

Form NRC-313R (7-77) 10 CFR 34	U.S. NUCLEAR REGULATORY COMMISSION APPLICATION FOR BYPRODUCT MATERIAL LICENSE— USE OF SEALED SOURCES IN RADIOGRAPHY	Approved by GAO B-180255(R0335)		
(SEE ATTACHED FORM NRC-313R INSTRUCTIONS AND NRC REGULATORY GUIDE 10.6—USE SUPPLEMENTAL SHEET WHERE NECESSARY) BE SURE ALL ITEMS ARE COMPLETED AND THAT ALL NECESSARY ATTACHMENTS ARE FURNISHED. IF ANY PORTION OF THE APPLICATION IS NOT APPLICABLE SPECIFICALLY SO STATE. DEFICIENT OR INCOMPLETE APPLICATIONS MAY BE RETURNED WITHOUT CONSIDERATION. LICENSE FEE REQUIRED, SEE ITEM 7 OF INSTRUCTIONS.				
1(a) NAME AND ADDRESS OF APPLICANT AND TELEPHONE NUMBER Capital X-Ray Services, Inc. 2133 So. 49th West Ave. Tulsa, Oklahoma 74107 1(b) TELEPHONE NO.: Area Code (918) 583 5797		2. THIS IS AN APPLICATION FOR: (Check appropriate item) A. <input type="checkbox"/> NEW LICENSE B. <input checked="" type="checkbox"/> AMENDMENT TO LICENSE NO. 35-11114-01 C. <input type="checkbox"/> RENEWAL OF LICENSE NO.		
1(c) APPLICANT IS: An individual <input type="checkbox"/> A partnership <input type="checkbox"/> A Corporation <input checked="" type="checkbox"/> An Unincorporated Association <input type="checkbox"/> Other <input type="checkbox"/> If applicant is other than an individual, the applicable section on the reverse side must be completed.		3. LOCATION(S) WHERE SEALED SOURCES WILL BE USED AND/OR STORED: (If use will be made in states other than named in 1(a), they should be listed here.) 2133 South 49th West Avenue Tulsa, Oklahoma 74107 (See Supplemental Information Attached)		
4. SEALED SOURCES TO BE USED IN RADIOGRAPHY (Attach supplementary pages, if necessary)				
BYPRODUCT MATERIAL (Element and Mass No.)	SOURCE MODEL NUMBER	NAME OF MANUFACTURER	MAXIMUM ACTIVITY PER SOURCE	NUMBER OF SOURCES
A.	A.	A.	A.	A.
B.	B.	NOT APPLICABLE	B.	B.
C.	C.	C.	C.	C.
5(a) RADIOGRAPHIC EXPOSURE DEVICES (Attach supplementary pages, if necessary)				
MODEL NUMBER		NAME OF MANUFACTURER (Include description if custom made)		
A.		A.		
B.		NOT APPLICABLE		
C.		C.		
5(b) RADIOGRAPHIC SOURCE CHANGERS (Attach supplementary pages, if necessary)				
MODEL NUMBER		NAME OF MANUFACTURER (Include description if custom made)		
A.		A.		
B.		NOT APPLICABLE		
C.		C.		
6. THE FOLLOWING INFORMATION IS ATTACHED AS A PART OF THIS APPLICATION: (Check appropriate blocks and attach information called for in the instructions with this form.)				
	Not Applicable	Attached	Previously Submitted	
(a) Description of radiographic facilities (Instruction 6-a)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(b) Description of radiation detection instruments to be used (Instruction 6-b)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(c) Instrument calibration procedures (Instruction 6-c)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(d) Personnel monitoring equipment (Instruction 6-d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(e) Operating and emergency procedures (Instruction 6-e)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(f) Training program (Instruction 6-f)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(g) Internal inspection system or other management control (Instruction 6-g)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(h) Overall organizational structure (Instruction 6-h)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
(i) Leak testing procedures (Instruction 6-i)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on _____ (DATE)
CERTIFICATE (This item must be completed by applicant)				
7. 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.				
LICENSE FEE ENCLOSED \$ 110.00 (CXSI Check No. 3288)		BY: <u>George W. Johnson</u> (Signature) George W. Johnson (Type or print name of certifying official) Radiation Safety Officer (Title of certifying official)		
DATE: April 1, 1983				
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.				

My Commission Expires 8-29-84

Notary
Donald M. Fitch

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REG4 LIC30
35-11114-01 PDR

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LEGAL STRUCTURE OF APPLICANT

If applicant is a corporation, complete Items 8 through 11; if applicant is a partnership, complete Items 12 through 14; if applicant is an unincorporated association or a legal entity other than a partnership or corporation, complete Items 15 and 16. Attach separate sheets where space provided proves inadequate.

CORPORATION

8. STOCK OF APPLICANT CORPORATION

NO. OF SHARES AUTHORIZED	NO. OF SHARES ISSUED	NO. OF SHARES SUBSCRIBED	TOTAL NUMBER OF:	
			(a) Stockholders	(b) Subscribers
10,000	8,000	8,000	3	3

9. Is applicant corporation directly or indirectly controlled by another corporation or other legal entity?

YES ☐NO ☒

If answer is "YES" give name and address of other corporation or other legal entity and describe how such control exists and the extent thereof.

10. (a) Identify by name and address any individual, corporation, or other legal entity (1) owning 10 percent or more of the stock of applicant corporation issued and outstanding or (2) subscribing to 10 percent or more of the authorized but unissued stock of the corporation.

(b) Identify by name and address all officers and directors of the corporation.

W.F. Conway, President, 3931 E. 37th Pl., Tulsa, Oklahoma 74135
D.R. Cooper, Vice President, 3434 S. 71st W. Ave., Tulsa, Oklahoma 74107
G.W. Johnson, Sec/Treas., 2407 W. Newton Ct., Tulsa, Oklahoma 74127

11. Identify the State, District, Territory, or possession under the laws of which the applicant is incorporated.

OKLAHOMA, TULSA CITY, TULSA COUNTY

PARTNERSHIP

12. Name and address of each individual or legal entity owning a partnership interest in the applicant.

13. State the percent of ownership of the applicant partnership held by each of the individuals or legal entities listed in Item 12.

14. Identify the State, District, Territory, or possession under the laws of which the applicant partnership is organized.

OTHER

15. Describe the nature of the applicant and identify the State, District, Territory, or possession under the laws of which it is organized.

16. State the total number of members or persons holding an ownership in the applicant, identify each by name and address, and indicate the ownership interest thereof.

COVER

PART 3 - AMENDMENT

SUPPLEMENTAL INFORMATION

FORM 313R-

LOCATION(S) WHERE SEALED SOURCES WILL BE USED AND/OR STORED - AMENDMENT

LOCATION(S) WHERE SEALED SOURCES WILL BE USED AND/OR STORED
1.0 SEALED SOURCE USE LOCATIONS

1.1 Temporary Job Sites - Oklahoma

(License #35-11114-01 Amendment No. 11 - Renewal, October 30, 1979)

1.2 Temporary Job Sites - Agreement States

(License #35-11114-01 Amendment No. 11 - Renewal, October 30, 1979)

1.3 Temporary Job Site, Capital X-Ray Services, Inc. - 2133 South 49th West Avenue, Tulsa, Oklahoma

(License #35-11114-01 Amendment No. 12 - Amendment, May 4, 1982)

PART 3 AMENDMENT APPLICATION

1.4 Shielded Radiographic Facility

4a Capital X-Ray Services, Inc. shall perform radiographic operations within the confines of a Shielded Radiographic Facility that is located within Capital X-Ray Services, Inc.'s property boundaries at 2133 South 49th West Avenue, Tulsa, Oklahoma. The Shielded Radiographic Facility property location, construction details, radiation shielding material and radiation attenuation values are described within Part 6(a) - Amendment - Supplemental Information.

COVER - 6(a)

PART 6(a) - AMENDMENT

SUPPLEMENTAL INFORMATION

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DESCRIPTION OF RADIOGRAPHIC FACILITIES

DESCRIPTION OF RADIOGRAPHIC FACILITIES1.0 RADIOGRAPHIC FACILITIES - TEMPORARY JOB SITES

- 1.1 Temporary Job Site Facilities; Fabrication Plants, Refineries, Power Plants
(License #35-11114-01 Amendment No. 11 - Renewal, October 30, 1979).
- 1.2 Temporary Job Site Operation Types; Closed Shop/Yard and Open Shop/Yard
(License #35-11114-01 Amendment No. 11 - Renewal, October 30, 1979).

PART 6(a) AMENDMENT APPLICATION2.0 SHIELDED RADIOGRAPHIC FACILITY2.1 Location

Figure No. 1, Page 23 - 6(a)

Figure No. 2, Page 24 - 6(a)

- 1a The Shielded Radiographic Facility is located within Capital X-Ray Services, Inc.'s present property boundaries at 2133 South 49th West Avenue, Tulsa, Oklahoma.
- 1b Capital X-Ray Services' property boundaries are security fenced (6' 0" high steel) and the perimeters of the Restricted Area of the Shielded Radiographic Facility are also security fenced (6' 0" high steel).
- 1c Capital X-Ray Services' existing office and shop building and the existing two residences and one commercial facility, located 200'

West of Capital X-Ray Services' office and shop building are single story structures.

2.2 Shielded Radiographic Facility - Dimensions and Construction

Figure No. 3, Page 25 - 6(a)

Figure No. 4, Page 26 - 6(a)

2a Outside Dimensions:

- a1 North facing shielding walls including High Radiation Area Access - Personnel/Equipment - 55' 11" X 11' 6" Wall Height.
- a2 East facing shielding wall - 60' 8" Length X 11' 6" Wall Height.
- a3 South facing shielding wall - 55' 11" Length X 11' 6" Wall Height.
- a4 West facing shielding wall - 32' 6" Length X 11' 6" Wall Height.

2b Inside Dimensions:

- b1 High Radiation Area Access - Personnel/Equipment (Concrete Slab) - 54' 0" Length X 12' 6" Width X 11' 6" Shielding Walls Height.
- b2 90⁰ High Radiation Area Access - 11' 3" (North-South) X 6' 8" (East-West) X 11' 6" Shielding Walls Height.
- b3 Radiographic Area/High Radiation Area - 19' 2" Width (North-South) X 23' 5" Length (East-West) X 11' 6" Shielding Walls Height.

2c Radiation Shielding Walls (all) - 6' 8" Width X 11' 6" Height Above Concrete Slab.

- c1 0' 3" Shielding Wall Depth Below Concrete Slab Level - All Walls.

2d Radiation Shielding Walls - Construction

- d1 Inner and outer retaining walls material - 5" X 6" X 10' 0" fir wood, creosoted beams.
- d2 Sealer - asphalt compound.
- d3 Horizontal pressure retaining rods - 9/16" diameter solid steel rods, teflon coated, welded each end to 3/8" X 6" X 6" steel plates.
- d4 Vertical alignment pins - Solid steel 1/4" diameter X 10" Long; 24" spacing.
- d5 Rodent barrier - .008 stainless steel rodent barrier below concrete slab and ground level.

2.3 Radiation Shielding Material and Approximate Half-Value Layers

Figure No. 4, Page 26 - 6(a)

- 3a Compacted sand - 108 pounds per cubic foot dry weight - all walls.
- 3b 5' 8" Width - all walls.
- 3c 11' 6" Height - Above concrete slab - all walls.
- 3d 0' 3" Shielding Wall depth below concrete slab level - all walls.
- 3e Half-Value Layers (Approximate) - Ir 192 and Co 60.
 - e1 Ir 192; 1 HVL = 2.28"
Ir 192 - 29.8 Total HVL
 - e2 Co 60; 1 HVL = 3.10"
Co 60 - 21.9 Total HVL

NOTE: Ir 192 and Co 60 HVL for compacted sand 108 Lbs/Cu Ft computed from Concrete HVL 155 Lbs/Cu Ft.

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2.4 Roof Coverage; Inside/Outside Lighting; Electrical Mains

Figure No. 5, Page 27 - 6(a)

Figure No. 6, Page 28 - 6(a)

- 4a The roof of the Shielded Radiographic Facility is constructed of steel .020 thickness - 4"/12" pitch, the inside structures being constructed with wooden trusses.
- 4b The inside work lighting consists of eight (8), 8' 0" Long, 110 Watts each, dual tube fluorescent fixtures.
- 4c The outside Restricted Area security lighting consists of ten (10) 250 Watts each, Mercury Vapor fixtures with photoelectric (automatic "on" and "off") cell switches.
- 4d The electrical mains (breakers) consist of an all-weather, padlock sealed, no external switch box that is permanently mounted on the North facing end of the East shielding wall.

NOTE: THE ELECTRICAL MAINS BOX ALSO CONTROLS THE ELECTRICAL MAINS CIRCUITRY FOR THE VISIBLE AND AUDIBLE ALARMS SYSTEMS, PARAGRAPH 2.6 KEYS TO THIS ELECTRICAL MAINS BOX ARE CONTROLLED BY CAPITAL X-RAY SERVICES' RADIATION SAFETY OFFICER, ASSISTANT RADIATION SAFETY OFFICER, RADIOGRAPHIC EQUIPMENT MANAGER AND RADIOGRAPHIC SHIFT SUPERVISORS AND SHALL NOT BE DISTRIBUTED TO ANY RADIOGRAPHERS OR ASSISTANT RADIOGRAPHERS. (MANAGEMENT CONTROLS PROCEDURE)

2.5 Radiographer/Assistants Tool Building

Figure No. 7, Page 29 - 6(a)

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- 5a The Radiographer/Assistants Tool Building is an 8' 0" X 16' 0", skid-mounted building of aluminum construction that is not attached to the Shielded Radiographic Facility.
 - 5b The Tool Building contains a 24" X 78" glass door such that an unobstructed visual observance of the High Radiation Area Access - Personnel/Equipment is afforded.
- 2.6 Audible Radiation Alarm/Visible Caution Lighting Systems and Caution Posting
- Figure No. 7, Page 29 - 6(a)
- Schematic Exhibit 7A, Page 30 - 6(a)
- Schematic Exhibit 7B, Page 31 - 6(a)
- 6a Radiation Sensor
 - a1 The Radiation Detection Sensor and Power Relay Module, S-82 Model, is manufactured by International Test Equipment, Inc., Tulsa, Oklahoma.
 - a2 The Radiation Detection Sensor activates the Power Relays Module when a radiation level of less than 2 mr/hr and a radiation energy of 120 KEV is received.
 - a3 The Power Relay Module when activated by the Radiation Detection Sensor, activates simultaneously the visible Caution Lighting System and the Audible Alarm System.
 - a4 The Radiation Detection Sensor and Power Relay Module is located within the Radiographic Area - High Radiation Area and is permanently mounted on the east facing wall, 8' 6" above the concrete slab floor.
 - a5 The Radiation Detection Sensor is equipped with a Green

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"circuitry operational" 10 Watt light and a Red "radiation detected - on" 10 Watt light.

6b Audible Alarm System

- b1 The High Radiation Area - Entered - Audible Alarm System consists of two (2) independently circuited photoelectric controls; transmitters - LED, Models 1420A and "beam" reflectors, manufactured by OPCON, Everett, Washington.
- b2 The two (2) photoelectric controls; transmitters are permanently mounted on the east facing wall inside the High Radiation Area Access - Personnel/Equipment.
- b3 The two transmitters are mounted at a 31⁰ angle in a South to North direction (towards the Restricted Area Access - Personnel/Equipment).
- b4 One (1) transmitter "eye" is mounted 1' 4" (calf height) above the concrete slab floor and one (1) transmitter "eye" is mounted 4' 0" (lower chest height) above the concrete slab floor.
- b5 The two (2) photoelectric "beam" reflectors are permanently mounted on the west facing wall inside the High Radiation Area Access - Personnel/Equipment.
- b6 The photoelectric reflectors are positioned such that the reflector faces are normal to the transmitter "beams", and the transmitters to reflectors distance is 22' 8".
- b7 The 22' 8" line distance between the transmitters and reflectors is floor and wall painted with a high visibility, caution yellow paint. This painted line is 4" wide.

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b8 This floor and wall yellow-painted line is the High Radiation Area Entrance Line.

b9 The audible alarm bell - 90 dB is a Jenkins Corporation Model 2005.

b10 The audible alarm bell is permanently mounted inside the High Radiation Area Access - Personnel/Equipment 8' 0" above the concrete slab floor.

b11 The audible alarm bell is circuited from each of the two photoelectric controls; transmitters.

b12 The audible alarm bell "sounds" when either or both of the photoelectric controlled "beams" are entered and the bell sounding is audible from any location, including the office and shop building within Capital X-Ray Services' property boundaries.

b13 The audible alarm bell, when activated and sounding, CAN BE SHUT OFF ONLY BY THE RETRACTION OF THE USED SEALED SOURCE OR THE TURNING OFF OF THE USED X-RAY MACHINE - NO RADIATION PRESENT. (NO EXTERNAL SWITCHES)

6c Caution Lighting

c1 The Caution Lighting System consists of four (4) high visibility Red Caution Lamps; Whelen Corporation Model RB 120R.

c2 These four (4) Red Caution Lamps are independently circuited from the Radiation Detection Sensor and Power Relay Module.

c3 The four (4) Red Caution Lamps become operational - "on" - immediately when radiation is detected by the Radiation Detection Sensor.

- c4 One (1) of the four (4) Red Caution Lamps is permanently mounted within the Radiographic - High Radiation Area, on the east facing wall 8' 0" above the concrete slab floor.
- c5 This one (1) Red Caution Lamp is a Radiographer/Assistant Caution - Emergency Lamp.
- c6 This one (1) Red Caution Lamp can be observed from two locations:
 - c6a The visual observation of a 30" diameter convex mirror permanently mounted on the west facing wall of the High Radiation Area Access - Personnel/Equipment. This mirror can be visually observed from the Radiographer/Assistant Exposure Device Control Unit Area that is located to the rear of the High Radiation Area Entrance Line.
 - c6b From inside the Radiographic Area - High Radiation Area. OBSERVATION OF THIS (1) RED CAUTION LAMP, IF THE LAMP IS ACTIVATED, AFFORDS RADIOGRAPHERS AND ASSISTANTS TO IMMEDIATELY VACATE THE HIGH RADIATION AREA.
- c7 Two (2) of the four (4) Red Caution Lamps are permanently mounted within the High Radiation Area Access - Personnel/Equipment. One (1) on the east facing wall and one (1) on the west facing wall, both 8' 6" above the concrete slab floor.
- c8 One (1) of the four (4) Red Caution Lamps is permanently

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mounted at the rear of the High Radiation Area Access - Personnel/
Equipment on the north facing wall 8' 6" above the concrete
slab floor.

c9 These three (3) Red Caution Lamps can be readily observed
from outside the Restricted Area Access Gate and from any
location within the High Radiation Area Access - Personnel/
Equipment.

c10 The four (4) Red Caution Lamps CAN BE SHUT OFF ONLY BY THE
RETRACTION OF THE USED SEALED SOURCE OR THE TURNING OFF OF
THE X-RAY MACHINE - NO RADIATION PRESENT. (NO EXTERNAL SWITCHES)

6d Quarterly Testing - Caution Lighting/Audible Alarm System - Management

d1 The Caution Lighting and Audible Alarm System shall be tested
by either the Radiation Safety Officer, the Assistant Radiation
Safety Officer or the Radiographic Equipment Manager on a
time interval that shall not exceed three months.

d2 A survey instrument calibration device containing a sealed
source (presently Co 60 - .014 Curies) shall be placed inside
the Radiographic Area - High Radiation Area with the beam
port positioned at a distance from the Radiation Detection
Sensor such that a maximum of 2 mr/hr will be present at
the Sensor when the sealed source is exposed.

d3 The sealed source shall be exposed:

d3a The four (4) Red Caution Lamps shall be visually
observed for proper functioning - "on".

d3b A 2" X 2" X 48" long alarm test rod shall be passed across each photoelectric control; transmitter "beam" separately and "beams" simultaneously during separate source exposed intervals and the operation of the audible alarm bell shall be audibly observed.

d4 The sealed source shall be retracted following each exposure and the four Red Caution Lamps shall be visually observed for proper functioning - "off" and the audible alarm bell shall be audibly observed for proper functioning - "off".

d5 The testing parameters and the results of the test shall be documented and retained for inspection.

d6 Repairs due to the malfunctioning of the Red Caution Lamps or the Audible Alarm System shall be effected prior to the use of a sealed source within the Shielded Radiographic Facility.

6e Daily Testing - Caution Lighting and Audible Alarm System

e1 The Caution Lighting and Audible Alarm System shall be tested by the Radiographer performing radiography within the Shielded Radiographic Facility each day and each work "shift" during the first radiographic exposure of the day and work "shift".

e2 The procedures for the Daily Testing of the Caution Lighting and Audible Alarm System are detailed within Part 6(e), Operating and Emergency Procedures - Supplement - Shielded Radiographic Facility, Pages 6 and 7 of Amendment Application, Part 6(e).

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- e3 The results of the Daily Testing of the Caution Lighting and Audible Alarm System by Radiographers shall be documented within the appropriate sections of the "Radiation Survey Report and Utilized Log - Shielded Radiographic Facility" Form RDR-2, Page 18 of Part 6(e), Operating and Emergency Procedures - Supplement - Shielded Radiographic Facility, of this Amendment Application.
- 6f Caution Posting - Shielded Radiographic Facility
- f1 The permanently attached Caution Posting of the Shielded Radiographic Facility structure includes the posting of all of the outside walls:
- f1a North - 3 wall faces
 - f1b East - 1 wall face
 - f1c South - 1 wall face
 - f1d West - 2 wall faces
- f2 A total of thirteen (13) 19" X 22-1/2" - "Caution (Radiation Symbol) High Radiation Area Inside This Facility" placards - magenta and yellow are mounted 7' 10" above ground level.
- f3 These outside walls Caution Placards are conspicuously visible to personnel approaching the facility from any direction, either during daylight hours or at night when the walls are lighted by the automatic "on" and "off" Mercury Vapor Fixtures.
- f4 The permanently attached Caution Posting of the Shielded Radiographic Facility structure includes the posting of the following areas - inside walls:

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f4a High Radiation Area Access - Personnel/Equipment -
3 Placards

f4b Radiography Area - High Radiation Area -
3 Placards

f5 A total of six (6) 19" X 19-3/4" - "Caution (Radiation Symbol)
High Radiation Area" placards - magenta and yellow are mounted
5' 8" above the concrete slab floor.

f6 These inside walls placards are conspicuously visible to
personnel entering the High Radiation Area Access - Personnel/
Equipment, and from inside the Radiography Area - High
Radiation Area, either during daylight hours or at night when
the inside of the Shielded Radiographic Facility is lighted by
the Fluorescent Work Light Fixtures.

2.7 Restricted Area Perimeter Fencing and Caution Posting
Figure No. 8, Page 32 - 6(a)

7a Restricted Area Perimeter Fencing

a1 The entire Restricted Area Perimeter of the Shielded Radiographic
Facility is security fenced with 6' 0" high steel chain link
fencing.

a2 The entire Restricted Area Perimeter Fencing contains only one
Personnel/Equipment Access Gate. This steel chain link rolling
gate is 6' 0" high X 12' 0" wide and is equipped with a security
padlock, keys being distributed to Radiographers & Assistants only.

7b Caution Posting

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- b1 The Restricted Area Perimeter Fencing and the Restricted Area Access - Personnel/Equipment Gate is posted with eighteen (18) total, 8-1/2" X 11-1/2" "Caution (Radiation Symbol) Radiation Area" placards - magenta and yellow.
- b2 The Caution Placards are permanently attached to the outside faces of the perimeter fencing and the Access Gate, and are 5' 0" above ground level.
- b3 A minimum of three (3) Caution Placards are conspicuously visible to personnel approaching from any direction, (North, East, South, or West) the Restricted Area Perimeter Fencing, either during daylight hours or at night when the Restricted Area is lighted by the Facility Mercury Vapor outside lighting fixtures.

2.8 Sealed Sources; Curie Strengths, Use Area, Exposure Types and Temporary Storage
Figure No. 7, Page 29 - 6(a)

8a Sealed Sources; Curie Strengths

- a1 Sealed Sources that shall be used within the Radiographic Area - High Radiation Area include:
 - ala Co 60; 75 Curies Plus 10%*
 - alal Approximately 55% of Total Exposures
 - alb Ir 192; 100 Curies Plus 20%*
 - albl Approximately 40% of Total Exposures

* NOTE: Sealed Sources presently licensed No. 35-11114-01, Amendment No. 11,
Authorized Use.

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alc (X-Ray Machines to 300 KVP)

alc1 Approximately 5% of Total Exposures

8b Exposure Device/Sealed Source Use Area

b1 Exposure Devices and Sealed Sources (Co 60 and Ir 192) shall be used within the Radiographic - High Radiation Area.

b2 The 19' 2" Wide X 23' 5" Long Radiographic - High Radiation Area is conspicuously outlined with a 4" wide, yellow - floor painted line encompassing the entire perimeter.

b3 Exposure Device Control Units (crank mechanisms) shall be placed within the Exposure Device Control Unit Area that is located within the High Radiation Area Access - Personnel/ Equipment. This Control Unit Area is conspicuously outlined and area-identified with a 4" wide, yellow - floor painted line encompassing the entire area.

8c Exposure Types; Sealed Sources

c1 Collimated (T/O 527 Pb)

cla Directional - Horizontal

cla1 Approximately 40% of total sealed source exposures.

clb Directional - Vertical - Beam Down

clb1 Approximately 30% of total sealed source exposures.

clc 360° Panoramic

clc1 Approximately 20% of total sealed source exposures.

c2 Uncollimated (Guide Tube Stop End)

- c2a Internal Exposures with the Source Tube Stop End located inside object being radiographed.
 - c2a1 Approximately 7% of total sealed source exposures.
- c2b External Exposures Double Wall Type Radiographic Exposures with the Source Tube Stop End being placed against one wall of item being radiographed.
 - c2b1 Approximately 3% of total sealed source exposures.

8d Temporary Storage

- d1 A Temporary Storage Location for Exposure Device/Sealed Sources is provided within the Radiographic - High Radiation Area.
- d2 A 2" Diameter X 7/16" Thick steel eye bolt is attached to the west facing wall. The steel eye bolt is equipped with a chain and padlock for the physical securing of the Exposure Device/ Sealed Source at this area.
- d3 One (1) 8-1/2" X 11-1/2" "Caution (Radiation Symbol) Radioactive Material" placard is permanently attached to the west facing wall above the steel eye bolt.
- d4 Temporary Storage of an Exposure Device/Sealed Source shall be effected only with the exposure device in an unassembled, locked condition and only during those times when the Radiographer is within the shop facility at radiographic film processing times.
- d5 Temporary storage times shall not exceed 1-1/2 hours total per 8 hour working shift and a total of 4½ hours per 24 hour working day (3 work shifts).
- d6 The Restricted Area Access Gate - Personnel Equipment shall be closed and locked at all times when an Exposure Device/Sealed

Source is being used or temporarily stored within the Shielded Radiographic Facility.

2.9 Sealed Source Use Factors

9a Working Shifts

- a1 Sealed Source Co 60 and Ir 192 shall be employed within the Shielded Radiographic Facility during Capital X-Ray Services' three working shifts:
 - ala 1st Work Shift - 7:30 AM - 3:30 PM - 7 Maximum Exposure Hours
 - alb 2nd Work Shift - 3:30 PM - 11:30 PM - 7 Maximum Exposure Hours
 - alc 3rd Work Shift - 11:30 PM - 7:30 AM - 7 Maximum Exposure Hours
- a2 Capital X-Ray Services' working schedule is primarily based on a 40-hour work week (Monday through Friday) per Radiographer and Assistant, but overtime radiographic operations Saturday and Sunday are normally necessary during approximately two working weeks of each month.

2.10 Radiation Attenuation and Occupancy Factors

Figures No. 9A, Page 33 - 6(a) Through No. 9K, Page 43 - 6(a)

10a Ir 192 Attenuation

- a1 Actual Radiation Level Measurements involving the use of a 96.0 Curie Iridium 192 Sealed Source are detailed:
 - ala Figure 9A, Page 33 "Distances"
 - alb Figure 9B, Page 34 "Uncollimated - No Shielding"
 - alc Figure 9C, Page 35 "Uncollimated - Shielded - .62 Steel"

10b Co 60 Attenuation

b1 Actual Radiation Level Measurements involving the use of a 78.0 Curie Co 60 Sealed Source are detailed:

- bla Figure 9A, Page 33 "Distances"
- blb Figure 9D, Page 36 "Uncollimated - No Shielding"
- blc Figure 9E, Page 37 "Uncollimated - Shielded - 1.0 Steel"
- bld Figure 9F, Page 38 "Panoramic - 360⁰"
- b1e Figure 9G, Page 39 "Collimated - Vertical (Beam Down)"
- b1f Figure 9H, Page 40 "Collimated - Directional; Horizontal - North"
- blg Figure 9I, Page 41 "Collimated - Directional; Horizontal - East"
- b1h Figure 9J, Page 42 "Collimated - Directional; Horizontal - South"
- b1i Figure 9K, Page 43 "Collimated - Directional; Horizontal - West"

10c Primary and Secondary (Scattered) Radiation Measurements

- c1 All radiation level measurements were taken with 2 calibrated survey instruments with the highest levels being those recorded.
- c2 Radiation levels were measured with the Ir 192 and Co 60 Sealed Sources at distances above the floor level from 1' 0" to 9' 0".
- c3 The highest radiation levels measured were when the sealed sources were placed at 48" above floor level (Primary and Secondary).
- c4 Radiation levels were measured at the entire outside surfaces of the Shielded Facility, at the High Radiation Area Entrance Line, inside the Radiographer/Assistants Tool Building, at all the perimeters of the Restricted Area fencing, the entire yard area, inside the entire office and shop building and for distances 100 feet outside Capital X-Ray Services' property fencing.
- c5 The radiation levels measured in all of the Unrestricted Areas, both inside and outside Capital X-Ray Services' fenced property boundaries are apparently a combination of both Primary and Secondary Radiation, because the measurements at the outside surfaces of the Shielded Facility were much lower levels.

FORM 313R

10d Personnel Occupancy and Maximum Dosage Factors in Unrestricted Areas

d1 Capital X-Ray Services' Personnel & Visitors - Non-monitored -
On-Site Inside Office and Shop Building Only.

d1a Three Secretarial Employees & Visitors

8 AM to 4 PM Daily

8 Hours per Day Normal Working Hours

5 Days per Week Normal Working Week

2,080 Hrs. maximum Normal Working Hrs. per Yr. Excluding
Vacations

+

8 AM to 4 PM Daily

8 Hours Per Day

2 Days Per Week - Overtime Hrs. Saturday & Sunday

83.2 Maximum Hrs. per Yr. Overtime

=

0.2 millirem maximum per hour X 2,080 hours maximum
normal working hours per year + 0.2 millirem maximum
per hour X 83.2 maximum hours per year overtime =
.433 rem maximum per year

d1b The 0.2 millirem maximum per hour dosage can only be
received when uncollimated exposures and collimated (360°) -
Panoramic exposures involving the use of 78 Curies or
larger of Co 60 or 96 Curies or larger of Ir 192 are
being effected within the Shielded Radiographic Facility.
These exposure types will constitute 30% min - 40% max of
all exposures; therefore, all on-site, non-monitored
employees or visitors inside the office and shop building

will receive in any one calendar year a radiation dose less than 0.5 rem and less than 2.0 millirem in any one hour and less than 100 millirem in any 7 consecutive days.

d2 Visitors - Non-Monitored - On Site, Outside Office & Shop Building

d2a Approximately Four Individuals On-Site at Any One Time
Who May be Present Outside Restricted Area Fencing.

8 AM to 4 PM Daily

3 Hours per Day Maximum Total - Visitors Time on Site

7 Days per Week Maximum

21 Maximum Hours Per Month Total - Visitors Time on Site

=

1.7 millirem maximum per hour X 21 maximum hours per
month X 12 months per year = .428 rem maximum per year

d2b The 1.7 millirem maximum per hour dosage can only be received at the Shielded Radiographic Facility - Restricted Area fenced perimeter when uncollimated exposures and collimated (360°) Panoramic exposures involving the use of 78 Curies or larger of Co 60 or 96 Curies or larger of Ir 192 are being effected within the Shielded Radiographic Facility. These exposure types will constitute 30% Min - 40% Max. of all exposures; therefore all on-site, non-monitored individuals frequenting any segment of the fenced Restricted Area will receive in any one calendar year a radiation dose less than 0.5 rem and less than 2.0 millirem in any one hour and less than 100 millirem in any 7 consecutive days.

- d3 Individuals; Non-Employees - Non-Monitored who may Possibly Frequent the South Facing Segment of the Shielded Radiographic Facility - Restricted Area Fencing, outside Capital X-Ray Services' Fenced Property Boundaries.
- d3a Since April 17, 1982, the date Capital X-Ray Services, Inc. moved operations into the office/shop facility located at 2133 South 49th West Avenue, Tulsa, Oklahoma, the property boundaries have been security fenced.
- d3b The only facilities in the near vicinity of Capital X-Ray Services property are two residences and one commercial facility that lie 200' West of Capital X-Ray Services' shop/office building and over 100' from Capital X-Ray Services' West Boundary fencing.
- d3c There are no facilities of any type located within 1/4 mile of Capital X-Ray Services' North, East and South property boundary fencing.
- d3d Since April 1982 there have been no individuals observed, other than mail delivery or electrical and water meter reading personnel, even for a very short period of time within any 24-hour day period, frequenting any area outside and adjacent to Capital X-Ray Services' boundary fencing. Therefore, for the computation of radiation dosages that may possibly be received by any individual frequenting any area outside Capital X-Ray Services' fenced property boundaries, the following

offsite maximum occupational factors and dosage factors
for non-monitored individuals are employed:

24 Hours Daily

3 Hours Per Day Maximum Total - Individuals Outside Restricted
Area Perimeter Fencing

7 Days per Week Maximum

21 Maximum Hours per Month Total - Individuals Outside Restrict-
Area Perimeter Fencing

=

1.7 millirem maximum per hour X 21 maximum hours per
month X 12 months per year = .428 rem maximum per year

d3e The 1.7 millirem maximum per hour dosage can only be received
at the South facing segment of the Shielded Radiographic
Facility - Restricted Area fencing when uncollimated expo-
sures and collimated (360^0) Panoramic exposures involving the
use of 78 Curies or larger of Co 60 or 96 Curies or larger
of Ir 192 are being effected within the Shielded Radiographic
Facility. These exposure types will constitute 30% Min - 40%
Max of all exposures; therefore all off-site, non-monitored
individuals who may frequent any segment of the Restricted
Area Perimeter Fencing will receive in any one calendar year
a radiation dose less than 0.5 rem and less than 2.0 millirem
in any one hour and less than 100 millirem in any 7 consecutive
days.

d4 Capital X-Ray Services' Employees - Film Badge & Dosimeter Monitored
d4a 25 to 30 Radiographers & Assistants - Yearly Average Who May
Perform Radiographic Operations within the Shielded
Radiographic Facility.

2,080 hours maximum normal working hours per year excluding vacations

+

208 hours maximum per year overtime

=

2,288 hours maximum yearly working hours

=

1.250 rems per quarter; 3.0 rems per quarter maximum provided that the dose to the whole body when added to the accumulated dose does not exceed 5(N-18) rems and Form NRC-4 is present and compiled.

- d4b The yearly radiation dosages for Radiographers and Assistants who shall perform radiographic operations within the Shielded Radiographic Facility will definitely not approach these dosage levels, but should be within a range of 1.750 rems to 2.750 rems per year maximum.

2.11 Maintenance and Repair - Shielded Radiographic Facility

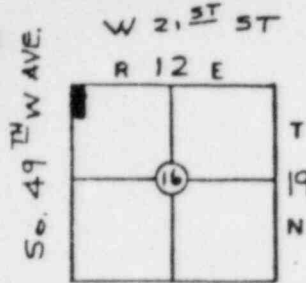
11a Maintenance of the Shielded Radiographic Facility structure and maintenance or repair of the caution lighting system and the audible alarm system is the responsibility of:

- a1 The Radiation Safety Officer
- a2 The Assistant Radiation Safety Officer
- a3 The Radiographic Equipment Manager
- a4 The Radiographic Shift Supervisor

11b No maintenance or repair functions shall be performed during any operations involving the use of sealed sources or X-Ray machines.

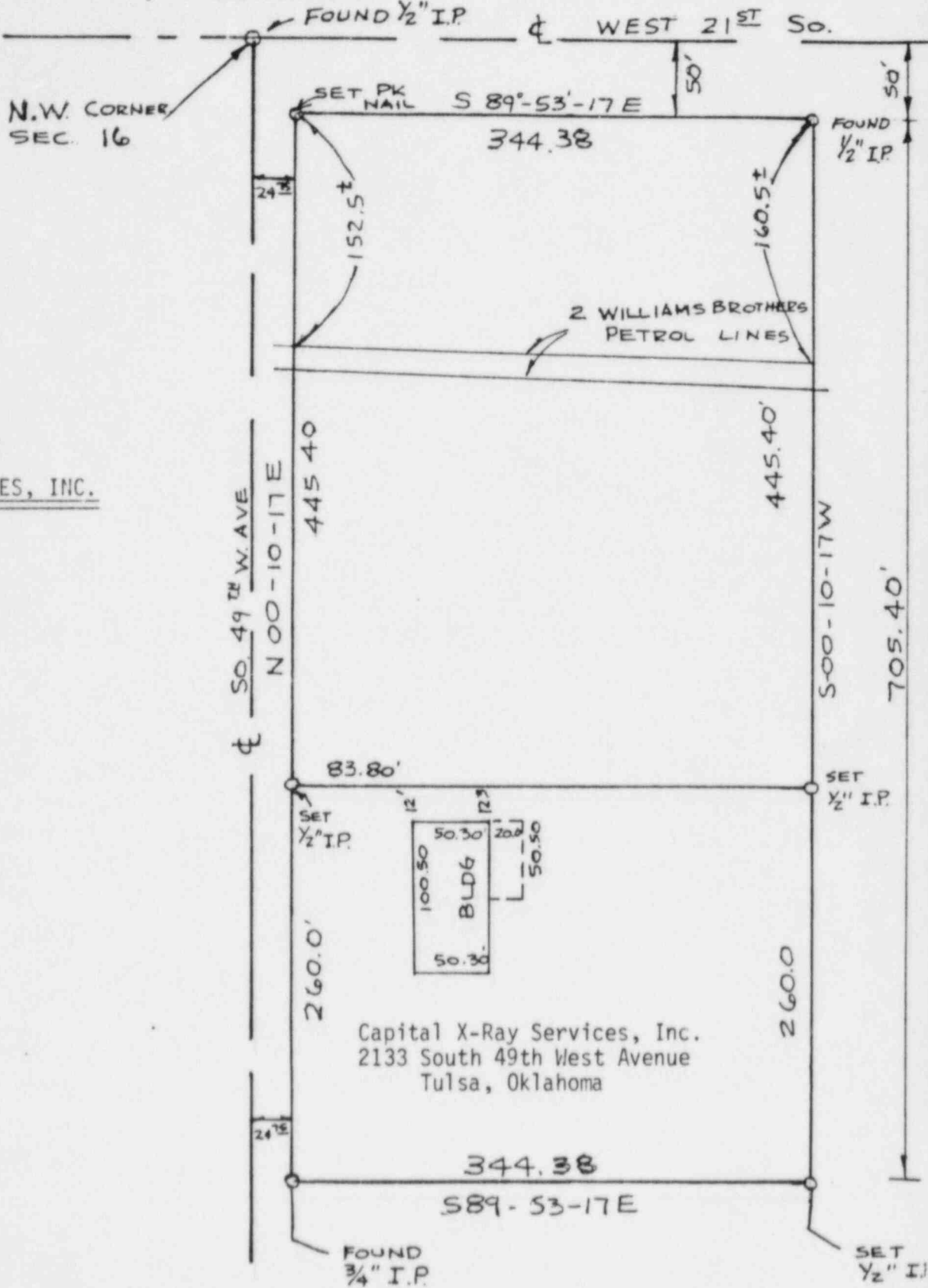
2.12 Records, Reports & Forms Posting

- 12a All records and reports pertaining to the use of Shielded Radiographic Facility, the radiation response testing of the caution lighting and audible alarm systems shall be maintained by the Radiation Safety Officer.
- 12b Form NRC-3 shall be posted within the High Radiation Area Access - Personnel/Equipment and the Radiographers/Assistants Tool Building.



4-7-82

LOCATION MAP

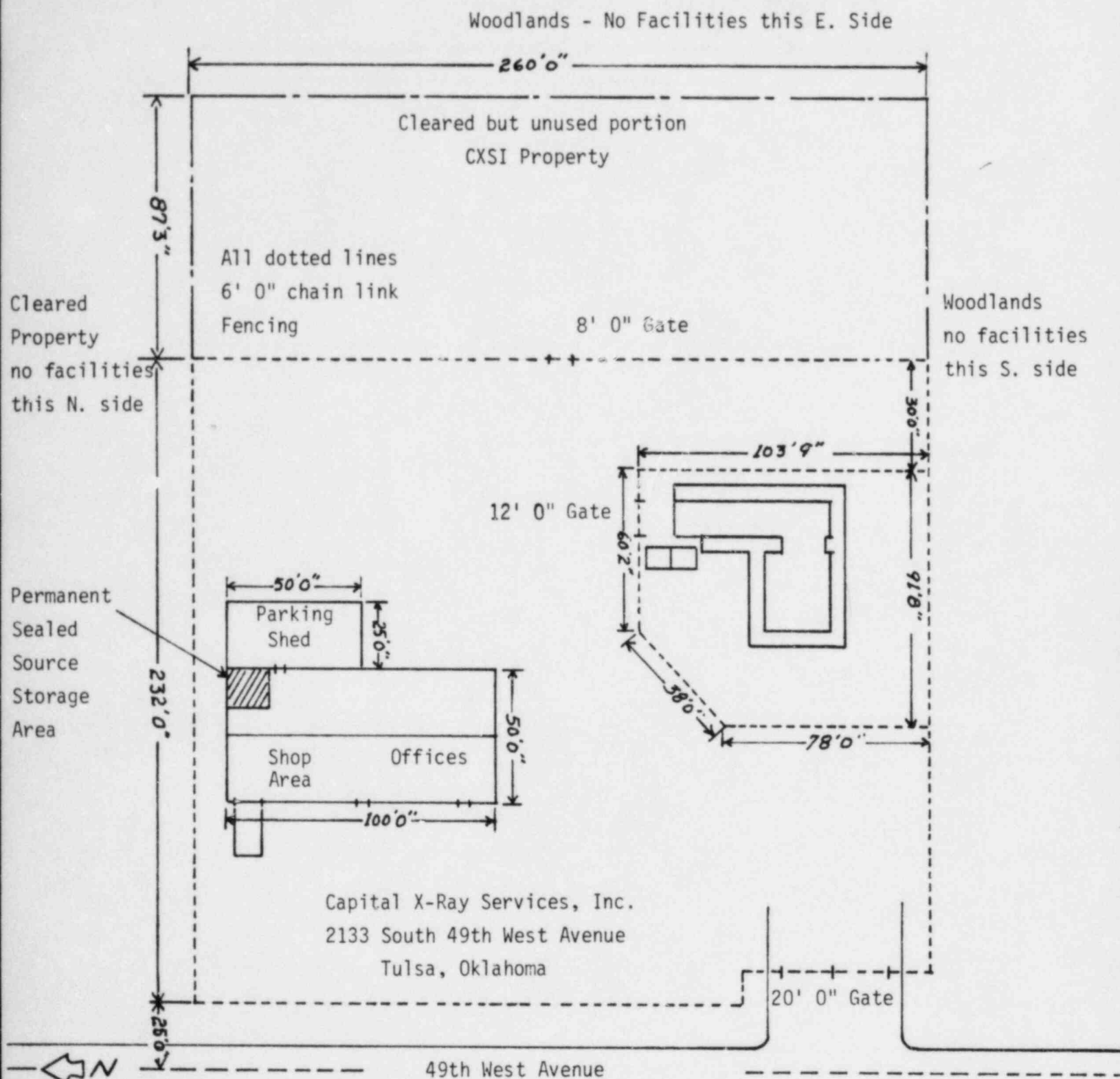


SURVEY PLATT

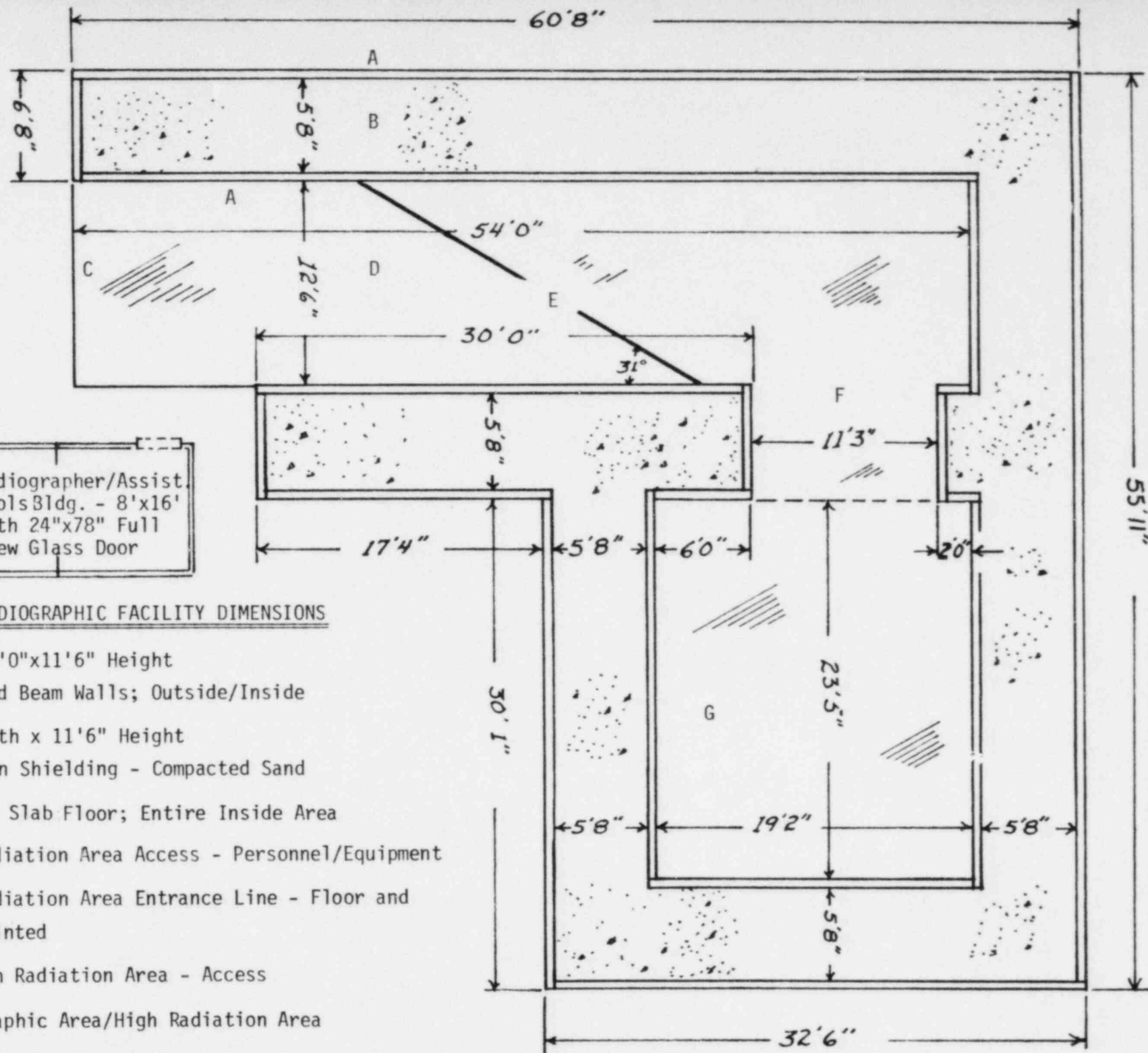
CAPITAL X-RAY SERVICES, INC.

Capital X-Ray Services, Inc.
2133 South 49th West Avenue
Tulsa, Oklahoma

SHIELDED RADIOGRAPHIC FACILITY; OFFICE & SHOP FACILITY; PROPERTY LINES; SECURITY FENCING

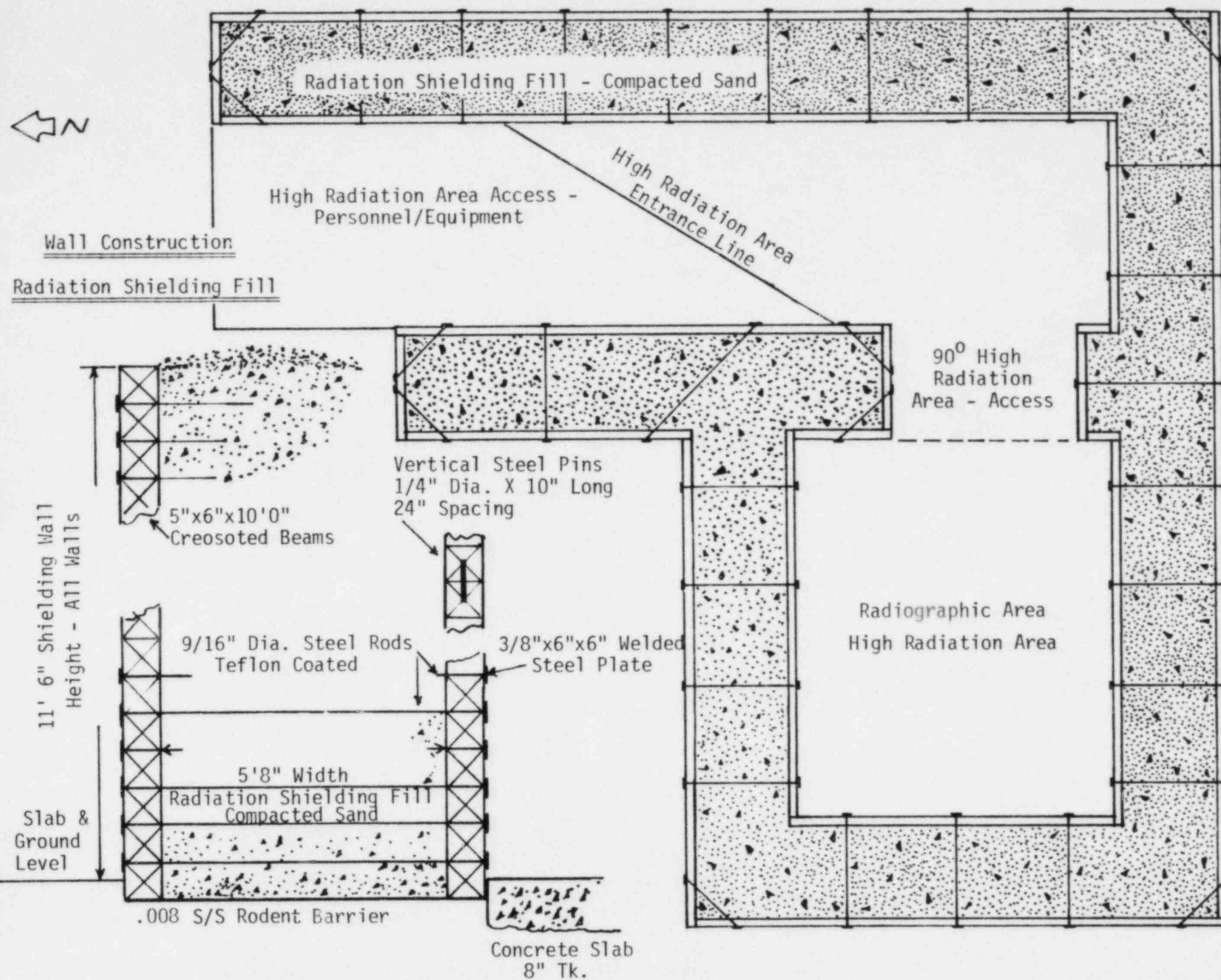


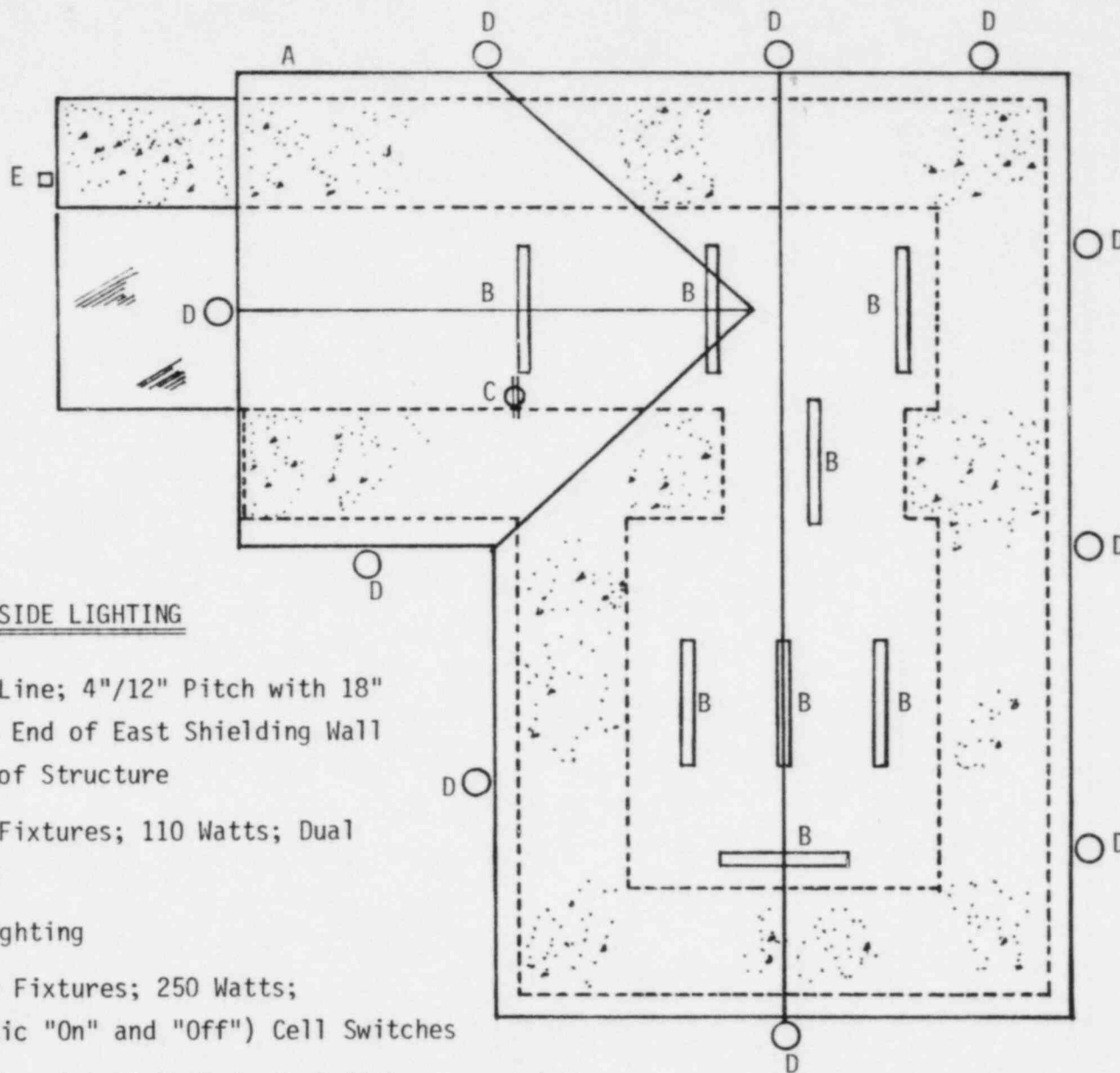
Two Residences and One Commercial Facility
this W. side. 100' 0" Set Back from Center
Line 49th West Avenue. Single Story
Facilities.



SHIELDED RADIOGRAPHIC FACILITY DIMENSIONS

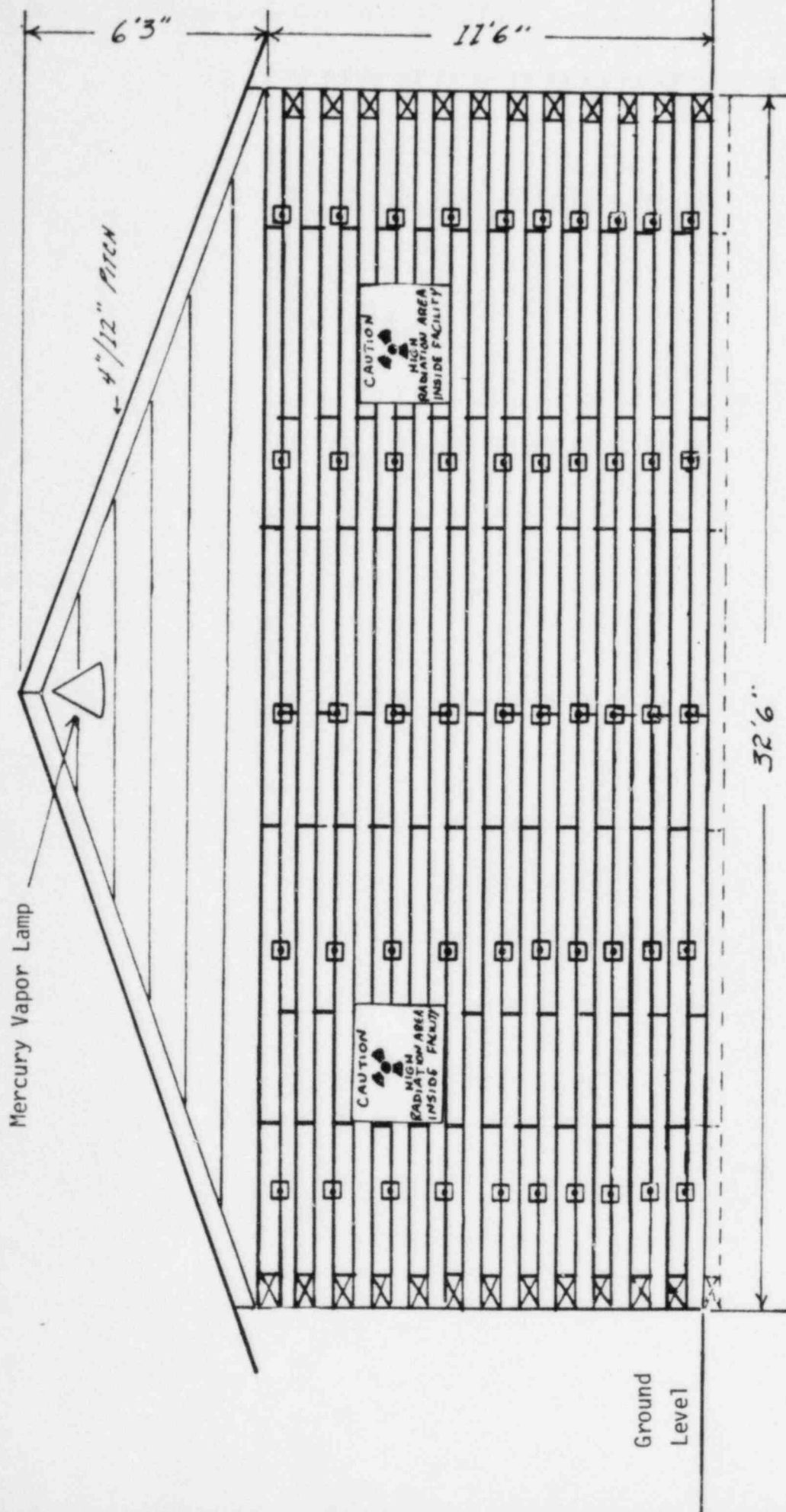
- A. 5"x6"x10'0"x11'6" Height
Creosoted Beam Walls; Outside/Inside
- B. 5'8" Width x 11'6" Height
Radiation Shielding - Compacted Sand
- C. Concrete Slab Floor; Entire Inside Area
- D. High Radiation Area Access - Personnel/Equipment
- E. High Radiation Area Entrance Line - Floor and
Wall Painted
- F. 90° High Radiation Area - Access
- G. Radiographic Area/High Radiation Area



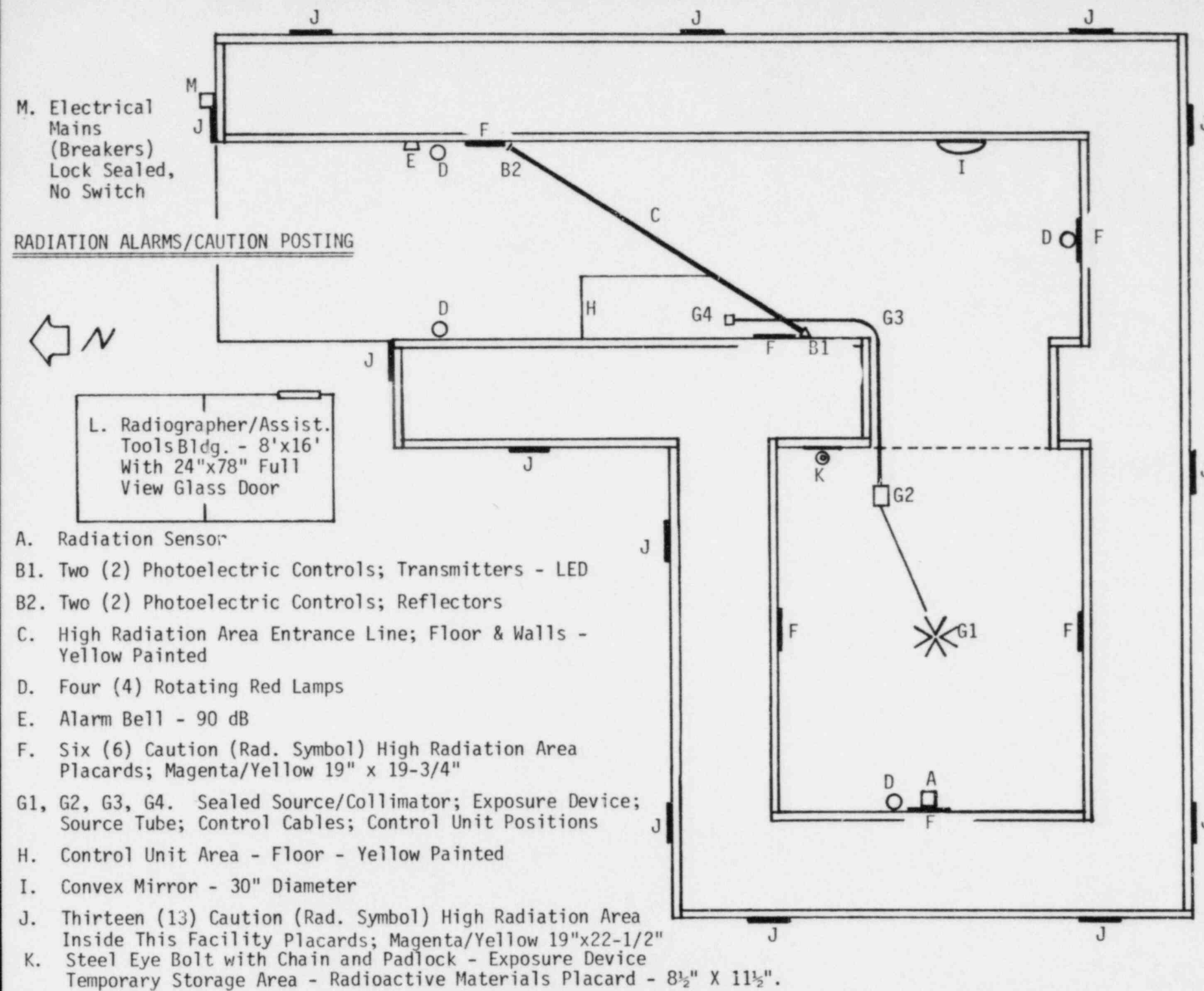


ROOF COVERAGE & INSIDE/OUTSIDE LIGHTING

- A. Steel Roof; Structure Line; 4"/12" Pitch with 18" Overhang - Note: North End of East Shielding Wall not Covered by Main Roof Structure
- B. Eight (8) Fluorescent Fixtures; 110 Watts; Dual Tubes; -20° F. Balast
- C. Switch - All Inside Lighting
- D. Ten (10) Mercury Vapor Fixtures; 250 Watts; Photoelectric (Automatic "On" and "Off") Cell Switches
- E. Electrical Mains (Breakers) Lock Sealed, No Switch; All Weather



WEST FACING WALL AND ROOF LINE



Graveled Drive Area

Graveled Yard Area

29'9"

78'0"

A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N _____

1b RD5016C S/N _____

B. SEALED SOURCE

B1. Type _____ Cis. _____

B2. Height Above Floor _____

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 A

Page 33 - 6(a)

RADIATION ATTENUATION

DISTANCES

C. COLLIMATION; T/O 527-Pb

C1. Monoramic (360°) _____

C2. Directional; Horiz. _____

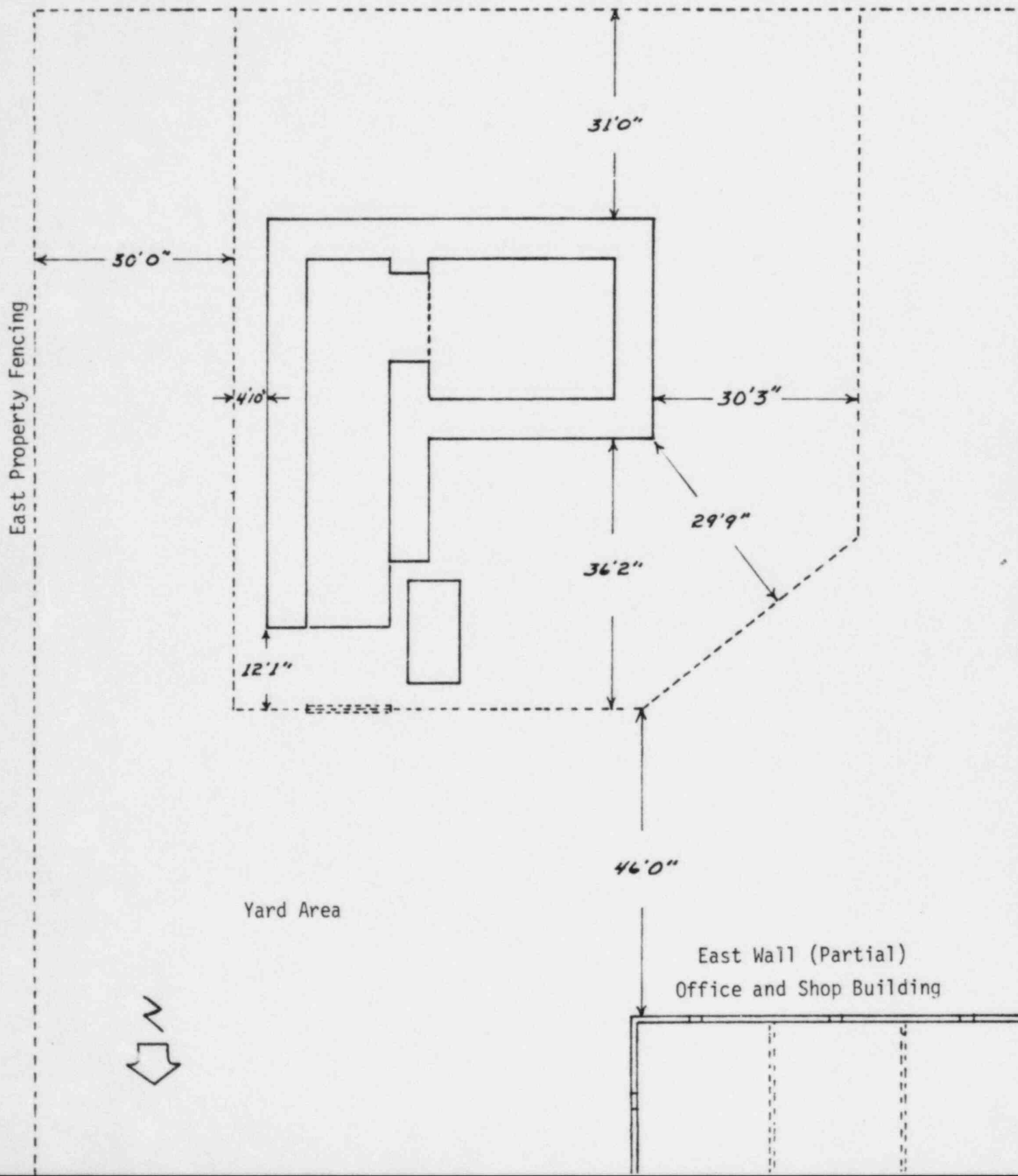
2a. Direction _____

C3. Vertical (Beam Down) _____

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding _____

D2. Steel Shielding; Tkns. _____



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N **2120**

B. SEALED SOURCE

B1. Type I-192 Cis. 96.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

RADIATION ATTENUATION

MR/HR

C. COLLIMATION: T/O 527-Pb

C1. Monoramic (360°) *N/A*

C2. Directional; Horiz. N/A

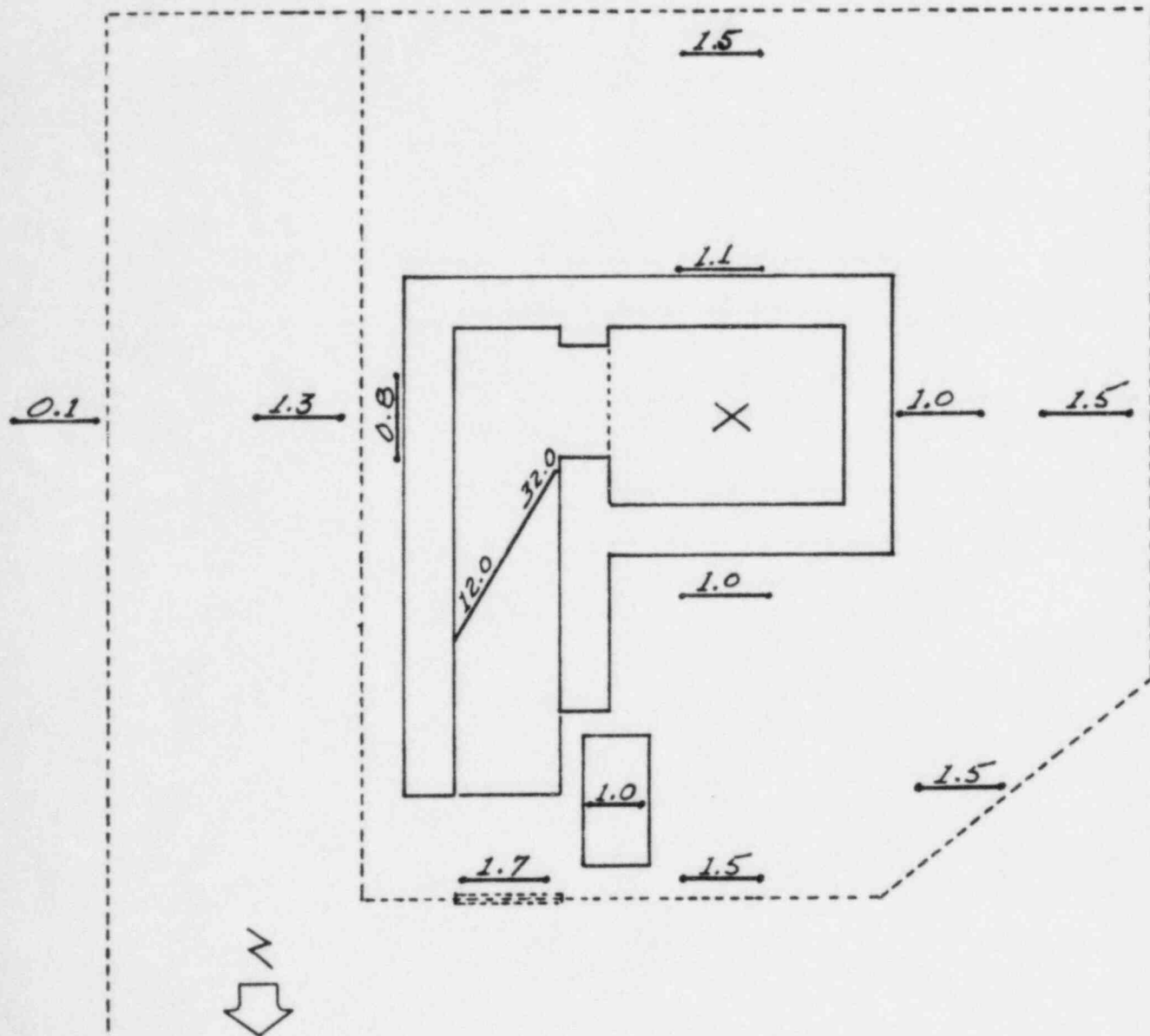
2a. Direction *N/A*

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding X

D2. Steel Shielding; Tkns. N/A



Highest Mr/Hr Levels Measured

Entire Yard Area

0.2

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.

0.10.1

0.0

A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type L-192 Cis. 96.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Monoramic (360°) N/A

C2. Directional; Horiz. N/A

2a. Direction N/A

C3. Vertical (Beam Down) N/A

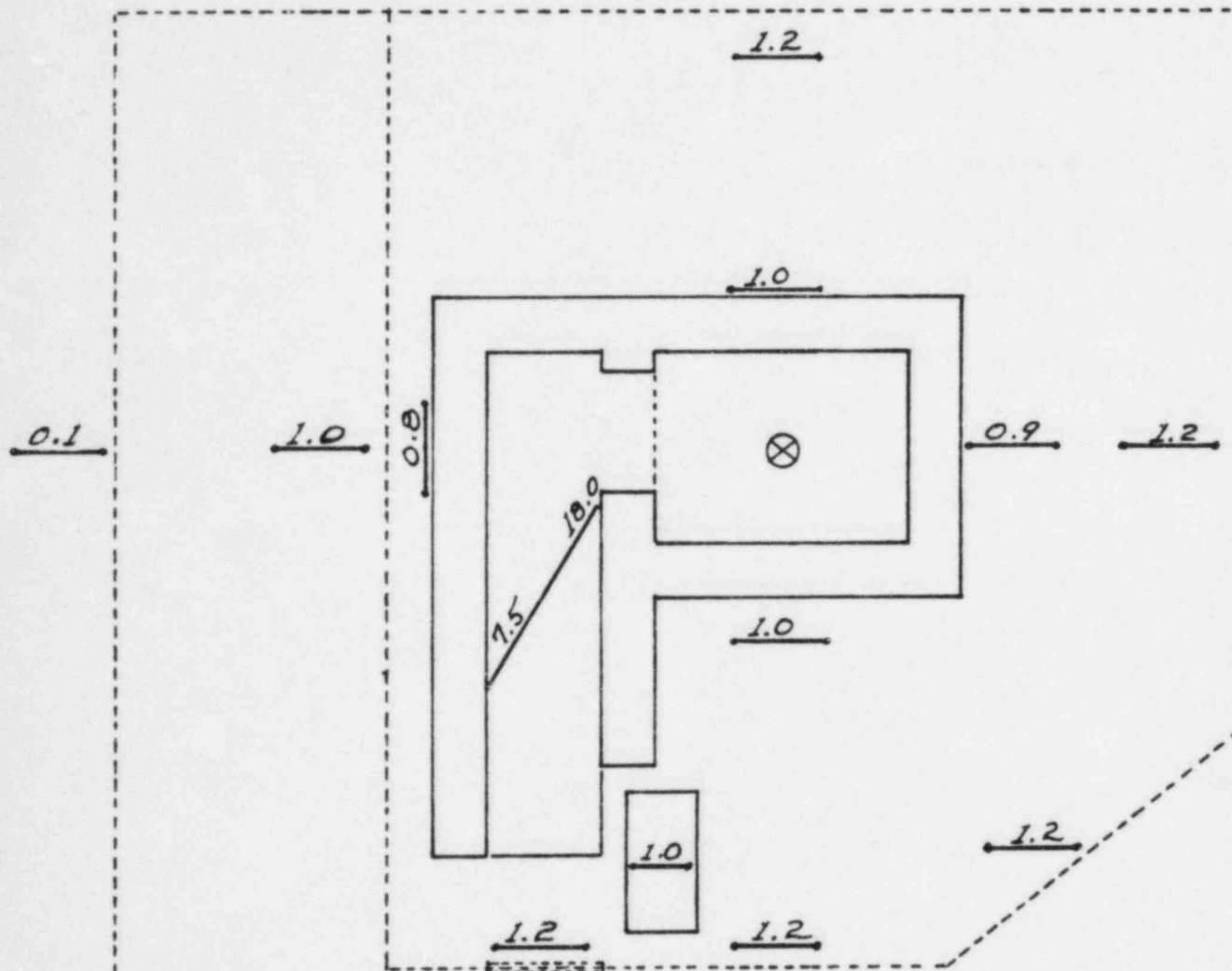
D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tkns. .62"

FIGURE NO. 9 C

Page 35 - 6(a)

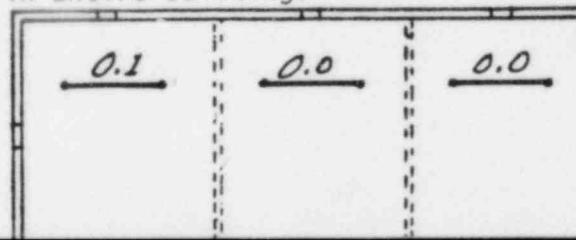


Highest Mr/Hr Levels Measured

Entire Yard Area

0.1

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 D

Page 36 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Isoramic (360°) N/A

C2. Directional; Horiz. N/A

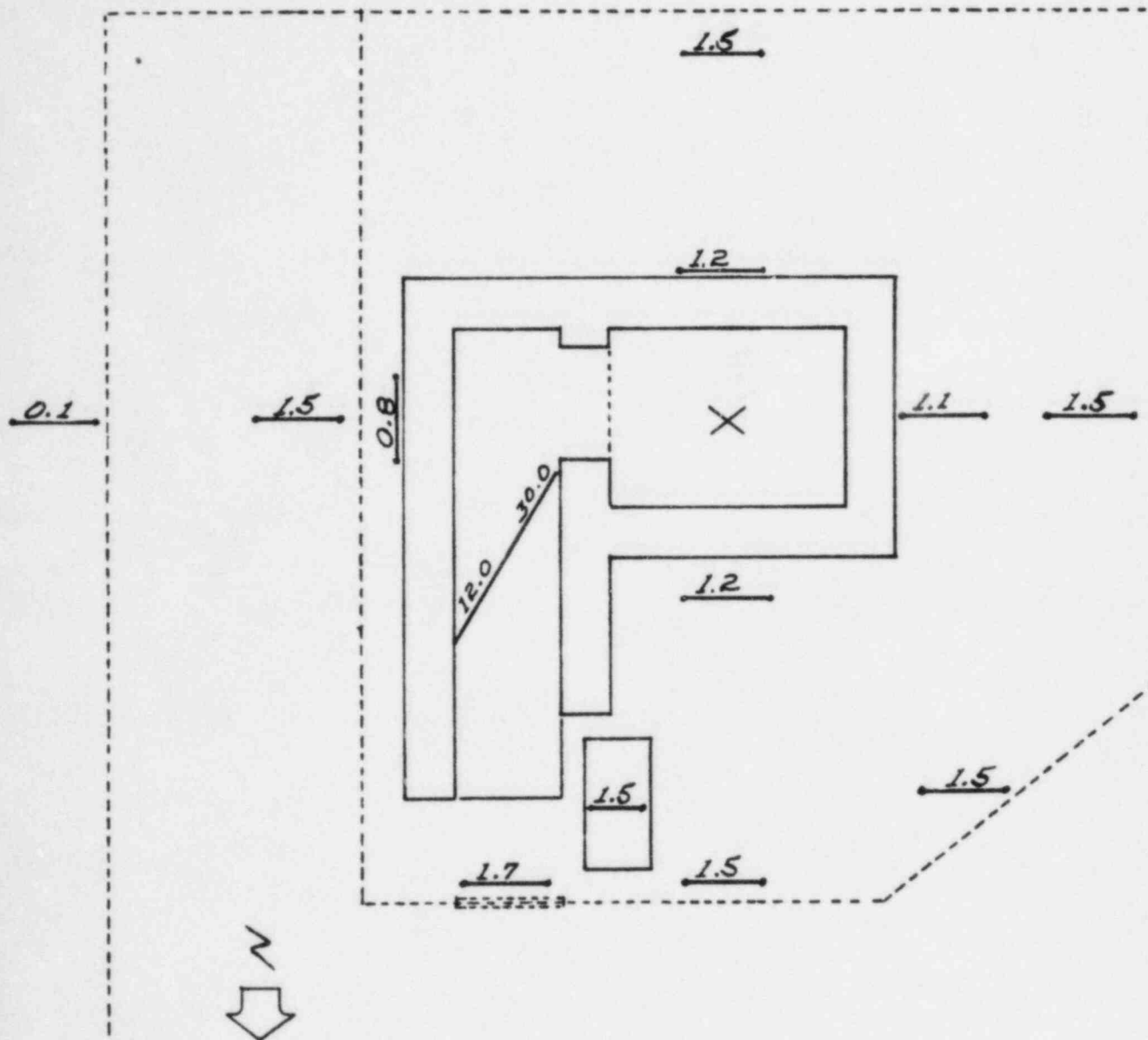
2a. Direction N/A

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding X

D2. Steel Shielding; Tkns. N/A

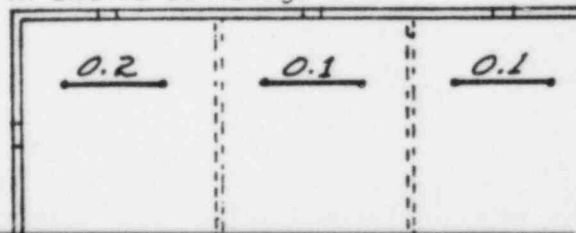


Highest Mr/Hr Levels Measured

Entire Yard Area

0.2

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9E

Page 37 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Monoramic (360°) N/A

C2. Directional; Horiz. N/A

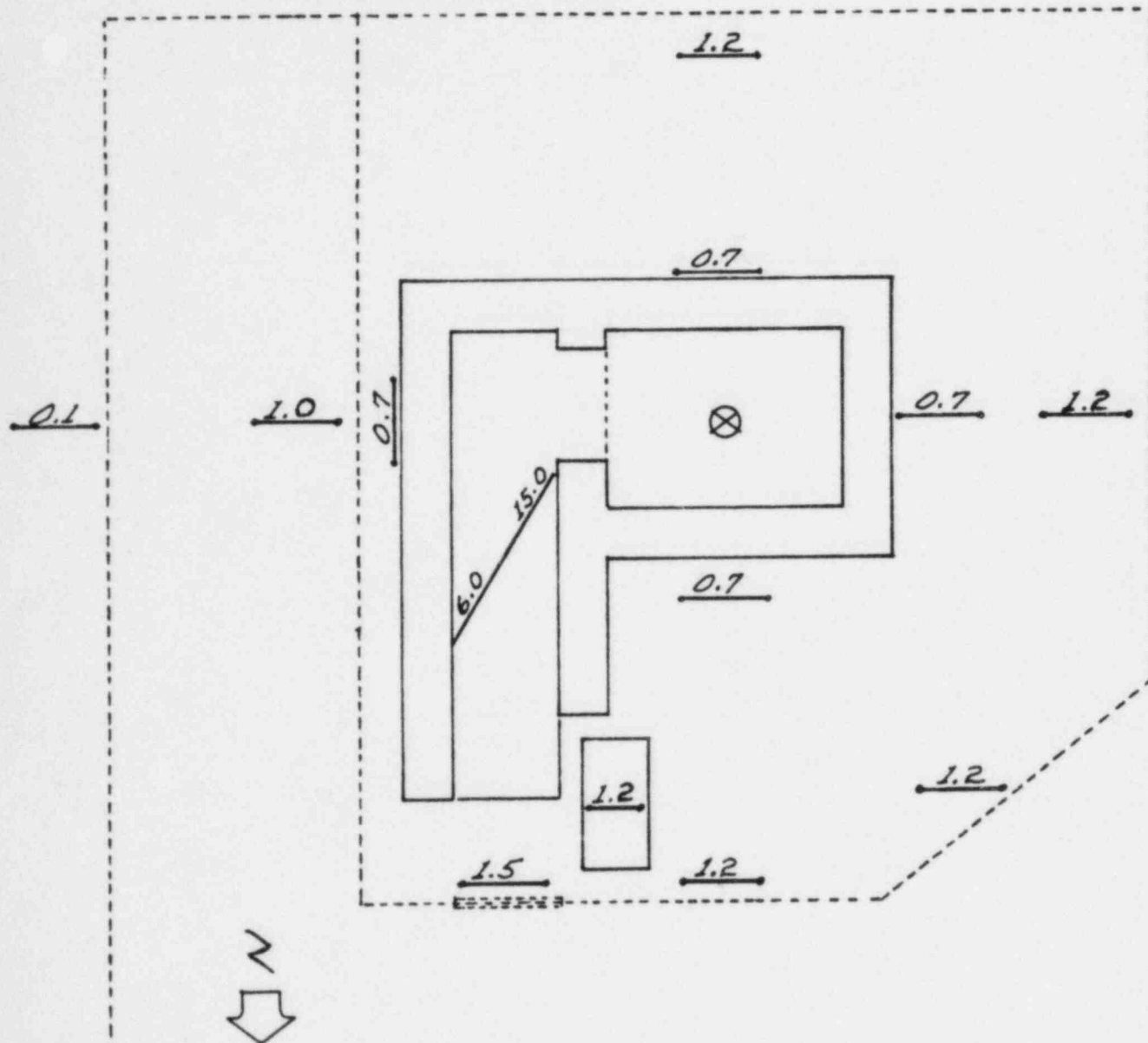
2a. Direction N/A

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tks. 1.0"

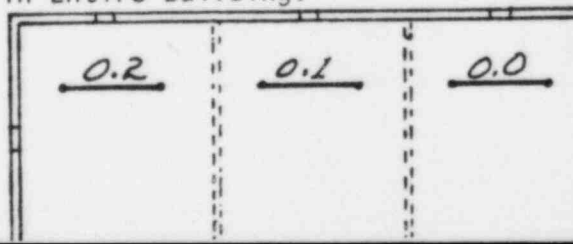


Highest Mr/Hr Levels Measured

Entire Yard Area

0.2

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 F

Page 38 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. panoramic (360°) X

C2. Directional; Horiz. N/A

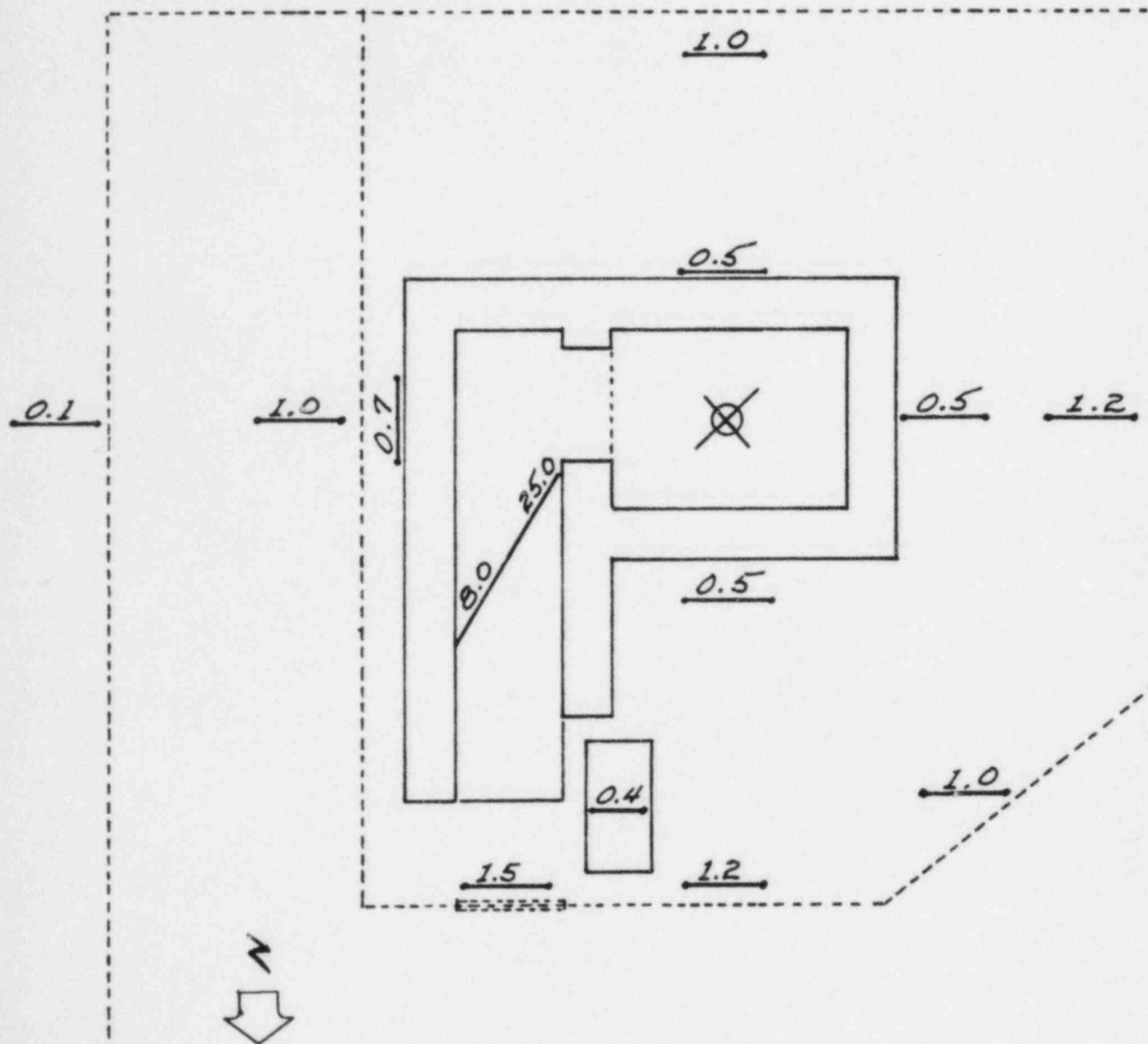
2a. Direction N/A

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tks. N/A



Highest Mr/Hr Levels Measured

Entire Yard Area

0.2

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.

<u>0.2</u>	<u>0.1</u>	<u>0.1</u>
------------	------------	------------

A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 96"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 G

Page 39 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Panoramic (360°) *N/A*

C2. Directional; Horiz. N/A

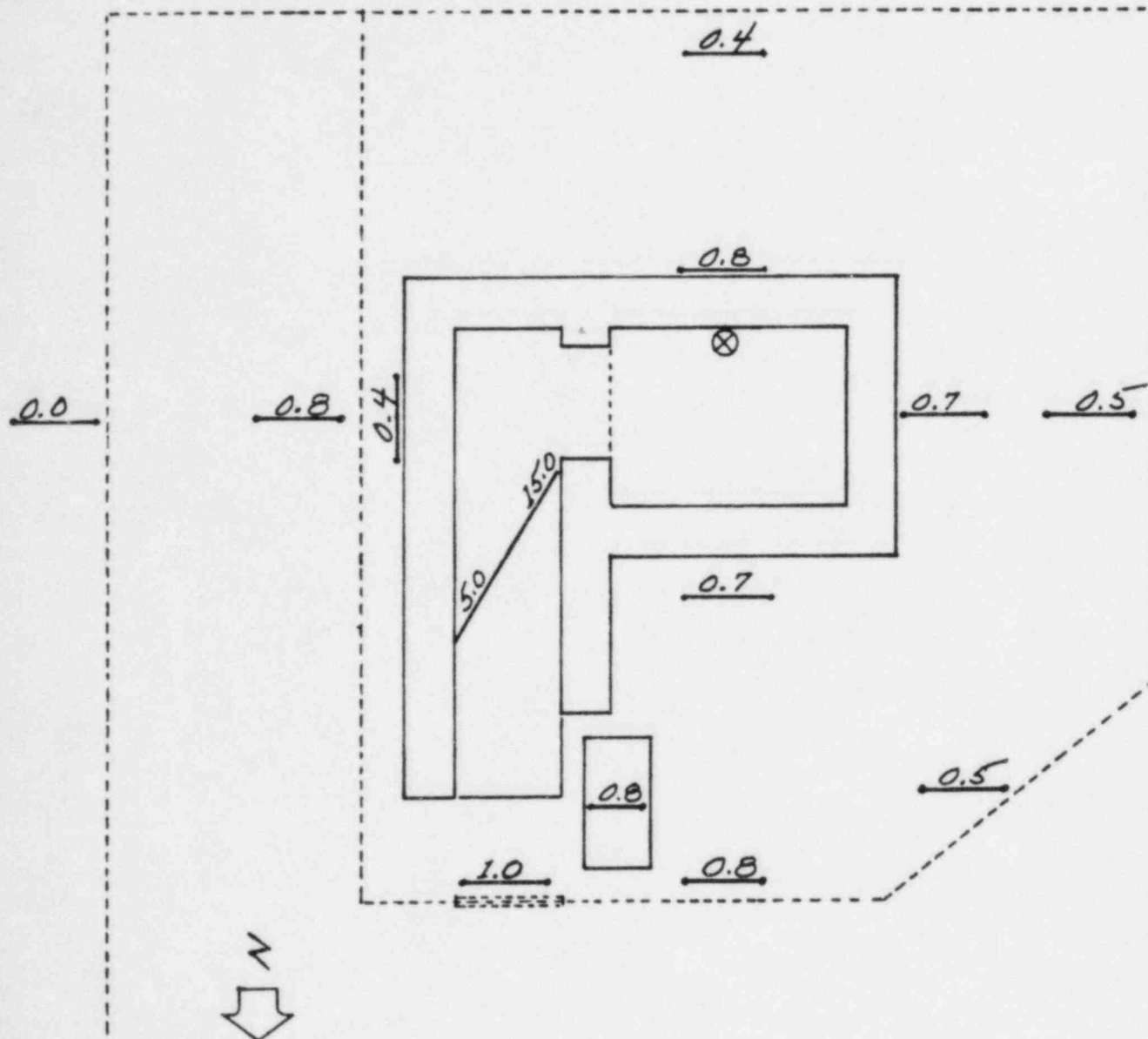
2a. Direction N/A

C3. Vertical (Beam Down) X

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tkns. N/A

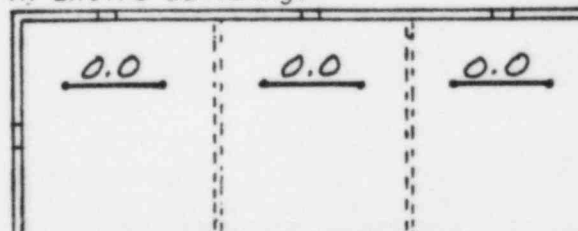


Highest Mr/Hr Levels Measured

Entire Yard Area

0.0

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 H

Page 40 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Monoramic (360°) N/A

C2. Directional; Horiz. X

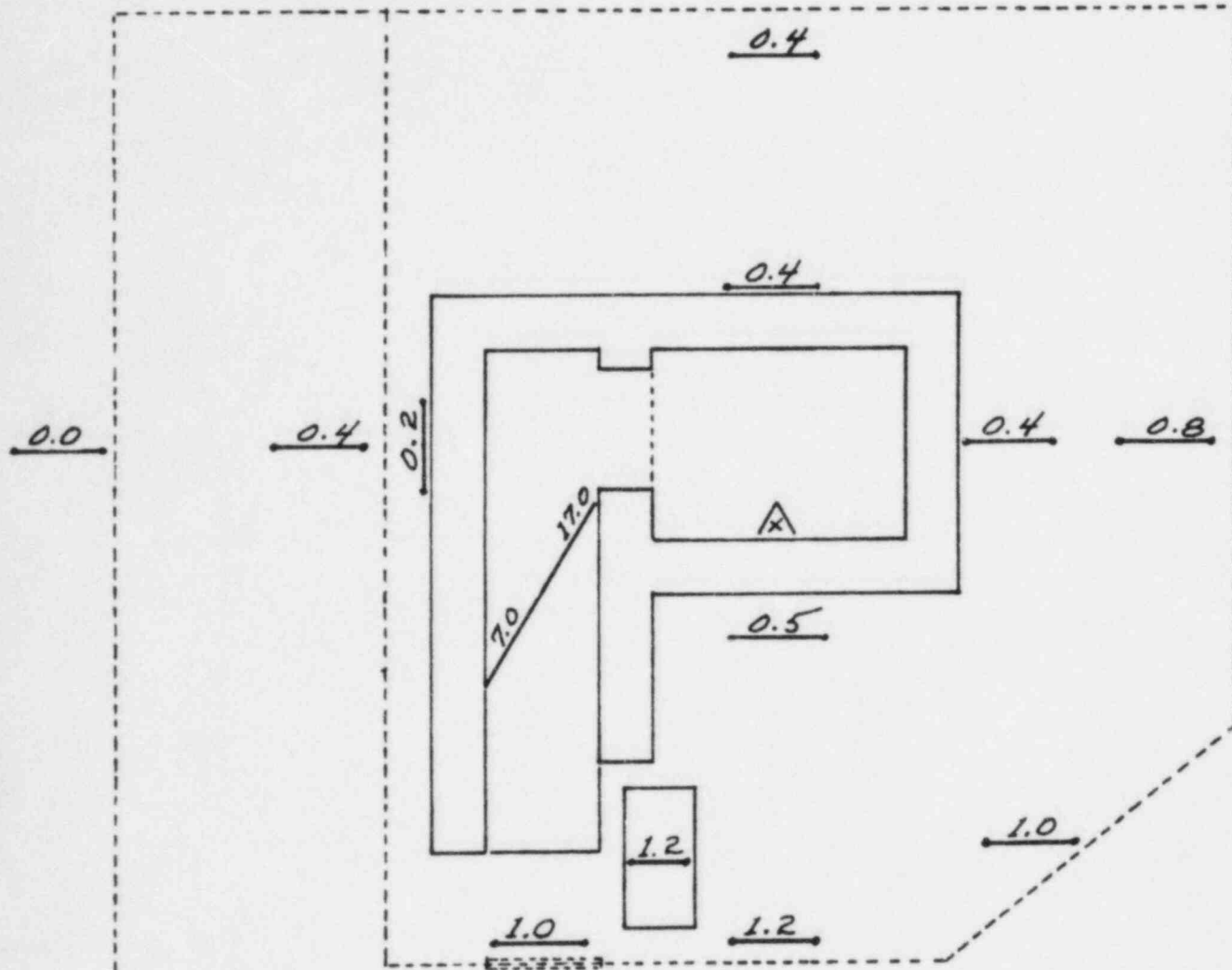
2a. Direction NORTH

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tks. N/A

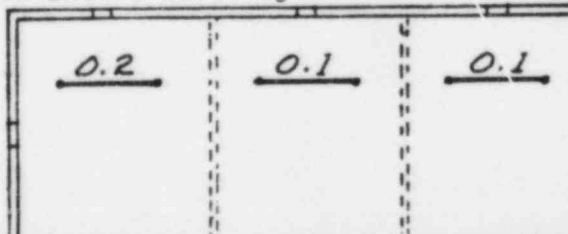


Highest Mr/Hr Levels Measured

Entire Yard Area

0.2

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 I

Page 41 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Panoramic (360°) N/A

C2. Directional; Horiz. X

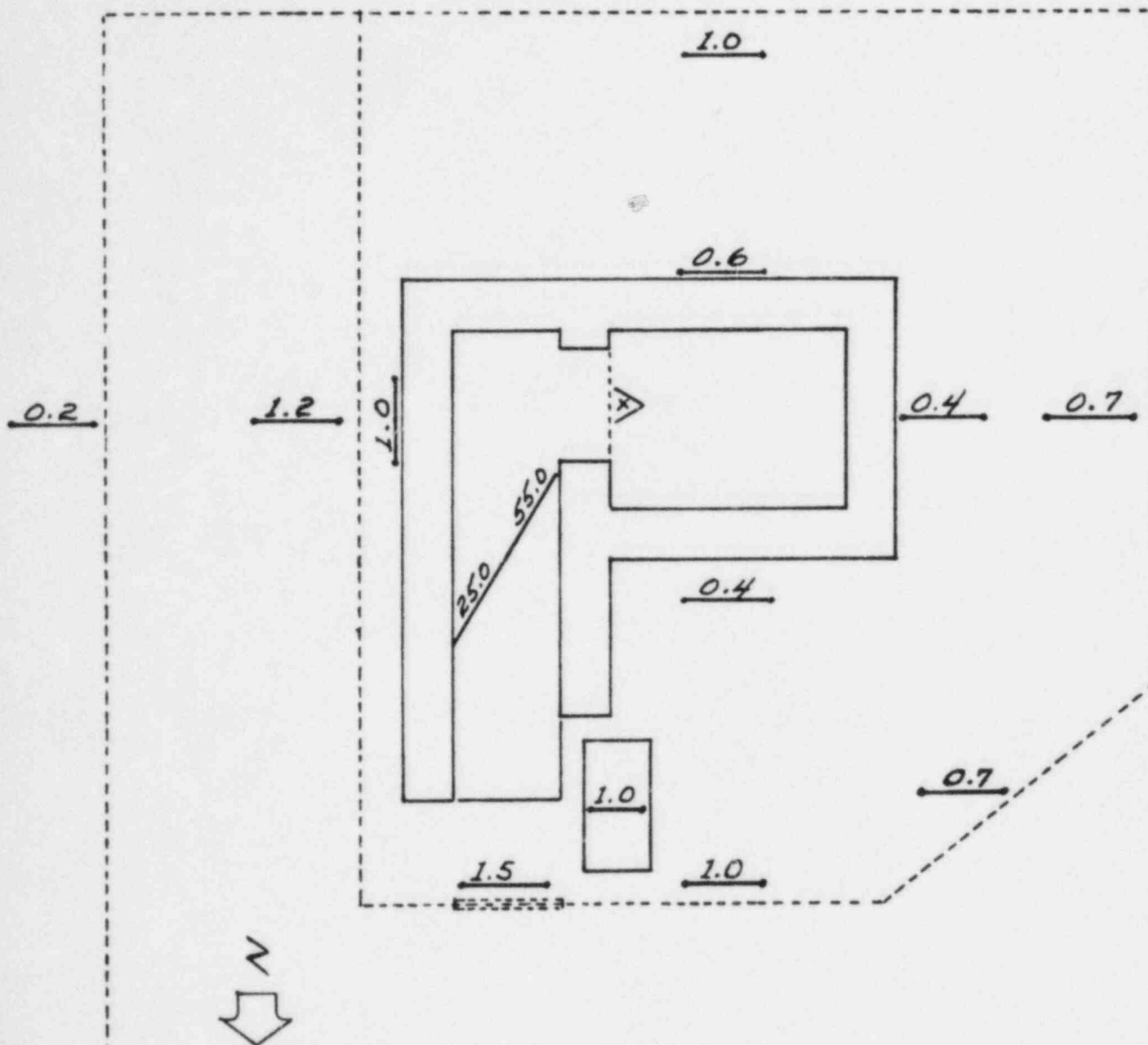
2a. Direction EAST

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tkns N/A



Highest Mr/Hr Levels Measured

Entire Yard Area

0.2

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.

<u>0.1</u>	<u>0.0</u>	<u>0.0</u>
------------	------------	------------

A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9 J

Page 42 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Panoramic (360°) N/A

C2. Directional; Horiz. X

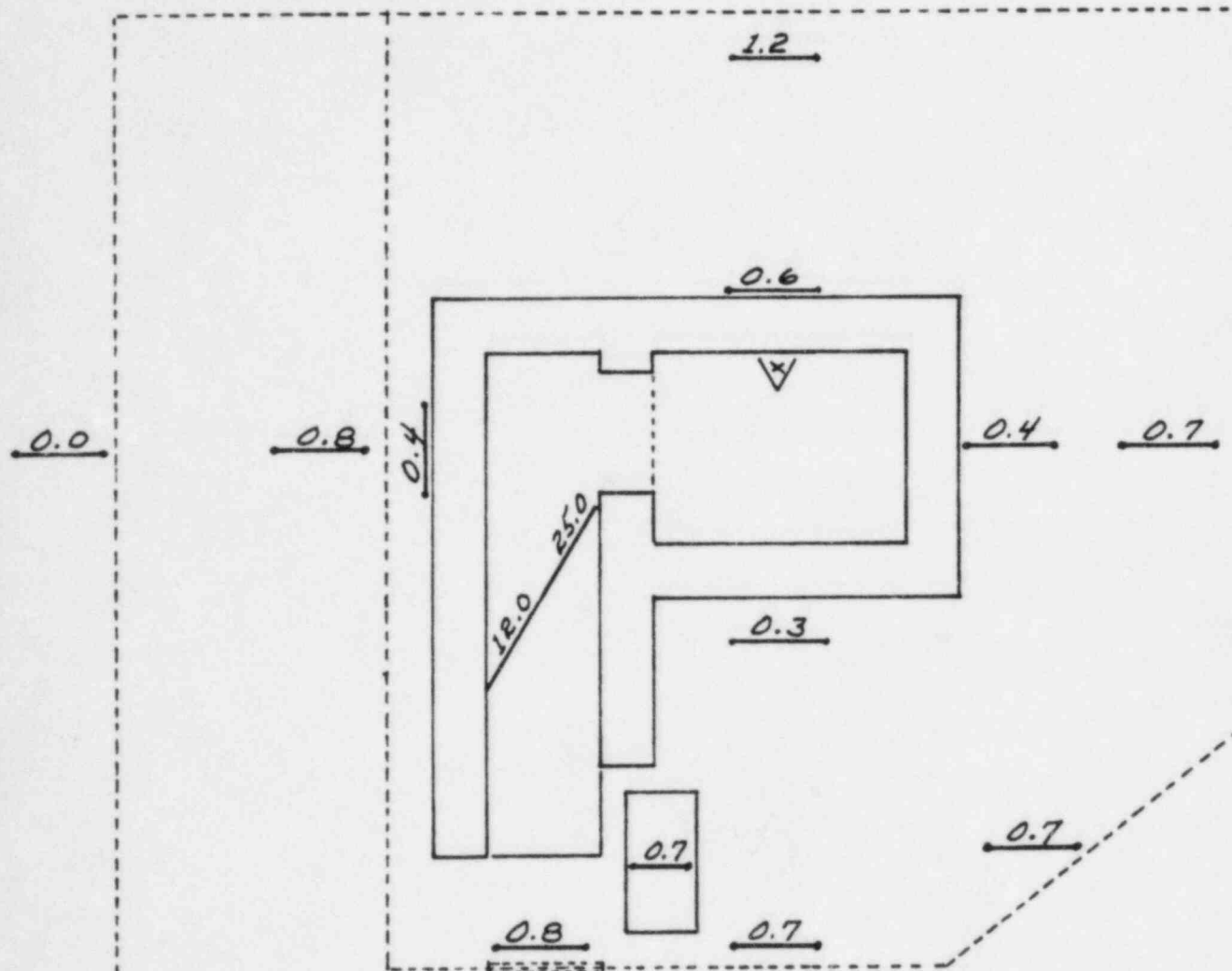
2a. Direction SOUTH

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tkns. N/A

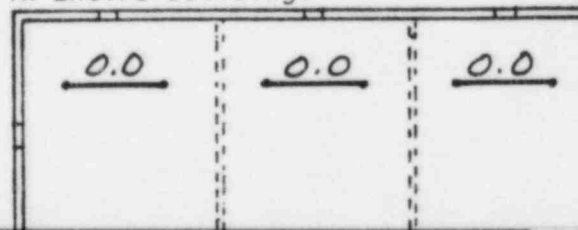


Highest Mr/HR Levels Measured

Entire Yard Area

0.0

East Wall Office and Shop Building
Highest Mr/HR Levels Measured with-
in Entire Building.



A. RADIATION SURVEY INSTRUMENTS

A1. Canadian Admiral

1a RD5016C S/N 1103

1b RD5016C S/N 2120

B. SEALED SOURCE

B1. Type Co60 Cis. 78.0

B2. Height Above Floor 48"

B3. Position; Marked "X" Inside Facility

FIGURE NO. 9K

Page 43 - 6(a)

RADIATION ATTENUATION

MR/HR

C. COLLIMATION; T/O 527-Pb

C1. Panoramic (360°) N/A

C2. Directional; Horiz. X

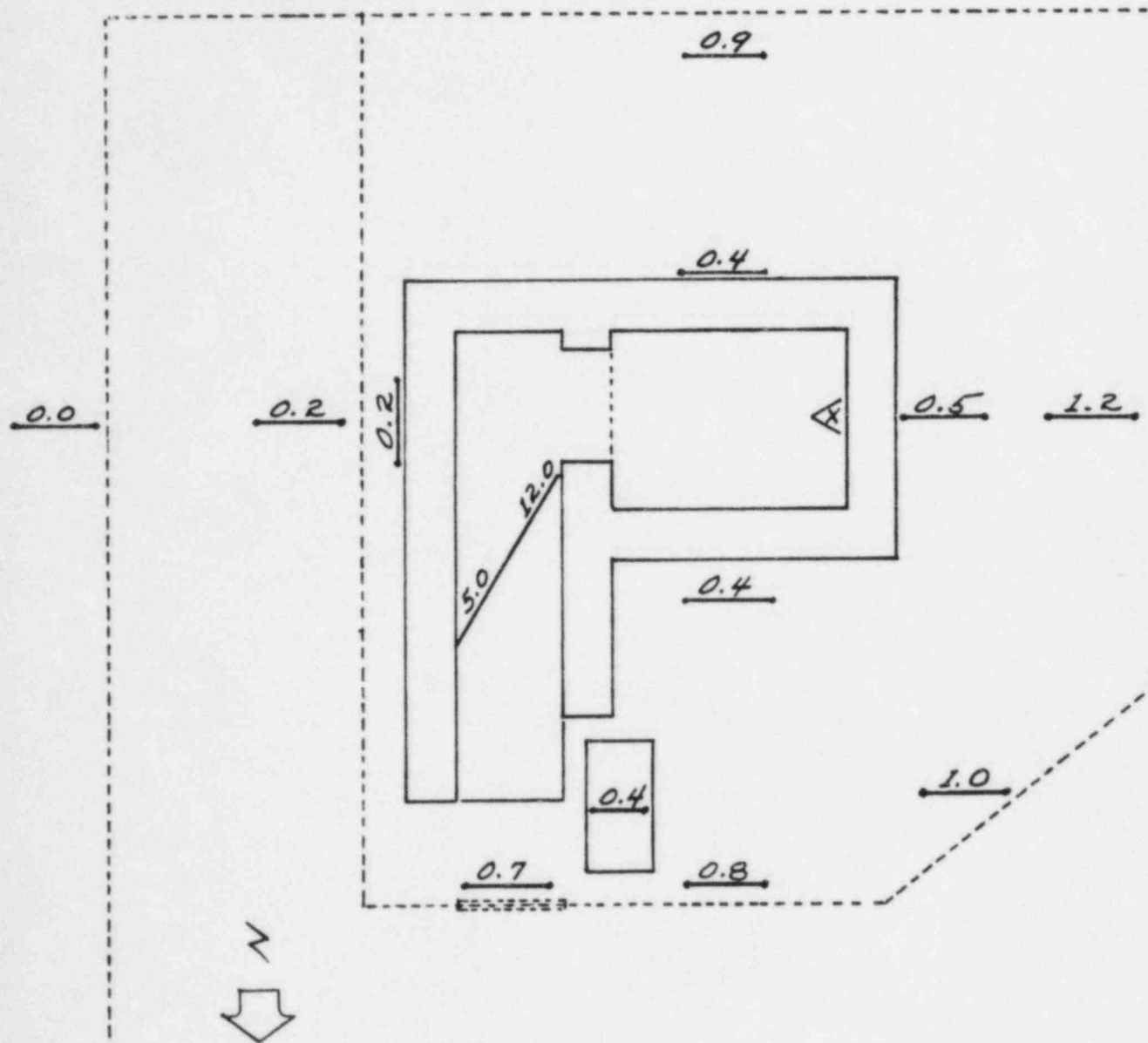
2a. Direction WEST

C3. Vertical (Beam Down) N/A

D. UNCOLLIMATED; GUIDE TUBE STOP

D1. No Shielding N/A

D2. Steel Shielding; Tkns. N/A

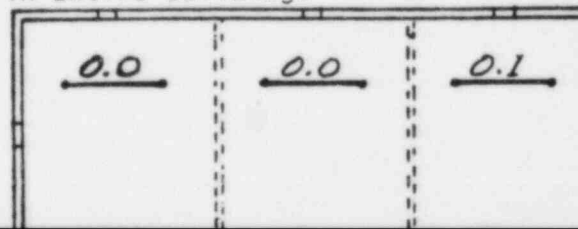


Highest Mr/Hr Levels Measured

Entire Yard Area

0.1

East Wall Office and Shop Building
Highest Mr/Hr Levels Measured with-
in Entire Building.



FORM 313R

COVER - 6(e)

PART 6(e) AMENDMENT

SUPPLEMENTAL INFORMATION

OPERATING, CAUTION AND EMERGENCY PROCEDURES - SUPPLEMENT

SHIELDED RADIOGRAPHIC FACILITY

FORM 313ROPERATING, CAUTION AND EMERGENCY PROCEDURESSECTIONS

1.0

THRU OPERATING, CAUTION AND EMERGENCY PROCEDURES

2.10

(License No. 35-11114-01, Amendment No. 11 Renewal, October 30, 1979)

2.11

REPORTING OF DEFECTS AND NON-COMPLIANCE

(Upgrading Addition 1-80)

PART 6(e) AMENDMENT APPLICATIONSUPPLEMENT - OPERATING, CAUTION AND EMERGENCY PROCEDURES - SUPPLEMENT

S-2.12

OPERATING, CAUTION & EMERGENCY PROCEDURES - SHIELDED RADIOGRAPHIC FACILITYSCOPE/OBJECTIVE

The Operating, Caution and Emergency Procedures detailed within this document shall be furnished to Radiographers and Assistant Radiographers as a supplement to their Basic Operating, Caution and Emergency Procedural Document. These combined procedures shall be employed as the Operating, Caution and Emergency Procedures during the performance of Radiographic Operations within Capital X-Ray Services' Shielded Radiographic Facility.

FORM 313RS-12a Personnel Monitoring Equipment

- a1 Assure that assigned film badge(s) and direct reading dosimeter(s) that have been charged to the "0" setting are being worn together. (Basic O & E Procedures Section 2.1)

S-12b Radiation Survey Instrument

- b1 Select a survey instrument and visually check the calibration tag and battery(s) voltage. (Basic O & E Procedures Section 2.3)

S-12c Sealed Source Exposure Device, Control Unit & Source Guide Tube Inspection

- c1 Remove the sealed source exposure device, control unit and source guide tubes from the Permanent Sealed Source Storage Area, relocking the Security Gate. (Basic O & E Procedures Section 2.2)
- c2 With the survey instrument switched to a low sensitivity scale, perform a physical radiation survey of the sealed source exposure device and perform the daily inspection of the sealed source exposure device, control unit and source guide tubes. Document the radiation survey and the equipment inspection results within the appropriate sections of the "Exposure Device Equipment Check List and Utilized Log", Form EDUL-1. (Basic O & E Procedures Section 2.5)

S-12d Transportation of Seald Source Exposure Device to the Shielded Radiographic Facility

- d1 Hand transport the sealed source exposure device, control unit, source guide tubes and survey instrument the 190 feet from the Permanent Sealed Source Storage Area into the Shielded Radiographic Facility; Radiographic Area.

PRECAUTIONARY MEASURE

PM-1 HAND TRANSPORTING OF THE SEALED SOURCE EXPOSURE DEVICE FROM THE PERMANENT SEALED SOURCE STORAGE AREA INTO THE SHIELDED RADIOGRAPHIC FACILITY; RADIOGRAPHIC AREA MAY BE EFFECTED BY EMPLOYING A HAND TRUCK (TWO-WHEELED DOLLY) FOR IR 192 EXPOSURE DEVICES AND BY EMPLOYING A FORK LIFT - TRUCK FOR CO 60 EXPOSURE DEVICES. EXTREME CAUTION SHALL BE EXERCISED WHEN USING THE FORK LIFT - TRUCK FOR CO 60 EXPOSURE DEVICE TRANSPORTATION. ASSURE THAT THE EXPOSURE DEVICE LIFTING SLINGS ARE AFFIXED TO THE FORK LIFT - TRUCK IN SUCH A MANNER THAT THE EXPOSURE DEVICE CANNOT FALL.

S-12e Security Control - Restricted Area

- e1 Close and padlock the Restricted Area Access Gate - Personnel/ Equipment.
- e2 Document Section A, "Equipment", of the Radiation Survey Report and Utilized Log - Radiographic Facility, Form RSR-2, Page No. 18.
- e3 With the sealed source exposure device remaining unassembled and locked, visually survey the entire inside area of the Shielded Radiographic Facility and the entire Restricted Area fenced Perimeter to assure that there are no personnel present and that all Caution posting is present and legible.

PRECAUTIONARY MEASURE

PM-2 THE RESTRICTED AREA ACCESS GATE - PERSONNEL/EQUIPMENT SHALL REMAIN LOCKED AT ALL TIMES DURING RADIOGRAPHIC OPERATIONS, AND ONLY THOSE

CAPITAL X-RAY SERVICES' PERSONNEL MONITORED INDIVIDUALS SHALL BE ALLOWED TO GAIN ENTRY.

S-12f Radiography Work Positioning

- f1 Position the items to be radiographed inside the Radiographic Area - High Radiation Area such that the sealed source will be positioned as close as possible to the center of the Radiographic Area.

S-12g Radiation Collimation/Shielding Devices

- g1 Select a Directional Beam Collimator for all single item radiographic exposures where the collimator can possibly be employed. (Basic O & E Procedures Section 2.4 - Figure CO-1)

- g2 Select a 360⁰ (Panoramic) Collimator for all multiple item (Panoramic) radiographic exposures.
(Basic O & E Procedures Section 2.4 - Figure CO-1)

g3 UNCOLLIMATED EXPOSURES

- g3a UNCOLLIMATED EXPOSURES; IR 192 OR CO 60 SHALL BE EFFECTED ONLY:

g3a1 When the configuration of the part to be radiographed does not allow the use of a collimator; therefore the sealed source guide tube stop end must be positioned against one face of the item for a double wall type exposure.

g3a2 When the sealed source guide tube stop end must be positioned inside the item for a single wall type exposure.

FORM 313RS-12h Sealed Source Exposure Device Use

- h1 With the survey instrument switched to a low sensitivity scale and readily visible, assemble the sealed source exposure device, control unit and source guide tube(s), attaching the collimator, if employed, to the last section of the guide tube. (Basic O & E Procedures Section 2.8)
- h2 Position the collimator or the source guide tube stop end at the necessary radiographic position.
- h3 Position the control unit within the Control Unit Area located behind the High Radiation Area Entrance Line.
- h4 Unlock the exposure device and with the survey instrument remaining switched to a low sensitivity scale and placed at a visible location inside the Control Unit Area, expose the sealed source at the radiographic position. THIS EXPOSURE IS THE PHYSICAL RADIATION SURVEYS; CAUTION LIGHTING AND AUDIBLE ALARM SYSTEMS - TEST EXPOSURE.
- h5 With the survey instrument in hand and switched to a low sensitivity scale, perform physical radiation surveys of the entire Restricted Area perimeter fencing and inside the Radiographers/Assistants Tool Building.
- h6 Document the physical radiation survey results within the appropriate segments of Section B, "Physical Radiation Surveys" of the "Radiation Survey Report and Utilized Log - Radiographic Facility", Form RSR-2.

EMERGENCY PROCEDURES

- EP-1A IF, DURING THE PERFORMANCE OF THE PHYSICAL RADIATION SURVEYS OF THE RESTRICTED AREA PERIMETER FENCING, RADIATION LEVELS IN EXCESS OF 2 MR/HR ARE MEASURED, IMMEDIATELY RETRACT THE SEALED SOURCE; PERFORM A PHYSICAL RADIATION SURVEY OF THE ENTIRE CIRCUMFERENCE OF THE EXPOSURE DEVICE, THE SOURCE GUIDE TUBE(S) AND THE COLLIMATOR, IF EMPLOYED, TO ASSURE THAT THE SEALED SOURCE IS IN THE FULLY SHIELDED POSITION, AND LOCK THE EXPOSURE DEVICE.
- EP-1B REPOSITION THE ITEM(S) TO BE RADIOGRAPHED, THE COLLIMATOR OR THE SOURCE GUIDE TUBE STOP END; UNLOCK THE EXPOSURE DEVICE; EXPOSE THE SEALED SOURCE; PERFORM PHYSICAL RADIATION SURVEYS OF THE RESTRICTED AREA PERIMETER FENCING TO ASSURE THAT THERE ARE NO RADIATION LEVELS IN EXCESS OF 2 MR/HR.
- S-12i Caution Lighting and Audible Alarm System - Functional Testing
- i1 With the sealed source remaining in the exposed position during this TESTING EXPOSURE, visually observe for proper functioning - "on" - the THREE red caution lights located inside the High Radiation Area Access - Personnel/Equipment.
 - i2 From the control unit area, visually observe the convex mirror that is attached to the West facing wall of the High Radiation Area Access - Personnel/Equipment. From this position, the proper functioning - "on" - of the ONE red caution light inside the Radiographic Area - High Radiation Area shall be determined by the mirrored reflection.

- i3 With the sealed source remaining exposed, employ the 2" x 2" x 48" ALARM TEST ROD to broach the audible alarm photoelectric control transmitter "beams" to assure that the audible alarm bell sounds.
- i4 Retract the sealed source; lock the control unit drive cable/source assembly lock; perform a physical radiation survey of the entire circumference of the exposure device, the source guide tube(s) and the collimator, if employed, to assure the sealed source is in the fully shielded position.
- i5 Document the testing results within the appropriate segments of Section C, "Caution Lighting and Audible Alarm" of the "Radiation Survey Report and Utilized Log - Radiographic Facility", Form RSR-2.
- i6 The Radiation Safety Officer, The Assistant Radiation Safety Officer, The Radiographic Equipment Manager or the Radiographic Shift Supervisor shall be notified as immediate as possible of the malfunctioning of any of the red caution lights or the audible alarm system, such that repairs may be effected.

PRECAUTIONARY MEASURE

- PM-3 REPAIRS TO THE RED CAUTION LIGHTS OR THE AUDIBLE ALARM SYSTEM SHALL BE PERFORMED ONLY BY THE RADIATION SAFETY OFFICER, THE ASSISTANT RADIATION SAFETY OFFICER, THE RADIOGRAPHIC EQUIPMENT MANAGER OR THE RADIOGRAPHIC SHIFT SUPERVISOR.

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S-12j Control of Access to High Radiation Area

- j1 The Restricted Area Access Gate - Personnel/Equipment shall remain closed and locked at all times during operations involving the exposure of a sealed source within the Shielded Radiographic Facility.
- j2 CONSTANT VISUAL SURVEILLANCE OF THE HIGH RADIATION AREA ACCESS- PERSONNEL/EQUIPMENT SHALL BE MAINTAINED:
- j2a At all times during radiographic operations when the audible alarm system is malfunctioning, AND
- j2b At all times during radiographic operations when two of the three red caution lights mounted inside the High Radiation Area Access - Personnel/Equipment are malfunctioning, AND
- j2c At all times during those radiographic exposures having a time interval of 30 minutes or less.
- j3 INTERMITTENT VISUAL SURVEILLANCE OF THE HIGH RADIATION AREA ACCESS - PERSONNEL/EQUIPMENT shall be defined as "that visual observation of the High Radiation Area Access - Personnel/Equipment that shall be performed at least once every 15 minutes.
- j3a INTERMITTENT VISUAL SURVEILLANCE OF THE HIGH RADIATION AREA ACCESS - PERSONNEL/EQUIPMENT MAY BE MAINTAINED ONLY:
- j3a1 During those radiographic operations when the audible alarm system has been tested and is functioning properly and when at least two of

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the three red caution lights mounted inside the High Radiation Area Access - Personnel/Equipment are functioning properly, AND

j3a2 During those radiographic exposures have a time interval in excess of 30 minutes.

j4 Constant Visual Surveillance and Intermittent Visual Surveillance of the High Radiation Area Access - Personnel/Equipment shall be performed by the Radiographer or Assistant Radiographer. If the Assistant is the individual performing the surveillance, THE RADIOGRAPHER SHALL NOT UNDER ANY CIRCUMSTANCES DEPART FROM THE IMMEDIATE VICINITY INSIDE CAPITAL X-RAY SERVICES' FENCED PROPERTY. The Radiographer shall, at least once every 15 minutes perform a physical "check" of the Assistant to assure that surveillance of the High Radiation Area Access - Personnel/Equipment is being maintained.

j5 Constant Visual Surveillance, Intermittent Visual Surveillance and Radiation Levels Monitoring of the High Radiation Area Access - Personnel/Equipment shall be performed from either:

j5a Inside the Restricted Area, in the immediate vicinity of the closed and locked Restricted Area Access Gate, BUT ONLY FROM A SURVEILLANCE POSITION WHERE THE MEASURED RADIATION LEVEL IS LESS THAN 1.5 MR/HR.

j5b The 24" X 78" glass door of the Radiographers/Assistants Tool Building, located inside the Restricted Area, BUT ONLY IF THE MEASURED RADIATION LEVEL INSIDE THE TOOL BUILDING IS LESS THAN 1.5 MR/HR.

j5c Outside the closed and locked Restricted Area Access Gate,
BUT ONLY FROM THE IMMEDIATE AREA AFFORDING A FULL VIEW OF THE
HIGH RADIATION AREA ACCESS - PERSONNEL/EQUIPMENT.

EMERGENCY PROCEDURE

EP-2 IF AT ANY TIME DURING RADIOGRAPHIC OPERATIONS, THE AUDIBLE ALARM
BELL SOUNDS:

- 2A IMMEDIATELY RETRACT THE SEALED SOURCE, PERFORM A PHYSICAL RADIATION SURVEY OF THE ENTIRE CIRCUMFERENCE OF THE EXPOSURE DEVICE, THE SOURCE GUIDE TUBE(S) AND THE COLLIMATOR, IF EMPLOYED, AND LOCK THE EXPOSURE DEVICE.
- 2B IMMEDIATELY DETERMINE IF AN INDIVIDUAL HAS GAINED ACCESS INTO THE HIGH RADIATION AREA.
- 2C IF AN INDIVIDUAL HAS GAINED ACCESS INTO THE HIGH RADIATION AREA, THAT INDIVIDUAL SHALL BE IMMEDIATELY INFORMED AS TO THEIR ENTRANCE INTO A HIGH RADIATION AREA AND THE RADIATION SAFETY OFFICER, ASSISTANT RADIATION SAFETY OFFICER, RADIOGRAPHIC EQUIPMENT MANAGER OR THE RADIOGRAPHIC SHIFT SUPERVISOR SHALL BE IMMEDIATELY NOTIFIED. THE INDIVIDUAL WHO ENTERED THE HIGH RADIATION AREA SHALL NOT BE ALLOWED TO DEPART FROM THE PREMISES.
- 2D UNDER NO CIRCUMSTANCES SHALL RADIOGRAPHIC OPERATIONS BE RESUMED UNTIL THE RADIATION SAFETY OFFICER OR ASSISTANT RADIATION SAFETY OFFICER HAS COMPLETED THE NECESSARY NOTIFICATIONS AND INVESTIGATIONS OF THE INDIVIDUAL'S ENTRANCE INTO THE HIGH RADIATION AREA. (BASIC O & E PROCEDURES, SECTION 2.7)
- 2E IF AN INDIVIDUAL HAS NOT GAINED ENTRANCE INTO THE HIGH RADIATION AREA, BUT THE ALARM BELL HAS SOUNDED DUE TO A MALFUNCTION OF THE AUDIBLE ALARM SYSTEM, RADIOGRAPHIC OPERATIONS MAY RESUME FOLLOWING THE TESTING OF THE ALARM SYSTEM. THE RADIATION SAFETY OFFICER,

THE ASSISTANT RADIATION SAFETY OFFICER, THE RADIOGRAPHIC EQUIPMENT MANAGER OR THE RADIOGRAPHIC SHIFT SUPERVISOR SHALL BE NOTIFIED AS IMMEDIATE AS POSSIBLE OF THE MALFUNCTIONING ALARM SYSTEM SUCH THAT REPAIRS MAY BE EFFECTED.

EP-3 IF AT ANY TIME WHILE CHANGING FILM OR SETTING UP ITEMS TO BE RADIOGRAPHED, THE RED CAUTION LIGHT WITHIN THE RADIOGRAPHY/HIGH RADIATION AREA COMES "ON":

- 3A IMMEDIATELY VACATE THE RADIOGRAPHY/HIGH RADIATION AREA AND IMMEDIATELY VISUALLY READ DOSIMETERS FOR POSSIBLE ACCRUED DOSAGE.
- 3B IMMEDIATELY DETERMINE BY PHYSICAL RETRACTION AND THE PERFORMANCE OF A PHYSICAL RADIATION SURVEY WHETHER THE SEALED SOURCE IS WITHIN ITS FULLY SHIELDED POSITION OR A MALFUNCTION OF THE RED CAUTION LIGHT HAS OCCURRED.

S-12k Radiographic Operations

- k1 The necessary radiographic exposures shall be performed with the Radiographer directly supervising the Assistant Radiographer.
- k2 Each individual shall frequently (every 15 minutes) visually read their direct reading dosimeter for personal accrued dosage.
(Basic O & E Procedures Section 2.1)
- k3 IMMEDIATELY FOLLOWING EACH EXPOSURE AND PHYSICAL RETRACTION OF THE SEALED SOURCE:
 - k3a Lock the Control Unit Drive Cable/Source Assembly Lock.

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- k3b With the survey instrument switched to a low sensitivity scale, perform a physical radiation survey of the entire circumference of the exposure device, the guide tube(s) and the collimator, if employed, to assure that the sealed source has been fully retracted into the fully shielded position. (Basic O & E Procedures Section 2.8)
- k4 Immediately following the last radiographic exposure and performance of the physical radiation survey of the exposure device, guide tube(s) and collimator, if employed, disassemble the exposure device, control unit, and source guide tube(s) and lock the exposure device and remove the key.
- k5 Document Section E, "Physical Radiation Survey; Exposure Device Prior to Securing" of the "Radiation Survey Report and Utilized Log, Shielded Radiographic Facility", Form RSR-2.
- k6 Document Section D, "Radiographic Exposures; Types, Times & Numbers" of the "Radiation Survey Report and Utilized Log, Shielded Radiographic Facility".
- k7 Document Section F, "Surveillance Method - High Radiation Area Access" of the "Radiation Survey Report and Utilized Log, Shielded Radiographic Facility".
- k8 Visually read accrued dosage from direct reading dosimeter(s) and document Section G, "Personnel; Dosimetry", affixing signature(s) to the "Radiation Survey Report and Utilized Log, Shielded Radiographic Facility".

S-121 Temporary Storage - Sealed Source Exposure Device

11 Radiographer - Assistant Radiographer Information

- 11a A Temporary Storage Location for Sealed Source Exposure Devices is provided within the Radiographic - High Radiation Area.
- 11b A 2" diameter X 7/16" thick steel eye bolt is attached to the 6' long west facing wall. The steel eye bolt is equipped with a chain and padlock for the physical securing of the Sealed Source Exposure Device at this area.
- 11c One (1) 8-1/2" X 11-1/2" "Caution (Radiation Symbol) Radioactive Material" placard is permanently attached to the west facing wall above the steel eye bolt.

12 TEMPORARY STORAGE PROCEDURES

- 12a Temporary Storage of a Sealed Source Exposure Device shall be effected only with the exposure device in a radiation surveyed, unassembled, safety plug installed, locked, key removed condition and only during those times when the Radiographer and Assistant are within the shop facility at radiographic film processing times, lunch breaks or restroom breaks.
- 12b The Sealed Source Exposure Device shall be physically secured at the Temporary Storage Location with the chain and locked padlock attached to the exposure device and the steel eye bolt.
- 12c Temporary storage times shall not exceed 1-1/2 hours total per 8 hour work shift, and never overnight.

12d The Restricted Area Access Gate - Personnel Equipment shall be closed and locked at all times when a sealed source exposure device is being temporarily stored within the Shielded Radiographic Facility.

PRECAUTIONARY MEASURE

PM-4 WHEN A SEALED SOURCE EXPOSURE DEVICE IS TEMPORARILY STORED WITHIN THE RADIOGRAPHIC - HIGH RADIATION AREA, THE RADIOGRAPHER SHALL NEVER, UNDER ANY CIRCUMSTANCES, DEPART THE IMMEDIATE VICINITY OF CAPITAL X-RAY SERVICES' FENCED PROPERTY.

S-12m Permanent Storage - Exposure Device, Control Unit & Source Guide Tube(s)

- m1 Immediately following the completion of the radiographic operation and complete documentation of the Radiation Survey Report and Utilized Log, Shielded Radiographic Facility, Form RSR-2, hand transport the sealed source exposure device, control unit, and source guide tube(s) the 190 feet from the Shielded Radiographic Facility to the Permanent Sealed Source Storage Facility within the shop building and securely chain and padlock the sealed source exposure device at the appropriate storage location.
- m2 Padlock the gate of the Permanent Sealed Source Storage Facility.
- m3 With the survey instrument switched to a low sensitivity scale, perform a physical radiation survey of the entire perimeter of the Permanent Sealed Source Storage Area to assure that there are no radiation levels in excess of 2.0 Mr/Hr.

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- m4 Complete the documentation of the Exposure Device Equipment Check List and Utilized Log, Form EDUL-1 as to equipment "Time In" and affix signature.

S-12n Accrued Individual Dosage

- n1 Each Radiographer and Assistant Radiographer shall visually read accrued dosage from direct reading dosimeters and shall individually document the posted "Daily Dosimeter Dosage Chart" Form DDC-1. (Basic O & E Procedures Section 2.1)

S-12o Maintenance, Repair & Audible Alarms Testing - Shielded Radiographic Facility

- o1 The maintenance or repair of any item within the Restricted Area perimeter of the Shielded Radiographic Facility and the quarterly radiation response testing of the audible alarm system and the red caution lighting shall be performed only by, or under the immediate direct supervision of:
- o1a The Radiation Safety Officer
 - o1b The Assistant Radiation Safety Officer
 - o1c The Radiographic Equipment Manager
- o2 The maintenance or repair of the red caution lights or the audible alarm system shall not be performed during radiographic operations.

S-12p Documents Posting

- p1 A Form NRC-3 shall be and remain posted within the Radiographers/ Assistants Tool Building and the High Radiation Area Access - Personnel and Equipment.

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p2 A copy of Capital X-Ray Services' Basic Operating, Caution and Emergency Procedures and a copy of these Operating, Caution and Emergency Procedures - Shielded Radiographic Facility - Supplement shall be posted within the Radiographers/Assistants Tool Building and shall remain readily available for reference at all times.

S-12q Emergency Notificationsq1 RADIATION SAFETY OFFICER

G. W. Johnson
2407 W. Newton Ct.
Tulsa, Oklahoma 74127
(918) 584-4954

ASSISTANT RADIATION SAFETY OFFICER

W. F. Conway
3931 E. 37th Pl.
Tulsa, Oklahoma 74135
(918) 743-6098

RADIOGRAPHIC EQUIPMENT MANAGER

D. R. Cooper
3434 S. 71st W. Ave.
Tulsa, Oklahoma 74107
(918) 446-5705

RADIOGRAPHIC SHIFT SUPERVISOR

M. L. Rake
Rt. 1, Box 257
Bristow, Oklahoma 74010
(918) 367-6923

RADIOGRAPHIC SHIFT SUPERVISOR

Wayne F. Conway
1008-C S. 107th E. Ave.
Tulsa, Oklahoma 74128
(918) 437-3668

q2 Incidents or Conditions that require the immediate termination of radiographic operations and the immediate notification by the Radiographer or Assistant:

q2a Dosimeter - "Offscale"

q2b Individual's entrance into the High Radiation Area

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- q2c Theft, loss or damage to the sealed source exposure device.
- q2d Non-retractable - "jammed" sealed source .
- q2e Fire or wind damage to the Shielded Radiographic Facility.

NOTE: The Radiographer or Assistant Radiographer shall not limit immediate notifications to the above listed incidents or conditions. Immediate notification shall be made to one of the individuals listed in Paragraph S-12q - q1, Page 16, or the USNRC Regional Officer (Form NRC -3) for any reason that may interfere with radiographic operations being performed safely within the Shielded Radiographic Facility.

S-12r Shielded Radiographic Facility Diagrams

- r1 Figure No. 1 - Permanent Radiographic Facility; Office & Shop
Page No. 19 Facility; Property Lines; Security Fencing
- r2 Figure No. 2 - Restricted Area Perimeter Fencing and Caution
Page No. 20 Posting
- r3 Figure No. 3 - Caution Lighting, Audible Alarms and Caution
Page No. 21 Posting

MANUF./CONTR. _____ TIME: (IN) _____ (OUT) _____ DATE _____

A. EQUIPMENT: SURVEY INSTRUMENT - MODEL NO. _____ SERIAL NUMBER _____
SEALED SOURCE - TYPE _____ S/N _____ CURIE STRENGTH _____
EXPOSURE DEVICE - MODEL NO. _____ SERIAL NUMBER _____

B. PHYSICAL RADIATION SURVEYS; SEALED SOURCE EXPOSED AT RT POSITION; HIGHEST MR/HR LEVELS AT RESTRICTED AREA PERIMETER FENCING, 5 SEGMENTS & HIGHEST MR/HR LEVEL INSIDE TOOL BUILDING.

NOTE: MARK "X" AT SEALED SOURCE RT POSITION

C. CAUTION LIGHTING AND AUDIBLE ALARM

1. CAUTION LIGHTS (4 - RED) - HIGH RADIATION AREA (3);

RADIOGRAPHY AREA (1) - MIRROR

OPERATIONAL _____ NON-OPERATIONAL _____

2. AUDIBLE ALARM; BEAMS BROACHED WITH ROD

OPERATIONAL _____ NON OPERATIONAL _____

3. SEALED SOURCE RETRACTED; CAUTION LIGHTS &

AUDIBLE ALARM; OFF _____ REMAINS ON _____

D. RADIOGRAPHIC EXPOSURES

TYPES

COLLIMATED

NON-COLLIMATED

Vertical _____

Internal _____

Horizontal _____

(FE Shielding _____)

Panoramic _____

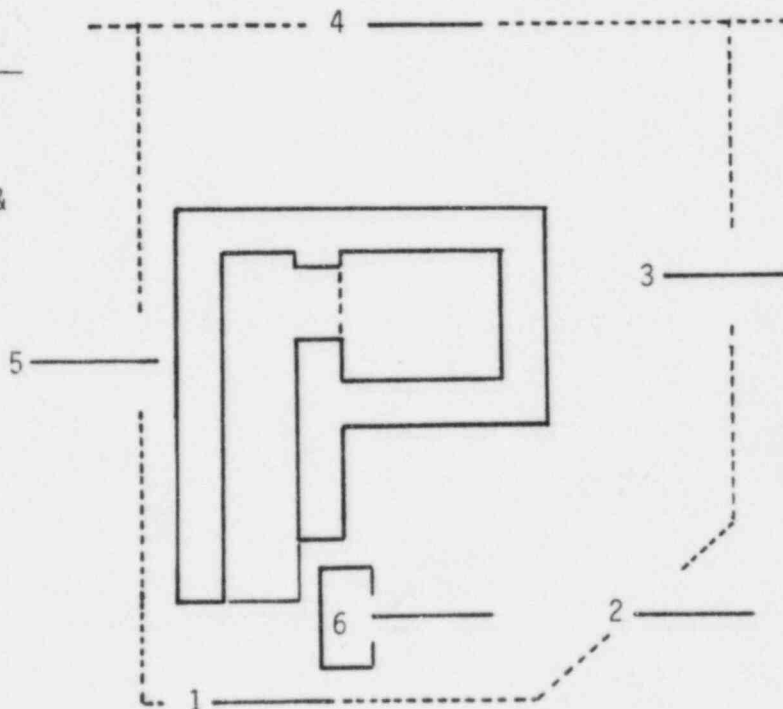
External _____

EXPOSURE(S) NUMBER & TIME

Total Exposures _____

Avg. Exp. Time _____

Total Exp. Time _____



E. PHYSICAL RADIATION SURVEY; EXPOSURE DEVICE, FOLLOWING LAST EXPOSURE & PRIOR TO STORAGE; MR/HR

Exterior Surface (Co 60) _____ 6" From Exterior Surface (Ir 192) _____

F. SURVEILLANCE OF HIGH RADIATION AREA ACCESS; CONSTANT _____ INTERMITTENT _____

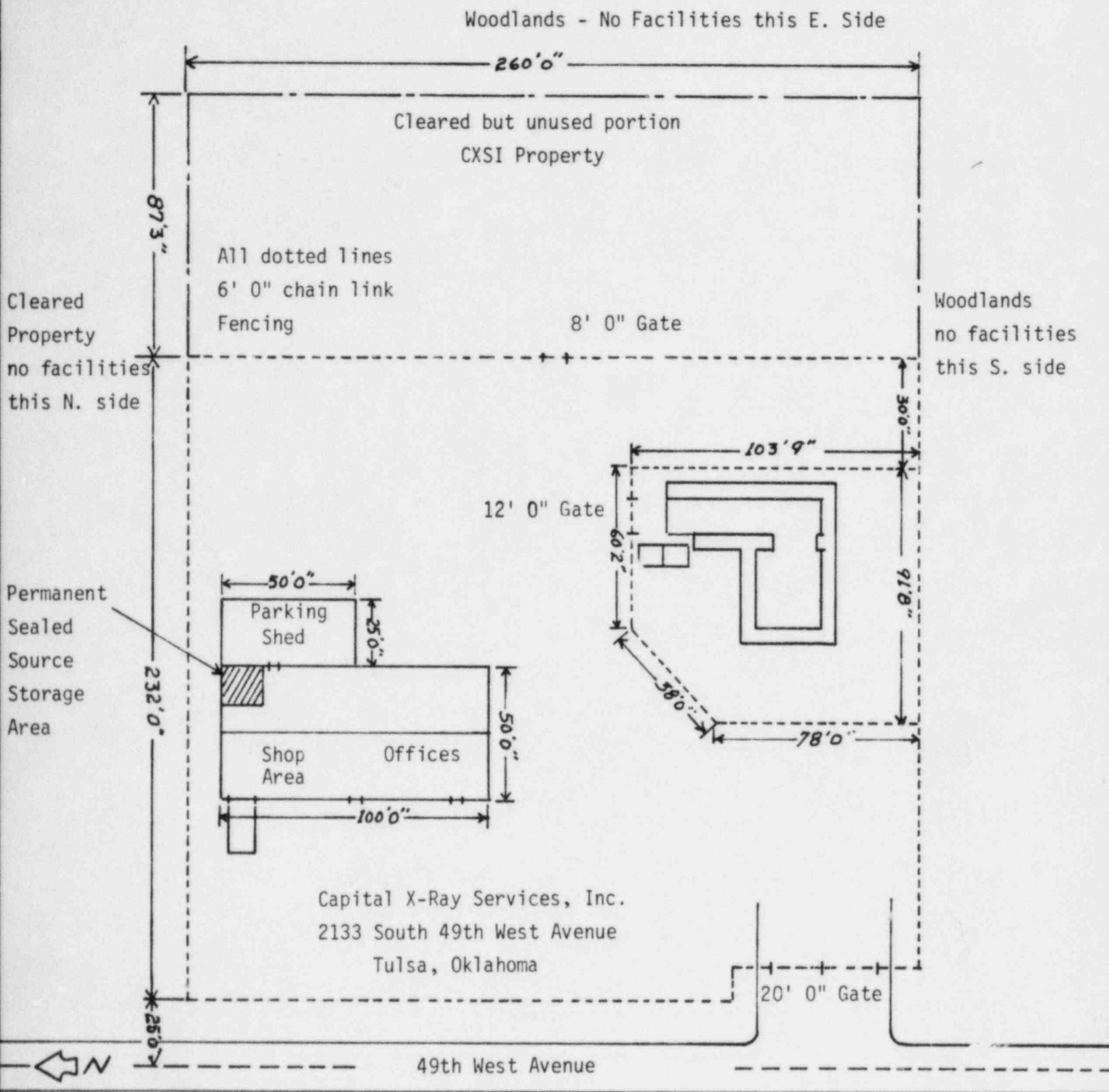
REMARKS _____

G. PERSONNEL:

RADIOGRAPHER _____ DOS. S/N _____ JOB DOSAGE _____ F.B.# _____

ASST. RADIOGRAPHER _____ DOS. S/N _____ JOB DOSAGE _____ F.B.# _____

ASST. RADIOGRAPHER _____ DOS. S/N _____ JOB DOSAGE _____ F.B.# _____

SHIELDED RADIOGRAPHIC FACILITY; OFFICE & SHOP FACILITY; PROPERTY LINES; SECURITY FENCING

Two Residences and One Commercial Facility
this W. side. 100' 0" Set Back from Center
Line 49th West Avenue. Single Story
Facilities.

D

RESTRICTED AREA PERIMETER; FENCING; CAUTION POSTING

A. RESTRICTED AREA Perimeter Fencing - 6' 0" Steel Chain Link

B. 6' 0" x 12' 0" Rolling Gate with Padlock

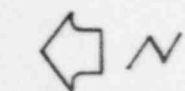
C. Property Fencing - Steel 6' 0" Chain Link

D. 6'0"x8'0" Property Fence Gate with Padlock

E. Eighteen (18) Caution (Radiation Symbol) Radiation Area Placards - Magenta and Yellow - 8½" x 11½"

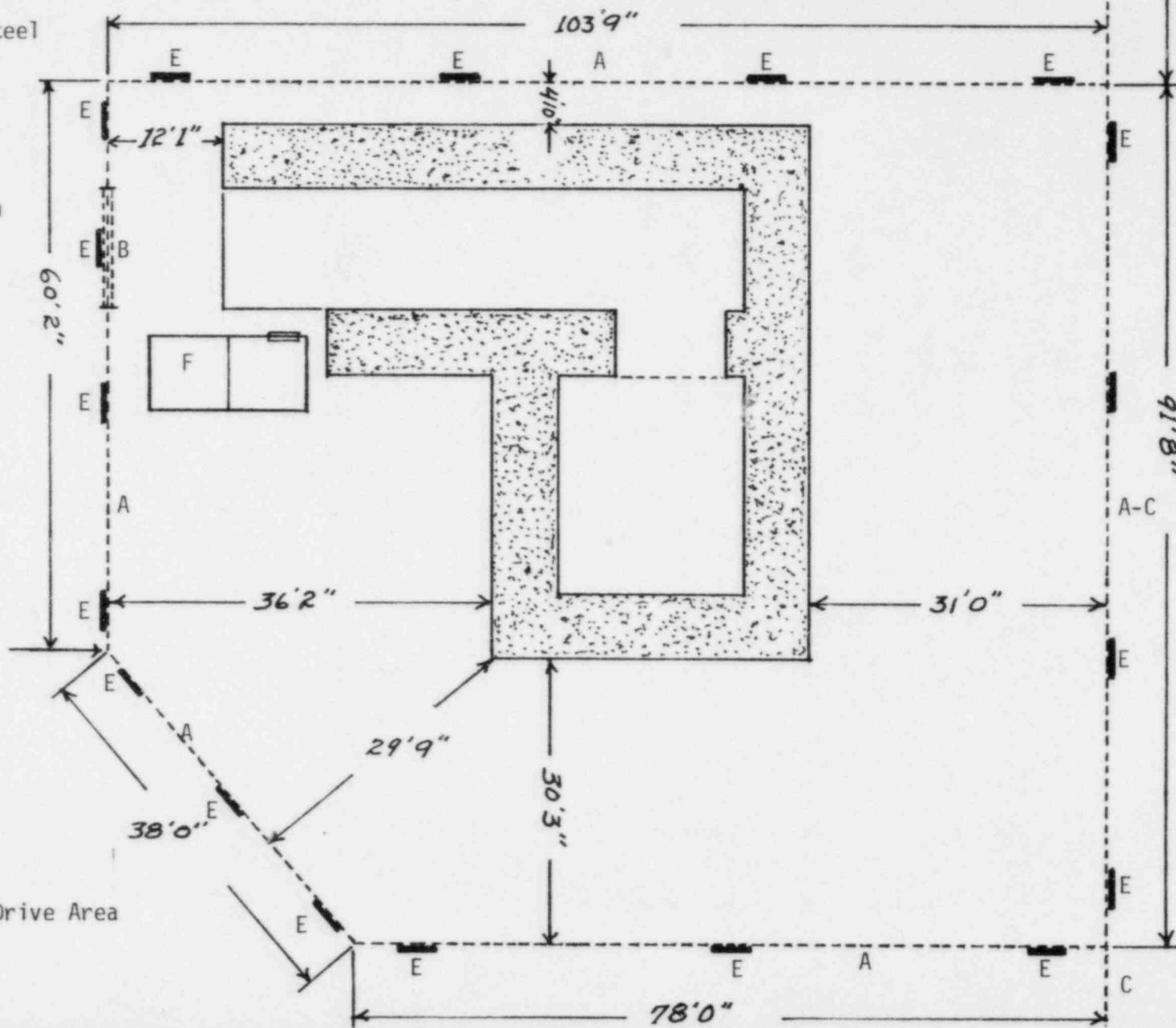
F. Radiographer/Assist. Tool Shed - 8'x16' With 24"x78" Full View Glass Door

Graveled Yard Area



S/E Corner Office & Shop Facility

Graveled Drive Area



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