



PT Filosofi Teknik Utama



SERTIFIKAT PENILAIAN PERPANJANGAN SISA UMUR LAYAN INSTALASI SPPBE NO.: 02/FTU-056/CERT-RLA/II/2024

Dengan ini menyatakan bahwa PT. Filosofi Teknik Utama telah melaksanakan Perpanjangan Sisa Umur Layan dengan baik dan sesuai dengan kaidah keteknikan yang berlaku serta Peraturan Menteri Energi dan Sumber Daya Mineral Republik Indonesia Nomor 32 Tahun 2021.

Data umum peralatan/instalasi dideskripsikan sebagai berikut:

Nama Instalasi	: Stasiun Pengisi Bulk Elpiji (SPBE)
Pemilik	: PT Mitra Harun Gasindo
Pengguna	: PT Mitra Harun Gasindo
Tipe Instalasi	: Instalasi Eksisting
Lokasi	: Jl Gadog Raya No. 3, Ciawi, Kab. Bogor
Jenis Fluida	: LPG
Kapasitas	: 50 Ton/Hari
Digunakan untuk	: Stasiun Pengisi Bulk Elpiji
Tahun Dibuat/Digunakan	: 2008/2010

Hasil Penilaian Perpanjangan Sisa Umur Layan sebagai berikut:

Nomor laporan RLA	: FTU-056/03/R-RLA/II/2024
Sisa Umur Layan	: 96 Months

Rekomendasi Parameter Operasi Instalasi PT Mitra Harun Gasindo:

Tipe	Parameter	Nilai Parameter	Referensi
Instalasi	Tekanan Desain (MAWP)	15,6 (Kg/cm ²)	<ul style="list-style-type: none">• Parameter Desain dan Operasi Instalasi• Laporan RLA LPG Storage Tank Cap. 50 Ton (T-01) No. FTU-056/01/R-RLA/II/2024• Laporan RLA Instalasi PT Mitra Harun Gasindo No. FTU-056/03/R-RLA/II/2024
	Temperatur Desain	55 (°C)	
	Tekanan Operasi	12 - 13 (Kg/cm ²)	
	Temperatur Operasi	25 - 30 (°C)	
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Sistem Perpipaan		Tabel 3.7	



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Sertifikat ini dapat berubah/diganti, apabila terjadi hal-hal yang menyebabkan Instalasi/peralatan tersebut tidak layak dan tidak aman untuk dioperasikan.

Perencanaan Inspeksi yang diajukan untuk instalasi adalah sebagai berikut:

Tipe Peralatan	Mekanisme Kerusakan	Metode Inspeksi	Interval Inspeksi	Standar
Perpipaan	Korosi Eksternal	Visual Inspection and UT Inspection	4 Tahun	API 570
	Korosi Internal	UT Inspection		
	Vibrasi	Pengukuran Getaran dan Inspeksi pada Sambungan		

Perencanaan Inspeksi yang diajukan untuk peralatan adalah sebagai berikut:

Tipe Peralatan	Mekanisme Kerusakan	Metode Inspeksi	Interval Inspeksi	Standar
Peralatan Putar	Vibrasi	Pengukuran Getaran	6 Bulan	API 610 & API 618
	Stator dan Rotor Kotor	Inspeksi Visual dan Pembersihan	6 Bulan	
	Suhu Terlalu Tinggi	Pengukuran Suhu	6 Bulan	
	Listrik Statis	Pengukuran Pembumian	6 Bulan	
	Gesekan pada Bearings, Brushes, Collector Rings, Commutators	Lubricate dan Pergantian Oli	1 Tahun	
	Kerusakan pada Ball, Roller, dan Thrust Bearing	Pergantian Part Peralatan	Rekomendasi Manufacture's	
Bejana Tekan	Korosi Eksternal	Visual Inspection and UT Inspection	4 Tahun	API 510
	Korosi Internal	UT Inspection		
Katup Pengaman	Overpressure	Pop Test / Bench Test	4 Tahun	API 527
	Leakage			



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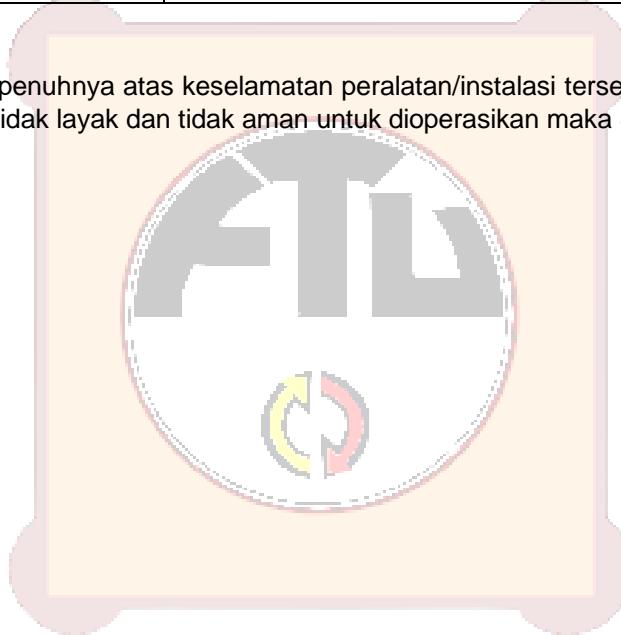
Tipe Peralatan	Mekanisme Kerusakan	Metode Inspeksi	Interval Inspeksi	Standar
Peralatan Listrik	Vibrasi	Pengukuran Getaran	6 Bulan	NEMA MG 1-32
	Stator dan Rotor Kotor	Inspeksi Visual dan Pembersihan	6 Bulan	
	Suhu Terlalu Tinggi	Pengukuran Suhu	6 Bulan	

PT Mitra Harun Gasindo, bertanggung jawab sepenuhnya atas keselamatan peralatan/instalasi tersebut di atas. Apabila terjadi perubahan desain atau hal-hal yang dapat menyebabkan instalasi tidak layak dan tidak aman untuk dioperasikan maka Sertifikat RLA ini dapat ditinjau kembali.

Diterbitkan di : Tangerang Selatan
Tanggal : 29 February 2024

PT Filosofi Teknik Utama


Cepi Gustiana
Operational Manager





PT Filosofi Teknik Utama

Judul Dokumen	No. Dokumen	:	FTU-056/03/R-RLA/II2024
Remaining Life Assessment Installation	Revisi	:	0
	Tanggal Rev.	:	29 February 2024

Remaining Life Assessment Installation PT Mitra Harun Gasindo

REV.	DESKRIPSI	TANGGAL	Prepared	Checked	Approved
0	Issued for approval	29-Feb-24	AB	CPI	
A	Issued for review	26-Feb-24	AB	CPI	
			PT Filosofi Teknik Utama		PT Mitra Harun Gasindo

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REVISION SHEET

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1. PENDAHULUAN

1.1 Latar Belakang

Berdasarkan pada PERMEN ESDM No. 32 tahun 2021 tentang Inspeksi Teknis dan Pemeriksaan Keselamatan Instalasi dan Peralatan Pada Kegiatan Usaha Minyak dan Gas Bumi, perihal "Pemeriksaan Peralatan Operasi MIGAS yang telah Melewati Umur Desain (Design Life) dan yang Tidak Memiliki Data". Dalam hal ini maka dilakukan penilaian sisa umur layan pada Instalasi PT Mitra Harun Gasindo sebagai bentuk tanggung jawab keselamatan kerja dan operasi terhadap instalasi tersebut.

1.2 Tujuan

Adapun lingkup pekerjaan yang dibahas dalam laporan penilaian sisa umur layan (RLA) ini meliputi:

- a) Penelaahan dokumen teknis instalasi
- b) Penelaahan dokumen inspeksi dan perawatan
- c) Penentuan mekanisme kerusakan
- d) Fitness for Service
- e) Penentuan sisa umur layan
- f) Penilaian risiko
- g) Rekomendasi metode dan interval inspeksi

Hasil penilaian ini digunakan sebagai pemenuhan Pemeriksaan Keselamatan untuk Persetujuan Layak Operasi (PLO) sesuai dengan Peraturan Menteri ESDM No. 32 Tahun 2021

1.3 Referensi

Regulasi, Code dan standar yang digunakan sebagai referensi utama dalam pekerjaan ini adalah:

No.	Nomor Dokumen	Judul Dokumen
1	Peraturan Pemerintah	
	Permen ESDM No.32 tahun 2021	Inspeksi Teknis dan Pemeriksaan Keselamatan Instalasi dan Peralatan pada Kegiatan Usaha Minyak dan Gas Bumi
2	Standar Nasional Indonesia	
	SNI 13-6222-2000	Istilah Perpipaan.

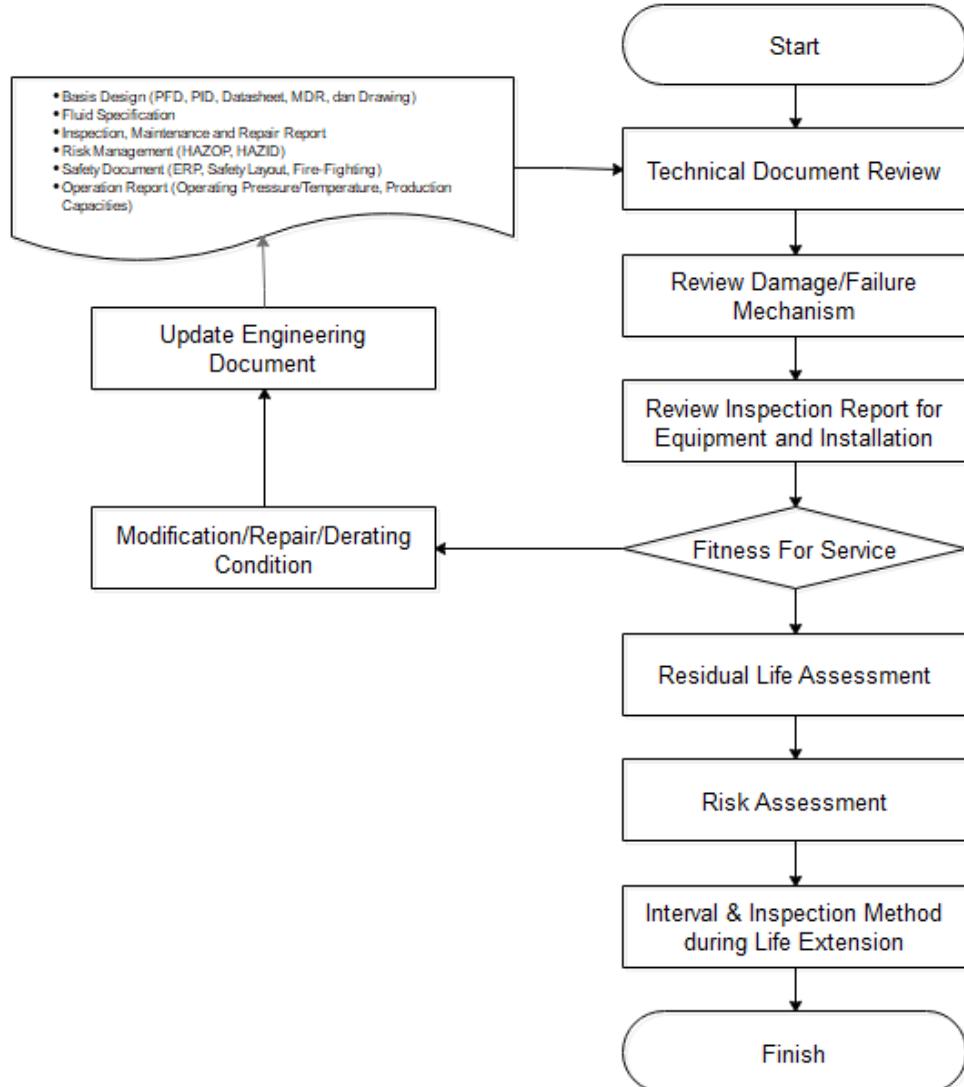
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No.	Nomor Dokumen	Judul Dokumen
3	SNI 13-3499-2002	Pipa Pengolahan - Process Piping. SNI
	SNI 13-3498-2002	Inspeksi Bejana Tekan.
	SNI 04-0225- 2000	Persyaratan umum instalasi listrik
	SNI 3473:2012	Sistem transportasi pipa penyalur untuk cairan hidrokarbon dan cairan lain
	SNI 3474:2009	Sistem penyaluran dan distribusi pipa gas
Standar Internasional		
3	ASME B.31.3	Process Piping
	ASME Section V	Non Destructive Examination.
	ASME Section VIII Div. 1	Rules for Construction of Pressure Vessels
	NFPA 10	Portable Fire Extinguisher.
	NFPA 58	Liquefied Petroleum Gas Code
	NFPA 25	Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection System
	NFPA 14	Standard for the Installation of Standpipe and Hose System
	NFPA 30	Flammable and Combustible Liquids Code.
	API RP 750	Management of process hazards
	API 510	Pressure Vessel Inspection Code : In-service Inspection, Rating, Repair and Alteration
	API 570	Piping Inspection Code : In-service Inspection, Rating, Repair and Alteration
	API 579-1/ASME FFS-1	Fitness for Services
	API 571	Damage Mechanisms Affecting Fixed Equipment in the Refining Industry
	API 576	Inspection of Pressure-relieving Devices
	API STD 618	Reciprocating Compressors for Petroleum, Chemical and Gas Industry Service
	API STD 610	Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries

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2. Lingkup Kerja

Metodologi yang digunakan dalam penilaian umur sisa layan (Remaining Life Assessment - RLA) instalasi ini, ditunjukkan pada berikut:



Gambar 2-1 Metodologi RLA Instalasi sesuai Permen ESDM No.32 Tahun 2021

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3. Penelaahan Dokumen

3.1 Data Instalasi

Informasi terkait data teknis instalasi PT Mitra Harun Gasindo:

Tabel 3.1 Data Umum Instalasi

Deskripsi	Keterangan
Pemilik	PT Mitra Harun Gasindo
Pengguna	PT Mitra Harun Gasindo
Lokasi	Jl Gadog Raya No. 3, Ciawi, Kab. Bogor
Kapasitas	50 Ton / Hari
Tahun Dibuat/Digunakan	2008 / 2010
Digunakan Untuk	Stasiun Pengisi Bulk Elpiji

3.2 Data Peralatan

Total peralatan yang mendukung proses pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.2 Data Peralatan

Tipe Peralatan	Jumlah
Bejana Tekan	2
Peralatan Putar	3
Peralatan Listrik	3
Katub Pengaman	18

3.2.1 Bejana Tekan

Informasi teknis untuk peralatan bejana tekan pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.3 Data Bejana Tekan

No	Tag No. / Serial No.	Deskripsi	Desain Press (kg/cm ²)	Tahun Pembuatan
1	T-01	LPG Storage Tank Cap. 50 Ton	17,60	2009
2	006/DPT/III/2010	Air Receiver Tank	10,00	2010

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3.2.2 Peralatan Putar

Informasi teknis untuk peralatan putar pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.4 Data Peralatan Putar

No	Tag No.	Deskripsi	Tekanan Maksimum (kg/cm2)	Tahun Pembuatan	Tipe
1	P-01	LPG Pump	18,27	2008	Centrifugal
2	P-02	LPG Pump	18,27	2008	Centrifugal
3	C-01	LPG Compressor	18	2008	Reciprocating

3.2.3 Peralatan Listrik

Informasi teknis untuk peralatan listrik pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.5 Data Peralatan Tangki Penimbun

No	Tag No.	Deskripsi	Tegangan (Volt)	Tahun Pembuatan
1	GEN/MHG/001	Power Generator	380	2008
2	MCC-01	Panel Distribution	380	2008
3	MCC-02	Panel Distribution	380	2008

3.2.4 Peralatan Katub Pengaman

Informasi teknis untuk peralatan katub pengaman pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.6 Data Peralatan Tangki Penimbun

No	Tag No.	Peralatan Dilindungi	Set Press (kg/cm2)	Tahun Pembuatan	Tipe
1	PRV-01	Line 3" Liquid Loading In	17,57	2008	Conventional
2	PRV-02	Line 2" Vapor Loading Out	17,57	2008	Conventional
3	PRV-03	Line 3" Liquid Loading to Filling	17,57	2008	Conventional
4	PRV-04	Line 6" Liquid to Tank	17,59	2008	Conventional
5	PRV-05	Line 6" Liquid to Tank	17,57	2008	Conventional
6	PRV-06	Line 3" Pump P-01	18,63	2008	Conventional
7	PRV-07	Line 3" Pump P-02	18,63	2008	Conventional
8	PRV-08	Line 6" Liquid to Tank	17,57	2008	Conventional
9	PRV-09	Line 3" Filling Process	17,57	2008	Conventional
10	PRV-10	Line 3" Filling Process	17,57	2008	Conventional
11	PRV-11	Gas Compressor	17,57	2008	Conventional
12	PRV-12	Gas Compressor	9,98	2008	Conventional
13	PRV-13	Line 6" Hid rant Pump	9,98	2008	Conventional
14	PRV-14	Vessel Air Receiver	9,98	2008	Conventional
15	PRV-V01	LPG Storage Tank	17,59	2008	Conventional
16	PRV-V02	LPG Storage Tank	17,59	2008	Conventional
17	PRV-V03	LPG Storage Tank	17,59	2008	Conventional
18	PRV-V04	LPG Storage Tank	17,59	2008	Conventional

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3.2.5 Sistem Perpipaan

Informasi teknis untuk sistem perpipaan pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.7 Sistem Perpipaan

No	NPS	Deskripsi	Design Press (kg/cm ²)	Material Spec.	Sch
1	2"	Return Line	17,57	SA 106 Gr.B	80
2	2"	ST 50T to Filling Hall	17,57	SA 106 Gr.B	80
3	3"	LPG Pump to Filling Hall	18,63	SA 106 Gr.B	80
4	4"	ST 50T to LPG Pump	17,57	SA 106 Gr.B	80
5	4"	Vapor Line	17,57	SA 106 Gr.B	80
6	4"	LPG Compressor to ST 50T	17,57	SA 106 Gr.B	80
7	4"	ST 50T to Filling Hall	17,57	SA 106 Gr.B	80

3.2.6 Sistem Penanggulangan Kebakaran

Informasi teknis untuk sistem penanggulangan kebakaran pada instalasi PT Mitra Harun Gasindo ditunjukkan pada tabel berikut:

Tabel 3.8 Sistem Penanggulangan Kebakaran

No	Nama Barang	Kapasitas	Jumlah
1	APAR Powder	6 Kg	14
2	APAR Powder	9 Kg	3
3	APAR Powder	60 Kg	4
4	APAR Powder	70 Kg	1
5	APAR CO2	7 Kg	3

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4. Mekanisme Kerusakan

Identifikasi mekanisme kerusakan yang terjadi pada peralatan bertekanan disesuaikan dengan kriteria pada ASME PCC-3 dan API 571 berdasarkan:

- Material
- Temperature
- Fluida
- Lingkungan
- Aliran
- Loading

Mekanisme kerusakan yang mungkin terjadi di Instalasi PT Mitra Harun Gasindo berdasarkan kriteria kondisi desain, kondisi operasi, material peralatan dan fluida sesuai API 571 ditunjukkan pada tabel berikut:

Tabel 4.1 Kemungkinan Mekanisme Kerusakan

No	Mekanisme Kerusakan	Mode Kerusakan	Kemungkinan Terjadi	Keterangan
1	Korosi Eksternal			
	- Korosi Atmospheric	<i>Metal Loss</i>	<i>Medium</i>	Kemungkinan terjadi pada sistem perpipaan, bejana tekan dan tangki timbun
	- Korosi Celah	<i>Metal Loss</i>	<i>Medium</i>	Kemungkinan terjadi pada celah antara support (metal) dengan peralatan
	- Korosi Galvanik	<i>Metal Loss</i>	<i>Medium</i>	Kemungkinan terjadi pada area sambungan sistem perpipaan ke nozzle pada peralatan
	- Korosi Under Insulasi	<i>Metal Loss</i>	<i>Medium</i>	Kemungkinan terjadi pada area yang terinsulasi pada bejana tekan dan sistem perpipaan
	- Korosi Tanah	<i>Metal Loss</i>	<i>Low</i>	Kemungkinan terjadi pada bottom plate tangka timbun
2	Korosi Internal			
	- Korosi akibat CO ₂	<i>Metal Loss</i>	<i>Low</i>	Tidak ditemukan informasi adanya CO ₂
	- Korosi akibat H ₂ S	<i>Metal Loss</i>	<i>Low</i>	Tidak ditemukan informasi adanya H ₂ S
3	- Korosi akibat Mikrobiologi	<i>Metal Loss</i>	<i>Low</i>	Kemungkinan terjadi jika flow rendah dan stagnan di peralatan perpipaan, tangki timbun dan bejana tekan
	Getaran	<i>Crack</i>	<i>Medium</i>	Kemungkinan terjadi pada perpipaan yang berada di dekat pompa dan kompressor apabila getaran melebihi kekuatan struktural

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5. Fitness for Service

5.1 Umum

Perhitungan keteknikan untuk meninjau kelayakan peralatan pada Instalasi PT Mitra Harun Gasindo antara lain:

- a) Kriteria kecukupan pada perpipaan berdasarkan ASME B31.3
- b) Kriteria kecukupan pada bejana tekan berdasarkan parameter tekanan sesuai API 510
- c) Kriteria kecukupan sistem keselamatan proses berdasarkan ketersediaan peralatan

5.2 Sistem Perpipaan

Hasil perhitungan kecukupan sistem perpipaan ditunjukkan pada tabel berikut:

Tabel 5.1 Hasil Penilaian Perpipaan

No	NPS	SCH	Material Spec.	Actual Thickness (mm)	Design Pressure (kg/cm2)	MAWP (kg/cm2)	Remarks
1	2"	80	SA 106 Gr B	5,91	17,57	271	Acceptable
2	2"	80	SA 106 Gr B	6,12	17,57	283	Acceptable
3	3"	80	SA 106 Gr B	7,95	18,63	256	Acceptable
4	4"	80	SA 106 Gr B	8,49	17,57	207	Acceptable
5	4"	80	SA 106 Gr B	8,82	17,57	216	Acceptable
6	4"	80	SA 106 Gr B	8,65	17,57	211	Acceptable
7	4"	80	SA 106 Gr B	7,74	17,57	203	Acceptable

5.3 Bejana Tekan

Perhitungan kecukupan pada bejana tekan mengacu pada perbandingan parameter tekanan (desain dan MAWP). Hasil perhitungan kecukupan bejana tekan ditunjukkan pada tabel berikut:

Tabel 5.2 Hasil Penilaian Bejana Tekan

No	Tag No. / Serial No.	Deskripsi	Design Pressure (kg/cm2)	MAWP (kg/cm2)	Remarks
1	T-01	LPG Storage Tank Cap. 50 Ton	17,6	15,6 *	Acceptable
2	006/DPT/III/2010	Air Receiver Tank	10,0	16,0	Acceptable

Note: * LPG Storage Tank Cap. 50 Ton Derating sesuai report RLA LPG Storage Tank Cap. 50 Ton (T-01)

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5.4 Sistem Penanggulangan Kebakaran

Kriteria kecukupan sistem penanggulangan kebakaran ditinjau ketersediaan peralatan pemadam.

Tabel 5.3 Hasil Penilaian Sistem Peralatan Pemadam Api

No	Nama Barang	Kapasitas	Jumlah
1	APAR Powder	6 Kg	14
2	APAR Powder	9 Kg	3
3	APAR Powder	60 Kg	4
4	APAR Powder	70 Kg	1
5	APAR CO2	7 Kg	3

6. Sisa Umur Layar

Perhitungan sisa umur layar mengacu pada API 570 (sistem perpipaan), API 510 (bejana tekan), dan API 653 (tangki timbun) yaitu sebagai berikut.

$$\text{Remaining life} = \frac{t_{actual} - t_{required}}{\text{Corrosion rate}}$$

Dimana:

- T-actual: Ketebalan pengukuran terakhir.
- T-required: Tebal yang diperlukan pada komponen. Dihitung dengan rumus desain di ASME VIII Div 1 (bejana tekan), ASME B31.3 (sistem perpipaan) dan API 653 (tangki timbun)

Perhitungan laju korosi menggunakan rumus sebagai berikut.

$$\text{Long Term Corrosion rate (LT)} = \frac{t_{initial} - t_{actual}}{\text{time between } t_{initial} \text{ and } t_{actual} (\text{years})}$$

atau

$$\text{Short Term Corrosion rate (ST)} = \frac{t_{previous} - t_{actual}}{\text{time between } t_{previous} \text{ and } t_{actual} (\text{years})}$$

Dimana:

- T-previous: Tebal sebelumnya yang diukur selama inspeksi sebelumnya.
- T-initial: Ketebalan pada saat fabrikasi.
- T-actual: Ketebalan pengukuran terakhir.

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6.1 Bejana Tekan

Sisa umur layan terendah pada peralatan bejana tekan disediakan pada tabel berikut:

Tabel 6.1 Hasil RLA Bejana Tekan

No	Tag No. / Serial No.	Deskripsi	Design Pressure (kg/cm2)	RLA (tahun)
1	T-01	LPG Storage Tank Cap. 50 Ton	15,6 *	8
2	006/DPT/III/2010	Air Receiver Tank	10	>20

Note: * LPG Storage Tank Cap. 50 Ton Derating sesuai report RLA LPG Storage Tank Cap. 50 Ton (T-01)

6.2 Sistem Perpipaan

Sisa umur layan terendah pada peralatan sistem perpipaan disediakan pada tabel berikut:

Tabel 6.2 Hasil RLA Sistem Perpipaan

No	NPS	SCH	Material Spec.	Design		RLA (tahun)
				Pressure (kg/cm2)	Temperature (degF)	
1	2"	80	SA 106 Gr B	17,57	98,6	>20
2	2"	80	SA 106 Gr B	17,57	98,6	>20
3	3"	80	SA 106 Gr B	18,63	98,6	>20
4	4"	80	SA 106 Gr B	17,57	98,6	>20
5	4"	80	SA 106 Gr B	17,57	98,6	>20
6	4"	80	SA 106 Gr B	17,57	98,6	>20
7	4"	80	SA 106 Gr B	17,57	98,6	>20

7. Analisa Risiko

Analisis risiko merupakan aktivitas untuk mengidentifikasi dan menganalisis potensi sebab dan kemungkinan akibat risiko, baik dengan metode kualitatif, semi kuantitatif, maupun kuantitatif. Analisis risiko yang dilakukan di dalam laporan ini bersifat kualitatif.

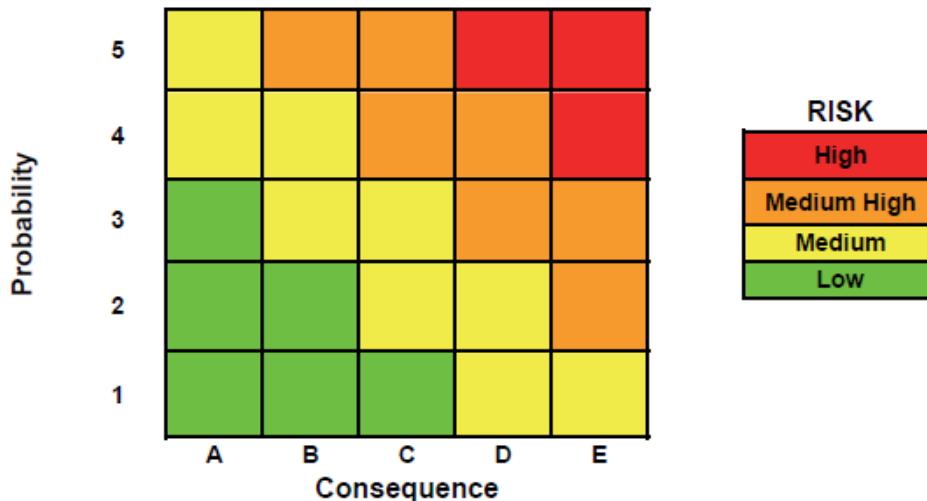
7.1 Risk Matriks

Analisa risiko dapat dirumuskan sebagai perkalian antara Probability of Failure (PoF) dan Consequence of Failure (CoF) dengan rumus sebagai berikut:

$$\text{Risk} = \text{Probability of Failure (PoF)} \times \text{Consequence of Failure (CoF)}$$

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Matrik risiko ditunjukkan pada gambar berikut:



Gambar 7-1 Risk Matrix based on API 581 2016

7.2 Probability of Failure (POF)

Kriteria Probability of Failure (PoF) ditunjukkan pada table berikut:

Tabel 7.1 Probability of Failure (POF) Kriteria

Category	Probability Range
1	$\leq 3.06E-05$
2	$3.06E-05 < 3.06E-04$
3	$3.06E-04 < 3.06E-03$
4	$3.06E-03 < 3.06E-02$
5	$> 3.06E-02$

Ref: API 518 2016 (Table 4.1M – Numerical Values Associated with POF

7.3 Consequence of Failure (COF)

Kriteria Consequence of Failure (CoF) ditunjukkan pada table berikut:

Tabel 7.2 Consequence of Failure (COF) Kriteria

Category	Consequence Range (m ²)
1	$CA \leq 9.29$
2	$9.29 < CA \leq 92.9$
3	$92.9 < CA \leq 929$
4	$929 < CA \leq 9290$
5	$CA > 9,290$

Ref: API 518 2016 (Table 4.1M – Numerical Values Associated with Area Based COF Categories

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7.4 Hasil Penilaian Resiko

Hasil penilaian risiko secara *qualitative* pada instalasi disediakan pada tabel berikut.

Tabel 7.3 Hasil Penilaian Resiko

No	Deskripsi	Kategori		Risiko	Keterangan
		PoF	CoF		
1	Installation PT Mitra Harun Gasindo	3	3	Medium Risk	Tidak pernah terjadi kebocoran ataupun kegagalan pada peralatan dan sistem keselamatan dan kebakaran yang baik dan juga management tanggap darurat untuk menjaga installasi tetap <i>safe and fit for service</i> .

7.5 Klasifikasi Area Berbahaya

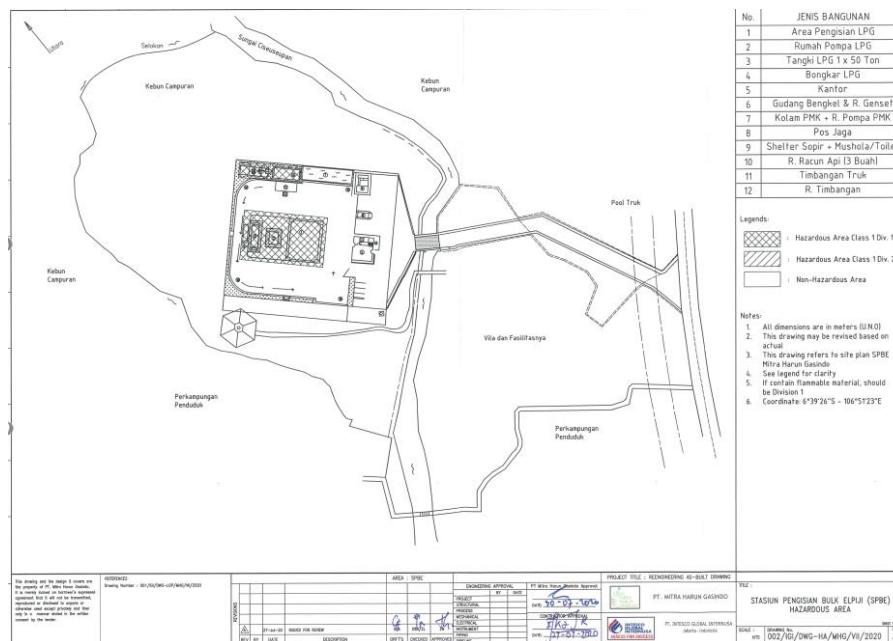
Klasifikasi area berbahaya pada Instalasi milik PT Mitra Harun Gasindo terbagi atas:

a) *Hazardous Area* – Kelas I, Divisi 1, Group D yang terdiri dari:

- Area Pengisian dari Truck
- Area Penyimpanan Akhir

b) *Hazardous Area* – Kelas I, Divisi 2, Group D yang terdiri dari:

- Rumah Pompa
- Tangki Proses



Gambar 7-2 Metodologi RLA Instalasi sesuai Permen ESDM No.32 Tahun 2021

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8. Rencana Inspeksi

Perencanaan inspeksi disesuaikan dengan jenis mekanisme kerusakan yang mungkin terjadi pada peralatan bertekanan. Perencanaan inspeksi mencakup aktifitas dan interval frekuensi yang disesuaikan dengan proses sistem pada Instalasi PT Mitra Harun Gasindo.

Tabel 8.1 Hasil Penilaian Resiko

Tipe Peralatan	Mekanisme Kerusakan	Metode Inspeksi	Interval Inspeksi	Standar
Peralatan Putar	Vibrasi	Pengukuran Getaran	6 Bulan	API 610 & API 618
	Stator dan Rotor Kotor	Inspeksi Visual dan Pembersihan	6 Bulan	
	Suhu Terlalu Tinggi	Pengukuran Suhu	6 Bulan	
	Listrik Statis	Pengukuran Pembumian	6 Bulan	
	Gesekan pada Bearings, Brushes, Collector Rings, Commutators	Lubricate dan Pergantian Oli	1 Tahun	
	Kerusakan pada Ball, Roller, dan Thrust Bearing	Pergantian Part Peralatan	Rekomendasi Manufacture's	
Bejana Tekan	Korosi Eksternal	Visual Inspection and UT Inspection	4 Tahun	API 510
	Korosi Internal	UT Inspection		
Perpipaan	Korosi Eksternal	Visual Inspection and UT Inspection	4 Tahun	API 570
	Korosi Internal	UT Inspection		
	Vibrasi	Pengukuran Getaran dan Inspeksi pada Sambungan		
Katup Pengaman	Overpressure	Pop Test / Bench Test	4 Tahun	API 527
	Leakage			
Peralatan Listrik	Vibrasi	Pengukuran Getaran	6 Bulan	NEMA MG 1-32
	Stator dan Rotor Kotor	Inspeksi Visual dan Pembersihan	6 Bulan	
	Suhu Terlalu Tinggi	Pengukuran Suhu	6 Bulan	

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9. Kesimpulan dan Rekomendasi

9.1 Kesimpulan

Hasil penilaian integritas pada instalasi sesuai dengan parameter teknis berdasarkan peraturan, kode/standar dan dokumen perusahaan antara lain:

- Secara umum Instalasi PT Mitra Harun Gasindo dalam kondisi baik dan layak beroperasi.
- Sisa umur layan pada Instalasi PT Mitra Harun Gasindo adalah **8 Tahun**, mengacu pada umur terendah peralatan bejana tekan **LPG Storage Tank Cap. 50 Ton (T-01)**
- Kategori risiko pada Instalasi PT Mitra Harun Gasindo adalah **Medium Risk**

9.2 Rekomendasi

Rekomendasi berdasarkan penilaian untuk Instalasi PT Mitra Harun Gasindo antara lain:

- Melakukan inspeksi dan perawatan secara berkala untuk mengetahui indikasi kebocoran, korosi eksternal, kerusakan peralatan dan keadaan tidak normal lain pada peralatan proses sesuai kaidah keteknikan yang baik
- Memperhatikan keandalan, fungsi dan integritas safeguard pada peralatan dan instalasi seperti sistem pembumian, dan perangkat pemadam kebakaran.
- Melakukan pemasangan penangkal petir dan melakukan sertifikasi pada dinas terkait.
- Melakukan kegiatan operasional dengan memperhatikan SOP dan manajemen risiko
- Melakukan kegiatan operasi peralatan pada rentang aman tekanan operasi, temperature operasi dan ketinggian fluida operasi.
- Melakukan pengecekan mekanisme kerusakan lain seperti korosi dan retak
- Memastikan tekanan operasi tidak melebihi MAWP peralatan bejana tekan dan perpipaan.
- Melakukan inspeksi/testing pada sistem pemadam kebakaran setiap 1 tahun sekali sesuai Standard NFPA 25.

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Lampiran A – Pehitungan



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" ST 50T to Filling Hall
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 250 Psig = 17,58 kg/cm²
Diameter (D) : 4 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 8,56 mm
Actual Thick (t_{act}) : 7,74 mm
Thick. Structural (t_{str}) : 2,30 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{250}{2} \times \frac{x}{20000} \times \frac{4}{1} = 0,025 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,025 + 0 = 0,025 \text{ inch} = 0,635 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{8,56 - 7,74}{16} = 0,051 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,051 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" ST 50T to Filling Hall
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 7,74 - (2 \times 0,051 \times 4) \\ &= 7,33 \text{ mm} = 0,29 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 7,33 \times 20000}{4} \times 1 \\ &= 2886 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 203 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{7,74 - 2,30}{0,051} = 106 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 106 years



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" LPG Compressor to ST 50T
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 250 Psig = 17,58 kg/cm²
Diameter (D) : 4 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 8,56 mm
Actual Thick (t_{act}) : 8,65 mm
Thick. Structural (t_{str}) : 2,30 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{250}{2} \times \frac{x}{20000} \times \frac{4}{1} = 0,025 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,025 + 0 = 0,025 \text{ inch} = 0,635 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{8,56 - 8,65}{16} = 0,127 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,127 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" LPG Compressor to ST 50T
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 8,65 - (2 \times 0,127 \times 4) \\ &= 7,63 \text{ mm} = 0,30 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 7,63 \times 20000}{4} \times 1 \\ &= 3006 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 211 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{8,65 - 2,30}{0,127} = 50 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 50 years



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" Vapor Line
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 250 Psig = 17,58 kg/cm²
Diameter (D) : 4 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 8,56 mm
Actual Thick (t_{act}) : 8,82 mm
Thick. Structural (t_{str}) : 2,30 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{250}{2} \times \frac{x}{20000} \times \frac{4}{1} = 0,025 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,025 + 0 = 0,025 \text{ inch} = 0,635 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{8,56 - 8,82}{16} = 0,127 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,127 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" Vapor Line
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 8,82 - (2 \times 0,127 \times 4) \\ &= 7,80 \text{ mm} = 0,31 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 7,80 \times 20000}{4} \times 1 \\ &= 3072 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 216 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{8,82 - 2,30}{0,127} = 51 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 51 years



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" ST 50T to LPG Pump
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 250 Psig = 17,58 kg/cm²
Diameter (D) : 4 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 8,56 mm
Actual Thick (t_{act}) : 8,49 mm
Thick. Structural (t_{str}) : 2,30 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{250}{2} \times \frac{x}{20000} \times \frac{4}{1} = 0,025 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,025 + 0 = 0,025 \text{ inch} = 0,635 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{8,56 - 8,49}{16} = 0,127 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,127 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 4" ST 50T to LPG Pump
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 8,49 - (2 \times 0,127 \times 4) \\ &= 7,47 \text{ mm} = 0,29 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 7,47 \times 20000}{4} \times 1 \\ &= 2943 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 207 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{8,49 - 2,30}{0,127} = 49 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 49 years



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 3" LPG Pump to Filling Hall
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 265 Psig = 18,63 kg/cm²
Diameter (D) : 3 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 7,62 mm
Actual Thick (t_{act}) : 7,95 mm
Thick. Structural (t_{str}) : 2,00 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{265}{2} \times \frac{x}{20000} \times \frac{3}{1} = 0,020 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,020 + 0 = 0,020 \text{ inch} = 0,505 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{7,62 - 7,95}{16} = 0,127 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,127 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 3" LPG Pump to Filling Hall
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 7,95 - (2 \times 0,127 \times 4) \\ &= 6,93 \text{ mm} = 0,27 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 6,93 \times 20000}{3} \times 1 \\ &= 3640 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 256 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{7,95 - 2,00}{0,127} = 47 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 47 years



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 2" ST 50T to Filling Hall
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 250 Psig = 17,58 kg/cm²
Diameter (D) : 2 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 5,54 mm
Actual Thick (t_{act}) : 6,12 mm
Thick. Structural (t_{str}) : 1,80 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{250}{2 \times 20000} \times \frac{2}{1} = 0,013 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,013 + 0 = 0,013 \text{ inch} = 0,318 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{5,54 - 6,12}{16} = 0,127 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,127 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 2" ST 50T to Filling Hall
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 6,12 - (2 \times 0,127 \times 4) \\ &= 5,10 \text{ mm} = 0,20 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 5,10 \times 20000}{2} \times 1 \\ &= 4019 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 283 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{6,12 - 1,80}{0,127} = 34 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 34 years



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 2" Return Line
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

PIPING DATA

Design Press. (P) : 250 Psig = 17,58 kg/cm²
Diameter (D) : 2 inch
Material : SA 106 Gr.B (Sch 80)
Allow. Stress (S) : 20000 Psig
Joint Eff. (E) : 1
Nominal Thick (t_{nom}) : 5,54 mm
Actual Thick (t_{act}) : 5,91 mm
Thick. Structural (t_{str}) : 1,80 mm
Year Built : 2008
Last of Inspection : 2024
Inspection Interval : 4 years
Corrosion Allowance : 0

FORMULA

Piping Calculation

Minimum Thickness of Piping

$$t_{req} = \frac{P D}{2 S E} = \frac{250}{2 \times 20000} \times \frac{2}{1} = 0,013 \text{ inch}$$

Minimum Required Thickness of Piping

$$t_{min\ req} = t_{req} + CA = 0,013 + 0 = 0,013 \text{ inch} = 0,318 \text{ mm}$$

Result : Thickness is *Satisfactory*

Corrosion Rate Long Term (CR)

Corrosion Rate for Piping

$$CR = \frac{t_{nom} - t_{act}}{\text{years between } t_{nom} \text{ and } t_{act}} = \frac{5,54 - 5,91}{16} = 0,127 \text{ mm/year}$$

Conclusion

Corrosion rate (CR) = 0,127 mm/year



PIPING CALCULATION

(ASME B31.3 & API 574)

ITEM NO : 2" Return Line
EQUIPMENT : Piping System
OWNER : PT Mitra Harun Gasindo

Sheet No. : 1 of 2

Maximum Allowable Working Pressure (MAWP)

Thickness Corroded for **Piping**

$$\begin{aligned} t\text{-Cor} &= tact - (2 \times CR \times \text{Inspection Interval}) \\ &= 5,91 - (2 \times 0,127 \times 4) \\ &= 4,89 \text{ mm} = 0,19 \text{ inch} \end{aligned}$$

Maximum Allowable Working Pressure (MAWP) for **Piping**

$$\begin{aligned} MAWP &= \frac{2 \times t\text{-Cor} \times S \times E}{D} \\ &= \frac{2 \times 4,89 \times 20000}{2} \times 1 \\ &= 3854 \text{ Psig} \end{aligned}$$

Conclusion

MAWP calc. = 271 kg/cm² (*Satisfactory*)

Remaining Life (RL)

Thickness Required (choice Max between Treq and Tstr) as per API 574

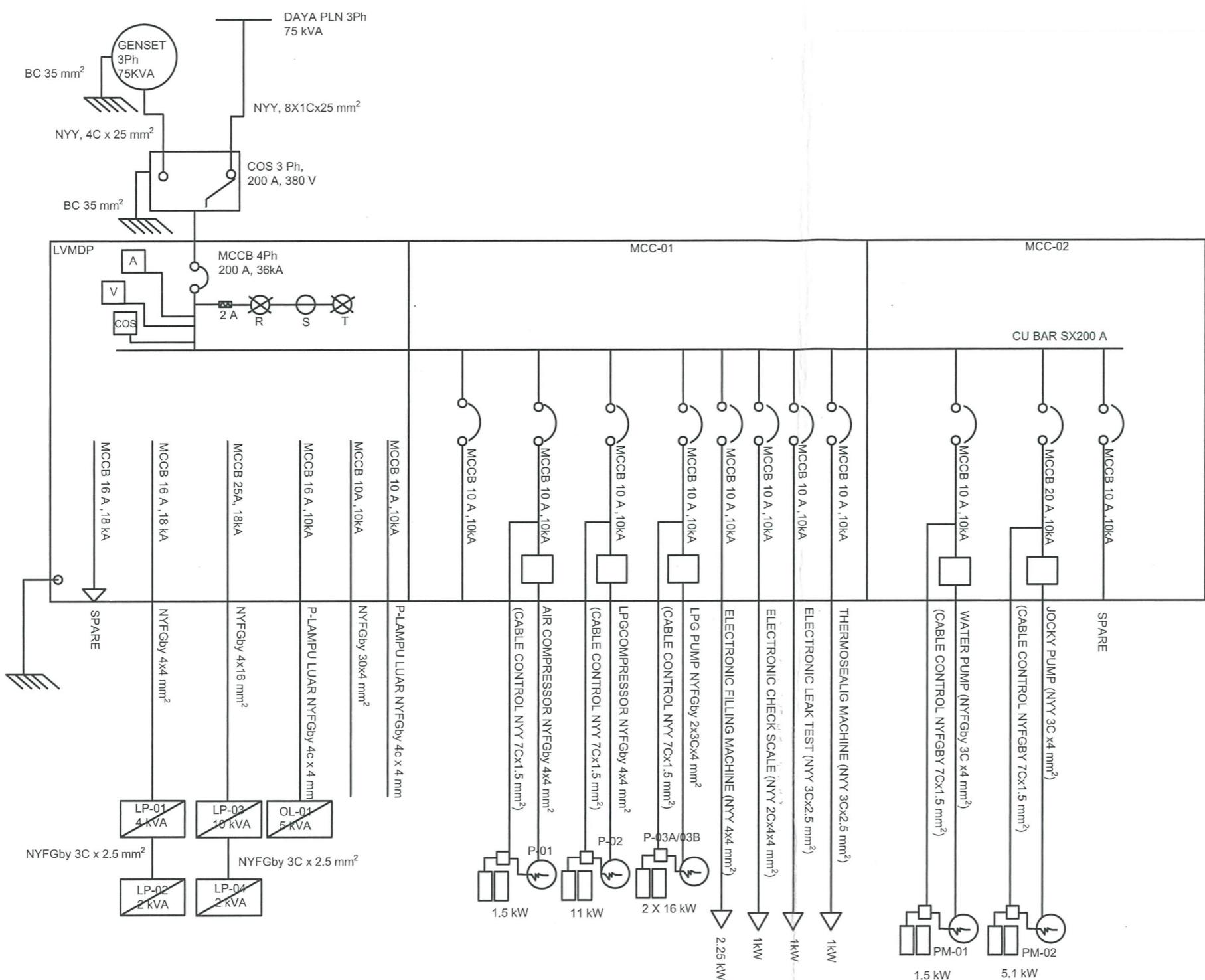
$$\text{Remaining Life Piping} = \frac{t_{act} - t_{req}}{CR} = \frac{5,91 - 1,80}{0,127} = 32 \text{ years}$$

Conclusion

Base on above calculation, Remaining life of piping is 32 years

	Remaining Life Assessment Installation PT Mitra Harun Gasindo	Rev. 0
	FTU-056/03/R-RLA/II/2024	Page 20

Lampiran B – Gambar (PFD, P&ID dan Layout)



	CURRENT TRANSFORMER
	AMMETER
	VOLTMETER
	UNDER VOLTAGE
	REVERSE POWER
	EARTH FAULT
	VOLT METER SELECTOR SWITCH
	SHORTCIRCUIT
	INDICATOR : RED, YELLOW, BLUE
	MCCB 3 PH
	LOW VOLTAGE MAIN DISTRIBUTOR PANEL
	DIAZED PUSE 3 PH
	GROUNDING
LP	LIGHTING PANEL
PP	POWER PANEL

NO	LOKASI	KLASIFIKASI BEBAN	BEBAN(KVA) TERSAMBUNG	DF	BEBAN TERPAKAI
	R.GUDANG & GENSET	LP-01	4		4
		MCC-01	43.30		20.01
		MCC-02	8.20		3.10
	R.POMPA PMK	LP-02	2		2
	KANTOR	LP-03	10		10
	SHELTER SOPIR	LP-04	2		2
	PENERANGAN LUAR	OL-01	8		8
			61.64 kVA		52.17 kVA
	BEBAN PUNCAK PEMAKAIAN BERSAMA				52.17 kVA
	PENYAMBUNGAN DAYA LISTRIK KE PLN, TH 380 / 220 V 75kVA				75 kVA
	KAPASITAS STANDBY DIESEL GENSET (STANDBY 75 KVA 380 / 220 V, 50 Hz, 1500 RPM, 3 PHASE				

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REFERENCES

AREA : SPBE							ENGINEERING APPROVAL			PT. MITRA HARUM GASINDO	
REVISIONS	DQ	08-APR-20	ISSUED FOR REVIEW	GFA	ESR/ZL	ZN	PROJECT	BY	DATE	CONTRACTOR APPROVAL	
							STRUCTURAL			DATE: 30-07-2020	
							PROCESS			F/KJ/JM	
							MECHANICAL			CONTRACTOR APPROVAL	
							ELECTRICAL			F/KJ/JM	
							INSTRUMENT			DATE: 27-07-2020	
							PIPEING			F/KJ/JM	
							Pipeline			DATE: 27-07-2020	
	REV	BY	DATE	DESCRIPTION		DRFT'G	CHECKED	APPROVED			

PROJECT TITLE : REENGINEERING AS-BUILT DRAWING



INTESCO GLOBAL INTERNUSA
Jakarta - Indonesia

LE :
STASIUN PENGISIAN BULK ELPIJI (SPBE)
SINGLE LINE DIAGRAM

IG No.
GI/DWG-SLD/MHG/VII/2020

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JENIS BANGUNAN <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20px; text-align: center;">No.</td><td style="width: 80px;"></td></tr> <tr><td style="text-align: center;">1</td><td>Area Pengisian LPG</td></tr> <tr><td style="text-align: center;">2</td><td>Rumah Pompa LPG</td></tr> <tr><td style="text-align: center;">3</td><td>Tangki LPG 1 x 50 Ton</td></tr> <tr><td style="text-align: center;">4</td><td>Bongkar LPG</td></tr> <tr><td style="text-align: center;">5</td><td>Kantor</td></tr> <tr><td style="text-align: center;">6</td><td>Gudang Bengkel & R. Genset</td></tr> <tr><td style="text-align: center;">7</td><td>Kolam PMK + R. Pompa PMK</td></tr> <tr><td style="text-align: center;">8</td><td>Pos Jaga</td></tr> <tr><td style="text-align: center;">9</td><td>Shelter Sopir + Mushola/Toilet</td></tr> <tr><td style="text-align: center;">10</td><td>R. Racun Api (3 Buah)</td></tr> <tr><td style="text-align: center;">11</td><td>Timbangan Truk</td></tr> <tr><td style="text-align: center;">12</td><td>R. Timbangan</td></tr> </table>																No.		1	Area Pengisian LPG	2	Rumah Pompa LPG	3	Tangki LPG 1 x 50 Ton	4	Bongkar LPG	5	Kantor	6	Gudang Bengkel & R. Genset	7	Kolam PMK + R. Pompa PMK	8	Pos Jaga	9	Shelter Sopir + Mushola/Toilet	10	R. Racun Api (3 Buah)	11	Timbangan Truk	12	R. Timbangan																																																																														
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Diagram showing the site plan of the SPBE facility, including buildings, roads, and surrounding areas like Selokan, Sungai Ciseuseupan, and Kebun Campuran.

Legends:

- Hazardous Area Class 1 Div. 1
- Hazardous Area Class 1 Div. 2
- Non-Hazardous Area

No.		JENIS BANGUNAN		
1		Area Pengisian LPG		
2		Rumah Pompa LPG		
3		Tangki LPG 1 x 50 Ton		
4		Bongkar LPG		
5		Kantor		
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Notes:

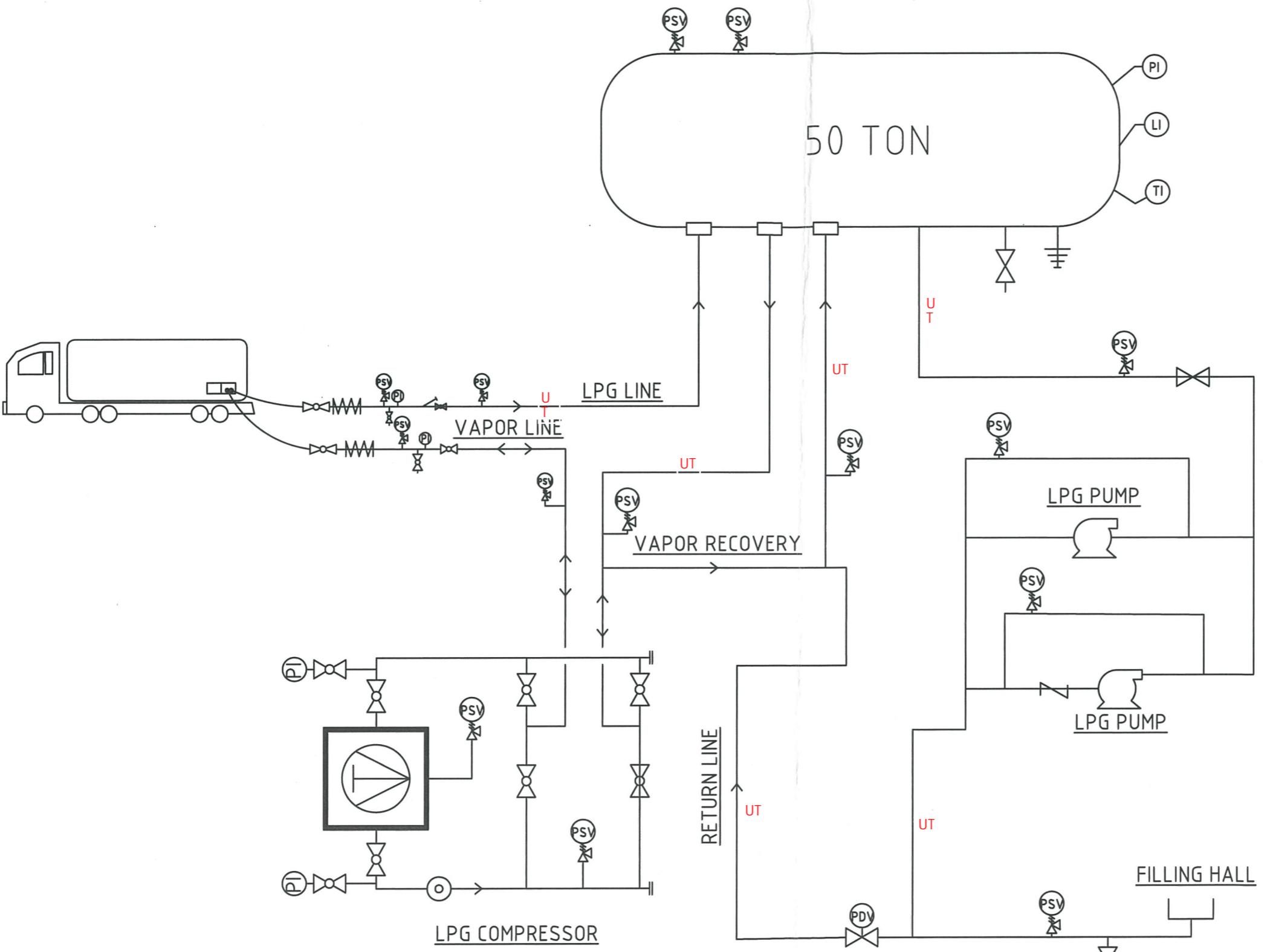
- All dimensions are in meters (U.N.O)
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- See legend for clarity
- If contain flammable material, should be Division 1
- Coordinate: 6°39'26"S - 106°51'23"E

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REVISIONS	ENGINEERING APPROVAL		PT Mitra Harun Gasindo Approval			
	PROJECT	BY	DATE			
REV	BY	DATE	GPA	ESR/ZL	ZH	DATE: 30-07-2020
REV	BY	DATE	DRFT'G	CHECKED	APPROVED	CONTRACTOR APPROVAL
			G	P	T	DATE: 30-07-2020
						INTESCO GLOBAL INTERNUSA ASSESS FOR SUCCESS
						PT. MITRA HARUN GASINDO Jakarta - Indonesia
						TITLE : STASIUN PENGISIAN BULK ELPJI (SPBE) HAZARDOUS AREA
						SCALE : NTS
						DRAWING No. 002/IGI/DWG-HA/MHG/VII/2020
						REV. □



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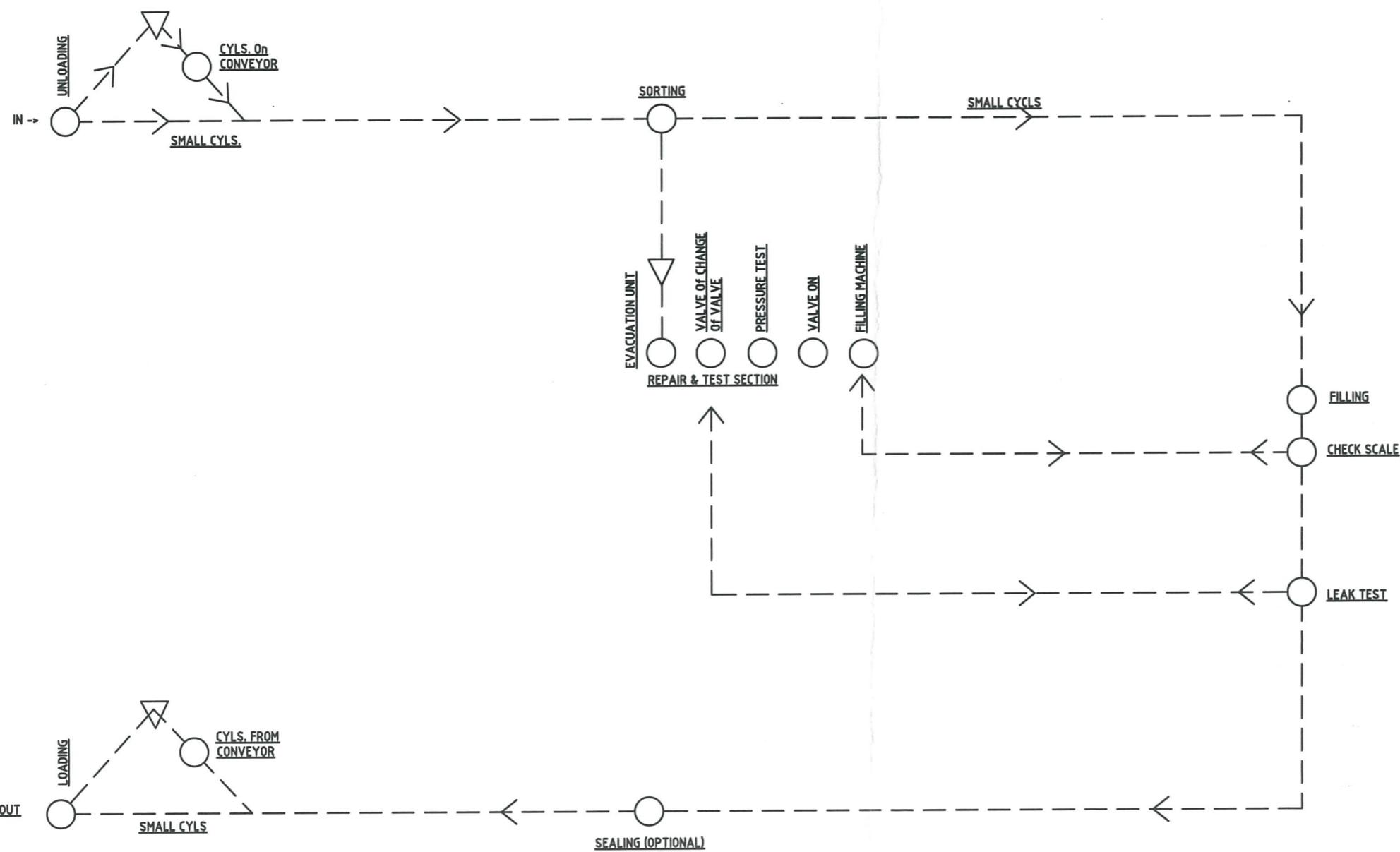
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REVISIONS						
	DQ	08-APR-20	ISSUED FOR REVIEW	GPA	ESR/ZL	ZN
REV	BY	DATE	DESCRIPTION	DRFTG	CHECKED	APPROVED
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PROJECT TITLE : REENGINEERING AS-BUILT DRAWING	
	PT. MITRA HARUN SOLUSI
	PT. INTESCO GLOBAL INTERUSA JAKARTA - INDONESIA

1

**STASIUN PENGISIAN BULK ELPIJI (SPBE)
PIPING AND INSTRUMENTATION DIAGRAM**

E : DRAWING No. REV.
NTS 004/IGI/DWG-PID/MHG/VII/2020 



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REFERENCES :

REVISIONS		
DQ	09-APR-20	ISSUED FOR REVIEW
REV	BY	DATE

AREA : SPBE			PROJECT TITLE : REENGINEERING AS-BUILT DRAWING		
ENGINEERING APPROVAL	PT. MITRA HARUN GASINDO				
BY		DATE			
PROJECT					
STRUCTURAL					
PROCESS					
MECHANICAL					
ELECTRICAL					
INSTRUMENT					
CONTRACTOR APPROVAL					
PIPELINE					
DATE:	30-07-2020				
INTECO GLOBAL INTERNUSA					
JAKARTA - INDONESIA					

Keterangan :

- ○ - OPERATION
- ▽ - TEMPORARY STORAGE
- → - MANUALLY TRANS. OF CYCLS

Basis :