

UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS—Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Materials Branch, Directorate of Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20, and the license fee provisions of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in Item 16 and the appropriate fee enclosed. (See Note in Instruction Sheet).

1. (a) NAME AND STREET ADDRESS OF APPLICANT (Institution, firm, hospital person, etc. Include ZIP Code and telephone number.)		b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1(a). Include ZIP Code.)	
Great Guns, Inc. 123 So. Price Hominy, Okla. 74035 918-885-6025		Great Guns, Inc. 715 West Main Henryetta, Okla. 74437 918-652-2341 L & L 19213 30-17148 03110 SAME	
2. DEPARTMENT TO USE BYPRODUCT MATERIAL neutron logging in oil or gas wells cement top logging in oil or gas wells bulk density logging in oil or gas wells tracer studies in oil or gas wells		3. PREVIOUS LICENSE NUMBER(S) (If this is an application for renewal of a license, please indicate and give number.) NONE 2. cont. logging instrument calibration sources	
4. INDIVIDUAL USER(S) (Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.) O.C. Lamascus, Don Cole, Jerry Fisher, Dean Leiker, William Seckler, Dan Rathbun, James Cupp.		5. RADIATION PROTECTION OFFICER. (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.) O.C. Lamascus, Radiation Protection Officer of the Company, Jerry Fisher, Radiation Protection Officer of the Hominy Station, Don Cole, Radiation Protection Officer of the Henryetta Station.	
6. (a) BYPRODUCT MATERIAL (Elements and mass number of each.) Americium 241 Cesium 137		b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.) One source not to exceed 3 curies each. Three Sources not to exceed 2 curies each.	

Applicant... 8947
Check No... 460(5A)
Amount/Fee Category... APPLICATION
Type of fee...
Date Check... NOV 2 1979
Received By... Brown

RECEIVED BY LFMB
Date NOV 21 1979
Log NOV PG 5 N.L.
By Brown
Orig To
Action Compl 11/21/79

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (If byproduct material is for human use, supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)

Sources are stored in down hole casing cemented to the ground seven feet below the ground when not in use. Locked of course. #15201103 storage assembly from Gearhart Owen is mounted in the truck permanently when in use. DOT 55-127 is used for the Density Sources and DOT 7-A is used for the neutron source.

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	P.G.A.C., Pauls Valley, Okla. GO Jet Services, Inc. Pauls Valley, Okla.		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	GO International, Okla. City, Shawnee, Hominy Precision Logging and Perforating Dresser Atlas, Mayfield Payne, Okla. Wireline		Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity	Tracer Lab., Midland, Texas Great Guns, Hays, Kansas		Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
AmBe	3 ci	P.G.A.C. GO Jet Services GO International Precision logging and perf. Dresser Atlas, Mayfield Payne, Okla. Wireline, Great Guns, Tracer Lab.	3 years 7 years 7 years 3 years	Oil Well Logging Oil Well Tracer

10. RADIATION DETECTION INSTRUMENTS (Use supplemental sheets if necessary)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
EON Models by Eon Corp. Brooklyn, N.Y. C.D. V 700	2	Beta Gamma 0 to 0.5		—	Monitoring and Surveying

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE

Using Cesium 137 Calibration. Send to Tracer Laboratory, Midland, Texas.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED (For film badges, specify method of calibrating and processing, or name of supplier)

ICN Dosimetry Service, Cleveland, Ohio

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No

14. RADIATION PROTECTION PROGRAM Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

Send leak tests to ICN Pharmaceuticals, Inc., Irvine, California

15. WASTE DISPOSAL If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

Send back to Tracer Lab., Midland

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

License Fee Category \$ 460.00

Fee Enclosed \$ 460.00

Date November 9, 1979

Great Guns, Inc.

Applicant named in item 1

By:

G.D. Davis, President

Title of certifying official

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.

GREAT GUNS, INC.
 123 SO. PRICE
 HOMINY, OKLAHOMA 74035
 918-885-6025

N

— MR/HR

30'

SHOP

— MR/HR

OFFICE

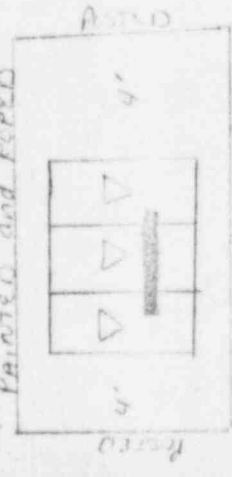
— MR/HR

45'

E

W

RIP AREA LOCKED, POSTED
 PAINTED and POSTED



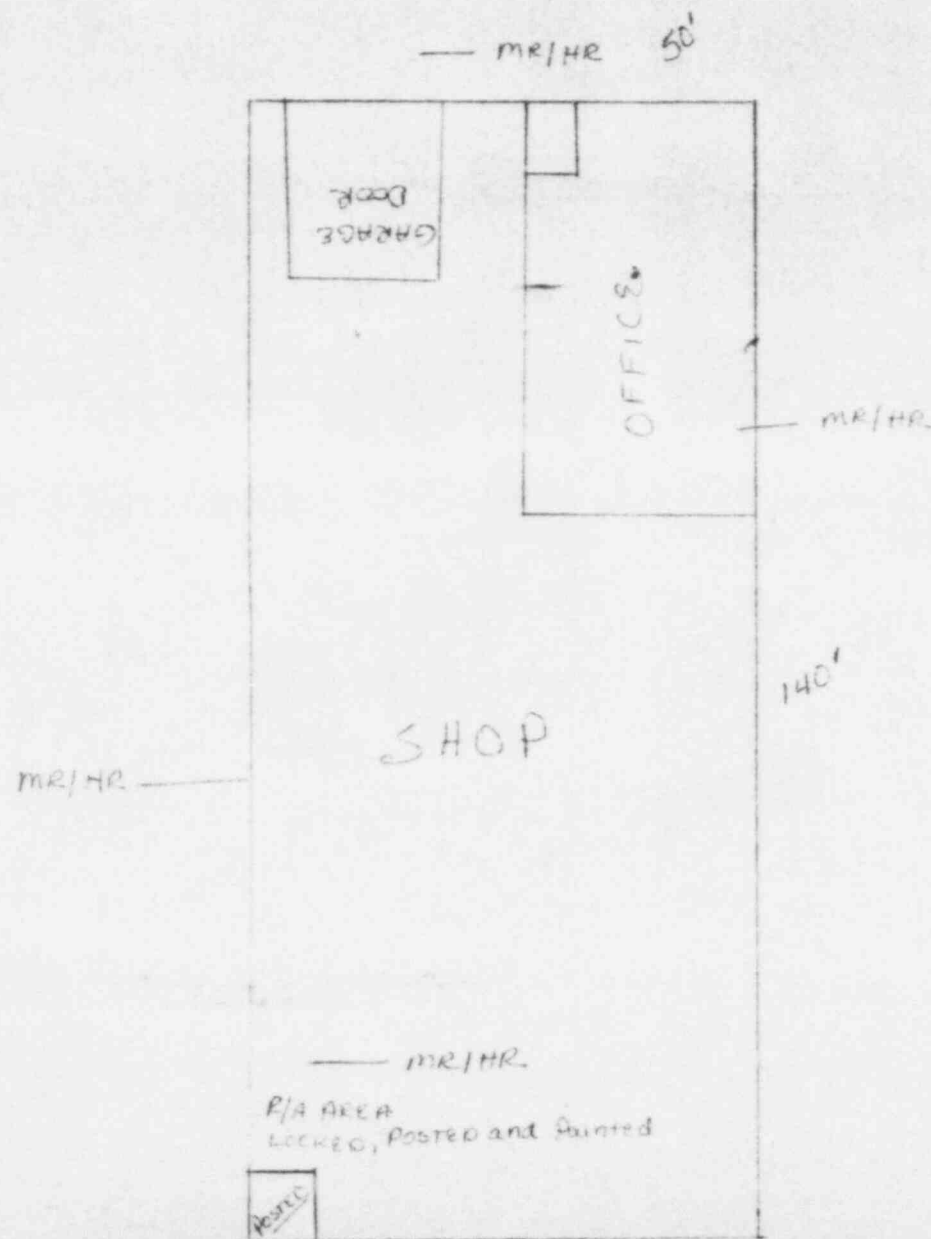
— MR/HR

— MR/HR 21'

S

GREAT GUNS, INC.
715 WEST MAIN
HENRYETTA, OKLAHOMA 74437
918-652-2341

01835



Tracer Laboratory of Midland, Inc.

This is to certify that

DON E. COLE

has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.

10-26-79

Date

Don E. Cole
Instructor

Tracer Laboratory of Midland, Inc.

This is to certify that

GERALD L. FISHER

**has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.**

10-26-79

Date

Robert D. Hill

Instructor

Tracer Laboratory of Midland, Inc.

This is to certify that

WILLIAM SECKLER

has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.

10-26-79

Date

Robert L. Deil
Instructor

Tracer Laboratory of Midland, Inc.

This is to certify that

JAMES F. CUPP

**has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.**

10-26-79

Date

Donald L. Diet
Instructor

Tracer Laboratory of Midland, Inc.

This is to certify that

DAN RATHBURN

has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.

10-26-79

Date

James L. Hill

Instructor

Tracer Laboratory of Midland, Inc.

This is to certify that

OC LAMASCUS

has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.

10-26-79

Date

R. L. Dier
Instructor

Tracer Laboratory of Midland, Inc.

This is to certify that

DEAN W. LEIKER

has on this date successfully completed training
in Radiation Health Physics and
Tracer Industrial Isotopes.

10-26-79

Date

Robert L. Dill
Instructor

HEALTH PHYSICS MANUAL
FOR
GREAT GUNS

OPERATIONS AND PROCEDURES

01835

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OPERATIONS AND PROCEDURES

1. No employee will be authorized to order or handle R.A. material other than those listed on the Radioactive Material License. Material will be transported to the well site location in ready to use form from storage facility in a shipping container furnished by Tracer Laboratory. Material will be carried in the extreme back of the logging unit which will be properly marked in accordance with DOT regulations. The Four(4) Radiation signs on the truck will be of the type mounted to truck. The storage container on truck will be kept locked.

Radioactive material will be opened on location and loaded into the ejector tools, which will then be lowered into the bore hole for surveying. After the surveying has been completed the ejector will be cycled through, leaving the remaining R.A. material in the bore hole. Any remaining R.A. material or waste, such as rags, disposable gloves, etc., will be transported back to storage facility and placed in the storage room, which is posted. Film badges will be worn by the logging engineers. Logging engineers will do all the handling, surveying, servicing, storing of R.A. material and waste.

Duties of Radiation Safety Officer are as follows:

- a.) Verification of all purchases of R.A. materials and possession limits.
- b.) In charge of all records such as personnel exposure records, logs of source and material usage, survey records, or waste disposal records
- c.) Record kept up on leak testing of source and calibration of survey meters.
- d.) Responsible for operation, emergency procedures and assistance in personnel training and orientation.
- e.) Maintenance of supplies such as radiation survey meters, radiation signs, labels, and warning items.
- f.) Conduct radiation safety audits of licensed activities periodically to assure compliance with the regulations and license conditions.

RSO will also is responsible for commission regulations and company requirements and procedures, training, safety, and most experience in company operations with the use of R.A. Materials.

OPER. & PROCED. CONT.

2. Enclosed is form #1A R.A., that will be filled out during and after each job. This form will be filled out and filed and made available at all times in the office. The forms includes: Date, isotope used, type of use, and volume used. The form will be signed by a licensed person in charge of each job.

The receipt or invoice number from the supplier will also be on the form. After a given supply of Iodine or Iridium has been used, the suppliers invoice will be attached to all 1A R.A. forms, applicable to this supply of material.

3. The R.A. material in a ready to use form will be removed from its shipping container at the facility or well site, and loaded into the ejector tool. The ejector tool will be placed over a sheet of plastic with absorbent material on the top of the plastic in case of any spillage. The container of R.A. material will be removed from its shipping container wearing rubber disposable gloves. All waste material will be wrapped in the plastic sheet: gloves, rags, container, etc., The materials will be transported back to our facility storage room at the end of a work project, which will consists of 24 hours or less.

The ejector tool will be emptied into the well bore and cycled through in order to clean it. After the equipment has been rigged down, cleaned and all R.A. waste material stored. The well site, truck, and personnel will be monitored and the readings recorded on R.A. form #1A R.A..

4. Forms 1A R.A. and 2 R.A., have been inclosed. This will be the procedures in making surveys in the shop, office areas, work bench, storage room, truck, personnel, and well site. These forms will be kept up to date and on file at all times in our office. Both of these forms will show survey readings of all of the above areas and place for each survey or person monitored. If any one of these areas have contamination, they will be treated as an emergency and cleaned up, as listed in steps in our emergency procedures inclosed in this manual. If at any time a engineer uses more than 50 millicuries in any one week, they will have a bioassay and thyroid checked, by the company's doctor.

Oper. & Proced. Cont.

5. In case R.A. material is spilled, the area will be vacated at once. The licensed operator will put on protective clothing, rubber gloves and using handling tongs will up right the container, absorbent material will be placed around container and on area of spill. If any personnel have been contaminated, steps will be taken to decontaminate them at once. If any clothing has been contaminated, it will be discarded immediately. In case R.A. Material has been spilled on the skin, it will be flushed thoroughly with soap and water. Should the spill be inside the shop area, everything will be stopped and cleared of personnel. This area will be decontaminated and the radiation protection office will be advised as soon as possible. This area will be surveyed and made sure it is safe before work is resumed. All waste involved in decontaminating the area and contaminated clothing will be transferred to Tracer Laboratory, Our supplier for disposal. If the radiation protection office feels any personnel in the area have been over exposed, they will report it to the company doctor at once for a blood and thyroid test.

6. Precautions that will be taken to insure R.A. material will not be released into fresh water zones:

Iodine 131 will only be ejected opposite the producing horizon or only a few feet above, to check for channeling behind the casing. If a channel is detected in the fresh water zone, we will cease ejecting iodine and relate the information to customer or operator of the well in a log form with a written conclusion on the bottom of the log.

Iodine 131 will not be ejected above 2000 feet, which is well below any fresh water zones in our operational area.

7. A minimum amount of time will be used while handling R.A. material, no time will be spent near R.A. Material except, for mandatory purposed, loading ejectors, and etc..

R.A. material transported to location will be at the furthest most point from driver, in a locked box on rear of truck, as shown on diagram 1A R.A. R.A. material storage facilities are located at a maximum distance from the shop and other inhabited buildings, as shown on diagram 2A R.A.

OPERATIONS & PROCEDURES CONT;

8. In the event of a vehicle accident:
 - a. Clear area of all people.
 - b. If liquid material is spilled, upright the container, with gloves and protective clothing.
 - c. Rope off the contaminated area and keep people away
 - d. Check all personnel involved in the accident with survey meter and record readings on each.
 - e. Notify radiation safety officer.
 - f. Take proper steps to decontaminate people involve.
 - g. Take steps to decontaminate vehicle and area.'
 - h. Surveys and wipe tests will be taken of the area
 - i. Notify Health Department as soon as possible and prepare written history of the accident.

Names of Persons and agencies will be listed below in case of accident or emergency.

9. Methods for Establishing, Posting, and Controlling Access to Restricted Areas. The applicant should establish and describe procedures for posting and controlling access to all work areas including laboratory type areas and field sites. When radiation levels are created which exceed 2 mR/hr the applicant should establish and describe methods for controlling access to all operational areas. All unnecessary personnel should be restricted from the areas and the areas should be posted. For example, when radiation levels will exceed 5 mR/hr for an hour or more, "Caution - Radiation Area" signs must be posted, and when radiation levels will exceed 100 mR/hr for an hour or more "Caution - High Radiation Area" signs must be posted.

10. Procedures for Transporting Radioactive Materials. The transport of radioactive materials over public roads by licensees is subject to the regulations of the Department of Transportation. Section 71.5 of the Commission's regulations in 10 CFR Part 71, "Packaging of Radioactive Material For Transport and Transportation of Radioactive Material Under Certain Conditions" requires that DOT regulations be followed for transport of radioactive materials when transport is intrastate. The DOT regulations cover, among other things, radiation levels at package surfaces (not to exceed 10 mR/hr at 3 feet from any surface and 200 mR/hr at the surface of containers); contents, construction, and labeling of packages; placarding of vehicles; and accident reporting.

OPER. & PROCED. CONT.

11. Waste Disposal

Tracer Laboratory of Midland, Inc. Midland, Texas has been contacted to handle all waste and material for disposal. This will be sent to Tracer Laboratory in a DOT regulation container by truck or air cargo. We will keep our waste disposal forms on file at all times at our office.

12. Meter Calibration and Leak Test

- a.) Survey meter calibration will be done every 6 months by Tracer Laboratory with a Cs-137 standard.
- B.) Leak Test will be sent to Tracer Laboratory every 6 month for analysis.

RADIOACTIVE MATERIAL
FORM 1A R. A.

DATE: _____

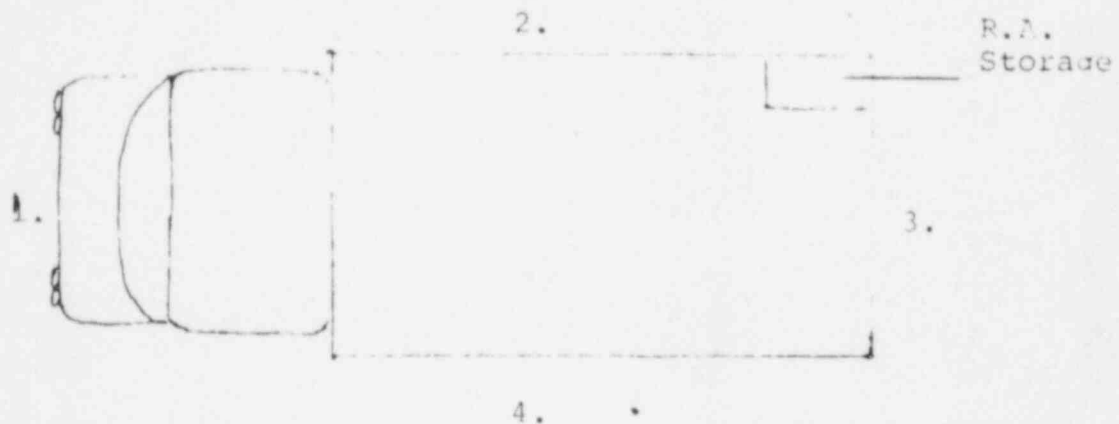
RADIOISOTOPE USED _____

TYPE OF USE _____

VOLUME _____

LICENSED PERSON SIGN HERE: _____

LOCATION USED: _____



SURVEY TRUCK 1. _____ mr

R.A. Storage: _____ mr

2. _____ mr

3. _____ mr

4. _____ mr

PERSONNEL; _____

WELL SITE _____

ATTACHED IS INVOICE OF R.A. MATERIAL FROM SUPPLIER.

GREAT GUNS, INC.

RADIATION SAFETY AND HANDLING PROCEDURES

OCTOBER 31, 1979

PERFORATING LOGGING

RADIATION HANDLING AND SAFETY PROCEDURES

FOR

GREAT GUNS INC.

I. Orientation of new employees.

- A. Briefing during job interview on the presence and hazards of radiation in there up coming job.
- B. Issue a film badge to survey employees radiation exposure.
- C. Demonstrate the proper procedure for inserting and removing sources from their storage pit and transporting to the truck pit.
- D. Demonstrate the proper procedure for inserting and removing radioactive sources from logging tools

II. Training old employees.

- A. Safety meetings held monthly to review handling and safety procedures.
- B. Film badge surveys reviewed monthly to determine employees exposure to radiation.
- C. Review proper procedures for handling tracer materials (sand and particle tracers).
 1. Transporting.
 2. Handling.
 3. Decontaminating an area if a spill does occur.
 4. Use of geiger counter to check decontamination of area.
- D. Emergency procedures if a source is lost or develops a leak.
 1. Proper authorities to notify.
 2. Safety procedures to follow until proper authorities arrive.

A. RADIATION PROGRAM MANAGEMENT AND RESPONSIBILITY.

1. The Radiation Protection Officer is to be designated overall manager for the radiation program.
2. 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, survey, the forming of committees where necessary and in general the administrative procedures for the entire radiation program. The Radiation Protection Officer is Steve Robben.
3. 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 include:
 - a. Site surveys.
 - b. Records, personnel monitoring records and compilation. If an employee has high exposure it is up to the Radiation Safety Officer to notify the employee of such exposure and to keep the employee's exposure down.
 - c. Vehicle survey records.
 - d. Training and qualifying personnel.
 - e. Conducts periodic safety checks to assure the radiation protection program.

The Radiation Safety Officers are Robert Grant and O.C. Lamascus for the company. Randy Wolf, Gary Wooten, Don Cole and Jerry Fisher are for the stations.

B. PERSONAL MONITORING PROCEDURES.

1. A Personnel directly related to activity involving radioactive materials will wear a film badge to monitor Gamma, Neutron and Beta radiations. Film badge records will be quarterly and monitoring will be on a monthly basis.
2. Maximum acceptable dose levels are not to exceed 1.25 Rem per calendar quarter or no more than 5.0 Rem per calendar year.
3. In the event that doses are greater than those listed above then proper notification will be posted with the licensing authority. Also reports of dosages will be maintained on a quarterly basis.

C. STORAGE AND SECURING RADIOACTIVE MATERIAL.

1. Radioactive sources will be locked in the appropriate storage pit when not in immediate use.

Storage facilities are designed 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.

2. Storage pits.

- a. Storage pits are located at both shops in bay. This bay is not to be used for truck maintenance.
- b. Down hole pits for Ambe to RA tracer material are at least 5' deep. Down hole pits for cesium and radium sources are at least 7' deep.
- c. All pits will remain locked when source is in storage. Also shop area will be locked after working hours.

D. POSTING RESTRICTED AREAS AND VEHICLES.

1. All storage areas will be posted with signs reading "Caution Radioactive Material," on all four sides and main entrances of shop will have the same sign.
2. All radioactive material sources used will be stored in their scheduled transport containers. They will be removed from the storage pit and placed on vehicles, either in locked type storage pits or will be chained locked to an integral part of the vehicle. The transporting vehicle will be marked with signs reading "RADIOACTIVE" on all four sides.

E. RECORDS MANAGEMENT.

1. Utilization log--This log will contain the master file on each type of shipment of radioactive material received and the distribution of each such shipment. This master file will be maintained at the facility.
2. 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.
3. Personnel exposure records--Twin pack film badges will be maintained in a separate file along with proper quarterly reports on each person using radioactive materials.

4. Leak test records on all sealed sources will be maintained on each sealed source. These records will indicate leak testing at six month intervals.
5. Survey meters will be calibrated at least once each six months and a record kept of the current calibration certificate.

F. PROCEDURES FOR TRANSPORTING RADIOACTIVE MATERIALS.

1. Radioactive materials will only be transported by company vehicles.
2. The vehicle transporting radioactive materials will be clearly marked with a 6" X 28" safety yellow background with black letters sign that reads "RADIOACTIVE".
3. All radioactive material will be transported in there proper transporting case.

G. PROCEDURES FOR HANDLING TRACER MATERIALS.

1. Tracer materials will only be used in holes that have a string of surface pipe cemented to surface to prevent injection of RA material into fresh water zones.
2. The purpose of tracer logging is to locate channeled areas behind the pipe or to locate the direction of water flow in injection wells.
3. When handling tracer material, rubber gloves will be worn at all times.
4. A survey record will be completed after each job. Showing radiation background before job and after job. This record will be kept on file for inspection.
5. Decontamination procedures and procedures to clean up spills.

The radioactive tracer preparations are down by factors of 50 to 200 below the dangerous levels for external radiation hazards. The major hazard involved with these tracer preparations is the factor of ingestion. The ingestion tolerance is from one part per thousand to one part per ten thousand of the typical activities used. Thus, great care is exercised by company personnel to avoid contamination of hands, clothing and other personal items. Accidental concentrations of radioactive material are cleaned up, dispersed, or disposed of safely.

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

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

Every effort should be made to decontaminate any contaminated area of the body. Scrubbings should be repeated until activity is removed. The same safety precautions shall be applied to the above operations as were applicable for tracer mixing and injections in particular.

1. Rubber gloves shall be worn during decontamination procedures involving personal contact with the equipment.
2. Food, cigarettes, etc. shall be kept outside the cleanup area. Quantities of radioactive material which presents no 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 sewerage system, the dilution of the activity by the sewerage must be such that the tolerance established for such disposal by the AEC and Agreement States are not exceeded.

Since we do not have the capability of assaying the wash water for the concentration of contaminant in microcuries 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 not exceeding tolerances.

If the wash water is discharged into a septic tank, then the surface of the fluid in the septic tank shall be surveyed after each such decontamination operation, and if any activity above background is noted, the tank shall be posted with a radiation warning sign alerting everyone concerned of the possible hazard.

If standard decontamination efforts are unsuccessful, 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 alternatives. They are as follows:

4. If the "fixed" contamination measures less than 0.2 mR/hr at one centimeter, the item of equipment, articles of clothing, etc., can be returned to normal use.
5. 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.
6. 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 inches from the surface.

More persistent activities remaining on injection apparatus, customers equipment, etc., are steam cleaned or chemically treated for contamination.

The user in charge shall be responsible for all contaminated equipment. That is, for any equipment, waste, area, or wash water that falls within the above alternative situations. The user 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. If further decontamination efforts fail. The contaminated materials should be sent to a licensed waste disposal plant.

H. PROCEDURES FOR USE OF RADIOACTIVE SOURCES.

Company personnel directly in charge of logging operations utilizing radioactive sources are responsible for the health protection of all personnel associated with the sources 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 sources. All customer personnel shall be required to be remote to these operations.
2. Only the company approved handling tools will be used.
3. All sources are to be transported in the approved and locked source shipping containers.
4. Our standard neutron logging source assembly encloses a 3.0 curie Americium-241 Beryllium neutron source. A dose rate of approximately 48-54 mr/hr. (neutron and gamma) is present at one meter from the unshielded source.
5. 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 tools, 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.

6. Any sources that you are not familiar with, in handling and usage, contact the Radioactive Safety Officer before before using them in a logging job.
7. Remove storage or transport container from bunker. With portable low-level survey meter, take reading at six inches from source. Record on radioactive contamination inspection data sheet. Place source in vehicle in secure position. (Locked containment) Survey vehicle on all four sides. Record on radioactive contamination inspection data sheet.
8. Arrival at well site-using low level survey meter, monitor the area before commencing job. Record on sketch of area. After job is finished re-monitor area to determine there is no contamination ground well site. Record on radioactive contamination inspection data sheet. After arriving at storage site monitor vehicle to show free of contamination.

I. LEAK TEST PROCEDURES.

1. Wipe tests on all sources must be performed at intervals not exceeding six months.
2. Source will be wipe tested with ICN Pharmaceuticals Service Company. Model LTK-1 Leak Test Kit. (Procedures enclosed)
3. Leak test kits will be mailed to ICN Pharmaceuticals Service in Irvine, California. for counting.
4. Reports will be sent back to licensee with leak test certificate.

J. 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 this 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. Procedure for Lost Source Downhole

- a. When a source is lost, notify the well owner or his representative that a source is stuck in the well. As soon thereafter as possible hand him a drawing of the source and housing model. This will enable him to know before he starts the fishing operation the quantity, type of radioactive material and the mechanical construction of the capsule and tool involved.
- b. Immediately notify the State Radiation Control Agency involved that the source has been lost and keep them informed of the progress toward recovery of the source.
- c. Client-to be notified.
- d. 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 not.
- e. During the critical fishing operations the mud being circulated should be monitored using gamma ray equipment with the downhole tool in the mud.
- f. You have only time and distance factors available to reduce the radiation field and personnel exposure while the source is being fished out. Where practical everyone except the driller and enough personnel to cover the hole should remain in the area. All handling of the drilling rig equipment should be handled by the customer and actual handling of the source should be done by the Radiation Safety Officer or one of his qualified designees.

3. Fires.

- a. Notify all personnel in the area immediately.
- b. Attempt to put out all fires if a radiation hazard.
- 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.

4. Leaking Source.

- a. If a source is leaking which the logging tool would indicate, shut the operations down.
- b. Notify contractor and immediately call 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.