terize reliably the quality of strippable reserves.

4. For a given coal bed, tipple and delivered samples from strip mines tend to exhibit lower average moisture contents (as-received basis), higher average ash contents (dry basis), as well as greater ranges in ash contents, and less predictable average heat values (dry basis) than expected.

5. Although for many coals tipple and delivered samples are available from both surface and deep mines, analyses of these types of samples are so dependent on the type and use of mining equipment, preparation facilities, processing, and contract specifications that they may only by chance bear a close resemblance to the coal in its natural state.

Apparently only a coal's sulfur content can be characterized accurately from existing published analyses of face, tipple, or delivered samples, as no significant differences were noted in any of the comparisons.

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CHANGING TRENDS IN URANIUM EXPLORATION

The concept so prevalent in the late 1940s and 1950s that "Uranium is where you find it" is no longer valid. Housewives and cowboys no longer find uranium orebodies. Modern uranium exploration requires a broadly based approach, well-founded on geologic, geophysical, and geochemical techniques, and one which is supported by an informed and aggressive management structure.

Methods of exploration based on flexible models of ore genesis and designed to evaluate large geologic provinces rapidly have been developed. Selective use of geophysical and geochemical tools help to define targets within a favorable province. Careful geologic mapping, sampling, and data interpretation lead to preliminary drilling and interpretation of favorable areas, usually with little or no evidence of surface mineralization. In contrast to this approach, European exploration organizations have, with government subsidy, evolved a domestic exploration philosophy built around extremely detailed surface techniques and saturation drilling of target areas. Only some of the differences in approach are explained by the different types of orebodies found.

Both of these approaches have been successful in their respective areas of use.

Fundamental to the success of any uranium exploration program in the future will be increased reliance on skillful and creative three-dimensional thinking by the technical man. As in the oil industry, the easy ones have been found, but in uranium, the "plums" remain.

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UNDRILLED STRUCTURES IN SOUTH DAKOTA

No abstract available.

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EXAMPLES OF USE OF STANDARD DATA PRODUCTS OF NASA-ERTS, SKYLAB, AND AIRCRAFT PROGRAMS IN STUDY OF WYOMING SURFACE RESOURCES

Cloud-free imagery of the State of Wyoming is available from the NASA programs; ERTS (complete coverage at 560 mi), Skylab (50% ± coverage at 265 mi), and aircraft (60% ± coverage at altitudes ranging from 15,000 to 60,000 ft). Standard data products available to the public include images or photographs of scenes recorded in different bands of the spectrum and in infrared and color. Many potential users (for example, consultants, small companies, and independent geologists) are limited to visual methods of analyses of these products. Wyoming studies have employed these standard data products for a variety of geologic and economic applications: regional geologic mapping for updating and correcting existing maps and as an educational tool; illustrations of the value of seasonal images in geologic mapping; specialized mapping of such features as sand dunes, playa lakes, lineaments, glacial features, regional facies changes, and their possible economic value; and multilevel sensing as an aid in mineral exploration. Cooperative studies between botanists, plant scientists, and geologists for the preparation of maps of surface resources can be used by planners and for environmental impact studies. These maps are especially useful in areas, such as the Powder River basin of Wyoming, facing critical environmental problems that will result from the development of energy resources.

The various studies illustrate that certain user requirements can be met satisfactorily with ERTS and Skylab alone, but that others require higher cost (to the user) aircraft and ground data or special data-enhancement techniques. Perhaps the key point, however, is that the NASA system has given us both complete and sequential regional coverage at a critical time in our effort to assess the effects of resource development.

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RESOURCE AND LAND INFORMATION APPLIED TO POTENTIAL COAL DEVELOPMENT IN GILLETTE AREA, WYOMING

Some of the world's largest known coal deposits are present in the Gillette area, Wyoming. Recent demands for increased production of these resources emphasize the need for sound land-use planning, resource management, and environmental protection if future development is to be guided in the best public interest. Accordingly, the U.S. Geological Survey has begun a program of integrated geologic, hydrologic, and related studies to acquire basic land, water, and resource data. The results of the investigation are being prepared and published in forms designed for ready understanding by a wide range of potential users.

The study covers 1,500 sq mi in central Campbell County, and focuses on: (1) current land use and land and coal ownership; (2) location and extent of coal resources; (3) surface and ground water resources; and (4) potential environmental impacts of surface mining.

Geologic mapping and drill data indicate the presence of nearly a dozen individual coal beds of economic interest, parts of which are strippable. The Wyodak-Anderson coal bed is the deposit of greatest interest. This bed averages 50 to 100 ft in thickness in many places, lies less than 200 ft deep over approximately 75,000 acres of the study area, and contains more than 7 billion tons of sub-bituminous coal in the area where the overburden is less than 200 ft thick.