KERR-McGEE NUCLEAR CORPORATION
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

May 17, 1979

REGISTERED MAIL

License Management Branch
Division of Fuel Cycle and Material Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Docket 40-8006

Dear Sir:

The Kerr-McGee Corporation desires to renew its license No. SUB-986. Enclosed please find our renewal application and our remittance of $70.00 for the fee required by 10 CFR 170.

If you have any questions regarding this application, please contact me.

Very truly yours,

W. J. Shelley, Director
Regulation & Control

WJS:ts

FORM NRC-2
(7-77)
10 CFR 40

Approved by GAO
R0203

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one)
- ☐ (a) New license
- ☐ (b) Amendment to License No. _____
- ☒ (c) Renewal of License No. SUB-986
- ☐ (d) Previous License No. _____

2. NAME OF APPLICANT
Kerr-McGee Corporation

3. PRINCIPAL BUSINESS ADDRESS
Kerr-McGee Center
Oklahoma City, Oklahoma 73125

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Technical Center, Kerr-McGee Corporation, 3301 N.W. 150 Street, Oklahoma City, OK

5. NAME OF PERSON TO BE CONTACTED CONCERNING THIS APPLICATION
Wm. J. Shelley

6. TELEPHONE NO. OF INDIVIDUAL NAMED IN ITEM 5
405-270-2631

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Thorium to be used in Thorium purification process development studies. Uranium materials used to provide radiation sources of known composition for experimental work, design and calibration of new instruments and related investigations. Uranium also used for process development studies.

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (*Including % U or Th.*)	(d) MAXIMUM AMOUNT AT ANY ONE TIME *(kilograms)*
NATURAL URANIUM	Ore, U_3O_8, ADU, UO_3	Solids to 90% U	250
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	Natural Thorium ThO_2, $ThCl_4$, $Th(NO_3)_4$	Wet Cakes and Solutions to 10% Th	150

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME *(kilograms)*
400

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES.

See supplemental sheet for item No. 9

10. LIST THE NAMES AND ATTACH A RESUME OF THE TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE OF APPLICANT'S SUPERVISORY PERSONNEL AND THE PERSON RESPONSIBLE FOR THE RADIATION SAFETY PROGRAM (OR OF APPLICANT IF AN INDIVIDUAL).

See supplemental sheet for item No. 10

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument).

See supplemental sheet for item No. 11

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).

See supplemental sheet for item No. 11

11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS. MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

See supplemental sheet for item No. 11

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

See supplemental sheet for item No. 12(a)

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

See supplemental sheet for item No. 12 (b)

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See supplemental sheet for item No. 12 (c)

13. WASTE PRODUCTS: *If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here* ☐ *and explain on a supplemental sheet:*

(a) Quantity and type of radioactive waste that will be generated.

(b) Detailed procedures for waste disposal.

See supplemental sheet for items No. 13(a) & 13(b)

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (*Specify instrument used, date of calibration and calibration technique used*) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(*This item must be completed by applicant*)

15. *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 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.*

BY: _____
(*Signature*)

Dated 5/17/79

W. J. Shelley, Director
(*Print or type name*)

Regulation & Control
Kerr-McGee Nuclear Corporation
(*Title of certifying official authorized to act on behalf of the applicant*)

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.

Application for Renewal of License SUB-986
by the
Kerr-McGee Corporation, Oklahoma City, Oklahoma

Supplemental Sheets

Item No. 9

Thorium in impure solutions is to be extracted by organic solvents, stripped with water and precipitated as a wet cake. Optimum solvent extraction procedure parameters will be determined. The maximum batch will not exceed 15 kilograms. Materials will be received as pure Thorium compounds or wet cakes, and actual work will be done using solutions. Laboratory hoods (face velocity 70-80 fpm) are used for solution preparation. Solutions and wet thorium cakes will be stored in corrosion resistant containers. The storage containers will be covered and well marked with approved warning signs or labels.

The uranium material, primarily ores and ore concentrates, has been blended with natural sands to produce dilute known concentrations of uranium and its daughter products. This material is used as calibration sources for instrument standardization and for instrument research and development.

Most of the blended uranium is buried in sealed test pits located out-of-doors on the 160-acre fenced site approximately 250 yards from the normal working areas. The 160 acres is surrounded by farmland and is conservatively remote from dwellings and other places of business.

The blended uranium is in containment fabricated of 12-guage galvanized steel, 6 feet in diameter and 12 feet long with welded steel bottoms. The uranium source material is about 3 feet below grade and is covered by 3 feet of sand and four inches of concrete. Access to the material is through a center fiber glass tube. A locked steel cover closes the tube when the test pits are not in use. The test pit area is appropriately marked with a radiation warning sign. Some uranium ore process development studies are also performed periodically.

That portion of source material not in use or in the test pits will be suitably packaged and stored in locked cabinets or rooms. These storage locations will be marked with radiation warning signs.

The thorium materials have not been in use since 1973 however further development work on solvent extraction methods may be conducted in the future. The uranium instrument test pits are seldom used more than ten days a year.

Access to radioactive materials is restricted to personnel who are trained to handle it safely. The limited use of small quantities of non-dry thorium compounds and the confined uranium materials pose no significant hazard to the workers or the general public.

Kerr-McGee Corporation
Oklahoma City, Oklahoma

Item No. 10

Supervisory Personnel and The
Radiation Protection Officer

Wilbert J. Robertson, Jr. - Laboratory Radiation Protection Officer

Education

B. S. in Chemistry. PhD in Inorganic Chemistry. Mr. Robertson completed a one semester course in Radiochemistry at the University of Wisconsin. This course covered the principles of radiation protection, the biological effects of radiation, and mathematics and calculations basic to the use and measurement of radioactivity.

Experience

Measurement techniques and knowledge of instruments were acquired while working at the Weldon Spring plant operated for the AEC by Mallinckrodt Chemical Works. Isotopes such as Mo 99, P 32, Eu 152-154, Zr-Nb95, Hf 181 As 74, W 185, Th 234, and U 237 were used in chemical tracer studies, generally involving liquid-liquid distribution. These studies were carried out over a period of years and generally involved possession of material from 1-50 mCi depending on the isotope.

Garet E. Van De Steeg

Education

Graduate student at The University of New Mexico, Albuquerque, beginning in (b)(6) and concluding with receipt of PhD in Chemistry in (b)(6)

Training while at the University of New Mexico includes:

a. Nine semester hours of formal courses in principles and practices of radio and nuclear chemistry.

b. Twelve semester hours of formal courses in animal and human physiology and radiation biology.

c. Three semester hours of formal courses in radiogeochemistry.

d. Approximately five hundred hours of seminars in radio and nuclear chemistry, and,

e. In excess of ten thousand hours (five years) of laboratory research using radioactive isotopes under AEC contract.

Kerr-McGee Corporation
Oklahoma City, Oklahoma

Garet E. Van De Steeg (Continued)

Experience

Experience with radiation, while at The University of New Mexico, includes five years continuous laboratory research with Iodine-131, in amounts up to 20 millicuries while studying the dilue solution chemistry of iodine and carrier-free behavior of Iodine-131 (see Progress Reports Numbers 6 through 9, 1964 and 1968, AEC Contract No. AT (11-1)-733). Other radiation experience while at the University involves short term (about one week) use of microcurie amounts of Phosphorous-32, Sulfur-35, Chlorine-36 and Iodine-131 while studying tracer techniques in-vivo on laboratory animals.

Robert E. Leonard

Education

B.S. in Chemistry. Basic Radiation Health Training by the U.S. Dept. of Health, Education and Welfare (b)(6)

Experience

Employed 1951 through 1957 at the Oak Ridge K 25 diffusion plant performing experimental work on enriched UF_6. Responsible for licensing and radiation health program involving S 35 while employed at the American Potash and Chemical Corp., Henderson, Nevada, plant. Radiation Safety Officer in charge of 6 density gauges at the American Potash, Hamilton, Miss., plant.

Gerald J. Sinke - Corporate Radiation Safety Officer

Education

B.S. in Chemistry. Postgraduate Health Physics training through the U.S. Dept. of Health, Education and Welfare.

Experience

Thorium and rare earth chemist; Health Physicist and Radiation Safety Officer for the Thorium Operations of the American Potash and Chemical Corporation (now a part of Kerr-McGee Corp.). He served as Manager, Health Physics and Industrial Safety at the Kerr-McGee Uranium and Plutonium Fuels Fabrication Plants (Cimarron Facility) for three years. He now functions as the Coordinator of Radiation Safety for the Kerr-McGee Corporation. Mr. Sinke is a Certified Safety Professional and has over 17 years experience in the field of Health Physics.

Kerr-McGee Corporation
Oklahoma City, Oklahoma

Item No. 11

Item No. 9 described the rural farm land type location of the Kerr-McGee Technical Center. Figure No. 1 is a floor plan of the laboratory buildings. Laboratory rooms C5 and E12 are used for chemical work involving the use of radiotracers, lab F4 is equipped for isotope storage and for low level radiochemical work. The use of radioisotopes is authorized under our Byproduct license No. 35-12636-06.

The area C19-E14 has previously been used for thorium work. Room No. 20 and Room F-2 currently house the counting equipment. The pilot plant area and other locations may contain small quantities of ores or compounds of source material at one time or another for analysis or R & D work.

Most laboratory rooms & areas are equipped with fume hoods. Glove box equipment is also available. Containment, ventilation controls and safe operating procedures preclude the need for wearing respiratory protective equipment while handling source materials, except under emergency conditions such as an accidental spill or fire.

Fig. No. 1 maps the locations where general safety and emergency equipment is located within the laboratory. Personnel are trained to properly use this equipment when needed. An inspection and maintenance program effectively keeps this equipment in readiness.

Survey & monitoring instruments include an Eberline E-120 Beta-gamma instrument (0-50 mr/hr, 30 mg/cm^2 window), and an Eberline PAC-3G alpha survey meter. These instruments are tested for proper function with a check source prior to use and are calibrated annually and after repairs. The calibration is contracted out to the Eberline Instrument Co., P.O. Box 2108, Santa Fe, New Mexico 87501, who perform this service under license No. NM-EBE-BL-00.

Measuring instruments are also in use. These are:

a) Canberra 8100 M.C.A. (.001 dpm alpha).

b) NMC PC-4 (0.2 dpm alpha).

c) Canberra Ge (Li) MAC 3000 (< 1 dpm gamma)

Kerr-McGee Corporation
Oklahoma City, Oklahoma

Item No. 12

A. Thorium

The severity of a possible accident during the thorium solvent extraction experiments is minimized by the limited size scale of the operations. The quantity of flammable solvents in use at any one time will be restricted to as small an amount as practiable. The laboratory building and storage areas are rated as fireproof construction. Fire extinguishers and personnel trained to use them are amply provided.

In case of an accident causing a spill of source material, the affected area will be placed in a shut-down mode until decontamination procedures are accomplished and surveys are conducted proving the area suitable for reuse. Physicians knowledgable in the fields of Health Physics & Nuclear Medicine located in Oklahoma City are available to render service in the event of an emergency.

The Kerr-McGee Technical Center has a well organized safety program with the backing of strong corporate support. The program includes active participation of all employees, supplemented by persons with special safety and industrial hygiene skills, safety committee and a trained Emergency Squad. Employees are trained on how to sound the emergency alert, how to protect themselves, evacuate and assemble in a safe location. The Emergency Squad is especially trained in fire fighting, rescue and first aid. A staff of skilled health physicists and health technicians (and their equipment) from the Kerr-McGee Nuclear Corporation's facilities nearby can be called upon for assistance. A published notification procedure (call list) is provided to assist those seeking help.

The Kerr-McGee Technical Center maintains a radiation survey program which is designed to monitor the adequacy of the containment and control provisions for radiological safety purposes.

When thorium is processed during the solvent extraction (S.X.) investigations, the following survey program is used:

a) Air sampling is conducted when preparing the solutions by dissolving dry thorium salts. Air sampling is also conducted periodically during the S.X. processing. Time weighted exposure calculations, if necessary, will be made in accordance with the regulations found in 10 CRF 20.103. Appropriate cause evaluations and corrective actions will also be conducted in accordance with these rules.

b) Surface contamination evaluations are conducted for both the restricted (operating) areas and the unrestricted areas. When the thorium S.X. experiments are concluded the operating area is cleaned to unrestricted level limits. The maximum alpha readings for unrestricted use of facilities and equipment are 3,000 dpm/100 cm^2 and the average is 1,000 dpm/100 cm^2 provided that a wipe test does not exceed 200 dpm/100 cm^2. (For natural uranium the levels are a factor of 5 higher).

During the thorium operations an alpha survey meter is provided for personnel survey of their protective clothing, hands & shoes prior to exiting the operating area. If needed, personnel decontamination is performed preventing the spread of contamination to unrestricted areas.

c) An evaluation of gamma dose rates will be made at the beginning of the operations. Personnel will wear film or T.L.D. dosimeters. Postings appropriate to the radiation level will be made using radiation warning signs. Dose rate monitoring of the processing area and storage area(s) will be conducted no less often than bi-monthly.

d) There will be no effluent discharges except for wastes which are discussed in item 13.

e) Bioassay procedures are not considered as a routine monitoring tool because of the very limited opportunity for any significant internal exposure to occur. In the unlikely event of a large accidental exposure, bioassay and medical management programs may be instituted.

f) Other elements of the survey program includes receiving inspection monitoring of packages containing radioactive material, keeping health physics records & inventories, labeling, posting procedure development and training.

g) The personnel responsible for the conduct of the radiation survey program are listed in item No. 10. Specifically their primary responsibilities are:

W. J. Robertson is the Laboratory Radiation Protection Officer (LRPO). He trains personnel and causes the routine surveys to be conducted by a monitor technician. He makes special surveys, keeps the health physics records, reviews and approves work activity involving radioactive materials and recommends safe work procedures, protective equipment and control methods. He directs radiological emergency activities and evaluates the hazard resulting from accidental releases of radioactive materials.

Garet Van De Steeg (radiochemist) supervises the necessary analysis on air samples, soil samples, vegetation, waste materials, bioassay samples and experimental process control samples.

Responsible supervisors direct the processing aspects of the thorium S.X. activities and the use of the uranium test pit facilities.

Gerald J. Sinke is the Corporate Radiation Protection Officer. He furnishes an overview function regarding the health physics aspects of the company's radiation safety program. He performs an annual audit of the Technical Center. His findings and recommendations are reported to top management personnel. He assists and councils the LRPO on matters concerning radiolocical safety.

B. Uranium

The instrument calibration test pits are surveyed by visual inspection to determine proper safeguarding and posting. The condition of the containment and associated earthwork and structures are also evaluated. This inspection is conducted at least annually. The values of the low dose rates above and near the test pits are known.

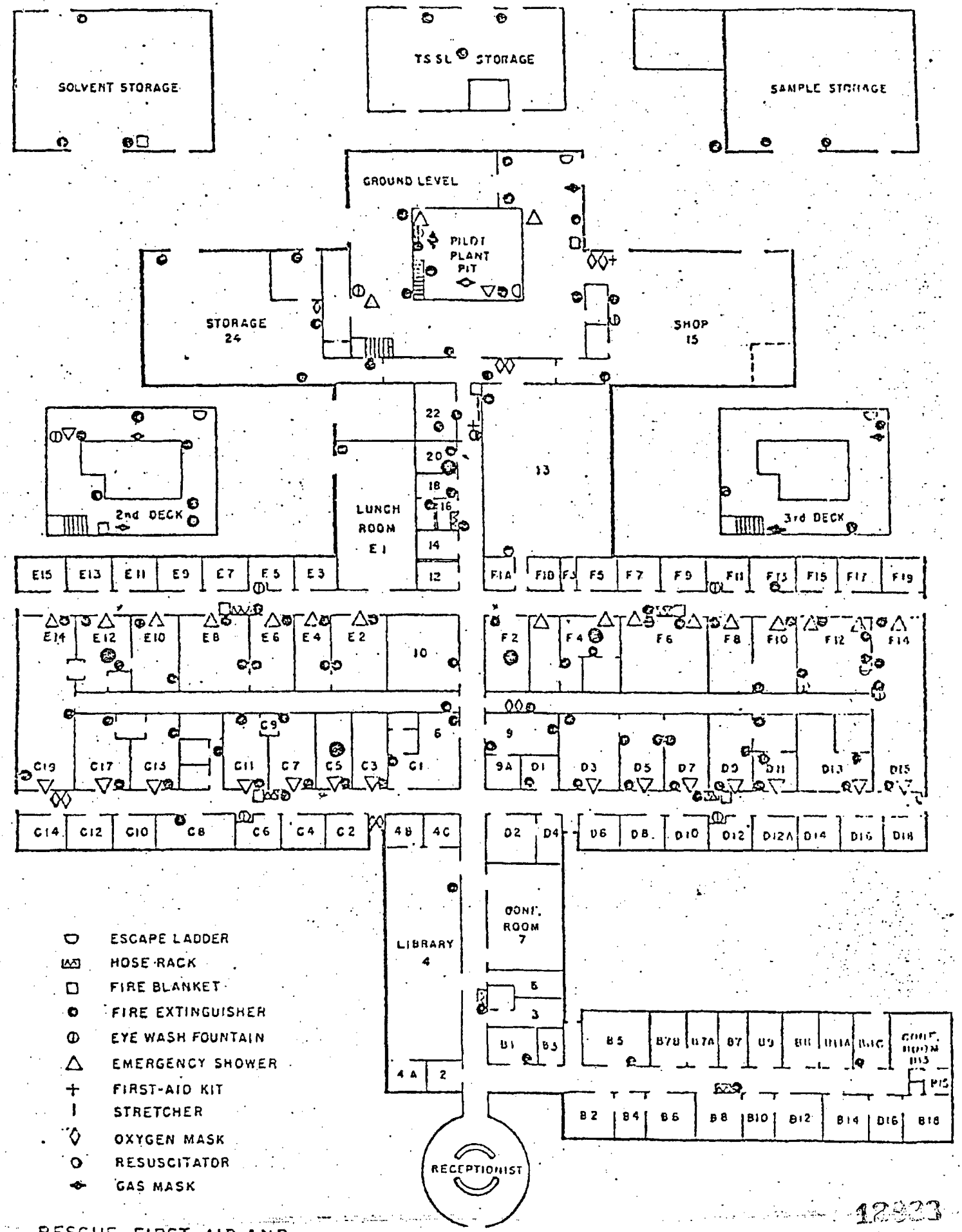
The handling of more than sample amounts of uranium at one time is unusual. Should the need for handling larger quantities of uranium occur (such as blending new mixtures for the test pits) then appropriate health physics procedures will be followed similar to those outlined above for thorium source material.

Item No. 13

Source material waste is generated only periodically and in small amounts. It is disposed of by using procedures compatible with 10 CFR 20.303 and 20.304 limits.

Item No. 14

Not applicable.



RESCUE, FIRST-AID AND FIRE FIGHTING EQUIPMENT

Fig. #1

KERR-McGEE TECHNICAL CENTER

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