

406-873-5792

FORM NRC-313 I (3-80) 10 CFR 30		U.S. NUCLEAR REGULATORY COMMISSION		1. APPLICATION FOR: (Check and/or complete as appropriate)	
APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL				XX	a. NEW LICENSE
See attached instructions for details. Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.					b. AMENDMENT TO: LICENSE NUMBER
					c. RENEWAL OF: LICENSE NUMBER LxL 19743
2. APPLICANT'S NAME (Institution, firm, person, etc.) JETCO WIRELINE (MONTANA), INC. TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION #406-873-4632			3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION Barrie G. Ibsen, President 03110 TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION #406-873-4632 30-19181		
4. APPLICANT'S MAILING ADDRESS (Include Zip Code) (Address to which NRC correspondence, notices, bulletins, etc., should be sent.) 505 East Main, Cut Bank, Montana 59427			5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED (Include Zip Code) Material Storage---905 E. Railroad, Cut Bank Temporary Job Sites will be at various well sites in the state of Montana.		
(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)					
6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL (See Items 16 and 17 for required training and experience of each individual named below)					
FULL NAME			TITLE		
a. Barrie G. Ibsen			President & Engineer		
b. Paul DeKaye			Field Engineer		
c.					
7. RADIATION PROTECTION OFFICER Barrie G. Ibsen			Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.		
8. LICENSED MATERIAL					
L I N E NO.	ELEMENT AND MASS NUMBER A	CHEMICAL AND/OR PHYSICAL FORM B	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source) C	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME D	
(1)	Americium 241	Sealed Source	Numec Model AM92	One---3 Curie Source	
(2)					
(3)					
(4)					
DESCRIBE USE OF LICENSED MATERIAL E					
(1)	The 3-curie AmBe source will be used for neutron logging of oil and gas wells at				
(2)	various well sites in Montana.				
(3)	8507240162 850625 REG4 LIC30				
(4)	25-19743-01 PDR				

RECEIVED BY: [Signature]
DATE: 5/7/81
FOR: [Signature]
BY: [Signature]
Orig To: [Signature]

Applicant: 1254
Check No.: 460(SA)
Amount/Fee: Application
Type of Fee: 5/7/81
Date Check: [Signature]

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	Shipping Container	Nuvec	Permit #AAAP 1113
(2)	Truck storage & Transport	Made by previous owner	met all previous inspections
(3)	Gamma Ray Neutron Logging Tool	& S.I.E.	
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	Survey Meter	Tracer Lab	SV20	1	All the above	0-50
(2)	Survey Meter	Victorean	493	1	All the above	0-50
(3)	Dosimeter	Tracer Lab	K112	2	All the above	0-200
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY
Gulf Nuclear, Inc.
202 Medical Center Blvd.
Webster, Texas 77598

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

N/A

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
<input checked="" type="checkbox"/> (1) FILM BADGE whole body gamma & neutron rad.	ICN Dosimetry Service 26201 Miles Road Cleveland, Ohio 44128	<input checked="" type="checkbox"/> MONTHLY
<input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD)		<input type="checkbox"/> QUARTERLY
<input type="checkbox"/> (3) OTHER (Specify): Dosimeter	Tracer Lab (ICN)	<input type="checkbox"/> OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)

- ☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
- ☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
- ☒ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
- ☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

N/A

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

N/A

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. **RADIATION PROTECTION PROGRAM.** Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
16. **FORMAL TRAINING IN RADIATION SAFETY.** Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.
17. **EXPERIENCE.** Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED
(See Section 170.31, 10 CFR 170)

b. CERTIFYING OFFICIAL (Signature)

c. NAME (Type or print)

Barrie G. Ibsen

(1) LICENSE FEE CATEGORY: 5 A

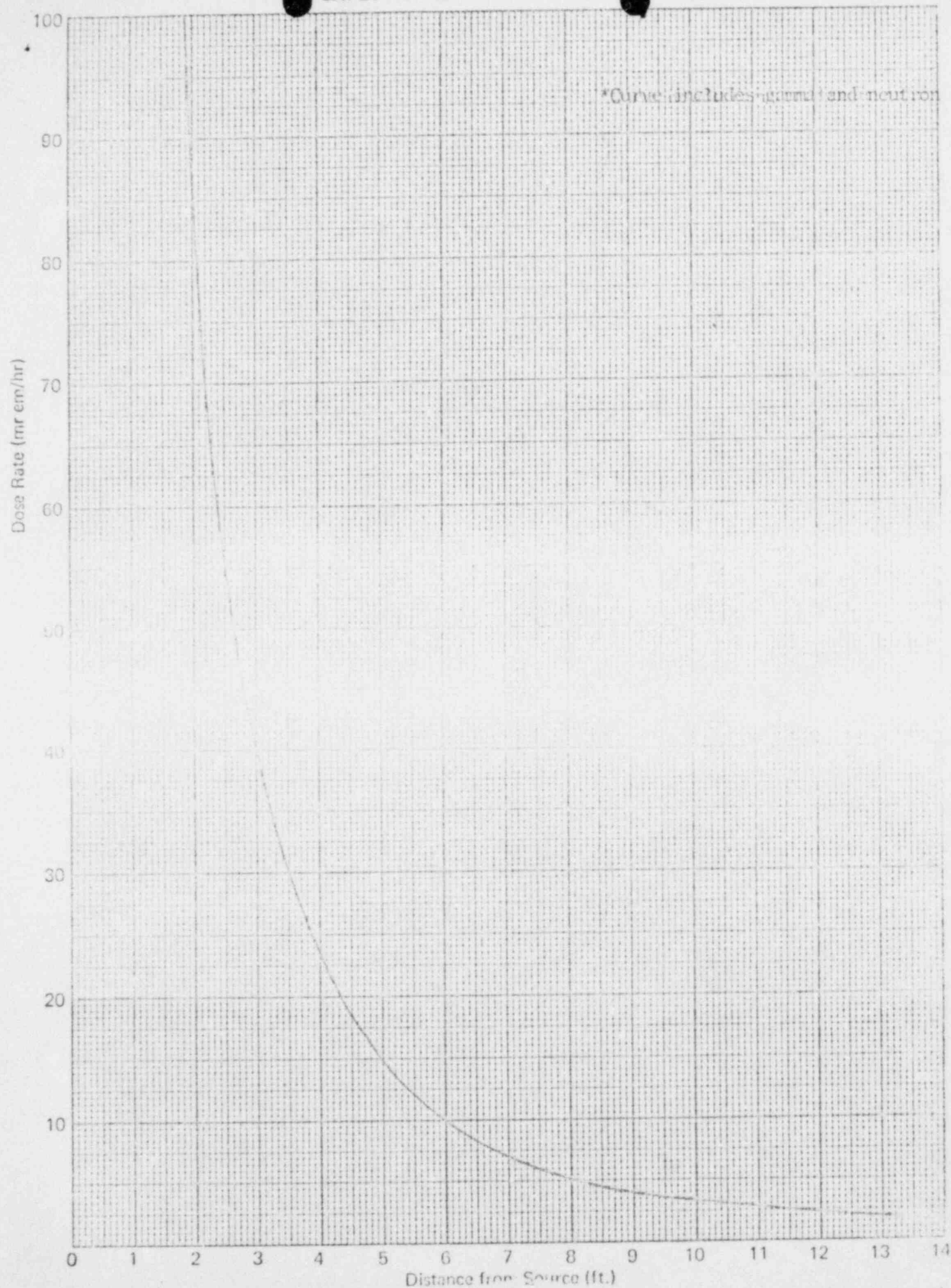
d. TITLE

President

(2) LICENSE FEE ENCLOSED: \$ 460.00

e. DATE

April 30, 1981



13. FACILITIES & EQUIPMENT

b. Source will be stored and locked in shipping container in remote corner of shop away from all unauthorized personnel.

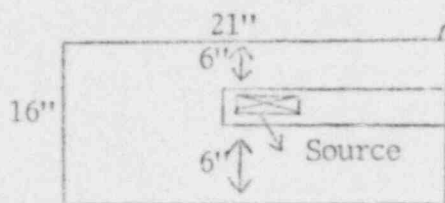
Dimensions - (See illustrations)

Thickness of shielding 6".

Type of shielding materials - paraffin.

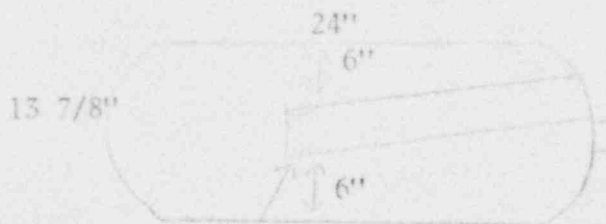
Radiation levels will not exceed 2 mR/hr at 18 inches from the surface of storage facilities.

Shop Storage



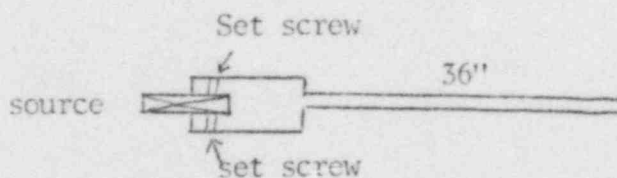
Enclosed end cover locked with locking band.

Truck Storage



Chain and lock to secure source from unauthorized personnel.

c. Remote handling tongs



15. Radiation Protection Program.

APPENDIX A

- I. Radiation Program Management and Responsibility
 - A. Company Organization Chart
- II. Radiation Safety Officer
- III. Personnel Monitoring Procedures
- IV. Storing and Securing Radioactive Sealed Source
- V. Posting Requirements
- VI. Records Management
- VII. Procedures for Transporting Radioactive Sealed Source

APPENDIX A

I. Radiation Program Management and Responsibility

- a. The Radiation Protection Officer is to be designated overall manager for the radiation program.
- b. The duties of the Radiation Protection Officer included 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. The Radiation Protection Officer is Barrie G. Ibsen.

II. 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 responsibility delegated by the Radiation Protection Officer. These duties might include :

- a. Site surveys.
- b. Records, personnel monitoring records and compilation.
- c. Vehicle survey records.
- d. Training and qualifying personnel.
- e. Conducts periodic safety checks to assure the radiation protection program.

The Radiation Safety Officer is Paul DeKaye.

III. Personnel Monitoring Procedures

All personnel directly related to activity involving radioactive materials will wear a film badge or a suitable acceptable dosimeter. Film badge records will be monthly and monitoring will be on a monthly basis.

It is clearly understood that maximum acceptable dose levels are not to exceed 1.25 Rem per calendar quarter or no more than 5.0 Rem per calendar year.

It is also clearly understood that in the event these doses are greater than those listed above that proper notification will be posted with the licensing authority. Also reports of dosages will be maintained on at least a quarterly basis.

IV. Storing and Securing Radioactive Sealed Source.

Upon receipt of the radioactive source the receiving records will be placed in a properly marked file. The source will be placed in a secure area that is properly marked with appropriate signs around the perimeter. The source when not in use will remain in the storage area properly locked and secured.

V. Posting Restricted Area, Vehicles and Labelling Containers.

- a. Posting restricted areas-Storage area and areas where radiation levels are expected to achieve 2 mR/hr 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.

A proper Notice to Employees will also be posted where it is obvious to employees.

- b. Vehicle Placarding. All vehicles transporting or containing radioactive materials will bear a placard on four sides that bears the proper labelling according to the D.O.T. specifications the word "RADIOACTIVE". This placard approximately 10 3/4" x 10 3/4" will be placed on the vehicle only when the vehicle is transporting or storing radioactive materials.

The placard is black lettering on a safety yellow background. It is clearly understood that this placard will not be displayed if the vehicle is not carrying or storing radioactive materials.

- c. All containers carrying or storing or used for transporting radioactive materials will bear a tag with the identification of the radioactive material, the quantity of the radioactive materials and the date that the radioactive material was that particular quantity. The tag will also state "Caution-Radioactive Materials."

VI. Records Management

- a. Personnel exposure records - film badge and dosimeter reports - will be maintained in a separate file along with proper quarterly reports on each person using radioactive materials.
- b. Leak Test records will indicate leak testing at s x month intervals.
- c. Utilization Log - This log will contain the master file on the radioactive source received and the distribution of each such shipment. This master file will be maintained at the facility.
- d. Receipt and transfer records will be maintained in files to show at all times where material is to be located or if it is disposed of.
- e. Survey records which include building or storage areas surveys on a quarterly basis will be maintained in a file. These surveys will reflect in milliroentgens.
- f. Vehicle surveys will be conducted before and after jobs and these surveys will be maintained in a file.
- g. Surveys will be conducted by monitoring a well bore at the surface prior to use of radioactive source and remonitoring the well bore upon completion of the work. These numbers will be recorded. A survey meter will be used for the monitoring process. Records of this survey performed on each job will be maintained in a file.

VII. Procedures for Transporting Radioactive Sealed Source.

- a. Radioactive Materials may be transported by company vehicle or private vehicle provided the vehicle is marked properly and the material transported is properly packaged and marked. An identification will be on each container transported and the vehicle will be placarded with the proper D.O.T. markings.
- b. The vehicle transporting the radioactive source will be clearly placarded with a 10 3/4" x 10 3/4", diamond shaped sign with black letters that read "RADIOACTIVE".

It is clearly understood that signs will be removed when vehicle does not transport radioactive materials.

APPENDIX B

- I. Procedures for Storage
 - a. Storage
 - b. Transport
- II. Procedures for Use of Radioactive Source
- III. Radiation Surveys
- IV. Leak Test Procedures
- V. Procedures for Lost Source Downhole
- VI. Emergency Procedures
- VII. Safety Curve for AmBe Source

APPENDIX B

I. Procedures for Storing Sealed Source

a. Storage

Radioactive source will be locked in its shield and kept in a locked storage, truck compartment, or chained and locked to an integral part of the truck when not in use.

Storage facilities will be so that no person in an uncontrolled area can receive more than 2 mR in any one hour or more than 100 mR in any seven consecutive days.

(1) Surface Storage

- (a) Sources are placed and locked inside steel box in their transport shields.
- (b) Maximum reading on contact, 2 mR or less. If higher reading, a fenced perimeter will be established at the 2 mR level.

(2) Posting

All storage areas must be posted "Caution-Radioactive Materials". on surface storage, the posting "Caution Radiation Area" must be on four sides.

- b. Radioactive material source used will be stored in its shielded transport container. It will be removed from surface storage and placed on vehicle, in lock type transport cases and will be fastened to an integral part of the vehicle. Vehicle will then be placarded with D.O.T. specification "RADIOACTIVE" signs on all four sides.

II. Procedure for Use of Radioactive Source

Company personnel directly in charge of logging operations utilizing radioactive source are responsible for the health protection of all personnel associated with the source and the general public who may be associated at all times. The above personnel (company) must personally supervise all source handling operations, transportation, storage and shipping according to the following regulations.

- (1) Company personnel who have been trained in handling sealed sources shall be the only ones who perform operations involving the source. All customer personnel shall be required to be remote to these operations.
- (2) Only the company approved handling tool will be used.
- (3) All sources are to be transported in the approved and locked source shipping containers.

- (4) Using the remote handling tools the source is removed from the shipping or transport container. The source is attached to the logging tool and placed inside of the well. When logging operation is finished the driller will return source to surface, the logging operator will remove tool from well, utilizing remote handling tool, the source will be removed from the tool and placed back into the storage container. The time-distance factors must be used effectively when working with radioactive sources to keep exposure to a minimum. When utilizing the remote handling tools a safe distance is provided but care and practice are needed to decrease the handling exposure time.

III. Radiation Surveys

- (1) Surface storage - Remove and place source in vehicle in locked storage. Survey of vehicle will be made with portable low-level survey meter. It will be surveyed ON ALL 4 sides before and after jobs and recorded on job log sheet.

Arrival at well site-using low level survey meter, monitor the area before commencing job. Record on sketch of area. After job is finished remonitor area to determine there is no contamination around well site. Record on Job Log Sheet. After arriving at storage site monitor vehicle to show free of contamination.

The following handling equipment will be present and used on well sites: Gloves and handling tools.

IV. Leak Test Procedures

Wipe test on source will be performed at intervals not exceeding six months.

Source will be wipe tested with Gulf Nuclear, Inc. Model LTK-1 Leak Test Kit. (Procedures enclosed with Test Kit)

Leak Test kits will be mailed to Gulf Nuclear, Inc. at Houston, Texas for counting.

Reports will be sent back to licensee with leak test certificate.

V. Procedure for Lost Source Downhole

- (1) When a source is lost notification will be given to owner or his representative that a source is stuck in the well. A drawing of source and housing model will be furnished prior to start of fishing operations to show the quantity, type of radioactive material and the mechanical construction of the capsule and tool involved.

The State Radiation Control Agency involved and the U.S. Nuclear Regulatory Commission will be notified that the source has been lost and will be kept informed of the progress toward recovery of the source.

- (2) Client-to be notified.
- (3) Dosimeters will be furnished to all rig personnel and company personnel. The owner will be advised that these are for their protection and intended primarily for a record of trivial or no exposures to his employees.
- (4) During the critical fishing operations the mud being circulated will be monitored with survey meter.
- (5) Where practical everyone except the driller and enough personnel to cover the hole will remain in the area. All handling of the drilling rig equipment will be handled by the customer and actual handling of the source will be done by the licensee.

VI. 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, are used as a guide for the procedures. These procedures are general and any specific emergency would certainly involve additional procedures not covered in the outline.

(1) 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, notification of the investigating officer, and Radiation Safety Officer at the home office should be notified immediately, making sure that the area is not left unattended. This will enable the Radiation Safety Officer to notify the proper governmental agency.

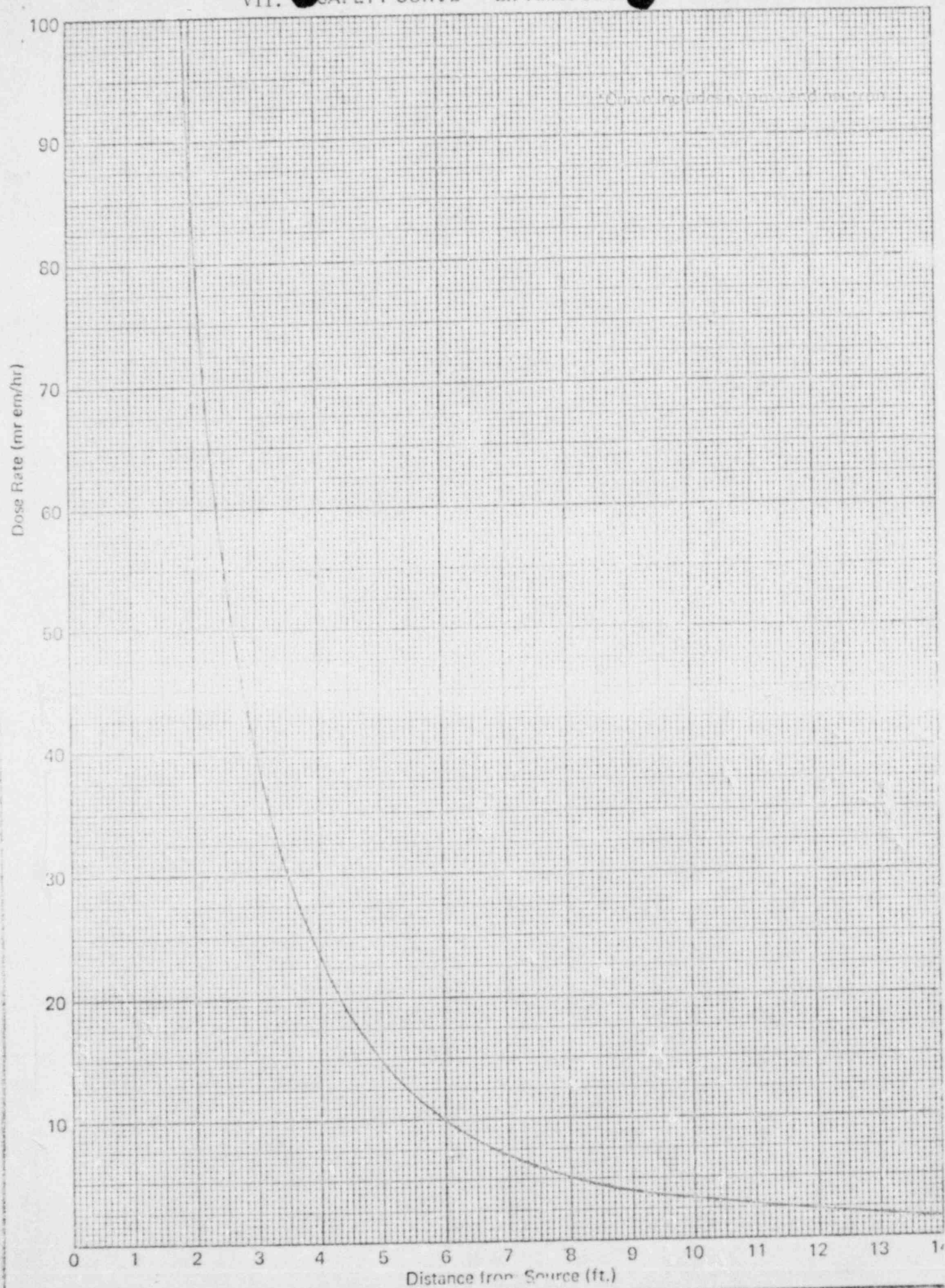
(2) Fire and Other Emergencies

- (a) Notify all personnel in the area immediately
- (b) Attempt to put out all fires if a radiation hazard is not immediately present
- (c) Notify the fire department
- (d) Notify the Radiation Safety Officer
- (e) The Radiation Safety Officer will set up restrictions governing the fire fighting and other emergency activities
- (f) Following the emergency, monitor the area and ascertain the emergency devices necessary for safe decontamination.
- (g) Decontaminate
- (h) The Radiation Safety Officer will have to approve the area before work can resume
- (i) Monitor all persons involved in combating the emergency
- (j) Prepare a complete history of the accident and report to the Radiation Safety Officer who will in turn report it to the proper State Agency.

(3) Leaking Source

- (a) If a source is leaking which the logging tool would indicate, shut the operations down.
- (b) Notify contractor and immediately call the Radiation Safety Officer for instructions.
- (c) Set up control procedures for keeping personnel out of the immediate area until instructions are received from the Radiation Safety Officer.

VII. SAFETY CURVE* - 2.7 AmBe SOURCE



RADIOACTIVE SOURCE STORAGE RECORD

Location: _____ Truck Number: _____ Month of _____ 19____

Removal of Sealed Source from Storage

[illegible]

DATE _____

COMPANY _____

WELL _____

FIELD _____

COUNTY _____ STATE _____

LEGAL DESCRIPTION _____

SOURCE NUMBER _____

Truck Survey before and after job in mR/hr

Before

Cab
Control Room

Front _____
Rear _____
Left _____
Right _____
Cab _____
Control Room _____

After

Cab
Control Room

Front _____
Rear _____
Left _____
Right _____
Cab _____
Control Room _____

ES Audio

Area Survey before and after job in mR/hr

Before

0

After

0

Survey Meter Identification

MODEL NO. _____

SERIAL NO. _____

MANUFACTURER _____

OPERATOR

APPENDIX C

PROCEDURES FOR LOST SOURCE DOWNHOLE

- A. Decision on Recovery of a Source
- B. The Company's Responsibilities
- C. Recovery or Abandonment of a Source
- D. Summary

APPENDIX C

This area is an expansion of part V of Appendix B.

A. Factors influencing the decision on recovery of a source when stuck in an oil well.

1. Cost of the tool versus best estimate of minimum cost and probable maximum cost of recovery.
2. The risk of sticking a drill stem and fishing tools, especially if all zones of interest are above the tool.
3. Interference of the tool with potential production and deeper drilling.
4. Value of clearing the hole for additional logs.

B. When a radioactive source is associated with stuck equipment, the Company becomes more actively involved. Our responsibilities are:

1. Remain in contact with the client and offer our best advice and recommendations regarding safe fishing procedures.
2. Take care to recognize the possibility that a fishing procedure might damage a source capsule.
3. Notify the Nuclear Regulatory Commission or State if it becomes apparent that it be desirable to or advisable to abandon the source in the well.

C. The introduction of the regulatory agencies does not alter the main objectives: to recover the source intact or abandon it in such a way as to protect personnel and property in the future.

1. If abandonment of a source appears imminent, the Company notifies the Nuclear Regulatory Commission and State by telephone. We then attempt to determine which line of action is to the best interest of all concerned, what the client wishes to and can reasonably do, and to present a packaged proposal to the agencies for final approval or further recommendations.

2. Abandonment of a source in a dry hole is simple. All records, including those of the state agency issuing permits for or controlling the drilling of oil and gas wells, should contain information regarding the depth, date, type and quantity of radioactive materials. The well head, if left above the surface, should contain the same information on an engraved durable metal placard.
3. 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 (Figure 1). 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 (Figure 2).
4. In questionable cases the life of the capsule and the solubility of radioactive materials might influence the acceptance of the proposal. (The Company's 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).
5. 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 (Figure 3). 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.
6. In the event a source is left in a producing zone it should be cemented in place if possible. Extreme caution should be used in side tracking to avoid reentering the original hole and damaging the source container (Figure 4). 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 original hole 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.

A gamma-ray source abandoned in a well cannot "induce" radioactivity in gas, oil, water, or other materials. For all practical purposes the same may be said of 3 curie, 5 curie and 20 curie AmBe neutron sources. Although neutron flux at one foot from a 3 curie, 5 curie or 20 curie source is negligible in this respect. For example, the flux in a reactor used to activate a cobalt-60 "Pip" tag to 10 microcuries is hundreds of millions times greater than that at one foot from a 5 curie source. Although it is not precisely correct to say that there is no activation, induced radioactivity would be almost immeasurable initially and through decay would be totally obscured by natural background radiation long before the material reached the surface.

D. Summary

1. All precautions should be taken to avoid rupture of a radioactive source during fishing operation. Although each source has been individually pressure tested to 25,000 psi, it is small and will not withstand milling, drilling, or pounding fishing operations.
2. A radioactive source which is intact may be safely abandoned in the well. The decision as to whether to abandon a tool with a source would be based on the accepted considerations for abandoning any other type tool. Added guidelines are the safety aspect, the proper placarding of the well and entering the information in the well records.
3. There should be no costly delay in obtaining approval to abandon a radioactive source in as much as the Company keeps the agencies well advised of the progress of the fishing operations as events develop.

4. Responsibility for notifying the regulatory agencies and making all reports is the Company's.
5. It is the client's responsibility to deal with the State agencies issuing permits for drilling oil and gas wells and to furnish that agency with any information which may be required.

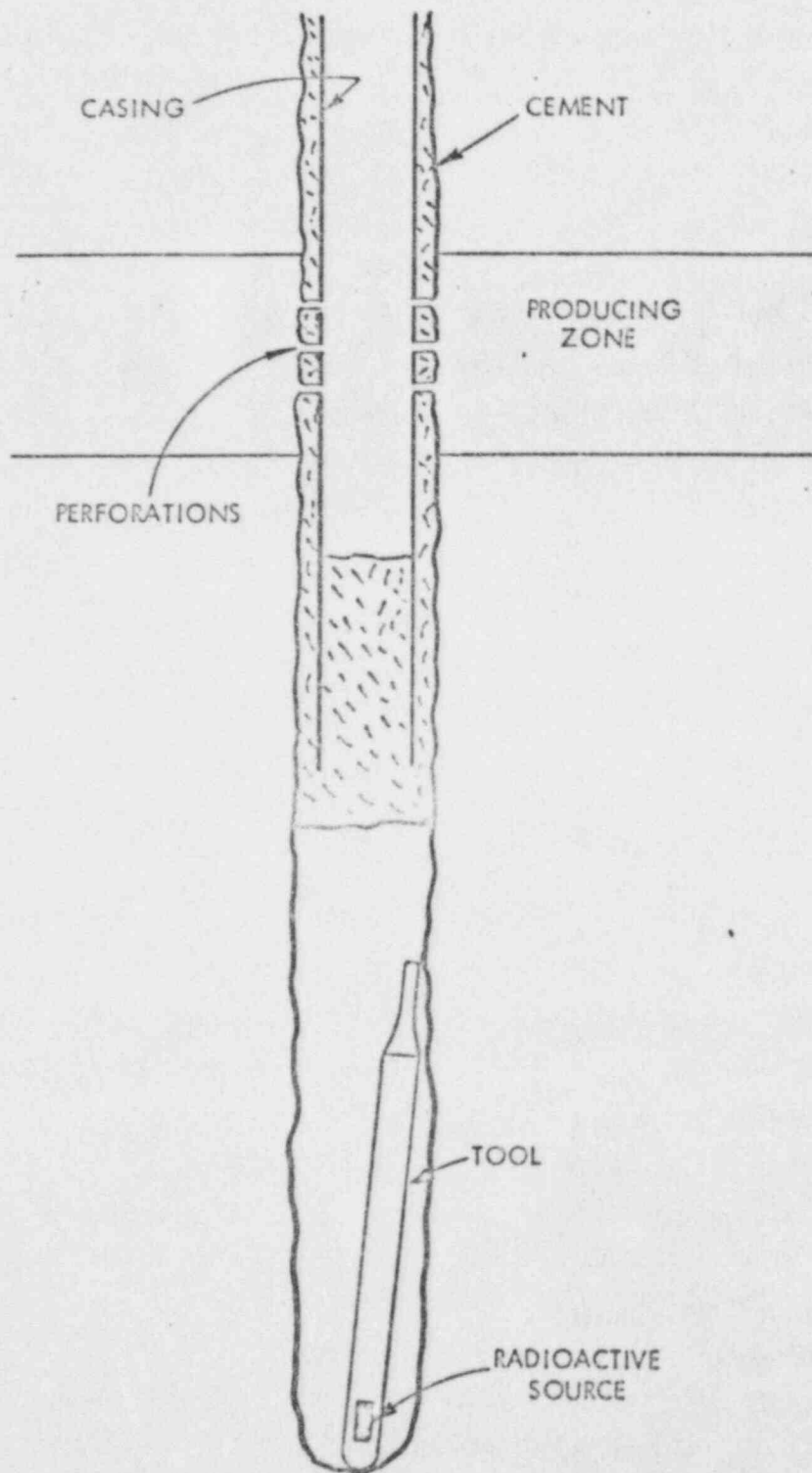


FIG. 1

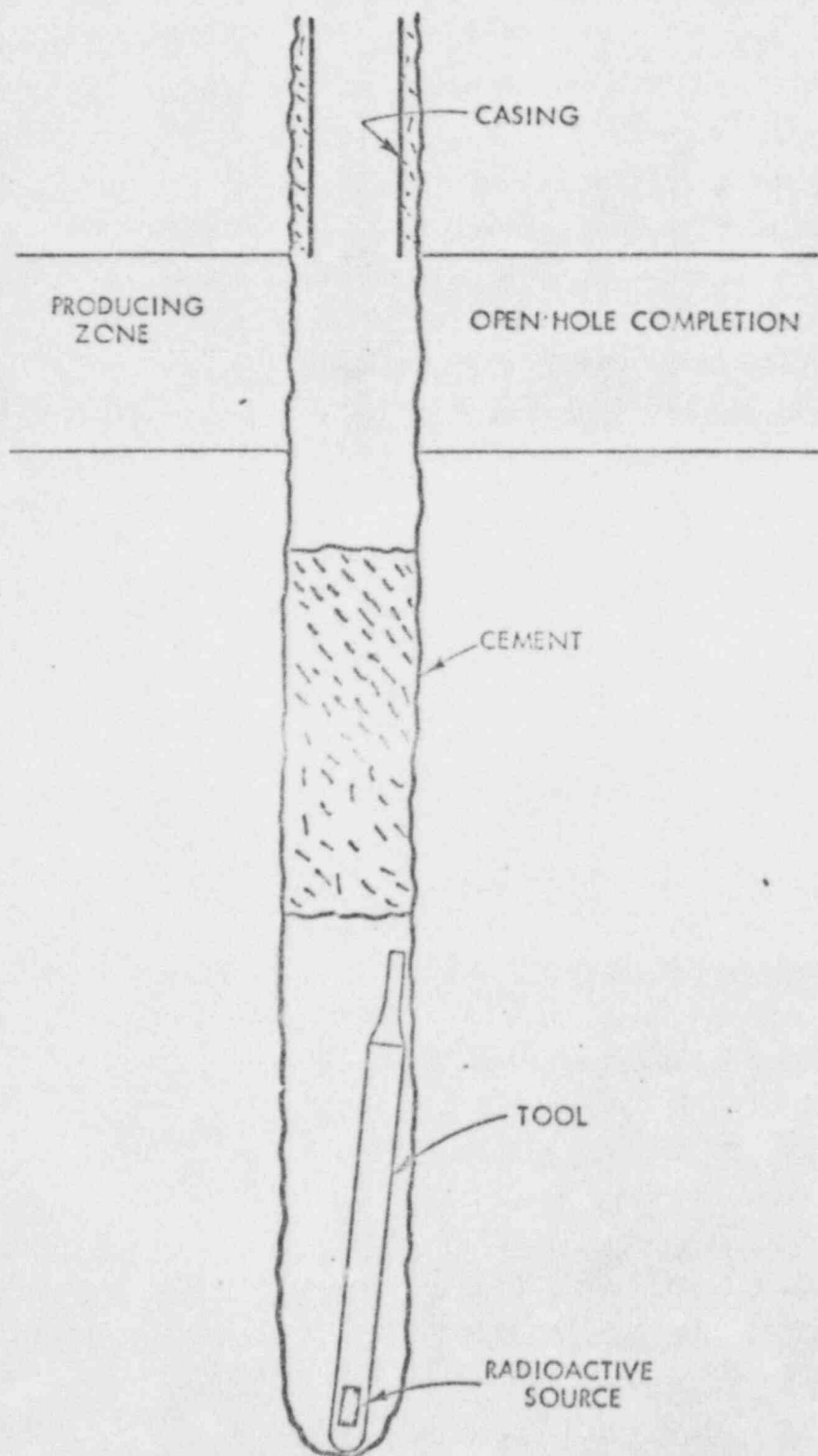


FIG. 2

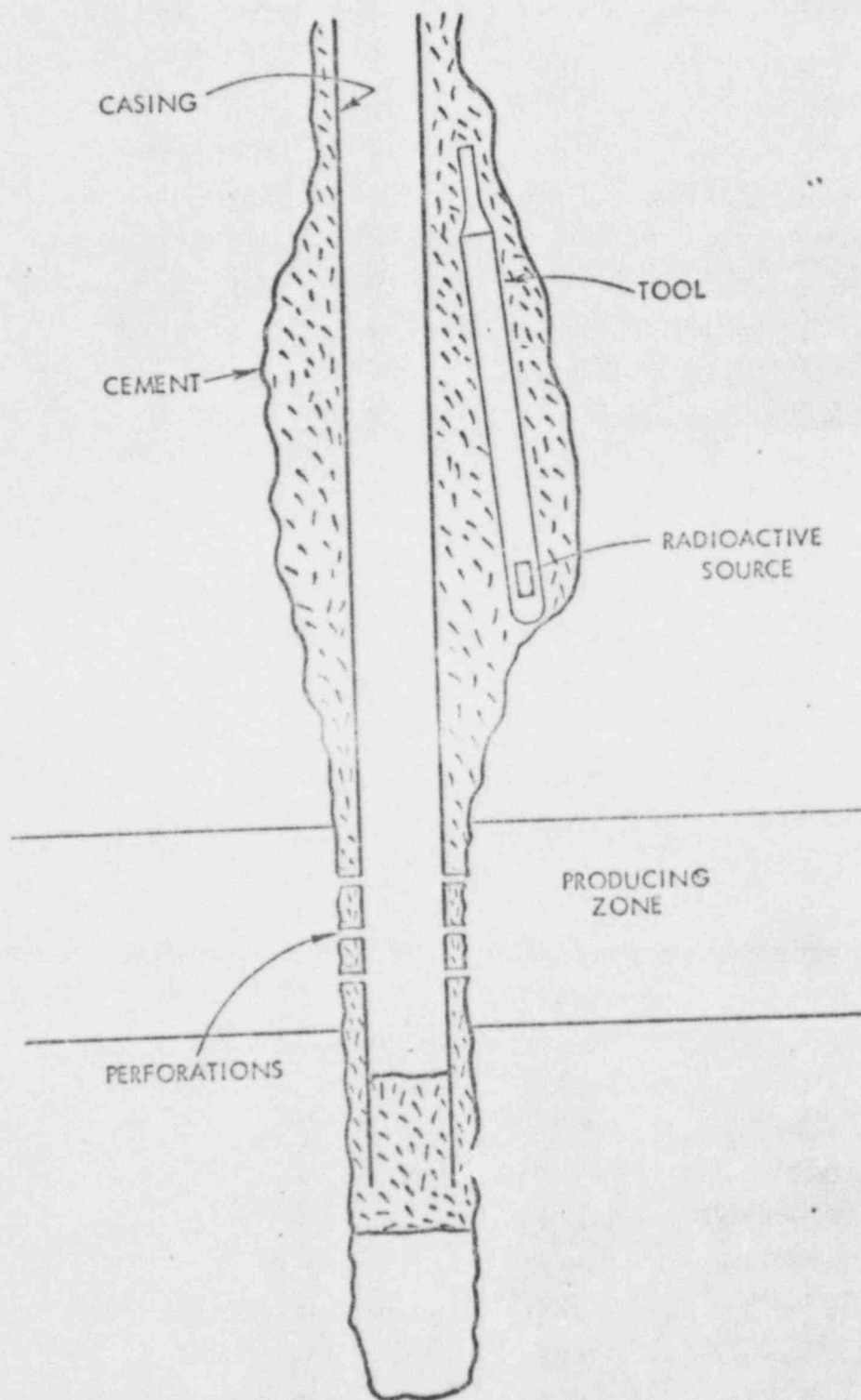


FIG. 3

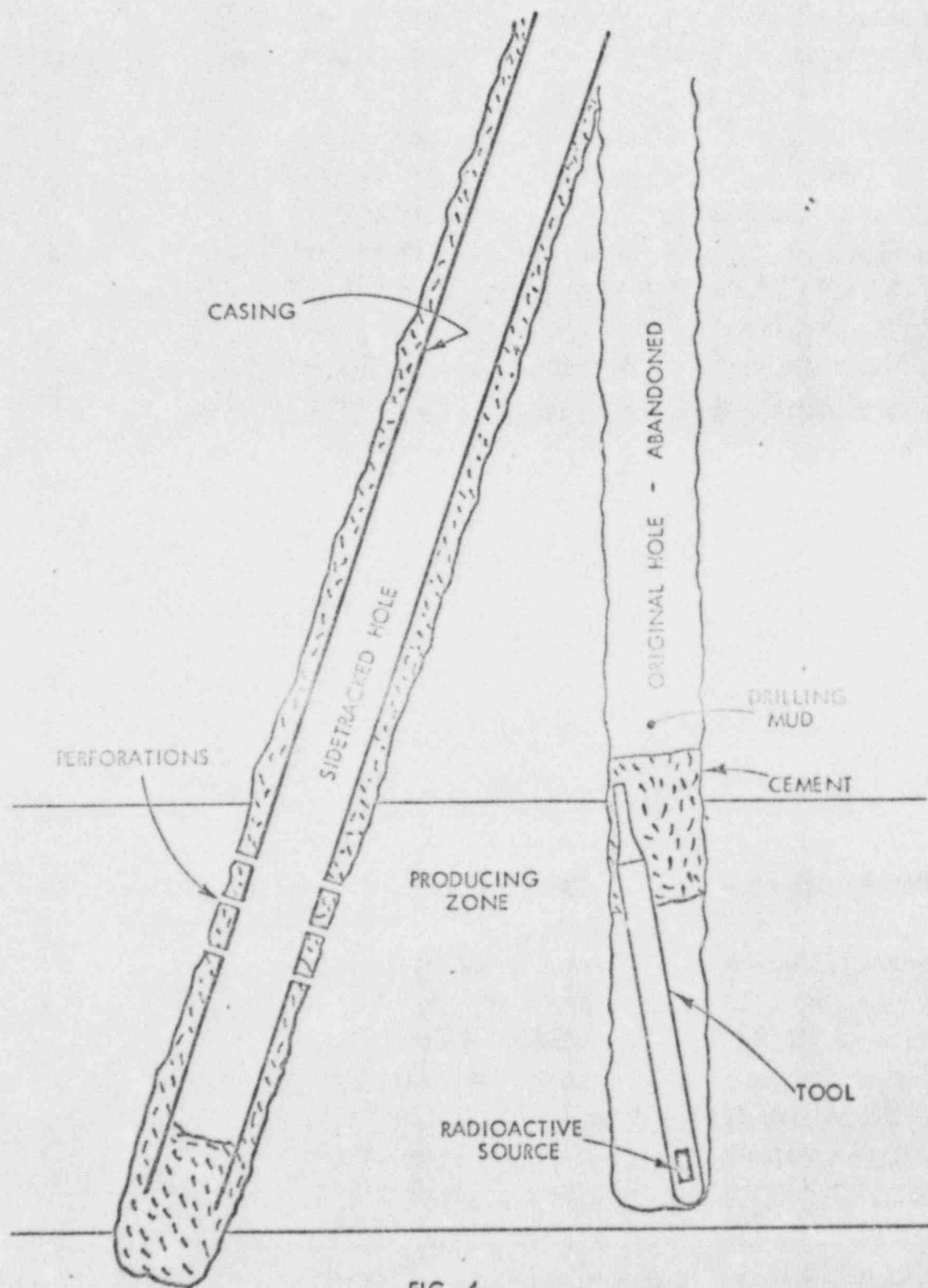


FIG. 4

BARRIE G. IBSEN

16. FORMAL TRAINING IN RADIATION SAFETY.

- a.
 - b.
 - c.
 - d.
- } Schlumberger of Canada

17. EXPERIENCE.

June 1, 1969 to Sept. 12, 1969

JFE-Junior Field Engineer. (Schlumberger of Canada)

- All associated training and schools for training engineers.
- Handling Cs 137 Density Logging Source (high energy gamma-ray) (3 curie).
- Handling AmBe SNP Logging Source (high energy neutron) (5 curie).

Sept. 12, 1969 to June 1, 1970

FE- Field Engineer. (Schlumberger of Canada)

- Handling Cs 137 Density Source (3 curie).
- Handling AmBe SNP Source (5 curie).

June 1, 1970 to Dec. 1, 1970

SFE-Senior Field Engineer. (Schlumberger of Canada)

- Handling Cs 137 Density Source (3 curie).
- Handling AmBe SNP Source (5 curie).

Dec. 1, 1970 to October 1, 1973

SFE-Senior Field Engineer. (Schlumberger of Canada)

- Handling Cs 137 Density Source (3 curie).
- Handling AmBe SNP Source (5 curie).
- Handling AmBe CNL Source (20 curie).

April 7, 1975 to Jan. 7, 1978

Regional Operations Manager---GO Wireline Services, Denver, Co.

---Supervisor of all open-hole logging in Rocky Mountain Division.

---Responsible for training and direct supervision of all personnel handling radioactive sources listed below.

- Cs 137 Density Source (3 curie)
- AmBe CNL Source (20 curie)
- AmBe SNP Source (5 curie)

07756

PAUL DEKAYE

16. FORMAL TRAINING IN RADIATION SAFETY.

a.

b.

c.

d.

Gulf Nuclear School of Radiation Safety for Well Logging

17. EXPERIENCE.

Worked for Jetco Wireline for six months at which a three Curie
AmBe Source is being used.

Certificate

This certificate indicates that PAUL DeKAYE
has satisfactorily completed an instruction and handling training course for Radiation
Safety for oil well logging.

MARCH 11, 1981

Date

Gulf Nuclear, Inc.
Houston, Texas

Frank Malik

Instructor

Walter P. Peoples, Jr.

Walter P. Peoples, Jr.
President