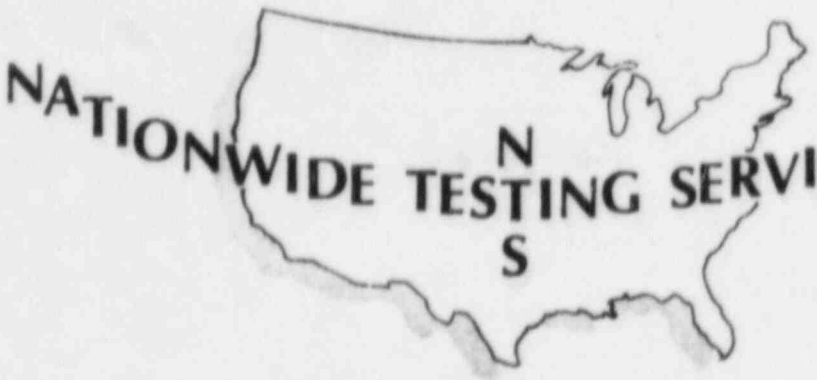
030-18642
N 12-24461-01
See Sec. 2



"The Diamond in Independent Testing"

"The Diamond in Independent Testing"

STATEMENTS AND CONCERNS

To the Commission:

In observing large companies of testing firms in the recent years it has come to be my opinion these firms and corporations have good and sound radiation programs, but has a tendency to veer or leave their programs and rules that governs radiation safety for the sake of production. This concerns me. This puts a heavy load on the technician and makes it very difficult for the technician to maintain the safety element which is required.

After discussions with many people and contractors about the above concern they said that I should do something about it. It was said that I should have my own operation and programs and that is how Nationwide Testing Services was formed.

Incomplete parts concerning Nationwide Testing Services shall be marked not applicable at this time, but has been added to the Radiation Safety and Control Program for consideration by the NRC Commission.

Sincerely,

Charlie Marcantel

Charlie Marcantel
President
Nationwide Testing Services

NTS NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

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RESUMES	SECTION 3
PERSONNEL MONITORING (Film badges/TLD & Dosimeters)	SECTION 4
SURVEY METERS	SECTION 5
LEAK TEST KIT, ANALYSIS VENDOR LIST & SURVEY INSTRUMENT CALIBRATION SERVICE VENDORS	SECTION 6
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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

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EMERGENCY PROCEDURES FOR FIELD RADIOGRAPHY USING X-RAY EQUIPMENT	SECTION 8

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

CORPORATE STRUCTURE

Not Pertaining to Radiation Safety Program

A.0 INTRODUCTION

A.1 NATIONWIDE TESTING SERVICES organization and structure, showing the responsibilities of officers and their designated duties.

A.2 ORGANIZATION AND PLANNING

1. PRESIDENT - The administrative executive officer has all responsibility for assuring that all tests, inspections, examinations, services and operations performed shall conform to contractual requirements.

2. VICE PRESIDENT - The administrative representative responsible to see that all in house or project complies with all safety requirements and reports directly to the President concerning all items.

3. QUALITY CONTROL MANAGER - A manager of Quality Control is appointed by the President for the purpose of administrating the requirements of Quality Control. The manager of Quality Control is responsible for the implementation and the surveillance of Quality Control requirements for the In House/or Projects. He/she reports directly to the President on matters relating to quality. He/she is also responsible for:

   1. development, approval, implementation and control of Test & Inspection Procedures and amendments.

   2. Directing and monitoring of personnel qualifications and certification (NDE)

   3. Providing assistance to the Radiation Safety Officer in auditing and inspection of In House/or Project.

   4. The establishment of a Quality Control Review Board.

4. OUTSIDE CONSULTANT AND ADVISOR - To advise or make changes in Federal Regulations concerning procedures, controlled documents, organization and other planning of corporative business and reports directly to the President for approval.

B.0 QUALITY CONTROL REVIEW BOARD

1. President
2. Vice President
3. Quality Control Manager
4. Outside Consultant and Advisor

B.1 The President has structured the quality organization such that its function is not to be influenced by operations or production.

C.0 QUALITY ASSURANCE PROGRAM

C.1 The purpose of Nationwide Testing Services program plan is devised to meet or exceed the quality requirements of our clients and all codes and specifications in which we work.

D.0 INDOCTRINATION

D.1 This plan is to be used as a short indoctrination to Nationwide Testing Services and its operations. A control copy shall be available for review at our location.

D.2 The following is organization and outline of our Quality Assurance Program.

1. The Quality Assurance Program shall be organized and developed to meet the requirements of Title 10, Code of Federal Regulations, Part 50, Appendix B (18 point criteria) in addition to other codes and specifications.

    1. Quality Assurance Program - Introduction
    2. Organization and Planning
    3. Design Control
    4. Procurement Document Control
    5. Procedures, Instructions
    6. Document Control
    7. Control of purchased material, equipment & services
    8. Control of Special Processes
    9. Controls
    10. Inspection
    11. Test Control
    12. Control of Measuring and Test Equipment
    13. Handling Storage and Shipping
    14. Control of Non-conforming parts
    15. Reporting of Defects and Non-compliance
    16. Reporting
    17. Documentation and Records
    18. Audits

E.0 DOCUMENT CONTROL

E.1 Control documents are issued for the purpose of formally transmitting general information, quality documents and updating information to Nationwide Testing Services personnel.

1. The need to develop, revise or amend a document may be identified by any employee of Nationwide Testing Services. The need for a new document or change may be in response to:
    a) the request of a client
    b) a change in code or specification
    c) an inadequate document
    d) special contract requirements
    e) a change in corporate policy

E.2 It is required for all personnel receiving documents under control to maintain these documents. Return of all control documents are required upon termination.

F.0 PROCESS CONTROL

F.1 Process control is the method for which we control In House/ or Field Inspection Processes.

F.2 Form 20.64 (NDE) in house work order is the control document used to instruct personnel to perform inspections to client specifications. In the laboratory the in house work order shall contain client specifications, test and inspection procedures to be used. Acceptance criteria and any other information needed to perform the particular inspection.

F.3 Form 20.65 (NDE) field work order is the control document used to instruct personnel to perform inspections to client specifications in the field. The field work order shall contain all necessary information required in order to perform the inspection. The field work order is also a time and material record for our field clients. The field work order is to be completed by our personnel and submitted to our client for review and signature prior to departure.

F.4 The in house/ or field work orders are to be completed by supervisor or designate.

G.0 EQUIPMENT

G.1 All test equipment used shall be in good operating condition. All equipment shall be calibrated in accordance with client/ code specifications.

G.2 All inoperable equipment or equipment out of calibration shall be quarantined. Supervisor shall be informed of such equipment

G.3 It is the responsibility of all personnel to keep equipment clean and in good working order.

H.0 MATERIALS

H.1 All materials used to perform tests shall meet the requirements of code or specification in which they are used.

H.2 All materials not conforming to specifications shall be quarantined.

I.0 TEST & INSPECTION PROCEDURES

I.1 All tests and inspections performed shall be done in conjunction with Nationwide Testing Services Test & Inspection Procedures. A controlled copy of all current procedures are available and shall be used as directed by in house/or field work orders.

I.2 The following index system that shall be used for all Nationwide Testing Services (T.I.P.S.)

Number	Method
R.1	Radiography
M.1	Magnetic Particle
U.1	Ultrasonic
P.1	Penetrant
V.1	Visual
S.N.1	Special NDE Procedures
20	Radiation Safety
22	Administrative

Specification/Code	
a.	ASME
b.	AWS
c.	API
d.	RDT
e.	Military & Government
f.	ANSI
g.	Prime Client General
h.	ASTM
i.	Radiation Safety
s.	Security

Examples:

R1 - A	Radiography in accordance with ASME V
U1 - B	Ultrasonic weld & inspection in accordance with AWS D1.1

J.0 REPORTS

J.1 All tests and inspections shall be accompanied by a written report.

J.2 Only authorized reports shall be used.

J.3 Hand written reports shall be completed by use of Black pen only. If mistakes, such as crossouts, erasures or other forms are wrote, the individual signing the report shall initial these errors.

J.4 Omissions of information from areas on reports shall be designated as follows:

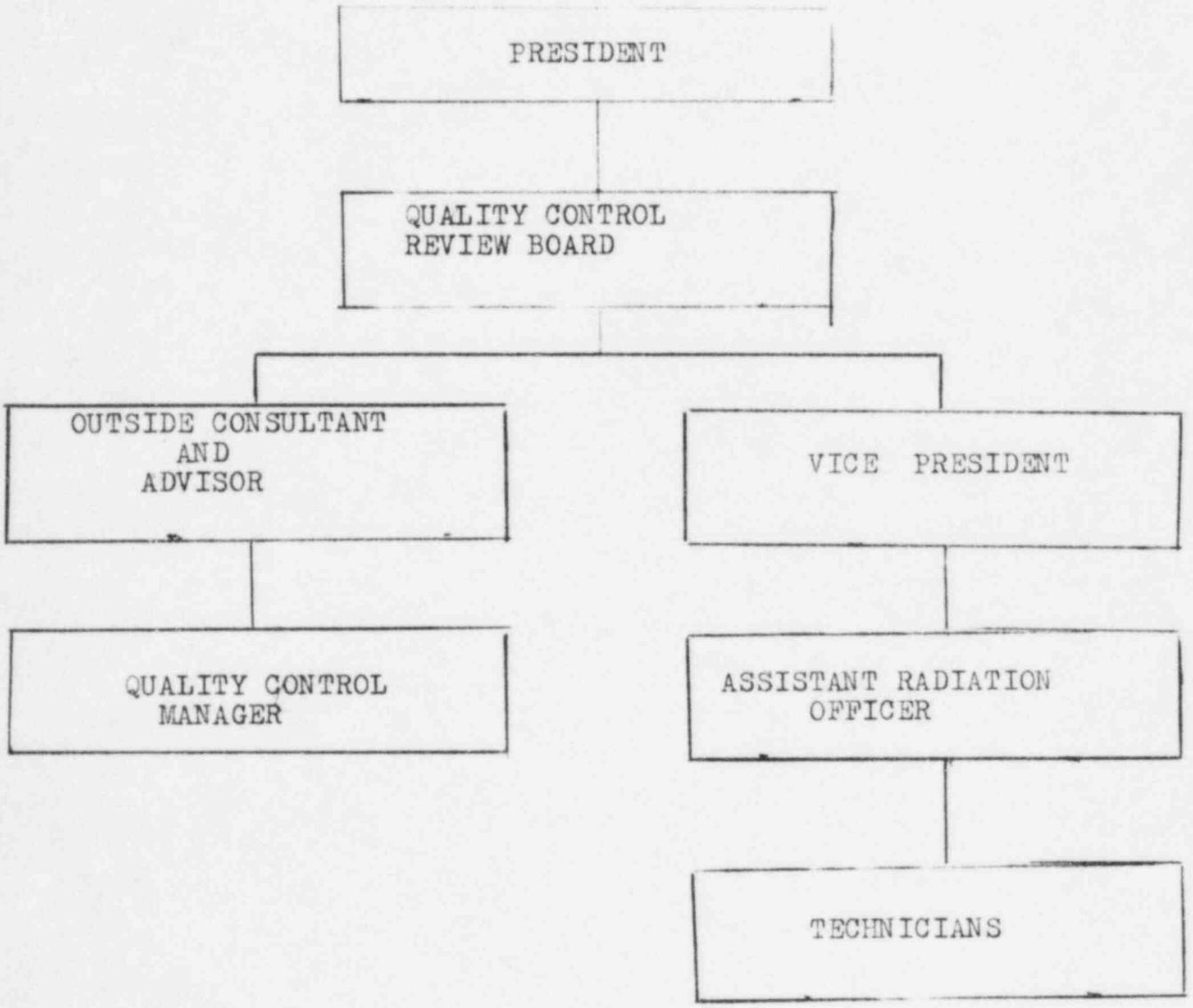
Information not supplied - N/S
Information not applicable - N/A
Crossouts - non - pertinent sections

J.5 All tests conducted shall have technique records included. Some reports do not have technique information areas. These reports shall be considered page 1 of 2 (minimum) and a technique form shall accompany these reports.

J.6 Level II or III personnel shall sign technique forms in the section designated (prepared by, the approved section) is for client or Level III approval only.

J.7 Accept and non accept sections of reports shall be signed by Level II or III personnel only.

J.8 Reports other than those named must have approval of a Level III.



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NATIONWIDE TESTING SERVICES, INC.

FROM: _____ DATE/TIME RECEIVED _____

_____ DATE DUE: _____

_____ VIA: _____

CLIENT PERSONNEL: _____ P.O. NO. _____

PHONE: _____ REF. NO. _____ JOB NO. _____

QUANTITY/COUNT THEIRS	QUANTITY/COUNT OURS	PART NUMBER	DESCRIPTION	ACCEPT	REJECT	PRICE PER PIECE	WEIGHT

METHOD: ☐ Magnetic ☐ Penetrant ☐ Ultrasonic ☐ Radiographic ☐ Gamma ☐ X-Ray ☐ Other _____

SPECIFICATION: _____ PROCEDURE: _____

OTHER INSTRUCTIONS: _____

QUANTITY CONFORMING _____

QUANTITY REJECTED _____

QUANTITY WITH INDICATIONS _____

REWORK: Grind _____ Reinspect _____

CHARGE: Time _____ Piece _____

Pieces Per Hour _____ Total Time _____

Film Used _____ Size _____ Cost _____

Other material used _____

REMARKS: _____

CONFORMING PARTS: ☐ Rubber Stamped ☐ Steel Stamped ☐ Dyed ☐ Other _____

REJECTED PARTS: ☐ Tagged ☐ Marked Other _____

EXAMINED BY: _____

PACKING SLIP	INVOICE NO.	INVOICE DATE	AMOUNT	

COMMENTS: (Show technique on other side)

FIELD WORK ORDER

N T S **NATIONWIDE TESTING SERVICES, INC.**

CLIENT _____

JOBSITE _____ BILLING: _____

REPORT TO: _____ ATTENTION OF: _____

PHONE: _____ PHONE: _____

WORK DESCRIPTION: _____ P.O. NO. _____

JOB NO. _____

DATE START _____

TIME START _____

METHOD _____

SPEC. _____

PROCEDURE _____

SPECIAL INSTRUCTIONS: _____

DATE	TECHNICIAN	ON-SITE WORK			TRAVEL		MATERIALS/EXPENSES
		RT	OT	SB	TIME	MILES	

REMARKS: _____

NATIONWIDE TESTING SERVICES, INC. For Client Approval

By: _____ Date: _____

SUBMITTED: ☐ FIELD REPORT ☐ TECHNIQUE RECORD ☐ TRANSMITTAL LETTER

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

22.1.0

PROGRAM OUTLINE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 This plan outlines the Radiation Safety and Control Program of Nationwide Testing Services. The methods described are based on the Nuclear Regulatory Commission Federal Regulations: 10CFR20, 10CFR21, 10CFR30 and 10CFR34 and radiography regulations of "Agreement States"

B.0 INTRODUCTION

B.1 Nationwide Testing Services, an independent non-destructive testing operation.

B.2 Hereinafter referred to as Nationwide Testing Services (NTS).

C.0 PROCEDURE

C.1 The Radiation Safety and Control Program describes the Radiation Safety Procedures. In this outline showing the basic methods and practices and organization used by Nationwide Testing Services to show control of the Radiation Safety effort.

C.1.1 Radiation Safety and Control Program show the systems of approach to:
1) Organizations
2) Qualifications
3) Operations
4) Training
5) Emergency
6) Documentation
7) Audits

C.1.2 All procedures covers a basic area of Radiation Safety and are identified by its title. The basic controlling document for Radiation Safety are as follows:
1) Operating and Emergency Procedures (20.1.0)
2) Source shipping/Receiving/Transfer/Disposal (20.1.1)
3) Operating and Emergency System of Control Procedure (20.1.2)
4) Maintenance (20.1.5)
5) Calibration of Survey Instruments (20.1.7)
6) Source Changing (20.1.6)
7) Leak Testing (20.1.8)
8) Qualification (20.1.3)
9) Training (20.1.4)
10) Audit (20.1.9)
11) Corrective Action (20.1.10)
12) Documentation Procedure (20.1.12)
13) Agreement States (20.1.13)
14) Forms (20.1.11)

C.2 ORGANIZATION

C.2.1 The organization of Radiation Safety in Nationwide Testing Services is in accordance with Figure 1 (see attached)

C.2.2 The responsibility for all parts of the Radiation Safety Program is vested with the President and shall be referred to as the Radiation Safety Officer.

C.2.3 A Safety Committee shall consist of the President, Vice President, and outside Consultant and Advisor. They shall plan and control the execution of the Safety Program. They shall meet any time at the President request.

C.2.4 The Assistant Radiation Safety Officer is responsible for all parts of the Radiation Safety Program in the absence of the Radiation Safety Officer and shall report directly to him. (not applicable at this time in training)

C.2.5 Any delegation of Radiation Safety responsibility will be after training, certification, examination, as directed by the President or Radiation Safety Officer.

C.2.6 Absence of the Radiation Safety Officer, responsibility for radiation emergencies shall advance to the Assistant Radiation Safety Officer. In his/her absence, the Vice President.

C.2.7 Radiographers shall be trained and certified Radiation Safety Representative for long term labor projects and report to the Radiation Safety Officer.

C.3 Nationwide Testing Services uses three basic controlled Procedures for its Radiation Safety Plan.

C.3.1 Radiation Safety Control Program:
Defines the system of control (20.1.2)

C.3.2 Operating and Emergency Procedures is the working controlled document for Radiographers and other personnel. (20.1.0)

C.3.3 Radiographer Training Program is the study materials for Radiographers. (20.1.4)

C.4 All revisions to the program plan or procedures shall be by letter designation and directed by the President and approved by the Safety Committee.

NTS NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY PROGRAM OUTLINE

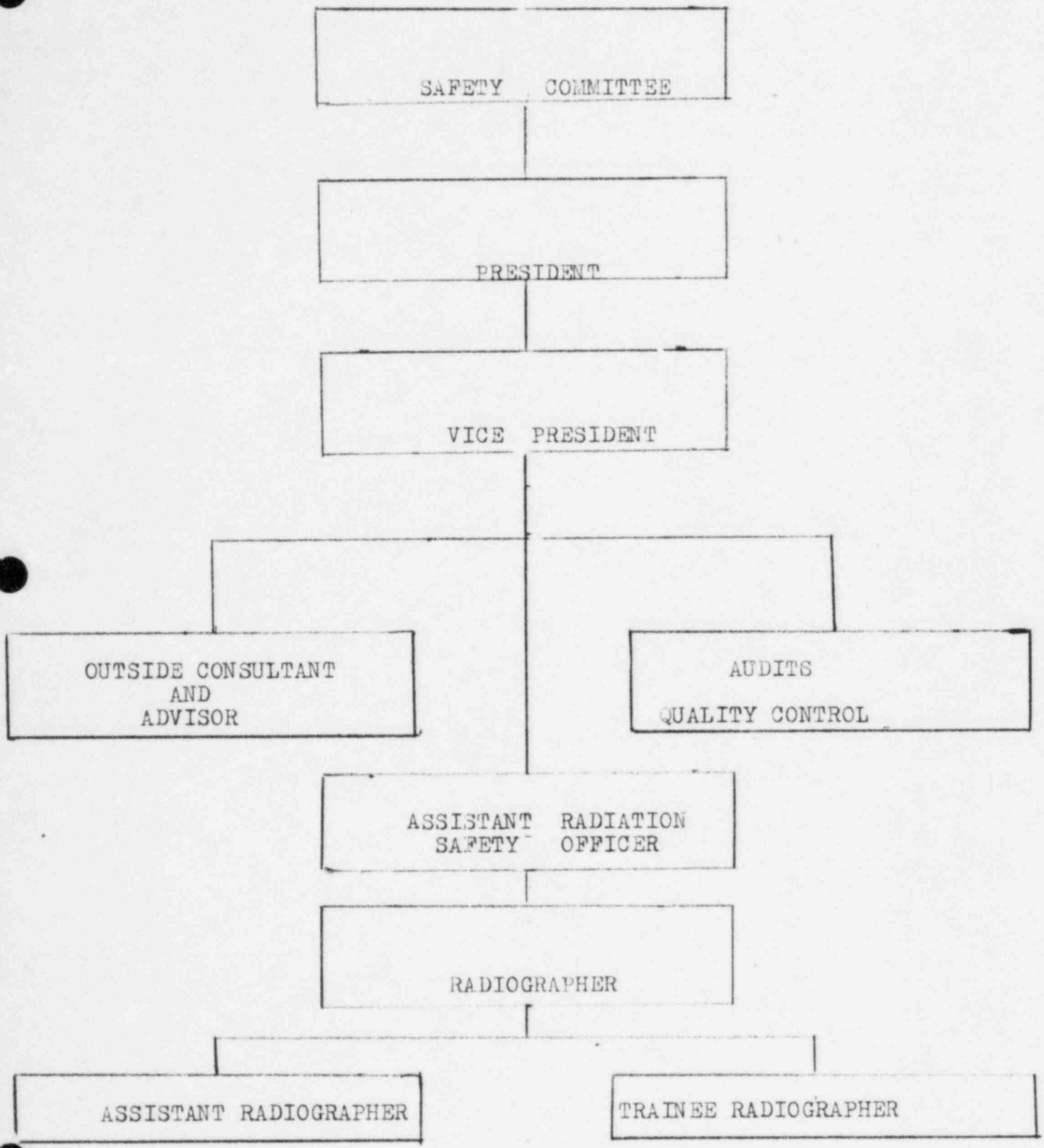


Figure 1

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

CHARLIE MARCANTEL (NATAINWide Testing Services, Inc.)
400 W. Touhy Ave #352
Des Plaines, IL. 60018

1(b) TELEPHONE NO.: Area Code (312) 299 5438

1(c) APPLICANT IS: An individual ☐ A partnership ☐ A Corporation ☒ An Unincorporated Association ☐ Other ☐ If applicant is other than an individual, the applicable section on the reverse side must be completed.

2. THIS IS AN APPLICATION FOR: *(Check appropriate item)*

A. ☒ NEW LICENSE
B. ☐ AMENDMENT TO LICENSE NO. _____
C. ☐ RENEWAL OF LICENSE NO. _____

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.)*

720 MORSE AVE.
SCHAUMBURG
ILL. 60193
(OTHER STATES, BUT UNKNOWN AT THIS TIME.)

4. SEALED SOURCES TO BE USED IN RADIOGRAPHY (Attach supplementary pages, if necessary)

BYPRODUCT MATERIAL *(Element and Mass No.)*	SOURCE MODEL NUMEER	NAME OF MANUFACTURER	MAXIMUM ACTIVITY PER SOURCE	NUMBER OF SOURCES
A. See ATTACHED Sheet	A. See ATTACHED Sheet	A. See ATTACHED Sheet	A. See ATTACHED Sheet	A. See ATTACHED Sheet
B.	B.	B.	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. See ATTACHED Sheet	A.
	B. See ATTACHED Sheet
	C.

5(b) RADIOGRAPHIC SOURCE CHANGERS (Attach supplementary pages, if necessary)

MODEL NUMBER	NAME OF MANUFACTURER *(Include description if custom made)*
A.	A.
B. See ATTACHED Sheet	B. See ATTACHED Sheet
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)	☒	☒	☐ on _____ (DATE)
(b) Description of radiation detection instruments to be used (Instruction 6-b)	☒	☒	☐ on _____ (DATE)
(c) Instrument calibration procedures (Instruction 6-c)	☐	☒	☐ on _____ (DATE)
(d) Personnel monitoring equipment (Instruction 6-d)	☐	☒	☐ on _____ (DATE)
(e) Operating and emergency procedures (Instruction 6-e)	☐	☒	☐ on _____ (DATE)
(f) Training program (Instruction 6-f)	☐	☒	☐ on _____ (DATE)
(g) Internal inspection system or other management control (Instruction 6-g)	☐	☒	☐ on _____ (DATE)
(h) Overall organizational structure (Instruction 6-h)	☐	☒	☐ on _____ (DATE)
(i) Leak testing procedures (Instruction 6-i)	☐	☒	☐ 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 $ 700.00

BY: Charlie Marcantel
(Signature)

CHARLIE MARCANTEL
(Type or print name of certifying official)

DATE February 14, 1985

PRESIDENT
(Title of certifying official)

RECEIVED FEB 20 1985 REGION III

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.

FORM NRC-313R (7-77)

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
1000	1000	NONE	TWO	NONE

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.

Charlie Marcantel
400 W. Touhy Ave # 382
Des Plaines, IL 60018

and

Barbara Marcantel
400 W. Touhy Ave # 382
Des Plaines, IL 60018

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

STATE OF ILLINOIS

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.

NTS NATIONWIDE TESTING SERVICES, INC.

ByProduct Material	Source Model Number	Name of Manufacturer	Maximum Activity Per Source	Number of Sources
Iridium 192	G-1 or G-3	Source Production and Equipment Co., Inc.	100 curies	
Iridium 192	32 or 33	Industrial Nuclear	100 curies	
Iridium 192	M-1-A, M-1-G M-1-T, A-2-A or A-1-A	Gamma Industries	100 curies	

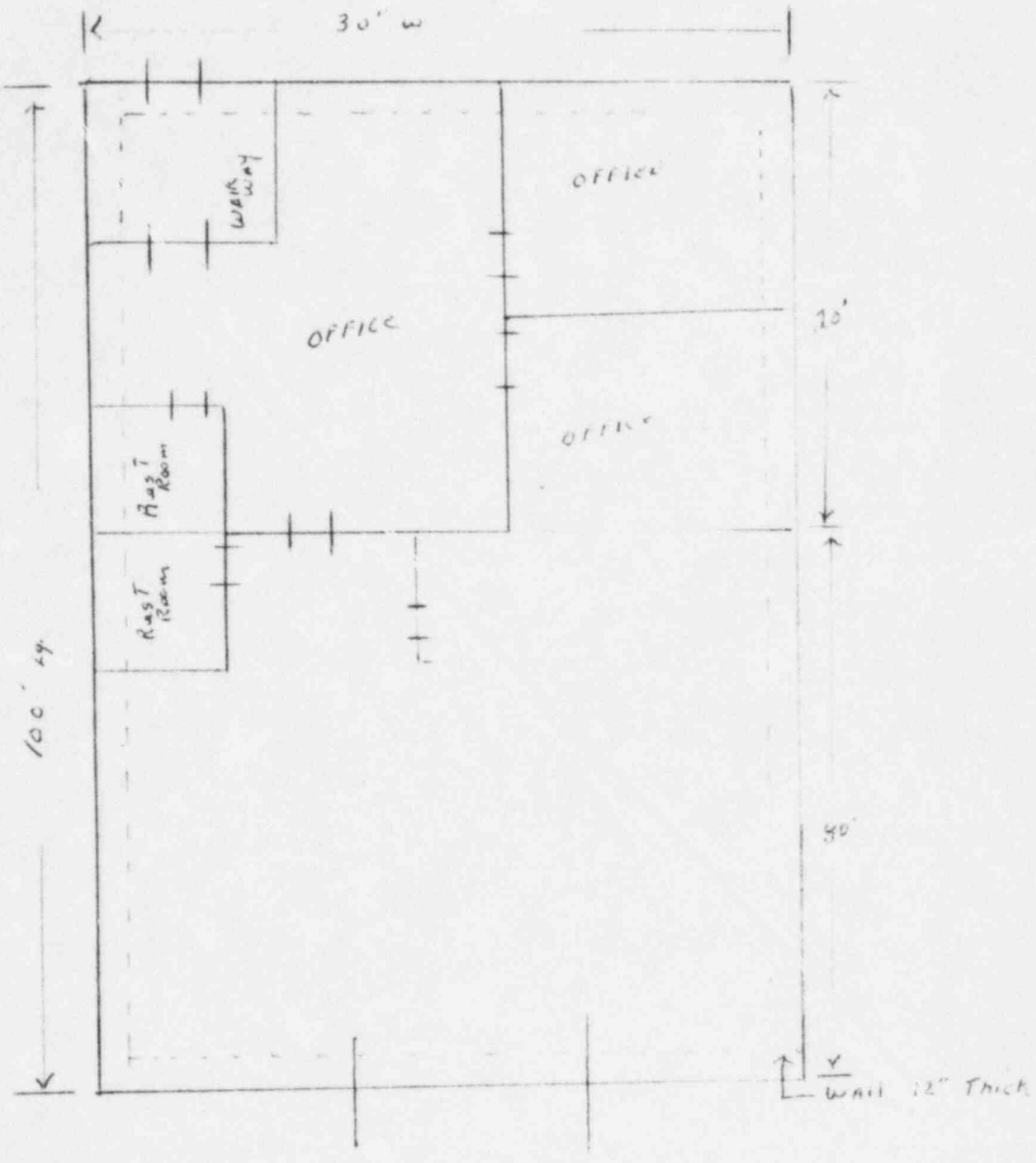
Radiographic Exposure Devices	Name of Manufacturer
Spec 2T	Source Production & Equipment Co., Inc.
MX-IC-100	Magnaflux Corp.
IR-100	Industrial Nuclear
Gamma Century S Gamma Century SA	Gamma Industries

Radiographic Source Changers	Name of Manufacturer
Industrial Nuclear A, 50 or 130	Industrial Nuclear
Spec C-1	Source Production & Equipment co., inc.
C-10 C-4	Gamma Industries

Nationwide Testing Services will begin its service with two (2) sources, when license is approved and add two (2) more sources in 60 to 90 days.

NTS

NATIONWIDE TESTING SERVICES, INC.



Sketch of Building

Location: 720 Morse Ave.
Schaumburg, IL. 60193

Note: Sealed sources to be stored at the above address for Nationwide Testing Services, Inc. No radiographic work shall be done at this facility at the present time. Arrangements will be made for shooting vault and sent to the NRC for approval.

RESUME

NAME: CHARLIE MARCANTEL
AGE: 45 years (October 11, 1938)

Experience: August 1975	Employed by Peabody Testing Services as Trainee Radiographer in New Orleans, Louisiana. Study concerning Radiation Safety and instructed by Andy Staggs, manager of Peabody Testing Services in New Orleans, Louisiana. Total of forty (40) hours of instruction received to qualify as an Assistant Radiographer.
September 1975	Advance studies given by John Ryan, Supervisor and Radiation Safety Monitor. Made qualifications to a Radiographic Technician, Level 1.
October 1975	Labor transfer to Connecticut. Eight (8) hours study course given by instructor at Nuclear site.
December 1975	Advance studies given by John Ryan and Andy Staggs. Forty (40) hours credited. Qualified and certified to a Level 11 Technician.
February 1977	Sent to Magnaflux Training Center, forty (40) hours of studies given in radiation safety and interpretation. Given by Magnaflux instructors.
May 1978	Transferred to Chicago Laboratory to gain better knowledge and education in radiographic techniques that was not available in New Orleans area.
June 1978	Dwayne Arnold Nuclear Site, Cedar Rapids, Iowa. Lead radiographer technician for major crack repair job at site. Given eight (8) hours in radiation safety at site for six months.
March 1980	Dwayne Arnold Nuclear Site, Cedar Rapids, Iowa. Received eight (8) hours of instruction in radiation safety.
March 1981	Dwayne Arnold Nuclear Site, Cedar Rapids, Iowa. Received twenty-four (24) hours of study in their new program of radiation safety given by their instructors.
1982 to 1984	Have done Home Study in Radiation Safety and Radiographic Procedures out of books such as ASNT Study Courses pertaining to Radiation and Radiation Safety. Hours of study cannot be documented and considered a statement to the NRC. Reasons for this inability to advance myself was because of production activities. See letter of concern and statement to NRC.

November
1983-1984 — Advance studies done in Radiation Safetv in order to design and organize Nationwide Testing Services Radiation Safety Program for Federal and State Approval.

March 1984 — Have met the requirements and tested the Nationwide Testing Services Procedure 22.F.1 and certified to a Level 111 personnel.

Experience — Total hours in NDE attached.

Equipment

Gamma IR 192
Gamma Century
MX - 1C - 100
IR 100
Spec 2-T
Gamma Pipeliner
Gamma c/60
Gammatrons
20 A
100 A
200 A
Source Changes
Spec Model - C1
Gamma - C10
Industrial Nuclear A130
Industrial Nuclear 50

X-Ray Unit
All Magnaflux
X-Ray Unit
MX - 150 KV
MX - 200 KV
Norelco 300 KV
X/mas 250 KV
X/mas 225 KV
X/mas 200 KV
360° pipe unit
X/mas X-Rav unit
for pipe O.D. of
36" and up. Remote
control unit
(crawler)

Have done inspection and maintenance on all the above equipment and accessories to all of the equipment.

MT0120 PERSONNEL EXPERIENCE RECORD PAGE #

7/01/76 THRU 1/31/84

EMPLY.# 4930 C *MARCANTEL, JR. LAB # 6002 CHICAGO

SPEC.CODE	TOTAL HOURS	MPI	PEN	XRAY	GAMA	U/T	E/C VISUAL	NDE N.VIS.	MISC
-NO CODE									
A-ASME	4,152.4	17.3	91.9	305.4	3,737.8				
C-AWS	555.9			373.2	182.7				
D-API	4,536.5		56.5	.5	4,436.0	27.5			16.0
F-DOD	447.0	142.7	21.1	72.8	210.4				
H-FEDERAL	140.0	140.0							
I-ANSI	1,756.7	6.5	3.0	12.7	1,734.5				
J-ASTM	319.9	45.0	2.3	196.7	71.4				4.5
K-SAE(AMS)	10.0	10.0							
M-PEAB. TEST	2,545.0	1,526.3	136.8	270.4	570.0	24.5			17.0
N-CLIENT SP	9,195.4	1,259.7	115.4	215.9	6,656.9	4.5	7.0		936.0
O-AWWA	4.0				4.0				
TOTAL	23,662.8	3,147.5	427.0	1,447.6	17,603.7	56.5	7.0		973.5

Some 7,697 Total HR Not showed on
EXPERIENCE Record FROM magnaflux
Charlie Marcantel
1-84

"The Diamond in Independent Testing"

SUBJECT: BRUCE TYLER

To Whom It May Concern:

Bruce Tyler will serve as Vice President of Nationwide Testing Services, Inc. His primary function will be to serve as an advisor in all phases of the radiation program and training courses. Mr. Tyler will work with the President (Charlie Marcantel) on all rulings and revisions concerning radiation safety.

Sincerely,

Charlie Marcantel

Charlie Marcantel
President
Nationwide Testing Services, Inc.

TRIAD

Name: Bruce D. Tyler
Age: 61 years (August 27, 1923)

Formal Education

Graduated - High School	1941
Graduated - Jr. College (2 years)	1948
Other Courses at U. of IL & Loyola University	1960 & 1961

Military Service Training

Aircraft & Engine	600 hrs.	1945
Instructor Training	120 hrs.	1949
Metal Heat Treatment	360 hrs.	1956
Magnetic Particle Testing & Liquid Penetrant	90 hrs.	1956
Supervisors Training	40 hrs.	1957
Industrial Radiography (X-Ray & Gamma) (conducted by J. Schnuman at X-Ray Prod. Co.)	80 hrs.	1958
Industrial Radiographic Interpretation (X-Ray Products Co.)	40 hrs.	1958
Basic Welding	16 hrs.	1958
Industrial Radiography (A.F.)	60 hrs.	1959
Machine Shop Fund. and Lathes	96 hrs.	1959
Air Force Staff & Command College	240 hrs.	1959

Others

Sheet Metal Fab.	1260 hrs.	1941
Statistical Q.C.	120 hrs.	1952
MT-PT-UT-E.C.	120 hrs.	1960-1965
Fundamentals of Supv.	20 hrs.	1967
Modern Supv. Tech.	20 hrs.	1968
Supv. Psychology	20 hrs.	1968
Industrial Mgmt.	20 hrs.	1969
Work Simplification	20 hrs.	1969
Industrial Radiography	80 hrs.	1969 - Kodak
Qual. Control - Concrete Test	40 hrs.	1971 - Portland Cement
Gamma Radiography	40 hrs.	1974 - Picker
Radiation Safety	40 hrs.	1975 - Gamma Ind.

Masters Certificate 1969

TRIAD

Experience

1950 - 1960 - N.D.I. Instructor/Inspector for Air Force at Chanute A.F.B., IL taught MT-PT-RT (X-Ray & Gamma) and performed the required NDT inspection on aircraft.

Oct. 1960 - Feb. 1982 - Employed by Magnaflux Corp. as Instructor/Director of Training

Basic Function:

Responsibility of corporate level III Examiner, SNT-TC-1A in directing and coordinating the activities required in developing, implementing, supervising, conducting, and testing in all level I, II and III courses in Magnetic Particle, Liquid Penetrant, Ultrasonics, Industrial Radiography, (X-Ray & Gamma) and Radiation Safety. Also all other level I, II and III special courses in Ultrasonic Weld Testing, (advanced and in-service nuclear, section XI), Radiographic Interpretation, visual inspection, experimental stress analysis, concrete testing, soil testing and all other related courses for Magnaflux personnel, customers representative or employee, and other registered students.

Directs the planning, coordination, and execution of these courses with the Assistant Director of Training, in the Chicago, Los Angeles, and Hartford training facilities and in any other locations where the training may be conducted.

Responsible for overall management and direction of the industrial radiation safety instruction program by maintaining liaison with the appointed Radiation Safety Officer, Main Plant Facility. Plan, coordinate, formulate, and provide for the execution of this program for Magnaflux employees involved and also for the students in attendance at the radiographic course(s).

I. Duties and Responsibilities - Training
General

1. Coordinate special training activities for company personnel as requested by other departments within the company.

2. Establish courses and dates for all regularly scheduled classes being conducted in Chicago, Los Angeles, and Hartford facilities.

3. Review recommendations for changes in programs, methods, practices, adaptations and expenditures.

4. Direct programs for Peabody Testing Services personnel in Chicago main plant and all other locations throughout the United States utilizing training department instructors.

5. Approve and monitor all Peabody Testing Services training courses before their presentation to inspection personnel.

4. Direct programs for Peabody Testing Services personnel in Chicago main plant and all other locations throughout the United States utilizing training department instructors.

5. Approve and monitor all Peabody Testing Services training courses before their presentation to inspection personnel.

6. Approve Peabody Testing Services personnel to be used in the capacity of an instructor.

7. Direct or review classroom theory and field training courses in all test methods used to improve total Peabody Testing Services capability through the inspection personnel.

8. Coordinate special training requirements and scheduling of Peabody Testing Services personnel into classes, with the Manager of Quality Control, Peabody Testing Services.

II. Duties and Responsibilities - Radiation Safety

1. Assist with the establishment, formulation and maintenance of current radiation operating and emergency procedures.

2. Approve the personnel radiation monitoring program as formulated by the Radiation Safety Officer.

3. Coordinate special training programs and/or meetings to disseminate important information from applicable safety regulations.

4. Determine with R.S.O. the cause of radiation incidents or accidents and assist with an immediate preventive action program against a repeat.

5. Assist with licensing activities through the R.S.O. with AEC and State of Illinois.

6. Review all records with R.S.O. for current status to be in compliance with State and Federal regulations.

7. Performed the responsibilities of the Radiation Safety Officer, Main Plant Facility in his absence and assisted him daily as might be required.

TRIAD

Title: Radiation Safety Officer, Main Plant Facility

Responsibility:

I. Duties and Responsibilities

1. Develop, establish and maintain up-to-date radiation operating and emergency procedures.

2. Establish and maintain a personnel monitoring program, to include film badge dosimetry and direct reading pocket dosimeters and giving instructions in their use.

3. Procure and maintain adequate radiation survey instruments.

4. Establish a survey instrument calibration program.

5. Enforce safe and proper usage of X-Ray machines and gamma ray exposure devices, radiography facilities, and associated equipment.

6. Insist and assure that only safe radiation working conditions be practiced and maintained.

7. Assume control and institute corrective action in emergency situations.

8. Maintain all personnel dosimetry records of engineering, research, training, visitors and other personnel of the main plant facility as specified by regulations for personal film badge dosimetry service.

9. Investigate causes of radiation incidents/accidents and determine and initiate the necessary corrective action to be taken. File all required reports concerning such incidents/accidents.

II. Specifics

1. Act as Magnaflux Corporation (licensee) liaison officer with the United States Atomic Energy Commission (USAEC) and State of Illinois on all license matters related to the main plant facility.

2. Handle correspondence with the Commission and other State and Local regulatory requirements.

3. Conduct necessary surveillance inspection at the main plant facility and stop or suspend any radiography operations not in compliance with the current Commission regulations, the Illinois Radiation Protection act, and all amendments and modifications of each of the above. Has sole authority to release a stop or suspend operation order.

4. Establish a record keeping program, and periodically review and inspect the records to insure that they are being accurately maintained. The following records shall be maintained and shall be made available to annual and no-notice inspections by the Commission and/or State of Illinois:

a. Records of Personnel Monitoring.

b. Records of Radiation Surveys.

c. Records of Quarterly Inventory.

d. Records of X-Ray and Source Utilization.

e. Records of Receipt, Shipment, and Return of Decayed Sources to the Authorized Supplier.

f. Records of Leak Tests (Wipe Analysis).

g. Records of Radiation Survey Instrument Calibration/Repair.

h. Records of Radiographic Equipment Inspections and Maintenance.

5. See that leak testing, repair, tagging, opening, modification, replacement or disposal of sources are accomplished only by himself or by persons specifically authorized by the USAEC.

6. Perform leak tests (wiping) of sources as required every six (6) months.

7. Conduct quarterly inventory of radioactive sources.

8. Maintain inspection reports on all radiation producing devices, mechanical exposure devices, survey instruments, and related equipment assigned to all departments in home plant facility.

9. Periodically meet with those personnel with film badge dosimetry service to review their ionizing dosage records and make every attempt to keep radiation exposures to an absolute minimum.

Feb. 1982 - Present - President and half owner of Triad Mfg. Corp. engaged in conducting N.D.T. training courses, marketing of N.D.T. equipment and materials, manufacturing of some N.D.T. equipment and accessory items and testing services.

N
T
S

NATIONWIDE TESTING SERVICES, INC.

PERSONNEL MONITORING

Personnel monitoring shall be supplied by Film Badges/TLD's and dosimeters The company supplying film badges/Tld's capable of monitoring X-Ray and Gamma Radiation and processing the film badges/Tld's in two weeks intervals.

R.S. Landauer Jr. and Company
Division of Technical Operations, Inc.
Glenwood Science Park
Glenwood, Illinois - 60425

DOSIMETERS

Dosimeters worn by monitored individuals during the performance of industrial Radiography shall have a range of 0-200 millirdentgens and sensitive to X and Gamma Radiation. These dosimeters and dosimeter chargers shall be manufactured by:

1.) Victoreen
2.) Dosimeter Corporation of America
3.) Eberline
4.) Bendix
5.) Landsverk
6.) Kelekett

NTS NATIONWIDE TESTING SERVICES, INC.

SURVEY METERS

The list below shows the survey meters that shall be used by Nationwide Testing Services.

Nationwide Testing Services requests that these models of survey meters be approved for use on the license.

Type of Instrument	Radiation Detected	Sensitivity Range (mr/hr)	Monitoring & Surveying
Gamma Industries Model 250 B	X & Gamma Radiation including energies emitted by IR 192	0-1000mr/hr	Surveying
Gamma Industries Model SMAC 252 B		0-1000 mr/hr	Surveying
Industrial Nuclear Model I Industrial Nuclear Co.		0-1000 mr/hr	Surveying
Smith 1000 A G. E. Smith & Assoc.		0-1000 mr/hr	Surveying
Victoreen 492 Victoreen Instrument Company		0-1000 mr/hr	Surveying
Victoreen 493 with 491-40 Probe Victoreen Instrument Company	Not applicable at this time		Surveying Shielded Room only
Gamma Industries Gamma Mars MKI Multiple Alarm Radiation System	Not applicable at this time		Surveying Shielded Room only

NTS NATIONWIDE TESTING SERVICES, INC.

LEAK TEST KIT--ANALYSIS VENDOR LIST

Gamma Industries
2255 Ted Dunham Ave.
P.O. Box # 2543 — Kowipe Kit
Baton Rouge, LA. 70821
(504) 388-0800

Source Production & Equipment Co.
625 Oxley St. — Model # 1
Kenner, LA. 70062
(504) 464-9471

SURVEY INSTRUMENT CALIBRATION SERVICE VENDORS

Gamma Industries
2255 Ted Dunham Ave.
Baton Rouge, LA. 70821
(504) 388-0800
Louisiana License LA 0006-21

Source Production & Equipment Co.
625 Oxley St.
Kenner, LA. 70062
(504) 464-9471
Louisiana License LA-2966-L01

"The Diamond in Independent Testing"

NATIONWIDE QUALITY SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.0

OPERATING AND EMERGENCY PROCEDURES

CONTROLLED COPY
No._____
Date_____
Issued_____

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Authorized For Use (Radiation Safety Officer		Date
Issued to NRC for Approval		Date

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A.0 INTRODUCTION

A.1 The operating and emergency procedures is your guide to a safe operation when working with radioactive source. You will have an operating and emergency procedure at all times whenever you are using a source of radiation.

A.2 YOUR AUTHORITY - Federal and/or Agreement State Law specifies the tasks a person is allowed to perform when working with radioactive sources. The complexity of tasks allowed are based on the radiation safety training and experience of the employee. The levels of training experience and/or authority as used by Nationwide Testing Services are identified as Trainee Radiographer, Assistant Radiographer, Radiographer, Radiation Safety Officer.

A.2.1 TRAINEE RADIOGRAPHER - A Trainee Radiographer is an employee of Nationwide Testing Service who is in training for the position of Assistant Radiographer. During this period of training, he shall not perform in the capacity of handling and/or using source.

A.2.2 ASSISTANT RADIOGRAPHER - An employee who uses radiographic exposure devices, sealed sources, X-ray equipment, survey instruments, and related equipment while under the personal (direct) supervision of a Radiographer. The Radiographer may not delegate his responsibility to the Assistant Radiographer. Any person who assists the Radiographer by manipulating radiographic exposure devices, sealed sources, X-ray equipment, survey instruments, and related equipment, is acting as an Assistant Radiographer and must have been certified to that level by the Radiation Safety Officer.

A.2.3 RADIOGRAPHER - An employee who performs radiography or is in attendance at the radiographic site to personally supervise radiographic operations. The radiographer is directly responsible for assuring the job is performed in accordance with the safety requirements of the Operating and Emergency Procedures. In case ofan emergency, he shall report the details of the situation to the Radiation Safety Officer.

A.2.4 ASSISTANT RADIATION SAFETY OFFICER - Management Representative responsible for all phases of the Radiation Safety Program in the absence of the Radiation Safety Office, and will report directly to the Radiation Safety Officer His job shall include training and qualification for all levels of radiation safety certifications

A.2.5 RADIATION SAFETY OFFICER - The member of management of Nationwide Testing Services with full authority and responsibility to administer and enforce the Radiation Safety Program. He shall have the authority to stop radiographic activity until safety requirements have been satisifed, and to discharge or suspend any individual who violates the rules and regulations in matters relative to radiation safety.

A.2.6 Vice President - The administrative representative responsible to see that all in house or projects complies with all safety requirements and reports directly to the President concerning all items.

A.2.7 President - The administrative executive officer has all responsibility for assuring all tests, inspections, examinations, services and operations performed shall conform to contractual requirements and shall take all the responsibility as the Radiation Safety Officer of Nationwide Testing Services.

B.0 Quarterly Safety Meeting/Refresher Training

B.1 Radiation Safety Officer - shall be responsible for conducting refresher training for all Radiographer and assistants under his supervision at intervals not to exceed quarterly.

B.1.2 Such training shall include, but not be limited to at least 4 items from the 6 item list below and other information.

(1) Agreement States or USNRC Rules and Regulations, Parts 19, 20, 21 and 34.
(2) Agreement States or USNRC Radioactive Material License
(3) Radiographic equipment and dectection instrumentation to be used.
(4) Fundamentals of radiation safety.
(5) Prevention of overexposures to personnel.
(6) NRC case histories

B.2 Radiation Safety Officer - shall maintain, available for inspection, records of safety meetings/refresher training including:

(1) Name(s) of Instructor(s)
(2) Names of individuals attending.
(3) Dates of training.
(4) Topic(s) discussed.

C.0 PERSONNEL SAFETY AND MONITORING

C.1 Your personal safety depends on the use of radiation monitoring devices. Before working with a radioactive source, you must have:

(1) Current Radiation Safety Certification
(2) Operating and Emergency Procedures
(3) Dosimeter
(4) Film Badge or TLD
(5) Calibrated operating survey meter

C.1.1 Dosimeter - The dosimeter measures total accumulated doses from zero to at least 200 milliroentgens. It can show you when your accumulated dose is abnormally high. Prior to each day or job, zero your dosimeter using your dosimeter Charger. Record this reading on Form 20.22 (Figure 1) or Form 20.23 (Figure 2), Form 20.33 (Figure 3). Check your dosimeter frequently to assure you are operating in a safe manner.

A saturated (off-scale) reading means danger-stop work immediately and contact your Radiation Safety Officer. If your dosimeter is lost, stop work immediately and contact your Radiation Safety Officerfor a replacement. DO NOT work without your dosimeter.

C.1.2 Film or TLD Badge - Your bi-monthly or monthly film or TLD badge is the most accurate record of your total radiation exposure. Wear it on the trunk of your body. Do not let anyone wear your badge. The badge will be processed by a qualified film/TLD badge service and the exposure date reviewed by the Radiation Safety Officer.

C.1.2.1 Frequency of processing.

C.1.2.2 Starting date of badge use and processing date.

C.1.2.3 Reporting date.

C.1.2.4 Employee name, social security number and date of birth.

C.1.2.5 Current dose (millirems)

C.1.2.6 Cumulative dose (millirems)

C.1.2.7 The badge is to be stored during non-working in a location where accidential exposure cannot occur. If your badge is lost-stop work immediately and call your Radiation Safety Officer for replacement.

C.1.2.8 Film or TLD badges lost or not returned by individuals shall be investigated by the Radiation Safety Officer. A report shall be made as to the reason for the badge not being returned, along with the individuals corrective action for the prevention of its reoccurance. Individuals dosimeter readings for the period of use, taken from Form 20.22, 20.23, or 20.33 will be used for the exposure received during that period. Dosimeter report will be forwarded to the badge processing facility in place of the lost badge, with a copy on file.

C.2 Permissible Dose Levels

C.2.1 An individual 18 years of age or over, may receive a dose to the whole body of 3 rems per calendar quarter provided that:

(1) Nationwide Testing Services has on file the individual's history of accumulated occupational dose to the whole body.

(2) The individual's dose to the whole body, when added to the previously accumulated dose to the whole body, shall not exceed 5 (N-18) rems where "N" equals the individual's age in years at his last birthday.

C.2.2 Individuals may receive a dose to the whole body of only 1.250 rems per calendar quarter when the requirements of Paragraph C.2.1 are not met.

C.2.3 Individuals who receive a dose in excess of 3 rems or 1.25 rems per calendar quarter, when applicable, will be notified of the amount of the exposure in writing by the Radiation Safety Office, who will require the individual to submit a written explanation of the circumstances of the overexposure and will be asked in person for explanation.

C.3 Survey Meter - The survey meter measures the radiation measures the radiation field strength, and shall have a range such that two (2) milliroentgens per hour through one (1) roentgen per hour can be measured. Use this meter to:

(1) Establish the isodose lines (perimeters)

(2) Assure source is in full retracted (safe) positions.

(3) Assure source is in full expose position when using a collimator. (Meter reading should fall off noticeably as source enters collimator).

(4) Locate the source (see Figure 4).

(5) Predict the accumulated dose for several exposures. Chcek the survey meter each shift for normal functioning and current calibration date. Calibration is

required every 90 days and after servicing. If functioning is abnormal or the date expired, do not use the meter - contact your Radiation Safety Officer.

C.4 Use of the Monitoring Equipment - Film or TLD badges and dosimeters shall be used by anyone 18 years of age and over who is likely to receive a dose of 300 mrem per calendar quarter. A survey meter shall be used every time a person enters a "Radiation Area" or is required to work around a storage container or exposure device.

D.0 The Source to Job Site/ or Location

D.1 Removal from Storage - Survey all permiters of the storage area for abnormal radiation levels using the survey meter. Radiation levels at the perimeter of a storage area shall not exceed 2 mr per hour. Survey the exposure device for abnormal radiation levels before removing it from the storage area. Remove the exposure device and position the survey meter against the device on both sides and the port.

If no reading occurs on the survey meter or the readings exceed 200 MR/HR at the surface, return the exposure device to storage and contact your Radiation Safety Officer. Do not work without a survey meter.

D.2 Daily Equipment Inspection - The daily inspection of the exposure device is for your safety. Equipment which is maintained in good working order seldom causes an emergency situation. Perform the daily inspection of the exposure device by following the instructions on Form 20.25 completing the Daily maintenance Inspection portion on 20.22 (Figure 1), 20.23 (Figure 2) or Form 20.34 (Figure 3).

All malfunctions or defects noted during the inspection shall be immediately reported to the Radiation Safety Officer and/or other Administrative Officer. The equipment is to be removed until repairs are made.

D.3 Carrying the Exposure Device - The total time an exposure device is hand-carried should be kept to a minimum. Remember, the radiation level on the exposure device's surface may be as high as 200 mr/hr. During hand-carrying, your legs can be exposed to this field. A good practice is to use a hand truck or cart whenever you are doing a lot of transporting.

E.0 CONTROLLING THE AREA

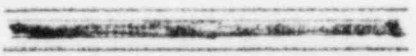
E.1 Responsibility of the Radiographer - The Radiographer is responsible for establishing the controlled "Radiation"

and "High Radiation" areas and assuring unauthorized personnel are not allowed to enter the area. The Assistant Radiographer may perform these duties only under the direct supervision of the Radiographer.

E.2 Preliminary Control - Prior to setting up the exposure device, the Radiographer will establish preliminary controls by conspicuously posting an area that will prevent anyone at the perimeter of these areas from receiving a dose in excess of 2 mr in any one hour. The approximate perimeters of the radiographic area shall be established and posted with "Caution--Radiation Area" or "Danger--Radiation Area" signs by referring to the Radiation Intensities and Distance Charts (Figure 5) or by using the inverse square law. The approximate perimeter of the High Radiation Area(100 mr/hr or more), will be calcualated from the Radiation Intensities and Distance Charts mentioned above, or tje inverse square law. Conspicuous posting of this area will be accomplished by using "Caution--High Radiation Area" or "Danger--High Radiation Area" signs. "Caution--High Radiation" signs may not be used on the perimeters of the "Radiation Area". These areas are defined in Paragraph P.O procedure. The signs shall be the conventional magenta and yellow colors to indicate radiation areas. It is recommended that perimeters be established using radiation barrier tape or rope (magenta or yellow colors).

EXAMPLES

SIGN



Rope or Ribbon

SIGN

F.O SETTING UP THE EXPOSURE

F.1 Remote type exposure devices

F.1.1 Before using radiographic equipment, the Radiographer and Assistant Radiographer shall be thoroughly familiar with procedures for restricting and posting of radiation areas and surveying of exposure devices.

F.1.2 With the exposure device locked and, with a calibrated and operating survey meter at hand connect the drive cable to the pigtail. This step is extremely important. If the connection is not properly made the source may not be able to be returned to the safe position at the end of the exposure.

F.1.3 Remove the safety plug from the exposure port, connect the source guide tube, and source stop tip. Exercise care to keep the guide tube and control cable as straight as possible

F.1.4 Unlock the exposure device and crank out the source.

F.1.5 During exposure(s), survey the radiation levels in accordance with G.0 of this procedure.

F.1.6 At the end of the exposure, crank the source back into the exposure device. Survey the exposure device with a survey meter in accordance with H.0 of this procedure.

F.1.7 Lock the exposure device.

F.1.8 After the last exposure, replace the safety plug in the exposure port.

F.1.9 Disconnect the control cable mechanism.

G.0 POSTING THE AREA

G.1 Final control - After the exposure device is readied for operation, the source is driven to the end of the source tube and a survey performed to establish the restricted area. Survey the perimeter of the area which was posted during the preliminary control and correct the positioning of the signs, as necessary, to reflect the 2 mr/hr field strength. Surveys shall be required for each shift and/or when the source-target configuration is substantially different from that of the preceding exposure. Survey meter readings in excess of 2 mr/hr are permissible at perimeters of the restricted area when the total exposure time during any one hour is less than 60 minutes.

Example: $\frac{\text{Any One Hour (60 min)}}{\text{Exposure in Minutes}} \times 2 =$ Maximum allowable mr/hr,

The maximum allowable mr/hr at the perimeter of restricted area for a job requiring five exposures of four minutes, each would be figured as follows:

$$\frac{60}{5 \times 4} \times 2 = 6 \text{ mr/hr}$$

G.2 All signs shall be magenta or purple on yellow background and display the conventional three-bladed radiation safety symbol

H.0 USE OF EXPOSURE DEVICE

H.1 The Radiographer is responsible for the safety of all personnel entering the restricted area. No one shall enter the area without the consent of the Radiographer for each specific entry. If any person persists in entering the posted area, secure the source until the person leaves. Report the problem to your Radiation Safety Officer or to Management. Note: When you warn persons of the danger of radiation, state the facts. Don't exaggerate. During an exposure all personnel shall stay outside the restricted area and the Radiographer and Assistant Radiographer(if used) shall act as guards. They must be alert at all times to prevent anyone from entering the area. Upon completion of an exposure, the Radiographer must:

H.1.1 Return the source to the radiographic exposure device by turning the control in the retract direction until a positive stop is encountered.

H.1.2 Upon assuring yourself the source has been returned to the safe position, proceed toward the exposure device with survey meter in hand, carefully examining the meter readings. Turn survey meter to lowest reading.

H.1.3 When reaching the exposure device, immediately survey the area where the source tube connects to the device and the entire circumference of the device shall be surveyed to see that the source has been retracted to the safe position. If the radiographic exposure device has a source guide tube, the survey shall include the guide tube.

H.1.4 Upon assuring yourself the source is in a safe position, survey and lock the exposure device. This procedure shall be conducted after each exposure. Note 1: When surveying device, remember Typical Surface Reading as noted when the exposure device was removed from storage. Note 2: When using (for example) Gamma Industries, Gamma Century SA, exposure device, locking the source in the safe position can only be accomplished by applying additional pressure on the crank assembly in the retract position.

H.1.4.1 Radiographers and Radiographer's Assistants shall be required to remove keys from all locked exposure devices except during authorized use or when under the direct surveillance of said individuals.

H.1.5 Upon completion of the scheduled radiographic operations in the established restricted area, the following procedure will be observed.

(1) Lock the control, as specified in Paragraph H.1.4.

(2) Remove the source tube and insert the safety plug.

(3) Dismantle the setup and remove barricades.

(4) After moving the exposure device from the site of

radiographic operation and prior to storage, another survey of the device will be conducted to assure that readings are within those outlined in Paragraph D.1.

H.1.6 An exposure device that is not returned to the storage area, and will be left unattended, must be locked and physically secured to prevent tampering or removal by unauthorized personnel. The device left in this condition must be barricaded and posted to a 2 mr/hr level.

H.1.7 Notification Prior to Using Exposure Devices at Temporary Jobsites (include X-Ray Units) - States require licensees to notify the agency, by phone and/or in writing, 3 days (if possible) prior to engaging in unauthorized temporary radiographic operations within their state. Notification is for locations other than those specifically listed on state licenses or registrations for non-agreement states. Radiographers are required to contact the Radiation Safety Officer and/or Administrative Officer, prior to engaging in unauthorized temporary radiographic operations, who in turn will notify the proper agency.

H.1.7.1 The following information is required when notifying the Radiation Safety Officer and/or the Administrative Officer:

(1) Location of operation (state, city, company, etc.)

(2) Make, model and S/N of exposure device.

(3) Specific time period (date, time, off-shift, etc.)

(4) Individual (or the customer) who will be contacted.

H.1.7.2 Radiographers shall contact the Radiation Safety Officer and/or Administrative Officer as soon as practical so that the required notice, in writing, can be sent to the appropriate agency.

H.1.7.3 Radiographers are required to have a current copy of each of the following documents prior to engaging in temporary radiographic operations.

(1) Respective Agreement State License (if not licensed in the State - copy of our NRC)

(2) NRC or Agreement State Regulations if applicable.

(3) Operating and Emergency Procedures.

I.0 STORAGE OF EXPOSURE DEVICES

I.1 When not in use, radiographic exposure devices will be placed in the storage areas provided. All storage areas shall have a sign bearing the words "Caution-Radioactive Material" or "Danger-Radioactive Material" with the radiation symbol (magenta on yellow background). These signs shall be posted on the outside of the storage area.

I.2 A survey of the storage area containing the exposure devices shall be made on the outside perimeters and the reading shall not exceed 2 mr per hour.

I.2.1 Survey storage areas shall be made each time an exposure device is removed or returned to storage. A record of that survey shall be kept.

I.2.1.1 Survey of temporary field trailer storage areas shall be made when an exposure device (additional or new source) is added.

I.2.1.2 Survey of temporary field storage areas shall be made at the start of each field job requiring storage. A record of that survey shall be kept.

I.3 Storage areas shall be kept locked at all times except when in use.

I.4 In the event radiographic operations are being conducted at a distance remote from the permanent storage area provided for the exposure device, the vehicle transporting the device may be used for storage by complying with Paragraphs N.3, N.4, N.5, N.6, N.7, and N.8 of this procedure.

J.0 USE OF X-RAY EQUIPMENT

Safety procedures of this section shall apply to operations with X-ray producing machines, where applicable.

J.1 Survey meters shall be used in the same manner as when utilizing radioactive material. They shall be used to determine that the X-ray unit is off except in cases where the main power source is disconnected.

J.2 No X-ray unit shall be left unattended whereby unauthorized personnel could cause the unit to be energized, resulting in a hazard. The control panel and/or power cables shall be stored or locked if unit is to be left unattended.

J.3 It will be the Radiographer's responsibility to complete Radiation Safety Report Form 20.23. Form 20.23 will have instructions for completion printed on the reverse side.

J.4 No individual shall operate an X-ray machine until such individual has received a copy of, instruction in, and

demonstrates an understanding of the operating procedures for said unit.

J.5 The X-Ray Equipment Procedure, although brief, does not relieve the Radiographer and/or Assistant Radiographer of any of the other detailed requirements of the Operating and Emergency Procedures, which does not pertain directly with the operation or use of an exposure device

K.0 PERMANENT RADIOGRAPHIC INSTALLATION

Safety procedures of this section shall apply to radiographic operations using radiographic installations.

K.1 Exposure room shall be used only with those sources of radiation authorized by licenses.

K.2 Sources of radiation to be exposed only in areas as authorized.

K.3 Requirements shall be posted at the radiographic installation.

K.3.1 The Radiation Safety Officer shall maintain a record of requirements.

K.4 Exposure room utilizing gamma radiation or X-ray shall be equipped with a visible and audible alarm signal. The visible alarm shall be actuated when the source of radiation if exposed (or X-ray tube energized). The audible alarm shall be actuated when entry to the high radiation area is attempted.

K.4.1 Alarm shall be generated so that an individual attempting to enter the area would be aware of the hazard during an exposure.

K.4.2 Alarm shall be generated so that the Radiographer would be aware of any unauthorized entry during an exposure.

K.4.3 Equipment inoperable shall be repaired or replaced by complying with the field radiography requirements of the Operating and Emergency Procedures.

K.5 Exposure room shall have available, a functioning and current calibrated survey meter.

K.6 Exposure room shall be checked prior to each exposure, to assure the area is cleared of personnel.

K.7 If an exposure device is to be left unattended, the device shall be returned to the shielded and locked position. The key shall be removed from the exposure device locking mechanism.

K.8 Upon completion of the scheduled radiographic operation, or the radiographic operation, or the Radiographer's shift, the exposure device shall be returned to the storage condition.

K.9 Exposure room utilizing X-ray equipment (on a permanent basis) shall be interlocked such that the unit will not operate unless all openings are securely closed.

L.0 COMPLETING THE RECORDS

L.1 Records are your evidence of compliance with the procedures of the Operating and Emergency Procedures. Your Radiation Safety Officer shall insist that you properly document your work

L.2 It shall be the Radiographer's responsibility to complete the following records:

(1) Radiation Safety Reports - Form 20.22, Figure 1 (Field Gamma)

(2) Radiation Survey Reports - Form 20.33, Figure 3 (Lab Gamma)

(3) Radiation Safety Reports - Form 20.23, Figure 2 (X-Ray Machine)

(4) Utilization Log - Form 20.21.

L.3 Each form (except 20.21) you use will have the instructions for completion printed on the reverse side. These instructions are self-explanatory and eliminate your remembering each detail

Complete the record and distribute the copies per the instructions. Make sure your signature and the date are legible.

M.0 RADIATION SAFETY RECORDS MAINTAINED AT IN HOUSE OR PROJECT

M.1 The following records shall be maintained at the in house/or project which are necessary for inspections by company, agreement state, or NRC auditors.

(1) Film Badge Reports

(2) Radiographer Approval and Training Certification Form 20.12 or 20.13 (as applicable for level of certification)

(3) Assistant Radiographer Approval and Training Certification Form 20.14 (as applicable)

(4) Occupational Radiation Exposure History Form 20.1 (as applicable)

(5) Receipt of Procedures Form 20.15 (as applicable)

(6) Quarterly Radiographer Audit Form 20.16

(7) Quarterly Assistant Radiographer Audit Form 20.35

(8) Quarterly Safety Meetings Form 20.17

(9) Termination Exposure Report Form 20.2 (as applicable)

(10) Radioactive material receipt Form 20.18

(11) Decay Charts

(12) Leak test performance record Form 20.19

(13) Leak Test Analysis Report

(14) Radioactive Material Transfer/Disposal Report Form 20.20

(15) Utilization logs Form 20.21

(16) Radiation Survey Reports Forms 20.22, 20.23, 20.33

(17) Radioactive Material Quarterly Inventory Form 20.6

(18) Type B Package Certifications (as applicable)

(19) Survey Meter Calibration Certifications

(20) Annual Inspection of Shielded Room X-Ray cabinets Form 20.26

(21) Gamma Exposure Device Inspection (Quarterly and Special) Form 20.27

(22) X-Ray Equipment Inspection (Quarterly and Special) Form 20.28

(23) Dosimeter Checks Form 20.30

M.2 Records for call-out jobs and projects with less than nine (9) months duration (Temporary Locations) shall be maintained in the office of the location where the call-out is originated.

N.0 TRANSPORTING THE SOURCE

N.1 Approved Vehicle - Vehicles approved by the Radiation Safety Officer or Nationwide Testing Services are the only approved vehicles to be used for transporting sealed sources.

N.2 Approved Drivers - Approved vehicles carrying sealed sources may be driven by any company employee with a current driver's license

N.3 Preparation for Transport - Packaging of exposure devices and/or storage containers containing radioactive material shall be designated and selected to meet with all the requirements of the U.S. Department of Transportation (DOT) Title 49 CFR, except when transported within the confines of in house or other authorized location of use.

N.3.1 Procedure for the packaging requirements of exposure devices and/or storage containers can be found in procedure 20.1.1 of this program (Source Shipping/Receiving/Transfer/Disposal Procedure).

N.3.2 Shipping containers shall be securely blocked or braced in vehicle to prevent shifting in transit.

N.4 Securing the Vehicle - Close and lock the door to the storage area. This door must be kept locked until you arrive at the jobsite.

N.5 Posting - Placard all four sides of the vehicle with signs reading "Radioactive", if required. The radioactive placard must have the top portion yellow with the symbol black. The lower portion must be white with the inscription, "Radioactive" in black.

Note: Requirements for the placarding of vehicles is determined by the transport index (see Procedure 20.1.1 of this program).

N.6 Surveying - Survey the exterior surfaces of the vehivle and the driver's compartment. No radiation field exceeding 2 mr/hr shall be permitted.

N.7 Overnight Stops - A radiation emergency could occur by:

(1) Unauthorized persons tampering with your equipment.

(2) Another vehicle striking your vehicle.

The chances of these emergencies occurring can be minimized by considering the following guidelines when you park:

(1) Make sure your vehicle is locked.

(2) Park in a well lit area.

(3) Do not park on streets carrying heavy traffic.

N.8 Key Control - The keys to the vehicle give you control over the radioactive source during transport. Do not loan your keys to person other than:

(1) Nationwide Testing Services Certified Radiographer

(2) Another employee of Nationwide Testing Services during the time you are personally with the vehicle.

Note: Do not hide a spare key in or around the vehicle.

O.0 HANDLING THE EMERGENCY

O.1 Introduction - This procedure is your instruction for handling an emergency involving a radioactive source. Follow the "Four Key Steps". The Radiation Safety Officer will provide step-by-step procedures for elimination of the emergency. The objective of this plan is to minimize the radiation exposure of all personnel involved.

O.2 Application - These instructions apply to all field and laboratory operations of Nationwide Testing Services.

O.3 Responsibility - The Radiographer who has been assigned the equipment is responsible for the emergency action. The Assistant Radiographer shall follow the instruction of the Radiographer.

O.4 Emergency - An emergency is a condition or potential condition which may cause one of the following:

(1) Overexposure or potential overexposure of any person in excess of the regulation.

(2) Malfunctioning, damaged, stolen or missing survey instrument.

(3) Malfunctioning, damaged, stolen or missing exposure device.

(4) Vehicle accidents, fires, or other relative situations. The above emergencies or potential emergencies, will be handled using the relative steps listed in this section Paragraphs 0.5, 0.6, 0.7, and 0.8.

0.5 Radiographer's Action - Follow the instructions below:

Step 1 - Assure all personnel are clear of radiation area.

Step 2 - Survey and post the area with "Caution-Radiation Area" or "Danger-Radiation Area" signs. (Refer to Paragraph G.0 of this procedure-Posting the Area). In the event the survey instrument is damaged or malfunctioning, the procedure described in Paragraph E.2 (Preliminary Control) shall be followed and maintained. No one shall be allowed to enter this area until the location of the sealed source has been determined by the Radiographer. The safe position of the sealed source shall be determined by securing an operable survey instrument.

Step 3 - Maintain surveillance of the area until you can be relieved by a responsible person. Emphasize to your relief the importance of keeping all persons out of the posted area.

Step 4 - Contact the Radiation Safety Officer for further instructions. Call the Radiation Safety Officer at the telephone number (312) 299-5438. Additional telephone numbers are listed on Form 20.31 Radiation Safety and Control Personnel. DO NOT PROCEED WITHOUT SPECIFIC INSTRUCTIONS FROM YOUR RADIATION SAFETY OFFICER. The Radiation Safety Officer will ask questions about the emergency to determine the safest method of correction. Carefully follow his instructions.

0.6 Personnel Involved - Personnel involved in the emergency are barred from further work with or around radioactive sources until released by the Radiation Safety Officer.

0.7 Equipment Involved - Equipment when may have been damaged as a result of the emergency shall not be used until released by the Radiation Safety Officer.

0.8 Locating a Lost Source Using Your Survey Meter. - In the event a source should become lost, immediately secure the suspected area of the loss by barricades, ropes and/or guards, to prevent overexposure to personnel, and proceed with the technique for locating a lost source as described in Figure 4.

0.9 Any individual who believes that a violation of Company, Federal and/or State regulations has occurred or could possibly occur, should notify the Radiation Safety Officer of the alleged violation.

P.0 AGREEMENT STATES REQUIREMENTS

Agreement States are those states that have accepted the responsibility from the USNRC for control of radioactive materials within their boundaries. The regulations of governing radioactive materials within each agreement state parallel very closely to the regulations of the USNRC. They do impose some additional requirements however, and each Radiographer shall be required to be familiar with these additional requirements.

P.1 Instructions

Each Radiographer and Assistant Radiographer shall have available copies of the Agreement State Regulations for the particular state in which they are working, and when applicable, Agreement States License.

P.2 Conflicts

When the Agreement State and Operating and Emergency Procedures conflict, the most stringent requirement shall apply. If you are not sure which one to follow, contact the Radiation Safety Officer.

Q.0 INSPECTION AND MAINTENANCE PROCEDURE

Inspection and Maintenance Procedures are the daily actions taken by a Radiographer to assure his equipment is in good working order.

Q.1 Equipment shall be maintained in good condition by periodic inspection, test calibration, and maintenance.

Q.2 Amaintenance-calibration label, when applicable, shall be placed on equipment to identify the date for the next servicing/calibration.

Q.3 Exposure Device

Q.3.1 Daily inspections shall be conducted by the Radiographer in the field per the instructions of Form 20.29, Figure 6.

Q.3.2 Field Maintenance

(1) Servicing of the equipment to correct minor deficiencies uncovered by the inspection, may be performed by the Radiographer except when abnormal radiation levels are involved.

Q.4 Special Inspection

Inspection shall be conducted whenever equipment is malfunctioning or has been subjected to severe damage or stress, such as dropping or submersion in water, etc. Exposure devices involved in emergencies shall be inspected per the instructions of the Radiation Safety Officer. The report shall be identified "Special Inspection" and include a description of the abnormal situation encountered.

Q.5 Survey Instrument

(1) Inspect the survey instrument at the beginning of each shift for normal functioning and current calibration date.

(2) Calibration is required each 90 days and/or after servicing (calibration tag on instrument).

Note: DO NOT use survey instruments with expired calibration dates.

Q.6 Reject Tag

Any equipment to be inoperable and/or out of calibration should have a reject tag affixed and shall be removed from service.

R.0 DEFINITIONS

Byproduct Material - Any radioactive material, except special nuclear material, yielded in, or made radioactive by exposure to radiation incident to the process of producing or utilizing special nuclear material. For example: Cobolt-60 and Iridium-192.

Curie (Ci) - The unit of activity for measuring the quantity of radioactive material. One curie (Ci) is the amount of material which yields 3.7×10^{10} disintegrations per second or the activity approximately equivalent to that of one gram of radium.

Dosimeter - A device for measuring the amount of exposure to ionizing radiation received by an individual.

Radiation Area - Any area accessible to personnel in which there exists radiation at such levels that a major portion of the body could receive, in any one hour, a dose in excess of 5 MR, or in any 5 consecutive days , a dose in excess of 100 Mr.

Radiation Signs - Signs which warn of the presence of ionizing radiation or materials that emit radiation. They display the conventional three-bladed radiation symbol in magenta, or purple, on a yellow background.

Radiographer - Any individual who performs, or who is in attendance at the site and personally supervises radiographic testing operations and who is responsible to the licensee for assuring compliance with the requirements of NRC Regulations, Regulations of Agreement States the conditions of the license, and these procedures.

Assistant Radiographer - Any individual who, under the personal supervision of a Radiographer, uses exposure devices or survey instruments in radiography.

Radiographic Exposure Device - Any device, such as a projector containing a radiographic sealed source fastened therein, in which radiographic sealed source, or shielding thereof, may be moved or otherwise changed from a shielded to an unshielded position, with respect to the source, for purpose of making a radiographic exposure. Sealed sources may also be transported in these devices when appropriate conditions are met.

Radiography - The nondestructive testing of materials by the production of an image on a radiation-sensitive surface, such as a photographic film, by the use of sealed sources containing radioactive material, or a beam of X-rays.

Roentgen Equivalent Man (REM) - A REM is a measure of dose of any ionizing radiation to body tissue relative to the estimated biological effect of exposure of one roentgen of X-ray. For the purpose of this procedure, one "REM" and one "R" are identical for the reason that the sealed sources utilized in industrial radiography do not emit Alpha or Beta radiation outside of the stainless steel capsule.

Restricted Area - Any area access which is cintrolled for the purpose of protection of individuals from exposure to radiation.

Roentgen (R) - A roentgen is a measure of the ionizing radiation that are produced by X or Gamma radiation.

Sealed Source - Any radioactive material that is encased in a capsule designed to prevent leakage or escape of the radioactive material.

Shielding Material - Any material used to absorb radiation and thereby reduce its amount of intensity.

Storage or Shipping Container - A shielding device in which sealed sources are placed for storage or transportation.

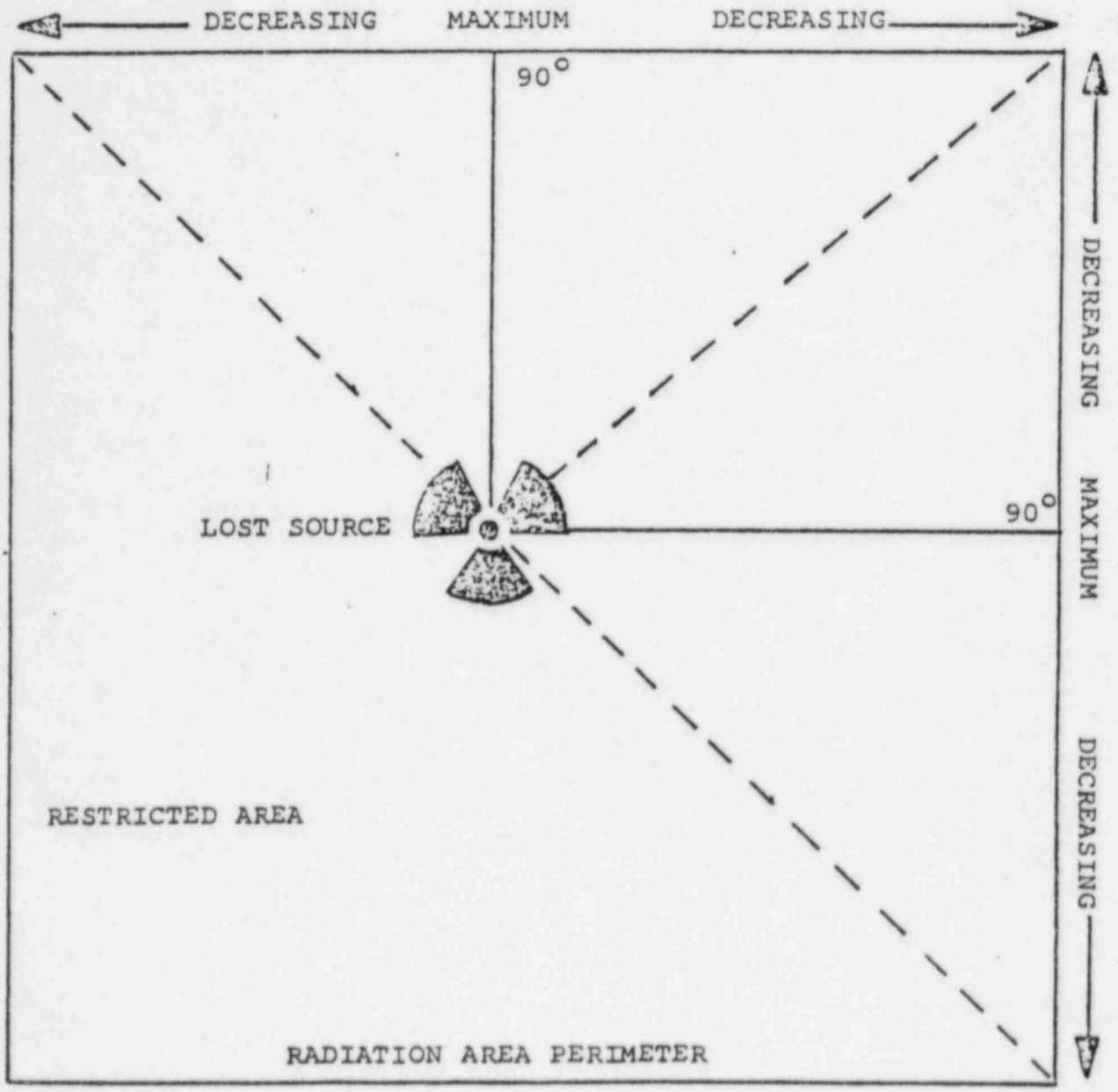
Survey - The measurement and recording of radiation intensities at various locations in an area where ionizing radiation exists.

Personal Supervision - of a Radiographer's Assistant by a Radiographer means supervision in which the Radiographer is physically present at the site where the sealed sources are being used and watching the Assistant when the Assistant uses radiographic exposure devices, sealed sources, or related source handling tools, or radiation survey instruments in radiography.

S.0 FORMS AND FIGURES

FIGURE NO.		FORM NO.
1	Radiation Safety Report (Field)	20.22
2	Radiation Safety Report (In House)	20.33
3	Radiation Safety Report (X-Ray Machines)	20.23
4	Locating a Lost Source Using the Survey Meter	-
5	Radiation Intensities and Distance Charts	-
6	Exposure Device Maintenance Checklist	20.29

LOCATING A LOST SOURCE USING THE SURVEY METER



1. Survey the area in two straight paths that are 90° to each other.
2. Identify the location of maximum reading on each path.
3. Visually project a line at 90° to each path. The intersection of the projected lines will be the source location. Remember, these paths lead into the high radiation area.

Figure 4

FIGURE 5

RADIATION INTENSITIES AT VARIOUS
DISTANCE FROM UNSHIELDED SOURCE

Iridium 192

Exposure Time In Any One Hour	Distance From Perimeter of Restricted Area	mr/hr Level
20 Curies Strength		
60 min.	245 ft.	2 mr/hr
30 min.	170 ft.	4 mr/hr
10 min.	100 ft.	12 mr/hr
5 min.	70 ft.	24 mr/hr
1 min.	30 ft.	120 mr/hr
30 Curies Strength		
60 min.	300 ft.	2 mr/hr
30 min.	210 ft.	4 mr/hr
10 min.	120 ft.	12 mr/hr
5 min.	85 ft.	24 mr/hr
1 min.	40 ft.	120 mr/hr
40 Curies Strength		
60 min.	360 ft.	2 mr/hr
30 min.	250 ft.	4 mr/hr
10 min.	140 ft.	12 mr/hr
5 min.	100 ft.	24 mr/hr
1 min.	45 ft.	120 mr/hr
50 Curies Strength		
60 min.	395 ft.	2 mr/hr
30 min.	280 ft.	4 mr/hr
10 min.	160 ft.	12 mr/hr
5 min.	115 ft.	24 mr/hr
1 min.	50 ft.	120 mr/hr
60 Curies Strength		
60 min.	430 ft.	2 mr/hr
30 min.	305 ft.	4 mr/hr
10 min.	175 ft.	12 mr/hr
5 min.	125 ft.	24 mr/hr
1 min.	55 ft.	120 mr/hr
70 Curies Strength		
60 min.	460 ft.	2 mr/hr
30 min.	325 ft.	4 mr/hr
10 min.	190 ft.	12 mr/hr
5 min.	135 ft.	24 mr/hr
1 min.	60 ft.	120 mr/hr
80 Curies Strength		
60 min.	495 ft.	2 mr/hr
30 min.	350 ft.	4 mr/hr
10 min.	200 ft.	12 mr/hr
5 min.	145 ft.	24 mr/hr
1 min.	65 ft.	120 mr/hr
90 Curies Strength		
60 min.	525 ft.	2 mr/hr
30 min.	370 ft.	4 mr/hr
10 min.	215 ft.	12 mr/hr
5 min.	155 ft.	24 mr/hr
1 min.	68 ft.	120 mr/hr
100 Curies Strength		
60 min.	555 ft.	2 mr/hr
30 min.	390 ft.	4 mr/hr
10 min.	230 ft.	12 mr/hr
5 min.	160 ft.	24 mr/hr
1 min.	72 ft.	120 mr/hr
Intensities of Iridium 192		
5.90 R/hr from 1 curie at 1 ft.		
.55 R/hr from 1 curie at 1 meter		

(see reverse side for sample)

Collimator

This lightweight Tungsten collimator is ideal for use with Iridium - 192 radiographic exposure devices. It attaches over the end of the source guide tube.

Tungsten Collimator is useful in areas where it is necessary to reduce the radiation area. Shall be used at all times when applicable.

SAMPLE

Side

SAMPLE

End

FIGURE 5 (Continued)

HALF AND TENTH VALUE THICKNESS
(Inches)

	Ir^{192}	Co^{60}
Lead Half	.19	.49
Tenth	.64	1.62
Steel Half	.53	.87
Tenth	1.8	2.90
Concrete Half	1.9	2.7
Tenth	6.2	9.0
Tungsten Half	.12	.31
Tenth	.40	1.04

Half value thicknesses reduce radiation to 1/2-Tenth value thickness reduce radiation to 1/10

Form No. 20.22
(Part 1)

N
T
S

NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIOACTIVE MATERIALS SHIPPING DOCUMENT

COMPANY VEHICLE NO._____

_____RADIOACTIVE MATERIALS WERE NOT TRANSPORTED

SHIPPER:

CONSIGNEE:

EXPOSURE DEVICE SURVEY WHEN REMOVED FROM STORAGE

_____MR/HR @ SURFACE OF DEVICE _____MR/HR @ PORT

NUMBER OF CURIES_____ DESCRIPTION OF CONTENTS: IRIDIUM 192____

110 CURIES MAXIMUM

RADIOACTIVE MATERIAL SPECIAL FORM N.O.S._____

TRANSPORT INDEX NOT OVER 1

VEHICLE SURVEY:

MR/HR @ SURFACE OF SHIPPING CONTAINER:_____ MR/HR @ OUTSIDE SURFACE____

MR/HR @ 3" _____ MR/HR @ DRIVERS SEAT_____

NOTE: DO NOT TRANSPORT IF SURFACE OF CONTAINER IS OVER 50MR/HR AND/OR OVER 1.0 MREM/HR @ 3" ADDITIONAL SHIELDING SHALL BE RE - QUIRED TO MEET SHIPPING REQUIREMENTS OF RADIOACTIVE YELLOW II LABEL.

TYPE B SHIPPING CONTAINER INSPECTION S/N_____CERT. NO._____
ACCEPTABLE CONTAINER ONLY (NRC)

CERTIFYING STATEMENTS AND SIGNATURES

This is to certify that the above named articles are properly classified described, packaged, marked, labeled and are in proper condition for transportation according to the applicable regulations of the department of transportation and that all radiographic procedures and precautions required by NATIONWIDE TESTING SERVICES radiation safety and control program Section 20.1.0 operating and emergency procedures were observed. The perimeter of the source storage area was surveyed prior to removing the exposure device from storage and immediately after returning the exposure device to storage the maximum radiation level was not in excess of 2mr/hr.

Personnel Signature_____

NOTE: Shipping document to be placed in plain view of anyone entering the vehicle in case of an accident or emergency.

a) on front seat of vehicle in plain view.
b) in side pouch on door on drivers side.

INSTRUCTIONS (SHIPPING REPORT)

This radioactive material shipping document is designed to fulfill D.O.T. requirements. This form is oriented toward company vehicles transporting radioactive material to and from field sites.

1. If radioactive materials were not transported, check box "Radioactive materials were not transported".
2. Shipper and Cosignee - Enter the shipper's and cosignee's address in the spaces provided.
3. Number of Curies - Enter the number of curies as of the day being transported.
4. MR/HR @ surface of shipping container and MR/HR @ 36" - Enter the highest reading at the surface of the shipping container and the highest reading @ 36" from the container. The reading at 36" is the transport index.
5. Vehicle Survey - Enter the highest reading at the surface of the vehicle and the highest reading at the driver's seat. No radiation level is to exceed 2 MR/HR @ these areas.
6. Contents - Circle contents - Iridium 192.
7. Type B shipping container inspection - Enter the serial number, certification number and note the condition of the shipping container.
8. Preparation for Shipping
   A. Place exposure device in a Type B shipping container. Type B exposure devices may necessitate the use of nonspecification overpacks.
   B. Block or brace the package to prevent shifting during transit.
   C. Shipping container shall have affixed an address label (same as used for shipper and cosignee) and all D.O.T. required identification.
   D. Shipping container shall have affixed, two"Yellow 11" labels. Information required on labels are as follows:

   Contents (spell out Iridium 192) transport index-not over 1.

   NOTE: Do not transport if transport index is over 1 (1.0 MREM/HR @ 36") or surface reading is over 50 MREM/HR additional shielding will be required.
9. Certifying statements and signature

   Signing this document - Validates the statement to indicate all applicable regulations, procedures were adhered to in the performance of radiography and the preparation of the shipping package.

(Field Gamma)
(Part 2)

N T S **NATIONWIDE TESTING SERVICES, INC.**

RADIATION SAFETY AND CONTROL PROGRAM
RADIATION SAFETY SURVEY REPORT

CUSTOMER NAME: _____
JOB LOCATION: _____
CITY/TOWN/STATE _____

TECHNICIAN:	FILM BADGE TLD. NO.	DOSIMETER NUMBER	READING START	READING STOP	

SOURCE MATERIAL: _____ S/N _____ EXPOSURE DEVICE MODEL _____ S/N _____

DAILY MAINTENANCE INSPECTION

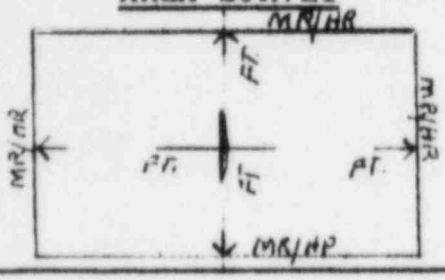
_____ ACCEPTABLE REMARKS: _____
_____ UNACCEPTABLE: _____

SURVEY METER

MAKE _____ MODEL _____ S/N _____ DATE CALIBRATED _____

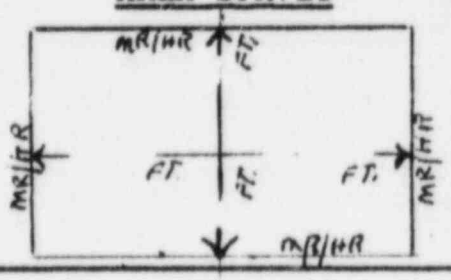
EXPOSURE DEVICE SURVEY WHEN REMOVED FROM STORAGE
_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT
EXPOSURE DEVICE SURVEY AT CONCLUSION OF LAST RADIOGRAPHIC EXPOSURE
_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT
EXPOSURE DEVICE SURVEY WHEN RETURNED TO STORAGE
_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT

AREA SURVEY

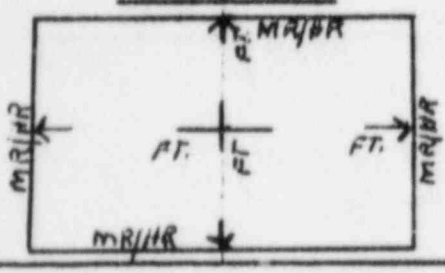


COMMENTS:

AREA SURVEY

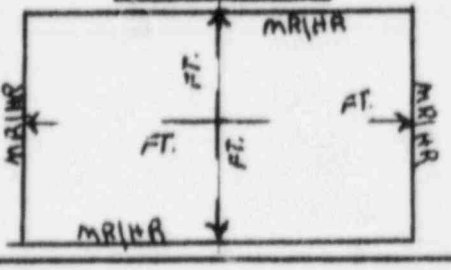


AREA SURVEY



COMMENTS:

AREA SURVEY



Radiographic activities were conducted as to NATIONWIDE TESTING SERVICES Operating and Emergency Procedures 20.1.0.
Signature _____

INSTRUCTIONS (SURVEY REPORT)

1. THIs form is to be completed for each day or job. This includes periods the exposure device is removed from storage, but is not used to perform radiography.
2. Customer - Self-explanatory
3. Date - Self-explanatory
4. Job Location - Self-explanatory
5. Technician - Radiographer, Ass't Radiographer and other monitored individuals names.
6. Film Badge/TLD No. - Self-explanatory
7. Dosimeter No. - Serial number of your dosimeter.
8. Dosimeter Reading Start - Dosimeter reading at start of each day or job. Dosimeters are to be zeroed at the beginning of each day or job.
9. Dosimeter Reading Stop - Dosimeter reading at the end of each day or job.
10. Source material and S/N - Record the type of byproduct material (IR 192) and the serial number of the capsule.
11. Exposure device model and S/N - Self-explanatory
12. Daily Maintenance Inspection - Perform the daily maintenance inspection as by section 20.1.0 note the condition as acceptable or unacceptable. If unacceptable, the item should be noted in the remarks column and brought to the Radiation Safety Officers attention. Do not use the exposure device until it is repaired.
13. Survey Meter - Record the make and model of the survey meter used. The serial number, and the date the survey meter was calibrated.
14. Exposure device survey when removed from storage. Record the highest reading in MR/HR at the surface of the device and the port
15. Exposure device survey at conclusion of last radiographic exposure Record the highest reading in MR/HR at the surface of the device and at the port. Surveys of the exposure device are performed each time the source is returned to the shielded position as described by procedure 20.1.0 paragraph 1.3. The survey at the conclusion of the last radiographic exposure is recorded.
16. Exposure device survey when returned to storage - Record the highest reading in MR/HR at the surface of the device and at the port. The readings should be the same as when removed from storage. If not, it should be suspected the source is not in the safe position.
17. Area Radiation Survey - Record the distances and readings. When the geometry changes more than 3 times, additional reports are to be used.

Form No. 20.23

NTS **NATIONWIDE TESTING SERVICES, INC.**

RADIATION SAFETY AND CONTROL PROGRAM

RADIATION SAFETY SURVEY REPORT (X-RAY FIELD)

Customer:_____ Date_____

Job Location:_____

Technician	Film Badge Number	Dosimeter Number	Dosimeter Reading start	Dosimeter Reading stop

Tube Head Make and Model_____ S/N_____

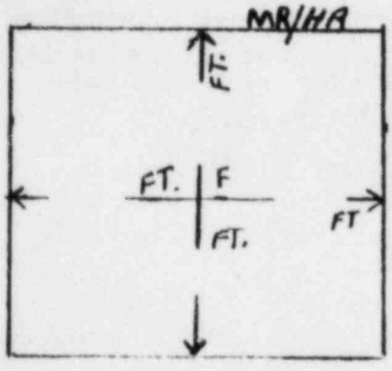
Control Panel Make:_____ S/N_____

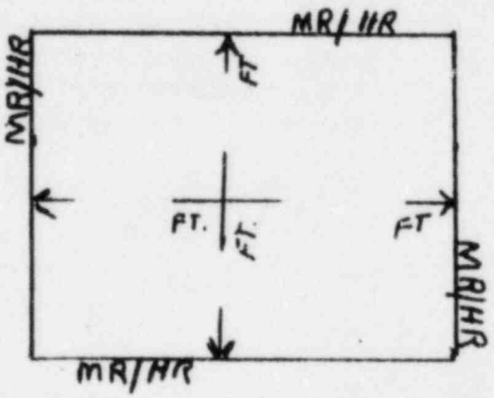
Daily Maintenance Inspection: Acceptable Unacceptable Remarks:_____

Survey Meter Model:_____ S/N_____ Date Calibrated_____

AREA PHYSICAL RADIATION SAFETY

COMMENTS





All Radiographic Procedures and precautions required by Nationwide Testing Services Radiation and Safety and Control Program Section 20.1.0 Operating and Emergency Procedures were observed.

Signed_____

INSTRUCTIONS

1. This form is to be completed for each day or job X-ray equipment is used in the field.
2. Customer - Self explanatory
3. Date - Self explanatory
4. Job Location - The location where radiography is to be performed. The description of the location is to be as complete and descriptive as possible.
5. Technician - Radiographers, Assistant Radiographers and other monitired names.
6. Film Badge Number - Self explanatory
7. Dosimeter Numbers - Serial number of dosimeter
8. Dosimeter Reading Start - Dosimeter reading in mr at start of day or job. Dosimeters are to be zeroed before each day or job. Therefore this reading should be zero.
9. Dosimeter Reading Stop - Dosimeter reading at end of each day or job.
10. Tube head make, model, S/N - the manufacturer, model and serial number of the tube head.
11. Control panel make and S/N: The manufacturer and serial number of the control panel.
12. Daily Maintenance Inspection - Perform the daily maintenance inspection as required by Nationwide Testing Services Radiation Safety and Control Program Section 20.1.0. Note the condition as acceptable or unacceptable. If unacceptable note the deficient item in the remarks column. Do not use the X-Ray equipment until it is repaired.
13. Survey Meter model, S/N and date calibrated - Record the model of survey meter used, the serial number, and date the instrument was calibrated.
14. Area Physical Radiation Survey - Record the distances and readings when the geometry changes more than once, additional reports are to be used. Use the comment section to note additional precautions.
15. Final compliance statement and signature - The responsible radiographer is to sign the report. Signing the report certifies all radiographic Procedures and Precautions required by Nationwide Testing Services Radiation Safety and Control Program Section 20.1.0 Operating and Emergency Procedures were observed.

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIATION SAFETY SURVEY REPORT (IN HOUSE GAMMA)

CUSTOMER: _____ DATE _____

NATIONWIDE TESTING SERVICES LOCATION: _____

TECHNICIAN	FILM BADGE/TLD NUMBER	DOSIMETER NUMBER	DOSIMETER READING START	DOSIMETER READING STOP

SOURCE MATERIAL: _____ S/N _____

EXPOSURE DEVICE MODEL _____ S/N _____

DAILY MAINTENANCE INSPECTION

ACCEPTABLE
UNACCEPTABLE

REMARKS: _____

SURVEY METER

MODEL: _____ S/N _____ DATE CALIBRATED _____

EXPOSURE DEVICE SURVEY WHEN REMOVED FROM STORAGE:

_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT

EXPOSURE DEVICE SURVEY WHEN RETURNED TO STORAGE:

_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT

EXPOSURE ROOM DESIGNATION: _____

EXPOSURE ROOM INTERLOCK FUNCTION CHECK:

ACCEPTABLE
UNACCEPTABLE

ALL RADIOGRAPHIC PROCEDURES AND PRECAUTIONS REQUIRED BY NATIONWIDE TESTING SERVICES RADIATION SAFETY AND CONTROL PROGRAM OPERATING AND EMERGENCY PROCEDURES WERE OBSERVED. THE PERIMETER OF THE SOURCE STORAGE AREA WAS SURVEYED PRIOR TO REMOVING THE EXPOSURE DEVICE FROM STORAGE AND IMMEDIATELY AFTER RETURNING THE EXPOSURE DEVICE TO STORAGE. THE MAXIMUM RADIATION LEVEL WAS NOT IN EXCESS OF 2 MR/HR.

SIGNED: _____

INSTRUCTIONS

1. This form is to be completed for each day or job Gamma sources are used in licensed exposure room.
2. Customer - Self explanatory
3. Date - self explanatory
4. Nationwide Testing Services Location
5. Technician - Radiographers, Assistant Radiographers and other monitore individual names.
6. Film badge/TLD number - Self explanatory
7. Dosimeter number - serial number of dosimeter
8. Dosimeter Reading Start - Dosimeter reading in MR at the start of each day or job. Dosimeters are to be zeroed before each day or job, there fore, this reading should be zero.
9. Dosimeter Reading Stop - Dosimeter reading at end of each day or job.
10. Source material and S/N - Record the type of by-product material (IR 192) and the serial number of the capsule.
11. Exposure Device Model and S/N - Self explanatory
12. Daily maintenance inspection - Perform the daily maintenance inspection as by Operating and Emergency Procedures and note the condition as acceptable or unacceptable. If unacceptable, the item should be noted in the remarks column and brought to the Radiation Safety Officers attention. Do not use the exposure device until it is repaired.
13. Survey Meter Model, S/N and date calibrated - Record the model of the survey meter used, the serial number and the date the survey meter was calibrated.
14. Exposure device survey when removed from storage - Record the highest reading in MR/HR at the surface of the device and at the port.
15. Exposure device survey when returned to storage - Record the highest reading in MR/HR at the surface of the device and at the port. The readings should be the same as when removed from storage. If not, it should be suspected the source is not in the safe position.
16. Exposure Room Interlock Function Check - Check the exposure room inter locks and alarm system and note as acceptable or unacceptable. If the system is unacceptable the item should be brought to the Radiation Safety Officers attention and repaired. Do not use the exposure room if the alarm system and interlocks are not functional.
17. Certifying statement and signature - Signing this document validates the statement to indicate all applicable regulations, procedures were adhered to in the performance of radiography.

RADIATION SAFETY & CONTROL PROGRAM

RADIOGRAPHIC EQUIPMENT - DAILY INSPECTION AND MAINTENANCE

Each radiographic exposure device and accessory must be inspected before each use. This inspection must be done when removing the item from the storage area.
Equipment found to be insatisfactory shall be reported to the radiation safety officer and/or Nationwide Testing Services Officers and repaired before use.

REMOTE TYPE GAMMA EXPOSURE DEVICE

UNIT - General exterior condition

Handle and feet and identification decals

Source tube and drive cable tube connections

Locking mechanism

Source connector

SOURCE TUBES - General exterior condition

Source tube to unit connection

Source tube to source tip connection

Source tube to tube connections

Source tip

CONTROLS - General exterior condition

Crank handle and drive mechanism

Drive cable to unit connection

Drive cable and cable tubes

Source connection

X-RAY EQUIPMENT

X-RAY TUBE - GENERAL EXTERIOR CONDITION
POWER CORD CONNECTOR
LABEL

CONTROL PANEL - GENERAL EXTERIOR CONDITION
POWER CORD CONNECTORS
METERS
ON-OFF CONTROLS

POWER AND CONTROL CABLES - INSULATION
CONNECTORS

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.1

SOURCE SHIPPING/RECEIVING/TRANSFER/DISPOSAL

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 OBJECTIVE

A.1 The objective of this section is to assure the proper procedure is used to insure compliance with Federal, State and Company regulations which affect the transporting, shipping, and receiving of radioactive material.

B.0 APPLICATION

B.1 Nationwide Testing Services personnel transporting, shipping and/or receiving of radioactive material outside the confines of in house or other authorized location of use.

C.0 PROCEDURE

C.1 The Radioactive Material (source) Shipping-Receiving Instruction Procedure described herein outlines the basic methods and practices used by Nationwide Testing Services to meet the objectives of the regulations.

C.2 This procedure is your guide for the proper procedure used and shall be available whenever you are shipping and/or receiving radioactive material.

C.3 This procedure is subject to modification or revision due to changes in Federal (DOT), State and/or Company requirements.

C.3.1 Procedure modifications or revisions shall be coordinated by the Radiation Safety Officer.

C.3.2 The Radiation Safety Officer is responsible for transmittal of modifications or revisions

C.3.3 The Nationwide Testing Services shall be responsible for maintaining this procedure on all projects.

D.0 PROCUREMENT

D.1 The decision to procure replacement or additional sources rests with the Nationwide Testing Services Officers. Sources shall be obtained by the Nationwide Testing Services only from suppliers and of make, model, and source strength listed on the by-product material licenses issued by the Nuclear Regulatory Commission.

E.0 PACKAGING

E.1 Packaging of radioactive material shall be designated and selected to meet with all the requirements of the Department of Transportation (DOT).

F.0 PREPARATION FOR SHIPPING

F.1 A survey meter shall be used every time a person is required to work with or around radioactive material.

F.2 Inspection of radioactive exposure device.

F.2.1 Survey surface of device for surface radiation levels.

F.2.2 Attach wire seal through safety plug, then to device.

F.2.3 Place exposure device in shipping container.

(1) Shipping container shall be DOT approved.

G.0 SHIPPING

G.1 The following instructions are mandatory to meet with the requirements of DOT and/or Nationwide Testing Services.

G.1.1 Affix address label on shipping container (remove or cover old label.)

G.1.2 Thoroughly remove or obliterate Radioactive Yellow-Shipping Labels from previous shipment.

G.1.3 Complete Radioactive Yellow - II or III Labels and place on opposite sides of shipping container. DO NOT ship without two (2) Radioactive Yellow - II or III Labels on container. (See Figure 1 for type of Yellow Label used.)

"Radioactive Yellow - II" shall be used whenever those requirements can be met.

Information needed on labels is as follows:

Contents: Iridium 192 (Iridium spelled out).

Number of Curies: Amount of curies of shipment.

Transport Index: The highest amount of radiation measured at 36" from any surface of the shipping container.

Example: If the meter reads 2 mr/hr at 36", place a 2 in box, if the meter reads 1 mr/hr place 1 in the box, etc. Transport Index of more than 10 - DO NOT SHIP MATERIAL

G.1.4 Container shall have affixed a "Danger Peligro Cargo Aircraft Only" label (for shipments by air)

G.1.5 Container shall have affixed a package certificate of approval

G.1.6 Container shall be labeled with the basic description of the material. "Radioactive Material Special Form N.O.S."

G.1.7 Container shall be labeled with the type of package "Type B".

G.2 Shipped by Air

G.2.1 Complete Radioactive Material Transfer/Disposal Report (Figure 3).

Note: Place a copy in the shipping container.

G.2.2 Complete Air Bill (Federal Express From 2, by completing the following:

(1) Consignee - Company's name and adress to which material is to be shipped.

(2) Shipper - Company's name and adress shipping material.

(3) Payment - Check Bill Shipper or Bill Consignee as applicable.

(4) Service

(a) Check "Priority one (P-1)"

(b) Check the "deliver " box for hold for pickup or delivery.

(5) Pieces/ Weight/Contents -

(a) Enter the number of packages (one).

(b) Enter the weight of the package.

(c) Enter the total number of packages (one)

(d) Enter the total weight (same as item 2). Enter a description of contents (Radioactive Material).

G.2.3 Complete Shipper's Certification for Materials Classified As Radioactive Material (Federal Express Form Figure 4), by completeing the following:

(1) Number of packages - Enter 1

(2) Proper shipping name - Radioactive Material Special Form N.O.S. - Cargo Only Aircraft.

(3) Radionuclide - 192 IR

(4) Form - Special Form

(5) Activity - Number of curies in shipment. Same as recorded on shipping container (Yellow Labels).

(6) Label Type - Yellow III or Yellow II

Note: "Yellow II" Labels do not require vehicle placards for shipment by highway. Yellow II shall be used whenever the surface reading is under 50 mrem/hr and the reading at 3 feet is not over 1.0 mrem/hr. (See Figure 1)

(7) Transport Index - same as recorded on containers - Yellow Labels. See paragraph G.1.3 for procedure to determine transport index.)

(8) Volume or weight - one.

(9) Check cargo - only aircraft.

(10) Name and adress of Shipper - Jobsite or location shipping material.

(11) Name and Title of Person Signing Certification - Only those individuals qualified to handle Radioactive Material shall prepare and sign shipments. Qualified individuals are the Radiation Safety Officer and Radiographers..

(12) Emergency Phone No. - (312) 299-5438

(13) Date - Date Shipped

(14) Distribution
White - Package Copy
Canary - Customer Service
Pink - Shipper Copy

G.3 Shipped by Truck

G.3.1 Complete Radioactive Material Transfer/Disposal Report (Figure 3) Note: Place a copy in the shipping container.

G.3.2 Complete waybill (Trucking Bill of Lading as follows:

(1) Consignee - Company's name and adress in which material is to be shipped.

(2) Shipper - Company's name and adress shipping material.

(3) Description of pieces and content as follows:

Iridium 192_____curies.
Radioactive Material Special Form N O.S.
Yellow Label III or Yellow Label II

Note: "Radioactive Yellow II Labels do not require vehicle placards for shipment by highway. Yellow II shall be used whenever the surface reading is under 50 mrem/hr., and the reading at 3 feet is not over 1.0 mrem/hr. (See Figure 1)

Transport Index - same as recorded on containers - Yellow Labels. (see paragraph G.1.3 for procedure used to determine transport index.)

Shippers Certification statement must be present on all waybills as follows:

"This is to certify that the above named materials are properly classified, described, packaged, marked, labeled, and are in proper condition for transportation according to the applicable regulations of the DEPARTMENT OF TRANSPORTAION.

(4) Number of Packages - 1

(5) Weight - Number of pounds being shipped.

(6) Class or Rate - 40¢/lbs. min.

Radioactive Material NOIVNX 40¢/lb. should be written in the description and content box (Area 3).

G.3.3 Check to see you have completed Items 3.1 thru 3.3.

G.3.4 Attach ring seal to locking device bolt or clip (on ring) of shipping container.

G.3.5 All sources shipped for disposal should be sent to the original supplier, unless otherwise specified by the Radiation Safety Officer.

G.3.6 Included with each shipment will be the necessary items for that shipment, as well as for the return of shipping container and/or container with radioactive material being returned for disposal.

(1) Two (2) wire seals:

(2) Two (2) Yellow III Labels and/or Yellow II Labels (See Figure 1 for type of Yellow Labels to be used)

(3) Airbill (Federal Express) or Truck Waybill:

(4) Shipping instructions;

(5) Decay chart for new shipment;

(6) Radioactive Material Transfer/Disposal Report (2) Figure 3

G.4 <u>Shipped by company vehicle to and from job sites</u>

G.4.1 Preparation for shipping

G.4.1.1 A survey meter shall be used every time a person is required to work with or around radioactive material.

G.4.1.2 Inspect the exposure device per Form 20.29.
Note: No device shall have a reading in excess of 200mr/hr.

G.4.1.3 Place the exposure device in a Type B shipping container.
Note: It is not necessary to place exposure devices with Type B approval in another Type B shipping drum.

G.4.1.4 Shipping container shall have affixed, two (2) Yellow II Labels. Information required on labels are as follows:

Contents Iridium 192

Number of curies 110 maximum

Transport Index: Not over 1
Note: DO NOT transport if transport index is over 1. (Additional shielding will be required

G.4.1.5 Seal and lock shipping container.

G.4.2 Preparation of shipping document.

G.4.2.1 Form 20.22 shall serve as the radioactive materials shipping document for shipment by company vehicles. This form has been designed to fulfill the requirements of the Department of Transportation.

G.4.2.2 Shipper and Consignee - The Nationwide Testing Services address ahll be entered in the spaces provided.

G.4.2.3 Date - Enter date the radioactive material is transported.

G.4.2.4 Jobsite Location - enter the field site address where the radioavtive material is to be used.

G.4.2.5 Exposure device S/N - enter the serial number of the device.

G.4.2.6 Number of Curies - enter the number of curies as of the day being transported.

G.4.2.7 Surface mr/hr of container and mr/hr at 36" - enter the highest surface reading of the shipping container and enter the reading at 36" from the container (which is the transport index).

G.4.2.8 Description of pieces and contents - identify the material being shipped by circling Iridium 192.

G.4.2.9 Signature of radiographer - The Radiographer completing form will sign their name in the colume provided.

G.4.2.10 Form 20.22 (part one) in case of accident or inspection
a) clearly distinguish the shipping paper (Form 20.22)
b) When the driver is at the vehicle controls, the shipping papers shall be within his immediate reach while he is restrained by the lap belt.
c) Visible to a person entering the drivers compartment or in a holder which is mounted to the inside of the door on the drivers side of the vehicle.
d) When the driver is not at the vehicle controls, the shipping paper shall be in a holder which is mounted to the inside of the door on the drivers side or on the drivers seating in the vehicle.

H.0 RECEIVING

H.1 Picking up shipment - Each licensee who picks up shipment from a carrier's terminal shall do so expeditiously upon receipt of notification. The shipment shall be monitored as soon as practical after receipt, but no later than three hours after package is received during normal working hours, or 18 hours if received after normal working hours.

H.2 If radiation levels are found on external surfaces of container in excess of 200 mr/hr, or at three feet from external surfaces in excess of 10 mr/hr, the individual shall

immediately notify the Radiation Safety Officer at (312) 299-5438 or Nationwide Testing Services Offices. Receipt of sources shall be documented on Form 20.18 (Radioactive Material Receipt Report), Figure 5 and a copy forwarded to the Radiation Safety Officer.

I.0 ENFORCEMENT OF REQUIREMENTS

I.1 It shall be the responsibility of the Nationwide Testing Services Officers and/or Radiation Safety Officer to enforce the requirements of this procedure.

SHIPPING LABELS

FIGURE 1

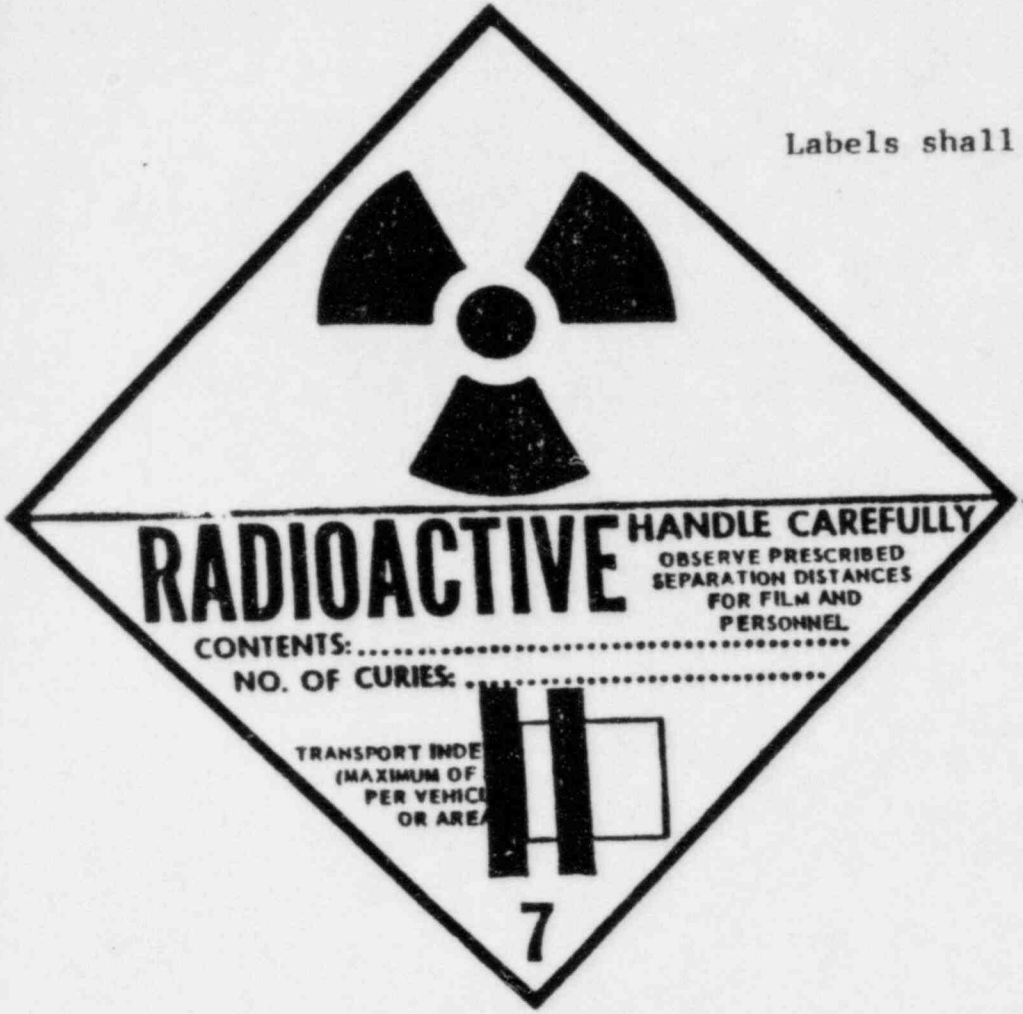
* "RADIOACTIVE YELLOW-II"

0.5 to 50 mrem/hr on the surface.
Not over 1.0 mrem/hr at 3 ft.

** "RADIOACTIVE YELLOW-III"

> 50 mrem/hr on surface but ⊁ 200.
> 1.0 mrem/hr at 3 ft. but ⊁ 10.

Labels shall be completed



* "Radioactive Yellow-II" -- Does not require vehicle placards for shipment by highway. Yellow-II shall be used whenever the surface mrem/hr and the 3 ft. mrem/hr can be met.

** "Radioactive Yellow-III" -- Requires vehicle placards on all four sides.

FIGURE 2

Shipped by Air Paragraph 3.2.2

FEDERAL EXPRESS — Federal's new form

PLEASE COMPLETE ALL INFORMATION IN THE 5 BLOCKS OUTLINED IN ORANGE
SEE REVERSE SIDE FOR COMPLETE PREPARATION INSTRUCTIONS

YOUR F.E.C. ACCOUNT NUMBER | DATE | AIRBILL NO 30589492

FROM Your Name | TO Consignee's Name | If Hold For Pick Up Phone No

COMPANY | DEPARTMENT FLOOR NO | DEPARTMENT FLOOR NO

SAMPLE

STREET ADDRESS | STREET ADDRESS

CITY | STATE | ZIP | CITY | STATE | ZIP

PURCHASE ORDER NO. OR YOUR REFERENCE NO | PURCHASE ORDER NO. OR CONSIGNEE REFERENCE NO | F.E.C. USE

PAYMENT ☐ Bill Shipper ☐ Bill F.E.C. Acct. No. | FREIGHT CHARGES

☐ Cash in Advance ☐ Bill F.E.C. Acct. No. | VALUATION CHARGE

SERVICE (Check One)	DELIVERY INSTRUCTIONS (Check One)		SPECIAL HANDLING (Check Services Required)				
	Deliv	Hold For Pick Up	Sat. Deliv	Restricted Articles	SSS	Govt	Other
PRIORITY ONE — Overnight Letter				X			
COURIER PAK ☐ Overnight Envelope (Up to 2 lbs)	☐	☐	☐	N.A.	☐	☐	
☐ Overnight Box (Up to 5 lbs)	☐	☐	☐	N.A.	☐	☐	
☐ Overnight Tube (Up to 5 lbs)	☐	☐	☐	N.A.	☐	☐	
STANDARD AIR ☐ Scheduled Next Day Deliver.							

Pieces	Weight	Declared Value	C.S.
1	65		
Total	Total	Total	
1	65		

AGT PRO | ADVANCE ORIGIN

AGT PRO | ADVANCE DESTINATION

OTHER

TOTAL CHARGES

Description of Contents: Radioactive Material

RECEIVED AT ☐ Shipper's Door ☐ FEC Station | FEC EMPLOYEE NO | DATE TIME

EC 8-78

OR THIS FORM

FEDERAL EXPRESS — Federal's older form

Account Number | Date | Airbill No 63264327

Account Name (Shipper) | Consignee | Attn of

Street | Street

City | State | City | State

SAMPLE

Ref. No. / P.O. No | Zip | Purchase | Zip

Payment: ☐ Bill to Shipper ☐ Cash in Advance ☐ Bill to Consignee ☐ Bill to 3rd Party (Bill to no.) | Freight Charges

NON-NEGOTIABLE AIRBILL SUBJECT TO CONDITIONS OF CONTRACT SET FORTH ON REVERSE OF SHIPPER'S COPY

Pieces	Weight	Decl. Val.	C.S.
Description: Radioactive Material			

Pieces	Weight	Decl. Val.	C.S.
1	65 lbs		
Total 1	Total 65 lbs		

DV | Advance Origin | Advance Destination | Other | Total Charges

☐ P.1 ☒ Haz ☐ SSS ☐ Sat. Serv ☐ Govt Invoice ☐ Other

Received at: ☐ Shipper's Door ☐ FEC Station | FEC Emp. No | Date/Time

Delivery Instructions

☐ HOLD AT STATION AND NOTIFY | Tel No

FEC 8-0048 1/78 PRINTED IN USA

FIGURE 4

Shipped by Air

FEDERAL EXPRESS CORPORATION

SHIPPER'S CERTIFICATION FOR MATERIALS CLASSIFIED AS RADIOACTIVE MATERIAL

NUMBER OF PCKGES	PROPER SHIPPING NAME Per Section 172.101, Title 49, Code of Federal Regulations (49 CFR) No abbreviations permitted. Specify each article separately.	RADIONUCLIDE Name of principal Radioactive content (49CFR 173.390)	FORM Physical/ Chemical	ACTIVITY Number of Curies	LABEL White I or Yellow II or Yellow III	TRANSPORT INDEX For Yellow Labels Only	VOLUME OR WEIGHT (as appropriate)
1	Radioactive Material Special Form N.O.S. Cargo Only Aircraft	192 Ir	Special Form				One

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to applicable regulations of the carrier and Title 49, Code of Federal Regulations. If acceptable for passenger carrying aircraft this shipment is intended for use in, or incident to research or medical diagnosis or treatment. This consignment is within the limitations prescribed for: (MARK ONE)

( ) BOTH PASSENGER AND CARGO AIRCRAFT

(X) CARGO ONLY AIRCRAFT

SAMPLE

NAME AND ADDRESS OF SHIPPER

NAME AND TITLE OF PERSON SIGNING CERTIFICATION

SIGNATURE

EMERGENCY PHONE NO

DATE

DISTRIBUTION
White – Package Copy
Canary – Customer Service/MEM
Pink – Shipper Copy

FEC-5-0149 (Rev. 3/77)

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.2

OPERATING AND EMERGENCY PROCEDURES

SYSTEM OF CONTROLS

CONTROLLED COPY
NO._____
DATE_____
ISSUED_____

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Authorized For Use (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 Present the administration system for normal operations and handling radiation emergencies. The specific emergency actions to be taken by the Radiation Safety Officer are also included in this procedure.

B.0 APPLICATION

B.1 Nationwide Testing Services operations that control, handle and/or store sealed sources used in the performance of industrial radiography.

C.0 PROCEDURE

C.1 Operating and Emergency Procedures

The Operating and Emergency Procedures is the Radiographer's and Assistant Radiographer's controlling document for routine operations and handling emergencies. The Operating and Emergency Procedures will be used in all field and in house operations.

C.1.1 Assistant Radiographer and Radiographer shall have Operating and Emergency Procedures available when-he/she is working with or around a sealed source.

C.1.2 Operating personnel are directed by the Operating and Emergency Procedures to report all radiation emergencies, as defined in paragraph 0.5, emergencies shall be reported to the Radiation Safety Officer.

C.1.3 Radiation safety requirements of Agreement States, which vary from the Operating and Emergency Procedures will be issued as addendums.
Field personnel working in Agreement States will be furnished the proper addendums

C.2 Radiation Hazard Severity

The degrees of radiation hazard are arbitrarily identified as Emergency Class A Incident and Class B Incident.

The definitions for these terms are as follows:

C.2.1 Emergency - A condition which may have caused or threatens to cause one of the following to occur:

C.2.1.1 Exposure:

(a) Whole body - 3 Rem or more
(b) Hands, forearms, ankles and feet 45 Rem or more.

C.2.1.2 Contamination - Any release of radioactive material

C.2.1.3 Work Loss - The loss of 4 hours or more in any facility

C.2.1.4 Damage - Damage of property in excess of $500.00

Note: An emergency includes all Class A and Class B incidents.

C.2.2 Class B Incident - A condition which may have caused or threatens to cause one of the following to occur:

C.2.2.1 Exposure:

(a) Whole body - 5 Rem or more
(b) Hands forearms, feet and ankles 75 Rem or more.

C.2.2.2 Contamination - Any release or radioactive material.

C.2.2.3 Work Loss - The loss of one work week or more for the operation of any facility affected.

C.2.2.4 Damage - Damage of property in excess of $200,000.00

C.3 Handling an Emergency

C.3.1 Radiation emergency reports will be handled by the Radiation Safety Officer or the approved alternates identified in the Program Plan.

C.3.2 The reporting Radiographer will be asked to answer the following questions and provide information covered in paragraph C.3.3.

(a) Have all personnel been removed from the radiation area?

(b) Has the radiation been posted?

(c) Is the area being controlled by a responsible person?

(d) Is there any immediate danger of personnel receiving further radiation exposure?

(e) Were there any personnel injured?

(f) What is the nature of the incident?

C.3.3 Three Emergency Action Guidelines are included in this paragraph. The Radiation Safety Officer shall select and use the appropriate guideline to plan the emergency action. Supplemental actions may be imposed by the Radiation Safety Officer.

TYPE OF EMERGENCY	Reference Paragraph
Personnel Overexposure	C.3.3.1
Exposure Device Malfunction	C.3.3.1
Source out of Guide Tube	C.3.3.1
Loss of Source on the Jobsite	C.3.3.1
Other Condition not Listed Below	C.3.3.1
Missing or Stolen Source	C.3.3.2
Plant or Area Fire	C.3.3.3

C.3.3.1 Emergency Action Guidelines for all conditions except plant or area fires, and a missing or stolen source.

(a) Determine if the source is properly shielded.

(b) Verify personnel are clear of the exposure area.

(c) Verify the radiation area has been posted.

(d) Verify the area is under surveillance.

(e) Determine if personnel are in danger of receiving further exposure.

(f) Determine if any personnel were injured.

(g) Determine which personnel with radiation training are available at or near the site.

(h) Determine the radiation exposure of personnel involved.

(i) Determine the nuclide and S/N of the source to establish field strength.

(j) If the condition is a Class A incident and there is no immediate danger, interrupt the reporting at this point to perform the notifications.

(k) Class A incidents shall be reported immediately, and Class B incidents within 24 hours. Reporting shall be made by telephone or telegraph to the following persons:

Radiation Safety Officer
Nationwide Testing Services
400 W. Touhy Ave
DesPlaines, Ill. 60018
Telephone (312) 299-5438
(312) 893-2466

(l) Verify the exact source location known, or direct the location be determined by triangulation as explained in Figure 4 of the Operating and Emergency Procedures.

(m) Direct the radiation area posting be corrected, if necessary and the high radiation be posted.

(n) Determine what shielding is available which could be used to minimize exposure during recovery.

(o) Determine the need for additional personnel including civil authorities and/or technical assistance during the planning stage and at the site. If extensive delays will occur, plan for continuous surveillance of the area.

(p) Determine the method of recovery which will produce the minimum exposure to the personnel.

(q) Review the radiation history of each trained person who is available to assist in recovery

(r) Establish a step-by-step procedure for recovery. Specify on the written procedure the maximum allowable time for each step (retreat time) which will take place within the radiation or high radiation area.

(s) Calclate the personnel exposure expected for each step. Determine the need for new film badges prior to recovery.

(t) Review the procedure in detail, with the person who will perform the recovery (recoverer). Assure the times will require recalculation of the exposure. Have the Recoverer read the procedure to the Radiation Safety Officer for proffing.

(u) The procedure shall be followed exactly. Changes will be made only by the Radiation Safety Officer.

(v) The Timekeeper shall immediately notify the Recoverer if the retreat time of a step has been reached. The Recoverer shall then immediately leave the radiation area and report to the Radiation Safety Officer for further instructions.

(w) Upon elimination of the emergency, proceed with Post Emergency Action per para. C.4.

C.3.3.2 Emergency Action Guidelines for Missing or Stolen Sources.

(a) Determine what nuclide and S/N is missing.

(b) Determine if the exposure device, storage container or source changer containing the source is missing.

(c) Determine if the source containing the equipment was locked. Is there evidence the locking mechanisms were broken.

(d) Determine if any personnel at the site have information as to the possible location of the source.

(e) Direct the Radiographer to immediately contact the supervisor of the company at the jobsite and make him aware of the hazard. Determine the need for clearing work areas until a survey is conducted. Determine the advisability of conducting a physical search of specific areas.

(f) Direct the Radiographer to rope off the area where the source was last seen, to protect any evidence.

(g) Interrupt the reporting at this point to perform the notifications.

(h) Report immediately, by telephone or telegraph, to the following persons:

Nationwide Testing Services
400 W. Touhy Ave.
DesPlaines, Ill.60018
Telephone (312) 299-5438
(312) 893-2466

(i) Determine the need for additional personnel and/or technical assistance during the planning stage and at the site. If extensive delays will occur, plan for continuous surveillance of the area

(j) Review the radiation history of each trained person who is available to assist in recovery.

(k) Establish a written step-by-step procedure for recovery.

(l) Direct the Recoverer to write the procedure verbatim as given by the Radiation Safety Officer. Have the Recoverer read the procedure to the Radiation Safety Officer for proofing.

(m) The procedure shall be followed exactly. Changes will be made only by the Radiation Safety Officer.

C.3.3.3 Emergency Procedure for Plant or Area Fire:

(a) Determine if the source is exposed. If it is exposed, can it be safely secured and removed from the danger area.

(b) Determine the location of the fire with relation to the source.

(c) Determine if personnel are clear of the exposure area.

(d) Determine if personnel are in danger of receiving further exposure.

(e) Assure the fire crew and plant supervision have been warned of the radiation hazard.

(f) Determine if the radiation area is posted.

(g) Determine if the radiation area can be maintained under surveillance.

(h) Determine if any personnel were injured.

(i) Determine which personnel with radiation training are available at or near the site.

(j) Determine the radiation exposure of personnel involved.

(k) Determine the dosimeter reading for each person involved.

(l) Determine the nuclide and S/N of the source to establish the field strength

(m) If the condition is a Class A Incident.

(n) Class A Incidents shall be reported immediately and Class B Incidents within

24 hours by telephone or telegraph to:

Nationwide Testing Services
400 W. Touhy Ave.
DesPlaines, Ill. 60018
Telephone (312) 299-5438
(312) 893-2466

(o) Verify the source location is known, or direct the location by triangulation as explained in Figure 4 of the Operating and Emergency Procedures.

(p) Direct the radiation area posting be corrected, if necessary, and high radiation area be posted.

(q) Determine what shielding is available which could minimize exposure during recovery.

(r) Determine the need for additional personnel and/or technical assistance during the planning stage and at the site. If extensive delays will occur, plan for continuous surveillance of area.

(s) Determine the method of recovery which will produce the minimum exposure to the personnel.

(t) Review the radiation history of each trained person who is available to assist in recovery.

(u) Establish a step-by-step procedure for recovery. Specify on the written procedure, the maximum allowable time for each step (Retreat Time) which will take place within the radiation or high radiation area.

(v) Calculate the personnel exposure for each step and determine the need for new film badges prior to recovery.

(w) Review the procedure, in detail with the person who will perform the recovery (Recoverer). Assure the times are realistic. Any changes in these times will require recalculation of the exposure.

(x) Direct the Recoverer to write the procedure verbatim as given by the Radiation Safety Officer. Have the Recoverer read the procedure to the Radiation Safety Officer for proofing.

(y) The Recoverer shall assign a responsible person as Timekeeper. The Radiation Safety Officer shall verify that the Timekeeper understands each step of the procedure and the importance of the "Retreat Time".

(z) The Radiation Safety Officer shall maintain telephone contact throughout the recovery, if at all possible.

(aa) The procedure shall be followed exactly. The Timekeeper shall immediately notify the Recoverer if the Retreat Time of a step has been reached. The Recoverer shall then immediately leave the radiation area and report to the Radiation Safety Officer for further instructions

(bb) Upon elimination of the emergency proceed with Post Emergency Action per para. C.4

C.4 POST EMERGENCY ACTION

C.4.1 Film (or TLD) badges of all personnel involved shall be processed on an expedited basis. Exposed personnel are barred from potential radiation exposure assignments until the results of the film badges are available and the employee is released by the Radiation Safety Officer.

C.4.2 Equipment that may have been damaged during the incident shall be removed from service until an inspection, maintenance and calibration (if required) had been performed to the satisfaction of the Radiation Safety Officer.

C.4.3 Notify the Radiation Safety Officer of Nationwide Testing Services the status, except in cases involving only personnel over-exposure.

C.5 PERSONNEL HISTORY RECORDS

C.5.1 Radiation Safety Officer shall make a reasonable effort to obtain the previous radiation history of each new employee.

C.5.2 Radiation Safety Officer shall maintain Form 20.1 (when used) in accordance with 10 CFR 20.

C.5.3 Radiation Safety Officer shall maintain individual's accumulated whole body dose records (comparable to NRC-5).

C.5.4 The Radiation Safety Officer shall report to the NRC and to each terminated employee their accumulated whole body dose information during employment within 30 days after the exposure has been determined on Form 20.2 (10 CFR 19.13 (c) 10 CFR 20.409 (b).

C.5.5 The Radiation Safety Officer shall submit an annual report to the NRC, stating the total number of persons monitored as required by 10 CFR 20.407.

C.6 EMERGENCY RECORDS

Complete records of radiation emergencies will be maintained by the Radiation Safety Officer.

C.7 POSTING REQUIREMENTS

C.7.1 The Radiation Safety Officer shall be responsible for assuring Form NRC-3 or Agreement State Notice to Employee, if applicable, and Form 20.31 is posted at his (her) location.

C.7.2 The Radiation Safety Officer shall be responsible for posting a "NOTICE" (conspicuously located) to comply with the requirements of 10 CFR 19 paragraph 19.11 (b) 10 CFR 21 paragraph 21.6 (sample C.7.2.1) or Agreement States Rules and Regulations (sample C.7.2.2).

C.7.2.1 Sample

NOTICE

This notice is published to comply with the requirements of 10 CFR 19 paragraph 19.11 and 10 CFR 21 paragraph 21.6.

A COPY OF 10 CFR 19, 10 CFR 20, 10 CFR 21, NATIONWIDE TESTING SERVICES RADIOACTIVE MATERIAL LICENSE, AND NATIONWIDE TESTING SERVICES OPERATING PROCEDURES ARE AVAILABLE IN THIS OFFICE AND MAY BE EXAMINED BY CONTACTING THE RADIATION SAFETY OFFICER.

C.7.2.2 Sample

NOTICE

This notice is published to comply with the requirements of Agreement States Rules and Regulations.

A COPY OF THE AGREEMENT STATES RULES AND REGULATIONS, NATIONWIDE TESTING SERVICES STATE RADIOACTIVE MATERIAL LICENSE AND NATIONWIDE TESTING SERVICES OPERATING PROCEDURES ARE AVAILABLE IN THIS OFFICE AND MAY BE EXAMINED BY CONTACTING THE RADIATION SAFETY OFFICER.

C.7.3 The Radiation Safety Officer shall be responsible for posting a copy of Section 206 of the Energy Reorganization Act of 1974.

A.0 GENERAL

A.1 Reporting of Defects and Noncompliance (10CFR21)

A.2 Deviations identified in nuclear materials, parts, or components through test inspection operations of Nationwide Testing Services shall be reported to the purchaser or licensee for evaluation.

A.3 The report of deviations shall be acknowledged by the signature of the recipient.

A.4 A copy of the completed report shall be forwarded to the Quality Control Manager.

A.5 The disposition of the deviation shall be completed by the purchaser or licensee and Nationwide Testing Services notified if re-examination is required.

A.6 Nationwide Testing Services maintains the right to report any deviation to the Commission. (NRC)

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.3

QUALIFICATION AND CERTIFICATION PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 OBJECTIVE

A.1 Assure personnel are competent in radiation safety to the level required by their job assignment.

B.0 APPLICATION

B.1 Nationwide Testing Services personnel.

C.0 PROCEDURE

C.1 Definitions:

(a) Qualification- Compliance with the requirements of certification.

(b) Certification- Written testimony of qualifications.

(c) Certifying Agency- Nationwide Testing Services.

(d) Trainee Radiographer- An employee who is training for the position of Radiographer's Assistant.

(e) Assistant Radiographer- An individual who uses radiographic exposure devices, sealed sources, related handling tools, or survey instruments while under the personal supervision of a Radiographer. He is certified in accordance with this Qualification and Certification section.

(f) Radiogr pher - An individual who performs radiography or is in attendance at the radiography site to supervise radiographic operations. The Radiographer is responsible to the Radiation Safety Officer for assuring that radiography is performed an accordance with the Safety Program. He is certified in accordance with this Qualification and Certification section.

(g) Assistant Radiation Safety Officer- An individual with experience in radiation safety, who performs training and examination of Trainee Radiographers, Assistant Radiographers, Radiographers, and officers. He shall be certified in accordance with the Qualification and Certification section for a Assistant Radiation Safety Officer.

C.2 Authority - The radiation safety portion of personnel qualification and certification shall be vested in the Radiation Safety Officer.

C.3 Levels of Qualification

(a) Trainee Radiographer- All trainees shall be trained in basic safety as specified in Procedure 20.1.4 Training. The employee shall be required to complete a written quiz prior to starting his on-the-job training assignment.

(b) Assighnment Radiographer- The radiation safety requirements for an Assistant Radiographer are as follows:

(1) Minimum age - 18 years.

(2) No known history of previous radiation exposures which would prohibit or cause restriction of his activity.

(3) Free from physical handicaps which could endanger himself or others during performance of his job.

(4) Completion of the radiation safety training requirements for Assistant Radiographer as defined in Procedure 20.1.4 Training.

(5) Satisfactory completion of the Assistant Radiographers examinations.

(c) Radiographer- The radiation safety requirements for a Radiographer are as follows:

(1) Previous qualification by Nationwide Testing Services as an Assistant Radiographer, or compliance with 2,3,4, and 5 below.

(2) A minimum of 3 months experience as an Assistant Radiographer.

(3) Consideration to be taken to substitute formal documented education and training to fulfill the 3 month minimum requirement on a case basis approved by the Radiation Safety Officer. Formal education shall have been completed by an authorized educational facility.

(4) Completion of the radiation safety training requirements for Radiographer as defined in Procedure 20.1.4 Training.

(5) Satisfactory completion of the Radiographer examinations.

C.4 Examination

(a) Trainee Radiographer- A five question written quiz given to each trainee. It will be directed toward avoiding accidental exposure. An oral review will also be used to assure the points are understood. The quiz will be conducted and evaluated by Radiation Safety Officer or designated indivaidual. A sample quiz is included in Figure #1.

(b) Assistant Radiographer

(1) General- The general examination shall contain a minimum of 10 questions on basic radiation safety. (Closed Book)

(2) Specific- The specific examination shall contain 15 questions on the Operating and Emergency Procedure. (Open Book)

(3) Practical- The practical examination shall measure the employee's proficiency in performing his required functions. He will be required to demonstrate competence to use the radiographic exposure device, sealed source, related handling tools, and survey instruments.

(4) Oral Review- An oral review shall be conducted with the employee to clarify any questions and correct misunderstanings.

(5) The test will be conducted and evaluated by the Radiation Safety Officer or designated individual.

(6) The Radiation Safety Officer shall review the examinations prior to issuance of certification.

(c) Radiographer

(1) General- The general examination shall contain at least 20 questions on basic radiation safety. (Closed Book)

(2) Specific- The specific examination shall contain at least 10 questions each, 30 questions total, on:

(a) Operating and Emergency Procedure.
(b) 10CFR20 and 10CFR34.
(c) Exposure Devices and Survey Meters. (Open Book)

(3) Practical- The practical examination shall measure the employee's proficiency in performing hid required functions. He will be required to demonstrate competence to use the radiographic exposure device, sealed source, related handling tools and survey instruments.

(4) Oral Review- An oral review shall be conducted with the employee to clarify any questions and correct misunderstandings.

(5) The test will be conducted and evaluated by the Radiation Safety Officer or designated individual.

(6) The Radiation Safety Officer shall review the examinations prior to issuance certification.

C.5 Passing Grade- Passing grade for the general, specific, and practical examinations for all certifications will be 80% or greater. Certification shall be disapproved for inability to demonstrate their understanding and/or knowledge of safety requirements.

C.6 Re-examination- Re-examination, after failure of an employee to satisfactorily complete a certification examination, shall not be conducted without a reasonable retraining period. The period shall be determined by the Radiation Safety Officer.

C.7 Certification- The Radiation Safety Officer's authority for issuing certifications for all certifications shall not be delegated.

(a) Certification Restrictions and Extentions

(1) Restrictions may be placed on a certification as deemed necessary by the Radiation Safety Officer. Typical examples are "Glasses required at all times", and "Lifting Limit - 50 lbs." Restrictions shall, in no case, constitute a waiver of the requirements of 10CFR20, 10CFR34, or the Operating and Emergency Procedure. The restrictions will appear on the employee's Certification.

(2) Extensions may be added to the certification as testimony of capabilities beyond the requirements of that level. Extentions may include operations identified by the Radiation Safety Officer. Extentions will require that the employee be trained and demonstrate to the Radiation Safety Officer his competence in understanding and performing the required function. The documentation of such capability shall become a part of the employee's personnel record.

(b) Personnel Records- The personnel records of Trainee Radiographer shall contain:

(1) Name of certified individual.

(2) Level of certification.

(3) Statement indicating satisfactory completion of requirements for Procedure 20.1.4 Training.

(4) Date of certification.

(5) Signature of Radiation Safety Officer.

(6) Copy of the examination taken.

(c) Personnel Records- The personnel records of all other certified individuals shall include:

(1) Name of certified individual.

(2) Level of certification.

(3) Educational background and experience.

(4) Statement indicating satisfactory completion of the requirements for Procedure 20.1.4 Training.

(5) Actual grades obtained in each examination.

(6) Date of certification and/or recertification.

(7) Signature of Radiation Safety Officer.

(d) Certification Card- Certification cards will be issued in accordance with Procedure 20.1.11.

C.8 Recertifications- All certified personnel shall be recertified at least once every three years by one of the following criteria:

(a) Evidence of continuing satisfactory performance as substantiated by audits. If extentions have been added to the certification, the audit must substantiate each extention.

(b) Re-examination in accordance with the original examination requirements.

C.9 Certification Withdrawals- The Radiation Safety Officer shall have the authority to withdraw certifications for:

(a) Violation of safety procedures or disregard for safe practices.

(b) Inability to demonstrate correct procedures during audits.

(c) Reassignment to functions no longer requiring the certification.

(d) Termination of the employee.

C.10 Tests shall be changed for re-examination and/or recertification.

FIGURE #1

NTS **NATIONWIDE TESTING SERVICES, INC.**

DATE:

GRADED BY:

SCORE:

BASIC RADIATION QUIZ

Select the most correct answer to the following:

(1) Those people who are exposed to and recieve radiation during their lifetime are:
   (a) Radiation workers
   (b) Medical x-ray technicians
   (c) General population
   (d) All of the above

(2) Areas designated by magenta and yellow signs should be:
   (a) Entered slowly and carefully
   (b) Hurried through to reduce radiation exposure
   (c) Not entered (except in attendance of a Radiographer

(3) You can work safely with radiation if you:
   (a) Use statistics to compute the probability of radiation hazards on each job
   (b) Follow the simple rules devised for your protection
   (c) Use your common sense, intelligence, and intuition
   (d) Have a PHD in Radiation Physics

(4) When a person is working near a radiation source, he should always:
   (a) Wear personal clothing
   (b) Wear a respirator
   (c) Wear lead-lined clothing provided
   (d) Wear pocket dosimeter and a film badge.

(5) You can always reduce your radiation exposure by:
   (a) Time
   (b) Distance
   (c) Shielding
   (d) All of the above

NAME: Sample

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NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.4

TRAINING PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 To show and assure consistent training to Nationwide Testing Services personnel.

A.2 OBJECTIVE

A) To show understanding of materials, method, and application and verify the understanding of training by examination and demonstration. Verification will be by oral review and written examination. Procedure is outlined in detail to give qualified training to all levels of responsibility in Radiation Safety.

B.0 APPLICATION

B.1 Nationwide Testing Services, Radiographic personnel.

C.0 PROCEDURE

C.1 Nationwide Testing Services training program is presented as follows to provide training areas commensurate with the employee's responsibility and the extent of the radiation danger involved.

1) Trainee Radiographer - No previous experience. Training to become an Assistant Radiographer.
2) Assistant Radiographer - Training to become a Radiographer.
3) Radiographer - Periodic training as outlined in C.3

C.2 Trainee Radiographer - No experience. Trainee Radiographers are given a four (4) hour lecture of information instruction. This instruction is given by the Radiation Safety Officer or a designated individual. The lecture includes the following subjects:

A) Basic Radiation Safety Booklet.
B) Needs and requirements for personnel monitoring.

1) Dosimeter - its functions, necessity, how it is used and the importance of it being carried at all times when working.
2) Film Badge - its function, necessity, how it is used and the importance of it being worn on the job at all times.
3) Dose Rate - R/hr and Mr/hr
4) Radiation Survey Meters - their function, operation, necessity in Radiography.
5) Controlling Radiation Dose - Time, distance and shielding.

C.2.1 During the lecture, the trainee is issued a film badge and dosimeter

C.2.2 Completion of four (4) hours of informative instruction, the trainee is given a written Basic Radiation Quiz and an oral review on basic radiation safety. To verify his understanding of the subjects covered as listed above.

C.2.3 After the instruction period of four (4) hours the Trainee if qualified, is issued a copy of Nationwide Testing Services Operating and Emergency Procedures.

C.2.4 A minimum of 20 hours of on-the-job training shall be required before a Trainee can become qualified for the position of an Assistant Radiographer. The Trainee shall not act in any way or capacity of handling and/or using sources.

C.2.5 On-The-Job-Training - Training includes coverage of the following subjects:

A) Operating and Emergency Procedures

1) The trainee shall be instructed in each section of the Operating and Emergency Procedures as the text for this instruction. This instruction shall be given by the Radiation Safety Officer or a designated individual understanding of the procedures shall be followed by successful completion of the General, Specific and Practical Examinations for Assistant Radiographer in Radiation Safety.

2) The Operating and Emergency Procedures issued to the Trainee shall be carried by him and referred to whenever needed for clarification and understanding of the Procedures.

B) Radiography Equipment

1) The trainee shall be instructed in the use of radiography equipment by using the manufacturer's operations manuals. This instruction shall be given by the Radiation Safety Officer or a designated individual.

2) The trainee shall be assigned to a Radiographic Team and he will observe the operations, procedures and techniques used by the team. He shall not act in any way or capacity of handling or using the radioactive source during this 20 hour training period.

C.2.6 Completion of 20 hours of on-the-job training, the trainee shall be eligible for a written examination followed by an oral review. In addition, he must satisfactorily demonstrate his competence to use, under the instructions of the Radiographer, the radiographic exposure devices, radiation survey instruments, sealed sources and related handling tools which will be used in performing his duties as as Assistant Radiographer.

C.2.7 Completion of the written examination, oral review and demonstration, the Radiographer Trainee becomes eligible for certification as an Assistant Radiographer.

C.3 Assistant Radiographer - After three (3) months employment as an assistant the employee becomes eligible for advancement to the position of Radiographer, upon successful completion of the following training procedure:

C.3.1 Fourteen (14) hours of instruction and demonstration is given to all Assistants before they can become a Radiographer. This instruction and demonstration includes coverage of the following subjects:

A) Origin and Nature of Radiation

1) Structure of the atom
2) Periodic table of elements
3) Isotope
4) Radioactive isotopes
5) Curie
6) Roentgen
7) Decay and half-life

Description of Basic Radiation Physics with emphasis placed on the origin of Gamma radiation and the Radioisotope decay process. The time for this is one (1) hour.

B) Characteristics of X-Rays and Gamma Rays

1) Energy
2) Wave length
3) Intensity
4) Electromagnetic Spectrum

Discussion of the relationship between Energy and Penetration characteristics. The time for this is one (1) hour.

C) Interaction of Radiation with Matter

1) Penetration
2) Absorption
3) Scatter
4) Ionization
5) Bremsstrahlung
6) Half and tenth value layers (shielding)

A general description of the various forms of ionization and the use of half and tenth value layer calculations for shielding. Time for this is one (1) hour.

D) Biological Effects of Radiation

1) Effect of radiation on the organs and tissues of the body.
2) Nature and consequences of radiation exposure.
Time for this is two (2) hours.

E) Units of Radiation Dose

1) Dose Rate R/hr
2) Levels of radiation from licensed material
3) REM
Time for this is one and one-half (1½) hour.

F) Methods of Controlling Radiation Dose

1) Inverse square law
2) Time
3) Distance
4) Shielding

G) Radiation Detection and Measurement

1) Purpose of Dosimetry
2) Dosimeters
3) Film Badges
4) Survey Meters
5) Survey Techniques
6) Equipment Calibration
7) Operations
8) Limitations

A description of dosimetry, monitoring, devices and techniques. Time for this is two (2) hours.

H) Radiographic Equipment

1) Exposure Devices
2) Storage Containers
3) Remote handling equipment
4) Operation and control of X-ray equipment, if applicable

A description and demonstration of devices.
Time for this is one and one-half (1½) hours.

I) The requirements of Federal or Agreement States Regulations

1) This description is on the interpretation of pertinent regulations.
Time for this is two (2) hours.

C.3.2 Completion of the fourteen (14) hours of instruction and demonstration and examination, the Assistant is eligible for certification as a Radiographer.

C.3.3 Guidelines for conducting the training by Nationwide Testing Services shall be as follows:

A) The course of instruction shall be completed within two weeks or ten working days. In the event, the course is not completed within this time frame, it shall be necessary to begin the instruction over again.

B) Conduct the course in the sequence outlined in Procedure 20.1.4. Training Procedure, Paragraph C.2.

C) Each subject in the outline shall be covered in the scope specified.

D) Each item in the outline shall be covered to the extent specified.

C.4 Radiographer - Radiographers shall complete a refresher training/examination every three (3) years in areas of training initially required for certification and/or when deemed necessary by the Radiation Safety Officer because of changes in commission and/or Agreement State Regulations, equipment, and Operating and Emergency System Procedures of Nationwide Testing Services. Upon satisfactory completion of the refresher examination, the Radiographer is eligible for recertification.

C.5 Experienced Radiographic Personnel - Radiographic personnel with previous experience, hired by Nationwide Testing Services shall meet the following requirements:

C.5.1 The previous employer(s) is contacted by telephone, followed by a written confirmation of the following:

A) Confirmation of employment
B) Length of time employed
C) Position and/or title while employed
D) Record of radiation safety training of experience and rating held relative to position or placement by Nationwide Testing Services.

1) After confirmation of employment information, the experienced personnel are issued a copy of the Radiation Safety Operating and Emergency Procedures to study and review.

C.5.2 Radiographic personnel with previous experience are given informative instructions on Nationwide Testing Services Operating and Emergency Procedures, instruments, sources, devices and equipment used in the course of performing their duties.

A) The approximate time for this instruction and examination is eight (8) hours.

B) This instruction is given by the Radiation Safety Officer or a designated individual.

C.5.3 Radiographic personnel with previous experience shall be required to pass the examinations that are applicable to the position being filled. The examinations shall apply in the same manner as outlined in the Qualification and Certification Procedure 20.1.3.

A) Completion of these requirements, the Radiographic personnel with previous experience shall be eligible for certification to the level to which they are qualified.

B) Will be required to work with a Nationwide Testing Services Radiographer for a designated time. Time for this is five (5) work days.

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.5

INSPECTION AND MAINTENANCE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 INSPECTION AND MAINTENANCE OF EQUIPMENT

A.1 GENERAL

A.1.1 The physical condition of all radiographic equipment shall be inspected at the following times:
1) Before each use
2) At the end of each calendar quarter
3) After the equipment has been subjected to unusual stress

B.0 OBJECTIVE

B.1 Provide safe operating equipment and assure sealed sources are controlled.

C.0 APPLICATION

1) Sealed Source
2) Exposure Device
3) Shielded Room
4) Survey Meter
5) X-ray Equipment

D.0 PROCEDURES

Equipment will be maintained in good condition by periodic inspection, test calibration

D.1 MAINTENANCE - CALIBRATION

A label placed on the equipment will identify the date for the next servicing.

D.2 SEALED SOURCE

D.2.1 Leak testing shall be performed every six (6) months and after any equipment accident that could have caused damage to the capsule.
1) Leak testing shall be performed by the Radiation Safety Officer or a designated individual to the directions of Form 20.19, Leak Testing of Sealed Sources (semi-annual)
2) The Leak test will be sent to a NRC Approved Laboratory for analysis.
3) The laboratory will send copies of the results. Completed Form 20.19.
4) Reports which identify capsule leakage will require immediate action as directed in the Operating and Emergency Procedures (20.1.2)

D.2.2 QUARTERLY INVENTORY

1) Quarterly physical inventories of sealed sources will be conducted at the end of each calendar quarter by the Radiation Safety Officer, or a designated individual. Form 20.14 source quarterly inventory shall be completed.
2) Any sources which cannot be accounted for constitutes a Class A Incident requiring immediate action as directed in the Operating and Emergency System Procedures (20.1.2)
3) Completed Form 20.6

D.3 EXPOSURE DEVICE

D.3.1 Daily inspections shall be conducted by the Radiographer. Form 20.19 Exposure Device Inspection (Daily)

D.3.2 Quarterly inspection shall be conducted by the Radiation Safety Officer or designated individual at the end of each calendar quarter.
1) Exposure device inspection (Form 20.27) shall be used when performing step-by-step procedures. Examples of Form 20.27 included as Figure 1.
2) Inspection shall be conducted per Form 20.27 on the following items (if applicable)
   a) Shield Assembly
   b) Source pigtail assembly
   c) Source tubes and cable housings
   d) Crank assembly
   e) Cable (source drive)
   f) Mechanical compatibility of components
3) Items found to be defective shall be "repaired" or "replaced" before being returned to service.
4) Defective items unable to be repaired shall be tagged and removed from service.
5) Tagged equipment shall be returned for maintenance and/or overhaul as required and/or source manufacturer for maintenance.

D.3.3 SPECIAL INSPECTION

D.3.4 Inspections will be conducted in accordance with D.3.2 whenever equipment has been subjected to severe stress or damaged. (dropping, submersion in water, mud or sand) Exposure devices involved in emergencies shall be inspected per instructions of the Radiation Safety Officer. The report shall be identified "Special Inspection" and include a description of the situation encountered.

D.3.5 FIELD MAINTENANCE

1) Servicing of the equipment to correct minor deficencies uncovered by the daily inspections may be performed by the Radiographer except when abnormal radiation levels are involved. Note:Minor deficiencies is defined as preventive maintenance only.
2) Units which show abnormal radiation level shall be immediately removed from service and the Radiation Safety Officer contacted.

D.3.6 SOURCE REPLACEMENT

a) Maintenance and required overhaul should be performed prior to installation of each new source as applicable.
   1) Exposure devices containing IR-192 should be overhauled by an appropriate equipment and/or source manufacturer.

D.4 SHIELDED ROOM

D.4.1 Inspection of shielded room shall be conducted at 12 month intervals or as required by applicable Agreement States Rules and Regulations, by the Radiation Safety Officer or designated individual per the instructions of Form 20.26 Shielded Room Inspection (Annual).

D.5 SURVEY INSTRUMENTS

D.5.1 Maintenance will be performed as required prior to each calibration and after damage or malfunction. The maintenance of survey instruments shall be performed by a facility that has NRC approval.

D.6 X-RAY EQUIPMENT

D.6.1 All X-ray equipment shall be maintained in accordance with manufacturers recommendations.

D.6.2 All X-ray equipment control panel shall be labeled with "Caution X-Rays". The [illegible] produces X-Rays When Energized" with the radiation symbol (magenta on a yellow background).

D.6.3 Daily inspections will be conducted by the Radiographer for proper operating condition.

D.6.4 Quarterly inspection shall be conducted by the Radiation Safety Officer or designated individual at the end of each calendar quarter.
a) Form 20.28 X-Ray Equipment Inspection (quarterly) shall be used when performing the step-by-step

inspection procedure. Form included as Figure 2.

b) Inspection shall be conducted as to Form 20.28 on the following items
   1) X-Ray Tube
   2) Control Panel
   3) Control Cable
   4) Power Cable

D.6.5 Items found to be defective shall be "repaired" or "replaced" before being returned to service.

D.6.6 Defective items unable to be repaired or replaced shall have a tag affixed and shall be removed from service.

D.6.7 Equipment tagged shall be returned to the appropriate equipment manufacturer for maintenance and/or overhaul as required.

Form No. 20.27

NTS NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

GAMMA EXPOSURE DEVICE INSPECTION

GENERAL DATA

QUARTERLY — LOCATION _____ DUE DATE _____
EXPOSURE DEVICE _____ MODEL _____ SN. _____

SPECIAL — LOCATION _____
SPECIAL INSTRUCTIONS _____

	ACCEPT	REPAIRED	REPLACED
SHIELD ASSEMBLY			
1. Check for excessive or abnormal radiation levels on the surface of the shield assembly.	____	____	____
2. Inspect safety plug for proper condition	____	____	____
3. Check locking mechanism for proper operation and for firm attachment to the shield assembly.	____	____	____
4. Inspect for proper alignment of "S" tube with entrance and exit ports.	____	____	____
5. Inspect carrying and holddown components for proper condition.	____	____	____
6. Inspect for proper labeling.	____	____	____
PIGTAIL ASSEMBLY			
7. Inspect connector for proper condition	____	____	____
SOURCE TUBES CABLE HOUSING			
8. Inspect for rust, dirt, or sludge buildup inside the tubes	____	____	____
9. Inspect tube connectors for proper condition.	____	____	____
10. Inspect for kinks, crushed sections, or other damage that could prevent operation.	____	____	____
CRANK ASSEMBLY			
11. Check for operating characteristics.	____	____	____
12. Inspect for excessive wear for damage to components.	____	____	____
CABLE			
13. Inspect Connector for proper condition.	____	____	____
14. Remove and inspect entire cable for flexibility, wear, rust, broken wires and length.	____	____	____
COMPONENT MECHANICAL COMPATABILITY			
15. Check connectors on source pigtail assembly and cable for proper fit and the possibility of accidental disconnection.	____	____	____
16. Check connectors on shield assembly and tubes for a proper fit.	____	____	____

INSPECTED BY: _____ DATE _____

Form No.20.28

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

X-RAY EQUIPMENT INSPECTION

☐ QUARTERLY

☐ SPECIAL

LOCATION _____ DUE DATE _____

TUBE HEAD _____ MODEL _____ SN. _____

CONTROL PANEL _____ MODEL _____ SN. _____

SPECIAL INSTRUCTIONS _____

_____

	ACCEPT	REPAIRED	REPLACED
X-RAY TUBE			
1. Check gas pressure (if applicable).	_____	_____	_____
2. Check power cord connector.	_____	_____	_____
3. Check general tube condition.	_____	_____	_____
4. Check condition of label "CAUTION X-RAYS THIS EQUIPMENT PRODUCES X-RAYS WHEN ENERGIZED."	_____	_____	_____
CONTROL PANEL			
1. Check general case condition.	_____	_____	_____
2. Check meter movement condition.	_____	_____	_____
3. Check power & control cord connectors.	_____	_____	_____
4. Check power & control cord connectors.	_____	_____	_____
5. Check X-Ray "ON" & "OFF" lights.	_____	_____	_____
6. Check key switch & lock.	_____	_____	_____
CONTROL CABLE			
1. Check both connectors.	_____	_____	_____
2. Check insulation full length.	_____	_____	_____
POWER CABLE			
1. Check connector & electrical plug.	_____	_____	_____
2. Check insulatien full length.	_____	_____	_____

REMARKS: _____

_____

_____

INSPECTED BY: _____

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.6

SOURCE CHANGING PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Authorized For Use (Radiation Safety Officer		Date
Issued to NRC for Approval		Date

A.0 OBJECTIVE

A.1 This procedure has been developed to assure a safe operation during source changing.

B.0 APPLICATION

B.1 Radiation Safety Officer of Nationwide Testing Services or a designated individual by the Radiation Safety Officer shall use source changers for the exchange of sources.

C.0 GENERAL

C.1 Only sources listed with source changers in Nationwide Testing Services NRC license may be changed by the Radiation Safety Officer or designated individual by the Radiation Safety Officer. All other sources shall be changed by the source supplier.

C.2 Only source models approved by Nationwide Testing Services NRC license for use in compatable exposure devices shall be used.

C.3 Upon receipt of a new source in a source changer, Nationwide Testing Services Radiation Safety and Control Program Procedures 20.1.1 source shipping/receiving/ transfer/disposal Paragraph A.0 shall be followed.

D.0 REMOVING OLD SOURCE

D.1 Always have a properly operating survey meter at hand when changing sources.

D.2 Survey shipping container upon receipt with a survey meter. Surface reading should not exceed 200 MR/HR.

D.3 Attach one end of the source guide tube in the usual manner. Remove dust cap and connect the other end of the source guide to the empty side of the source changer. Position the equipment in such a manner to permit free travel of the source assembly in the tube.

D.4 Unlock empty side of source changer

D.5 Crank the source out of the camera and into the source changer. Note: Stand as far away as possible when retracting control cable.

D.6 Survey the source changer to verify the source is in the safe position and lock changer.

D.7 Disconnect source guide tube and drive cable to source pigtail. Replace dust cap.

E.0 INSTALLING NEW SOURCE

E.1 Remove dust cap on the source changer.
Note: Lock body with the new source tag.

E.2 Align the isotope camera and source guide tube with source changer. Drive cable should protrude from end of source guide tube about ½ inch.

E.3 Connect new source to drive cable.

E.4 Connect source guide tube to the source changer.

E.5 Unlock the source changer and retract the new source into the exposure device.

E.6 Survey the exposure device to assure source is in the safe position, lock the exposure device, disconnect source guide tube and drive accessories.

E.7 Mount new source identification plate on exposure device.
Note: Distributors of sealed source usually supply a certificate with each source giving the results and date of the last leak test performed on a source. If such a certificate is not received the source shall not be used until a leak test has been performed and the results of the test showing that the source is not leaking or contaminated have been received.

F.0 LEAK TESTING

F.1 Upon completion of the source changer perform a leak test. The leak test shall be accomplished by wiping the port of the changer which contained the new source. Leak testing shall be performed in accordance with Nationwide Testing Radiation Safety and Control Program Procedure 20.1.3.

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.7

SURVEY INSTRUMENT CALIBRATION PROCEDURE

(Performed by Outside Vendors)

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

NATIONWIDE TESTING SERVICES, INC.

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A.0 SCOPE

A.1 This procedure describes the method and general requirements in which survey instruments of Nationwide Testing Services shall be calibrated by outside vendors.

B.0 GENERAL

B.1 The method described herein is designed to assure survey instruments of Nationwide Testing Services calibrated by outside vendors meet the minimum requirements of Nationwide Testing Services, Nationwide Testing Services License conditions and USNR C Title 10 CFR or applicable Agreement State regulations.

B.2 Survey instruments shall be calibrated at intervals not to exceed 3 months and after servicing.

B.3 Survey instruments accuracy shall not exceed $\pm$ 10% of full scale reading.

C.0 REFERENCES

C.1 U.S. Nuclear Regulatory Commission Title 10 CFR or applicable Agreement State regulations.

D.0 PERSONNEL

D.1 Any survey instrument calibration service vendor approved by the Radiation Safety Officer of Nationwide Testing Services may calibrate Nationwide Testing Services survey instruments provided the vendor complies with the general requirements specified in this procedure.

E.0 EQUIPTMENT

E.1 Survey instruments shall be calibrated by survey instrument calibration devices containing Cobalt 60 or Cesium 137.

F.0 PROCESS

F.1 Survey instruments shall be calibrated in accordance with the vendors approved calibration procedure provided the requirements specified in this procedure are met.

F.2 Survey instrument calibration shall be accomplished by checking two points on each range.

F.3 An adhesive label shall be affixed to each calibrated survey instrument. As a minimum, the label shall contain the following information:

a.) Date calibrated;

b.) Date calibration due;

c.) Serial number of unit;

G.0 RECORDS

G.1 Records of survey instrument calibration shall contain as a minimum the following information:

a.) Name of vendor supplying survey instrument calibration service;

b.) Type, model, S/N of survey instrument calibrated;

c.) Range checked;

d.) Two calculated intensities on each range;

e.) Survey instrument reading at calculated intensities;

f.) Date calibrated;

g.) Calibration and date;

h.) Byproduct material used to calibrate;

i.) Technician performing calibration;

j.) Information regarding any repairs;

H.0 ACCEPTANCE CRITERIA

H.1 Survey instruments which cannot be calibrated within ± 10% of full scale on any range shall be unacceptable.

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.8

LEAK TESTING PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 OBJECTIVE

A.1 Detect leakage of a sealed source.

B.0 APPLICATION

B.1 Nationwide Testing Services sealed sources.

C.0 PROCEDURE

C.1 All sources shall be leak tested at intervals not to exceed six months.

C.2 Sources transferred to Nationwide Testing Services shall be accompanied by a current Certification of Sealed Source and Leak Test Analysis (6 month) containing the following or be subjected to retesting.

C.2.1 Nuclide
C.2.2 Source serial number
C.2.3 Activity
C.2.4 Date sample collected
C.2.5 Date of Analysis

C.3 The leak test kit shall be used in accordance with supplier's instructions. The Radiation Safety Officer licensed by the NRC or Agreement State shall perform the wipe. Analysis shall be performed by a NRC or Agreement State approved vendor.

C.4 Sources received in a source changer shall be leak tested upon receipt after the source has been loaded in the exposure device. This shall be accomplished by swabbing the exchange part of the source changer.

C.5 Retest Notification - Radiation Safety Officer is responsible for implementing the action for leak testing. Test per instruction on Form 20.19.
NOTE: Swab the inside of the exposure port as far into the camera as possible, using the same swab as was used in the exposure port, swab the pigtail.

C.6 Any analysis that shows a level of contamination of .005 micro-curies or greater, constitutes a Class A incident. The Radiation Safety Officer shall immediately implement the required emergency action.

C.7 Performance of Leak Tests shall be documented on Form 20.19. Leak Test analysis records shall be maintained for review.
NOTE: Always have properly operating survey meter at hand when working around sources.

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.9

AUDIT PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 The audit provides continuing surveillance to ensure compliance with Federal, State and Nationwide Testing Services radiation safety regulations.

A.2 OBJECTIVE

A.3 Information to management regarding the effectiveness of Nationwide Testing Services activities which affect radiation safety.

B.0 APPLICATION

B.1 Nationwide Testing Services In House/or Projects Work.

C.0 PROCEDURE

C.1 The Radiation Safety Officer is responsible for planning, scheduling and follow-up of radiation safety audits. The categories of audits to be performed are:

A) System
B) Equipment
C) Personnel

C.2 System audits are performed to determine adequacy of the radiation safety system.

A) Audit check sheets shall be used to assure consistent evaluation of all areas of radiation safety. Specific check sheets on the Operating and Emergency Procedures will verify compliance.

B) In House shall be audited at least annually for compliance with the Radiation Safety System.

C) Project shall be audited at least every six (6) months for compliance with the Radiation Safety System.

C.3 In House and equipment audits are designed to reduce radiation safety incidents resulting from equipment failures.

A) Audits of In House and equipment shall be performed on check sheets for compliance to maintenance and calibration procedures.

C.4 Personnel audits will assure consistent training and only qualified employees are performing radiation area tasks.

A) Audits of personnel will use check sheets to verify compliance with Training and Qualification Procedure.

B) Personnel audits shall be conducted for certified Radiographers quarterly.

C) Personnel audits shall be conducted within 30 days of due date.

1) Individuals failing to be audited within 30 days of due date will have their certification temporarily revoked.

2) Certifications shall remain revoked until audited and reinstated by the Radiation Safety Officer.

D) Individuals being certified by examination shall be immediately audited after receiving his/her certification.

C.5 Audits will be planned and scheduled by the Radiation Safety Officer.

A) Audit planning delineates procedure, forms, and check lists to be used and identifies specific areas of emphasis

C.6 Audits shall be performed by designated representative as follows:

A) A system, equipment and project audit.

1) President
2) Vice President
3) Assistant Radiation Safety Officer
4) Quality Control (designated representative)

B) Personnel Audit

1) Individuals as listed in C.6.A.

C) Audits may be announced or unannounced.

C.7 All audits will be documented with copies of the reports filed.

C.8 Deficiencies found by audit will be reviewed by the Radiation Safety Officer for appropriate corrective action, corrective action shall be in accordance with Procedure 20.1.19 "Corrective Action"

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.10

POCKET DOSIMETER

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 OBJECTIVE

A.1 Detect Pocket Dosimeter

B.0 APPLICATION

B.1 Nationwide Testing Services Pocket Dosimeter.

C.0 PROCEDURE

C.1 All pocket dosimeters shall be checked at intervals not greater than six (6) months or when the dosimeter operation is in question.

C.2 Dosimeters issued by the Radiation Safety Officer are the only ones to be used.

D.0 The following steps shall be used when checking the dosimeter:

A) Zero the dosimeter
B) Expose the dosimeters to a known dose and record the exposure technique on Form 20.30. The dose should be in the range of 50% to 80% of the dosimeters range, except that the dose for calibration of dosimeters, a range greater than 10R may be 8R to 80% of the dosimeters range.

Dosimeter Range	Dose for Calibration
0 - 200 mr	100 mr to 160 mr
0 - 500 mr	250 mr to 400 mr
0 - 10 R	5R to 8R
Range above 10R	8R to 80% of the dosimeters range

C) Read the dosimeter and record the dose on Form 20.30 immediately after the end of the exposure.

D) Hold the dosimeters in an unrestricted area for at least 24 hours after the exposure and record the reading of the dosimeters on Form 20.30.

E) Remove any dosimeter from service whose reading immediately after the exposure dose does not conform to plus or minus 20% of the administered dose, or whose reading after 24 hours differs by greater then 10% from the initial reading.

D.1 TECHNIQUE

A) Source: KV_____MA_____isotope_____curies_____
B) Source to dosimeter distance
C) Exposure Time

D) Shielding between source and dosimeter
E) Calculated dose
F) Remarks

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.11

FORMS PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Authorized For Use (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 OBJECTIVE

A.1 Define the procedure for organization, use and control of forms.

B.0 APPLICATION

B.1 Forms required and recommended for operation of the Radiation Safety Program are included as appendices to this section. The time and manner of application are defined in the other section of the program.

C.0 PROCEDURE

C.1 Origination of new forms shall be at the direction of the Radiation Safety Officer.

C.2 Revisions of forms shall be identified be sequential letter changes. All changes shall be approved by the Radiation Safety Officer.

C.3 Effectivity of changes will be determined by the Radiation Safety Officer.

C.4 Forms instructions and distribution are found on the reverse side of each form, as required.

C.5 NOTE: Forms used by the Radiographer are also included in the Operating and Emergency Procedures.

Form No. 20.1

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

OCCUPATIONAL EXTERNAL RADIATION EXPOSURE HISTORY

1. Name: _____ 2. Social Security No. _____
(Print Last First Middle)

3. Date of Birth: _____ 4. Age in Full Years (N) _____
(Month Day Year)

Occupational Exposure - Previous History

5. Previous Employments involving Radiation exposure-List name & address of employer	6. Dates of employment (From - To)	7. Periods of Exposure	8. Whole Body (rem)	9. Record	9. Cal.	10. Remarks

Accumulated Occupational Dose - Totals 11.

Calculations - Permissible Dose

12. Whole Body:
a - Permissible Accu. Dose = 5 (N-18) = _____ rem
b - Total Exposure to Date (from item 11) = _____ rem
c - Permissible Dose..... = _____ rem

13. Certification: I certify that the exposure history listed above is correct and complete to the best of my knowledge and belief.

Employees signature _____ Date _____
Radiation Safety Officer _____ Date _____

Note: Attach copies of correspondence to employees previous employer requesting exposure history as required in item 5.

Form No. 20.2

"The Diamond in Independent Testing"

DATE OF THIS REPORT:_____

NAME:_____

DATE OF BIRTH:_____

SOCIAL SECURITY NUMBER:_____

DATE OF EMPLOYMENT: From_____ To_____

Our records indicate your accumulated dose to be_____ millirems during your period of employment with Nationwide Testing Services.

This report is furnished to you under the provision of the Nuclear Regulatory Commission regulations entitled "Standards for Protection against Radiation" (10-CFR Part 20). You should preserve this report for future reference.

Radiation Safety Officer

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIOACTIVE MATERIAL INVENTORY (REQUIRED QUARTERLY)

DATE	MATERIAL / CAPSULE NUMBER	PROJECTOR MODEL	PROJECTOR SERIAL NO.	CURIES	LAST LEAK TEST	INSPECTION & MAINTENANCE	LOCATION	INVENTORIED BY:

Form No. 20.12

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

CERTIFICATION OF RADIATION SAFETY TRAINING
FOR PREVIOUSLY TRAINED RADIOGRAPHERS

A. NAME_____ Emp.No._____
DATE OF BIRTH_____ Social Security No._____
DATE EMPLOYED_____
Month-Day-Year

B. The above named Radiographer has been previously certified to use radioactive sources as a fully qualified Radiographer prior to employment with Nationwide Testing Services. However, to insure that he has received adequate radiation safety prior to being designated as a fully qualified Radiographer with this Company, the following training and examinations were given:

1) Informative instructions on Nationwide Testing Services Operating and Emergency Procedures, instruments, sources, devices and equipment used in the course of performing their duties in radiographic inspection.

(Min. eight (8) hours) _____ Instructor _____ No. of hours _____ Date

2) Passed a written examination to determine his knowledge of topics outlined in Nationwide Testing Services Procedure and Operating and Emergency Procedures.

_____ Date _____ Examination Score

3. Demonstrated satisfactorily his competance to perform industrial radiography and use and the necessary related tools and equipment associated with such operations.

_____ Date

4. Received a copy of this Company's Radioactive Material License, Operating and Emergency Procedures, and Agreement State or Federal Regulations for Control of Radiation.

_____ Date

5. Received instructions on the subjects described in the USNRC Case Histories of Radiography Accidents.

(Min. two (2) hours) _____ Instructor _____ No. of hours _____ Date

6. Work five (5) days with Radiographic personnel.

C. Previous training and experience as a Radiographer using radioactive sources is as follows:

1) Employed as Radiographer's Assistant from _____ to _____ working for _____.
Company Name

2) Received formal instruction on topics outlined in Nationwide Testing Services Training Procedure.

_____ on _____
Company Name Date

3. Was first qualified as a Radiographer at _____
Company Name
on _____.
Date

4. Has worked as a Radiographer for the following companies on the dates shown:

_____ FROM _____ TO _____

_____ FROM _____ TO _____

_____ FROM _____ TO _____

D. I hereby certify the above information is correct to the best of my knowledge.

_____ _____
Signature of Radiographer Date

Approved as Radiographer

_____ _____
Signature of Radiation Safety Officer Date

Date Certification Expires _____

Form No. 20.13

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIOGRAPHER
RADIATION SAFETY TRAINING CERTIFICATION

1. Name_____ Emp. No._____
Date of Birth_____ Social Security No.
Date Employed_____
Month-Day-Year

11. The above named individual has satisfactorily completed Nationwide Testing Services Radiographer Training Program and has received Radiation Safety Training and testing as specified below.

1. Attended instruction on the topics outlined in the Training Procedures Paragraph C.2.1:

a.	Origin and Nature of Radiation (Min. one (1) hour)	No. of hours	Date
b.	Characteristics of X-rays and gamma rays (Min one-half ($\frac{1}{2}$) hour)	No. of hours	Date
c.	Interaction of Radiation with Matter (Min. one (1) hour)	No. of hours	Date
d.	Biological Effects of Radiation (Min. one and one-half (1-$\frac{1}{2}$ hours)	No. of hours	Date
e.	Units of Radiation Dose (Min. one (1) hour)	No. of hours	Date
f.	Methods of Controlling Radiation (Min. two (2) hours)	No. of hours	Date
g.	Radiation Detection and Measurements (Min. two (2) hours)	No. of hours	Date
h.	Radiographic Equipment (Min. one (1) hour)	No. of hours	Date
i.	The Requirements of Federal or Agreement States Regulations (Min. two (2) hours)	No. of hours	Date

2. Received instruction on the requirements of Nationwide Testing Services Radiation Safety Program with emphasis on the Operating and Emergency Procedures. This instruction is in addition to that given during on-the-job training period.

(Min. two (2) hours)

_____ _____
No. of hours Da

3. Received instruction on the subjects described in the US NRC Case Histories of Radiography Accidents.

(Min. two (2) hours)

_____ _____
No. of hours Date

4. Completed on-the-job training as Radiographer's Assistant under the direct supervision and guidance of a qualified Radiographer during the period from _____ to _____.
Date Date
The principle Radiographer instructor was _____.

5. Passed a written examination to determine his knowledge of topics outlined in Nationwide Testing Services Training Program and Operating and Emergency Procedures. (Examination to follow 14 hours of instruction.)

_____ _____
Date Exam Score

6. Demonstrated satisfactorily his competance to perform industrial radiography and to use the necessary tools and equipment associated with such operations

_____ _____
Date Taken Exam Score

7. Received a copy of Nationwide Testing Services Radioactive License, Operating and Emergency Procedures and Agreement State or Federal Regulations for Control of Radiation.

_____
Date

111. I hereby certify the information is correct to the best of my knowledge.

_____ _____
Signature of Radiographer Date

Approved as Radiographer

_____ _____
Signature of Radiation Safety Officer Date

_____
Date Certification Expires

Form No. 20.14

N T S **NATIONWIDE TESTING SERVICES, INC.**

RADIATION SAFETY AND CONTROL PROGRAM

ASSISTANT RADIOGRAPHER
RADIATION SAFETY TRAINING CERTIFICATION

A. NAME _____ EMP. NO. _____
DATE OF BIRTH _____ SOCIAL SECURITY NO. _____
DATE EMPLOYED _____
Month-Day-Year

B. The above named individual has satisfactorily completed Nationwide Testing Services informative instructions and testing for Radiographer Trainee as specified below.

1) Attended informative instruction on the topics outlined in the Training Procedure Paragraph C.2.

a) Basic Radiation Safety

b) Needs and requirements for personal monitoring.

(Min. four (4) hours) _____ _____ _____
Instructor No. of hours Date

2) Passed a written examination and an oral review on basic radiation safety at the conclusion of the four (4) hours of informative instructions (Basic Radiation Quiz).

C. Completed a minimum pf two (2) weeks of on-the-job training as a Radiographer Trainee from _____ _____
Date Date

D. The above named individual has satisfactorily completed Nationwide Testing Services Assistant Radiographer Training Program and has received Radiation Safety Training and testing as specified below.

1) Attended instruction on the topics outlined in the Training Procedure Paragraph C.2.5 (Min. sixteen (16) hours)

a) Operating and Emergency Procedures

b) Radiography Equipment

_____ _____ _____ to _____
Instructor No. of hours Date Date

2) Successfully completed the written examination, oral review and demonstration to use the necessary tools and equipment associated with the position of Radiographer's Assistant

_____ _____
Date Exam Score

E. I hereby certify the above information is correct to the best of my knowledge.

_____ _____

Signature of Assistant Radiographer Date

Approved as Assistant Radiographer

_____ _____

Signature of Radiation Safety Officer Date

Form No. 20.15

N T S **NATIONWIDE TESTING SERVICES, INC.**

RADIATION SAFETY AND CONTROL PROGRAM

RECEIPT OF RADIATION SAFETY AMD CONTROL PROGRAM PROCEDURES

TO: Radiation Safety Officer
Nationwide Testing Services
400 W. Touhy Ave. Site #382
DesPlaines, Ill. - 60018

I have received my personal copy of the Nationwide Testing Services Radiation Safety and Control Program 20.1.0 Operating and Emergency Procedures, Nationwide Testing Services By-product Material License, US NRC regulations or applicable agreement state regulations.

I have read the contents and fully understand all rules and regulations and will follow then at all times.

I further understand that violation of these rules and regulations will be cause for disciplinary action.

_____ Emp. No. _____
Nationwide Testing Services Employee

_____
Document Control No.

_____
Radiation Safety Officer

_____
Date

If other than a Nationwide Testing Services employee, fill in the following information. Changes in this manual will be sent to you.

Name _____ Title _____

Company/Organization _____

Address _____

City, State, Zip _____

Document Control No. _____

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

QUARTERLY RADIOGRAPHER AUDIT

Location_____ Date_____

Radiographer_____

Inspector_____ Jobsite_____

Exposure Device Model_____ S/N_____ Source_____ S/N_____

Survey Meter: Model_____ S/N_____ Cal. Date_____

Instructions:
The purpose of the unscheduled survey is to check the Radiographer for compliance with Nationwide Testing Services policies and NRC/State regulations. The following items should be checked during the unscheduled survey, but they are only minimum requirements. Additional items that are checked should be recorded under "Remarks". The Inspector must record the corrective action for all items to be unsatisfactory.

ITEM	Sat.	Unsat.
Is the radiation area adequately surveyed and controlled? Action Taken:		
Are the signs and barriers at the "radiation Area" adequate? Action Taken:		
Is the "High Radiation" area posted? Action Taken:		
Is the gamma camera being properly surveyed after each exposure? Action Taken:		
Is Form 20.22, 20.23, or 20.33 being properly completed? Action Taken:		

ITEM	Sat.	Unsat.
Does the radiographer have a copy of the Radiation Safety Program Operating and Emergency Procedure, License and Regulations? Action Taken:		
Is the radiographer using a dosimeter and film badge properly? Action Taken:		
Is the shielded source being secured in the shielded position each time the source is returned? Action Taken:		
Is the radiographer providing adequate personal supervision of the assistant radiographer? (Note: If an assistant radiographer is not performing the job function as an assistant or if an assistant is not available write N/A) Action Taken:		

REMARKS:

Form No. 20.17

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

SAFETY TRAINING REPORT (Required Quarterly)

LOCATION:_____ DATE:_____

CONDUCTED BY:_____

SUBJECTS PRESENTED:

ATTENDEES:

NTS NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIOACTIVE MATERIAL RECEIPT REPORT

LOCATION _____ DATE _____

ISOTOPE _____ CAPSULE NO. _____ CURIES _____

RECEIVED FROM _____

SOURCE CHANGER

MAKE _____ MODEL _____ S/N _____

(Note: When received in changer perform leak test and complete leak test report.)

Installed in camera: MAKE _____ MODEL _____ S/N _____

SURVEY OF MATERIAL AS RECEIVED

SURFACE OF CONTAINER _____ MR/HR. AT 36" _____ MR/HR.

SURFACE OF EXPOSURE DEVICE _____ MR/HR. AT 36" _____ MR/HR.

REMARKS:

SHIPMENT RECEIVED BY _____

Form No. 20.19

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

LEAK TEST PERFORMANCE RECORD

LOCATION _____ DATE _____

ISOTOPE _____ CAPSULE S/N _____ CURIES _____

TYPE OF TEST: WET _____ DRY _____ SOLVENT _____

LEAK TEST KIT USED: MANUFACTURER _____ MODEL NO. _____

CAMERA: MAKE _____ MODEL _____ S/N _____

SOURCE CHANGER: MAKE _____ MODEL _____ S/N _____

LOCATION WIPED: _____

LEAK TEST WIPE PERFORMED BY: _____

N T S NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIOACTIVE MATERIAL TRANSFER/DISPOSAL REPORT

LOCATION _____ DATE _____

ISOTOPE _____ CAPSULE S/N _____ CURIES _____

EXPOSURE DEVICE

MAKE _____ MODEL _____ S/N _____

TRANSFERRED FROM _____ TO _____

SOURCE CHANGER

MAKE _____ MODEL _____ S/N _____

REASON FOR TRANSFER:

SOURCE DISPOSAL ☐ MALFUNCTIONING OR DAMAGED ☐ SALE OR LOAN TO OTHER AUTHORIZED LICENSEE ☐

LIST ANY MECHANICAL DEFECTS OR MALFUNCTIONS _____

_____

SHIPMENT PREPARED BY _____ AUTHORIZED BY _____

SHIPPING CONTAINER

Container shall be a Type B designed to meet with the requirements of DOT.

1. Shipping Container S/N _____
2. Condition of Shipping Container _____
3. Danger Peligro Cargo Aircraft Only Label Affixed _____
4. Package Certification or Approval Affixed _____
5. Labeled with Package Certificate (Model or Identification No.) _____
6. Labeled with "Radioactive Material Special Form N.O.S." ____
7. Labeled with "Type B" _____
8. Shipping Label Affixed _____
9. Radioactive Yellow Labels Affixed _____

Type of Label: Yellow II ☐ Yellow III ☐

SURVEY OF MATERIAL PRIOR TO SHIPMENT

SURFACE OF EXPOSURE DEVICE _____ MR/HR AT 36" _____ MR/HR

SURFACE OF CONTAINER _____ MR/HR AT 36" _____ MR/HR

Form No. 20.21

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

UTILIZATION LOG

Source Material________________________ Capsule Serial No.________________

Exposure Device Model____________________ Serial Number____________________

DATE/TIME OUT		DATE/TIME IN		LOCATION	RADIOGRAPHER

Form No. 20.24

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

SURVEY METER CALIBRATION CONTROL LOG

ITEM: ______________________________

MFR: ____________ MODEL ____________ SERIAL NO. ____________

DATE RECEIVED: ____________ CALIBRATION: FREQUENCY ____________ PROCEDURE ____________

DATE	TYPE OF SERVICE	DATE REMOVED FROM SERVICE	REMARKS	CALIB. DATE	CERT. NO.	CALIB. DUE

N T S NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

DOSIMETER CHECKS (Required Semi-Annually)

Serial Number	Range	Check Date	Calculated Dose	Dosimeter Reading Immediately after Exposure (Initial Reading)	Dosimeter Reading 24 Hours After Exposure

Technique:

Source: KV_____ MA_____ ISOTOPE_____ CURIES_____

Source to Dosimeter Distance:_____

Exposure Time:_____

Shielding Between Source and Dosimeter:_____

Calculated Dose:_____

Remarks:

NTS

NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIATION SAFETY AND CONTROL PERSONNEL

NTS:
Location:
Phone No.

Nationwide Testing Services
400 W. Touhy Ave. Site #382
DesPlaines, Ill. - 60018
(312) 299-5438

NTS:

Nationwide Testing Services
720 Morse Ave.
Schaumburg, IL. - 60193
(312) 893-2466

NTS

Phone No.

Barbara Marcantel
400 W. Touhy Ave. Site #382
DesPlaines, Ill. - 60018
(312) 299-5438

NTS:

Bruce Tyler (Vice President)
720 Morse Ave.
Schaumburg, IL. - 60193
(312) 893-2466

NTS:

Radiation Safety Officer:

Charlie Marcantel
400 W. Touhy Ave. Site #382
DesPlaines, Ill. - 60018
(312) 299-5438
(312) 893-2466

NTS NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

QUARTERLY ASSISTANT RADIOGRAPHER AUDIT

Location____ _____, Date_____

Assistant Radiographer_____

Inspector_____

Exposure Device Model_____ S/N_____ Source_____ S/N_____

Survey Meter: Model_____ S/N_____ Calibration Date_____

Instructions:
The purpose of the unscheduled survey is to check the assistant radiographer for compliance with company policies and NRC/State regulations. The following items should be checked during the unscheduled survey, but they are only minimum requirements. Additional items that are checked should be recorded under REMARKS. The Inspector must record the corrective action for all items found to be unsatisfactory.
NOTE: An assistant radiographer may only be permitted to operate radiographic exposure devices, sealed sources, related handling tools and survey instruments under the personal supervision of a radiographer.

ITEM	Sat.	Unsat.
Is the radiation area adequately being surveyed and controlled? Action Taken:		
Are the signs and barriers at the "Radiation Area" adequate? Action Taken:		
Is the "High Radiation area posted? Action Taken:		
Is the gamma camera being properly surveyed after each exposure? Action Taken:		

ITEM	Sat.	Unsat.
Does the assistant radiographer have available a copy of the Radiation Safety Program Operating and Emergency Procedures, License and Regulations? Action Taken:		
Is the assistant radiographer using s dosimeter and film badge properly? Action Taken:		
Is the sealed source being secured in the shielded position each time the source is returned to that position? Action Taken:		
REMARKS:		

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.12

DOCUMENTATION PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 To maintain a complete current record system.

A.2 OBJECTIVE - Will control changes, assure schedules happenings and document significant occurrences.

B.0 APPLICATION

B.1 Procedures, forms, practices, certifications and schedules.

C.0 PROCEDURE

C.1 Radiation Safety Program Procedure masters shall be maintained by the Radiation Safety Officer with master copy of the latest revisions.

A) Effective date of procedural changes shall be established by the Radiation Safety Officer.

B) Program revision and equipment or in house changes requiring NRC notification and/or approval shall be coordinated by the Radiation Safety Officer.

C) Safety Program revisions shall be accomplished with a new printing with distinctive cover identification.

D) The Radiation Safety Officer is responsible for transmittal of revision to all affected personnel.

C.2 Each Radiation Safety Program and Training Manual shall have a sequential number and shall be assigned when issued. The Radiation Safety Officer shall maintain a log for revision and recall.

C.3 Radiation Safety Officer or designated individual will prepare and update a maintenance schedule on detection equipment and exposure devices.

C.4 Calibration records and calibration schedules are the responsibility of the Radiation Safety Officer.

C.5 Personnel Radiation Safety Certification records are the responsibility of the Radiation Safety Officer.

A) All personnel examinations and re-examinations relative to radiation safety shall be on file.

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NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.13

AGREEMENT STATE PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer)		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 This procedure will establish those special requirements of each Agreement State.

B.0 APPLICATION

B.1 All Nationwide Testing Services personnel working in an Agreement State.

C.0 PROCEDURE

C.1 Specific Agreement State requirements are defined by:

A) Each Agreement State that has special requirements differing from the Federal regulations shall be covered in a specific appendix.

B) The state appendix shall enumerate all express requirements of that state.

C) Revisions of state's regulations will result in revision of one appendix (Revising will be the responsibility of the Radiation Safety Officer).

D) Copies of all appendices will be with all assigned Radiation Safety Manuals, where applicable.

1. Each Radiographer and Assistant Radiographer shall have available on the project, copies of the appendices for the particular state in which they will be working.

E) No Agreement State regulation shall be reason for not conforming to the Nationwide Testing Services Radiation Safety Manual, State and Federal Regulations

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES

RADIATION SAFETY AND CONTROL PROGRAM

20.1.14

CORRECTIVE ACTION PROCEDURE

Title	Approved	Date
Title	Approved	Date
Title	Approved	Date
Issued for Approval (Radiation Safety Officer		Date
Issued to NRC for Approval		Date

A.0 GENERAL

A.1 To assure positive action is taken to prevent recurrence of incidents, hazarardous conditions, and audit deficiencies.

B.0 OBJECTIVE

B.1 To provide a system of determining causes of adverse conditions and verifying the effectiveness of actions.

C.0 APPLICATION

C.1 Nationwide Testing Services in house/project personnel.

D.0 PROCEDURE

D.1 Corrective action shall be applied to all radiation incidents, to radiation hazardous conditions, and audit deficiencies are necessary in the judgement of the Radiation Safety Officer.

(a) All radiation incidents shall be documented, analyzed as to cause, and appropriate corrective action assigned.

1.) All corrective action to incidents shall be in writing and approved by the Radiation Safety Officer.

2.) Follow-up to assure compliance shall be documented to provide feedback and prevent recurrence.

(b) All radiation hazardous conditions shall be reported to the Radiation Safety Officer for review and assignment of formal corrective action.

(c) All audit defiencies shall be reviewed and, where significant, formal corrective action shall be executed at the discretion of the Radiation Safety Officer.

(d) Radiation Safety Officer shall assure that adequate corrective action is accomplished to eliminate the causes of discrepancies and to prevent the recurrence of identification or similar discrepancies.

(e) The Radiation Safety Officer shall maintain a log of all formal corrective actions with current status of follow-up and/or audit.

(f) The Radiation Safety Officer shall schedule appropriate re-audits to determine effectiveness of corrective measures.

(g) Formal corrective action distribution shall include the Radiation Safety Officer and Vice President of Nationwide Testing Services.

(h) Noncompliance with the Radiation Safety Officer's corrective action directions shall be resolved with the Safety Comittee.

NATIONWIDE TESTING SERVICES, INC.

CONCERNING OTHER INFORMATION

In addition to the operating and emergency procedure source shipping/ receiving/ transfer/disposal NRC regulations 10CFR 19, 10CFR20, 10CFR 34 and Nationwide Testing Services NRC license that is given to all radiographic personnel. In addition to this as an extra precaution pertaining to radiation safety there shall be a book prepared for each exposure device that Nationwide Testing Services uses. The book shall be mandatory to be taken when exposure device is signed out. Enclosed is a brief outline of book and its information.

"The Diamond in Independent Testing"

NATIONWIDE TESTING SERVICES, INC.

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SECTION I	DECAY CHART: UTILIZATION LOG: MAINTENANCE LIST LEAK TEST
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SECTION III	OPERATING AND EMERGENCY PROCEDURES 20.1.0
SECTION IV	SOURCE SHIPPING/RECEIVING/TRANSFER/DISPOSAL PROCEDURE 20.1.1
SECTION V	TITLE 10, CHAPTER 1, CODE OF FEDERAL REGULATIONS ENERGY PART 19;20;34 NRC LICENSE AND AMENDMENTS
SECTION VI	EXPOSURE DEVICE MANUAL
SECTION VII	CERTIFICATION OF TYPE B CONTAINERS

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

UTILIZATION LOG

Source Material____________________ Capsule Serial No.________________

Exposure Device Model____________________ Serial Number________________

DATE/TIME OUT		DATE/TIME IN		LOCATION	RADIOGRAPHER

IR - 192 DECAY CHART & SOURCE DATA

ELK Grove

INDUSTRIAL NUCLEAR COMPANY
1124 Chess Drive, Foster City, CA. 94404
(415) 349-6367

CURIES 107 DATE 3-16-83 SER. NO. 191

MOD NO. 32 SOURCE SIZE .10 x .10

LEAK TEST DATA
NEGATIVE BY
SURFACE CONTAMINATION DATA
<0.005 uci BY

MAXIMUM SURFACE RADIATION
DATE RECEIVED BY

Sample ONLY

INDUSTRIAL NUCLEAR CO.
WIPE TEST <0.005 uci
BY G Johnson
DATE 3-16-83

200
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2

JAN | MAR | APR | MAY | JUN | JUL | AUG | SEP | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | AUG

1983 1984

Form No. 20.22
(Part 1)

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NATIONWIDE TESTING SERVICES, INC.

RADIATION SAFETY AND CONTROL PROGRAM

RADIOACTIVE MATERIALS SHIPPING DOCUMENT

COMPANY VEHICLE NO._____

_____RADIOACTIVE MATERIALS WERE NOT TRANSPORTED

SHIPPER:

CONSIGNEE:

EXPOSURE DEVICE SURVEY WHEN REMOVED FROM STORAGE

_____MR/HR @ SURFACE OF DEVICE _____MR/HR @ PORT

NUMBER OF CURIES_____ DESCRIPTION OF CONTENTS: IRIDIUM 192____

110 CURIES MAXIMUM

RADIOACTIVE MATERIAL SPECIAL FORM N.Q.S._____

TRANSPORT INDEX NOT OVER 1

VEHICLE SURVEY:

MR/HR @ SURFACE OF SHIPPING CONTAINER:_____ MR/HR @ OUTSIDE SURFACE____

MR/HR @ 36"_____ MR/HR @ DRIVERS SEAT_____

NOTE: DO NOT TRANSPORT IF SURFACE OF CONTAINER IS OVER 50MR/HR AND/OR OVER 1.0 MREM/HR @ 36" ADDITIONAL SHIELDING SHALL BE RE - QUIRED TO MEET SHIPPING REQUIREMENTS OF RADIOACTIVE YELLOW 11 LABEL.

TYPE B SHIPPING CONTAINER INSPECTION S/N_____ CERT. NO._____

ACCEPTABLE CONTAINER ONLY (NRC)

CERTIFYING STATEMENTS AND SIGNATURES

This is to certify that the above named articles are properly classified described, packaged, marked, labeled and are in proper condition for transportation according to the applicable regulations of the department of transportation and that all radiographic procedures and precautions required by NATIONWIDE TESTING SERVICES radiation safety and control program Section 20.1.0 operating and emergency procedures were observed. The perimeter of the source storage area was surveyed prior to removing the exposure device from storage and immediately after returning the exposure device to storage the maximum radiation level was not in excess of 2mr/hr.

Personnel Signature_____

NOTE: Shipping document to be placed in plain view of anyone entering the vehicle in case of an accident or emergency.

a) on front seat of vehicle in plain view.

b) in side pouch on door on drivers side.

INSTRUCTIONS (SHIPPING REPORT)

This radioactive material shipping document is designed to fulfill D.O.T. requirements. This form is oriented toward company vehicles transporting radioactive material to and from field sites.

1. If radioactive materials were not transported, check box "Radioactive materials were not transported".
2. Shipper and Cosignee - Enter the shipper's and cosignee's address in the spaces provided.
3. Number of Curies - Enter the number of curies as of the day being transported.
4. MR/HR @ surface of shipping container and MR/HR @ 36" - Enter the highest reading at the surface of the shipping container and the highest reading @ 36" from the container. The reading at 36" is the transport index.
5. Vehicle Survey - Enter the highest reading at the surface of the vehicle and the highest reading at the driver's seat. No radiation level is to exceed 2 MR/HR @ these areas.
6. Contents - Circle contents - Iridium 192.
7. Type B shipping container inspection - Enter the serial number, certification number and note the condition of the shipping container.
8. Preparation for Shipping
   A. Place exposure device in a Type B shipping container. Type B exposure devices may necessitate the use of nonspecification overpacks.
   B. Block or brace the package to prevent shifting during transit.
   C. Shipping container shall have affixed an address label (same as used for shipper and cosignee) and all D.O.T. required identification.
   D. Shipping container shall have affixed, two"Yellow II" labels. Information required on labels are as follows:

   Contents (spell out Iridium 192) transport index-not over 1.

   NOTE: Do not transport if transport index is over 1 (1.0 MREM/HR @ 36") or surface reading is over 50 MREM/HR additional shielding will be required.
9. Certifying statements and signature

   Signing this document - Validates the statement to indicate all applicable regulations, procedures were adhered to in the performance of radiography and the preparation of the shipping package.

Form No. 20.22
(Field Gamma)
(Part 2)

NTS **NATIONWIDE TESTING SERVICES, INC.**

RADIATION SAFETY AND CONTROL PROGRAM
RADIATION SAFETY SURVEY REPORT

CUSTOMER NAME: _____
JOB LOCATION: _____
CITY/TOWN/STATE _____

TECHNICIAN:	FILM BADGE TLD. NO.	DOSIMETER NUMBER	READING START	READING STOP	

SOURCE MATERIAL: _____ S/N _____ EXPOSURE DEVICE MODEL _____ S/N _____

DAILY MAINTENANCE INSPECTION

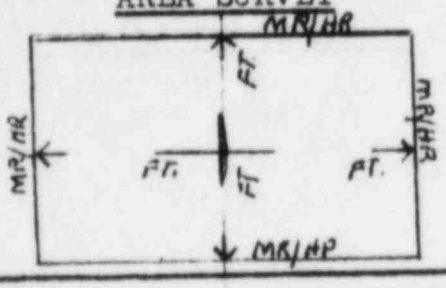
_____ ACCEPTABLE REMARKS: _____
_____ UNACCEPTABLE: _____

SURVEY METER

MAKE _____ MODEL _____ S/N _____ DATE CALIBRATED _____

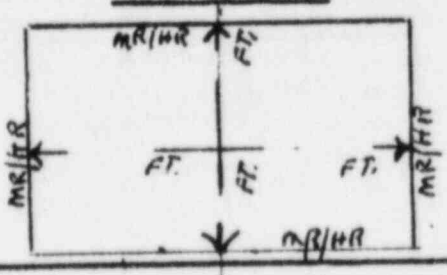
EXPOSURE DEVICE SURVEY WHEN REMOVED FROM STORAGE
_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT
EXPOSURE DEVICE SURVEY AT CONCLUSION OF LAST RADIOGRAPHIC EXPOSURE
_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT
EXPOSURE DEVICE SURVEY WHEN RETURNED TO STORAGE
_____ MR/HR @ SURFACE OF DEVICE _____ MR/HR @ PORT

AREA SURVEY

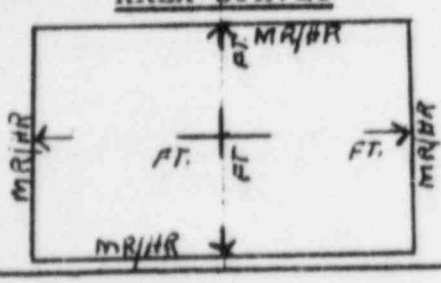


COMMENTS:

AREA SURVEY

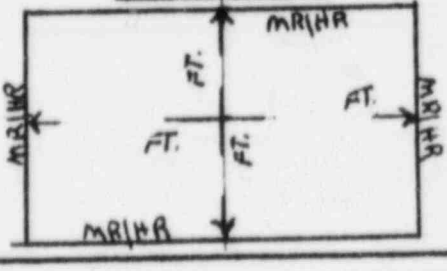


AREA SURVEY



COMMENTS:

AREA SURVEY



Radiographic activities were conducted as to NATIONWIDE TESTING SERVICES Operating and Emergency Procedures 20.1.0.
Signature _____

INSTRUCTIONS (SURVEY REPORT)

1. THIs form is to be completed for each day or job. This includes periods the exposure device is removed from storage, but is not used to perform radiography.
2. Customer - Self-explanatory
3. Date - Self-explanatory
4. Job Location - Self-explanatory
5. Technician - Radiographer, Ass't Radiographer and other monitored individuals names.
6. Film Badge/TLD No. - Self-explanatory
7. Dosimeter No. - Serial number of your dosimeter.
8. Dosimeter Reading Start - Dosimeter reading at start of each day or job. Dosimeters are to be zeroed at the beginning of each day or job.
9. Dosimeter Reading Stop - Dosimeter reading at the end of each day or job.
10. Source material and S/N - Record the type of byproduct material (IR 192) and the serial number of the capsule.
11. Exposure device model and S/N - Self-explanatory
12. Daily Maintenance Inspection - Perform the daily maintenance inspection as by section 20.1.0 note the condition as acceptable or unacceptable. If unacceptable, the item should be noted in the remarks column and brought to the Radiation Safety Officers attention. Do not use the exposure device until it is repaired.
13. Survey Meter - Record the make and model of the survey meter used. The serial number, and the date the survey meter was calibrated.
14. Exposure device survey when removed from storage. Record the highest reading in MR/HR at the surface of the device and the por
15. Exposure device survey at conclusion of last radiographic exposure Record the highest reading in MR/HR at the surface of the device and at the port. Surveys of the exposure device are performed each time the source is returned to the shielded position as described by procedure 20.1.0 paragraph 1.3. The survey at the conclusion of the last radiographic exposure is recorded.
16. Exposure device survey when returned to storage - Record the highest reading in MR/HR at the surface of the device and at the port. The readings should be the same as when removed from storage. If not, it should be suspected the source is not in the safe position.
17. Area Radiation Survey - Record the distances and readings. When the geometry changes more than 3 times, additional reports are to be used.

NATIONWIDE TESTING SERVICES, INC.

COPY OF

OPERATING AND EMERGENCY PROCEDURES

20.1.0

SAMPLE ONLY

NATIONWIDE TESTING SERVICES, INC.

COPY OF
SOURCE SHIPPING/RECEIVING/TRANSFER/DISPOSAL

20.1.1

SAMPLE ONLY

PART 19

NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS
INSPECTIONS

PART 20

STANDARDS FOR PROTECTION AGAINST RADIATION

Part 34

LICENSES FOR RADIOGRAPHY AND RADIATION SAFETY REQUIREMENTS FOR RADIOGRAPHIC OPERATIONS

NATIONWIDE TESTING SERVICES, INC.

NATIONWIDE TESTING SERVICES

NRC LICENSE AND AMENDMENTS

SAMPLE ONLY

INDUSTRIAL NUCLEAR COMPANY
1124 Chess Drive Foster City, CA. 94404 • (415) 349-6367

OPERATION MANUAL

MODEL IR100
PORTABLE GAMMA RAY EXPOSURE DEVICE

WARNING

Do not unpack, assemble, operate, disassemble, or carry this device except in the presence of appropriate radiation measuring instruments.

NTS NATIONWIDE TESTING SERVICES, INC.

COPY OF
CERTIFICATION OF TYPE B CONTAINER

SAMPLE ONLY

"The Diamond in Independent Testing"