

SEP 20 1982

SAFETY EVALUATION REPORT

SOURCE MATERIAL LICENSE

TETON EXPLORATION DRILLING CO., INC.

LEUENBERGER SITE, CONVERSE COUNTY, WYOMING

DOCKET NO. 40-8781

LICENSE NO. SUA-1403

SEPTEMBER 1982

09/02/82

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1.0 DESCRIPTION OF THE PROPOSED ACTION

By an application dated October 10, 1980, Teton Exploration and Drilling, Inc., (TEDI) applied to the U.S. Nuclear Regulatory Commission (NRC) for a Source Material License to construct and operate a commercial scale in situ leach uranium mine and recovery plant in Converse County, Wyoming on its Leuenberger site. TEDI has operated a research and development in situ leach and recovery facility at the same site since January 22, 1980 under License No. SUA-1373.

The proposed action is to grant a five-year license authorizing the operation of a commercial scale in situ mining and uranium recovery facility.

A Final Environmental Statement and this safety evaluation report will provide the basis for the issuance of a five year Source Material License.

2.0 REVIEW SCOPE

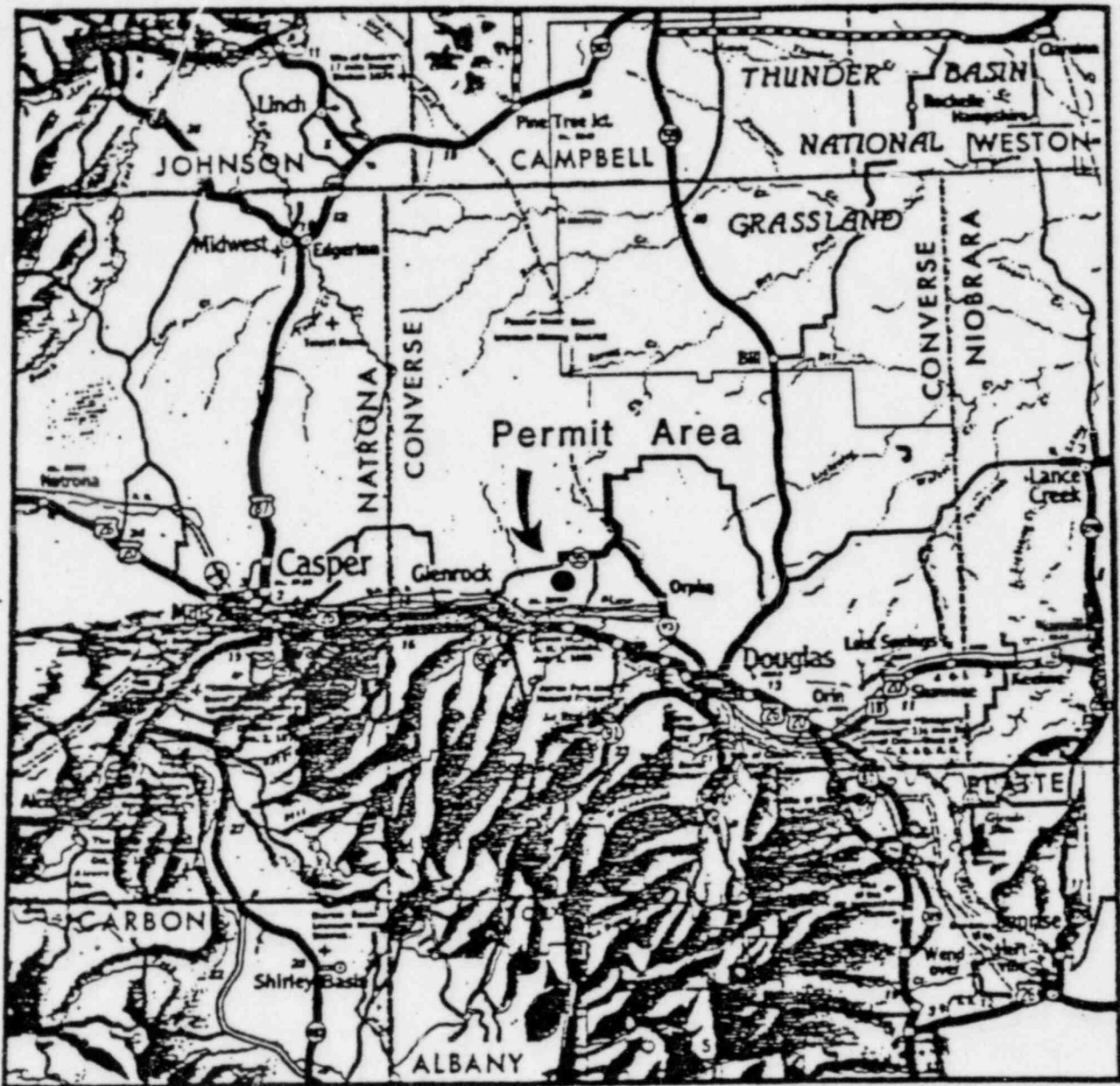
This document details the staff's review of in-plant radiological safety of the licensee's proposed Leuenberger commercial site. The review included an evaluation of the application dated October 10, 1980 which was revised with supplements included with letters dated November 17, 1981 and April 21, 1982. In addition, the licensee's Health Physics Manual and enclosure transmitted with the applicant's letter dated May 8, 1981, as supplemented by submittal dated April 19, 1982, was also reviewed.

3.0 AUTHORIZED ACTIVITIES

The proposed license will authorize Teton Exploration and Drilling, Inc., (TEDI) to solution mine uranium from a low-grade ore body using a sodium bicarbonate-based lixiviant with hydrogen peroxide and/or oxygen as the oxidizing agent at a feed rate of up to 2,000 gpm when mining, processing and ground water restoration are operating concurrently. The uranium-containing solution will be extracted and concentrated at the onsite process facility into a final yellowcake slurry with uranium in the form of $UO_4 \cdot 2H_2O$. This slurry will be shipped by DOT/NRC approved tankers or by a licensed common carrier in DOT/NRC approved drum containers to facilities owned and operated by others for further processing. No drying of the uranium slurry products will occur at the mine site.

3.1 Facility Description

The proposed site location, also referred to as the Leuenberger Site, is located in Converse County, Wyoming, approximately 7.5 air miles northeast of the town of Glenrock, Wyoming. Figure 2.1 of the application shows the general location and access to the site.



Taken from the Wyoming Highway Commission Map

JUNE, 1979

Location Map



Wyoming



UNC TETON EXPLORATION DRILLING, INC.

Subsidiary of United Nuclear Corporation PO Drawer 441
 A UNIC INTERNATIONAL COMPANY Casper, Wyoming 82402

2.
**LOCATION OF and ACCESS TO
 LEUENBERGER SITE**
 FIGURE 2-1

3.2 Process Operations

3.2.1 Uranium Recovery Plant

The recovery plant will have a design process flow rate of 2,000 gallons per minute when mining, process operations, and ground water restoration are operating concurrently. The recovered leach solution will be surged in tanks located in the process plant building and from there will be pumped through ion-exchange (IX) vessels where uranyl bicarbonate-uranyl tricarbonate will be adsorbed into a strong base anion exchange resin. The uranium product will be eluted from the resin by a chloride or sulfate ion solution and the yellowcake will finally be precipitated with hydrogen peroxide. The process flow sheet and major process plant equipment are shown on the enclosed Figure 3-6 from the application.

4.0 RADIATION SAFETY ORGANIZATION, RESPONSIBILITIES AND QUALIFICATIONS

4.1 Organization

The applicant has enclosed in Section 5.1 of his application a description of his organization (See enclosed Figure 5-1). The mine manager at the Leuenberger Project, the highest corporate official onsite, is responsible for the conduct of daily activities, including the conduct of the radiation safety and environmental monitoring programs. The mine manager obtains technical support from the Solution Mining Department at the Teton Casper office. The Environmental and Safety Coordinator/Radiation Protection Officer (RPO) is charged with supervising the safety and environmental activities. The RPO reports directly to the Mine Manager.

Although radiation and safety matters are supervised by the onsite Environmental and Safety Coordinator/RPO, final authority in safety and radiation protection is delegated to the Senior Safety and Radiation Officer and this individual's superiors at the Casper office. The Senior Safety and Radiation Officer is available to the onsite Environmental and Safety Coordinator/RPO for technical support.

The staff concludes that the organization of the radiation safety function as proposed by TEDI is acceptable.

4.2 Radiation Safety Responsibilities

The applicant has provided a detailed description of the authorities and responsibilities of the radiation safety personnel in Section 5.2 of the supplement to their application, enclosed by letter dated November 17, 1981. The RPO has been delegated the authority to suspend any activity that may credibly cause significant risk to employees, plant facilities, or the environment.

The staff has concluded that this statement is fully adequate and provides reasonable assurance that the Senior Safety and Radiation Officer, the RPO 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. Specifics regarding the audit function are presented in Section 5.6.2 of this document.

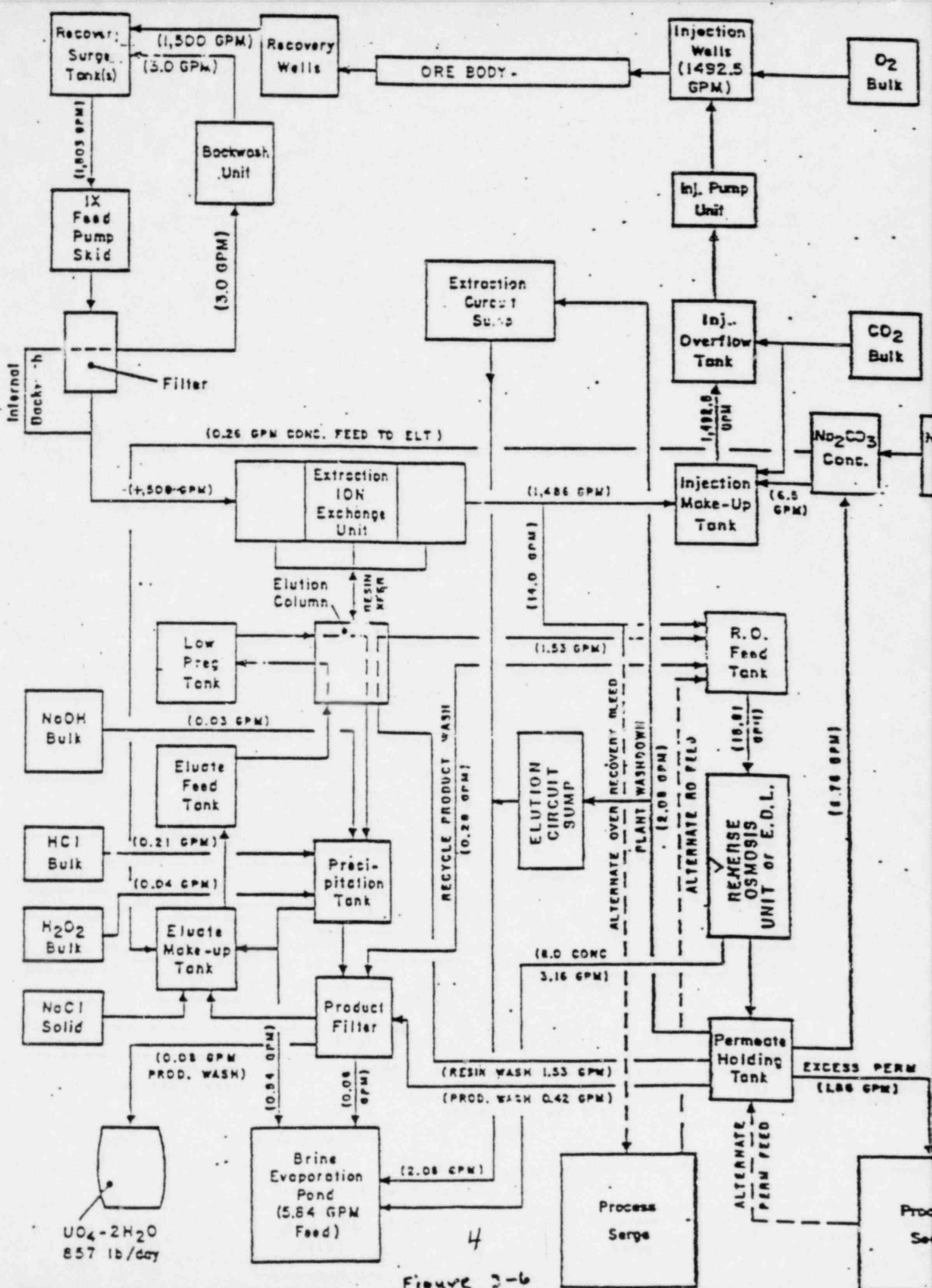
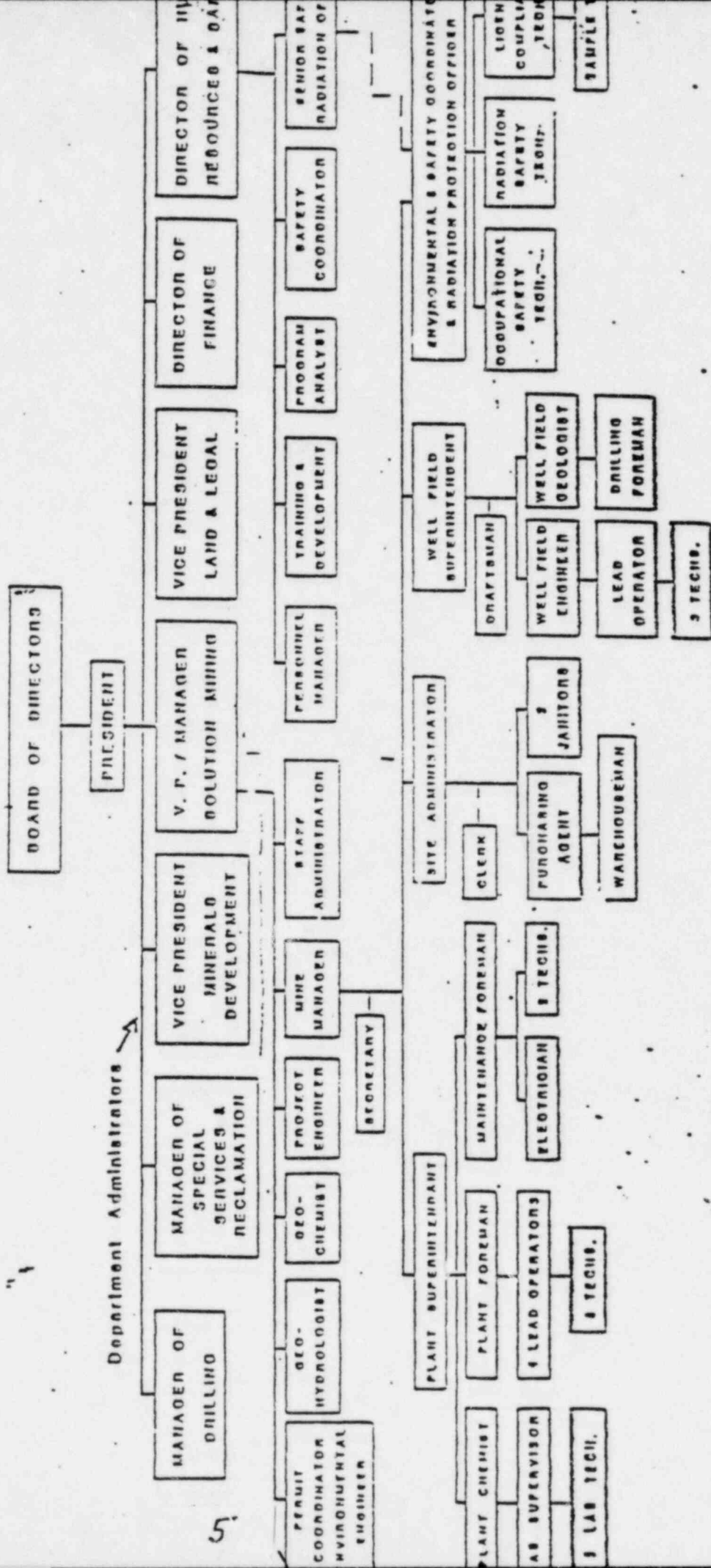


Figure 3-6

OPTIMUM FLOW RATES ARE REPORTED



Department Administrators

LEGEND
 — Line Authority
 - - - Functional Authority

FIGURE 5-1 TETON CORPORATE ORGANIZATION

5.

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 is shared by licensee management, the Radiation Protection Officer (RPO), and all facility workers. TEDI has indicated a commitment to maintain exposures ALARA.

The staff concludes that the licensee management and the site RPO have been provided the necessary authorities and responsibilities to direct the radiation safety program.

4.3 Qualifications of the Radiation Safety Program

4.3.1 Environmental Safety Coordinator/RPO, Senior Safety and Radiation Officer

The applicant provided the qualifications of the positions of Environmental and Safety Coordinator/RPO and the Senior Safety and Radiation Protection Officer in Section 5.4 of their application dated October 10, 1980, as revised November 17, 1981. The staff agrees that the qualifications required for these positions are adequate and are comparable to the qualifications specified in draft NRC Regulatory Guide "Information Relevant To Ensuring That Occupational Exposure At Uranium Mills Will Be As Low As Is Reasonably Achievable."

5.0 RADIATION SAFETY PROGRAM

5.1 Operating Procedures

The applicant provided for the development of standard written operating procedures in Sections 5.1 and 5.2 of their application. The applicant states that the Senior Safety and Radiation Officer shall set and administer policy and enforce regulations for radiation safety and compliance and develop written operating procedures for all activities involving the handling of radioactive materials, radiation hazard evaluation and radiation environmental monitoring. A demonstration of the applicant's written procedures were furnished the NRC by letter dated May 8, 1981, entitled, "Health Physics Manual." The staff, following review of the applicant's plans for developing these written procedures and the health physics manual, have concluded that they are satisfactory and do not require the detail that NRC requires for a uranium mill since this facility, when licensed, will not be processing, handling, or packaging dry yellowcake materials. In addition, the licensee will provide engineered controls to limit concentrations of airborne radioactivity, which should be quite low compared to a conventional mill (see Sections 6.2 and 6.3 below).

TEDI has committed in Section IX of this manual that any work or maintenance activity for which there is no written operating procedure which may result in exposure to radioactive materials will be carried out in accordance with a Radiation Work Permit (RWP) procedure. This procedure involves contacting, prior to the start of work, the RPO who will process a RWP form which will include the precautions to be taken. The RPO will then direct the work so as to keep exposures ALARA.

5.2 Training

The applicant has provided a description of his training program on pages 112 and 113 of the license application which will include such aspects as:

1. Plant process
2. Basic atomic structure and physics relative to radionuclides
3. Fundamentals of health protection including personal hygiene and good housekeeping practices.
4. Health protection measures provided by the Company.
5. Health protection surveys, monitoring equipment and their location.
6. Radiation protection regulations.
7. Plant emergency procedures.

As part of this initial orientation, each employee will receive a copy of a manual detailing each of the above mentioned topics. After a reasonable time for studying purposes, a written test will be given to each employee containing questions directly related to the principles of radiation health and safety protection. The results of this test will be reviewed orally with each employee.

The instructor will at that time discuss any wrong answers with the employee until the individual understands the correct answer. Employees receiving a grade of less than 70% correct will be retested. All test results will remain a permanent part of the employee's file.

In addition to the above mentioned program, each permanent employee will undergo an annual retraining course after which a dated statement will be signed by the employee attesting to completion of the course and understanding of all principles and procedures discussed.

The staff concludes that this training program is satisfactory.

5.3 Radiation Surveys - Air Sampling

The applicant submitted his plans for performing radon and uranium radiation surveys in Section 5.7.3 of the application and Sections IX, XI and XII of the Health Physics Manual submitted with letter dated May 8, 1981. The applicant stated that the proposed facility will be designed for maximum ventilation (see Section 6.0 below); and, therefore, he does not expect high concentrations of radon gas. The applicant further stated that all process tanks and vessels will be covered and vented via powered exhaust fans to the atmosphere utilizing a forced air exhaust system, and that a forced air wall ventilation system will be installed in the process plant Working Area to diminish the possibility of radon gas and other radioactive materials accumulating within the building. The applicant furnished the results of one recent air sample for uranium with

the November 17, 1981 supplement to his application and made a later telephone comment on a second air sample. Both uranium concentrations in the R&D process area indicated results that were less than one percent of the applicable limit in Appendix B of 10 CFR 20.

The applicant has proposed locations for radon sampling in Figure 5.2 of the application, enclosed. There will be 10 radon sampling locations as listed below:

- | | |
|-------------------------|----------------------------------|
| 1. Recovery Surge Tank | 6. Product Filter Tank |
| 2. Injection Surge Tank | 7. Yellowcake Precipitation Tank |
| 3. Ion Exchange Vessel | 8. Reverse Osmosis Tank |
| 4. Ion Exchange Vessel | 9. Laboratory |
| 5. Eluant Make Up Tank | 10. Product Room |

The applicant's proposed program serves two purposes: i.e., sample the locations having the highest potential for radon emission (the surge tanks) and provide a good coverage of the entire building in the event of a slow radon leak causing accumulation of this gas in some portion of the building that we cannot predict at this time. Radon sampling will be performed monthly; and if monthly samples exceed 25 percent of the applicable value in Appendix B of 10 CFR 20, the sampling frequency at these locations will be increased to weekly until four consecutive samples are below 25% of the applicable limit. Then the frequency may be decreased to monthly.

The applicant states that since the final product will be in slurry form, the only anticipated airborne dust contamination will be from resuspension of dried yellowcake in the event of a spill from the process equipment, and that it is expected that this type of contamination will be kept to a minimum by maintenance and housekeeping procedures at the facility. Also, the applicant has committed that all spills will be cleaned-up immediately and the affected area surveyed. As a check, however, TEDI has proposed that air filter samples for uranium be collected at the 10 locations identified for radon as shown in Figure 5.2 of the application plus the following additional locations itemized below, and counted for gross alpha activity:

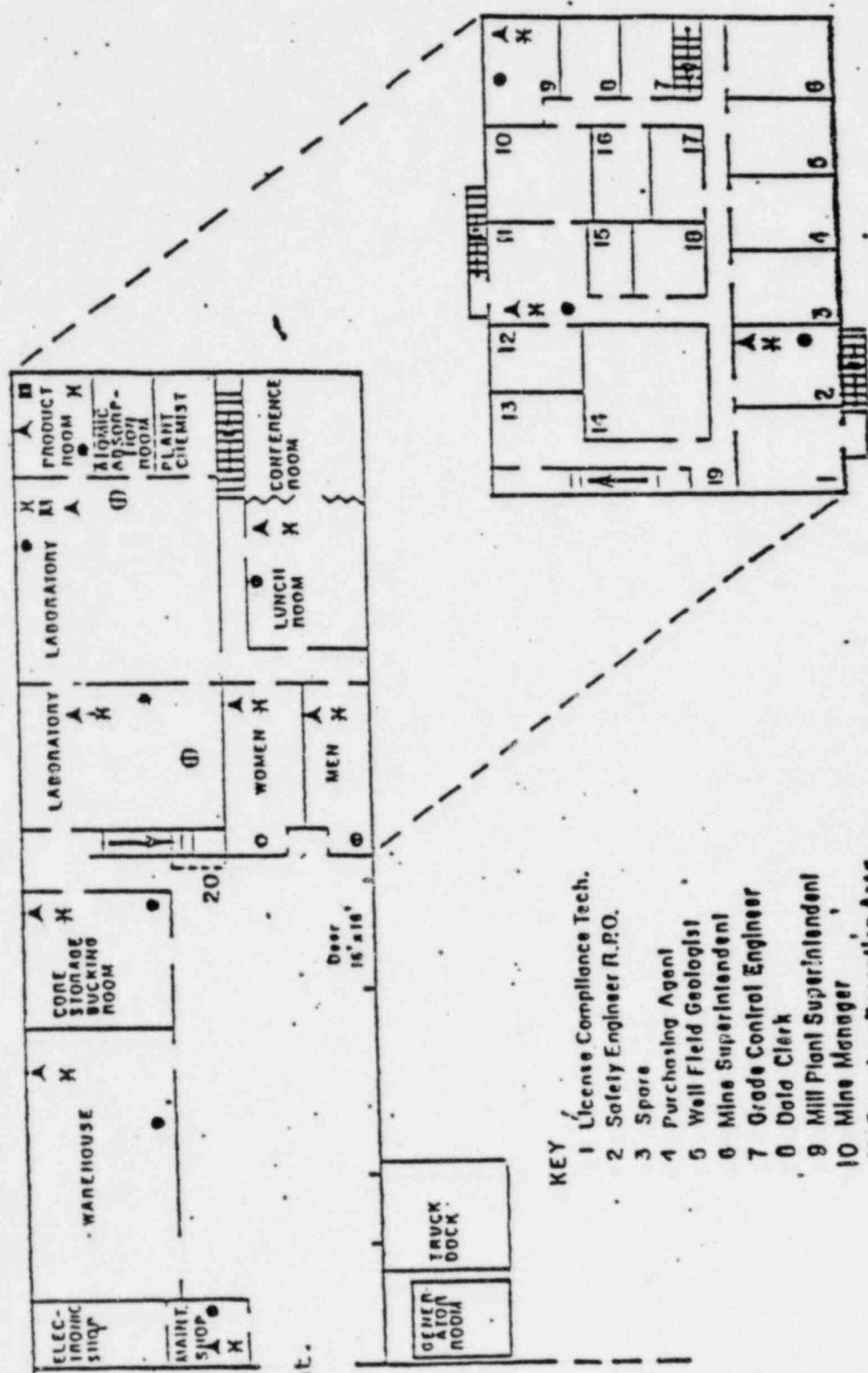
- | | |
|---------------------------|--------------------------------|
| 11. Tank to Filter Solids | 14. Laboratory |
| 12. Storage Room | 15. Product Room |
| 13. Storage Room | 16. Three Second Floor Offices |

The applicant has proposed that uranium air sampling be conducted on a weekly basis until it can be determined that the airborne concentrations of uranium at these locations are insignificant; then, the uranium air sampling program will be continued on a weekly basis in the uranium packaging area only.

The staff has determined that Teton's air sampling program is satisfactory. Teton's selection of air sampling survey locations provides a good coverage of the entire building as well as including those locations having the greatest potential for significant concentrations of airborne radioactivity. The licensee's weekly surface contamination program described in Section 6.0 will be capable of detecting contamination in certain locations in the building after the licensee's uranium air sampling program becomes restricted to the



North



PLANT ADDITION

See Sheet
2 of 2
for west
portion of
Process Plant.

- KEY
- 1 License Compliance Tech.
 - 2 Safety Engineer R.P.O.
 - 3 Spare
 - 4 Purchasing Agent
 - 5 Well Field Geologist
 - 6 Mine Superintendent
 - 7 Grade Control Engineer
 - 8 Data Clerk
 - 9 Mill Plant Superintendent
 - 10 Mine Manager
 - 11 Secretary Reception Area
 - 12 Site Administrator
 - 13 Surveyor, Surveyor Tech.
 - 14 Drafting Room
 - 15 Copy Room
 - 16 Process Engineer
 - 17 Fills & Supplies
 - 18 Administration Clerk
 - 19 Coffee Machine
 - 20 Clothes Washer and Dryer

- ⊕ Safety Shower
- Radon Monitoring Station
- ▲ Alpha Monitoring Station (also alpha surface contamination)
- Area Monitoring Nodes
- ✱ Beta and Gamma Monitoring Station

FIGURE 3-2. PROCESS PLANT RADIOLOGICAL MONITORING STATIONS.

H₂O₂

H₂O₂

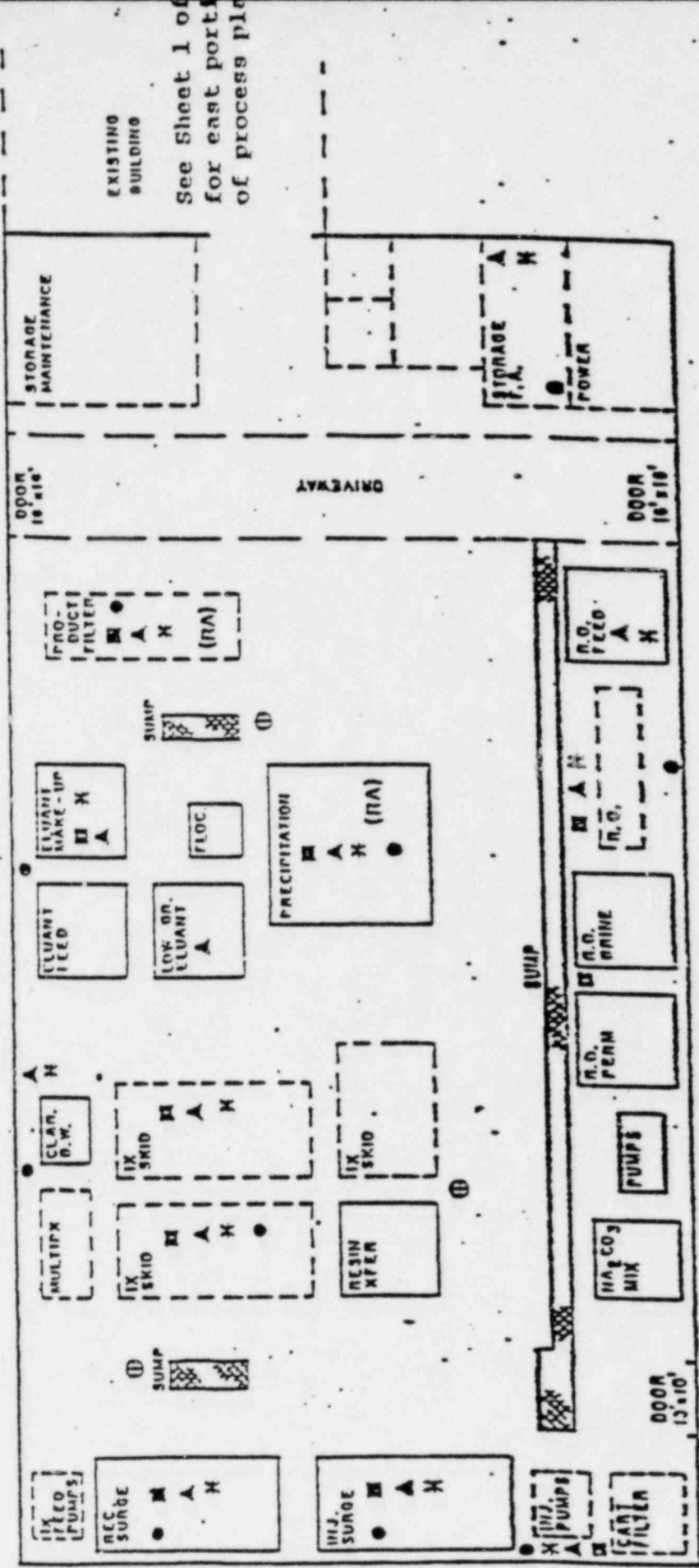
KEY

- Ⓜ Safety Shower
- Ⓜ Ration Monitoring Station
- ▲ Alpha Monitoring Station (also alpha surface contamination)
- Area Monitoring Badges
- Ⓧ Beta and Gamma Monitoring Station (RA) (Restricted Area)



North

POND FENCE



See Sheet 1 of for east port of process plan

FIGURE 5-2 PROCESS PLAN: RADIOLOGICAL MONITORING STATIONS

uranium packaging area. Also, the staff has added a license condition requiring Teton to conduct a daily inspection program capable of visually detecting yellowcake contamination that may have been spread from the processing areas.

5.4 Gamma Radiation Surveys

The application has proposed that a survey be made quarterly within the restricted area to determine gamma radiation exposure rates at 20 representative locations shown in Figure 5-2 of the application. Measurements will be in mR/hr and will be made with an Eberline Model FRS-1 ratemeter equipped with an HP-270 probe or equivalent equipment. The staff has determined that this program is acceptable.

5.5 Personnel Dosimetry

5.5.1 Determination of External Exposure

The applicant has no specific plans for evaluating employee's external exposures from penetrating radiation (e.g., gamma rays and beta particles with a range greater than 7 mg/cm²). Section XXIII of the Health Physics Manual states that external radiation levels shall be measured via TLD (thermoluminescent) monitors. The applicant states that the procedure "can involve" personnel badges (worn on the individual) or area monitoring (permanently placed at specific locations) or both, at an unspecified exchange frequency. Teton further stated that only area monitors will be used if it can be demonstrated that no individual is likely to receive a dose in any calendar quarter in excess of 25% of the applicable values specified in Section 20.101(a) of 10 CFR 20.

Because of the lack of specificity in the applicant's statements, the staff shall require that on a monthly basis for a one year period, TLD or film type dosimeters shall be used (to be worn on the employees). The dosimeter shall be designed to measure exposure to penetrating radiation (e.g., gamma rays and beta particles with a range greater than 7 mg/cm²). Teton may elect to discontinue this program after a one year period by submitting adequate justification in an application for a license amendment.

5.5.2 Determination of Internal Exposures

The applicant has proposed that whenever air sampling procedures indicate that concentrations of airborne radioactivity in work locations exceed 25% of the applicable 10 CFR 20, Appendix B value, time-weighted exposure calculations will be computed for employees who have worked in these locations. Whenever calculations reveal that an employee was exposed to 1 MPC Hour or more in any one shift, this value shall be assigned to him and logged into his "Employment Exposure Airborne Radionuclide Form," attached to Section XI. This section also covers a procedure for calculating MPC Hours of exposure.

Sections IX and XI of the Health Physics Manual states that breathing zone sampling will be required for all maintenance activities and other activities having a potential for exposure to airborne uranium as determined by the RPO in conjunction with the Radiation Work Permit Procedure discussed in these

documents. The results of this sampling will be used to determine exposures for affected employees.

The staff concludes that employee exposure determination procedures proposed by TEDI are acceptable.

5.5.3 Bioassay

The applicant's proposed urinalysis bioassay program as described in Section 5.7.5 of the application does not meet the minimum requirements of the NRC, and, therefore, the staff shall require by a license condition, the implementation of a urinalysis 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 discussed in Section 5.6.2 of this document.

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 within 30 days to the Uranium Recovery Licensing Branch and 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 addressed Internal Audits, Inspections and Reports in Section 5.3 of their application and Section XXIV of the Health Physics Manual, but this information does not contain sufficient details to enable the staff to make a determination of the adequacy of the proposed program. Therefore, the staff shall require that the applicant implement an inspection and audit program as specified below.

5.6.1 Inspection Program

The inspection program shall be conducted by the RPO whose responsibility, along with those items specified in Section 5.2 of the application, 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 Mine 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, as well as all personnel exposure data. The monthly inspection summary

shall be submitted to the Mine Manager and shall include recommended remedial actions as necessary.

It is the RPO's responsibility that all items discussed in these inspections 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 RPO or other expert with equivalent qualifications perform a formal annual ALARA audit of the radiation safety program and submit a detailed report (written) to the Director of Human Resources and Safety, Casper, Wyoming, the Uranium Recovery Licensing Branch and Region IV, NRC.

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 and effluent monitoring data.
6. Surveys required by radiation work permits.
7. Reports on overexposure submitted to NRC, MSHA, or the State.
8. Operating and monitoring procedures completed or revised during this period.

The written annual 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, 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 and Contamination Surveys

The applicant provided in Section 5.7.6 of the application the layout for the process area, offices, laboratories, worker change and eating area, etc. The proposed layout is acceptable to the staff; the proximity of the men's and women's change rooms to the process area should minimize the potential for the

spread of contamination from the process areas to the uncontrolled areas of the building.

Section XIII of the Health Physics Manual enclosed with the applicant's letter dated May 8, 1981, states that weekly alpha contamination surveys will be performed in the lunch room, change rooms and office areas, and that measurable contamination in excess of 1000 d/m/100 cm² must be decontaminated as "quickly as possible."

All employees leaving the change rooms who have worked in the packaging area must monitor themselves before leaving that area. Contamination levels in excess of 1000 d/m/100 cm² will require an investigation by the onsite RPO. The staff has concluded that the applicants contamination control program is acceptable.

6.2 Ventilation Design

The applicant stated that general plant air will be ventilated at a rate of two plant volumes per hour (1,200,000 cubic feet of air per hour). The ventilation system consists of three fresh air intake wall vents on the south or windward side of the building and three wall exhaust fans on the opposite or north side of the building. There will also be three convection vents on the roof.

In addition to the general ventilation of the building, all process vessels where radon could be released will be vented separately with an exchange rate of five times per hour. The system will consist of ten-inch diameter heat duct piping where fresh air will be circulated across the top of each tank to be ultimately vented to the outside atmosphere. The staff has determined that the applicant's proposed ventilation design is satisfactory.

6.3 Spillage and Leakage Prevention

Section 7.5.1.1 of the application states that under normal operating conditions, the process fluids are contained in vessels and piping circuits within the plant. However, the process plant has been designed to control and confine liquid spills should they accidentally occur. This will be done with separate sumps for each functional area within the process plant. These sumps shall be equipped with automatic level control systems to empty any spilled solutions into the RO brine tank. Should the brine tank become full, it will discharge to the brine pond on a level control signal.

A six inch curb constructed around the process plant will be installed as an integral part of the concrete floor. The curb will contain liquid spills to a volume equivalent to the volume of groundwater circulated in a fifty minute time period, when operating at full capacity (74,500 gallons). The five percent floor slope will direct any spilled solutions to the sumps. The fifty minute period should allow ample time to react to any spill that may occur during the operation.

The staff concludes that the above program is acceptable.

6.4 Protective Clothing and Equipment

Although the applicant states that employees will wear plant work clothing, the only information provided for employees wearing contamination-control protective clothing is covered in Chapter IX of the Health Physics Manual enclosed with letter dated May 8, 1981, entitled, "Maintenance-Radiation Work Permit," and covers procedures for maintenance work or any work for which there is no effective operating procedure for prescribing effective radiation protection controls. The RWP procedure requires that the Radiation Protection Officer review all Radiation Work Permits and specify any needed protective clothing, e.g., coveralls, cotton or rubber gloves, plastic shoe covers, rubbers, various types of respiratory protection, etc. The staff finds this procedure to be acceptable.

6.5 Access Control

The applicant has committed to restrict the access to the proposed project by locating the proposed processing area, well field and pond area within a fenced area. Gates and fencing will be posted with warning signs. Entrances into the process building will be conspicuously posted "CAUTION ANY AREA 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 20 for posting areas within the facility.

6.6 Release of Equipment and Materials

The applicant has provided information concerning the release of contaminated equipment in Section VII of his Health Physics manual. The applicant stated any equipment, materials and packages released from the restricted area will be in accordance with "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, which has been enclosed with Section VII of this manual.

The applicant stated that all liquid wastes and "bleeds" will be stored in the evaporative ponds; and that all solid radioactive waste would be disposed of by transfer to a licensed NRC facility authorized to dispose of the material.

This program is acceptable to the staff.

6.7 Quality Assurance and Equipment Calibration

The applicant has not addressed quality assurance in this application.

The applicant will, therefore, 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 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.

The applicant's instrument calibration procedures contained in Section XVIII of the HP Manual did not contain adequate information regarding calibration frequency. The staff will, therefore, require that all radiation monitoring, sampling, and detection equipment 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.

7.0 EMERGENCY PROCEDURES

The applicant discussed emergency procedures for two types of in-plant radiological accidents in pages 161 and 162 of the application, i.e., tank failure, and pipe failure. Since the plant has been designed to cope with these accidents by design of curbing, sumps, and a 5% sloped concrete floor, adequately trained operators should be able to cope with these accidents and take necessary remedial actions. The proposed procedures are acceptable.

8.0 DECOMMISSIONING

The applicant proposes to reclaim disturbed areas in accordance with the regulations of the Wyoming Department of Environmental Quality. In addition, facility 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," dated November 1976, enclosed in Section VII of the licensee's Health Physics Manual.

The staff shall require that, at the time decommissioning occurs, NRC guidelines in existence at the time be implemented to assure that necessary identification of the extent of facility contamination and resulting required decontamination be completed. A final inspection by Region IV, USNRC inspectors will be necessary to provide verification that the facilities are free of contamination prior to the termination of the license.

9.0 SURETY

The staff will require that surety arrangements to cover the cost of site decommissioning be maintained by TEDI.

10.0 CONCLUSION

Upon completion of the safety review of the applicant's license application and supplements, the staff has concluded that the proposed Teton Exploration Drilling Co., Inc., Leuenberger Project operations described in this SER, 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 Teton Exploration Drilling Co., Inc., be issued a license which includes the following in-plant safety conditions.

9. Authorized Place of Use: T34N, R74W, Sixth Principal Meridian, Converse County, Wyoming, approximately 7.5 air miles Northeast of Glenrock, Wyoming.
10. Authorized use: For uranium recovery from pregnant lixiviant in accordance with statements, representations, and conditions contained in Figures 3.6 and 3.7 of Section 3.0, Figure 4.1 of Section 4.0 and Section 5.0 submitted with NRC-2 Form dated October 10, 1980, as supplemented by submittals dated October 26, 1981, November 17, 1981 and April 21, 1982; and the Health Physics Manual and enclosure submitted by the applicant's letter dated May 8, 1981, as supplemental by submittal dated April 19, 1982 except where superseded by license conditions below. Notwithstanding the above, the following condition shall override any conflicting statements contained in the licensee's application and subsequent submittals: whenever 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, 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 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, "ANY AREA WITHIN THIS FACILITY MAY CONTAIN RADIOACTIVE MATERIAL."
13. 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 Streams 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.
14. An inspection program shall be conducted by the RPO whose responsibilities, along with those specified in Section 5.2 of the licensee's application, 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 Mine 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 Mine Manager and shall include recommended remedial actions as necessary.

15. The licensee shall perform an annual ALARA audit of the radiation safety program which shall be conducted by the RPO or other expert with equivalent qualifications who shall submit a detailed, written report to the Director of Human Resources and Safety, Casper, Wyoming and the U.S. Nuclear Regulatory Commission, Uranium Recovery Licensing Branch, Washington, D.C. 20555, and 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.

16. 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.
17. 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 $\mu\text{g U/l}$ uranium for 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. 15.

Anytime an action level of 30 $\mu\text{g U/l}$ for four (4) consecutive urine specimens or 130 $\mu\text{g U/l}$ 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 the 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.

18. Any changes in the process circuit, illustrated and described in Figure 3-6 of the license application dated October 10, 1980, shall require the approval of the RPO 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.
19. 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 cm^2). The dosimeters shall be exchanged and read monthly.

Roger T. Woolsey

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Operating Facilities Section II
Uranium Recovery Licensing Branch
Division of Waste Management

Approved by:

H. J. Pettengill
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Operating Facilities Section II
Uranium Recovery Licensing Branch

Case closed: 04008781011S