

UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS. - Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the licensee is subject to Title 10, Code of Federal Regulations, Part 20.

<p>1. (a) NAME AND STREET ADDRESS OF APPLICANT (Institution, firm, hospital, person, etc. Include ZIP Code.)</p> <p>Williams Brothers Company National Bank of Tulsa Building Tulsa, Oklahoma 74103</p>	<p>(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1 (a) Include ZIP Code.)</p> <p>3300 West 21st Street Tulsa, Oklahoma 74107</p>
<p>2. DEPARTMENT TO USE BYPRODUCT MATERIAL</p> <p>Slurry Development Research Center of the Engineering Division</p>	<p>3. PREVIOUS LICENSE NUMBER(S) (If this is an application for renewal of a license, please indicate and give number.)</p> <p>New License</p>
<p>4. INDIVIDUAL USER(S) (Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)</p> <p>H. L. Lawler, Senior Research Engineer or Glenn Cunningham, Research Engineer (Resume Attached)</p>	<p>5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)</p> <p>H. L. Lawler (Items 8 & 9)</p>
<p>6. (a) BYPRODUCT MATERIAL (Elements and mass number of each.)</p> <p>A. Strontium 90 B. Cesium 137 C. Iron 59</p>	<p>(b) CHEMICAL AND OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME (If sealed sources, also state name of manufacturer, model number, number of sources and maximum activity per source.)</p> <p>Sealed Source, Industrial Nucleonics Corp., Two, Model DH-3 Measuring Heads, each has 1,000 millicuries. Sealed Source, Industrial Nucleonics Corp., Two, Model DH-5 Measuring Heads, each has 50 millicuries. Iron Coupons, approximately 2 inches by 8 inches, cut from experimental pipeline, to be irradiated by Oak Ridge or Argonne National Laboratories to a level of approximately 500 millicuries of Fe 59. Maximum of two coupons at any one time - and generally only one coupon at a time.</p>
<p>7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED (If byproduct material is for human use, supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)</p> <p>A. through B. Sealed units used with measuring devices to determining densities of various slurry solutions pumped through experimental pipelines.</p> <p>C. Coupon, and the cuttings obtained from machining it, will be used to determine the rate of wear to the pipeline from the various water and mineral mixtures (slurries) pumped through the pipeline. The Fe 59 cuttings will be used to make up various strengths of standard solutions for comparison with the slurry pipeline samples withdrawn periodically, and their "counts" measured.</p>	

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

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8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Oak Ridge (Y-12 area) 1943-45	2 years	Yes No	Yes No
and Amer. Oil Co. (Whiting Refinery)		1 week	Yes	Yes
b. Radioactivity measurement standards and monitoring techniques and instruments	Sweeny Radiographing Co., Univ. of Tulsa Physics Lab. (Work covered both subjects)	2 months 1 week	Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity	Amer. Oil training included written exam for A. E. C., accepted	1 week	Yes No	Yes No
d. Biological effects of radiation	Training Program 32.66, covered both math & biological effects		Yes No	Yes No

9. EXPERIENCE WITH RADIATION (Actual use of radiostopes or equivalent experience)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
U-235	--	Oak Ridge (Y-12 area)	2 years	Enhancement for Bomb
Co 60	2 curie	American Oil & Sweeny	Two Mos. + 1 wk.	Radiographing
Ir 192	5 curie	Radiographing Co., Tulsa	Two Months	Density Measurement
Sr 90	2 curie	Williams Brothers Co.,		
Cs 137	100 M curie	Tulsa		

10. RADIATION DETECTION INSTRUMENTS (Use supplemental sheets if necessary)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
Technical Measurements Corp. Model 1001 Pulse Height Analyzer & Scaler 1		Alpha Beta Gamma	--	--	Measuring & Calibration
New England Nuclear Corp. Liquid Standards	1 set	--	--	--	Calibration
Precision Radiation Instruments, Inc., Model 1		Beta Gamma	0-5 mr/hr	--	Measuring and
17B Scintillator w/hand probe added			in six ranges		Monitoring (Survey)

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE. Monitoring instrument will be calibrated every two to three months using Univ. of Tulsa Physics Lab New England Nuclear Corp. liquid standards and their Model 1001 Pulse Analyzer.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier.)

Will use Landsverk Electrometer Co. pocket dosimeters or equivalent, film badges, R.S. Landauer Co., Glenwood, Illinois

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) ☒ Yes ☐ No

See Attachment

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance -- pair of the source.

See Attachment

15. WASTE DISPOSAL. Is a commercial waste disposal service employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

See Attachment

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, 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.

Date July 14, 1969

Williams Brothers Company
Applicant named in item 1

By:

Vice President

Title of certifying official

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.

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

B. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Idaho State University Pocatello, Idaho	2 mo.	Yes <input checked="" type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>
b. Radioactivity measurement standardization and monitoring techniques and instruments	" "	2 mo.	Yes <input checked="" type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>
c. Mathematics and calculations basic to the use and measurement of radioactivity	" "	9 mo.	Yes <input checked="" type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>
d. Biological effects of radiation	-----	-----	Yes <input checked="" type="radio"/> No <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>

9. EXPERIENCE WITH RADIATION (Actual use of radiotapes or equivalent experience)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
CO 60 RaD&E Po 210	Normal Lab Samples	Idaho State University Modern Physics Lab.	4 mo.	Radiation Counting and Detection Experiments

10. RADIATION DETECTION INSTRUMENTS (Use supplemental sheets if necessary)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier)

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No
14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak test, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.
15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

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Applicant named in item 1

Date _____

By: _____

Title of certifying official

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.

ITEM 13 - FACILITIES AND EQUIPMENT

The irradiated iron coupon when received will be removed from the shipping container, placed in a plastic container, and stored in a steel lined chamber and surrounded by a second steel lined chamber and with the annulus filled with sand and gravel. These containers will be locked and buried in a 10 foot high earth embankment and will be marked with suitable signs warning of radiation. This area will be regularly monitored. The key will be in the possession of the safety officer or other individual user. Handling of the coupon will be by means of a long pole with an electric magnet on one end so that it may be conveniently handled.

When pipeline tests are to be made, the coupon will be removed from the container by using the pole and magnet. The pipe spool in which the coupon fits will be located outside of the building at a distance such that a barrier of concrete blocks can be built around it (see Figures Nos. 1, 2 and 3).

The clamping of the coupon into the spool will be done by long handled wrenches and tongs designed for this purpose, while operating from behind the concrete block barrier.

As shown by Figure 3, the facilities have benches with laboratory type, chemically resistant, and easily decontaminated tops; sinks, drains; waste containers; glass and plastic trays and various other containers for easy cleaning and decontamination. The storage facility will be outside and some distance away from the building in an area remote from other operations. All work will be inside of a fenced-in area with supervised entrance and exit.

ITEM 14 - RADIATION PROTECTION PROGRAM

All isotopes will be procured by the Radiation Protection Officer in conjunction with the Purchasing Department upon approval of the Director of the Slurry Development Research Center.

Isotopes (iron specimens and cuttings) will be stored in a locked underground facility near the Center. Only persons under the supervision of the responsible users will have access to the materials.

Area and personnel surveys will be made as outlined in the attached "General Rules and Regulations for Pipeline Tests Involving Use of Radioisotopes" and "monitoring".

All repair and maintenance of sealed sources will be performed by the manufacturer of the equipment, Industrial Nucleonics Corporation, or the manufacturer's representative of any other make of equipment which may be acquired. The responsible user will leak test the sealed sources by using a dampened cotton swab held by tweezers while the source rests in the recess of its storage container. The test sample will be analyzed (counted) by the equipment manufacturer or equivalent outside service organization.

The standard samples will be made from the irradiated iron fillings by weighing several different samples which represent increasing amounts of iron for a given unit volume. Each sample will be dissolved in acid and made up to the standard volume with neutral slurry. Weighing will be done by using a chain-o-matic type balance, or equivalent equipment, having extension controls. The operator will use an optical scope for reading the balance scales. All operations will be practiced before hand using equivalent, non-radioactive material and specimens so that the techniques can be perfected before an "active" material is handled.

All necessary areas will be properly posted with conspicuous signs bearing appropriate wording and the standard symbol indicating radiation danger.

ITEM 15 - WASTE DISPOSAL

When the tests are completed and the slurry mixture is ready for disposal, it will be disposed of by a licensed agency or stored in a safe manner until its activity is at or below the values contained in Table I, Column 2, of the Rules and Regulations, Title 10, Part 20, Appendix B.

The iron coupon and any remaining cuttings will be placed in the storage facility. As an alternative, they may be given to a company or individual specifically licensed for carrying out such disposal, with appropriate notification of such act being given to the A.E.C. Region IV, Regional Compliance office.

GENERAL RULES AND REGULATIONS FOR PIPELINE TESTS
INVOLVING USE OF RADIOISOTOPES

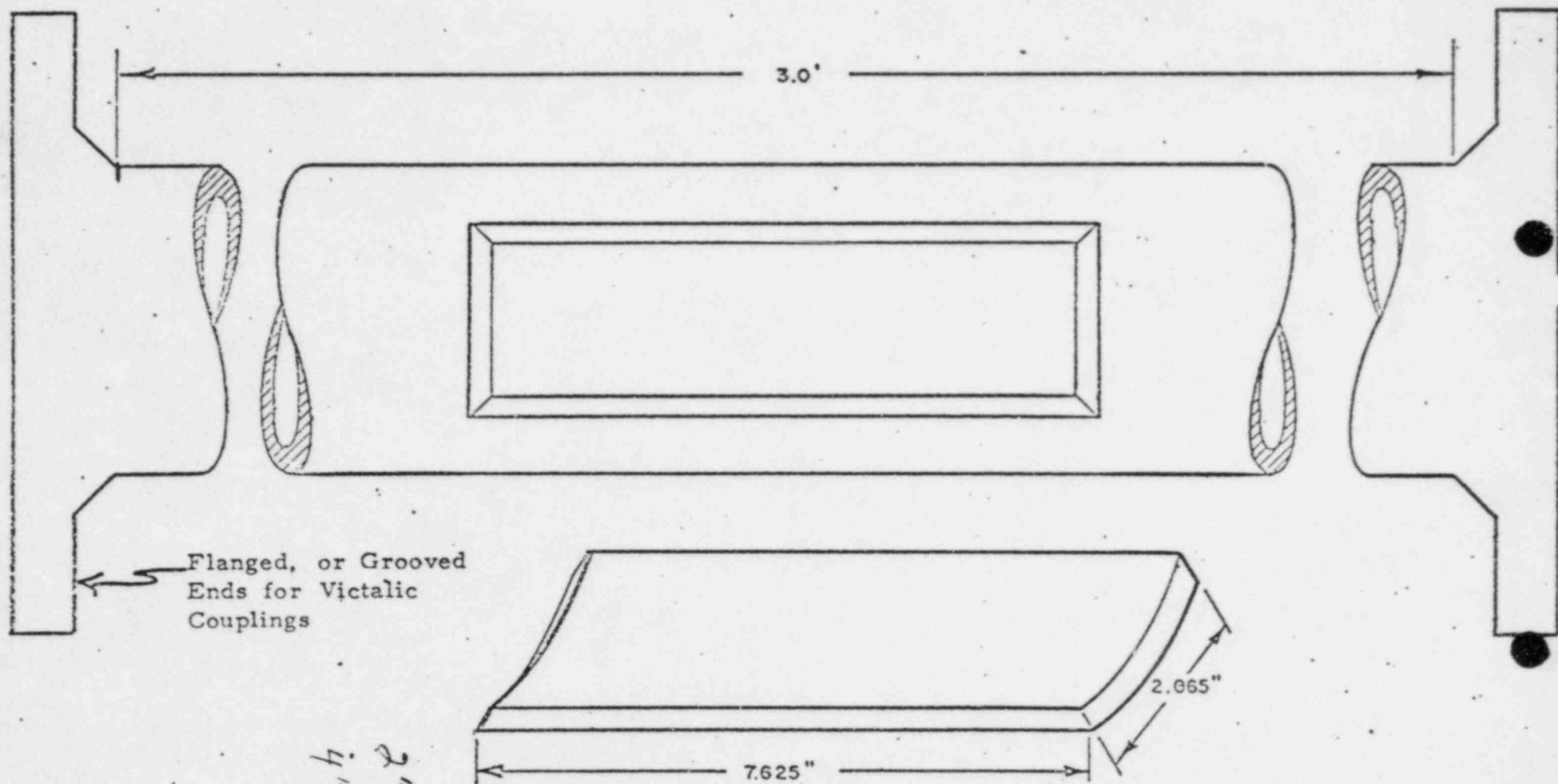
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- 1) Smoking, eating or drinking in the test area is prohibited at all times when tests are being made which involve the use of radioisotopes.
- 2) Avoid carelessness in handling materials; do not splash, splatter or spill radioactive contaminated liquids.
- 3) Every bottle, flask, beaker, tube, etc., which contains a radioactive material shall be identified by label, or a code number.
- 4) Pipetting by mouth is prohibited.
- 5) The premises shall be kept clean and orderly at all times.
- 6) Rubber gloves shall be worn while working with radioactive solutions and when taking and handling samples of the contaminated pipeline solutions. Plastic face guards will be used when taking samples from the pipeline.
- 7) When a test is completed and before leaving the premises, wash and monitor the hands. When gloves are worn wash the gloves thoroughly with soap and water before they are removed and continue to wash them until the activity is reduced to a safe level (approaches the background count). Also the feet will be monitored.
- 8) Decontamination of the hands, either with or without gloves, is not easy and may require vigorous and repeated scrubblings. Wash hands over sink in full stream of water. Use Lava soap and scrub-brush.
- 9) Distance is the best protection; always use it to best advantages. Two feet distance gives four times more protection than is given by one foot.

MONITORING

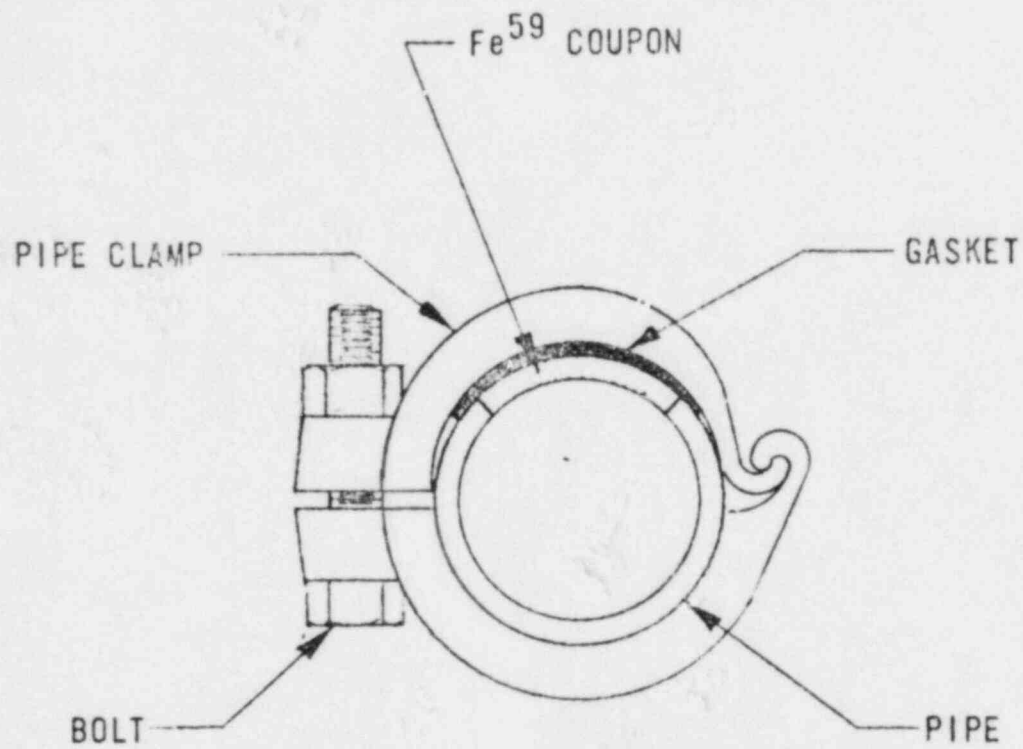
- 1) There are two kinds of monitoring; 1) Personnel and 2) Area. Personnel monitoring is the measure of the dose of radiation to which each person is exposed. Area monitoring is the measure of dose rates at various points in the area and the measure of dose rates of radiation emanating from equipment.

- 2) Personnel concerned will wear pocket dosimeters and film badges at all times when radioactive material is being used, handled or exposed to the test premises.
- 3) Area, equipment and personnel monitoring will be done by means of a radiation survey meter. The premises including benches, table tops, sinks, floor, etc. will be monitored after each test involving radioactive material use is completed. The premises will be surveyed routinely once a month and at any other time if contamination is expected.
- 4) If contamination of the hands or clothing is suspected at any time, then monitoring of the suspected parts shall be done immediately and decontamination, if necessary, shall be done immediately.
- 5) Incoming shipments of radioactive materials shall be monitored before they are unpacked. After unpacking, they shall be remonitored and examined for any kind of damage that could result in spillage.
- 6) The following levels of radiation dose will not be exceeded.
 - a. Working area. Maximum permissible dose rate 2.5 mr/hr
 - b. Personnel
 - 1) Total body radiation shall not exceed 100 mr/wk.
 - 2) Hands and forearm shall not exceed 1500 mr/wk.



2" Sch 40 = 0.154"
4" Sch 40 = 0.237"

FIGURE 1
TEST SPOOL AND PIPE INSERT



WILLIAMS BROTHERS COMPANY
ENGINEERS CONSTRUCTORS
TULSA OFFICE

PIPE CLAMP UNIT

DATE JULY 8, 1969
APPROVED H.L.L.

FIGURE 2



SUMP



FOR MIXER
ABOVE

110

HEAD
TANK

MIXER

220

PUMP

MOTOR

1" WATER HYDRANT
& HOSE

PLATFORM

110

(BELOW)

220

BENCH

WASTE
CONTAINER



GLASS
WINDOW

HTR. & PWR.
CONTR. CAB.

FLOOR
DRAIN

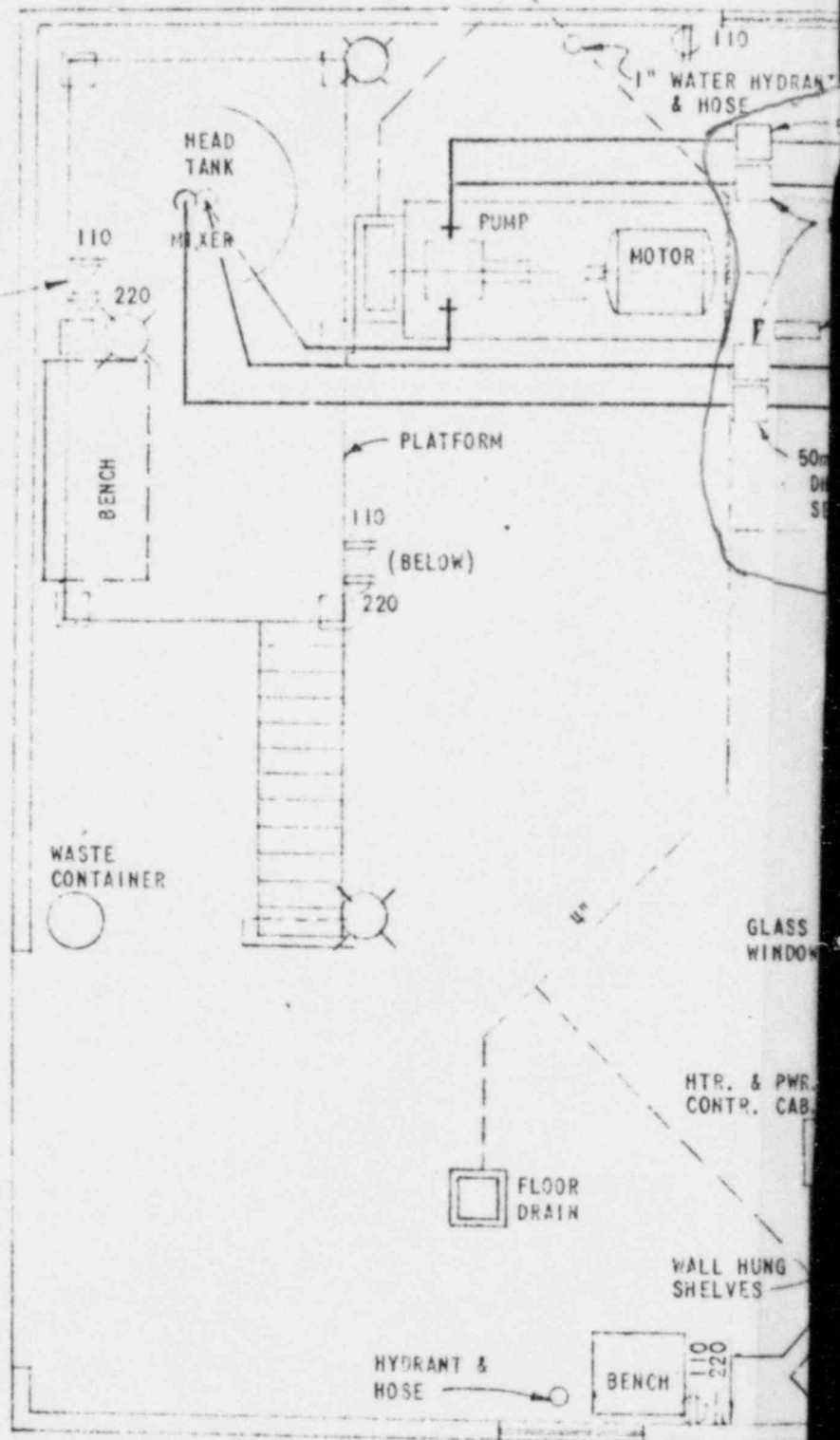
WALL HUNG
SHELVES

HYDRANT &
HOSE

BENCH

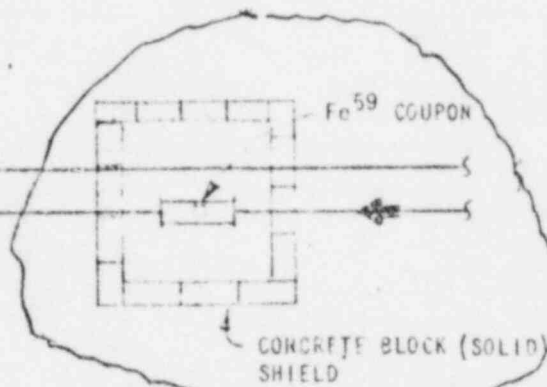
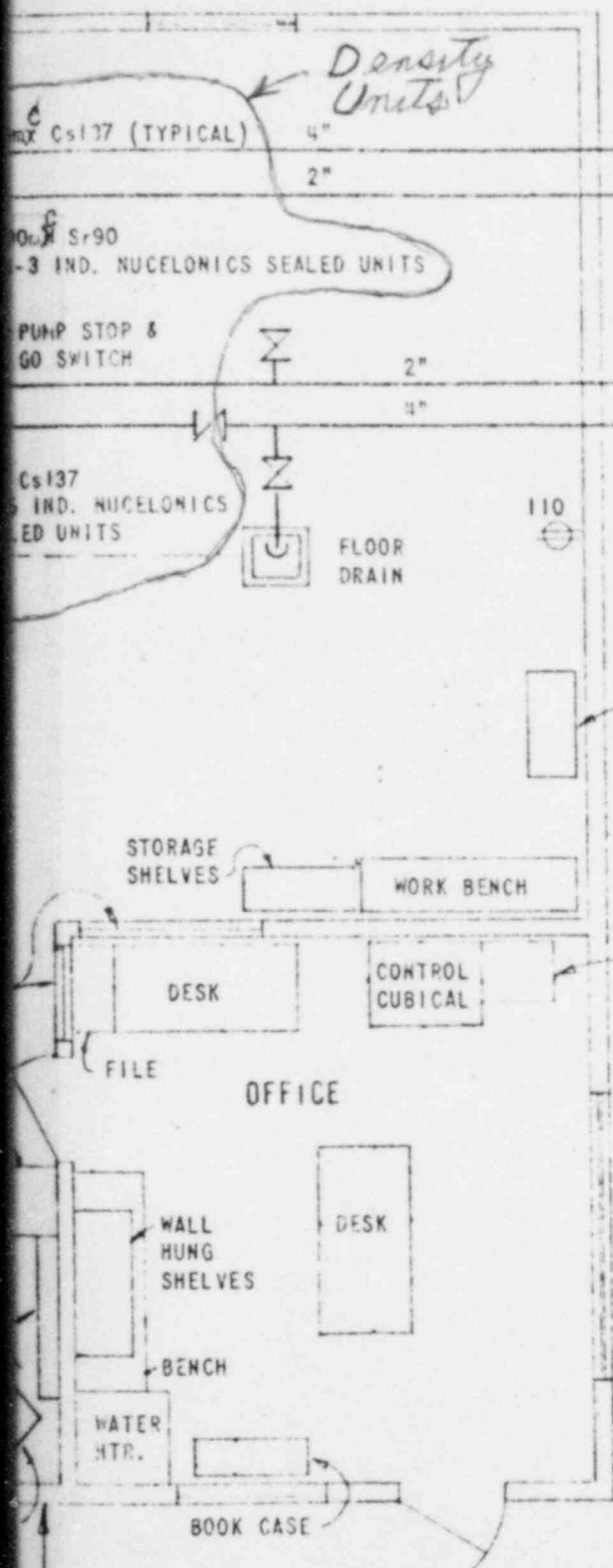
110

220



4" TO DRAIN DITCH

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Never used - actually was never installed and no Iron Coupon (Fe⁵⁹) was ever obtained!

**TI
APERTURE
CARD**

Also Available On
Aperture Card

8510240209-01

WILLIAMS BROTHERS COMPANY
ENGINEERS CONSTRUCTORS
TULSA OFFICE

SLURRY
TEST LOOP FACILITY PLAN

DATE JUNE 30, 1969

APPROVED H.L.L.

SKETCH NO. 3