LUKOIL OIL COMPANY

PETROTEL-LUKOIL S.A.

APROBAT:

Membru al Directoratului – Inginer Sef
Dan Danulescu

07 / 04 2022

TEMA TEHNICA PENTRU
CONTRACTAREA LUCRARILOR DE PROIECTARE

1. DATE GENERALE

1.1. Denumirea lucrarii: **Inlocuit pompe alimentare cu apa demineralizata degazata cazane recuperatoare caldura instalatii Recuperare sulf fir II si fir III, pozitie montaj 303-P4 B,C**

1.2. Scopul urmarit este acela de a se obtine:

Studiului de prefezabilitate al solutiei (Basic Design)	DA ☒	NU ☐
Studiul detaliat al solutiei (FEED)	DA ☐	NU ☒
Proiect tehnic de detaliu pentru executie (DDE)	DA ☒	NU ☐
Proiect de autorizare / reautorizare	DA ☒	NU ☐
Proiect de reparatie	DA ☒	NU ☐

1.3. Instalatia (serviciul) beneficiara: Aria de Productie – Sector 3
1.4. Amplasament: Instalatia DGRS-TG-RSU-TGTU-SAU-RGF-EGF

1.5. Documente si documentatii de referinta

2. NECESITATE SI OPORTUNITATE

2.1 Datorita fiabilitatii reduse in exploatarea pompelor capsulate existente care au iesit din exploatare, este necesara inlocuirea lor cu pompe noi tip BB4 – API-610.

3. PRINCIPALELE CERINTE

Nota: Specificatia a fost elaborata si aprobata.

3.1 Verificarea documentatiei tehnice si a ofertelor primite de la potentialii furnizori, efectuarea analizei comparative cu datele din specificatiile de procurare si

evaluarea acestora in ceea ce priveste scopul proiectului si emiterea punctului de vedere al proiectantului.

3.2 Elaborarea documentatiei de executie si/sau de montaj in conformitate cu normele si legislatia romaneasca si UE in vigoare.

3.3 Se vor elabora memoriile si se vor indica volumele de expertiza necesare a fi realizate in cazul in care sunt implicate constructii (fundatii, constructii metalice, conducte, sisteme de aparare la incendiu), echipamente (statice / dinamice) sau conducte existente. Expertizele trebuiesc a solicitate doar in conformitate cu:

- Legea nr.10 / 1995 Calitatea in constructii republicata;
- Ordinul MAI nr. 129/2016 - Aprobarea normelor metodologice privind avizarea si autorizarea de securitate la incendiu si protectie civila;
- HG nr. 2139 din 30 noiembrie 2004 pentru aprobarea Catalogului privind clasificarea şi duratele normale de funcţionare a mijloacelor fixe;
- Regulamente si normele ANRE gaze si electric;

3.4 Elaborarea documentatiei economico-financiara pentru implementarea solutiilor CAPEX-OPEX (devize pe ficare disciplina, devizul general, evaluarea efectelor in urma implmentarii, etc).

3.5 Realizarea verificarilor finale "Controlul de Autor" asupra implementarii proiectului conform documentatiei elaborate si furnizarea documentatiei "Revizie finala" sau "As-Build" inclusiv a celei de executie (DDE), care sa includa toate modificarile sau derogarile emise pe durata realizarii propiectului propriu-zis.

3.6 Relevarea in teren precum si identificarea documentelor existente ce pot fi utilizate;

3.7 Va indica necesitatea si cantiatile necesar a fi dezizolate de pe conducte si echipamente, cantitatea de schele temporare pentru efectuarea releveelor si/sau a expertizelor.

3.8 Trebuie sa furnizeze raport privind relevarea in teren si evaluarea documentelor puse la dispozitie de beneficiar.

3.9 Va elabora si furniza caiete de sarcini si cerintele necesare pentru realizarea studiilor si expertizele necesare implementarii solutiei.

3.10 Va elabora si prezenta studiile TOPO si GEO pentru amplasamentul identificat, in cazul in care acestea sunt necesare pentru obtinerea Autorizatiei de construire;

4. DESCRIEREA SOLUTIEI PROPUSE

Intocmire specificatie tehnica de procurare pompa centrifuga si proiect de CM.

4.2. Descrierea solutiei propuse pe categorii de lucrari si a documentatiei initiale pusa la dispozitie pentru dezvoltare proiect:

Nr. crt.	Categorii de lucrari	Descriere sumara	Inclus in scop	Anexa	Observatii
1	**Tehnologii**				

1.1.	Scheme de principiu	Se va monta pe pozitia existenta in instalatie.	DA ☒ NU ☐	Anexa 1	*Plan amplasare*
1.2.	PFD, Bilant material si termic	PFD.	DA ☒ NU ☐	Anexa 2	*Existent*
1.3.	P&ID		DA ☒ NU ☐	Anexa 3	*Existent*
1.4.	Diagrama Cauza-Efect	Se va furniza la solicitarea proiectantului.	DA ☒ NU ☐		
1.5.	Studiu HAZOP	Nu este disponibil, este inclus in scop.	DA ☒ NU ☐		
1.6.	Manual de operare cu instructiunile pe faze	Se va furniza la solicitarea proiectantului.	DA ☒ NU ☐		
1.7.	Caracterizarea fluxurilor tehnologice – calitate produse	Conform specificatie pompe PLK	DA ☒ NU ☐	Anexa A	*Este disponibila*
2	**Utilaje**				
2.1.	Existente / Refolosite din existent		DA ☐ NU ☒		
2.2.	Echipamente noi	Inlocuire pompe existente cu pompe noi.	DA ☒ NU ☐		
2.3.	Specificatii procurare	Intocmire specificatie procurare pompa noua.	DA ☐ NU ☒	Anexa 4 Anexa 5	
2.4.	Analiza tehnica a ofertelor de tehnologii sau echipamente primite de la potentialii furnizori	Vor fi puse la dispozitie ofertele tehnice primite de la furnizorii inscrisi	Avizari oferte DA ☒ NU ☐		
3	Montaj utilaj si leg. conducte	Se vor furniza la solicitarea proiectantului izometriile aferente unde se vor executa.	DA ☒ NU ☐		
4	Constructii beton, edilitare si alte facilitati	Fundatie/postament.	DA ☒ NU ☐		
5	Constructii metalice	Se va furniza la solicitarea proiectantului.	DA ☒ NU ☐		
6	Instalatii apa-canal	Instalatie de racire corp pompa dupa caz.	DA ☒ NU ☐		
7	Instalatii electrice	Adaptare alimentare locala cat si in statia electrica a noii pompe.	DA ☒ NU ☐		
		Se marcheaza corepunzator in dreptul fiecarei categorii:			
		inalta tensiune > 0,6 kV	DA ☐	NU ☒	
		inalta tensiune > 0,4 kV	DA ☐	NU ☒	
		joasa tensiune < 0,4 kV	DA ☒	NU ☐	
		joasa tensiune < 24 V	DA ☐	NU ☒	
		iluminat 220 V	DA ☐	NU ☒	

		UPS Convertizoare frecventa Tablouri comanda forta Statii TRAFO Alte auxiliare, prize impamantare, etc	DA ☐ DA ☐ DA ☐ DA ☐ DA ☐	NU ☒ NU ☒ NU ☒ NU ☒ NU ☒	
8	Instalatii AMC	Se va furniza la solicitarea proiectantului	DA ☒ NU ☐		
9	Configurare hardware si software DCS-ESD	Conform proiect	DA ☒ NU ☐		
10	Analizoare on-line, detectoare gaze	-	DA ☐ NU ☒		
11	Sisteme, retele, instalatii si dotari PSI	-	DA ☐ NU ☒		
10	Utilitati (aer, azot, apa etc)	Se va asigura circuit apa racire corp pompa.	DA ☒ NU ☐		
11	Instalatii de incalzire si/sau insotitori	-	DA ☒ NU ☐		
12	Instalatii de ventilatie si/sau climatizare	-	DA ☐ NU ☒		
13	Mecanizare ex: grinda monorail	-	DA ☐ NU ☒		
14	Memorii tehnice necesare obtinerii autorizatiilor, avizelor si/sau expertizelor	-	DA ☐ NU ☒		
15	Alte facilitati	1.Montarea senzorilor de vibratii si temperatura lagare pompa si lagare motor. 2.Montare traductor presiune pe circuit apa racire corp pompa cu indicatie in DCS. 3. Montaj presiune diferentiala pe filtrul din aspiratia pompelor	DA ☒ NU ☐		

4.3. Alte cerinte sau dotari solicitate: Nu este cazul.

5. DOCUMENTATIA CARE TREBUIE LIVRATA

5.1. Tipul, calitatea si cantitatea documentatie indicata mai jos reprezinta continutul minim al pachetului care se solicita a fi livrat, functie de particularitatile lucrarii pot fi adaugate si alte tipuri de documente care sunt necesare ideplinirii scopului, a tuturor cerintelor legale si de securitate a lucrarilor.

5.2. Furnizorul are obligatia sa indice in continutul ofertei tehnice documentatia suplimentara necesara a fi elaborata si livrata in pachetul de documentatie a proiectului.

5.3. Furnizorul trebuie sa índice in continutul ofertei tehnice cantitatea si calitatea setului de documentatie si/sau pachetul minim de informatii preliminare ce vor trebui a fi furnizate de catre Beneficiar, informatii provenind de la licentiatori, autorii de Basic Design-uri, furnizorii de echipamente sau a altor entitat si care ii sunt necesare pentru elaborarea scopului in termen, conform Graficului de executie asumat.

5.4. Furnizorul are obligatia sa prezinte in cadrul ofertei tehnice Graficul de realizare si de livrare a documentatiei tehnice de proiectare tinand cont de etapele de dezvoltare a proiectului in detaliu si cu conditionarile aferente confrom 5.3.

Pachet documentatie livrabila in cadrul proiectului:

1. Tehnologie			
1.1	Memoriu tehnic	DA ☒	NU ☐
1.2	Scheme de principiu	DA ☒	NU ☐
1.3	PFD, Bilant material si termic	DA ☐	NU ☒
1.4	P&ID	DA ☒	NU ☐
1.5	Diagrama Cauza Efect	DA ☒	NU ☐
1.6	Studiu HAZOP	DA ☒	NU ☐
1.7	Manual de operare cu instructiuni pe faze	DA ☒	NU ☐
1.8	Aviz verificare MEC	DA ☒	NU ☐
2. Conducte			
2.1	Memoriu tehnic	DA ☒	NU ☐
2.2	Lista conductelor la care se intervine	DA ☒	NU ☐
2.3	Lista conductelor noi	DA ☒	NU ☐
2.4	Identificarea, elaborarea si alocarea claselor de conducte, atat pentru cele noi cat si pentru cele existente	DA ☒	NU ☐
2.5	Lista puntcelor Tie-In (conexiune vechi – nou)	DA ☒	NU ☐
2.6	Calcularea si dimensionarea conform SR EN13480	DA ☒	NU ☐
2.7	Elaborarea izometriilor model 2D & 3D	DA ☒	NU ☐
2.8	Lista necesar materiale, inclusiv suporti, stalpi sau estacade cu precizie de ±10%	DA ☒	NU ☐
2.9	Documentatie necesara efectuarii expertizelor	DA ☒	NU ☐
2.10	Proiect de reparatii conducte semnat si stampilat RADTP si MEC	DA ☒	NU ☐
2.11	Avizele si autorizatiile autoritatilor romane (CNCIR, ANRE, etc)	DA ☒	NU ☐
2.12	Caiet de sarcini pentru constructor	DA ☒	NU ☐
3. Echipamente si utilaje			
3.1	Memoriu tehnic incluzind standardele de fabricatie, tinand cont de solicitarile explicite ale beneficiarului	DA ☒	NU ☐
3.2	Program control de calitate si grafic urmarire pe etape fabricatie	DA ☐	NU ☒
3.3	Lista echipamentelor cu indicarea tag-name conform P&ID, caracteristicile principale de design si operare	DA ☒	NU ☐
3.4	Specificatii de procurare – Fise Tehnice	DA ☒	NU ☐
3.5	Documentatia si desenele de executie (DDE)	DA ☒	NU ☐
3.6	Conditii si cerinte privind protectia impotriva coroziviunii, eroziunii si pentru securitatea personalului	DA ☒	NU ☐

3.7	Instructiuni privind transportul, conservarea, montajul, pregatire si punerea in functiune, scoaterea din operare si pregatirea echipamentului pentru activitati de inspectii si mentenanta	DA ☒	NU ☐
3.8	Lista cu necesarul materiale pentru PIF si piesele de schimb pentru 2 ani exploatare	DA ☒	NU ☐
3.9	Proiectul de executie / reparatie semnat si stampilat RADTP si MEC	DA ☒	NU ☐
3.10	Memoriu si documentatia necesara efectuarii expertizelor echipamentelor existente	DA ☒	NU ☐
3.11	Avizele si autorizatiile autoritatilor romane (CNCIR, etc) certificari PED si NoBo – daca intra in sarcina proiectantului	DA ☒	NU ☐
3.12	Avizarea ofertelor tehnice (2 revizii) pentru calificarea la licitatie	DA ☒	NU ☐
3.13	Avizarea documentatiei de executie (daca nu este in sarcina producatorului de echipamente)	DA ☒	NU ☐
4. Instrumentatie – AMC, PLC, DCS si ESD			
4.1	Memoriu tehnic	DA ☒	NU ☐
4.2	Lista echipamentelor cu indicarea tag-name conform P&ID, domeniile, clasa precizie, tip, etc	DA ☒	NU ☐
4.3	Specificatiile de procurare si lista potentialilor producatori	DA ☒	NU ☐
4.4	Lista cu necesarul materiale pentru PIF si piesele de schimb pentru 2 ani exploatare	DA ☒	NU ☐
4.5	Jurnal de cabluri	DA ☒	NU ☐
4.6	Specificatii de cabluri	DA ☒	NU ☐
4.7	Trasee de cabluri	DA ☒	NU ☐
4.8	Scheme conexiuni	DA ☒	NU ☐
4.9	Lista I/O	DA ☒	NU ☐
4.10	Secificatii UPS (si hook-up)	DA ☐	NU ☒
4.11	Lista cu necesar materiale cu precizie de ±10%	DA ☒	NU ☐
5. Electrice			
5.1	Memoriu tehnic	DA ☒	NU ☐
5.2	Lista echipamentelor cu indicarea tag-name conform P&ID si a principalelor caracteristici tehnice	DA ☒	NU ☐
5.3	Specificatiile de procurare si lista potentialilor producatori	DA ☒	NU ☐
5.4	Lista cu necesarul materiale pentru PIF si piesele de schimb pentru 2 ani exploatare	DA ☒	NU ☐
5.5	Jurnal de cabluri	DA ☒	NU ☐
5.6	Specificatii de cabluri	DA ☒	NU ☐
5.7	Trasee de cabluri	DA ☒	NU ☐
5.8	Scheme conexiuni	DA ☒	NU ☐
5.9	Schema instalatiei de impamantare	DA ☒	NU ☐
5.10	Lista I/O	DA ☒	NU ☐
5.11	Specificatii UPS (si hook-up) sistem automentinere in caz de fluctuatie de tensiune	DA ☒	NU ☐
5.12	Lista cu necesar materiale cu precizie de ±10%	DA ☒	NU ☐
5.13	Avizele si autorizatiile ANRE	DA ☐	NU ☒

6. Constructii metalice, beton si amenajarea teritoriului			
6.1	Memoriu tehnic incluzind standardele de fabricatie	DA ☒	NU ☐
6.2	Program control de calitate si graficul de urmarire pe etape executie	DA ☒	NU ☐
6.3	Planuri de amplasare fundatii, camine si trasee conducte subterane, drumuri	DA ☒	NU ☐
6.4	Documentatia si desenele de executie (DDE)	DA ☒	NU ☐
6.5	Lista cu necesar materiale cu precizie de ±10%	DA ☒	NU ☐
6.6	Aviz verificare MDRAP A1, A2 , B1, B11, C	DA ☐	NU ☒
6.7	Punctul de vedere al proiectantului privind executia lucrarii (conf. HG nr. 273/1994)	DA ☒	NU ☐
6.8	Asigura prezenta si prezinta punct de vedere la receptia de terminare a lucrarilor (conf. Legii nr. 10/1995 republicata)	DA ☒	NU ☐
6.9	Asigura prezenta si prezinta punct de vedere la receptia finala a lucrarilor (conf. Legii nr. 10/1995 republicata)	DA ☒	NU ☐
6.10	Intocmirea documentatiei DTAC sau DTAD, dupa caz	DA ☒	NU ☐
7. Documentatie privind securitatea industriala de SSM-SU			
7.1	Studiul de identificare a zonelor cu pericol de explozie	DA ☐	NU ☒
7.2	Plan amplasare cu indicarea claselor zonelor cu pericol de explozie (zonare Ex)	DA ☐	NU ☒
7.3	Scenariul si planul de interventie in caz de incendiu	DA ☐	NU ☒
7.4	Factori de risc si masuri de tehnica securitatii muncii	DA ☒	NU ☐
8. Documentatie privind factorii de mediu si Ecologia			
8.1	Indicarea solutiilor BAT pentru solutia tehnica aleasa	DA ☐	NU ☒
8.2	Studiul de impact asupra indicatorilor cuprinsi in AIM	DA ☐	NU ☒
8.3	Enumerarea (eventualelor) tipurilor de deseuri si cantitatea anuala rezultata in urma implementarii solutiei	DA ☐	NU ☒
8.4	Noxe generate (daca e cazul), estimarea cantitatii anuale si limitele impuse	DA ☐	NU ☒
8.5	Masuri de eliminare sau pentru compensarea impactului negativ asupra climatului de munca si/sau mediului inconjurator.	DA ☐	NU ☒
9. Documentatie economica			
9.1	Devize de cheltuieli defalcat pentru fiecare disciplina inclusiv pentru lucrari de expertiza si constructii montaj	DA ☒	NU ☐
9.2	Devizul General (CAPEX)	DA ☒	NU ☐
9.3	Estimare costuri aferente activitatii de pregatire si pentru punere in functiune	DA ☒	NU ☐
9.4	Costuri de operare (OPEX)	DA ☐	NU ☒
9.5	Efecte / Venituri realizate in urma implementarii proiectului	DA ☐	NU ☒
10. Avize si Autorizatii			
10.1	De constructie	DA ☒	NU ☐
10.2	De demolare	DA ☒	NU ☐
10.3	Urbanism	DA ☐	NU ☒
10.4	De Mediu	DA ☐	NU ☒
10.5	Insemex	DA ☒	NU ☐
10.6	ISCIR	DA ☒	NU ☐

10.7	CNCIR	DA ☒	NU ☐
10.8	CNCAN	DA ☐	NU ☒
10.9	ISU	DA ☐	NU ☒
10.10	Altele (se vor enumera dupa caz)	DA ☐	NU ☒
11. Altele cerinte			
11.1	Lucrari civile - Punctul de vedere al proiectantului privind executia lucrarii (conf. HG nr. 273/1994)	DA ☐	NU ☒
11.2	Asigura prezenta si prezinta punct de vedere la receptia de terminare a lucrarilor (conf. Legii nr. 10/1995 republicata)	DA ☒	NU ☐
11.3	Asigura prezenta si prezinta punct de vedere la receptia finala a lucrarilor – dupa expirarea perioadei de garantie (conf. Legii nr. 10/1995 republicata)	DA ☒	NU ☐

6. SURSA DE FINANTARE: Program Investitional - Reutilare Tehnica 2022 (poz.97) ✓

7. RESPONSABIL PROIECT DIN PARTEA BENEFICIARULUI:

- Numele si prenumele Mitache Iulian/Calin Marin
- Functia: Ing Tehnolog Sector
- Telefon: (int)3750
- e-mail: imitache@petrotel.lukoil.com

8. TERMEN EXECUTIE

8.1. Termenele de predare pe faze de executie (conform RUT 2022)
8.2. Termenul maxim de livrare al pachetului complet documentatie conform scopului stabilit prin prezenta tema este: **01.06.2022**
8.3. Termenul maxim de livrare a pachetului complet de documentatie dupa efectuarea controlului de autor in varianta/revizia finala As-Built, este de maxim 10 zile lucratoare dupa PIF sau eliminarea oricaror observatii.

9. LISTA AVIZARE:

FUNCTIA	NUMELE SI PRENUMELE	SEMNATURA
SEF SERVICIU CONSTRUCTII CAPITALE	Y. I. EROGOV	
TEHNOLOG SEF	CATALIN NICULESCU	02.04.2022
ING. SEF ADJ. PRODUCTIE	PARNAU DANIEL	01.04.22
ING. SEF MECANIC	DENYS MAKUSHEV	06.04.2022

ING. SEF METROLOG	ION ENE	
ING.SEF ENERGETICIAN	MAXIM GRECOV	
SEF ARIE	ADRIAN NEGOITA	
SEF SIE	ALEXANDRU VALENTIN	
SEF SERVICIU SSM-SU	FLORENTIN DINU	
SEF SERVICIU PROTECTIA MEDIULUI	GHEORGHE DUCA	

Tema tehnica intocmita de:

- Numele si prenumele Mitache Iulian / Calin Marin
- Functia: Inginer Tehnolog Sector 3
- Telefon: 3750
- e-mail: imitache@petrotel.lukoil.com

Anexa A

Date initiale pentru partea Tehnololgica

1.2. Proiect: Inlocuit pompe alimentare cu apa demineralizata degazata cazane recuperatoare caldura instalatii Recuperare sulf fir II si fir III, pozitie montaj 303-P4 B,C

1.	Utilajele care vor fi implicate in proiect	Pompe 303-P4B si 303-P4C Conducta aspiratie Conducta refulare Conducta apa racire pompa
2.	Parametrii de lucru ai utilajelor	Fluid de lucru – Apa demineralizata degazata Temperatura fluid (Tf): 90-110°C Presiune aspiratie (Pa): 0.5barg Presiune refulare (Pr): 40 barg Debit (Q) : 50 m^3/h
3.	Inlocuirea utilajelor	DA ☒ NU ☐
4.	Utilajele care necesita inlocuire	303-P4B, 303-P4C
5.	Se vor modifica parametrii de lucru ai utilajelor	DA ☐ NU ☒
6.	Parametrii de lucru ai utilajelor noi	Conform specificatie PLK anexata
7.	Utilaje suplimentare/noi	DA ☐ NU ☒
8.	Parametrii de lucru ai utilajelor suplimentare/noi	-
9.	Echipamente AMC pe utilajele existente	Senzori prezenta lichid in aspiratia pompei; Senzori deplasare axiala pompa. Sistem racire lagare pompa cu fluidul de lucru; Manometru pe aspiratia si refularea pompei Ampermetru local + transmis in DCS Apa racire pompa (Apa recirculate sau demineralizata)
10.	Echipamente AMC pe utilajele noi	Senzori vibratii pompa si motor electric Masurare temperature lagare/pompa/ motor electric Masurare amperaj motor electric local si la distanta Senzori masurare temperatura infasurari motor electric
11.	Echipamente AMC noi pe utilajele existente	NU
12.	Racorduri noi pentru echipamente AMC	DA ☒ NU ☐
13.	Parametrii de blocare si alarmare pentru fiecare utilaj in parte	DA ☒ NU ☐
14.	Caracteristicile sistemelor de siguranta existente.	
15.	Necesitatea calculului componentelor sau amenajarilor interioare ale utilajului	DA ☐ NU ☒
16.	Necesitatea inlocuirii componentelor interioare	DA ☐ NU ☒

	existente	
17.	Utilajele pentru care este necesara refacerea calculului si inlocuirea componentelor interioare.	*Nu e cazul*
18.	Locul amplasarii utilajelor suplimentare/noi	Pozitie actuala a pompelor 303-P4B/C

Legaturi Conducte

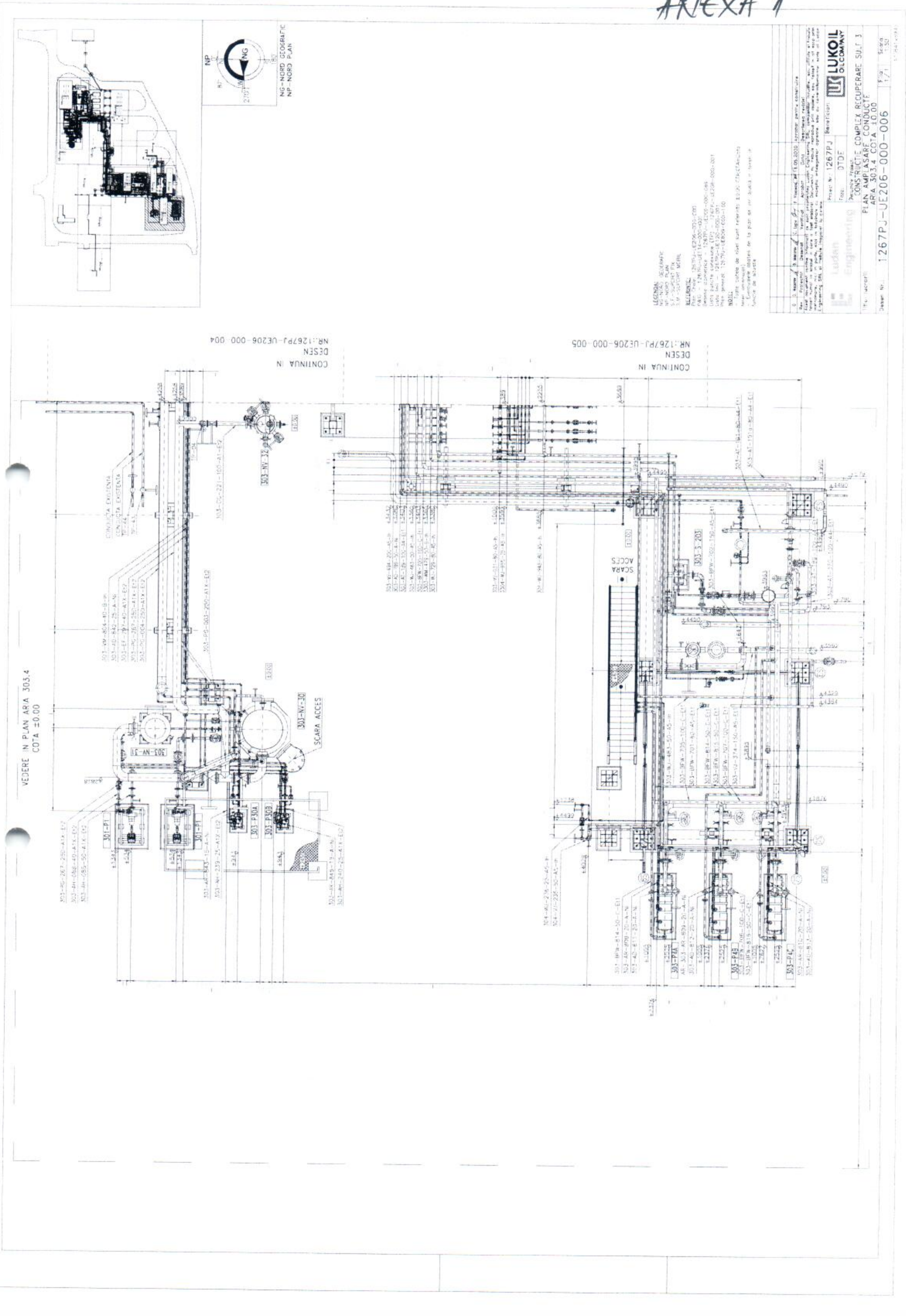
1.	Necesitatea montajului conductelor noi	
2.	Locul conexiunilor conductelor noi	*Pompe 303-P4B/C, conducte aspiratie si refulare.*
3.	Parametrii de lucru ai conductelor existente care fac interconexiune cu cele noi	DA sunt descrisi la pct.4 de la datele tehnologice.
4.	Parametrii de lucru ai conductei noi	Conform proiect
5.	Necesitatea inlocuirii conductelor existente.	Conform proiect
6.	Specificatiile conductelor care se inlocuiesc	Conform proiect
7.	Limitele conexiunii conductelor	Robineti izolare conducte aspiratie si refulare pompa.
8.	Amplasarea conductelor	Conform proiect
9.	Traseul conductei	Conform proiect
10.	Existenta spatiului liber pe estacada	Nu este cazul
11.	Necesitatea constructiei estacadelor noi	Nu este cazul

	Lista documentatiei necesare la elaborarea partii de Tehnologie	
1.	Desenele ale utilajelor existente	DA – Izometrii Conducte aspiratie refulare pompa
2.	Cartile tehnice ale utilajelor existente	DA - Pompa
3.	Plan amplasare a utilajelor	DA
4.	Plan zonare.	DA

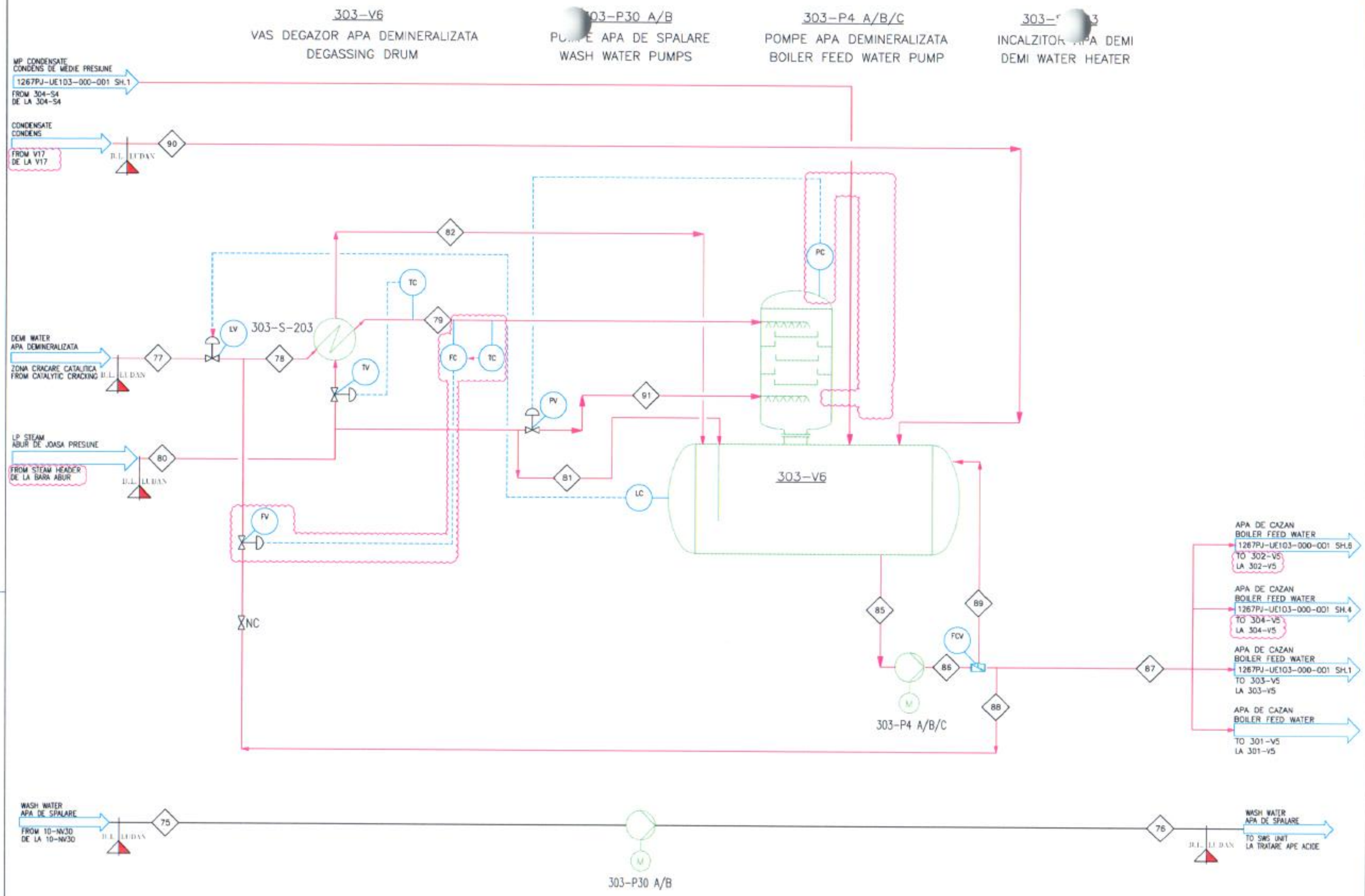
RESPONSABIL DIN PARTEA BENEFICIARULUI:

FUNCTIA	NUMELE SI PRENUMELE	SEMNATURA
ING. TEHNOLOG SECTOR	Mitache Iulian	
INSPECTOR N.P.	Iorgoiu Ciprian	05.04.22
SEF INSTALATIE	Mihalcea Vasile	

ANEXA 1


NG-NORD GEOGRAFIC
NP-NORD PLAN
VEDERE IN PLAN ARIA 303.4
COTA ±0.00
CONTINUA IN
DESEN
NR.:1267PJ-UE206-000-004
CONTINUA IN
DESEN
NR.:1267PJ-UE206-000-005
SCARA ACCES
LEGENDA:
Proiect Nr.: 1267PJ
Faza: DTDE
Beneficiar:
LUKOIL OIL COMPANY
CONSTRUCTIE COMPLEX RECUPERARE SULF 3
PLAN AMPLASARE CONDUCTE
ARIA 303.4 COTA 10.00
1267PJ-UE206-000-006
Scara 1:50

ANEXA 2



NOTES / NOTE

LUDAN Engineering S.R.L.
MASTER
Discipline PROCESS
Name V.BOLOGA Sign.
Date 14.10.2019

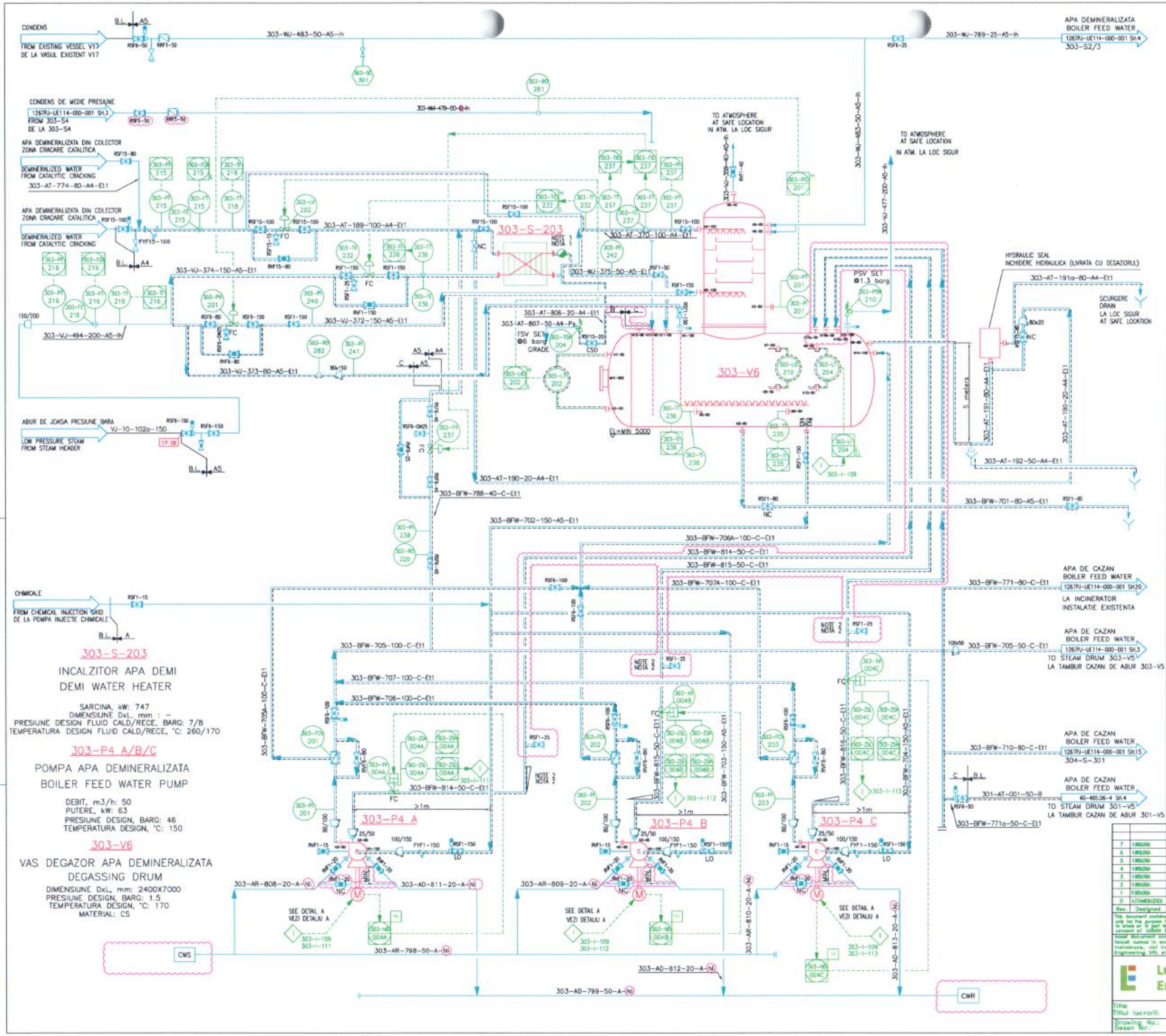
STREAM NUMBER / PARAMETERS	UM	75	76	77	78	79	80	81	82			85	86	87	88	89	90	91
Vapour Fraction		0	0	0	0	0	1	1	0			0	0	0	0	0	0	1
FLOWRATE	kg/h	3558	3558	30000	55000	55000	7000	986	3586			50000	50000	45000	132	4736	18000	2600
	m3/h	3.6	3.6	30	55	55	2692	371.5	3.7			52.3	52.3	47	0.13	5	19.4	4000
	STDm3/h	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-
TEMPERATURE	°C	45	45	20	58.4	70	165	165	120			104	104	104	104.5	104	140	130
PRESSURE	barg	0.6	3	5	4	3.5	4	4	0			0.7	34	34	34	34	2.5	0.2
DENSITY	kg/m3	998	998	998	998	998	2.6	2.6	0.6			955	955	955	955	955	927	0.65
VISCOSITY	cP	0.6	0.6	1	1	1	0.01	0.01	-			0.26	0.26	0.26	0.26	0.26	0.2	0.01

Rev.	Designed	Drawn	Checked	Approved	Date	Descrierea reviziei
3	V.BOLOGA	A.SOSOREANCA	B.GOZMEN	P.VLASCEANU	14.10.2019	A patra emitere
2	V.BOLOGA	A.SOSOREANCA	B.GOZMEN	P.VLASCEANU	20.12.2018	A treia emitere
1	V.BOLOGA	A.SOSOREANCA	B.GOZMEN	P.VLASCEANU	20.12.2018	A doua emitere
0	V.BOLOGA	A.VLASCEANU	V.BOLOGA	P.VLASCEANU	12.04.2018	Prima emitere

Ludan Engineering

Project No.: / Proiect Nr.: 1267PJ
Phase: / Faza: DTDE
Customer: / Beneficiar: LUKOIL OIL COMPANY
Project Name: CONSTRUCTION OF SULFUR RECOVERY UNIT 3 / CONSTRUCTIE COMPLEX RECUPERARE SULF 3
Title: / Titlul lucrarii: PROCESS FLOW DIAGRAM / VAS DEGAZOR APA DEMINERALIZATA/DEGASSING DRUM
Drawing No.: / Desen Nr.: 1267PJ-UE103-000-001
Sheet / Fila: 5/6
Scale / Scara: 100%
A1(841x594)

ANEXA 3



NOTES / NOTE

1 – THERMODYNAMIC TYPE TRAPS.
1 – OALE DE CONDENS TIP TERMODINAMIC.

2 – VERTICAL OR TILTED PUMP RECIRCULATION LINE WITH 3.5m HEIGHT WITH EXHAUST VALVE LOCATED AT HIGHEST POINT
2 – RECIRCULARE VERTICALA SAU USOR INCLINATA CU INALTIME DE 3.5m SI VENTIL MONTAT LA CEL MAI INALT PUNCT

DETAIL A:
DETALIU A:

STOP – START

RUN – FAULT – MODE

LUDAN Engineering S.R.L.
MASTER
Discipline: PROCESS
Name: VPB Sign.
Date: 04.04.2019

Rev.	Designed	Drawn	Checked	Approved	Date	Revision description
7	V.BOLOGA	A.BOSCORNEA	R.ECONOMU	P.VLASCEANU	04.04.2019	A opta emitere
6	V.BOLOGA	A.BOSCORNEA	R.ECONOMU	P.VLASCEANU	06.03.2019	A saptea emitere
5	V.BOLOGA	A.BOSCORNEA	R.ECONOMU	P.VLASCEANU	04.03.2019	A sasea emitere
4	V.BOLOGA	A.BOSCORNEA	R.ECONOMU	P.VLASCEANU	15.11.2018	A cincea emitere
3	V.BOLOGA	A.BARBULITA	R.ECONOMU	P.VLASCEANU	07.05.2018	A patra emitere
2	V.BOLOGA	A.BARBULITA	R.ECONOMU	P.VLASCEANU	21.06.2018	A treia emitere
1	V.BOLOGA	A.BARBULITA	R.ECONOMU	P.VLASCEANU	21.05.2018	A doua emitere
0	A.STANESCU	A.VLASCEANU	V.BOLOGA	P.VLASCEANU	12.04.2018	Prima emitere

Ludan Engineering

Project No.: / Proiect Nr.: 1267PJ
Phase: / Faza: DTDE
Customer: / Beneficiar: LUKOIL OIL COMPANY
Project Name: CONSTRUCTION OF SULFUR RECOVERY UNIT 3
Title: / Titlul lucrarii: PIPING AND INSTRUMENTATION DIAGRAM
VAS DEGAZOR APA DEMINERALIZATA/DEGASSING DRUM
Drawing No.: / Desen Nr.: 1267PJ-UE114-000-001
Sheet:/Fila 19/20
Scale:/Scara X:Y
A1(841x594)

ANEXA 4

LUKOIL
OIL COMPANY

Construction of Sulfur Recovery Unit 3

PROCESS DATA SHEET
CENTRIFUGAL PUMP
Boiler Feed Water Pump
303-NP-4 A/B

Project Phase: DTDE

Project No.: 1267PJ

Client: S.C. PETROTEL - LUKOIL S.A.

Site Location : Ploieşti, Prahova, Romania

VIZA BUN DE EXECUTIE
Specialist Pregatire Documentatie
COMANJON
SEMNATURA.....
DATA.....

APPLICABLE TO: ○ PROPOSAL ● PURCHASE ☒ AS BUILT

FOR: S.C. PETROTEL - LUKOIL S.A. UNIT: Sulfur Recovery Unit 3

SITE: Ploiești, Prahova, Romania SERVICE: 1

NO. REQ 2 PUMP SIZE ____ TYPE: HORIZONTAL NO. STAGES ____

MANUFACTURER ____ MODEL: ____ SERIAL No. ____

NOTES: INFORMATION BELOW TO BE COMPLETED ○ BY PURCHASER ☐ BY MANUFACTURER ○ BY MANUFACTURER OR PURCHASER

○ GENERAL

PUMPS TO OPERATE IN (PARALLEL)	No. MOTOR DRIVEN 2	No. TURBINE DRIVEN	
(SERIES) WITH	PUMP ITEM No.	PUMP ITEM No.	
GEAR ITEM No.	MOTOR ITEM No.	TURBINE ITEM No.	
GEAR PROVIDED BY	MOTOR PROVIDED BY	TURBINE PROVIDED BY	
GEAR MOUNTED BY	MOTOR MOUNTED BY	TURBINE MOUNTED BY	
GEAR DATA SHT. No.	MOTOR DATA SHT. No.	TURBINE DATA SHT. No.	

OPERATING CONDITIONS

● CAPACITY NORMAL 42 (m^3/h) RATED 50 (m^3/h)

OTHER Minimum continuous flow 20 m3/h.

● SUCTION PRESSURE MAX/RATED 0.4 / 0.7 (barg)

● DISCHARGE PRESSURE 34 (barg)

● DIFERENTIAL PRESSURE 33.6 (barg)

● DIFF. HEAD 359 (m) NPSHA 3.0 (m)

○ PROCESS VARIATIONS ____

○ STARTING CONDITIONS ____

SERVICE: ● CONT. ○ INTERMITTENT (STARTS/DAY) ____

○ PARALLEL OPERATION REQ'D

● SITE AND UTILITY DATA

LOCATION:

○ INDOOR ○ HEATED ○ UNDER ROOF

● OUTDOOR ○ UNHEATED ○ PARTIAL SIDES

○ GRADE ○ MEZZANINE ○ ____

● ELECTRICAL AREA CLASSIFICATION

CL ____ GR IICT3 Zone 2

● WINTERIZATION REQ'D ○ TROPICALIZATION REQ'D.

SITE DATA

● ALTITUDE 157 (m) BAROMETER 750 mmHg

● RANGE OF AMBIENT TEMP: MIN/MAX. -28 / 41 (°C)

○ RELATIVE HUMIDITY: MIN / MAX 66 / 90 (%)

UNUSUAL CONDITIONS: ● DUST ○ FUMES

○ OTHER ____

○ **UTILITY CONDITIONS:**

STEAM:	DRIVERS		HEATING	
MIN.:	____ (bar)	____ (°C)	____ (bar)	____ (°C)
MAX.:	____ (bar)	____ (°C)	____ (bar)	____ (°C)

ELECTRICITY	DRIVERS	HEATING	CONTROL	SHUTDOWN
VOLTAGE:	400			
HERTZ:	50			
PHASE:	3			

COOLING WATER: ____

TEMP. INLET ____ (°C) MAX. RETURN ____ (°C)

NORM PRESS. ____ barg DESIGN ____ barg

MIN RETORNO ____ barg MAX ALLOW DP ____ bar

SITE AND UTILITY DATA (COT'D)

WATER SOURCE ____

CHLORIDE CONCENTRATION (PPMW) ____

INSTRUMENT AIR: MAX / MIN PRESS ____ / ____ (bar)

LIQUID

● TYPE OR NAME OF LIQUID **BOILER FEED WATER**

● PUMPING TEMPERATURE:

NORMAL 104 (°C) MAX 110 (°C) MIN 90 (°C)

● VAPOR PRESSURE 1.17 (bar) 104 (°C)

● RELATIVE DENSITY (SPECIFIC GRAVITY):

NORMAL 0.955 MAX 0.92 MIN 0.967

● SPECIFIC HEAT, Cp 4 (kJ/kg°C)

● VISCOSITY ____ (cP) @ ____ (°C)

● MAX. VISCOSITY 0.31 @ MIN. TEMP (cP)

○ CORROSIVE/EROSIVE AGENT ____

○ CHLORIDE CONCENTRATION (PPMW) ____

○ H_2S CONCENTRATION (PPMW) ____

LIQUID ○ HAZARDOUS ○ FLAMMABLE

● OTHER **COMPOSITION (%WT) H20: 100**

PERFORMANCE

PROPOSAL CURVE No. ____ ☐ RPM

☐ IMPELLER DIA RATED ____ MAX ____ MIN ____ (mm)

☐ RATED POWER ____ (BHP) EFFICIENCY ____ (%)

☐ MINIMUM CONTINUOUS FLOW:

THERMAL ____ (m^3/h) STABLE ____ (m^3/h)

☐ PREFERRED OPERATING REGION ____ TO ____ (m^3/h)

☐ ALLOWABLE OPERATING REGION ____ TO ____ (m^3/h)

☐ MAX HEAD @ RATED IMPELLER ____ (m)

☐ MAX POWER @ RATED IMPELLER ____ ____ (kW)

☐ NPSHR AT RATED CAPACITY ____ (m)

○ SUCTION SPECIFIC SPEED ____

■ MAX. SOUND PRESS. LEVEL REQ'D 85 (dBA)

☐ EST MAX. SOUND PRESS. LEVEL ____ (dBA)

REMARKS: Minimum continuous flow to be confirmed by vendor

NOTE: 1 active, 2 x spare

Pump shall be centrifugal type.

19.01.22

19.01.2022

DRMU-I377-02.02.22

CONSTRUCTION

APPLICABLE STANDARD:

- ○ API 610 11TH EDITION
- ● OTHER NON - API (SEE REMARKS)

PUMP TYPE:

☒ OH2	☐ BB1	☐ VS1	☐ VS6
☐ OH3	☐ BB2	☐ VS2	☐ VS7
☐ OH6	☐ BB3	☐ VS3	☐ OTHER
	● BB4	☐ VS4	
	☐ BB5	☐ VS5	

☐ **NOZZLE CONDITIONS:**

	SIZE	RATING	FACE	POSITION
FLANGE				
SUCTION				HORIZONTAL
DISCHARGE				VERTICAL
BALANCE DRUI				

PRESSURE CASING CONNECTIONS:

	No.	SIZE (NPS)	TYPE
☐ DRAIN			
☐ VENT			
☐ PRESSURE GAUGE			
☐ TEMP GAUGE			
☐ WARM-UP			
☐ BALANCE/LEAK-OFF			

○ CYLINDRICAL THREADS REQUIRED

CASING MOUNTING: (SEE SEPARATE SHEET FOR VERTICLES)

☐ CENTERLINE ☐ NEAR CENTERLINE
☐ FOOT ☐ SEPARATE MOUNTING PLATE
☐ IN-LINE

CASING SPLIT:

☐ AXIAL ☐ RADIAL

CASING TYPE:

☐ SINGLE VOLUTE ☐ MULTIPLE VOLUTE ☐ DIFFUSER
☐ OVERHUNG ☐ BETWEEN BEARINGS ☐ BARREL

CASE PRESSURE RATING:

☐ MAX ALLOWABLE WORKING PRESSURE 46 (bar)
@ 150 (°C)
☐ HIDRO TEST PRESSURE (bar)
○ SUCT'N PRESS. REGIONS MUST BE DESIGNED FOR MAWP

ROTATION: (VIEWED FROM COUPLING END)

☐ CW ☐ CCW

○ IMPELLERS INDIVIDUALLY SECURED

REMARKS:

○ BOLT OH3 PUMP TO PAD/FOUNDATION

SHAFT:

☐ SHAFT DIAMETER AT COUPLING (mm)

CONSTRUCTION (CONT)

☐ SHAFT DIAMETER BETWEEN BEARINGS (mm)
☐ SPAN BETWEEN BEARING CENTERS (mm)
☐ SPAN BETWEEN BEARING & IMPELLER (mm)

REMARKS:

SHAFT COUPLINGS: ○ DRIVER TO PUMP

○ MAKE Metastream
☒ MODEL
☐ RATING (kW/100 RPM)
○ LUBRICATION
☒ LIMITED END FLOAT REQUIRED
☒ SPACER LENGHT (mm)
☒ SERVICE FACTOR

DRIVER HALF COUPLING MOUNTED BY:

○ PUMP MFR. ○ DRIVER MFR. ○ PURCHASER
○ COUPLING PER API671

BASEPLATES:

○ API BASEPLATE NUMBER
○ NON-GROUT CONSTRUCTION

REMARKS:

MATERIAL

● CLASS API 610 Table H.1 C-6 (12% CHR - 1.4006)
○ MIN DESIGN METAL TEMP -28 (°C)
☐ BARREL/CASE IMPELLER
☐ CASE/IMPELLER WEAR RING
☐ SHAFT
☐ DIFFUSERS
☐ COUPLING SPACER/HUBS
☐ COUPLING DIAPHAGMS (DISKS)

REMARKS:

BEARINGS AND LUBRICATION

BEARING (TYPE / NUMBER):

☐ RADIAL /
☐ THRUST /
○ REVIEW AND APPROVE THRUST BEARING SIZE

LUBRICATION:

☒ GREASE ☒ FLOOD ☒ RING OIL
☒ FLINGER ☒ PURGE OIL MIST ☒ PURE OIL MIST
○ CONSTANT LEVEL OILER PREFERENCE (SEE REMARKS)
☒ PRESSURE LUBE SYS ○ API-610 ○ API-614
○ OIL VISC. ISO GRADE

REMARKS:

1. The flanges will be acc. To EN 1092-1
2. Allowable nozzle loads: API 610.
3. Marking on the name plate: CE

Note 1 - Manufacturer to advise

19-01-22

DRMU-1377-02.02.22

BEARINGS AND LUBRICATION (CONT)

- ○ OIL HEATER REQ'D ○ ELECTRIC ○ STEAM
- ○ OIL PRESS TO BE GREATER THAN COOLANT PRESS
- REMARKS: _____

MECHANICAL SEAL OR PACKING

SEAL DATA:

- ○ SEE ATTACHED API-682 DATA SHEET
- ○ NON API-682 SEAL
- ● SEAL CODE API 682, Plan11
- ○ SEAL MANUFACTURER _____
- ○ SIZE AND TYPE _____ / _____
- ○ MANUFACTURER CODE _____

SEAL CHAMBER DATA:

- ○ TEMPERATURE _____ (°C)
- ○ PRESSURE _____ (bar)
- ○ FLOW _____ (m^3/h)
- ☐ SEAL CHAMBER SIZE _____
- ☐ TOTAL LENGTH (mm) ☐ CLEAR LENGTH (mm)

SEAL CONSTRUCTION:

- ☐ SLEEVE MATERIAL _____
- ☐ GLAND MATERIAL _____
- ○ AUX SEAL DEVICE _____
- ○ JACKET REQUIRED _____

GLAND TAPS:

- ○ FLUSH (F) ○ DRAIN (D) ○ BARRIER/BUFF (B)
- ○ QUENCH (Q) ○ COOLING (C) ○ LUBRICATION (G)
- ○ HEATING (H) ○ LEAKAGE ○ PUMPED FLUID (P)
- ○ BALANCE FLUID (E) ○ EXTERNAL FLUID INJECTION (X)

SEAL FLUIDS REQUIREM'T AND AVAILABLE FLUSH LIQUID:

NOTE:IF FLUSH LIQUID IS PUMPAGE LIQUID (AS IN FLUSH PIPING PLANS 11 TO 41), FOLLOWING FLUSH LIQUID DATA IS NOT REQ'D.

- ○ SUPPLY TEMPERATURE MAX/MIN _____ / _____ (°C)
- ○ RELATIVE DENSITY (SPECIFIC GRAVITY) _____ @ _____ (°C)
- ○ NAME OF FLUID _____
- ○ SPECIFIC HEAT, Cp _____ (kJ/kg°C)
- ○ VAPOR PRESSURE _____ (kPa abs)@ _____ (°C)
- ○ HAZARDOUS ○ FLAMMABLE ○ OTHER _____
- ☐ FLOW RATE MAX/MIN _____ / _____ (m^3/h)
- ☐ PRESSURE REQ'D MAX/MIN _____ / _____ (bar)
- ☐ TEMPERATURE REQ'D MAX/MIN _____ / _____ (°C)

BARRIER/BUFFER FLUID

- ○ SUPPLY TEMPERATURE MAX/MIN _____ / _____ (°C)
- ○ RELATIVE DENSITY (SPECIFIC GRAVITY) _____ @ _____ (°C)
- ○ NAME OF FLUID _____

MECHANICAL SEAL OR PACKING (CONT)

- ○ VAPOR PRESSURE _____ (bar) _____ (°C)
- ○ HAZARDOUS ○ FLAMMABLE ○ OTHER _____
- ☐ FLOW RATE MAX/MIN _____ / _____ (m^3/h)
- ☐ PRESSURE REQ'D MAX/MIN _____ / _____ (bar)
- ☐ TEMPERATURE REQ'D MAX/MIN _____ / _____ (°C)

QUENCH FLUID:

- ○ NAME FLUID _____
- ☐ FLOW RATE _____ (m^3/h)

SEAL FLUSH PIPING:

- ○ SEAL FLUSH PIPING PLAN _____
- ○ TUBING ○ CARBON STEEL
- ○ PIPE ○ STAINLESS STEEL
- ○ AUXILIARY FLUSH PLAN
- ○ TUBING ○ CARBON STEEL
- ○ PIPE ○ STAINLESS STEEL
- ○ PIPING ASSEMBLY:
- ○ THREADED ○ UNIONS ○ SOCKET WELDED
- ○ FLANGED ○ TUBE TYPE FITTINGS
- ○ PRESSURE SWITCH (PLAN 52/53) TYPE _____
- ○ PRESSURE GAUGE (PLAN 52/53)
- ○ LEVEL SWITCH (PLAN 52/53) TYPE _____
- ○ LEVEL GAUGE (PLAN 52/53)
- ○ TEMP INDICATOR (PLAN 21, 22, 23, 32, 41)
- ○ HEAT EXCHANGER (PLAN 52/53)

REMARKS: API 685 Table H.1 C-6 (12% CHR - 1.4006) - Note 1

PACKING DATA:

- MANUFACTURER _____
- TYPE _____
- SIZE _____ No. OF RINGS _____
- ☐ PACKING INJECTION REQUIRED
- ☐ FLOW _____ (m^3/h) @ _____ (°C)
- ☐ LANTERN RING _____

STEAM AND COOLING WATER PIPING

- ○ COOLING WATER PIPING PLAN _____
- ○ COOLING WATER REQUIREMENTS
- ○ SEAL JACKET/BRG HSG _____ (m^3/h) @ _____ (bar)
- ○ SEAL HEAT EXCHANGER _____ (m^3/h) @ _____ (bar)
- ○ QUENCH _____ (m^3/h) @ _____ (bar)
- TOTAL COOLING WATER _____ (m^3/h)
- ○ STEAM PIPING ○ TUBING ○ PIPE

REMARKS: _____

ADDITIONAL REMARKS: _____

19.01.22

19.01.2022

INSTRUMENTATION

VIBRATION:
- ○ NON CONTACTING (API-670) ○ TRANSDUCER
- ○ PROVISION FOR MOUNTING ONLY
- ○ FLAT SURFACE REQ'D
- ○ SEE ATTACHED API-670 DATA SHEET
- ○ MONITORS AND CABLES

REMARKS: See Page 6, GENERAL REMARKS

TEMPERATURE AND PRESSURE:
- ○ RADIAL BRG METAL TEMP ○ THRUST BRG METAL TEMP
- ○ PROVISION FOR INSTRUMENTS ONLY
- ○ SEE ATTACHED API-670 DATA SHEET
- ○ TEMP GAUGES (WITH THERMOWELLS)
- OTHER
- ○ PRESSURE GAUGE TYPE
- LOCATION

REMARKS: See Page 6, GENERAL REMARKS

SPARE PARTS

- ○ START-UP ○ NORMAL MAINTENANCE
- ● SPECIFY See general remarks

MOTOR DRIVE

- ○ MANUFACTURER
- ☐ kW ☐ (RPM)
- ☐ HORIZONTAL ☐ VERTICAL
- ☐ FRAME
- ○ SERVICE FACTOR
- ● VOLTS/PHASE/HERTZ 400 / 3 / 50
- ● TYPE ELECTRIC MOTOR
- ○ ENCLOSURE
- ○ MINIMUM STARTING VOLTAGE
- ○ TEMPERATURE RISE
- ○ FULL LOAD AMPS
- ○ LOCKED ROTOR AMPS
- ○ INSULATION F / class B
- ○ STARTING METHOD
- ○ LUBE
- ☐ VERTICAL THRUST CAPACITY
- UP (N) DOWN (N)

BEARINGS (TYPE / NUMBER):
- ☐ RADIAL /
- ☐ THRUST /

REMARKS:

MOTOR DRIVE (CONT)

REMARKS: Pump motor shall be provided by pump vendor
Motor shall be mounted by pump vendor

SURFACE PREPARATION AND PAINT

- ● MANFACTURER'S STANDARD
- ○ OTHER (SEE BELOW)

PUMP:
- ○ PUMP SURFACE PREPARATION
- ○ PRIMER
- ○ FINISH COAT

BASEPLATE:
- ○ BASEPLATE SURFACE PREPARATION
- ○ PRIMER
- ○ FINISH COAT

SHIPMENT:
- ○ DOMESTIC ○ EXPORT ○ EXPORT BOXING REQUIRED
- ○ OUTDOOR STORAGE MORE THAN 6 MONTHS

SPARE ROTOR ASSEMBLY PACKAGED FOR:
- ○ HORIZONTAL STORAGE ○ VERTICAL STORAGE
- ○ TYPE OF SHIPPING PREPARATION

REMARKS:

REMARKS:

API 685 Table H.1 C-6 (12% CHR - 1.4006) - Note 1

☐ WEIGHTS

MOTOR DRIVEN:
- WEIGHT OF PUMP (kg)
- WEIGHT OF BASEPLATE (kg)
- WEIGHT OF MOTOR (kg)
- WEIGHT OF GEAR (kg)
- TOTAL WEIGHT (kg)

TURBINE DRIVEN:
- WEIGHT OF BASEPLATE (kg)
- WEIGHT OF TURBINE (kg)
- WEIGHT OF GEAR (kg)
- TOTAL WEIGHT (kg)

REMARKS:

OTHER PURCHASE REQUIREMENTS

- ● COORDINATION MEETING REQUIRED
- ○ REVIEW FOUNDATION DRAWINGS
- ○ REVIEW PIPING DRAWINGS
- ○ OBSERVE PIPING CHECKS
- ○ OBSERVE INITIAL ALIGNMENT CHECK
- ○ CHECK ALIGNMENT AT OPERATING TEMPERATURE
- ○ CONNECTION DESIGN APPROVAL

REMARKS:

19.01.22

OTHER PURCHASER REQUIRIMENTS (CONT)

- ○ RIGGING DEVICE REQ'D FOR TYPE OH3 PUMP
- ○ HYDRODYNAMIC THRUST BRG SIZE REVIEW REQ'D
- ○ LATERL ANALYSIS REQUIRED
- ○ ROTOT DYNAMIC BALANCE
- ○ MOUNT SEAL RESERVOIR OFF BASEPLATE
- ● INSTALLATION LIST IN PROPOSAL
- ○ SPARE ROTOR VERTICAL STORAGE
- ○ TORSIONAL ANALYSIS / REPORT
- ○ PROGRESS REPORTS REQUIRED

REMARKS:

QA INSPECTION AND TEST

- ● REVIEW VENDORS QA PROGRAM
- ● PERFORMANCE CURVE APPROVAL
- ● SHOP INSPECTION
- ○ TEST WITH SUBTITUTE SEAL

TEST	NON-WIT	WIT	OBSERVED
HYDROSTATIC	○	●	○
PERFORMANCE	○	●	○
NPSH	○	●	○
COMPLETE UNIT TEST	○	○	○
SOUND LEVEL TEST	○	●	○
● CLEANLINESS PRIOR TO FINAL ASSEMBLY	○	●	○
○ NOZZLE LOAD TEST	○	○	○
○ BRG HSG RESONANCE TEST	○	○	○
○ REMOVE / INSPECT HYDRODYNAMIC BEARINGS AFTER RESR	○	○	○
● AUXILIARY EQUIPMENT TEST	○	●	○
○	○	○	○
○	○	○	○

- ● MATERIAL CERTIFICACION REQUIRED
  - ● CASING ● IMPELLER ● SHAFT
  - ○ OTHER
- ● CASTING REPAIR PROCEDURE APPROVAL REQ'D
- ● INSPECTION REQUIRED FOR CASTINGS
  - ○ MAGNETIC PARTICLE OR ○ LIQUID PENETRANT
  - ● RADIOGRAPHIC ○ ULTRASONIC
- ● INSPECTION REQUIRED FOR CASTINGS
  - ○ MAGNETIC PARTICLE OR ○ LIQUID PENETRANT
  - ● RADIOGRAPHIC ○ ULTRASONIC

QA INPECTION AND TEST (CONT)

- ○ ADDITIONAL INSPECTION REQUIRED FOR:
  - ○ MAGNETIC PARTICLE ○ LIQUID PENETRANT
  - ○ RADIOGRAPHIC ○ ULTRASONIC
- ○ ALTERNATE ACCEPTANCE CRITERIA (SEE REMARKS)
- ○ HARDNESS TEST REQUIRED FOR:
- ○ WETTING AGENT HYDROSTEST
- ○ VENDOR SUBMIT TEST PROCEDURES
- ○ RECORD FINAL ASSEMBLY RUNNING CLEARANCES
- ○ INSPECTION CHECK-LIST (APPENDIX N)

REMARKS:

GENERAL REMARKS

Operating Manual for pump
- Supplement to operating instructions: explosion protection, ATEX
- Recommendation for installation and monitoring
- Cross sectional drawing
- Parts list
- General arrangement drawing
- Connection diagram
- Product information
- EC Declaration of Conformity
- Test report and performance curve
- Wear ring report and bearing performance
- Operating instroctions
- Safety instructions

B. OTHER REQUIREMENTS

axial displacement transducer

ADDITIONAL REMARKS System description: Suction vessel is closed and is on level control; Pump location is bellow liq. level

19.01.22

19.01.2022

Additional technical requirements and list of spare parts for pumps (mandatory, not optional)

Pump type NON API

Requirement for motor bearing body:
threaded holes for mounting vibration and temperature sensors
automatic hubs for motor bearings

Requirement for pumps:
seals type LabTecta ™ or Bearing Gard™ or equivalent for body bearing pumps

Start-up and 2-year spare parts for 2 pumps
2 x set of gaskets
4 x mech. seal repair kit
seals type LabTecta ™ or Bearing Gard™ or equivalent – 4 pcs

Other requirements:
Mechanical seals: Anod , Burgman
Coupling type: Metastream
No water cooling for body bearing pumps .
Axial displacement transducer

19.01.22

19.01.2022

ANEXA 5

LUKOIL OIL COMPANY

Construction Sulphur Recovery Unit 3

ELECTRIC MOTOR DATA SHEET

303-NMP- 4 A/B

Project Phase	**DTDE**
Project No.:	**1267PJ**
Client :	**S.C. PETROTEL – LUKOIL S.A.**
Site Location :	**Ploiești, Prahova, Romania**

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SEMNATURA.....
DATA.....

CONȚINUT

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2. DRIVEN EQUIPMENT DATA (BY DRIVEN EQUIPMENT VENDOR) 5
3. MOTOR VENDOR INFORMATION 5

1. PROJECT REQUIREMENTS

Item	Description	Technical characteristics
A	**GENERALITIES**	
A.1.	Motor Tag	303-NMP-4 A/B
A.2.	Driven equipment tag	303-NP-4 A/B
A.3.	Driven equipment type	BB4 centrifugal pump
A.4.	Driven equipment description	Boiler Feed Water Pump
A.5.	Quantity (pcs.)	3
A.6.	Estimated shaft power [kW]	63
A.7.	kW rating	Should be 110% of maximum kW requirement of the pump considering to drive 120 % minimum of the duty point flow
A.8.	Standard and codes	See general specification
A.9.	General specification	Doc.nr.: 1267PJ-UE506-000-001
A.10.	Ambient temperature (minimum / maximum)	-28°C ÷ +41°C
A.11.	Relative air humidity (coldest / hottest month)	90% ÷ 66%
A.12.	Indoor / outdoor / under roof installation	Outdoor
A.13.	Climate / others environment conditions	Temperate
A.14.	Altitude	Up to 1000 meters
B	**CONSTRUCTIONS**	
B.1.	Mechanical protection (IP)	IP 66
B.2.	Hazardous area classification	Zone 1
B.3.	Hazardous temperature classification	IIC
B.4.	Gas group classification	T3
B.5.	Ex type of protection	EEx de ("d" – motor enclosure,"e" – motor terminal box)
B.6.	Connection diagram	Star-690V; Delta-400V
B.7.	Motor type	Asynchronous squirrel cage
B.8.	Duty type (as per IEC 60034-1)	S1 (continuous)
B.9.	Insulation class / Temperature rise limit	F / class B
B.10.	Cooling method	Aer
B.11.	Efficiency class	IE3
B.12.	Starting method	SOFT START
B.13.	VSD stand-alone panel (yes/no)	N/A
B.14.	Rotation direction	Bidirectional

Item	Description	Technical characteristics
B.15.	Type of mounting (horizontal/vertical)	Horizontal
B.16.	Painting color	Manufacturer proposal
B.17.	Automatic lubrication system	YES
B.18.	Sound pressure level (1m)	82
B.19.	Motor manufacturer	Siemens or ABB
B.20.	VSD manufacturer	N/A
C	**SUPPLY NETWORK**	
C.1.	Voltage	400V (+10/-15%)
C.2.	Frequency	50Hz ± 2%
C.3.	Neutral system (TN-S/TN-C/TT/IT)	TN-CS
D	**CONNECTION CABLE DATA**	
D.1.	Power cable (type / section / outside diameter / armor)	CYEABY-F 3x120+70
D.2.	Space heaters (section / outside diameter / armor)	CYABY-F 3x2,5
D.3.	Winding temperature sensor's cables (section / outside diameter / armor)	CYABY-F 3x1,5
D.4.	Cable glands	Yes (double sealed Ex e cable glands for armored cables to be provided for all cable entries)
D.5.	Cable glands material and thread	Brass nickel plated; metric thread
E	**AUXILIARIES**	
E.1.	Anticondensation heater (yes/no)	Yes, supplied at 230Va.c. with separate motor terminal box
E.2.	Windings thermoelements (yes/no)	Yes, PTC type
E.3.	Bearings thermoelements (yes/no)	Yes
E.4.	Bearings vibration sensors (yes/no)	N/A
E.5.	Bearings oil type	

2. DRIVEN EQUIPMENT DATA (BY DRIVEN EQUIPMENT VENDOR)

Item	Description	Technical characteristics
1	Manufacturer's name	
2	Rated / Maximum required power (kW)	
3	Rated speed (rpm)	
4	Torque / speed curve drawing no.	
5	Full load torque (Nm)	
6	Starting torque (% of FLT)	
7	Coupling system (belt/direct)	
8	Inertia moment GD^2 (kgm^2)	

3. MOTOR VENDOR INFORMATION

Item	Description	Technical characteristics
1	Manufacturer's name	
2	Rated output (kW)	
3	Voltage (V)/phases	
4	Synchronous / full load speed (rpm)	
5	Frame size	
6	Full/no load current (A)	
7	Starting current (% of FLT)	
8	Efficiency @ 100/75/50% load	
9	Power factor @ 100/75/50% load	
10	Ramp-up time I_E(s)	
11	Cold/hot allowed starts per hour	
12	Torque/speed curve drawing no.	
13	Full load torque (Nm)	
14	Starting torque (% of FLT)	
15	Starting time @80% load	
16	Motor inertia moment GD^2 (kgm^2)	
17	Insulation class/Temperature rise limit	
18	Explosion proof protection type	
19	Explosion proof certifying authority	
20	Climatic protection	

Item	Description	Technical characteristics
21	Mechanical protection	
22	Rotor withdrawal space (m)	
23	Weight (kg)	
24	Noise level	
25	Bearings DE/NDE	
26	Lubrification type	
27	Greasing period	
28	Thermoelements type	
29	Anticondensation heaters voltage/power (V/W)	

ANEXA 6

Grafic de predare documentatie pe faze executie

Nr. Crt.	Documentatie elaborata	Termen predare
1.	Memoriu tehnic si specificatiile de procurare echipmente noi	4 saptamani de lansarea comenzii ferma / contract
2.	Specificatii procurare echipamente noi (statice, dinamice, electric, AMC, DCS)	4 saptamani de lansarea comenzii ferma / contract
3.	Documentatie de executie	
	Proiect de dezafectare si/sau de demolare pentru echipamentele existente	6 saptamani de lansarea comenzii ferma / contract
	Proiect de adaptare sau constructie fundatie noua	2 saptamani de la primirea documentatie de la furnizor echipament
	Proiect de adaptare si montaj legaturi conducte noi	4 saptamani de la primirea documentatie de la furnizor echipament
	Proiect de adaptare circuite electrice din statie distributie pana la noul echipament, inclusiv cu interconctarile cu sisteme de automatizare si protectie	6 saptamani de la primirea documentatie de la furnizor echipament
	Proiect de adaptare circuite AMC si ESD de la noul echipament la DCS existent, inclusiv cu interconectarile la sistem alimentare electric si configurare DCS.	8 saptamani de la primirea documentatie de la furnizor echipament
4.	Cerinte tehnice sau caiet de sracini pentru contractor lucrari C+M pe toate disciplinele	10 saptamani de la primirea documentatie de la furnizor echipament
5.	Manuale si instrctiuni de operare pe faze tehnologice - Pregatire premergator punere in functiune - Punere in functiune - Operare normala - Intretinere si mentenanta regulata - Instructiuni oprire accidentala	10 saptamani de la primirea documentatie de la furnizor echipament
5.	Documentatia completa de executie in forma finala As-Build.	2 saptamani de la PIF