

DAFTAR PUSTAKA

- Asikin, S., 1976, *Geologi Struktur Indonesia*, Departemen Teknik Geologi ITB, Bandung, 139 hal.
- Anonim, 1981, "Annual Book of ASTM", Philadelphia, USA.
- Allen, G. P., and J. L. C. Chambers, 1998, Sedimentation in the modern and Miocene Mahakam Delta: Jakarta, *Indonesian Petroleum Association*, p. 57-74.
- Bustin, R. M., 1989. *Coal Resources of the Western Canada Sedimentary Basin*. Vancouver: University of British Columbia
- Boggs, S. Jr. 1987. *Principles of Sedimentology and Stratigraphy*. Merrill Publishing Company: Ohio.
- Cook, A.C, 1982. *The Origin and Petrology of Organic Matter in Coals, Oil Shales, and Petroleum Source-Rock*. Geology Departement of Wollongong University. Australia.
- Cook, A.C. 1999. *Coal Geology and Coal Properties*. Australia: Keiraville consultant.
- Horne, J.C. 1979. Depositional Models in Coal Exploration and Mine Planning in Appalachian Region. Texas: *AAPG Convention SEPM Houston*.
- Komariah, W.E, 2012, *Peningkatan Kualitas Batubara Indonesia Peringkat Rendah melalui Penghilangan Moisture dengan Pemanasan Gelombang Mikro*, Tesis, Fakultas Teknik Program Studi Magister Teknik Kimia, Universitas Indonesia, Depok.
- Muchjidin, 2006, *Pengendalian Mutu Dalam Industri Batubara*. Penerbit ITB: Bandung.

- Marks, E., Sujatmiko, Samuel, L., Dhanutirto, H., Ismoyowati, T., Sidik, B.B., 1982. Cenozoic Stratigraphic Nomenclature In Kutai Basin, Kalimantan, *Proceeding of Indonesian Petroleum Association, 11th Annual Convention*, Jakarta, Indonesia.p. 75-84.
- Nichols, Gary, 1999, *Sedimentology and Stratigraphy*. Blackwell Publishing, Kanada.
- Pertamina BPPKA, 1997, *Petroleum Geology of Indonesian Basins*, vol XI, Kutai Basin, Jakarta. 134 p.
- Satyana, A.H., Nugroho, D., and Surantoko, I., 1999. Tectonic Controls on The Hydrocarbon Habitats of The Barito, Kutai and Tarakan Basin, Eastern Kalimantan, Indonesia; Major Dissimilarities. *Journal of Asian Earth Sciences* Special Issue Vol. 17, No. 1-2, p. 99-120.
- Supriatna, S., Sukardi., dan Rustandi. 1995. *Peta Geologi Lembar Samarinda, Kalimantan. Bandung: Pusat Penelitian dan Pengembangan Geologi*.
- Stach, E., M, TH, Mackowsky., M, Teichmuller., G, H, Taylor., D, Chandra., and R, Teichmuller, 1982, *Coal Petrology*, Berlin: Gebrüder Borntraeger
- Speight, James G. 2005. *Handbook of Coal Analysis*. A John Wiley & Sons, Inc, Publication. USA.
- Sidiq, Nur, 2011, *Geologi dan Studi Kualitas Batubara pada Seam A, Daerah Binai dan Sekitarnya, Kecamatan Tanjung Palas Timur, Kabupaten Bulungan, Provinsi Kalimantan Timur*, Skripsi, Jurusan Teknik Geologi Fakultas Teknologi Mineral Universitas Pembangunan Nasional “Veteran”, Yogyakarta.
- Van de Weerd, A., and Armin R.A., 1992. *Origin and Evolution of the Tertiary Hydrocarbon Bearing Basins in Kalimantan (Borneo), Indonesia*. AAPG Bulletin, 76 (11), p. 1778-1803.
- WCI., 2005. *The Coal Resource: A Comprehensive Overview of Coal*. World Coal Institute

LAMPIRAN

Foto singkapan jalur MS 1 dan 2 di RKBM

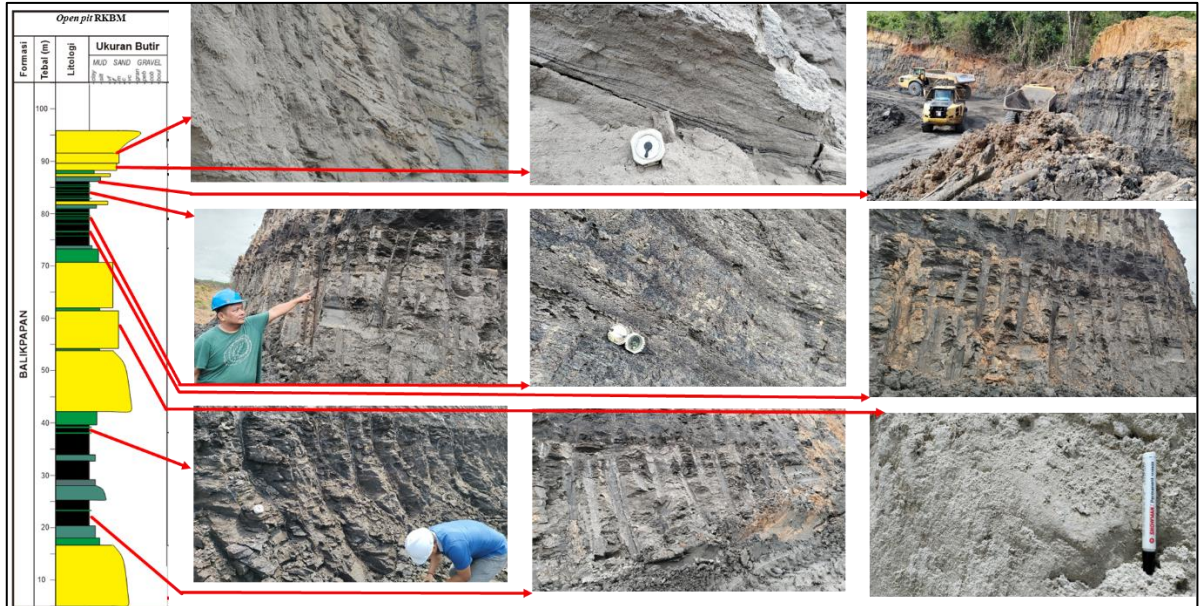
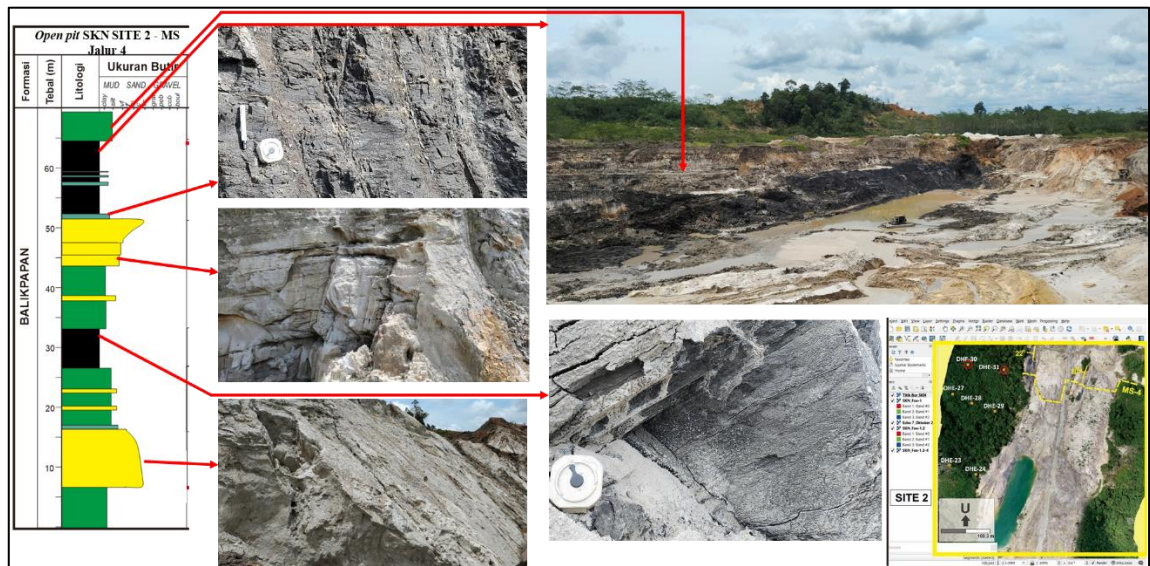


Foto Singkapan Jalur MS 3 di Site 1 SKN



Foto Singkapan Jalur MS 4 di Site 2 SKN





REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
 Report No : IDSMDJ22000507
 Analysis Date(s) : July 26 up to July 27, 2022
 Ref. No. : OC-0441/IOL-SMD/VII/22

Sample Code				R 1A
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-19	%	ar	37.36
Moisture in the analysis sample	ASTM D3173/D3173M-17a	%	ad	17.18
Ash Content	ASTM D3174-12 (Reapproved 2018) ^{E1}	%	ad	3.36
Volatile Matter	ASTM D3175-20	%	ad	30.04
Fixed Carbon	By difference	%	ad	40.42
Total Sulphur	ASTM D4239-18 ^{E1}	%	ad	0.39
Gross Calorific Value	ASTM D5865-19	Cal/g	ad	5519
Gross Calorific Value	ASTM D5865-19	Cal/g	ar	4174

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, July 28, 2022

For and on behalf of
 PT. IOL INDONESIA


 Zulfyanto
 Laboratory Manager

FOS 7.8.1.1.2. Ed 04 Rev 00/16 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to relieve the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of issuance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at https://www.bureauveritas.com/terms_and_conditions

REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
Report No : IDSMDJ22000029.2
Analysis Date(s) : January 25 up to January 27, 2022
Ref. No. : OC-0028/IOL-SMD/I/2022

Sample Code				R 2A 24-01-2022
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-19	%	ar	34.78
Moisture in the analysis sample	ASTM D3173-17a	%	ad	17.61
Ash Content	ASTM D3174-12 (Reapproved 2018) ^{E1}	%	ad	2.63
Total Sulphur	ASTM D4239-18 ^{E1}	%	ad	0.35
Gross Calorific Value	ASTM D5865-19	Cal/g	ad	5657
Gross Calorific Value	ASTM D5865-19	Cal/g	ar	4478

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, January 27, 2022
For and on behalf of
PT. IOL INDONESIA

Zuliyanto
Assistant Laboratory Manager

FOS 7.8.1.1.2.Ed 04 Rev 00/16 Sep 2019

Page 2 of 2



REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
 Report No : IDSMDJ22000507
 Analysis Date(s) : July 26 up to July 27, 2022
 Ref. No. : OC-0441/IOL-SMD/VII/22

Sample Code				R 3A
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-19	%	ar	35.79
Moisture in the analysis sample	ASTM D3173/D3173M-17a	%	ad	16.38
Ash Content	ASTM D3174-12 (Reapproved 2018) ^{C1}	%	ad	4.47
Volatile Matter	ASTM D3175-20	%	ad	37.31
Fixed Carbon	By difference	%	ad	40.93
Total Sulphur	ASTM D4239-18 ^{C1}	%	ad	0.34
Gross Calorific Value	ASTM D5865-19	Cal/g	ad	5837
Gross Calorific Value	ASTM D5865-19	Cal/g	ar	4452

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, July 28, 2022

For and on behalf of
 PT. IOL INDONESIA


 Zulyanto
 Laboratory Manager

FOS 7.8.1.1.2 Ed 04 Rev 00/16 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to relieve the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of attendance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at https://www.bureauveritas.com/terms_and_conditions

PT. IOL Indonesia
Wisma 76, 21st Floor
Jl. Let. Jend. S. Parman Kav. 76
Jakarta 11410, Indonesia
Tel : +62 21 5366 6861
Fax : +62 21 5366 6870
<https://commodities.bureauveritas.com/>



Certificate No: IDSMAJ21000654.3

Date : October 1, 2022

CERTIFICATE OF SAMPLING AND ANALYSIS



Name of Barge / Tug Boat : BG. KALINDO ABADI 2 / TB. KALINDO UTAMA 2
Quantity : 4,986.544 MT
Shipper : PT. SUMMBER DAYA ALAM MULLIA
Consignee : TO ORDER
Notify : TO ORDER
Description of Goods : INDONESIAN STEAM COAL IN BULK
Port of Loading : JETTY BARA KUMALA, EAST KALIMANTAN, INDONESIA
Port of Discharge : MUARA BERAU ANCHORAGE, EAST KALIMANTAN, INDONESIA
TRANSSHIPMENT TO MV. ZALEHA FITRAT
Date of Loading : SEPTEMBER 17 UP TO SEPTEMBER 20, 2022

THIS IS TO CERTIFY that we have performed the inspection, sampling and analysis of the coal consignment nominated above. Samples were taken during loading on barge and analyzed as per ISO standard methods.

The following results were obtained:

PARAMETER	BASIS	RESULTS
TOTAL MOISTURE	(ARB)	: 37.65 PCT
INHERENT MOISTURE	(ADB)	: 21.10 PCT
ASH	(ADB)	: 5.99 PCT
VOLATILE MATTER	(ADB)	: 34.41 PCT
FIXED CARBON	(ADB)	: 38.50 PCT BY DIFFERENCE
TOTAL SULPHUR	(ADB)	: 0.29 PCT
GROSS CALORIFIC VALUE	(ADB)	: 5072 KCAL/KG
GROSS CALORIFIC VALUE	(ARB)	: 4101 KCAL/KG
HGI		: 48
SIZE (0 - 50 MM)		: 78.62 PCT

ISSUED BY
PT IOL Indonesia at loading port



Zuliyanto
Assistant Laboratory Manager

REBH 0245

Survey and sampling were carried out on our behalf by PT. Surveyor Indonesia

SMD 301221

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to relieve the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of attendance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request at <https://commodities.bureauveritas.com/general-conditions-service>



**BUREAU
VERITAS**

REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
Report No : IDSMDJ21000263
Analysis Date(s) : April 21 up to April 22, 2022
Ref. No. : OC-0178/IOL-SMD/IV/21

Sample Code				R 2B
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-17	%	ar	42.14
Moisture in the analysis sample	ASTM D3173/D3173M-17	%	ad	20.43
Ash Content	ASTM D3174-12 (Reapproved 2018)	%	ad	5.35
Volatile Matter	ASTM D3175-18	%	ad	40.47
Fixed Carbon	By difference	%	ad	34.75
Total Sulphur	ASTM D4239-17	%	ad	0.31
Gross Calorific Value	ASTM D5865-13	Cal/g	ad	4770
Gross Calorific Value	ASTM D5865-13	Cal/g	ar	3207

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, April 23, 2021

For and on behalf of
PT. IOL INDONESIA


Zuliyanto
Assistant Laboratory Manager

FOS 7.8.1.1.2.Ed 04 Rev 0016 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to relieve the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of attendance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at https://www.bureauveritas.com/terms_and_conditions



**BUREAU
VERITAS**

REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
Report No : IDSMDJ22000593
Analysis Date(s) : August 27 up to August 28, 2022
Ref. No. : OC-0530/IOL-SMD/VIII/22

Sample Code				R 3B
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-19	%	ar	40.05
Moisture in the analysis sample	ASTM D3173/D3173M-17a	%	ad	21.96
Ash Content	ASTM D3174-12 (Reapproved 2018) ^{E1}	%	ad	5.51
Volatile Matter	ASTM D3175-20	%	ad	39.53
Fixed Carbon	By difference	% *	ad	37.50
Total Sulphur	ASTM D4239-18 ^{E1}	%	ad	0.28
Gross Calorific Value	ASTM D5865-19	Cal/g	ad	5256
Gross Calorific Value	ASTM D5865-19	Cal/g	ar	3414

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, August 29, 2022

For and on behalf of
PT. IOL INDONESIA


Zullyanto
Laboratory Manager

FOS 7.8.1.1.2.Ed 04 Rev 00/15 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the extent of due care and diligence. This certificate is not intended to relieve the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of issuance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at https://www.bureauveritas.com/terms_and_conditions



PT. JASA MUTU MINERAL INDONESIA
Coal Laboratory & Superintending

Jl. Rapak Indah No.139 Samarinda Kalimantan Timur - Indonesia
Telp : (0541) 6276886 Fax : (0541) 6276887
Email : marketing@mutuenergy.com

PRELIMINARY REPORT

Job Number	: 0286/LAB/III/2022	Principle	: PT. Sinar Kumala Naga
Date Of Received Sample	: March 17, 2022	Reference	: 005/SKN/III/2022
Amount Of Sample	: 3 Samples		
Date Issued	: February 18, 2022		
Attention	: Mrs. Maisyarah		
Email	: imayborneo@gmail.com		

CODE SAMPLE	Test Method	SKN 1A				
		SS - 0257				
Basis		Air Dried	Dry	Dry Ash Free	As Received	Index
Mass as Received (kg)		6.80				
Total Moisture (% m/m)	ASTM D3302 / D3302M- 19	-	-	-	34.46	-
Moisture in the Analysis Sample (% m/m)	ASTM D3173/D3173M-17a	14.09	-	-	-	-
Ash Content (% m/m)	ASTM D3174 - 12 (2018) e1	2.43	3.23	-	4.81	-
Volatile Matter (% m/m)	ASTM D3175 - 20	37.12	42.26	56.94	30.51	-
Fixed Carbon (% m/m)	ASTM D 3172 - 13	41.37	49.51	48.06	23.07	-
Total Sulphur (% m/m)	ASTM D 4239 - 18 e1 (Method A)	0.43	1.71	1.86	1.00	-
Gross Calorific Value (kcal/kg)	ASTM D5865/D5865M - 19	5857	5987	6973	4400	-
Hardgrove Grindability Index	ASTM D409/409M-16	-	-	-	-	69

CODE SAMPLE	Test Method	SKN 2A			
		SS - 0258			
Basis		Air Dried	Dry	Dry Ash Free	As Received
Mass as Received (kg)		8.05			
Total Moisture (% m/m)	ASTM D3302 / D3302M- 19	-	-	-	33.23
Moisture in the Analysis Sample (% m/m)	ASTM D3173/D3173M-17a	13.40	-	-	-
Ash Content (% m/m)	ASTM D3174 - 12 (2018) e1	4.11	10.02	-	6.89
Volatile Matter (% m/m)	ASTM D3175 - 20	48.45	50.04	55.61	34.40
Fixed Carbon (% m/m)	ASTM D 3172 - 13	40.04	39.94	44.39	27.45
Total Sulphur (% m/m)	ASTM D 4239 - 18 e1 (Method A)	0.44	1.69	1.88	1.16
Gross Calorific Value (kcal/kg)	ASTM D5865/D5865M - 19	5714	6073	6749	5745

CODE SAMPLE	Test Method	SKN 3A			
		SS - 0259			
Basis		Air Dried	Dry	Dry Ash Free	As Received
Mass as Received (kg)		7.40			
Total Moisture (% m/m)	ASTM D3302 / D3302M- 19	-	-	-	32.79
Moisture in the Analysis Sample (% m/m)	ASTM D3173/D3173M-17a	13.28	-	-	-
Ash Content (% m/m)	ASTM D3174 - 12 (2018) e1	1.87	2.31	-	11.46
Volatile Matter (% m/m)	ASTM D3175 - 20	31.31	45.68	55.25	30.23
Fixed Carbon (% m/m)	ASTM D 3172 - 13	44.93	47.01	44.75	24.49
Total Sulphur (% m/m)	ASTM D 4239 - 18 e1 (Method A)	0.41	0.98	2.39	1.31
Gross Calorific Value (kcal/kg)	ASTM D5865/D5865M - 19	5714	5859	6723	4952

Analysis according to : ASTM Method

Regards,

Erwan, A.Md
Laboratory Manager



REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
 Report No : IDSMDJ22000629
 Analysis Date(s) : September 7 up to September 8, 2022
 Ref. No. : OC-0566/IOL-SMD/IX/22

Sample Code				PIT FOX SKN 1B
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-19	%	ar	35.98
Moisture in the analysis sample	ASTM D3173/D3173M-17a	%	ad	15.79
Ash Content	ASTM D3174-12 (Reapproved 2018) ^{E1}	%	ad	3.94
Volatile Matter	ASTM D3175-20	%	ad	39.18
Fixed Carbon	By difference	% *	ad	41.09
Total Sulphur	ASTM D4239-18 ^{E1}	%	ad	0.39
Gross Calorific Value	ASTM D5865-19	Cal/g	ad	5610
Gross Calorific Value	ASTM D5865-19	Cal/g	ar	4398

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, September 9, 2022

For and on behalf of
PT. IOL INDONESIA


Zuliyanto
Laboratory Manager

FOS 7.8 1.1.2 Ed 04 Rev 0016 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to release the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of attendance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at http://www.bureauveritas.com/terms_and_conditions



BUREAU
VERITAS

REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
Report No : IDSMDJ22000593
Analysis Date(s) : August 27 up to August 28, 2022
Ref. No. : OC-0530/IOL-SMD/VIII/22

Sample Code				PNJ FOX 1 2B
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-19	%	ar	34.96
Moisture in the analysis sample	ASTM D3173/D3173M-17a	%	ad	17.45
Ash Content	ASTM D3174-12 (Reapproved 2018) ^{E1}	%	ad	5.98
Volatile Matter	ASTM D3175-20	%	ad	38.52
Fixed Carbon	By difference	%	ad	38.05
Total Sulphur	ASTM D4239-18 ^{E1}	%	ad	0.41
Gross Calorific Value	ASTM D5865-19	Cal/g	ad	5430
Gross Calorific Value	ASTM D5865-19	Cal/g	ar	4278

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, August 29, 2022

For and on behalf of
PT. IOL INDONESIA


Zuliyanto
Laboratory Manager

FOS 7.8.1.1.2 Ed 04 Rev 00/16 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to release the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of assistance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at https://www.bureauveritas.com/terms_and_conditions



**BUREAU
VERITAS**

REPORT OF ANALYSIS

Customer : PT. PETRO NAGA JAYA
Report No : IDSMDJ21000263
Analysis Date(s) : April 21 up to April 22, 2022
Ref. No. : OC-0178/IOL-SMD/IV/21

Sample Code				S3B
Analyses	Standard Method	Unit	Basis	Result
Total Moisture	ASTM D3302/D3302M-17	%	ar	35.01
Moisture in the analysis sample	ASTM D3173/D3173M-17	%	ad	17.68
Ash Content	ASTM D3174-12 (Reapproved 2018)	%	ad	4.23
Volatile Matter	ASTM D3175-18	%	ad	38.55
Fixed Carbon	By difference	%	ad	41.54
Total Sulphur	ASTM D4239-17	%	ad	0.41
Gross Calorific Value	ASTM D5865-13	Cal/g	ad	5670
Gross Calorific Value	ASTM D5865-13	Cal/g	ar	4476

Note: ar = As Received Basis ; ad = Air Dried Basis

Sampling was not carried out by us, so we are not responsible for any errors that may have been generated during transportation and sampling process.

This report is comprised of two pages and content of any one pages are not valid unless read in conjunction with the other pages.

The report of analysis may not be reproduced (copied) without written permission from the laboratory.

Samarinda, April 23, 2021

For and on behalf of
PT. IOL INDONESIA


Zuliyanto
Assistant Laboratory Manager

FOS 7.8.1.1.2 Ed 04 Rev 0016 Sep 2019

Page 2 of 2

This certificate is issued without prejudice. Our liability is limited to the exercise of due care and diligence. This certificate is not intended to relieve the buyers and sellers from their contractual obligations and only reflects our findings at the time, place and date of attendance only.

All services are rendered in accordance with Bureau Veritas Commodities Division General Conditions of Service, available on request or at https://www.bureauveritas.com/terms_and_conditions