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ANALYSIS OF FOURTY-FOUR SAMPLES OF PITCH FROM ATHABASCA BITUMEN PROJECT EP41

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OCTOBER 1976

ERP/ERL 76-174 (TR)
ENERGY RESEARCH PROGRAM
ENERGY RESEARCH LABORATORIES
REPORT ERP/ERL 76-174 (TR)

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INTRODUCTION

Fourty-four samples of "pitch recovered from the Podbielniak still at 975°F" were submitted by R. Ranganathan for ultimate and ash analysis. The samples in sealed 1 quart cans varied in weight from 25 to 1000 or more grams. Where possible the samples were pulverized to pass a No. 60 sieve and a representative sample extracted for ultimate analysis and ash determination. If the samples were small - small pieces were used without pulverization.

The ash required for the determination of iron, nickel and vanadium was prepared by the removal of the more volatile constituents at a very low temperature over an extended period of time, followed by ignition under oxidizing conditions at 750°C.

The ultimate analysis for carbon and hydrogen, nitrogen, sulphur and ash were carried out by the ASTM procedures prescribed for coal and coke. The ash analyses were carried out using the proposed lithium tetraborate fusion method in which 0.2g of sample are fused with lithium tetraborate. The final determination of the element in question is made by atomic absorption spectrometry.

The ultimate analyses presented in Table I are on the "as analysed basis." The ash constituents are presented as a percentage of the ash. The values may be calculated to the as analysed pitch basis by using the ash value shown in the ultimate analysis.

TABLE I

FRC No.	2713-76	2714-76	2715-76	2716-76	2717-76	2718-76
Mark	EFS 22-73	23-73	24-73	25-73	26-73	27.73
<u>Ultimate Analysis</u>						
Carbon %	83.53	80.67	80.82	80.44	79.91	80.15
Hydrogen %	7.33	6.75	5.97	6.05	5.95	6.09
Sulphur %	5.35	5.36	5.35	5.08	4.81	5.05
Nitrogen %	1.45	1.60	1.74	1.76	1.81	1.79
Ash %	3.60	3.88	5.06	5.76	6.23	5.93
<u>Ash Analysis</u>						
Vanadium V205 . . . %	4.28	5.00	4.30	4.31	4.43	3.99
Nickel Ni0. %	1.02	1.15	1.04	1.12	1.15	1.11
Iron Fe203 %	7.87	8.01	10.10	8.09	7.61	7.64

TABLE I (continued)

FRC No.	2719-76	2720-76	2721-76	2722-76	2723-76	2724-76
Mark	EFS-28-73	12-73	13-73	15-73	16-73	17-73
<u>Ultimate Analysis</u>						
Carbon %	79.11	80.95	82.41	80.95	80.54	80.32
Hydrogen %	5.37	6.96	6.77	6.60	5.86	5.61
Sulphur %	4.46	5.82	5.86	5.57	5.23	4.83
Nitrogen %	1.83	1.46	1.56	1.70	1.79	1.84
Ash %	8.25	3.61	3.76	4.75	5.46	6.79
<u>Ash Analysis</u>						
Vanadium V205 . . . %	5.14	4.43	4.53	4.63	4.26	4.34
Nickel NiO %	1.23	1.16	1.17	1.18	1.15	1.15
Iron Fe203 %	7.55	7.58	7.52	7.55	7.72	7.64

TABLE I (continued)

FRC No.	2725-76	2726-76	2727-76	2728-76	2729-76	2730-76
Mark	EFS-36-73	37-73	38-73	39-73	128-73	129-73
<u>Ultimate Analysis</u>						
Carbon %	82.15	82.16	81.93	81.68	78.66	77.78
Hydrogen %	5.97	5.75	5.45	5.27	5.12	5.00
Sulphur %	5.88	5.59	5.21	4.75	4.21	3.68
Nitrogen %	1.65	1.83	1.90	1.98	1.74	1.90
Ash %	3.25	4.27	5.12	6.06	10.11	10.69
<u>Ash Analysis</u>						
Vanadium V205 . . . %	5.76	5.42	4.87	3.62	5.35	5.36
Nickel NiO %	1.26	1.34	1.27	1.08	1.20	1.20
Iron Fe203 %	7.44	7.52	7.49	7.87	7.66	7.66

TABLE I (continued)

FRC No.	2731-76	2732-76	2733-76	2734-76	2735-76	2736-76
Mark	EFS-130-73	131-73	34-73	87-73	86-73	85-73
<u>Ultimate Analysis</u>						
Carbon %	78.56	77.29	81.25	70.11	79.89	55.61
Hydrogen %	4.92	5.18	9.49	5.71	6.70	6.18
Sulphur %	3.67	3.78	5.98	5.39	5.30	5.05
Nitrogen %	1.74	1.80	0.79	1.51	1.63	1.70
Ash %	10.48	11.39	1.15	3.96	4.22	4.29
<u>Ash Analysis</u>						
Vanadium V205 . . %	5.36	5.35	5.28	4.43	5.06	5.35
Nickel NiO . . . %	1.20	1.22	1.18	1.17	1.23	1.34
Iron Fe203 . . . %	7.65	7.72	7.55	7.71	7.52	7.49

TABLE I (continued)

FRC No.	2737-76	2738-76	2739-76	2740-76	2741-76	2742-76
Mark	EFS-84-73	83-73	82-73	50-73	52-73	53-73
<u>Ultimate Analysis</u>						
Carbon %	73.48	57.65	68.40	81.39	82.50	83.76
Hydrogen %	5.89	5.39	5.30	7.20	6.07	5.72
Sulphur %	4.63	4.39	4.21	7.03	6.42	5.45
Nitrogen %	1.74	1.84	1.83	1.44	1.86	1.84
Ash %	6.06	7.77	9.36	2.47	3.45	4.41
<u>Ash Analysis</u>						
Vanadium V205 . . %	5.21	4.14	4.59	6.07	7.19	5.21
Nickel NiO . . . %	1.15	1.09	1.12	1.25	1.67	1.63
Iron Fe203 . . . %	7.73	7.58	7.59	7.66	7.09	7.24

TABLE I (continued)

FRC No.	2743-76	2744-76	2745-76	2746-76	2747-76	2748-76
Mark	EFS-40-73	41-73	42-73	43-73	5-73	6-73
<u>Ultimate Analysis</u>						
Carbon %	81.73	81.29	81.94	81.55	80.98	79.88
Hydrogen %	6.85	6.27	7.08	6.28	7.37	6.80
Sulphur %	6.05	6.15	6.04	6.08	4.97	4.90
Nitrogen %	1.38	1.41	1.32	1.42	1.41	1.63
Ash %	3.10	3.24	3.05	3.11	4.80	5.07
<u>Ash Analysis</u>						
Vanadium V205 . . %	4.85		5.35	5.48	4.50	4.87
Nickel NiO . . . %	1.15		1.17	1.17	0.94	1.17
Iron Fe203 . . . %	7.21		7.72	7.58	7.87	7.87

TABLE I (continued)

FRC No.	2749-76	2750-76	2751-76	2752-76	2753-76	2754-76
Mark	EFS-10-73	11-73	18-73	19-73	132-73	133-73
<u>Ultimate Analysis</u>						
Carbon %	79.73	80.53	79.09	78.25	81.69	81.62
Hydrogen %	6.67	6.25	5.47	5.30	9.52	9.69
Sulphur %	4.81	4.58	4.26	3.94	5.93	5.98
Nitrogen %	1.55	1.69	1.83	1.77	0.81	0.74
Ash %	5.58	6.69	8.09	9.98	1.04	0.96
<u>Ash Analysis</u>						
Vanadium V205 . . %	4.84	5.05	5.05	5.21	6.53	6.78
Nickel NiO . . . %	1.12	1.17	1.17	1.12	1.45	1.37
Iron Fe203 . . . %	7.87	7.72	8.01	7.75	8.01	8.29

TABLE I (continued)

FRC No.	2755-76	2756-76				
Mark	EFS-36-73	88-73				
<u>Ultimate Analysis</u>						
Carbon %	81.59	81.42				
Hydrogen %	9.68	7.05				
Sulphur %	7.05	4.55				
Nitrogen %	0.85	1.38				
Ash %	0.21	3.47				
<u>Ash Analysis</u>						
Vanadium V205 . . %	33.46	5.50				
Nickel NiO . . . %	8.17	1.17				
Iron Fe203 . . . %	7.21	7.58				