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Canada Centre
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Centre canadien
de la technologie
des minéraux
et de l'énergie

RESEARCH PROJECTS OF OIL AND GAS RESOURCE AND RESERVE ASSESSMENT

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RESEARCH PROJECTS OF OIL AND GAS RESOURCE AND RESERVE ASSESSMENT

by

Albert E. George*

OBJECTIVES AND RATIONALE

1. Chemical characterization of bitumen and heavy oils as feeds for upgrading purposes. These fundamental chemical studies on the hydrocarbons, sulphur-types and nitrogenous components have relevance in separation processes and for environmental considerations. The geochemical aspect of the work is related to exploration.
2. Chemical characterization of products from bitumen and heavy oils at various stages of upgrading to obtain more insight into the reactions occurring during processing, e.g. hydrogen donor - acceptor reactions. Evaluating the products to meet market requirements or for proper choice of further processing steps.
3. Development of analytical methods for characterization of bitumens and synthetic fuel heavy products. There is need for considerable development in this area where the methods are non-existent or inadequate for studying high molecular weight components, complexed polynuclear aromatics and asphaltenic structures.
4. Removal of nitrogenous components and related polar material because of their catalyst deactivating effects. Use of economic methods is sought. Possible use of the separated material as additives to improve performance characteristics of asphalts, building materials or as binders for briquetting, antifissuring agents, etc.
5. Analytical services to external agencies.

We do about 3500 analyses per year of fuel oils, mines air samples, etc. for companies and provincial agencies in all Canada.

RECENT ACCOMPLISHMENTS

Filing 2 patent applications in the areas of removal of nitrogenous components from bitumens and water-oil emulsions resulting from in-situ recovery of bitumens.

These five areas have been summarized, together with outputs on five overhead projector slides (see Appendix).

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JUSTIFICATION FOR DOING THE WORK

1. As part of ERL we do support work to the CANMET Hydrocracking Process and are involved in problems related to upgrading bitumens and heavy oils.
2. We address medium to long term research problems which are recognized as being extremely important in the future but due to long pay-out, private industry is not currently prepared to spend money on them.
3. We aim to contribute to improvements in the above areas of Canadian Energy Technology by transferring technology to suitable licensing organizations.

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1. CHEMICAL CHARACTERIZATION OF BITUMENS AND HEAVY OILS
AS FEEDS FOR UPGRADING PURPOSES

(HYDROCARBON-TYPES, SULPHUR COMPOUND TYPES, NITROGENOUS
COMPONENTS)

A. ALBERTA BASIN BITUMENS AND HEAVY OILS
(ATHABASCA, LLOYDMINSTER, COLD LAKE)

B. GEOCHEMICAL CORRELATIONS

- ALBERTA BASIN
- OFF-SHORE EAST COAST OILS
- ARCTIC OILS

OUTPUT: 7 PUBLICATIONS

2 REPORTS UNDERWAY

2. CHEMICAL CHARACTERIZATION OF PRODUCTS FROM THE CANMET
HYDROCRACKING PROCESS

- A. PRODUCTS AT VARIOUS REACTION CONDITIONS AND
CONVERSION RATES.
- B. CONTRACTS
 - BTX PRODUCTION POTENTIAL FROM SYNTHETIC
FUEL NAPHTHA (COMPLETED)
 - PRODUCTION OF HIGH CETANE NUMBER DIESEL OIL
FROM SYNTHETIC FUEL (PROJECTED)

OUTPUT: 2 PUBLICATIONS
2 REPORTS
2 REPORTS UNDERWAY

3. DEVELOPMENT OF ANALYTICAL METHODS FOR CHARACTERIZATION OF BITUMENS AND SYNTHETIC FUELS HEAVY PRODUCTS

A. MODIFICATION OF THE API-USBM METHOD FOR HYDROCARBON-TYPE ANALYSIS

- SPEED, SAMPLE SIZE, SEPARATION
- ON-LINE QUANTITATION OF FRACTIONS

B. DEVELOPING HPLC SYSTEMS FOR CHARACTERIZATION OF PNA IN SYNFUELS.

OUTPUT: 3 PUBLICATIONS
2 REPORTS

4. REMOVAL OF NITROGENOUS COMPONENTS FROM SYN FUEL PRODUCTS

- A. CATALYST DEACTIVATION EFFECTS - SEPARATED MATERIAL AS ADDITIVES FOR VARIOUS USES.
- B. SOME EMULSION PROBLEMS - "BLACK WATER" PROBLEM.

OUTPUT: FILING 2 PATENT APPLICATIONS



5. ANALYTICAL SERVICES TO EXTERNAL AGENCIES

- NEW BRUNSWICK ELECTRIC POWER COMMISSION (FUEL OILS)
- ONTARIO MINISTRY OF NATIONAL RESOURCES (CRUDES AND NATURAL GASES)
- MINING COMPANIES AND MINES PROVINCIAL INSPECTORS (MINE AIR SAMPLES)

OUTPUT: 3500 ANALYSES PER YEAR

MEMBERS OF THE N A C M M R SUB-COMMITTEE, ENERGY PROCESSING 1979

Chairman: Mr. J.C. Campbell,
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The members were selected because of their prominence in fields concerning Bitument and Heavy Oil, Uranium, Carbonization and Coal Conversion. However some have prominence and/or extensive knowledge in several areas and every-one should feel free to pass judgement on all areas.

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