

SAFETY EVALUATION REPORT
SOURCE AND BYPRODUCT MATERIAL LICENSE
KERR-MCGEE NUCLEAR CORPORATION
SOUTH POWDER RIVER BASIN
"Q" SAND PROJECT

DOCKET NO. 40-8768

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1.0 DESCRIPTION OF PROPOSED ACTION

By letter dated March 25, 1980, Kerr-McGee Nuclear Corporation (KMNC) applied to the NRC for a Source and Byproduct Material License to construct and operate a Research and Development (R&D) in-situ leach uranium mine and recovery plant in Converse County, Wyoming. The activity will be known as the "Q" Sand Project and is designed to characterize the environmental and operating parameters for a future commercial scale in-situ facility.

The proposed action is to evaluate the suitability of "Q" sands for in-situ leaching of uranium through a pilot program involving a one-acre leach field. The well field would be in a "five-spot" pattern drilled to a depth of about 525 feet with a spacing of about 100 feet between each well. Additional monitoring wells will be drilled into the surrounding "Q" sand structure around the test wells and also into aquifers immediately above and below the "Q" sand structure.

The solution mining will be accomplished using a sodium carbonate-sodium bicarbonate leach solution with hydrogen peroxide and/or oxygen added. The uranium bearing lixiviant will be pumped from the well field to a uranium recovery process facility at a rate of about 100 gpm. The uranium recovery process will involve a solid resin ion exchange column. After passage through the column, the necessary chemicals will be added to the "barren" lixiviant to return the fluid to the desired concentration for reuse. This rejuvenated lixiviant will then be reinjected into the leach zone to recover additional uranium. The production and injection rates will be metered and controlled to ensure that the groundwater flow in the solution mining area will be toward the extraction wells. A system bleed of one to five gpm will be used to maintain this control. See Section 3.2, below for a description of the recovery plant process operations.

The proposed action is to grant a five year license authorizing the operation of R&D in-situ leach mining and uranium recovery facilities.

A Negative Declaration and Environmental Impact Appraisal dated May 1981, and this Safety Evaluation Report will provide the basis for the issuance of a five year Source Material License.

2.0 REVIEW SCOPE

This document details the staffs' review of in-plant radiological safety of the licensee's proposed South Powder River Basin "Q" Sand Project. This review included an evaluation of a partial radiological safety report included with the applicant's Environmental Report transmitted to the NRC with cover letter dated March 25, 1980, as amended by supplements dated August 6, August 21, September 11, and December 5, 1980; and January 19, 1981.

3.0 AUTHORIZED ACTIVITIES

The proposed license will authorize KMNC to solution mine uranium from a low grade ore body at an extraction pumping rate of 100 gpm. The uranium-containing

solution will be extracted and concentrated at the on-site process facility into a final U_3O_8 slurry product.

3.1 Facility Description

The proposed project site will be located on the east central portion of Wyoming in Converse County approximately 17 air miles northeast of Glenrock and 23 air miles northwest of Douglas. See Figures 2-1 and 2-2 enclosed. Access to the site is by Ross Road (not shown), a paved road running northward from Interstate 25.

KMNC has obtained the mining rights on a total of 73,030 acres of land in the areas indicated as the permit area in Figure 2-1 which includes the project site in Section 36, T36N, R74W. The state of Wyoming owns the surface rights to Section 36.

KMNC is in the process of developing an underground mine (The Bill Smith Mine in Section 36). See Topographic Map Figure 3-2 in application dated March 25, 1980. The R&D recovery plant will be located at the existing mine site.

3.2 Process Operations

In the recovery plant, which will have a design process rate of 100 gallons per minute, the uranium will be stripped from the ion exchange resin with a strong chloride or acid eluant. The rich eluant will be treated with ammonia to cause the uranium to precipitate to a yellowcake slurry which will be transported to a nearby mill for drying and packaging or shipped as a wet product to a uranium processing plant. A block flow diagram for the recovery plant is enclosed as Figure 3-4, and the layout of all proposed licensed facilities is enclosed as Figure 3-2.

A small evaporation pond will be constructed near the plant and used to collect and evaporate process waste waters such as excess eluant from the precipitation cycle. See the Environmental Impact Appraisal dated May 1981 for a description of the ponds and the leak detection systems.

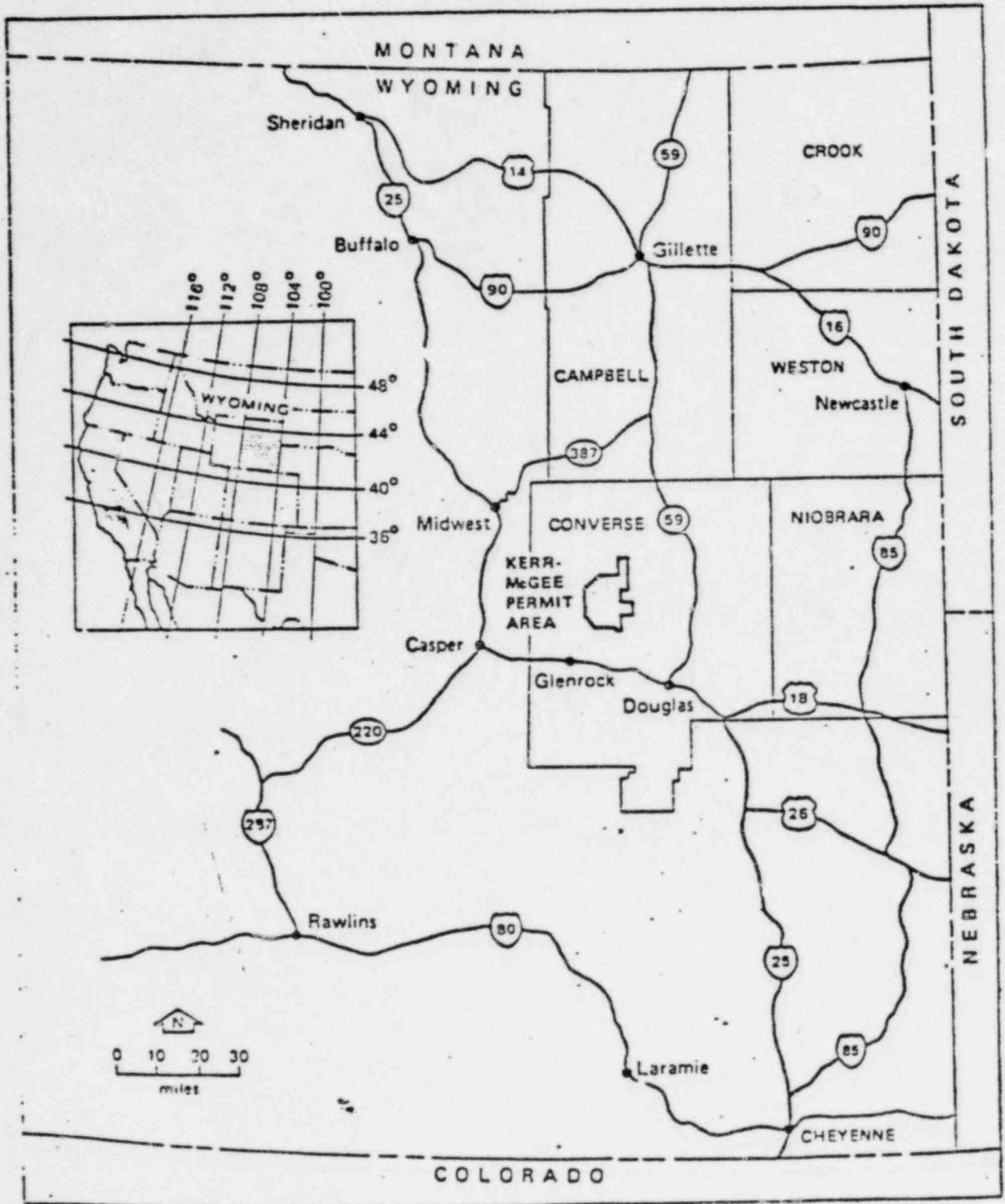
3.2.1 Uranium Recovery Plant

The fundamental purpose of recovery processes are described in Section 1.0, above. See Figures 3-4 and Attachment 4 (from the submittal dated January 19, 1981) which are enclosed.

3.2.2 Well Field Leach Circuit

The well field is expected to include 13 leaching wells and about 10 monitoring wells. If the pilot plant performance indicates closer well spacing is needed, additional wells may be drilled. The leaching wells in the initial program will be drilled to a depth of about 525 feet on a conventional five-spot pattern with a spacing of about 100 feet between like wells. Monitoring wells will be completed in the "Q" sand around the test site and will be completed in the aquifers above and below the "Q" sand. The well field site is located

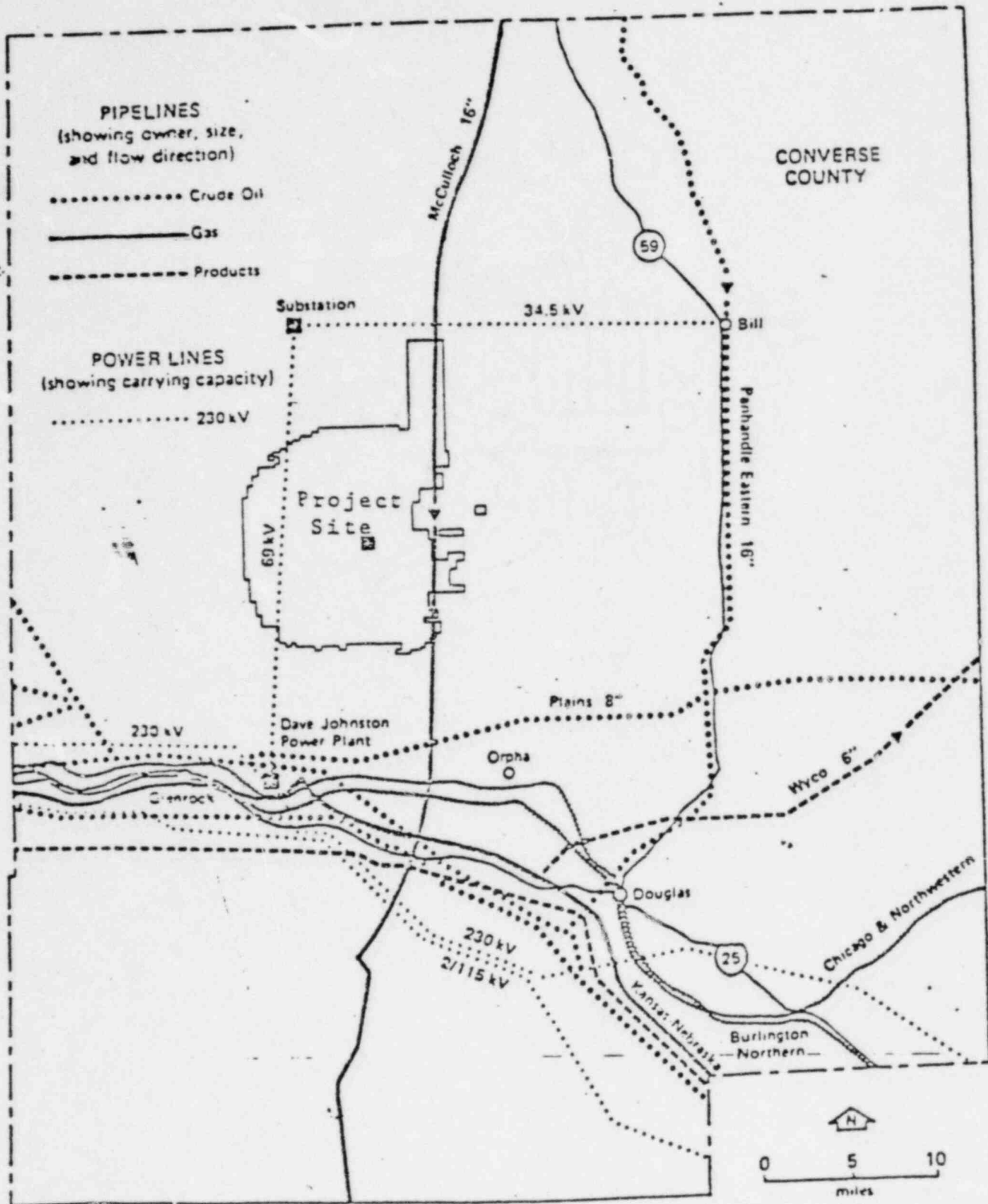
FIGURE 2-1



REGIONAL LOCATION OF THE KERR-McGEE PERMIT AREA

POOR ORIGINAL

FIGURE 2-2



TRANSPORTATION CORRIDORS IN THE VICINITY OF THE KERR-McGEE PERMIT AREA

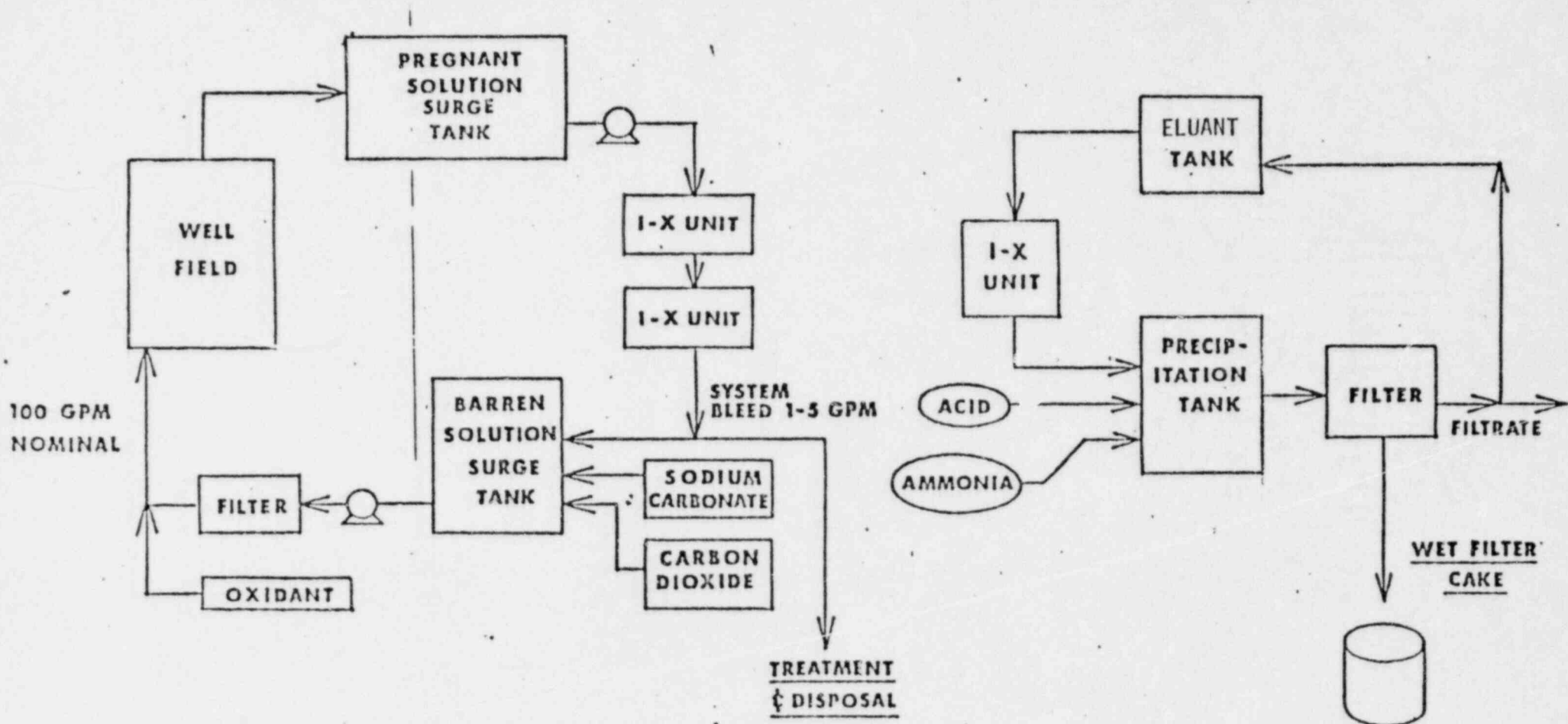
POOR ORIGINAL

FIGURE 3-4

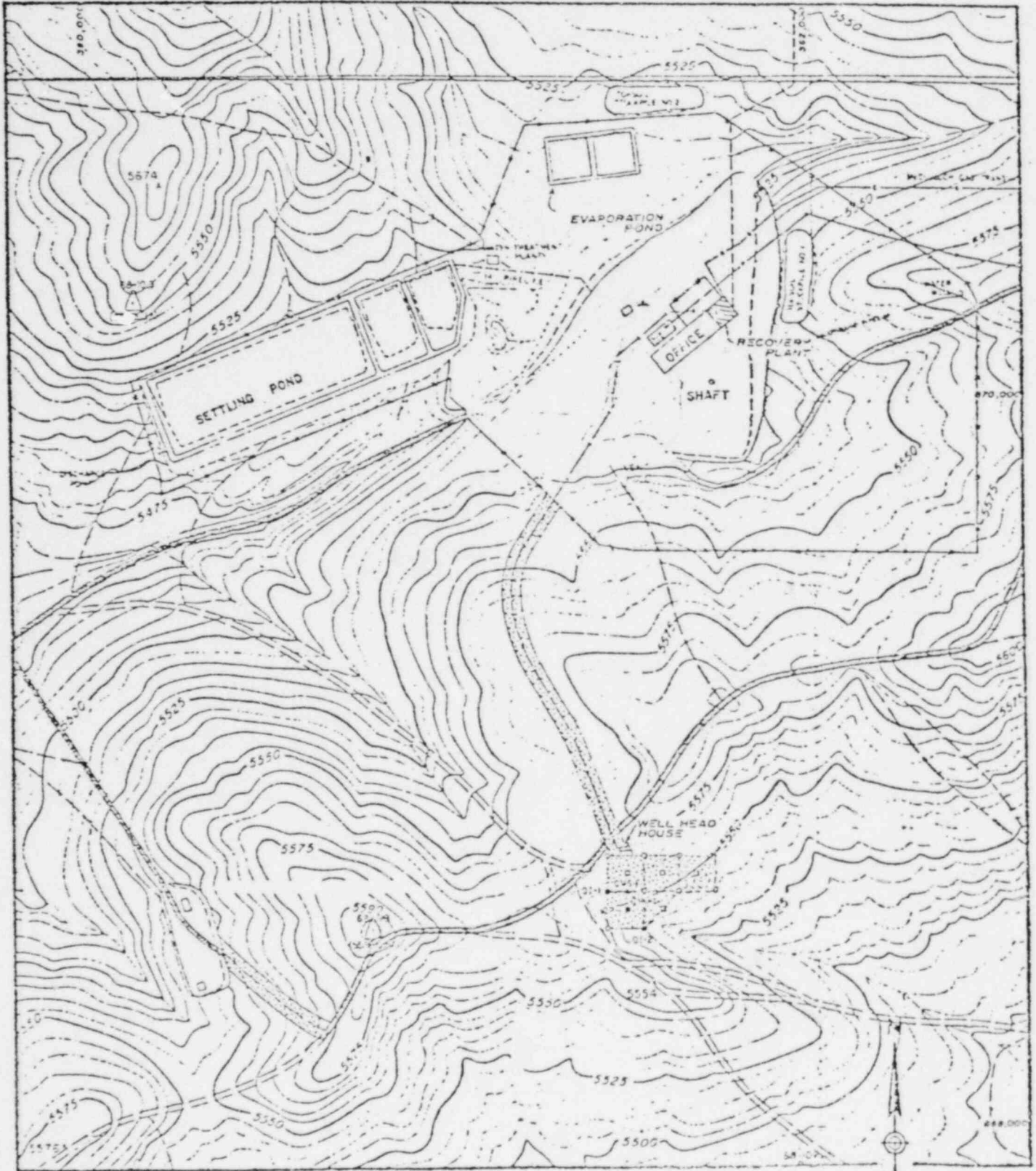
SCHEMATIC FLOW DIAGRAM
SOLUTION MINE PROCESS PLANT
KERR-McGEE "Q" SAND PROJECT

MAIN FLOW THROUGH PLANT

ELUTION PROCESS

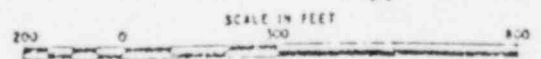


LOCATION OF G-SAND FIELD
 AND RECOVERY PLANT
 SOUTH POWDER RIVER BASIN
 SECTION 36 - T.36N., R.74W.
 CONVERSE COUNTY, WYOMING



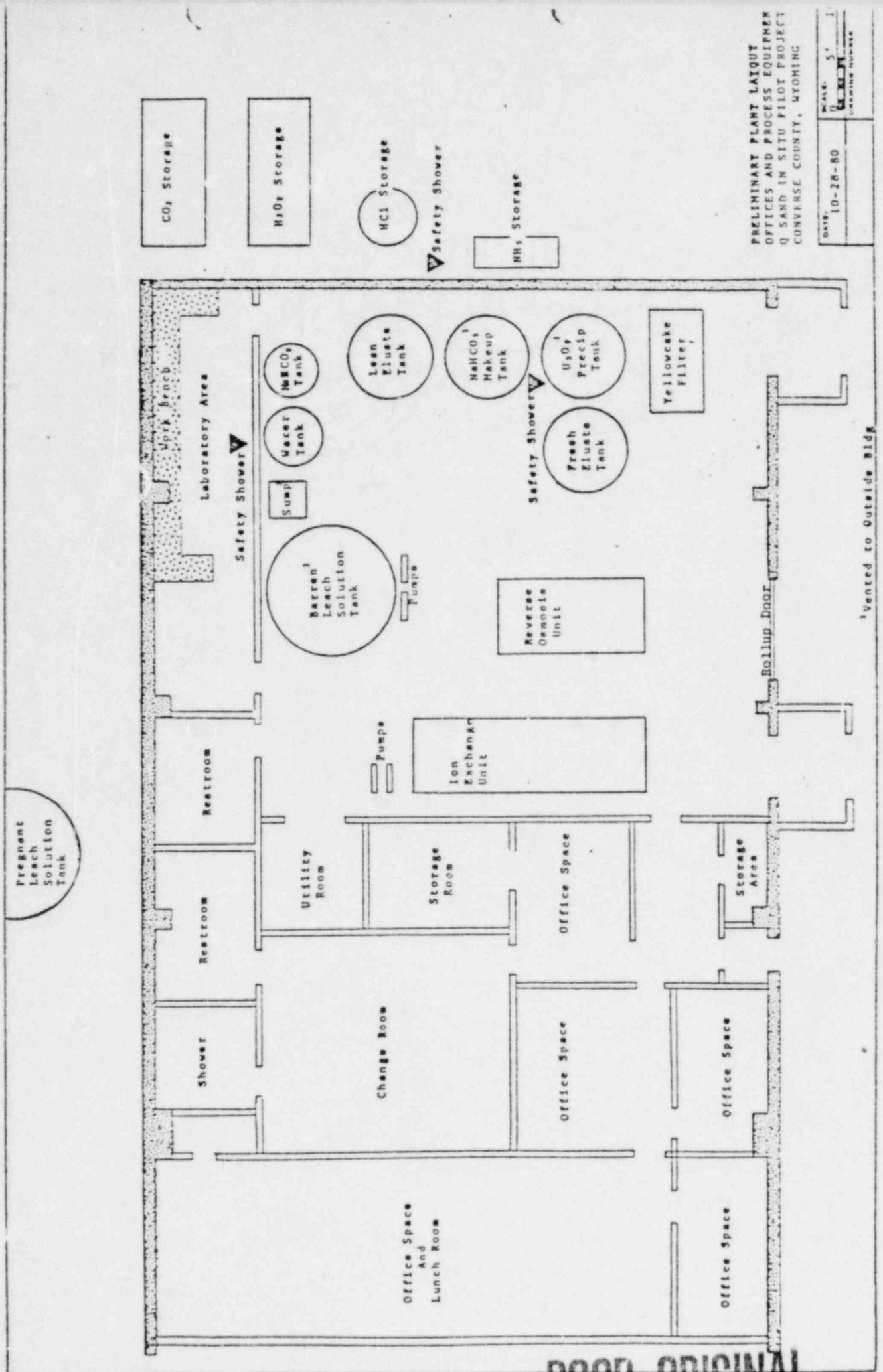
LEGEND

- △ MONITOR WELL
- PRODUCTION WELL
- INJECTION WELL
- EXPLORATION HOLE
- ▨ DISTURBED AREA
- EXISTING ROADS TO BE USED FOR ACCESS
- - - PIPE LINE



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 Rev. Jan 15, 1981

POOR ORIGINAL FIGURE 3-2



PRELIMINARY PLANT LAYOUT
 OFFICES AND PROCESS EQUIPMENT
 Q SAND IN SITU PILOT PROJECT
 CONVERSE COUNTY, WYOMING

DATE: 10-28-80
 SCALE: 5' 1" = 1' DRAWING NUMBER

about 1500 feet south of Kerr McGee's Bill Smith Mine Shaft, in Section 36, T36N, R74W. The recovery plant will be connected to a well field header building by buried pipelines (See Figure 3-2).

4.0 Radiation Safety Organization, Responsibilities, and Qualifications

4.1 Organization

The applicant proposes that the Coordinator of Radiation Safety for Kerr McGee Nuclear Corporation serve as the Radiation Safety Officer (RSO) for this project. The applicant also states that the Director of the Chemical Mining Department, New Mines Division will serve as the Project Manager (PM). The PM will be responsible for the overall supervision of the project. Thus, the applicant intends that the PM shall have the responsibility to assure the proper execution of the radiation safety program.

The staff has concluded that the proposed management organization does not provide for an adequately trained radiation safety specialist onsite. Therefore, the staff shall require that an appropriately qualified Radiation Safety Technician (RST) be assigned full time to the site to supervise and operate the day-to-day functions of the radiation safety program. The minimum qualifications of the site RST are presented later in the section. Further, the RST shall report directly to the PM on matters dealing with radiological safety. The staff recommends, but does not require, that the RST should not be assigned other production related duties. The RST shall supervise any additional radiation safety staff, assigned to the site. The RST may have other safety-related duties, such as responsibility for programs of industrial hygiene and fire safety.

4.2 Radiation Safety Responsibilities

The applicant has not provided a detailed description of the authority and responsibilities of the radiation safety personnel other than to state that the RSO shall design the facility radiation safety program and shall ensure its proper implementation by regular review. The staff has concluded that this statement does not provide enough detail or reasonable assurance that the RSO and other applicable radiation safety staff will properly oversee and audit radiation safety activities at the site in order to achieve ALARA exposures to workers and the general public from this facility operation. The purpose of the radiation safety program at a uranium recovery facility is to maintain radiation exposures ALARA for all employees, contractors, visitors, and members of the general public. Thus, the implementation of a successful ALARA program becomes the responsibility of everyone incidental to the operation of the facility. Responsibility to achieve ALARA are shared by licensee management, the RSO, the site RST, and all facility workers. Therefore, the staff shall require by license conditions that the licensee management, RSO and RST shall be provided the following authorities and responsibilities to direct the radiation safety program.

4.2.1 Licensee Management

The staff has concluded and requires that the licensee shall have a documented commitment to ALARA which provides for the following:

1. Dissemination and posting of information and policy statements on radiation safety for employees, contractors, and visitors.
2. Semiannual ALARA audit of the radiation safety program. The audit shall be performed by the Radiation Safety Officer (RSO) for Kerr-McGee Nuclear Corporation or other expert with equivalent qualifications.
3. Annual management review of the health physics program, its staff, and the allocation of adequate space and money.

4.2.2 Radiation Safety Officer

The staff shall require by license condition that the Radiation Safety Officer (RSO) shall be delegated the following responsibilities:

1. Authority to enforce regulations and corporate policies that affect any aspect of the facility radiation safety program.
2. Responsibility to plan and administer the ALARA audit and radiation safety training programs.
3. Authority to review and concur on plans for new equipment, process changes, or changes in operating procedures prior to implementation and to concur that the changes do not adversely impact the radiation safety program or the ALARA objective.

4.2.3 Radiation Safety Technician

The Radiation Safety Technician (RST) shall have the following responsibilities:

1. Supervise, evaluate, and assure that all in-plant and environmental surveys are properly documented and that such records are maintained.
2. Assure that worker exposures are measured or calculated, documented and that such records are maintained.
3. Perform inspections of the facility to assure compliance with the regulations and the radiation safety program.
4. Daily review of the facility maintenance work order logs to assure that prescribed radiation safety procedures were followed.
5. Annually review all facility operational and monitoring procedures to assure they are still appropriate and not in conflict with newly established radiation safety policies or regulatory requirements.

4.3 Qualifications of the Radiation Safety Personnel

4.3.1 Radiation Safety Technician

The applicant did not provide for the permanent assignment of a radiation safety staff at the site. However, as stated earlier in this document the staff shall require that a properly qualified technician be assigned to the facility. The staff requires that the Radiation Safety Technician (RST) for the facility shall have the following minimum qualifications:

1. Education: An associate degree in the physical sciences, engineering, or a health-related field. Alternatively, a high school diploma plus four years of relevant work experience in applied radiation protection are acceptable.
2. General Experience: One year of previous work experience in a uranium recovery facility or related industry involving radiation protection.
3. Health Physics Experience: One year of work experience using radiation detection equipment and analytical laboratory procedures that involve health physics, industrial hygiene, or industrial safety measures to be applied in uranium recovery operations.
4. Specialized Training: At least 4 weeks of formalized training in radiation health protection applicable to radiation hazards normally experienced at uranium recovery facilities.
5. Specialized Knowledge: A working knowledge of the proper operation of health physics instruments to be used in the recovery facility for surveying and sampling techniques, and personnel dosimetry requirements.

If the individual selected for the RST position does not meet the educational requirements specified above, however, he or she possesses prior work experience in radiation safety, then the licensee may consider two years of applied radiation safety work experience as a substitute for each year of the college level educational requirement. In cases where the RST possesses a college degree, with major emphasis in the area of the physical sciences and some specialized courses in radiation safety, the requirement for additional specialized training may be waived.

4.3.2 Corporate Radiation Safety Officer

The applicant provided the personal qualifications of the individual assigned the position of Radiation Safety Officer (RSO) in Appendix A of their application submittal dated March 25, 1980, however, the staff has concluded that minimum qualifications need to be established for this position since the RSO shall have direct responsibilities in developing the radiation safety program and administering the training and ALARA audit programs. The staff requires that the minimal qualifications for the position of Radiation Safety Officer

shall be as outlined in Regulatory Guide OH 941-4 entitled, "Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills Will Be As Low As Is Reasonably Achievable," dated August 1980 and as presented below.

The Radiation Safety Officer (RSO) shall have the following minimum qualifications:

1. Education: A bachelor's degree in the physical sciences or engineering from an accredited college or university.
2. General Experience: One year of supervisory experience and one year of experience in a uranium recovery facility or related industry.
3. Health Physics Experience: One year of work experience in applied health physics, radiation protection, industrial hygiene, or similar work. This experience shall involve actually working with radiation detection and measurement equipment rather than only administrative or "desk" work.
4. Specialized Training: A formalized intensive course in health physics of at least 4 weeks duration. At least 1 week of the course shall be specifically applicable to health physics problems associated with uranium recovery facilities. In addition, every 2 years, the RSO shall attend a refresher course on health physics.
5. Specialized Knowledge: A thorough knowledge of: the proper application and use of all health physics equipment used in the uranium recovery industry, the chemical and analytical procedures used for radiological sampling and monitoring, and the methods used to calculate personnel exposure to uranium and its daughters.

If the individual selected for the RSO position does not meet the educational requirements specified above, however, he or she possesses prior work experience in radiation safety, the licensee may consider two years of applied radiation safety work experience as a substitute for each year of the college level educational requirement. In cases where the RSO possesses a graduate degree, with major emphasis in radiological and environmental sciences, the requirement for specialized training may be waived.

5.0 RADIATION SAFETY PROGRAM

5.1 Operating Procedures

The applicant did not provide for the development of standard written operating procedures. The staff has concluded that standard written operating procedures shall be established for all operational activities involving radioactive materials that are handled, processed, stored, or transported. Written procedures shall also be established for nonoperational activities, to include health physics and environmental monitoring, sampling, analysis, and instrument calibration. An up-to-date copy of each written procedure shall be kept in each area where it is used.

All written procedures for both operational and nonoperational activities shall be reviewed and approved in writing by the RSO or other expert with equivalent qualifications before being implemented and whenever a change in a procedure is proposed to ensure that proper radiation protection principles are applied. The RST shall review all existing operating procedures on an annual basis. For work or nonroutine maintenance work where the potential for exposure to radioactive material exists and for which no standard written operating procedures already exists, a radiation work permit (RWP) shall be required. Such permits shall describe the following:

1. The scope of the work to be performed.
2. Any precautions necessary to reduce exposure to uranium and its daughters.
3. The supplemental radiological monitoring and sampling necessary during and following the completion of the work. Nonroutine maintenance involving exposure of workers to airborne radioactivity shall require the use of continuous breathing zone monitoring.

The RST shall indicate by signature the review of each RWP prior to the initiation of work, and the work shall be carried out in strict adherence to the conditions of the RWP. When the RST is not available, a supervisory member of the production staff who has received specialized radiation protection training may review and sign RWPs in the RST's absence.

5.2 TRAINING

The applicant failed to present any procedures for an adequate radiological training program for employees at the facility. Therefore, the staff requires that the following items be incorporated in the training program.

An initial training program shall be conducted by the RSO or other expert with equivalent qualifications. This training program shall include: the basic principles of radiation safety, the health hazards of exposure to uranium and its daughters, the personal hygiene practices for a uranium recovery facility, the facility radiation safety procedures, and the appropriate response to emergencies and accidents involving exposure to radioactive materials.

Upon completion of the initial training program, each individual shall be given a written examination. Each worker must achieve a predetermined passing score on the examination. The instructor shall review the incorrect answers with the worker until the instructor determines the worker has a passing knowledge of the instructional information. The examinations shall be maintained on file. Annually, each permanent facility worker shall be given a refresher training course. Retraining shall include: a discussion of relevant information that has become available during the past year, a review of safety problems during the past year, a discussion of changes in regulations and license conditions, an explanation of exposure trends, and a discussion of any other pertinent topics. Also, six times a year, all permanent site workers shall attend a general facility safety meeting at which radiation safety problems

shall be offered for discussion. Safety meeting minutes, attendance records, and training program records shall be maintained on file.

All permanent site workers shall be given specialized instruction on the radiation health and safety aspects of the specific jobs they will perform. This instruction shall be in the form of individualized on-the-job training performed by supervisors with the assistance of the RST.

5.3 Radiation Surveys - Area Monitoring

The applicant proposed to implement a radiation survey program that incorporates the following. "A portable low volume, membrane filter sampler will be used to collect restricted area samples within the plant. Additionally, radon daughter measurements will be made inside the building using an MDA Instant Working Level Meter. Air sampling during the start-up phases of operation shall be thoroughly performed to determine the location(s) and magnitude of any airborne radioactivity. Once the "character" of the air quality is determined, a routine air sampling program will be conducted at a frequency no less than monthly. Process changes, equipment problems, etc. may require special air sampling to be done. A beta-gamma dose rate instrument, Technical Associates Model CP-4 or equivalent, will be available for monitoring the process area, particularly areas where radioactive daughter products could accumulate. An alpha survey meter, Eberline Model PAC-IS-AGA or equivalent, will also be provided."

The staff has concluded that the applicant's proposed in-plant radiation area surveying program is inadequate and insufficient in detail to assure that the radiological environment for the worker will be evaluated at proper frequencies. The staff has determined that even though the uranium recovery process is entirely a wet process a potential transitory airborne hazard might exist due to 1) the spillage, drying, and resuspension of yellowcake, or 2) the emission of radon gas from process tanks. Therefore, the staff shall require by license condition that periodic surveys of all restricted areas to be occupied by workers be performed for both natural uranium and radon gas or its progeny. The staff recommends that radon progeny measurements would be preferable to active radon gas measurements. Surveys for natural uranium (resuspended yellowcake) shall be on a monthly basis with the exception that it shall be increased to weekly for any restricted area meeting the defined limits of an "airborne radioactivity area" as defined in 10 CFR Part 20.203(d) and an investigation of the cause of the high levels shall be made. Surveys for radon or its daughters shall be performed monthly in all enclosed process structures inhabited by workers. If the radon or radon progeny concentrations are found to exceed 8 pCi/l or 0.08 WL (Working Levels), respectively, then radon surveys shall be performed on a weekly basis. Such weekly sampling shall be maintained until four consecutive weekly samples exhibit concentrations less than 8 pCi/l or 0.08 WL. Additionally, prior to commencing operations, the NRC shall require the applicant to submit for review and approval the designated locations for surveys of airborne natural uranium and radon. The staff advises that the fluorometric analysis for uranium in disequilibrium with its daughters is preferred over the radiometric method.

The staff has noted that the applicant did not address the need for periodic gamma radiation surveys of restricted areas and process equipment. The staff notes that there is the potential for radioactive materials of reasonably high specific gamma ray constant (Ra-226) to plate out and concentrate on process equipment (i.e., ion exchange column). Therefore, the staff shall require that quarterly gamma radiation surveys be performed in the restricted area. Prior to commencing operation, the applicant shall submit, for NRC review and approval, the location designations for the gamma radiation surveys.

The applicant did not address the need to perform contamination surveys for alpha emitters (yellowcake) in areas normally occupied by workers. The staff has concluded that alpha surveys are necessary to determine if uranium contamination exists and whether decontamination might be necessary to protect the health and safety of workers. Therefore, the staff requires that the licensee shall perform alpha contamination surveys at the laboratory and offices, monthly, and at the eating and change areas, weekly. If the applicant proposes to analyze urine bioassay samples at an onsite laboratory then all surfaces used for urine sample preparation shall also be surveyed preceding the analyses.

If the contamination levels exceed those listed in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material," dated November 1976, i.e., the Uranium Recovery Licensing Branch Position, the area shall be decontaminated. The source of the contamination shall be determined, control measures initiated, and the results documented.

The staff has reviewed the applicants proposal for implementing special monitoring as deemed necessary. As discussed in an earlier part of this section, the staff shall require the RST to review the need to monitor nonroutine maintenance activities or changes in the process circuit. Any special surveys shall be representative of the breathing zone or work areas experienced by the workers during the maintenance activity. This is meant to include nonroutine airborne surveys for natural uranium, radon or radon progeny and uranium surface contamination surveys.

5.4 Environmental Surveys

The details of an unrestricted area environmental monitoring program is beyond the scope of this document. For an explanation of the staffs conclusions on monitoring and surveys for radiological effluents, the reader is referred to Section 5 of the Environmental Impact Appraisal dated May 1981.

5.5 Personnel Dosimetry

5.5.1 External Dosimeters

The applicant has committed that: "Dosimeters will be required for all operating personnel and will be supplied by Eberline Instrument Corporation, Santa Fe, New Mexico, or an equivalent qualified supplier. The dosimeters will be serviced monthly."

The applicant did not describe the type of dosimeters to be used, therefore, the staff shall require that either TLD or film type dosimeters are used. The dosimeter shall be designed to measure exposure to penetrating radiation (e.g., gamma radiation and beta particles with a range greater than 7 mg/cm²).

5.5.2 Internal Dosimetry

The applicant did not provide details on the manner in which worker exposures due to the inhalation and ingestion of airborne radon and its daughters or radioactive particulates of uranium would be determined. The regulations under 10 CFR 20.103(a)(1-2) currently require the control and assessment of exposure to radon and its daughters on a calendar year basis, whereas, the soluble form of uranium (yellowcake) must be evaluated and controlled on the basis of a 40-hour work week. Therefore, to assure these regulatory objectives, the staff shall require as stated earlier that natural uranium and radon or its progeny be surveyed on a monthly basis and the surveys for airborne natural uranium in defined airborne radioactivity areas shall be performed on a weekly basis.

The calculation of internal exposure to radon or uranium shall be based upon a TWE (time weighted exposure) calculation incorporating a consideration of both occupancy time and average airborne concentration. If occupancy times are established as an average for each category of workers, then the licensee shall also be required to review, by means of a semiannual time study, the basis upon which average occupancy periods are set.

For unusual or nonroutine maintenance procedures that require airborne sampling due to RWP requirements or where the work is of such nature that routine area surveys could not establish accurately the activity concentration to the worker, the exposure calculation shall be based on the actual occupancy time and the airborne concentration determined by continuous breathing zone monitoring.

If an employee reaches an action level of 25 percent of the maximum permissible exposure on calculated TWE for the week or calendar quarter, dependent on the solubility of the material, then the RST will initiate an investigation of the employee's work record and exposure history to identify any problem areas. If any problem areas are noted, they will be studied and the necessary corrective measures will be taken to ensure reduction of future exposures to as low as is reasonably achievable. Records shall be maintained of these investigations. These requirements are contained in a license condition.

5.5.3 Bioassay

The applicant has proposed that no routine bioassay program be conducted, but has committed to periodic urinalysis to measure the effectiveness of the radiation protection program.

The staff has concluded that bioassay, in the form of an urinalysis program, shall be conducted on a monthly basis. The applicant shall be required to collect baseline urine samples from all employees prior to initial assignment

at the facility. While workers should not routinely be exposed to dry yellowcake, exposures may occur due to the drying of spills or during maintenance activities. The possibility of ingestion also exists, especially for those workers who routinely handle the wet yellowcake product. Also, a bioassay program will aid in determining whether the airborne monitoring program is adequate.

The staff shall require, by license condition, the implementation of a bioassay program as described in Regulatory Guide 8.22 "Bioassay at Uranium Mills," with the following exceptions:

1. The applicant shall perform a baseline urinalysis for all permanent employees prior to their initial assignment at the facility.
2. The frequency of urine sample collection shall be monthly.
3. Anytime an action level of 15 μg U/l of urine for any worker is reached or exceeded, the licensee shall provide documentation to the U.S. NRC indicating what corrective actions have been performed to satisfy the actions outlined in Regulatory Guide 8.22. This information shall be included as part of the ALARA audit report required by License Condition No. 27.

Anytime an action level of 30 μg U/l for four consecutive urine specimens or 130 μg U/l for any one specimen is reached or exceeded, the licensee shall provide documentation with 30 days to the Uranium Recovery Licensing Branch and Inspection and Enforcement Region IV, U.S. NRC, indicating what corrective actions have been performed to satisfy the requirements of Regulatory Guide 8.22.

5.6 Inspection and Auditing Program

The applicant did not discuss an inspection and auditing program in the submittal, therefore, the staff has established the following procedures and criteria which the applicant shall adhere to. The primary concern of an effective inspection and auditing program is to evaluate (in a formal written outline/ synopsis) the overall effectiveness of the radiation safety program and the ALARA objective.

5.6.1 Inspection Program

The inspection program shall be conducted by the RST whose responsibility, along with those items specified in Section 4.2, will be to perform a daily "walk through" inspection of the operating area to ensure that all personnel maintain a safe working environment. Any items of noncompliance or violations of procedures, policies, regulations or license conditions shall be documented and maintained on file. All problems requiring remedial action shall be brought to the attention of the Project Manager and proper action taken. The inspection program will include a monthly written summary review of all documented

radiological surveys, radiation work permits, operating program logs as well as all personnel exposure data. The monthly inspection summary shall be submitted to the Project Manager and shall include recommended remedial actions as necessary.

It is the RST's responsibility that all items mentioned in the above paragraph and in items 1-6, Section 4.2, be reviewed, evaluated and assured proper documentation. To ensure that the inspection program is maintained and all operational data, surveys and inspection results are compiled properly, an auditing process will also be implemented.

5.6.2 Auditing Program

The staff requires that the corporate RSO or other expert with equivalent qualifications perform a formal semiannual ALARA audit of the radiation safety program and submit a detailed report (written) to the PM, the Uranium Recovery Licensing Branch and I&E Region IV. In order to evaluate the ALARA objective the licensee shall review the following records as part of the semiannual audit:

1. Bioassay results including any actions taken when the results exceeded action levels in Table 1 of R.G. 8.22.
2. Exposure records, both external and internal time weighted calculations.
3. Safety meeting minutes, training program records and attendance records.
4. Daily inspection log entries and summary reports of the monthly reviews.
5. In-plant radiological survey and monitoring data as well as environmental radiological effluent and monitoring data.
6. Surveys required by radiation work permits.
7. Reports on overexposure submitted to NRC, MSHA, or the State.
8. Reviews of operating and monitoring procedures completed during this period.

The written semiannual audit report shall be specific in addressing any noticeable trends in personnel exposures for identifiable categories of workers and types of activities, any trends in radiological effluent data, and the performance of exposure and effluent control equipment and whether it is being properly used, maintained and inspected. Any recommendations to further reduce personnel exposures or environmental releases of uranium or radon and radon progeny shall be included in the report.

6.0 FACILITY AND EQUIPMENT

6.1 Facility Design

The applicant provided a facility floor diagram, as Attachment 4 to submittal dated December 5, 1980, showing the proposed layout for process equipment, offices, the laboratory, and worker change and eating areas. The proposed layout would require that process workers pass through office areas of the facility to enter the change room or showers. In addition, the laboratory staff would be required to pass through the process areas of the facility to go from the office area to the laboratory.

The staff has concluded that the applicants proposed floor layout design could reasonably lead to the spread of contamination to nonprocess areas such as the office areas and the laboratory. The staff requires that the applicant shall modify the facility layout design to provide for better traffic patterns from process areas to nonprocess areas. The staff will require that eating shall only be allowed in administrative offices, in enclosed lunch areas, and in control rooms that are separated from the process areas. The staff believes the applicant should provide access to the process area through the change room rather than through office areas. Also, applicant should see if access to the laboratory area from the change area can be made without passage through the process area. Prior to commencement of operations, the applicant shall be required to submit the revised layout for NRC review and approval.

6.2 Ventilation Design

The applicant stated that no special ventilation equipment would be needed other than normal building ventilation. The applicant appears to reach this conclusion on the basis that the final product, a wet filter cake, should not result in airborne radioactive particulates. The applicant further states that maintenance procedures shall require that the yellowcake product be kept wet when equipment containing it is opened for repair. Similarly, housekeeping procedures will require prompt clean-up of all spills by wet methods as a means to avoid the resuspension of yellowcake in air.

The staff has determined that the applicant's description of the ventilation system does not provide enough information to conclude its adequacy. The staff has found from experience with many other licensed facilities that even in the best circumstances of dedication to housekeeping that resuspension of spilled yellowcake may lead to airborne particulate levels well above background. The best designed systems normally provide for independent ventilation for process and nonprocess areas. As a minimum, forced air flow should be directed from nonprocess areas into process areas. Additionally, all storage and/or process tanks open to the air within the building should be hooded and vented to the outside atmosphere to prevent radon accumulation within the process area. The applicant shall be required by license condition to submit for NRC review and approval a more detailed description of the ventilation systems to include equipment specifications, airflow paths, estimated air turnover rates, and projected airborne radioactivity concentrations resulting from routine operations for all enclosed areas normally occupied by workers.

6.3 Protective Clothing and Equipment

The applicant has submitted insufficient information on this topic and the staff has determined that the following shall be required by license condition.

The applicant shall provide and require process and maintenance workers, who work in yellowcake areas or work on equipment contaminated with yellowcake, wear protective clothing including coveralls and boots or shoe covers. Workers who package yellowcake slurry for transport shall also be provided gloves. Before leaving the change area, all process workers involved in the precipitation, handling, packaging, or transport of yellowcake slurry shall either shower and/or monitor their face and hands using a calibrated alpha survey instrument. Where alpha monitoring is used exclusive of showering, the monitoring results shall be documented and maintained on file. In addition, the applicant shall perform spot surveys for alpha contamination at least quarterly on workers leaving the facility proper.

Alpha contamination greater than 1000 dpm/100 cm² on skin or clothes shall be cause for decontamination and resurveying, and for an investigation by the radiation safety staff. Records shall be maintained of these investigations.

6.4 Access Control

The applicant has committed to restrict the access to the proposed project site by locating the processing area and the evaporation pond within the fenced area of the Bill Smith mine site. Gates and fencing will be posted with warning signs. Entrances into the process building will be conspicuously posted: "CAUTION - ANY AREA OR ROOM WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL."

By license condition, the staff will exempt the applicant from the requirements of Section 20.203 of 10 CFR Part 20 for posting areas within the process facility.

6.5 Release of Equipment and Materials

The applicant has not provided information concerning the release of contaminated equipment. The staff will require, by license condition, decontamination prior to release of equipment, materials, and packages from the restricted area. This will be achieved by following the guidelines of the WMUR Branch position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material", dated November 1976.

The staff will require by license condition that degraded resin shall be transferred to an NRC licensed uranium recovery facility for disposal in their tailings impoundment or the resin shall be shipped to a licensed radioactive waste disposal site.

6.6 Quality Assurance and Equipment Calibration

The only part of a quality assurance program that the applicant has presented regards instrument calibration. The applicant has proposed that monitoring and survey instruments be calibrated by a certified laboratory at least annually and after repairs affecting calibration. Radiological instrumentation will initially and periodically be calibrated by qualified health physics personnel for Kerr-McGee Nuclear Corporation.

The staff has determined and will require by license condition that in addition to the above all radiation monitoring, sampling, and detection equipment shall be recalibrated after each repair and as recommended by the manufacturer or at least semiannually, whichever is more frequent. In addition, all radiation survey instruments shall be operationally checked with a radiation source before each use.

The applicant will also be required by license condition to develop a quality assurance program for all sampling and analyses performed as part of the in-plant radiation safety and environmental monitoring programs that includes all of the recommended elements of a quality assurance program specified in Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Stream and the Environment." In addition, prior to commencing operations, the applicant will be required to submit to the US Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, for approval in the form of a license amendment, complete specifications for this quality assurance program.

7.0 EMERGENCY PROCEDURES

The applicant states that safety lighting will be provided in the event of power loss at the facility. In the event of a fire, the applicant states that fire extinguishers, either dry chemical or CO₂ foam, will be available in the processing area. The applicant has committed the rapid cleanup of spills using wet methods and maintenance procedures which should minimize airborne particulates. The staff shall additionally require by license condition that the applicant develop and submit for NRC review and approval prior to commencing operations a detailed emergency plan establishing authorities and procedures to be followed for a variety of potential accidents likely to occur.

8.0 DECOMMISSIONING

The applicant has committed to reclaiming disturbed areas in accordance with the regulations of Wyoming Department of Environmental Quality. In addition, the reclamation and decommissioning shall be in conformance with NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Material," November 1976, and with U.S. EPA Environmental Standards in effect at the time for cleanup of open lands and buildings. This topic is covered in detail in the Environmental Impact Appraisal.

9.0 SURETY REQUIREMENTS

The applicant stated that a bond for the total amount of the estimated reclamation costs will be posted with the Wyoming Department of Environmental Quality, Land Quality Division, to ensure funds are available for the reclamation program. The surety requirements are discussed in detail in the Environmental Impact Appraisal.

10. CONCLUSION

Upon completion of the safety review of the applicant's license application and supplement, the staff has concluded that the proposed Kerr-McGee Nuclear Corporation South Powder River Basin "Q" Sand Project operations described in this SER and the EA, subject to all conditions imposed by the staff, will be protective of public health and safety and fulfills the requirements of 10 CFR Part 20.

The staff, therefore, recommends that Kerr-McGee Nuclear Corporation be issued a license subject to the following conditions:

9. Authorized Place of Use: Section 36, T36N, R74W, Converse County, Wyoming, approximately 17 air miles northeast of Glenrock and 23 air miles northwest of Douglas.
10. Authorized Use: For uranium recovery from pregnant lixiviant in accordance with statements, representations and conditions contained in (1) the licensee's Environmental Report Sections 6.2, 6.3 and 6.4, enclosed with cover letter dated March 25, 1980; (2) Figure 3-2 of submittal dated September 11, 1980; (3) Attachment 4 of submittal dated, December 5, 1980; (4) Sections 1 and 3 of the licensee's March 25, 1980 Environmental Report and in supplements dated September 11, and December 5, 1980, and January 19, and April 27, 1981. Notwithstanding the above, the following conditions shall override any conflicting statements contained in the licensee's application and supplements. Wherever the word "will" is used in the licensee's submittals, it shall denote a requirement.
11. All sampling and monitoring data, calibration records, reports on audits, inspections, and other analyses, training records, and safety meeting minutes, as well as any subsequent reviews, investigations, and corrective actions, shall be documented. Unless otherwise specified in the U.S. Nuclear Regulatory Commission regulations, all such documentation shall be maintained for a period of at least five (5) years.
12. The licensee shall notify the U.S. Nuclear Regulatory Commission, Region IV, Office of Inspection and Enforcement, 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76011, and U. S. Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, Washington, D.C. 20555, at least six (6) weeks prior to commencing mining operations, in writing, so that an NRC inspection may be conducted to review the licensee's development and implementation of administrative and operating procedures and monitoring programs.
13. The licensee shall have a Radiation Safety Technician (RST) assigned full time to the site. The RST shall report directly to the Project Manager on matters dealing with radiological safety.
14. The licensee shall have a documented commitment to ALARA which provides for the following:
 1. Dissemination and posting of information and policy statements on radiation safety for employees, contractors, and visitors.
 2. Semiannual ALARA audit of the radiation safety program. The audit shall be performed by the Radiation Safety Officer (RSO) for Kerr-McGee Nuclear Corporation or other expert with equivalent qualifications.

3. Annual management review of the health physics program, its staff, and the allocation of adequate space and money.
15. The Radiation Safety Officer (RSO) shall have the following responsibilities:
 1. Authority to enforce regulations and corporate policies that affect any aspect of the facility radiation safety program.
 2. Responsibility to plan and administer the ALARA audit and radiation safety training programs.
 3. Authority to review and concur in writing on plans for new equipment, process changes, or changes in operating procedures prior to implementation and to concur that the changes do not adversely impact the radiation safety program or the ALARA objective.
 16. The Radiation Safety Technician (RST) shall have the following responsibilities:
 1. Supervise, evaluate, and assure that all in-plant and environmental surveys are properly documented and that such records are maintained.
 2. Assure that worker exposures are measured or calculated, documented, and that such records are maintained.
 3. Perform inspections of the facility to assure compliance with the regulations and the radiation safety program.
 4. Daily review of the facility maintenance work order logs to assure that prescribed radiation safety procedures were followed.
 5. Annually review all facility operational and monitoring procedures to assure they are still appropriate and not in conflict with newly established radiation safety policies or regulatory requirements.
 17. The Radiation Safety Technician (RST) shall have the following minimum qualifications:
 1. Education: An associate degree in the physical sciences, engineering, or a health-related field. Alternatively, a high school diploma plus four years of relevant work experience in applied radiation protection are acceptable.
 2. General Experience: One year of previous work experience in a uranium recovery facility or related industry involving radiation protection.

3. Health Physics Experience: One year of work experience using radiation detection equipment and analytical laboratory procedures that involve health physics, industrial hygiene, or industrial safety measures to be applied in uranium recovery operations.
4. Specialized Training: At least 4 weeks of formalized training in radiation health protection applicable to radiation hazards normally experienced at uranium recovery facilities.
5. Specialized Knowledge: A working knowledge of the proper operation of health physics instruments to be used in the recovery facility for surveying and sampling techniques, and personnel dosimetry requirements.

If the individual selected for the RST position does not meet the educational requirements specified above, however he or she possesses prior work experience in radiation safety, then the licensee may consider two years of applied radiation safety work experience as a substitute for each year of the college level educational requirement. In cases where the RST possesses a college degree, with major emphasis in the area of the physical sciences and some specialized courses in radiation safety, the requirement for additional specialized training may be waived.

18. The Radiation Safety Officer (RSO) shall have the following minimum qualifications:
 1. Education: A bachelor's degree in the physical sciences or engineering from an accredited college or university.
 2. General Experience: One year of supervisory experience and one year of experience in a uranium recovery facility or related industry.
 3. Health Physics Experience: One year of work experience in applied health physics, radiation protection, industrial hygiene, or similar work. This experience shall involve actually working with radiation detection and measurement equipment rather than only administrative or "desk" work.
 4. Specialized Training: A formalized intensive course in health physics of at least four (4) weeks duration. At least 1 week of the course shall be specifically applicable to health physics problems associated with uranium recovery facilities. In addition, every two (2) years, the RSO shall attend a refresher course on health physics.

5. **Specialized Knowledge:** A thorough knowledge of the proper application and use of all health physics equipment used in the uranium recovery facility, the chemical and analytical procedures used for radiological sampling and monitoring, and the methods used to calculate personnel exposure to uranium and its daughters.

If the individual selected for the RSO position does not meet the educational requirements specified above, however, he or she possesses prior work experience in radiation safety, the licensee may consider two (2) years of applied radiation safety work experience as a substitute for each year of the college level educational requirement. In cases where the RSO possesses a graduate degree, with major emphasis in radiological and environmental sciences, the requirement for specialized training may be waived.

19. Standard written operating procedures shall be established for all operational activities involving radioactive materials that are handled, processed, stored, or transported. Written procedures shall also be established for nonoperational activities, to include in-plant and environmental monitoring, sampling, analysis, and instrument calibration. An up-to-date copy of each written procedure shall be kept in each area where it is used.

All written procedures for both operational and nonoperational activities shall be reviewed and approved in writing by the RSO or other expert with equivalent qualifications before being implemented and whenever a change in a procedure is proposed to ensure that proper radiation protection principles are applied. The RST shall review all existing facility procedures on an annual basis. For work or nonroutine maintenance work where the potential for exposure to radioactive material exists and for which no standard written procedure already exists, a radiation work permit (RWP) shall be required. Such permits shall describe the following:

1. The scope of the work to be performed.
2. Any precautions necessary to reduce exposure to uranium and its daughters to as low as is reasonably achievable.
3. Any supplemental radiological monitoring and sampling required during and following completion of the work. Nonroutine maintenance involving exposure of workers to airborne particulates of uranium and its daughters shall require the use of continuous breathing zone monitoring.

The RST shall indicate by signature the review of each RWP prior to the initiation of the work, and the work shall be carried out in strict adherence to the conditions of the RWP. When the RST is not available, a supervisory member of the facility staff who has received specialized radiation protection training may review and sign RWPs.

20. The licensee shall have a training program as described below.

An initial training program shall be conducted by the RSO or other expert with equivalent qualifications. This training program shall include: the basic principles of radiation safety; the health hazards of exposure to uranium and its daughters; the personal hygiene practices for a uranium recovery facility; the facility radiation safety procedures; and the appropriate response to emergencies and accidents involving exposure to radioactive materials.

Upon completion of the initial training program, each individual shall be given a written examination. Each worker must achieve a predetermined passing score on the examination. The instructor shall review the incorrect answers with the worker until the instructor determines the worker has a passing knowledge of the instructional information. The examinations shall be maintained on file. Annually, each permanent facility worker shall be given a refresher training course. Retraining shall include: a discussion of relevant information that has become available during the past year; a review of safety problems during the past year; a discussion of changes in regulations and license conditions; an explanation of exposure trends; and a discussion of any other pertinent topics. Also, six (6) times a year, all permanent site workers shall attend a general facility safety meeting at which radiation safety problems shall be offered for discussion. Safety meeting minutes, attendance records, and training program records shall be maintained on file.

All permanent site workers shall be given specialized instruction on the radiation health and safety aspects of the specific jobs they will perform. This instruction shall be in the form of individualized on-the-job training performed by supervisors with the assistance of the RST.

21. The licensee shall perform monthly surveys for natural uranium in all enclosed process structures with the exception that they shall be increased to weekly for any enclosed area meeting the requirements of an "airborne radioactivity area" as defined in 10 CFR Part 20.203(d) and an investigation of the cause of the high levels shall be made.

The licensee shall also perform monthly surveys for radon or radon progeny in all enclosed process structures inhabited by workers with the exception that radon or radon progeny surveys shall be increased to weekly if the radon or radon progeny concentrations are found to exceed 8 pCi/l or 0.08 WL (Working Levels), respectively. Such weekly sampling shall be maintained until four (4) consecutive weekly samples exhibit less than 8 pCi/l or 0.08 WL. Prior to commencing operations and within sixty (60) days of the issuance of this license, the licensee shall submit to the Uranium Recovery Licensing Branch, for NRC review and approval in the form of a license amendment, the designated locations for surveys of airborne natural uranium and radon or radon progeny.

The calculation of internal exposure to radon, radon progeny, or natural uranium shall be based on a TWE (Time Weighted Exposure) calculation incorporating a consideration of both occupancy times and average airborne working levels or activity concentrations. If occupancy times are established as an average for each category of worker, the licensee shall also, by means of a semiannual time study, determine the basis upon which average occupancy periods are established.

If any worker reaches or exceeds 25 percent of the maximum permissible exposure limits as specified in 10 CFR Part 20 based upon a calculated TWE for the week or the calendar quarter, dependent on the solubility of the material, the RST shall initiate an investigation of the employee's work record and exposure history to identify the source of the exposure. Necessary corrective measures shall be taken to ensure reduction of future exposures to as low as is reasonably achievable. Records shall be maintained of these investigations.

22. The licensee shall perform quarterly gamma radiation surveys in enclosed areas. Prior to commencing operations and within sixty (60) days of issuance of this license, the licensee shall submit to the Uranium Recovery Licensing Branch, for NRC review and approval in the form of a license amendment, the locations for the gamma radiation survey.
23. The licensee shall perform alpha contamination surveys of the facility, laboratory and offices monthly, and of the eating and change areas, weekly. If the licensee performs the analysis of urine bioassay samples at a facility laboratory, the licensee shall also survey all surfaces used for urine sample preparation preceding the analyses.

If the alpha contamination levels exceed those listed in the attached "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct Source or Special Nuclear Material", dated November 1976, the area shall be decontaminated. The source of the contamination shall be determined, control measures shall be initiated, and the results shall be documented.

24. Any changes in the process circuit, illustrated and described in Figure 3-4 of the license application dated March 25, 1980, shall require the approval of the RSO and shall be submitted to the U.S. Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, for prior approval in the form of a license amendment.
25. The licensee shall use external personnel dosimeters, either TLD or film type dosimeters, that are designed to measure exposure to penetrating radiation (e.g., gamma radiation and beta particles with a range greater than 7 mg/cm²).
26. The licensee shall implement a urinalysis program as outlined in Regulatory Guide 8.22, "Bioassay at Uranium Mills", with the following exceptions:
 1. The licensee shall perform a baseline urinalysis for all permanent employees prior to their initial assignment at the facility.
 2. The frequency of urine sample collection shall be monthly.
 3. Anytime an action level of 15 µg U/l urine is reached or exceeded for any worker, the licensee shall provide documentation to the U.S. Nuclear Regulatory Commission indicating what corrective actions have been performed to satisfy the requirements of Regulatory Guide 8.22. This information shall be included as part of the ALARA audit report required by License Condition No. 27.

Anytime an action level of 30 µg U/l for four (4) consecutive urine specimens or 130 µg U/l for any one specimen is reached or exceeded, the licensee shall provide documentation within thirty (30) days to the U.S. Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, Washington, D.C. 20555, and Office of Inspection and Enforcement, Region IV, 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76011, indicating what corrective actions have been performed to satisfy the requirements of Regulatory Guide 8.22.

27. The licensee shall perform a semiannual ALARA audit of the radiation safety program which shall be conducted by the RSO or other expert with equivalent qualifications who shall submit a detailed, written report to the Project Manager and the U. S. Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, Washington, D.C. 20555, and the Office of Inspection and Enforcement, Region IV, 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76011. In order to evaluate the ALARA objective, the licensee shall review the following records as part of the semiannual audit:
1. Bioassay results including any actions taken when the results exceeded action levels in Table 1 of Regulatory Guide 8.22.
 2. Exposure records of external and internal time-weighted calculations.
 3. Safety meeting minutes, attendance records, and training program records.
 4. Daily inspection log entries and summary reports of the monthly reviews.
 5. In-plant radiological survey and monitoring data as well as environmental radiological effluent and monitoring data.
 6. Surveys required by radiation work permits.
 7. Reports on overexposure submitted to NRC, MSHA, or the State.
 8. Reviews of operating and monitoring procedures completed during this period.

The written semiannual audit report shall be specific in addressing any noticeable trends in personnel exposures for identifiable categories of workers and types of activities, any trends in radiological effluent data, and the performance of exposure and effluent control equipment and whether it is being properly used, maintained, and inspected. Any recommendations to further reduce personnel exposures or environmental releases of uranium or radon and radon progeny shall be included in the report.

28. The licensee shall modify the facility layout design submitted as Attachment 4 to letter dated December 5, 1980, to provide for better traffic patterns from process areas to nonprocess areas. Access to the process area should be provided through the change room rather than through office areas. Within thirty (30) days of the issuance of this license, the revised floor plan and a description of the changes made shall be submitted to the Uranium Recovery

Licensing Branch for review and approval in the form of a license amendment prior to initiation of operations at the facility.

29. The licensee shall provide a separate ventilation system for process and nonprocess areas, or a single system which shall be designed so that air shall flow from the nonprocess areas into the process areas.

Additionally, all storage and/or process tanks within the building shall be vented to the outside atmosphere to prevent radon accumulation within the tank or an enclosed structure. Within thirty (30) days of issuance of this license, the licensee shall submit to the Uranium Recovery Licensing Branch, for NRC review and approval in the form of a license amendment, a more detailed description of the ventilation systems to include equipment specifications, airflow paths, estimated air turnover rates, and projected airborne radioactivity concentrations resulting from routine operations for all enclosed areas normally occupied by workers.

30. The licensee shall provide and require that all process and maintenance workers who work in yellowcake areas or work on equipment contaminated with yellowcake, wear protective clothing including coveralls and boots or shoe covers. Workers who package yellowcake slurry for transport shall also be provided gloves. Before leaving the change area, all process workers involved in the precipitation, through packaging for transport of yellowcake slurry shall either shower and/or monitor their face and hands using a calibrated alpha survey instrument. Where alpha monitoring is used exclusive of showering, the monitoring results shall be documented and maintained on file. In addition, the licensee shall perform spot surveys for alpha contamination at least quarterly on all workers leaving the facility proper. Alpha contamination greater than 1000 dpm/100 cm² on skin or clothes shall be cause for decontamination and resurveying, and for an investigation by the radiation safety staff. Records shall be maintained of these investigations.
31. Release of equipment, materials, or packages from the restricted area shall be in accordance with the enclosed "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated November 1976.
32. All radiation monitoring, sampling and detection equipment shall be recalibrated after each repair and as recommended by the manufacturer or at least semiannually, whichever is more frequent. In addition,

all radiation survey instruments shall be operationally checked with a radiation source before each use.

33. The licensee is hereby exempted from the requirements of Section 20.203(e)(2) of 10 CFR 20 for posting areas within the facility, provided that all entrances to the facility are conspicuously posted in accordance with Section 20.203(e)(2) and with the words, "CAUTION - ANY AREA OR ROOM WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL."
34. The licensee shall develop a quality assurance program for all sampling and analyses performed as part of the in-plant radiation safety and environmental monitoring programs that includes all of the recommended elements of a quality assurance program specified in Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Stream and the Environment." In addition, prior to commencing operations and within ninety (90) days of issuance of this license, the licensee shall submit to the U.S. Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, for approval in the form of a license amendment, complete specifications for this quality assurance program.
35. The inspection program shall be conducted by the RST whose responsibility, along with those specified in License Condition No. 16, shall be to perform a daily "walk through" inspection of the operating area to ensure that all personnel maintain a safe working environment. Any items of noncompliance or violations of procedures, policies, regulations or license conditions shall be documented in a log and maintained on file. All problems requiring remedial action shall be brought to the attention of the Project Manager and proper action taken. The inspection program shall include a monthly written summary review of all documented radiological surveys, radiation work permits, operating program logs, all personnel exposure data, and environmental monitoring data. The monthly inspection summary shall be submitted to the Project Manager and shall include recommended remedial actions as necessary.
36. Within ninety (90) days of issuance of this license and prior to commencing operations, the licensee shall develop and submit to the Uranium Recovery Licensing Branch, for NRC review and approval in the form of a license amendment, a detailed emergency action plan establishing authorities and procedures to be followed for a variety of potential accidents likely to occur.
37. Degraded resin shall be transferred to an NRC licensed uranium recovery facility for disposal in their tailings impoundment or the resin shall be shipped to a licensed radioactive waste disposal site.

38. Eating shall only be allowed in administrative offices, enclosed lunch areas, and control rooms that are separated from the process areas.

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