

DAFTAR ISI

	Halaman
HALAMAN JUDUL	i
LEMBAR PENGESAHAN	ii
PERNYATAAN KEASLIAN KARYA ILMIAH.....	iii
HALAMAN PERSEMBAHAN.....	iv
PRAKATA	v
RINGKASAN	vi
<i>ABSTRACT</i>	vii
DAFTAR ISI	viii
DAFTAR GAMBAR.....	xi
DAFTAR GAMBAR.....	xii
DAFTAR TABEL.....	xiii
DAFTAR LAMPIRAN	xiv
DAFTAR SINGKATAN DAN LAMBANG	xv
DAFTAR SINGKATAN DAN LAMBANG	xvi
BAB I PENDAHULUAN	1
1.1. Latar Belakang	1
1.2. Rumusan Masalah	2
1.3. Tujuan.....	2
1.4. Batasan Masalah.....	2
1.5. Lokasi Penelitian	2
1.5.1. Geologi Regional Lapangan “HARS”	3
1.5.2. Statigrafi Regional Cekungan Sumatera Selatan	4
1.5.3. Struktur Regional Cekungan Sumatera Selatan.....	6
1.5.4. <i>Petroleum System</i> Cekungan Sumatera Selatan.....	7
1.5.5. Sejarah produksi Lapangan “HARS”	8
1.6. Luaran Penelitian.....	9
1.7. Manfaat Penelitian.....	9
BAB II TINJAUAN PUSTAKA DAN LANDASAN TEORI.....	10
2.1. Tinjauan Pustaka	10

2.2.	Landasan Teori.....	12
2.2.1.	Produktivitas Formasi.....	12
2.2.2.	<i>Productivity Index (PI)</i>	12
2.2.3.	<i>Inflow Performance Relationship (IPR)</i>	12
2.3.	<i>Friction Loss</i>	15
2.4.	<i>Screeening Criteria Artificial Lift</i>	17
2.5.	<i>Electrical Submersible Pump (ESP)</i>	19
2.5.4.	Prinsip Kerja	20
2.5.5.	Peralatan <i>Electric Submersible Pump (ESP)</i>	21
2.5.6.	<i>Pump Performance Curve</i>	27
2.6.	<i>Desain Electric Submersible Pump (ESP)</i>	31
2.6.1.	Penentuan Laju Alir Produksi Maksimum dan Optimum	31
2.6.2.	Penentuan Tipe pompa.....	32
2.6.3.	Perkiraan <i>Pump Setting Depth</i>	32
2.6.4.	Perhitungan Jumlah <i>Stages</i>	35
2.6.5.	Pemilihan Motor	36
2.6.6.	Pemilihan Kabel Listrik.....	36
2.6.7.	Pemilihan <i>Switchboard</i> dan Transformer	37
BAB III	METODOLOGI PENELITIAN	39
3.1.	Metode Penelitian.....	39
3.2.	Tahapan Penelitian	39
BAB IV	PENGOLAHAN DAN PENYAJIAN DATA	41
4.1.	Data Sumur “AH-025”	41
4.2.	Penentuan Produktivitas sumur.....	44
4.2.1.	IPR Metode Wiggins	44
4.2.2.	Penentuan Laju Alir Optimum.....	46
4.2.3.	Penentuan Desain Pompa <i>Electric Submersible Pump (ESP)</i>	47
4.2.4.	Penentuan Tipe dan Ukuran Pompa <i>Electric Submersible Pump (ESP)</i>	51
4.2.5.	Analisa Kinerja Pompa <i>Electric Submersible Pump (ESP)</i>	52
4.2.6.	Prencanaan Peralatan Penunjang	59
4.2.7.	Hasil Akhir Desain <i>Electrical Submersible Pump</i>	65

BAB V HASIL DAN PEMBAHASAN	68
BAB VI KESIMPULAN DAN SARAN.....	74
6.1. Kesimpulan.....	74
6.2. Saran.....	74
DAFTAR PUSTAKA.....	75
LAMPIRAN	77

DAFTAR GAMBAR

	Halaman
Gambar 1.1. Lokasi Lapangan “HARS	3
Gambar 1.2. Profil Statigrafi Cekungan Sumatera Selatan (Ginger and Fielding, 2005).....	5
Gambar 2.1. Grafik <i>Friction loss</i> Hazen-William (Brown E Kermit, 1977)..	17
Gambar 2.2. Screening Criteria (Weatherford)	17
Gambar 2.3. Screening Criteria (Herriot Watt University)	18
Gambar 2.4. Screening Criteria (Clegg, J.D).....	18
Gambar 2.5. Instalansi ESP (Brown E Kermit, 1980)	20
Gambar 2.6. <i>Junction Box</i> (Brown E Kermit, 1980)	21
Gambar 2.7. Electrostart ESP Switchboard (Baker Hughes 11 edition, 2019)	22
Gambar 2.8. <i>Variable Speed Drive</i> (Baker Hughes 11 edition, 2019)	22
Gambar 2.9. ESP Motor <i>Component</i> (Baker Hughes 11 edition, 2019)	23
Gambar 2.10. <i>Seal Component</i> (Baker Hughes 11 edition, 2019).....	24
Gambar 2.11. <i>Pump Intake</i> (Baker Hughes 11 edition, 2019).....	24
Gambar 2.12. <i>Rotary Gas Seprator</i> (Baker Hughes 11 edition, 2019).....	25
Gambar 2.13. ESP <i>Pump</i> (Baker Hughes 11 edition, 2019).....	26
Gambar 2.14. <i>Cable</i> (Baker Hughes 11 edition, 2019)	26
Gambar 2.15. <i>Pump Peformance Curve</i> FLEX 3.2 (Catalog Baker Hughes, 2018)	28
Gambar 2.16. <i>Upthrust and Downthrust</i> (Brown E Kermit, 1980).....	29
Gambar 2.17. Grafik Voltage Drop (Baker Hughes 11 edition, 2019).....	37
Gambar 3.1. Diagram Alir Metode Penelitian.....	40
Gambar 4.1. <i>Well Trajectory</i> “AH-025”.....	41
Gambar 4.2. Kurva IPR Metode Wiggins	46
Gambar 4.3. API Tubing Table Spesofocation (Oil Production. Net)	48
Gambar 4.4. <i>Pump Performance Curve</i> FLEX 3.2, 60 Hz.....	51

DAFTAR GAMBAR

(Lanjutan)

	Halaman
Gambar 4.5. Nodal Analysis @132 Stage	54
Gambar 4.6. Katalog Pompa ESP 400 S (Katalog Baker Hughes, 2019)	55
Gambar 4.7. Nodal Sensitivitas Stage	56
Gambar 4.8. Variable Speed Curve (Centralift, 2020)	57
Gambar 4.9. Nodal Sensitivity Frekuensi	59
Gambar 4.10. Katalog Gas Seprator 400 S (Katalog Baker Hughes, 2019).....	60
Gambar 4.11. Katalog Motor 450 S (Katalog Baker Hughes, 2019)	61
Gambar 4.12. Katalog Kabel (Katalog Baker Hughes, 2019)	62
Gambar 4.13. Grafik Voltage Drop (Baker Hughes 11 edition, 2019).....	63
Gambar 4.14. Katalog Transformer (Katalog Baker Hughes, 2019)	64
Gambar 4.15. Katalog Switchboard (Katalog Baker Hughes, 2019)	65
Gambar 4.16. Ilustrasi Pompa ESP Terpasang Sumur “AH-025”	67

DAFTAR TABEL

	Halaman
Tabel 2.1. <i>Scoring</i>	18
Tabel 2.2. <i>Scoring Sheet Artificial Lift</i>	19
Tabel 4.1. Data Sumur “AH-025” Lapangan “HARS”	42
Tabel 4.2. Data <i>Swabbing Job</i> Sumur “AH-025” Lapangan “HARS”	43
Tabel 4.3. Tabulasi Perhitungan Laju Alir Metode Wiggins	46
Tabel 4.4. Hasil Perhitungan Pompa ESP FLEX 3.2	52
Tabel 4.5. Tabulasi Perhitungan <i>outflow</i> 132 <i>Stages</i>	54
Tabel 4.6. Tabulasi Perhitungan Sensitivitas <i>Stages</i>	56
Tabel 4.7. Tabulasi Pembacaan <i>Head Capacity</i>	57
Tabel 4.8. Tabulasi Perhitungan Sensitivitas Frekuensi	58
Tabel 4.9. Hasil Perhitungan Perencanaan Pompa ESP	59
Tabel 4.10. Spesifikasi Motor 450S SP Type	61
Tabel 4.11. Spesifikasi Kabel Kabel tipe CENTriline CPLF	62
Tabel 4.12. Spesifikasi <i>Transformers</i> S.W FACT II Type	64
Tabel 4.13. Spesifikasi <i>Switchboard Electrostart</i> 3300	65
Tabel 4.14. Hasil Akhir Desain <i>Electical Submersible Pump</i>	66

DAFTAR LAMPIRAN

	Halaman
Lampiran A. <i>Well Trajectory</i>	78
Lampiran B. Hasil Perhitungan Sensitivitas Menggunakan <i>Software</i>	79
Lampiran C. <i>Well Diagram Software</i>	81
Lampiran D. Tipe Pompa Menggunakan Catalog <i>Software</i>	82
Lampiran E. Dokumen Data Swabbing Job Sumur “AH-025”	85