

	Southern Adish Gas Condensate Refinery Project							 ADISH Southern Adish Gas Condensate Refinery company
	REQUISITION FOR DESIGN OF SODIUM SULFIDE PRODUCTION UNIT							
	Project	Phase	Unit	Disc.	Type	Seq. No.	Rev.	
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REQUISITION FOR DESIGN OF SODIUM SULFIDE PRODUCTION UNIT

01	20/JAN/25	IFA	HRP	SSH	MM	
00	25/NOV/24	IFA	HRP	SSH	MM	
REV.	DATE	Purpose of Issue	PRE'D	CHK'D	APP'D	AUT'D

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1. GENERAL PROJECT DESCRIPTION

Southern Adish Gas Condensate Refinery Company is developing a grass root gas condensate refinery complex which will be located in Iranian Coast of the Persian Gulf at the Tombak Region (50 km West of Assaluyeh). Hydrocarbon condensate feed will be mainly supplied from existing gas refineries in mentioned region.

This requisition is prepared for the design required for Southern Adish Gas Condensate Refinery and Designer shall develop his quotation in strict accordance with conditions stated here and any attached documents.

2. DEFINITIONS & ABBREVIATIONS

PROJECT	Southern Adish Gas Condensate Refinery Project
CONTRACT	Subject Contract (Contract No. ADSH-E-CO-GE-001)
CLIENT	Southern Adish Gas Condensate Refinery Co.
CONTRACTOR	Shall mean the party which has entered under a CONTRACT or agreement with CLIENT for the execution of basic/detail engineering of PROJECT facilities.
VENDOR	Shall mean any person, firm or company, contracted to manufacture or supply any materials, equipment or services for the performance of any item in connection with this PROJECT.
INSPECTOR	Party assigned by the Contractor or Client to inspect the specified services, equipment or system being provided by the Vendor

3. INQUIRY

The purpose of this inquiry is to formally request a proposal from engineering firm for the design of a Sodium Sulfide Production (SSP) unit.

As the Design Contractor, will be responsible for all design works associated with this project. A comprehensive proposal is required that includes the approach to the design, timelines, and estimated costs. All relevant aspects of the project shall address in the proposal.

The designer will be responsible to develop the Basic Design based on proven know how, technical knowledge and previous experience.

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4. DOCUMENTS ATTACHED TO THIS MATERIAL REQUISITION

No.	Document No	Document Title
1	SACR-DE-GEN-PR-SPC-0004	BASIC ENGINEERING DESIGN DATA
2	SACR-DE-GEN-PR-SPC-0001	Process Sizing Criteria
3	SRIC-BE-GEN-PM-SPC-0001	Codes & Standards

Note: The other project specification will be submitted in next stage of bid.

5. DOCUMENTS REQUIRED DURING BID

The technical documents requirements during bid are as per following as minimum:

- Company Profile
- Experience and Reference List
- Organization Chart
- Key Personnel Introducing
- Scope of Work
- Master Documents List
- Planning and Time Schedule
- Technical Description
- Process Flow Diagram
- Equipment Description
- Safety and environmental consideration
- Feed and Products Specification
- Utility Consumption List
- Waste, Effluent and Emission List

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6. FEED CHARACTERISTICS

The feed is sour fuel gases from the NHT and MDH with the following compositions:

Compositions of Feed Gas from NHT Unit

Component	kmol/h
NH3	0.02
H2S	28.68
H2	34.47
CH4	0.43
C2H6	0.30
C3H8	0.30
i-C4H10	2.71
n-C4H10	23.31
i-C5H12	8.30
C5+	0.02 (*)
MW	32.37
Flow rate	98.54 kmol/hr
Flow rate	3189.4 kg/hr

(*) C5+ mass flow rate is 1.7 kg/h

Sour Fuel Gas treatment section shall be designed to handle sour fuel gases from the Naphtha Hydrotreater Unit (NHT).

Note: As the Middle Distillate Hydrotreater Unit (MDH) is future plan and this unit is not constructed, the off gas from this unit is not included for treatment in SSP unit feed.

Feed Streams to the Sour Fuel Gas Amine Absorption section

SOURCE	FLOW RATE (KG/H) (Note-3)
NHT	3189.4 (Note-1)
TOTAL	3189.4 (Note-3)

Note-1: This figure is related to EOR case; it is 3178.4 kg/hr in SOR case.

Note-2: This figure is related to Case-A EOR; it is 392, 395 and 871 kg/hr for Case-A SOR, Case-B SOR and Case-B EOR respectively. Case-A EOR is selected because it contains the highest amount of H2S.

Note-3: Design Capacity: 3,500 kg/hr. The minimum feasible turndown to be specified by Engineering contractor.

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7. PRODUCT SPECIFICATIONS

7.1. Sodium Hydrosulfide

An aqueous solution of Sodium Hydrosulfide will be yellow to dark green, and have a characteristic “rotten-egg” odor of Hydrogen Sulfide (H₂S).

It is used as a key intermediate in Kraft paper pulping; as a metal chelator (chelating agent) in copper mining and heavy metal recovery; and as a chemical intermediate in the production of sulfur dyes and other valuable sulfur-containing chemicals such as thioglycolic acid. NaSH is also a depilatory (de-hairing) agent for the tanning industry and a defeathering solution for the chicken and poultry processing industry. Furthermore, it is used for waste water treatment and chemical industry (cosmetics).

Sodium Hydrosulfide Solution (35-46%) Specifications

CHARATERITICS	SPECIFICATION
Wt. % NaSH	35-46
Wt. % Na ₂ S	max. 2 %
Density (40 % & 20 °C)	1.28 kg/m ³
PH	11-13
Viscosity (20 °C):	approx. 11 cp
Appearance	yellow to dark green to black
Freezing Pint (40 % & 20 °C)	4.5 °C
Fe (Iron)	less than 10 ppm

Note: The concentration rate at solid (Flakes) form is 70% min. The flake production to be evaluated.

7.2. Sodium Sulfide Flakes

Sodium sulfide is a yellow, solid flake. It is used in the pulp and Paper industry and in the leather processing to remove hair. It may be used in the making of colors and dyes. It can be used in manufacture of other water chemicals, metals, mining (ore processing), waste water and process sludge treatment.

Sodium Sulfide Flakes Specifications

CHARATERITICS	SPECIFICATION
Apperance	Light Yellow to Yellow
Na ₂ S wt %	min 60%
Linear Formula	Na ₂ S, 5H ₂ O
Melting Point	120 °C
PH	12.9 10G/L@20°C
Fe	<10 ppm
Na ₂ CO ₃ (Note)	<0.5 wt %
Na ₂ S ₂ O ₃ (Note)	<0.8 wt %
Na ₂ SO ₃ (Note)	<0.5 wt %
NaOH	<0.2 wt %
NaSH	<0.5 wt %

Note: The source to be evaluated.

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7.3. Treated Gas

Treated Gas Specifications

SPECIFICATION	CHARATERITICS
MW	Report
H ₂ S	< 100 ppmvl
LHV	47723 kJ/kg
Density	7.798 lg/m ³

8. PROCESS

One train of Sodium Sulfide Production Units is considered for sweetening the sour gas and produce sodium sulfide. The sweet gas will be sent to fuel gas network as fuel gas. And the sodium sulfide is for the export purpose and sailing in international market.

It is expected the SSP unit comprises of the following section:

1. LPG Recover, to recovery the heavy cut (C₃+) from the gas.
2. Sour Gas Caustic Scrubber.
3. Na₂S Reactor section.
4. Vaporization and Flake maker.
5. Packaging.

8.1. FEED and PRODUCTS CONDITIONS

The feed and products conditions table.

Stream	Source	Operating Pressure, bar(g)	Design Pressure, bar(g)	Operating Temperature, °C	Design Temperature, °C
Sour Gas	NHT	6.5	8.5	46	85

The feed and products conditions table

Product	Operating Press., bar(g)	Design Press., bar(g)	Operating Temp., °C	Design Temp., °C	Destination
Treated Gas (by-product)	5.5	8.5	55	85	Fuel Gas Header
NASH Solution	Note	5	45	85	Tank
NA ₂ S Solution	Note	5	70	95	Tank
NA ₂ S, Flakes	na	na	40	na	Bags Storage
NA ₂ S, Flakes	na	na	40	na	Bags Storage

Note: To be designed based on hydraulic calculation.

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9. GUARANTEE

The Vendor shall guarantee following specification and requirement as minimum:

- Process and performance guarantee including unit capacity , product quality and on stream factor.
- Proper Material Selection for Life time equal to 25 years.
- Utilities Consumption
- Safety Guarantee
- Waste and Effluents