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L. C. Rouse, Chief
Fuel Cycle Licensing Branch #1

ENVIRONMENTAL CONSIDERATIONS RELATED TO KERR-McGEE NUCLEAR CORPORATION'S
REQUEST FOR AN EXEMPTION TO COMMENCE CONSTRUCTION IN ORDER TO ENLARGE THE
CAPACITY OF THE SEQUOYAH UF_6 PLANT FROM 5000 TPY TO 10,000 TPY

Kerr-McGee Nuclear Corporation is authorized to possess and use unlimited quantities of natural uranium for the purpose of conversion of ore concentrates to UF_6 at their Sequoyah UF_6 Plant under License No. SUB-1010. During 1974, it became apparent that the future growth of the uranium market and the requirement for the services supplied by the Sequoyah Plant would reach a level during 1978, which would make it advantageous for Kerr-McGee Corporation to enlarge the capacity of the Sequoyah Plant to 10,000 tons per year.

Several alternative expansion schedules were evaluated by Kerr-McGee to meet the December 1977 target date. An extended engineering and construction schedule commencing in June 1975, with completion in December 1977, was selected primarily because it would not require plant shutdown or layoff of plant operating personnel as would the alternative schedules. Furthermore, the selected schedule would require fewer construction personnel than the alternative schedules.

Kerr-McGee is aware of the requirements for a review pursuant to Part 51 and plans to submit the required environmental information the early part of July, 1975. However, because of an urgent need to meet the schedule discussed above, they have requested a specific exemption in accordance with 10 CFR 40.14, from the requirements of 10 CFR 40.31(f).

The process for production of UF_6 at the Sequoyah Facility has been in operation for approximately 5 years. The process utilizes the technology which has been proven by successful performance in various AEC (now ERDA) plants located in the United States. The Sequoyah process involves the preparation of pure uranium trioxide from the ore concentrate and dry chemical conversion to uranium hexafluoride. The following is a step-by-step description of production methods used at the Sequoyah Facility. The process involves (a) the feed preparation, (b) dissolution of ore concentrates in nitric acid, (c) purification of the uranium solution by solvent extraction, (d) denitration of the uranyl nitrate to prepare uranium trioxide, (e) hydrogen reduction of the uranium trioxide to uranium tetrafluoride by reaction with anhydrous hydrogen fluoride, and (g) formation of uranium hexafluoride by contacting uranium tetrafluoride

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with elemental fluorine.

We have reviewed the request considering and balancing the following factors as required by 10 CFR 40.14(b)(2):

A. Whether continuation of the activities will give rise to a significant adverse impact on the environment and the nature and extent of such impact, if any.

The majority of the expansion activities will involve the installation of facilities, equipment, piping, instrumentation and other apparatuses that are identical to existing equipment. Since the plant was originally constructed to provide for additional capacity, the majority of the process additions will involve the addition of unit processes in space provided in the initial construction. Following is a detailed description of each new addition:

1. A new 4,000 gallon digestion tank with a diameter of 8 feet 6 inches and a height of 9 feet will be required. The tank will be used for dissolving the ore concentrates and will be the same as two other existing digestion tanks.
2. A new pulse column measuring 30 inches in diameter and with 25 feet of contacting height will be required. The column will be used for re-extracting uranyl nitrate and will be installed adjacent to an existing column.
3. A new 4500 gallon raffinate hold tank measuring 9 feet in diameter and nine feet in height will be installed next to the two existing raffinate hold tanks. The design and function of the new tank, as well as the piping, instrumentation, and other apparatuses, will be identical to existing equipment.
4. A new 6,000 gallon stainless steel boildown tank measuring 10 feet in diameter and 10 inches in height will be required. It will have identical functions and design to two existing tanks.
5. Two additional denitrators will be installed for the conversion of uranyl nitrate to uranium trioxide. They will be identical to the two denitrators now in service, and their support equipment will be identical to present equipment.

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6. A new process line incorporating two additional 18 inch diameter fluid-bed reduction reactors and peripheral equipment will be required for the conversion of uranium trioxide to uranium dioxide.
7. Two 30 inch diameter fluid-bed hydrofluorinators and peripheral equipment will be required for the conversion of uranium dioxide to uranium tetrafluoride.
8. In order to convert UF_4 to UF_6 the following equipment will be added:
 - a. Two additional fluorination towers will be added in parallel with the existing three towers.
 - b. One additional cleanup reactor will be installed in parallel with the existing one.
 - c. Three additional cold traps will be installed to augment the existing three units.
 - d. An additional refrigerated water system will be installed to service the three new cold traps.
 - e. Additional bins, conveyors, piping and instrumentation will be installed.
9. For the blending and sampling of the product, two additional steam chests identical in function to the existing chest will be required to homogenize UF_6 in shipping cylinders for sampling.
10. A new cell room building measuring approximately 60 feet by 147 feet and 17 feet high will be required. The building will be designed identical to the original cell room, steel frame concrete block with a metal deck built up roof. The cell room will contain 30 production fluorine cells and will have the same chemical flows, piping, instrumentation and other appurtenances as the original cell room.
11. An ammonia tank (8 feet in diameter and 40 feet high) identical to the existing ammonia tank will be installed next to the existing tank.

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12. A new tank farm addition measuring approximately 50 feet by 50 feet and containing two new 8 feet by 40 feet, 15,000 gallon, horizontal stainless steel storage tanks for nitric acid, a duplicate of these in steel construction for anhydrous hydrofluoric acid, and an additional duplicate to these in polyvinyl lined steel for aqueous hydrofluoric acid will be required. The tanks will be provided with limestone pits, concrete containment dikes, piping, instruments and other appurtenances exactly like the existing tank farm.
13. A new fuel oil tank with a capacity of 30,000 gallons and measuring 18 feet in diameter by 18 feet in height will be required. The tank will be identical to an existing tank and will be equipped with the same instrumentation, piping, containment dike and other appurtenances as on the existing tank.
14. A new gas or coal fired 30,000 gallon boiler which is identical in appearance, instruments, and piping to the existing system will be required.

Construction activities are expected to produce only a relatively minor impact on the environment since the majority of the construction activities involve adding equipment inside existing structures. Except for the removal of approximately 500 yards of soil for piers and foundations and its disposal within the present area of the plant, no other significant disturbances to the environment are expected. No blasting or significant dust producing operations will be required.

B. Whether redress of any adverse environmental impact from construction can reasonably be effected should such redress be necessary.

As indicated above, the majority of the construction activities under this exemption involve adding equipment inside existing structures while the other construction activities are not expected to result in any significant environmental impact. Therefore, if an adverse environmental impact does result from construction, it should not necessitate major redress.

C. Whether commencement of construction would foreclose subsequent adoption of alternatives.

The alternative of constructing a completely new plant with its attendant site development requirements is not economically sensible since a significant greater cost would occur than expanding the present Sequoyah facility which was designed with consideration for expansion. Moreover, the construction of a completely new plant would have significantly greater adverse environmental effects than expanding the present facility.

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While the applicant does not discuss directly whether construction of the facilities prior to completion of the environmental review would foreclose the adoption of any alternative effluent treatment systems associated with the proposed activities, the environmental information to be submitted by early July, 1975, should leave ample time for review and recommendations by the staff on the adoption of alternatives.

D. The effect of delay in the commencement of construction on the public interest.

A delay of three months in construction may prevent the completion of the fluorine building before winter thus preventing the interior installation of piping and mechanical equipment before the spring of 1976. In addition, delay would require additional construction workers in an operating plant during 1976 and 1977 thus increasing the difficulty of detailed supervision and the probability of injury and might result in an interruption of operations during 1977. Furthermore, while a small impact, the employment of 24 construction workers in an area whose unemployment rate is 11.8% as compared with 5.9% for the total of the state of Oklahoma would be delayed.

In summary, it appears that:

1. In view of the type of construction involved, and the fact that the site is already committed to licensed fuel conversion operations, any adverse impact on the environment should be minimal and should be limited within the bounds of the site.
2. Redress of any adverse environmental impact from the construction could reasonably be effected should such redress be necessary.
3. Commencement of construction would not foreclose subsequent adoption of any alternatives.
4. Delay in commencement of construction would have an adverse effect on the public interest.

Upon consideration and balancing of these factors, we conclude that an exemption from the provisions of 10 CFR 40.31(f) should be granted to permit Kerr-McGee to commence construction in order to enlarge the capacity of the Sequoyah UF₆ Plant.

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for R. B. Chitwood, Chief
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