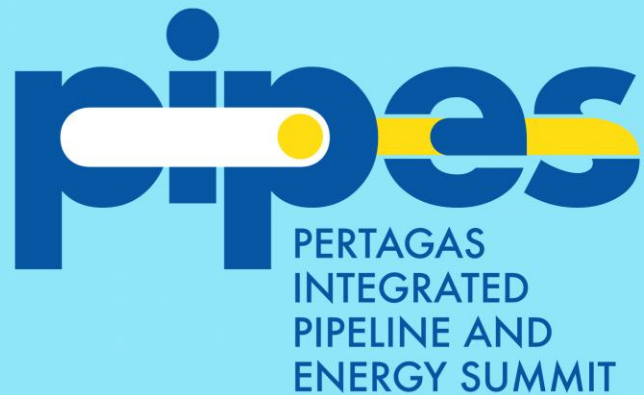


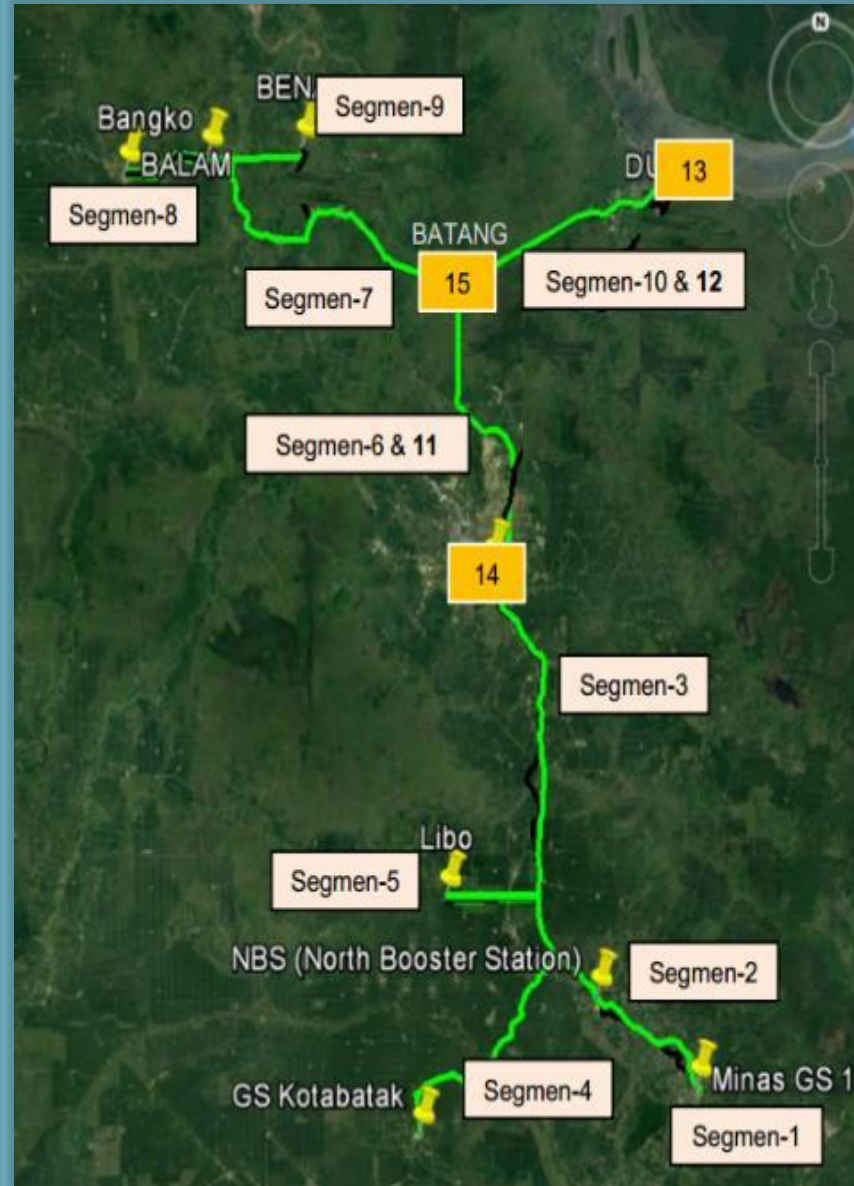
A decorative vertical bar consisting of three segments: a blue segment at the top, a white segment in the middle, and a yellow segment at the bottom.

## Flow Assurance & Commissioning Pipa Minyak (Proyek Rokan 3.0)

Batang HO dan KBJ SLC Booster Pump Station dan Pipeline  
Segmen 3 (20" – 57 km) dan Segmen 4 (8" – 33 km)

Noor Syamsul Khalish  
Oki Handoko

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Obyektif proyek          | Mendukung program Pemerintah dalam meningkatkan lifting dari Blok Rokan yang merupakan back-bone (sepertiga) produksi minyak bumi nasional.                                                                                                                                                                                                                                                                                                                                         |
| Ruang lingkup            | <p><b>Rokan v1.0 Base Scope:</b></p> <ol style="list-style-type: none"> <li>1. Penggantian Pipa Penyalur Minyak Blok Rokan sepanjang 342 km dan</li> <li>2. Pembangunan St. Pompa &amp; St. Meter</li> </ol> <p><b>Rokan v2.0 Additional Scope Penyesuaian Pompa</b></p> <ol style="list-style-type: none"> <li>1. Relokasi dan Penyesuaian Pompa Rokan</li> </ol> <p><b>Rokan v3.0 Additional Scope Booster Pump Station</b></p> <p>Booster Pump Station Batang HO dan KBJ SLC</p> |
| Pelaksana                | <p>Base Scope : <b>Kons. PGASOL – PDC (“KPP”)</b></p> <p>Penyesuaian Pompa : <b>PT Elnusa Tbk</b></p> <p>Booster Pump Paket 1 : <b>Kons. ELN – PGASOL (KEP)</b></p> <p>Batang Station Paket 2 : <b>PT. PGASolution</b></p> <p>KBJ Station Paket 3 : <b>PT Elnusa Tbk</b></p>                                                                                                                                                                                                        |
| Panjang Pipa ; Spec      | 342 km ; 13 Segmen pipeline<br>4”s/d 24”OD API Grade B                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Jangka Waktu Pelaksanaan | <p><b>Paket 1 : 17 Jan’24 – 16 April’25 ( 15 Bulan)</b></p> <p><b>Paket 2&amp; Paket 3 : 15 Maret’24 – 14 Mei’25 ( 14 Bulan);</b></p> <p><b>pencapaian MC di Desember 2024 (9 Bulan)</b></p>                                                                                                                                                                                                                                                                                        |
| Capasitas Pump           | <p><b>Batang Station : 90.000 bopd / @ 30.000 bopd ( 4 Unit)</b></p> <p><b>KBJ Station : 120.000 bopd / @ 30.000 bopd (5 unit)</b></p>                                                                                                                                                                                                                                                                                                                                              |



**Rokan v1.0**  
**Pipa Minyak Rokan**

 **100%**



**Rokan v2.0**  
**Penyesuaian Pompa**

 **100%**



**Rokan v3.0**  
**Booster Pump**

 **100%**



**HSE:**  
**Safe Manhours**  
**7.156.823 hrs**  
(sd. April 2025)

## MANAGEMENT OF CHANGE (MOC)

- **Flow Assurance**
  - Formal Risk Assessment (FRA)
- Commissioning Communication Protokol/Sequence

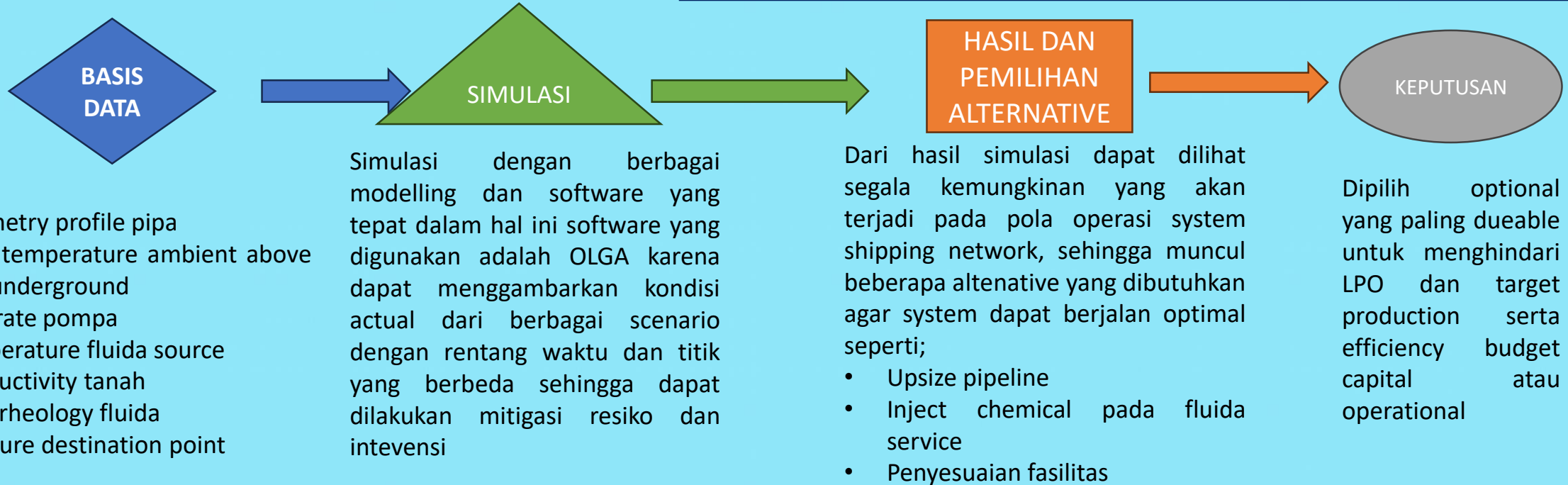
## COMMISSIONING/OIL IN

- Pre Safety Start Up Review (PSSR)
  - Inspeksi tools & equipment
  - **Table Top Drill & Wet Drill**
    - **Commissioning / Oil in**
  - Monitoring Pola Operasi

- Analisa Engineering untuk memastikan bahwa **fluida (minyak, gas, dan air) dapat mengalir dengan lancar dan aman** melalui sistem perpipaan sepanjang umur operasi fasilitas.
- Flow Assurance mensimulasikan pressure, temperature fluida, sehingga dapat direncanakan intervensi yang diperlukan

Flow Assurance melibatkan analisis dan pengelolaan berbagai faktor yang dapat mempengaruhi aliran fluida, seperti:

1. Sifat fluida: Viskositas, densitas, dan komposisi fluida dapat mempengaruhi aliran.
2. Desain pipa: Diameter, material, dan konfigurasi pipa dapat mempengaruhi aliran.
3. Kondisi operasional: Tekanan, suhu, dan laju aliran dapat mempengaruhi aliran.
4. Pengaruh lingkungan: Faktor lingkungan seperti suhu, tekanan, dan kelembaban dapat mempengaruhi aliran.



## HASIL SIMULASI SOUTH NETWORK

| SOURCE            | FLOWRATE (BOPD) | MAXIMUM PRESSURE TRANSIENT AT TIE-IN (BOOSTER OFF) |
|-------------------|-----------------|----------------------------------------------------|
| GS-1              | 12000           | 607                                                |
| GS-2              | 6000            | 605                                                |
| GS-3              | 6000            | 567                                                |
| GS-4              | 6000            | 477                                                |
| GS-5              | 6000            | 385                                                |
| GS-6              | 6000            | 402                                                |
| BOB East          | 11725           | 347                                                |
| KOTABATAK GS 8"   | 13800           | 351                                                |
| PETAPAHAN GS 12"  | 13800           | 260                                                |
| LIBO 4"           | 2500*           | 284                                                |
| LIBO EXISTING 10" | 5000            | 227                                                |
| PUNGUT/TANDUN     | 6000            | 173                                                |
| INTAN             | 6000            | 172                                                |

| SOURCE              | FLOW RATE DISPATCH (BOPD) | LIMITASI POMPA UPDATE (PSH) | LIMITASI POMPA UPDATE (PSV) | PRESSURE STEADY STATE PIPESIM DISPATCH | dP EXISTING (pressure drop from GS to Tie-In) | MAXIMUM PRESSURE TRANSIENT AT TIE-IN (BOOSTER ON) | MAXIMUM PRESSURE TRANSIENT AT GS SHIPPING PUMP (BOOSTER ON) | Normal Operating Pressure (OLGA) PSIG |
|---------------------|---------------------------|-----------------------------|-----------------------------|----------------------------------------|-----------------------------------------------|---------------------------------------------------|-------------------------------------------------------------|---------------------------------------|
| GS-1                | 12000                     | 450                         | 610 & 680                   | 364                                    | 81                                            | 447                                               | 528                                                         | 416-504                               |
| GS-2                | 6000                      | 650                         | 680                         | 430                                    | 81                                            | 443                                               | 524                                                         | 415-499                               |
| GS-3                | 12000                     | 450                         | 610                         | 323                                    | 32                                            | 398                                               | 430                                                         | 329-379                               |
| GS-4                | 12000                     | 550                         | 610                         | 193                                    | 98                                            | 298                                               | 396                                                         | 305-358                               |
| GS-5                | 6000                      | 450                         | 610                         | 71                                     | 10                                            | 127                                               | 137                                                         | 116-134                               |
| GS-6                | 6000                      | 450                         | 610                         | 101                                    | 27                                            | 148                                               | 175                                                         | 134-160                               |
| BOB East (NBS)      | 0                         | 375                         | 400 & 250                   | -                                      | 150****                                       | 0                                                 | 0                                                           | 0                                     |
| KOTABATAK GS 8"     | 4600-13800                | 360                         | 375                         | 249                                    | 257*                                          | 74                                                | 331                                                         | 329-330                               |
| PETAPAHAN Train 12" | 4600-13800                | 360                         | 375                         | 193                                    | 160                                           | 74                                                | 234                                                         | 232-233                               |
| LIBO 4"             | 2500                      | 270                         | 300                         | 374                                    | 60                                            | 366                                               | 426                                                         | 408-420                               |
| LIBO EXISTING 10"   | 5000                      | 270                         | 300                         | 193                                    | 60                                            | 309                                               | 369                                                         | 355-366                               |
| PUNGUT/TANDUN       | 6000                      | 270                         | 300                         | 123                                    | 20                                            | 214                                               | 234                                                         | 211-220                               |
| INTAN               | 6000                      | 400                         | 440                         | 113                                    | 200                                           | 206                                               | 406                                                         | 355-404                               |

**Note 1:** Destination pressure Duri Tank pada simulasi steady state PIPESIM dan Transient OLGA 18 psig.

**Note 2:** Limitasi PSH dan PSV LIBO dan BOB East (NBS) akan di konfirmasi Kembali.

(\*) DP from discharge booster kota batak to tie in Kota Batak Junction adalah 257 psig. Based on simulasi transient segmen 4 case 4.

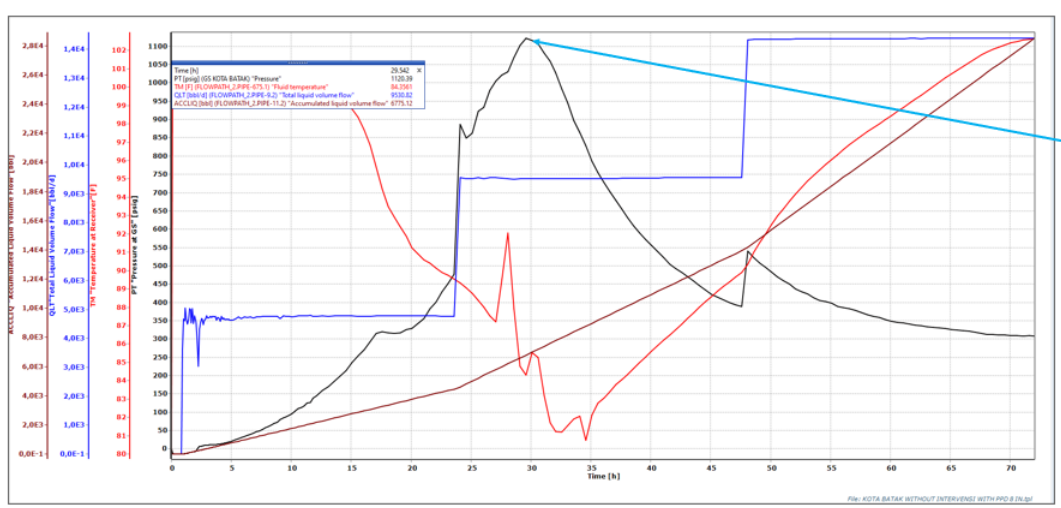
(\*\*) Pressure maksimum at discharge booster Kota Batak.

(\*\*\*) Normal operating Pressure at discharge booster Kota Batak.

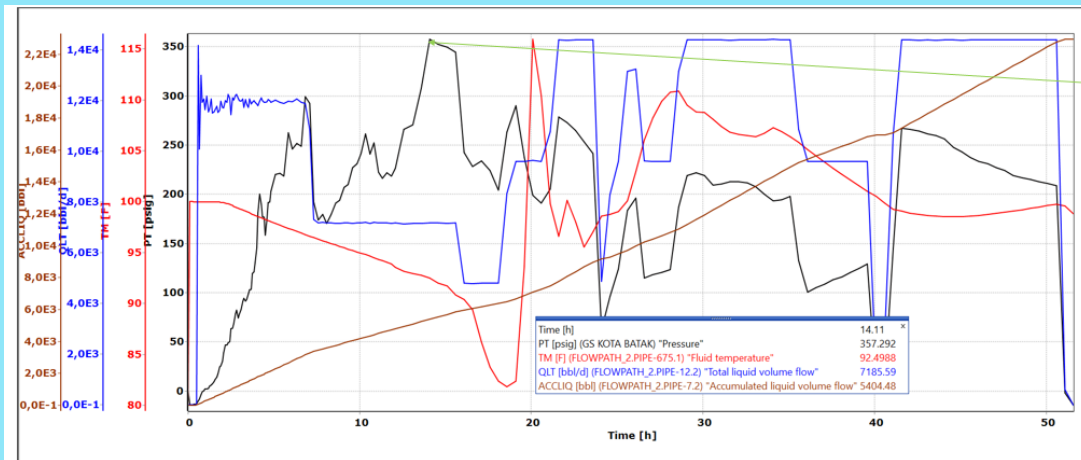
(\*\*\*\*) DP berdasarkan MOM Verifikasi data operasi BSP ke NBS PHR 19 Sept 23

Basis Data Simulasi Segment 3 Booster Pump Off  
Project Rokan

Hasil Simulasi Segment 3 Booster Pump On  
Project Rokan



Case Simulasi transient Commissioning Segment 4 Inject PPD (tanpa intervensi)  
Project Rokan



Case Simulasi transient Commissioning Segment 4 Inject PPD (dengan intervensi)  
Project Rokan

## Proposed Sequence (Commissioning Segment 4)

- **Chemical Inject (Pour Point Depressant)** untuk menurunkan Pour Point Temperatur Fluida dari 100-Pada 105 deg F menjadi 90 deg F sebanyak 1500 ppm
- Flow pengaliran 2 pompa (9200 BOPD) selama 7 jam, dilanjutkan dengan 1 pompa (4600 BOPD) dengan total 7411 BOPD selama 24 jam
- Hot Water Injection 1500 (total) sebanyak BBLS pada bersama fluida pada sequence awal penyaluran selama 7 jam untuk meningkatkan temp. fluida
- **Solar Injection** di kicker Pig launcher . Injeksi solar sebanyak @5000 liter dengan durasi 7 menit inject 8 menit off dilakukan di awal dan selama berlangsungnya commissioning
- Hot Water Injection sebanyak 500 bbls dengan durasi 15 jam (flowrate 800 bwpd) dengan temperatur 190 deg F pada km 14+400
- Hot Water Injection sebanyak 350 bbls (flowrate 800 bwpd) dengan temperatur 190 deg F pada km 26+300

# FORMAL RISK ASSESSMENT

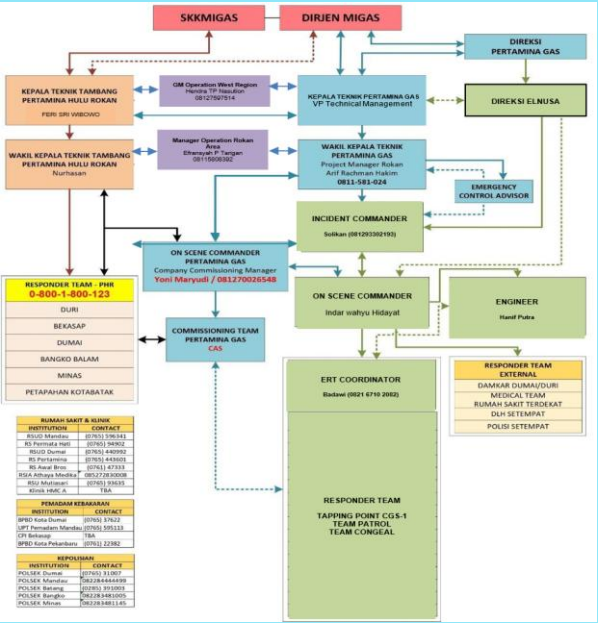
|    |                                                                                                                                                                                              |   |   |    |                                                                                                                                                                                                                                                                                                   |                  |   |   |   |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|---|---|
| 15 | Characteristic of fluid minas GS is low waxy and have PPT at 90 F<br>PAH at Shipping Pump GS 1,2,3,4,5,6<br>PSH at Shipping Pump GS 1,2,3,4,5,6<br>PSV Shipping Pump set 610 psig & 680 psig | 5 | 1 | 5  |                                                                                                                                                                                                                                                                                                   |                  |   |   |   |
| 15 | Characteristic of fluid minas GS (Crude+Condensate) is low waxy and have PPT at 90 F<br>Injection Solar 10.000 L                                                                             | 5 | 2 | 10 | Update protocol communication for congeal combating to monitor temperature at PL & PR during No Flow condition in Seg.3 20" Pertagas. The procedure should be described for prevention action such as intervention to increase fluid temperature when temperature in PL & PR lower than PPT (90F) | PERTAGAS/ELN USA | 5 | 1 | 5 |

Studi Risiko atas usulan tahapan hasil Flow Assurance dan mitigasi-mitigasi yang perlu tindak lanjut agar tahapan commissioning yang telah direncanakan dapat diimplementasikan sesuai studi flow assurance

|                                                                                                                                                             |     |   |   |    |                                                               |   |   |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|---|----|---------------------------------------------------------------|---|---|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1.1.2.3. High backpressure to discharge GS shipping pump, leading to shipping pump at GS 1,2,3,4,5,6 damaged possible to Loss Production Opportunity (LPO). | ASS | 5 | 3 | 15 | 1. PAH at Shipping Pump GS 1,2,3,4,5,6                        | 5 | 2 | 10 | Resetting PAHH Transmitter Shipping Pump Minas GS 1,3,4,5,6 from 450 psig to 550 psig<br>Resetting PAH at Outgoing meter NBS from 80 psig to 100 psig<br>Resetting PSH & PSV Shipping Pump Libo GS from PSH 270 to 450 and PSV from 300 to 475<br>Resetting PSH & PSV Shipping Pump Intan GS from PSH 400 to 420 and PSV from 440 to 450<br>Recommend revalidate MAWP Shipping Line from Discharge Shipping Pump to Tie In Pertagas (include above ground and underground)<br>Recommend to ensure shipping vibration is solved before Switching | F |
|                                                                                                                                                             |     |   |   |    | 2. PAHH at Shipping Pump GS 1,2,3,4,5,6 to Trip Shipping Pump |   |   |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|                                                                                                                                                             |     |   |   |    | 3. PSV Shipping Pump set 610 psig & 680 psig                  |   |   |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|                                                                                                                                                             |     |   |   |    | 5. Lock Open manual valve at suction line                     |   |   |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |

Prosedur detail mengenai sequence / tahapan Commissioning sesuai dengan hasil dari rekomendasi Flow Assurance dan Formal Risk Assessment.

- Detail aktivitas, PIC dan estimasi durasi
- Organisasi ERT
- Prosedur mitigasi



| PTG       |     |                                                                                                                                                                                                                       |                                                                                                                           |            |                                                     |                 |               |                    |                        |                   |                           |                |      |                               |                           |     |  |
|-----------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------|-----------------|---------------|--------------------|------------------------|-------------------|---------------------------|----------------|------|-------------------------------|---------------------------|-----|--|
| PHR       |     |                                                                                                                                                                                                                       |                                                                                                                           |            |                                                     |                 |               |                    |                        |                   |                           |                |      |                               |                           |     |  |
| PHR & PTG | No  | Komunikasi                                                                                                                                                                                                            | Catatan Commissioning                                                                                                     | Estimasi   | Personel                                            | Tim Operasional | Tim Pelaksana |                    |                        |                   | PERTAGAS                  |                | PHR  |                               |                           |     |  |
|           |     |                                                                                                                                                                                                                       |                                                                                                                           |            |                                                     |                 | DAMKAR        | On Scene Commander | Commissioning Engineer | PIC Commissioning | Commissioning Coordinator | Operation Team | TOPI | CGS TI Plant Ops Unit & Field | PHR (North and Dumai Ops) |     |  |
|           | B.3 | PHR dan PTG akan meminta endorsement ke SKK Migas                                                                                                                                                                     | SKK Migas sudah memberikan endorsement terkait Pengaliran Parsial CGS 01                                                  | 3 Okt 2022 |                                                     |                 |               |                    |                        |                   |                           |                |      |                               |                           |     |  |
|           | C   | SEGMENT 11A<br>FILLING CRUDE FROM CGS 1 TO CGS 10                                                                                                                                                                     |                                                                                                                           |            |                                                     |                 |               |                    |                        |                   |                           |                |      |                               |                           |     |  |
|           | C.1 | Matikan Shipping Pump CGS 1 dan ganti meter untuk LACT meter 2                                                                                                                                                        | HPS pump off. Ticket LACT meter sudah diganti dengan pembacaan 477 bbls.                                                  |            | Joni Ridwan                                         |                 | C.1           |                    |                        |                   |                           |                |      | C.1                           |                           |     |  |
|           | C.2 | Menutup existing valve 12"-300# SD-101-C2 (menuju Tie-in existing 24 inch)                                                                                                                                            | Gate valve konfirm close @08:58                                                                                           |            | Denny HCT                                           |                 | C.2           |                    |                        |                   | C.2                       |                |      | C.2                           |                           | C.2 |  |
|           | C.3 | Buka valve Tie-In TP-026 8"-GV-581 untuk mengalirkan crude oil ke 8" new pipeline.                                                                                                                                    | - Valve 8"-GV-581 open @03:02                                                                                             |            | Damawan Tarigan                                     |                 | C.3           |                    | C.3                    |                   |                           |                |      |                               |                           |     |  |
|           | C.4 | Mulai start pompa LPS B dan HPS 6D (A dan E) di CGS 1<br>Setelah minyak sampai di receiver pompa HPS A/E akan dimatikan                                                                                               | - Level shipping tank: 11.77 ft<br>- Problem di timer pompa<br>- LPS B dan HPS 6D (A dan E) running @03:08                |            | Joni Ridwan                                         |                 | C.4           |                    |                        |                   | C.4                       |                |      | C.4                           |                           | C.4 |  |
|           | C.5 | Monitor aliran udara / crude oil di Launcher CGS 1, periksa dengan menggunakan TI-PG-001 dan TI-PG-002 dan periksa aliran udara secara visual di sump pit manhole untuk memastikan udara dalam pipa-pipa dikeluarkan. | Record dalam logsheet                                                                                                     |            | Benara Fenda Parhusip                               |                 | C.5           |                    |                        | C.5               |                           |                |      |                               |                           |     |  |
|           | C.6 | Jika crude oil mulai keluar di sump pit, tutup valve: - bypass PSV 2"-GV-532                                                                                                                                          |                                                                                                                           |            | Benara Fenda Parhusip                               |                 | C.6           |                    |                        | C.6               |                           |                |      |                               |                           |     |  |
|           | C.7 | Start proses pigging CGS 1 ke CGS 10 dan tracking pig. Catat waktu saat pig mulai bergerak.                                                                                                                           | - Start launching @03:11                                                                                                  |            | Benara Fenda Parhusip                               |                 | C.7           |                    |                        | C.7               |                           |                |      |                               |                           |     |  |
|           | C.8 | Ketika pig sudah terindikasi pada pig signal TI-2-002, buka valve 8"-GV-582 serta tutup valve pig launcher 4"-GV-583, 4"-GV-584, dan ball valve 8"-BV-021                                                             | - Pig melewati pig signal TI-2-002 @ 03:12<br>- Valve close @03:16                                                        |            | Benara Fenda Parhusip                               |                 | C.8           |                    |                        | C.8               |                           |                |      |                               |                           |     |  |
|           | C.9 | Monitor dan Record Parameter Operasi CGS 1 dan Launcher Area: Level Shipping Tank, Pressure (Shipping Pump), Temperature, etc.                                                                                        | Record:<br>- Level shipping tank: 11.73 ft<br>- Pressure Shipping Pump: 11 psig<br>- Flowrate 10 bpm (14,400 BOPD)        |            | Joni Ridwan<br>Damawan Tarigan &<br>Benara Fenda P. |                 | C.9           |                    |                        | C.9               |                           |                |      |                               |                           | C.9 |  |
|           |     | Melakukan tracking pigging dan Pipeline Patrol:                                                                                                                                                                       | Tracking:<br>- KP 0+500 @03:21<br>- KP 1+000 @03:31<br>- KP 1+500 @03:42<br>- VD 1+870 @03:49 (tidak terdeteksi 90 detik) |            |                                                     |                 | C.10          |                    |                        | C.10              |                           |                |      |                               |                           |     |  |

# PRE SAFETY START UP REVIEW (PSSR)

Inspeksi lapangan untuk memastikan kesiapan dari aspek keselamatan operasi apakah start up / commissioning dapat dilanjutkan

- Verifikasi dokumen teknis (izin, manual, SOP) telah lengkap
- Sistem & peralatan sdh dilakukan individual test
- Peralatan dan tools, termasuk alat intervensi tersedia dan dalam kondisi bagus
- Personil telah siap dan terlatih

## Closing FRA & PSSR

Inspeksi lanjutan (jika diperlukan) untuk memastikan catatan atau finding saat FRA dan PSSR telah selesai dilengkapi/closed dengan benar.





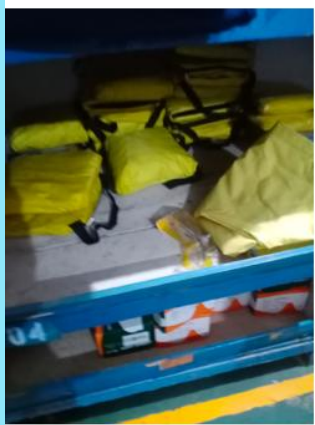


**PT. PERTAMINA GAS**  
**COMMISSIONING PRE-REQUISITES CHECK LIST**  
**PRE-START UP SAFETY REVIEW**

| Project                        | JASA SPCC SISTEM POMPA DAN SISTEM KONTROL BATANG HO & KBI SILC BOOSTER STATION (PARIT 1 & II) | Tanggal                              | 29-Jan 2025 |     |           |   |  |            |          |
|--------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------|-------------|-----|-----------|---|--|------------|----------|
| Lokasi                         | NOTA BATANG JUNCTION BOOSTER STATION                                                          |                                      |             |     |           |   |  |            |          |
| ORGANISASI DAN PERSONEL        |                                                                                               |                                      |             |     |           |   |  |            |          |
| NO                             | ITEM YANG DI CHECK                                                                            | Mechanical Completion / Crude Oil in |             |     | Punchlist |   |  | Keterangan | DUE DATE |
|                                |                                                                                               | Ya                                   | Tidak       | N/A | A         | B |  |            |          |
| <b>ORGANISASI DAN PERSONEL</b> |                                                                                               |                                      |             |     |           |   |  |            |          |
| I.1                            | <b>Struktur Organisasi</b>                                                                    |                                      |             |     |           |   |  |            |          |
|                                | - Adakah jumlah personel memadai                                                              | ✓                                    |             |     |           |   |  |            |          |
|                                | - Adakah pihak terkait sudah terlibat dan bertanggung jawab sesuai fungsinya                  | ✓                                    |             |     |           |   |  |            |          |
|                                | - Adakah pembagian tugas di dalam tim dan dipahami                                            | ✓                                    |             |     |           |   |  |            |          |
| I.2                            | <b>PERSONIL PENDUKUNG</b>                                                                     |                                      |             |     |           |   |  |            |          |
|                                | - Adakah Petugas Pemadam Kebakaran                                                            | ✓                                    |             |     |           |   |  |            |          |
|                                | - Adakah Ambulans dan Timaga Medis                                                            | ✓                                    |             |     |           |   |  |            |          |
|                                | - Adakah melibatkan Petugas Keamanan                                                          | ✓                                    |             |     |           |   |  |            |          |
| II.1                           | <b>PERSONIL DAN PERALATAN</b>                                                                 |                                      |             |     |           |   |  |            |          |
|                                | - Adakah Tool tersedia dan berfungsi                                                          | ✓                                    |             |     |           |   |  |            |          |
|                                | - Adakah Alat Komunikasi tersedia dan berfungsi                                               | ✓                                    |             |     |           |   |  |            |          |
|                                |                                                                                               |                                      |             |     |           |   |  |            |          |
| <b>FIRE DAN SAFETY</b>         |                                                                                               |                                      |             |     |           |   |  |            |          |
| III.1                          | <b>Fire</b>                                                                                   |                                      |             |     |           |   |  |            |          |
|                                | - Apakah Crude oil inlet berdekatan dengan sumber api                                         |                                      | ✓           |     |           |   |  |            |          |
|                                | - Apakah Crude oil outlet berdekatan dengan sumber api                                        |                                      | ✓           |     |           |   |  |            |          |
|                                | - Apakah ada pengaman/cover dari sumber api                                                   |                                      |             |     |           |   |  |            |          |
| III.1.1                        | <b>Apakah tersedia Alat Pemadam</b>                                                           |                                      |             |     |           |   |  |            |          |
|                                | - APAR                                                                                        |                                      |             |     |           |   |  |            |          |
|                                | - Model Pemadam                                                                               |                                      |             |     |           |   |  |            |          |
|                                | - Apakah sudah dilakukan koordinasi dengan otoritas pemadam kebakaran setempat                |                                      |             |     |           |   |  |            |          |



# INSPECTION TOOLS & EQUIPMENT



# TABLE TOP & WET DRILL



## Table Top Drill

Pengecekan nomor & pemanggilan PIC – PIC terkait saat pelaksanaan commissioning sesuai dengan struktur organisasi yang ada di ERT commissioning

## Wet Drill

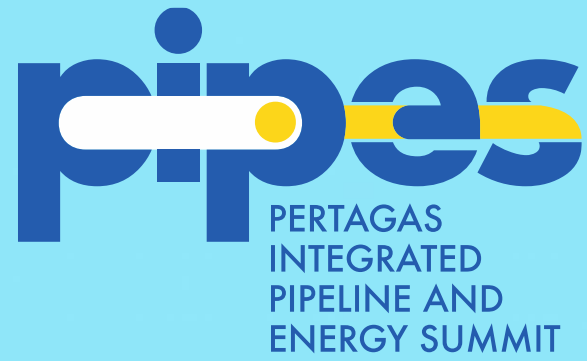
Latihan akhir (*gladi/simulasi*) pelaksanaan commissioning dengan semua peralatan dan personil sudah on position dan terlatih dengan apa yang akan dilakukan



- Melaksanakan kegiatan Commissining sesuai dengan tahapan / skenario pada Protokol Komunikasi
- Memonitor secara berkala kesesuaian kondisi aktual dengan hasil simulasi
- Trial Operation dengan beberapa scenario pola operasi shipping GS, dan perbandingan actual pressure yang terjadi vs hasil simulasi



| SOURCE                                     | FLOWRATE<br>SIMULATION<br>(BOPD) | LIMITASI<br>POMPA<br>UPDATE<br>(PSH) | LIMITASI<br>POMPA<br>UPDATE<br>(PSV) | dP EXISTING<br>(pressure drop<br>from GS to Tie-In) | MAXIMUM<br>PRESSURE<br>TRANSIENT AT<br>TIE-IN<br>(BOOSTER ON) | MAXIMUM<br>PRESSURE<br>TRANSIENT AT<br>GS SHIPPING<br>PUMP<br>(BOOSTER ON) | Normal<br>Operating<br>Pressure<br>(OLGA)<br><br>PSIG | Flowrate Aktual<br>COMMISSIONING<br>(BOPD) | Aktual Pressure<br>Commissioning<br>(psig) |
|--------------------------------------------|----------------------------------|--------------------------------------|--------------------------------------|-----------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------|--------------------------------------------|
| GS-1                                       | 12000                            | 450                                  | 610 & 680                            | 81                                                  | 446                                                           | 527                                                                        | 347-500                                               | 12000                                      | 352                                        |
| GS-2                                       | 6000                             | 650                                  | 680                                  | 81                                                  | 445                                                           | 526                                                                        | 415-499                                               | 12000                                      | 402                                        |
| GS-3                                       | 12000                            | 550                                  | 610                                  | 32                                                  | 398                                                           | 430                                                                        | 332-392                                               | 12000                                      | 330                                        |
| GS-4                                       | 12000                            | 550                                  | 610                                  | 98                                                  | 297                                                           | 395                                                                        | 303-362                                               | 6000                                       | 246                                        |
| GS-5                                       | 6000                             | 450                                  | 610                                  | 10                                                  | 127                                                           | 137                                                                        | 104-135                                               | 6000                                       | 181                                        |
| GS-6                                       | 6000                             | 450                                  | 610                                  | 27                                                  | 149                                                           | 176                                                                        | 133-165                                               | 12000                                      | 184                                        |
| PETAPAHAN Train<br>12"                     | 9200-27600                       | 360                                  | 375                                  | 160                                                 | 75                                                            | 235                                                                        | 232-233                                               | 27600                                      | 265                                        |
| Total Flowrate at KBI during commissioning |                                  |                                      |                                      |                                                     |                                                               |                                                                            |                                                       | 87600 BOPD                                 |                                            |
| LIBO 4"                                    | 2500                             | 580                                  | 610                                  | 60                                                  | 364                                                           | 424                                                                        | 402-415                                               | 17000                                      | 290                                        |
| LIBO EXISTING 10"                          | 5000                             | 580                                  | 610                                  | 60                                                  | 306                                                           | 366                                                                        | 354-364                                               | 6000                                       | 205 (Mindal)                               |
| PUNGUT/TANDUN                              | 6000                             | 270                                  | 300                                  | 20                                                  | 212                                                           | 232                                                                        | 204-217                                               | 6000                                       | 188                                        |
| INTAN                                      | 6000                             | 400                                  | 440                                  | 200                                                 | 203                                                           | 403                                                                        | 340-392                                               | 6000                                       | 180                                        |



**TERIMA  
KASIH**