

# KERR-McGEE CORPORATION



## APPLICANTS ENVIRONMENTAL REPORT

USAEC

Docket No. 40-8027

For Div. of Compliance

Uranium Hexafluoride Plant

NOVEMBER 1971

**Revised**

8507310348 850530  
PDR FOIA  
BURR85-229

PDR

INDEX  
ENVIRONMENTAL REPORT  
SEQUOYAH FACILITY  
KERR-McGEE CORPORATION  
R E V I S E D

I. General	1
II. Description of Site and Area	1
III. Environmental Approval	16
IV. Environmental Impact	17
V. Environmental Surveillance Program	30
VI. Results of Plant Use	33
VII. Alternatives	44
VIII. Commitments of Resources	44
IX. Cost Benefit Analysis	45

ENVIRONMENTAL REPORT  
SEQUOYAH FACILITY  
KERR-McGEE CORPORATION  
R E V I S E D

I. General

On February 20, 1970, the AEC issued License No. SUB-1010 to Kerr-McGee Corporation for the operation of a Uranium Hexafluoride Production Plant located in Sequoyah County, Oklahoma. This environmental report is submitted in accordance with the requirements of Appendix D, 10CFR Part 50, effective September 9, 1971.

II. Description of Site and Area

A. Location

The plant is located in a 2100-acre tract on the western edge of Sequoyah County. This tract is bounded on the north by U.S. Highway 64, on the west by the Illinois River and the Arkansas River, on the south by Interstate Highway 40 and on the east by the eastern section line of Section 22.

Drawing 110-C-151 Rev. 4, attached, shows the site layout and its location in relation to nearby population centers. The site is approximately 2.5 miles southeast of Gore, Oklahoma, 19 miles west of Sallisaw, Oklahoma, and 20 miles north of Stigler, Oklahoma. The immediate plant area is a fenced-in restricted area of about 75 acres in Section 21, T12N-R21E, with access to Oklahoma Highway 10 adjacent to the eastern boundary.

B. Physical Description

The Sequoyah Facility was designed and built by Bechtel Corporation based upon design criteria furnished by Kerr-McGee. The plant consists of about 69,000 square feet of manufacturing, warehousing and office floor space in three

separate buildings. The main process and administration building contains offices and laboratory (10,600 square feet), fluorine generation (17,250 square feet), maintenance (5,500 square feet), utility (5,500 square feet) and main process areas (26,900 square feet). A separate solvent extraction building (4,000 square feet) contains only the solvent extraction system. A separate warehouse building was provided for storage of mechanical parts. In addition, retention ponds for sanitary sewage, fluoride treatment and clarification, and raffinate are located to the west of the plant. The plant employs approximately 100 people of whom 75 are production and maintenance workers.

#### C. Process Description

The Sequoyah Facility receives impure uranium concentrates from concentration mills located in the western United States and Canada in 55 gallon drums by truck. The drums are weighed and the material emptied into a sampling system, after which the drums are vacuum cleaned and reused. The concentrate is passed through a sampling system which removes a small portion as a representative sample for analysis. The concentrate is stored in hoppers briefly, then digested in a hot nitric acid solution. Recycle materials are added, the solution adjusted for acid and uranium content, and the uranium values extracted in a countercurrent solvent extraction system using tributyl phosphate as a specific extractant in a solution of diluent hexane. The uranium-rich organic solution is scrubbed by a small stream of water and the uranium is reextracted into a large portion of water and then concentrated in a two-stage heating process. The impurities extracted by the solvent extraction system constitute the primary liquid waste from the process.

Upon the completion of concentration, the uranium-rich water solution is dehydrated and denitrated in a stirred reactor to uranium trioxide,  $UO_3$ , which is conveyed to a milling system and stored temporarily. It is then fed into a two-stage fluid bed operating at approximately 1100°F where it is reduced



to uranium dioxide,  $\text{UO}_2$ , by a countercurrent flow of dissociated ammonia. Upon completion of the reaction, the  $\text{UO}_2$  is stored in a hopper temporarily and fed to a two-stage reactor system in which it is converted to  $\text{UF}_4$  by a countercurrent stream of anhydrous hydrofluoric acid gas. The  $\text{UF}_4$  is then conveyed to a series of fluorination towers which burn the  $\text{UF}_4$  in the presence of elemental fluorine to the gaseous compound  $\text{UF}_6$ . The gaseous product of this reaction is cooled and filtered twice by sintered metal particulate filters and then condensed to a solid at  $50^\circ\text{F}$  in a refrigerated heat exchanger known as a "cold trap." Gases not condensed in the first cold trap then pass through a cleanup reactor to scavenge any excess fluorine by passing it through a falling stream of  $\text{UF}_4$ . This gas, containing  $\text{UF}_6$ , noncondensable gases, HF and a trace of fluorine, is then passed into a secondary "cold trap" at a temperature of  $-50^\circ\text{F}$  for the removal of  $\text{UF}_6$ . Noncondensables must be further treated for the removal of fluorine, HF and traces of  $\text{UF}_6$ . These noncondensable gases are exhausted to a three-fluid burner which combines them with air and hydrogen gas exhausted from the fluorine manufacturing process and burns the fluorine and hydrogen to HF and water. This hot gas stream is cooled and passed through a sieve-plate scrubber where the HF gas is absorbed in water.

The solidified  $\text{UF}_6$  collected in the cold trap is melted by heating with steam and drained to a shipping cylinder. The cylinder is vented to the cold trap, disconnected from the drain manifold and moved to a storage yard for sampling, solidification and storage. After analytical tests are completed the cylinder can then be shipped to a diffusion site as feed material for the enrichment process. Such cylinders contain 10 tons of  $\text{UF}_6$  and are approved by the Department of Transportation for natural  $\text{UF}_6$  shipments.

This process is performed in a closed system consisting of a series of vessels, tanks, towers, evaporators and reactors employing auxiliary equipment to provide: conveying, removal of impurities, effluent control, heating and

cooling. The process is performed in the main process area and the solvent extraction building described above.

The process uses in sequence: 60% nitric acid, aluminum hydroxide, ammonia, hydrofluoric acid, potassium hydrogen fluoride, sodium carbonate, tributyl phosphate and liquid hexane with natural gas as fuel for steam producing boilers. An oil inventory serves as standby fuel for the boilers.

Each of the raw materials listed above is stored and handled by methods recommended by the Manufacturing Chemists Association. The utility area containing boilers, nitric acid absorber, offgas burners and scrubber is located immediately behind the main process building. The storage area for chemicals is located across a driveway from this utility area. The area immediately surrounding the plant is covered with either concrete or asphalt paving. The area around the solvent extraction building for 100 feet distant is covered with non-combustible gravel in order to meet insurance requirements for flammable material.

A storage yard capable of containing 100 shipping cylinders for  $UF_6$  is located adjacent to the northeast corner of the main process building. A switch yard for the necessary breakers and transformers to control incoming electrical power is located immediately east of the  $UF_6$  storage yard and surrounded by a six-foot chain link fence.

#### D. Waste Treatment

The process produces waste streams which are treated to prevent uncontrolled release to the environment and are collected into three primary and several secondary streams.

##### 1. Raffinate

The waste stream from the extraction system, known as raffinate, is primarily composed of ammonium nitrate, nitric acid, metallic salts and minute quantities of uranium and the radioactive daughter products of normal uranium decay. This stream is combined with spent sodium hydroxide from the solvent treatment system and the miscellaneous digest scrubber and any excess recovered weak acids from the absorber as a convenience

for treatment. Treatment provides for neutralization by lime slurry and impoundment in earthen-walled retention basins for permanent storage. After neutralization, contained uranium and daughter products in the raffinate, thorium 230 and 234 and radium 226 for the most part, coprecipitate with most of the other heavy metal impurities as hydroxides. This precipitate is allowed to settle first in a settling basin and then in a clarification lagoon. No sludge or supernatant liquid is released from the storage impoundments.

Two storage ponds have been constructed with a combined capacity of about 25 million gallons providing for three feet of freeboard height above the maximum liquid level to protect against accidental release by overflow. Basin No. 2, with approximately 15 million gallon capacity, has just been put into use. This basin provides storage capacity for approximately two years at planned production rates.

It would be desirable to develop an appropriate method of safe disposition of a solid. Currently, however, no practicable process for solidification has been developed. Several alternatives have been considered by the Kerr-McGee technical staff and engineering studies are proceeding with the objective of selecting the most desirable alternative for further development and installation.

## 2. Fluoride Discard

The second liquid waste stream is generated by the hydrofluoric acid scrubber. The scrubber is connected to all emergency vent headers located on process vessel and storage tanks so that gases evolved through the overpressurization of vessels and tanks are absorbed, thus avoiding uncontrolled release to the atmosphere. This fluoride waste stream is combined with waste sodium carbonate solutions originating in the fluorine cell rework area, spilled acid from the HF vaporizer room sump and laboratory wastes. Treatment of this fluoride-containing stream provides for neutralization by lime slurry with resultant precipitation of the fluoride as calcium fluoride.

This alkaline sludge is first settled in a retention basin to permit flocculation and sedimentation. The overflow is treated with sulphuric acid to adjust the pH and precipitate excess calcium hydroxide and permitted to clarify by retention in a second basin. The clarified treated waste overflows and is combined with clean waste water and the sewage lagoon overflow and is discharged to the Illinois River through a natural water course. A concrete stilling basin at the point of combination allows for mixing of the flow and controlled release through slotted weirs so that the rate of discharge may be measured. Samples of the discharge are taken periodically at this point.

### 3. Sanitary Waste

Sanitary and domestic wastes are treated in a stabilization lagoon which is approved by the State Department of Health. Overflow from this lagoon is combined in the stilling basin with clean waste water and the liquid effluent described in paragraph II.D.2.

### 4. Gaseous

During the dehydration and denitration of concentrated aqueous uranium solution to the intermediate product uranium trioxide,  $\text{UO}_3$ , gases are released containing nitric acid, water vapor, oxides of nitrogen and entrained solids. These gases are first scrubbed with water for the removal of entrained solids and condensation of nitric acid vapor and water and piped to an absorption tower for the absorption and concentration of nitrous oxides. The absorption tower is designed to remove approximately 99% of the incoming nitrous oxide. The gas stream is discharged from the absorber into the boiler stack and released at the top of the stack approximately 150 feet above ground level. Nitric acid produced from the absorption tower is recycled to the process for reuse.

Reduction of uranium trioxide to uranium dioxide,  $\text{UO}_2$ , produces a waste gas of nitrogen, hydrogen and water vapor. This gas stream is filtered on sintered metal particulate filters for the removal of any solid entrainment and piped to a waste gas burner where the excess hydrogen is converted to water



vapor. The gas from the burner is piped to the boiler stack and released approximately 150 feet above the ground.

A waste gas stream is discharged from the hydrofluorination reactors containing hydrofluoric acid vapor and water vapor. This gas is cooled in a condenser producing a weak hydrofluoric acid solution which is returned to the vendor and noncondensables are then piped to the hydrofluoric scrubber described for control of hydrofluoric acid gas evolution.

Noncondensable gases from the hydrofluoric acid scrubber are conducted to the top of the boiler stack and released to the atmosphere at this point. Initial diffusion and dispersion calculations concluded that the HF concentration discharged at this point would be reduced to one part per billion at the maximum fallout point at ground level based upon probable climatological conditions.

#### 5. Miscellaneous

Considerable ambient air is moved through solid uranium streams as displaced gas when hoppers are emptied and filled and to pneumatically convey uranium dusts to a collection point to avoid their uncontrolled release. Uranium dusts are removed from such air streams by cyclone separators and filters of closely woven fabric felt. Such filters are provided on all exhaust gas streams in order to eliminate release of uranium dust to the environment.

The design, construction and operation of the waste treatment systems comply fully with applicable State and Federal regulations, specifically "Water Quality Standards of the State of Oklahoma 1968 and Title 10 Code of Federal Regulation Part 20."

Retention basins constructed for raffinate storage and fluoride stream settling and clarification are built to AEC standards, "Licensing Guide - Information and Criteria Pertinent to the Evaluation of Embankment Retention Systems." These storage pits are monitored by seepage wells located at the periphery. Results of this monitoring program are reported

under environmental surveillance programs later in this document.

The plant auxiliary systems were started in January, 1970, and uranium charged in late February, 1970. Production operations have continued since then without interruption.

#### E. Area Description

The plant site was located after a preliminary study of ten potential sites of the Arkansas River Valley. The specific site was selected after consideration of transportation, water supply, land availability, absence of other industrial installations, the quality and skill of available labor and recognition of the current and chronic depressed state of the eastern Oklahoma economic activity.

The topography in this area of Oklahoma along the Arkansas River generally varies from flat in the bottom lands of the river to gently rolling adjacent to the bottom lands to a high level ridge rising as much as 400 feet above the valley floor. Many large and small water courses drain the upland ridges. Farming, ranching, forestry and mining have been the primary economic uses of the land in this century. Mines are located near Stigler, Warner and Sallisaw.

Heavy timber growth covers this area of Oklahoma. Original stands of cedar, walnut, hickory and oak served as a source of a heavy forestry industry. This valuable timber has been replaced with heavy growth of blackjack and post oak on the hillsides. In the valleys oak, Osage orange, hackberry, willow, elm, pawpaw, sassafras, locust and many plum and sumac thickets grow profusely. Redbud and dogwood specimens survive interspersed with the taller timber. A few rare specimens of hardwood and cedar exist in more remote locations.

Farming and ranching in the Arkansas River Valley have been the only recent economic activities. Some cotton is raised in the river bottom and corn, wheat, soybeans, oats and sorghum are occasionally grown in small patches.

At the time of site acquisition a small soybean field was located at the west edge of the site along the Illinois

River and a small wheat field was located in the area now occupied by the plant. Approximately one-third of the site is open and the balance is heavily wooded. The timber consists primarily of post and blackjack oak with a few specimens of hickory, pecan and cedar remaining at more inaccessible locations. Most of the fringes of the open area are covered with sumac and plum brush with occasional Osage orange, hackberry, sassafras, pawpaw and elm trees.

None of the timber is mature enough for any extensive forestry operation. Some local cutting is done for fuel and farther east in Arkansas similar timber is used as a source of raw material for the manufacture of charcoal.

Grasses in the open area are primarily native wild pasture of infinite variety. After many seasons of heavy grazing, it is based primarily on native Bermuda grass with some sage grass, switch grass, gramma and Indian grass, along with sedge and imported lespedeza. No significant cultivation has occurred on the site except for the two small fields mentioned.

Typically, this section of Oklahoma receives ample rainfall in the spring and fall and is prone to have high temperatures and dry weather during the summer months. The vegetation will grow quickly in the spring, tend to be dormant in the hot summer, may brown off in the late summer and not completely regain its color until the following spring, though some growth is taking place during the cooler, wet fall months.

Wildlife in the area was once plentiful with large numbers of prairie and forest grazing animals and attendant populations of predators. Market hunting and heavy land usage essentially eliminated all of the large animals except a small deer herd. This deer herd has increased, however, since the early 1920's in response to protection and is now of sufficient size to support some regulated hunting in the area. Recently a small bank of elk were released in southeastern Oklahoma to determine if elk could be reestablished without interfering with



pasturage of domestic stock. Many species of small animals are present. Fox, coyotes, badgers, coons and opossum are plentiful. Muskrats and beaver can be located along many waterways in eastern Oklahoma. Rodents such as rabbits, packrats and field mice are plentiful and supply a food source for predatory animals and birds.

Innumerable species of birds are native to this area or use it annually as a flyway during migration. The Bobwhite quail, however, is the only indigenous bird which receives any hunting pressure. Falcons, hawks and crows are plentiful as are many varieties of songbirds and sparrows.

This area experiences heavy flights of migrating wild fowl. The Arkansas River Valley is well populated with several species of geese and ducks in the fall and early winter enroute to wintering grounds along the Gulf Coast and in Mexico. While not drawing large groups of hunters from urban areas, wild fowl hunting is a sport enjoyed by many local residents. The proximity of the water of the Arkansas River and grain fields along its course serve as an ideal stopping point in the yearly migration.

#### F. Population

This area of eastern Oklahoma is relatively sparsely populated and almost completely devoid of industrial activity. Population growth has been approximately 3% in the period 1960 to 1970. The plant site is located approximately 150 miles east of Oklahoma City on Interstate Highway 40, approximately 40 miles west of Fort Smith, Arkansas, and 25 miles to the south-east of Muskogee, Oklahoma. Nearby cities and towns in the area are listed on the next page.

<u>County or City</u>	<u>Direction</u>	<u>Distance Miles</u>	<u>Population</u>
Sequoyah County			23,370
Vian	E	4	1,131
Sallisaw	E	19	4,888
Muskogee County			59,542
Muskogee	NW	25	37,331
Warner	W	15	1,217
Webbers Falls	W	3	485
Gore	NW	2	478
Other			
Fort Smith, Arkansas	E	40	62,802

Since the selection of the site in 1967, completion of interstate routes and the Arkansas Riverway has considerably increased the amount of east-west traffic and will probably increase the recreational use of the entire area. The Robert S. Kerr Reservoir of the Arkansas Riverway is located in Sequoyah County, and the Webbers Falls Reservoir is immediately west of the plant site in Muskogee County. It is expected that these two impoundments, after further commercial development, will form an important recreational resource.

The climate in the area is characterized by hot summers and moderate winters. The normal annual rainfall is approximately 40 inches and the mean temperature is 62°. The extreme high temperature during a 62-year period of records was 115° and the extreme low was -15°. Winds in the area are somewhat variable and tend to be lighter than those of farther western Oklahoma. A wind rose showing the direction and velocity of the wind during the last six months is shown on the following page. This wind rose is constructed from data collected at the Sequoyah Plant since installation of measuring equipment early in 1971. No regular weather reporting station, either Fort Smith, Arkansas, or Muskogee, Oklahoma, was found to be representative of the actual conditions on the site.



Sequoyah County lies in a zone of approximately  $1.66 \times 10^{-3}$  probability of experiencing a tornado in any given year. Until the purchase of the site for the plant, one family had lived on this ground for a period of 100 years and has no record or recall of a tornado ever damaging the plant area.

This area was a part of the land given to the Cherokee Nation after their move from the southeastern United States. The Carlile house on the property at one time served as a station for a stage running from Fort Smith to Fort Gibson. The ford of the Illinois River was known as Carlile Ford but has been flooded by the completion of the Robert S. Kerr Reservoir.

#### G. Geography and Geology

The Arkansas River in this area flows through a mountainous section on the southwest flank of the Ozark Uplift and is characterized by level-topped parallel east-west ridges rising as much as 400 feet above the adjacent valley floor. These uplands are drained by several rivers and numerous creeks which flow into the Arkansas along the area. The maximum change of elevation across the site is from 450 feet above sea level at the Illinois River to 700 feet in the southeast corner of Section 22.

Exposed surface geology consists of sandstone and shale sequence of the lower Atoka structure. The outcropping Atoka rocks are approximately 100 feet thick and are capped by approximately 15 feet of thick terrace gravel in the immediate area of the plant. Much of the structure was determined from core hole data gathered to explore the size and extent of the normal fault which surfaces on Highway 64 at the Carlile School. Twenty-one cores were drilled in the area to examine the characteristics of this fault zone. The core holes exhibited alternating beds of sandstone and black shale. Three separate sandstone beds can be recognized in the deeper holes of Section 21 and correlated with outcrops above the Illinois River. The Atoka sandstone and shales were deposited on a stable shelf. In post Atoka time the region was affected by a major deformation which formed a number of northeast to

southwest trending folds and normal faults. The faulting ended in middle-Des Moinesian time and the region has been structurally stable since the middle-Pennsylvanian period, approximately 250 million years ago.

Exploration of the area has demonstrated no commercial deposits of oil and gas. Dry holes are located approximately two miles east and three miles south of the plant site. These two wells were plugged and capped with concrete after completion of drilling to 2000 feet and 4600 feet, respectively. All of the dry holes abandoned in the 16 township area surrounding the site were abandoned by leaving the surface casing in the hole and placing one or more cement plugs on top.

Other minerals in the area consist of coal, sandstone, sand and gravel from the Arkansas River floodplain. The nearest coal production is 14 miles west at the town of Warner. Coal is being mined from a depth of 1400 feet at Stigler in Haskell County 18 miles south of the site. The nearest coal deposits are located approximately 12 miles southeast of the plant site but these low-quality mines are currently inactive.

Local subsurface aquifers vary from poor quality and yield in the Atoka formation to good quality and higher yields from the Arkansas River alluvium. A water well on the plant site in Section 27-12N-21E is a typical Atoka well with a static water level of 30 feet, a total depth of 84 feet and a yield of one gallon per minute. An alluvium water well typical of this formation is located in Section 19-12N-21E. This well was drilled to a depth of 44 feet and has a static water level of four feet and a yield of 400 gallons per minute.

Monitor wells located on the site around the retention ponds have been drilled to a depth of 30 to 60 feet and are typical Atoka formation wells.

#### H. Seismicity

Authorities on the subject consider the Arkansas Valley area to have been stable since middle-Des Moinesian time.



Minor to moderate seismic activity has occurred in the El Reno area west of Oklahoma City, the Tulsa area and in the Quachita Mountains of southeastern Oklahoma. The nearest earthquake epicenter is near Poteau, Oklahoma, 40 miles to the south. An earthquake of April 27, 1961, at Poteau is listed<sup>1</sup> at intensity V on the Modified Mercalli Scale (very minor damage to dishes and windows). All of the earthquakes listed appear to be associated with structural features outside of the southwest Ozark tectonic province.<sup>1,2</sup> Consultants have concluded that earthquakes do not constitute a hazard at the Sequoyah site.

#### I. Waterways

As described above, the plant site is bounded on the west by the Illinois and Arkansas Rivers and, as can be seen on Drawing 151, the Arkansas River lays a short distance to the south of the site. All natural drainage of the plant area flows to the west into the Illinois River.

The Arkansas River has undergone significant development in recent years, primarily as a commercial waterway for the movement of freight. With completion in 1970 of the Robert S. Kerr and Webbers Falls Reservoirs and the installations in the north on the Verdigris River near Tulsa, Oklahoma, this waterway now has become a working commercial trafficway. Barge traffic has not thus far developed significantly but is expected to grow at a steady rate for the next decade.

The Illinois River is primarily noted as the only spring-fed cold water river in Oklahoma. Tenkiller Ferry Reservoir was completed and opened for recreation in 1953 approximately seven miles up river from the site. It has proven very popular with Oklahoma residents and has several commercial installations serving the recreational market. With the completion of the dam for Tenkiller Reservoir and the decrease in water temperature below the reservoir, the Illinois River from the dam to its junction with the Arkansas became one of two

---

<sup>1</sup>U.S. Coast and Geodetic Survey Report 41-1 (Revised), "Earthquake History of the United States."

<sup>2</sup>Tectonic Map of the United States; USGS & AAPG, 1961.

artificially stocked trout streams in Oklahoma. Most of the stocking and trout fishing is done between the Highway 64 bridge north to the dam.

With completion of the Robert S. Kerr Reservoir in 1970, the headwater of the reservoir normal pool level now extends upstream in the Illinois to the Highway 64 bridge. As a result, the Illinois, from the Highway 64 bridge to the Arkansas proper, is classified as a part of the reservoir. Since the reservoir filled in December, 1970, it appears that water from the Arkansas has flowed up the Illinois past the plant outfall discharge point. This area around the highway bridge has not become commercialized for recreational purposes but, since the Corps of Engineers has designated the west bank of the Illinois immediately north of U.S. 64 as a public access area for the reservoir, it is expected that eventually it will develop as a recreational area.

The area on the shoreline of the Robert S. Kerr Reservoir from the I-40 bridge to Vian Creek is being studied as a possible wildlife refuge. This area will be partially reserved for wildlife with limited waterfowl hunting permitted.

As mentioned previously, the Corps of Engineers has control of the Illinois River at Tenkiller Reservoir, the downstream water to the Arkansas and the area reserved for the flood level (470') of the Robert S. Kerr Reservoir. The dams and their lock mechanism are the only government installations in the vicinity of the plant.

### III. Environmental Approval

When this site was selected for the location of the plant, extensive consultation was held with the Oklahoma Water Resources Board and the Corps of Engineers as to the most acceptable method of diverting Illinois River water for use in plant cooling and potable water. Agreement was reached with the Oklahoma Water Resources Board on January 9, 1968, with the issuance of a "Permit to Appropriate Surface Water No. P-67-765"



covering 30,000 acre-feet of water per year to be diverted from the outlet works of the Tenkiller Reservoir.

Subsequently, Contract No. DACW 56-70-C-0083 for water storage space in Tenkiller Ferry Reservoir was completed with the Department of the Army Corps of Engineers. These agreements permitted the diversion system to be designed and installed to remove water from the reservoir dam and pipe it to the site.

No State, local or regional planning organizations have been authorized to consider regional economic development in this area.

The State of Oklahoma is proceeding in an orderly fashion to evolve a set of environmental control regulations that are consistent with the U.S. Government authorized regulatory activities. The Oklahoma Water Resources Board requires a permit for the disposal of waste to riverways. This permit has been granted by the State for the Sequoyah Facility, No. IW-70-011, for waste disposal. In addition, a Sanitary Waste Treatment Permit dated August 21, 1969, was issued.

Because this plant processes nuclear source materials, it was necessary to obtain an operating license from the USAEC. License SUB-1010 was granted February 20, 1970, based upon application submitted on September 25, 1969.

In accordance with applicable regulations under the Refuse Act of 1899, an application for a waste discharge permit was filed with the Corps of Engineers on June 21, 1971, and supplemented on October 4, 1971. The Discharge Permit Application OK-076-OYI-2-000111 is currently being processed.

Copies of these permits are attached in the appendix to this report.

#### IV. Environmental Impact

As described in paragraph I.B. above, plant construction was completed in early 1970. Production operations started immediately and have continued without interruption. As a result of the surveillance program described in paragraph V

below, we have measured no adverse effect on the environment.

A. Land Use

Prior to plant construction the immediate plant area was used partly for the cultivation of wheat and the balance was in pasture and woodland. Grading for the building site, settling basins and treatment and storage ponds (as shown on the attached Drawing 151) changed the original surface contours. All graded land not covered by hard surface materials was subsequently seeded with fescue and rye to prevent wind and rain erosion.

Because of the extensive availability of recreational land and water facilities in the area and the nature of the plant processes, we have no plans to provide public access or use of the site area.

With the completion of the Arkansas Riverway and the extensive interstate highway system, it is expected that land along the Arkansas River will be developed in many places for industrial and commercial use. Since the land chosen for the Sequoyah Plant is not uniquely suitable for other beneficial use, it is believed that erecting this plant in this location provided an overall benefit to the human environment in the area.

The plant site does not intrude into any site of historical significance and is not listed in the National Register of Historic Places.

B. Water Use

In accordance with the contracts described under paragraph III above, water for the Sequoyah Facility is withdrawn from the Tenkiller Reservoir Dam and conducted through a 16-inch water main to the site. Appropriate valving and metering are provided just above the raw water stilling basin. This water main was designed to provide sufficient cooling and potable water for the expanded capacity of the plant.

Very little water is used in the process except for makeup of neutralizing solutions, the absorption of noxious gases and for potable or sanitary purposes. Water used for these

purposes is discharged through treatment systems to a common outfall on the plant site prior to discharge to the Illinois River.

A portion of the water reaching the plant site bypasses the treatment system and joins the overflow from the cooling tower. This stream combines with the overflow from the sanitary lagoon and fluoride clarification pond and flows through a natural watercourse to enter the Illinois River approximately 1000 yards above its junction with the Arkansas River. As a part of our environmental surveillance system, the quality of the outfall water is routinely measured as described under paragraph V. The drawing on the following page, "Waste and Rainwater Drainage System," shows the flow of water through the plant.

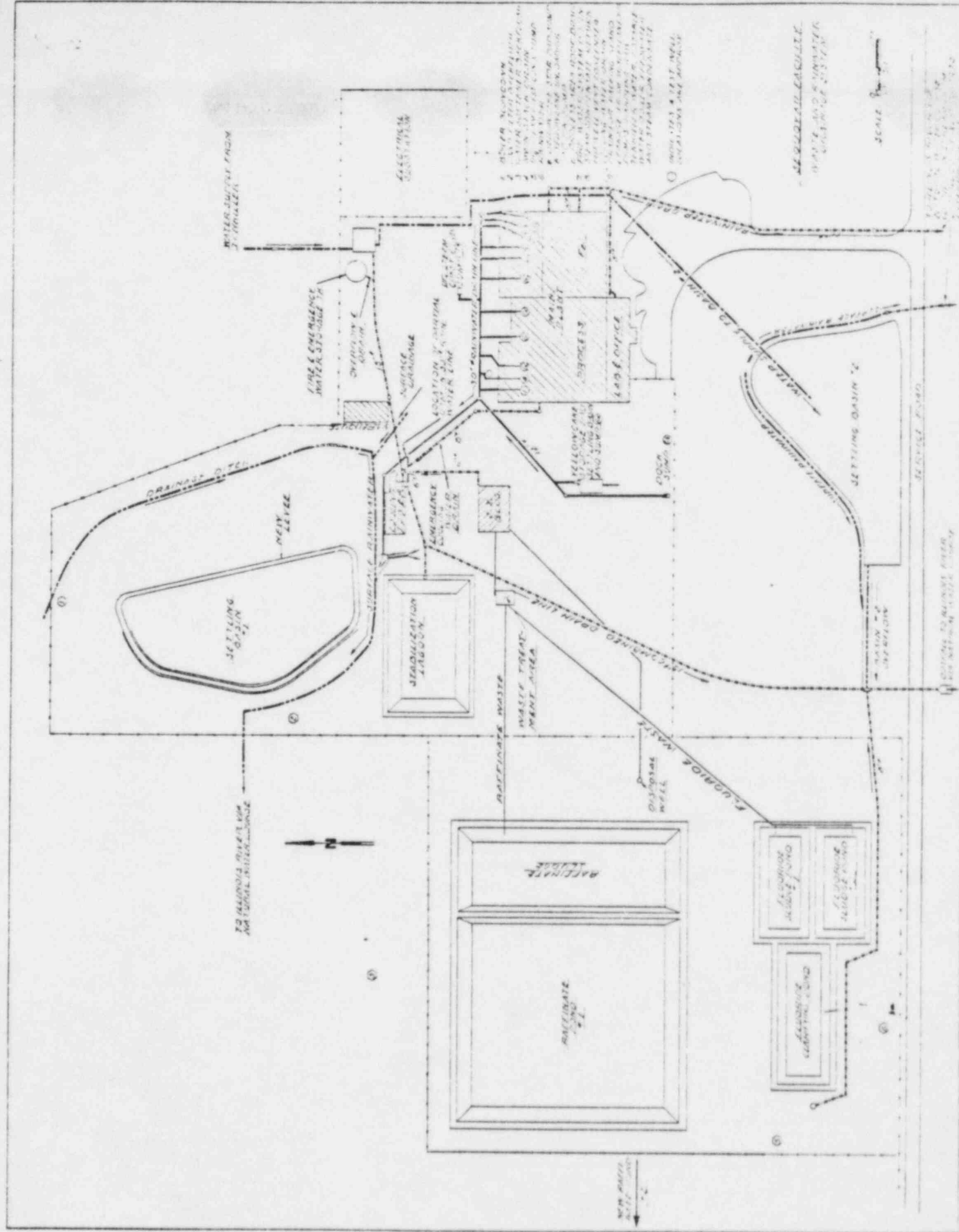
#### C. Heat Dissipation

Process heat removal from the facility is provided for by the use of either cooling water or ambient air. Water received from Lake Tenkiller is sufficiently cold to use directly for cooling purposes. There are some very important and critical points in the process where temperature must be carefully controlled. Water is piped directly to these critical points and is then discharged to the cooling water system. Other, less critical heat release points are cooled by using the water in a cooling water system which circulates through cooling towers. In this manner critical points are provided with low temperature cooling water under sufficient gravity-induced pressure to protect the environs, personnel and equipment while less critical points are cooled with recycle water.

The heat dissipated from the plant results in a 5°F increase of the temperature of the water discharged. This discharge stream is calculated to raise the average temperature of the Illinois River by less than .1°F.

#### D. Chemical Discharge

Original plant design criteria provided that chemical waste originating from the solvent extraction building as an ammonium nitrate solution known as "raffinate" and the



scrubber solution containing small quantities of fluoride and uranium would be discharged as generated into a deep well disposal system. This deep well had been drilled to the depth of approximately 3700 feet into a porous Arbuckle limestone formation saturated with low-quality water unfit for agricultural, industrial or potable use due to the high quantities of soluble salts. However, the AEC Source Material License SUB-1010 did not approve the use of this well as planned because of the need for additional data as to the extent and capacity of the underground reservoir, the permeability of the formation and the uniform distribution of waste within the formation. Subsequently, Kerr-McGee has employed a consultant firm experienced in the delineation of such underground reservoirs, H. J. Gruy & Associates, Inc., to conduct a development program to determine the extent and capacity of this underground reservoir. This development program involves the measurement of injection rates and dissipation of injection pressures over time periods at various depths in the reservoir permitting the consultant to correlate the actual reservoir data with mathematical models of similar reservoirs. It is expected that these lengthy and expensive tests and the subsequent correlation will permit definition of the reservoir capacity and confirm the absence of risk of communication of waste fluids to potable and surface water. Currently, Kerr-McGee's geological and engineering review of these tests is proceeding and an AEC license amendment application will propose the authorization of the use of this deep disposal well upon completion of AEC and geological review.

As a consequence of the inability to license the deep disposal well, provisions were made to divide the chemical waste into two types with permanent surface storage of one and treatment of the other as fully described in paragraph II.D.

1. Nitrate Waste

The primary chemical waste of the uranium hexafluoride production process is a nitrate solution of ammonia containing the impurities removed from the feed material and



approximately one molar nitric acid concentration. These impurities contain minute quantities of radium 226 and thorium 230 and 234 as daughter products in equilibrium with the original uranium content. No practical method is known for the beneficial recovery, concentration or reduction to solid of these heterogeneous wastes. Consequently, holding ponds with carefully sealed bottoms were constructed in accordance with AEC criteria. A lime system to neutralize the excess nitric acid was installed and all such waste is treated with lime and pumped to the pond for storage. No nitrate chemical wastes have been discharged to the environment and all those generated are currently being held in disposal ponds in the plant area.

## 2. Fluoride Waste

The second portion of the chemical waste generated by the process is a very dilute solution of hydrofluoric acid (.3%) from the offgas scrubber in the hydrofluorination and fluorination processes. It was known that the treatment of this material with calcium hydroxide would precipitate calcium fluoride and further treatment with sulphuric acid would precipitate excess calcium and neutralize effluent solutions to acceptable disposal levels. A pond system with a carefully sealed bottom meeting AEC standards was constructed. The solution is neutralized with lime and then pumped to an initial pond for settling. The overflow from the first pond is then treated with sulphuric acid to adjust the pH and to precipitate excess calcium and allowed to settle. The final clear overflow liquid is combined with other aqueous effluents at the plant outfall. The combined stream meets accepted levels (USPHS drinking water standards) of fluoride ion.

Chemical wastes are retained or processed to remove chemical impurities prior to discharging to the Illinois River. As a result of this treatment no significant flow of chemical discharge occurs in the water returned to the Illinois River.

This effluent system is measured three times each day by removing a sample from the effluent stilling basin which

is analyzed for fluoride and nitrate ion and composited into weekly samples and subsequently into monthly samples. Daily samples are analyzed by the Sequoyah Laboratory staff to provide assurance to plant supervision that control measures are operating adequately. Daily samples are composited by months and analyzed by an independent laboratory.

The results of these independent analyses are shown on Table I for radioactivity and Table II for fluoride and nitrate, including data determined in a preoperational program conducted in 1969 by R. Y. Nelson of Oklahoma University. As can be seen from Table I, radioactive discharge is well within the alpha, beta and radium limits of 10CFR20. It can be seen from Table II that fluoride control resulting from the fluoride precipitation and clarification system shows only two months above U.S. Public Health Service drinking water standards. Nitrate concentrations are erratic, however. Source of the abnormal nitrate contamination in the effluent has been traced to originating as leaching by rainwater of nitrate solutions accidentally spilled during early startup operations and not completely removed in decontamination efforts. As described above, all nitrate wastes have been stored in a neutralized condition in retention ponds since the startup of the plant.

#### DISCHARGE DATA

Effluent:	2,300,000 gal/day
	3.9 cfs
	19,159,000 lbs
Nitrate:	Current Daily Analysis
	N as NO <sub>3</sub> - 2 ppm
	NO <sub>3</sub> - 8.4 ppm
	160.9 lbs/day
Fluoride:	Current Daily Analysis
	F <sup>-</sup> - .7 ppm      13.4 lbs/day
Illinois River:	1,462 cfs (Gore, Oklahoma)
	NO <sub>3</sub> - 2.4 ppm <sup>1</sup> 2,290 lbs/day
	F <sup>-</sup> - .1 ppm <sup>2</sup> 95 lbs/day



Arkansas River: 19,500 cfs (Muskogee, Oklahoma)

NO<sub>3</sub> - 4.8 ppm<sup>1</sup> 64,000 lbs/day

F<sup>-</sup> - .3 ppm<sup>2</sup> 4,680 lbs/day

<sup>1</sup>Oklahoma Water Quality Standards-1968

<sup>2</sup>Table II

Based upon these data and the continuing surveillance program, it establishes that the nitrate nitrogen content is being maintained at less than four ppm and fluorides at less than 1.5 ppm.

Recent literature<sup>3</sup>, examined in a search for data as to the result of acute and chronic exposure at the levels of nitrate and fluoride contamination measured thus far, does not demonstrate any concern for below 10 ppm nitrate as nitrogen but reports that infant methemoglobinemia has been caused by the use of drinking water containing 50 ppm nitrate. Precise concentration limits are not defined but it is widely recommended that water containing more than 10 ppm of nitrate nitrogen should not be used for infants. Other thresholds of deleterious effects appear to be approximately 20 ppm for the brewery industry with no effect from irrigation, stock or wildlife water below approximately 600 ppm. Fish and other aquatic life accommodate nitrate as a normal process of aerobic stabilization of organic nitrate. Aquatic plant life thrive in water containing elevated nitrate concentrations. Good fish life is supported in waters having up to 4.2 ppm. Consequently, levels of nitrate discharged from the Sequoyah Facility are well below those which cause harmful effects.

Fluoride levels at approximately 1 to 2 ppm are known to be beneficial in preventing the presence of caries in teeth. Levels of 3 to 4 ppm can cause mottled enamel but are not likely to cause other effects. No damage has been reliably reported from waters containing up to 5 ppm. For waters used for industrial purposes, a limit of 1 ppm is suggested for the

---

<sup>3</sup>Water Quality Criteria, 2nd Ed., McKee and Wolf; State Water Quality Control Board, Sacramento, California.

food processing industry although no serious effects have been noted until a concentration of 10 ppm is reached. Cattle, stock and wildlife apparently show no deleterious effects below approximately 10 ppm. In view of a control point of 1.5 ppm, the emission of fluorides in discharges from Sequoyah are well below those which cause any temporary or permanent harm.

E. Sanitary Wastes

Sanitary and domestic wastes are collected and piped to a stabilization lagoon approved by the State Department of Health of Oklahoma. Discharge of liquid effluent from this system has been tested and conforms to the State requirements. This stream is combined with the waste clear water and fluoride streams and flows to the Illinois River.

F. Biological Impact

Installation of the plant and its operation has caused minimum biological impact on the area. The construction work resulted in the removal of a small wheat field from production and of a few native trees, none of them of special or marked value. All slopes affected by the preparation of the area for construction were reseeded upon completion with a mixture of fescue and rye that rapidly became established, thus preventing erosion.

Small numbers of indigenous birds and animals were forced to relocate. A large amount of natural cover and feed sources remain to maintain native bird and game populations. There has been no noticeable reduction of the nearby population of deer and small animals or quail and other species of birds. It has been observed that many of the native animals are feeding upon the fresher grasses in the reseeded areas as a result of the water used in periods of dry weather.

The slightly elevated temperature (65°) of aqueous discharge has no effect on fish life and meets Oklahoma standards.<sup>4</sup> Schools of fish in the watercourse and at the point of discharge have been observed.

---

<sup>4</sup>Oklahoma Water Quality Standards-1968.

#### G. Radioactivity Discharge

Processing results in minor radioactive contamination of the following plant discard streams which have been described more fully earlier in this report: (1) a small amount of uranium and daughter products contained in raffinate from the solvent extraction plant, (2) a small amount of normal uranium contained in the hydrofluoric acid solution, (3) ambient air passed through vacuum transfer and cleaning systems which is discharged to the atmosphere after filtering containing minute amounts of finely divided uranium salts, and (4) gaseous effluent resulting from noncondensable gas release from the  $UF_6$  condensing system containing trace amounts of  $UF_6$  which is piped to the top of the flue gas stacks from the boiler house.

All sources of discharge of radioactive substance are controlled either by permanent storage or treatment of filtration to keep effluents well within limits set by 10CFR20.

#### H. Transportation

Materials are normally moved to the plant in truckload quantities by common carriers or in vendor trucks. Such trucks travel over the interstate highway system to the turnoff on Interstate Highway 40 approximately one-half mile east of the Arkansas River Bridge. Here the route moves onto State Highway 10 for approximately one-half mile and then to the plant area over an asphalted concrete road installed as access to the plant. All radioactive materials are transported in accordance with D.O.T. regulations.

Plant personnel normally live in residential areas some distance from the site. A small percentage live in the area of Vian, Oklahoma, approximately six miles to the east. Others live at distances primarily in rural areas ranging up to Muskogee and Stillwell. All employees travel to the plant location from their homes in privately-owned automobiles or trucks.

This amount of movement of materials and personnel to and from the plant since the commencement of operations in

February of 1970 has not resulted in unusual wear or caused hazardous conditions on these public-supported highways. Continued operation of the plant during the NEPA review period will not measurably increase the deterioration of the highway system.

I. Schools

No adverse impact of this installation on public schools has been experienced since the majority of employees were local residents. Additional tax income of approximately \$90,000 is received by Sequoyah County annually.

J. Accidents

In an industrial processing plant such as the Sequoyah Facility, the possibility of internal accident or climatic conditions disrupting the closed processing system is present.

Sequoyah County is subject to steady winds and has a small probability of  $1.66 \times 10^{-3}$  of being hit by a tornado in any given year. The small probability decreases geometrically as the area of interest decreases. As a consequence, an advanced weather warning service has been arranged through local meteorological consultants. This weather warning service provides that at 50% probability of damaging winds at the site a warning is given four hours prior to its arrival and at 90% probability, one hour prior. Such warnings are made by the consultants after examining available weather information collected through public and private networks and are based upon mathematical models and historical data of the system. In the event of a four-hour warning being received by the plant management, production operations are ceased and all personnel moved indoors. At the one-hour warning, all but essential services are terminated, storage tanks closed off and a close watch is posted. During 1971 five severe weather warnings have been received but no damaging storm has approached the plant.

Internal accidents caused by equipment malfunctions, design inadequacies or human error are a possibility in a newly-installed chemical plant. On three occasions during early

startup operations such accidents resulted in the release of some hydrofluoric acid,  $UF_6$ , and nitric acid solution of uranium to the restricted area in the plant. Since this time, considerable effort in correcting the design problems, securing equipment reliability, and training personnel in correct operating procedures has resulted in no accidental releases of contamination during the nine months of 1971.

The credibility and threat of an accident releasing uranium materials to the environment was carefully examined. The uncontrolled release of uranium materials must occur in one of three forms. Each has been separately scrutinized.

1. Gases

The production of  $UF_6$  results in a reaction forming a volatile gaseous compound of uranium, uranium hexafluoride. This gaseous compound is formed in a gas-type reactor wherein solid  $UF_4$  and gaseous elemental fluorine are combined with an excess of fluorine, essentially "burning" the uranium tetrafluoride to uranium hexafluoride. In the process of this reaction, an incomplete yield is obtained which results in the production of several intermediate uranium fluoride compounds, nonvolatile metallic impurities as fluorine compounds and large quantities of  $UF_6$ . The impurities and intermediate uranium fluoride solids are separated from the  $UF_6$  gas stream by filtrations in series employing sintered metal filters. This filtration is repeated and the  $UF_6$  is then condensed in a chilled heat exchanger.

While the gas formed is at high temperature and rates, the probability of escape is small since it is occurring in a sealed vessel on an essentially instantaneous basis. Any rupture in the sealed system would cause the production of an undesirable uranium oxyfluoride of extremely small particle-sized powder, comparable in nature to the particles existing in common smoke. The accidental breaching of the closed system would result in large clouds of white smoke emitted in the reactor area and the easily-controlled reaction would be



immediately detected and terminated by prompt closing of the fluorine feed valve.

Upon completion of the reaction and collection of the  $UF_6$ , the collection vessel is closed off from the process stream and the cooling terminated while steam is activated to several melting coils located on the bottom of the exchanger. The solidified  $UF_6$  melts at  $147^\circ$  and 22 psi and can be handled with normal care as to operating and maintenance procedures. However, after all or part of the loaded heat exchanger is delivered to the cylinder for storage and shipment, the temperature of  $200^\circ F$  has generated a vapor pressure of approximately 60 psig. If ruptured during the transfer, cooling or storage, the maximum creditable accident would be the rupture of the valve connected to the shipping cylinder and subsequent vaporization of a portion of the contents.

The second possibility is a rupture of the valve of the same nature, however, occurring during the time that the cylinder is being reheated for homogenization in preparation for the removal of a sample. The solidified cylinder must be heated in live steam for approximately four hours before it becomes homogenous enough to blend.

The results of such an accident in terms of downwind concentrations and probable effect on humans at the nearest uncontrolled resident location (1/2 mile) are negligible as calculated by established diffusion methods<sup>5</sup> assuming moderately stable winds (four meters/sec). It is calculated that maximum exposure to airborne concentrations in the event the wind direction was correct would not exceed .053 microcuries assuming no washout, two hour presence in cloud and 100% deposition. Such exposure would amount to approximately 14% of established occupational body burden.

## 2. Liquid

All liquid handling equipment in the plant is located inside the building. If ruptured, liquid containers

---

<sup>5</sup>Meteorology and Atomic Energy, 1968.

are located in the sump areas with the volume of the depressed areas sufficient to hold any container in that area. As a consequence, an uncontrolled release of uranium-containing liquid from its immediate area could not occur without the compounding features of more than one accident simultaneously.

### 3. Solid

The breakdown of solids handling equipment and the release of the contained material to the plant is possible through the failure of packing or other equipment components. Such releases are normally restricted to the immediate local area where the material generates a pile of solid uranium powder. Some entrainment of such released powder on ambient air streams during the course of cleanup could occur, and the purpose of the fence line and remote air sampling stations is to detect any such release. In addition, regular surveying, both visually and with instruments, and routine monitoring of in-plant restricted area detects the accumulation of solids of a size range acceptable to air entrainment.

### K. Aesthetics

The land chosen for the Sequoyah site, as described earlier, had been previously occupied by a small wheat field, woodland and the balance in uncultivated pasture. Efforts were made to design the facility in a manner so that land would be conserved and the resulting view would be enhanced rather than harmed. The view was unremarkable and similar to many others in the area. Architecturally, the lean, uncluttered appearance and orderly arrangement of the Sequoyah Facility enhances the aesthetic value of the site. Pictures of the plant from the air are on the following page.

### V. Environmental Surveillance Program

The design criteria of the Sequoyah Facility included criteria for control of the quality of releases from the plant as a guide to the architectural engineering firm in establishing equipment design and specifications. Concurrently, it was





SEQUOYAH FACILITY  
KERR-McGEE CORPORATION

realized that the meeting of these criteria could not be entirely verified by on-site measurements and an Environmental Surveillance Program was initiated. The purpose of the program is to demonstrate that effluent control equipment and procedures are limiting gaseous and liquid discharges of radioactive and chemical pollutants to the environment to acceptable levels. This program was initiated prior to the operation of the plant so that a base line could be established. The program covers all possible effluents from the plant and provides for monitoring of the holding ponds through the installation of several wells at their periphery to insure that no unforeseen leakage from the retention system occurs.

The following samples are taken at locations shown on Drawing 110-C-151 and analyzed for radioactivity, fluoride and nitrate contents as monitors for all other chemical releases:

1. The liquid effluent stream consisting of the combination of the fluoride treatment effluent, the sanitary effluent, water bypassed around the water treatment facility and overflow from the cooling tower plant is sampled at the point where it leaves the immediate plant control area south of the road. The stream is sampled once each shift and samples are composited on a weekly and monthly basis for analysis.

2. Air samplers are located at the fence perimeter and at a radius of 1000 feet in four directions. Continuous samples are taken for a week and analyzed.

3. The Illinois and Arkansas Rivers are sampled upstream and downstream of the outfall discharge once each week and analyzed in a monthly composite.

4. Soil and vegetation samples are taken near the location of the four air samplers quarterly. Vegetation is protected by cages and entirely collected at the time scheduled. Soil is taken from a four-square-foot area one-inch deep near the cages. All samples are analyzed for radioactivity, uranium, radium, fluoride and nitrate.

5. Samples are removed from the monitoring wells near the storage ponds and from water wells on the site once each

week and analyzed on a monthly composite.

6. Surface ponds on the site are sampled weekly and analyzed on a monthly composite.

All composited environmental samples are analyzed by an independent laboratory. Results of these analyses are given on Table I to X immediately following.

The environmental surveillance program was developed to (1) measure the effectiveness of in-plant control systems on regulating the discharge of potentially harmful chemicals and radioactivity, (2) demonstrate to State regulatory bodies that applicable regulations were being met on a continuing basis, and (3) measure the effects of discharge at lower-than harmful concentrations of such materials on the environment.

Justification of this program was the desire to secure the results described and the continuing concern of Kerr-McGee Corporation for the preservation and enhancement of the human environment in Oklahoma.

#### VI. Results of Plant Use

The conversion of impure uranium concentrates to purified uranium hexafluoride is a central and necessary step in the complete nuclear fuel cycle. Nuclear power production promises a number of environmental advantages including the absence of release of significant amounts of combustion products to the atmosphere, the possibility of attractive architectural design, the significantly reduced flow of fuel materials and waste products and a reduction of associated noise and land commitment. Nuclear power is regarded as essential to meet the growing energy needs of the United States in the coming decades. The availability of abundant and reliable supplies of electrical power contributes in many ways to an enhanced human environment.

As stated above, Kerr-McGee does not believe that any adverse effect on the environment results from the past or continuing operation of the Sequoyah Facility.

TABLE I

GROSS ALPHA AND BETA AND RADIUM 226 ANALYSIS OF SEQUOYAH FACILITY  
COMBINATION STREAM AND THE ILLINOIS AND ARKANSAS RIVERS  
 $\mu\text{Ci}/\text{ml} \times 10^{-7}$

	Combination Stream			Illinois River						Arkansas River					
	At Plant			Upstream			Downstream			Upstream			Downstream		
	$\alpha$	$\beta$	226 Ra	$\alpha$	$\beta$	226 Ra	$\alpha$	$\beta$	226 Ra	$\alpha$	$\beta$	226 Ra	$\alpha$	$\beta$	226 Ra
Operational															
1971 (a)															
January	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February	1.6	.8	.01	<.01	.01	<.01	.04	.09	<.01	.02	.06	<.01	.03	.05	<.01
March	6.8	4.0	<.01	.01	.09	<.01	.20	.14	<.01	.02	.14	<.01	.29	.37	<.01
April	31.8	13.0	.26	.02	<.01	.04	1.10	.50	.01	.03	.10	<.01	.04	.06	<.01
May	26.4	47.4	.02	.01	.09	.01	.90	2.00	.05	.01	.03	.07	.01	.07	.04
June	NS	NS	NS	<.01	.09	<.01	.04	.12	<.01	.03	.12	<.01	<.01	.16	<.01
July	4.2	3.3	.03	.03	.03	.01	<.01	.14	<.01	<.01	.04	.02	<.01	<.01	.02
August	11.7	6.0	.06	.06	.03	.02	.06	.03	<.01	.01	.06	<.01	.02	.05	.02
September	3.6	3.0	.02	.08	.05	<.01	1.80	1.70	.02	<.01	.10	.02	<.01	.17	.01
Preoperational															
1969 (b)															
July	No Effluent			.03	.08		NS			.03	.06		.04	.03	
August	"			.03	.07		NS			.04	.05		.02	.04	
September	"			.02	.03		NS			.02	.05		.02	.01	
October	"			.02	.03		NS			.02	.01		.02	.02	
November	"			<.01	<.01		NS			<.01	.04		<.01	.01	
December*	"			<.01	<.01		NS			NS	NS		NS	NS	

(a) Controls for Environmental Pollution Results

(b) R. Y. Nelson's Preoperational Survey Results

NS - Not Sampled

\* - Sequoyah Lab Results

TABLE II

FLUORIDE AND NITRATE ANALYSIS OF SEQUOYAH FACILITY  
COMBINATION STREAM AND THE ILLINOIS AND ARKANSAS RIVERS  
CONCENTRATION IN PPM F<sup>-</sup> & NO<sub>3</sub> AS N

	Combination Stream		Illinois River				Arkansas River			
	At Plant		Upstream		Downstream		Upstream		Downstream	
	F	N	F	N	F	N	F	N	F	N
Operational										
1971 (a)										
January	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February	1.0	1.8	.5	1.8	.4	1.8	2.0	1.3	1.3	.5
March	2.6	<.1	<.1	<.1	.2	<.1	.4	.1	.2	<.1
April	2.6	22.0	.1	.2	.1	.2	.4	.4	.3	.4
May	.8	8.1	<.1	2.6	.3	1.2	.6	.6	.3	1.8
June	NS	NS	<.1	1.1	.2	.8	.4	1.1	.4	.8
July	.4	.9	<.1	.5	.2	.5	.2	.3	.2	.2
August	.7	13.7	.1	.3	.2	.2	.4	.3	.3	.2
September	.6	3.1	.1	.5	.2	.7	.2	.9	.2	.7
Preoperational										
1969 (b)										
July	Not Operating		.2	.5	NS	NS	.4	.2	.1	.3
August	"		.2	.4	NS	NS	.5	.1	.2	.3
September	"		.2	.3	NS	NS	.5	.1	.4	.3
October	"		.3	.3	NS	NS	.4	.4	.3	.3
November	"		.1	.3	NS	NS	.4	.5	.1	.3
December*	.3		<.1		<.1		.3		.1	

(a) Controls for Environmental Pollution Results

(b) R. Y. Nelson's Preoperational Results

NS - Not Sampled

\* - Sequoyah Lab Results



TABLE III

GROSS ALPHA, GROSS BETA AND RADIUM-226 ANALYSIS  
SEQUOYAH FACILITY MONITOR WELLS  
 $\mu\text{Ci}/\text{ml} \times 10^{-6}$

	Well 1			Well 2			Well 3			Well 4*			Well 5			Well 6		
	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra
Operational																		
1971 (a)																		
January	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February	.10	.07	.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	.01	<.01	.02	.06	<.01	.03	.02	<.01
March	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
April	.01	.02	<.01	<.01	.02	<.01	.19	.19	<.01	<.01	.04	<.01	<.01	.02	<.01	.03	.03	<.01
May	.04	.12	.03	.03	.08	<.01	.02	.06	<.01	.03	.06	<.01	.08	.18	<.01	.04	.07	<.01
June	.08	.11	<.01	.25	.11	<.01	.06	.08	<.01	NS	NS	NS	.03	.07	<.01	.02	.04	<.01
July	.07	.10	.04	.05	.07	<.01	.04	.12	<.01	NS	NS	NS	.02	.10	.06	<.01	.02	<.01
August	.09	.05	.03	.10	.03	<.01	NS	NS	NS	NS	NS	NS	.03	.08	<.01	.01	.02	<.01
September	.14	.08	.01	.05	.04	<.01	.03	.15	<.01	NS	NS	NS	.02	.05	.02	<.01	<.01	<.01
Preoperational																		
Wells were not drilled prior to facility operation.																		

(a) Controls for Environmental Pollution Results

\* - Well #4 Abandoned in June

NS - Not Sampled

TABLE IV

FLUORIDE AND NITRATE ANALYSIS  
SEQUOYAH FACILITY MONITOR WELLS  
CONCENTRATION IN PPM F<sup>-</sup> & NO<sub>3</sub> AS N

	Well 1		Well 2		Well 3		Well 4*		Well 5		Well 6	
	F	N	F	N	F	N	F	N	F	N	F	N
Operational												
1971 (a)												
January	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February	1.8	11.0	.4	4.3	2.0	3.3	6.0	5.5	6.3	5.5	.7	5.5
March	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
April	.5	32.0	.2	1.6	1.5	6.5	.6	3.1	1.0	4.4	.7	3.5
May	1.3	30.0	1.0	44.0	.9	5.5	.8	6.3	.9	3.9	.7	3.5
June	1.0	43.1	.6	14.7	1.1	2.3	NS	NS	1.1	1.8	.5	1.5
July	1.4	3.9	.9	23.3	1.2	.5	NS	NS	.8	19.5	.3	.3
August	1.0	2.2	.8	3.2	NS	NS	NS	NS	.9	44.3	.4	.2
September	1.2	4.1	.9	2.5	.6	4.3	NS	NS	1.0	3.1	.4	1.6

Preoperational

Wells were not drilled prior to facility operation.

(a) Controls for Environmental Pollution Results

\* - Well #4 Abandoned in June

NS - Not Sampled

TABLE V

GROSS ALPHA, GROSS BETA AND RADIUM-226 ANALYSIS  
SEQUOYAH FACILITY FAULT AND DOMESTIC WELLS  
 $\mu\text{Ci}/\text{ml} \times 10^{-6}$

	Fault Well			Carlisle School Well			Residence Well 1			Residence Well 2		
	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra	$\alpha$	$\beta$	Ra
Operational												
1971 (a)												
January	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
March	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
April	.01	.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
May	.01	.02	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
June	<.01	.03	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
July	.02	.03	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
August	.02	.02	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
September	.01	.02	<.01	<.01	<.01	<.01	<.01	<.01	<.01	NS	NS	NS
Preoperational												
1969 (b)												
July				<.01	<.01		<.01	.01		<.01	.01	
August				<.01	<.01		<.01	.01		<.01	.01	
September				<.01	<.01		<.01	.01		<.01	.01	
October				<.01	.01		NS	NS		<.01	.01	
November				<.01	<.01		NS	NS		<.01	.01	
December*	<.01	.04	<.01	<.01	.04		<.01	.03		<.01	.06	

(a) Controls for Environmental Pollution Results-Residence Well 2 abandoned prior to facility operation

(b) R. Y. Nelson Preoperational Survey Results

NS - Not Sampled

\* - Sequoyah Lab Results

TABLE VI

FLUORIDE AND NITRATE ANALYSIS  
SEQUOYAH FACILITY FAULT AND DOMESTIC WELLS  
CONCENTRATION IN PPM F<sup>-</sup> & NO<sub>3</sub> AS N

	Fault Well		Carlisle School Well		Residence Well 1		Residence Well 2	
	F	N	F	N	F	N	F	N
Operational								
1971 (a)								
January	NS	NS	NS	NS	NS	NS	NS	NS
February	1.8	6.6	1.0	4.4	1.8	5.5		
March	NS	NS	NS	NS	NS	NS	NS	NS
April	2.6	2.6	.1	6.2	.2	3.5		
May	2.9	2.7	<.1	3.2	.3	25.5	NS	NS
June	3.0	1.5	.2	1.6	.4	.8		
July	2.4	.1	.2	.5	.2	<.1	NS	NS
August	2.7	.6	.2	.4	.3	.4		
September	2.7	.1	.2	.4	.3	.3	NS	NS
Preoperational								
1969 (b)								
July			.3	.3	.2	.3	.1	.6
August			.4	.4	.2	.1	.2	NS
September			.3	.5	.2	NS	.3	.4
October			.3	.4	NS	NS	.3	.6
November			.2	.3	NS	NS	.2	.4
December*	.7	2.3	.1	NS	<.1	NS	<.1	NS

(a) Controls for Environmental Pollution Results

(b) R. Y. Nelson Preoperational Survey Results

NS - Not Sampled

\* - Sequoyah Lab Results

TABLE VII

GROSS ALPHA ACTIVITY AND FLUORIDE RESULTS  
 SEQUOYAH FACILITY ENVIRONMENTAL AIR  
 ALPHA RESULTS -  $\mu\text{Ci}/\text{ml} \times 10^{-14}$   
 FLUORIDE RESULTS - CONCENTRATION IN PPM  $\text{F}^-$

	East <sup>1</sup>		North <sup>2</sup>		South <sup>2</sup>		West <sup>3</sup>	
	$\alpha$	F	$\alpha$	F	$\alpha$	F	$\alpha$	F
Operational								
1971 <sup>(a)</sup>								
April	5.4	<.001						
May	1.9	.001	<.3		3.0	.003		
June	5.8	<.001	10.6	<.001	3.4	<.001		
July	2.4	.002	7.0	<.001	3.6	<.001		
August	3.0	.001	7.2	.002	1.4	.002		
September	<.3	<.001	4.6	.001	2.6	.005		
Preoperational								
1969 <sup>(b)</sup>								
June thru								
November								
Average	<100.0	NS	<100.0	NS	<100.0	NS	<100	NS

<sup>1</sup>East station installed in April, 1970

<sup>2</sup>North and South stations installed in May, 1970

<sup>3</sup>West station is under construction

(a) Controls for Environmental Pollution Results

(b) R. Y. Nelson's Preoperational Survey Results

NS - Not Sampled



TABLE VIII

RADIOACTIVITY AND CHEMICAL ANALYSIS  
SEQUOYAH FACILITY PONDS<sup>1</sup>  
ALPHA, BETA AND Ra-226 RESULTS -  $\mu\text{Ci/ml} \times 10^{-6}$   
FLUORIDE AND NITRATE RESULTS - CONCENTRATION IN PPM F<sup>-</sup> & NO<sub>3</sub> AS N

	Pond 1 (1/4 Mile South of Facility)					Pond 2 (1/4 Mile East of Facility)				
	$\alpha$	$\beta$	Ra	N	F	$\alpha$	$\beta$	Ra	N	F
Operational										
(a)										
1971										
January	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February	.02	.02	<.01	5.5	5.4	<.01	.02	<.01	11.0	1.5
March	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
April	.01	.04	<.01	1.7	.3	.01	.02	<.01	.5	.2
May	<.01	.02	<.01	1.4	<.1	<.01	.01	<.01	1.4	.1
June	.01	.01	<.01	1.3	.4	<.01	.01	<.01	.2	.3
July	.01	.01	<.01	<.1	1.2	.01	.01	<.01	.5	.1
August	.07	.04	<.01	.2	2.7	.01	.01	<.01	.3	.2
September	.02	.02	<.01	.3	1.7	<.01	.01	<.01	.6	.1
Preoperational										
(b)										
1969										
July	<.01	.01	NS	.4	.1	<.01	<.01	NS	.2	<.1
August	<.01	<.01	NS	.5	<.1	<.01	<.01	NS	.3	<.1
September	<.01	.01	NS	.4	<.1	<.01	<.01	NS	.3	<.1
October	<.01	.01	NS	.3	.1	<.01	.01	NS	.3	<.1
November	<.01	<.01	NS	.2	<.1	<.01	<.01	NS	.2	<.1
December*	<.01	<.01	NS	NS	.1	<.01	.04	NS	NS	<.1

<sup>1</sup>Ponds were constructed for water supplies when land was farmed and are fed by runoff and/or small springs.

(a) Controls for Environmental Pollution Results

(b) R. Y. Nelson's Preoperational Survey Results

NS - Not Sampled

\* - Sequoyah Lab Results

TABLE IX

GROSS ALPHA RESULTS  
 SEQUOYAH FACILITY RESTRICTED AREA FENCE LINE AIR SAMPLES  
 $\mu\text{Ci/ml} \times 10^{-12}$  ASSUMING ALL ALPHA ACTIVITY DUE TO NATURAL URANIUM

	<u>South Fence</u> <u>Gross Alpha</u>	<u>North Fence</u> <u>Gross Alpha</u>
Operational		
1971 (a)		
January	.78	.76
February	1.02	.84
March	1.30	1.06
April	2.00	1.20
May	.68	.76
June	.74	1.04
July	.78	.86
August	.80	.64
September	.22	.42
Preoperational		
1969 (b)		
June thru		
October Average		<1.00

(a) Sequoyah Facility Health Physics Monthly Average Results  
 (b) R. Y. Nelson's Preoperational Survey Results

TABLE X

FLUORIDE AND URANIUM RESULTS  
 SEQUOYAH FACILITY ENVIRONMENTAL SOIL AND VEGETATION SAMPLES  
 FLUORIDE RESULTS - mg/g  
 URANIUM RESULTS -  $\mu$ g/g

	South		West		North		East	
	F	U	F	U	F	U	F	U
<u>SOIL</u>								
Operational								
1971 (a)								
June	1.0	.3	4.1	.7	5.8	.8	2.7	3.7
September	3.4	3.0	<.1	8.0	3.9	15.0	2.0	3.0
Preoperational								
1969 (b)								
June	NS	13.2	NS	29.7	NS	25.2	NS	22.5
October	NS	29.1	NS	22.2	NS	18.6	NS	17.1
<u>VEGETATION</u>								
Operational								
1971 (a)								
September	3.0	32.0	2.0	75.0	4.0	13.0	1.0	11.0
Preoperational								
1969 (b)								
June	NS	38.1	NS	34.5	NS	25.2	NS	13.2
October	NS	31.5	NS	18.9	NS	20.4	NS	22.8

(a) Controls for Environmental Pollution Results

(b) R. Y. Nelson's Preoperational Survey Results

NS - Not Sampled

## VII. Alternatives

The site for the plant was chosen for its relative isolation, access to transportation and other favorable characteristics enumerated above. Alternate locations were evaluated and rejected on the basis of these criteria. These alternate locations, in view of the absence of any adverse environmental impact, would not currently be evaluated differently than they were at the initial consideration in 1967.

Alternate conversion processes were not available in the public domain at the time of initial planning without significant additional development work so we have duplicated the AEC process. The one other commercial process available is understood to produce no liquid effluent similar to the raffinate effluent generated at Sequoyah. Some technologists would view this as an advantage. However, since the process was proprietary and very little was known of its characteristics, the current process was chosen. The alternate process should offer no advantage in terms of gaseous effluents.

Kerr-McGee does not believe that a more favorable alternate site or process exists as confirmed by the environmental surveillance program now in effect at the Sequoyah Facility.

## VIII. Commitments of Resources

The Sequoyah Facility requires commitment of a certain amount of land, water and various chemicals to the production activity. The use of water is temporary and is returned to the river. Its use, permitted by the authorizations cited in paragraph II, does not interfere with alternate constructive use such as potable water or irrigation.

The land commitment is not irretrievable since it could be restored to its initial condition at the end of the plant's useful life.

Chemicals used in the processes are all common items of commerce produced for such purposes and are not in limited supply. The uranium materials processed are not consumed but

leave the plant in an enhanced physical form for further use by an economically important segment of industry.

IX. Cost Benefit Analysis

A. Benefits

The benefits of the Sequoyah Facility will primarily accrue to the commerce and the residents of Sequoyah and Muskogee Counties, Oklahoma, as well as the overall nuclear industry.

1. Nuclear industry will gain the benefit of having a second domestic supplier of conversion service, employing a different process and accommodating a different set of specifications for the mining and milling segment of the uranium industry. The second supplier provides a degree of competition to insure an equitable price structure and assure the continuing availability of this important phase of the nuclear fuel cycle.

2. Of the approximately 100 employees at the Sequoyah site, 90 were hired from the immediate area resulting in a payroll of approximately \$1 million per year. It has been estimated that for every direct factory employee, three times as many service personnel are required, thus resulting in a total infusion of payroll of approximately \$3 million.

3. Sequoyah County activities will benefit due to the additional taxes paid on the industrial installation as compared to those paid on the unimproved land.

B. Penalties of Environmental Impact

This has been discussed above and it is concluded that no measurable adverse effect results from this installation.

1. Water Use

Since the water discharged is approximately the quality of the Illinois and somewhat above the quality of the Arkansas, into which it immediately flows, no measurable penalty is assessed upon downstream uses of water for industry, agriculture or potable service.



## 2. Land Use

Temporary removal of about 75 acres of land at an average cost of \$400 an acre must be balanced by the value of a multimillion dollar industrial installation. Land not needed for the immediate plant area is continuing to be leased for agriculture. It is our belief that no penalty should be assessed for the change in land use or appearance of the area.

## 3. Biological Impact

No irreplaceable loss of wildlife or air quality has occurred and, as a consequence, it is concluded that no cost penalty can be assessed for this effect.

## C. Conclusion

Based upon the above, it is our conclusion that the enhancement of values to the population of Sequoyah and Muskogee Counties by the addition of a viable industrial site far outweighs, in benefits, the nonmeasurable impact upon the environment.

APPENDIX  
APPLICANTS ENVIRONMENTAL REPORT  
SEQUOYAH FACILITY

AEC Radioactive Source Material License No. SUB-1010, Docket No. 40-8027, issued February 20, 1970, and Amendment No. 1, issued January 15, 1971.

Oklahoma Water Resources Board-Waste Disposal Permit No. IW-70-011, issued March 9, 1971.

Oklahoma State Department of Health-Sanitary Waste Treatment Permit, issued August 21, 1969.

Oklahoma Air Pollution Control Division-Open-Pit Incinerator Evaluation Test, July 26, 1971.

Oklahoma Water Resources Board-Permit to Appropriate Surface Water No. P67-765, issued January 9, 1968.

U.S. Army Corps of Engineers-Contract No. DACW 56-70-C-0083 for water storage space in Tenkiller Ferry Reservoir.

UNITED STATES  
ATOMIC ENERGY COMMISSION

SOURCE MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954, and Title 10, Code of Federal Regulations, Chapter 1, Part 40, "Licensing of Source Material," and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, possess and import the source material designated below; to use such material for the purpose(s) and at the place(s) designated below; and to deliver or transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954 and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission, now or hereafter in effect, including Title 10, Code of Federal Regulations, Chapter 1, Part 20, "Standards for Protection Against Radiation," and to any conditions specified below.

Licensee		3. License No. SUB-1010
1. Name	Kerr-McGee Corporation	4. Expiration Date February 28, 1975
2. Address	Kerr-McGee Building Oklahoma City, Oklahoma 73102	5. Docket No. 40-8027
6. Source Material  Uranium	7. Maximum quantity of source material which licensee may possess at any one time under this license  No quantity limitation	

CONDITIONS

8. Authorized use (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)  
Subject to the conditions specified herein, this license authorizes the activities described in the licensee's application dated September 23, 1969, as supplemented January 14 and February 3, 1970, in accordance with the representations, specifications, and procedures in Appendix A of the said application, including supplements.
9. This license does not authorize the disposal of liquid waste containing radioactive constituents by injection into any disposal well.
10. Authorized place of use: The licensee's Sequoyah facility located about 2 1/2 miles southeast of Gore, Oklahoma.
11. This license authorizes the use of respirators in determining employee exposures to airborne radioactive materials subject to the conditions and specifications in the attached Annex A.

## MATERIAL LICENSE

License Number SUB-1010

## Supplementary Sheet

12. The licensee is exempt under the requirements of this license from compliance with Section 20.203(e)(2) of 10 CFR 20 provided all entrances to the plant are conspicuously posted in accordance with Section 20.203(e)(2) and with the words, "Any area within this plant may contain radioactive material."
13. The licensee shall immediately notify the Director, Region IV, Division of Compliance, USAEC, Denver, Colorado, by telephone and telegraph of any failure in an earth dam retention system which results in a release of liquid wastes containing radioactive material. This requirement is in addition to the requirements of 10 CFR 20.
14. Pursuant to Sections 20.106(b) and 20.302 of 10 CFR 20, this license authorizes the incineration of licensed material in accordance with the procedures specified in the application, including supplements, listed in Item 8 of this license.
15. As a minimum, the licensee shall conduct the environmental monitoring program described on pages VI-6.1.1 and VI-6.1.2 (Rev. 2/3/70) of the licensee's application listed in Item 8 above, including supplements.
16. This license authorizes the disposal or transfer of articles contaminated with source material to persons not possessing appropriate licenses provided the conditions in Annex B are met.

For the U. S. Atomic Energy Commission

*Don F. Harmon*by Don F. HarmonDivision of Materials Licensing  
Washington, D. C. 20545Date Jan 29 1977



DML:MB:RLL

40-8027

SUB-1010, Amendment No. 1

UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

JAN 15 1971

cc: P. J. DUNN / W. T. SHALLEY

D. J. FOLEY / A. W. KOSKOTSON

B. E. BROWN

D. K. SLY

A. R. VALENTINE

Chg → G. E. WULLER ✓

~~Chg~~ - J. PYLE

Kerr-McGee Corporation  
ATTN: Dr. Frank K. Pittman, Director  
Technical Services  
Kerr-McGee Building  
Oklahoma City, Oklahoma 73102

Gentlemen:

Your application dated November 5, 1970 has been incorporated into the "demonstration" portion of your application for License No. SUB-1010. In order to provide continued continuity in the license for subsequent construction of waste disposal facilities Condition 17 has been added to License No. SUB-1010 to read as follows:

"17. In the location, design, construction, maintenance and inspection of waste disposal systems into which effluents containing radioactive material in excess of the limits specified in Column 2, Table II of Appendix B, 10 CFR Part 20 are disposed, the licensee shall follow the criteria established in Section 4, page 5 of the enclosure entitled "Information and Criteria Pertinent to Evaluation of Embankment Retention Systems." In addition, the licensee shall establish appropriately located test holes near retention ponds to check for seepage, if any, of radioactive materials."

All other conditions of this license shall remain the same.

FOR THE ATOMIC ENERGY COMMISSION

Robert L. Layfield  
Materials Branch  
Division of Materials Licensing

Enclosure:

"Information and Criteria  
Pertinent to Evaluation of  
Embankment Retention Systems"

KERR-McGEE  
NUCLEAR DIVISION

JAN 19 1971

CONTRACT ADMINISTRATION

**RECEIVED**

JAN 15 1971

NUCLEAR DIV.  
MARKETING

**RECEIVED**

JAN 18 1970

TECH. SERVICES  
NUCLEAR DIV.





# OKLAHOMA WATER RESOURCES BOARD

DIALEX BUILDING • 100 WEST WASHINGTON STREET • OKLAHOMA CITY • OKLAHOMA • 73112

**RECEIVED**

March 22, 1971

MAR 23 1971

*FLS*  
 XE L974 BEX  
 3-23-71

XE L883 24-71

**P. S. DUNN**

Mr. P. S. Dunn, Group Vice-President  
 Nuclear Operations  
 Kerr-McGee Corporation, Sequoyah Facility  
 Kerr-McGee Building  
 Oklahoma City, Oklahoma 73102

PERMIT NO: IW-70-011DATE APPROVED: March 9, 1971

Dear Mr. Dunn:

This is to advise you that your application for Waste Disposal Permit has been approved by the Oklahoma Water Resources Board. This letter, accompanied by the enclosed copy of the application, constitutes the issuance of a Waste Disposal Permit.

Your permit will remain in effect so long as you are not in violation of the Oklahoma Water Quality Standards. In accordance with the Pollution Control Act of 1955:

SECTION 905 (a)

It shall be unlawful for any person to cause pollution of any waters of the State or to place or cause to be placed any wastes in a location where they are likely to cause pollution of any waters of the State.

SECTION 905 (b)

It shall be unlawful for any person to carry on any of the following activities without first securing such Permit from the Board, as is required by it, for the disposal of all industrial wastes which are or may be discharged thereby into the waters of the State.

1. The construction, installation, modification or operation of any industrial disposal system or part thereof or any extension or addition thereto.

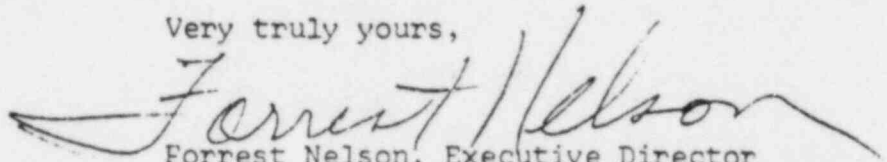
SECTION 905 (b) (cont.)

2. The increase in volume or strength of any industrial wastes.
3. The construction, installation or operation of any industrial or commercial establishment or any extension or modification thereof or addition thereto, the operation of which would cause an increase in the discharge of wastes into the waters of the State or would otherwise alter the physical, chemical or biological properties of any waters of the State in any manner not already lawfully authorized.
4. The construction or use of any new outlet for the discharge of any wastes into the waters of the State.

The above activities can be carried out only after securing a Permit from the Oklahoma Water Resources Board or revising an existing Permit.

On occasions personnel from the Oklahoma Water Resources Board will be visiting your facilities; if a special visit is desired at any time, please notify our office.

Very truly yours,

  
Forrest Nelson, Executive Director  
OKLAHOMA WATER RESOURCES BOARD

FN/ph

Encl:

X2 034615  
7 11 11

APPLICATION FOR  
WASTE DISPOSAL PERMIT  
(Must be Typewritten and Filed in Triplicate)

Application No. W-70-011  
Stream System \_\_\_\_\_  
(Office Use Only)

1. Name of Industry Kerr-McGee Corporation, Sequoyah Facility
  2. Address Kerr-McGee Building, Oklahoma City, Oklahoma 73102  
(Street No. or Box No. City State Zip Code)
  3. County Sequoyah
  4. Legal Description of Plant Location 1/4 NE 1/4 Sec. 21  
Twp. 12N Rge. 21E
  5. Legal Description of Point of Discharge 1/4 NE 1/4 Sec. 21  
Twp. 12N Rge. 21E
  6. Treated waste is discharged into the waters of Illinois River  
tributary to the Arkansas River  
Lake Tenkiller
  7. Source of Water Supply: Reservoir Amount: 30,000 acre-ft/yr
  8. Products Manufactured and Quantity: 5,000 tons per year of uranium hexafluoride  
Surface Clarified effluent of lime-treated HF scrubber waste and
  9. Type of Effluent (waste): cooling tower blowdown, boiler blowdown, domestic  
waste and water treatment brine. Surface retention: Solvent extrac-
  10. Amount Discharged: 1500 G.P.M. to Illinois River tion raffinate waste  
after lime treatment.
- WASTE TREATMENT FACILITIES:
11. Primary Treatment: Lime treatment  
(Type and Capacity)
    - A. Sludge Produced: None
    - B. Final Sludge Disposal: Four (4) earthen pits (2 sludge pits, clarifier lagoon and raffinate evaporative lagoon 10,000,000 gal - one year waste capacity)
  12. Secondary Treatment: pH adjustment of waste effluent  
(Type and Capacity)
  13. Waste Stabilization Pond: Sanitary waste oxidation lagoon - 1,400,000 gal.  
(Type and Capacity)
  14. Solid Waste Disposal: \_\_\_\_\_  
(Type, Capacity and Life)
  15. INJECTION WELL: (Pending AFC License Approval)
    - A. Date Constructed: October 26, 1969
    - B. Total Depth of Well: 3,100 feet
    - C. Receiving Strata: Arbuckle limestone
    - D. Total Thickness of Receiving Strata: Radioactivity, P<sup>234</sup>, soluble sulfate and calcium, Cl<sup>-</sup>, pH, turbidity, dissolved solids. Grab sampling at frequency to demonstrate quality standards compliance.
  16. Laboratory Schedule for Quality Control: \_\_\_\_\_

SIGNATURE OF APPLICANT

P. S. Dunn, Group Vice-President  
Nuclear Operations

(Office Use Only)

Application received and filed in this office, this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_

OKLAHOMA WATER RESOURCES BOARD



## PERMIT

OKLAHOMA STATE DEPARTMENT OF HEALTH  
OKLAHOMA CITY 5, OKLAHOMA

Date August 21, 19 69

The Kerr-McGee Corporation having complied with the requirements of the law is hereby granted permission to construct sanitary waste collection and treatment facilities to serve the Kerr-McGee Corporation's Sequoyah facility east of Gore in Sequoyah county, Oklahoma, to be constructed in accordance with the plans approved by this department on August 12, 1969.

subject to the following provisions :

- 1) That all details relative to the project not covered in the plans and specifications as approved will be constructed and accomplished in accordance with good public health practice.
- 2) That the recipient of the permit is responsible that the project receive supervision and inspection by competent and qualified personnel.
- 3) That wherever water and sewer lines are constructed with spacing of 10 feet or less, sanitary protection will be provided in accordance with Section 21 of the Standards for Water Pollution Control Facilities, ODH Engineering Bulletin No. 0587.
- 4) That this office will be notified approximately 10 days prior to completion of the project, so that a final inspection can be made by an engineer from this department before final payment is made to the contractor.

A. B. Cady, M. A.  
Lloyd H. Himmelfarb

Commissioner of Health

State Sanitary Engineer

Commissioner

R. LEROY CARPENTER, M.D.

State Board of Health

OTHER WHITENECK, D.D.S. President  
ROBERTO McCULLOUGH, D.D.S. Secretary  
ROBERT L. LOY, M.D. Member  
GLEN L. BERKENBIL, M.D. Member  
WAYNE J. BOYD, M.D. Member  
BERT T. BRUNDAGE, M.D. Member  
CARL D. OSBORN, M.D. Member  
EUGENE A. OWENS, M.D. Member  
HAROLD A. TOAZ, Member

Oklahoma

State Department of Health

3400 N. Eastern, Oklahoma City, Oklahoma 73105



July 26, 1971

*Copies* W.J. SHELLEY / P. S. DUN  
D.J. TOLLY  
T.E. ISKOWN  
S.J. GOKEN

Mr. George Wuller  
Ker McGee Building  
133 Robert S. Kerr Avenue  
Oklahoma City, Oklahoma 73102

Dear Mr. Wuller:

A visible emission evaluation test was made on your open-pit incinerator located at Kerr-McGee's Sequoyah Facility in Gore, Oklahoma, July 14, 1971. The test consisted of making periodic visible readings of the stack emissions during the time period from 10:00 a.m. to 10:15 a.m., while the incinerator consumed approximately 2000 lbs. of type O waste.

The stack emissions ranged from a 0 to 3/4 Ringelmann during the test. It is our estimation that your incinerator will operate in compliance with the Air Pollution Control Division Regulation No. 5, if it is maintained and charged properly.

This letter is not intended to be a formal permit and does not waive any requirements for stack sampling for determining exact emission rates in the future.

As we discussed, it is now necessary for the cost accounting and certification of cost to be submitted to our office so that your tax credit application can be completed.

We want to take this opportunity to thank you and your company for helping to protect Oklahoma's environment.

Please contact our office if we may be of any further assistance to you.

Very truly yours,

*Doyle McWhirter*

Doyle McWhirter, R.P.S.  
Air Pollution Control Division

DMW:MJS

cc Mr. Loyd F. Pummill  
Deputy Commissioner  
for Environmental Services  
cc Mr. Sam Trzcinski, R.P.S.  
District Sanitarian  
cc Mr. Homer Pace, R.P.S.  
Sequoyah County Health Department  
cc Mr. Robert V. Blanche, Director  
Air Pollution Control Division



PERMIT TO APPROPRIATE SURFACE WATER

SW $\frac{1}{4}$  & SE $\frac{1}{4}$  Sec. 14; NW $\frac{1}{4}$  & NE $\frac{1}{4}$   
Sec. 23, Twp 13N, Rge. 21EIM  
(Legal Description,  
Office Use Only)

Stream System Illinois Number 2-17 County Sequoyah  
Application No. 67-765 Date of Filing October 18, 1967  
Permit No. P67-765

This is to certify that the Oklahoma Water Resources Board has held a public hearing on the application of Kerr-McGee Corporation  
By: R. M. Fryar, Vice President; Att.: Carter Dudley, Attorney  
whose address is Kerr-McGee Bldg., Oklahoma City, Okla., for a Permit  
to appropriate 30,000 acre-feet of water, for the purpose of Commercial  
nuclear processing and allied facilities.

Water to be diverted ~~from~~ directly out of Tenkiller Reservoir  
in SW $\frac{1}{4}$  & SE $\frac{1}{4}$  Sec. 14 and NW $\frac{1}{4}$  and NE $\frac{1}{4}$  Sec. 23, Twp 13N, Rge. 21EIM

at a rate not to exceed 18,650 gpm.

The application is hereby approved and the applicant is authorized to proceed with the construction of the project in compliance with the above described application, which is made a part hereof and subject to the following terms, conditions and limitations:

1. Providing prior rights and domestic uses downstream are not  
affected by this diversion of water.
2. Work on the project must be started by the 18th day of October  
1969, and the applicant has until the 18th day of October 1974  
to complete the project.
3. Upon completion of the project applicant must file with the  
Executive Director of the Oklahoma Water Resources Board a NOTICE OF  
COMPLETION OF PROJECT in the manner prescribed.
4. In order to keep this Permit in full force and effect and  
retain the PRIORITY DATE, a WATER USE REPORT must be filed each year  
on forms furnished by the Board.
5. Acceptance of this Permit by applicant shall be an acknowledge-  
ment and agreement that application will comply with all the terms,  
conditions and limitations embodied in this Permit.

DATED this 9th day of January, 19 68.

OKLAHOMA WATER RESOURCES BOARD

enclosures Copy App. 67-765  
Completion of Works  
S.B. 324 & Receipt filed Walter Nelson, Acting Director

CONTRACT BETWEEN THE UNITED STATES OF AMERICA  
AND  
THE KERR-MCGEE CORPORATION, DELAWARE,  
FOR  
WATER STORAGE SPACE IN TENKILLER FERRY RESERVOIR

THIS CONTRACT, entered into this 27th day of February, 1970, by the UNITED STATES OF AMERICA (hereinafter called the ("Government")), represented by the Contracting Officer executing this contract, and the KERR-MCGEE CORPORATION, a corporation organized and existing under the laws of the State of Delaware, with its principal office at Oklahoma City, Oklahoma, (hereinafter called the "User"), WITNESSETH THAT:

WHEREAS, the Act of Congress approved June 28, 1938 (Public Law 761, 75th Congress, 3rd session), as modified by the River and Harbor Act approved July 24, 1946, authorized the construction, operation and maintenance of the Tenkiller Ferry Dam and Reservoir on the Illinois River, Oklahoma, (hereinafter called the "Project"); and,

WHEREAS, under provisions of the Water Supply Act of 1958, as amended (43 USC 390 b-f), the Government is authorized to make contracts with States and local interests for water supply storage for municipal and industrial purposes; and,

WHEREAS, the User is empowered so to contract with the Government and is vested with all necessary powers for the accomplishment of the purposes of this contract;

NOW, THEREFORE, in consideration of the faithful performance of each party of the mutual covenants and agreements hereinafter set forth, the parties hereto do mutually agree as follows:

ARTICLE 1. WATER STORAGE SPACE.

a. The User shall have the right to utilize an undivided 3.780 percent of the storage space in the Project between elevations 632.0 and 594.5 feet above mean sea level as deemed necessary by the User to impound water for its present municipal and industrial use, and to make such diversions as granted to the User by the State of Oklahoma,

CONTRACTOR'S COPY

to the extent such storage space will provide, subject to the retention by the Government and others of the remaining undivided 96.220 percent of the storage space between said elevations for such purposes as the Government may deem desirable. Although the User's storage space is estimated to provide a dependable yield of about 10,000 acre-feet of water per year for municipal and industrial use, it is understood and agreed that the Government in no way guarantees such a yield.

b. The User shall have the right to withdraw water from the aforesaid 3.780 percent of the storage space between elevations 632.0 and 594.5, so long as the elevation of the water within the Project is above elevation 594.5 feet above mean sea level, and provided that such releases when combined with local runoff below the dam will not cause flooding.

c. The design and location of any future installations or facilities which the User may construct at the Project for the purpose of diversions or withdrawals shall be subject to the approval of the Contracting Officer, and the cost of such installation or facilities, or any modification thereof, shall be borne by the User. The User shall be responsible for operation and maintenance of all installations or facilities which may be provided and owned by the User.

d. The User recognizes that this contract provides storage space only, as stated above, and that any water that may be impounded therein will be raw water. The Government makes no representation with respect to the quality or availability of water and assumes no responsibility therefore, or for treatment of the water.

e. The User shall utilize such storage space in a manner consistent with Federal and State laws.

## ARTICLE 2. MEASUREMENT OF WITHDRAWALS AND RELEASES.

a. For the purpose of maintaining an accurate record of water supply withdrawals, the User agrees to install, or cause to be installed, meters or measuring devices satisfactory to the Contracting Officer, without cost to the Government, at such times and places as the User, may construct facilities for the withdrawal of water from the Project by any means other than through the Project outlet works. The User shall furnish to the Contracting Officer regular monthly records of all such withdrawals, and shall furnish interim records at more frequent intervals upon specific request.

b. In the event the User desires releases through the Project works either as a sole source or as a supplement to facilities referred to in subparagraph "a" above, water will be released through the Project outlet works from water supply storage space in accordance with schedules prescribed in writing from time to time by the User and transmitted to the Contracting Officer. The measure of all such releases shall be by means of a rating curve of the outlet works, or by other suitable means, agreed upon in advance of the commencement of operation of the Project for water supply purposes.

ARTICLE 3. REGULATION OF THE USE OF WATER. The regulation of the use of water stored under this contract shall be the responsibility of the User and shall not be considered a part of this contract.

ARTICLE 4. CONSIDERATION AND PAYMENT.

a. The User shall pay the following sums to the Government:

(1) Annual payments of \$9,717, based on the yearly amount required to amortize the investment cost for providing the aforesaid water supply storage space in the project over a 50-year period as determined in the manner set out in Exhibit A attached hereto and made a part hereof. Except for the first payment, which shall be applied solely to the retirement of the principal, all payments shall include accrued interest at the rate of 2.5 percent per annum on the unpaid balance. A schedule of annual payments is shown in Exhibit B attached hereto and made a part hereof. The first annual payment will be due and payable within 30 days of the date the User is notified that this contract has been approved by the Secretary of the Army. Payments thereafter shall be due and payable within 30 days of the yearly anniversary date of the first payment under this contract. Payments for any fractional part of a year which may result from termination of this contract shall be prorated on the basis of the annual charge.

(2) 55.12 percent of the annual loss in power revenue resulting from the operation of the Project for providing 25,400 acre-feet of storage for water supply. The annual payment shall be in the amount of \$1,100. The first annual payment shall be due and payable on the date set forth in subparagraph a(1) of this Article. Annual payments thereafter shall be due and payable on the anniversary date of the first payment under this contract.



(3) 1.504 percent of the joint-use costs of ordinary operation and maintenance of the Project. Items of operation and maintenance which form the basis of computation and which will be used in future computation of operations and maintenance charges are shown in Exhibit A. Payments due prior to availability of actual experienced specific costs and joint-use costs of operation and maintenance shall be in the amount of \$1,600. Payments thereafter shall equal to 1.504 percent of the joint-use costs of operation and maintenance for the preceding Government fiscal year. The first annual payment shall be due and payable on the date set forth in subparagraph a(1) of this Article. Annual payments thereafter shall be due and payable on the anniversary date of the first payment under this contract. Payments following the first complete fiscal year of operation shall be adjusted to reflect the difference between the prior payment or payments for operation and maintenance and the actual experienced specific costs for water supply and joint-use costs of operation and maintenance for the period covered by such payments.

(4) 1.084 percent of the joint-use cost of major capital replacement items and sedimentation resurveys, when incurred. Payment shall be made with the first annual payment becoming due after the date said cost is incurred.

(5) 2.50 percent per annum on any overdue payment until paid, to be compounded annually from the date such payments are due. The amount charged on payments overdue for a period of less than one year shall be figured on a monthly basis. For example, if the payment is made within the first month after being overdue (31 to 60 days after the anniversary date), one month's interest shall be charged.

b. If the actual construction cost of the Project differs from the estimated cost as set forth in Exhibit A, whether increased or decreased, the aforesaid cost to be repaid by the User as set forth in subparagraph a(1) above shall be adjusted accordingly upon final determination of Project costs. If the cost is increased or decreased, an adjustment, as determined by the Contracting Officer, of payments made prior to determination of the final Project cost shall be made in the first payment after such cost is determined. Exhibits A and B shall be modified to reflect the final Project costs, and the adjusted payments and such modifications shall form a part of this contract.

c. The extent of operation and maintenance of the Project shall be determined by the Contracting Officer, and all records and



accounting shall be maintained by the Contracting Officer. Records of the cost of operation and maintenance of the Project shall be available for inspection and examination by the User.

d. Should the User request additional operation and maintenance for water supply storage over and above that determined by the Contracting Officer, and over and above that which formed the basis for determination as set out in Exhibit A, the User shall bear the entire cost of such additional expense.

ARTICLE 5. PERIOD OF CONTRACT. This contract shall become effective as of the date of approval of the Secretary of the Army, and shall continue in full force and effect for a period of one year. The User shall have the right to renew this contract each year thereafter as long as storage remains available under the interim plan for providing water supply storage space in the Project or for a total period of 50 years, whichever expires first. Payment of each annual payment will constitute renewal for the ensuing year.

ARTICLE 6. NEW CONTRACT. It is understood that in the event of a change in project purposes, physical modification of the Project and/or reallocation of storage in the Project to provide for water supply by an Act of Congress, and upon equitable allocation of Project cost among purposes served by the reservoir, prior to expiration of 50 years, a new contract shall be negotiated for use of storage space, with the new contract providing for appropriate modification in quantity, elevations and annual payment. The new contract shall include permanent rights to storage space under the provisions of Public Law 88-140. The terms of the new contract shall be subject to mutual agreement at that time; however, it is further understood by the parties hereto, that credit will be given for the amount of repayment, applied to amortization of investment, which has been paid to the Government under this contract in computing the amount due under the new contract for investment allocable to the water supply storage space.

ARTICLE 7. WATER SUPPLY STORAGE, AND OPERATION AND MAINTENANCE.

a. The Government shall operate and maintain only the Project owned by the Government.

b. The Government shall not be responsible for diversions by others, nor will it become a party to any controversies between users of the aforesaid storage space, except as such withdrawal may affect storage space reserved by the Government.

c. The Government reserves the right to take such measures as may be necessary in the operation of the Project to preserve life and/or property.

ARTICLE 8. RIGHT-OF-WAY. The grant of an easement for rights-of-way over, across, in, and upon Government-owned lands under the control of the Secretary of the Army, required for transmission of water from the point of withdrawal, shall be by separate instrument without additional cost to the User under the authority of and in accordance with the provisions of 10 U.S.C. 2669.

ARTICLE 9. RELEASE OF CLAIMS. The User shall hold and save the Government, including its officers, agents, and employees, harmless from liability of any nature or kind for or on account of any claim for damages which may be filed or asserted as a result of storage and withdrawal or release of water from the Project made or ordered by the User or as a result of the construction, operation, or maintenance of the features or appurtenances owned and operated by the User.

ARTICLE 10. TRANSFER OR ASSIGNMENT. The User shall not transfer or assign this contract nor any rights acquired thereunder, nor suballot said water storage space or any part thereof, nor grant any interest, privilege, or license whatsoever in connection with this contract, without approval of the Secretary of the Army or his authorized representative; provided that, this restriction shall not be construed to apply to any water which may be obtained from the water supply storage by the User and furnished to any third party or parties.

ARTICLE 11. OFFICIALS NOT TO BENEFIT. No member of Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 12. COVENANT AGAINST CONTINGENT FEES. The User warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the User for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability, or in its discretion to add to the

contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE 13. APPROVAL OF CONTRACT. This contract shall be subject to the written approval of the Secretary of the Army, and shall not be binding until so approved.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

APPROVED:

THE UNITED STATES OF AMERICA

Stanley R. Rees  
Secretary of the Army

Date: 15 JUL 1970

By Vernon W. Pinkey  
VERNON W. PINKEY  
Colonel, CE  
District Engineer  
Contracting Officer

KERR-McGEE CORPORATION

By J. C. Lowe  
President

Attest:

By Carl E. Cullen  
Asst. Sec. of the Army  
(Seal) Secretary

APPROVED  
Sub  
LEGAL

UNITED STATES ATOMIC ENERGY COMMISSION

ROI  
Benson  
epom  
Bour  
Bourmont  
CLB

IN THE MATTER OF:

KERR-MC GEE CORPORATION

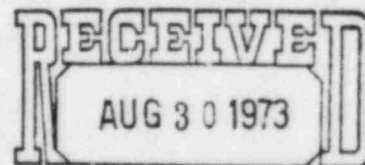
BHG	REV
GF	PTS
JAN	DMH
HP	File

Docket No. 1010

Place - Washington, D. C.

Date - Tuesday, 14 August 1973

Pages 1 - 46



Directorate of Regulatory Operations  
Region IV

Telephone:  
(Code 202) 547-6222

ACE - FEDERAL REPORTERS, INC.

Official Reporters

415 Second Street, N.E.  
Washington, D. C. 20002

NATIONWIDE COVERAGE

AUG 23 1973

711

UNITED STATES OF AMERICA  
ATOMIC ENERGY COMMISSION

- - - - -X  
In the matter of: :  
: :  
Kerr-McGee Corporation : Docket No. 1010  
: :  
- - - - -X

Court Room #1  
U. S. Tax Court  
1111 Constitution Avenue, N.W.  
Washington, D. C.

Tuesday, 14 August 1973

The prehearing conference in the above-entitled matter was convened, pursuant to notice, at 10:00 a.m.

BEFORE:

JOHN FARMAKIDES, Chairman, Atomic Safety and  
Licensing Board.

DR. DALE BABCOCK, Member.

LESTER KORNBLITH, Member.

APPEARANCES:

On behalf of the Applicant:

FRANCIS S. IRVINE, Esq., Kerr, Davis, Irvine, Burbage  
& Foster, Inc., 600 Fidelity Plaza, Oklahoma City,  
Oklahoma.

On behalf of the Intervenor Natural Resources Defense Council:

SHELDON, Karin, 1712 N Street, N. W., Washington,  
D. C. 20008.

On behalf of the Regulatory Staff:

ROY E. KINSEY, JR. Esq. and JAMES P. MURRAY, JR., Esq.  
U. S. Atomic Energy Commission, Washington, D. C.



arl

P R O C E E D I N G S

CHAIRMAN FARMAKIDES: It is now 10:00 o'clock,  
and the hearing will be in order.

This is a prehearing conference in the matter of  
application of Kerr-McGee Corporation to amend its source  
material license so as to authorize subsurface disposal  
of certain liquid radioactive waste.

On July 10, 1973, the AEC issued a notice of  
hearing, published in the Federal Register at 38 FR 18921,  
directing that a hearing be held to consider this application  
by the Kerr-McGee Corporation.

The application was filed on May 10, 1972.

The amendment requested would permit the licensee  
to utilize deep well disposal of Raffinate wastes generated  
from its solvent extraction, uranium purification process  
at its Sequoyah facility.

By letter dated September 29, 1973, the Deputy  
Director advised the licensee that its amendment request  
had been denied and specified the reason therefor.

After consideration of additional information  
submitted by the licensee, the Deputy Director, by letter  
dated March 14, 1973 affirmed the denial of September 29,  
1972. On April 5, 1973, the licensee requested a hearing  
on the matter of the denial pursuant to the provisions of  
10 CFR 2.103.

1           The notice of hearing directed this Board to  
2 consider and to decide as the issues in this proceeding  
3 whether, pursuant to AEC Act of 1954 as amended and in  
4 accordance with 10 CFR 40.32 (c) and (d), the following  
5 two issues:

6           (1) The licensee's equipment, facilities and  
7 procedures proposed for use pursuant to the requested amend-  
8 ment are adequate to protect health and minimize danger,  
9 life or property, and

10           (2) The issuance of the amendment will be  
11 inimical to the health and safety of the public.

12           The Board is composed of Dr. Dale Babcock, to  
13 my right, a nuclear engineer. To my left is Mr. Lester  
14 Kornblith, also a nuclear engineer. My name is John  
15 Farmakides. I am an attorney.

16           I would like to have the parties state their  
17 appearance, please.

18           MR. IRVINE: Francis S. Irvine, attorney, Oklahoma  
19 City, Oklahoma.

20           CHAIRMAN FARMAKIDES: Staff?

21           MR. KINSEY: Roy Kinsey, counsel for the  
22 Regulatory Staff.

23           MR. MURRAY: I am James P. Murray, Jr., associated  
24 with Mr. Kinsey. I am chief rulemaking and enforcement  
25 counsel, AEC.

1 CHAIRMAN FARMAKIDES: Thank you.

2 Gentlemen, I think there are any number of ways  
3 we can proceed. One that I think would be pertinent in  
4 this case, and perhaps would lead to an orderly disposition  
5 of the proceeding is to suggest to the parties that they  
6 frame a statement or joint statement of the issues before  
7 this Board, and that this joint statement reflect not only  
8 those issues which are in agreement between the parties,  
9 but also those issues on which they do not agree.

10 We think that would be an extremely important  
11 assist in helping the Board resolve the issues  
12 before us. This would indicate to you that the Board does  
13 not quite understand the joinder of issues between the  
14 parties, and we think this could be clarified considerably  
15 by the two parties.

16 Secondly, we thought that one way of proceeding  
17 here is to have the parties certify for the Board, if you  
18 will, the record that has previously been made with respect  
19 to the application for amendment of the Applicant, and then  
20 to advise the Board how you wish to augment the record.

21 I understand at our last prehearing conference  
22 that discovery will be minor, that the position of the two  
23 parties is, as far as they are concerned, pretty well  
24 established, and they can proceed.

25 Am I correct, gentlemen?

1 MR. IRVINE: That's correct, sir.

2 MR. KINSEY: That's correct, Mr. Chairman.

3 CHAIRMAN FARMAKIDES: In other words, you are  
4 saying no further discovery is necessary, and you can  
5 proceed without any further documentation of the record  
6 except for what the Board has just indicated to be necessary?

7 MR. IRVINE: Yes, as far as the Applicant is  
8 concerned, there will be no further documentation needed.  
9 I think we have essentially all the documents that have been  
10 submitted at any time by either of the parties, so far as  
11 we know.

12 MR. KINSEY: That is right.

13 CHAIRMAN FARMAKIDES: For the Staff?

14 MR. KINSEY: Yes, Mr. Chairman, we have no need  
15 for further discovery.

16 CHAIRMAN FARMAKIDES: Of course, the Board has  
17 questions. We find the record before us is not adequate,  
18 and Dr. Babcock will address that point later, and insofar  
19 as we find the record is not adequate, we will expect you  
20 to augment that record.

21 Is there anything else that you would like to  
22 raise at this time?

23 MS. SHELDON: Mr. Chairman, I am Karin Sheldon,  
24 representing the National Resources Defense Council.

25 We filed with you a petition requesting the

1 reissuance of the notice in this proceeding, and I wonder  
2 if this would be an appropriate time to make a comment on  
3 this, or if you would prefer to let the petition stand on  
4 its own.

5 CHAIRMAN FARMAKIDES: I would very much appreciate  
6 a comment. Let me ask the parties if there is anything else  
7 of a preliminary nature that you want to raise with respect  
8 to the proceeding as it is now scheduled.

9 Mr. Irvine?

10 MR. IRVINE: You are speaking primarily of this  
11 proceeding today?

12 CHAIRMAN FARMAKIDES: Yes, sir. Well, we are  
13 preparing for the evidentiary sessions.

14 MR. IRVINE: Yes, I realize that, but the time  
15 of the evidentiary sessions may or may not need to be  
16 changed depending on what occurs here today. So we are not  
17 addressing ourselves specifically to that at this time.

18 CHAIRMAN FARMAKIDES: All right.

19 MR. KINSEY: Mr. Chairman, you have before you  
20 the Staff response.

21 CHAIRMAN FARMAKIDES: Yes, which we haven't read  
22 yet.

23 MR. KINSEY: If I could briefly summarize the  
24 Staff's response, we would interpose no objection.

25 CHAIRMAN FARMAKIDES: Fine. Before you do that,



1 let me ask Ms. Sheldon to make an appearance and ask  
2 about the notification here. Please address yourself to the  
3 fact that your first two lines indicate that you are  
4 petitioning the AEC, which would seem to indicate you are not  
5 petitioning this Board.

6 However, at the very end of your petition, you  
7 indicate that you have, in the last paragraph, you are  
8 simultaneously filing this petition with the Commission.  
9 So I am not really -- the Board isn't quite sure what you are  
10 doing and what this, in fact, is. If you could, address  
11 yourself to that.

12 MS. SHELDON: I will. I am representing the  
13 National Resources Defense Council with respect to this  
14 petition. Basically, the issue at hand is what is the best  
15 way to effectuate what we consider to be an AEC policy as  
16 well as a matter that is stated in AEC regulations, that  
17 persons whose interests are affected by AEC proceedings have  
18 a right to intervene and participate in those proceedings.

19 The petition which we have filed was intended to  
20 be addressed to you, because we feel that you do have the  
21 authority to decide this matter, and to order a reissuance  
22 of the notice of hearing, if you so wish.

23 By stating the Atomic Energy in the first sentence,  
24 this included you as representatives of the Commission.

25 CHAIRMAN FARMAKIDES: Well, let's clarify that.

1 I don't think we are representatives of the Commission.  
2 We are a body separately established. We have no direct  
3 connection at all. We have a connection in a sense that  
4 our decision can be reviewed by the Commission. Is that what  
5 you mean?

6 MS. SHELDON: Yes, that is what we mean. We  
7 mean you are carrying out adjudicatory functions as part  
8 of the Atomic Energy Commission, not the commissioners  
9 themselves, but the Commission as a regulatory and  
10 adjudicatory agency.

11 The question that we have and the reason that  
12 we included the statement in the last paragraph was to  
13 assure timely resolution of this matter, and to prevent  
14 any problems that might arise if you decided that you did  
15 not have the jurisdiction to reissue the notice of hearing.

16 In that case, we wanted this matter to go to  
17 the Commission itself quite rapidly, so that there would be  
18 no delay of these hearings, and with respect to notice,  
19 and one could be issued promptly if found to be necessary.

20 We were not trying to drag the proceedings out.  
21 Certainly we have no intention of doing that, because as is  
22 clear from this, we are not even intervening at this point.  
23 The only question that we are addressing in this petition  
24 concerns the notice which was issued about the hearings.

25 CHAIRMAN FARMAKIDES: Do I understand you correctly

1 that you are not seeking to intervene at this point?

2 MS. SHELDON: No. I think the petition, as you  
3 will see, is not sufficient to be a petition for interven-  
4 tion. It does not state what our interests are in this  
5 matter, and does not meet the requirements of 10 CFR 314.  
6 I have no authority, for example, to intervene on behalf of  
7 NRDC in this proceeding. So we are asking the notice be  
8 reissued, because we feel the rights of persons affected  
9 by this proceeding, those rights which are stated in the  
10 Commission's regulations, are meaningless unless persons who  
11 are able to exercise those rights are informed of their  
12 existence.

13 There may be questions that the rights to inter-  
14 vene are limited to construction license or operating  
15 license for a production facility, or a nuclear power plant.  
16 However, a review of 10 CFR 40 reveals that no particular  
17 procedures are specified therein, and certainly no different  
18 procedures which are to be applicable to hearings conducted  
19 for source material licenses. If we read the whole of  
20 10 CFR Part 2, which specifies general rules of practice  
21 for the Commission, we see that in 2.1, which covers the  
22 scope of the rules, it indicates that the rules are to be  
23 applicable to all proceedings under the Atomic Energy Act,  
24 and that includes, of course, proceedings such as the one  
25 that is being contemplated here for an amendment to the

ar9

1 source license.

2 Now, the problem, as we see it, and as it is  
3 addressed in our petition, is that the petition set forth  
4 all the requirements of the hearing without notifying persons  
5 that they had a right to intervene, specifying the amount of  
6 time that they had a right to exercise this right of inter-  
7 vention, or stating the procedures to be followed.

8 Now, in the response of the Staff, which I have  
9 briefly read this morning, they indicate they have no  
10 objection to this notice of reissuance of the notice, and  
11 they acknowledge that this right does in fact exist, and  
12 that people should be informed of it.

13 The difficulty which the Staff finds with our  
14 petition involves our interpretation of Section 2.105.  
15 It is this section that we have determined indicates what  
16 should be specified in the notice of hearing.

17 Now, I would like to say that even if it is  
18 determined that Section 2.105 does not apply to hearings of  
19 this kind, the policy and the regulations set forth in  
20 Section 2.714 and 715 mean that some means must be available  
21 to the public to notify them of their rights to intervene.  
22 Even without a specific notation of what is to be included  
23 in a notice of hearing, there must be some provision which  
24 sets forth in the notice that the public has a right to  
25 intervene.

1 CHAIRMAN FARMAKIDES: Let me interrupt. Perhaps  
2 at this time we might go back and accept the Staff's offer  
3 to discuss their response to our motion, since you are,  
4 in effect, responding to theirs. We will give you plenty of  
5 time to respond to their response, as it were.

6 The thought I would like to ask, too, is that you  
7 might, while the Staff is responding to your petition,  
8 and before you then respond to their response, could you  
9 address the penultimate paragraph on page 5 of your  
10 petition in which you say that we do have authority, and  
11 could you also address that in view of the interaction of  
12 7103, 7105, and -- I am sorry -- 2.103, and 2.105, and  
13 2.703?

14 We very much would welcome your help in outlining  
15 for us what authority you feel we have here, and especially  
16 as to the interaction of 104 and 105 and 703. So I will  
17 give you some time to consider that, and we can go, I think,  
18 at this time -- unless you want to clarify your petition  
19 further.

20 MS. SHELDON: Why don't I do that briefly, so  
21 I leave in your minds a clear idea of what we are getting  
22 at?

23 CHAIRMAN FARMAKIDES: What we will do following  
24 that is let them respond to your petition, and you can  
25 reply to them.



1 All right. Okay.

2 MS. SHELDON: Really, the argument can be stated  
3 very simply. It is rather an equitable, fundamental due  
4 process argument. The Commission has, through its  
5 regulations and through its policy, granted persons whose  
6 interests are affected by their proceedings the right to  
7 intervene, and participate. This is a rather fundamental  
8 right.

9 CHAIRMAN FARMAKIDES: All proceedings?

10 MS. SHELDON: All proceedings, unless otherwise  
11 specifically specified. This is the right that exists on  
12 the one hand.

13 On the other hand, that right, in order to be  
14 exercised by persons who are eligible to exercise that  
15 right, must be an informed one. In other words, the right  
16 without a notice of the existence of that right is meaning-  
17 less, and the notice which the Commission provides through  
18 the Federal Register indicating when hearings are going to  
19 be held, and unless in the Federal Register notices,  
20 specified statements are included to tell people that they  
21 have a right to intervene and tell them what procedures are  
22 to be followed, then the rights themselves are unable to  
23 be exercised and are, as we said, therefore, meaningless.

24 CHAIRMAN FARMAKIDES: You are saying the rules as  
25 published by the Commission are not an effective means of

1 putting people on notice as to their rights?

2 MS. SHELDON: I would venture to say very few  
3 people, members of the public, whom I generally represent  
4 in proceedings of this kind, have access to the Code of  
5 Federal Regulations or would have familiarity with it. Most  
6 of them are not represented by counsel. They learn of these  
7 things through newspapers and through the Federal Register.

8 Thank you.

9 CHAIRMAN FARMAKIDES: Sir?

10 MR. KINSEY: Two points which are contained in  
11 our response which we filed with you this morning:

12 The first point is that we do not believe that  
13 either 2.104 or 2.703, which govern the issuance of notices  
14 of hearing, requires any explicit statement inviting interested  
15 persons to intervene in these proceedings. The regulations  
16 are clear on their face under 2.714 in the Atomic Energy  
17 Act of 1954, which is exclusively clear that any interested  
18 person whose interests may be affected by a proceeding may  
19 petition to become a party to that proceeding.

20 CHAIRMAN FARMAKIDES: Is that your response to  
21 Ms. Sheldon's comment that rules are really not available  
22 and they cannot act as proper notice as to the right of  
23 petitioner to intervene?

24 MR. KINSEY: Yes. In that regard, I might say  
25 the rules are available, but are not available normally to

1 persons who wish to intervene.

2 CHAIRMAN FARMAKIDES: Proceed.

3 MR. KINSEY: Insofar as their argument on Section  
4 2.105 requiring notice of proposed action and also pursuant  
5 to that provision requiring specific language inviting  
6 persons to intervene, it is the Staff's position that this  
7 section is inapplicable to the instant proceeding in that  
8 this is a hearing required under the act and therefore there  
9 would be notice under 104.

10 CHAIRMAN FARMAKIDES: Come back again on that.

11 You are saying this is a proper hearing under 2.104?

12 MR. KINSEY: That's correct, sir, and therefore  
13 it is a hearing required pursuant to the Atomic Energy Act.  
14 Section 2.105 concerns notices of proposed action.  
15 That is, prior to the Director of Regulation taking action  
16 in granting the license, he publishes a notice in the Federal  
17 Register indicating he proposes to take this action.  
18 Specific language pursuant to 105 must be incorporated  
19 inviting the Applicant to request a hearing and inviting  
20 any interested person whose interests may be affected by  
21 the granting of a license or an amendment also the right to  
22 petition to intervene and request a hearing.

2

2325

1 CHAIRMAN FARMAKIDES: Mr. Kinsey, let me be clear  
2 here. Under 2.104A, "In the case of an application on which  
3 a hearing is required by the Act," is this proceeding required  
4 by the Act?

5 MR. KINSEY: I believe so, sir.

6 CHAIRMAN FARMAKIDES: What part of the Act?

7 MR. MURRAY: Section 189.

8 CHAIRMAN FARMAKIDES: So you are maintaining this  
9 proceeding is required by the Act?

10 MR. MURRAY: Yes, sir.

11 CHAIRMAN FARMAKIDES: All right. I am sorry.  
12 Proceed, sir.

13 MR. KINSEY: That basically is the point, or  
14 the two points, contained in our response. Notwithstanding our  
15 arguments with respect to the petitioner's arguments, Staff  
16 would interpose no objection should the Board determine that  
17 as a matter of policy that a supplementary notice of hearing  
18 should issue.

19 CHAIRMAN FARMAKIDES: By whom?

20 MR. KINSEY: We also believe in this regard that  
21 the Board under the notice of hearing issued by the Commission  
22 would have jurisdiction to issue such a notice in that you  
23 now have jurisdiction over this case, and by the same token  
24 you also have jurisdiction to set time, place and date.

25 CHAIRMAN FARMAKIDES: In other words, you are

1 suggesting that this Board could very easily issue an order  
2 in which we -- a prehearing conference order, for example,  
3 in which we narrate what has happened today, and in which we  
4 then advise the public that petitions to intervene will be  
5 accepted up to three days from that notice.

6 Once that happens, that would, in fact, then be --  
7 supplement the actual notice of hearing issued by the  
8 Commission?

9 MR. KINSEY: That is right.

10 CHAIRMAN FARMAKIDES: All right. Anything else,  
11 Mr. Kinsey?

12 MR. KINSEY: No.

13 CHAIRMAN FARMAKIDES: Mr. Irvine?

14 MR. IRVINE: As the Applicant here, we want to  
15 be in the position that whatever is done by this Board is  
16 done in a lawful sort of way. We don't want to be in the  
17 position of going up to appeal on some kind of notice  
18 technicality, so to speak.

19 However, we do feel that we agree with the Board's  
20 position that this is a hearing required by law, and that the  
21 notice of this under Section 104 has been given and is proper.

22 CHAIRMAN FARMAKIDES: Are you saying you agree with  
23 the Staff's position?

24 MR. IRVINE: Yes, I agree with the Staff's position  
25 on that. Therefore, we feel the notice has been given, that



1 the notice is proper.

2 I do not know that I necessarily agree with the  
3 Staff's position that this Board may now give a new notice  
4 or order a new notice, although I suppose that you may order  
5 done almost anything that you desire to have done. But in  
6 order to give this Board authority, the notice has to be  
7 published, and then the Board is appointed, as I understand  
8 the regulations. So that the Board becomes a functioning body  
9 as a result of the requests for hearing and the publication of  
10 the notice.

11 So, therefore, I am not certain that the Board,  
12 therefore, has the authority to go back and to say the notice  
13 was improper and, therefore, new notice must be issued.

14 CHAIRMAN FARMAKIDES: Thank you, sir.

15 Ms. Sheldon, would you like to respond now, or do  
16 you want a couple more minutes?

17 MS. SHELTON: This is fine. I trust these comments  
18 will be responsive.

19 To begin with, Mr. Chairman, it is our position  
20 that the Section 2.104 notice of hearing is not applicable  
21 to these proceedings.

22 Section 2.105 is.

23 For this reason, the Section 2.103 gives the  
24 Applicant the right to demand a hearing if he so wishes,  
25 after the Director of Regulations has taken initial action.

1           The hearing is at the option of the particular  
2 licensee involved. He does not have to demand if it he does  
3 not wish to.

4           Consequently, I don't feel this makes this a hearing  
5 which is required under the Act.

6           Now, our view of what is a hearing which is  
7 required under the Act is one which is set forth as absolutely  
8 required. It must take place. It is not the option or within  
9 the discretion of any party to hold or not to hold a hearing.  
10 It is specified as one which must take place.

11           In this case, if Kerr-McGee had not demanded a  
12 hearing we wouldn't be here today. Therefore, we don't feel  
13 2.104 applies, but 2.105 does apply because this hearing is  
14 not required by the Act.

15           CHAIRMAN FARMAKIDES: To that point, isn't that  
16 point moot if we accept the Staff's suggestion that all we  
17 need do at this point in time is to issue an order which out-  
18 lines an opportunity for the public to petition to intervene  
19 say thirty days from the date of that order?

20           Doesn't that accommodate your position?

21           MS. SHELDON: Certainly.

22           CHAIRMAN FARMAKIDES: Then the position of whether  
23 this is a 104 or 105 is no longer pertinent, if you agree with  
24 the Staff's position on the authority of this Board to issue  
25 an order in which we permit petitions to intervene for thirty

1 days.

2 MS. SHELDON: The important thing to us is granting  
3 persons whose interests are affected the right to intervene,  
4 or notifying them that this right exists. We would accept the  
5 order of the Board or reissuance of the notice on this matter  
6 as an appropriate response, regardless -- this is not as  
7 critical to the argument as the question of exercising.

8 CHAIRMAN FARMAKIDES: You can appreciate our  
9 position. If we can solve a problem at one level, there is no  
10 sense going to a different level.

11 MS. SHELDON: Yes.

12 CHAIRMAN FARMAKIDES: It seems to me the Staff is  
13 in agreement with the Natural Resources Defense Council, and  
14 the Applicant stated at one point that it also agreed with  
15 Staff's position, and then it went on to perhaps disagree to  
16 a certain extent.

17 Is there anything further with respect to these  
18 points made by Ms. Sheldon, Mr. Kinsey?

19 MR. KINSEY: I would concur in your remarks that if  
20 we can resolve it at one level, there is no need to take it  
21 to another.

22 Again, our position is that we would have no  
23 objection in this instance to the Board taking what action is  
24 deemed necessary.

25 CHAIRMAN FARMAKIDES: Without joining issue on 104

1 and 105?

2 MR. KINSEY: Correct.

3 MS. SHELDON: Mr. Chairman, may I ask you, then, if  
4 the suggestion of an order is the solution?

5 CHAIRMAN FARMAKIDES: This is going to be a Board  
6 action, and it isn't mine, and I haven't talked to my colleagues  
7 yet.

8 It seems to me that if you two in essence -- and I  
9 think you have agreed in essence that this would be proper  
10 notice or sufficient notice for your purposes, this would be a  
11 very preferred course of action.

12 Now --

13 MS. SHELDON: The only thing that troubles me about  
14 that -- and this is -- I don't know what the immediate scope of  
15 this proceeding is -- what will happen the next time around?

16 CHAIRMAN FARMAKIDES: What do you mean?

17 MS. SHELDON: If a situation of this kind arises  
18 again and the notice is put in the Federal Register and does  
19 not contain what we feel is the requisite information, if we  
20 will have to proceed once more on this.

21 CHAIRMAN FARMAKIDES: Well, if you are suggesting  
22 this is a good test case for you to take up, that will be your  
23 decision to make, but in terms of this Board we are here to  
24 resolve an issue.

25 MS. SHELDON: That is the only thing that troubles

1 me.

2 CHAIRMAN FARMAKIDES: Well, you will have to think  
3 about that.

4 MS. SHELDON: We feel the Staff's position and  
5 ours is close enough so that no further difficulty is ahead  
6 of us.

7 CHAIRMAN FARMAKIDES: In view of that, I was going  
8 to ask for briefs this morning. I read the petition, of  
9 course, and I wasn't quite sure to whom it was addressed or  
10 whether it was properly before us, but assuming it was it  
11 doesn't appear I now need briefs, unless you people think you  
12 want to file briefs.

13 MR. MURRAY: Of course you have our position,  
14 Mr. Chairman, in the response to the petition.

15 CHAIRMAN FARMAKIDES: I haven't read it yet,  
16 Mr. Murray.

17 MR. MURRAY: That constitutes our brief and legal  
18 argument, demonstrating our views.

19 CHAIRMAN FARMAKIDES: Do the other two parties  
20 want to file a paper here?

21 MR. IRVINE: We received this rather late, and I  
22 was away from Oklahoma City yesterday and over the weekend,  
23 so I have not had an opportunity to prepare anything.

24 If you would like, we would be happy to prepare  
25 a response along the lines we have suggested.



1 CHAIRMAN FARMAKIDES: No, sir. I am just asking  
2 you if you wish to respond to it.

3 I think at this point in time I feel confident  
4 that we have enough information here to resolve the issue.  
5 But I am asking you if you would like to respond to the  
6 petition to require litigation filed by the National  
7 Resources Defense Council.

8 No?

9 MR. IRVINE: No.

10 MS. SHELDON: Mr. Chairman, if you would like a  
11 more complete statement of our reasons and perhaps a more  
12 detailed response to your questions this morning, I would be  
13 happy to provide you with that.

14 CHAIRMAN FARMAKIDES: Ms. Sheldon, I welcome that.  
15 It appears to me again that if you and the Staff are so close  
16 perhaps you are really in agreement and the application is  
17 basically in agreement.

18 I don't see that we have to beat a dead horse, and  
19 I think we can resolve it very easily.

20 I have to talk to the other members to see if  
21 this is a Board position or merely a proposal.

22 Is there anything further on this petition?

23 (No response.)

24 Thank you.

25 Let me, Ms. Sheldon, ask one more thing. Assuming

1 we go that route, do you have any advice to give the Board as  
2 to whether or not you would petition to intervene?

3 MS. SHELDON: Not at this point I don't. I know  
4 the National Resources Defense Council has been very  
5 interested in the question of disposition of nuclear waste  
6 materials and has been involved in other proceedings on this  
7 issue.

8 I also know they are collecting information on this  
9 particular issue and are seeking to be as informed as  
10 possible.

11 That will be a decision which they will have to  
12 make themselves, and most likely if they do, they will  
13 intervene on their own behalf, since most of their  
14 members have lawyers.

15 I would assume that intervention would be made  
16 by one of their own counsel.

17 CHAIRMAN FARMAKIDES: Let's make the assumption  
18 that they do intervene. How much discovery time would you  
19 need?

20 MS. SHELDON: I have not looked at the materials.  
21 That I really am not in a position to say. I really don't  
22 know what they have, or how long they would need to do that.

23 CHAIRMAN FARMAKIDES: All right. Let's make  
24 certain assumptions just to be certain that the record is  
25 ample for our consideration, the Board's consideration.

1 This is August 14. Assuming an order of the time  
2 we are talking about issues in a couple of days, let's say just  
3 for using round numbers August 20, then thirty days will  
4 expire September 20, on or about September 20.

5 Perhaps then we will be able to respond to any  
6 petitions to intervene within a matter of a week or two weeks.  
7 So that means we will be prepared to proceed with a second  
8 prehearing conference, if necessary, October 15, the week of  
9 October 15.

10 We then would be able to go to evidentiary hearing,  
11 assuming no time for discovery, within a couple of weeks.

12 Assuming time for discovery, I would think we would  
13 be going into December.

14 MR. MURRAY: Mr. Chairman, one of our principal  
15 witnesses is a professor of geology at the University of  
16 Missouri. He starts back to school on the 27th. It looks like  
17 he will be out for Christmas vacation at the time this hearing  
18 goes forward.

19 CHAIRMAN FARMAKIDES: Do you have any suggestions,  
20 Mr. Murray?

21 MR. MURRAY: I suggest that the Chairman give  
22 consideration to cutting down on the period you are talking  
23 about, the thirty-day period for interventions.

24 If NRDC wants to intervene, it seems to me they  
25 are on actual notice. There is no question about that.

1 CHAIRMAN FARMAKIDES: Yes. We could certainly ask  
2 NRDC that if they wish to intervene they commence informal  
3 discovery immediately.

4 MR. MURRAY: And the public document room is  
5 filled with materials on this proceeding, as you know.

6 CHAIRMAN FARMAKIDES: Let me put NRDC on notice. If  
7 you do wish to intervene I think you should begin informal  
8 voluntary discovery at the earliest time and that you could  
9 petition to intervene at an early moment so that we can  
10 proceed without delay.

11 Mr. Murray, I am not thinking of NRDC, but with  
12 respect to the position with respect to the public, are you  
13 suggesting that we give less than thirty days' notice?

14 MR. MURRAY: I am suggesting that the public is  
15 already on notice as of the notice of hearing that was filed  
16 in the Federal Register in this proceeding, fully on notice in  
17 conjunction with the Atomic Energy Act and the regulations,  
18 and any additional notice that the Board deems appropriate  
19 to give will be simply a gratuitous notice.

20 CHAIRMAN FARMAKIDES: That is contrary to the  
21 position stated earlier.

22 MR. MURRAY: No, sir. We have no objection to the  
23 notice. It is not contrary to our view, as the filing made  
24 clear. Therefore, the opportunity should be taken to cut  
25 down the period of notice given.

jon12

1           We are all in favor of notice, and we think it has  
2       been adequate. We don't think thirty days' additional notice  
3       is required.

4           MS. SHELDON: The problem is that without specifying  
5       that persons have a right to intervene, the notice falls short  
6       of putting persons on notice that they have to get busy with  
7       discovery and participate.

8           If they don't know that they have a right to do so,  
9       how can they exercise that? And cutting down that time  
10      period certainly in our view is an abrogation of the rights  
11      that we are trying to establish.

12          Now, our concern is not with NRDC alone, although  
13      I am representing them here. Our petition was for all the  
14      members of the public, particularly people in the area of  
15      concern in Oklahoma, that they receive proper notice which  
16      advises them that this hearing is going to be held and tells  
17      them how they can become involved if they feel their interests  
18      are going to be affected thereby.

19          We feel this is legally required, and we would like  
20      to see every possible step taken without dragging this hearing  
21      out intolerably to provide the right time of notice, which  
22      not only includes the fact that a hearing is going to be held,  
23      but a statement of participation and procedures and so on.

24          CHAIRMAN FARMAKIDES: I understand your position,  
25      Ms. Sheldon.



1 MR. IRVINE: Let me address myself to this one more  
2 time. Equity cuts both ways, and Kerr-McGee now has followed  
3 through with every procedure possible in order to bring this  
4 thing to as early a hearing as we possibly can do.

5 Now, we are looking three more months down the line  
6 for the continuation of this hearing.

7 Now, quite frankly, the people who are interested  
8 in Oklahoma are quite well aware of the situation that has  
9 been developed. It has been taken through the Oklahoma  
10 Public Health Service, the Oklahoma Public Health Service, the  
11 Oklahoma Water Resources Board, the state agencies who are  
12 particularly interested in this aspect of this matter, or the  
13 disposal of wastes in deep wells.

14 It has also been before our Corporation  
15 Commission and that is a great deal to do with the disposal  
16 of underground wastes by oil wells.

17 As a consequence, these people are well aware of  
18 this, and as a matter of fact I was asked to present today  
19 a letter from the Oklahoma Public Health Service to go as a  
20 part of the record in here in which they recognize and are  
21 aware of this.

22 So I think that to go back now and to say we must  
23 issue an order and notify the public at large that they have  
24 a right to intervene would be not necessarily contrary to the  
25 spirit, but certainly contrary to the exact language of the

1 regulations.

2 CHAIRMAN FARMAKIDES: Mr. Irvine, excuse me, sir.  
3 How would the thirty-day delay affect adversely the Kerr-McGee  
4 Corporation?

5 MR. IRVINE: Well, sir, we have several pits out  
6 there in which we are now under temporary license from the  
7 AEC disposing of this material. If it is at all possible, we  
8 need to get those pits emptied out.

9 We have had a lot of rain in Oklahoma this year  
10 and we need to get started emptying these pits into the well  
11 if it is at all possible.

12 An additional three months' delay gives us that many  
13 more problems that we have to deal with from a physical stand-  
14 point.

15 CHAIRMAN FARMAKIDES: Can you be more specific?  
16 What does this mean in terms of your time schedules, your  
17 costs? Do you have any information in hand that you can supply  
18 the Board?

19 MR. IRVINE: I did not have specifically the costs  
20 at hand, but it will mean within a short period of time that  
21 we either are going to have to dig additional pits at  
22 considerable cost on there to temporarily handle these wastes,  
23 unless we can get some sort of relief to put them into this  
24 well.

25 Now, I can get you those, and I will submit those

1 to you if you desire.

2 CHAIRMAN FARMAKIDES: I think we have had enough  
3 information provided to us on this point. Let's now go to the  
4 second point which is perhaps more substantive, and that is  
5 the question of adequate documentation for the record.

6 Dr. Babcock has a number of questions on which he  
7 wishes to clarify, and I think it is terribly important that  
8 the Applicant take notes.

9 I guess you will have the transcript, too, but  
10 it would seem that absent this kind of information the Board  
11 will not have a sufficient basis on which to make a finding.

12 Also, the Staff is going to be asked to supply  
13 certain documentation.

14 Dr. Babcock?

15 DR. BABCOCK: I assume that Kerr-McGee is placing  
16 major reliance on the fact that this well will, or will not  
17 be a satisfactory mechanism for the disposal of the wastes.  
18 Major reliance is being placed upon the tests in which you  
19 pump water down the well. You have got the response to this  
20 pumping by shutting the thing off and measuring the decay  
21 of the pressure. Then you submitted certain data to  
22 a computer, and you attempted to duplicate the pressure  
23 responses that you had made.

24 CHAIRMAN FARMAKIDES: We are quoting from  
25 documentation that has been available to us and is now in

1 the record.

2 MR. IRVINE: You are quoting from Mr. Gruy's report,  
3 Exhibit A to our application?

4 DR. BABCOCK: Yes, Exhibit A.

5 Yes. I believe it would be quite helpful to this  
6 Board if, at the next meeting, if Kerr-McGee would give some  
7 kind of resume of experimental work that was done and the  
8 input that was fed to the computer and how they took this  
9 input and arrived at the conclusions that you present.

10 In other words, I have difficulty, and I believe  
11 the other members of the Board also have difficulty, in  
12 seeing how the data that was given can be translated into  
13 the conclusions that you came up with.

14 In other words, we want to be a little more  
15 knowledgeable about the process that you people went through.

16 MR. IRVINE: Mr. Farmakides and Mr. Babcock, is it  
17 permissible to interrupt you as we go along and perhaps  
18 clarify these things?

19 DR. BABCOCK: If you are asking me, yes.

1 MR. IRVINE: Sir, both the Staff attorneys and  
2 myself have conferred in connection with this matter, and  
3 although we are aware of the fact that the regulations provide  
4 that testimony will be submitted in written form, we had both  
5 felt that testimony in this instance might better be given in  
6 verbal form, and it was our intention to give an extensive  
7 verbal testimony in connection with this very matter.

8 We would, I suppose now would be as good a time as  
9 any to find out whether this would be an acceptable matter or  
10 not.

11 CHAIRMAN FARMAKIDES: I would like to know why.  
12 I prefer written testimony. I think it makes good sense. It  
13 helps the Board move, and provides the technical members with  
14 sufficient time to absorb the material before the fact, and  
15 we can then cross-file, I think, more effectively.

16 Is there a reason why you are suggesting oral  
17 testimony? Is there a problem you have?

18 MR. IRVINE: Not a specific problem. We intended  
19 to bring Mr. Gruy here to explain the system he used and how  
20 he did it, and we felt he could explain it more fully by  
21 verbal testimony.

22 CHAIRMAN FARMAKIDES: Why couldn't he do it in  
23 written testimony?

24 MR. IRVINE: You can do almost anything in written  
25 form that you could verbalize, but I felt the testimony would be



1 more effective, would answer specific questions.

2 CHAIRMAN FARMAKIDES: I would hope he would be here  
3 anyway, even if he presented written testimony.

4 Excuse me. (Pause.)

5 I think we prefer to go along with the rules and  
6 require written testimony, sir, and you can certainly  
7 summarize it orally, and I think that would be to the advantage  
8 of the Board and the parties, especially if we have an inter-  
9 vention. I think it would be very clear that written  
10 testimony is preferred.

11 Perhaps in order to expedite the hearing this  
12 morning, or the hearing conference here, Dr. Babcock might  
13 simply give you the areas in which we need clarification, and  
14 then you and the Staff could get together on those areas later  
15 and decide if there is any discovery needed. I don't see that  
16 there is any such need.

17 However, if we can proceed this way, I think we will  
18 save some time.

19 DR. BABCOCK: What I have given so far has been kind  
20 of a generality situation. I will now give you a few examples  
21 of the types of specific questions we would like to see  
22 delineated further.

23 Question one: What are the constants that were  
24 introduced into the simulation run?

25 Two: What are the variables that were then left to

1 be adjusted by the simulation operator?

2 MR. IRVINE: Dr. Babcock, I am trying to write these  
3 down.

4 CHAIRMAN FARMAKIDES: You will have the transcript.  
5 It is just for additional clarification.

6 MR. IRVINE: Thank you.

7 DR. BABCOCK: Question three: How accurate a fit of  
8 the simulator data to the actual data is required in order to  
9 say for sure that:

10 (a) The well casing does not have a leak that  
11 communicates to a vertical fissure and allows major escape of  
12 the waste water that eventually leaks to the surface?

13 (b) Let us assume that there is a quarter-inch  
14 pipe that penetrates the arbuckle formation. Would the  
15 leakage through this pipe be detected in the simulator test?

16 (c) How much leakage through the nearest fault can be  
17 detected or predicted by the simulator test? In other words,  
18 I am trying to get an idea of the magnitude of possible error  
19 in your conclusion that there is not major leakage.

20 Going to question four now: I note that the  
21 computer printout does not basically follow the pressure fall-  
22 off as measured. The computer printout falls off less slowly  
23 than the measured during the initial portion of the test. It  
24 falls off more rapidly than the actual test in the final  
25 portion.

1           The question I am asking you is, is that a  
2 significant item? Are you greatly concerned about that  
3 deviation which you did not discuss?

4           Question five: What is the significance of the  
5 continued divergence between the simulator and the actual data  
6 beyond the test duration, which I believe was something like  
7 150 hours. You are obviously concerned with many tens of  
8 thousands of hours, and if there is a divergence there at the  
9 end of 150 hours, does this affect the conclusions that you  
10 have given?

11           Question six: I note that you predict that there is  
12 a fault some 1100 feet from the well, but in the verbal  
13 description of faults, you say the nearest fault is  
14 approximately one mile away. I would like to have this  
15 divergence discussed.

16           MR. IRVINE: Pardon me, Dr. Babcock. Just to be  
17 specific, sir, what verbal discussion of this were we  
18 referring to, sir? I don't recall.

19           DR. BABCOCK: I am sorry. I was using verbal in the  
20 sense that it is words, not oral. I was speaking about this  
21 document (indicating), the engineering study by H. J. Gruy.  
22 That report mentioned the fact that there were known faults  
23 around the simulator test -- the simulator test predicted a  
24 fault at a further distance, and I wanted that explained.

25           MR. IRVINE: Fine. Thank you, sir.

1           DR. BABCOCK: The next set of questions is of a  
2 somewhat different nature, so I will take up this next set and  
3 we will start a new numbers system, because you will note  
4 they are not quite like the others.

5           These are really related to alternatives that might  
6 be something different than what you have proposed as your  
7 mechanism of putting this water down the well.

8           My question one is: Would an increase in the  
9 density of the injected fluid be helpful in keeping the water  
10 that is injected from eventually finding a way to the  
11 surface?

12           My point there is, I am wondering if the fact that  
13 the injected fluid would be more dense than the fluid that is  
14 there now, would that give it a vector to go down as opposed  
15 to a vector to go up in the present situation?

16           If this has any merit at all, I would like to have  
17 some kind of a discussion of the cost of doing this kind of  
18 thing.

19           If the mechanism of increasing the density of the  
20 water that you considered turned out to be evaporation, which is  
21 the most obvious way of doing it, would the reduction in the  
22 amount of water that you got in order to increase the density,  
23 would the reduction be helpful in your well injection  
24 procedure?

25           I believe that is a sample of what I am talking

1 about. Just a moment. (Pause.)

2 Mr. Farmakides thought my last question was not  
3 quite as precise as it ought to be.

4 When I say would it be helpful, what I meant was  
5 would there be benefits accrued to the Kerr-McGee operation  
6 by reducing the volume one third in addition to the benefit  
7 that you would get if you did increase the density?

8 MR. KORNBLITH: I don't have questions as finely  
9 honed as Dr. Babcock, but I would like to make one point that  
10 we were talking about before. The Board members, at least  
11 one of the Board members, had a good technical background, but  
12 not related to the areas of petroleum engineering, well  
13 evaluation, and this sort of thing, and we would -- or I  
14 would -- like to see included in this written testimony we have  
15 discussed enough material to give a person with a reasonable  
16 but not specialized technical background an appreciation of how  
17 one goes about evaluating the performance of a well as it  
18 affects this application.

19 I think this sort of thing is the sort of thing  
20 that I might want to read once or twice before I come into  
21 the hearing, rather than to rely upon having to absorb it  
22 orally while I am sitting here, and I think this is basically  
23 the reason why the Board has asked that this testimony be put  
24 in writing.

25 I am sure there will be a number of detailed



1 questions during the hearing that by their nature have to be  
2 answered orally, but I think what I was referring to basically  
3 is background material, which we would like to have in written  
4 form.

5 In addition to the types of areas that Dr. Babcock  
6 has been addressing, I feel we need some additional information  
7 from the Staff in order to relate their conclusions to the  
8 material that has been provided in the record. We have a  
9 substantial amount of data that the applicant has submitted  
10 that Dr. Babcock has been discussing. We have some rather  
11 short, brief evaluations of these data by the Staff consultants,  
12 and we have some ultimate conclusions by the Staff, but we  
13 don't have much that serves to connect these three things.  
14 This is one of the things the Board would like to see.

15 Thank you. That is all I have.

16 CHAIRMAN FARMAKIDES: Do you have any questions of  
17 the Board we could be helpful on?

18 MR. IRVINE: May I ask, Mr. Kornblith, is the  
19 information that you are particularly interested in in  
20 connection with wells the method, general methods of operation  
21 of disposal wells?

22 MR. KORNBLITH: I am concerned more with the  
23 question of methods of determining the suitability of a well  
24 for disposal purposes.

25 MR. IRVINE: That helps me. Thank you.

1 MR. KORNBLITH: How one gets from the physical data  
2 that one can measure to an understanding of the performance  
3 of the well, disposal well.

4 MR. IRVINE: Thank you.

5 MR. KINSEY: Mr. Chairman?

6 CHAIRMAN FARMAKIDES: Mr. Kinsey?

7 MR. KINSEY: This may be premature in light of our  
8 earlier discussions concerning the petition.

9 Do you want to discuss document stipulation at this  
10 point?

11 CHAIRMAN FARMAKIDES: I don't know that it is neces-  
12 sary to discuss them, if you people get together and agree.  
13 That is perfect. We can do it as soon as you are ready to  
14 submit it. That will be fine with us, or perhaps if we do go  
15 along with the resolution of the issue posed this morning by  
16 giving 30 days' notice, and if we do that, I have been looking  
17 at the calendar, and now I see that if we issued an order today  
18 or tomorrow with respect to the resolution of the issue, and  
19 this gives the assumption that for purposes of planning we  
20 do give 30 days, and then that 30 days expires on September 14,  
21 we could then have another prehearing conference that could  
22 occur the very next Monday or Tuesday, September 18, and that,  
23 then, would indicate that we could go to an evidentiary  
24 hearing, I would feel, within a very short period of time  
25 thereafter, unless there is a real reason why discovery has

1 got to be implemented.

2 MR. IRVINE: Yes, sir.

3 CHAIRMAN FARMAKIDES: How does that schedule meet  
4 with the approval of the parties, or with your disapproval?

5 MR. IRVINE: It certainly meets with our approval  
6 a great deal more than thinking about some time in December.

7 CHAIRMAN FARMAKIDES: Fine.

8 Mr. Kinsey?

9 MR. KINSEY: That is agreeable with us.

10 CHAIRMAN FARMAKIDES: Of course, this all depends  
11 on what happens when the notice goes out.

12 MR. KINSEY: I might add in that regard, insofar as  
13 discovery would be concerned, there is, I have to say, not that  
14 much documentation entailed in this as opposed to other types  
15 of proceedings.

16 CHAIRMAN FARMAKIDES: This additional time may well  
17 be helpful in the applicant's ability, or his opportunity to  
18 resolve questions posed by Dr. Babcock.

19 MR. IRVINE: I might say, not only the opportunity,  
20 but the absolute necessity to do so.

21 CHAIRMAN FARMAKIDES: All right. We feel the same  
22 thing. We felt the record had to be documented more.

23 MR. IRVINE: It would take us more time than  
24 between now and the hearing data now set to do it adequately.

25 CHAIRMAN FARMAKIDES: I think what we will do -- is

1 there anything further, gentlemen?

2           What we will do is recess. The Board will continue  
3 its thinking on the matter and come up with a resolution this  
4 morning or this afternoon, and we will issue an order as  
5 quickly as possible, probably today or tomorrow. Then that  
6 order will govern the proceedings.

7           It would seem to me that in view of the questions  
8 posed by Dr. Babcock and Mr. Kornblith that the 27th of August  
9 date is unrealistic, and we perhaps should abandon it in any  
10 event.

11           Is that agreeable with the parties?

12           MR. IRVINE: Yes.

13           CHAIRMAN FARMARIDES: All right.

14           So, let's consider the hearing scheduled now for  
15 the 27th and 28th could be canceled, and we will come out with  
16 another date for that hearing.

17           We have one more request to make.

18           DR. BABCOCK: The operation we were just describing,  
19 pumping water down the hole, stopping the pumping and allowing  
20 the decay of the pressure to take place, and then put on  
21 a simulator, is a relatively well understood and relatively  
22 common technique for chemical engineers to analyze. This is  
23 similar to a radioactive decay. In other words, it is a decay  
24 to a steady state.

25           MR. IRVINE: Yes.

1 DR. BABCOCK: The methods used for analyzing radio-  
2 active decay or other diffusional operations, those that decay  
3 to a steady state, are well recognized by chemical engineers,  
4 and you can draw straight lines, for example, through various  
5 portions of the data and can draw conclusions from these  
6 straight lines.

7 I was wondering if Kerr-McGee had done such an  
8 analysis of the data, and if they have, would they present that,  
9 also.

10 MR. IRVINE: Yes, sir.

11 DR. BABCOCK: In other words, I want the first order  
12 analysis of the data on graph form using appropriate equations  
13 or appropriate scales that are different from the linear  
14 scale that you showed me.

15 MR. IRVINE: Yes, sir.

16 CHAIRMAN FARMAKIDES: Is there anything further?

17 MR. IRVINE: Yes. May we address ourselves to the  
18 earlier requests on framing a joint statement of the issues?

19 Both the Staff and myself have visited in connection  
20 with this matter, and I am not at all sure that we can frame  
21 anything that really says it much better than the issues are  
22 stated in the notice here.

23 CHAIRMAN FARMAKIDES: We can't litigate on those  
24 issues; they are so broad.

25 MR. KINSEY: Not the issues for the Board to resolve,



1 sir.

2 MR. IRVINE: On page 2 of the notice.

3 MR. MURRAY: On page 2.

4 CHAIRMAN FARMAKIDES: Right, but they are so broad.

5 I think you can join issue on much more specific facts or  
6 points than the general issues posed on page 2.

7 Off the record.

8 (Discussion off the record.)  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

2325  
End 3

#4

arl

1 CHAIRMAN FARMAKIDES: Back on the record.

2 Is there anything further, gentlemen?

3 MR. IRVINE: What timing are we looking at for  
4 the submission of written testimony? Or will that be  
5 decided at the next prehearing conference?

6 CHAIRMAN FARMAKIDES: We could certainly do it  
7 at that time. I feel the very best way to get a proceeding  
8 underway and get it concluded to the satisfaction of all the  
9 parties and the Board is to let the parties make as many  
10 decisions as possible, consistent, of course, with the  
11 desire of the Board to develop a full and complete record.

12 If you people get together and come up with a  
13 proposed schedule, that would be very welcome by the Board.  
14 As a matter of fact, we would be looking to you to suggest  
15 what is your best schedule for proceeding, and then in the  
16 light of what is convenient for you, the Board would then  
17 be able to also fit its schedule into your full schedule,  
18 if at all possible; and if not, we could certainly adapt  
19 a compromise schedule.

20 So what you can do in the course of you people  
21 speaking to each other, you can certainly develop a  
22 schedule that will meet your needs and will meet the rules.  
23 The Staff has certain commitments under the rules.  
24 You can present that schedule to us. This has been done  
25 time and time and time again by licensing Boards and it

1 works very well.

2 If we do modify that schedule, it won't be very  
3 much, and that gives you tremendous flexibility coming up  
4 with a schedule that is agreeable to both parties.

5 Now, if other parties become involved, of course,  
6 you have to talk to those parties, too.

7 MR. KORNBLITH: In this particular case, the  
8 technical material we have submitted is a little outside  
9 the scope of the matters we normally consider in these hear-  
10 ings. It would therefore be helpful to the Board if we had a  
11 little more time to study and review that material before  
12 the hearing than we otherwise might have done.

13 MR. MURRAY: You are referring to the five-  
14 difficulty prescription?

15 MR. KORNBLITH: I think if we could have the  
16 material in our hands 10 days or two weeks before the  
17 hearings, it would be helpful.

18 CHAIRMAN FARMAKIDES: Yes. That is just a  
19 caution to you that when you prepare your proposed schedule,  
20 give us some time. Otherwise, we won't accept it or will  
21 modify it to suit what Mr. Kornblith indicated.

22 MR. IRVINE: We are not looking at a further pre-  
23 conference hearing until some time shortly after the 14th of  
24 September.

25 CHAIRMAN FARMAKIDES: If there is no petition to

1 intervene, we can go to hearing on the 14th of September.  
2 If there is, then what you said is out. If there is no  
3 petition to intervene, let's be very clear. We are ready to  
4 go to trial that week.

5 MR. MURRAY: We really won't know until the final  
6 day is up, and these folks file usually on the last day.

7 CHAIRMAN FARMAKIDES: Well, we will play it the  
8 way it occurs, you know.

9 MR. IRVINE: You do not anticipate a further pre-  
10 conference hearing unless there is a petition to intervene?

11 CHAIRMAN FARMAKIDES: That is right, unless you  
12 people can see a reason for it.

13 MR. IRVINE: I might state at this stage of the  
14 game that I have been furnished the copy of the list of  
15 documents that have been submitted by the Staff, and so far  
16 as that list is concerned, since there may not be a further  
17 pre-conference hearing, we would stipulate as to authenticity  
18 of those, unless you need that in writing.

19 CHAIRMAN FARMAKIDES: We would like to have it  
20 in writing, sir.

21 MR. IRVINE: All right.

22 CHAIRMAN FARMAKIDES: That will be fine, and the  
23 fact that you are aware of all those documents, and you  
24 have no objection to having them made available to us,  
25 we would appreciate that.

1           Could we have a copy of that, too, Mr. Kinsey?

2           MR. KINSEY: Yes.

3           CHAIRMAN FARMAKIDES: I appreciate receiving those.  
4           There is one more thing that I welcome in the hearings. I  
5           welcome communication between the parties. I think it is  
6           essential for an expeditious and an efficient hearing, and if  
7           you need me, if you need me either as a legal member or  
8           as Chairman of the Board, call me in a conference call and  
9           I will talk to you all. If you have any problem on discovery,  
10          call that. The telephone is a marvelous tool, and we can  
11          use it.

12          MR. MURRAY: I have heard it called other things.

13          CHAIRMAN FARMAKIDES: I am aware of that, too. &

14          MR. KINSEY: One final question: In the possi-  
15          bility that we may not have another prehearing conference,  
16          and that is, the Staff would like to reserve the right to  
17          qualify and use a technical interrogator during the course  
18          of the proceeding.

19          CHAIRMAN FARMAKIDES: I have found that that  
20          helps a lot. We lawyers have -- some people say we lawyers  
21          have limitations, you know.

22          MR. IRVINE: Obviously a mistake.

23          CHAIRMAN FARMAKIDES: Gentlemen, thank you very much.  
24          This will conclude the prehearing conference.

25          (Whereupon, at 11:18 a.m., the conference was  
adjourned.)



Blueprint

with

-  
Original