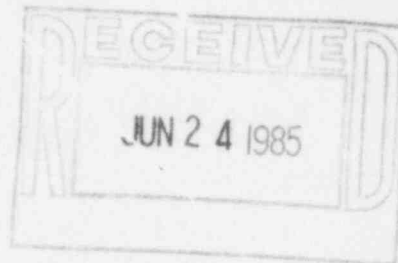


NOW LOGGING, PERFORATING INC.

OPERATING AND EMERGENCY
PROCEDURES MANUAL

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REG4 LTC30
35-23188-01 PDR

TO: U.S. Nuclear Regulatory
Commission - Region IV
Material Licensing



NORTHERN OKLAHOMA WIRELINE

NRC

OPERATING AND EMERGENCY

PROCEDURES MANUAL

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June 1985

460685

WHENEVER THIS MANUAL REFERENCES THE STATE OR FEDERAL
REGULATORY AGENCY, IT IS TO BE UNDERSTOOD THAT FOR
OPERATIONS IN THIS STATE THE AGENCY REFERENCED IS:

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV - OFFICE OF INSPECTION & ENFORCEMENT
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76012

TELEPHONE: (817) 860-8100

WHENEVER REFERENCE IS MADE TO THE RADIATION SAFETY OFFICER,
IT IS ONE AND THE SAME AS THE RADIATION PROTECTION OFFICER.

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OPERATING AND EMERGENCY PROCEDURES MANUAL

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NORTHERN OKLAHOMA WIRELINE

OPERATING & EMERGENCY PROCEDURES MANUAL

OPENING STATEMENT:

This manual outlines procedures pertaining to the use and handling of radioactive sources. It is the intent of NOW Logging, Perforating, Inc. to comply in every way possible with State and Federal regulations for control of radiation. Although our operations are such that the levels of radiation provide a low risk of exposure, we will follow procedures and practices that will maintain doses to individuals as low as is reasonably achievable.

To insure compliance with regulations, a safety committee will be formed, consisting of:

Jim A. Dixon, Vice President
Monte McCormick, Radiation Safety Officer
Jerry Spray, Operations Manager
Keith Moon, Consultant

The safety committee will regularly review the status of NOW Logging, Perforating, Inc.'s safety procedures and policies and search out any discrepancies which might exist. Our health physics program will be reviewed on a regular basis and upgraded as it pertains to exposure, and new programs implemented if determined that improvement can be made.

It is the intent of NOW Logging, Perforating, Inc. to minimize safety and noncompliance problems, to minimize hazards to employees, and to ensure that all company personnel are committed to a safe and proficient safety program. We will make every effort to inform and train our employees in the proper use and handling of radioactive materials. We will follow to the best of our ability procedures to assure that no radiation exposure will cause harm to our personnel, our customer's personnel, or the general public.

The following pages outline our operating procedures and emergency procedures, and are supplemental to license application.

I. MANAGEMENT RESPONSIBILITY

A. The Radiation Safety Officer (R.S.O.) is responsible for the over-all radiation procedures and training function. These duties consist of:

1. Making sure all facilities are inspected monthly to determine the contamination levels, if any.
2. Maintaining proper files for the protection of the employees and the review of regulatory agents.
3. Providing an effective and ongoing training program for all employees who handle radioactive materials.
4. To insure that all waste procedures are implemented.
5. To insure that all transportation of radioactive material is done in compliance with D.O.T. regulations (49 CFR).
6. To insure that job site surveys and vehicle surveys are completed within specified time.
7. Providing monthly checks on all radiation handlers to insure proper compliance with all State and Federal regulations.
8. Maintaining a personnel monitoring device.
9. Maintaining records to insure that no excessive exposures are received by employees (not to exceed 1.25 Rems per calendar quarter or no more than 5.0 Rems per calendar year.)
10. To insure that survey meters are calibrated every six months.
11. To insure that leak/wipe tests of sealed sources are performed every six months. (If licensed for radioactive source.)
12. The Radiation Safety Officer is committed to make every effort to comply with State and Federal regulations for control of radiation and to report any deficiency or area of non-compliance to the radiation safety committee.

B. Management Records - Master Radiation Files will be maintained at the facility by the R.S.O. Some of the records contained in these files are:

1. Radiation License Information
 - (a) License and Amendments
 - (b) Procedures Manual
 - (c) State/Federal Rules and Regulations
2. Personnel Exposure Records
 - (a) Reports from dosimetry service
 - (b) Employee termination exposure report letters
3. Survey Records
 - (a) Survey meter calibration certificates
 - (b) Monthly facility surveys
 - (c) Monthly bunker surveys
 - (d) Monthly vehicle surveys
 - (e) Job site surveys

4. Source Information (If licensed for radioactive source.)
 - (a) Source inventory
 - (b) Source utilization log
 - (c) Receipts of purchase and disposal
 - (d) Leak/wipe test reports
 - (e) Physical inspection of source assembly, container, & tools.
5. Tracer Material Use (If licensed for I-131 and Ir-192)
 - (a) RA material receiving log
 - (b) Packing slip and receipt of delivery
 - (c) RA material use log
 - (d) RA waste disposal log
 - (e) Receipt for shipment for disposal of RA material

C. Bulletin Board

1. Post - "Notice to Employees"
2. Post - Current personnel exposure report
3. Post - Notice of where license, procedures manual, and regulations can be found

D. Training of Personnel

1. No company employee will be allowed to use or supervise the use of radioactive materials until he has first:
 - (a) Successfully completed a State or Federally approved radiation safety training course.
 - (b) Read and received instruction in the applicable State or Federal rules and regulations.
 - (c) Read and received instruction in the company's operating and emergency procedures and demonstrated an understanding thereof.
 - (d) Demonstrated competence to use radioactive materials, related handling tools and radiation survey instruments which will be employed in his assignment.
2. Employees may assist in operations using radioactive materials under the direct supervision of someone qualified under section D-1, if said assistant has:
 - (a) Read or received instruction in the company's operating and emergency procedures and demonstrated an understanding thereof.
 - (b) Demonstrated competence to use the radioactive materials, related handling tools and radiation survey instruments which will be employed in his assignment.
3. Records of qualifications, certificates of training, etc., indicating that the above requirements have been met will be maintained in the radiation files for inspection.

4. Upon hiring, all personnel whose duties may require them to work in/around or visit a restricted area will be informed of the radiation hazards and appropriate precautions as prescribed in 10 CFR 19.12 "Instructions to Workers". A review of the hazards and appropriate precautions will be made annually thereafter, either individually or in group safety meetings.

E. Documents and records at temporary job sites:

1. Operating and emergency procedures.
2. Survey records for the period of operation at the temporary job site.
3. Evidence of current calibration for the radiation survey instruments in use at the temporary job sites.
4. A copy of radioactive material license, if operating under reciprocity.

F. Documents and records at field stations where radioactive materials are used or stored:

1. Copy of radioactive material license.
2. Operating and emergency procedures.
3. Applicable NRC and/or Agreement State regulations.
4. Records of latest survey instrument calibrations on each survey instrument.
5. Records of latest leak test results on each sealed source.
6. Semiannual physical inventories.
7. Utilization records. (for this station)
8. Records of inspection and maintenance. (for this station)
9. Facility, bunker, vehicle, job site, etc. surveys for this particular field station.

II. RADIATION SAFETY AND MONITORING DEVICES

A. TLD Badges: (Thermoluminescent Dosimeter)

1. A TLD badge will be assigned by name and number to each employee working with radioactive materials. Under NO circumstances will an employee be permitted to use a TLD badge other than his own.
2. The Radiation Safety Officer will be responsible for the distribution of the TLD badges and the procedures governing their use. Care should be taken to prevent exposure of TLD badges to environmental conditions which involve excessive heat or moisture as such exposure will impair the ability of the badges to measure radiation dosage.
3. TLD badges will be worn attached to clothing in the trunk area of the body during all operations which involve possible exposure to radiation.
4. TLD badges will be returned to the Radiation Safety Officer, or his designated representative, at the end of the control period for the badge.
5. TLD badge reports will be kept up-to-date by the Radiation Safety Officer. These reports will become a part of each employee's personnel record by means of an individual exposure report which will be maintained on a quarterly basis by the R.S.O. Each person to whom a TLD badge is assigned will be informed of his total radiation exposure upon request or within thirty (30) days after termination.

B. Survey Meters:

1. A radiation survey meter shall be carried on each vehicle used for transportation of radioactive materials. Survey meters used shall be sensitive to gamma radiation.
2. One or more operable radiation survey meters will be kept at the base facility as a spare and for emergency use.
3. A job site survey must be made before and after each operation using radioactive materials. (Ref: Figure #6) A record of each survey will be kept in the company's survey file.
4. A calibration check shall be performed on each radiation survey meter at six months intervals and after repair. The calibration check shall consist of testing the survey meter at two points other than zero, on each scale using a radiation source of known output. The calibration will be performed by a State or Federally approved survey meter calibration service company. A written record of this calibration will be kept by the R.S.O. in the company's survey file.

5. A survey must be made and recorded for each operation using sealed radiation sources. (Ref: Figure #6)

C. Leak/wipe Tests for Sealed Sources:

1. A leak/wipe test shall be performed on each sealed radiation source at six months intervals. Leak/wipe tests will be performed by the Radiation Safety Officer or other authorized user.
2. Leak/wipe tests will be performed through the use of kits according to the accompanying instructions. The kits will be supplied by one of the following:

Suntrac Services, Inc. (SIT-1), Webster, Texas
G.E. Smith & Associates, Pasadena, TX (Leak TEst Kit #2)
Nuclear Sources & Services, Inc., Houston, Texas (LT-1)
Gulf Nuclear, Houston, Texas (LTK-1)
Eberline Instruments, Santa Fe, New Mexico
or Any other State or Federally approved company providing
this service.

3. After the wipe/test is performed, the kit will be checked with a survey meter prior to any shipment by U.S. mail or private carrier.
4. Leak/wipe test evaluations will be done in accordance with standard license requirements, and will provide data sensitive to 0.005 microcurie of removable contamination.
5. Results of leak/wipe tests (evaluation reports) will be retained for review by regulatory agents.

III. STORAGE FACILITIES

A. Storing and Securing

1. When not being used, the radioactive source(s) will be placed in a secure area that is properly marked with warning signs around the perimeter. This storage area will be locked at all times except when removing or returning sources. (Ref: Figure # 5)
2. Storage facilities are designed and positioned so that no person in an uncontrolled area will receive more than 2 mr in any hour or more than 100 mr in any seven (7) consecutive days.
3. Only licensed radiation handlers will be allowed to remove or replace the source(s) and they must be wearing a TLD badge.
4. Monthly storage bunker surveys will be made by the R.S.O. and kept in the survey files. (Ref: Figure # 5)

B. Vehicle Storage

1. The radioactive source will be locked in a transport container near the rear of the transport vehicle. This container will remain locked at all times except when removing or replacing sources.
2. The transport container must be an approved D.O.T. 7-A container and should be placed at the furthest point possible away from the driver or passengers. Documentation of the container's certification as D.O.T. 7-A should be kept in the radiation files.

C. Posting Restricted Areas, Vehicles and Labelling Containers

1. Posting restricted areas and storage areas where the levels are expected to achieve 2 mr per hour will be labelled with signs stating "Caution - Radiation Area" or "Caution - Radioactive Materials." 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, then a sign stating "Caution - High Radiation Area", magenta and safety yellow in color will be conspicuously posted.
2. All vehicles transporting or containing radioactive materials will bear a placard on four sides with the proper labelling of the word "RADIOACTIVE" (11" x 11" square). It is clearly understood that this placard will not be displayed if the vehicle is not carrying or storing radioactive materials.
3. All containers carrying, storing or used for transporting radioactive materials will bear a tag with the identification of the radioactive material, and the exposure level (mr/hr) of the material.

IV. SOURCE HANDLING PROCEDURES

- A. Only company employees who are licensed radiation handlers and who have been trained in handling sealed sources shall perform or directly supervise operations utilizing a sealed radioactive source.
- B. The source assembly will be transported to and from location in full compliance with Department of Transportation regulations (49 CFR). The source assembly will be carried in a transportation container that meets USA DOT 7A specifications and which is fastened to an integral part of the vehicle and located at the furthest point possible away from the driver or passengers. Shipping papers as outlined in 49 CFR Subpart C - Parts 172.200 thru 172.204, will be carried in the cab of the vehicle.
- C. Prior to leaving the facility for the job site, the source will be logged out on the Source Utilization Log (Ref: Figure #2) and a survey made using a low level survey meter approximately 6 inches from the source container. This log will be kept in the radiation files for review by regulatory agents.
- D. At no time will a source be handled by hand. All loading or unloading will be done with the aid of a source handling tool or other approved handling tool.
- E. All employees involved in operations using a source will wear a personnel monitoring device (TLD badge). A certified calibrated low level survey meter will be available during all operations using a source.
- F. At the well location, and prior to beginning operations utilizing the source, operator will complete "Before" portion of the Job Site Survey. (Ref: Figure #6)
- G. A restricted area of not less than 30 feet around the work area will be established and marked with signs, barrier rope, or other designation. Direct surveillance will be maintained by the supervisor or designated employee during all source handling procedures to protect against unauthorized and/or unnecessary entry into the restricted area.
- H. Using the remote handling tool, the source assembly is removed from the transport container. The source assembly is attached to the logging tool and placed inside the well.
- I. When logging procedures have been completed, the tool is returned to the surface, the source shield is replaced, and the source assembly is removed and placed back into the transport container. A vehicle survey is taken to check for contamination and proper transport index (mr/hr at 1 yard). "After" portion of the Job Site Survey is completed before leaving location to show there is no ground contamination.
- J. Upon return to facility, source assembly will be surveyed and logged in on the Source Utilization Log (See C above). Source assembly will then be returned to the storage bunker using the source handling tool, and storage bunker locked.

V. LOST SOURCE PROCEDURES (Ref: Figure #3)

- A. Prior to performing well logging operations using a sealed source, a written agreement must be executed between licensee and the well owner/operator, stating that within thirty (30) days after a well logging source has been classified as irretrievable, (1) the source will be immobilized and sealed in place with a cement plug, (2) a whipstock or other deflection device will be set well above the cement plug unless the source is not accessible to any subsequent drilling operations, and (3) a permanent identification plaque will be mounted at the surface of the well. (See Section C for specifics).
- B. In the event a tool containing a sealed source of radioactive material is stuck in an oil or gas well, the following procedures should be followed to insure maximum safety:
1. Remain in contact with the well operator and offer advice and recommendations regarding safe fishing (retrieval) procedures and make the well operator aware of the possibility that fishing procedures might damage the source capsule.
 2. During the retrieval operations, the logging supervisor will monitor for radiation at the surface, using a gamma logging tool near the pipe for fluids circulating from the hole, or using a low level beta/gamma survey meter with a thin window beta probe, or a scintillation probe with high enough energy resolution to accommodate the pipe thickness.
 3. Upon retrieval of the source, if no radioactive contamination is detected, logger will remove the source housing assembly from the logging tool and physically check it for any damage such as abrasions brought about by metal to metal contact or any disfigurement brought about by pressure.
 4. Should any radioactive contamination be detected during retrieval or if the source appears to be damaged, we will immediately notify the State or Federal regulatory agency governing radiations. (Emergency telephone number on cover page of this manual.)
 5. If there is no evidence of radioactive contamination or physical damage, the source will be returned to a licensed storage facility for our company where it will be leak/wipe tested and the wipe sent for immediate analysis. The source will be kept in the storage container out of service pending receipt of the analysis results.
- C. If it becomes apparent that the source cannot be retrieved and will have to be abandoned downhole, we will notify the State or Federal regulatory agency having jurisdiction over radiation and any regulatory agency governing the drilling of oil and gas wells. Following are procedures to follow for safe abandonment of a source downhole:
1. After notifying the regulatory agencies, the logging supervisor should determine steps to be taken to abandon the source in such a way as to protect persons and property now and in the future, considering what the well operator wishes and can reasonably do, and then present this proposal to the regulatory agencies for final approval or further recommendations.

2. A source left below a producing zone presents little difficulty. In most cases the normal cementing of the production string of casing or tubing will isolate the source. If the well is to be produced from open hole completion, cement should be spotted around and/or above it to prevent the movement of fluids past the capsule and eventual destruction of the capsule through abrasion.
3. In questionable cases the life of the capsule and the solubility of radioactive material might influence the acceptance of the proposal. (The source capsules have an estimated life of 500 years in undisturbed salt water. The solubility of the radioactive materials is in the order of one part per billion per week.)
4. Production of gas, water or oil past a source should be prohibited unless the capsule is protected from abrasion. Casing or tubing should be adequate. The spotting of cement, if practical and feasible, adds to the protection. Care should be taken in setting casing past the location of the tool to avoid dislodging it. A gamma-ray survey run after the casing is below the zone will give assurance that the tool and source will not be encountered and damaged at a lower level.
5. In the event a source is left in a producing zone, it should be cemented in place if possible. Extreme caution should be used to avoid re-entering the original hole and damaging the source container. Normally, the source is at or near the bottom of the tool. If there were sufficient clearance to place cement around the source, the tool would, in most cases, be retrievable. However, the drilling mud would probably harden in a short time to prevent appreciable flow of fluids by the source. In addition, the separation between the new and old holes would reduce the rate of flow at the tool to a very small figure. It is recommended that the new and old holes be separated by at least 15 feet to preclude any possibility of damage to the source by perforating.
6. Upon abandonment of a radioactive source in an oil or gas well, licensee shall provide a permanent plaque for posting the well or well bore. It shall be constructed of long-lasting material such as stainless steel, brass, bronze, or monel and contain the following information engraved on its face:
 - a. The word "CAUTION" in large letters.
 - b. The radiation symbol (color not required).
 - c. The date of abandonment.
 - d. The name of the well operator or well owner.
 - e. The well name and well identification number(s) or other designation.
 - f. The sealed source(s) by radionuclide and quantity of activity.
 - g. The source depth and the plug back depth (depth to the top of the plug).

- h. An appropriate warning, depending on the specific circumstances of each abandonment, such as (1) "DO NOT DRILL BELOW PLUG BACK DEPTH", (2) "DO NOT ENLARGE CASING", (3) "DO NOT RE-ENTER HOLE", followed by --- BEFORE CONTACTING (whichever is appropriate) THE U.S. NUCLEAR REGULATORY COMMISSION //or// THE STATE BUREAU OF RADIATION CONTROL.
7. A written report must be filed with the Regional Office of the NRC or the Agreement State Bureau of Radiation Control within 30 days of abandonment, giving description of attempts to recover the source and results of retrieval attempts; steps taken to isolate and protect the source; all pertinent well information; and information contained on the permanent identification plaque. A copy of this report should also be furnished to the State agency issuing permits for or controlling the drilling of oil and gas wells.

VI. EMERGENCY PROCEDURES

- A. Vehicle Wreck - In the event of an accident while transporting radioactive materials, the following procedures should be followed:
 1. Do not leave the area unattended by qualified personnel.
 2. Notify the investigating officer.
 3. Notify the Radiation Safety Officer.
 4. Survey the area and close off any area where the level exceeds 2 mr/hr.
 5. Decontaminate the contaminated area (if any).
 6. The RSO will notify the proper regulatory 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 Radiation Safety Officer.
 5. The RSO will set up restrictions governing the fire fighting and other emergency activities.
 6. Following the emergency, monitor the area and ascertain the emergency devices necessary for safe decontamination.
 7. Decontaminate.
 8. The 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 Radiation Safety Officer who will in turn report it to the proper State or Federal regulatory agency.

C. Leaking Source

1. If a source is leaking, which the logging tool would indicate, shut the operation down.
2. Notify contractor and immediately call Radiation Safety Officer for instructions.
3. Set up control procedures for keeping personnel out of the immediate area until instructions are received from the Radiation Safety Officer.

D. Lost Source Downhole(See Section V - Lost Source Procedures).

E. Theft or Loss of Radiation Source

1. Licensee shall report immediately by telephone and confirm promptly by letter to the State or Federal authorities the theft or loss of a source as soon as such theft or loss becomes known to the licensee.
2. Every investigative method should be taken to recover said source.

VII. SOURCE MAINTENANCE AND DISPOSAL PROCEDURES

- A. Every radioactive source must be accounted for. Licensee must have records of receipt and disposal and maintain a current source inventory. A source cannot be sold or transferred to anyone who does not have in his possession a current radioactive material license authorizing possession of that particular source (manufacturer, model, and curie quantity).
- B. Inspection and maintenance of source holders, logging tools, source handling tools, storage containers, transport containers, and injection tools will be conducted at intervals not to exceed 6 months to assure proper labeling and physical condition. (Ref: Fig. #) Should any damage be revealed, the device will be removed from service until repairs have been made. Records of inspection and maintenance should be maintained for a period of two years for inspection by the regulatory agency.
- C. Each source, source holder, or logging tool containing radioactive material shall bear a durable, legible and clearly visible marking or label, which has, as a minimum, the standard radiation caution symbol, without the conventional color requirement, and the following wording:

DANGER (OR CAUTION)
RADIOACTIVE

This labeling shall be on the smallest component transported as a separate piece of equipment.

- D. Each transport container should have permanently attached to it a durable, legible, and clearly visible label which has, as a minimum, the standard radiation caution symbol and the following wording:

DANGER (OR CAUTION)
RADIOACTIVE
NOTIFY CIVIL AUTHORITIES (OR COMPANY NAME)
- E. Under NO circumstances will any employee of licensee remove a source from a source holder or assembly. It is prohibited to make effort to remove sources stuck in a handling tool, logging tool, etc., which involve chiseling, drilling, cutting, etc.
- F. Any maintenance or service operations which require direct hand contact with the source assembly, such as cleaning or "O" ring exchange will be performed as follows:
 - 1. Since the source assembly is threaded, a hand tool with the appropriate thread, no less than 24" in length, will be made and screwed into the source assembly. The hand tool then will be secured in a table mounted vice. Note: If there is thread damage, the source will be sent back to the manufacturer for repair or replacement.
 - 2. The "O" rings will be cut off with a razor knife. The source assembly will be cleaned with a long nosed solvent spray apparatus, which can be purchased at any automotive supply.

3. Upon completion of the cleaning, a piece of PVC pipe, 18" in length and of the appropriate diameter to fit over the source assembly, will be used to transfer greased "O" rings to the two grooves that have been cleaned. The PVC pipe will be placed over the source assembly with only the "O" ring groove exposed. A modified round wood stick with a flat end will push the "O" ring off of the PVC pipe into the "O" ring groove. Repeat procedures for second "O" ring.
 4. Upon completion of replacement of the "O" rings, the handling tool used for normal operations will be used to unscrew the source assembly from the support holding tool while still in the vice and replaced to its assigned transportation container/shield.
- G. Sealed sources will be returned to the manufacturer for disposal, in compliance with transportation regulations previously mentioned in this manual. Receipt from manufacturer must be placed in the radiation files as a record of disposal.

RADIOACTIVE SOURCE INVENTORY AND INSPECTION

[illegible]

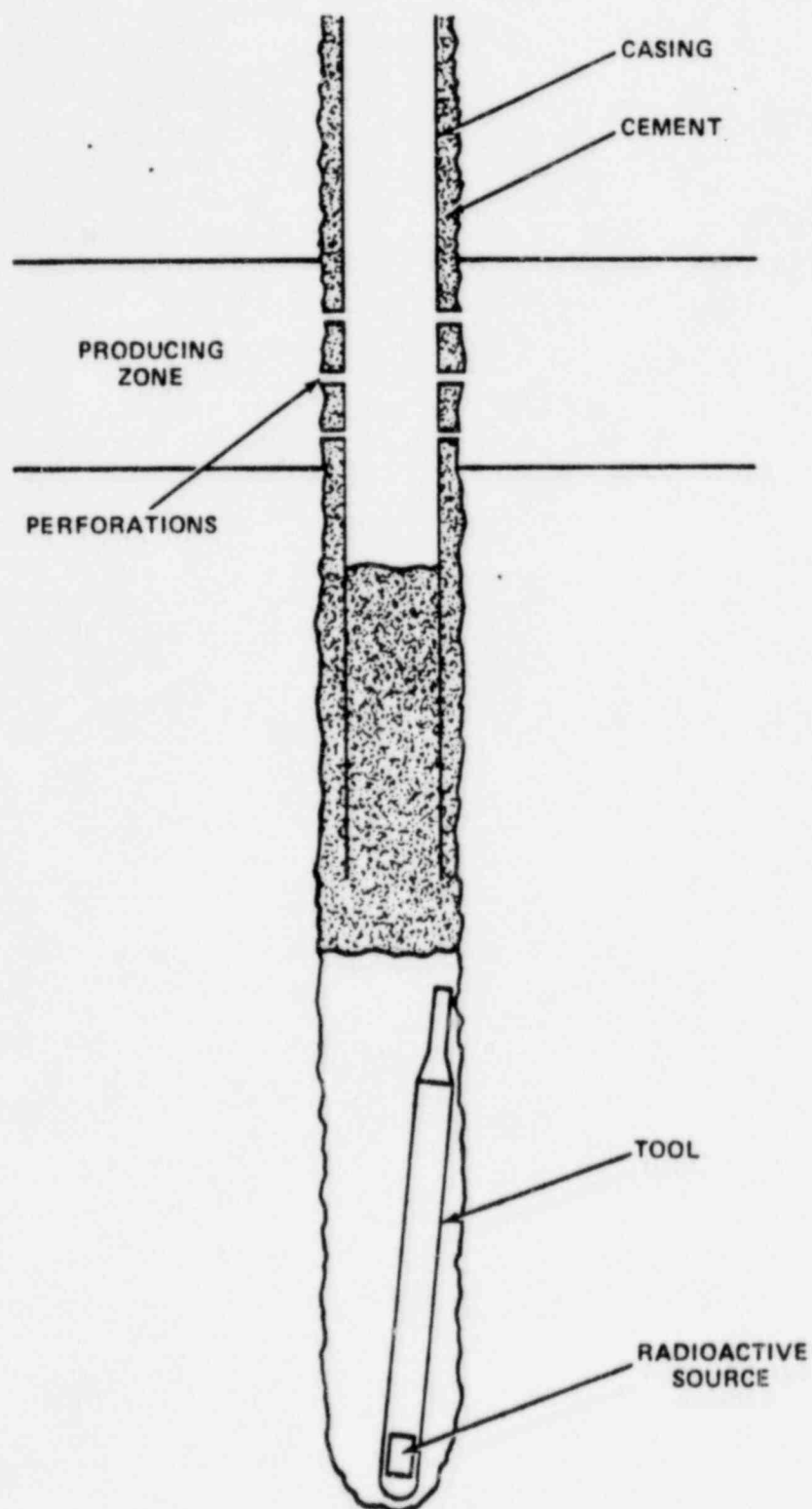
* Visual inspection of physical condition and proper labeling.

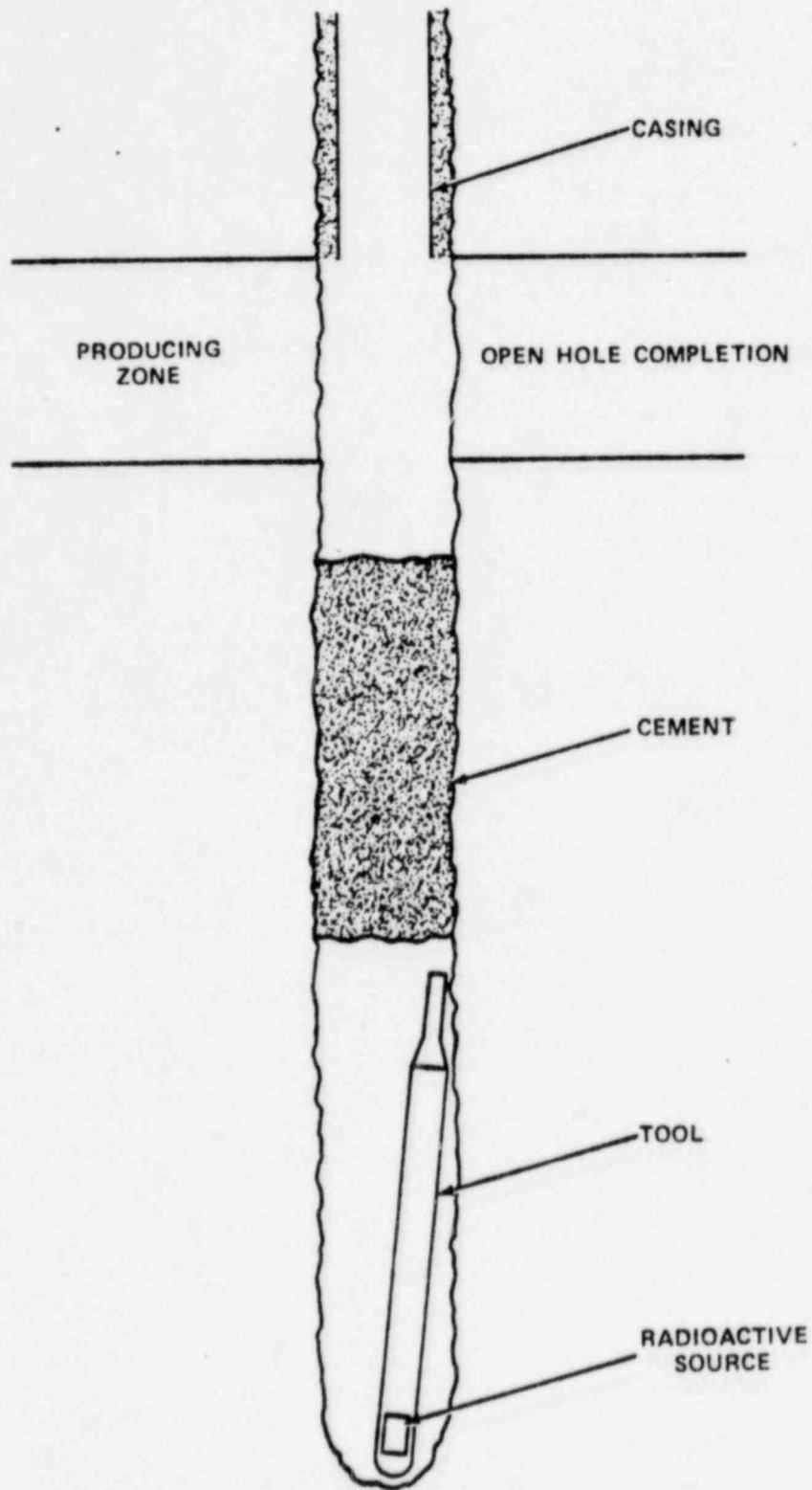
Note: Physical inventory and inspection must be conducted every six months and kept on file for two years.

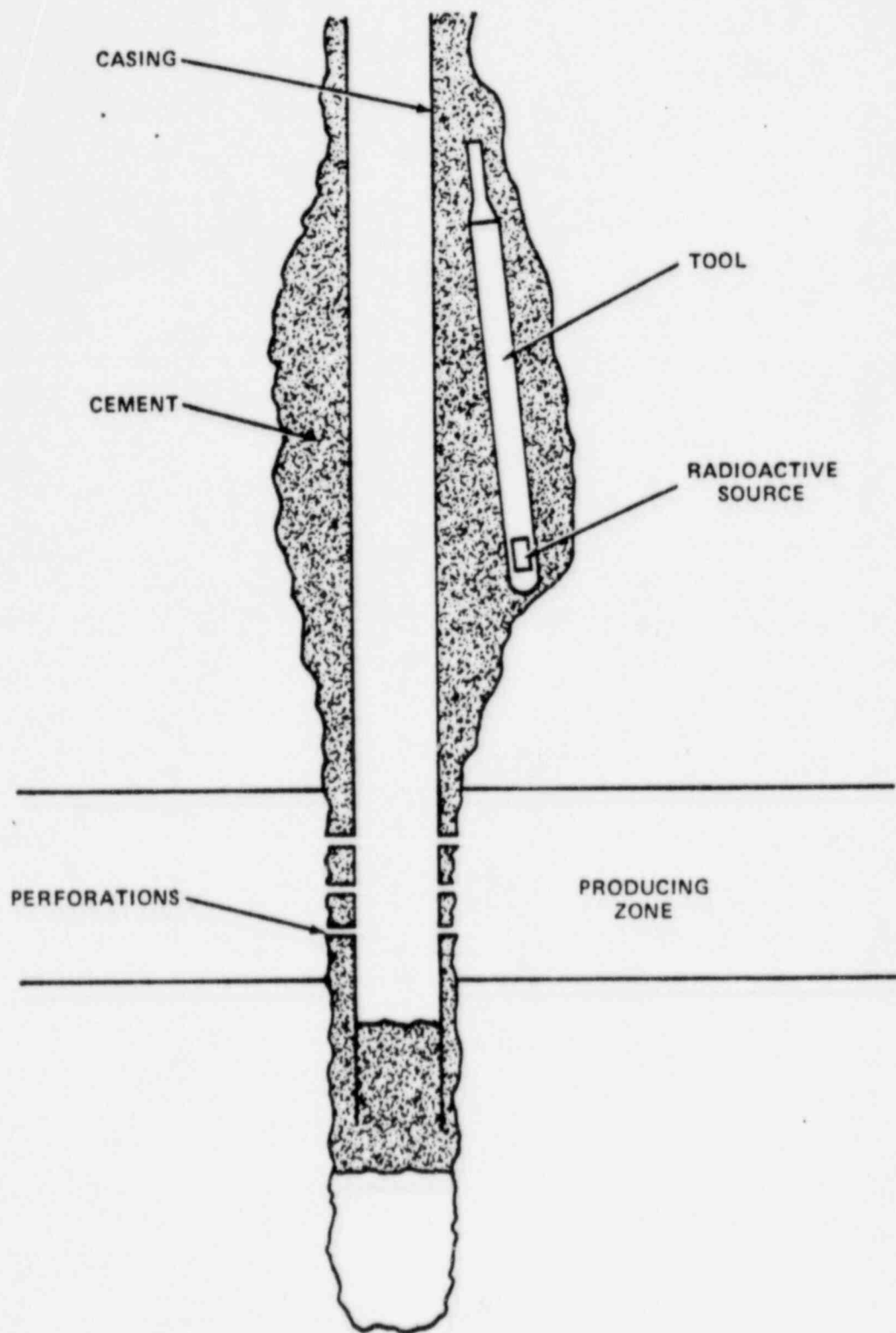
BY

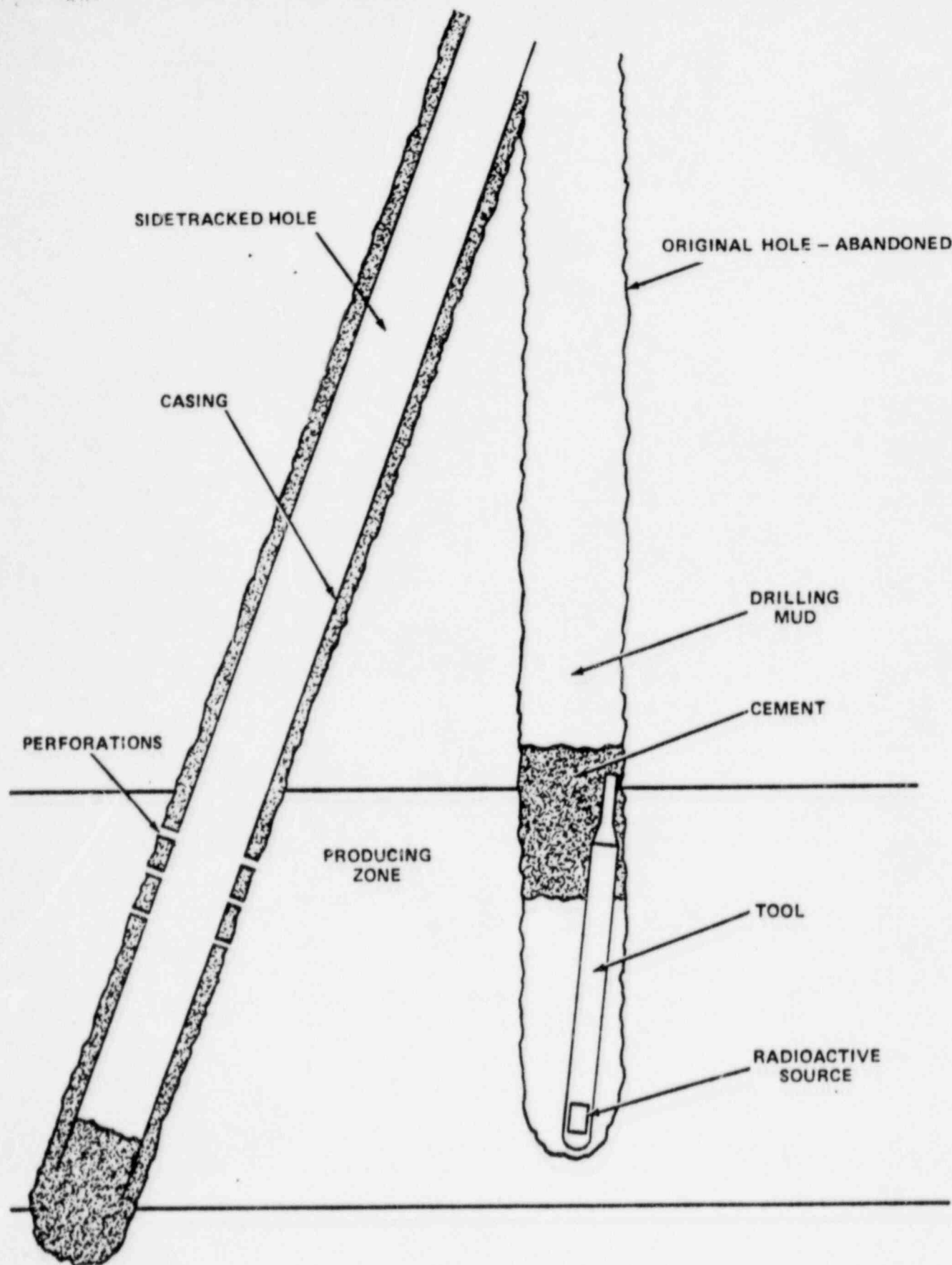
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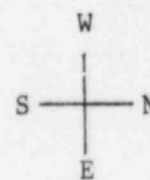
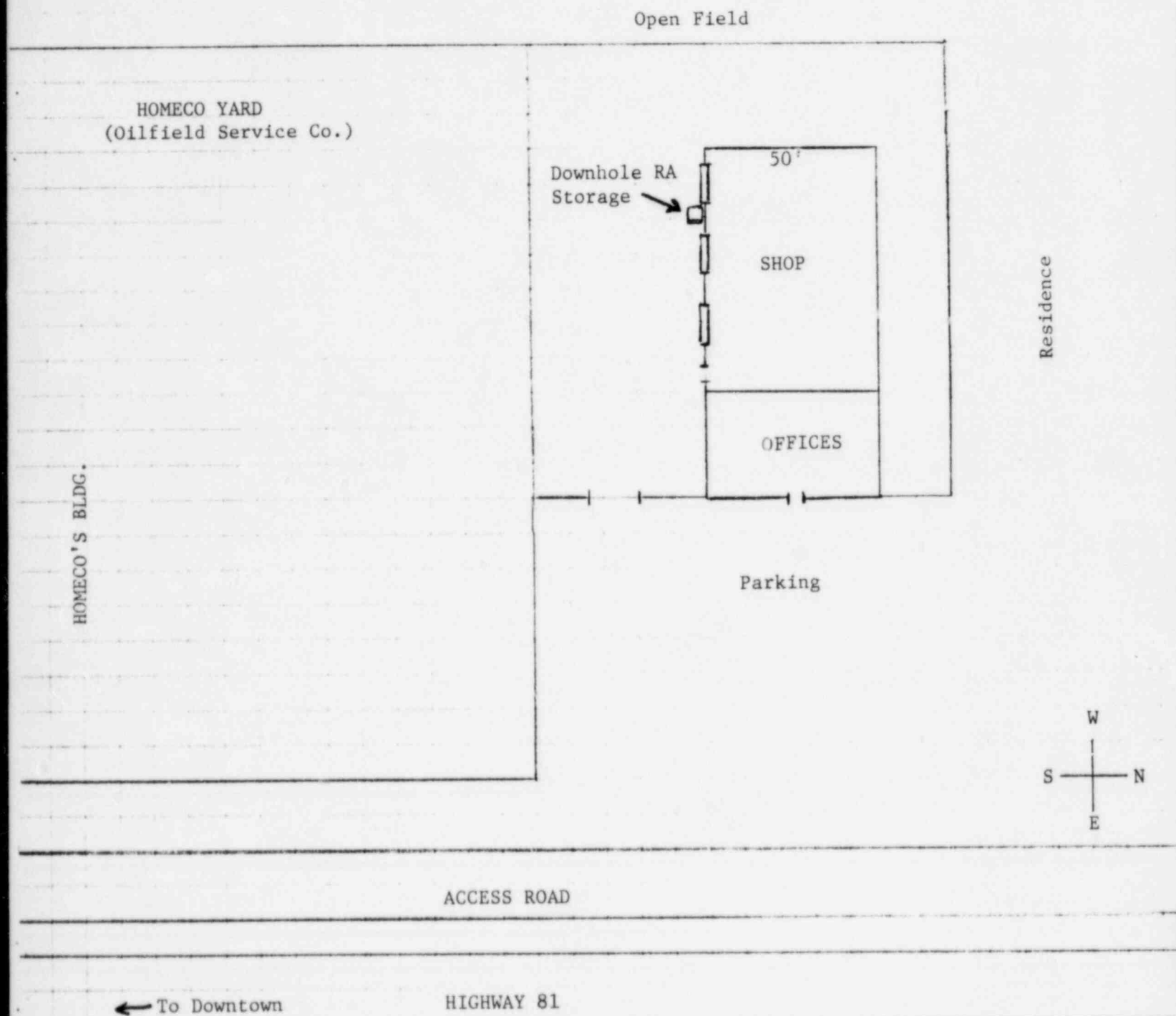
Figure #1









FACILITY DRAWING

NORTHERN OKLAHOMA WIRELINE
5720 North 81 Highway
Enid, Oklahoma 73701

RA STORAGE BUNKER DESIGN AND SURVEY FORMSURVEY METER INFO:

Make: _____

Model: _____

Serial No.: _____

Date of

Calibration: _____

SURVEYED BY: _____

DATE: _____

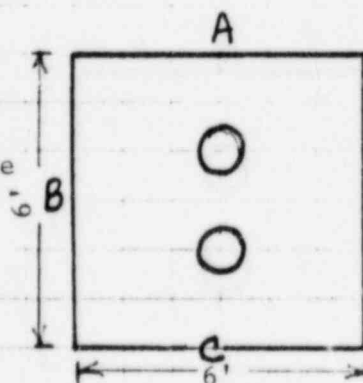
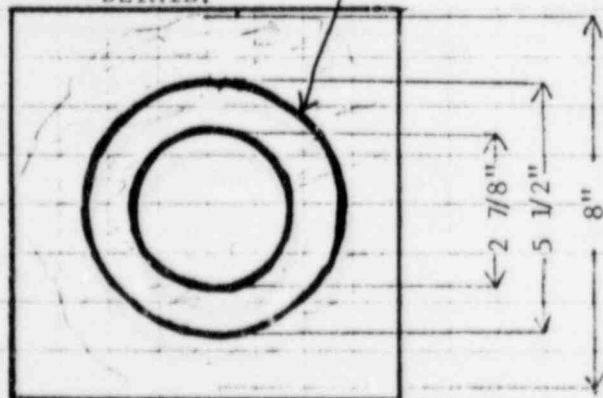
SURVEYS		
A		MR/HR
B		MR/HR
C		MR/HR
D		MR/HR

RA STORAGE BUNKER:

6'x 6' x6" concrete slab, surrounded by 3' high fence constructed from 2" pipe, with radiation warning signs on each side.

Two pits 6' deep and 8" in diameter, containing 2 7/8" tubing set in 5 1/2" casing, with cement between tubing and casing and around outside of casing. See Detail.

Steel Cap with Lock
Chain for lowering and
raising source.

DETAIL:

OVERHEAD DOOR - BAY # 3

OVERHEAD DOOR - BAY #2

**SURVEY BEFORE AND AFTER
USE OF RADIOACTIVE MATERIALS**

Figure #6

DATE _____

WELL IDENTIFICATION: _____
Name Number

LOCATION: Field _____

County _____

State _____

SURVEY METER IDENTIFICATION

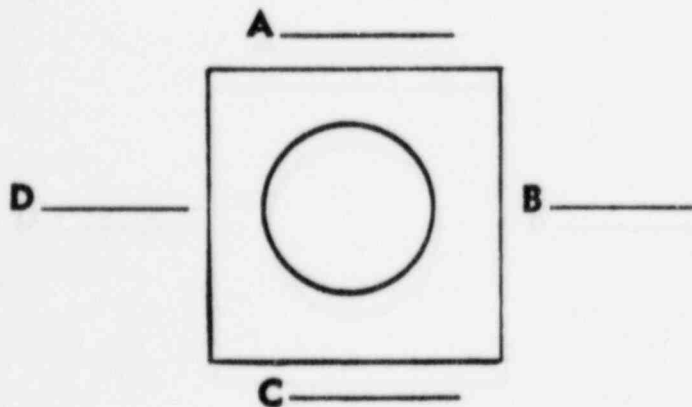
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Manufacturer _____

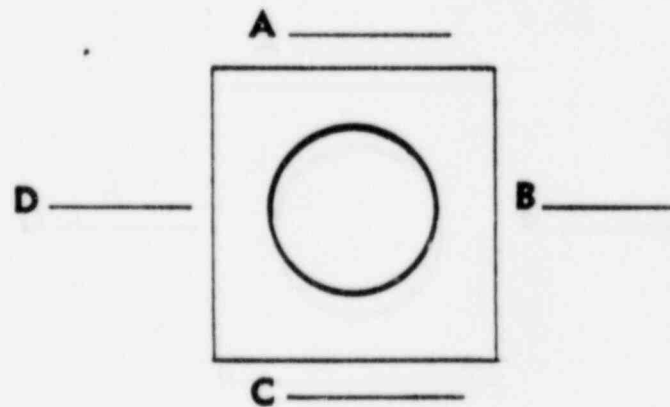
Serial Number _____

DATE OF CALIBRATION _____

BEFORE - MR/HR



AFTER - MR/HR



OPERATOR

MONTHLY VEHICLE SURVEY

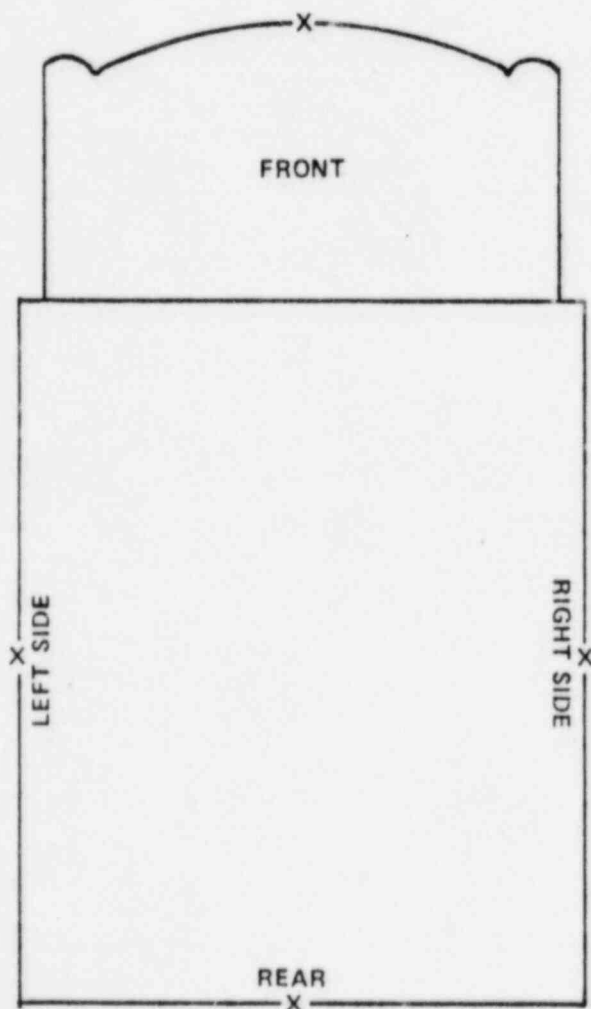
DATE _____

SURVEY METER IDENTIFICATION:

MANUFACTURER _____ SERIAL NO. _____

MODEL NO. _____ DATE OF CALIBRATION: _____

ALL READINGS IN MR/HOUR



SURVEY

FRONT _____ MR/HR

REAR _____ MR/HR

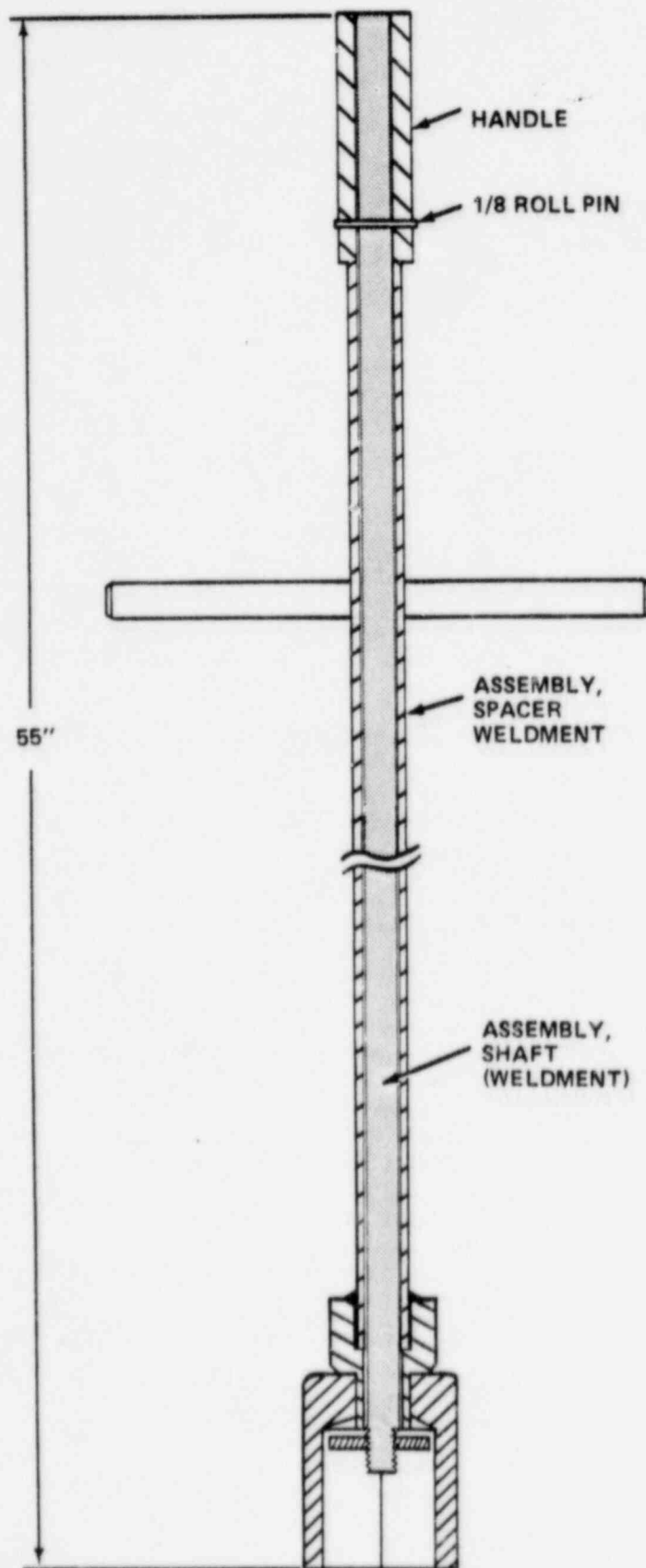
RIGHT SIDE _____ MR/HR

LEFT SIDE _____ MR/HR

X - DENOTES POSTING WITH
RADIOACTIVE SIGNS_____
OPERATOR

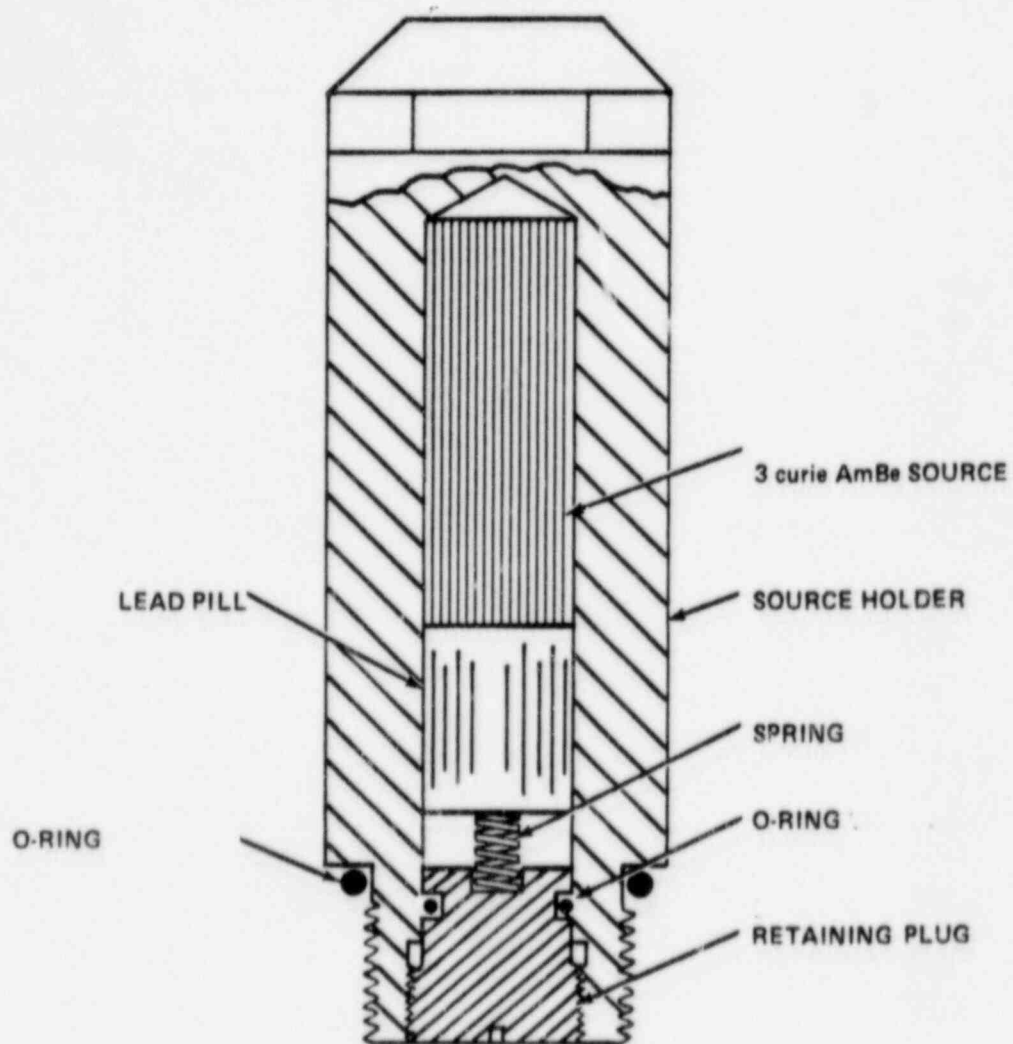
Unit/Truck No. _____

SOURCE LOADING TOOL ASSEMBLY
SOURCE HOLDER - 3 curie AmBe 241

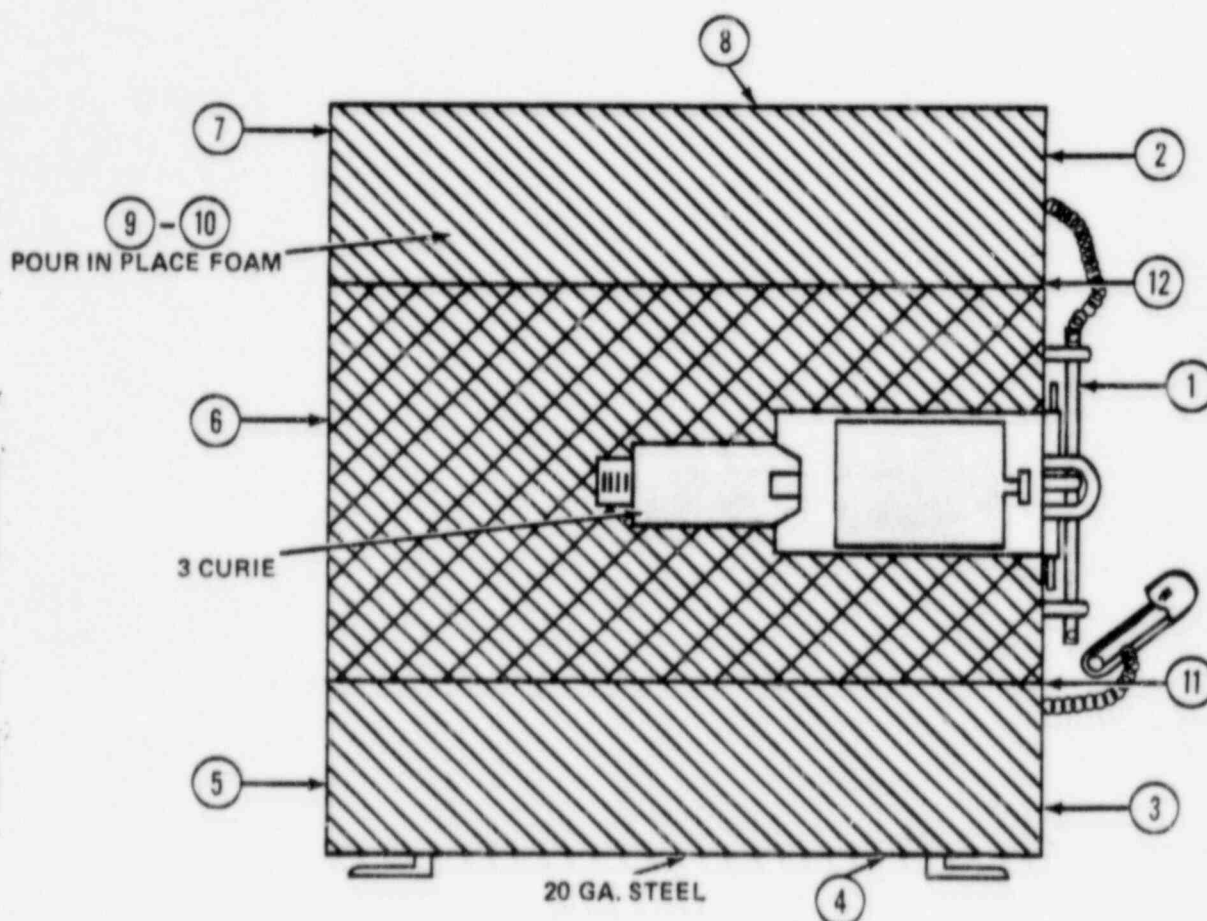


460685

SOURCE HOLDER ASSEMBLY
3 curie AmBe SOURCE



3 curie AmBe 241 SHIELD
D.O.T. - 7A



NO.	NEUTRONS	GAMMA
1	40 MR/HR	1.0 MR/HR
2	20 MR/HR	1.0 MR/HR
3	40 MR/HR	1.0 MR/HR
4	48 MR/HR	2.0 MR/HR
5	32 MR/HR	1.2 MR/HR
6	44 MR/HR	1.8 MR/HR
7	32 MR/HR	1.3 MR/HR
8	48 MR/HR	2.0 MR/HR
9	48 MR/HR	2.0 MR/HR
10	48 MR/HR	2.0 MR/HR
11	48 MR/HR	2.0 MR/HR
12	48 MR/HR	1.8 MR/HR