NRC FORM 313
(9-90)
10 CFR 30, 32, 33, 34, 35 and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0120
EXPIRES 8/30/93

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 3.75 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

APPLICATION FOR MATERIAL LICENSE

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

APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY, NMSS
WASHINGTON, DC 20555

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

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIALS SAFETY SECTION B
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406

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

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

IF YOU ARE LOCATED IN:

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

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

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

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

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

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

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

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

- [ ] A. NEW LICENSE
- [X] B. AMENDMENT TO LICENSE NUMBER 34-00738-04
- [ ] C. RENEWAL OF LICENSE NUMBER

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

Dept. of Occupational & Environmental Sfty.
Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106

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

Case Western Reserve University
10900 Euclid Avenue
Cleveland, Ohio 44106

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Warren Malchman

TELEPHONE NUMBER: 216-368-2906

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 enclosed

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

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

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS: see enclosed

9. FACILITIES AND EQUIPMENT: see enclosed

10. RADIATION SAFETY PROGRAM: see enclosed

11. WASTE MANAGEMENT: see enclosed

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

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
Warren H. Malchman	Warren H. Malchman	Director, Dept. of Occup. & Environmental Safety	7/31/91

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS
Amd	Aug 18	EX 3L	

AMOUNT RECEIVED: FEE EXEMPT — 170.11(A)(4)

APPROVED BY: Rita Jacques — 8/13/91

RECEIVED
DATE: AUG 05 1991
REGION III

NRC FORM 313 (9-90)

CONTROL NO. 91950

A/S

CASE WESTERN RESERVE UNIVERSITY

DESIGN PROPOSAL

LOW LEVEL
RADIOACTIVE WASTE STORAGE
FACILITY

1. Identification of waste to be stored

a. *Specify any possession limit increases needed for extended interim storage of LLW.*

Isotopes requiring possession limit increases are indicated by an *. Current possession limits for all other isotopes are adequate. Increases have been determined in most cases by multiplying activity purchased in fiscal 1990 by five:

ISOTOPE NRC	CURRENT NRC LIMIT mCI	ANNUAL CWRU PURCHASE mCI	PROPOSED LIMIT mCI
C-14	2000	50	2000
CR-51*	300	100	500
H-3	20000	800	20000
I-125*	500	400	2000
P-32*	3000	2200	4000
S-35*	3000	900	4500

b. *Identify the estimate maximum amount of LLW to be stored, both in terms of volume and activity, by radionuclide.*

ISOTOPE	ESTIMATED ACTIVITY TO BE STORED mCI	ESTIMATED VOLUME TO BE STORED CuFT
H-3	4000	
I-125	1000	
P-32	1000	3500 TOTAL ALL ISOTOPES
S-35	2000	
C-14	250	
CR-51	250	

These estimates of storage volume reflect the five year purchase estimates with a slight adjustment for decay.

c. *Characterize the LLW to be stored:*

(1) Volume of waste by Class (A, B, or C)

All waste will be class A.

(2) Physical form of the waste: Solid, Liquid or Gas

Approximately 80% of the waste stored at the proposed facility will be dry solids containing <0.5% liquid by volume. The balance of the waste will be bulk liquid storage, 16% being aqueous and 4% organic. Storage of isotopes in gaseous form is not anticipated.

(3) Waste processing: volume reduction, solidification or other treatments.

Campus researchers are presently required to separate waste by isotope and type, dry solid, vials, etc. Items placed in radioactive waste containers should be monitored before disposal to reduce waste volume. Radiation safety office personnel remove waste from the laboratories, cross checking labels and activities with authorization limits. At the time of processing the waste will be segregated into DOT-17H, or equivalent containers, by isotope. Long term waste (half lives longer than 90 days) will be compacted. Short half life material will not be compacted but stored for 10 half lives and when suitable activities reached disposed of as non-radioactive.

(4) Additional non-radiological properties of LLW (if any): hazardous, biological/pathogenic, corrosive, flammable, etc.

Disposal records for the last 2 years reveal that waste processed and stored long term will contain minimal amounts of flammables and corrosives. Biological and pathological waste will be stored in a refrigerator freezer separate from the proposed facility. The freezer storage area is the one currently being used to store animal carcasses.

(d) Describe the amount and type of LLW currently being stored and processed.

CWRU does not currently store waste. A synopsis of current waste being processed (per year) is as follows:

DRY SOLID (LONG TERM)	100 CU. FT.

DRY SOLID (SHORT TERM)	200 CU. FT.
LIQUID AQUEOUS ABSORBABLE	150 GAL.
LIQUID ORGANIC	30 GAL.
VIALS DEREGULATED	200 CU. FT.
VIALS REGULATED	40 CU. FT.

These values are non-compacted volumes.

Identify any additional permits or approvals necessary for storage (i.e., EPA hazardous waste permit, State or local approvals, etc.)

The E.P.A. waste permit number which will cover this facility is:

OHD 000812230.

The Cleveland Fire Department has been involved in the LLRW storage area design process from its initiation. Several design decisions concerning the placement, size and type of automatic and manual fire suppression systems were incorporated into the final design and budget process.

2. *Plans for final disposal*

a. Specify when disposal capacity will no longer be available to you and onsite storage will begin.

It is anticipated that offsite disposal will cease in the fourth quarter of 1992. Onsite storage will commence, conditional on the approval of this amendment, after the last offsite shipment which can be scheduled.

b. Specify the State-Regional disposal facility to be used for ultimate disposal of your LLW and when that facility is scheduled to begin accepting LLW. Your Regional Compact or State LLW authority should be able to provide this information if you do not have it.

Case Western Reserve will utilize the Midwest Compact. As of 6/1/91 the date for the expected operation of this facility is 3/1/97.

c. Specify when you will begin shipping LLW to that facility and how long it will take for your estimated storage inventory to be moved out.

Waste shipments will commence at the earliest possible date with total disposal and will be carried out expeditiously.

3. *Physical Description of Storage Area*

a. *Identify the location and provide a diagram of the LLW storage area which demonstrates where packages will be stored and how packages will be accessible for inspection purposes. Include the locations of waste processing equipment (if applicable), air sampling stations, effluent filters and any sources of flammable or explosive material.*

The storage area is a new 3000 sq. ft. processing and storage facility constructed adjacent to the present waste facility, **Attachments #1 and #2**. The room will be housed on the first level of a parking deck (Complete preliminary drawings for architectural, mechanical and electrical are included, **Attachment #3**). All areas of interest, processing, compacting, storage, office space, etc. have been indicated on the drawings. Descriptions of additional equipment are included in **Attachments #4-#6.**

b. *Specify the maximum volume of LLW that can be stored in the proposed waste storage area and relate this to annual volume of waste generated.*

An analysis of the waste trends for current work at CWRU, estimates growth rates in research, and implementation of waste reduction protocols along with compaction of long term isotopes yields a 5 year storage requirement of 500 DOT-17H drums, or 3500 cuft. The facility has been design to meet this need.

c. *Specify the type of building/structure in which the waste will be stored and demonstrate that the waste will be protected from weather at all times.*

The LLW storage area is being constructed in an existing parking structure adjacent to the present facility, **Attachment #1-#3**. The area will be fully enclosed with restricted access. Complete mechanical, heating, ventilating and air conditioning needs along with hot and cold running water will be supplied at all times. See the attached diagrams.

d. *Describe the measures to control access to the LLW storage area and thereby ensure security of the waste.*

The new facility will utilize the restricted lock system currently used on CWRU's waste area. Keys are maintained by RSOF personnel. Key codes are kept by University Key shop personnel all other access is restricted. All restricted keys are issued through the CWRU security office.

e. *Describe the ventilation system and how it will assure adequate ventilation of the storage area.*

The storage area is designed with a 10 ton ventilation system having a 1745 cfm flow rate. This gives a turn over rate of 4.2 times per hour. The air from the hood and processing area will be filtered through a charcoal and HEPA system having an automated mechanical engineer verifying flow pressures, **Attachment #7**.

f. *Describe the fire protection and suppression system to minimize the likelihood and extent of fire.*

Fire suppression will be supplied by a dedicated Co2 system utilizing both smoke and infrared detection sensors. Three portable 50 lb. Co2 extinguishers will supplement the fixed system. The walls will have a 4 hour fire rating and be constructed of 12" poured concrete. Doors will be labelled for 3 hours. Chemical sensors planned for inclusion in the facility will allow early detection of combustible or flammable vapors. All alarms will be remotely monitored from campus security.

g. *Describe how the adverse effects of extremes of temperature and humidity on waste and waste containers will be avoided.*

The facility will be constructed with a complete heating, ventilation and air conditioning system to control temperature and humidity within normal operating conditions, **Attachment #7**.

h. *Describe vulnerability to other hazards such as tornado, hurricane, flood, industrial accident, etc.*

The facility is on the first floor of a steel reinforced concrete parking structure which is above the area flood plane. Planning has included such variables as lighting, turning area, equipment operating procedures and other applicable items to minimize the possibility of industrial accident.

4. *Packaging and container integrity*

a. Describe the package or containers to be used for storage LLW, any hazards the waste may pose to their integrity, and the projected storage life of the package or containers.

The standard packing container to be used is the DOT-17H shipping drum.

b. Describe your program for periodic inspections of LLW packages to ensure that they retain their integrity and containment of LLW.

Waste will be stored in racks which allow direct visualization of all sides of the containers and the floor. Weekly physical and visual inspections will be documented along with area contamination surveys. In addition chemical sensors placed around the storage area will detect high concentrations of organic vapors, indicative of a breached or leaking drum.

c. *Describe your program and equipment (if applicable) for remote handling and/or repackaging damaged or leaking waste containers.*

Over packs will be available in the event a container becomes damaged or leaks. The dedicated processing area can be used for the repack process. Remote handling requirements are not anticipated.

5. *Radiation Protection*

a. Describe your program for safe placement and inspection of waste in storage and maintaining occupational exposures as low as reasonably achievable (ALARA). This program should include periodic radiation and contamination surveys of individual packages and the storage area in general, as well as posting the storage area in accordance with 10 CFR Section 20.203.

Waste drums will be cleaned before use. After being filled and sealed, barrels will be wipe tested for external contamination and the results documented, **Attachments #8 and #9**. External monitoring will determine exposure rates at contact and 3 ft. barrels with exposure rates >2Mr/hr @ 1 foot will be placed in the decay room. Weekly contamination surveys and continuous air effluent monitoring will be carried out and documented. All postings will be in accordance with 10 CFR 20.203.

b. *Describe projected exposure rates, needs for shielding (if any) and any changes in personnel monitoring which will be required as a result of waste storage.*

Exposure rates for all barrels shipped from CWRU in the last two years have been less than 2Mr/hr on contact. It is not expected that higher exposure rates will be found. In the event that a drum has an external exposure rate in excess of 2Mr/hr a separate decay room having 10-11" thick poured concrete walls (concrete density of 147#/cu.ft.) has been added. Currently personnel in the radiation safety office have TLD body and extremity badges monitored quarterly. No change in these procedures are anticipated.

c. *Describe your procedures for responding to emergencies, including notification of and coordination with local fire, police and medical departments.*

Local fire, EMS and police agencies will be encouraged to tour the new facility. The local fire agency has been involved with the project from the initial planning stage. University Hospitals and Clinics has a hazardous materials decontamination room adjacent to their emergency room. All ER personnel are trained in its use, **Attachment #10**. The radiation safety staff is on an emergency pager system and can be contacted by CWRU security 24 hrs/day. The emergency call list is updated regularly.

d. *Describe your system for maintaining accurate records of waste in storage (including any waste receipts or transfers from or to other licensees) to assure accountability.*

Waste is segregated by isotope in the researchers laboratory. Each bag or container is labeled with isotope, activity in mCi, and date. As bags are placed into drums this information is recorded on a drum log sheet. When the drum is full, it is sealed, wipe tested, labeled and monitored for external radiation. The activities of the contents will be totaled. This information will be added to a computer spreadsheet identifying the type of waste barrel, its contents, assay date, indentification number and location in the facility. Suitable hard copy back-ups will be made of the computer data to insure no loss of information in the event of an accident. A description of this process is included in **Attachment #11.**

6. *Training*

a. *Describe your program for training personnel in procedures for packaging, handling, placement, inspection, surveying and emergency response.*

Personnel training is multi-phased. Each radiation safety worker who handles material is given a training course which includes but is not limited to the information outlined in Reg. Guide 8.29.

The following is an outline of the topics covered in the CWRU radiation worker training course.

INTRODUCTORY RADIATION SAFETY TRAINING CLASS
FOR NEW CWRU RADIATION STAFF WORKERS

Exposure/Dose Definitions

Roentgen (R) : unit of exposure = 2.58×10^{-4} Coulombs per kg air

Rad : unit of absorbed dose = 0.01 J/kg = 100 erg/gm

Rem : unit of biological dose equivalence, Rem = Rad x QF

QF = 1 for beta and photon emissions

QF = 20 for alpha emissions

QF = 5-20 for fast neutron emissions

Units of Radioactivity

- NRC and State regulations require that all units of radioactivity be expressed in units of disintegrations per unit time.

1 Curie (Ci)= 2.22×10^{12} dpm = 3.7×10^{10} dps

1 Becquerel (Bq) = 1 dps

Radiation dose limits

1,250 mRem/qtr : head, eyes, trunk of body

7,500 mRem/qtr : skin of whole body (applies to beta and alpha external doses)

18,750 mRem/qtr : hands, forearms, feet, ankles

500 mRem/gestational period for pregnant workers

Determination of prior dose

RSOF Radiation Badge Request Form

Occupational lifetime dose limit = 5(Age -18) Rem

Exposure limits for minors and general population

125 MRem per calendar quarter

500 mRem per year

Radioactivity in effluents to unrestricted areas

-airborne concentrations defined in 10 CFR 20 Appendix E (call Radiation Safety at 368-2306 for air monitoring and/or other calculations before working with volatile compounds such as Na-22, I-125)

-sanitary sewer effluent concentrations and annual total quantities defined by CWRU I license

-A.U. sewer disposal limits and conditions defined in RPPM

< 20 uCi per day for H-3, C-14

< uCi per day for other non-alpha emitters

Bioassay Services

-Radiation Safety provide bioassay screening for H-3 and I-125
-ALARA levels set at 10% of applicable Regulatory Guide recommendations

Contamination Surveys

-document probe readings in dpm (or other units of disintegrations per unit time)

-monitoring frequency

- post experiment or weekly if using (includes handling an open container) more than 200 uCi at any given time

-monthly if only using less than 200 uCi at any given time

Personnel Monitoring

-badges record long term exposure

-exposure records are available upon written request or personal visit to the Radiation Safety Office during normal business hours

-keep survey meter turned on and within easy reach during isotope work to allow frequent contamination checks of self and equipment, and immediate response to decay emissions in case of an accident

Caution Signs and Labels

"Caution Radioactive Materials" : indicates radioactive materials of any quantity are used in the room

"Caution Radiation Area" : indicates potential exposures exceeding 5 mRem/hr or

100 mRem in a five day period

"Caution High Radiation Area" : indicates potential exposure exceeding 100 mRem/hr

-label all RAM with isotope, activity, and date (NRC requirement)

RAM Package Receipt

-open packages of volatile compounds in a fume hood

-wear appropriate protective clothing

-document all probe readings

-document all wipe tests

-deface all warning labels before discarding packing materials

Accidents

-report all accidents and/or spills to the Radiation Safety Office so that the incident corrections can be advised//supervised and properly documented for future NRC/ODH inspections

Waste Disposal

- label all bags and containers with isotope, activity, and date

-survey waste container exterior for loose contamination

- fill out waste disposal form

- call Radiation Safety Office (368-2906) to schedule waste pickups

Waste Minimization/Reduction Suggestions

- survey all items before they are placed into Rad Waste containers

- items that are not contaminated should not be disposed of as Rad Waste

- if spots of bench paper are contaminated, cut out the contaminated areas and resurvey the remaining bench paper

The following documents are reviewed by each employee:

10-CFR Parts 19, 20
Ohio Department of Health Radiation Protection Rules
U.S. REGULATORY GUIDES: DIVISION 8 AND 10
CWRU NRC License and License Communications
ODH AND NRC Notice to Employees

REG GUIDES COVERED

8.13 Prenatal Radiation Exposure
8.18 Information Relevant to Ensuring that Occupational Exposures at Medical Institutions are As Low As Reasonably Achievable
8.20 Application of Bioassay for I-125 and I-131
8.23 Radiation Safety Surveys at Medical Institutions
8.29 Instructions Concerning Risks from Radiation Exposure
8.32 Criteria for establishing a Tritium Bioassay Program

In addition personnel working in the storage and processing facility will have inservice training on specific pieces of equipment, e.g. compactor, electrohydraulic hoist, and survey and monitoring equipment.

Attachments:

1) Location map
2) Design Development Drawing for New Facility
3) Existing Facility Blue Print
4) Compactor Description

5) Lift Description
6) Air Sampler Description
7) Current Ventilation System Procedures
8) CWRU RSOF Radioisotope Disposal Log
9) Drum Flow Sheet
10) Emergency Room Hazmat Facility Description
11) Adco Quality Assurance Letter

Attachment # 1

The location of the present waste processing, and future waste processing and storage area, is highlighted. The facilities are located in a parking structure next to the University's Dental and Nursing schools. The map provided depicts the campus of Case Western Reserve University.

CASE WESTERN RESERVE UNIVERSITY AND SURROUNDING AREA

Attachment # 2

This design development drawing shows the layout of the LLRW processing and storage area. The location of all important pieces of equipment are identified. Solid lines indicate walls constructed of 147#/cuft concrete. The locations for the portable 50# Co2 fire extinguishers are not marked. The current thought is these devices will be located by exits to the storage area.

Attachment # 3

The attached drawings include architectural floor plans, mechanical and electrical plans for the proposed facility.

Attachment # 4

Documentation describing the compactor used in the processing of LLRW at CWRU.

INSTALLATION, OPERATION & MAINTENANCE MANUAL FOR

MODEL DOS-RAW-W1

SERIAL NO. CB-87041

CASE WESTERN RESERVE UNIVERSITY

CLEVELAND, OHIO

CONSOLIDATED BALING MACHINE COMPANY, INC.
5400 RIO GRANDE AVENUE
JACKSONVILLE, FL 32205

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RADIOACTIVE WASTE PRESS

DESCRIPTION

The Model DOS-RAW-W1 Baler is designed for pressing of radioactive waste directly into 55-gallon drums.

This is basically a two-column, downstroke, hydraulic baler enclosed in a shroud. On the base of the press is a "drum support plate" mounted on spring-loaded rollers. This plate makes possible easy moving of the drum in and out of the press as necessary when repeatedly loading and pressing material.

Incorporated inn the press is an Air Exhaust System consisting f a hood, prefilter and absolute filter and an exhaust fan. This system filters the air from within the shroud.

The press is operated by means of a motor driven hydraulic system. This system includes a 5 H.P. Motor, 5 GPM Hydraulic Pump, Solenoid Operated 4-Way Control Valve, Check Valve, Pressure Operated Switch, Relief Valve, and a 4-inch bore Hydraulic Cylinder. The Electrical System is arranged for operation on a 3 Phase, 60 Cycle supply of the voltage specified. Incorporated in the Control Panel is a step-down transformer which supplies 115 volts to the Control Circuit.

In the Hydraulic System is incorporated an adjustable Relief Valve, adjustable Pressure Operated Switch and a Hydraulic Gauge. The Relief Valve should be set for approximately 2,000 PSI and the Pressure Operated Switch at 1,850 PSI maximum to give 25,000 pounds operating force. Since the Pressure Switch is the controlling component, it can be set at a lower pressure if desired when making tests or pressing material where a lower pressure is preferred. The Relief Valve acts as a Safety Valve and should be set at least 100 PSI above the Pressure Switch so that the latter is the controlling component. A Shut-Off Valve in the line to the Hydraulic Gauge is normally closed. It should only be opened (about 1/2 turn) when checking the pressure reading at the gauge. During normal operation it is left closed. Disregard latter if press has liquid filled gauge.

The Controls consist of one "Up" and one "Down" and two "Stop" Push-buttons - one for the pump motor and one for the exhaust fan motor. The Pushbuttons are so wire that depressing the Pump-Motor up or down button also starts the Fan Motor. When the Press is started, it will run until the pressure switch is activated, but Fan Motor continues to run and will continue until the Fan Motor "Stop" Button is depressed. A Safety Switch prevents operation of the pump motor if the shroud door is not in the closed position. In normal operation, the temperature of the Hydraulic Fluid will rise approximately 20 degrees Fahrenheit. A maximum temperature of 160 degrees Fahrenheit can be tolerated without any adverse effects.

OPERATION

1. Starting with Drum Support Plate in "Out" or Loading" Position, set drum in place on this plate. Care should be taken to see that drum is centered on Drum Support Plate. Adjust the drum locating pins on the Drum Support Plate.

2. Load drum with material, making certain that material is evenly distributed, and step on Drum Support Plate Locating Pin Device to release the Locating Pin and push drum into position for pressing. Check to see that Drum is centered under platen.

NOTE: When loading, make certain that Non-Compressible items such as lengths of pipe, heavy pieces of wood are not put into drum.

3. Depress the "Down" Pushbutton. This will result in starting of pump and fan motor and downward compression stroke of platen.

4. When maximum pressure is reached, the pressure switch will shut off the pump motor. To return the platen, depress the "Up" Pushbutton. The platen will return to the up or loading position and the pump motor will shut off.

5. The Shroud Door can be opened and the drum pulled out for reloading. After reloading, steps 2, 3 and 4 are repeated. The loading and pressing operations are repeated until a full drum of material is obtained. At this time, the drum is removed and a cover put in place.

   When the operation is completed, the "Stop" Fan Pushbutton can be depressed to shut off the fan.

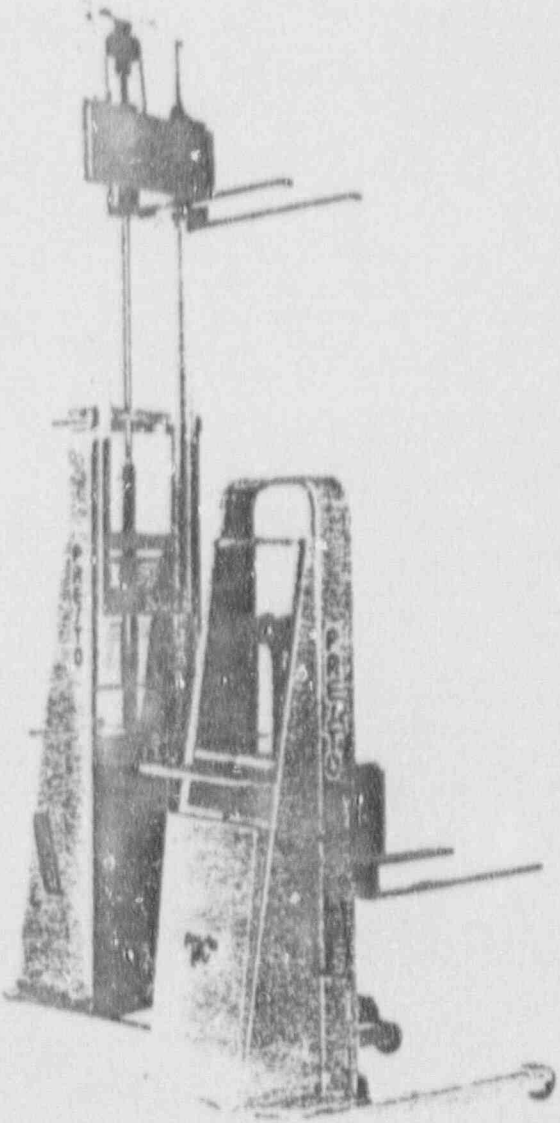
NOTE: When there are long periods between loadings, material in a drum can be left with the platen down, the material locked under pressure and the motor, of course, off. This helps set the material and results in a denser drum of material.

Attachment # 5

Documentation describing the electro hydraulic lifter used for moving and stacking drums.

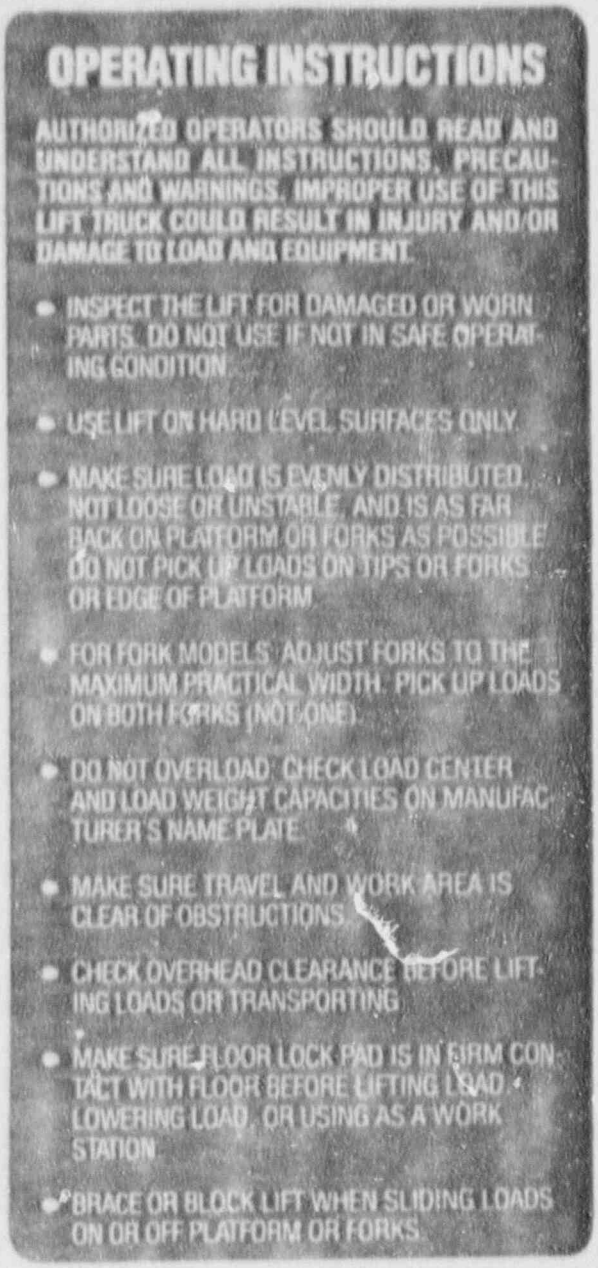
PARTS OPERATING AND MAINTENANCE MANUAL

BATTERY OPERATED LIFTS



LEE ENGINEERING COMPANY, INC.

P.O. Box 2?°0
505 Narrag. ett Park Drive, Pawtucket, Rhode Island 02861
401-725-6100 FAX #401-728-7840



DAILY OPERATIONS MAINTENANCE CHECKS

1. Battery

   A) Check fluid level.
   B) Check for corroded and loose terminals.
   C) Visually inspect for any cracks or damage to the casing.
   D) Check for loose battery tie-downs.

2. Charger

   A) Inspect wire connections.
   B) Check power cord for nick/damage.
   C) Check charger for proper mounting.

3. Hydraulic System

   A) Inspect pump & cylinder for oil leaks.
   B) Check hydraulic oil level.
   C) Check all hydraulic fittings & hoses.
   D) Check ram for nicks/damage.

4. Frame Assembly

   A) Check floor lock.
   B) Check placement of safety screen.
   C) Check chain roller assembly connections.
   D) Check for any worn or damaged parts.

MONTHLY OPERATIONS MAINTENANCE CHECKS

1. Battery

   A) Clean terminals.
   B) Clean battery compartment area.
   C) Check specific gravity - fully charged battery should read 1265.

2. Hydraulic System

   A) Clean & inspect hydraulic cylinder.
   B) Lubricate chain with a rust inhibitive lubricant.
   C) Check chain tension.

3. Frame Assembly

   A) Clean and lube all roller bearings and cam followers.
   B) Clean & inspect all welds.
   C) Check wheels for wear and damage.
   D) Inspect nameplate for legibility.

CONTROL NO. 51950

Attachment # 6

Documentation describing the air sampler used to monitor airborne low level beta emitters in real time. The system has been modified to include a charcoal filtration trap for assessment of airborne I-125.

Instruction Manual

LUDLUM MODEL 333-2 BETA AIR MONITOR

LUDLUM MEASUREMENTS, INC.
501 OAK 915 - 235-5494 P. O. BOX 810
SWEETWATER, TEXAS, U.S.A., 79556

DESIGNER AND MANUFACTURER
OF
Scientific and Industrial
INSTRUMENTS

CONTROL No. 51000

LUDLUM MODEL 333-2 BETA AIR MONITOR

TABLE OF CONTENTS

MODEL 333- _ BETA AIR MONITOR ADDENDUM SHEET

DETECTOR REMOVAL

1. Turn instrument off.
2. Remove cover by removing the 2 lower bolts on either end and the machine screws on top of the instrument. Gently lift cover until the alarm cable is accessible. Unplug alarm cable and lift cover off.
3. Disconnect the two BNC connectors from the lead shield. Remove the 3 bolts on rear of lead shield and slide the shield end toward the rear of the instrument.
4. Grasp Rear Shield handle and lift entire assembly out of instrument, being careful not to hit the detectors against anything.
5. The OUTER detector can be removed by unplugging the clip on the detector and then loosening the 3 outer set screws. Remove the INNER detector by unplugging the clip and loosening the remaining set screw.
6. Reassemble in reverse order of disassembly.
7. NOTE: BE CAREFUL NOT TO [illegible] DETECTOR AGAINST ANYTHING DURING REASSEMBLY.

CONTROL No. 91950

LUDLUM MODEL 333-2 BETA AIR MONITOR

1. GENERAL

The Ludlum Model 333-2 Beta Air Monitor and the Model 333-1P Regulated Vacuum Pump form a complete air monitoring system. The Model 333-2 is configured for continuous sampling of airborne beta-emitters. The detection system consists of a primary pancake detector facing the upstream side of the filter paper and a second gamma subtract pancake detector located behind and facing the back of the primary detector. The sampling assembly is surrounded by 2 inches of lead shielding.

Some standard features of the Model 333-2 are listed below.

(1) Dual alarm setpoints provide independent setting of the ALERT level (strobe) and the ALARM level (bell). Setpoints may be checked via the front panel pushbuttons; however, the adjustment controls are located behind the calibration cover plate.
(2) Failure detection is provided for loss of count in the primary detector.
(3) Contact closure is provided for all three of the alarm annunciations listed above.
(4) Two recorder outputs are provided:
    a) 4-20 mA source.
    b) 0-1 volt DC.
(5) A Lo/No air flow indicator flashes when air flow drops below a preset rate.
(6) Critical air chamber components are constructed of stainless steel.

2. SPECIFICATIONS

DETECTORS: 2 standard pancake G-M tubes (type 7311); effective diameter - 1.75 inches; window density - 1.5 to 2.0 mg/cm^2 mica.

DETECTOR ARRANGEMENT: both detectors contained in a lead shield, with the primary detector facing the filter paper and a second gamma subtraction detector positioned behind the primary detector.

COUNTING EFFICIENCY: Tc-99, 36% of 2 pi.

SHIELD: 2-inch lead.

SAMPLE CHAMBER: stainless steel construction.

RECORDER: striking strip chart (30 day capacity).

RATEMETER: 3 1/2-inch logarithmic meter.

LUDLUM MOD. 333-2 BETA AIR MONITOR

RANGE: 10 to 100,000 counts-per-minute (CPM).

FILTER: type 5211, 47mm diameter paper.

ALARM INDICATION: 1) ALERT, flashing red strobe with SPDT (single-pole, double-throw) contact closure; 2) ALARM, bell with SPDT contact closure; alarm points are individually adjustable over the full ratemeter range; set points are displayed on the meter readout by depressing the appropriate button on the front panel. All contacts are rated for 3 amps @ 120 VAC resistive. The bell is rated at 92dB at 10'.

ALARM ACKNOWLEDGE: front panel AUDIO ON/OFF forces the flashing strobe "on" and the bell "off".

ALARM DELAY: adjustable from 1 to 30 seconds.

LOCK-IN FEATURE: both ALERT and ALARM circuits with individual switches allowing selection of either "Lock-in" or non "Lock-in" alarm operation.

FAIL INDICATION: front panel LED and SPDT relay contacts, indicating no counts received in the Beta detector.

RECORDER OUTPUT: 4-20mA current source capable of driving a maximum 750 ohm external load. 0-1 volt recorder output is also provided.

FLOW INDICATION: 10 to 100 LPM flowmeter.

LO/NO FLOW INDICATOR: front panel flashing red lamp.

FLOW REGULATOR USEABLE RANGE: 47-80 LPM.

WEIGHT: 160 pounds, excluding the pump and flow regulator.

SIZE: 27 3/4 inches wide x 15 7/8 inches high x 13 inches deep.

AIR PUMP: rotary, carbon-vane type; 240 SCFH maximum.

MAXIMUM PUMP OPERATING TEMPERATURE: 180°F (temperature measured at the center of the pump end plate).

MOTOR: 1/4 Hp, 1725 RPM, 5-amp, 115V, 60 HZ, continuous duty.

CONTROL NO. 91956

3. DESCRIPTION OF CONTROLS AND FUNCTIONS

3.1 Front Panel

ALERT is a pushbutton control used to display the ALERT annunciation level on the meter readout.

ALARM is a pushbutton control used to display the ALARM annunciation level on the meter readout.

AUDIO is a toggle switch used to defeat the bell when placed in the "OFF" position. The flashing strobe is forced "ON" when this switch is in the "OFF" position, alerting the user to an abnormal state.

RESET is a pushbutton switch used to zero the meter and reset both the ALERT and ALARM annunciators.

RCDR is a toggle switch used to turn the local recorder off without having to shut down the entire instrument.

PUMP is a toggle switch used to energize the rear panel motor outlet.

MON is a green LED indicating counts are being received in the primary detector. With only background present, this light may momentarily blink off.

PILOT is an orange neon bulb indicating that AC is applied to the electronics portion of the instrument.

ON/OFF is a toggle switch used to energize the electronics of the Model 333-2.

Meter Readout is considered to be the primary readout and indicates counts received on a 4-decade logarithmic scale from 10 to 100,000 CPM.

The following controls are located underneath the Calibration Control Cover:

HV is a recessed control used to adjust the high voltage applied to both detectors. It is variable from approximately 0 to 1250 volts.

BKGND SUB is a recessed control used to adjust the amount of background detector subtraction from 0% to 90%.

BKGD PULS is a recessed control used to adjust the pulse width applied to the log/ratemeter subtraction circuit (refer to Log/Alarm Board calibration procedure).

MTR ZERO is a recessed control used to adjust the midscale reading of the primary readout.

MTR SPAN is a recessed control used to adjust the primary meter full-scale reading.

LCL RCRDR is a recessed control used to calibrate the strip chart recorder on the front instrument panel.

RMT RCRDR is a recessed control used to calibrate the external recorder output (available on pin N of the 14-pin MS connector on the rear of the instrument).

ALRM RESP is a recessed control used to vary the ALARM level annunciation time from approximately 1 to 30 seconds.

ALRT SET is a recessed control used in conjunction with the ALERT PUSH TO READ button to adjust the ALERT LEVEL (strobe) setpoint.

ALRM SET is a recessed control used in conjunction with the ALARM PUSH TO READ button to adjust the ALARM LEVEL (bell) setpoint.

3.2 Back Panel

DETECTOR OUTPUTS are two BNC connectors providing preamplifier output from each detector.

110 VAC is a socket used to apply power to the electronics chassis and to the vacuum pump outlet.

REMOTE is a 14-pin, MS-style connector used to provide the following external connections:

PIN	CONNECTIONS
A	MONITOR RELAY (Common, COM)
B	MONITOR (Normally Closed, NC)
C	MONITOR (Normally Open, NO)
D	ALARM RELAY (COM)
E	ALARM (NC)
F	ALARM (NO)
G	4-20 mA SOURCE OUTPUT
H	ALERT (COM)
I	ALERT (NC)
J	ALERT (NO)
K	GND
L	+24 VDC @ 100 mA maximum
M	RESET (GND for remote reset)

 CONTROL No. 91950

Attachment # 7

Documentation describing the current ventilation system management. This system will be moved to the new facility. Operating procedures will not change significantly with the move.

MAINTENANCE & OPERATION INSTRUCTIONS

ROOM DOA-990
School of Medicine
Case Western Reserve University
Project #88-1312

This room is to be used for storing radio-active materials prior to their removal from the building.

It is very important that the room and the exhaust duct be monitored constantly to detect radio-activity.

1. VENTILATION:

   1. The ventilation system consisting of the original air handling unit and a new exhaust fan shall run continuously.

   2. The filters of the air handling unit shall be changed once every two (2) weeks, or more often if deemed necessary by visual observation. The prefilter ahead of the HEPA filter in the exhaust duct shall be changed at the same time the filters of the air handling unit are changed.

      In addition: With clean prefilter and clean HEPA filter, a reading of the air static pressure drop as shown on the gauges of the control panel located outside Room DOA-990 shall be taken and entered in a log book. When the pressure drop across the prefilter and the HEPA filter rises 0.75" above the clean filter pressure drop, the prefilter shall be changed. The system shall run without a prefilter for a few minutes. If the pressure drop across the HEPA filter is above 1.5", the HEPA filter shall be changed.

2. FILTERING SYSTEMS:

   1. With clean prefilters, HEPA filters and charcoal adsorbers, the pressure drop across the prefilter and HEPA filters and across the charcoal adsorber shall be observed and noted in log book.

2. When the pressure drop across the prefilter - HEPA filter combination rises 0.75" above clean filter pressure drop, the prefilter shall be changed. The system shall run without a prefilter for a few minutes and if the pressure drop through the HEPA filter is above 1.5", the HEPA filter shall be changed.

3. When the pressure drop across the charcoal adsorber rises more than 0.5" above clean adsorber pressure drop, the charcoal absorber shall be replaced.

4. Filter and prefilter replacement shall be done in accordance with manufacturer's instructions by qualified trained personnel.

Attachment # 8

The CWRU RSOF Radioisotope Disposal Log identifies the origin, quantities of material and activities placed in each drum. This allows a complete history of the contents of each drum which will be stored in the facility.

BARREL # _____

DRUM WEIGHT _____ LBS

CWRU RSOF RADIOISTOPE DISPOSAL LOG

Waste Category ( ) Dry/Solid-long ( ) Dry/Solid-short ( ) Abs Aq ( ) Ani Car
( ) Dereg Vials ( ) Reg Vials ( ) Bulk Scint Fluid

DATE	AUTHORIZED USER	ISOTOPE	ACTIVITY IN mCi	BALANCE 3H & 14C COMBINED	TOTAL VOLUME	
					GAL	FT3

TOTAL ACTIVIT . IN mCi

3H _____mCi 14C _____mCi 35S_____mCi 32P_____mCi 125I_____mCi

36Cl_____mCi 22Na_____mCi 45Ca_____mCi 51Cr_____mCi ( ) Other _____ _____

( ) Other_____ _____mCi ( ) Other _____ _____mCi **DRUM TOTAL** _____ mCi

Attachment # 9

The Drum Flow Sheet documents that each drum is sealed correctly and has no removable external contamination. Readings taken to complete this form will determine its placement in the storage facility. External exposure rates at 3 ft of greater than 2 MR/hr will be placed in the decay room.

DRUM FLOW SHEET

		Initials	Date
Sealed By		_____	_____
Correctly Labelled		_____	_____
Bolt tight		_____	_____
Smeared		_____	_____
MR/HR @ Surface	_____	_____	_____
MR/HR @ 1 Meter	_____	_____	_____

Meter Info. Make: Victoreen Model #: 450P Serial#: 1168
Correction Factor of ^{137}Cs = 1 Cal. Due Date 9/91

Counted	_____DPM	_____	_____
	_____DPM	_____	_____
	_____DPM	_____	_____
Total DPM/100 cm^2	_____DPM	_____	_____
Manifest Number	_____	_____	_____

Barrel Transferred to: ___ Decay ___ Contractor Date _____

CONTROL NO. 91950

chment # 10

This document gives a general description of the University Hospitals and Clinics Hazmat decontamination room and the training of the individuals staffing it.

UHC To Open h. .ZMAT Facility

University Hospitals of Cleveland's Emergency Department will open northeast Ohio's only hospital-based hazardous materials (HAZMAT) decontamination facility.

When caring for a contaminated patient, Emergency Department personnel are protected by a fully-encapsulating, chemical-resistant suit.

The HAZMAT facility is under the direction of clinical nurse specialist Maria Takacs, R.N., M.S.N., and Nabil ElSanadi, M.D., acting director of UHC's Emergency Department, medical director of the Mobile HAZMAT Unit for the southeast Chagrin HAZMAT team, and medical director for the Geauga County Hazardous Incident Response Team (HIRT).

The facility is located near the Emergency Department ambulance bay. With a separate entrance and exit, and a completely self-contained environment, the entire facility has been designed to provide not only state-of-the-art emergency medical care for contaminated patients, but also a safe and effective means for Emergency Department personnel to care for those patients.

Carol Grove, R.N., Emergency Department head nurse manager, explains that the facility has piped-in medical gases and suction capability, with dedicated emergency medical equipment. This allows Emergency Department personnel to provide expert emergency medical care to a patient during the decontamination process. The facility also has a self-contained water drainage system for the hazardous waste.

According to Dr. El anadi, the HAZMAT facility and Emergency Department personnel can handle a variety of situations that involve the need for decontamination, such as chemical spills, toxic fumes, and radiation incidents. These can involve absorption, surface and inhalation contamination.

"Emergency medical service providers in the community have been waiting for a facility like this," says Dr. ElSanadi. "Although there are a number of mobile HAZMAT units within northeastern Ohio, the problem remains that injured parties generally have to go to a hospital. During the transport, and upon hospital arrival, other people are becoming contaminated with the same substance. With our HAZMAT facility we can decontaminate a patient, provide expert, emergency medical care, while simultaneously providing a safe environment for personnel and visitors."

"In any emergency situation, we need to respond quickly," says Grove. "With everyone trained in decontamination procedures, if a situation happens at 2 a.m., we won't have to call in a dedicated team. Patient care won't be compromised."

To contact a UHC emergency medicine specialist for information, consultation or referral of one of your patients, call 1-800-552-8338 our toll-free physician referral service.

Dr. ElSanadi Leads Emergency Dept.

Nabil ElSanadi, M.D., M.B.A., F.A.C.E.P., has been appointed acting director of University Hospitals' Emergency Department.

Dr. ElSanadi, a graduate of The Ohio State University School of Medicine, performed his residency in Internal Medicine and a research fellowship in hypertension cardiology at the Cleveland Clinic Foundation. Board-certified in Emergency Medicine, Dr. ElSanadi also is an assistant clinical professor of Medicine at Case Western Reserve University. He received his master's degree in business administration from the Case Western Reserve University Weatherhead School of Management.

Dr. ElSanadi's previous appointments include director of the Emergency Department and Services at Meridia Suburban Hospital; medical director, Chagrin Valley Medical Urgent Care Center; flight physician, Metro Life Flight; and critical care physician/internist at the Lake Hospital System.

Aside from his appointment with UHC's Emergency Department, Dr. ElSanadi is a flight physician and medical director for UHC's aeromedical transport service, University AirCare.

Dr. ElSanadi is a member of the American Medical Association, Northeastern Ohio Society of Emergency Physicians, American College of Emergency Physicians, Ohio State Medical Association, Cleveland Academy of Medicine, and the Ohio Chapter of American College of Emergency Physicians.

Nabil ElSanadi, M.D.

Attachment # 11

This letter gives a more indepth description of the waste collection process utilized at CWRU. It outlines the methods used to insure that waste labelling and processing is correct.

June 27, 1991

Richard Brown
ADCO Services, INC.
17650 Duvan Drive
Tinley Park, IL 60477

Richard:

This letter outlines Case Western Reserve University's radioactive waste handling procedures. These procedures, along with radiation safety office cross checks of information on file, are designed to insure that only known isotopes and activities enter the ADCO waste stream.

User Procedures

All authorized users of radioactive materials are required to separate their waste by isotope. The **Radwaste Accumulation Log** (Attachment I) is used by many laboratories to log material being placed in the laboratory waste container. These containers are generally yellow plastic bags. Once the bag is sealed and labeled a **Radioactive Waste Disposal Form** (Attachment II) is completed and a collection requested. Waste is collected by RSOF personnel and checked for labels which should include isotope name, total activity and assay date. Containers which do not have this information are not retrieved. At the time of collection all forms and labels are checked for completion and the container is monitored for external radiation. The purpose of this metering is two fold, it ensure that the waste can be transported through public hallways and that exposure levels are consistent with labeled activity and isotope.

partment of Occupational & Enviromental Safety
Quail Bldg. 216
10900 Euclid Ave.
Cleveland, Ohio 44106
216/368-2906
FAX: 216/368-2236

Radiation Safety Office Procedures

When the bags reach the RSOF waste processing facility they are consolidated by isotope according to ADCO protocols and placed into DOT-17h drums. Each waste bag is logged on a **CWRU RSOF Radioisotope Disposal Log** (Attachment III), as it is place in the drum. Activities are combined by isotope and totaled for each drum. These values are summed for the ADCO shipment manifest. Drums are again wipe tested and monitored for external radiation. This information is logged on the **Drum Flow Sheet** (Attachment IV) which is printed on the back side of the disposal log. Finally all drums are logged on the manifest work sheet which lists waste type and barrel number (Attachment V).

We feel that our user training and department protocols allow close quality control over the waste containers shipped from CWRU. I hope this explanation satisfies any question you may have concerning our waste collection protocols and that they satisfy all applicable rules and protocols required for entry in your DIS program.

If you have any further question feel free to call, 216-368-2906.

Sincerely,

Gordie

Gordie Polando
Asst. Radiation Safety Officer

enclosures:

Radwaste Accumulation Log
Radioactive Waste Disposal Form
CWRU RSOF Radioisotope Disposal Log
Drum Flow Sheet

91950

RADWASTE ACCUMULATION LOG

ISOTOPE	ACTIVITY	DATE	ISOTOPE	ACTIVITY	DATE

1) Dry solid radioactive waste should be placed in a designated bag which should have an accumulation log listing isotope, activity in mCi and assay date.
2) Scintillation vials should be placed in the small thick yellow bags and tagged with an accumulation log listing isotope, activity in mCi, assay date and clearly stating that the bag contains vials.
3) Remember radioactive sharps are to be placed in sharps containers and clearly labeled with isotope, activity in mCi and assay date.
4) Radioactive liquids should be in an appropriate container and labeled with isotope, activity in mCi, assay date and chemical form (e.g. aqeous or organic).

isotope					
total activity					

closing person:	date :

CONTRACT No. 91950

CWRU RADIATION SAFETY OFFICE
RADIOACTIVE WASTE DISPOSAL FORM

Authorized User (Print) _____ Lab Phone _____

Bldg. & Room # _____ CWRU Acct # _____

WASTE TYPE*	ISOTOPE	ACTIVITY (IN mCi)	(F)ree or (B)ound	VOLUME	COST

RADIATION SAFETY USE ONLY

_____ _____
Authorized User Signature Date

*Note: Under "Waste Type" please indicate if the waste is:

Dry/Solid
Scintillation Vials
Bulk Scintillation Fluid
Bulk Aqueous Liquid

Please call the Radiation Safety Office at 368-2906 to schedule a pick-up or ask any questions.

RS Form 24
Rev. B 5/90

WHITE - RADIATION SAFETY YELLOW - AUTHORIZED USER

Check No. 91350

BARREL # _____

DRUM WEIGHT _____ LBS

CWRU RSOF RADIOISTOPE DISPOSAL LOG

Waste Category ( ) Dry/Solid-long ( ) Dry/Solid-short ( ) Abs Aq ( ) Ani Car
( ) Dereg Vials ( ) Reg Vials ( ) Bulk Scint Fluid

DATE	AUTHORIZED USER	ISOTOPE	ACTIVITY IN mCi	BALANCE 3H & 14C COMBINED	TOTAL VOLUME	
					GAL	FT3

TOTAL ACTIVITY IN mCi

3H _____mCi 14C _____mCi 35S_____mCi 32P_____mCi 125I_____mCi

36Cl_____mCi 22Na_____mCi 45Ca_____mCi 51Cr_____mCi ( ) Other _____ _____

( ) Other_____ _____mCi ( ) Other _____ _____mCi **DRUM TOTAL** ___ ___ **mCi**

DRUM FLOW SHEET

		Initials	Date
Sealed By		_____	_____
Correctly Labelled		_____	_____
Bolt tight		_____	_____
Smeared		_____	_____
MR/HR @ Surface	_____	_____	_____
MR/HR @ 1 Meter	_____	_____	_____

Meter Info. Make: Victoreen Model #: 450P Serial#: 1168
Correction Factor of ^{137}Cs = 1 Cal. Due Date 9/91

Counted	_____DPM	_____	_____
	_____DPM	_____	_____
	_____DPM	_____	_____
Total DPM/100 cm^2	_____DPM	_____	_____
Manifest Number	_____	_____	_____

Barrel Transferred to: ___ Decay ___ Contractor Date _____

CONTROL NO. 91950

BARREL NUMBER	SOLID	REG-VIALS	DEREG VIALS	AB. AQ.