LAMPIRAN I
DATA DAN PERHITUNGAN

A. Data Pengamatan

1. Analisa Kandungan Logam Berat Mn Pada Membran Silika Padat dari *Fly Ash* Batubara

Jenis Sampel	Waktu Kontak (Menit)	Konsentrasi Kadar Logam Mangan (Mn) ppm
Sampel 0	0	6,51
	30	4,74
	60	6,20
Sampel 1	90	6,25
	120	7,44
	150	6,26
	30	0,81
	60	3,87
Sampel 2	90	1,21
	120	1,08
	150	0,92
	30	3,39
	60	3,04
Sampel 3	90	1,92
	120	3,04
	150	1,42

Keterangan:Sampel (artifisial)
Sampel 0 = Sebelum dilewatkan membran
Sampel 1 = Setelah dilewatkan membran dengan konsentrasi NaOH 1M
Sampel 2 = Setelah dilewatkan membran dengan konsentrasi NaOH 2M
Sampel 3 = Setelah dilewatkan membran dengan konsentrasi NaOH 3M

2. Analisa Kandungan Logam Berat Mn Pada Membran Silika Padat dari *Fly Ash* Batubara

Jenis Sampel	Waktu Kontak (menit)	Konsentrasi Kadar Logam Mangan (Mn) ppm
Sampel 1	0	2,41
Sampel 2	30	0,45
	60	0,24
	90	0,37
	120	0,36
	150	0,39

Keterangan : Sampel (artifisial)
Sampel 1 = Sebelum dilewatkan membran
Sampel 2 = Setelah dilewatkan membran

3. Analisis Penentuan Rejeksi Pada Membran Silika Padat dari *Fly Ash* Batubara

Waktu Kontak (menit)	Rejeksi Membran Silika Padat dari *Fly Ash* Batubara (%)		
	Konsentrasi NaOH		
	1M	2M	3M
30	27,1889	87,5576	85,8678
60	4,7619	40,5529	53,3026
90	3,9993	81,4132	70,5069
120	-14,2857	83,4101	53,3026
150	3,8402	86,8678	78,1874

4. Penentuan Nilai Fluks Pada Membran Silika Padat dari *Fly Ash* Batubara

Waktu Proses	Kadar logam Mn (ppm)			Nilai Fluks (ml/sec.cm^2)		
	Konsentrasi NaOH			Konsentrasi NaOH		
	1M	2M	3M	1M	2M	3M
30	4,74	0,81	3,39	27,1889	87,5576	85,8678
60	6,20	3,87	3,04	4,7619	40,5529	53,3026
90	6,25	1,21	1,92	3,9993	81,4132	70,5069
120	7,44	1,08	3,04	-14,2857	83,4101	53,3026
150	6,26	0,92	1,42	3,8402	86,8678	78,1874

LAMPIRAN II
PERHITUNGAN

A. Perhitungan Rejeksi

a) Rejeksi untuk membran 1M

- **Rejeksi membran untuk waktu 30 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{4,74}{6,51}))$ x 100 %

  R = 27,1889 %

- **Rejeksi membran untuk waktu 60 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{6,20}{6,51}))$ x 100 %

  R = 4,7619 %

- **Rejeksi membran untuk waktu 90 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{6,25}{6,51}))$ x 100 %

  R = 3,9993 %

- **Rejeksi membran untuk waktu 120 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{7,44}{6,51}))$ x 100 %

  R = -14,2857 %

- **Rejeksi membran untuk waktu 150 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{6,26}{6,51}))$ x 100 %

  R = 3,8402 %

b) Rejeksi untuk membran 2M

- **Rejeksi membran untuk waktu 30 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{0,81}{6,51}))$ x 100 %

  R = 87,5576 %

- **Rejeksi membran untuk waktu 60 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{3,87}{6,51}))$ x 100 %

  R = 40,5529 %

- **Rejeksi membran untuk waktu 90 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{1,21}{6,51}))$ x 100 %

  R = 81,4132%

- **Rejeksi membran untuk waktu 120 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{1,08}{6,51}))$ x 100 %

  R = 83,4101 %

- **Rejeksi membran untuk waktu 150 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{0,92}{6,51}))$ x 100 %

  R = 85,8678 %

c) Rejeksi untuk membran 3M

- **Rejeksi membran untuk waktu 30 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{0,92}{6,51}))$ x 100 %

  R = 85,8678 %

- **Rejeksi membran untuk waktu 60 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{3,04}{6,51}))$ x 100 %

  R = 53,3026 %

- **Rejeksi membran untuk waktu 90 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{1,92}{6,51}))$ x 100 %

  R = 70,5069%

- **Rejeksi membran untuk waktu 120 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{3,04}{6,51}))$ x 100 %

  R = 53,3026 %

- **Rejeksi membran untuk waktu 150 menit**

  R = $(1-\frac{Cp}{Cb})$ x 100 %

  R = $(1-(\frac{1,42}{6,51}))$ x 100 %

  R = 78,1874 %

B. Pehitungan Nilai Fluks

a) Nilai Fluks Membran dengan Konsentrasi 1M

- **30 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 100 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{1800\,s}$ x $\frac{1}{3,297}$

  = 0,0168 ml/sec.cm^2

- **60 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 120 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{3600s}$ x $\frac{1}{3,297}$

  = 0,0101 ml/sec.cm^2

- **90 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 135 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{5400s}$ x $\frac{1}{3,297}$

  = 0,0075 ml/sec.cm^2

- **120 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 140 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{7200}$ x $\frac{1}{3,297}$

  = 0,0058 ml/sec.cm^2

- **150 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 124 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{9000}$ x $\frac{1}{3,297}$

  = 0,0041 ml/sec.cm^2

b) Nilai Fluks Membran dengan Konsentrasi 2M

- **30 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 80 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{1800\,s}$ x $\frac{1}{3,297}$

  = 0,0134 ml/sec.cm^2

- **60 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 90 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{3600s}$ x $\frac{1}{3,297}$

  = 0,0071 ml/sec.cm^2

- **90 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 83 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{5400s}$ x $\frac{1}{3,297}$

  = 0,0046 ml/sec.cm^2

- **120 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 86 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{7200}$ x $\frac{1}{3,297}$

  = 0,0036 ml/sec.cm^2

- **150 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 80 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{9000}$ x $\frac{1}{3,297}$

  = 0,0026 ml/sec.cm^2

c) Nilai Fluks Membran dengan Konsentrasi 3M

- **30 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 83 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{1800\,s}$ x $\frac{1}{3,297}$

  = 0,0139 ml/sec.cm^2

- **60 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 86 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{3600s}$ x $\frac{1}{3,297}$

  = 0,0072 ml/sec.cm^2

- **90 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 82 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{5400s}$ x $\frac{1}{3,297}$

  = 0,0046 ml/sec.cm^2

- **120 menit**

  J = Vpermeat x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{t\,.sampel}$ x $\frac{1}{Am}$

  = 90 ml x $\frac{1L}{1000\,ml}$ x $\frac{3600s}{1\,jam}$ x $\frac{1}{7200}$ x $\frac{1}{3,297}$

  = 0,0037 ml/sec.cm^2

- **150 menit**

  J = Vpermeat x $\frac{1L}{1000\ ml}$ x $\frac{3600s}{1\ jam}$ x $\frac{1}{t\ .sampel}$ x $\frac{1}{Am}$

  = 83 ml x $\frac{1L}{1000\ ml}$ x $\frac{3600s}{1\ jam}$ x $\frac{1}{9000}$ x $\frac{1}{3,297}$

  = 0,0027 ml/sec.cm^2