguish a small fire immediately, using water or chemical extinguishers, as appropriate. If the fire cannot be brought under complete control quickly, call the local fire department. The emergency phone number is posted at all telephones in the plant. Notify Plant Management immediately. If the fire is in a contaminated area, assume that the smoke is also contaminated. In the event of a significant fire, inform the fire officials to use their self-contained breathing equipment. Avoid, to the extent possible, contact with smoke. Take all precautions necessary to limit the potential spread of contamination. If the fire is large and not likely to be contained quickly, advise the Fire Department to evacuate affected residents if atmospheric conditions indicate that off site exposure may be possible (e.g.,smoke plume is not experiencing significant rise). If possible, air samples should be taken during and after a fire. Persons and equipment contaminated in a fire should remain in a defined area after the fire is extinguished and released only after proper decontamination of such persons or equipment is accomplished.

Date: 6/15/87 License: 37/23341/01

3. If the fire is located in a dryer, turn off all dryers immediately. Locate the dryer in which garments are burning. Disconnect electric power to the dryer and then hose down the burning or smoldering garments thoroughly. After extinguishing the garments, make a thorough inspection of the entire exhaust duct system, searching for any smoldering lint which may be present.

4. Plant Management shall notify local, state, federal, and insurance authorities, as appropriate.