



December 27, 1983

Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
1717 H. Street, NW
Washington, D. C. 20555

RE: License 42-01512-01
Expiration Date 12/31/83
Request for Renewal

Gentlemen:

The Western Company of North America, Western Petroleum Services, requests renewal of License No. 42-01512-01 for another five year period. Western's check in the amount of \$460.00 is enclosed as payment for the renewal fee made payable to U. S. Nuclear Regulatory Commission.

All information, conditions, etc. concerning the present will apply to the renewal except that Western's Radiation Safety Manual has been revised and reformatted for both users and administration purposes. Two copies of the revised manual is enclosed for your use and review purposes.

Sincerely,

Robert I. Slaughter
Radiation Protection Officer

RS/pc

cc: NRC Radiation Safety Officers
Forrest Duff - Oklahoma City
George Neill - Pittsburgh
Vince Whelan - Fort Worth
NRC License File

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REG4 LIC30
42-01512-01 PDR

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RECEIVED BY LFMD	
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Log	Doc # (new)
By	Brown
Orig. To	
Action Compl.	1/20/84

Applicant	
Check No.	280288
Amount/Fee	\$460.50
Type of Fee	Renewal
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WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

RADIATION SAFETY MANUAL

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WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

The enclosed procedures (60-01-1 thru 60-05-2) outline the radiation safety program to be followed by The Western Company of North America and all personnel involved in the use of radioactive materials.

It is the responsibility of all administrative personnel within the radiation program organization to understand all sections of this manual. All other personnel involved in the use of radioactive materials shall be responsible for understanding sections 60-01-2 thru 60-05-2 only.

Any questions concerning the procedures contained within this manual should be directed to the District Radiation Safety Officer (District Manager). If he cannot answer the question the Radiation Protection Officer at Fort Worth Accident Prevention should be consulted.

WPS SAFETY PRACTICES MANUAL

ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Program Management Organization
for Administrative Personnel

NO. SPM- 60-01-1

PURPOSE

The purpose of this procedure is to outline, to administrative personnel, the functions and responsibilities of those persons working within the framework of the operations area of the WPS Radiation Program.

I. WPS Radiation Protection Officer

- A. The WPS Radiation Protection Officer is the designated overall manager for the radiation program. The WPS Radiation Protection Officer is the Loss Control Engineer located at WPS Accident Prevention in Fort Worth.
- B. The duties of the Radiation Protection Officer include the delegation of authority to persons responsible for carrying out the duties such as that of Radiation Safety Officer, overall responsibility for records, surveys, the forming of committees where necessary and in general the administrative procedures for the entire radiation program.
- C. The WPS Radiation Protection Officer is responsible for contacting federal or state agencies to request renewals and changes to applicable licenses granted by those agencies.

II. District Radiation Safety Officer

- A. The Radiation Safety Officer is responsible to the Radiation Protection Officer and in general is to conduct or cause to be conducted the programs and responsibilities delegated by the Radiation Protection Officer. The Radiation Safety Officer for each district is the District Manager. His duties shall include:
 - 1. Site surveys
 - 2. Records, personnel monitoring records and compilation
 - 3. Vehicle survey records
 - 4. Training and qualifying personnel
 - 5. Conducting periodic safety checks to ensure that the radiation protection program is functioning properly in his district
- B. Before a District Manager can fully assume the appointment of Radiation Safety Officer by the Radiation Protection Officer, he must have successfully completed the radiation safety training course provided by Radiation Consultants, Inc., Houston Texas, or other approved training company, within four (4) months of the initial date of appointment.

DATE: 12/15/83

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ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Program Management Organization
for Administrative Personnel

NO. SPM- 60-01-1

III. Radiation Supervisor

- A. The Radiation Supervisor is responsible to the District Radiation Safety Officer for the overall performance of the operation to which he has been assigned such as:
 - 1. Detailing requirements for planning and directing personnel, safety, methods and techniques used for the particular operations.
 - 2. Responsibility for the control over the specific radioactive materials that are to be used or dispensed on a job.
 - 3. Maintaining control of records and reports generated from required surveys of material, equipment and restricted areas on the job.
 - 4. Must assure that all equipment and devices are maintained in working order and that sealed sources or tracer materials are properly locked and stored when not in use.
 - 5. Responsibility for assuring the compliance of personnel and procedures as required by the federal or state license or regulations.
- B. Before an employee can be classified as a Radiation Supervisor, he must successfully complete the radiation safety training course provided by Radiation Consultants, Inc. or other approved training company.

IV. Technicians

- A. The technician is an employee who is directly responsible to the Radiation Supervisor for the duties assigned by the Radiation Supervisor.
- B. Under the direct supervision of the Radiation Supervisor at the well-site, the technician may handle and/or dispense tracer materials and use survey instruments.
- C. Before an employee can be classed as a technician he must have successfully complete the following training:
 - 1. Has read or received instruction on this operating manual.
 - 2. Has demonstrated competence to use R/A material and the tools associated with its use under the personal supervision of the Radiation Supervisor.

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ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radioactive Materials Records Management
for Administrative Personnel

NO. SPM- 60-02-1

PURPOSE

Federal and state agencies require the development and retention of certain records concerning the storage, use and handling of radioactive materials. This procedure will list and describe the types of records WPS will use.

PROCEDURES

I. Recordkeeping - General

- A. Records and reports required by federal and state agencies are to be preserved for periods specified in this section, or until the governing agency authorizes their disposal.
- B. All records required by federal and state agencies will be transferred to the agency within 30 days following (1) the termination of a license granted by that agency, (2) such other times as the licensing agency may direct.
- C. Districts which close down their operations shall transfer all of their records and reports to the WPS Radiation Protection Officer, Accident Prevention - Fort Worth.

II. Recordkeeping - Records and Reports

The following records and reports shall be completed by every district using radioactive materials and kept in an orderly filing system.

- A. Radioactive Sealed Source Utilization Log (Form 60-02-1A). This record summarized the receipt, utilization and transfer of densiometer sealed sources. When this record form is used with a SAM vehicle with two (2) sealed sources, both of the densiometer serial numbers will be listed at the top center of the form. The individual making the entry on the form must write his name in the indicated place beside the entry. A copy of the "Dispatcher's Job Ticket" for each usage shall be maintained in a separate file to identify the wellsite location the where the instruments were utilized. (See Attachment 1). These records shall be maintained for inspection by regulatory agencies for a period of two (2) years.
- B. Radioactive Tracer Material Utilization Log (Form 60-02-1B). This record summarizes the receipt, utilization and final disposition of all tracer materials used. A copy of the "Dispatcher's Job Ticket" will be kept in a separate file to identify the location of tracer utilization for each job. Receiving bills of lading shall also be maintained in a separate file for tracer materials to identify receipt of materials. The column labeled "Disposition" shall be used to identify what happened to tracer materials and packaging such as: "All downhole;" "___ downhole and ___ returned to storage;" "empty container returned to storage;" "transferred to ___;" "empty containers returned to vendor," etc. (See Attachment 2). The individual making the entry on the form must write

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SUBJECT: Radioactive Materials Records Management
for Administrative Personnel

NO. SPM- 60-02-1

his name in the indicated place beside the entry. These records shall be maintained for inspection by the regulatory agencies for a period of two (2) years from the date of entry.

- C. Survey Meter Calibration Log (Form 60-02-1C). This form used to record the date of each six (6) month calibration of the district survey meter(s). The district shall maintain a file of the "Certification of Calibration" test certificates and send a copy of each "Certificate of Calibration" to the WPS Radiation Protection Officer at Fort Worth. (Attachment 3). Records of calibration shall be maintained for a period of two (2) years from the date of calibration for inspection by the regulatory agencies.
- D. Wellsite Radiation Monitoring Report (Form 60-02-1D). This report will be completed for each tracer material wellsite job. This report is not required for densiometer sealed source jobs. The original form is to be retained in district files with a copy sent to the WPS Radiation Protection Officer at Fort Worth. (Attachment 4). These reports shall be maintained for inspection by the regulatory agencies for two (2) years after completion of the surveys.
- E. Storage Area Monitoring Report (Form 60-02-1E). Quarterly monitoring of the district's radioactive material storage area shall be reported using Form 60-02-1E - Storage Area Monitoring Report.

Note: Densiometer sealed sources are considered in storage while stored in the densiometer trailer, or mounted on the SAM vehicle, at the district yard, are considered storage areas.

The district will retain the original for inspection by the regulatory agencies for two (2) years after completion of the survey, and send a copy to the WPS Radiation Protection Officer at Fort Worth. (Attachment 5).
- F. Vehicle Monitoring Report (Form 60-02-1F) Monthly monitoring of district vehicles used to transport densiometers, i.e., densiometer trailers and SAM vehicles. The district will retain the original and send a copy to the WPS Radiation Protection Officer at Fort Worth. (Attachment 6). These shall be maintained for inspection by the regulatory agencies for two (2) years after completion of the survey.
- G. Sealed Source Inventory Report (Form 60-02-1G) Every three (3) months, this form will be completed to account for all radioactive sealed sources received and possessed during that time period. The report will be maintained in district files for two (2) years from the date of the report. A copy of each report will be sent to the WPS Radiation Protection Officer at Fort Worth. (Attachment 7).
- H. Tracer Materials Inventory Report (Form 60-02-1H) Every three (3) months this form will be completed to account for all radioactive tracer materials which are on hand at the time. The report will be maintained

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ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radioactive Materials Records Management
for Administrative Personnel

NO. SPM- 60-02-1

in district files for two (2) years from the date of the report. A copy of each report will be sent to the WPS Radiation Protection Officer at Fort Worth. (Attachment 8).

- I. Temporary Use TLD Badge Log (Form 60-02-1I). This form is used to assign temporary TLD badges to personnel who are not regular personnel with permanently assigned TLD badges. A temporary badge is assigned only to one person before it is returned to the TLD badge vendor for processing and reading. Previously assigned temporary badges will not be reassigned to another person. The form will be retained by a district in its TLD Badge Report files. (Attachment 9)
- J. TLD Badge Reports and personnel exposure records will be maintained in a separate file. Quarterly TLD Badge Reports from the TLD badge vendor on each person using radioactive materials will be kept at the district office. The TLD badge vendor also sends a duplicate copy of the report to the WPS Radiation Protection Officer at Fort Worth for the Company's master files. (Refer to SPM-60-03-1, Radiation Detection - Personnel Monitoring Badges, for further details.)
- K. Certificate of Leak Test records on all sealed sources will be maintained on each sealed source. Leak test kits from Radiation Consultants, Inc. or other agency approved suppliers will be used each six (6) months. The district receives the original report from the vendor and the WPS Radiation Protection Officer at Fort Worth receives a copy from the vendor. An up-to-date copy of the latest Certificate of Leak Test report will always accompany and be transported with a densiometer when it is in field use on a job and when it is transferred from the district.

III. Responsibility

The District Radiation Safety Officer is responsible for assigning record-keeping duties to others in this organization and for monitoring their work to assure compliance with these procedures.

RSO

UTILIZATION LOG

FOR DENSIMETER SERIAL #

[illegible]

WELLSITE RADIATION MONITORING REPORT

Date _____

Customer _____ Well _____

Field _____ County _____ State _____

Radiation Supervisor _____ Technician _____

Supervisor's Badge # _____ Technician's Badge # _____

Job Ticket No. _____ District _____

Survey Meter Type _____ Serial # _____ Date Calibrated _____

TRACER ISOTOPE INFORMATION

Tracer Type _____ Strength _____

Amount of Tracer Taken on Job _____ mCi Amount Used on Job _____ mCi

Disposition of Leftover Tracer _____

VEHICLE MONITORING INFORMATIONBefore Leaving Shop
(Vehicle Loaded)Background _____ mR/hr
(30 feet clear of any R/A material)

<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>
Front Sign*	_____
Back Sign*	_____
Left Sign*	_____
Right Sign*	_____

After Return to Shop
(Vehicle Empty)

Front Sign* _____ mR/hr

Left Sign* _____ mR/hr

Before Leaving Job-Site
(Vehicle Loaded)Background _____ mR/hr
(30 feet clear of any R/A material)

<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>
Front Sign*	_____
Back Sign*	_____
Left Sign*	_____
Right Sign*	_____

Background _____ mR/hr

Back Sign* _____ mR/hr

Right Sign* _____ mR/hr

JOB-SITE MONITORING INFORMATIONBefore Operations Begin

Background Reading _____ mR/hr Wellhead Reading _____ mR/hr

Reading in Area Where Work is to be Performed _____ mR/hr

After Completing Operations

Background Reading _____ mR/hr Wellhead Reading _____ mR/hr

Reading in Area Where Work was Performed _____ mR/hr

Thyroid Check (For Iodine-131 Use Only) _____ mR/hr

Exact Location of Any Significant Contamination _____

Steps Taken to Remedy Contamination Problem _____

Signature _____

STORAGE AREA MONITORING REPORT

District _____ Date _____

All radioactive materials storage bunkers and down-hole storage facilities are to be monitored for radiation levels each quarter.

Survey Meter Type _____

Survey Meter Serial # _____

Calibration Date _____

ABOVE GROUND STORAGE

Background Reading* _____ mR/hr

Radiation levels on surface of storage area (measure each door separately -- no measurement is necessary if storage is empty -- indicate if empty)

<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>	<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>
Top	_____	Front	_____
Left	_____	Back	_____
Right	_____		

Radiation level at 1 meter from storage area

Left	_____	Front	_____
Right	_____	Back	_____

DOWN-HOLE STORAGE

Background Reading* _____ mR/hr

Highest level at surface of down-hole storage cover _____ mR/hr

* Normal background is recorded at least 30 feet from the storage area, or 6 feet from the cover of the down-hole storage facility.

Signature _____

Title _____

Make in duplicate: (1) Retain in District Office (1) Fort Worth Accident Prevention

VEHICLE MONITORING REPORT

District _____ Date _____

Survey Meter Type _____

Survey Meter Serial # _____

Calibration Date _____

Each vehicle is to be monitored quarterly, with radioactive sealed sources in place.

Vehicle #	(All readings are in mR/hr)			
	Front	Back	Left	Right

Signature _____

Title _____

Make in duplicate: (1) Retain in District Office
(1) Fort Worth Accident Prevention

RADIOACTIVE SEALED SOURCE
PHYSICAL INVENTORY REPORT

District _____ Date _____

This report is to be completed every three months to account for all sealed sources under the license.

Densimeter or Source Serial # _____ Unit # _____

Type of By-Product Material _____

Quantity of By-Product Material _____

Physical Condition of Source Holder (Visual) _____

Condition of Labels (If required) _____

Physical Location of the Sealed Source(s) _____

Signature _____

Title _____

Make in Duplicate: (1) Retain in District Office
(1) Fort Worth Accident Prevention

RADIOACTIVE TRACER MATERIALS
PHYSICAL INVENTORY REPORT

District _____ Date _____

This report is to be completed every three months to account for all radioactive tracer material on hand.

Type of Tracer Material _____

Quantity of Tracer Material _____

Physical Location of Material _____

Signature _____

Title _____

Make in Duplicate: (1) Retain in District Office
(1) Fort Worth Accident Prevention

TEMPORARY USETLD BADGE LOG

District _____

Complete this form when assigning temporary TLD badges to personnel who are not technicians or loggers and who will be working within the 2 mR/hr restricted areas. Each TLD badge may be assigned to only one person. DO NOT assign a badge to another person after it has been previously exposed or worn by one person.

TLD Badge #	Name of Employee Assigned to Badge	Emp. #	Date Assigned	Date Returned	Logged by (Initials)

Retain in District Office after each quarter's use.

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ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Detection - Personnel
Monitoring Badge

NO. SPM- 60-03-1

PURPOSE

The purpose of this procedure is to safeguard the welfare of those who could possibly be exposed to radioactive materials by establishing a uniform system of wearing personnel badges and monitoring these badges to detect exposure levels. It is essential that these procedures be followed to assure that any personnel exposure be recorded on the badge, and in turn any badge exposure will be a personnel exposure.

GUIDELINES

General

1. The badge supplier will send the shipment of badges to the District Manager (Radiation Safety Officer - RSO) several days before the beginning of the quarterly period. Badge shipments should arrive within two to three days of the beginning of the monitoring period. Care should be taken to keep badges in an area free from radiation. The monitoring period is for a three (3) month period and begins on the first day of the month. The badge will come from the supplier in a holder with a badge number, last name and initial, month and year for the monitoring period, and the code for the district on the badge holder. Complete badges with holders are furnished each quarter, and the badges should not be removed from the holders. The thermoluminescence dosimeters (TLD) badges that are used are not affected by humidity, organic vapors, or heat (less than 300°C or 572°F): therefore, false readings from being wet or getting hot are eliminated. The TLD badge service will measure personnel exposure to Beta and Gamma radiation.
2. A separate badge marked "Control" with the date for the monitoring period is included with each badge shipment. The Control is not to be worn. It is used to monitor the badges while in transit and storage. It is essential that the Control badge be kept in an area free from radiation.

PROCEDURE

I. District RSO's Responsibility

- A. The District RSO shall assure that an adequate supply of TLD badges are available and shall require the use of such equipment by:
 1. Each individual who enters a restricted area where radiation exposure would exceed 2 mr/hr.
 2. Each individual who enters a high radiation area where radiation exposure would exceed 100 mr/hr.
 3. Each individual who handles tracer materials (excluding individuals who use and operate densitometers only).

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SUBJECT: Radiation Detection - Personnel
Monitoring Badge

NO. SPM- 60-03-1

- B. Require that only the person whose name appears on the badge wear the badge.
- C. Issue badges for each monitoring period to personnel who are required to wear badges. Visitor or numbered badges not assigned regularly to the same personnel shall be recorded.
- D. Collect badges for the previous monitoring period within three days of the end of the period and return these badges and Control badge to the supplier by first class mail. This shall be handled as follows:

- 1. Immediately before the badges are packaged for return shipment, survey each individual badge with a survey meter, detector window open and facing the badge, as close to the badge as possible to detect any radiation emission, above background, that might be present due to contamination.

Note: It is very important that this survey be taken very carefully, with the survey meter on its lowest scale, because a very small amount of R/A material can give high exposure readings due to the very small distance to the badge and the long length of exposure time.

- 2. Separate any badge found to be emitting radiation from the rest of the badges, and immediately notify the Radiation Protection Officer for further instructions.
- 3. Badges should be mailed within five days of the end of the monitoring period.
- E. The district office will order badges for new employees from the TLD badge supplier by listing the full name, birth date and social security number of the new employee on the Nuclear Sources and Services "TLD Change Form". (Form 60-03-1A, Attachment 1).
- F. Return badges for terminated employees with the regular shipment. The badge should be marked with the termination date of the employee and stored with the Control badge until the entire shipment is returned to the supplier.
- G. Notify the supplier when employees are transferred from one location to another so the supplier can change the location of future badge shipments for that employee, if so required.

TLD CHANGE FORM

To: Nuclear Sources and Services, Inc.
P.O. Box 34042
Houston, Texas 77034
Attn: TLD

TLD Information: (713) 641-1379

TLD Billing: (713) 641-0391

From: Facility Name _____

Mailing Address _____

City, State, Zip _____

(A/C) Phone _____

()

Additions

Last Name, Initials

Social Security #

Date of Birth

Deletions

Last Name, Initials

Date Terminated

Social Security #

Changes (To correct personal data or for transfers)

Last Name, Initials

Corrections/Transfer From-----To-----

Address Changes (Fill out only lines with changes or corrections)

Facility Name _____

Mailing Address _____

City, State, Zip _____

Attention (if any) _____

Signature_____
Date

WPS SAFETY PRACTICES MANUAL

ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Exposure - Personnel
Monitoring Badge

NO. SPM- 60-04-1

GUIDELINES

The TLD badge supplier shall notify the WPS Radiation Protection Officer in Fort Worth, when any badge showing an exposure above 1,250 mrem for a quarterly period is processed.

PROCEDURE

I. WPS Radiation Protection Officer's Responsibility

A. Severe Over-Exposure (above 5 rem)

1. Immediately notify the District Manager (Radiation Safety Officer-RSO) of the nature and extent of the exposure by telephone.
2. Notify the appropriate radiation regulatory agency immediately for whole body exposures over 25 rems, and within 24 hours for exposures from 5 rem to 25 rem (whole body). (New Mexico requires immediate notification for whole body exposures over 5 rem. Texas and Louisiana require 24-hour notification for whole body exposures of 5 rem or more.)
3. Notify the individual in writing within 30 days of the nature and extent of the exposure.
4. Make a personal investigation of the exposure to determine how the exposure occurred, and what may be done to prevent any recurrence.
5. File a final report within 30 days of notice of the incident, to Western Management and the Radiation Regulatory Agency, giving the findings of the above investigation.

B. Over-Exposure (above 1.25 rem)

1. Notify the District RSO within five (5) days of notification by the badge supplier of the nature and extent of the exposure.
2. Notify the appropriate radiation regulatory agency, in writing, within 30 days of notice by the supplier, of the nature and extent of the exposure.
3. Notify the individual in writing, within 30 days, of the nature and extent of the exposure.
4. Review the manager's investigation of the incident and make a follow-up report if necessary.

C. High Exposure (above 400 mrem)

1. Notify the District RSO, within five (5) days of notification by the badge supplier, of the nature and extent of the exposure.

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ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Exposure - Personnel
Monitoring Badge

NO. SPM- 60-04-1

2. Notify the individual in writing of the nature and extent of the exposure.
3. Review the District RSO's and individual's reports for possible changes in procedures.

II. District RSO's Responsibility

A. Severe Over-Exposure (above 5 rem)

1. Immediately relieve the individual from job duties and have him/her examined by a doctor. The doctor should be requested to run a blood test, urinalysis, and a general examination. The individual should remain away from work associated with radioactive materials until the doctor's report is received and analyzed.
2. Make a complete and thorough investigation to determine how the over-exposure occurred and make a report, in writing, to the Fort Worth Radiation Protection Officer within five (5) days of notice of the over-exposure.
3. If the over-exposure was caused by an intentional exposure, or by a violation in policies or procedures, take disciplinary action appropriate to the violation and record the incident in the personnel files.

B. Over-Exposure (above 1.25 rem)

1. Make a complete and thorough investigation of the over-exposure to determine how the incident occurred. Submit a written report to the Radiation Protection Officer at Fort Worth within ten (10) days of notification of the incident.
2. If the over-exposure was caused by an intentional exposure, or by a violation in policies or procedures, take appropriate disciplinary action and record the incident in the personnel files.

WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

SUBJECT: Personnel Bioassay Requirements when
Handling Iodine (I-131)

NO. SPM- 60-05-1

PURPOSE

In order to comply with the Nuclear Regulatory Commission and State requirements concerning the use of radioactive Iodine, bioassay testing procedures are required to detect any possible exposure to employees who may use the materials. If it is detected by this testing that exposure limits have been exceeded, certain action is required to prevent further exposure and eliminate the cause of the exposure.

PROCEDURE

I. General

Personnel who open bottles and dispense quantities of liquid I-131 in excess of 50 mci at any one time are required to provide a urine sample for bioassay testing purposes. The urine sample should be taken after six (6) hours following the possible exposure to I-131.

Bioassay specimen test kits will be ordered from an approved supplier, with any order made in excess of 50 mci of I-131.

Once the urine sample has been taken, it must be mailed immediately to an approved supplier for processing. The bioassay report will be placed in the district TLD badge file for recordkeeping purposes. The processor will also send a copy of the report to the WPS Radiation Protection Officer in Fort Worth for filing purposes.

At the end of each calendar year, any personnel who had opened or dispenses I-131 containers in quantities greater than 50 mci at any one time during that calendar year will submit to a thyroid check.

II. Test Result Action

A. Whenever the thyroid burden at the time of measurement exceeds 0.04 micro curies of I-131, the following actions shall be taken:

1. An investigation shall be made by the responsible District Radiation Safety Officer to determine the causes of the I-131 overexposure and to evaluate the potential for further exposures.
2. The District Radiation Safety Officer shall take steps to restrict the worker from further exposure until the source of exposure is discovered and corrected.
3. A repeat bioassay shall be taken within two (2) weeks of the previous measurement and should be evaluated within 24 hours after measurement in order to confirm the presence of internal radioiodine and to obtain an estimate of its effective half-life for use in estimating dose.
4. The WPS Radiation Protection Officer will notify the proper

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Handling Iodine (I-131)

NO. SPM- 60-05-1

governmental licensing agencies as required by regulation
or conditions of the license.

B. If the thyroid burden at any time exceeds 0.14 uCi of I-131, the
following action shall be taken:

1. Carry out action as in paragraph A.I. above.
2. The District Radiation Safety Officer, after consultation
with the WPS Radiation Protection Officer, will refer the
case to the appropriate medical/health physics consultant
for recommendations regarding therapeutic procedures that
may be carried out to accelerate removal of radioactive
iodine from the body.
3. Carry out repeated measurement as recommended by appropriate
medical/health physics specialist consulted.

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SUBJECT: Radiation Exposure History

NO. SPM- 60-06-1

PURPOSE

Federal and state radiation regulations require licensed users of radioactive materials to keep an updated permissible radiation dose record for employees who will be subjected to exposure above certain minimum levels. To calculate the permissible dose it is necessary to have a Radiation Exposure History.

PROCEDURE

I. Radiation Exposure Limits

Form WPS-40, Occupational External Radiation Exposure History, (Attachment - 1), must be completed as follows for each employee who is permitted to be exposed to radioactive materials in any period of one calendar quarter in excess of the limits specified in the following table:

	<u>Rems per Calendar Quarter</u>
Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads.....	1 1/4
Hands and forearms; feet and ankles.....	18 3/4
Skin of whole body.....	7 1/2

II. Instructions for Completion of Form WPS-40

A. Identification

- Item (1) Self-explanatory.
- Item (2) Self-explanatory, except that if individual has no social security number, the word "none" shall be inserted.
- Item (3) Self-explanatory.
- Item (4) Enter the age in full years. This is called "N" when used in calculating the Permissible Dose. N is equal to the number of years of age of the individual on his last birthday.

B. Occupational Exposure

- Item (5) List the name and address of each previous employer and the address of employment. Start with the most recent employer and work back. Include only those periods of employment since the eighteenth birthday involving occupational exposure to radiation. For period of self-employment, insert the word "self-employed."
- Item (6) Give the dates of employment.
- Item (7) List periods during which occupational exposure to radiation occurred.

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SUBJECT: Radiation Exposure History

NO. SPM- 60-06-1

Item (8) List the dose (in rems) for each period of exposure from the two following sources:

1. Records of previous occupational exposure of the individual.
2. Assumed exposure calculated by using $3 \frac{3}{4}$ rems per calendar quarter for exposure prior to January 1, 1961, and $1 \frac{1}{4}$ rems per calendar quarter for exposure beginning on or after January 1, 1961.

"Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye.

Item (9) After each entry in Item (8), indicate in Item (9) whether dose is obtained from records of employee or assumed and calculated by above.

Item (10) Self-explanatory.

C. Total Accumulated Occupational Dose (Whole Body)

Item (12) Upon completion of the report, the employee must certify that the information in Columns 5, 6, and 7 is accurate and complete to the best of his knowledge. The date is the date of his signature.

E. Calculations

Item (13) The permissible accumulated occupational dose for each individual is obtained by carrying out the following steps: The value for N should be taken from Item (4). Subtract 18 from N and multiply the difference by 5 rem. (For example: John Smith, age 32; $N=32$; $PAD = 5(32-18) = 70$ rem). Enter the Total Exposure to Date from Item (11). Subtract (b) from (a) and enter the difference under (c). The value in (c) represents the unused part of the permissible accumulated dose.

Item (14) Self-explanatory.

The original shall be retained in the District files and a copy shall be sent to the WPS RSO in Fort Worth.

III. Termination Procedures

Regulations provide that employers must give a report of radiation exposures to all employees who have been occupationally exposed to radiation if they request such a report. Additionally, under certain conditions the employer is automatically required to provide such a report.

WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Exposure History

NO. SPM- 60-06-1

- A. Exposures less than the limits - If an employee's quarterly exposure does not exceed the limits outlined in Part I above for any quarter during which they worked the Radiation Exposure Report (Form 60-05-1A-Attachment 2) shall be completed. One copy should be sent to the employee, one copy should be retained in the District files and one copy shall be sent to the WPS RSO at Fort Worth.
 - B. Exposures above the limits - If an employee's quarterly exposure, during any quarter which they were employed, exceeds the limits outlined in Part I above, the Radiation Exposure Report (Form 60-05-1B, Attachment 3) shall be completed. One copy should be sent to the employee and one copy should be retained in the District files, and one copy shall be sent to WPS RSO at Fort Worth.
 - C. Exposures to I-131 - For employees who have previously had a urinalysis performed for I-131 exposure, the Radiation Exposure Report (Form 60-05-1C, Attachment 4) shall be completed. One copy should be sent to the employee, one copy should be retained in the District files and one copy shall be sent to the WPS RSO at Fort Worth.
- IV. The District Radiation Safety Officer (RSO) is responsible for assuring compliance with the above requirements.
- V. The District RSO or his designate is responsible for completing and distributing the forms according to instructions given for that form.

IDENTIFICATION

OCCUPATIONAL DOSE—PREVIOUS HISTORY

13. CALCULATIONS—Permissible Dose

(A) Permissible Accumulated Dose = _____ rem

(B) Total Dose to Date (Form Item 11) = _____ rem

(C) Unused Part of Permissible Accumulated Dose (A-B) = _____ rem

Employee's Signature

Date _____

14. Name of License or Registrant

RADIATION EXPOSURE REPORT

District _____ License # _____

Employee Name _____ Period of Employment _____ to _____

Mailing Address _____ Period of Report _____ to _____

_____ Date of Report _____

Social Security # _____

RADIATION EXPOSURE DATA

Total Exposure _____ mRem (whole body)

In no calendar quarter covered by this report did the named individual's exposure exceed the applicable limits set forth in 10 CFR 20.101.

Radiation Safety Officer

RADIATION EXPOSURE REPORT

District _____ License # _____

Employee Name _____ Period of Employment _____ to _____

Mailing Address _____ Period of Report _____ to _____

_____ Date of Report _____

Social Security # _____

RADIATION EXPOSURE DATA

Year	Exposure (in mRem)			
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.

This report is furnished to you under the provisions of 10 CFR 19.13. You should preserve this report for further reference.

Radiation Safety Officer

RADIATION EXPOSURE REPORT

District _____ License # _____
Employee Name _____ Period of Employment _____ to _____
Mailing Address _____ Period of Report _____ to _____
_____ Date of Report _____
Social Security # _____

RADIATION EXPOSURE DATASample DateResults (uCi/ml)

Sample DateResults (uCi/ml)

This report is furnished to you under the provisions of 10 CFR 19.13. You should preserve this report for further reference.

Radiation Safety Officer

WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radioactive Materials - Employee Notices
and Instructions

NO. SPM- 60-07-1

PURPOSE

Federal and state regulations provide certain rules pertaining to information above radiation work which must be given to affected employees.

PROCEDURE

I. Posting of "Notice to Employees"

- A. Each licensed district shall post copies of that state's "Notice to Employees". Note: "Notice to Employees" posters for Louisiana, New Mexico, Texas, Mississippi, Colorado, Alabama, North Dakota and NRC licensed states are shown in Attachments 1-8 (respectively) at the end of this section.
- B. A copy of the form shown in Attachment 9 shall be attached to the bottom of each of the "Notice to Employees". This form describes records which may be received and the location where they may be reviewed.
- C. In addition to the above documents the "Notice of Violations" received from the most recent regulatory agency inspection shall be posted for a period of at least 30 days.
- D. Documents, notices or forms listed A thru C above shall be conspicuously posted, and appear in a sufficient number of places to permit individuals engaged in work under the license to observe them on the way to or from any particular work location to which the document applies. Defaced or altered documents shall be replaced.

II. Instructions to Workers

- A. All individuals working in, or frequenting any area where source of radiation are used or stored shall be kept informed of the storage, transfer, or use of radioactive material or of radiation in these areas.
- B. All individuals working in, or frequenting any area where source of radiation are used or stored shall be instructed in the health protection problems associated with exposure to such radioactive material, precautions or procedures to minimize exposure, and the functions and purpose of protective devices employed.
- C. All individuals shall be instructed in, and required to observe, to the extent within the worker's control, the applicable provisions of licensing agency regulations and company licenses for the protection of personnel from exposure to radiation or radioactive materials.

WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radioactive Materials - Employee Notices
and Instructions

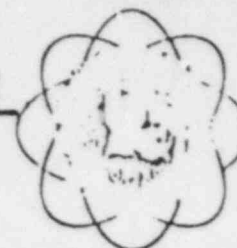
NO. SPM- 60-07-1

- D. All individuals shall be instructed of their responsibility to report promptly to the licensee or registrant, any condition which may lead to, or cause a violation of licensing agency regulations, company licenses, or certificates of registration, or unnecessary exposure to radiation or radioactive material.
- E. All individuals shall be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material.
- F. All individuals shall be advised as to the radiation exposure reports which workers may request.
- G. The extent of these instructions shall be commensurate with potential radiological health protection problems associated with the source (s) of radiation.

DEPARTMENT OF CONSERVATION

LOUISIANA DIVISION OF RADIATION CONTROL NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION



In the Louisiana Radiation Regulations, the Louisiana Division of Radiation Control has established standards for your protection against radiation hazards.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to—

1. Apply these regulations and the conditions of his license to all work under the license or registration.
2. Post or otherwise make available to you a copy of the Louisiana Radiation Regulations, licenses, registrations and operating procedures which apply to work you are engaged in, and explain their provisions to you.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the Louisiana Radiation Regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE REGULATIONS

1. Limits on exposure to radiation and radioactive material in controlled and uncontrolled areas.
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports; and
6. Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The Louisiana Radiation Regulations require that your employer

give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license or registration. The basic limits for exposure to employees are set forth in Sections D. 101, D. 103, and D. 104 of the regulations. The sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air and water.

2. If you work where personnel monitoring is required, and if you request information on your radiation exposures,

(a) Your employer must give you a written report, upon termination of your employment, of your radiation exposures, and

(b) Your employer must advise you annually of your exposure to radiation.

INSPECTIONS

All licensed or registered activities are subject to inspection by representatives of the Louisiana Division of Radiation Control.

INQUIRIES

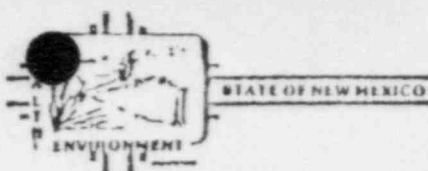
Inquiries dealing with the matters outlined above can be directed to:

LOUISIANA DIVISION OF
RADIATION CONTROL
P. O. Box 14690
Baton Rouge, Louisiana 70808

TELEPHONE
24-hour
Area Code 504
925-4518

Posting Requirement

Copies of this notice must be posted in a sufficient number of places in every establishment where employees are employed in activities licensed or registered pursuant to Parts B or C by the Louisiana Division of Radiation Control, to permit employees working in or frequenting any portion of a restricted area to observe a copy on the way to or from their place of employment.



NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS: INSPECTIONS

Part 4 of the New Mexico Radiation Protection Regulations establishes standards for your protection against radiation hazards. Part 10 establishes options for radiation workers and related matters.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to -

1. Apply these regulations to work involving sources of radiation.
2. Post or otherwise make available to you a copy of the Radiation Protection Regulations, licenses and operating procedures that apply to work you are engaged in, and explain their provisions to you; post Notices of Violation involving radiological working conditions and orders.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the Radiation Protection Regulations and the operating procedures that apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE REGULATIONS

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas.
2. Measures to be taken after accidental exposure.
3. Personnel monitoring, surveys and equipment.
4. Caution signs, labels and safety interlock equipment.
5. Exposure records and reports.
6. Options for workers regarding division inspection.
7. Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The Radiation Protection Regulations require that your employer give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in Part 4 of the Radiation Protection Regulations. These sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air and water.

2. If you work where personnel monitoring is required, and if you request in-

formation on your radiation exposures:

- (a) your employer must give you a written report, upon termination of your employment, of your radiation exposures, and
- (b) your employer must advise you annually of your exposure to radiation.

INSPECTIONS

All licensed or registered activities are subject to inspection by representatives of the Environmental Improvement Division. In addition, any worker or representative of workers who believes a violation of the Act, Radiation Protection Regulations or license condition exists or has occurred in work under a license or registration with regard to radiological working conditions on which the worker is engaged may request an inspection by sending a notice of the alleged violation to the address below. The request must set forth the specific grounds for the notice and must be signed by the worker or the representative of workers. During inspections, division inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he believes contributed to or caused any violation.

INQUIRIES

Inquiries dealing with the matters outlined above can be sent to:

RADIATION PROTECTION BUREAU
ENVIRONMENTAL IMPROVEMENT DIVISION
P. O. BOX 968
SANTA FE, NEW MEXICO 87503

POSTING REQUIREMENT

Copies of this notice must be posted in a sufficient number of places in every establishment where employees are employed in activities licensed or registered, pursuant to Parts 2 and 3 of the Radiation Protection Regulations, to permit employees working in or frequenting any portion of a restricted area to observe a copy on the way to or from their places of employment.

NOTICE TO EMPLOYEES

TEXAS REGULATIONS FOR CONTROL OF RADIATION

The Texas Department of Health has established standards for your protection against radiation hazards, pursuant to the Texas Radiation Control Act, Art. 4590f, Revised Civil Statutes, State of Texas.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to--

1. Apply these regulations to work involving sources of radiation.
2. Post or otherwise make available to you a copy of the Texas Department of Health regulations, licenses, certificates of registration, notices of violations, and operating procedures which apply to work you are engaged in, and explain their provisions to you.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the regulations and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE REGULATIONS

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas;
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Options for workers regarding Agency inspections; and
7. Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The regulations require that your employer give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in Sections 21.101, 21.103, and 21.104 of the regulations. These sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air and water.
2. If you work where personnel monitoring is required.,
 - (a) Your employer must give you a written report, upon termination of your employment, of your radiation exposures if that exposure exceeded 10% of any limit set forth in Sections 21.101, 21.103, or 21.104, and
 - (b) Upon written request your employer must advise you annually of your exposure to radiation, or on termination of association, of your exposure regardless of the amount of exposure.

INSPECTIONS

All licensed or registered activities are subject to inspection by representatives of the Texas Department of Health. In addition, any worker or representative of workers who believes that there is a violation of the Texas Radiation Control Act, the regulations issued thereunder, or the terms of the employer's license or registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by sending a notice of the alleged violation to the Texas Department of Health. The request must set forth the specific grounds for the notice, and must be signed by the worker as the representative of the workers. During inspections, Agency inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he believes contributed to or caused any violation as described above.

POSTING REQUIREMENT

Copies of this notice must be posted in a sufficient number of places in every establishment where employees are employed in activities licensed or registered, pursuant to Part 41 or Part 42 of Texas Regulations for Control of Radiation, to permit employees to observe a copy on the way to or from their place of employment.



UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555

NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION (PART 20); NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS (PART 19)

In Part 20 of its Rules and Regulations, the Nuclear Regulatory Commission has established standards for your protection against radiation hazards from radioactive material under license issued by the Nuclear Regulatory Commission. In Part 19 of its Rules and Regulations, the Nuclear Regulatory Commission has established certain provisions for the options of workers engaged in NRC-licensed activities.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to -

1. Apply these NRC regulations and the conditions of his NRC license to all work under the license.
2. Post or otherwise make available to you a copy of the NRC regulations, licenses, and operating procedures which apply to work you are engaged in, and explain those provisions to you.
3. Post Notices of Violation involving radiological working conditions, proposed imposition of civil penalties and orders.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the NRC regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE NRC REGULATIONS

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas;
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Options for workers regarding NRC inspections; and
7. Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The NRC regulations require that your employer give you a written report if you receive an

exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in Sections 20.101, 20.103, and 20.104 of the Part 20 regulations. These Sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air.

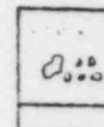
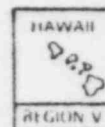
2. If you work where personnel monitoring is required pursuant to Section 20.202:
 - (a) your employer must give you a written report of your radiation exposures upon the termination of your employment, if you request it, and
 - (b) your employer must advise you annually of your exposure to radiation, if you request it.

INSPECTIONS

All activities under the license are subject to inspection by representatives of the NRC. In addition, any worker or representative of workers who believes that there is a violation of the Atomic Energy Act of 1954, the regulations issued thereunder, or the terms of the employer's license with regard to radiological working conditions in which the worker is engaged, may request an inspection by sending a notice of the alleged violation to the appropriate United States Nuclear Regulatory Commission Inspection and Enforcement Regional Office (shown on map at right). The request must set forth the specific grounds for the notice, and must be signed by the worker or the representative of the workers. During inspections, NRC inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he believes contributed to or caused any violation as described above.

POSTING REQUIREMENTS

Copies of this notice must be posted in a sufficient number of places in every establishment where activities licensed by the NRC are conducted, to permit employees working in or frequenting any portion of a restricted area to observe a copy on the way to or from their place of employment.



UNITED STATES NUCLEAR REGULATORY COMMISSION

A representative of the Nuclear Regulatory Commission can be contacted at the following addresses and telephone numbers. The Regional Office will accept collect telephone calls from employees who wish to register complaints or concerns about radiological working conditions or other matters regarding compliance with Commission rules and regulations.

Regional Offices

REGION	ADDRESS	TELEPHONE	
		DAYTIME	NIGHTS AND HOLIDAYS
I	Region I, Office of Inspection and Enforcement, USNRC 631 Park Avenue King of Prussia, Pennsylvania 19406	215 337 1150	215 337 1150
II	Region II, Office of Inspection and Enforcement, USNRC 230 Peachtree Street, N.W., Suite 1217 Atlanta, Georgia 30303	404 221 4503	404 221 4503
III	Region III, Office of Inspection and Enforcement, USNRC 799 Roosevelt Road Glen Ellyn, Illinois 60137	312 868 2666	312 868 2666
IV	Region IV, Office of Inspection and Enforcement, USNRC 611 Ryan Plaza Drive, Suite 1000 Arlington, Texas 76012	817 334 2841	817 334 2841
V	Region V, Office of Inspection and Enforcement, USNRC 1996 N. California Boulevard, Suite 202, Walnut Creek Plaza Walnut Creek, California 94596	415 486 3141	415 486 3141

MISSISSIPPI STATE BOARD OF HEALTH

NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION (PART 801, SECTION D) NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS: INSPECTIONS (PART 801, SECTION J)

In Part 801, Section C, of its Rules and Regulations, the Mississippi State Board of Health has established standards for your protection against radiation hazards from radioactive material under license issued by the Mississippi State Board of Health. In Part 801, Section J, of its Rules and Regulations, the Mississippi State Board of Health has established certain provisions for the options of workers engaged in work under an Agency license or registration.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to—

1. Apply these regulations to work involving sources of radiation.
2. Post or otherwise make available to you a copy of the Mississippi State Board of Health regulations, licenses, and operating procedures which apply to work you are engaged in, and explain their provisions to you.
3. Post Notice of Violation involving radiological working conditions, proposed imposition of civil penalties and orders.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the Mississippi State Board of Health regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE REGULATIONS

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas.
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Options for workers regarding Agency inspection; and
7. Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The Mississippi State Board of Health regulations require that your em-

ployer give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in Section D.101, D.103 and D.104 of the regulations. The sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air and water.

2. If you work where personnel monitoring is required, and if you request information on your radiation exposures,
 - (a) Your employer must give you a written report, upon termination of your employment, of your radiation exposures, and
 - (b) Your employer must advise you annually of your exposure to radiation.

INSPECTIONS:

All licensed or registered activities are subject to inspection by representatives of the Mississippi State Board of Health. In addition, any worker or representative of workers who believe that there is a violation of the Mississippi Radiation Protection Act of 1976, Title 45, Chapter 14, Mississippi Code of 1972, the regulations issued thereunder, or the terms of the employer's license or registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by sending a notice of the alleged violation to the Division of Radiological Health, Mississippi State Board of Health. The request must set forth the specific grounds for the notice, and must be signed by the worker as the representative of the workers. During inspections, Agency Inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he believes contributed to or caused any violation as described above.

POSTING REQUIREMENT

COPIES OF THIS NOTICE MUST BE POSTED IN A SUFFICIENT NUMBER OF PLACES IN EVERY ESTABLISHMENT WHERE EMPLOYEES ARE EMPLOYED IN ACTIVITIES LICENSED OR REGISTERED, PURSUANT TO PART B OR PART C, BY THE MISSISSIPPI STATE BOARD OF HEALTH, TO PERMIT EMPLOYEES WORKING IN OR FREQUENTING ANY PORTION OF A RESTRICTED AREA TO OBSERVE A COPY ON THE WAY TO OR FROM THEIR PLACE OF EMPLOYMENT.

NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION



In the Radiation Control Regulations, the Colorado Department of Health Has Established Standards for Your Protection Against Radiation Hazards.

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to:

1. Apply these regulations to work involving sources of radiation.
2. Post or otherwise make available to you a copy of the Department of Health regulations, licenses, and operating procedures which apply to work you are engaged in, and explain their provisions to you.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the Department of Health regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE REGULATIONS

1. Limits on exposure to radiation and radioactive material in controlled and uncontrolled areas;
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Notices, Instructions and reports to workers, and
7. Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The Colorado Department of Health regulations require that your employer give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in RH 4.2 and RH 4.4 of the regulations. These sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air or water.
2. If you work where personnel monitoring is required, and if you request information on your radiation exposures,
 - a) Your employer must give you a written report, upon termination of your employment, of your radiation exposures, and
 - b) Your employer must advise you annually of your exposure to radiation.

INSPECTIONS

All licensed or registered activities are subject to inspection by the Colorado Department of Health or its duly authorized representatives.

INQUIRIES

Inquiries dealing with the matters outlined above can be sent to the Colorado Department of Health, Radiation and Hazardous Wastes Control Division, 4210 E. 11th Ave., Denver, Colorado 80220.

POSTING REQUIREMENTS

Copies of this notice must be posted in a sufficient number of places where employees are employed in activities registered or licensed pursuant to Parts II, III, and X by the Colorado Department of Health, to permit employees working in or frequenting any portion of a controlled area to observe a copy on the way to or from such area.



NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION

IN ALABAMA REGULATIONS FOR CONTROL OF RADIATION, THE ALABAMA DEPARTMENT OF PUBLIC HEALTH HAS ESTABLISHED STANDARDS FOR YOUR PROTECTION AGAINST RADIATION HAZARDS

Your Employer's Responsibility

Your employer is required to—

1. Apply these regulations to work involving sources of radiation;
2. Post or otherwise make available to you a copy of the Alabama Department of Public Health regulations, licenses, and operating procedures which apply to work you are engaged in and explain their provisions to you; and
3. Post any Notice of Violation involving radiological working conditions.

Your Responsibility as a Worker

You should familiarize yourself with those provisions of the Alabama Department of Public Health regulations and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

What Is Covered by These Regulations

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas.
2. Measures to be taken after accidental exposure.
3. Personnel monitoring surveys and equipment.
4. Caution signs, labels, and safety interlock equipment.
5. Exposure records and reports.
6. Options for workers regarding Alabama Department of Public Health inspections.
7. Related matters.

Reports on Your Radiation Exposure History

1. The Alabama Department of Public Health regulations require that your employer give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license.

The basic limits for exposure to employees are set forth in Sections 6-3.101, 6-3.103, and 6-3.104 of the regulations. These sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air and water.

2. If you work where personnel monitoring is required and if you request information on your radiation exposures,

(a) Your employer must give you a written report, upon termination of your employment, of your radiation exposures, and

(b) Your employer must advise you annually of your exposure to radiation.

Inspections

All licensed or registered activities are subject to inspection by representatives of the Alabama Department of Public Health. In addition, any worker or representative of workers who believes that there is a violation of Act No. 582, Regular Session, 1963, the regulations issued thereunder, or the terms of the employer's license or registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by sending a notice of alleged violation to the address given below. The request must set forth the specific grounds for the notice and must be signed by the worker or by the representative of the workers. During inspections, agency inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he or she believes contributed to or caused any violation as described above.

Inquiries

Inquiries dealing with the matters outlined above can be sent to the Alabama Department of Public Health, Environmental Health Administration, State Office Building, Montgomery, Alabama 36130. Telephone—(205) 832-5992.

POSTING REQUIREMENTS

COPIES OF THIS NOTICE MUST BE POSTED IN A SUFFICIENT NUMBER OF PLACES IN EVERY ESTABLISHMENT WHERE EMPLOYEES ARE EMPLOYED IN ACTIVITIES LICENSED OR REGISTERED, PURSUANT TO PARTS 6-2, 6-5, or 6-8, BY THE ALABAMA DEPARTMENT OF PUBLIC HEALTH, TO PERMIT EMPLOYEES WORKING IN OR FREQUENTING ANY PORTION OF A RESTRICTED AREA TO OBSERVE A COPY ON THE WAY TO OR FROM THEIR PLACE OF EMPLOYMENT.

NOTICE TO EMPLOYEES

STANDARDS FOR RADIATION PROTECTION

THE NORTH DAKOTA STATE DEPARTMENT OF HEALTH HAS ESTABLISHED
STANDARDS FOR YOUR PROTECTION AGAINST RADIATION HAZARDS

YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to -

Apply these regulations and the conditions of his North Dakota Radioactive Material License to all work under the license.

Post or otherwise make available to you a copy of the North Dakota State Department of Health regulations, licenses, and operating procedures which apply to work you are engaged in, and explain their provisions to you.

Post Notices of Violation involving radiological working conditions, proposed imposition of civil penalties and orders.

Refrain from discriminatory acts against employees who provide information to the North Dakota State Department of Health.

YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the North Dakota State Department of Health regulations, and the operating procedures which apply to the work you are engaged in. You should observe all provisions for your own protection and protection of your co-workers.

WHAT IS COVERED BY THESE REGULATIONS

Limits on exposure to radiation and radioactive material in restricted and unrestricted areas;
Measures to be taken after accidental exposure;
Personnel monitoring, surveys, and equipment;
Caution signs, labels, and safety interlock equipment;

Exposure records and reports;

Options for workers regarding Department inspections;

Prohibits discrimination against employees, and;
Related matters.

REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The North Dakota State Department of Health regulations require that your employer give you a written report if you receive an exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in Sections 33-10-04-02.1, 3. and 4. of the regulations. These sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air and water.
2. If you work where personnel monitoring is required, and if you request information on your radiation exposures,
 - (a) Your employer must give you a written report of your radiation exposures upon termination of your employment, and;
 - (b) Your employer must advise you annually of your exposure to radiation.

INSPECTIONS

All licensed or registered activities are subject to inspection by representatives of the North Dakota State Department of Health.

EMPLOYEE PROTECTION

If an employee believes that discrimination has occurred due to engaging in activities described in Section 33-10-10-01.6. of these regulations said employee may, within 30 days of the discriminatory act, file a complaint with the Department of Labor, Employment Standards Administration, Wage and Hour Division. The Department of Labor shall conduct an investigation and shall, where discrimination has occurred, issue an order providing relief to the employee if relief is not provided by other means of settlement.

INQUIRIES

Inquiries dealing with the matters outlined above can be sent to the North Dakota State Department of Health, Division of Environmental Engineering, 1200 Missouri Avenue, Room 304, Bismarck, North Dakota 58501. Telephone (701) 224-2348.

COPIES OF THIS NOTICE MUST BE POSTED IN A SUFFICIENT NUMBER OF PLACES IN EVERY ESTABLISHMENT WHERE EMPLOYEES ARE EMPLOYED IN ACTIVITIES LICENSED OR REGISTERED WITH THE NORTH DAKOTA STATE DEPARTMENT OF HEALTH, TO PERMIT EMPLOYEES WORKING IN OR FREQUENTING ANY PORTION OF RESTRICTED AREA TO OBSERVE A COPY ON THE WAY TO OR FROM THEIR PLACE OF EMPLOYMENT

WPS SAFETY PRACTICES MANUAL

ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Program Management Organization
for Field Personnel

NO. SPM- 60-01-2

PURPOSE

The purpose of this procedure is to outline, to administrative personnel, the functions and responsibilities of those persons working within the framework of the operations area of the WPS Radiation Program.

I. WPS Radiation Protection Officer

- A. The WPS Radiation Protection Officer is the designated overall manager for the radiation program. The WPS Radiation Protection Officer is the Loss Control Engineer located at WPS Accident Prevention in Fort Worth.
- B. The duties of the Radiation Protection Officer include the delegation of authority to persons responsible for carrying out the duties such as that of Radiation Safety Officer, overall responsibility for records, surveys, the forming of committees where necessary and in general the administrative procedures for the entire radiation program.
- C. The WPS Radiation Protection Officer is responsible for contacting federal or state agencies to request renewals and changes to applicable licenses granted by those agencies.

II. District Radiation Safety Officer

- A. The Radiation Safety Officer is responsible to the Radiation Protection Officer and in general is to conduct or cause to be conducted the programs and responsibilities delegated by the Radiation Protection Officer. The Radiation Safety Officer for each district is the District Manager. His duties shall include:
 - 1. Site surveys
 - 2. Records, personnel monitoring records and compilation
 - 3. Vehicle survey records
 - 4. Training and qualifying personnel
 - 5. Conducting periodic safety checks to ensure that the radiation protection program is functioning properly in his district
- B. Before a District Manager can fully assume the appointment of Radiation Safety Officer by the Radiation Protection Officer, he must have successfully completed the radiation safety training course provided by Radiation Consultants, Inc., Houston Texas, or other approved training company, within four (4) months of the initial date of appointment.

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ACCIDENT PREVENTION PROCEDURES

SUBJECT: Radiation Program Management Organization
for Field Personnel

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III. Radiation Supervisor

- A. The Radiation Supervisor is responsible to the District Radiation Safety Officer for the overall performance of the operation to which he has been assigned such as:
1. Detailing requirements for planning and directing personnel, safety, methods and techniques used for the particular operations.
 2. Responsibility for the control over the specific radioactive materials that are to be used or dispensed on a job.
 3. Maintaining control of records and reports generated from required surveys of material, equipment and restricted areas on the job.
 4. Must assure that all equipment and devices are maintained in working order and that sealed sources or tracer materials are properly locked and stored when not in use.
 5. Responsibility for assuring the compliance of personnel and procedures as required by the federal or state license or regulations.
- B. Before an employee can be classified as a Radiation Supervisor, he must successfully complete the radiation safety training course provided by Radiation Consultants, Inc. or other approved training company.

IV. Technicians

- A. The technician is an employee who is directly responsible to the Radiation Supervisor for the duties assigned by the Radiation Supervisor.
- B. Under the direct supervision of the Radiation Supervisor at the well-site, the technician may handle and/or dispense tracer materials and use survey instruments.
- C. Before an employee can be classed as a technician he must have successfully complete the following training:
1. Has read or received instruction on this operating manual.
 2. Has demonstrated competence to use R/A material and the tools associated with its use under the personal supervision of the Radiation Supervisor.

WPS SAFETY PRACTICES MANUAL

ACCIDENT PREVENTION PROCEDURES

SUBJECT: Recordkeeping Requirements for
Field Personnel

NO. SPM- 60-02-2

PURPOSE

Federal and state agencies require the development and retention of certain records concerning the storage, use and handling of radioactive materials. This procedure will list and describe the types of records WPS will use.

PROCEDURES

I. Recordkeeping - General

- A. Records and reports required by federal and state agencies are to be preserved for periods specified in this section, or until the governing agency authorizes their disposal.
- B. All records required by federal and state agencies will be transferred to the agency within 30 days following (1) the termination of a license granted by that agency, (2) such other times as the licensing agency may direct.
- C. Districts which close down their operations shall transfer all of their records and reports to the WPS Radiation Protection Officer, Accident Prevention - Fort Worth.

II. Recordkeeping - Records and Reports

The following records and reports shall be completed by every district using radioactive materials and kept in an orderly filing system.

- A. Radioactive Sealed Source Utilization Log (Form 60-02-1A). This record summarized the receipt, utilization and transfer of densiometer sealed sources. When this record form is used with a SAM vehicle with two (2) sealed sources, both of the densiometer serial numbers will be listed at the top center of the form. The individual making the entry on the form must write his name in the indicated place beside the entry. A copy of the "Dispatcher's Job Ticket" for each usage shall be maintained in a separate file to identify the wellsite location the where the instruments were utilized. (See Attachment 1). These records shall be maintained for inspection by regulatory agencies for a period of two (2) years.
- B. Radioactive Tracer Material Utilization Log (Form 60-02-1B). This record summarizes the receipt, utilization and final disposition of all tracer materials used. A copy of the "Dispatcher's Job Ticket" will be kept in a separate file to identify the location of tracer utilization for each job. Receiving bills of lading shall also be maintained in a separate file for tracer materials to identify receipt of materials. The column labeled "Disposition" shall be used to identify what happened to tracer materials and packaging such as: "All downhole;" "___ downhole and ___ returned to storage;" "empty container returned to storage;" "transferred to ___;" "empty containers returned to vendor," etc. (See Attachment 2). The individual making the entry on the form must write

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his name in the indicated place beside the entry. These records shall be maintained for inspection by the regulatory agencies for a period of two (2) years from the date of entry.

- C. Survey Meter Calibration Log (Form 60-02-1C). This form used to record the date of each six (6) month calibration of the district survey meter(s). The district shall maintain a file of the "Certification of Calibration" test certificates and send a copy of each "Certificate of Calibration" to the WPS Radiation Protection Officer at Fort Worth. (Attachment 3). Records of calibration shall be maintained for a period of two (2) years from the date of calibration for inspection by the regulatory agencies.
- D. Wellsite Radiation Monitoring Report (Form 60-02-1D). This report will be completed for each tracer material wellsite job. This report is not required for densiometer sealed source jobs. The original form is to be retained in district files with a copy sent to the WPS Radiation Protection Officer at Fort Worth. (Attachment 4). These reports shall be maintained for inspection by the regulatory agencies for two (2) years after completion of the surveys.
- E. Storage Area Monitoring Report (Form 60-02-1E). Quarterly monitoring of the district's radioactive material storage area shall be reported using Form 60-02-1E - Storage Area Monitoring Report.

Note: Densiometer sealed sources are considered in storage while stored in the densiometer trailer, or mounted on the SAM vehicle, at the district yard, are considered storage areas.

The district will retain the original for inspection by the regulatory agencies for two (2) years after completion of the survey, and send a copy to the WPS Radiation Protection Officer at Fort Worth. (Attachment 5).

- F. Vehicle Monitoring Report (Form 60-02-1F) Monthly monitoring of district vehicles used to transport densiometers, i.e., densiometer trailers and SAM vehicles. The district will retain the original and send a copy to the WPS Radiation Protection Officer at Fort Worth. (Attachment 6). These shall be maintained for inspection by the regulatory agencies for two (2) years after completion of the survey.
- G. Sealed Source Inventory Report (Form 60-02-1G) Every three (3) months, this form will be completed to account for all radioactive sealed sources received and possessed during that time period. The report will be maintained in district files for two (2) years from the date of the report. A copy of each report will be sent to the WPS Radiation Protection Officer at Fort Worth. (Attachment 7).
- H. Tracer Materials Inventory Report (Form 60-02-1H) Every three (3) months this form will be completed to account for all radioactive tracer materials which are on hand at the time. The report will be maintained

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in district files for two (2) years from the date of the report. A copy of each report will be sent to the WPS Radiation Protection Officer at Fort Worth. (Attachment 8).

- I. Temporary Use TLD Badge Log (Form 60-02-11). This form is used to assign temporary TLD badges to personnel who are not regular personnel with permanently assigned TLD badges. A temporary badge is assigned only to one person before it is returned to the TLD badge vendor for processing and reading. Previously assigned temporary badges will not be reassigned to another person. The form will be retained by a district in its TLD Badge Report files. (Attachment 9)
- J. TLD Badge Reports and personnel exposure records will be maintained in a separate file. Quarterly TLD Badge Reports from the TLD badge vendor on each person using radioactive materials will be kept at the district office. The TLD badge vendor also sends a duplicate copy of the report to the WPS Radiation Protection Officer at Fort Worth for the Company's master files. (Refer to SPM-60-03-1, Radiation Detection - Personnel Monitoring Badges, for further details.)
- K. Certificate of Leak Test records on all sealed sources will be maintained on each sealed source. Leak test kits from Radiation Consultants, Inc. or other agency approved suppliers will be used each six (6) months. The district receives the original report from the vendor and the WPS Radiation Protection Officer at Fort Worth receives a copy from the vendor. An up-to-date copy of the latest Certificate of Leak Test report will always accompany and be transported with a densiometer when it is in field use on a job and when it is transferred from the district.

III. Responsibility

The District Radiation Safety Officer is responsible for assigning record-keeping duties to others in this organization and for monitoring their work to assure compliance with these procedures.

WELLSITE RADIATION MONITORING REPORT

Date _____

Customer _____ Well _____

Field _____ County _____ State _____

Radiation Supervisor _____ Technician _____

Supervisor's Badge # _____ Technician's Badge # _____

Job Ticket No. _____ District _____

Survey Meter Type _____ Serial # _____ Date Calibrated _____

TRACER ISOTOPE INFORMATION

Tracer Type _____ Strength _____

Amount of Tracer Taken on Job _____ mCi Amount Used on Job _____ mCi

Disposition of Leftover Tracer _____

VEHICLE MONITORING INFORMATIONBefore Leaving Shop
(Vehicle Loaded)Background _____ mR/hr
(30 feet clear of any R/A material)

<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>
Front Sign*	_____
Back Sign*	_____
Left Sign*	_____
Right Sign*	_____

After Return to Shop
(Vehicle Empty)

Front Sign* _____ mR/hr

Left Sign* _____ mR/hr

Before Leaving Job-Site
(Vehicle Loaded)Background _____ mR/hr
(30 feet clear of any R/A material)

<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>
Front Sign*	_____
Back Sign*	_____
Left Sign*	_____
Right Sign*	_____

Background _____ mR/hr

Back Sign* _____ mR/hr

Right Sign* _____ mR/hr

JOB-SITE MONITORING INFORMATIONBefore Operations Begin

Background Reading _____ mR/hr Wellhead Reading _____ mR/hr

Reading in Area Where Work is to be Performed _____ mR/hr

After Completing Operations

Background Reading _____ mR/hr Wellhead Reading _____ mR/hr

Reading in Area Where Work was Performed _____ mR/hr

Thyroid Check (For Iodine-131 Use Only) _____ mR/hr

Exact Location of Any Significant Contamination _____

Steps Taken to Remedy Contamination Problem _____

Signature _____

STORAGE AREA MONITORING REPORT

District _____ Date _____

All radioactive materials storage bunkers and down-hole storage facilities are to be monitored for radiation levels each quarter.

Survey Meter Type _____

Survey Meter Serial # _____

Calibration Date _____

ABOVE GROUND STORAGE

Background Reading* _____ mR/hr

Radiation levels on surface of storage area (measure each door separately -- no measurement is necessary if storage is empty -- indicate if empty)

<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>	<u>Location of</u> <u>Survey</u>	<u>Reading</u> <u>(mR/hr)</u>
Top	_____	Front	_____
Left	_____	Back	_____
Right	_____		

Radiation level at 1 meter from storage area

Left	_____	Front	_____
Right	_____	Back	_____

DOWN-HOLE STORAGE

Background Reading* _____ mR/hr

Highest level at surface of down-hole storage cover _____ mR/hr

* Normal background is recorded at least 30 feet from the storage area, or 6 feet from the cover of the down-hole storage facility.

Signature _____

Title _____

Make in duplicate: (1) Retain in District Office (1) Fort Worth Accident Prevention

VEHICLE MONITORING REPORT

District _____ Date _____

Survey Meter Type _____

Survey Meter Serial # _____

Calibration Date _____

Each vehicle is to be monitored quarterly, with radioactive sealed sources in place.

Vehicle #	(All readings are in mR/hr)			
	Front	Back	Left	Right

Signature _____

Title _____

Make in duplicate: (1) Retain in District Office
(1) Fort Worth Accident Prevention

RADIOACTIVE SEALED SOURCE
PHYSICAL INVENTORY REPORT

District _____ Date _____

This report is to be completed every three months to account for all sealed sources under the license.

Densimeter or Source Serial # _____ Unit # _____

Type of By-Product Material _____

Quantity of By-Product Material _____

Physical Condition of Source Holder (Visual) _____

Condition of Labels (If required) _____

Physical Location of the Sealed Source(s) _____

Signature _____

Title _____

Make in Duplicate: (1) Retain in District Office
(1) Fort Worth Accident Prevention

RADIOACTIVE TRACER MATERIALS
PHYSICAL INVENTORY REPORT

District _____ Date _____

This report is to be completed every three months to account for all radioactive tracer material on hand.

Type of Tracer Material _____

Quantity of Tracer Material _____

Physical Location of Material _____

Signature _____

Title _____

Make in Duplicate: (1) Retain in District Office
(1) Fort Worth Accident Prevention

TEMPORARY USETLD BADGE LOG

District _____

Complete this form when assigning temporary TLD badges to personnel who are not technicians or loggers and who will be working within the 2 mR/hr restricted areas. Each TLD badge may be assigned to only one person. DO NOT assign a badge to another person after it has been previously exposed or worn by one person.

TLD Badge #	Name of Employee Assigned to Badge	Emp. #	Date Assigned	Date Returned	Logged by (Initials)

Retain in District Office after each quarter's use.

WPS SAFETY PRACTICES MANUAL

ACCIDENT PREVENTION PROCEDURES

SUBJECT: Personnel Monitoring Requirements for
Field Personnel

NO. SPM- 60-03-2

PURPOSE

The purpose of this procedure is to safeguard the welfare of those who could possibly be exposed to radioactive materials by establishing a uniform system of wearing personnel badges and monitoring these badges to detect exposure levels. It is essential that these procedures be followed to assure that any personnel exposure be recorded on the badge, and in turn any badge exposure will be a personnel exposure. Additionally, procedures are outlined for steps to be followed in the event of an over-exposure and for personnel working with Iodine-131.

GUIDELINES

I. TLD Badge Procedures

A. The following procedures will be followed for the handling of TLD badges.

1. The badge supplier will send the shipment of badges to the District Manager (Radiation Safety Officer - RSO) several days before the beginning of the quarterly period. The monitoring period is for a three (3) month period and begins on the first day of the month. The badge will come from the supplier in a holder with a badge number, last name and initial, month and year for the monitoring period, and the code for the district on the badge holder. Complete badges with holders are furnished each quarter, and the badges should not be removed from the holders. The thermoluminescence dosimeters (TLD) badges that are used are not affected by humidity, organic vapors, or heat (less than 300°C or 572°F); Therefore, false readings from being wet or getting hot are eliminated. The TLD badge service will measure personnel exposure to Beta and Gamma radiation.
2. The district office will order badges for new employees from the TLD badge supplier, by listing the full name, birth date and social security number of the new employee on the Nuclear Sources and Services "TLD Change Form" (Form 60-03-1A, Attachment 1).
3. Return badges for terminated employees with the regular shipment. The badge should be marked with the termination date of the employee and stored with the Control badge until the entire shipment is returned to the supplier.
4. The supplier will be notified when employees are transferred from one location to another so the supplier can change the location of future badge shipments for that employee, if so required.

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B. Employee's Responsibility

1. Personnel will wear badges on the front of their body(i.e., shirt pocket, or collar).
2. Employees assigned badges are required to wear the badge at all times when (1) on a job, (2) at a Company facility, (3) traveling to or from job.
3. The employee, when on "days off", vacation, or in any situation except as defined above, should see that the badge is kept in a place free from radiation exposure and secured by being "locked up" so that it cannot be "tampered with".
4. See that badges are changed out as required and worn only during the current monitoring period, as required.
5. Return the badge to the District Radiation Safety Officer at the end of the wear period.

II. This section outlines the employees responsibility in the event that the TLD badge report indicates the individual has exceeded the allowable exposure limits.

A. Severe Over-Exposure (above 5 rem)

1. Submit to an examination by a doctor to determine if any biological effects have occurred.
2. Stay removed from any exposure to radioactive materials until approved for return by your manager.
3. Review your activities during the monitoring period and submit a written report within ten (10) days to the Radiation Protection Officer at Fort Worth stating how the over-exposure occurred.

B. Over-Exposure (above 1.25 rem)

Review your activities during the monitoring period and submit a written report within ten (10) days to the Radiation Protection Officer at Fort Worth stating how the over-exposure occurred.

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III. In order to comply with the Nuclear Regulatory Commission and State requirements concerning the use of radioactive Iodine, bioassay testing procedures are required to detect any possible exposure to employees who may use the materials. If it is detected by this testing that exposure limits have been exceeded, certain action is required to prevent further exposure and eliminate the cause of the exposure.

The following section outlines the procedures to be followed.

A. Personnel who open bottles and dispense quantities of liquid I-131 in excess of 50 mci at any one time are required to provide a urine sample for bioassay testing purposes. The urine sample should be taken after six (6) hours following the possible exposure to I-131.

B. At the end of each calendar year, any personnel who had opened or dispensed I-131 containers in quantities greater than 50 mci at any one time during that calendar year will submit to a thyroid check.

C. Test Result Action

Whenever the thyroid burden at the time of measurement exceeds 0.04 ci of I-131, the following actions shall be taken:

1. An investigation shall be made by the responsible District Radiation Safety Officer to determine the causes of the I-131 overexposure and to evaluate the potential for further exposures.
2. The District Radiation Safety Officer shall take steps to restrict the worker from further exposure until the source of exposure is discovered and corrected.
3. A repeat bioassay shall be taken within two (2) weeks of the previous measurement and should be evaluated within 24 hours after measurement in order to confirm the presence of internal radioiodine and to obtain an estimate of its effective half-life for use in estimating dose.
4. The WPS Radiation Protection Officer will notify the proper governmental licensing agencies as required by regulation or conditions of the license.

B. If the thyroid burden at any time exceeds 0.14 uci of I-131, the following action shall be taken:

1. Carry out action as in Paragraph A.I. above.
2. The District Radiation Safety Officer, after consultation with the WPS Radiation Protection Officer, will refer the case to the appropriate medical/health physics consultant for recommendations regarding therapeutic procedures that may be carried

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ACCIDENT PREVENTION PROCEDURES

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out to accelerate removal of radioactive iodine from the body.

3. Carry out repeated measurement as recommended by appropriate medical/health physics specialist consulted.

IV. Termination Procedures

Regulations provide that employers must give a report of radiation exposures to all employees who have been occupationally exposed to radiation if they request such a report. Additionally, under certain conditions the employer is automatically required to provide such a report.

- A. Exposures less than the limits - If an employee's quarterly exposure does not exceed the limits outlined in Part I above for any quarter during which they worked the Radiation Exposure Report (Form 60-05-1A-Attachment 2) shall be completed. One copy should be sent to the employee, one copy should be retained in the District files and one copy shall be sent to the WPS RSO at Fort Worth.
 - B. Exposures above the limits - If an employee's quarterly exposure, during any quarter which they were employed, exceeds the limits outlined in Part I above, the Radiation Exposure Report (Form 60-05-1B-Attachment 3) shall be completed. One copy should be sent to the employee and one copy should be retained in the District files, and one copy shall be sent to WPS RSO at Fort Worth.
 - C. Exposures to I-131 - For employees who have previously had a urinalysis performed for I-131 exposure, the Radiation Exposure Report (Form 60-05-1C-Attachment 4) shall be completed. One copy should be sent to the employee, one copy should be retained in the District files and one copy shall be sent to the WPS RSO at Fort Worth.
- V. The District Radiation Safety Officer (RSO) is responsible for assuring compliance with the above requirements.
- VI. The District RSO or his designate is responsible for completing and distributing the forms according to instructions given for that form.

WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

SUBJECT: Use of Radioactive Tracer Materials

NO. SPM- 60-04-2

PURPOSE

In order to give proper safety consideration to the various radioactive materials used in tracer studies, the following procedures must be followed by all Western personnel using radioactive tracers.

GENERAL

Western is licensed to use the following radioactive isotope tracer materials for oil field tracer studies:

<u>Type Source</u>	<u>Half Life</u>	<u>Form of Material</u>
Iodine (I-131)	8.1 days	Liquid
Iridium (Ir-192)	75 days	Sand
Iron (Fe-59)	45 days	Nails

The radioactive tracer materials may be used in oil field studies such as: acidizing operations, cement top locations, cement channel locations, casing seat channel location, waterflood directional flow, oil injection profiles, interface markers, bottom plug markers, flow calibrations, oil slurry cement locations, recovery projects, fracturing, mud cake determination, permeability surveys and other types of surveys.

Iridium 192 in the form of radioactive sand and Iodine 131 in the form of a liquid are generally poured into a blender volume tank or a slurry hopper where they are mixed or blended and then pumped downhole. Iron 59 in the form of radioactive nails are hammered into plugs before they are set downhole. Well logging companies are contracted by the well operators to conduct downhole instrument studies on the tracer materials later on.

I. Receiving and Opening Tracer Packages

- A. All packages sent from Western's suppliers containing radioactive materials are shipped according to DOT regulations. The radiation exposure limit for a single DOT package is not more than 200 mR/hr at the surface of the shipping container and not more than 10 mR/hr at a distance of three (3) feet from the surface of the container.
- B. When a shipment of tracer material is delivered to a district facility, it shall be monitored on the external surfaces of the package(s) for radioactive contamination caused by possible leakage of the contents. The monitoring shall be performed as soon as practicable after receipt, but no later than three (3) hours after the package is received at the district facility if received during the normal working hours, or eighteen (18) hours if received after normal working hours.

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SUBJECT: Use of Radioactive Tracer Materials

NO. SPM- 60-04-2

Using a piece of Whatman filter paper or a piece of paper towel of approximately 2 square inches, wipe the exterior surface of the package using moderate pressure. In an area of low radiation background survey the filter disk or paper towel with the beta window of the survey meter in the open position. This measurement will be taken at a distance of $\frac{1}{2}$ " from the open beta window. If the reading exceeds 0.5 mr/hr above the background level, immediately notify the District Radiation Safety Officer.

- C. After the tracer shipment has been monitored, it will immediately be placed into the district storage area for safekeeping until the time of use. At that time, the shipment will be logged into the district's Radioactive Tracer Material Log (Form 60-02-1B) and receiving records will be placed in a properly marked file.

II. District Storage Facilities

- A. District storage facilities for radioactive tracer materials shall be designed or positioned so that no person in an uncontrolled area outside the storage area can receive more than 2 mR in any one hour or more than 100 mR in any seven (7) consecutive days.
- B. The storage area can be a locked room or any other means which will provide physical security to the tracer material and provide radiation exposure protection to personnel working outside the storage area.
- C. Only authorized personnel wearing TLD badges shall have access to the storage facility.
- D. Tracer materials shall be stored in their original shipping containers while in the storage area when possible.
- E. District storage pit recommendations:
 - 1. Minimum of two feet of earth, concrete or fill separate adjacent pits.
 - 2. Pits to be a minimum of four feet deep.
 - 3. Lids to be screwed on or recessed in, designed to exclude water and equipped with a locking device. Label top of lid with stick-on label stating "Caution - Radioactive Material."
 - 4. Maximum lid contact reading should be 2 mR/hr or less. If not, a locked fence perimeter will be established beyond the 2 mR/hr level range.

Note: Contact the WPS Radiation Protection Officer at Fort Worth for storage pit drawings.

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SUBJECT: Use of Radioactive Tracer Materials

NO. SPM- 60-04-2

- F. All storage area doors shall be posted "Caution - Radioactive Material." On pit storage areas, the posted "Caution - Radioactive Material" signs should be on four sides of the fences controlling the area.
- G. Storage facilities shall be monitored quarterly and the results recorded on the Facility Storage Monitoring Report (Form 60-02-1E) in section 60-02-1 of this manual.

III. Transportation of Tracer Materials

A. Packaging of Radioactive Materials

- 1. 1. Packaging requirements for radioactive material quantities are generally based upon the aggregate radioactivity of the material as outlined below:

<u>WPS Radioactive Material</u>	<u>Type "A" Packaging Quantity Limits</u>
Iodine (I-131)	10 Curies
Iridium (Ir-192)	10 Curies
Iron (Fe-59)	30 Curies

- 2. All packages of radioactive materials must meet certain general packaging requirements:
 - a. The outside of each package must incorporate a feature such as a seal, which is not readily breakable and which, while intact, will be evidence that the package has not been illicitly opened. The smallest outside dimension of the package must be four (4) inches or greater.
 - b. Liquid radioactive material in Type "A" quantities must be packaged in a leak-resistant and corrosion-resistant inner containment vessel. There must be no significant removable surface contamination on the exterior of any package.
 - c. No person may offer for transportation aboard a passenger carrying aircraft, any radioactive material, unless that material is intended for use in, or incident to, research, medical diagnosis or treatment, or for which a specific exemption is provided.
- 3. Limited Quantities- Exemptions from specification packaging and general packaging requirements are allowed for limited quantities of radioactive materials, such as Iron (Fe-59), for amounts not exceeding thirty (30) millicuries (mCi).

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The above exceptions from specification packaging are subject to the following (this would apply only to Western shipment of FE-59 nails):

- a. Materials must be packaged in strong tight packages so that there will be no leakage of radioactive materials under conditions normally incident to transportation.
 - b. The radiation dose rate at any point on the external surface of the package may not exceed 0.5 millirem per hour.
 - c. There must be no significant removable radioactive surface contamination on the exterior of the package.
 - d. The outside of the inner container must be marked "RADIOACTIVE".
4. Due to complexities of packaging, every effort should be made to use the original packaging as received from the radioactive material supplier when forwarding the materials to the wellsite for use.

B. Shipping papers, labelling and placarding procedures

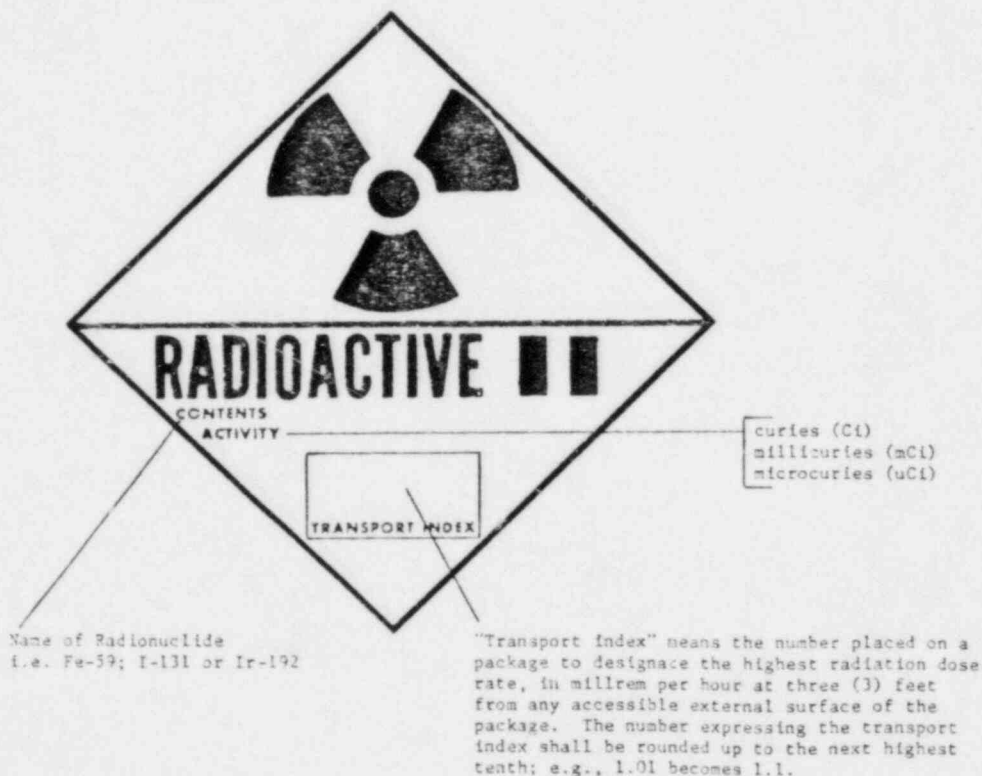
1. As a private motor carrier, Western may not transport hazardous materials such as radioactive materials unless the shipment is accompanied by proper shipping papers or documentation prepared in accordance with DOT regulations.
2. The Shipper's Certification For Radioactive Materials, Form O-106, (Attachment 1) will be completed and carried with each shipment of tracer materials. Attachment 1 illustrates how a completed form may appear. The certification section of the form on the bottom right side must be completed only when Western permits a carrier outside of the Company to transport the shipment.
3. The Shipper's Certification For Radioactive Materials form for the tracer supplier may be used as the model for most shipments.
4. Specific requirements are outlined in the regulations concerning the driver and motor carrier responsibilities for shipping paper accessibility:
 - a. If the shipping paper is carried with other shipping papers or any other papers, it must be clearly distinguished by either distinctively tabbing it or by having it appear first, and
 - b. When the driver is at the vehicle controls, the shipping paper must be at his immediate reach when he is restrained

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- by the lap belt, and
- c. Either readily visible to a person entering the driver's compartment, or in a holder which is mounted on the inside of the door on the driver's side of the vehicle.
5. Radioactive labels - There are three hazardous materials warning labels used to identify a shipment of radioactive materials - RADIOACTIVE I, RADIOACTIVE II, and RADIOACTIVE III. Each RADIOACTIVE label contains at the lower half, a space for the shipper to add the "CONTENTS", and the "NO. OF CURIES". In addition, RADIOACTIVE II and RADIOACTIVE III include a black box which the shipper must complete with the "Transport Index: (Maximum of 50 per vehicle or area)". The entries may be completed by legible printing, using a durable weather-resistant means of marking.



All three types of labels used are illustrated on pages 7 & 8. The radiation rate exhibited by a package when measured with a survey meter determines the type of labeling required.

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Type Label Required

Radiation Dose Rate

Radioactive White I

0.5 mR/hr or less on surface of package and 0 m/hr at 3 foot distance from package.

Radioactive Yellow II

More than 0.5 mR/hr on surface of package and not more than 1.0 mR/hr at 3 foot distance from surface of package.

Radioactive Yellow III

More than 50 mR/hr on surface and more than 1.0 mR/hr at 3 foot distance from surface of package.

6. Loading Requirements for Carriage by Highway

Special loading and storage requirements are outlined for materials classed as Radioactive Materials.

Packages of radioactive materials loaded into a single vehicle may not have a total transport index which exceeds 50. Transport index numbers are on packages bearing the RADIOACTIVE YELLOW II or the RADIOACTIVE YELLOW III hazardous materials warning labels.

Such packages of radioactive materials may not be placed in motor vehicles or other places closer than provided in the "transport index table" to any area which may be continuously occupied by passengers or employees.

Total Transport Index	Minimum distance in feet to area of persons, or minimum distance in feet from dividing partition of cargo compartments
None	0
0.1 to 1.0	1
1.1 to 5.0	2
5.1 to 10.0	3
10.1 to 20.0	4
20.1 to 30.0	5
30.1 to 40.0	6
40.1 to 50.0	7

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Note: The distance in the table must be measured from the nearest point on the packages of radioactive materials.

7. The DOT "Radioactive" placard will be placed on all four sides of any vehicle which is carrying radioactive tracers requiring the use of the RADIOACTIVE YELLOW III label. Removable magnetic DOT signs may be purchased for use on cars and pickups.

Radioactive Material Labels



Radioactive White I
(Red and Black Printing on White)

Radioactive White I labels must be affixed to each package measuring 0.5 millirem or less per hour at each point on the external surface on the package, provided package is not Fissile Class II or Class III, or does not contain a "large quantity" of radioactive material.

Radioactive Yellow II
(Yellow, Red, and Black
Printing on White)

Radioactive Yellow II must be affixed to each package measuring more than 0.5 millirem per hour at each point, and not exceeding 1.0 millirem per hour at three (3) feet from each point on external surface of the package.



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Radioactive Yellow III must be affixed to each package measuring more than 50 millirem per hour at each point on the surface of the package or exceeds 1.0 millirem per hour at three (3) feet from each point on the external surface of the package.

GUIDELINES ON USE: Complete "Contents", No. of Curies" and "Transport Index". Display Labels (total 2) on each side or on each end, excluding bottom

C. Securing tracers transported in or on Western vehicles

The tracer shipment must be secured during transit in one of the following manners:

1. Locked in the trunk of a car and braced to prevent shifting during transport.
2. Locked in the tool box of a pickup and braced to prevent shifting during transport.
3. Locked in a box mounted securely on a truck to prevent shifting during transport.

D. Temporary storage in a vehicle at the wellsite.

1. Tracer materials will remain stored in their vehicle compartment until the time of their use.
2. The vehicle storage compartment shall be used to transport any unused tracers and/or their packaging materials back to the district storage facility for final disposition as required.

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E. Drivers of vehicles transporting tracers

1. The drivers of vehicles transporting tracers must meet DOT requirements for age (21 years of age or older) and training (licensed and DOT certified) in order to transport hazardous materials.
2. The drivers need not be authorized users of radioactive materials in order to transport the tracers and need not be issued a TLD badge if the driver's area of the cab receives less than 2 mR/hr radiation exposure.
3. The vehicle driver releases responsibility and control of his radioactive cargo at the wellsite to the district's Radiation Supervisor present on the job.

IV. Wellsite Safety Equipment

- A. The following handling and safety equipment will be available and used for wellsite tracer operations:
1. Rubber or plastic gloves.
 2. Organic vapor cartridge type respirator (for liquid Iodine 131 only).
 3. Handling tongs or a similar device (when extended time is required by nature of the job).
 4. Other protective clothing (to be determined before the job at the district office).
 5. Plastic trash bags (storage bags for contaminated equipment and tracer packaging).
 6. Paper towels (for clean up uses).
 7. TLD badges (issued to anyone required to work in restricted-over 2 mR/hr - area).
 8. Dust respirator for Ir-192 sand work.

Note: For optional use, a Radiation Emergency Anticontamination Kit, Model 6000 from the Dosimeter Corporation of America contains an MSA dust mask, coveralls, shoe covers, sponges, towels and gloves in a carrying tube for emergency use.

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- B. A calibrated low-level survey meter with beta window such as a Victoreen Model 493 will be available at the jobsite to conduct necessary survey activities.

V. Tracer Use Operating Procedures.

A. Pre-job knowledge and planning - the Radiation Supervisor must know:

1. Types of radiation involved.
2. Intensity of radiation.
3. Relative hazard of each type of radiation.
4. What the "stay time" (maximum allowable exposure time) is.
5. What the possible contamination problems are.
6. Any internal contamination problems.
7. What industrial nuisance removable contamination will create.
8. What controls must be dictated to protect personnel.
9. Plan methods for controlling access to radioactive material use.

B. Specific procedures will vary with the individual job applications. In general, the following procedures should be followed:

1. The job will be planned in advance and the necessary tracer material should be ordered only as needed.
2. Personnel required to work in restricted areas (over 2 mR/hr exposure) will have or be issued TLD badges prior to the start of the job from the district yard.
3. The required tracer material will be taken out of district storage and placed in the locked storage compartment of the vehicle properly placarded to transport it to the wellsite.
4. The tracer material will be logged "out" on the Radioactive Tracer Material Utilization Log (Form 60-02-1B) and hazardous materials shipping papers will be given to the tracer material vehicle driver. A second copy of the shipping papers may be carried to the wellsite by the Radiation Supervisor for the job.
5. The Radiation Supervisor will carry to the wellsite a ring-binder containing:
 - a. Copy of radiation license
 - b. Copy of Western Radiation Manual or equivalent
 - c. Copy of "Notice to Employees" poster
 - d. Dispatch Job Sheet
 - e. Survey meter calibration
 - f. Wellsite Radiation Monitoring Report (Form 60-02-1D)
6. Conduct pre-trip vehicle survey and list results on the Wellsite Radiation Monitoring Report (Form 60-02-1D).

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7. Transport tracer material to the jobsite.
8. Define and select mixing locations at wellsite.
9. At pre-pumping safety meeting, tell and define to employees (also customers, etc.) what restricted area, if any, will be prohibited to unauthorized personnel during the tracer part of the job. Indicate that no eating, smoking or drinking will be allowed in any restricted area.
10. The wellsite will be monitored prior to the start of the job so as to detect any pre-existing radiation conditions before the start of Western's work and results recorded on the Wellsite Radiation Monitoring Report (Form 60-02-1D).
11. All restricted areas where radiation levels are expected to achieve 2 mR/hr will be posted with signs stating "Caution-Radiation Area". These signs will bear the radiation symbol and be magenta and safety yellow in color. The signs will be conspicuous and obvious from all directions. In the event that the levels exceed 5 mR/hr, a sign stating "Caution - High Radiation Area, " magenta and safety yellow in color, will be conspicuously posted.
12. Mix radioactive material with injection fluid with special consideration given to splashing, wind conditions, and any other outside influence which could interfere with the safe handling of the material.
13. For cement work, mix the water with the concrete on location. Using plastic gloves, the tracer material is added to the cement slurry. The maximum concentration of Iodine 131 in the cement slurry should be 0.013 microcuries per milliliter. The slurry is then discharged from the Unimix trailer and pumped into the well.
14. For stimulation work, add tracer material to the blender volume tank fluid. Usually, a concentration of 0.20 to 0.33 millicuries of Iridium 192 sand per 1,000 pounds of frac sand is used. The blender fluid is then discharged to pumps and sent downhole into the well.
15. Exposure time should be controlled. If exposure approaches the maximum permissible limit, personnel should be rotated.
16. Empty tracer containers shall be placed in properly labeled and marked plastic bags for district storage or disposal purposes.
17. Following the completion of the operation, all lines will then be flushed with displace fluids. All equipment and lines will

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be surveyed to check for contamination. Decontamination shall in general be accomplished by rinsing and flushing fresh water through the equipment. (See Part VII of this section for decontamination procedures. The entire area shall be monitored and the results recorded on the Wellsite Radiation Monitoring Report (Form 60-02-1D).

18. Monitoring techniques for personnel, handling tracer materials, using a survey meter with the beta window in the open position:
 - a. Check hands (fingertips), shoes (soles and heels), face (nostrils) first.
 - b. Remove any contaminated clothing and place in a marked plastic bag and continue monitoring.
 - c. Check hands ALWAYS before eating, drinking or smoking. Cleanse hands carefully of any contamination (scrub with soap and water), and check again.
19. Unused tracer materials, if any, and contaminated tracer containers will be placed in their secured vehicle transport compartment and returned to the district storage area. Log in on Radioactive Tracer Material Utilization Log (Form 60-02-1B) after returning to the district office. Place a copy of the dispatch sheet in district radiation files.
20. The empty vehicle which transported the leftover tracer and/or contaminated empty containers will be monitored and the results will be logged on the Wellsite Radiation Monitoring Report, (Form 60-02-1D) which will then be placed in the appropriate district file.
21. Collected temporary or visitor TLD badges will be logged in and returned to their storage file which is distant from any source of radiation that might cause a false or erroneous reading when the badges are processed.

VI. Radioactive Tracer Waste Disposal

The following procedures must be adhered to in order to assure proper disposal of radioactive tracer material. Waste-contaminated bottles, tools, equipment and residual quantities of radioisotopes used in tracer studies may be disposed of only by the following methods:

- A. Radioactive, or contaminated, material may be stored in the district storage area until it has sufficiently decayed to the point where, upon surveying with an instrument and finding levels no higher than background, the waste can be disposed of in a normal manner. All labels indicating that the bottles, tools or equipment containing radioactive material will be removed. The labels indicating

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done immediately following the mixing operations. If indication of radioactive contamination is found on it of clothing, equipment, etc., or on the body of person involved in the operation, every effort should be made remove the activity.

C. Decontamination Procedures

The radiation tracer preparations are down, by factors below the dangerous levels for external radiation hazard involved with these tracer preparations is the ingestion. The ingestion tolerance is from one part per one part per ten thousand of the typical activities used. Great care should be exercised by company personnel to decontamination of hands, clothing and other personal items. Concentrations of radioactive material should be cleared or disposed of safely.

Decontamination shall, in general, be accomplished by rinsing fresh water through the equipment, or washing and decontaminated items of clothing or portions of the individual. A detergent may be added to the water to aid this process of the equipment which cannot be decontaminated by this method be disassembled and scrubbed with water and detergent necessary, by steam cleaning. A 15% hydrochloric acid may be used to remove contamination from the surface of non-metallic materials. Other chemicals may be used for decontamination use should be limited due to their toxic nature.

Articles of clothing can normally be easily decontaminated by rinsing and scrubbing with water containing a strong detergent. Decontamination applies to portions of the exposed individual's body. Items of clothing on the job are unsuccessful decontamination should be removed immediately to be washed after returning to the home station nearest the job location. Contaminated articles, rags, etc., shall never be laundered in a home or laundry. Such washing and scrubbing is restricted to the company base. If the contamination cannot be removed, the clothing shall be discarded and treated as radioactive.

As indicated above, every effort should be made to decontaminate the contaminated area of the body. Scrubbing should be restricted to the activity is removed. The same safety precautions shall apply to the above operations as were applicable for tracer injection in particular.

1. Rubber gloves shall be worn during decontamination involving personal contact with the equipment.
2. Food, cigarettes, etc., shall be kept outside the contaminated area. Quantities of radioactive material which

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hazard outside the body can be very dangerous if the same amount is internal.

3. The wash water shall be treated as radioactive waste. If wash water is discharged into sanitary sewage system, the dilution of the activity by the sewage must be such that the tolerance established for such disposal by the NRC and agreement states are not exceeded.

Since we do not have the capability of assaying the wash waste for the concentration of contaminant is microcurie per milliliter, we must use the amount of tracer material actually used on the job and the average daily water consumption at the base in determining that we are exceeding tolerances.

Wash water shall not be discharged into a septic tank.

If standard decontamination efforts are unsuccessful, the procedures to be followed shall depend on the value and ownership of the items involved, the degree of contaminations, and the half-life of the contamination activity. Every effort shall be made to thoroughly decontaminate rented or borrowed equipment. If all efforts to decontaminate items of equipment, clothing, etc., have failed to render the radioactive contamination to background and the measurable activity is apparently "fixed", the User in charge has three (3) alternative. They are as follows:

- a. If the "fixed" contamination measures less than 0.2 mR/hr at one centimeter, the item of equipment, article of clothing, etc., can be returned to normal use.
- b. If the "fixed" contamination measures more than 0.2 mR/hr at one centimeter, the item or items in question shall be treated as radioactive waste and disposed of accordingly.
- c. If the item containing the "fixed" contamination (which measures more than 0.2 mR/hr at one centimeter) is such that it is continually used in tracer operations, e.g., parts of a dump bailer, tracer injector, etc., and will be used in no other operation, then it may continue to be used if it is labeled properly and treated as a radioactive source and if the radiation measures less than 2.0 mR/hr at three (3) inches from the surface.

More persistent activities remaining on pumping apparatus, customer's equipment etc., may require being steam cleaned or chemically treated for contamination.

The Radiation Supervisor in charge of the job shall be responsible for all contaminated equipment. That is, for any equipment, waste, area, or wash water that falls within the above

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alternative situations. The Radiation Supervisor in charge shall personally supervise its safe disposition either by staying on the job until the contamination is removed or transporting the equipment to the base where it may be stored awaiting further decontamination efforts.

VIII. Emergency Procedures

Emergencies vary greatly in their respective hazards. Sometimes these emergencies are in the form of spills, fires or explosions which, consequently, result in the spread of radioactive contamination. Emergency procedures contained in the National Bureau of Standards, Handbook No. 48, are given here as a guide. It must be recognized that these procedures are general and any specific emergency would certainly involve additional procedures not specifically covered in this outline.

A. Spills involving no radiation hazard to personnel:

1. Notify all personnel in the area at once.
2. Permit only a minimum number of personnel in the vicinity of the spill.
3. Confine the spill immediately.
4. Notify the District Radiation Safety Officer and the Fort Worth WPS Radiation Protection Officer.
5. Decontaminate.
6. Monitor all personnel involved in the spill and cleaning.
7. Permit no person to resume work in the area until it has been surveyed and approved by one of the approved individual Users specified on the NRC and/or agreement state radioactive material license.

B. Spills involving radiation hazard to personnel:

1. Notify all personnel not involved in the spill to vacate the area at once.
2. If the spill is liquid and the hands are protected, right the container.
3. If the spill is on the skin, flush thoroughly.
4. If the spill is on the clothing, discard outer or protective clothing at once.
5. Switch off all fans. Vacate the room.

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6. Notify the Radiation Protection Officer as soon as possible.
7. Take immediate steps to decontaminate the personnel involved.
8. Decontaminate the area.
9. Permit no person to resume work in the area until a survey is made and approval of the District Radiation Safety Officer is secured.
10. Prepare a complete history of the accident and give details in the Emergency Procedures Report (Form 60-04-2A - Attachment 2).

C. Injuries to personnel involving radiation hazards:

1. Wash minor wounds immediately under running water while spreading the edges of the cut.
2. Call a physician, preferably one who is qualified to treat radiation injuries.
3. Permit no person involved in a radiation injury to return to work without approval of the attending physician.
4. Report all radiation accidents (wounds, over-exposure, ingestion, inhalation) to your supervisor.
5. Prepare a complete history of the accident and give the details in Emergency Procedures Report. (Form 60-04-2A - Attachment 2).

D. Fire and other major emergencies:

1. Notify all personnel in the area at once.
2. Attempt to put out all fires if radiation hazard is not immediately present.
3. Notify the fire department.
4. Notify the District Radiation Safety Officer.
5. Govern the fire fighting or other emergency activity by the restrictions of the District Radiation Safety Officer.
6. Following the emergency, monitor the area and determine the emergency devices necessary for safe decontamination.
7. Decontaminate.
8. Permit no person to resume work without approval of the District Radiation Safety Officer.

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9. Monitor all persons involved in combating the emergency.
10. Prepare a complete history of the accident and give details in the Emergency Procedures Report (Form 60-04-2A - Attachment 2).

IX. General Guidelines for Controlling Radioactive Tracer Exposure to Personnel

A. Introduction

In order to give proper safety consideration to the various radioactive materials used in tracer surveys, the following information should be understood by all field Users. The relatively low activity levels of the tracer units allow some latitude in handling techniques such that moderate safety precautions are sufficient. The large variety of tracer preparations used, or available for use, is such that no fixed procedures can be specified for each tracer unit. In general though, the majority of tracers may be handled for a few minutes without the use of extension tools.

The major safety problem is the prevention of accumulation of radioactive material in the body. The activities typically used are from 100 to 10,000 times the tolerable limit for internal accumulation. The degree of this particular hazard depends on the biological activity of the isotope, its half-life and the nature of the tracer preparation.

B. Safety through distance

Distance can be an effective safety measure from a source. Safe distances should be known for the amounts of radioactive material being handled or stored.

Examples of exposure rates at various distances from a 100 millicurie source:

Radioactive Tracer Material	<u>1 Ft.</u> mR	<u>3 Ft.</u> mR	<u>6 Ft.</u> mR	<u>9 Ft.</u> mR
Iridium 192	590	65	16.38	7.2
Iodine 131	220	24	6.11	2.7
Iron 59	640	71	17.77	7.9

Note: Tables A through C (Attachments 3 thru 5) at the end of this section are provided for exposure rate calculation purposes.

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C. Safety through shielding

Certain materials are effective shields against radiation. The half-value layer is the amount of shield necessary to reduce the radiation to one-half. In tracer work, shielding generally is only used when the materials are in storage.

Half-value layer for some tracer materials:

<u>Radioactive Tracer Material</u>	<u>Lead</u>	<u>Steel</u>	<u>Concrete</u>
Cesium - 137	0.25"	0.68"	2.1"
Iridium - 192	0.19"	0.50"	1.9"

D. Safety through stay time

The safety of an individual may be gained by controlling the amount of time he is exposed to radiation. If exposure approaches an unsafe limit, personnel shall be rotated to receive as little radiation as possible.

Charts 1-3 (Attachments 6 thru 8) at the end of this section, give the allowable handling time in minutes per week for various amounts of Iodine 131 and Iridium 192. This is based on a maximum allowable radiation exposure of 5.0 rems per year or 1.25 rems per quarter (18.75 rems for extremities) as specified in the pertinent federal and/or agreement state regulations. We must stay within the handling times as indicated on the chart in order that we may continue to handle the unshielded tracer units without the benefit of hand-type monitoring devices such as wrist film badges, finger dosimeters, etc., or remote handling devices. However, the use of normal safety equipment such as survey meters, rubber gloves, etc., and the regular TLD badge is still required.

The allowable handling time is determined as the maximum time in minutes per week that a person can work with his hands (rubber gloved) in direct contact with unshielded tracer units. The allowable handling time as indicated on Chart A is not additive—that is, you cannot, for example, work for 18 minutes with 10 millicuries of Iridium 192 and 42 minutes with an equal amount of Iodine 131 in one week. If several hand exposures to both types of tracer materials are received during one week, the exposures must be rationed.

Example: If in one calendar week a person directly handles 20 millicuries of Iodine 131 for three (3)

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minutes, 10 millicuries of Iridium 192 for three (3) minutes, and 15 millicuries of Iodine 131 for four (4) minutes, these exposures are totaled as follows: From the chart, the allowable handling time for 20 millicuries of Iodine 131 is 21 minutes. Hence, the exposure to the hands for 20 millicuries of Iodine 131 is 3 divided by 21, or .143 or the weekly allowable handling time. Similarly, the exposure for the 10 millicuries of Iridium 192 is 3 divided by 18, or 1.67; and that for the 15 millicuries of Iodine 131 is 4 divided by 28, or .143. Adding these fractions together, $.143 + .167 + .143 = .453$, or a little less than half the total allowable handling time for that particular calendar week.

WHEN THE VARIOUS EXPOSURES ADD TO A TOTAL OF MORE THAN 1.00, THE WEEKLY ALLOWABLE HANDLING TIME HAS BEEN EXCEEDED AND THE FOLLOWING WEEK'S WORK MUST BE LIMITED ACCORDINGLY.

Remember that tolerances are not intended as working levels, but as maximum safe levels only, and that the objective should be to obtain a minimum exposure during tracer operations. This can be accomplished by working as rapidly, yet carefully, as possible with the tracer units and also by distributing the actual direct handling of the unshielded materials among as many qualified people as possible.

X. Responsibilities

The District Radiation Safety Officer is responsible for assigning duties and assuring compliance with these procedures. He will conduct a quarterly review of these procedures with his authorized personnel and record in district records the time, date and attendance of the meeting.

SHIPPER'S CERTIFICATION FOR RADIOACTIVE MATERIALS							
NATURE AND QUANTITY OF CONTENT				PACKAGE			
Proper Shipping Name	Radionuclide	Form	Activity		Category	Transport Index	Type
Hazardous materials descriptions and proper shipping names from 172.101 Hazardous Materials Table use: Radioactive Material, n.o.s. or Radioactive Material Special Form, n.o.s.	Name or Symbol of Principal Radioactive Content	Chemical form and physical state (gas, liquid, solid) or special form	Number of milli-curies	Number of Packages	I-White or II-Yellow or III-Yellow Label	For Yellow Label Categories only	USA DOT 7A Type A
Radioactive Material, n.o.s. UN2982	Ir-192	Solid	25 mCi	2	III Yellow	7	USA DOT 7A Type A
Radioactive Material, n.o.s. UN2982	I-131	Liquid	5 mCi	1	III Yellow	1	Type A
Radioactive Material, Special Form, n.o.s. UN2974	Fe-59	Special Form	45 mCi	1	III Yellow	1	
Radioactive Material, Special Form, n.o.s. UN2974	Cs-137	Special Form	12 mCi	1	II Yellow	1	
Dispatch Sheet Job No. 32115							
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 the applicable regulations of the Department of Transportation.							
Name and full address of Shipper				Name and title of person signing Certification			
The Western Company of North America				GEORGE P. SMITH			
6100 Western Place				DISTRICT ENGINEER			
Fort Worth, Texas				LASTSTEP, TX			
Date: 12/15/83				Signature of the Shipper: George P. Smith			

EMERGENCY PROCEDURES REPORT

District _____ Date _____

1. Customer _____
2. Location _____
3. Customer's Supervisor _____
4. Company Supervisor _____
5. Cause of Emergency _____

6. Type of Isotope _____
7. Quantity of isotope (curies) believed to have been involved _____
8. Safety precautions immediately enacted _____

EMERGENCY PROCEDURES REPORT

9. List any suspected over-exposures (if there were none indicate NONE)

1. _____ 3. _____
2. _____ 4. _____

10. Results of personnel radiation survey for those individuals working inside the 2 mR/hr restricted area (all results in mR/hr).

	NAME	HEAD	FACE	BODY	HANDS	LEGS	FEET
1.	_____	_____	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____	_____	_____

11. On a sketch of the job-site, mark the exact location of the spill.

12. Make a dose chart if the level of the spill is greater than 10 mR/hr at 1 foot.

1. One foot _____ mR/hr
2. Three feet _____ mR/hr
3. Six feet _____ mR/hr

13. Check the air space for contamination _____

14. Results of wipe tests taken after emergency clean-up operations

Position #1 _____ dpm
Position #2 _____ dpm
Position #3 _____ dpm

15. Recommendations to ensure incident does not recur in the future _____

DISTANCE -vs- EXPOSURE RATE
FOR
IRIDIUM-192 (Ir-192)

mR/hr at various distances from one (1) curie of unshielded Ir-192

<u>Feet</u>	<u>mR/hr</u>	<u>Feet</u>	<u>mR/hr</u>
1	5900.00	29	7.02
2	1475.00	30	6.56
3	655.56	31	6.14
4	368.75	32	5.76
5	236.00	33	5.42
6	163.89	34	5.10
7	120.41	35	4.82
8	92.19	36	4.55
9	72.84	37	4.31
10	59.00	38	4.09
11	48.76	39	3.88
12	40.97	40	3.69
13	34.91	41	3.51
14	30.10	42	3.34
15	26.22	43	3.19
16	23.05	44	3.05
17	20.42	45	2.91
18	18.21	46	2.79
19	16.34	47	2.67
20	14.75	48	2.56
21	13.38	49	2.46
22	12.19	50	2.36
23	11.15	51	2.27
24	10.24	52	2.18
25	9.44	53	2.10
26	8.73	54	2.02
27	8.09	55	1.95
28	7.53		

Note: For other quantities, multiply the number of curies
by the mR/hr value shown here for the required distance.

Example: @ 11 feet = 48.76 mR/hr for 1 curie of Ir-192

50 millicuries = 0.05 curies

then - $0.05 \text{ Ci} \times 48.76 = 2.4 \text{ mR/hr}$

50 mCi intensity @ 11 feet = 2.4 mR/hr

DISTANCE -vs- EXPOSURE RATE
FOR
IODINE-131 (I-131)

mR/hr at various distances from one (1) curie of unshielded I-131

<u>Feet</u>	<u>mR/hr</u>
1	2200.00
2	550.00
3	244.44
4	137.50
5	88.00
6	61.11
7	44.89
8	34.37
9	27.16
10	22.00
11	18.18
12	15.27
13	13.01
14	11.22
15	9.77
16	8.59
17	7.61
18	6.79
19	6.09
20	5.50
21	4.98
22	4.54
23	4.15
24	3.81
25	3.52
26	3.25
27	3.01
28	2.80
29	2.61
30	2.44
31	2.28
32	2.14
33	2.02
34	1.90

DISTANCE -vs- EXPOSURE RATE
FOR
IRON-59 (Fe-59)

mR/hr at various distances from one (1) curie of unshielded Fe-59

<u>Feet</u>	<u>mR/hr</u>
1	6400.00
2	1600.00
3	711.11
4	400.00
5	256.00
6	177.77
7	130.61
8	100.00
9	79.01
10	64.00
11	52.89
12	44.44
13	37.86
14	32.65
15	28.44
16	25.00
17	22.14
18	19.75
19	17.72
20	16.00
21	14.51
22	13.22
23	12.09
24	11.11
25	10.24
26	9.46
27	8.77
28	8.16
29	7.60
30	7.11
31	6.65
32	6.25
33	5.87
34	5.53
35	5.22
36	4.93
37	4.67
38	4.43
39	4.20
40	4.00

Note: 1 microcurie (uCi) = 0.000001 curie (Ci)

CHART 1 - HAND EXPOSURE FROM RADIOACTIVE TRACERS

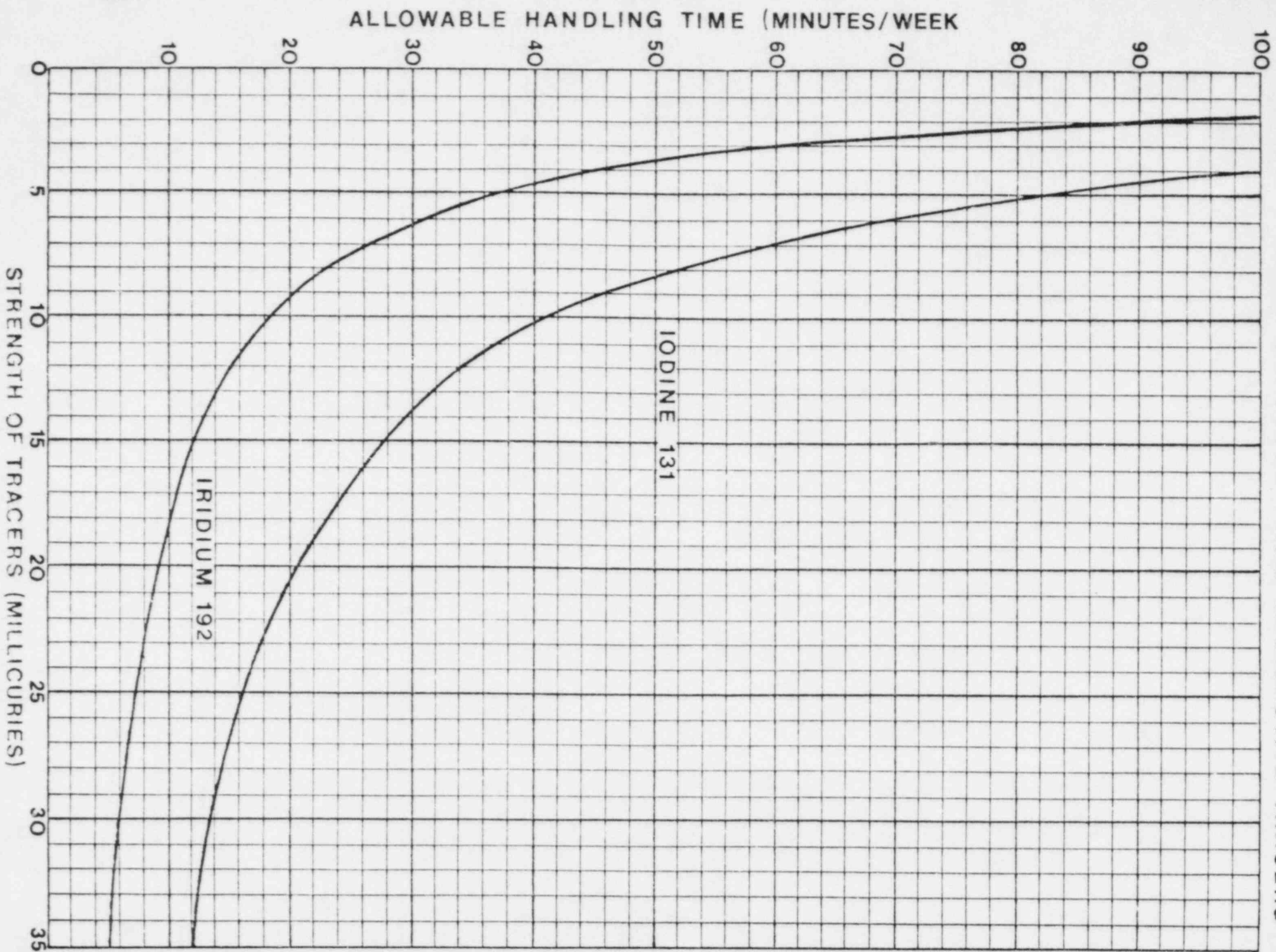


CHART 2 - RADIATION LEVELS AT ONE FOOT FROM
UNSHIELDED RADIOACTIVE TRACERS

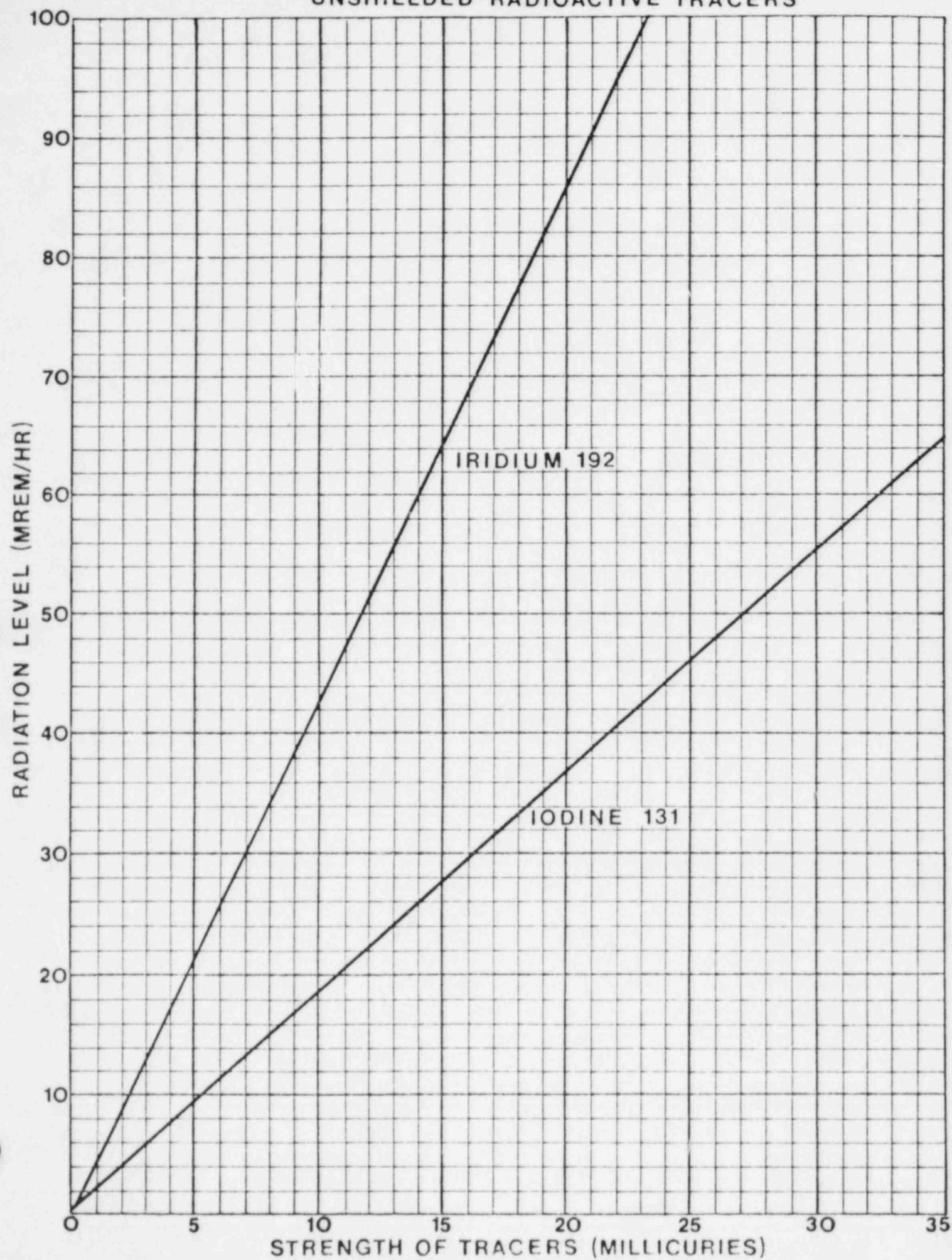
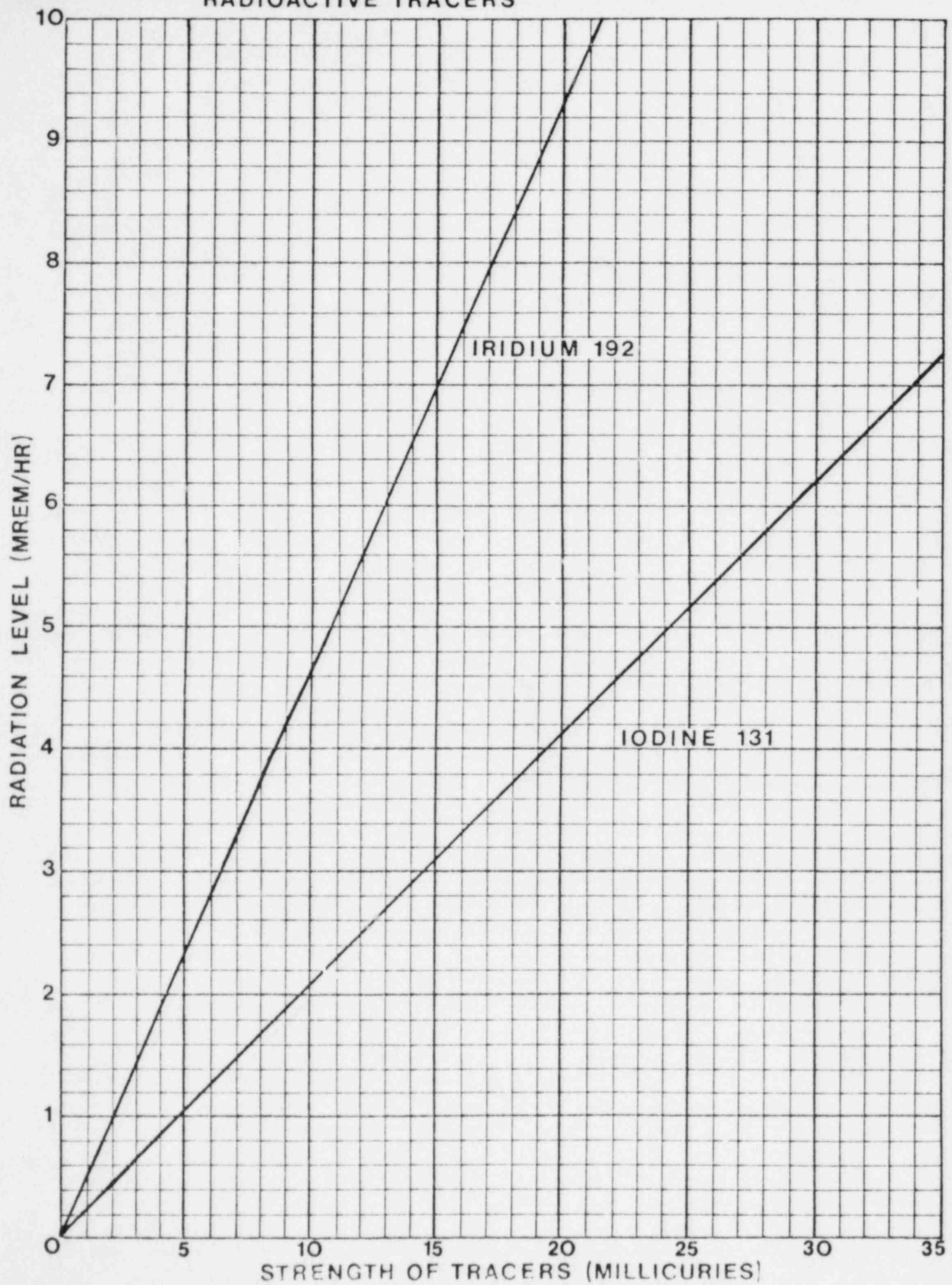


CHART 3 - RADIATION LEVELS AT THREE FEET FROM UNSHIELDED
RADIOACTIVE TRACERS



WPS SAFETY PRACTICES MANUAL
ACCIDENT PREVENTION PROCEDURES

SUBJECT: Use of Densimeters with Sealed Sources
of Radioactive Material

NO. SPM- 60-05-2

PURPOSE

Federal and State radioactive material licensing agencies require written safety procedures for the use of radioactive materials.

GENERAL DESCRIPTION

Densimeters are density gauges designed for the measurement of slurry densities. The densimeters utilize the principle of nuclear radiation transmission through materials in a pipe to measure density. The slurry substance absorbs radiation proportional to its density. The radiation transmitted through the material or substance is measured by an ion chamber electrically connected to electronics and an indicator recording system. The Western-built densimeter may be permanently assembled on a section of pipe on skid-mounted models or on pump vehicles. The Texas Nuclear Unit is a portable density gauge which must be assembled to a pipe at the wellsite.

Western-built densimeters use a 12 to 50 millicurie (mci) strength Cesium (Cs-137) radioactive sealed source while other units use a 100 millicurie (mci) strength Cs-137 sealed source. The sealed sources are contained in steel-collared lead-filled source holders which shield radioactive material and prevent excessive radiation exposure to personnel in the nearby areas.

I. Sealed Source Storage Procedures

- A. Densimeters containing sealed sources must be kept in a locked and secured condition while in storage at the district yard.
- B. The radioactive material sealed source holder of the densimeter is provided with a lock to prevent the source from being removed or stolen from its skid assembly when so mounted.
- C. The densimeter skid assembly is located in the locked trailer when in the district yard in storage. The trailer may be secured to a post to prevent movement.
- D. Densimeters which are mounted and installed as an integral portion of a pump vehicle are stored in place on the vehicle with its source holder locked in place.
- E. Densimeter trailers and pump vehicles in storage in the yard will be posted with the DOT hazardous material placard if they contain sources exceeding 50 mci of activity.
- F. The portable densimeter movable source holder assembly will be stored in a locked room or chained and locked to a substantial part of a building.

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- G. Radiation storage area signs are not required since the radiation levels at 12 inches from the surface of the source holders are less than five (5) millirems per hour (mr/hr).
- H. Every three months the Sealed Source Physical Inventory Report, (Form 60-02-1G), shall be completed, distributed and a copy maintained in the district radiation file.

II. Densimeter Transportation Procedures

- A. Western-built skid-mounted densimeters are transported while secured in their trailers and pump-mounted units are carried secured in place on their vehicles.
- B. Shipping papers, labeling and placarding procedures.
 - 1. As a private motor carrier, Western may not transport hazardous materials such as radioactive materials in its vehicles unless the shipment is accompanied by proper shipping papers prepared in accordance with DOT regulations.
 - 2. The Shipper's Certification For Radioactive Materials, (Form O-106-Attachment 1), will be completed and will accompany every shipment of radioactive sealed source. Attachment 1 illustrates what a completed form may look like.
 - 3. A completed Shipper's Certification For Radioactive Materials, (Form O-106), need only be made up once and may be used with a specific densimeter until its sealed source is changed out. A copy of the form will be laminated or sealed to protect it from the elements and carried as a permanent document with the densimeter. Pump vehicles will have the form attached to the inside of the driver's door.
 - 4. Specific requirements are outlined in the regulations concerning the driver and motor carrier responsibilities for shipping paper accessibility.
 - a. If the shipping paper is carried with other shipping papers or any other papers, it must clearly be distinguished by either distinctively tabbing it or by having it appear first; and
 - b. When the driver is at the vehicle controls, the shipping paper must be at his immediate reach when he is restrained by the lap belt; and
 - c. Either readily visible to a person entering the driver's compartment, or in a holder which is mounted on the inside of the door on the driver's side of the vehicle.
 - 5. All vehicles transporting radioactive sealed sources with greater

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than 50 mci strength will be placarded with diamond-shaped DOT "Radioactive" signs placed on all four sides of the vehicles. Vehicles carrying 50 mci or less sealed sources will not be placarded.

6. A permanent hazardous material shipping label as indicated on the Shipper's Certification for Radioactive Materials, (Form 0-106), will be attached to each Densimeter sealed source holder. It is suggested that a laminated or sealed label be used on each source holder. Use the Yellow II label on source holders with 50 mci or smaller sources.

C. Drivers of vehicles transporting sealed sources

1. The drivers of vehicles transporting sealed source Densimeters must meet DOT requirements for age (21 years of age or older) and training (licensed and DOT certified) in order to transport the hazardous materials.
2. The drivers need not be trained authorized Users of radioactive material in order to transport the sealed sources and need not be issued a TLD badge.
3. The vehicle driver will release responsibility and control of his radioactive cargo, at the wellsite, to the district's Radiation Supervisor present on the job, when a Radiation Supervisor is required.

III. Jobsite Procedures - Densimeters

- A. Western Cement Slurry and Sand Slurry Densimeters are mounted on pipe assemblies on skids or on pump trucks. The Densimeters are secured in place and do not require any manipulation in their operation which would expose any workers or the public to any radiation level in excess of 2 mr/hr.
- B. Radiation Supervisors are not required to supervise the use of Densimeters at any wellsite locations.
- C. The Wellsite Radiation Monitoring Report, (Form 60-02-1D), is not to be completed when using Densimeters at wellsite locations and a survey meter is not required at the wellsite.
- D. In order to track the movement (history) of the Densimeters from a district, it is necessary to complete the Radioactive Sealed Source Utilization Log, (Form 60-02-1A), when the instrument leaves and returns to the district yard. A Radiation Servicer(s) will be appointed by the District Manager (RSO) to maintain this log in an up-to-date manner.

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- E. The District RSO will insure that WPS drivers transporting Densimeter equipment have read "Use of Densimeters With Sealed Sources of Radioactive Material", SPM-60-05-2, Section II, III and V concerning Densimeter Transportation Procedures, Jobsite Procedures and Emergency Procedures. These employees will sign their names to a register to be maintained in the district radiation files certifying that they have read and understand the above mentioned sections of this manual.
- F. As part of the vehicle driver's pre-trip/post-trip inspection of his vehicle, he will visually inspect the Densimeter mounted on his equipment to see that the equipment is in place and that the Yellow II or Yellow III Shipping Labels are readable and in place on the Densimeter case or box. Any irregularities will be reported to a Radiation Supervisor on duty at the district office.

Special Note: Under normal operations, the densimeter assembly does not require disassembly in the field or at the district yard. Only those individuals specially trained to mount, repair, relocate and/or remove the part of the gauge containing the radioactive source may do so. The Engineering and Manufacturing Departments' Radiation Safety Officer in Fort Worth is responsible for repairs and replacement to the sealed source holders.

IV. Sealed Source Leak Test Procedures

- A. Leak test service for sealed sources will be provided by Radiation Consultants, Inc, Houston, Texas or other approved companies every six (6) months. The actual wipes will be made by the Radiation Safety Officer or a Radiation Supervisor utilizing instructions per vendor's kit as follows:
1. Fill out the form relating to source identification plus date, location, name, etc.
 2. Dissolve dry detergent in small amount of water.
 3. Dampen the cotton end of the swab in the liquid and proceed with the test according to supplier's instructions supplied with the kit.
 4. Repeat the wipe dry with the second swab if two are provided.
 5. Place the swab(s) back in the kit according to the supplier's instructions.
 6. Survey the package kit with your radiation survey meter. If a reading above background is obtained, do not mail the kit; contact the District Radiation Safety Officer immediately.
 7. If no radiation is detected during the survey, mail the kit

DATE: 12/15/83

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to the vendor.

- B. Wipe around all externally exposed areas where contamination may be present (ie, screws, threads, welds, bas of caps, etc.).

If the wipe has significant amount of radioactive material, a leakage rate in excess of 0.005 microcuries, an emergency notification will be sent to the district (sender) via telegram or telephone advising that the source must be taken out of service and returned for repair. The emergency notification will contain detailed instructions for removal and shipment of the source.

The sealed source having an excess of 0.005 microcuries must be removed from service and provisions for decontamination shall be taken as soon as practicable. The excess leakage will be reported by the district to the licensing federal or state agency within five (5) days of the date of the test.

V. Emergency Procedures

Emergencies vary greatly in their respective hazards. These are sometimes in the form of spills, fires, explosions or vehicle wrecks which consequently result in the spread of radioactive material contamination. The National Bureau of Standards Handbook, Number 48, Emergency Guides, is used as a guide for the procedures. These procedures are general and any specific emergency would certainly involve additional procedures not covered in this outline.

A. Vehicle Wreck

In the event of an accident while transporting radioactive materials, efforts should be made to minimize the exposure of any persons. This would include roping off the area, notifying the investigating officer and the Radiation Safety Officer at the district immediately, making sure the area is not left unattended. This will enable the District Radiation Safety Officer to notify the WPS Radiation Protection Officer in Fort Worth and/or the proper governmental agency.

B. Fire and Other Emergencies

1. Notify all personnel in the area immediately.
2. Attempt to put out all fires if a radiation hazard is not immediately present.
3. Notify the fire department.
4. Notify the District Radiation Safety Officer.
5. The District Radiation Safety Officer will set up restrictions governing the fire fighting and other emergency activities.

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6. Following the emergency, monitor the area and ascertain the emergency devices necessary for safe decontamination.
7. Decontaminate.
8. The District Radiation Safety Officer will have to approve the area before work can resume.
9. Monitor all persons involved in combating the emergency.
10. Prepare a complete history of the accident and report to the District Radiation Safety Officer who will in turn report it to the Radiation Protection Officer an/or the proper state agency.

C. Leaking Sealed Source

1. If a source is leaking, as reported by Radiation Consultants, Inc., shut the operations down.
2. Immediately notify the District Radiation Safety Officer for instructions.
3. Set up control procedures for keeping personnel out of the immediate area until instructions are received from the District Radiation Safety Officer.
4. The District Radiation Safety Officer will immediately notify the WPS Radiation Safety Officer at Fort Worth.

VI. Responsibility

The District Radiation Safety Officer is responsible for assigning duties and assuring compliance with these procedures.

SHIPPER'S CERTIFICATION FOR RADIOACTIVE MATERIALS							
NATURE AND QUANTITY OF CONTENT				PACKAGE			
Proper Shipping Name	Radionuclide	Form	Activity		Category	Transport Index	Type
Hazardous materials descriptions and proper shipping names from 172.101 Hazardous Materials Table use: Radioactive Material .n.o.s. or Radioactive Material Special Form, n.o.s.	Name or Symbol of Principal Radioactive Content	Chemical form and physical state (gas, liquid, solid) or special form	Number of milli-curies	Number of Packages	I-White or II-Yellow or III-Yellow Label	For Yellow Label Categories only	USA DOT 7A Type A
Radioactive Material, n.o.s. UN2982	Ir-192	Solid	25 mCi	2	III Yellow	7	USA DOT 7A Type A
Radioactive Material, n.o.s. UN2982	I-131	Liquid	5 mCi	1	III Yellow	1	Type A
Radioactive Material, Special Form, n.o.s. UN2974	Fe-59	Special Form	45 mCi	1	III Yellow	1	
Radioactive Material, Special Form, n.o.s. UN2974	Cs-137	Special Form	12 mCi	1	II Yellow	1	
Dispatch Sheet Job No. 32115							
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 the applicable regulations of the Department of Transportation.							
Name and full address of Shipper				Name and title of person signing Certification			
The Western Company of North America				GEORGE P. SMITH			
6100 Western Place				DISTRICT ENGINEER			
FORT WORTH, TEXAS				LASTSTEP, TX			
Date: 12/15/83				Signature of the Shipper: George P. Smith			