

BEFORE THE  
ENVIRONMENTAL QUALITY COUNCIL

**FILED**

STATE OF WYOMING

MAR 07 1984

Docket No. TFN 1 2/285

Ardelle M. Kissler, Clerk  
Environmental Quality Council

IN THE MATTER OF OBJECTIONS TO )  
A MINING PERMIT APPLICATION FOR )  
FMC WYOMING CORPORATION, )  
TFN 1 2/285 )

FINDINGS OF FACT,  
CONCLUSIONS OF LAW AND ORDER

Pursuant to notice duly given to all parties in interest, this matter came on for hearing on January 6, 1984, at 10:00 a.m., in the City Hall Council Chambers, Rock Springs, Wyoming. Mr. Edgar Langrand, a member of the Environmental Quality Council, presided as hearing officer.

The applicant appeared and was represented by Ms. Marilyn Kite. The protestant, Tenneco Minerals appeared and was represented by Mr. Michael Coriden. The Department of Environmental Quality, Land Quality Division appeared and was represented by Mr. Weldon S. Caldbeck, Assistant Attorney General.

With all parties participating in the hearing, the Environmental Quality Council having taken this matter under advisement and having been fully advised and having considered all the testimony and evidence submitted by the parties, now makes its Findings of Fact, Conclusions of Law and Order.

FINDINGS OF FACT

1. FMC Wyoming Corporation ("FMC") was issued a research and development license to conduct a pilot in situ trona mining project in December, 1980 in Section 36, Township 17 North, Range 110 West, Sweetwater County, Wyoming.

2. Operations began in August, 1981. The research and development program has continued until the present time.

3. An application for a commercial permit to conduct in situ mining of trona for the same project was filed in September, 1982, TFN 1 2/285. The Land Quality Division ("LQD") and the Water Quality Division ("WQD"), Department of Environmental Quality, ("DEQ"), reviewed the application, deemed the application complete in June, 1983, and the technical review was conducted.

4. In October, 1983, the DEQ gave notice to FMC that the technical review had been completed and to proceed to publication pursuant to W. S. Section 35-11-406(j).

5. Notice of the application was then published pursuant to W. S. Section 35-11-406(j) for four (4) consecutive weeks in the Rock Springs Daily Rocket Miner paper. On December 2, 1983, Tenneco Minerals Company filed an objection to the issuance of the commercial in situ permit. This hearing was conducted in response to that protest.

6. FMC proposes to commence commercial operations in 1984. The permit provides for Phase I of the operation to continue until 1995. At that time, FMC will provide an environmental report and, if necessary, make any mid-course corrections based upon data collected during the operation (Tr. 123). Phase II will commence upon completion of the environmental report and continue for the remainder of the life of the operation.

7. The geologic formations overlying the proposed production zone include the Bridger Formation, approximately 1,000 feet thick consisting of sandstones interbedded with

silt-stones and shale. The lower one-third of the Bridger Formation is low permeability shale. The Bridger Formation is underlain by the Laney member of the Green River Formation which consists of primarily shale material which is approximately 400 feet thick. Below the Laney member is the Wilkins Peak member which contains the trona beds. It is approximately 800 feet thick. Below the Wilkins Peak member is the Tipton/New Fork member which is approximately 100 feet thick and, again, low permeability shale (Tr. 147,148). These formations are relatively uniform and homogeneous throughout the region (Tr. 153).

8. These formations contain poor quality groundwater and have low permeabilities, yielding small amounts of water to wells (Tr. 158). Testimony by both FMC and Tenneco confirmed the low permeability and limited volume of water produced from these formations (Tr. 96 and 159).

9. FMC's hydrologic tests considered the aggregate permeability of all types of material within the zone tested. If joints and fractures had been encountered by the test wells, the results would reflect the hydrologic characteristics of those joints and fractures (Tr. 175). The aerial extent of individual tests varied from tens of feet to 500 to 1,000 feet from each well, depending on the zone of influence of the individual well (Tr. 164 and 165).

10. FMC used the test results to estimate the potential for migration of the mining solution in the three formations. It is estimated that the mining solution could migrate in the Bridger formation 500 feet in approximately 50 years. Migration would not occur in the Laney member because of inadequate pressure differentials. Based upon assumed conservative

values, migration in the Wilkins Peak member, including trona bed 17 in which Tenneco is currently mining, would be approximately 2 feet in 50 years (Tr. 174).

11. The current Tenneco mining operation is located approximately 5 miles from the FMC mining section and the Tenneco lease boundary is approximately 3 miles from the FMC operation (Tr. 119).

12. Testimony of FMC and Tenneco confirm that joints and fractures encountered in their respective underground mines do not yield significant amounts of water (Tr. 87 and 133).

13. Vertical joints and fractures within the area of the FMC and the Tenneco mine operation will not present a problem because they are discontinuous and short, seldom over a few hundred feet long (Tr. 216 & 240). These joints and fractures are usually contained within the trona bed and do not extend above or below (Tr. 245).

14. Bed 17, currently being mined by Tenneco, is approximately 200 feet higher at the Tenneco site than at the FMC test site. It is not feasible for significant quantities of mining solution to migrate uphill from the FMC site to the Tenneco property under the pressures which will exist (Tr. 225).

15. The monitoring program proposed by FMC and approved by LQD and WQD consists of numerous monitoring wells surrounding the production zone (Tr. 179). Because of the extremely low permeabilities, monitoring the pressure effects in the monitoring wells will provide an earlier detection of an excursion than monitoring chemical quality of the remote groundwater. (Tr. 180 and 252).

16. Monitoring the material balance, e.g., the amount of solution injected and the amount recovered, will assure that no significant fluid loss will go undetected. If the results of either the pressure tests or the material balance figures indicate problems, FMC can modify operations and the injected fluid will tend to migrate back into the production cavity created on the FMC site rather than in any other direction (Tr. 196 and 197).

17. Mine permit application documents reveal that FMC will continuously monitor wells SAP.2, SAP.12, SAP.14, SAP.17, other wells shall be monitored on a weekly basis during normal operations and more frequently during hydrofracing. Installation of additional wells will parallel the mining operation. (Mine plan B-15 - B-17).

18. Mine permit application documents reveal that FMC must report any pressure changes in the monitor wells which are outside of normal variations. Such pressure changes beyond normal variations would be:

- a.) 20 PSI for the Laney & New Fork members
- b.) 5 feet (water elevation) in the Bridger.

19. The approved production zone includes all trona beds in Section 36 with an initial 500 ft. buffer zone inside the perimeter of the mining section.

20. Tenneco presented no data or tests concerning the existence of hydrologically significant joints and fractures. Tenneco's evidence concerning permeability and hydrogeologic

conditions was consistent with the evidence presented by FMC.

21. Evidence did not establish that the FMC in situ operation will threaten or jeopardize Tenneco workers, mineral reserves or the reliability of Tenneco's source of supply.

22. The DEQ agreed that the FMC application is complete and adequate to protect the public health and the environment (Tr. 251). The LQD and FMC agreed that specific conditions with regard to monitoring balance and regulating hydrofracturing operations are appropriate (Tr. 253).

#### CONCLUSIONS OF LAW

1. The Environmental Quality Council has jurisdiction over both the subject matter and parties to this proceeding.

2. Due and proper notice of the hearing in this matter has been given in all respects as required by law and, specifically, by Section 35-11-406(k), Wyoming Statutes, 1977, as amended.

3. The FMC application is complete and contains the information required by W. S. 35-11-406 and W. S. 35-11-428.

4. Evidence did not establish that the FMC in situ operation, as proposed, would constitute a public nuisance or endanger the public health and safety. Evidence did not establish that the proposed in situ operation would cause any significant adverse effects outside the permit area.

5. With the conditions included as noted in the Order, the monitoring program as proposed by FMC will be in compliance with the requirements of W.S. 35-11-428 and 429, and Land

Quality Division rules and regulations.

ORDER

WHEREFORE, PURSUANT TO W. S. 35-11-112(c)(ii), IT IS HEREBY ORDERED THAT:

1. The Director of the Department of Environmental Quality and the Administrator of its Land Quality Division shall issue the permit, TFN 1 2/285, to FMC Wyoming Corporation to conduct an in situ trona mining operation in accordance with the approved mining and reclamation plan, the Wyoming Environmental Quality Act, and the rules and regulations promulgated thereunder.

2. Said permit shall set forth and be subject to the following conditions:

a.) FMC shall provide to the Land Quality Division all monitoring data on at least a bi-monthly schedule (every other month).

b.) Pressure changes in any monitoring well that is outside normal deviations, as described in Finding of Fact No. 18, shall be immediately reported (within twenty four hours) to the Land Quality Division. The Land Quality Division will promptly investigate such deviations.

IT IS FURTHER ORDERED that the Land Quality Division will incorporate into the permit any conditions determined appropriate and reasonable to monitor material balance and further regulate hydrofracturing operations.

DATED this 1st day of March, 1984.

ENVIRONMENTAL QUALITY  
COUNCIL

By: Edgar L. Langrand  
Edgar Langrand  
Hearing Examiner