

## INFORMATION REPORT INFORMATION REPORT

## CENTRAL INTELLIGENCE AGENCY

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Methods of Underground Gasification of Coal

1. The methods used in the Soviet Union vary with brown coal and hard coal. The brown coal systems were based on linking between vertical boreholes by medium pressure air, using reverse linkage. Electro-linkage, although still used, was proving uneconomical. The actual gasification process was carried out with low-pressure air and the gasification zone transferred to successive rows of boreholes. This sequence provided a pre-drying of the lignite.
2. Hard coal was being gasified with oxygen-enriched air at the main station, Lisichansk  $\sqrt{N}$  48-50, E 38-227. A new deposit was being gasified with plain air. Linkage was established by drilling boreholes either from drifts, through outcropping seams, or by directionally drilled boreholes. High-pressure fracture by air or drilling mud was also carried out.

Methods Under Study

3. The method emphasized for brown coal was the linkage between vertical boreholes by reverse combustion; in hard coal, change-direction boreholes received the most attention. Other methods were still under study but were diminishing in importance. Vortex patterns did not appear to be under study.

Controls

4. Gasification was controlled by temperature, pressure, gas flow, and gas composition measurements with manual control on the outlet gas quantities where required. The latest system used a remote telemetering system with scanning, all parameters being converted at the borehole outlets to electrical impulse.

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Point Utilization

5. The pioneer brown coal station at Tula  $\sqrt{N}$  54-12, E 37-36 transmitted gas for burning in local factories. The new brown coal stations at Shatsk  $\sqrt{N}$  54-02, E 41-43 and Angren  $\sqrt{N}$  41-00, E 70-12 were being prepared for power generation at the site, the planned output being 48 and 100 MW, respectively. No other application on site was at present envisaged.

Gas Purification

6. The gas from brown coal was given a cyclone treatment for sand removal whenever sand occurred in the overburden. The gas was subsequently washed, treated in electrostatic filters and washed by the Thylox process for sulphur removal. The gas from hard coal was water washed and cooled but not treated for sulphur removal.

Additives

7. Research carried on with oxygen enrichment of the air-blast and addition of steam was directed mainly to the production of gas with a  $H_2:N_2$  ratio of 3:1, evidently for ammonia synthesis. However, it was not regarded as of primary interest, the objective being the generation of electricity at a cost less than that possible with mining by open-cast or conventional methods or hydraulic mining. No work had been done on enrichment of the gas itself. Priority was being given to the new natural gas lines from Saratov  $\sqrt{N}$  51-34, E 46-02 to Moscow. The low calorific value gas from underground gasification was not considered an economical proposition for transmission over more than five kilometers.

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