BEFORE THE STATE OIL AND GAS BOARD OF ALABAMA

PURSUANT TO A DECISION RENDERED FOLLOWING A REGULAR SESSION OF THE STATE OIL AND GAS BOARD OF ALABAMA ON APRIL 17, 1985, THE FOLLOWING ORDER IS HEREBY PROMULGATED:

IN RE: ORDER NO. 85-101 DOCKET NO. 4-17-8526

This cause came on for hearing before the State Oil and Gas Board of Alabama on the petition of United States Steel Corporation, a foreign corporation authorized to do and doing business in the State of Alabama, requesting the State Oil and Gas Board to enter an order approving a horizontal borehole degasification project for the Oak Grove Coal Degasification Field, located in Jefferson and Tuscaloosa Counties, Alabama, and the Board finds that due, proper and legal notice of the hearing of said cause has been given in the manner and form and for the time required by law and the rules and regulations of this Board, and that due and legal proofs of publication of notice are on file with the Board, and that the Board has full jurisdiction of this cause, and the Board having heard the evidence of witnesses and argument of counsel and having taken the matter under advisement at its regular session, and being fully advised in the premises finds:

FINDINGS OF FACT

I.

That Petitioner has an active plan to conduct a horizontal borehole degasification project in the Oak Grove Coal Mine, in conjunction with underground mining operations at said mine, said project's objective being the degasification of coal seams in advance of mining operations in a manner that will allow Petitioner to sell occluded natural gas produced from coal seams; and

II.

That the procedures planned for the implementation of the horizontal borehole project are set forth in the attachment hereto labeled "Horizontal Holes in the Coal Seam for Underground Degasification"; and

III.

That approval of the aforementioned horizontal borehole project will prevent waste, protect coequal and correlative rights of all interested parties.

CONCLUSIONS OF LAW

Based on the Findings of Fact set forth hereinabove, IT IS, THEREFORE, HEREBY ORDERED, ADJDUGED AND DECREED by the State Oil and Gas Board of Alabama that the drilling and production of methane gas from horizontal boreholes drilled into the Mary Lee and Blue Creek Coal Seams in conjunction with underground mining of said seams by United States Steel Corporation within Unit I of the Oak Grove Goal Degasification Field is approved; provided, however, that the State Oil and Gas Board of Alabama does not assume jurisdiction over mining operations, and the Operator is subject to and shall comply with all relevant laws, rules and regulations of other State and Federal agencies which may be applicable to mining operations.

ORDERED this 7th day of May, 1985.

STATE OIL AND GAS BOARD OF ALABAMA

BY _____
Dr. Ralph W. Adams, Chairman

BY _____
Gaines C. McCorquodale, Member

ATTEST:

_____
Ernest A. Mancini, Secretary

HORIZONTAL HOLES IN THE COAL SEAM FOR UNDERGROUND DEGASIFICATION

1. DRILLING (See Drawing R-261)

   A. Equipment and Materials

      1. Drill-Acker "Big John" hydraulically driven-modified to include a guidance system developed for use by Methane Drainage Ventures (M.D.V.)

      2. Drill Steel- 5 or 10 foot core barrel type

      3. Drill Bits-3 1/4, 4 and 6 inch diameter

      4. Collar Guide

      5. Blow-out Preventer (Stuffing Box)-M.D.V. design

      6. Water Separator

      7. Wellhead Valve

      8. Wellhead and Transmission Pipe

      9. Automatically Operated Safety Valves

   B. Design and Procedure

      1. The drill will be a hydraulically powered permissible drill capable of drilling holes 3" to 6" in diameter. Hydraulic power will be provided to the drill from a remote electric power pack unit which can be up to 150' away. A water swivel will be attached to the drill to permit water to pass through the drill steel.

      2. The drill steel will be in regular 5'or 10' lengths.

      3. Drilling will be accomplished either by the rotating action of the drill steel using the "chuck" on the drill or by pumping water through the drill steel to a "down hole motor." In either case water will be used to cool the bit and flush cuttings from the hole.

      4. A collar guide will be grouted into the hole for a distance of at least 40'. The collar guide will be nominal 4" diameter Schedule 40 steel pipe. The outby end of the collar guide will be threaded or flanged to receive the wellhead valve through which drilling will be accomplished.

5. Drilling will be done through a blow-out preventer (stuffing box) so that no gas will be released into the working area. The wellhead valve next to the coal face will be kept closed when drill rods are not in the hole. The methane, coal cuttings, and recirculating water generated during drilling will be discharged into a separator. The cuttings and drill water will flow to a sump with the water being recirculated through the system. The cuttings will be removed from the sump and dumped by a scoop tractor. The methane from the separator will be discharged either into the main trammission line or vented into the return. Hand-held methanometers will be utilized in the area.

6. Boreholes will be drilled in a pattern to be determined.

C. Safety Controls

The area will be timbered and ventilated as required by the approved roof and ventilation and dust control plans.

2. WELLHEAD STATION (See Drawing 4880 For Details)

A. Equipment and Materials

Borehole well head layout materials are described on the attached drawing.

B. Design and Procedure

The boreholes will be located in a solid rib along an outside aircourse at specific locations throughout the mine. Once drilling on a borehole is completed, the 4" wellhead valve at the outby end of the drilling collar will be closed. The borehole will be connected to the underground collection and transmission line. An automatically operated safety shutdown valve will be installed immediately outby the 4' wellhead valve.

During normal operation the gas produced will be discharged through the automatic safety valve and passed through appropriate equipment to remove the entrained water and solids. A one way check valve will be installed to prevent back flow of gas from the transmission line to the borehole. Immediately downstream of the check valve will be a manually operated gate valve located so as to isolate all the aforementioned equipment and each

borehole from the transmission line.

Operation of the automatic safety shutdown valve will provide for remotely shutting in each borehole in the event of a rupture or leak in the transmission line or a methane concentration in the return aircourse through which the pipeline passes of 2% or more.

3. TRANSMISSION LINE (From the boreholes)

A. Equipment and Materials

All collection and transmission lines will be constructed of polyethylene pipe (DuPont Aldyl "A" or equivalent). Normally pipeline joints will be connected by butt fusing. At those points where the polyethylene pipe is to be mated to metal valves or fittings, mating flanges will be butt fused to the end of the polyethylene pipe.

Inline water separators will be installed along the length of the pipeline as required.

B. Design and Procedure

The pipelines will be placed on the footwall of or securely hung in the entry next to the rib, in the return aircourses. When it is necessary to route the pipeline across an intake, belt, or track entry, the gas pipeline will be enclosed in a larger diameter tube that will be sealed into a brattice line on each side of the fresh air entry to be crossed. The transmission pipeline will be sectionalized to limit the continuous runs to no more than 2500 feet. This isolation will be accomplished by way of automatically operated safety shutdown valves that will operate in the same manner as the automatic safety shutdown valves at each borehole.

Tranmission pressure will be supplied by the in-situ methane pressure.

C. Safety Controls

All the underground transmission and collection pipelines from the bottom of the vertical borehole to each of the producing borehole well heads will be traced with 1" diameter breakable PVC tubing which will be fastened to the top of the transmission line such that it will break in case of a roof fall or significant pipeline movement. The breakable PVC tubing will be pressurized with nitrogen at nominal

90 p.s.i.g. This pressure will hold open the automatic valves on each borehole wellhead and the transmission line sectionalizing safety shutdown valves.

Nitrogen will be supplied from an underground station containing nitrogen cylinders, regulators, pipe, valves, etc. necessary to provide the required pressure.

In the event of a roof fall or significant movement of the pipeline which ruptures the breakable plastic tubing the nitrogen pressure will be lost thereby shutting in each producing borehole and isolating each section of the underground transmission and collection line.

The 1" diameter nitrogen filled breakable tubing will include: 1) at least one manually operated emergency shutdown valve located on the surface near the top of the vertical borehole; 2) at least one manually operated emergency shutdown valve located underground in the aircourse in which the collection and transmission line is located; and 3) an electrically operated emergency shutdown valve activated by the methane monitoring system described below.

If a need arises to shut in the boreholes and close the sectionalizing valves of the transmission line, it can be accomplished by opening one of these emergency shutdown valves, or intentionally rupturing the 1" breakable tubing.

Means will be provided to isolate a problem borehole or a section of the transmission line so that the remaining boreholes or other sectionalized portions of the transmission line can be operated while servicing or making repairs to the problem area.

A methane monitoring system will be provided in the aircourses containing the boreholes and the transmission and collection pipeline. This system will permit shutting in the boreholes if a methane concentration of 2% is detected by the monitoring system. The shutting in will be by way of the electrically operated automatic safety shutdown valve. Shutdowns as a result of a high methane concentration will also activate an alarm at a central location where a responsible person can hear or observe the signal and take appropriate action. If at any time the methane monitoring system has been deenergized for reasons such as routine

maintenance or failure of a sensor unit, the transmission system may continue to operate provided the affected portion of the system shall be continously patrolled for methane by a qualified person until the monitoring system is returned to normal operation.

4. INSPECTION PROCEDURES

Inspection of the stations and pipelines will be made by firebosses and supervisorary personnel in compliance with regulations. Checks and inspections will be made on a weekly basis with information appropriately recorded. Upon completion of the pipeline installation, the total system and each additional segment will be pressure tested to insure integrity.

5. SURFACE FACILITIES (See Drawing 4880 For Details)

A. Equipment and Materials

1. Vent Pipe

2. Flame Arrestor

3. Lightning Protection

4. Valves

B. Design and Procedure

The surface installation consists of a pipeline to vent the methane collected to the atmosphere through a vent stack adequately protected from lightning and a flame arrestor, and a gas sales pipeline. Methane that travels up the vertical borehole is directed to either of these lines through manually operated valves located at the top of the hole. The direction of flow in the gas sales pipe line will be controlled by way of a check valve.

C. Safety Controls

A manually operated emergency shutdown will be provided in the 1" nitrogen filled breakable PVC line located on the surface near the top of the vertical borehole. The function of this valve has been described in the underground portion of this plan.

HORIZONTAL HOLES IN THE COAL SEAM FOR UNDERGROUND DEGASIFICATION

Note: Equipment and materials mentioned in the proposal will be purchased by competitive bids. Substitutions may be made for materials believed to be equally satisfactory or better than those specified.