TECHNICAL REPORT
September 1 through November 30, 1993

Project Title: **DEVELOPMENT OF A USE FOR ILLINOIS COAL CONCENTRATES FOR SLURRY FED GASIFIERS**

DOE Grant No: DE-FC22-92PC92521 (Year 2)
ICCI Project No: 93-1/1.1A-3M
Principal Investigator: Latif A. Khan, ISGS
Other Investigators: John M. Lytle, Saleem Khan and Mahmood At-Taras, ISGS; and Henry P. Ehrlinger III, Consultant
Project Manager: Daniel D. Banerjee, Illinois Clean Coal Institute

ABSTRACT

The primary purpose of this project is to identify and test concentrates made from preparation plant fines as to their amenability as feed for slurry-fed, slagging, entrained-flow gasifiers. The high sulfur content and high BTU value of Illinois coals are particularly advantageous in such a gasifier. Elemental sulfur is recovered as a revenue-producing product in gasifier technologies, and the higher BTU Illinois coal concentrate requires less water to produce a pumpable slurry than western coal (30-35% vs 45%) thereby reducing the amount of heat lost in vaporization of entrained water. This means that 66 tons of Illinois coal concentrate, containing 13,000 BTU per pound, at 70% solids would provide as much net heat as 100 tons of 9500 BTU coal pumped at 54% solids.

During the current reporting period twelve 55-gallon drums of preparation plant fines were obtained from a mine in Illinois. Part of the slurry was screened on 60 mesh to remove coarse material (about 9.57%) and the fines were used for preliminary flotation tests in a subaeration cell. Fifteen batch tests were conducted to establish flotation conditions for operation of the continuous flow column flotation unit. Varying the type and quantities of reagents, grades were recorded over 12,000 BTU and the recovery of combustible matter or BTU varied from 41.6% to 88.2%

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EXECUTIVE SUMMARY

The coal industry of Illinois discards a significant amount of coal as fines from washing plants. A small amount is recovered in three flotation plants and several fine-size gravity separation plants treat washing plant wastes. An estimate is that about 4,000,000 tons of recoverable coal is being impounded as waste per year in Illinois. This coal, when concentrated by gravity or flotation approaches the size and chemical requirements for gasification.

The gasification of coal slurry is a technology which has been proven to be scientifically and environmentally effective. Integrated gasification-combined cycle (IGCC) plants have the capability to achieve heat rates as low as 8200 BTU/KWH (42 efficient). Additionally, IGCC plants are largely waste free. The products are medium-BTU clean gas, steam, inert granulated slag, and elemental sulfur. The slag and sulfur are marketable, sulfur has sold for about \$67.00 per ton in the midwest, and up to \$115 per ton in the Florida market area. Illinois coal meets all of the desirable characteristics needed for gasification: first it can be concentrated to a grade greater than 13,000 BTU/lb as compared to about 9500 BTU/lb for western coal; second, it can be densified to over 70% solids and remain pumpable as compared to about 55% for western coals; third, the sulfur is a marketable product in a gasifier rather than a penalty as when Illinois coal is utilized in conventional combustion, and fourth, it is partially ground to plant specifications when it is delivered to the IGCC plant.

With these advantages and opportunities Illinois coal has over western coal it was suggested that these opportunities be developed toward commercial usage. During the current reporting period a number of barrels of preparation plant fines were obtained from a mine in Illinois. The slurry was screened on 60 mesh to remove coarse material (about 9%) and the fines were used for preliminary flotation tests. Fifteen batch tests were conducted to establish flotation conditions for operation of the continuous flow column flotation unit. Ten of the tests are reported herein, the remaining will be included in the next quarterly report when the chemical analyses are completed. Varying the type and quantities of reagents, grades were recorded over 12,000 BTU/lb and the recovery of combustible matter or BTU varied from 41.6% to 88.2%

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

OBJECTIVES

The goals and objectives of this project are to have coal from Illinois washing plant waste streams used for gasifier feed for power generation. To do so this project will utilize waste products from real plant waste streams from a variety of sources to develop a series of examples of concentrates which have low ash content, high BTU content and sulfur which will be saleable when the coal is used for power generation using IGCC technology.

The coal industry of Illinois discards a significant amount of coal as fines from washing plants. A small amount is recovered in three flotation plants and several fine-size gravity separation plants which treat washing plant waste. An estimate is that about 4,000,000 tons of recoverable coal is being impounded as waste per year in Illinois. This coal, when concentrated by gravity and/or flotation, approaches the size and chemical requirements for slurry-fed, slagging, entrained-flow gasification. There are presently enough coal fines mined and discarded in Illinois annually to power a 2400 MW power plant. This is significantly larger than any existing power plant in the state.

Samples of coal concentrates generated from several different plant sources will be generated and given a gasification amenability review to determine their acceptability as gasifier feed. In addition to current plant wastes, at least one sample of impounded waste will be examined under the same criteria.

Additionally, several of these samples will be tested for their potential as pumpable coal slurry. Earlier work indicated that existing pipeline technology had every reason to be a transportation method of choice.

This work at this time has a very important impact on the Illinois Coal Industry. Because of the recent enactment of the Clean Air Act, many of the markets for Illinois high-BTU, high-Sulfur coal are in jeopardy. Three alternatives are available to users of coal to meet the mandated sulfur to energy ratios. First, substitute low BTU western coal for Illinois coal, this can be done either by total substitution or by blending to a desired endpoint. Second, install scrubbers in any of their many forms, or lastly, adapt power plants to take advantage of the high BTU, high sulfur coal feedstock available with Illinois coal. Illinois coal has ideal properties for integrated gasification combined cycle plants which produce power at about 25% higher efficiency and produce no appreciable pollutants.

INTRODUCTION AND BACKGROUND

The gasification of coal slurry is a technology which has been proven to be scientifically and environmentally effective. Integrated gasification combined cycle (IGCC) power plants have the capability to achieve heat rates as low as 8200 BTU/KWH (42% efficiency). For comparison, a pulverized coal plant with pollution controls to limit both sulfur and nitrogen oxide emissions might have a fuel-to-electricity heat rate around 10,000 BTU/KWH (32-35%) efficiency. Additionally the IGCC plants are waste free: the products are medium BTU clean gas, steam, inert granulated slag, and elemental sulfur. The slag and sulfur are marketable, the sulfur at about \$115 per ton. A pulverized coal plant generates steam, slag in some form, and either SO_2 or NO_x gasses or scrubber sludge, neither of which is desirable. Destec Energy, Inc. of Plaquemine, LA and Texaco's Cool Water CA plants have used several coals to prove their technologies, both having used Illinois coals on controlled runs.

During the 1991-1992 contract year (with ICCI) the ISGS contracted to study **Gasifier Feed, Tailor-made from Illinois Coal**. During the first two quarters products were made from Illinois coals in which the heat rate was reduced to 8,490 BTU/KWH on real samples generated at Kerr-McGee's Galatia plant, a marked improvement when compared to either washed Illinois coal or western coal. The products from plant testing were submitted to Williams Technologies' slurry pumping test facility and found to be amenable to long-distance pumping at high densities without additives.

EXPERIMENTAL PROCEDURES

Sampling

Material for the first testing program was obtained from a mine in Illinois. First the slurry was collected in 6 55-gallon drums and left to settle for about 6 hours. The clear water was then decanted and the drums were refilled with the slurry. In the second run the slurry was collected in an additional 6 55-gallon drums. This time the slurry was screened through a 28 mesh screen without thickening it on the spot. To determine the characteristics of the effluent generated at the plant unscreened and unthickened slurry was collected in 2 5-gallon buckets. This material was used to determine the particle size distribution and chemical characteristics of the coarse and fine fractions of the feed.

Particle Size Distribution

To determine the particle size distribution of the effluent

generated at Mine A the slurry collected in 2 5-gallon buckets was combined, thoroughly mixed and sampled. The rest of the material was wet screened on a 60 mesh screen. The coarser fraction was dried, weighed and riffled for sampling and then it was screened into different size fractions. The particle size distribution of the finer (-60 mesh) material was determined using a Microtrac particle size analyzer.

Flotation Tests

Froth flotation tests were carried out in a 1-liter subaeration cell to select flotation reagents for the column flotation. In this series of tests the type as well as the concentration of the reagents was varied. The following experimental procedure was followed in all cases.

With the rotor in place one liter of slurry containing 6% solids was added to the cell. Mixing of the slurry in the absence of air was started at a rotor speed of 1200 RPM. After 1 minute of mixing the required dosage of collector and frother were added one after other and the conditioning was carried out for three minutes. Then the air was allowed to be sucked in through the rotor and the coal laden froth was collected continuously. Both the froth and the reject were filtered, dried, weight and sampled for analysis.

Experimental Results

Particle Size Distribution and character of the material

9.56 % of the material was coarser than 60 mesh. Most of this material is concentrated in the 28-48 mesh size fraction (Tab 1).

Tab. 1 The particle size distribution of the coarser material.

size	weight	com.wt.g	wt%
com.weight%			
+10 mesh	38.57	38.57	7.01
7.01			
10-16 mesh	54.08	92.65	9.84
16.85			
16-28 mesh	106.31	198.96	19.36
36.27			
28-48 mesh	331.74	530.70	60.35
96.52			
-48 mesh	19.12	549.82	3.48
100.00			

The fines (-60 mesh) constitutes the bulk (90.44%) of the sampled material and most of that material clayey (Fig. 1 and Tab. 2)

Tab.2 Particle size distribution of the fines

size	finer than%
80 mesh	97.2
120 mesh	91.1
170 mesh	84.1
230 mesh	76.7
325 mesh	69.9

Character of the material

The ash content of the finer material is relatively high but its carbon and total sulfur concentrations are lower than those of the coarser material (Tab.3). On the other hand the total carbon content of the fines is, because of its higher proportion, very significant and the potential of the recovery of this fine coal from the fine reject is quite high. Flotation tests were therefore carried out on the finer fraction of the slurry. The coarser material can be more economically processed by other relatively inexpensive physical cleaning methods and this was another reason for selecting fines as a feed for flotation tests.

Tab.3 Description of Feed Products

Prod	% Wt	<u>A N A L Y S E S</u>				<u>DISTRIBUTION</u>		
		Ash	T/S	C	BTU	Ash	T/S	C
		%	%	%		%	%	%
Feed	100.00	50.31	3.79	49.69	6879	100.0	100.0	100.0
100.0								
-60M	90.44	52.01	3.50	47.99	6574	96.9	91.1	90.6
90.2								
+60M	9.56	24.71	5.17	75.29	10755	3.1	8.9	9.4
9.8								

Flotation tests results

The first few tests were run to determine the amount of reagent that would be required to float reasonable amount of

coal. Kerosene and MIBC were used in a ratio of 1:1 as collector and frother in these tests. The results of these tests are compiled in table 4.

Tab.4 Effect of reagent (Kerosene and MIBC) on recovery of coal and quality of product

Reagent Dose		Comb.Rec.	Ash	S	Test#
Kerosene	MIBC	%	%	%	
5.6	5.6	79.7	16.28	3.28	1
4.2	4.2	74.6	16.05	3.20	4
2.8	2.8	65.1	14.18	3.03	2
1.87	1.87	41.6	16.74	2.77	3

Tab.5 Effect of type of collector and frother (2.8 : 2.8 lbs/T) on recovery of coal and quality of product

Reagent Dose		Comb.Rec.	Ash	Test#
Kerosene	MIBC	%	%	
Kerosene	MIBC	65.1	14.18	2
Kerosene	CM670	63.1	16.98	6
Kerosene	2-EH	65.2	14.09	7
Kerosene	Pine	81.1	17.90	8

Tab.6 Effect of dosage and type additive on the flotation efficiency of Kerosene and 2-Ethyl Hexanol and an additive on recovery of coal and quality of product

Reagent Dose			Comb.Rec.	Ash	Test#
Kerosene	2-EX	Add.	%	%	
2.8	2.45		65.2	14.09	7
1.87	1.75		59.1	13.31	9
1.87	1.75	0.51	88.2	30.87	10

Tab.7 Effect of dosage Kerosene, Pine Oil + Fuel Oil (PO:FO=2:3) and additive on recovery and flotation of coal.

Reagent Dose		Comb.Rec.	Ash	Test#	
Kerosene	PO/FO	Add.	%		
2.8	2.8		81.4	16.9	5
	2.8		68.3	12.4	11
	2.8	0.25	76.1	14.3	13
	2.8	0.51	84.2	17.1	12

DISCUSSION

The amount of reagent required to float a coal depends both on the type of coal and of the frother. Our test revealed that to float the coal being tested about 5 lbs. of MIBC and kerosene would be required. An increase beyond this level does not significantly increase the amount of recovery but causes a gradual increase both in the ash and sulfur content of the material. The increase in the ash content is probably caused by entrapment of the mineral matter in the larger amount of the froth that is generated due to increased dosage of the reagent and the increase in the sulfur may be because of the fact that a low dosage only the better floating coal is recovered. With an increase in the reagent dosage a decrease in the quality of the recovered material is expected.

2-Ethyl Hexanol performs as well as MIBC as far as the recovery of combustibles and the ash content of the product is concerned (Tab.5) where as CM 670 does not seem to perform as well. Pine oil on the other hand recovers much higher amount of coal but the grade of the product is not so high. Apparently in this case the higher ash content is caused by the entrapment of the mineral matter in the froth as was the case when higher dosage of MIBC was used.

In case of 2-Ethyl Hexanol we also see an improvement in the quality of material with a decrease in the reagent dosage. A dramatic increase in the recovery as well as the ash content of the recovered product is caused when a surfactant is added to the Kerosene + 2-Ethyl Hexanol system. The surfactant probably does not contribute to selectivity of the collection of coal on the surface of the bubble in this case and the increase is apparently caused by simple entrapment of the material.

The addition of a surfactant to boost the froth generating power of a frother adds a new dimension to this research. The reagent consumption in secondary coal recovery from effluent is higher than in the normal coal flotation. This increase is caused by increase in the specific surface area of the material due to a decrease in the particle size of the material and some other factors. A further increase in the consumption of the reagent should be expected when flotation columns instead of subaeration cells are used due to the absence of mechanical shear of rotors in the columns. To help facilitate the generation of the bubbles in the absence of the mechanical shears higher dosage of reagent are used to produce adequate number of bubbles. Every effort is made to select reagents that can, in small quantities, generate sufficient amount of froth but also collect coal selectively. Apparently the reagent consumption can be reduced further by adding surfactants to the system that help generate froth.

In case of pine oil the addition of a surfactant seems to have a positive impact on both the collecting and frothing properties of the pine oil as is evident from the data in table 7. This data shows that 0.25 - 0.5 lbs/ton of a relatively inexpensive surfactant be used to replace not only 2.8 lbs/t of kerosene but to get even better results.

These tests were to serve as a guideline for the starting reagent rate and type for the continuous flow tests which are being conducted in the Deister Column. Chemical analyses on the final five tests were not available at the time this report was being prepared.

Sample Procurement at other site

Collection of the effluents and tailing ponds sample was made difficult by the strike of the United Mine Workers. Thanks to the cooperation of the mines supervisory staff arrangements have been made to collect effluent samples at three mines. Tailing pond material at one of these mines will be sampled also.

```

mm/dd/vy      :ch-top %pass %ch      : summary data
              :700.00 100.0 0.0      : dv: 0.0268
              :500.00 100.0 0.0      : %10: 2.46
              :350.00 100.0 0.0      : %50: 17.24
:MICROTRAC DATA: DATA BASE UPDATE :250.00 100.0 2.8      : %90: 119.38
:              :175.00 97.2 6.1      : mv: 40.70
:sequence #: 1726 record #: 1724 :125.00 91.1 7.0      : cs: 0.251
:sample date/time: 11/17/93 09:54 : 88.00 84.1 7.4      :
:sample ident: LATIF A.KHAN        : 62.00 76.7 6.8      : sd: 42.36
:sample ID : 1117-F1              : 44.00 69.9 7.3      : ma: 7.05
:lot code:                        : 31.00 62.6 6.7      :
:account #:                       : 22.00 55.9 7.4      :
:source: 7997 0.7 -700.SRA        : 16.00 48.5 8.4      :
:length: 20 sec. run #: 100/ 0    : 11.00 40.1 7.6      :
:sample preparation code: 0       : 7.80 32.5 7.1      :
:notes:                           : 5.50 25.5 5.6      :
:              : 3.90 19.9 7.1      :
:              : 2.80 12.8 7.3      :
:              : 1.90 5.5 3.1      :
: F1-exit F7-update F8-histogram : 1.40 2.4 1.9      :
: F5-next          F9-%pass/ret'n: 0.90 0.4 0.4      :
:              :                  :
:              :                  :
:              :                  :
:              :                  :

```

: name value
 :smpl amt 0.000
 :disprent
 :disp amt 0.000
 :disp med
 :dmed amt 0.000
 :agitat'n
 :agit tim 0
 :circul'n
 :circ tim 0
 :param #1 0.000
 :param #2 0.000
 :param #3 0.000

LATIF A. KHAN
1117-F1
Record Number: 1726

PROJECT MANAGEMENT REPORT
September 1 through November 30, 1993

Project Title: **DEVELOPMENT OF A USE FOR ILLINOIS
COAL CONCENTRATES FOR SLURRY FED
GASIFIERS**

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Henry P. Ehrlinger III, Consultant
Project Manager: Daniel D. Banerjee, Illinois Clean
Coal Institute

COMMENTS

First Quarter costs are below original budget as they do not include Mr. Ehrlinger's consulting fee which is payable after the submission of the first quarterly report, and no travel costs have been finalized.

Hiring of an hourly assistant

Mahmood At-Taras, a student at the University of Illinois was hired to help run the tests.

SCHEDULE OF PROJECT MILESTONES

Milestones:

- A. Testing using coal from waste streams (Task 1)
- B. Testing using coal from impounded waste (Task 2)
- C. Pumpability analyses of selected samples (Task 3)
- D. Combustion testing of selected products (Task 4)
- E. Select plant conditions (Task 5)
- F. Report at Annual Contractors Meeting
- G. Technical project management reports prepared and submitted

Financial Plan

A summary of total estimated project costs by major tasks is shown in the following table. Costs of safety, quality control, and report preparation are distributed into the research tables.

Tasks	ICDB Funding
1	31.235
2	31.235
3	9.187
4	5.000
5	19.265
Total	96.323

EXPENDITURES - EXHIBIT B

Projected and Estimated Actual Expenditures by Quarter

Quarter*	Types of Cost	Direct Labor	Materials and Supplies	Travel	Major Equipment	Other Direct Costs	Indirect Costs	Total
Sept. 1, 1993 to Nov. 30, 1993	Est. Actual	3,675	99	0	0	826	460	5,060
	Projected	6,746	750	1,326	0	12,598	2,142	23,562
Sept. 1, 1993 to Feb. 28, 1994	Est. Actual							
	Projected	13,492	1,500	2,652	1,950	25,196	4,479	49,269
Sept. 1, 1993 to May 31, 1994	Est. Actual							
	Projected	20,238	2,250	3,798	1,950	37,794	6,603	72,633
Sept. 1, 1993 to Aug. 31, 1994	Est. Actual							
	Projected	26,984	3,000	5,304	1,950	50,392	8,763	96,393

* Cumulative by quarter

COSTS BY QUARTER - EXHIBIT C
DEVELOPMENT OF A USE FOR ILLINOIS COAL
CONCENTRATES FOR SLURRY FED GASIFIERS

○ Projected Expenditures -----

△ Actual Expenditures ----- 5060

Total CRSC Award \$96,393

Test No. 1

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	45.69	16.28	3.28	83.72	12017	14.3	43.9	79.7
83.5								
Tail	54.31	82.07	3.52	17.93	NA	85.7	56.1	20.3
NA								

Conditions:

-60 Mesh Feed
 6% Solids
 5.60#/Ton Kerosene
 5.60#/Ton MIBC

Test No. 2

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed 100.0	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
Conc 69.7	36.38	14.18	3.03	85.82	12387	9.9	31.6	65.1
Tail 30.3	63.62	73.64	3.75	26.36	3095	90.1	68.4	34.9

Conditions:

-60 Mesh Feed
 6% Solids
 2.80#/Ton Kerosene
 2.80#/Ton MIBC

Test No. 3

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	23.95	16.74	2.77	83.26	12018	7.7	18.2	41.6
43.8								
Tail	76.05	63.12	3.92	36.88	NA	92.3	81.8	58.4
NA								

Conditions

-60 Mesh
 6% Solids
 1.87#/Ton Kerosene
 1.87/Ton MIBC

Test No. 4

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	42.66	16.05	3.20	83.95	12102	13.2	38.3	74.6
78.5								
Tail	57.34	78.76	3.84	21.24	NA	86.8	61.7	25.4
NA								

Conditions:

-60 Mesh
 26% Solids
 4.20#/Ton Kerosene
 4.20#/Ton MIBC

Test No. 5

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	47.05	16.95	3.48	83.05	NA	15.3	47.4	81.4
NA								
Tail	52.95	83.16	3.43	16.84	NA	84.7	52.6	18.6
NA								

Conditions

-60 Mesh Feed
 6% Solids
 2.80#/Ton Kerosene
 1.10#/Ton Pine Oil
 1.70#/Ton Fuel Oil

Test No. 6

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	36.45	16.98	3.42	83.02	NA	11.9	35.0	63.1
NA								
Tail	63.55	72.10	3.65	27.90	NA	88.1	65.0	36.9
NA								

Conditions:

-60 Mesh Feed
 6% Solids
 2.80#/Ton Kerosene
 2.80#/Ton CM 670

Test 7

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	36.40	14.09	NA	85.91	NA	9.9	NA	65.2
NA								
Tail	63.60	73.71	NA	26.29	NA	90.1	NA	34.8
NA								

Conditions:

-60 Mesh Feed
 6% Solids
 2.80#/Ton Kerosene
 2.80#/Ton 2-Ethyl Hexanol

Test 8

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	47.45	17.99	NA	82.01	NA	16.4	NA	1.1
NA								
Tail	52.55	82.73	NA	17.27	NA	83.6	NA	18.9
NA								

Conditions:

-60 Mesh Feed
 6% Solids
 2.84#/Ton Pine Oil
 2.84#/Ton Fuel Oil

Test 9

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	32.72	13.31	NA	86.69	NA	8.4	NA	59.1
NA								
Tail	67.28	70.83	NA	29.17	NA	91.6	NA	40.9
NA								

Conditions

-60 Mesh Feed
 6% Solids
 1.87#/Ton Kerosene
 1.87#/Ton 2-Ethyl Hexanol

Test No. 10

Prod	% Wt	A N A L Y S E S				DISTRIBUTION		
—								
		Ash	T/S	C	BTU	Ash	T/S	C
BTU								
Feed	100.00	52.01	3.50	47.99	6574	100.0	100.0	100.0
100.0								
Conc	61.26	30.87	NA	69.13	NA	36.4	NA	88.2
NA								
Tail	38.74	85.44	NA	14.56	NA	63.6	NA	11.8
NA								

Conditions:

-60 Mesh Feed
 6% Solids
 1.87#/Ton Kerosene
 1.87#/Ton 2-Ethyl Hexanol
 0.51#/Ton surfactant

DATE

FILMED

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END