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# LAMPIRAN

### Lampiran 1. Data parameter produksi

Well	Tanggal	WHP	Bukaan	Steam Flow	Brine Flow	Mass Flow	Enthalpy	Dryness
LHD		barg	%	ton/jam	ton/jam	ton/jam	kJ/kg	%
LHD-A	4-Oct-19	15.4	32	81.36	35.4	116.75	2175	69.7
	23-Nov-19	16.7	44	73.44	33.1	106.56	2164	68.9
	18-Nov-20	16.5	38	63.72	46.8	110.52	1948	57.7
LHD-B	6-Oct-19	11.0	22	90.4	59.4	149.8	1988.0	60.36
	24-Nov-19	9.5	100	78.8	28.7	107.3	2250.0	73.30
	21-Nov-20	50.0	10	72.9	11.7	84.2	2504.0	86.00
LHD-C	9-Oct-19	11.5	17	32.6	212.76	245.3	1007	13.3
	25-Nov-19	11.6	50	28.8	208.8	237.6	998	12.1
	25-Nov-20	11.0	53	31.3	224.64	256.0	1005	12.2

#### Keterangan

WHP : *Well Head Pressure* (Tekanan kepala sumur)

Bukaan : Total bukaan

Steam Flow : Laju alir uap

Brine Flow : Laju alir air

Mass Flow : Laju alir massa gabungan (uap dan air)

Dryness : Tingkat kekeringan massa (perbandingan uap dibandingkan air pada satu waktu)

barg : *bar gauge*

**Lampiran 2.** Data konsentrasi kimia Brine LHD-A

Analyt	Well		
	LHD-A		
	4-Oct-19	23-Nov-19	18-Nov-20
<b>Na - Sodium</b>	348	325	361
<b>K - Potassium</b>	101	95.2	106
<b>Ca - Calcium</b>	1.56	1.23	1.23
<b>Mg - Magnesium</b>	<0.01	<0.01	<0.01
<b>Li - Lithium</b>	2.37	2.37	2.31
<b>Sr - Strontium</b>	<0.01	<0.01	<0.01
<b>Ba - Barium</b>	<0.005	<0.005	<0.005
<b>Fe - Iron</b>	0.014	0.008	0.02
<b>B - Boron</b>	22.7	18.7	12.1
<b>SiO2 - Silica</b>	960	1000	973
<b>Al - Aluminum</b>	0.686	0.722	0.799
<b>Sb - Antimony</b>	0.061	0.042	0.035
<b>As - Arsenic</b>	3.89	3.4	3.12
<b>Mn - Manganese</b>	0.009	<0.005	0.027
<b>Cl - Chloride</b>	614	574	626
<b>F - Fluoride</b>	1.53	1.57	1.5
<b>SO4 - Sulfate</b>	44.2	12.5	14.2
<b>HCO3 - Total Alkalinity (as HCO3-)</b>	7	<2	7.15
<b>CO3 - Carbonate Alkalinity (as CO3=)</b>		<2	
<b>HCO3 - Bicarbonate Alkalinity</b>		<2	
<b>NH3 - Ammonia</b>	0.692	0.801	0.769
<b>H2S - Hydrogen Sulfide</b>	12.6	13.5	10.7
<b>CO2 - Total Inorganic Carbon</b>	<20	<20	<20
<b>TDS (Calculated)</b>	2110	2040	2110
<b>Lab pH (units)</b>	5.92	4.62	5.73
<b>Field pH (units)</b>	6.5	6.37	6.6

**Lampiran 3. Data Konsentrasi NCG LHD-A**

Analyt	Unit	LHD-A		
		4-Oct-19	23-Nov-19	18-Nov-20
H2O - Water Vapour	ppm/weight	9.97E+05	9.97E+05	9.97E+05
CO2 - Carbon Dioxide		1.68E+03	1.81E+03	1.77E+03
H2S - Hydrogen Sulfide		8.16E+02	8.13E+02	8.32E+02
NH3 - Ammonia		4.11E+00	4.20E+00	4.09E+00
Ar - Argon		5.36E-01	6.16E-01	6.13E-01
N2 - Nitrogen		1.35E+01	1.32E+01	1.55E+01
CH4 - Methane		1.44E+00	1.51E+00	1.53E+00
H2 - Hydrogen		7.53E+00	7.22E+00	8.98E+00
H2O - Water Vapour	moles/10 <sup>6</sup>	N/A	N/A	N/A
CO2 - Carbon Dioxide		6.90E+02	7.41E+02	7.62E+02
H2S - Hydrogen Sulfide		4.32E+02	4.31E+02	4.41E+02
NH3 - Ammonia		4.36E+00	4.46E+00	4.33E+00
Ar - Argon		2.42E-01	2.78E-01	2.77E-01
N2 - Nitrogen		8.73E+00	8.52E+00	9.99E+00
CH4 - Methane		1.62E+00	1.70E+00	1.72E+00
H2 - Hydrogen		6.74E+01	6.47E+01	8.04E+01
H2O - Water Vapour	% dry gas	N/A	N/A	N/A
CO2 - Carbon Dioxide		5.73E+01	5.92E+01	5.74E+01
H2S - Hydrogen Sulfide		3.59E+01	3.44E+01	3.49E+01
NH3 - Ammonia		3.62E-01	3.56E-01	3.43E-01
Ar - Argon		2.01E-02	2.22E-02	2.19E-02
N2 - Nitrogen		7.24E-01	6.81E-01	7.90E-01
CH4 - Methane		1.35E-01	1.36E-01	1.36E-01
H2 - Hydrogen		5.60E+00	5.17E+00	6.37E+00

**Lampiran 4.** Data konsentrasi brine LHD-B

Analyt	Well		
	LHD-B		
	6-Oct-19	24-Nov-19	21-Nov-20
Na - Sodium	330	305	279
K - Potassium	57.8	59.6	74.1
Ca - Calcium	8.34	6.78	2.36
Mg - Magnesium	0.053	0.274	<0.01
Li - Lithium	1.99	1.97	1.35
Sr - Strontium	0.032	0.022	<0.01
Ba - Barium	<0.005	<0.005	<0.005
Fe - Iron	0.499	1.32	0.025
B - Boron	24.9	27.9	43.4
SiO <sub>2</sub> - Silica	752	865	812
Al - Aluminum	1.01	0.787	0.867
Sb - Antimony	0.087	0.083	0.065
As - Arsenic	2.14	2.25	4.48
Mn - Manganese	0.008	0.032	0.006
Cl - Chloride	402	379	434
F - Fluoride	1.07	1.21	1.53
SO <sub>4</sub> - Sulfate	86.6	59.6	32.9
HCO <sub>3</sub> - Total Alkalinity (as HCO <sub>3</sub> -)	161	161	34.4
CO <sub>3</sub> - Carbonate Alkalinity (as CO <sub>3</sub> =)		<2	
HCO <sub>3</sub> - Bicarbonate Alkalinity		161	
NH <sub>3</sub> - Ammonia	0.925	0.766	0.809
H <sub>2</sub> S - Hydrogen Sulfide	36.9	34.3	13.2
CO <sub>2</sub> - Total Inorganic Carbon	44.4	43.6	<20
TDS (Calculated)	1720	1870	1720
Lab pH (units)	8.86	8.82	6.64
Field pH (units)	8.49	8.43	7



**Lampiran 5.** Data konsentrasi NCG LHD-B

Analyt	Unit	LHD-B		
		6-Oct-19	24-Nov-19	21-Nov-20
H2O - Water Vapour	ppm/weight	9.93E+05	9.93E+05	9.94E+05
CO2 - Carbon Dioxide		5.99E+03	6.01E+03	5.49E+03
H2S - Hydrogen Sulfide		7.15E+02	6.90E+02	7.59E+02
NH3 - Ammonia		6.32E+00	6.11E+00	5.29E+00
Ar - Argon		6.05E-01	5.64E-01	5.63E-01
N2 - Nitrogen		2.97E+01	2.48E+01	2.58E+01
CH4 - Methane		1.57E+00	1.36E+00	1.37E+00
H2 - Hydrogen		5.13E+00	5.85E+00	7.43E+00
H2O - Water Vapour	moles/10 <sup>6</sup>	N/A	N/A	N/A
CO2 - Carbon Dioxide		2.47E+03	2.48E+03	2.26E+03
H2S - Hydrogen Sulfide		3.81E+02	3.67E+02	4.04E+02
NH3 - Ammonia		6.73E+00	6.51E+00	5.62E+00
Ar - Argon		2.74E-01	2.56E-01	2.56E-01
N2 - Nitrogen		1.92E+01	1.60E+01	1.67E+01
CH4 - Methane		1.78E+00	1.54E+00	1.54E+00
H2 - Hydrogen		4.78E+01	5.27E+01	6.68E+01
H2O - Water Vapour	% dry gas	N/A	N/A	N/A
CO2 - Carbon Dioxide		8.44E+01	8.48E+01	8.20E+01
H2S - Hydrogen Sulfide		1.30E+01	1.26E+01	1.47E+01
NH3 - Ammonia		2.30E-01	2.23E-01	2.04E-01
Ar - Argon		9.39E-03	8.77E-03	9.28E-03
N2 - Nitrogen		6.57E-01	5.50E-01	6.06E-01
CH4 - Methane		6.09E-02	5.28E-02	5.60E-02
H2 - Hydrogen		1.63E+00	1.80E+00	2.43E+00

**Lampiran 6.** Data konsentrasi Brine LHD-C

Analyt	Well		
	LHD-C		
	9-Oct-19	25-Nov-19	25-Nov-20
Na - Sodium	351	349	360
K - Potassium	31.4	31	34.2
Ca - Calcium	7.03	8.17	7.2
Mg - Magnesium	0.033	0.034	0.028
Li - Lithium	0.778	0.893	0.831
Sr - Strontium	0.088	0.086	0.079
Ba - Barium	0.009	0.011	0.008
Fe - Iron	0.011	0.007	0.013
B - Boron	18.4	18.7	19
SiO <sub>2</sub> - Silica	507	497	484
Al - Aluminum	0.828	0.822	0.939
Sb - Antimony	0.045	0.059	0.056
As - Arsenic	2.29	2.26	2.2
Mn - Manganese	0.049	0.052	0.041
Cl - Chloride	442	434	434
F - Fluoride	2.07	2.01	2.15
SO <sub>4</sub> - Sulfate	111	120	124
HCO <sub>3</sub> - Total Alkalinity (as HCO <sub>3</sub> <sup>-</sup> )	79.1	82.6	78.7
CO <sub>3</sub> - Carbonate Alkalinity (as CO <sub>3</sub> <sup>=</sup> )		<2	
HCO <sub>3</sub> - Bicarbonate Alkalinity (as HCO <sub>3</sub> <sup>-</sup> )		82.6	
NH <sub>3</sub> - Ammonia	1.09	1.03	0.895
H <sub>2</sub> S - Hydrogen Sulfide	15.7	15.4	16.2
CO <sub>2</sub> - Total Inorganic Carbon (as CO <sub>2</sub> )	31.5	37.9	42.8
TDS (Calculated)	1550	1550	1550
Lab pH (units)	8.1	8.21	7.69
Field pH (units)	8.03	8.08	7.2

**Lampiran 7. Data konsentrasi NCG LHD-C**

Analyt	Unit	LHD-C		
		9-Oct-19	25-Nov-19	25-Nov-20
H2O - Water Vapour	ppm/weight	9.92E+05	9.92E+05	9.93E+05
CO2 - Carbon Dioxide		6.89E+05	7.32E+03	6.38E+03
H2S - Hydrogen Sulfide		4.52E+02	4.60E+02	4.18E+02
NH3 - Ammonia		7.08E+00	7.95E+00	7.53E+00
Ar - Argon		2.75E+00	3.09E+00	2.20E+00
N2 - Nitrogen		1.47E+02	1.52E+02	1.09E+02
CH4 - Methane		1.04E+01	1.02E+01	9.77E+00
H2 - Hydrogen		7.91E-01	8.95E-01	8.19E-01
H2O - Water Vapour	moles/10 <sup>6</sup>	N/A	N/A	N/A
CO2 - Carbon Dioxide		2.84E+03	3.02E+03	2.63E+03
H2S - Hydrogen Sulfide		2.41E+02	2.45E+02	2.23E+02
NH3 - Ammonia		7.54E+00	8.47E+00	8.02E+00
Ar - Argon		1.25E+00	1.41E+00	1.00E+00
N2 - Nitrogen		9.52E+01	9.85E+01	7.06E+01
CH4 - Methane		1.18E+01	1.16E+01	1.10E+01
H2 - Hydrogen		7.12E+00	8.06E+00	7.37E+00
H2O - Water Vapour	% dry gas	N/A	N/A	N/A
CO2 - Carbon Dioxide		8.86E+01	8.90E+01	8.91E+01
H2S - Hydrogen Sulfide		7.52E+00	7.22E+00	7.55E+00
NH3 - Ammonia		2.35E-01	2.50E-01	2.72E-01
Ar - Argon		3.89E-02	4.14E-02	3.39E-02
N2 - Nitrogen		2.97E+00	2.91E+00	2.39E+00
CH4 - Methane		3.67E-01	3.41E-01	3.74E-01
H2 - Hydrogen		2.22E-01	2.38E-01	2.50E-01