DEMONSTRATION SECTION

STANDBY LICENSE RENEWAL APPLICATION

CIMARRON PLUTONIUM FACILITY

LICENSE SNM-1174

DOCKET NO. 70-1193

GENERAL INFORMATION

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1.0 GENERAL INFORMATION

Applicant: Kerr-McGee Nuclear Corporation

Address: Kerr-McGee Center, P.O. Box 25861
Oklahoma City, OK 73125

1.1 Introduction

Kerr-McGee Corporation is engaged in the discovery and development of natural resources and in the processing of these reserves into products needed in the U.S. economy.

Starting as an oil well contract drilling partnership in 1929, the company later added production, refining, pipeline and marketing facilities. Today, Kerr-McGee is diversified with activity centered in discovering and developing a wide variety of natural resources. Over the last five decades the company has accumulated major reserves of oil, natural gas, coal, uranium, forest products, and resources from which chemicals are derived.

The company entered the nuclear industry in 1952 with the acquisition of uranium ore claims and mines in northeast Arizona. Today, Kerr-McGee is a leader in the uranium supply industry; owns major reserves of uranium, produces uranium, and operates a uranium conversion facility. Kerr-McGee is concurrently developing expertise in the decontamination of plutonium and uranium fuel fabrication facilities, while conducting research and development programs in chemical in-situ mining activities.

Kerr-McGee Nuclear Corporation is a wholly owned subsidiary of Kerr-McGee Corporation and responsible for the operatio of its milling facilities at Grants, New Mexico, the conversion facility at Gore, Oklahoma, decontamination of nucle[illegible] manufacturing facilities near Crescent, Oklahoma, conducting chemical in-situ mining research and development activities near Casper, Wyoming, and for sales of nuclear materials and services produced by these [illegible]bject facilities.

1.2 Corporate Data

Kerr-McGee Nuclear [illegible]on is incorporated in the state of Delaware. The names, addresses an[illegible]zenship of the principal officers are:

Name	Address	Position	Citizenship
F. A. McPherson	Oklahoma City	President Kerr-McGee Corporation	USA
B. Stevens	Oklahoma City	President Nuclear Corporation	USA

Name	Address	Position	Citizenship
R. P. Luke	Oklahoma City	Executive Vice President Nuclear Corporation	USA
R. Tregembo	Oklahoma City	Vice President Mining-Milling	USA
W. E. Heimann	Oklahoma City	Secretary	USA
R. D. Robins	Oklahoma City	Treasurer	USA

Parent company officers serving as the Board of Directors of the Kerr-McGee Nuclear Corporation in addition to Mr. McPherson listed above, are:

D. A. McGee	Oklahoma City	Chairman of the Board	USA
J. W. McKenny	Oklahoma City	Vice Chairman	USA
B. Stevens	Oklahoma City	President, KMNC	USA

None of the other officers of the parent corporation are directly involved in the nuclear operation, however, all officers are United States Citizens.

1.3 Financial Qualifications

The Corporation is a wholly owned subsidiary of Kerr-McGee Corporation and there is no control of Kerr-McGee Nuclear Corporation by any alien, foreign corporation or foreign government through stock ownership, membership on the Board of Directors or stock ownership in Kerr-McGee Corporation.

Kerr-McGee Corporation, the owner of Kerr-McGee Nuclear Corporation, is a fully integrated natural resources company which operates through its divisions and subsidiaries in oil and gas, contract drilling, uranium production, coal mining, plant foods, minerals and preserved wood products. Kerr-McGee Corporation is listed on the New York Stock Exchange and its annual report provides the financial information required by 10 CFR 70.22. Kerr-McGee Nuclear Corporation data will be fully consolidated as are existing subsidiaries.

1.4 Facility Location

The licensed activities will be conducted in the Cimarron Plutonium Plant at the Kerr-McGee Nuclear Corporation's Cimarron Facility located in Logan County, Oklahoma, approximately thirty (30) miles north of Oklahoma City.

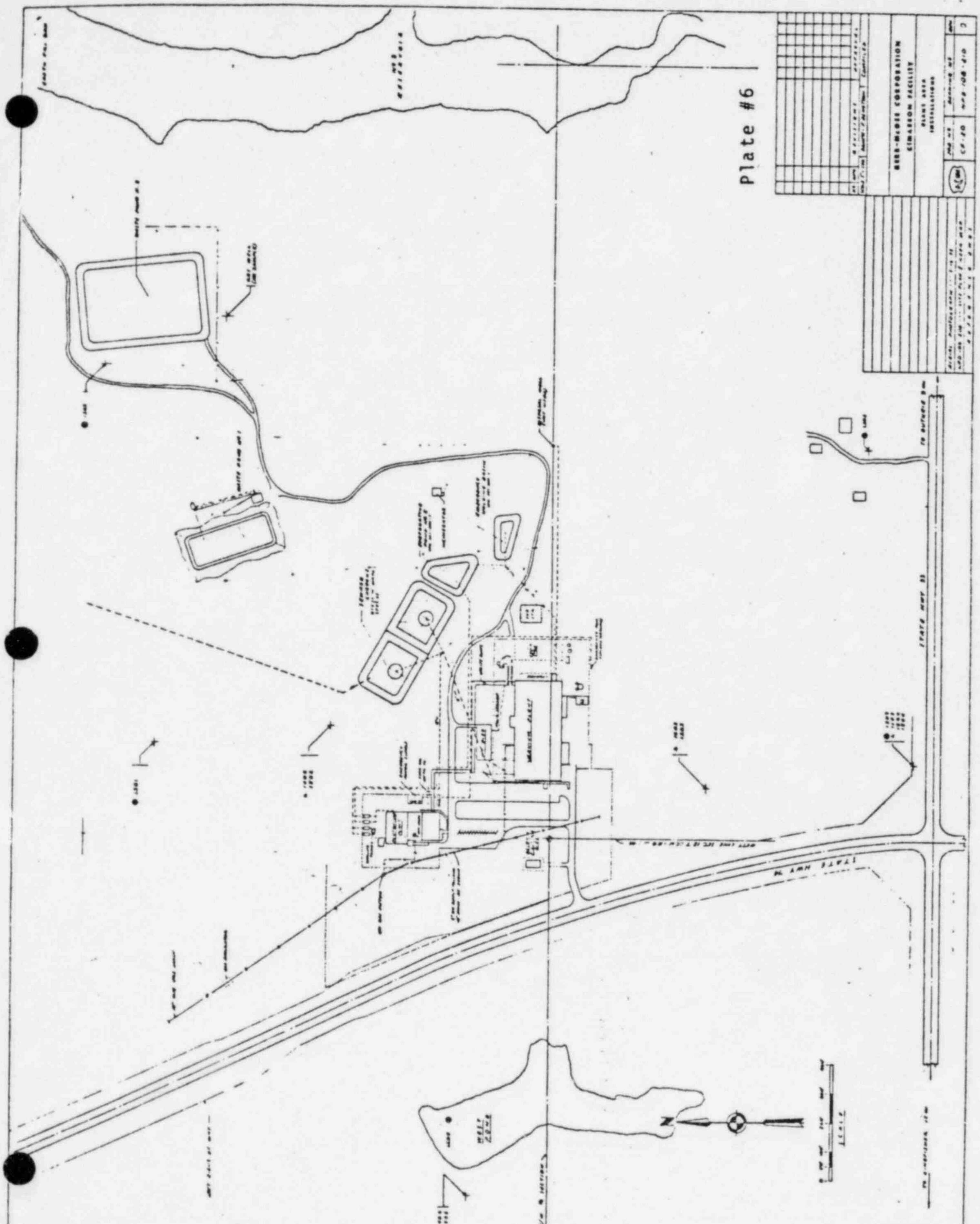

Figure I Date 8/7/76

The Cimarron Facility is located on a 1,000 acre site overlooking and bordered on the north by the Cimarron River. The contiguous Kerr-McGee property adjacent to the plant is shown on Page 1-3. The facilities shown include the Plutonium and Uranium Plants plus sanitary lagoon and waste holding ponds. The surface water collection lakes have been built to the east of the plant for the purpose of serving as a reservoir for process water. The Plutonium Plant comprises approximately 26,000 sq. ft. of floor space while the Uranium Fuel Plant comprises 60,000 sq. ft. of floor space.

The neighboring communities of the Cimarron Facility are Crescent (population 1,651; five miles north), Guthrie (population 10,312; ten miles east), Navina (population 10, seven miles south), Cashion (population 491; twelve miles southwest), and Kingfisher (population 4,245; nineteen miles west).

1.5 Material Description

The maximum quantity of special nuclear material, and by-product and source materials to be possessed at the Cimarron Plutonium Plant at any one time under the license is:

Special Nuclear Material:

Plutonium - 11,475 grams in any form
(including the Americium associated therewith)

1 gram of Plutonium^{238} sealed calibration source

Source Material:

Uranium (Natural) - 50 kilograms in any form

Other:

Cesium^{137} sealed source 165 millicuries.

The process material, plutonium and natural uranium is distributed on the inside of gloveboxes, vessels and pipelines in a dispersed manner, unaccessible for physical distribution. (See Section 9).

1.6 Summary Description of Proposed Activities

The general plan for the Cimarron Plutonium Plant during its "standby" status condition of suspended operations consists of maintaining surveillance over the facility to assure that there is no threat to the health and safety of the public, including those employed at the plant. The scope of operations will include:

a. An armed guard security force on duty at all times.

b. Maintenance of an intrusion barrier and alarm system with procedures to cope with persons who may attempt illegal entry to the facility property.

c. Ventilation control will be continued, keeping the building under a negative pressure compared to atmospheric pressure. The air pressure in the gloveboxes will be kept negative to the building pressure. Emergency power will be maintained to assure no interruption of ventilation control in the event that the main power fails. The high efficiency air filtration systems will continue to function and the air exhaust stack will be continuously monitored (with alarm).

d. Except as needed for maintenance or air filter changes, the gloveboxes will have solid port covers attached to the boxes instead of gloves. These covers will be tamper-safed with seals.

e. Health physics and industrial safety programs will carry on consistent with the reduction of personnel and risk to hazards. As appropriate, room air sampling, personnel monitoring, contamination monitoring, bioassay sampling, etc., will continue. (See Sections 5 & 6).

f. Environmental sampling and measurements of air, water, soils and vegetation will be done periodically.

g. Fire Brigade activities will continue under the new facility organization. Emergency plans will be implemented to the extent needed in case of fire, explosion, release of hazardous materials, and severe weather problems. Training, drills and emergency equipment inspections and tests will be conducted.

h. Radioactive contamination recovered from the inside of gloveboxes, pipelines, vessels, etc., incidental to maintenance, shall be removed, properly packaged and subsequently buried by a licensed burial contractor.

i. Radioactive material contamination remaining in gloveboxes and other process equipment will be measured by NDA techniques as required. These measurements show that a criticality incident is not credible. They also show that the material is not accessible to undetected diversion.

j. Utilities, sanitary facilities, laundry and services necessary to support the described activities will be maintained. Work clothing and personal protective equipment will be provided as needed.

k. The emission spectrometer in the laboratory will be used as needed by Kerr-McGee personnel for analyses of material other than plutonium. They may also do other laboratory work in gloveboxes, hoods, etc. free of plutonium contamination.

1.7 Conformance to License

Assurance is given that all activities are performed or conducted in accordance with the license conditions by:

a. Strict adherence to detailed procedures and/or work permits, copies of which are posted or available at each area where work is to be done.

b. The use of personnel indoctrinated and trained in the handling of plutonium and uranium materials under the applicable license conditions.

c. Restricting access to the processing areas to authorized individuals.

d. Enforcement of administrative controls to maintain such records as required.

e. Conduct of periodic and unscheduled independent inspections, surveys and audits by safety and health physics personnel or assigned teams to assure that procedures and license conditions are being followed and that safe conditions exist regarding contamination levels, radiation exposure and industrial safety and hygiene.

1.8 Technical Qualifications

The Cimarron Facility is operated by the Kerr-McGee Nuclear Corporation. The health physics and safety control programs are the responsibility of the Cimarron Facility Standby Operations Manager, who reports to the Executive Vice-President, who reports to the President of Kerr-McGee Nuclear Corporation. The development of health and safety standards is the responsibility of the Corporate Staff Health Physicist. Nuclear Safety Standards are the responsibility of the Vice President of Nuclear Licensing and Regulation. Independent inspections, surveys and audits are the responsibility of these individuals.

The technical and engineering staff of the Nuclear Corporation are well versed in all aspects of the health physics and nuclear safety requirements of handling special nuclear materials, and have experience in training others in nuclear health and safety. All supervisory personnel have a college degree or equivalent in engineering or science and/or several years experience in the handling and processing of special nuclear materials. The supervisory personnel responsible for health physics and nuclear safety control are completely familiar with pertinent NRC safety documents and with the applicable regulations of 10 CFR Parts 20, 70 and 71.

Valuable experience and training for safe operation of the Cimarron Plutonium Plant has been gained by Nuclear Corporation personnel in the operation of the Cimarron Facility Uranium Plant since November, 1965, under License SNM-928, and the Plutonium Plant since 1969, under License SNM-1174.

FACILITY DESCRIPTION

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2.0 FACILITY DESCRIPTION

The Cimarron Plutonium Plant is a manufacturing facility designed and constructed for the safe production of $(U\text{-}Pu)O_2$ pellets and clad fuel rods containing these pellets. The plant also has facilities for the recovery of plutonium from unirradiated scrap materials.

However, the NRC has prohibited the processing of special nuclear material. New license constraints have become applicable and the plant is committed to its current stand-by status. Thus, plutonium fuel fabrication operations are neither in progress nor planned.

2.1 General Construction Features

The Cimarron Plutonium Plant is constructed of precast, prestressed concrete exterior walls and roof. The concrete floor was poured in place after the precast concrete building was erected. The roof construction over the concrete roof deck is a poured in placed insulation with built up roofing and gravel. Exterior building walls have insulation built in during the concrete casting to form a sandwich type construction. The walls are erected on grade beams and drilled-belled piers. All exterior and interior joints in the precast building are caulked to make an airtight structure. The walls, ceiling and floors throughout the building have a smooth coated surface which may be easily cleaned. All supply ducts and piping headers are in smooth sided enclosures, sealed against the building roof.

Floor plan of the plant and pertinent construction details are shown in drawings CPP-100-A-201 and 202. The process area includes a poured in place concrete storage vault and adjoining basements. The adjoining basement areas provide access to the bottom of solution storage tanks and house the solvent extraction process for the scrap recovery operation.

Emergency "exit only" doors are provided throughout the plant. The doors are sealed to prevent inflow or outflow of air and are equipped to sound an alarm when opened. The sound of this alarm is entirely different from the emergency evacuation system alarm. There is only one personnel entrance which is at the front of the building. The front of the building contains offices, lunchroom and men's and women's change rooms.

The shipping and receiving area at the rear west side of the plant is a material air lock. Two air locks are provided between the change rooms and the process area. Another air lock is provided for entry to the laboratory rooms. All air locks are interlocked so that only one door to the air lock can be opened at one time.

Provisions for two laundries are included: (1) the "hot" laundry is employed for exterior clothing contamination to the level of 500 to 5,000 d/m/100 sq. cm. while the cold laundry adjacent to the change rooms washes more completely the laundry from the "hot" laundry and laundry having less than 500 d/m/100 sq. cm. Clothing exceeding 5,000 d/m/100 sq. cm. is discarded.

A first aid room and personnel decontamination room are provided. Tub facilities are installed in the personnel decontamination room.

The supply air fan room and the exhaust air fan rooms are located on the second floor and are accessible from inside and outside of the building. An air lock separates the two fan rooms.

2.2 Yard Utilities

Water supply - Domestic water for the Plutonium Plant is obtained from the Cimarron Facility domestic water system or from the pipeline connecting to the Logan County Rural Water District #2.

Natural gas is obtained from the line supplying the Cimarron Facility.

2.3 Electrical Design Criteria

2.3.1 General

All electrical equipment and wiring is in accordance with applicable IEEE and NEMA standards and complies with the National Electric Code.

2.3.2 Power Distribution

Electric power is obtained from the secondary side of an existing substation just east of the Cimarron Facility. Power is received at 12,470 volts and transformed to 480 volts for distribution underground in transite ducts to load centers located in the plant.

2.3.3 Electrical Equipment Room

Electrical equipment is installed in the supply air fan room and all motor control centers are located in this area. The electrical equipment area is ventilated to limit the maximum temperature in the room to 90°F.

2.3.4 Emergency Power

Emergency loads are connected to a motor control center which is fed through an automatic transfer switch. This switch senses a drop of the normal power, the switch also transfers back to normal and stops the generator. The 300 kw emergency generator is 480 volt, 3 phase, 60 Hertz. The emergency generator is tested weekly. Connected to the generator for emergency power are the glovebox exhaust fans, one each of the intake air and room air exhaust fans, one cooling tower cell and cooling water circulation pumps, safety instrumentation and alarm circuits.

A redundant emergency power source is provided for all safeguards instrumentation and alarm circuits in case the generator fails. This consists of storage batteries in series to provide the proper voltage and an inverter to convert to AC. The batteries are kept charged by a trickle charger. They are also given a voltage test weekly.

2.3.5 Lighting

The illumination capacity in all areas is 80 to 100 foot candles. However, during standby the level will be reduced to roughly 30 foot candles, or as needed for inspection of gauges, etc. Emergency lighting is provided by rechargeable battery-type incandescent fixtures. Light fixtures in process areas are water tight. Switching of all lighting circuits is done at the panels except in office and lunchroom areas.

2.3.6 Communications

Telephones are provided in the various plant areas. A 2-way loudspeaker system is installed throughout all the plant areas. These are controlled from each phone.

VENTILATION

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3.0 VENTILATING, HEATING AND AIR CONDITIONING

3.1 Basic System

The building ventilation system is divided into three different sub-systems. The first consists of the building supply air fans and contains the heating and cooling coils. The second consists of the room air exhaust fans. The third system consists of the process exhaust fans. The process exhaust fans are further divided into four systems: the first exhausts the air from the acid glovebox; the second exhausts the air from the solvent extraction plant gloveboxes only; the third exhausts the air from all laboratory hoods and slot boxes; and the fourth exhausts the air from the gloveboxes handling basic solutions. A schematic ventilation flow diagram for the Cimarron Plutonium Plant is shown on page 3-4. During standby, the acid & basic glovebox ventilation systems are joined together.

3.2 General Design Features

Supply air and room exhaust air fan systems consist of three fans each, any two of which will supply and exhaust the required air through the interior of the building. The third fan serves as a standby fan in each system and also as an emergency fan to increase the air flow in any given area when required. The ventilation system is designed for 8 air changes per hour, minimum, and for an emergency of 12 air changes per hour. During the standby operations ("suspended activity") only one supply fan and one exhaust fan will normally be operated.

The supply and exhaust air fans are interlocked so that a failure of a fan in either system will shut down the corresponding fan in the other system. All supply and exhaust fans are installed with back flow preventers. An emergency generator is provided to power the glovebox exhaust fans and one each of the supply and room air exhaust fans in case of power failure.

The entire ventilation system is equipped with instrumentation to detect abnormal operating conditions, such as excessive pressure drop through the absolute filters, loss of negative pressure in the spaces within the building, or loss of negative pressure within the gloveboxes. A stack monitor with alarm is installed to provide continuous sampling of the stack effluents. Air samplers are also installed in all rooms within the building. Air monitors with alarms are located in process areas.

3.3 Supply Air

All air entering the plant is supplied by the supply air fans. These fans are preceded by filters and precipitators to remove all dust. The heating and cooling coils are contained in the supply air fans, and the fans supply heated or cooled air as required. The supply air fans are housed in an upstairs fan room which is accessible only from outside the building. The heating and cooling coils are supplied by hot water boilers and a chilled water unit in the mechanical room on the first floor of the building. Mixing boxes are used to mix hot air or cool air as required by thermostats for the various spaces within the building. The office, reception and lunchroom area of the plant is heated and cooled using a recirculated air system with 25% fresh air makeup. All other portions of the building are heated and cooled with 100% fresh air.

3.4 Room Air Exhaust

All air is supplied to the rooms through ducts and diffusers located in the roof or ceiling of the spaces. The flow of air in the room is from ceiling to floor and all room air is exhausted through the floor into underground exhaust ducts. The underground exhaust ducts connect into an underground exhaust air tunnel, which is connected to the room air exhaust fans, which are on the second floor in a separate fan room.

A differential pressure of approximately 0.10 inches of water is maintained between the clean and potentially contaminated areas. Airlocks are installed between the change rooms and all process or laboratory areas. The change rooms, office, reception and lunchroom operate at normal atmospheric pressure.

A roughing filter followed by an absolute filter is installed in the floor at the entrance of the underground ducts. A bank of absolute filters is installed in the upstairs fan room ahead of the exhaust air fans. To protect the absolute filters from burning debris, stainless steel wire mesh is installed in the riser through which all exhaust air must flow from the underground ducts to the upstairs fan room.

Thus room air is exhausted through a roughing filter and two absolute filters before being discharged through a stack to the atmosphere.

3.5 Process Exhaust

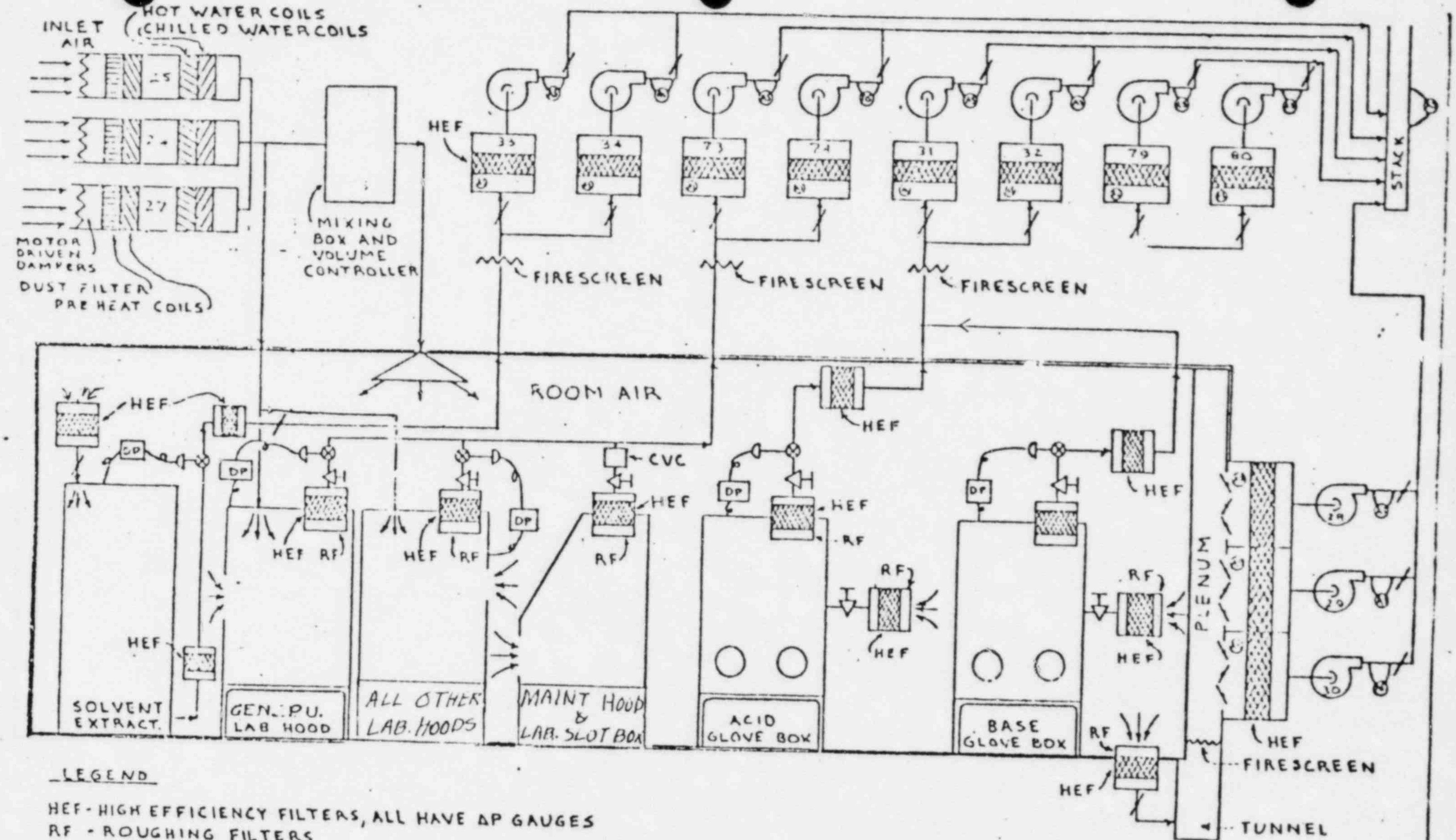
The glovebox exhaust system is designed to maintain a negative pressure of approximately 0.50 inches of water with respect to the room pressure with 3 volume changes per hour. The air in the gloveboxes is exhausted through three absolute filters before being discharged to the atmosphere. During the standby operation, no solvents will be stored in the gloveboxes.

The first absolute filter is located on the glovebox; the second absolute filter is located in the duct leaving the space; and the third absolute filter is in a bank of filters just ahead of the glovebox exhaust fans. Two fans are supplied for the glovebox exhaust system, one of which will adequately provide the normal air flow. The second serves as a standby fan and as an emergency fan should an increase in flow be required because of rupture of glove ports. The gloveboxes are supplied by room air which enters the gloveboxes through absolute filters.

The open face hoods and slot type hoods in the laboratory areas are exhausted through the laboratory exhaust system. This system consists of two fans and is similar in operation to the glovebox exhaust system. Open face and slot type hoods have an average face velocity of at least 125 linear feet per minute.

Installed ahead of the absolute filter in the glovebox is a roughing filter. Air leaving the glovebox exhaust fans is exhausted into the same stack as the room air exhaust fans.

Figure 11



LEGEND

HEF - HIGH EFFICIENCY FILTERS, ALL HAVE ΔP GAUGES
RF - ROUGHING FILTERS
AS - AIR SAMPLING
DP - DIFFERENTIAL PRESSURE CONTROLLER
CVC - CONSTANT VOLUME CONTROLLER

SCHEMATIC VENTILATION FLOW DIAGRAM

3.6 Preventive Maintenance on Emergency Equipment

In support of preventive maintenance procedures for emergency equipment, the following quality assurance program is in effect to insure that emergency equipment and critical instrumentation are maintaned in operating condition.

3.6.1 Quality Assurance Program

The emergency generator is located outside the Plutonium Plant on the east side of the building. Weekly inspections and annual tests are performed by Kerr-McGee maintenance personnel, while annual maintenance inspections are provided by authorized service dealers.

1. The emergency generator is inspected weekly for operational condition. Tests include the following:

   a. Manual starting to include one hour operating time.

   b. A record of the weekly inspection will show the water temperature, oil pressure, temperature voltage output, and exhaust temperature.

   c. A record of all repairs needed is maintained.

2. Annual load tests are performed by plant maintenance personnel and a record of test results are reported to the facility manager. Annual load tests include the following:

   a. With all necessary equipment connected record load performance (amperes, volts, cycles) of the emergency generator.

   b. As in item b. above, with all equipment connected a load performance of the automatic sequence start-up is inspected.

   c. Annual load testing results to include any proposed system modifications are submitted to the facility manager.

3. The emergency generator is serviced annually by authorized diesel repair service. (Cummings Diesel Company performs this service).

4. Stand-by units such as exhaust fans connected to the emergency system are inspected monthly and include manuel start-up inspections. Results of the test are recorded on a monthly log sheet.

5. Weekly log sheets are maintained on emergency exit door operations and door alarm systems.

5. Instrument calibration services are performed semi-annually.

3. The emergency generator has a backup (redundant) power source for the safeguard instrumentation and alarms. This consists of batteries in series to provide the proper voltage and an inverter to convert to AC. A trickle charger keeps the batteries charged. This system is inside the building in the plant vital area. Tests include the following:

a. [illegible] tests of battery voltage are made and recorded.

b. A complete load test is made annually by switching off the emergency power. The system performance is recorded and the results submitted to the facility manager.

ORGANIZATION

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4.0 ORGANIZATION, ADMINISTRATION AND PERSONNEL

4.1 Organization

This section describes positions having managerial, technical or operational responsibility relating to the Cimarron Plutonium Plant in the areas of health physics and industrial safety. Personnel experience resumes and an organization chart are included.

4.2 Administration

Facility Control

The Cimarron Plutonium Plant is the responsibility of the Standby Operations Manager, who is responsible for decontamination activities, safety programs, personnel and SNM material. The manager of the Cimarron Facility, who is also the Standby Operations Manager, reports to the Executive Vice President, who in turn reports to the President, Kerr-McGee Nuclear Corporation.

Health and safety programs, at the Cimarron Facility, are supported by personnel from Kerr-McGee Corporation's Environmental and Health Management Division. The Corporate Staff Health Physicist reporting to the Senior Physical Scientist, who in turn reports to the Vice President and Corporate Medical Director (a licensed physician), is responsible for the general administration of the health and safety programs at the Cimarron Facility, the audit of health and safety activities and the establishment of health and safety standards. Health and Safety standards are prepared under the direction of the Vice President and Corporate Medical Director by the Corporate Staff Health Physicist with contributions by other qualified technical personnel. The standards are reviewed for license compliance by the Vice President of Nuclear Licensing and Regulation; reviewed for implementation by the Cimarron Standby Operations Manager and approved by the Executive Vice President and/or the President of the Nuclear Corporation. Activities involving ionizing radiation and radioactive materials are conducted in accordance with written and approved health and safety standards which are in accordance with guidelines found in publications by ANSI, NCRP, ICRP, NRC, and OSHA.

4.3 Operating Control

The Cimarron Standby Manager has the responsibility for formulating, developing and maintaining written detailed operating procedures based on approved health and safety standards. Operating procedures are reviewed by the Corporate Staff Health Physicist to insure compliance with health and safety standards and by the Vice President, Nuclear Licensing and Regulation to insure compliance with license conditions. These persons are responsible during this review for determining the proposed operational procedures which may be outside of the scope of the current license and instituting an authorizing license amendment prior to the installation of such a procedure change. The amendment applications are made under the direction of the Vice-President, Nuclear Licensing and Regulation.

4.4 <u>Experimental and Development Work</u>

Experimental and development work involving plutonium will not be performed in the Plutonium Plant.

4.5 <u>Process and Equipment Control</u>

Changes in process and utility equipment are designed, drawings and specifications prepared, reviewed and approved, as appropriate by the Cimarron Standby Manager, the Corporate Staff Health Physicist, Vice President of Nuclear Licensing and Regulation, the Nuclear Corporation's Project Engineer Manager, and the Executive Vice-President, Kerr-McGee Nuclear Corporation.

4.6 <u>Maintenance</u>

The Standby Manager or his designate reviews and approves all plans for maintenance work. Maintenance work is considered complete when work is physically completed, inspected, and approved by the Maintenance Supervisor. In the event the work involves the potential release of SNM, a special work permit procedure is used.

4.7 <u>Personnel</u>

Activities performed at the Kerr-McGee Nuclear Corporation, Cimarron Facility, are under the direction of:

A. W. Norwood, Manager - Stand-by Operations
R. P. Luke, Executive Vice President, Kerr-McGee Nuclear Corporation
B. Stevens, President, Kerr-McGee Nuclear Corporation

4.8 <u>Organization Chart</u>

Organization charts are presented on pages 4-4, 4-4.1 and 4-4.2.

4.9 Education and Experience of Key Personnel

William J. Shelley, Vice President, Nuclear Licensing and Regulation, Environmental and Health Management Division, Kerr-McGee Corporation

Education - B.A. in Chemical Engineering
M.S. in Chemical Engineering

Experience - Employed by Mallinckrodt Chemical Works from 1949-1967. Served as Project Engineer with assignments in construction, research and development, and plant start-up; Administration Assistant responsible for the operation of division purchasing, office services; Production Control Manager responsible for production scheduling, production reporting and material accountability functions; Director of Administration; and Assistant Division Manager.

Mr. Shelley was General Manager of the Mallinckrodt Uranium Division for six years, in which capacity he was responsible to the USAEC for the operation of its $50,000,000 chemical refining and metal fabrication facilities located at Weldon Spring, Missouri.

Evan R. Goltra, M.D., F.A.C.P., Vice President and Corporate Medical Director, Environmental and Health Management Division Kerr-McGee Corporation

Education - A.B., Chemistry, Dartmouth College
M.D., State University of New York, (Downstate)
M.P.H., Harvard School of Public Health

Diplomate, American Board of Preventive Medicine (Aviation Medicine and Occupational Medicine)

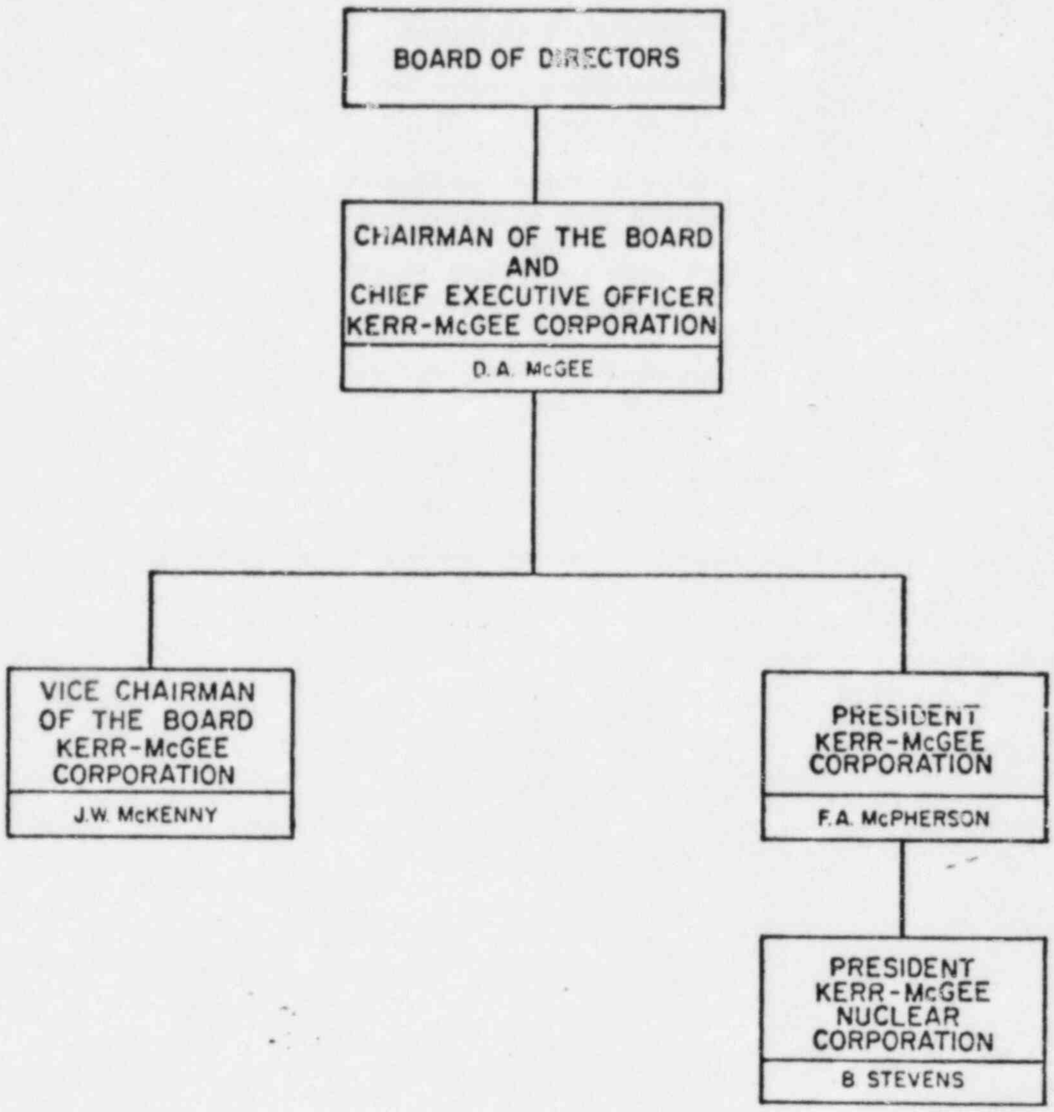
Experience - USAF, Colonel, retired

Area Medical Director, Alcoa, Texas facilities

USAF, Brooks AFB, Commander U.S.A.F. School of Aerospace Medicine

USAF, Brooks AFB, Vice Commander Aerospace Medical Division

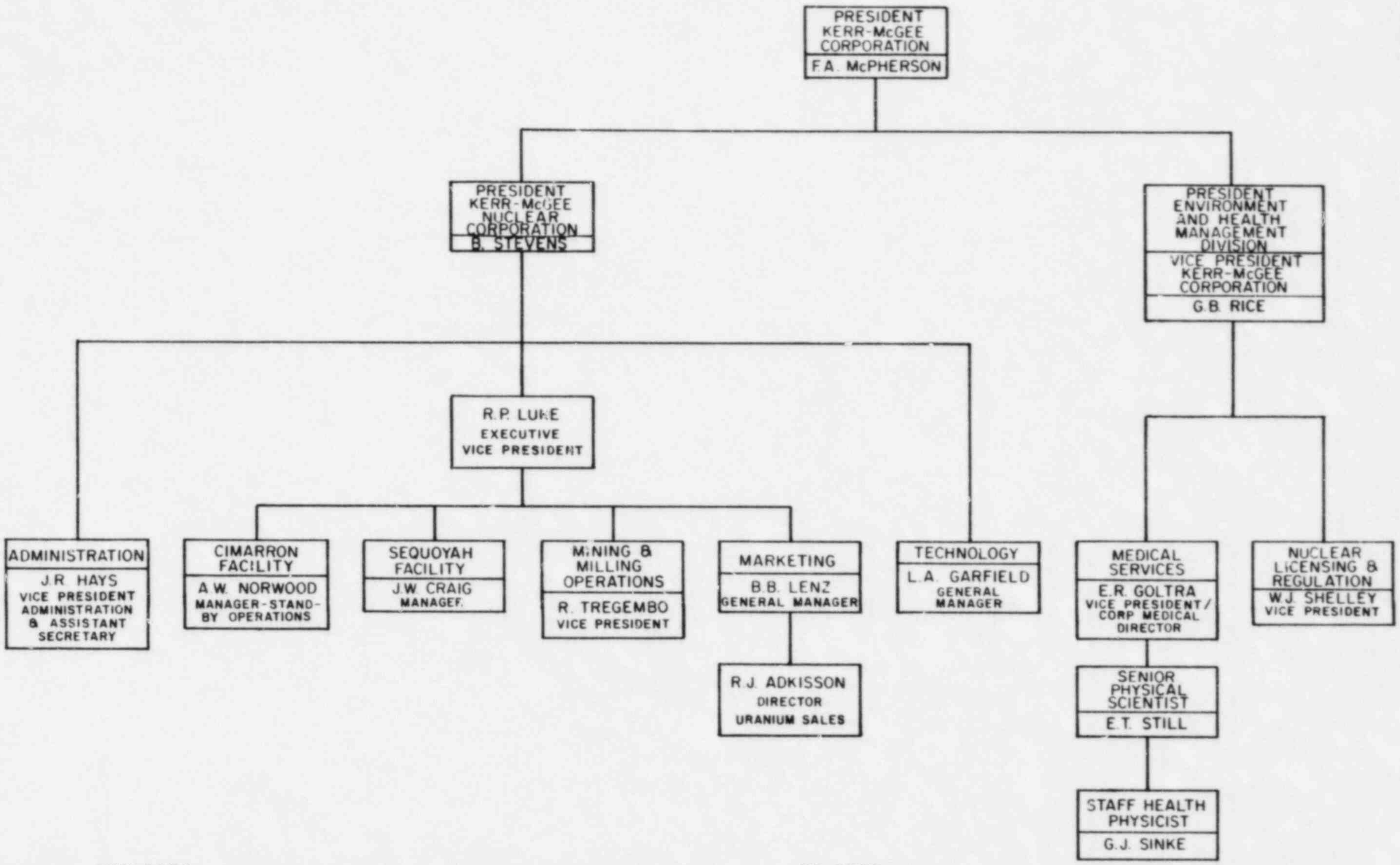
USAF, Alaska, Commander, Arctic Aeromedical Lab.



License No. SNM -1174 Docket No. 70-1193

Amend No. Renewal Date March 30, 1982 Section

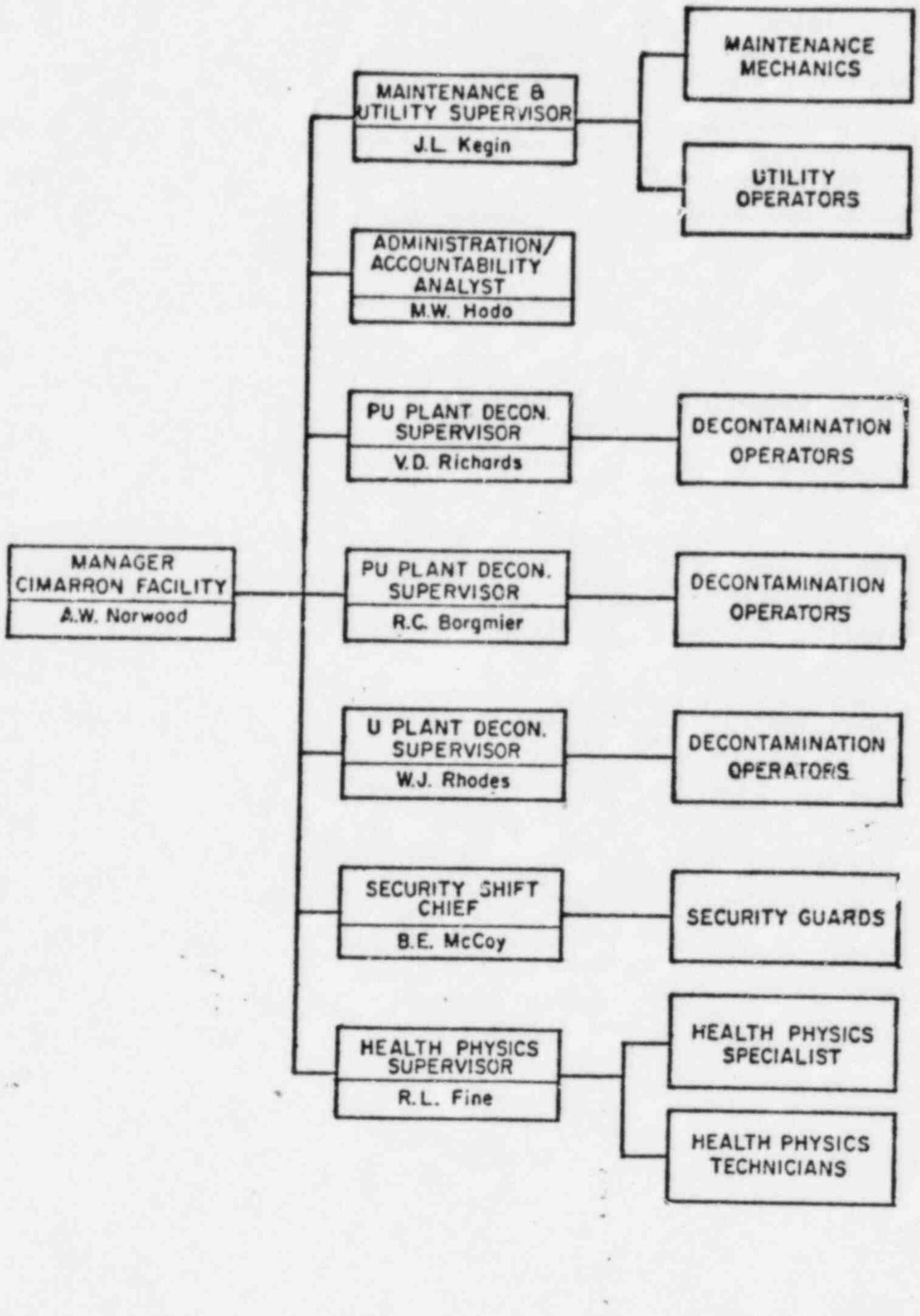
Replaces Page 4-4 Dated 5-18-77



License No. SNM-1174 Docket No. 70-1193

Amend No. Renewal Date 10/15/82 Section

Replaces p. 4-4.1 Dated 3/30/82



MANAGER CIMARRON FACILITY
A.W. Norwood
MAINTENANCE & UTILITY SUPERVISOR
J.L. Kegin
MAINTENANCE MECHANICS
UTILITY OPERATORS
ADMINISTRATION/ ACCOUNTABILITY ANALYST
M.W. Hodo
PU PLANT DECON. SUPERVISOR
V.D. Richards
DECONTAMINATION OPERATORS
PU PLANT DECON. SUPERVISOR
R.C. Borgmier
DECONTAMINATION OPERATORS
U PLANT DECON. SUPERVISOR
W.J. Rhodes
DECONTAMINATION OPERATORS
SECURITY SHIFT CHIEF
B.E. McCoy
SECURITY GUARDS
HEALTH PHYSICS SUPERVISOR
R.L. Fine
HEALTH PHYSICS SPECIALIST
HEALTH PHYSICS TECHNICIANS

Edwin T. Still, Senior Physical Scientist, Environmental and Health Management Division Kerr-McGee Corporation

Education - DVM (Veterinary Medicine); M.S. (Radiation Biology); continuing education and training in management, science, radiation safety and health protection, and radiobiology through courses and schools of the government, military departments, and national laboratories.

Experience - Assistant to the Director of and Biomedical Advisor for the Defense Nuclear Agency for three years. Developed and carried out policy for ionizing radiation health effects research, reconstruction of external and internal radiation doses for weapons tests' participants, and Department of Defense radiological emergency response procedures.

Research Program Coordinator, Armed Forces Radiobiology Research Institute for four years. Developed and managed multidisciplinary radiobiological research program on effects of nuclear weapons; responsible for operation of pulse-type nuclear reactor (TRIGA), electron accelerator and multi-kilocurie $Cobalt^{60}$ sources; special advisor on health physics and radiation protection for radiological decontamination of Enewetak Atoll, Marshall Islands, Pacific Ocean.

Technical Research Coordinator, U.S. Atomic Energy Commission for six years. Managed research programs concerned with mammalion radiobiology, toxicity of internal radionuclides, and the kinetics of internally deposited radionuclides. Reviewed, evaluated and drafted Environmental Impact Statements for major nuclear facilities.

Over 17 years experience in all aspects of radiation health effects and safety procedures, served on numerous national level committees concerned with control and regulation of ionizing radiation and the determination of detrimental effects.

Joined Kerr-McGee in February 1982.

G. J. Sinke, Staff Health Physicist, Environmental and Health Management Division, Kerr-McGee Corporation

Education - B.S. in Chemistry - Postgraduate Health Physics training through the U.S. Department of Health, Education, and Welfare, Oak Ridge Associated Universities and the University of Lowell.

Experience - Chemist, Chief Chemist and Manager of Testing Laboratories at Kingsbury Ordance Plant for eight years.

Thorium and rare earth chemist; Industrial Safety Engineer, Health Physicist and Radiation Safety Officer for the West Chicago Rare Earth and Thorium Operations of American Potash and Chemical Corporation (now a part of Kerr-McGee Chemical Corporation). His duties included the licensing and regulation function for the operation. He has over 15 years experience in the field of industrial safety and health physics.

Mr. Sinke transferred to the Cimarron Facility in November, 1969. He served as Manager, Health Physics and Industrial Safety for the Cimarron Facility for nearly three years. He is a certified safety professional.

Alvin W. Norwood, Manager, Cimarron Facility

Education - B.S. Degree, Oklahoma State University; University of Washington Graduate Center at Hanford - Radiation Biology and Fundamentals of Radiation Measurement. Columbia Basin College - History of Radiation and Industrial Physics.

Employed from 1965-69 by Battelle Northwest Laboratories, Richland, Washington, as senior technician. Duties include operation of the Plutonium Recycle Test Reactor in capacity of a Reactor Technician.

Mr. Norwood served as our Plutonium Plant Health Physics Supervisor for three years, as Facility Health & Safety Manager for three years, and as Facility Standby Operations Manager for six years.

Joseph L. Kegin, Maintenance and Utility Supervisor

Education - High School graduate, 1953. Several short courses involving maintenance specialties, pollution control methods and supervisory training.

Experience - Maintenance work for a drilling company, electric motor overhaul, finance clerk, electrical shop foreman, supervisor of nuclear processing equipment maintenance. Plant engineering in facilities manufacturing uranium and plutonium mixed oxide fuels. Seventeen years experience in the nuclear field.

Ronald L. Fine, Health Physics and Safety Supervisor

Education - Oklahoma State University, Associate Degree (1966) in Nuclear and Radiological Technology and B.S. Degree (1971) in Nuclear and Radiological Technology.

1967 - short course in Basic Radiological Health by HEW National Center for Radiological Health.

Experience - Off-site surveillance at Nevada Test Site for Southwestern Radiological Health Labs (now known as Environmental Protection Agency), Las Vegas, Nevada, 1966 to 1967, as Health Physics Technician. Employed by Kerr-McGee Cimarron Facility for nine years as a Health Physics Technician. Six years in the Uranium Plant and three years in the Plutonium Plant. Mr. Fine has served as our Health Physics Supervisor for two years.

Mickey W. Hodo, Administration/Accountability Analyst

Education - High School graduate, 1956.
Air Force Tech Supply School, 1957.

Experience - Air Force Stock Records Clerk for three years.

Employed by Kerr-McGee Cushing Facility as a Thorium Production Operator for one year.

Employed by Kerr-McGee Cimarron Facility as a Uranium Plant Production Operator for four years, and as an Account ability Clerk at the Uranium Plant and Plutonium Plant for twelve years.

Virgil D. Richards, Plutonium Plant Decontamination Supervisor

Education - High School graduate, 1958.

Experience - Employed by Kerr-McGee Cimarron Facility as a Production Operator at the Uranium Plant for one year, as a Maintenance Mechanic at Plutonium Plant and Uranium Plant for five years, as a Production Operations Supervisor at Plutonium Plant and Uranium Plant for six years, and as a Plutonium Plant Decon Supervisor for two years.

Robert C. Borgmier, Plutonium Plant Decontamination Supervisor

Education - High School graduate, 1936.

Experience - Employed at Hanford Reservation at Richland, Washington, as a Plutonium Process Operator and Senior Technician for 20 years.

Employed by General Electric as a Nuclear Field Technician for refueling nuclear power plants for 1.5 years.

Employed by Kerr-McGee Cimarron Facility as a Plutonium Plant Production Supervisor for 6 years, as a Maintenance Mechanic for 2 years, and as a Plutonium Plant Decon Supervisor for 1.5 years.

Wilbur J. Rhodes, Uranium Plant Decontamination Supervisor

Education - High School graduate, 1953

Experience - Employed by Kerr-McGee Cimarron Facility as a Uranium Plant Production Operator for 9 months, and as a Maintenance Mechanic at the Uranium Plant and Plutonium Plant for 12.5 years.

William A. Rogers, Health Physics Specialist

Education - High School graduate; attended 4 navy schools: 1) Basic Propellant Engineering School, 2) Nuclear Plant Operators School, 3) Machinist Mate School, and 4) Nuclear Power Plant Operators School. These schools extended over 2 years.

Experience - Spent 7 years in nuclear Navy. Employed by Kerr-McGee Cimarron Facility for 16 months as a Plutonium Plant Operator, and 7 years as a Health Physics Technician.

Jack F. Andrews - Senior Health Physics Technician

Education - High School graduate and one year of college.

Experience - Employed one year by AEC Security at Los Alamos. Employed by Los Alamos Scientific Laboratory one year in Decontamination Operations and one year as a Health Physics Monitor.

Employed by Kerr-McGee Cimarron Facility as a Uranium Plant Operator for two years, as a Operations Supervisor for three years at the Uranium Plant and Plutonium Plant, as a Health Physics Technician for three years at the Uranium Plant, and as a Health Physics Technician for five years at the Plutonium Plant.

Frank Murch, Senior Health Physics Technician

Education - G.E.D., U.S. Air Force. Air Force school in X-Ray Technology in 1956.

Experience - X-Ray Technician for three years in U.S. Air Force. X-Ray Technician in public hospital for one year.

Employed by Kerr-McGee Cimarron Facility as production operator at Uranium Plant for two years, as a Maintenance Mechanic at the Plutonium Plant and Uranium Plant for eight years, and as a Health Physics Technician at the Plutonium Plant and Uranium Plant for 3.5 years.

Dennis M. Ford, Senior Health Physics Technician

Education - G.E.D., U.S. Air Force. Two and one half years of college.

Experience - Employed by Kerr-McGee Cimarron Facility as a Plutonium Plant Production Operator for four years, and as a Health Physics Technician at the Plutonium Plant and Uranium Plant for four years.

Claude M. Thompson, Senior Health Physics Technician

Education - Associate Degree in Accounting

Nuclear, Biological and Chemical Warfare School - U.S. Marines.

Experience - Employed by Kerr-McGee Cimarron Facility as a Production Operator for one year, and as a Health Physics Technician at the Plutonium Plant and Uranium Plant for 2.5 years.

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RADIATION HEALTH AND SAFETY

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5.0 RADIATION HEALTH AND SAFETY - GENERAL

5.1 Health and Safety

This section outlines the various health and safety programs, including descriptions of the facilities, equipment and procedures, which are provided and used at the Cimarron Plutonium Plant to protect health and minimize danger to life or property.

During the standby operations, maintenance and utility activities are thoroughly reviewed for any unusual health safety aspects prior to approval. If results from any sampling, survey or monitoring programs or other audits and inspection activities indicate unfavorable trends, or potentially unsafe conditions, a report is made immediately to management and the cause is immediately investigated. Corrective action is initiated by the project Cimarrom Facility Manager or his designate. If necessary, specific activities are discontinued or curtailed until adequate protective measures are incorporated and demonstrated as providing for continued safe operation.

5.1.1 General Responsibilities

Responsibility for health and safety rests with each individual. Plant management is responsible for assuring that safe conditions exist and safe practices are followed. Management is also responsible for providing facilities and equipment required for safe conduct of work.

Health & safety personnel at the Cimarron Facility, working within standards and criteria approved by Corporate management, are responsible for developing and conducting detailed programs to determine the adequacy of plant safety conditions and practices and for determining the extent of effluent releases. They also provide training in safety areas and offer competent assistance as required for finding and correcting unsafe conditions and practices; this group is also responsible for carrying out certain facility service functions related to nuclear and industrial safety, such as monitoring, first aid, issuance of safety equipment, etc.

Basically, the health & safety program consists of two distinct activities: 1) those dealing with the control of the spread of radioactive contamination and the resultant personnel internal and external radiation hazards, and 2) industrial hygiene and industrial safety.

5.1.2 Health and Safety Organization

The Nuclear Corporation approved manpower level provides adequate staffing of professional health physicists and health physics technicians to properly service the Cimarron Facility during the standby operation.

The Standby Operations Manager is a professionally qualified health physicist with plutonium experience and reports to the Executive Vice President, Kerr-McGee Nuclear Corporation.

The Plutonium Plant Health Physics and Safety Supervisor reports to the Standby Operations Manager and is responsible for the day by day health and safety monitoring aspects of the standby operations. A staff of Health Physics technicans reports to the Health Physics and Safety Supervisor.

Additionally, the Kerr-McGee Corporation maintains a highly qualified professional health physicist in the position of Corporate Staff Health Physicist reporting to the Senior Physical Scientist. Also available in the administering of health and safety programs is the Vice President of Nuclear Licensing and Regulations, and the Corporate Medical Director. The Corporate Staff Health Physicist, the Cimarron Standby Operations Manager, and the Health Physics and Safety Supervisor actively engage in the preparation and updating of extensive health physics procedures and industrial safety instructions. These personnel make frequent detailed audits of facility operations.

At least one member of the health physics staff will be on duty for monitoring coverage in the Plutonium Plant at all times.

5.2 Training Program

5.2.1 Introduction

The training program is designed specifically to train the personnel in the safe handling of plutonium and the effective operation of equipment necessary for the standby operations of the Cimarrom Plutonium Plant. The training consists of both class-room instruction and in-plant training with demonstrations in the five basis program elements: 1) Radiation Safety (including health physics and nuclear criticality safety, 2) Plant Operations, 3) Equipment Operation, 4) Emergency Procedures, and 5) Industrial Safety.

Operating personnel receive more extensive in-plant training on actual operations involving their specific assignments with more generalized instruction in areas assigned to others.

The initial training includes a minimum of 20 hours of topical material specifically relating to health and safety (health physics and nuclear criticality safety) in formal lectures and demonstrations.

Instructors for the training program generally include the Cimarron Facility Manager and the Health Physics Staff. First line supervisory personnel and other individuals of the Technical Staff with specialized experience and training ability are utilized as appropriate for specific subject matter.

An outline of the comprehensive training program is given to show the curriculum for classroom instruction and in-plant training. The program includes detailed coverage of controls for safety and operating procedures in all of the basic program elements. (See program elements, Section 5.2.2.)

1. Adequate Training and Job Performance

   To satisfy the criteria that an employee has received adequate training to safely perform his job, the following requirements must be met:

   a. Employee must participate in the 20 hour training cycle and show satisfactory performance on the written evaluation.

b. Employee is required to review the written procedures pertaining to the job assignment. Instructions concerning the safety (health, nuclear, fire prevention) aspects of the job assignment are provided by the supervisor or by an assigned experienced employee.

c. Receive continuous training and counseling from the supervisor when performing individual job assignmnets and performing those job assignments requiring team efforts (waste disposal operations, decontamination operations, etc.)

During the first 90 calendar day period the new employee is subject to a personnel review (Form 3566) conducted by the immediate supervisor and the supervisor at the next higher level. This written review is an evaluation of the employees work habits and includes written comments concerning the following:

determination as to further training needed,
quality and quantity of work performance,
dependability on the job,
attendance on the job,
adaptability to job assignments,
willingness to work and overall
housekeeping

The supervisor recommends retention of the employee when the employee can demonstrate satisfactory performance in the references assignments.

5.2.2 TRAINING PROGRAM OUTLINE

1.0 Radiation Safety

Subject matter covered in this part is designed to assure that each individual has a basic understanding of radiation, the hazards peculiar to plutonium handling, the consequences of unsafe work practices, and overall health physics philosophy and standards.

1.1 Classroom Instruction

- 1.1.1 General Information
- 1.1.2 Radiation Technology
- 1.1.3 Contamination Technology
- 1.1.4 Biological Effects
- 1.1.5 Plutonium Toxicology and Physiology
- 1.1.6 Plutonium Health Physics Data
- 1.1.7 Uranium Toxicology and Physiology
- 1.1.8 Uranium Health Physics Data
- 1.1.9 Nuclear Criticality Safety
- 1.1.10 Industrial Safety

1.2 In-Plant Training

The sessions give personnel actual experience in the techniques of radiation detection, measurement, control and safety practices. The subject matter is designed to supplement and extend the classroom instruction through demonstration and individual participation. Training includes procedural coverage of:

- 1.2.1 Alpha, Beta-Gamma, Neutron Surveys
- 1.2.2 Personnel Exposure Measuring Techniques
- 1.2.3 Ventilation Controls
- 1.2.4 Radiation Detection Systems
- 1.2.5 Protective Clothing Practices
- 1.2.6 Respirator Program
- 1.2.7 Decontamination
- 1.2.8 Glove Changes and Bagging Techniques
- 1.2.9 Approved Containers and Storage Practices

2.0 Plant Standby Operations

This part covers training in plant operating rules and procedures of a general nature which apply throughout the plant.

2.1 Classroom Instruction

2.1.1 Definition of Responsibilities
2.1.2 Plant Design Features
2.1.3 Glovebox Operation and Control
2.1.4 Vault Storage and Material Safeguards
2.1.5 Administrative
2.1.6 Security Procedures

*SECTIONS 2.2-3.0 ARE DELETED.

4.0 Emergency Procedures

This training is to give all operating personnel an understanding of the actions to be taken for a variety of emergency situations or equipment failures. Where feasible, the in-plant training to supplement classroom instruction is utilized. This training includes coverage of all plant emergency situations and the response actions for each specific emergency as follows:

a. Fire Fighting and Fire Prevention
b. Release of Hazardous Materials
c. Severe Weather Warning Action
d. Building Evacuation Drills (fire contamination)
e. Building Re-entry Drills
f. Rescue, First Aid, and Emergency Medical Procecures
g. Electrical Failure
h. Outside Assistance Plans
i. Post-Accident Hazard Evaluation and Recovery Plans
j. Security Procedures During Emergencies

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5.2.3 Radiation Safety Standards

1. Examples of Standards & Procedures Used for Training

   a. "All high efficiency filter shall be DOP tested prior to installation and final filters will be DOP tested in-place prior to use and at least annually thereafter." (Note: Deviations require licence amendment).

   b. "Check out survey procedures for the plutonium plant shall assure that individuals (and personal effects) are essentially free of radioactive material contamination before leaving the plant (i.e., personnel contamination shall not exceed 500 d/m alpha per 100 cm^2 and 200 c/m betta-gamma per GM probe area)." (Note: The Cimarron Facility Manager approves the check-out survey procedures and he may make changes in the procedures, without Corporate approval, providing assurance of compliance to the specified contamination levels).

   c. "Persons who are delegated responsbility for affecting changes to existing procedures, processes, equipment or buildings shall assure prior to the change that the change is thoroughly reviewed, analyzed and/or physically inspected as appropriate for compliance with the approved safety standards." (Note: The Cimarron Facility Manager approves changes which are within the health and safety standards, however, he shall assure that changes conform to the approved standards).

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5.3 Glovebox Use

During the "standby" conditions of the plutonium plant, the only operations performed within gloveboxes contaminated internally with plutonium will be incidental to necessary maintenance work and filter changes. Normally, all glove ports have no gloves and are sealed with solid 3/8 inch thick plastic gasketed covers, securely held in place with strong adhesive tape. The port covers are tamper-safed with seals. Ventilation control maintains a negative air pressure within the boxes. Gloves will be properly installed as needed for maintenance. The gloves will be removed and the solid covers replaced tamper-safed after the maintenance is completed.

5.3.1. Glovebox Operations

The gloveboxes are fabricated specifically for material containment. Pertinent design features of the gloveboxes installed in the Cimarron Plutonium Plant are shown on the J. A. Jones Construction Company drawings #UP-1112-1, -2 and -3.

1. Glovebox shells are constructed of 3/16" thick 304L stainless steel plate.

2. Glovebox filter housings are constructed of 10 gauge, 304L stainless steel sheet.

3. Glovebox windows

   a. All glovebox windows gas and liquid tight for normal service conditions.

   b. Glovebox window materials are selected for the desired service as follows:

      Dry or mild acid fume - plexiglas (fire resistant type). Severe acid fumes - Homolite or tempered safety glass. For gamma-beta shielding - lead glass (clipped over windows, external to glovebox).

4. Gloveboxes are fabricated with sufficient structural strength to permit the installation of shielding materials as required.

   The addition of one-inch thick, leaded glass for shielding is considered a foreseeable load and this poses no structural problems for the gloveboxes.

5. Glovebox base structures are fabricated of mild steel and painted to protect against oxidation. Legs are adjustable over a 6" span.

6. Glove Ports

   a. Glove ports are located on 16-18" centers between gloves with centerline at 51-54" above floor level.

   b. Glove rings are of standard manufacture 8" diameter schedule 40 304L stainless steel pipe (one position in a laboratory glovebox utilities a 5" diameter glove port).

   c. Glove rings have two external "O" ring machined grooves for attaching gloves.

   d. An internal sealing ring is provided to seat each glove firmly against the interior diameter of the glove ring.

   e. Glove port covers are provided for unused glove ports.

   f. Glove ports are welded on metal box entries and attached by glueing to plexiglas fronted boxes.

7. Bagging Techniques

   a. General movement of material and tools in and out of gloveboxes for transfers is accomplished by a standard bag in - bag out procedure. The bag out techniques used at the Hanford and/or Rocky Flat NRC sites are followed as a general practice.

   b. Bag out ports have the same ring seal construction as glove ports and range in size from 8" to 22" diameter.

   c. A dielectric sealer is used to seal the bags and form air tight pouches for material containment during transfers. A seal about a quarter inch wide is made across the layers of bags. An alternate bag sealing method is used only to a limited extent with supervisory approval where a dielectric seal is difficult. A seal is made by twisting the bag, firmly taping the twisted area and cutting across the twist with a sharp knife and taping the cut edges.

d. Bag material is 0.012" thick flexible polyvinyl chloride (PVC) sheet sealed into a tube of the correct diameter to fit the specific size bag-out ring.

e. Air locks are not presently used on gloveboxes and will be used only as may be needed for large equipment movements such as maintenance overhauls.

f. Contamination control is verified by radiation surveys following bagging operations.

g. Respirators and surgeons gloves are worn by personnel during bagging operations.

8. Glovebox Services

a. General glovebox illumination is provided by fluorescent light fixtures installed external to the boxes above illumination windows.

b. Electrical service to the interior of gloveboxes is through Amphenol or similar type fittings with water tight covers.

9. Internal doors are a swinging type with piano hinges of stainless steel or kynar plastic. Door latches are operable from both sides of a door and are wedge type to maintain a tight seal on door gaskets.

10. Gasket material on gloveboxes is neoprene rubber, viton or teflon.

11. Gloveboxes are constructed for removal from service of contaminated glovebox filters within the interior of the glovebox.

12. As necessary for maintenance or filter changing the glove port covers will be replaced with new glovebox gloves. When the need for gloves is finished, the port covers will be replaced and tamper-safed. Gloves are normally standard 8" diameter, shoulder length.

a. 0.030" thick Neoprene-Hypalon for general use in glove boxes in dry or wet chemical applications.

b. 0.030" thick Neoprene for general dry processing use.

c. 0.065" thick lead loaded Neoprene for use in glove box positions involving significant gamma hand exposures.

d. 0.030" thick lead loaded Neoprene for use in glove box positions involving significant gamma hand exposures.

e. 0.015" thick Neoprene for day light duty applications.

f. 0.015" thick Hypalon for light duty application (such as wet chemical laboratory operations).

g. 0.015" thick 5" cuff for special laboratory use.

0.008" thick Neoprene 5" cuff for light duty use in special laboratory applications.

13. Health physics instructions are rigidly followed during attachment of new gloves or bags and removal into the glovebox of used gloves or bags. Extreme care is taken to assure the new glove or bag is firmly attached to the port ring so it cannot come loose during removal of the old glove or bag. Respirators are worn by personnel making the change as well as by other personnel in the process area. Any loose contamination resulting from the change is immediately located by an alpha survey around the port and a survey of the floor and any other horizontal surfaces below the port. Contamination greater than 1000 d/m per probe area is immediately cleaned up.

*14. Glovebox Fire Detection

Gloveboxes (solvent extraction system described in item 15) are equipped with fusible salt heat detectors which, when activated, sound an alarm and give a visible signal on the glovebox fire detection panel located in the hallway leading to the processing areas. The audio alarm can also be heard by the guard. The visible signal on the panel indicates where the fire is. Test switches are provided on the panel to check the alarm circuitry. This is done monthly. An annual test is performed by actually causing each fusible salt detector to function by heating them with a hot air gun.

The activation of a glovebox fire alarm initiates the following sequence of events:

Personnel in the immediate vicinity, when alerted by the alarm and or visual detection of the fire, will immediately don respirators, shut off the inlet air, and obtain fire extinguishers.

Personnel alerted by an alarm in an unoccupied area proceed to the alarm panel and determine the fire location from the visual panel signal. After locating the fire respirators are secured and the same procedure is followed as described above. If needed, the fire brigade is summoned by the inter-com system from any telephone. Fire extinguishers (CO_2) are available for cooling the outside of the box to prevent the plexiglas for melting. ABC powder extinguishers are also provided for fire fighting.

*15. Fire Detection - Solvent Extraction Glovebox

There are no flammable or combustible solvents in the solvent extraction equipment during the standby operation condition of the plutonium plant.

The solvent extraction process used class III combustible liquids which were dodecane and tributylphophate. The solvent extraction glovebox has an automatic fire extinguishing system and alarm. Halon 1301 is automatically discharged into this glovebox whenever one of the two Fenwal heat detectors exceeds 165°F. The building glovebox fire alarm system also is activated. Inlet air dampers automatically close. The Halon 1301 is propelled by nitrogen pressure from a tank containing 110 lbs. of the extinguisher. A spare 110 lb. tank is provided which can be quickly turned into the system by manually turning a valve. A testing circuit is provided for this system on the fire alarm panel.

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6.0 HEALTH PHYSICS PROGRAM CONTROL OF SPREAD OF RADIOACTIVE CONTAMINATION

The basic philosophy that each individual is responsible for his or her fellow workers safety is supplemented by health physics programs to assure and demonstrate that the conditions in the plant and in the surrounding environs are safe. The health physics standards adopted for the Cimarron Plutonium Plant are consistent with those stipulated in the last amended version of Title 10, CFR Part 20, Standards For Protection Against Radiation. Future amendments to Part 20 will be incorporated into the health physics program as may be required.

Stringent operating precautions are taken and process equipment is designed to prevent the spread of radioactive materials. Radiation detection and measurement instruments are utilized to reveal the presence of plutonium contamination so that the necessary steps may be taken to control or eliminate contamination.

6.1 Details of Program Elements

Written operating procedures relative to activities with nuclear material and the Plutonium Plant include controls required to minimize and prevent the spread of radioactive contamination. The plutonium health physics manual of operating procedures or instructions specifing contamination, radiation, and safety requirements peculiar to the plant, is prepared by the Plutonium Health Physics and Safety Supervisor with reviews by the Corporate Staff Health Physicist and approval by the Standby Operations Manager and by the Executive Vice-President, Kerr-McGee Nuclear Corporation.

Included in the manual are such topics as: protective clothing requirements, eating and smoking areas, emergency detection systems ventilation, emergency responses, and personnel dosimetry requirements.

The Standby Operations Manager or his designate approves all work requests for equipment maintenance or repair involving any potential release of special nuclear material. Prior to approval he specifies safety requirements on a radiation work procedure form if special health physics precautions are required.

6.1.1 Radiation Safety Procedures Manual

A section of the Radiation Safety Procedures Manual includes detailed health physics instructions, including instructions for the following health physics topics:

1. Radiation Safety (General)
2. Film Badges and Other Dosimeters
3. Restricted and Radiation Area Control
4. Environmental Monitoring

5. Instrument Calibration
6. Contamination Control
7. Criticality Safety Procedures
8. Respiratory Protection
9. Waste Monitoring and Disposal

10. Bioassay Sampling and Action Levels
11. Control of K-M Employee Exposure/Control of Visitor Exposure
12. Wound Counting
13. Emergency Actions
14. Training
15. Procedure Review and Approvals

16. Health Physics Requirements for Shipping and Receiving

6.1.2 Personnel Dosimetry

Personnel dosimetry programs are implemented to measure: (1) external exposure to low and high energy photon, beta and neutron radiation associated with handling plutonium; and (2) exposure to internally deposited plutonium. Details of the dosimetry programs are:

1. External

   a. Whole Body

      Film badge or TLD whole body dosimeters are worn by all persons while in the process areas of the plant. Because of the low levels of the exposure rate during the "standby" operations, the dosimeters may be exchanged and processed quarterly.

b. Field Measurements

Field measurements of photon exposure rates are made with calibrated ionization chamber instruments capable of measuring exposure rates between 0 and 5000 mR/h. Field measurements of neutron dose rates are made with a "REM" type survey instrument which measures the true equivalent dose over a wide range of neutron energies. Health Physics supervision specifies a survey frequency consistent with the requirements for controlling and evaluating personnel exposure.

2. Internal

Internal plutonium depositions or the lack thereof are determined by analysis of urine sample, nasal smear, or fecal sample; and by lung count, or wound count data. Urine samples are collected and analyzed routinely while the other sampling and evaluation techniques are implemented only under accident or other conditions involving a known or suspected internal deposition.

a. Urine Sampling

The program for plutonium urinalysis is described below and is divided into three primary categories; namely, routine sampling, accidental exposures and automatic rescheduling. The plutonium urine sample in all cases consists of four voidings, usually taken at home on two consecutive days, before going to bed at night and on arising the morning. This will be assumed to be the equivalent of 24 hour sample for plutonium urinalysis.

6.2 Plutonium Urinalysis Program

6.2.1 Routine Sampling

1. The first of each calendar quarter all of the names of all individuals due for a routine sample for that quarter will be placed on sample kits at the sample kit pick-up station. A list of the names will be posted at the station for notification purposes.

2. Persons not picking up and returning their sample within 10 days will be given a written notice. (Excluding days of vacation or sick leave time, etc).

6.2.2 Accidental Exposure Sampling

Accidental exposure can result in potential over-exposures which may require special sampling for evaluation of actual exposure. Because potential over-exposures vary in severity, four classes are defined below with a minimum sample schedule for each class. Additional samples may be requested by the Health and Safety Coordinator.

6.2.3 Continuous Sampling

Continuous sampling is imposed following exposure that could have resulted in a deposition equal to or greater than a 50% allowable lung or body burden, if the resulting data is expected to be meaningful in evaluating the deposition and exposure. Continuous sampling in this case could include all voiding (fecal and urine), until initial sample results are received and evaluated. Fecal sampling is meaningful for inhalation cases only. This class covers the most serious accident; it includes but is not limited to the following:

1. Any injection of plutonium into body or extremity tissue which the wound counter indicated to be <50% body burden considering the bone as the critical organ (<0.02 μCi).

2. Any chemical burns (acidic or alkaline) from plutonium bearing solutions when the skin appears to have received significant damage (such as blisters or worse).

3. Valid nasal smears (either side) of 500 d/m or greater.

4. Exposure to greater than 200 MPC-hrs. of airborne contamination in one work week.

5. Skin contamination which, after attempts to decontaminate, is still in excess of 100,000 d/m and skin appears to be damaged.

6. Any exposure to smoke from fires involving contaminated material.

After evaluating initial sample results, one of the other sample programs may be scheduled for the individual(s), depending upon the results.

6.2.4 <u>Prompt Action</u>

This class includes but is not limited to any of the following situations:

1. Any injection of plutonium into body or extremity tissue which is detectable by the plutonium wound counter after decontamination of the wound area.

2. Any chemical burns (acidic or alkaline) from plutonium bearing solutions.

3. Nasal smears (either side) with results of 50 to 499 d/m.

4. Exposure of 100 to 200 MPC-hrs. of airborne contamination in one work week.

5. Skin contamination which after attempts to decontaminate, is still in excess of 100,000 d/m.

The sampling program for prompt action accidents includes as a minimum (unless otherwise shown to be meaningless):

a. Total voiding of feces is to be collected for a five (5) day period commencing with the first voiding after the incident, for inhalation cases.

b. Total voiding of urine is to be collected for a five (5) day period.

c. A urine sample ten (10) days later.

d. A urine sample one (1) month later.

e. Monthly urine samples thereafter for a year. (Exception-monthly samples may be discontinued after receiving three (3) consecutive samples results of <0.2 d/m.)

6.2.5 Delayed Action:

This class includes but is not limited to any of the following situations:

1. Superficially plutonium contaminated cuts or abrasions which do show a positive count by surface alpha monitoring, but give no indication on the wound counter.

2. Nasal smears (either side) with results of 15 to 49 d/m.

3. Exposure of 40 to 99 MPC-hrs. of airborne contamination of one work week.

4. Exposure of air concentration in excess of the MPC without benefit of respiratory protection for an indeterminate period of time.

5. Skin contamination, which after attempts to decontaminate, is still in excess of 20,000 d/m but less than 100,000 d/m.

The minimum urine sample program for the delayed action class is:

a. An initial sample about one month after the accident.

b. Eleven more samples at monthly intervals. (Exception - monthly samples may be discontinued after receiving three consecutive sample results of <0.2 d/m)

6.2.6 Special Cases:

One urine sample about one month after the incident in the following cases:

1. Small wounds occurring in the plutonium areas when no activity can be detected by surface surveys or the wound counter.

2. Positive nasal smears (either side) with results of <15 d/m.

3. Skin contamination which, after attempts to decontaminate, is still in excess of 5,000 d/m but less than 20,000 d/m.

6.3 Urine Sample Action Levels

Sample Activity (d/min per 24 hr sample)	Action
<0.2	Continue on routine frequency.
≥0.2 but <1.0	An action level of 0.2 d/m per 24-hour sample shall be established requiring resampling and investigation as to the possible source, cause and magnitude of the exposure; excluded are persons who may routinely excrete plutonium above the action level because of previous known depositions.
≥1.0 but <10	Resample immediately and continue weekly sampling until results are received. Review work history and if exposure is likely, impose work restrictions. If deposition is verified by second sample, establish special sampling schedule and arrange for other bioassay programs needed to evaluate exposure.
≥10	Resample immediately. Impose work restrictions that prevent individual from performing work with unsealed plutonium. Sample individual weekly until results from the second sample are received. If a deposition is verified by the second sample, establish a special sampling schedule and arrange for other bioassay programs needed to evaluate exposure.

Additional work restrictions are imposed as necessary to control internal depositions, averaged over one calendar year, at or below burden values recommended by the International Commission on Radiological Protection (ICRP).

Other bioassay programs may include fecal sampling, body counting, and/or blood sampling. These are routinely implemented when an evaluation of the available data indicates an internal deposition in excess of the ICRP burden values.

6.3.1 Nasal Smears

*Nasal smears are collected and counted if a person:

1. Works where surface contamination levels exceed 5,000 d/m-100 cm^2 smearable and/or airborne contamination levels exceed 1 MPC or,

2. Has skin facial contamination greater than 500 d/m-60

cm^2 and/or skin contamination other than facial that is greater than 5000 d/m.

Nasal smears may also be used to determine plutonium to americium ratios for significant inhalation cases, since this is required for evaluating in-vivo lung counts.

6.3.2 Fecal Sampling

Fecal sampling is used in cases where preliminary nasal smear and air sample data indicate a deposition in excess of 10% of a lung burden.

6.3.3 In-vivo Lung Counts

Commercially available body counting services is used for evaluating significant lung depositions and for routine counting for all personnel assigned to work in plutonium handling areas.

6.3.4 Wound Counting

All wounds received in the plutonium handling areas are monitored with the wound counter following appropriate field decontamination by Health Physics personnel. Attempts to reduce plutonium depositions must be authorized by the Health and Safety Coordinator or his designated alternate. Removal and/or treatment must be given by a qualified physician and under the surveillance of Health Physics personnel.

6.4 Facility Monitoring

Facility monitoring includes programs for evaluating and controlling facility radiological conditions and releases of radioactive materials to the environs.

6.4.1 Air Monitoring

The air monitoring system is capable of continuous sampling and measurement of general room air and stack effluent concentrations.

1. Room air samples are collected continuously at fixed locations throughout the plant using a central vacuum system to pull room air through filter paper media. Plutonium activity is determined by counting of selected filters each 7 days in a calibrated alpha counter. Operating practices in the plutonium handling areas are conducted in the manner necessary for maintaining average routine airborne concentrations at less than established concentration limits of 10 CFR 20 for restricted areas.

The locations of air samples are shown on a plant layout map. See Fig. 6-1 and 6-2 on pages 6-21 and 6-22.

There are procedures for determining air concentrations and exposures during operations requiring respiratory protective devices and for differentiating these exposures from those received when such devices are not used.

2. Continuous Air Monitoring Systems

Early warning of airborne contamination in excess of concentration guide levels is achieved by operating continuous air monitors in the main process areas. Each monitoring device is equipped with a local alarm and recorder. These are the fixed filter type systems with a minimum detection capability in one hour of at least ten times the applicable 10 CFR 20 limits. They are located in areas with the greatest potential for airborne plutonium contamination (See Fig. 6-1 and 6-2 on pages 6-21 and 6-22).

3. Stack monitoring is accomplished by continuously sampling air from the stack and filtering it through a fixed filter. This filter is monitored continuously by a system capable of detecting 1000 times MPC within one hour. The system is also equipped with a recorder and an alarm system.

The stack filter is changed weekly and counted in a calibrated alpha counter for determining the plutonium activity released in the stack effluent. The detection capability is at least 50% of 10 CFR 20 limits. Sufficient data to determine sampling rate, stack volume and filter collection efficiency is obtained as necessary for making effluent release and air concentration evaluations.

6.4.2 Air Filtration System

1. Room Exhaust

a. During the "standby" conditions of the plant, four air changes per hour, minimum, are maintained in all process and laboratory areas during normal conditions.

b. All room exhaust is filtered through two high efficiency filters following a dust type roughing filter on each intake.

2. Process Exhaust

   a. Exhaust from each glovebox is filtered through three high efficiency filters following a roughing filter.

   b. The first high efficiency filters are located in the gloveboxes (or in equivalent enclosures, if outside) for controlling contamination during replacement.

3. Open face and slot type hoods have an average face velocity of at least 125 linear feet per minute. Except as needed for maintenance, these boxes are sealed closed during the "standby" status of the plant.

4. Filter Test Requirements

   a. All high efficiency filters are tested and certified for 99.97% efficiency for 0.3 micron particles by the supplier.

   b. Filter installation is under proper supervisory direction to assure the filter media is not damaged and a good seal is achieved for each filter. A log book record of each filter installation is maintained to reflect the date, location and reason for filter installation or replacement.

   c. Air sampling at the second filters in the glovebox exhaust system is performed during facility operation to determine filter integrity. Samples from the final filter intake and exhaust plenums of both the room and glovebox systems are collected and analyzed.

   d. In-place testing of the final filters is performed prior to use and annually thereafter using the "cold" DOP test. The acceptance efficiency for a filter bank using the standard polydisperse DOP aerosol (count median diameter of about 0.8 micron) is 99.95%.

6.4.3 Surface Contamination

The following surface contamination limits and surveillance practices are established:

1. Measurements of surface contamination are made routinely by direct survey techniques using portable alpha instruments. Smear tests are made to determine the extent of

fixation for surfaces where contamination is detected by direct survey and are made routinely in non-radiation areas where levels are expected to be below portable instrument detection levels.

2. Radiation areas include all process, laboratory and receiving areas and the air lock to each change room. Surface contamination levels are maintained within the following limits as measured with portable survey instruments:

   Room and Equipment Surfaces

   - 1000 d/min -- 60 cm^2 (direct) 500 d/min -- 100 cm^2 (smearable).

   Radiation area floors are surveyed at least weekly using portable alpha survey instruments. Other surfaces are surveyed at the discretion of the Health Physics Supervisor. Monthly standard smear tests are made to establish trends. (No eating is permitted in the radiation areas. Smoking is permitted only in the lunchroom, offices and approved areas.)

3. Non-radiation areas include the change rooms, lunchroom, offices and reception area. Contamination is maintained within the following limits in these areas:

   Room and Floor Surfaces -

   <500 d/min - 60 cm^2 (direct)

   <100 d/min -100 cm^2 (smearable)

   The basic philosophy is one of maintaining contamination levels in non-radiation areas below detection levels.

4. Equipment and materials from radiation areas within the Plutonium Plant are surveyed and are considered contaminated unless adequate direct and/or smear surveys can be performed to establish the actual contamination status.

   Equipment and materials are released to non-radiation areas only if the contamination levels can be measured and are below: 500 d/min -60 cm^2 (direct) and 100 d/min -100 cm^2 (smearable). Items contaminated above these levels remain in the plutonium areas or are disposed of as contaminated waste within established limits. Contaminated equipment and materials temporarily stored at the plant are tagged with an appropriate radiation tag showing the contamination status.

5. Items Removed From Gloveboxes

Maintenance and/or filter changing will require items to be removed from gloveboxes and other enclosures. Controls implemented to maintain contamination control include: 1) items survey as it is removed from process glovebox and/or enclosure, 2) placement of singly bagged or contained item in a secondary container, 3) placement of "Radioactive Material" sticker and identification on outer container if the item is to be stored or not returned to a process enclosure by the person who removed it within his work shift, and 4) controls on where and how the secondary package can be opened after storage. For movement or storage within the radiation area of the plant, contamination levels on the outer container are maintained below: 1000 d/min -60 cm^2 (direct), 500 d/min -100 cm^2 (smearable).

Contaminated items leaving the plant are doubly contained and packaged in compliance with applicable shipping regulations. The outer container is tagged with an appropriate radiation tag which identifies the material plus the contamination and radiation status.

Approved shipments from the plant are surveyed and tagged within requirements established by Title 49, Code of Federal Regulations, Part 173 prior to leaving the plant.

6. Persons entering the plutonium process areas are responsible for conducting the following contamination surveys, as applicable, with alpha detection instruments provided for the purpose:

   a. Hand surveys at work site, especially after coming out of glovebox gloves or enclosures.

   b. Hand and shoe surveys at room exits.

   c. Hand and shoe survey prior to entering non-radiation areas.

   Detection of contamination in excess of 1000 d/min -60 cm^2 is reported immediately to a health physicist who recommends appropriate decontamination and initiates investigative and corrective action.

7. Protective clothing and equipment is provided and as a minimum is to be worn in the radiation areas as follows:

a) In process and laboratory rooms when no work is being done in glove boxes or other internally contaminated enclosures and no work is being done on process or laboratory equipment which has the potential for being contaminated on the inside or outside:

1. Film badge
2. Safety glasses and safety shoes
3. Smock over personal clothing or coveralls over underwear
4. Shoe covers

b) Persons working in glove boxes or other enclosures and/or equipment which is contaminated with SNM inside or out shall wear:

1. Film badge
2. No outer personal clothing
3. Safety glasses and safety shoes
4. Coveralls, shoe covers, head cover and surgical gloves taped to the coverall sleeves.

Respiratory protective equipment must be readily available for use.

c) With health physics personnel approval persons such as visitors, inspectors, etc., who are not working in glove boxes or enclosures or on equipment may be present in a room with such activity in progress wearing:

1. Film badge
2. Safety glasses or "visitors specs"
3. Smock over personal clothing, head cover, and shoe covers.

Respiratory protective equipment must be readily available for use.

7.1 Protective clothing work during maintenance work in process areas may become contaminated to various levels. Routine detection by health physicists and other persons at a job site is the primary defense against mixing highly contaminated clothing and with clothing having little or no contamination. Clothing contaminated to >500 d/m per 60 cm^2 is disposed of as low level solid waste, while protective clothing contaminated at levels <500 d/m per 60 cm^2 may be washed in the laundry.

Responsibility for maintaining contamination levels within established limits rests with the Cimarron Facility Manager. The health physics staff has responsibility for measuring contamination levels in the facility and on equipment and materials, informing the appropriate management person of the conditions, and providing guidance for decontamination and control efforts.

6.4.4 Stack Release Measurements

The amount of alpha activity released into the air shall be determined by continuous stack sampling. A constant flow air sampler (Radeco, Model HD-28; interfaced with the Eberline, Model AIM-35 or equivalent) is required to record continuous alpha measurements on airborne particulates, to detect sudden increases in airborne alpha activity, and to provide an audible alarm.

The continuous stack sampler includes a recorder and alarm system located in the health physics office, with a high level alarm remoted to the guard station.

1. Minimum Detectability of Instrumentation

The minimum detection level of the continuous stack monitor is 96 MPC hours for soluble ^{239}Pu at the stack. This minimum detection level is based on an observed increase of 5 counts per minute in a time period of 15 minutes with the alarm trip set for 15 counts/minute.

Instrument detection of a 5 c/m increase in a 15 minute period results from a concentration of 2.3×10^{-11} uCi/ml at the stack (383.3 MPC for soluble ^{239}Pu and 23 MPC for insoluble ^{239}Pu). An increase to the alarm trip within a 15 minute period results from a concentration of 6.9×10^{-11} uCi/ml at the stack (1150 MPC for soluble ^{239}Pu and 69 MPC for insoluble ^{239}Pu).

A detailed stack sampling program includes specific requirements to provide continuous monitoring or radioactive particulates released into the air.

a. The continuous sampler is calibrated at least monthly with a ^{239}Pu standard source. A weekly sample is counted in a Hewlett Packard (Model 5561A) or other suitable counting system for the purpose of calculating the stack effluent.

b. The following formula is used to arrive at a factor to convert the counts per minute (c/m) results of the continuous counter to microcuries per milliliter (uCi/ml) at the stack.

$$uCi/ml = \frac{CPM}{\text{absorption coefficient} \times \text{collection efficiency} \times \text{counter geometry} \times 2.22\times10^{6} \times 28320}$$

The absorption coefficient and collection efficiency are each assumed to be 50% for HV-70 paper (sampling paper),

2.22×10^{6} = disintegrations per minute per microcurie,

28320 = milliliters per cubic foot, and

$$\text{counter geometry} = \frac{\text{standard c/m - background c/m}}{\text{standard source value in c/m}} = \text{~}26\%$$

The above equation results in the following:

$$uCi/ml = \frac{1}{(0.5)(0.5)\ (.264)(2.22\times10^{6})(28320)} = 2.4 \times 10^{-10}\ uCi/ml$$

2. Detection Limits

a. For a 5 c/m increase in 15 minutes:

$$uCi/ml = \frac{c/m \times 2.4 \times 10^{-10}}{Ft^{3}\ \text{(volume of sample)}}$$

$$uCi/ml = \frac{(5)(2.4 \times 10^{-10})}{52.5} = 2.3 \times 10^{-11}\ uCi/ml$$

b. For an alarm trip in 15 minutes:

$$uCi/ml = \frac{(15)(2.4 \times 10^{-10})}{52.5} = 6.9 \times 10^{-11}\ uCi/ml$$

3. Weekly Sample Results

The Hewlett Packard counter is maintained at ~33% counting efficiency. The background of the counter is $\leq$0.2 c/m. The detection limit for a 10 minute count is 0.1 c/m above background. The sample volume of a weekly sample is 35,280 F^{3}.

$$uCi/ml = \frac{(0.1)(1.9 \times 10^{-10})}{35,280} = 5.4 \times 10^{-16}\ uCi/ml$$

5.4×10^{-16} uCi/ml represents 0.009 MPC for soluble ^{239}Pu and 0.00054 MPC for insoluble ^{239}Pu.

6.5 Site Environmental Surveillance

The probability of significant routine releases to the environs has been reduced to a minimum by elaborate plant filtration and control systems and a low potential for accidental releases. Compliance with radiation limits for effluents at the point of release is practiced for both liquid and stack effluents. For this reason, a minimal site environmental monitoring program is carried out. This includes prestart-up collection of background contamination and meteorological data and other samples as follows:

a) Surface water samples taken each year.

b) Sanitary effluents (when outfall flows present), sampled once each week and composited to provide a monthly sample for analysis.

c) Stack exhaust weekly.

d) Air samples from the environmental sampling stations shall be collected once each quarter.

e) Soil and vegetation sampling will be done annually at the end of each growing season.

The procedure for monitoring Cimarron Facility effluents and their effect on the environment may be found in Environmental Monitoring Procedure KM-NC-20-2 Revision 3.

6.6 Respiratory Protection Program

Acceptable respiratory protection is normally achieved by the application of engineering controls, including process containment and ventilation design. When such controls are not feasible or cannot be applied the use of protective respiratory devices, a respirator may be appropriate.

6.6.1 General Criteria for Respirator Use

1. The substitution of respirators for feasible engineering controls is not warranted.
2. The use of half-face respirators is not practiced in the Plutonium areas.
3. Full face respirators equipped with high efficiency particulate filters are used during:
   a. Maintenance or process activities where confining integrity may be violated.
   b. Glovebox glove and plastic bag changes.
   c. Minor emergency reentries and control actions.
4. Supplied air systems are used for major emergency entries involving known plutonium releases.
5. Detailed instructions on respirator usage and requirements are specified in operating procedures and radiation work procedures.

Detailed health physics instructions define these aspects of the respirator program: Administration, Training, Maintenance and Fitting.

Fitting is qualitatively evaluated by exposing the wearer to an irritating aerosol of stannic chloride generated with the commercially available smoke tube.

Respirators are capable of providing a degree of protection at least equal to protection factors prescribed in 10 CFR 20.103.

PAGES 6-15 THRU 6-15.2 HAVE BEEN DELETED

6.6.2 Training

Since the success of a radiation safety program depends heavily upon individual performance, time and effort is devoted to assuring that individuals have an adequate understanding of radiation safety as it applies to their work. The individual's immediate supervisor is responsible for training him in necessary safety practices related to his work assignment and allowing time for health physics training. The health physics staff is responsible for training the individual in a basic understanding of radiation, the consequences of unsafe work practices, and the proper use of radiation detection equipment. Formal training sessions are conducted by both the operating and health physics staff to assure employees are trained in the basic safety aspects of plutonium handling.

6.7 Inspections and Audits

6.7.1 Radiation Safety

An internal inspection program reviews the day to day activities and conditions within the plant to assure that procedures are followed and that contamination control is maintained. Health physics monitoring and survey records and equipment inspection records are generated as well as work permits etc. A daily log is also kept. These records reflect corrective action taken as necessary to correct problems encountered.

Quarterly audits of these records as well as the overall health and safety program are made to determine a more general level of performance. Participating in these audits are the Health and Safety Coordinator, the Cimarron Facility Manager, and the Health Physics Supervisor. A written summary of findings is submitted to the Executive Vice President, Kerr-McGee Nuclear Corporation. The summary is used as a basis for correcting deficiencies.

6.7.2 Fire Safety

Each fire extinguisher is inspected monthly by fire brigade members and annually by an outside fire safety equipment and inspection company agent. The monthly inspection is in accordance with NFPA 10A 1970, Chapter 2, "Inspection". Spare fire extinguishers are kept on hand to replace any found defective while the defects are being repaired. Other testing, including hydrostatic tests, are performed by the inspection and service company.

Inspections and audits of other fire fighting equipment, housekeeping conditions and other emergency equipment is conducted monthly.

6.7.3 Industrial Safety

Audits of the Industrial Safety Program are often made in conjunction with the quarterly audit. The Occupational Safety and Health Administration's Safety and Health Standards (Part 1910) are used as a guide for inspection purposes. Other applicable standards such as the National Fire Codes, Electrical Codes, A.N.S.I. standards, etc., are also used.

6.8 Solid Waste and Liquid Effluent Control

Liquid wastes exceeding 4×10^{-7} mci α/ml shall be prepared for disposal. These liquids will be contained within solidified portland cement in 55-gallon drums. The drums will be transferred to a licensed waste disposal contractor.

6.8.1 Contaminated Solid Waste

Solid wastes with plutonium contamination is handled within criteria for low level solid waste with the additional precaution of double bagging or the use of a second container. These doubly contained wastes are appropriately packaged for transport for disposal by a licensed waste disposal contractor.

6.8.2 Combustible Waste Control

Written procedures specify the requirements needed for the preparation and packaging of waste material for off-site burial. Plutonium waste limits for burial is restricted by AEC regulations 10 CFR Part 20. However, special permit requirements of the licensed burial contractor of further restrictions by state laws (burial site location) regulate the amount of plutonium waste material that Kerr-McGee Nuclear Corporation packages for shipment.

*To minimize a fire hazard all combustible solid waste contaminated with nitric acid must be leached with water to remove the oxidizing acid. This is done in the glovebox. The leached waste is not allowed to dry and is packaged wet with water when it is removed from the glovebox.

When packaging waste in drums in the vault, the drums containing the waste shall be covered with a drum lid whenever the drum(s) are left unattended.

6.9 Health Physics Equipment

Instrumentation with the necessary maintenance program to assure their workability is provided at the Cimarron Plutonium Plant to perform the surveys associated with the health physics control programs. All survey and sampling equipment is inspected and calibrated under the direction of the Health Physics Supervisor at intervals sufficient to assure reliable operation. The following instruments or equivalents are available at the plutonium plant. However, additional instruments not listed here are available at the uranium plant.

6.9.1 HEALTH PHYSICS EQUIPTMENT LIST

Use	Type	No.	Model	Radiation Measured	Range
Beta-Gamma Survey	Dose Rate	4	CP-4 Technical Associates	β,γ	0-5 R/h
	" "	1	CP-TP-1B Tech. Associates	γ	0-5000 R/h
	Detector	3	E-500 B Eberline Inst. Corp	β,γ	0-2 R/h

	Detector	1	PRM-5 Eberline Inst. Corp. & pg-2 Probe	γ	0-500,000 counts/min
Neutron Survey	Dose Rate	1	PNR-4 Eberline Inst. Corp.	n	0-5 rem/h
	Detector	1	PNC-4 Eberline Inst. Corp.	n	0-104 n/sec-cm^2
Alpha Survey	Portable	8	PAC-4S Eberline Inst. Corp.	α	0-2,000,000 counts/min
	Fixed	10	RM-3C Eberline Inst. Corp.	α	0-50,000 counts/min
	Fixed	20	AHM-20 Eberline Inst. Corp.	α	0-1000 counts
	Floor	1	FM-3G Eberline Inst. Corp.	α	0-100,000 counts/min
Hand Survey	Fixed	1	AHM-10 Eberline Inst. Corp.	α	0-100,000 counts/min
Air Sampling	Continuous	6	IC-251 RADeCo Inc.	α	0-10,000 counts/min
	"	2	AIM-3S Eberline Inst. Corp.	α	0-10,000 counts/min
	Sampler	4	HD2B RADeCo. Inc.	(Collection only)	
Calibration	Gamma	1	TO-571 R.S. Landauer, Jr. & Co.	-	10-15 mCi CO-^{60}
	Alpha	1 set	594-1 Eberline Inst. Corp.	-	up to 1,500,000 d/ min
	Air Flow	1	C8-28 RADeCo.	-	1/2 to 2 cfm
	" "	1	" " "	-	2-8 cfm
Count Room	Gross Alpha	1	LASS-1 Eberline Inst. Corp.	α	Eff. 75% of 2pi

Count Room	Alpha & Gamma Spectrometer	1	2200 Nuclear Data Corp - 1024 Channel Analyzer	α, γ	-
	Wound	1	Thin NaI(th) Detector & Single Channel Analyzer	γ	>0.004 μCi
	TLD Reader	1	TLR-5 Eberline Inst. Corp.	γ	-
Waste Monitoring Station	Neutron	1	Moderated BF_3 & Scaler	n	>10g PuO_2

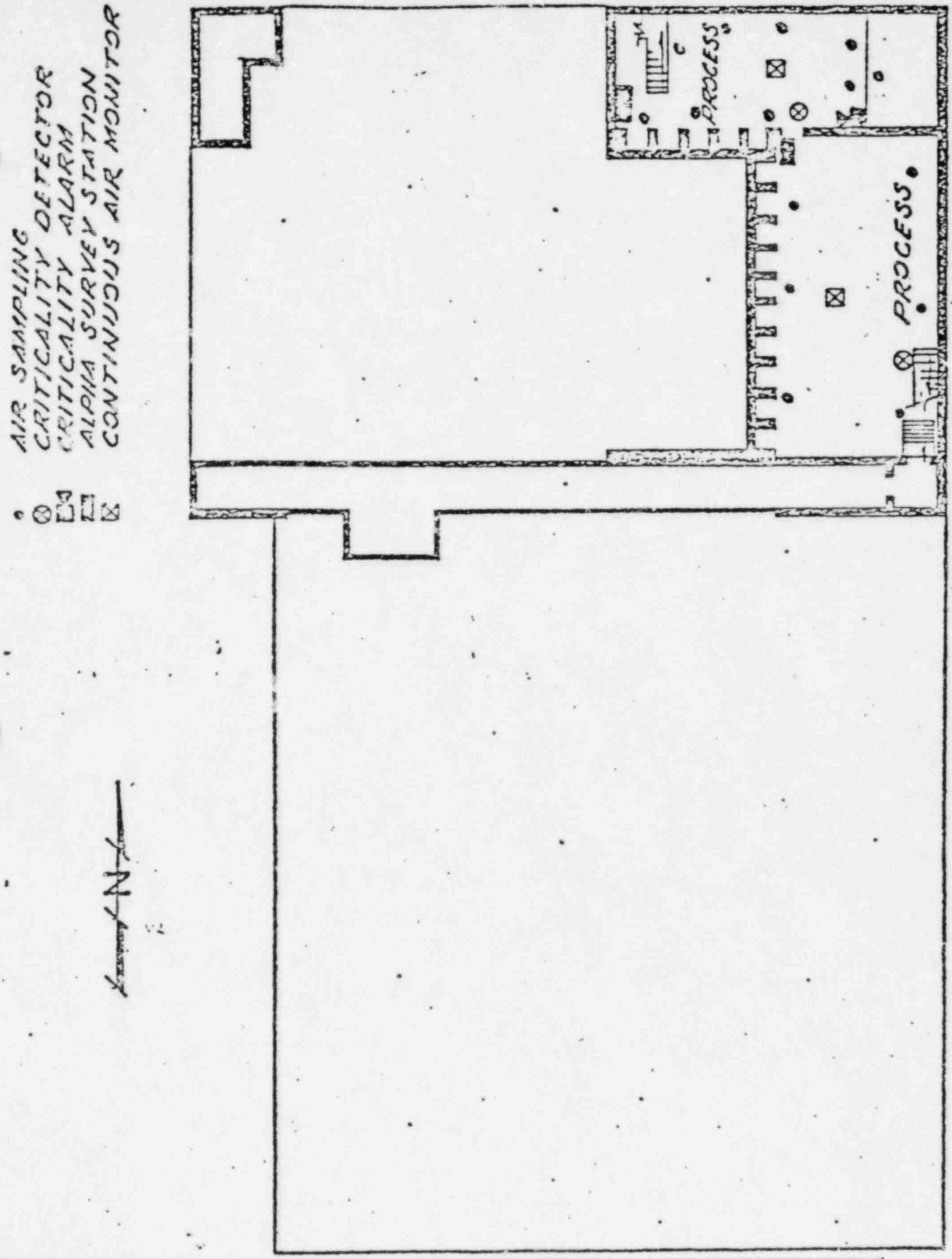

Figure 6-1
Cimarron Plutonium Plant Basement Floor

License No. SNM-1174	Docket No. 70-1193			Page
Amend No. Renewal	Date 10/15/82	Section Fig. 6-1		6-21
Replaces 6-21		Dated 3/15/75		

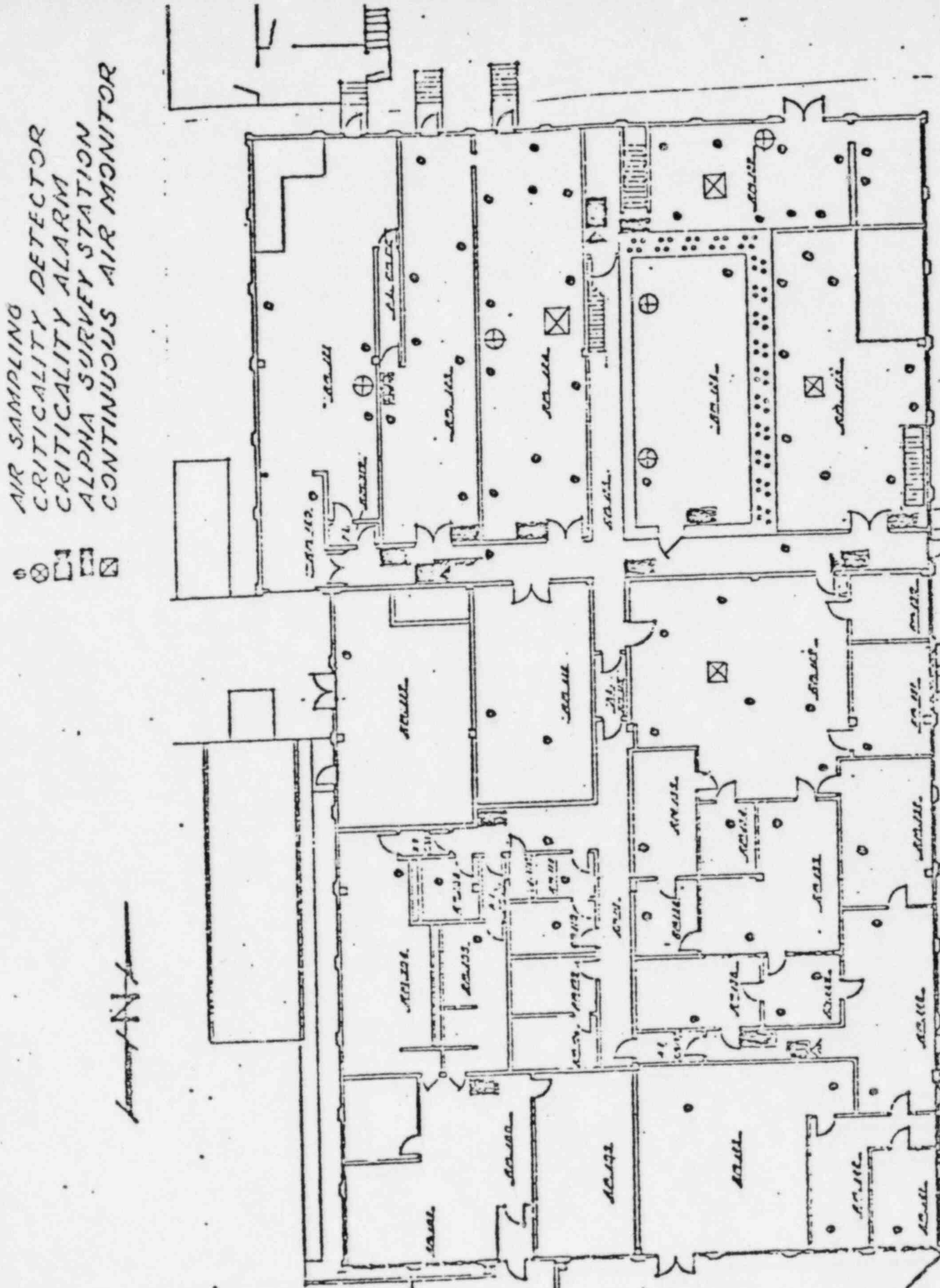

Figure 6-2 Cimarron Plutonium Bld. First Floor

License No. SNM-1174	Docket No. 70-1193		Page 6-22
Amend No. Renewal	Date 10/15/82	Section Fig. 6-2	
Replaces 6-22		Dated 3/15/75	

NUCLEAR CRITICALITY

SAFETY FOR

STANDBY CONDITION

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7.0 Nuclear Criticality Safety for Standby Condition

For the plant shutdown mode a criticality accident is not credible for the following reasons:

1. The only fissile material that may be handled is in the form of small NDA standards. The plutonium in these standards is in the form of mixed oxide containing less than 60g Pu per packet. The sum of the plutonium content of all the standards in use is less than 230g. This quantity is below the safe mass for all credible conditions by TID-7016 Rev. 1. The standards in storage are well isolated in the vault from other fissile material.

   When in use, the standards will be mounted in an area as free of other plutonium as possible (approximately 10-20 mg per sq. ft) to minimize background.

2. All storage tanks have been given at least three acid rinses with complete drainage in between. Wherever possible NDA measurements were used to verify a low Pu holdup.

3. All glovebox inner surfaces and equipment have been cleaned of all recoverable amounts of plutonium by repeated acid or trichlorolthane swabbing. Following this, NDA measurements were used to verify a low residual contamaination (less than 0.6g Pu per sq. ft. on the average.

4. The inner surfaces of all piping have been rinsed repeatedly using acid. Again NDA measurements were used to verify low surface residues when possible.

5. Contaminated liquid waste will be limited to that generated by clothing laundry and clean-up of contamination outside of gloveboxes. It is not credible that serious levels of contamination that could generate more than a few ppm of plutonium in mop water will occur. Any clothing having more than 10,000 DPM per 60 cm^2 will be put into solid waste. This again should limit Pu content to a few ppm in the liquid waste.

6. HEPA filters removed from the system will each be isolated until an NDA count is obtained. Experience to date indicates that the maximum Pu content will be much below 10g per filter during operation in the shutdown condition.

   Under the above conditions of shutdown, the requirement for criticality safety surveillance and audit is deleted from the license conditions.

THE REMAINDER OF SECTION 7 HAS BEEN DELETED

MISCELLANEOUS HEALTH AND SAFETY

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Misc. Health and Safety (continued)

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8.0 MISCELLANEOUS HEALTH AND SAFETY ITEMS

This section includes the following items.

1. Site Criteria
2. Emergency Planning and Control
   Emergency Procedures
   Criticality Detection and Alarm System
   Testing and Training
3. Accident Analyses
   Accidental Criticality
   Radioactive Liquid Leakage
   Fire or Explosion
   Consideration of Tornadoes and Tornado Analysis

8.1 Site Criteria

The "exclusion area" for the Cimarron Facility includes approximately 1,000 acres immediately surrounding the plant site which is property owned by Kerr-McGee Corporation. The exclusion area contains no residences. A total of about 15 residents are located at the exclusion area boundary.

The "low population zone" or area immediately surrounding the exclusion area is predominantly rural and can be considered to be the area encompassed within a radius of about 15 miles from the Cimarron Facility. The total population in the low population zone is estimated to be approximately 15,000 people at the population density of about 21 people per square mile.

The "population center distance" from the Cimarron Facility is about 30 miles to the south to a densely populated area within the city limits of Oklahoma City which has a population of roughly 300,000 people. The population center distance of 30 miles is at least twice the distance from the Cimarron Facility to the outer boundary of the low population zone.

8.2 Emergency Planning and Control

8.2.1 Emergencies could occur from an explosion or fire which breaches the containment systems or may be caused by forces of nature. Emergencies could occur and result in localized contamination incidents as the result of equipment malfunctions. Proper response to emergencies is important for minimizing personnel exposure and plant loss. Detailed procedures for the proper response of personnel are available and followed in the event of an emergency.

Prior arrangements with fire fighting, ambulance, law enforcement, and hospital organizations are defined in these procedures.

8.2.2 Criticality Detection and Alarm System

Gamma sensitive radiation detection systems containing audible alarms in the event of an accidental criticality are located in the deactivated main process areas to provide plant coverage in accordance with the requirements of 10 CFR 70.24. Signals from the detectors are fed to a central control panel located in the plant reception area.

Activation of the evacuation alarm requires at least two detectors to exceed the alarm trip setting limits. The criticality detection system is connected to the plant emergency power system in addition to normal power.

Monthly test of the alarm system are documented in the Health Physics Supervisors Log. Plant evacuation procedures are monitored quarterly. Room 121, 123, 124, 127, 128, and the basement B01 all have monitoring devices capable of detecting a criticality. An additional monitoring device is located in the vault.

8.2.3 Testing and Training

Planned evacuation drills are conducted to develop familiarity with the plant emergency plan. Personnel are trained in evacuation methods and informed of routes to the assembly station in indoctrinations.

Where tests reveal inadequate performance, corrective action is taken immediately.

8.3 Accident Analyses

The environmental hazards to operating personnel and the general public from releases of radioactivity as a result of an abnormal event have been considered.

Potential credible accidents at the facility that provide dispersion mechanisms and could involve the release of radioactive materials to off-site locations include a tornado causing severe damage or destruction of the building structure, and a fire or explosion involving plutonium contaminated equipment.

The potential hazards to the public from direct radiation, and dispersion of radioactive material as a result of a tornado, chemical explosion or fire have been evaluated. The building and vault structures, and ventilation and exhaust systems provide suitable containment systems for the credible accident situations.

1. The major consequence - limiting safeguards which are available in the Cimarron Plutonium Plant are listed below. These safeguards are applicable to protect health and minimize danger to life or property in the event of a serious accident.

   a. Fire-resistant construction or massive concrete structures for the building and storage vault.

   b. Storage structures are tornado-proof.

c. Fire-resistant high efficiency filters with sufficient distance between filters and plutonium handling locations to ensure filter integrity under accident conditions.

d. Provisions of a 42 foot stack for air effluents.

e. A ventilation system designed to progressively move air from areas of minimum or no contamination into areas of greater potential contamination to minimize a spread of contamination within the plant due to gaseous and airborne radioactivity.

f. Fire potection features including glovebox detection system for sensing and alerting of a glovebox fire.

8.3.1 Accidental Criticality

Under the Standby conditions there is no credible mechanism which would cause a nuclear criticality in the plant.

8.3.2 Radioactive Liquid Leakage

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8.3.3 Fire or Explosion

The likelihood of a fire or explosion is extremely small since no flammable or combustible solvents remain and all ion exchange resins have been removed. All flammable gases are also disconnected from the process equipment. However, if a fire should start, it, as well as the dispersed activity would be significantly confined within at least the secondary containment system (Building and exhaust filtratration system) thereby minimizing the hazard to the general public.

1. Typical malfunctions that are postulated as associated with a fire or explosion accident which might cause dispersion of radioactivity are:

   a. Deterioration of filters which would permit radioactivity to be released.

   b. A blower failure to cause a stoppage in the flow of ventilation air.

   c. A blower failure to cause blowback from operating areas to non-operating areas.

2. The design safeguards which are available to preclude a dispersion as a result of a above postulated malfunctions include:

   a. Instrumented ventilation system to detect and alarm for abnormal conditions.

   b. Interlocked fan system with standby fans for supply air and exhaust systems with back flow preventers installed.

   c. Double high efficiency filtration for room air exhaust and triple high efficiency filtration for process glovebox exhaust. The glovebox air supply is also filtered through a high efficiency filter.

8.3.4 Maximum Credible Fire or Explosion

The maximum quantity of plutonium in the plant during the "standby" operations of the plutonium plant is only 12 kilograms. The following discussion shows that even 125 kilograms of plutonium involved in a fire or explosion will not result in a significant exposure to any person at the exculsion area boundary.

The hazard from the maximum credible situation postulated for this type accident is assumed to be the dispersion of significant quantities of airborne plutonium to the unrestricted area. This is likely to occur from a glovebox, ruptured or damaged by fire or explosion, with a fraction of the airborne contaminant passing through the exhaust filters and released to the atmosphere at the stack. The accident analysis demonstrates that a radiation dose which exceeds the guides specified in 10CFR100 is not credible from a fire or explosion (contained in the building) involving 125 kilograms of plutonium.

1. Accident Assumptions

   a. A fire or explosion occurs involving 125 kilograms of plutonium.

b. The secondary containment provided by the concrete building structure is not violated.

c. Four percent of the plutonium involved results as airborne particulate and is exhausted over one hour.

d. The dual high efficiency filters in the exhaust system each effectively remove 99% of the airborne radioactivity.

e. The nearest boundary of exclusion area is 400 feet.

f. An individual is exposed to the airborne concentration of radioactivity for two hours at the nearest exclusion area boundary.

2. Credible Airborne Concentration

The assumed dual filter efficiency of 99% for the 4% airborne activity of the 125 kg. plutonium involved results in a stack release of 0.5 g Pu to the environs (1×10^5 μCi/gram). Using a maximum ground level dilution factor of 3×10^{-6} at 400 feet from the 42 feet stack for neutral stability and calm wind conditions and a release time of one hour, the average concentration downwind is 1.3×10^{-6} μCi/m^3. This is the maximum credible concentration for exposures at the nearest boundary of the exclusion area.

3. Dose Calculations

a. For an assumed air intake rate of 1.25 m^3/hr. and an exposure of 2 hours, the possible radioactivity inhaled is 3.25×10^{-6} μCi.

$$q = 1.3 \times 10^{-6} \ \mu Ci/m^3 \times 1.25 \ m^3/hr. \times 2 \ hrs.$$

$$Q = 3.25 \times 10^{-6} \ \mu Ci.$$

b. Using a realistic value of 365 day effective half-life for plutonium, the lung dose commitment resulting from an intake of 1 μCi of insoluble Pu-239 is about 160 rems. Thus, the maximum credible lung dose resultant from the postulated accident is about 5.2×10^{-4} rems or .002 % of the specified accidental dose of 25 rem.

(Lung dose) - $D_L = 3.25 \times 10^{-6} \ \mu Ci \times 160 \ rem/\mu Ci$
$= 5.2 \times 10^{-4}$ rem

8.3.5 Consideration of Tornadoes

Kerr-McGee Corporation engaged a consulting engineering firm (1) to evaluate the tornado potential and credible consequences relative to the Cimarron Plutonium Plant. The study was conducted by a group of professional engineering consultants from the University of Oklahoma and included the disciplines of structural statistician, health physics, meteorological and environmental sciences.

The study demostrates that the Cimarron Plutonium Plant reflects through its design, construction and operation an extremely low probability for tornado accidents that could result in the release of significant quantities of radioactive material. In addition, the site location and the engineered features included as safeguards against the hazardous consequence of severe meteorological conditions or tornadic winds do ensure a low risk of public exposure.

Additionally, Kerr-McGee Corporation engaged Weatherscan Incorporated, a competent and privately owned weather research and forecasting firm, to provide additional supporting information on the meteorological aspects for the Cimarron Plutonium Plant tornado analysis. The report gives the probability of a tornado occurrence at the site of the Cimarron Plutonium Plant at 1.6×10^{-3} or an occurrence of once per 600 years.

8.4 Economic Practicability of Building Reinforcement

The economic practicability of reinforcing the existing building which houses the Cimarron Plutonium Plant to withstand a direct hit by a tornado is considered. General design criteria do not exist for tornado resistant structures. In fact, the Task Committee on Wind Forces of the American Society of Civil Engineers did not consider specifications of this type and ascribed this attitude to a lack of demand.

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(1) Reid, Laguros, Klehr, Harp, Nelson, Streebin, Gillespie and Aldridge - Consultants to Engineers, Norman, Oklahoma, 73069.

Commercial structures are not designed to withstand a direct hit by a tornado since the forces involved are at least an order of magnitude greater than those used in ordinary wind design. Some framing systems offer more resistance than others, reinforced concrete versus wood, for example. But no structures of framing systems are sized to resist forces of the magnitude involved in tornadoes. To achieve this kind of resistance one has to go to "block house" types of structures such as the pluotnium storage vault, or go underground. Either of these approaches intuitively leads to economic impracticability.

Given an existing frame and wall panel system, such as the existing building which house the plutonium plant, there is really no obvious way to reinforce it against tornado-size forces.

8.5 Vault Door

The vault door is a blast-type, pressure resistant door manufactured by the Overly Manufacturing Company, Greensburg, Pennsylvania. Details of the steel door construction are given on the attached drawing, Overly Mfg. Co., File 7556, Sheet No. 3-3.

The pertinent specifications of the vault door include:

8.5.1 Manual Single Swing Pressure Door

Pressure Resistant:

From Hinge Side (against stops) - 667 psf
From Stop Side (against hinges)- 432 psf

The manufacturer shall guarantee that the door will withstand the specified pressures.

Construction:

1. Pressure tight door shall be constructed to meet specified pressures. Door shall be constructed of structural steel or formed shapes, and steel sheets or plates.
2. Frames shall be structural steel shapes with reinforcing anchors placed to resist all pressures, both negative and positive. Frames shall be factory template fitted, drilled, and tapped for hinge pintles and locking hardware.
3. Door locking devices shall resist specified pressure.

8.5.2 Structural Analysis of the Vault Door

The allowable (or working load level) for the vault door is guaranteed by the manufacturer at 667 psf against the stops. The minimum overload factor against yielding is the ratio --

$$\frac{36000 \text{ psi}}{27000 \text{ psi}} = 1.33 \text{ for the plates, and}$$

$$\frac{45000 \text{ psi}}{27000 \text{ psi}} = 1.67 \text{ for the H-sections}$$

Assuming a 30 percent increase to allow for the difference between ultimate and yield levels, these factors become --

$$1.3(1.33) = 1.73 \text{ and } 1.3(1.67) = 2.07$$

These factors thus give a minimum door pressure at ultimate of:

$$1.73(667) = 1152 \text{ psf}$$

This calcualted pressure of 1152 psf that the door should withstand to ultimate can be compared to the mean pressure differential of 881 psf for tornadoes.

Futhermore, it is not unreasonable for the following reasons to conclude that the vault door would remain intact even under the unlikely pressure differential of 1800 psf as postulated for a severe tornado. The interior face plate is not considered in the structural calculations for the design or working load pressures. The inclusion of this plate would increase the section stiffness on the order of thirty percent. The isolation of the repetitive section as a one-way strip from the door is a simple and very conservative design procedure and in actuality some form of two-way action would exist.

8.6 Weather Warning Service

DELETED

Delete pages 8-10 through 8-32 covering sections 8.7 through 8.9. Also deleted are Appendix E and Appendix G.

8.10 Radiation Protection Program for Pu-238 Sealed Source

A doubly encapsulated Pu-238 neutron source (max. 2 grams Pu) is stored in the vault at the Cimarron Plutonium Plant.

The source was received and stored in a paraffin-filled steel drum (USA DOT-7A) shipping container or equivalent shielding storage container. It is not to be used during the standby period.

The source was brought on site in an approved shipping and storage container. Site personnel are trained by the manufacturer of the assay device in its operation. The radiation level at one meter is under 2 mrems per hour. The source is leak checked every six months and all operators are required to wear film badges.

The source is protected from loss or theft during storage or transportation by:

1. Keeping the source locked in its storage cask when not actually in use;

2. Storing the source in locked facilities, and

3. Using signed receipt or protective signature freight service.

Upon receipt and semi-annually thereafter, the Pu-238 source will be leak tested under the direction of the Health Physics Supervisor using smear technique and alpha counting of smear. The test shall be capable of detecting the presence of 0.005 microcurie of alpha contamination on the test sample. Records of leak tests will be maintained. The sealed source shall not be opened or removed from the outer source container by Kerr-McGee personnel.

Additional Radiological Safety Items:

1. If the source is dropped on a hard surface, or receives apparent damage in any other way, a member of the Health Physics group will be notified immediately. The source will be installed in its cask and the area will be monitored. The source will then be checked for alpha activity. If alpha activity is found, or external damage is apparent, the source will be returned to the manufacturer for repair.

2. No modifications will be made to this source by Kerr-McGee.

8.10.1 Industrial Safety

1. Fire Protection

The Cimarron Plutonium Plant is satisfactorily protected against fire loss or damage. The plant is never left unattended or unguarded. The building is of Fire-resistive construction. Type A with the structural materials being steel and concrete and concrete roofing. The plant is equipped with fire fighting equipment and personnel are instructed in the fire fighting techniques required for this type plant.

a. Equipment - CO_2 & ABC powder fire extinguishers are strategically located throughout the building. In accordance with local building codes, at least one hand extinguisher is provided for every 2500 square feet of plant area. Additional 50 pounds CO_2 extinguishers on wheels are available on the plant site. Fire blankets, respirators and Scott Air-Paks (self contained breathing equipment) are provided for emergency use. Hose bibs are located outside the plant for use in the event of a grass fire. All gloveboxes are equipped with heat sensors and connected to a fire detection alarm system. The S.X. area is additionally protected with a Halon 1301 fire extinguishment system. A "grass rig" fire truck with a 250 gal. water tank, pump and 1" hose is also on site for fire protection.

b. Procedures and Training - Fire emergency procedures for supervisory and operating personnel are established. Supervisory personnel are specifically trained in fire fighting techniques, including special health-physics and nuclear safety precautions for the materials involved. Operating personnel and new employees are periodically instructed in the proper use of the plant fire fighting equipment and on the emergency fire procedure. Arrangements are made with the fire departments at the nearest cities of Crescent and Guthrie for assistance in the event of a serious fire at the plant or surrounding property.

c. Inspections - Audits are performed by Health Physics personnel to assure that fire protection equipment is in its proper place and in proper condition for use at all times.

d. Flammable Gases - the only gases in the plant of a combustible nature are natural gas (acetylene for welding). A MSA Explosive Meter instrument for leak detection is available for regular use around the plant to sample the atmosphere prior to welding or other possible hazardous operations.

8.11 Fire Loss Prevention Program

8.11.1 Organization and Duties

The Fire Loss Prevention Program consists of a Fire Loss Prevention Management Staff with the Cimarron Facility Manager serving as Emergency Director. The Emergency Director is assisted by the Health Physics Supervisor, the Maintenance Supervisor, the Health and Safety Coordinator and the Facility Fire Marshal.

8.11.2 Duties of the Fire Loss Prevention Management Staff

1. Provide equipment and supplies
2. Establish size and organizational structure for fire brigade crews.
3. Prepare fire fighting procedures and training plans for fire brigade crews and other selected personnel.
4. Select Fire Marshal.

5. Provide assistance to Fire Marshal during training sessions.

6. Maintain liaison with Public Fire Departments and Professional fire fighters; provide assurance that officials of Public Fire Departments are properly indoctrinated for assistance if needed.

8.11.3 Fire Marshal Duties

1. Provide a periodic inspection of fire brigade equipment and fire alarms.

2. Schedule maintenance of defective equipment.

3. Schedule training sessions and or drills.

8.11.4 Fire Chiefs or Captains

DELETED

8.11.5 Selection of Fire Brigade Crews

During the shutdown or "standby" condition all personnel assigned to the Cimarron Facility are members of the Fire Brigade.

Plant security guards will perform their usual duties and provide direct support in traffic and communications.

8.11.6 Training of Fire Brigade Crews

In addition to specialized training all employees are given basic instructions on the use of portable fire extinguishers.

A professional fireman is periodically hired to conduct live fire-fighting training exercises, and provides specialized instructions and advice to the brigade.

The fire brigade is scheduled to participate in quarterly training sessions. Annually, members of the Fire Departments from Guthrie and Crescent, Oklahoma, will participate in a briefing session.

As per license condition, Section 3 of Appendix A, the city fire departments are informed that they are under the supervision of the Cimarron Facility Fire Brigade Officers during indoctrination sessions, response to a fire, and/or practice drills.

Bridgade members are required to complete a specified program of instructions covering the handling of equipment used in fire fighting and rescue activities. The use of protective equipment such as bunker coats, boots, helmets, gloves, chem-suit and air paks, etc., are also provided during training sessions. *The care and use (including drafting) of the fire truck "pumper" is practiced. Emergency electrical switching is taught to enable the switching from the main (69 kv) substation to the alternate separate line substation (12.5 kv). All members are trained to use portable fire extinguishers. Announced fire alarm drills are practiced with mock fire situations, that are staged for realism. Rescue, first aid and transportation of injured may also be practiced during a fire brigade training session.

Health Physics personnel are equipped and trained to provide monitoring service in the event radioactive material or hazardous chemical materials are involved in a fire situation. Health Physics personnel and selected other personnel are trained in Red Cross First Aid procedures.

In the Pu Plant the fire alarm is given by picking up the nearest telephone, dial 30, and announcing that the fire brigade is needed. The intercom system broadcasts the message when 30 is dialed.

8.11.7 Fire Prevention Inspection and Audits

Supervisors are required to perform inspections of their work areas to assure that fire-safe work procedures are being followed and that housekeeping practices are used with regard to preventing fires.

Independent fire prevention audits are conducted by the Health and Safety Coordinator and other technically qualified personnel.

Specific items audited include:

1. Electrical equipment
2. Bearings
3. Chemicals (storage areas)
4. Solvents and gases
5. Welding and cutting equipment - open flames and other heating devices.
6. Static electricity

The use of flame permits or special work permits is also audited for compliance requirements. Housekeeping and fire extinguishing equipment are also audited. Audit reports are provided for management review and follow-up audits are performed where corrective action is necessary.

8.11.8 Fire-Accident Evaluations

Careful evaluation has been made of the effects of fire, explosions or other accidents. Considerations of potential health problems in the environs of this nuclear fuels facility played an important part in the design, and will continue to throughout standby operations of the Cimarron Plutonium Plant.

The facility is well equipped with fire fighting equipment. Personnel are will instructed in the special fire fighting procedures required.

The probability that an accident could cause a significant release of radioactive material beyond the limits of the Kerr-McGee property line is very low.

8.11.9 Fire Protection Capabilities - A Comparison with Regulatory Guide 3.16

The principal purposes of the fire protection program for KMNC plutonium processing and fuel fabrication plant are the protection of the general public from radioactive and toxic material, protection of plant personnel, and protection against loss of confinement.

Detailed fire protection capabilities in comparison with NRC Regulatory Guide 3.16 include:

1. The plutonium plant is designed and constructed using building components of heat-resistant and noncombustible material whenever practicable. The structural shell (and it's supporting members) surrounding the areas handling plutonium is designed with sufficient fire resistance so that it will continue to act as a confinement structure during any credible accident conditions resulting from fires. Suspended ceilings and their supports, room partitions and ventilation tunnels are of noncombustible construction. Heat insulating materials are also noncombustible.

2. "Emergency only" exits to the out-of-doors are provided in the plutonium process rooms on the ground floor level. The basement rooms each have two means of egress to the exits. Air pressure in the processing rooms are negative to the adjacent hallways and air-locks and especially to the emergency exits. Personnel evacuating a room affected by fire will pass into a different air zone. (The air flow is in the direction opposite to the exit travel.)

3. Electrical wiring systems and their supporting members servicing essential items (preventing the loss of confinement of radioactive materials) are protected against fire. Cable enclosures, fire stops at barrier walls, floors and ceilings, and non-flame-propagating electrical insulation are used.

4. A catch pan is provided beneath the pellet press equipment to contain any combustible hydraulic fluid which may leak.

5. Lightning rods of conventional design are not provided for this building.

6. A plant-wide public address system connected to every telephone in the plant is provided and serves as the manual fire alarm system.

Automatic fire alarms are indicated audibly and by a location identification signal lamp at the main fire control panel. The audible signal is heard throughout the plant including the guard station. These systems include the gloveboxes, the solvent extraction area, and the heat and smoke detectors in the ventilation system ahead of the final high efficiency filters.

7. The ventilation system is designed to prevent release of radioactive material from the stack even in the event of a credible fire and or explosion within the glovebox system or anywhere within the building. Fire protection features of the ventilation system includes where practical, fire doors and dampers to restrict the spread of fire, fire-resistant and fire-retardant materials of construction (including filters). Halon 1301 system for the S. X. boxes, and portable fire extinguishers).

The final HEPA filters and exhaust fans are located in a separate room where they are not exposed to the direct effects of fire or explosion in the operating area.

8. Gloveboxes with connecting tunnels may have doors which can be used as fire stops by manually closing the doors. Portable CO_2 extinguishers may be used to cool the outer surface of a glovebox which has a fire within it.

9. Chemical fume hoods are equipped with full-closing sashes. Provision is made for manual fire suppression where fire or explosion hazards exist.

10. Automatic water sprinkler coverage is not provided within the building. The solvent extraction area is protected by a "Halon" automatic fire extinguishment system.

11. A.B.C. "all purpose" portable fire extinguishers are located where Class A fuels are most likely to be present in quantity. Instructions are given to not direct A.B.C. powder at the floor filter installations. CO_2 fire extinguishers are available for flammable liquid fires, electrical fires, and for cooling glovebox exteriors.

Section 8.11.9 continued

The Plutonium Fuel Plant is not equipped with an automatic sprinkler system though the solvent extraction plant is equipped with a Halon Extinguishment System. At the request of Kerr-McGee Nuclear Corporation, University Engineers of Norman, Oklahoma, conducted a number of tests and performed certain calculations which support the conclusion that insufficient combustible materials exist in the plant or combination of rooms to support a fire in a credible manner.

8.12 Personnel Training

Personnel health and safety is considered an integral part of line supervisory responsibilities. Nevertheless, individual employees are primarily responsible for their own safety and it is the responsibility of each employee to discuss the situation with his supervisor whenever he feels uneasy about the environment in which he is assigned to work.

Each employee is informed of the potential hazards involved in the handling of plutonium and uranium, as well as a description of the design features of the production and safety equipment specifically provided to minimize these hazards. Periodic safety meetings are held for all operating personnel to keep them aware of the hazards involved in handling nuclear materials.

Written instructions are provided to each employee regarding change room procedures, safety equipment, and the procedures to be followed in case of fire, electrical failure or other emergency type shutdown operations. The standby operating procedures for the plant have an introductory section which gives general safety precautions and procedures for the specific operation.

Injury reports are reviewed by the Cimarron Facility Manager for subsequent insurance claims as outlined by company policy.

Reports from Health Physics supervision are submitted monthly to plant management summarizing all plant activities regarding health and safety, including film badge results, and a report of accidents and employee injuries sustained. These reports are reviewed and discussed during Plant Safety Committee meetings to aid in improving overall plant safety. Employees are quizzed on plant safety features and practices as part of the periodic plant safety meetings to help determine employee comprehension of the safety requirements.

8.12.1 Accidents

Emergency showers are located throughout the plant area. First aid equipment is available in a first aid room for treatment of minor injuries. More serious accident cases are promptly given treatment by a Medical Doctor. An emergency procedure for serious accidents is established. An emergency medical building is provided on-site. Contaminated injuries which may need cleaning by surgery are to be treated by a qualified physician at the emergency building. After decontamination, the patient is then to be sent to a public hospital.

A planned program for accident prevention by the use of visual aids is provided. Safety signs, posters and banners are displayed, as appropriate, throughout the plant Safety literature, pamplets and magazines are reviewed for applicable safety news and disseminated to the personnel concerned for use in promoting safety in the operations.

8.12.2 Industrial Hygiene

The company provides the necessary protective work clothing and equipment for all plant and laboratory personnel as required for their line of duty. Such personnel safety items include: coveralls, shoecovers, shoes, safety glasses, goggles, gloves, shower clogs, laboratory protective apparel and respirators.

Monitoring equipment is used to test the air for NH_3, HF, HNO_3 & other chemicals. Other instruments are used to determine noise levels, heat stress, explosive atmospheres, oxygen defeciency etc.

Good personal hygiene practices are continually emphasized. As part of the general health, safety and hygiene instructions each man is informed that it is his responsibility to keep his work area clean.

Locker room procedures are provided for each employee.

Smoking in the plant is allowed only while in approved non radiation areas. Eating in the plant is restricted to the lunchroom.

8.13 Emergency Lighting System

The Cimarron Plutonium Plant is adequately provided with an emergency lighting system. The interior of the plant is equipped with emergency lights strategically mounted throughout the plant, notably at all exit doors and at certain instrument panels which may require emergency shutdown action in the event of power failure. The emergency lights are either connected to the emergency power system or are battery powered and turn on automatically in the event of a power failure. The units are plugged into 110 volt electrical outlets to keep the batteries constantly charged.

Additionally, outdoor flood lights are installed along the plant perimeter fence. These lights are connected to a time switch which automatically turns the lights on at night and off at daybreak.

8.14 Maintenance Activities

Supervisors are responsible for initiating action for maintenance operations on equipment in the process areas under their jurisdiction. This responsibility includes the alerting of health physics personnel to the planned maintenance action and the appropriate cleaning of contaminated equipment prior to releasing to maintenance personnel. In most instances, equipment is wiped clean of radioactive materials and acid washed prior to maintenance work. In cases where it may be impractical to thoroughly decontaminate the equipment prior to necessary maintenance, the judgment of a qualified health physicist on the appropriate controls and surveys is followed. Usually, radiation surveys are made and air samples are taken in the immediate area before, during and after the maintenance operations to assure a proper evaluation of radiation exposures.

The Maintenance Supervisor is responsible for control of emergency maintenance operations and assures that radiation exposure of personnel is held to a minimum.

8.15 Cimarron Facility Emergency Manual

This manual includes an introduction defining the need and purpose for emergency action plans, nine (9) sections which describe (1) The Kerr-McGee Organizational Structure and Responsibilities for coping with Emergencies at the Cimarron Facility; (2) Fire; (3) Release of Hazardous Material; (4) Severe Weather; (5) Evacuation Plans; (6) Damage and Hazard Assessment; (7) Care for Contamination and Injured Personnel; (8) Outside Assistance; (9) Re-Entry and Final Recovery Guide and five (5) Appendixes (A) Notification and Call Lists; (B) Training and Periodic Drills; (C) Maintenance of Emergency Equipment and Procedures; (D) Electrical - Emergency; and (E) Quick Reference "Pull-Out" Sheets for Action Plans.

8.16 Control/Safety Analysis of Reducing Gas Hazards

DELETED

CIMARRON PLUTONIUM PLANT
STANDBY OPERATIONS
TABLE OF CONTENTS

9.0 CIMARRON PLUTONIUM PLANT OPERATIONS

The Cimarron Plutonium Plant was placed on standby as of March 10, 1976, with the completion of all production operations and the accomplishment of the cleanout sequence described in Appendix K. During the standby condition, operations will consist of preventing leakages from gloveboxes and replacement of absolute filters as needed. Negative pressure will be maintained on all gloveboxes and the plant ventilation function will continue to maintain the gradient of pressure from atmospheric to the interior of the gloveboxes. Contamination resulting from leakage will be removed and waste generated shipped to a licensed burial site.

The emission spectrometer located in the laboratory area will be utilized to assay materials other than plutonium. Laboratory rooms, hoods, slot boxes, gloveboxes and equipment free of plutonium contamination may be used for non-plutonium analytical work by personnel from the Kerr-McGee Technical Center. These personnel shall be trained in all building rules concerning security and safety, or they shall be escorted when present in the plutonium plant.

*Delete pages 9-9 through 9-42 as inapplicable during the shutdown period.

TABLE I

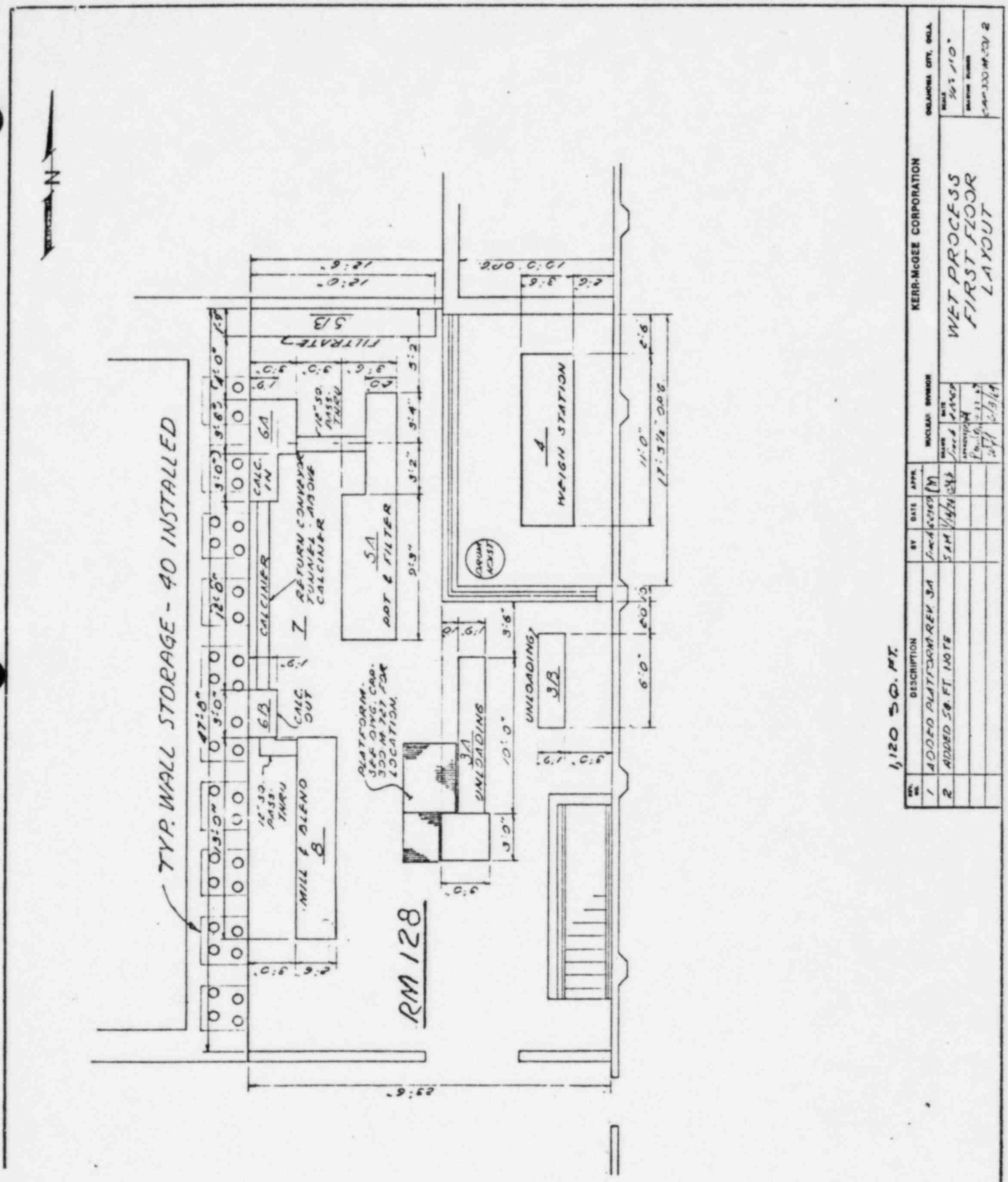
9.1 PROCESS EQUIPMENT LIST

Glove Box	Equipment Description
Room 128 - Conversion and Powder (Wet Process) Production, Drawing CPP-100-M-201-2	
3A	Plutonium nitrate receiving station
3A	Plutonium nitrate unloading hood
3B	$Pu(NO_3)_4$ 14-liter transfer tank
3B	$Pu(NO_3)_4$ 14-liter vacuum trap tank
3B	$Pu(NO_3)_4$ 14-liter contaminated transfer tank
4	Solution weigh & blend scales
-	Wall (solution storage) tanks
5A	Precipitation tank
5A	Digestor tank
5A	pH adjustment tank
5A	Digestor tank
5A	Pan Filters
5B	Filtrate tanks
6B	Calciner
6B	Furnace tray unloading glovebox
8	Hammermill
8	Blending
-	Portable Transfer Glovebox
Room 124 - Pellet Production (Dry Process), CPP-400-M-201-5	
11	Pellet Press (Granulator)
(1)	Slugging Press
(1)	Calciner
(1)	Sintering Furnace
15C	Centerless Grinder
15B	Pellet Inspection
16	Vacuum Outgas Glovebox

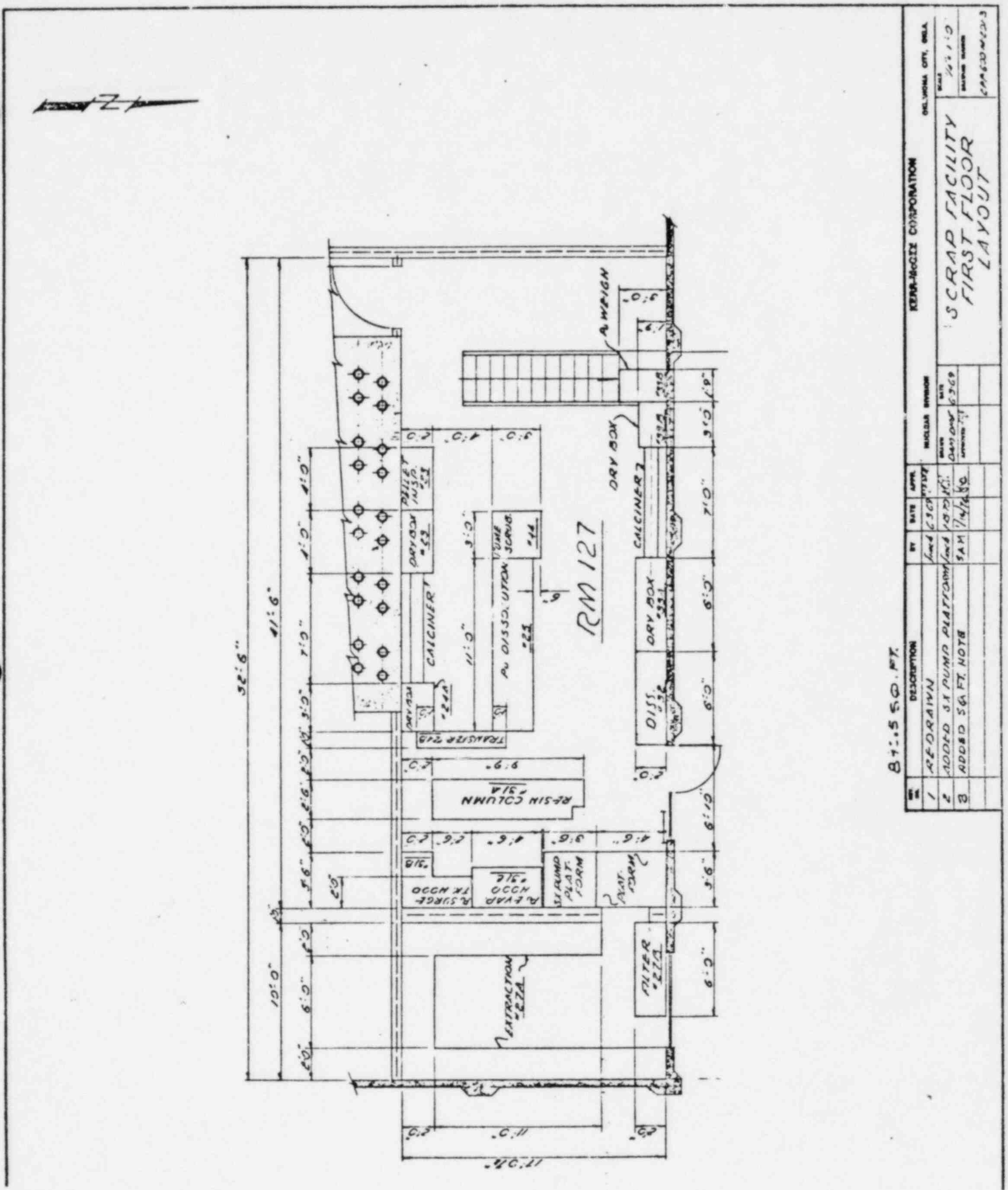
Table I cont.

Glove Box	Equipment Description
Room 123 - Fuel Rod Fabrication	
18	Pellet Inspection and Core Loading Glovebox
19A	Decontamination (Slot Box)
(1)	Welding Glovebox
(1)	He Impregnator - Leak Detector
Room 121	
(1)	X-Ray
Room 122 - Fuel Rod Inspection	
(1)	Dimensional and Visual Inspection Stations
(1)	Fuel Pin Wash and Etch
Room 127, BO-1 - Scrap Recovery	
(1)	Calciner
32	Dissolver Spec
25 & 39	Dissolver NonSpec
26	Solid Waste Washing
31A	Ion Exchange Cycle
31C	Evaporation-Precipitation-Calcination to PuO_2
26	Miscellaneous lab and feed work station-Basement
Room BO-2	
(1)	Waste processing tankage
(1)	Waste treatment operation
Room 27-A	
(1)	Solvent Extraction Cycle

(1) No Glovebox Number Assigned



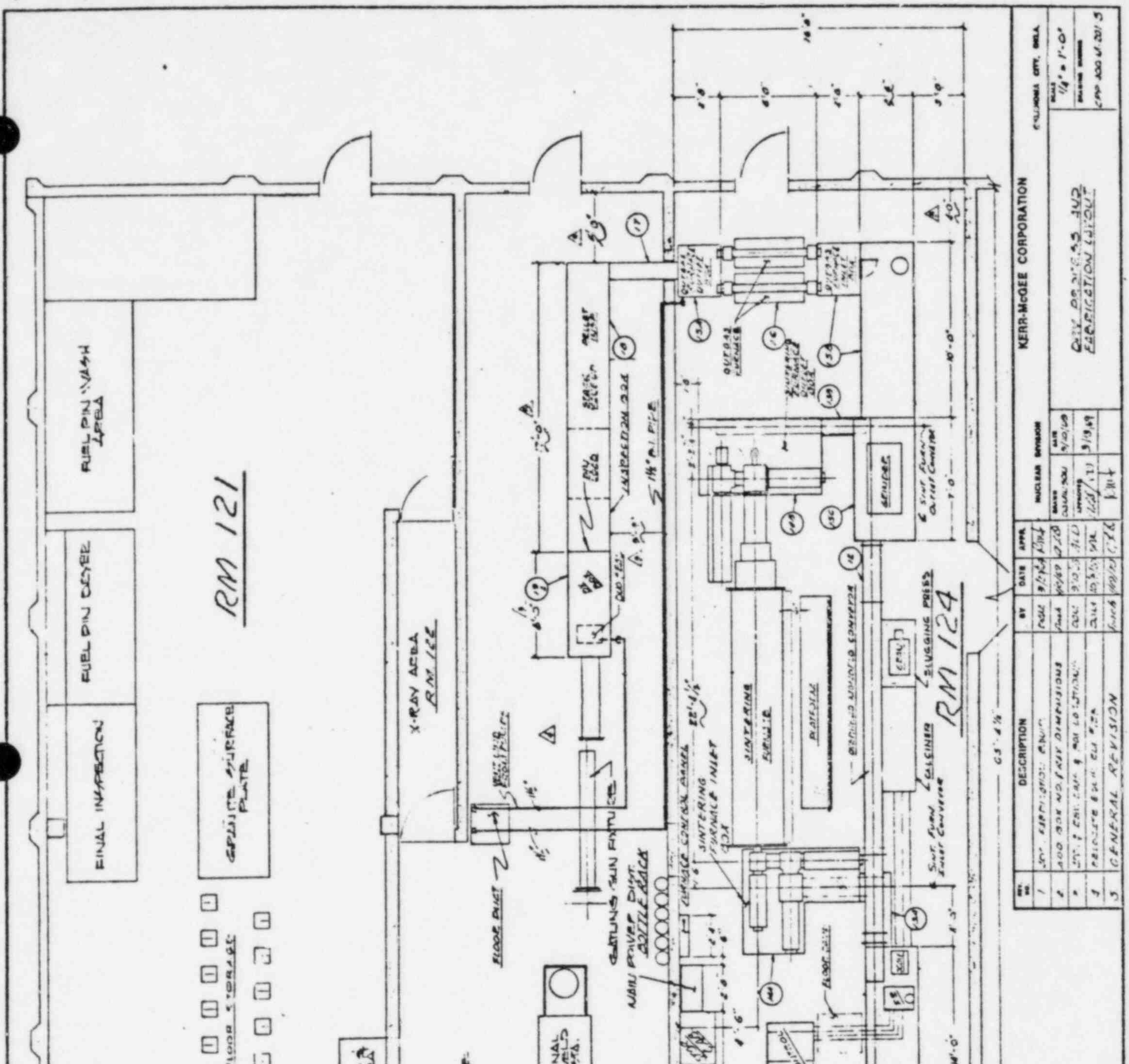
License No. SNM-1174	Docket No. 70-1193
Amend No.	Date 8/7/76 Section 9.0
Replaces DWG CPP-100-M-201-0	Dated 8-30-74



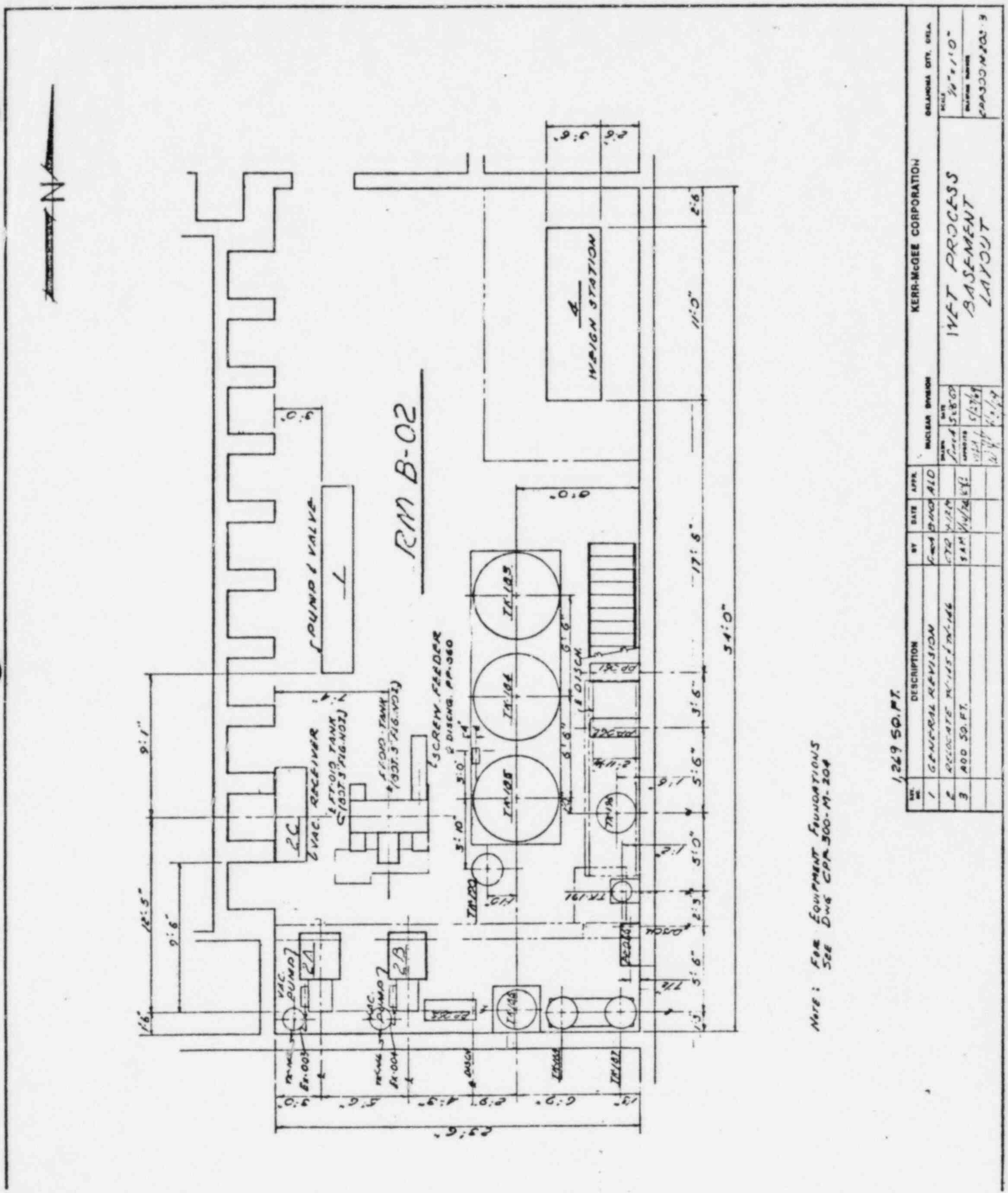
License No. SNM-1174 Docket No. 70-1193

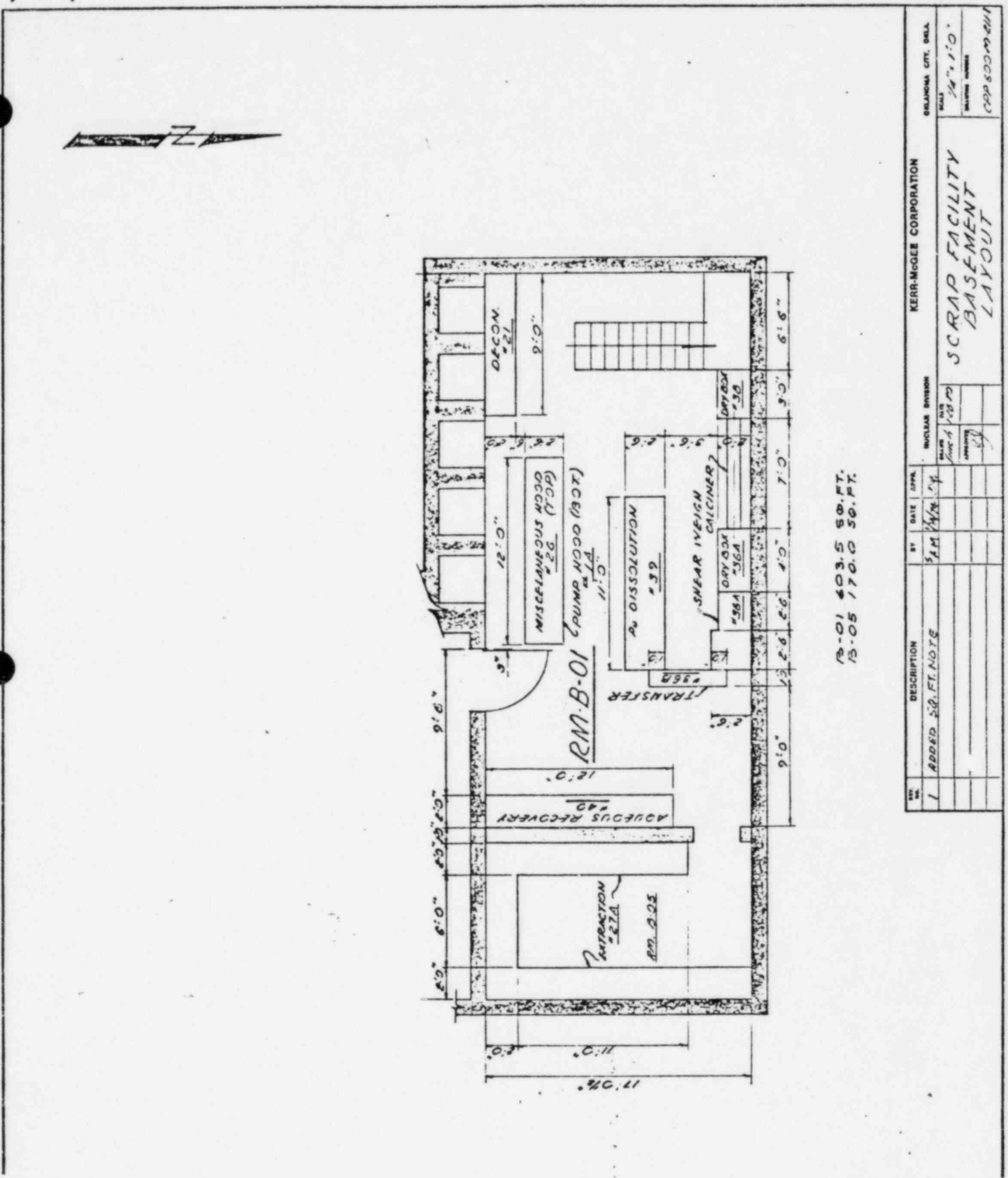
Amend No. Date 8/7/76 Section 9.0

Replaces DWG CPP-100-M-201-0 Dated 8-30-74



License No. SNM-1174	Docket No. 70-1193	Page
Amend No.	Date 8/7/76 Section 9.0	9-6
Replaces DWG CPP-100-M-201-C	Dated 8-30-74	


KERR-McGEE CORPORATION
WET PROCESS BASEMENT LAYOUT
RM B-02
WEIGH STATION
PUMP & VALVE
VAC. RECEIVER
SCREW FEEDER
1,269 SQ.FT.
NOTE: FOR EQUIPMENT FOUNDATIONS SEE DWG CPP-300-M-204
34'-0"



License No. SNM-1174 Docket No. 70-1193 Page 9-8

Amend No. ____ Date 8/7/76 Section 9.0

Replaces DWG CPP-100-M-201-0 Dated 8-30-74

ATTACHMENT I

PROCEDURE

ENVIRONMENTAL MONITORING PROCEDURE

KM-NC-20-2, REVISION 3

LICENSE RENEWAL

SNM 1174

DOCKET NO. 7093

PROCEDURE

ENVIRONMENTAL MONITORING PROCEDURE
KM-NC-20-2, REV. 3

PURPOSE: Establish practice for monitoring Cimarron Facility effluents and their effect on the environment.

RESPONSIBILITY:	ACTION:
Facility Manager and/or his designated Alternate	1. Approve environmental monitoring practices.
	2. Administratively responsible for obtaining permission to collect off-site samples.
Production Supervision	1. Inform Health Physics of releases of radioactive material or chemicals which may affect the environment.
Maintenance and Utility Supervision	1. Provide maintenance as requested by Health Physics supervision.
Health Physics Supervision	1. Provide Health Physics personnel to collect environmental samples.
	2. Determine environmental sampling locations.
	3. Report significant sample results to management.
Health Physics Technicians	1. Collect effluent and environmental samples.
	2. Prepare water, soil and vegetation samples for shipment to KM Technical Center for analysis.
	3. Prepare air samples for alpha counting and for shipment to Oklahoma State Health Department.

I. SAMPLING TECHNIQUES

A. Effluents will be sampled regularly to determine radioactivity content.

1. While stacks are in use, gaseous effluents will be sampled continuously. The samples will be collected and analyzed for radioactive material at least once each week.

2. Liquid effluents include domestic wastes and process wastes.

   Domestic wastes from laundry and restrooms is released to the sanitary lagoons.

   Process waste will be monitored to determine whether it will be pumped to sanitary lagoons if 0.1 MPC for the Plutonium Plant and 1.0 MPC for the Uranium Plant.

B. Air, water, soil and vegetation samples will be collected to determine radioactive material and chemical content.

1. Off-site air samples will be collected by high volume samplers at three locations. Samples will be collected on 8 x 10 inch filter paper over four-hour intervals each day and the filter paper will be changed each week (sampling will be cycled through twenty-eight hours each week). The sample filters will be divided for counting by the Oklahoma State Department of Health and Kerr-McGee Health Physics personnel. Samples will be counted for gross alpha, but uranium and plutonium analyses may be performed on samples significantly above background.

2. Samples will be collected monthly from the two sanitary lagoons and analyzed for gross alpha and gross beta activity. Annual samples will be collected from the Cimarron River, upstream and downstream, seven ponds, one stream, three water wells, and seven monitor wells and analyzed for uranium, plutonium, nitrate, flouride, gross alpha and gross beta activity.

3. Soil samples (composite of 10 surface plugs 3" diameter and 2" deep, then composite of 10 subsurface plugs 3" and 10" deep) will be collected annually at 17 locations and analyzed for uranium, plutonium and fluoride.

4. Vegetation samples (500 grams) will be collected annually from 10 locations near the Cimarron Facility and analyzed for uranium, plutonium and fluoride.

5. Special samples will be collected if positive results are obtained from routine samples or to define the extent of a release.

C. Gamma radiation will be monitored with film badges.

1. Film badges will be located on boundary fences. The film will be changed and analyzed quarterly.

II. SAMPLING LOCATIONS

A. Sampling locations are shown on attached diagrams.

1. Air samples will be collected one-half mile north, east and south of the Facility.

2. Water samples will be collected from: the sanitary lagoons, the Cimarron River near Highway 74 bridge and three-fourth mile downstream; pond under Highway 74 bridge; pond west of the Cimarron Facility entrance; Kerr-McGee water supply ponds; pond located northwest of the cold incinerator; stream north of covered waste pond 2; well in pasture northeast of the Plutonium Plant; well at farmhouse southeast of the Cimarron Facility; monitor wells surrounding the uranium waste ponds (now covered over), if there is any water present; and well located at Highway 33/74 intersection.

3. Soil samples will be collected north of the Uranium Plant boundary fence; south of the Uranium Plant boundary fence; north of Plutonium Plant boundary fence; one-half mile north, east, south and west of the Cimarron Facility; one mile north, east, south and west of the Cimarron Facility; two miles northeast, northwest, southeast and southwest of the Cimarron Facility; three, five and ten miles north of the Cimarron Facility.

4. Vegetation samples will be collected north of the Uranium Plant boundary fence; south of the Uranium Plant boundary fence; north of Plutonium Plant boundary fence; one-half mile east, west, north and south of the Cimarron Facility: on the covered Plutonium waste pond, on the two covered uranium waste ponds; and of the old burial pit.

5. Gaseous effluent samples will be collected from exhaust stacks which are in use.

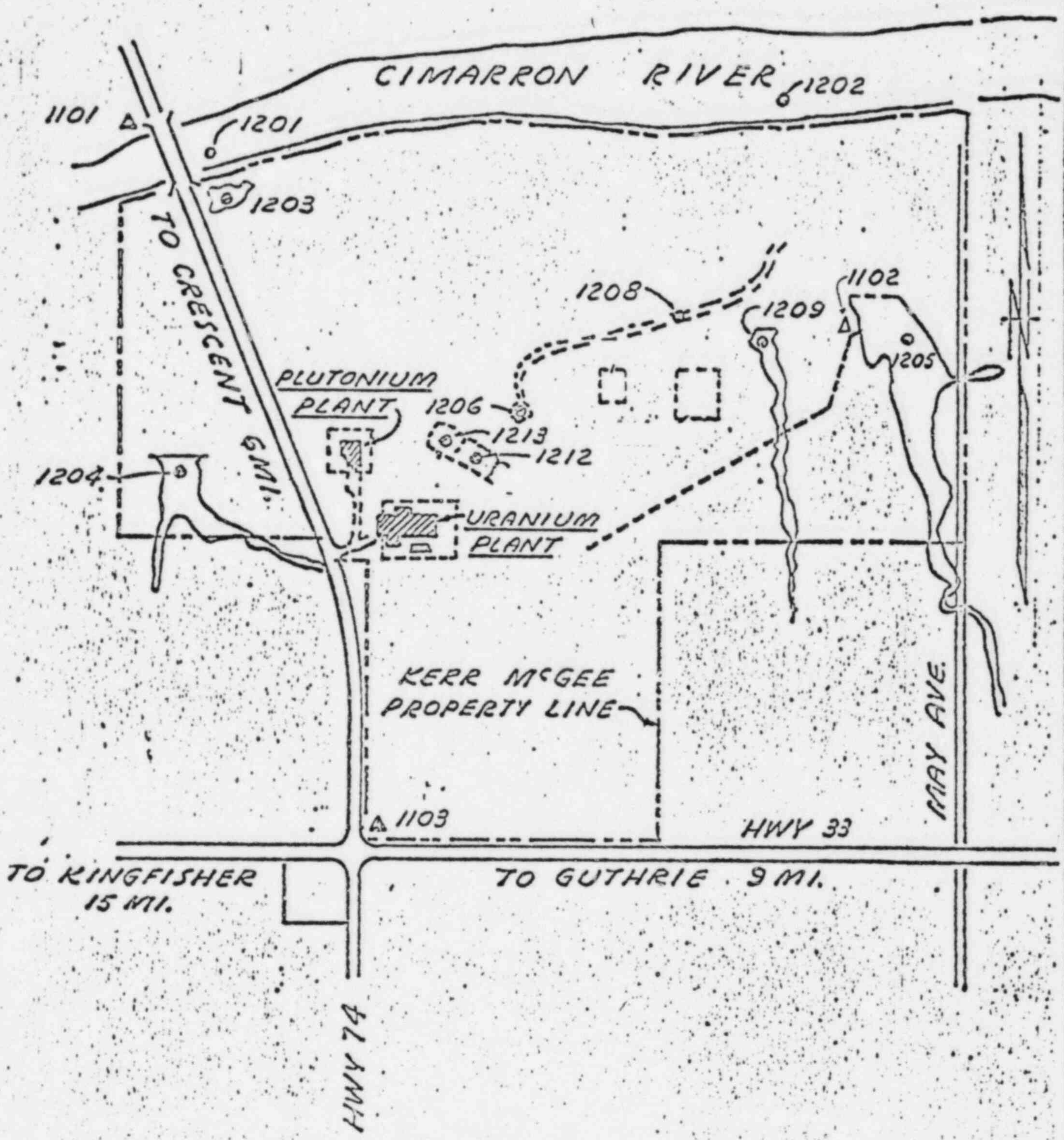
CIMARRON FACILITY ENVIRONMENTAL SAMPLING SCHEDULE

SAMPLE NUMBER	SAMPLE LOCATION	SAMPLE FREQUENCY	SAMPLE ANALYSIS
	AIR	Weekly	Gross α
1101	North - 1/2 mi.		
1102	East - 1/2 mi.		
1103	South - 1/2 mi.		
	SURFACE WATER	Annually	U, Pu, F, NO , Gross α Gross β
1201	Cimarron River - Upstream		
1202	Cimarron River - Downstream		
1203	Pond - NW of Plant		
1204	Pond - West of Plant		
1205	K-M Lake - East		
1206	Pond - NW of Incinerator		
1208	Stream North of Uranium Pond #2		
1209	K-M Lake - West		
1212	Sanitary Lagoon - East*		
1213	Sanitary Lagoon - West*		
	WELL WATER	Annually	U, Pu, F, NO , Gross α Gross β
1301	Well - North of Plant		
1303	Well - Farmhouse SE of Plant		
1307	Well - Jct. Hwy 33/74		
1302	Monitor Well - SW of Uranium Pond #1		
1304	Monitor Well - NW of Uranium Pond #1		
1305	Monitor Well - NW of Uranium Pond #2		
1306	Monitor Well - SE of Uranium Pond #2		
1308	Monitor Well - NE of Uranium Pond #2		
1309	Monitor Well - SW of Uranium Pond #2		
1310	Monitor Well - S of Uranium Pond #2		

*Monthly radioactivity samples, in addition to annual samples.

CIMARRON FACILITY ENVIRONMENTAL SAMPLING SCHEDULE
(Con't)

SAMPLE NUMBER	SAMPLE LOCATION	SAMPLE FREQUENCY	SAMPLE ANALYSIS
	SOIL	Annually	U, Pu, F
1401	North - 1/2 mi.		
1402	North - U Fence Line		
1403	South - U Fence Line		
1404	South - 1/2 mi.		
1405	East - 1/2 mi.		
1406	West - 1/2 mi.		
1407	North - 1 mi.		
1408	South - 1 mi.		
1409	East - 1 mi.		
1410	West - 1 mi.		
1411	NE - 2 mi.		
1412	NW - 2 mi.		
1413	SW - 2 mi.		
1414	SE - 2 mi.		
1415	North - 3 mi.		
1416	North - 5 mi.		
1417	North - 10 mi.		
1418	North - Pu Fence Line		
	VEGETATION	Annually	U, Pu, F
1501	North - 1/2 mi.		
1502	North - U Fence Line		
1503	South - U Fence Line		
1504	South - 1/2 mi.		
1505	East - 1/2 mi.		
1506	West - 1/2 mi.		
1507	Covered Pu Pond		
1508	Covered Pond #1		
1509	Covered Pond #2		
1510	Old Burial Pit		
1511	North - Pu Fence Line		

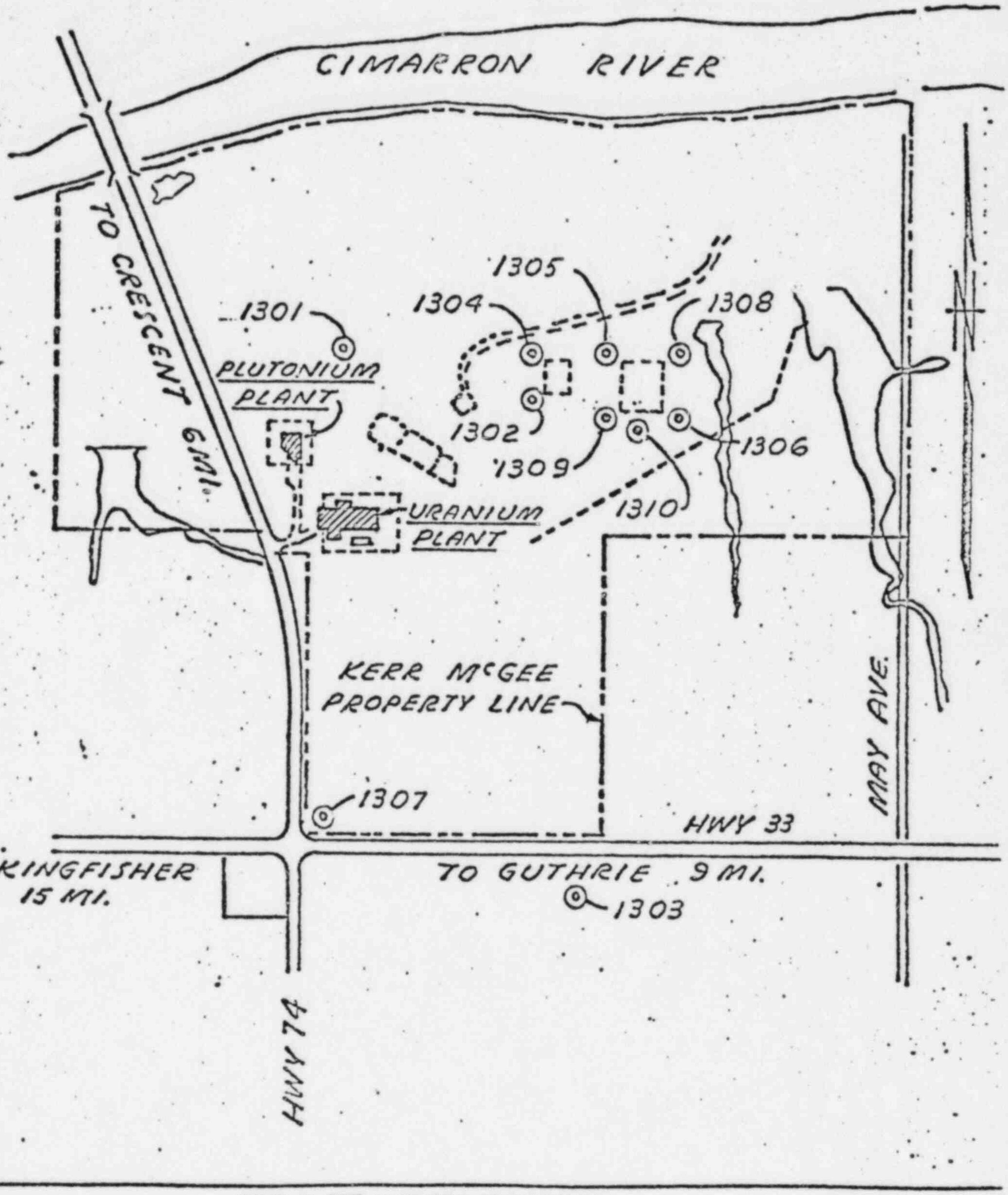


KERR-McGEE NUCLEAR CORPORATION
CIMARRON FACILITY

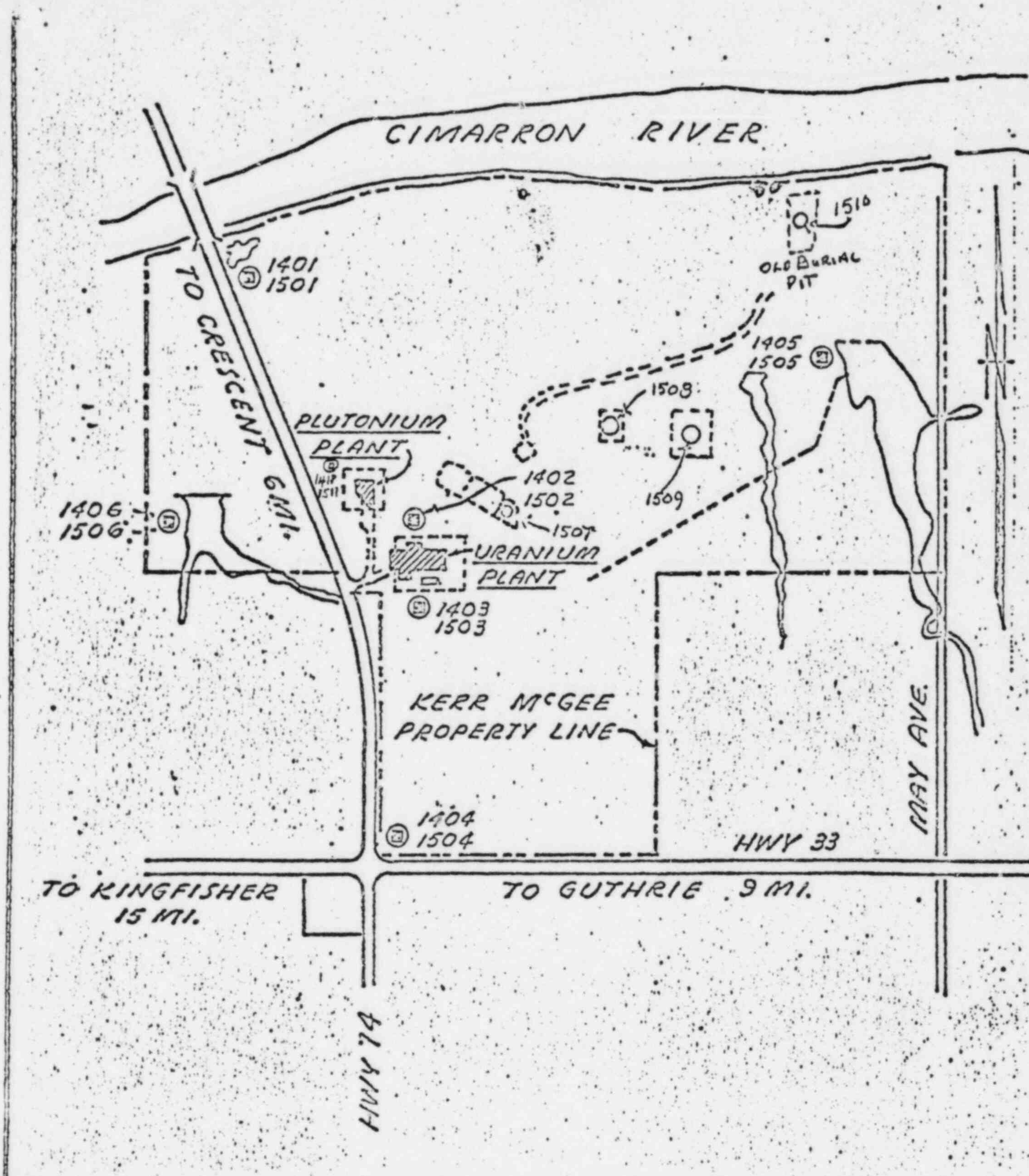
Air and Surface Water Sampling Points

Air (1100 Series) - Δ

Surface Water (1200 Series) - o



KERR-McGEE NUCLEAR CORPORATION
CIMARRON FACILITY
Well Water Sampling Points
Water Well (1300 Series) - ⊙



KERR-McGEE NUCLEAR CORPORATION

CIMARRON FACILITY

Soil and Vegetation Sampling Points

Soil (1400 Series) - ◻

Vegetation (1500 Series) - ○

KERR-McGEE NUCLEAR CORPORATION

CIMARRON FACILITY

Soil Sampling Points (Cont'd)

APPENDIX A

LICENSE CONDITIONS

FOR THE

CIMARRON PLUTONIUM PLANT

OF

KERR-McGEE NUCLEAR CORPORATION

APPENDIX A
LICENSE CONDITIONS FOR
THE CIMARRON PLUTONIUM PLANT

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License Conditions

for the
Kerr-McGee Nuclear Corporation
Cimarron Plutonium Plant - Standby Condition

Set forth herein are technical and administrative specifications within which the authorized activities are conducted at the Cimarron Plutonium Plant of Kerr-McGee Nuclear Corporation.

GENERAL

1.0 Authorized Place of Use

Kerr-McGee Cimarron Plutonium Plant.

1.1 Possession Limits

The maximum quantity of special nuclear material, by-product and source material to be possessed at the Cimarron Plutonium Plant at any one time under the license is:

1. Special Nuclear Material:

   a. Plutonium - 11,475 grams of plutonium, as determined by the non-destructive assay measurements and reported in Appendix K.

   b. 1 gram of $Plutonium^{238}$ sealed calibration source.

2. Source Material:

   a. Uranium - 50 kilograms of uranium.

3. Other:

   a. $Cesium^{137}$ sealed source 165 millicuries.

1.2 Authorized Activities

1. Standby operations include the following:

   a. Operation and maintenance of all exhaust equipment necessary to maintain a negative pressure inside all gloveboxes.

   b. Clean-up of all contamination leaks outside of the gloveboxes. This also includes repair of glovebox enclosures when needed.

   c. Changing of filters as needed and disposal of used filters.

   d. All programs needed to assure the health and safety of employees.

   e. Operation of the emission spectrometer and other non-plutonium contaminated laboratory equipment and facilities by the Kerr-McGee Technical Center personnel as needed. This use will be limited to materials other than plutonium. These personnel will either be thoroughly trained in the Plutonium Plant rules or be escorted at all times.

   f. The operation of the ion exchange column (systems) located in glovebox 31A, Room 127, and glovebox 40 in B01 for the purpose of removing Plutonium contamination from waste cleanup solutions to reduce volume of waste generated. Regeneration of ion exchange resins by removal of the Plutonium and subsequent concentrations of the SNM is not included. Loaded resins shall be discharged from the column and packaged for shipment to an appropriate burial site.

   g. Dismantling of solvent extraction equipment; gloveboxes and ventilation equipment; process and laboratory equipment.

   h. Decontamination activities of building surfaces, and equipment outside of gloveboxes.

   i. Disposal of equipment, scrap and waste resulting from decontamination activities in accordance with applicable statues and regulations.

j. The use of respiratory equipment is subject to the conditions specified in 40 CFR 20.103.

k. Upon completion of the decontamination of facilities, the licensee shall submit a report that assesses the results of the decommissioning activities and the environmental impacts of any residual contamination. The report shall include final contamination survey data for the facilities and grounds that provide the basis for unrestricted release. The licensee may segment the report for major structures covered by this license if it is determined that ongoing decontamination activities or storage of materials in other areas will not change the final survey status of the structure(s) to be released.

2. The following activities are specifically forbidden:

   a. All processing operations with SNM material except the ion exchange operations described in 1.2.1f above.

   b. Receipt of SNM materials.

1.3 Compliance with Regulatory Guide 8.10

Kerr-McGee Nuclear Corporation is committed to the philosophy described in Regulatory Guide 8.10 and implements this philosophy by:

1. Current organizational assignments.

2. The Standby Operations Manager, Cimarron Facility, has established a system of reporting operations departing from plant procedures or engineered protection for the maintenance of occupational exposure and restricting effluent releases to as low as practicable.

3. Occupational exposures and release levels are summarized and reported monthly to site and corporate management for appropriate control action.

4. A Technical Review Board composed of personnel from the Kerr-McGee Corporation is established consisting of:

   a. Corporate Director of Safety Services;
   b. Corporate Vice President of Medical Services;
   c. Corporate Vice President of Nuclear Licensing and Regulation,

   to review data reported in paragraphs 2 and 3 above and recommend to Kerr-McGee Nuclear Corporation Management additions, improvements or revisions that would result in achieving the "as low as reasonably achievable" occupational exposure and effluent release.

2.0 ORGANIZATIONAL STRUCTURE KERR McGEE NUCLEAR CORP.

The Cimarron Facility Plutonium Plant is part of the Cimarron Facility of the Kerr-McGee Nuclear Corporation. Authority for the standby operation of the Cimarron Plutonium Plant is delegated from the President of Kerr-McGee Nuclear Corporation, to the Executive Vice President, to the Standby Operations Manager.

Organizational responsibilities established in the Kerr-McGee Nuclear Health and Safety program provide:

1. Protection of its employees.

2. Protection of the health and safety of the public.

3. Control of radioactive contamination.

4. Discharge of Kerr-McGee's responsibilities under public laws and regulations.

Independent surveys of plant activities provide for nuclear health and safety control in the design of equipment and protection of the personnel against radioactivity and radiation hazards.

2.1 Health and Safety Procedures

Written standard procedures specifying measurement frequency and controls in health physics safety programs are prepared by the Cimarron Standby Operations Manager with participation by the Health Physics and Safety Supervisor or other qualified technical personnel. These procedures are then approved by the Corporate Staff Health Physicist, and approved for implementation by the Executive Vice President, Kerr-McGee Nuclear Corporation.

2.2 Process and Equipment Control - Deleted

2.3 Operating Procedures - Deleted

2.4 Experimental and Development Work - Deleted

2.5 Maintenance

Maintenance work is performed only as authorized in writing by qualified personnel (Maintenance Supervisor and the Standby Operations Manager). The Plutonium Plant Health Physics Supervisor reviews the work planned and must approve the written work order when maintenance work involves the potential release of nuclear material. Maintenance work is considered complete when inspected and accepted by the Maintenance Supervisor or his designate and by the originator of the work order.

2.6 Organization - Cimarron Facility

Responsibility

The Cimarron Plutonium Plant Organization is established to perform the functions required to meet the following purposes:

1. Conduct activities authorized by paragraph 1.

2. Establish procedures to assure that:

    a) Radiation and contamination levels are maintained as low as reasonably achievable.

    b) Safeguards security requirements are met.

3. To maintain and staff the plant in a manner to meet the above purposes and insure the safety of plant personnnel and the public.

4. To conduct positive audit inspection and surveillance programs to assure that all units of the organization are meeting their responsibilities as described in approved procedures.

The Cimarron Standby Operations Manager or his designate approves all work request for equipment maintenance or repair involving any potential release of special nuclear material. Prior to approval he specifies safety requirements on a radiation work procedure form or a special work permit if special health physics precautions are required. Additionally, where special precautions are required, the special work permit shall be reviewed by the Corporate Staff Health Physicist for health physics review and nuclear safety review.

Plant supervisors are responsible for ensuring that all personnel review applicable written procedures when assigned to a specific task. Written procedures may be posted in the lunch room for personnel review; written procedures may be posted at the site of the task for personnel review; and all procedures shall be kept under document control by the various supervisors.

2.6.1 Standby Organization

The organizational structure provided at the Cimarron Plutonium Facility meets the responsibilities described above. The organizational positions and the requirements for personnel in these positions are described below. When illness or authorized absence of the Standby Operations Manager, Cimarron Facility or the Health Physics and Safety Supervisor requires a re-assignment of their responsibilities, it shall be authorized in writing by the Executive Vice President, Kerr-McGee Nuclear Corporation, and shall reflect the ability of the designate(s) to meet the minimum qualifications for the specific position.

Personnel levels in the organization structure are changed as required by the level of activity, but shall continue to provide the necessary skills for monitoring, surveying, controlling, maintaining and auditing the plant containment system; providing for the radiological safety of the plant personnel and the public; and emergency action capability for fire and explosions and any loss of control over radioactive material or SNM.

2.6.1.1

The Cimarron Standby Operations Manager reporting to the Executive Vice-President Kerr-McGee Nuclear Corporation is responsible for all activities at the Cimarron Facility. Procedures describing proper operation of the equipment, the health and safety requirements of the operation, and audit practices shall be approved by the Cimarron Standby Operations Manager and the Executive Vice-President, Kerr-McGee Nuclear Corporation.

The Standby Manager shall hold a bachelor degree in science or engineering with seven years of supervisory and management experience, including at least two years in a nuclear facility. He shall have demonstrated a proficiency to manage health and safety programs and to identify activities requiring health physics or a criticality analysis.

Support for health and safety programs at the Cimarron Facility is provided by the Kerr-McGee Corporation's Environmental and Health Management Division. Section 4 of the demonstration section provides a biographical sketch on personnel from the Environmental Health and Management division.

The possession only license reduces the requirements for personnel to monitor and control the plant in its partially cleaned out condition. Appropriate reductions in the number of personnel at the plant site and in the organization structure may be made, provided the necessary competence and capability is maintained, for monitoring, surveying, controlling, maintaining and auditing the plant containment system, and providing for the radiological safety of the plant personnel and the public. The also includes emergency action capability for fire and explosions and any loss of control over radioactive material or SNM.

2.6.1.2 Health Physics Staff

The Health Physics staff of the Cimarron Facility consists of professional health physicists and health physics technicians experienced and trained in the operations of a nuclear health safety program. A record of the qualifications, training and experience of each member of the Health Physics Staff shall be maintained by Plutonium Plant Health Physics and Safety Supervisor. The Corporate Staff Health Physicists and the Standby Operations Manager, Cimarron Facility, review the adequacy of the health physics staffing on the Cimarron Plutonium Plant at least annually. A recommendation, based on this review, shall be forwarded in writing to the Executive Vice President, Kerr-McGee Nuclear Corporation.

Biographical data on the Health Physics and Safety Supervisor and supporting health physics technicians may be found in Section 4 of the demonstration section.

2.6.1.3 Plutonium Plant Health Physics and Safety Supervisor

The Plutonium Plant Health Physics and Safety Supervisor reports to the Standby Operations Manager, Cimarron Facility. He conducts the Plutonium Plant Radiation and Protection Programs, the monitoring and surveillance of the personnel, and activities within the Cimarron Plutonium Plant in the area of health, safety and effluent monitoring. He shall have at least 2 years of academic training in science or engineering and 2 years of radiation monitoring experience. He must be capable of directing the activities of health physics technicians, recognizing potential radiation safety problems, and advising supervision on radiation protection matters.

2.7 Review Responsibility

The independent review functions are assigned to the Kerr-McGee Corporation's Environment and Health Management Division for license compliance and health physics and industrial safety. The Corporate Security Officer reviews the security capabilities.

The assigned responsibility for review shall address the following areas of responsibility:

1. The standards for contamination control, radiation protection, and security.

2. Procedures to be followed by management in assuring that equipment is operated in a way to prevent spread of contamination, radiation exposure and diversion of nuclear materials.

3. Make periodic inspections and audits of operations for conformance to written standards and procedures. Such audits will be reduced to writing by the auditor and filed permanently with the Vice President, Nuclear Licensing and Regulation after circulation to the Standby Operations Manager and Executive Vice-President, Kerr-McGee Nuclear Corporation.

4. Procure as required special audit services from qualified consultants or other divisions of Kerr-McGee when it appears that an adequate solution definition exceeds the capability of the staff.

2.8 Environment and Health Management Division Organization

The President of the Environment and Health Management Division is a Vice President of Kerr-McGee Corporation and reports directly to the President of Kerr-McGee Corporation.

The division contains 5 subsidiary organizations, Nuclear Licensing and Regulations, Medical Services, Environmental Affairs, Safety Services and Regulatory Compliance. Nuclear Licensing and Regulations, Medical Services and Regulatory Compliance are primarily responsible for support of the Kerr-McGee Nuclear Plutonium Plant during stand-by operations.

a. The Vice President of the Nuclear Licensing and Regulations is responsible for establishing general guidelines for criteria, standards and procedures of activities within the Cimarron Plutonium Plant concerning health, safety, accountability and safeguards security. He conducts liaison with the local, state and federal agencies concerned with radioactive materials. In this function, he repairs, amends and renews required licenses and permits.

   The incumbent shall hold an advanced degree in engineering or related field or its equivalent, and at least 10 years of successful technical management, 5 years involving nuclear activities and demonstrate a competent appraisal of health and safety problems related to radioactive materials.

b. The Medical Director, Vice President, Medical Services, will provide the position of Staff Health Physicist responsible for the establishment of corporate radiation protection standards. Such standards will treat control of radiation, monitoring of contamination, personnel and facilities and prepare detailed procedures as required. The Staff Health Physicist shall hold a BS degree in science and engineering, 5 years experience involving radiation protection, or the equivalent. He shall be professionally capable of providing authoritative advice and counsel on matters of radiation protection, health physics and industrial hygiene and industrial safety.

c. The Director of Regulatory Compliance will staff the department to include a Compliance Specialist qualified to audit and inspect Cimarron Plutonium Plant activities governed by the NRC License, permits and other regulations. The Compliance Specialist is responsible for evaluating ongoing health, safety, accountability and safeguards programs to identify existing or potential deficiencies. Observations, findings and recommendations are presented to the Director for follow-up with local management to ensure corrective action is taken. The Compliance Specialist shall possess a degree preferably in science plus at least 5 years experience in nuclear operations to include radiation health and safety. Seasoned knowledge and experience obtained in the Nuclear industry would offset the degree requirement. The incumbent shall be capable of providing a credible assessment of facility operations.

d. Section 4 of the demonstration section provides biographical data on several additional staff personnel from the Environment and Health Management Division.

2.8.1 Alternate Criticality Safety Analysis - Deleted

2.8.2 Alternate Safety Review - Deleted

2.9 Approval of Position Assignment

The assignment of individuals to the functional positions identified in this Appendix A shall be approved by the manager at the second organizational level above the position to be staffed.

3.0 HEALTH PHYSICS PROGRAM SPECIFICATION

The health physics program for the Cimarron Plutonium Plant has been established to prevent the spread of radioactive contamination, and minimize exposure to radiation, thus protecting the health of employees and the general public, and minimizing danger to life and property.

During the term of this possession only license, the following surveys, samples, measurements and audits may be modified or decreased in frequency, as long as data show that the remaining parts of the program are effective in detecting any loss of control:

a) The frequency of surveys and samples may be reduced, but in no case shall the frequency be less than quarterly. Records and data shall indicate that the new controls and programs continue to be effective, or increased survey frequencies or a greater number of samples shall be re-instituted.

b) As long as it can be shown that samples do reflect the conditions in their vicinity, the air samplers can be used to monitor larger areas than those required while process operations were previously being performed. In no case shall one sampler be used to monitor an area that receives its air supply from more than one ventilation supply duct.

c) Air flows through the various operation areas, gloveboxes, hoods and equipment pieces may be reduced if it can be shown that any potential loss of control over radioactive material would result in its flowing from areas of low potential contamination to areas of higher potential contamination, that it will not result in air flow reversals as a result of normal activities in the area, and that air flow patterns will remain in balance. The separation of the ventilation systems that formerly services the ammonia and the nitric acid atmosphere gloveboxes is no longer necessary.

3.0.1 General Program Provisions

The Kerr-McGee Nuclear Corporation provides a health physics program which includes as a minimum:

1. The evaluation of release of radioactive effluents and materials; written observations or recommendations resulting from evaluation.

2. The establishment of procedures to monitor and control spread of nuclear contamination, exposure to individuals, disposal of wastes and the integrity and reliability of radiation detection instruments; and

3. The maintenance of appropriate reports and records associated therewith.

3 1 Plant Design and Construction

3.1.1 General Features

The plant is designed, built, equipped and maintained to insure radiological, fire and structural safety. These include the following features:

1. Controlled access to the plant process area.

2. Adequate emergency exists.

3. Sufficient air locks to assure contamination control.

4. First aid, personnel decontamination and plutonium wound counting capabilities.

5. An emergency generator adequate to power the glovebox exhaust fans, and a supply air and room air exhaust fan, and safety instrumentation and alarm circuits.

6. Suitable plant illumination, both external and internal, for routine use and emergency situations.

7. The process equipment, gloveboxes, hoods, enclosures and instrumentation are of proper safety engineering design to insure a high degree of containment, personnel protection and material accountability.

3.1.2 Ventilation and Exhaust Systems

Airborne contamination is minimized and effectively controlled by the following criteria:

1. Separate systems are provided and maintained for filtered supply air, room air exhaust and glovebox exhaust. An emergency fan is provided in each system. The supply and exhaust fans are appropriately interlocked for fan failure.

2. The office, reception and lunchroom areas of the plant use a recirculated air system with 25% air makeup. All other plant areas are heated or cooled with fresh filtered air.

3. Room air flow is from ceiling to floor and the air flow provides a routine minimum of 4 air changes per hour and the capability for 12 air changes per hour for an emergency.

4. Air balance ensures air flow from areas of nonradioactivity to areas of higher potential for radioactivity. A differential pressure of approximately 0.10 inches of water is maintained between the clean and potentially contamined areas.

5. Airlocks with interlocked doors are installed and maintained between the change rooms and all process or laboratory areas.

6. The glovebox exhaust system maintains a negative pressure of approximately 0.50 inches of water with respect to the room pressure with 6 volume changes per hour in the SX glovebox, 3 volume changes per hour in dry boxes and maintains a flow rate of greater than 100 feet per minute through an open glove port.

7. The entire ventilation system is equipped with instrumentation to detect abnormal operating conditions such as excessive pressure drop across filters and loss of negative pressure. Pressure drop across the high efficiency filters shall not exceed 75% of the differential pressure rating specified for the filters by the supplier. The differential pressure on all intermediate and final filters is checked and recorded at least weekly. Filters exceeding a differential pressure of 4.0 inches of water (40% of rating) will be changed.

8. The air filtration system includes a minimum:

   a) Dust filters and precipitators preceding the supply air fans.

   b) The gloveboxes are supplied by room air through a roughing filter and a high efficiency filter.

   c) Room air exhaust - Through two high efficiency filters in addition to a dust type roughing filter on each intake.

   d) Glovebox exhaust - Through three high efficiency filters with roughing filters at each glovebox exhaust.

e) A visual examination shall be made of all filters prior to installation, to assure that obviously damaged filters are not installed.

f) All high efficiency filters are certified by the supplier for 99.97% efficiency for 0.3 micron particles.

g) Filter installation is made under supervisory direction with a log maintained of final filter installations. Air sampling is conducted during operations to demonstrate filter integrity.

h) In-place testing of the final filters is performed by trained and competent personnel when installed, and annually thereafter using the cold DOP test. The acceptance efficiency for a filter bank using the standard poly disperse DOP aerosol (count median diameter of about 0.8 micron) is 99.95%.

3.2 Health Physics Equipment

Instrumentation is provided and maintained to perform the surveys associated with the health physics control programs. All survey and sampling equipment is inspected and calibrated under health physics supervision at least quarterly, and at a frequency sufficient to assure reliable operation.

3.2.1 Personnel Dosimetry

Personnel dosimetry programs are maintained to measure internal and external exposures to radiation.

1. Film badges or thermoluminescent dosimeters (TLD's) are used to measure the whole body penetrating dose from B and gamma radiation. Badges or TLD's are worn by all plant workers and visitors.

2. An indium foil is used with the film badge for criticality dosimetry. Additional dosimetry methods such as blood sodium and hair activation are utilized for criticality dose evaluations.

3. During any authorized decontamination and maintenance activities for the facility and its equipment that involves radioactive material, lapel air samplers shall be worn by a minimum of 50% of the personnel involved in these activities.

4. Field measurements of photon exposure and neutron dose rates are made at a survey frequency of at least quarterly to properly control and evaluate personnel external exposures.

5. Internal

   A routine urinalysis program shall be established. Sampling frequency shall be, as a minimum, once per quarter for employees who are assigned to the plutonium plant and semiannually for other persons who infrequently enter plutonium handling areas. An action level of 0.2 d/m per 24-hour sample shall require resampling and investigation as to the possible source, cause and magnitude of the exposure; excluded are persons who may routinely excrete plutonium above the action level because of previous known depositions. Mandatory resampling for such persons shall be performed if routine urinalysis indicate possible additional intake.

A bioassay program shall also be established to evaluate possible deposition from known or suspected accidental exposures. Fecal sampling and/or lung counting shall be performed for such exposures, as well as for follow-up evaluation of confirmed routine urinalyses, if evidence indicates that the exposure may have been to relatively insoluble forms of plutonium. The bioassay program shall be complimented by in-vivo counting of plutonium plant workers. The bioassay program shall also include the capability for on-site measuring for plutonium in wounds.

3.3 Facility Monitoring

Facility monitoring includes programs for evaluating and controlling radiological conditions and releases to the environs.

1. Air Monitoring

a) An air monitoring program is maintained that requires at a minimum: 1) Continuous sampling and monitoring of stack effluent and room air in process areas and 2) sampling of room air.

Sample Collection and Monitoring Criteria

1) Stack monitoring continuously for the room and process exhaust system.

2) The stack sampling system provides for isokinetic sampling and collection in a manner that will provide representative sampling of the stack effluent.

3) Continuous room monitoring.

4) Room and work area sampling during necessary maintenance on gloveboxes and/or filter changing.

Work Area Sampling Criteria

Work area air sampling units shall be located to obtain samples representative of personnel exposure to airborne concentrations of radioactive materials.

The minimum sampling rate is a nominal 2 cfm for all stationary work area and portable breathing zone air samplers. Continuous air samplers (CAMS) with alarms have a nominal sampling rate of 1 cfm.

Stack Release Measurements

The amount of alpha activity released into the air outside of the plant shall be determined by continuous stack sampling with a recording instrument consisting of an audible alarm system located in the health physics office, with a high level alarm remoted to the guard station.

The minimum detection level of the continuous monitor is 96 MPC hours for soluble ^{239}Pu at the stack and 6 MPC hours for insoluble ^{239}Pu at the stack. This minimum detection level is based on an observed increase of 5 counts per minute in a time period of 15 minutes. A visual check (read and record) of the recorder is made during each shift.

The alarm is set at 15 counts per minute. The alarm level of the continuous monitor is 288 MPC hours of soluble ^{239}Pu at the stack and 18 MPC hours for insoluble ^{239}Pu at the stack. When an alarm is received, the following action is taken:

a) remove and count the inline samples on the exhaust side of each final filter bank to locate the leaking filter bank.

b) shut down the leaking filter bank by switching to the standby filter bank.

c) within 48 hours of switching filters, change the filters in the leaking filter bank, then administer the DOP test, and leave the tested filter bank on standby.

Sampling period: Continuous sampling of the stack at the rate of 3.5 c.f.m. with the sampling filter paper changed weekly and the filter counted in the air sample counter results in a mimimum detection of 5.4 x 10^{-16} uCi/ml.

2. Contamination Control

Measurements of surface contamination are made on the basis of a published schedule which includes all potentially contaminated areas of the plant. Surface contamination measurements are made by appropriate direct survey techniques and smear tests.

a) Rooms B-01, B-02, 127, 128, and Solvent Extraction shall have contamination levels maintained below 1000 d/min - 60 cm^2 by direct survey and 500 d/min - 100 cm^2 by smear test. All other radiation areas, including all process, laboratory and material receiving areas shall be maintained below 500 d/min - 60 cm^2 by direct survey and 100 d/min - 100 cm^2 by smear test.

b) Non-radiation areas include the change rooms, lunchroom offices and reception area and surface contamination levels in these areas are maintained below 500 d/min - 60 cm^2 by direct survey and 50 d/min - 100 cm^2 by smear test.

3. Contamination surveys are conducted with alpha detection instruments as follows and personnel contamination levels in excess of 500 d/min - 60 cm^2 are immediately reported to health physics personnel for prompt decontamination and investigative action.

a) Personnel, equipment and materials shall be surveyed prior to leaving the radiation area.

b) Hand surveys shall be made at work stations after removing hands from glovebox gloves or hood enclosures.

c) Hand and shoe surveys shall be made at process area exits.

d) Process area floors shall be surveyed at least weekly.

4. Appropriate protective clothing to aid in contamination control are worn by personnel in radiation areas in accordance with plant procedures.

5. No eating is permitted in the radiation areas. Smoking is permitted only in approved areas, lunchroom and offices.

6. All radioactive waste material generated as the result of maintenance is appropriately bagged in plastic bags, sealed and surveyed for handling outside of gloveboxes and hoods.

3.3.1 Solid Waste and Liquid Effluent Control

1. Contamination - free waste (<100 d/m - 100 cm^2) is appropriately monitored prior to disposal on the Cimarron site by controlled burial or incineration.

2. All equipment and material is surveyed by alpha survey or NDA analyzed for Pu content and disposed of by a licensed waste disposal contractor.

3. All contaminated liquid waste which might result from decontamination work shall be passed through the IX column. Sample results which show that the solution is above .1 MPC levels shall be reprocessed.

4. Low level liquid sanitary wastes are controlled as follows:

Sanitary wastes originating from the cold laundry, showers, and sinks proceed to one of two 10,000 gallon hold tanks and are sampled for plutonium content. Based on the sample result, the Health Physics Technician shall either hold the waste for rework or discharge it to the sanitary lagoon which overflows into the Cimarron River. Sanitary waste from the water closets passes through a septic tank system without sampling and is discharged into the sanitary lagoon.

3.4 Respiratory Protection Allowance

3.4.1 Objectives

Respiratory protective equipment is used in circumstances in which adequate limitation of radioactive materials by use of process or other engineering controls is impracticable. Individuals in the restricted area of the Cimarron Plutonium Plant may be exposed to average concentrations of airborne radioactive materials in excess of the limits specified in Appendix B, Table I, Column 1 of 10 CFR 20, Exposures are kept below these limits provided:

1. The individual uses respiratory protective equipment such that the total intake, in any period of seven consecutive days, by inhalation, ingestion or absorption, does not exceed that which would result from breathing concentrations specified in Appendix B, Table 1, Column 1 of 10 CFR 20 for a period of 40 hours. Personnel operating in restricted areas shall use respiratory protective equipment that is certified or had certification extended by the National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA).

2. Each respirator user is advised that he may leave the area for relief from respirator use in case of equipment malfunction, physical or psychological discomfort, procedural or communication failure, significant deterioration of operating conditions, or any other condition that might cause reduction in the protection afforded the wearer.

3.4.2 Respirator Program

A respiratory protection program is maintained to assure that the objective above is met. Such program includes:

1. Air sampling and other surveys sufficient to identify the hazard, to eliminate individual exposure, and to permit proper selection of the respiratory protective equipment.

2. Procedures to assure proper selection, supervision and adequate training of personnel using such protective equipment.

3. Procedures to assure the adequate fitting of respirators and the testing of equipment operability;

4. Procedures for maintenance to assure full effectiveness of respirators, including issuance, cleaning and decontamination, inspection, repair and storage;

5. Bioassays of individuals and other surveys as may be appropriate to evaluate individual exposures and to assess protection actually provided; and

6. Records sufficient to permit periodic evaluation of the adequacy of the respiratory protection program.

3.4.3 Respirator Usage Criteria

1. The use of half-face respirators will not be practiced in the Plutonium process areas.

2. Full-face respirators equipped with high efficiency particulate filters will be used during:

   a) Maintenance activities where confinement integrity might be violated.

   b) Glovebox glove changes, plastic bag changes, and bag-out operations.

   c) Minor emergency reentries.

3. Supplied air systems will be used for major emergency reentries involving known plutonium releases.

3.4.4 Respiratory Protective Equipment

The respiratory protective equipment is evaluated to determine that, when used to protect against radioactive material under the conditions of use to be encountered, the respirators are capable of providing a degree of protection at least equal to protection factors prescribed in 10 CFR 20.103.

3.4.5 Training

Time and effort is devoted to assuring that individuals have an adequate understanding of radiation safety as it applies to their work. All plant personnel shall receive an indoctrination lecture appropriate to their assigned job prior to starting work. Training coverage includes plant and equipment operations, emergency procedures and a minimum of 20 hours training specific to radiation safety. Documented re-training sessions for each employee will be held at least once each year.

3.5 Miscellaneous Safety Specifications

3.5.1 Hydrogen Feed Control for Sintering Furnaces - Deleted

3.5.2 Solvent Usage - Deleted

3.5.3 Solvent Precautions - Replaced by 3.4.6

Solvent that will be retained and possibly used during shutdown will be a small amount of trichloroethane. This is non-flammable. This will be stored outside when not in use. No solvents of any kind are left in any gloveboxes. Small quantities of flammable paint thinners, cements and such solvents as needed for maintenance work will be stored in a double walled metal storage cabinet designed for flammable liquid storage.

The use of any solvents in the Plutonium Plant shall be specifically authorized in writing by the Standby Operations Manager, Cimarron Facility and usage shall be in accordance with recognized industrial safety precautions.

PAGES 3-10 THRU 3-12 HAVE BEEN DELETED

3.5.5 Ion Exchange Systems

The ion exchange systems located in Room 127 and B01 will be used to decontaminate solutions generated during decontamination activities. This method of decontamination will meet the criteria as stated in the policy statement on low level waste volume reduction published October 16, 1981, in the federal register.

Three 5 inch ion exchange columns are located in glovebox 31A and two 5 inch ion exchange columns are located in glovebox 40. The waste solutions will pass through the IX columns and the effluent concentrations will be reduced to dischargeable levels. This treatment of waste solutions should generate a volume of approximately 10,000 gallons for subsequent discharge to the sanitary lagoon. Dischargeable limits will meet the criteria of 0.1 MPC or less.

The loaded column resins will not be eluted. The resins will be discarded into 4 inch ID two liter bottles for preparation for burial. This step is preceded by the attachment of the vacuum circuit to the column to remove surplus moisture. When the procedure requires excessive time or does not achieve the goal of the elimination of all liquids, the resins will be combined with the appropriate amounts of absorbal cement to ensure that no free liquid remains in the package prepared for disposal.

The ion exchange will consist of an anion resin to remove the plutonium in a soda ash matrix from mop water and/or other generated waste waters.

3.5.6 Glovebox Design Criteria

The gloveboxes are fabricated specifically for material containment with the following design criteria:

1. Glovebox shells and filter housings are constructed at least 12 gauge thick stainless steel.

2. Glovebox windows

   a) All glovebox windows will be gas and liquid tight under normal service conditions.

   b) Glovebox window materials are selected for the desired service as follows:

   Dry or mild acid fume - plexiglas (fire resistant type). Severe acid fumes - Homolite or tempered safety glass. For gamma-beta shielding - leaded glass (clipped over windows, external to glovebox).

3. Gloveboxes are fabricated with sufficient structural strength to permit the installation of shielding materials to reduce exposure to personnel.

4. Glove Ports

   For the standby condition, gloveboxes with internal plutonium contamination have their glove ports covered by plastic covers 3/8 in. thick, with gaskets, and then secured with plastic tape and tamper safed with plastic numbered seals.

   At least annually, every plastic tape which secures a plastic cover to the glove port, shall be visually examined for evidence of deterioration and a survey of the tape shall be checked for alpha contamination to assure that radioactive material does not leak out of the box thru the tape seal. A record of this examination and survey shall be maintained.

5. Glovebox Transfers - Deleted

6. Glove Services - Deleted

7. Glovebox Gloves

Gloves may need to be installed on a box for maintenance purposes such as filter changing. The installation of any glove on a glove port shall be authorized in writing, by the Standby Operations Manager, Cimarron Facility or his designated alternate. After the maintenance work is completed, the gloves will be replaced with the solid port covers.

Gloves are normally standard 8" diameter, shoulder length. Glove materials are selected for the desired service as follows:

a) Neoprene rubber 30 mil - for dry boxes.
b) Neoprene, hypalon coated or pure.
   Hypalon - 30 mil - for wet boxes.
c) Neoprene, neoprene-hypalon - 30 mil or 15 mil - for laboratory boxes.

3.5.7 Dielectric Sealer Safety Precautions

Bag sealers are restricted in use because of arcing that could lead to a potential fire hazard. Safety criteria for bag sealers include the following:

1. No adjustments are to be made on the bag sealer settings without prior approval from supervision.

2. All bag sealers are equipped with a shielded flexible copper power cable that can be bolted tightly at both ends for good electrical contact.

3. Additional shielding consisting of a tygon tubing sleeve acts as a cover for the shielded cable.

4. Internal wiring in the bag sealing machines is limited to 60 percent of the available electrical power.

5. Bag sealers are not used on material collected from the SX glovebox or gloveboxes containing dry resin, or waste material containing combustible solvents.

6. All material must be placed in a container (plastic bag, ice cream carton, etc) before placing in the glovebox bag for bag-out operations.

7. Respirators are required for all bag in and bag-out operations.

3.5.8 Hood and Slot Box Activities

In the analytical laboratory areas, hoods and slotboxes free of plutonium contamination may be used for analytical work.

There will be no work activities performed in hoods and slotboxes which are contaminated internally with plutonium, except for necessary maintenance. The closures to these hoods and boxes are closed and tamper safed.

Hood and slotbox activities shall be in accord with the following:

Operation of the emission spectrometer and other laboratory equipment and facilities, which are not or have not been potentially contaminated with plutonium, by the Kerr-McGee Technical Center personnel. This use of the laboratory area shall be limited to materials other than plutonium and personnel shall be thoroughly trained in the Plutonium Plant rules, or they shall be escorted by a knowledgeable person at all times while they are in the plant.

3.6 Quality Assurance Criteria - Deleted

3.7 Surveillance Requirements - Deleted

3.8 Fire Protection Features

Precautions are taken to provide early detection of fires in gloveboxes. Gloveboxes and/or glovebox complexes are equipped with a fuseable salt heat detection system that sounds an alarm and indicates the location of a overheated glovebox. Written procedures specify preventive measures and general instructions to personnel in fire control safety. The following equipment is maintained for fire extinguishing capability:

1. The Cimarron Plutonium Plant is a fire resistive construction with the structural members and roof being precast, prestressed concrete.

2. All high efficiency filters are fire resistant in accordance with UL-586 standard.

3. Access ports are provided at both the inlet and exhaust sides of the final filter banks to permit fire fighting at these locations with portable extinguishers as deemed necessary to protect final filter integrity.

4. Each process glovebox is equipped with a Fenwal, Eutectic salt fire detection system. The glovebox fire detectors are monitored at a central proprietary system and remote alarm sound in constantly supervised areas.

5. Portable carbon dioxide or dry chemical fire extinguishers are strategically located and mounted conveniently throughout the plant.

6. All exhaust ducts are fire resistant material.

Precautions shall be taken when using torches or other open flames within plastic greenhouse enclosure to ensure that flames or hot materials cannot ignite or penetrate the plastic enclosures.

3.9 In-House Fire Brigade

A fire brigade is maintained at the Cimarron Facility. The fire brigade crew consists of a fire marshal and all facility employees with specific assignments for fire emergency and special training in fire fighting. A published assignment sheet shall list the names and assigned responsibilities for all members of the fire brigade. The fire marshal of the fire brigade is familiar with the equipment and operations in all areas of the plant. He has had formal fire fighting training at a fire school university. The fire brigade personnel attend a fire fighting session at least quarterly.

3.9.1 Training of Fire Brigade Crews

The Fire Loss Prevention Program includes training of the Fire Brigade by the Fire Lost Prevention Management Staff with the Cimarron Standby Operations Manager serving as Emergency Director. The Emergency Director is assisted by the Health Physics and Safety Supervisor, the Corporate Staff Health Physicist, and the Facility Fire Marshall.

The Fire Loss Prevention Management has the primary responsibility to provide equipment and supplies for fire brigade support; prepare fire fighting procedures and assure that Public Fire Departments are properly indoctrinated for emergency support.

The fire brigade training program requires as a minimum:

1. Instructions covering the handling of all fire and rescue apparatus.
2. Instructions to assemble fire brigade crews at the appropriate fire alarm stations.
3. Attendance at quarterly training sessions, and attendance during training sessions conducted by professional firemen.

3.9.2 Support from Public Fire Departments

The FLPM Staff or the designated shift fire captain, shall have supervisory control over members of public Fire Departments during on-site practice drills, on-site indoctrination sessions or response to fire(s) occurring on-site.

The public fire departments have been informed of the above control plan and have agreed to attend annually scheduled indoctrination sessions held at the Cimarron Facility.

At least annually a professional fireman will be hired to conduct live fire-fighting training exercises, and provide specialized instruction and advice to the on-site fire brigade crews.

3.9.3 Documentation of Training Sessions

Instructors are required to maintain attendance records during training sessions of fire brigade crews. Written records of training sessions are maintained for audit review and administrative control. The Emergency Director or his designate will maintain attendance records all during training sessions conducted by professional fire and safety personnel, and by Public Fire Department Instructors.

3.10 Contaminated Combustible Waste Control

Waste material generated and contaminated in the plutonium process area is transferred from Cimarron Facility to U.S. Ecology Incorporated (or other authorized carrier) for disposal in an NRC licensed burial ground.

The following specifications are required in the preparation of waste material for off-site burial:

1. Maintenance generated combustible or non-combustible waste is removed from gloveboxes by "bag out" methods, and all surfaces of the bag must be checked with a survey meter before transferring to vault storage.

2. Noncombustible waste is handled the same as combustible waste, except that decontamination of surface areas may precede the packaging for placement in shipping drum.

3. Combustible material is stored in vault on metal shelves or in covered metal receptacles (55 gallon drums with a ring lock lid). Storage shelves and drums are isolated from areas of spark generation and or heat supply. A portable suppression system (fire extinguisher) is available in the vault storage area.

4. The contaminated bag cut is placed in a secondary bag for health physics survey and release for transfer to vault.

5. Radiometric (NDA) assays are made on waste packages and compared with data obtained from fabricated waste standards for plutonium content. The packages are then placed in the inner liners of waste shipping drums.

6. Material accountability procedures require a written log on material movement from glovebox to vault storage with appropriate entry on waste or transfer cards.

3.10.1 Preparation of Drums for Off-site Burial

Plutonium content is determined on all combustible waste packages before transferring to drum storage. Plutonium limit for burial is restricted by NRC regulations 10 CFR Part 20, and augmented by special permit requirements of the licensed burial contractor and or the burial site location.

Additional specifications reuired to prepare/package 55 gallon drums for off-site burial include the following:

1. Drums for combustible waste burial are fitted with rigid 90 mil polyethylene drum liners. This inside enclosure or liner is sealed with glue. Maximum quantity of plutonium allowed per waste drum is 35 grams. The plutonium content is determined by radiometric assay.

2. Drum lids are inspected for gaskets, fasteners and/or lid clamps. No drum containing combustible waste shall be left unattended without its lid in place. An exception applies to drums that are partially filled with combustible material and undergoing pressure from the waste compactor. Applying pressure to drum contents overnight (with the compactor) facilitates a reduction in the total waste.

3. Health physics personnel perform alpha/gamma surveys of drum surfaces before drums are released.

4. Tamper safe seals are placed on each drum before removal from the vault.

3.11 Controls for Liquid Waste Solidification

Contaminated liquid waste may be generated from maintenance and decontamination work.

3.11.1 Disposal of Liquid Waste

Aqueous waste is transferred into plastic bottles containing absorbant. The amount of plutonium in the bottle is determined by nondestructive assay measurement. If the total Pu content of the bottles is less than the permitted maximum, the bottles are then placed in a 55 gallon drum and solidified with Portland cement.

When large quantities of mop water and/or other generated waste liquids are stored in 55 gallon drums awaiting disposal, an alternative to solidification may be used. The containers of mop water and/or generated liquid waste treated with soda ash are filtered and passed through anion resin (ion exchange) for plutonium removal. The stripped solutions of mop water and generated waste may then be chemically analyzed for plutonium levels and subsequently discharged to the sanitary lagoon.

PAGES 3-24 THRU 4-5 HAVE BEEN DELETED

5.0 NUCLEAR CRITICALITY SAFETY FOR STANDBY CONDITION

For the plant shutdown mode, a criticality accident is noncredible under the conditions of shutdown operations, therefore, the only requirement for criticality safety surveillance and audit is found under the following license conditions:

1. A nuclear criticality safety audit shall be conducted and documented on a monthly basis.

2. Liquid level probes and alarms shall be installed and tested in each glovebox prior to the use of liquid decontamination solutions within the glovebox. In all cases where a glovebox contains liquids, a liquid level alarm and probe shall be installed and operational. The alarm set points will be one inch height of liquid above the glovebox floor. The alarm operation and set point for liquid level probes and alarms in use shall be tested at least monthly.

3. The exemption to the provisions of Section 70.24 of Title 10, Code of Federal Regulations that was granted under license condition #14 to the present license for standby operations dated July 15, 1977, is deleted during the conduct of activities authorized by this amendment.

4. Although gloveboxes have been cleaned and it is expected that the plutonium content of any 5 inch diameter 4 liter poly bottle of drainage from piping and components or decontamination solution will be very low and should never exceed 40 grams of plutonium. Each container shall be nondestructive assay counted before it is placed in the safe storage array to assure that for nuclear criticality safety purposes, it does not contain more than 2.0 kgs. of plutonium. The safe storage array shall contain no more than ten (10) containers with a minimum edge to edge spacing of twenty-four(24) inches between containers.

5. A maximum of two plutonium bearing containers each with the capacity no larger than 4 liters shall be permitted at the work station where the plutonium content of containers with more than 35 grams of plutonium is to be subdivided. The work station shall be at least two feet from any other plutonium. Plutonium contaminated waste shall be stored on-site in either the vault, Room 121 or Room 123. The maximum authorized plutonium content in any individual 55 gallon drum shall contain no more than 35 grams as determined by (NDA) measurement. The maximum authorized plutonium content in any other storage package shall contain no more than 5 grams in any cubic foot as determined by (NDA) measurement.

Pages 5-2 through 5-10 have been deleted.

6.0 Stack Release Measurements

The amount of alpha activity released into the air shall be determined by continuous stack sampling. A constant flow air sampler (Radeco, Model HD-28; interfaced with the Eberline, Model AIM-35 or equivalent) is required to record continuous alpha measurements on airborne particulates, to detect sudden increases in airborne alpha activity, and to provide an audible alarm. When the alarm sounds or a sudden increase in airborne alpha activity is detected, health physics personnel shall immediately start an investigation to determine the cause of the increased activity.

The continuous stack sampler includes a recorder and alarm system located in the health physics office, with a high level alarm remoted to the guard station.

6.1.1 Minimum Detectability of Instrumentation

The minimum detection level of the continuous stack monitor is 96 MPC hours for soluble ^{239}Pu at the stack. The minimum detection level is based on an observed increase of 5 counts per minute in a time period of 15 minutes with the alarm trip set for 15 counts/minute.

Instrument detection of a 5 c/m increase in a 15 minute period results from a concentration of 2.3×10^{-11} uCi/ml at the stack (383.3 MPC for soluble ^{239}Pu and 23 MPC for insoluble ^{239}Pu). An increase to the alarm trip within a 15 minute period results from a concentration of 6.9×10^{-11} uCi/ml at the stack (1150 MPC for soluble ^{239}Pu and 69 MPC for insoluble ^{239}Pu).

A detailed stack sampling program includes specific requirements to provide continuous monitoring or radioactive particulates released into the air.

a) The continuous sampler is calibrated at least monthly with a ^{239}Pu standard source. A weekly sample is counted in a Hewlett Packard (Model 5561A) or other suitable counting system for the purpose of calculating the stack effluent.

b) The following formula is used to arrive at a factor to convert the counts per minute (c/m) results of the continuous counter to microcuries per milliliter (uCi/ml) at the stack.

$$\mu Ci/ml = \frac{CPM}{\text{absorption coefficient} \times \text{collection efficient} \times \text{counter geometry} \times 2.22 \times 10^6 \times 28320}$$

The absorption coefficient and collection efficiency are each assumed to be 50% for HV-70 paper (sampling paper)

2.22×10^6 = disintegrations per minute per microcurie,

28320 = milliliters per cubic foot, and

$$\text{counter geometry} = \frac{\text{standard c/m - background c/m}}{\text{standard source value in d/m}} = 26\%$$

The above equation results in the following:

$$\mu Ci/ml = \frac{1}{(0.5)\ (0.5)\ (.264)\ (2.22 \times 10^6)\ (28320)} = 2.4\ 10^{-10}\ \mu Ci/ml$$

6.1.2 Detection Limits

a. For a 5 c/m increase in 15 minutes:

$$\mu Ci/ml = \frac{c/m \times 2.4 \times 10^{-10}}{Ft^3\ (\text{volume of sample})}$$

$$\mu Ci/ml = \frac{(5)\ (2.4 \times 10^{-10})}{52.5} = 2.3 \times 10^{-11}\ \mu Ci/ml$$

b. For an alarm trip in 15 minutes:

$$\mu Ci/ml = \frac{(15)\ (2.4 \times 10^{-10})}{52.5} = 6.9 \times 10^{-11}\ \mu Ci/ml$$

6.1.3 Weekly Sample Results

The Hewlett Packard counter is maintained at 33% counting efficiency. The background of the counter is 0.2 c/m. The detection limit for a 10 minute count is 0.1 c/m above background. The sample volume of a weekly sample is 35,280 F^3.

$$\mu Ci/ml = \frac{(0.1)\ (1.9 \times 10^{-10})}{35,280} = 5.4 \times 10^{-16}\ \mu Ci/ml$$

5.4×10^{-16} uCi/ml represents 0.009 MPC for soluble ^{239}Pu and 0.00054 MPC for insoluble ^{239}Pu.

7.0 AUDITS OF RADIATION SAFETY, FIRE SAFETY AND INDUSTRIAL SAFETY PROGRAM

7.1.1 Radiation Safety

Inspections are made of various health physics procedures and the compliance to the procedures is assessed. Individuals responsible for participating in these inspections generally includes the Corporate Staff Health Physicist, Cimarron Facility Standby Operations Manager and the Health Physics and Safety Supervisor. A written record of deficiencies is made to appropriate management personnel, who shall initiate corrective action.

Once a quarter the audit is made to determine a more general level of performance. This written record is submitted to the Standby Operations Manager, Cimarron Facility with a copy to the the Vice President, Nuclear Licensing and Regulation, and the Executive Vice President, Kerr-McGee Nuclear Corporation.

7.1.2 Fire Safety

Each fire extinguisher is inspected monthly by fire brigade members and annually by an outside fire safety equipment and inspection company agent. The monthly inspection is in accordance with NFPA - 10A - 1970, Chapter 2, inspection. Spare fire extinguishers are kept on hand to replace any found defective while the defects are being repaired. Other testing, including hydrostatic test, are performed by the inspection and service company.

Inspections and audits of other fire fighting equipment, housekeeping conditions, and other emergency equipment is conducted at least quarterly and deficiencies are reported in writing to management personnel who shall initiate corrective action.

7.1.3 Industrial Safety

Audits of the industrial safety programs are often made in conjunction with the fire safety inspection. The occupational safety and health administrations, safety and health standards (part 1910) are used as a guide for inspection purposes. Other applicable standards such as the National Fire Code, electrical codes, ANSF standards, etc., are also used.

KERR-MCGEE NUCLEAR CORPORATION

Pu-LICENSE RENEWAL APPLICATION

ADDENDUM - References Radiological Contingency Plan

APPENDIX A, Plutonium Plant

SNM - 1174; Docket 1193

March 30, 1982

Addendum; Appendix A — References - The Radiological Contingency Plan for the Cimarron Plutonium Facility

Pursuant to an order from the Nuclear Regulatory Commission dated February 11, 1981, a Radiological Contingency Plan for the Cimarron Plutonium Facility of Kerr-McGee's Nuclear Corporation has been prepared. This plan was prepared in accordance with the "Standard Format and Content for Radiological Contingency Plans for Fuel Cycle and Materials Facilities" submitted by NRC with the "order".

The information documented in the plan includes considerations to ensure (1) that the plant contains adequate engineered safety features and is otherwise designed to limit releases of radioactive materials and radiation exposures in the event of an accident, (2) that a capability exists for measuring and assessing the significances of accidental releases of radioactive materials, (3) that appropriate emergency equipment and planning are provided onsite to protect workers against radiation hazards that might be encountered following an accident, (4) that notifications are made promptly to federal, state, and local government agencies, and (5) that necessary recovery actions are taken in a timely fashion to return the plant to a safe condition following an accident.

This Radiological Contingency Plan has been assembled from several sources of information including, the License Application and Environmental Report, existing corporate policies, and current operating procedures.

After final approval by the Division of Fuel Cycle and Material Safety of the USNRC this plan will become a condition of Material License SNM-1174.