30-12171

NRC Form 313 I (12-81) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

1. APPLICATION FOR: (Check and/or complete as appropriate)

	a. NEW LICENSE
	b. AMENDMENT TO: LICENSE NUMBER
X	c. RENEWAL OF: LICENSE NUMBER 34-12198-02

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

2. APPLICANT'S NAME (Institution, firm, person, etc.)
Barnebey-Cheney Company
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(614) 258-9501

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
Harley W. Wheeler
TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(614) 258-9501

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)
Barnebey-Cheney Company
P.O. Box 2526
Columbus, Ohio 43216

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code)
Barnebey-Cheney Company
835 N. Cassady Avenue
Columbus, Ohio 43219

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Harley W. Wheeler	Technical Services
b.		
c.		

7. RADIATION PROTECTION OFFICER
Harley W. Wheeler

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.
See Attachments under ~~items 15,16,17~~

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Iodine 131	Any	N/A	2 mCi nominal
(2)	Hydrogen-3	U.S. Radium Corp. model LAB-508-02	Ionics Research Inc. Model 100 Detector	4 foils of cell 150 mCi ea
(3)	Hydrogen-3	foils contained in B-C model SBA-N500	Analytical Instrument Development Inc. SBA-N500 detector cell	Not to exceed 200 mCi per foil
(4)	Xenon-133	Gas or Gas in solution	N/A	10 mCi

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	Testing of Activated Carbon for RadioIodine penetration per ASTM-D3803-79
(2)	To be used in gas chromatography for sample analysis
(3)	~~To be used in gas chromatographs for sample analysis and for distribution to~~ persons authorized to receive the liscensed material pursuant to terms & conditions ~~of specific licenses issued by the NRC, an agreement state or a foreign country.~~
(4)	To be used for testing of activated carbon for retention efficiency

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9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	Storage in glass G.C. vials inside sanyo refrigerator (-12 C)	Vials-Alltech refrigerator-sany	#95050 #5R4801
(2)			
(3)	Barnebey-Cheney Model SBA-N500 Halogen Detector	Barnebey-Cheney Company	SBA-N500
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	Survey	Ludlum	14C	2	Alpha Beta Gamma	0-1000 MR/hr.
(2)	Gamma Sepctrometer	Ortec	Nim Bin Attachment 10	1	Gamma	1cpm
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☒ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

See Attachment #11

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☒ (1) FILM BADGE	Morrison-Knudson Co., Inc P.O. Box 7808	☒ MONTHLY
☒ (2) THERMOLUMINESCENCE DOSIMETER (TLD)		☐ QUARTERLY
☐ (3) OTHER (Specify): _____		☐ OTHER (Specify): _____

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.

☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.

☒ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC. See Attachment for Item 13

☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

Nuclear Engineering Company Inc., See Attachment for Item 14

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

See Attachment #14

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.

    a. Principles and practices of radiation protection.

    b. Radioactivity measurement standardization and monitoring techniques and instruments.

    c. Mathematics and calculations basic to the use and measurement of radioactivity.

    d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

See Attachments

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our 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.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* 460.00	b. CERTIFYING OFFICIAL *(Signature)* William W. Vogelhuber c. NAME *(Type or print)* William W. Vogelhuber
(1) LICENSE FEE CATEGORY: 3 by product Mtrl N.	d. TITLE President
(2) LICENSE FEE ENCLOSED: $ 460.00	e. DATE September 14, 1987

Item 10 Radiation Detection Instruments

A. Survey Instruments

a. Instrument Identification

Manufacturer	Model	Serial Number	Radiation Detected	Range (mR/hr.)
Ludlum	14C	6250	alpha,beta, gamma	0-1000
Ludlum	14C	17275	alpha, beta, gamma	0-1000

b. Use

i. Instruments will be used in acceptance testing of all incoming radioiodine reagents.

ii. Instruments will be used for radiological surveys of radioiodine storage room, radioiodine waste storage area and general laboratory environment.

c. Instrument Service & Calibration

i. Survey instruments will be calibrated and/or serviced by:

Triangle Resource Industries

3527 Whiskey Bottom Road

Laurel, MD 20810 and/or 6792-7507

301) 792-7507

Mr. Jerry Dare

Radiation Safety Department

Ohio State University

B042 Groves Hall

333 West 10th Avenue.

Columbus, Ohio 43210

(614) 421-8315

ii. Interval of calibration per instrument will not exceed one year.

iii. Each instrument will be returned for calibration on an alternating six months basis so that the laboratory will have at least one newly calibrated survey meter every six months.

d. Instrument Malfunction or Failure

i. In the event either survey unit fails to perform, it will be returned to Triangle Resource Industries (above A, c, i).

ii. In the event both survey units fail to perform; no in-house radioiodine testing will be performed, no radioiodine reagents will be ordered or accepted from supplier, and radiological surveys (with the exception of Removable Contamination Survey Reports) will be postponed and duly noted in records.

B. Gamma Spectrometer

a. Instrument identification:

Manufacturer	Model Number	Serial Number	Radiation Detected
Ortec	905-4 NaI-Tl Detector	--	Gamma
Ortec	266 Detector Base	--	N.A.
Ortec	401M 402M Minibin	60603 60603	N.A.
Ortec	456 High Voltage Supply	--	N.A.

Manufacturer	Model Number	Serial Number	Radiation Detected
Ortec	113 Preamp	3326	N.A.
Ortec	490A Single Channel Analyzer	386-02	N.A.
Ortec	776 Counter/Timer	251-03	N.A.
Ortec	441 Linear Rate Meter	2110-09	N.A.

b. Use

i. Instrument will be used to determine adsorption efficiencies of activated carbon in nuclear containment applications per ASTM 3808-79, Regulatory Guide 1.52 and RDT-M16-IT specifications.

ii. Instrument will be used to determine Removable Contamination as collected on swabs throughout the laboratory as prescribed by Barnebey-Cheney radiation protection program.

iii. Instrument will be used to determine the removable contamination via swabs on containers of incoming radioiodine reagents as prescribed by the Barnebey-Cheney radiation protection program.

c. Instrument Service & Calibration

i. Gamma spectrometer will be serviced by:

EG&G Ortec

100 Midland Road

Oak Ridge, TN 37830

ii. Calibration will be based on the instrument response to an NBS $I_2$131 traceable standard.

iii. Interval of calibration will not exceed one year.

d. Instrument Malfunction or Failure

i. In the event the gamma spectrometer fails to perform it will be returned to EG&G Ortec (above B.c.i.), no radioiodine reagents will be ordered and/or received and, no analysis of radioiodine impregnated activated carbon samples will be performed.

C. Responsibility of Instrument Operation

a. it is the responsibility of the Radiation Safety Officer to maintain the calibrated radiation detection instrumentation.

Item 11. Calibration of Instruments

A. Calibration by Service Company

a. Triangle Service Industries

3527 Whiskey Bottom Road

Laurel, MD 20810

b. Jerry Dare

Radiation Safety

Ohio State University

B042 Groves Hall

333 West 10th Avenue

Columbus, Ohio 43210

(614) 421-8315

c. EG & G Ortec

100 Midland Road

Oak Ridge, TN 37830

Item 13. Facilities and Equipment

A. Laboratory facilities and fume hoods.

a. Laboratory area ca. 2250 square feet (See Figure 1).

b. Laboratory radioiodine test room area ca. 265 square feet.

i. Room equipped with an activated carbon air filter system of 2000 cfm capacity.

ii. Room equipped with hood in line with activated carbon air filter of 2000 cfm capacity.

c. Signs indicating the presence of radioactive agents are posted at each door and throughout the laboratory.

d. All personnel entering the radioiodine test room must wear a radiation monitoring device (eg. film badge or dosimeter pencil).

B. Storage facilities and containers.

a. Radioiodine reagents will be stored at 0°C (max) in sealed glass gas chromatography type vials within lead containers inside the radioiodine test room.

i. A lead shield surrounds the radioiodine samples inside the refrigerated storage unit.

C. Remote handling tools.

a. Tongs of 12" and 24" lengths are available for radioactive sample handling.

D. Respiratory protective equipment.

a. The radioiodine test room maintains a negative pressure to insure removal of radioactive gases.

i. A Barnebey-Cheney Type NC-CP-21 air purification unit is installed utilizing Type 787 impregnated activated carbon specifically for radioiodine removal (See Figure 2).

b. Individual activated carbon respirators are available for personal use.

Item 15. Radiation Protection Program

Objective:

The objectives of this program are:

1. To outline procedures that promote as low as reasonable achievable (ALARA) occupational radiation exposure standards for Barnsbey-Cheney laboratory personnel (per Reg. Guide 8-10).
2. To provide specific contingency actions to be taken should accidental contamination occur.
3. To identify specific personnel and outline their respective responsibilities and duties for execution of this safety program.
4. To describe relevant record keeping practices that meet our exceed documentation required by NRC guidelines (per Reg. Guide 8-10).
5. To describe procedure and directions that comply with all applicable NRC radioiodine handling, storage, waste removal and documentation guidelines (per CFR Title 10 part 20).

Introduction:

The radiation safety program outlined below focuses on contingency actions to be used in the event of radiation spill. NRC requirements integrated into this safety program insure procedures and techniques used at Barnebey-Cheney minimize exposure of radioiodines and maximize its containment. The correct implementation and execution of all parts of this program is insured by holding specific individuals accountable for their respective obligations to the program. the company is obligated to maintain accountability to the radiation safety program in the absence of said individuals so that at no time are the standards of the safety program compromised.

As presented, this program represents a guide and reference to be used on a daily basis. This program will be updated at Barnebey-Cheney testing service requirements expand and/or NRC guidelines are modified.

Radiation Safety Program

I. Cleanup Procedure

A. Verification of radioiodine spill.

1. A noticeable change in the response of survey meters which are in constant operation will occur.

a. An immediate double check of affected areas with same survey meters will be performed to verify spill.

2. Visible evidence will occur.

a. Freshly spilled methyliodide liquid appears as dark brown fluid and leaves a dark residue after evaporation.

b. Iodine crystals appear as dark brown granules that will evaporate leaving a dark residue.

c. Broken vials or open lead "pigs" will be evident.

d. Defective or broken test equipment emitting radioiodine vapors will be evident.

3. A deviation in routine RAD testing results will occur.

a. Swab testing results will show increased radioactive counts.

b. Survey meter testing will yield increased dose rates.

c. Personnel film badge and ring testing will indicate increased exposure.

d. Air and stack testing will show increased radioactive counts.

e. Dosimeter pencil readings will show increased radioactive counts.

B. Evacuate the laboratory area affected by the spill.

1. Evacuate the radioiodine handling and storage room.

a. Leave hood on.

i. Close vials releasing radioiodine if possible.

b. Leave contaminated clothing at the spill site.

c. Shut door tightly

2. Direct all other personnel to leave the general laboratory area via closest exits.

a. Terminate experiments that may not be left unattended.

b. Stabilize experiments that may be resumed at a later time.

3. Remove injured or unconscious personnel only after donning protective clothing (See "D" below) or immediately if life threatening situation is eminent.

C. Administer first aid if necessary in uncontaminated area after measures (protective clothing) to prevent cross contamination have been taken.

1. Perform basic and/or advanced first aid.

a. Establish an airway.

b. Maintain breathing.

c. Monitor circulation.

2. Flush skin or eyes contacting radioiodine with copious amounts of water.

a. Retain water for radioactivity evaluation.

i. Store water in a sealable plastic container in the radioactive waste storage area.

3. Notify local emergency squad and indicate if radiation contamination is suspected.

4. Proceed to hospital for radiation exposure evaluation.

   a. Obtain necessary follow-up procedures from physician.

   b. Supplement hospital report with monthly dosimeter readings when available.

   c. File hospital report with company insurance agency.

D. Don protective radiation handling clothing.

1. Disposable gloves.

2. Disposable lab coat.

3. Disposable lab shoe covers.

   a. Walk carefully since plastic overshoes increase the chance of a fall from slipping.

4. Wear respirator.

   a. Carbon filter or

   b. Self contained breathing apparatus.

5. Safety glasses.

E. Confine radioactivity

1. Transfer radioiodine to radioiodine hood.

   a. Use tongs (1' or 4' length) to prevent cutting of skin or puncturing gloves on broken glass.

   b. Use paper towels to absorb residual liquids.

   c. Use dust pan and broom to collect iodine crystals, broken glass, or contaminated activated carbon particles.

2. Seal all radioactive materials in a non-permeable plastic vessel containing a nuclear grade activated carbon adsorbent.

3. Scrub down affected area outside the hood with copious amount of soapy warm water.

   a. Collect all water for disposal as radioactive waste.

4. Leave all clean-up tools and contaminated supplies within the hood.

F. Post containment radiation check.

1. Use a survey meter to check contaminated area.

   a. If area shows radiation level consistent with historical background levels (less than 100 cpm), the area is sufficiently clean for reuse.

   b. If the area is still contaminated repeat scrub-down procedure at least one more time.

2. Take radiation swabs of entire lab to determine quantitatively all radiation levels.

3. Should survey meter and swab test results still indicate high radiation levels, the area will be covered with a nuclear grade activated carbon adsorbent.

   a. Radiation levels of air and stack will be checked on a daily basis until background levels are similar to those historically documented.

   b. The activated carbon will be disposed of as radioactive wastes.

4. Discard all protective clothing as radioactive waste.

5. Determine radioactivity on laboratory hood filter and change-out as required.

G. Document all survey and resultant radiation levels in NRC log book.

E. Remove radioactive waste via certified radioactive waste removal company.

1. Nuclear Engineering Co. Inc.

a. Barnebey-Cheney NRC license application part 14.

II. Order, Receipt and Storage of Radioiodine Reagents.

A. Accept delivery from courier via an immediate and direct route to the laboratory.

1. Only laboratory personnel may receive samples in the laboratory area.

a. Harley Wheeler

b. Mike Doersam (alternate)

2. A film badge or dosimeter must be worn.

3. If package does not arrive at scheduled time, notify manufacturer and carrier at once.

4. Only elemental iodine and methyliodide may be accepted excluding all other radioisotopes.

B. Inspect packing list on container.

1. If contents deviate from original order contact supplier immediately.

a. Methyliodide (CH_3I^{131}) 1.0mCi (nominal)

b. Iodine (I_2^{131}) 1.0mCi (nominal)

C. Determine dosimeter values at shipping container surface and at a three foot distance with survey meters.

1. If values exceed historically documented values of 22,000 dpm (0.01mCi) per 100 cm^2 surface, place container in radioiodine hood, contact supplier and receive medical examination for potential inhalation of radioiodine vapors.

a. Allow container to decay in hood.

2. Document results.

D. Determine dosimeter values of shipping container by performing swab test.

1. Excessive iodine values due to leakage should have been evident in II.C above; if not follow II.C.1.

2. Document quantitative results.

E. Open shipping container and inspect sealed radioiodine container.

1. Report damage to supplier if any has occurred.

a. Store in hood as radioactive waste per II.C.1.

F. Open sealed radioiodine container inside radioiodine hood.

1. Wear protective clothing, especially disposable gloves.

2. Note changes in dosimeter readings.

a. Dramatic increases in survey meter response may indicate a ruptured iodine container.

i. Store iodine in hood as radioactive waste.

ii. Allow sample to decay in hood.

iii. leave all contaminated protective clothing in hood.

G. Remove lead "pigs" from sealed container.

1. Leakage should have been evident by this point, if not, refer to steps I.A.2.a. through d.

H. Remove glass vial containing radioiodine.

1. Leakage should have been evident by this point, if not, refer to steps I.A.2.a through d.

I. Wrapping the top and bottom halves of the glass radioiodine vial in paper towels, quickly snap off the top and quantitatively transfer the radioiodine into a "react-a-vial" gas chromatography vial and seal.

1. If a spill occurs, see I. "Cleanup Procedure".

2. Store vial and towels as radioactive waste.

J. Place G.C. vials in lead vial shields ("pigs") and store in refrigerator at 0°C.

K. Remove all radioactive protective clothing and discard as radioactive waste disposal.

1. Once exposed, lab coats are not to be removed or worn outside the laboratory area.

III. Ordering Radioiodines from Manufacturer.

A. Only the Radiation Safety Officer or designated alternate is permitted to order radioiodines.

1. Harley Wheeler (RSO)

2. Mike Doersam

B. Only methyl iodide (liquid) and elemental iodine (solid) may be order under current Barnebey-Cheney Co. Radiation Protection Program.

1. 1.0mCi nominal for each methyliodide and elemental iodine reagents. (See Part 8 Licensed Material of NRC 3 13-1 license.)

2. Xenon 133 gas or gas in solution may be ordered under current license in the amount of 1.0mCi. Prior to ordering or handling this substance, an addition to this Radiation Safety Program concerning safe handling of Xenon 133, must be submitted and approved by the Radiation Safety Committee.

C. Radioiodine reagents must arrive by 10:00 A.M. of the second business day.

1. Contact carrier as to whereabouts of reagents if 10:00 A.M. deadline is reached.

IV. Supervision of Radioiodine Use.

A. Radiation Safety Committee (RSC)

1. Members

a. William W. Vogelhuber - President

b. Willard M. Clark - Vice President

c. Harley W. Wheeler - Radiation Safety Officer

d. Michael A. Doersam - Technical Service Dept.

2. Duties and Responsibilities

a. Review all nuclear energy related guidelines and regulations to insure Barnebey-Cheney compliance.

b. Review Barnebey-Cheney laboratory procedures to evaluate level of safety.

c. Appoint a Radiation Safety Officer (RSO)

d. Decisions will be made on issues involving radionucleides only in the absence of the RSO.

i. Decisions will be based on member seniority.

e. Meet as required to discuss and/or establish Barnebey-Cheney laboratory practices and procedures.

B. Radiation Safety Officer (RSO)

1. Currently designated RSO

a. Harley W. Wheeler

2. Authority

a. Absolute authority with issues involving any receipt, use, storage and disposal of radioactive material.

b. Delegates authority to personnel who are competently trained and experienced in the safe use of radioiodines to receive radioiodine reagent shipments and perform routine lab testing.

3. Duties and Responsibilities

a. Oversees all uses of radioiodine reagents for testing and analysis.

b. Oversees and/or performs radiological safety testing.

i. Is cognizant of laboratory personnel radiation exposure history.

c. Maintains "stat of the art" awareness of radioiodine detection instrumentation and analysis techniques.

d. Maintains and directs a safety program that insures as low as reasonably achievable (ALARA) exposure standards.

e. Maintains a working knowledge of all instrumentation used for detection of radiation.

i. limits of operation

ii. standardization and calibration requirements

iii. alternate radioactive monitoring devices

V. Routine Radiological Testing Program for Airborne and Adhered Radioactive Materials.

A. Airborne radioactivity.

1. Personnel zone

a. Directly in front of radioiodine safety hood.

2. Ventilation stack zone

a. Ductwork in radioiodine vapor filter.

B. Objects and sites for testing for radioactive materials adhered to surfaces.

1. Incoming radioiodine reagent containers.

2. General laboratory area

a. Five points distributed throughout the lab and indicate in Figure 1. as TP#1 through TP#5.

C. Test frequency for airborne and adhered radioactivity.

1. Weekly radioiodine testing is performed.

D. Responsibility of testing

1. Radiation Safety Officer has primary testing responsibility.

2. Competently trained and/or experienced personnel authorized by the RSO have secondary responsibility.

E. Procedure for testing of airborne radiation in personnel zone and ventilation stack.

1. Construct testing apparatus as shown in Figure 3.

2. Using Ortec counting instrumentation determine counts of unexposed carbon filter cartridge and record as background counts.

3. Run air pump at 3.7 1/min flow through carbon filters for 10 minutes (± 6 sec).

   i. Carbon filters of 1" dia. x 1"D with BC Type 787 adsorbent.

4. While wearing gloves, transfer carbon cartridge to plastic bag and seal bag.

5. Using the Ortec counting instrumentation, determine the number of test counts for the cartridge.

6. Calculate airborne radiation in personnel zone.

   a. Subtract background counts (V.E.2) from test counts.

   b. Convert to counts per minute by multiplying by 60 sec/min.

   c. Divide by the counting system efficiency which is 1.75% (0.0175) to yield disintegrations per minute (dpm).

   d. Convert dpm to uCi by dividing by 2.2×10^6 dpm/uCi.

   e. Divide by total volume of air through the cartridge, 3800 ml (10 min x 3.81/min) to give dosage in uCi/ml.

   f. Record in NRC notebook.

F. Procedure for testing radiation adhered to surfaces.

1. Number Whatman filter pads TP#1 - TP#5.

   a. For incoming radioiodine reagents, see sec. II above.

2. Using Test Points TP#1 - TP#5 indicated in Figure 1 wipe flat surface of approximately 100 cm^2 with correspondingly numbered filter pad.

3. Using Ortec counting instrumentation determine total radioactive content (uCi) of all five (5) pads simultaneously.

   a. Correct for background radiation.

   b. Calculate disintegrations per minute per $100cm^2$ as in V.E.5.a-c.

4. Document $dpm/100cm^2$ results.

5. If corrected radioiodine content exceeds 100 $dpm/100cm^2$, recheck individual filter pads to identify location of higher than normal radiation level and document results.

6. If any test point exceeds 1000 $dpm/100cm^2$ radiation, refer to Spill Cleanup Procedure above, execute procedure and document actions.

G. Procedure for Survey of Radioiodine Test Room

1. Perform every day that work is performed in the Radioiodine Test Room, or at weekly intervals if no work has been done in the test room.

2. Using survey meter, record counts per min evident while holding it 3" from the north, south, east and west wall.

3. Survey meter will be operating during times personnel are present in the radioiodine room.

VI Summary of Documentation Requirements

A. Surface and airborne radiation levels.

1. Include location and respective radiation level.

2. Perform at weekly intervals.

3. Survey meter sweeping performed daily when working in radioiodine test room or weekly when no work is done in that room.

B. Personnel dosimetry

1. Identify individual with his respective monthly dosimetry value.

a. film badge

b. ring

2. Visitor's dosimeter pencil reading.

a. Identity & address

b. Adsorbed radiation

c. Date

C. Radioiodine reagent receipt

1. Condition of shipping container (as mrems)

2. Date of receipt

3. Total radioiodine (uCi).

D. Waste disposal area.

1. Swab value of each container.

2. Perform at weekly interval.

ATTACHMENT FOR ITEM 14

A. Waste Disposal

1. All Radioactive waste will be handled by Nuclear Engineering Company, Inc.

2. In the course of Radio Iodine testing operations, it is normal to produce incidental waste material including disposable gloves, disposable towels, activated carbon and radio iodine too far decayed to be useful for testing. Herein follows the disposition of this material.

   a. All waste material not suspected of I-131 contamination but used in the test room will be stored initially in the "Waste Container." (see figure 1)

   b. All gloves and carbon samples that are suspected of I-131 contamination (ie. exposed to our used in handling of I-131) will be stored in the "Radio Iodine Handling Hood." (see figure 1)

   c. Iodine-131 compounds to far decayed to be used in testing shall be adsorbed on nuclear grade type 787 carbon in 100 to 200 gram to gram ratio. These shall be stored in the Radio Iodine Handling Hood, in air-tight containers.

   d. Periodically the waste contents of the Radio Iodine Handling Hood shall be inspected for radio activity. Waste that shows no activity over background on the survey meter at a 1" distance shall be transfered from the hood into the waste container.

   e. The contents of the waste container shall be similarly surveyed and if no radio-activity over background is found, it shall be transfered from the hood to steel waste disposal containers.

   f. The containers are kept in a not-readily accessible area and are wiped and surveyed weekly. They are marked "Radioactive Material -N.O.S." Once a drum is full, it is tagged to be disposed of at a date 6 months from the date of tagging.

   g. On the disposal date the contents of the drum are disposed of as common plant trash.

   h. A log is kept of dates and numbers of drums disposed.

   i. The residence time of I-131 in the Radio Iodine Hood is not less than 4 months, and may be up to 1 year.

   j. The expected residence time of I-131 in the steel waste disposal containers is 6 months to 2 years.

   k. the highest activity of I-131 in the waste going to the plant trash is less than 1.9 x 10 - 10 microcuries per gram.

TRAINING AND EXPERIENCE FOR HARLEY W. WHEELER

	Type of Training	Where Trained	On Job	Formal Course
a.	Principles & Practices of Radiation Protection.	Franklin University Columbus, OH 43211	No	Yes
		Barnebey-Cheney Co. Columbus, OH 43219	Yes	Yes
b.	Radioactivity Measurement standardization and monitoring techniques and instruments	Barnebey-Cheney Co. Columbus, OH 43219	Yes	Yes
c.	Mathematics & Calculations basic to the use and measurement of radioactivity	Franklin University Columbus, OH 43211	No	Yes
d.	Biological Effects of radiation	Franklin University Columbus, OH 43211	No	Yes

Isotope	Max. Amount	Experience Gained At	Duration	Type of Use
H-3	250mci	Barnebey-Cheney Co.	2 yrs.	GC Detector for testing carbon filters for nuclear application per ANSIN5-19
I-131	2mci	Barnebey-Cheney Co.	2 yrs.	for testing carbon media for nuclear air filtration per ASTM03803

ADDITIONAL QUALIFICATIONS

Mr. Wheeler is a certified Level II tester with a Bachelor of Science degree from Franklin University (1986).

He holds a State of Ohio Safety certificate and an Ohio Supervisors Safety Training certificate. As plant Safety Committee chairman he maintains a safety program for both plant and the laboratory.

Mr. Wheeler's past experience includes 6 years in the manufacture of nuclear grade adsorbents both as a supervisor and worker. He has also spent 4 years implementing manufacturing quality control tests [1] on bulk carbon production. His last 4 years have been spent primarily in the research, development and nuclear testing laboratory. He has implemented numerous [2] nuclear specifications for the qualification of nuclear air purification devices and media. He has participated in the set up and completion of Round Robin testing for ASTM D3803 on RadioIodine testing of nuclear grade adsorbents.

In the course of his daily activities Mr. Wheeler interfaces with the company Quality Assurance Manager and top management. He interfaces with instrumentation manufacturers and selects equipment for control of test parameters. His training, organizational abilities, and attention to detail serve well to recognize and avoid hazardous laboratory situations and to maintain adequate documentation.

Foot Notes*

1. ASTM D2866, ASTM D3467, ASTM D2652, ASTM D3802, ASTM D3466, ASTM D2862, ASTM D2355, ASTM D3838 and numerous in house procedures.

2. ASTM 3803, ASTM D4069, ANSI N509-1976, 1980, ANSI N510-1980, Req. Guide 1.52-1973, 1976, 1978 Reg guide 1.14-1978, 1979, ROT-M16-IT-1972, 1973 and 1977.

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Training and Experience for Michael A. Doersam

Type of Training	Where Trained	On Job	Formal Course
a. Radioactivity measurement standarization and monitoring techniques and instruments	Tennelec Inc. Oak Ridge, TN	Yes	No
b. Mathematics and calculations basic to the use and measurement of radioactivity	University of Toledo Depts. of Physics Toledo, OH	Yes	Yes
c. Biological effects of radiation	Defiance College Dept. of Biology Defiance, OH	Yes	Yes

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type of Use
Cs137	5 uCi	Tennelec Inc.	3½ Years	NaI Detector
Co60	1 uCi	Tennelec Inc.	3½ Years	NaI Detector
Co57	1 uCi	Tennelec Inc.	3½ Years	NaI Detector
Ba133	1 uCi	Tennelec Inc.	3½ Years	NaI Detector

ADDITIONAL QUALIFICATIONS

With a Bachelor of Science from the Defiance College (1976) and three and one-half years experience with nuclear instrumentation, Mike Doersam has a basic knowledge of nuclear physics and also has the capacity to recognize potentially hazardous laboratory situations and how to prevent them.

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Fig. 1 Radioiodine TestRoom Schematic

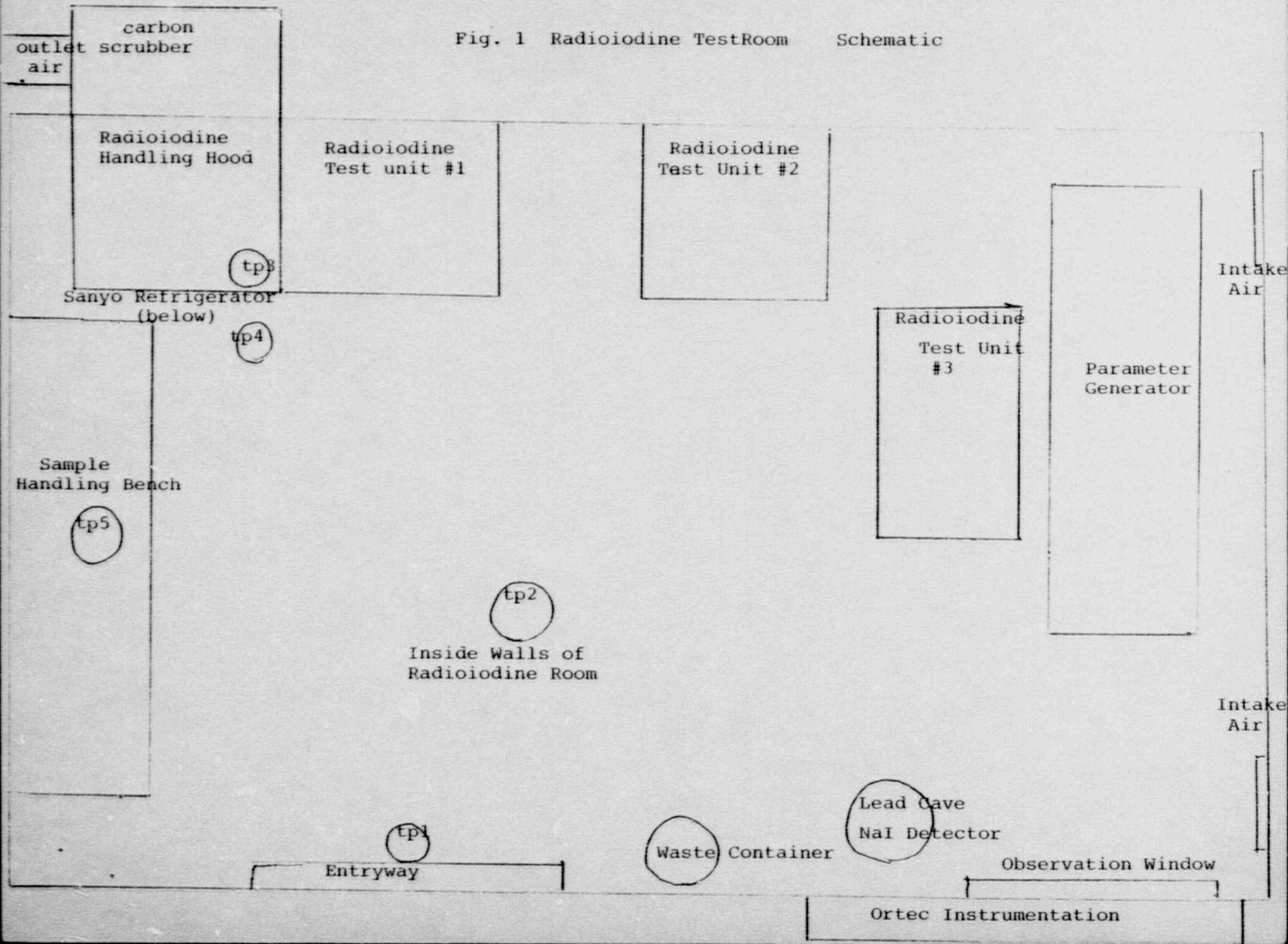


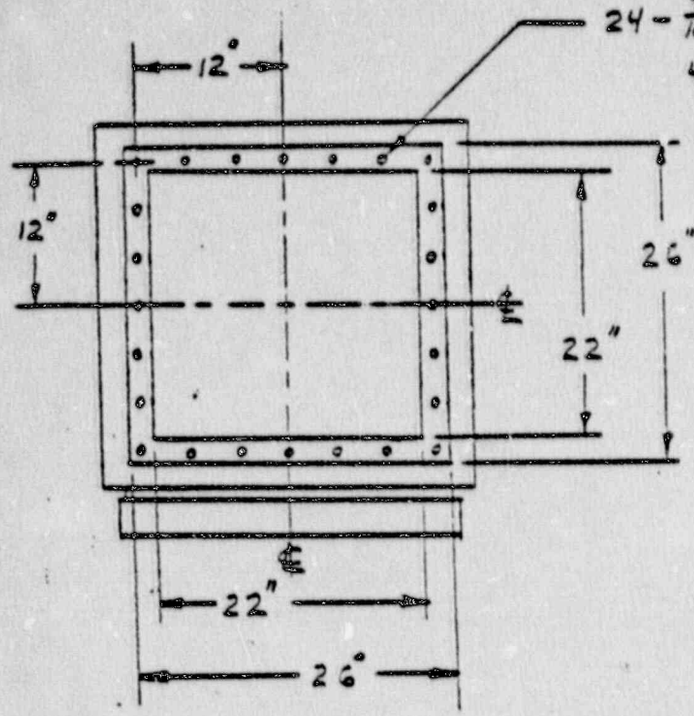
FIGURE 2

BARNEBEY-CHENEY COMPANY · COLUMBUS, O.

74-9-27-02

MODEL NC-CP21 SGN CAISSON®

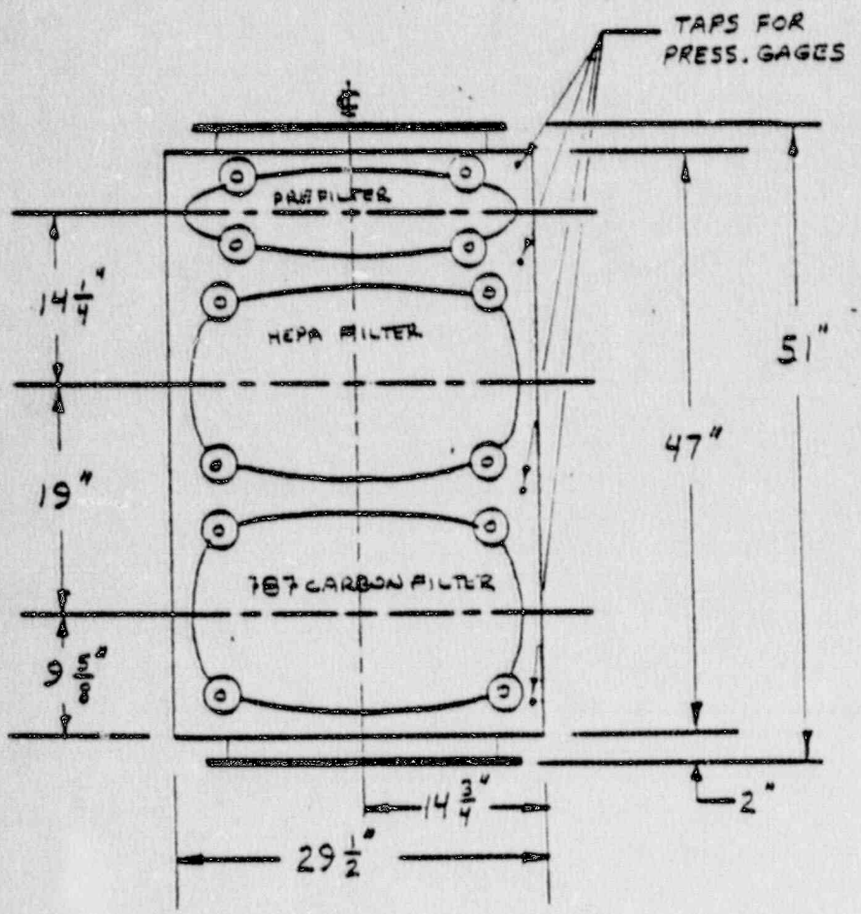
1000 CFM

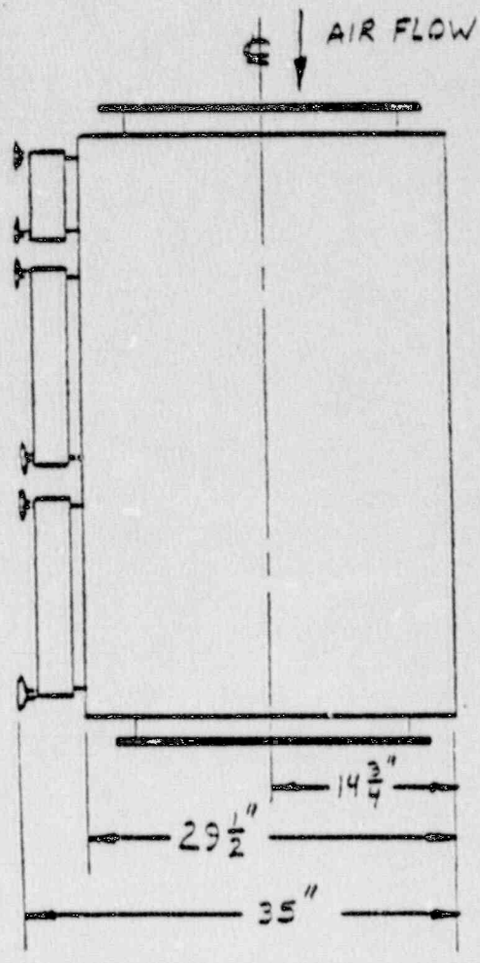


NOTES:

1.) INTERIOR TO BE PRIMED AND FINISHED WITH EPOXY COATING. EXTERIOR PAINTED WITH PRIMER ONLY.

2.) INTERIOR SURFACES TO BE FREE OF WELD SPATTER.





12 GAGE C.R.S.