CLARIFICATION#2 AGAINST TENDER # TENDER ENQUIRY NO. PROC-SERVICES/CB/RMD-4941/2021 for KPD & TAY INTEGRATED RESERVOIR SIMULATION STUDY & NETWORK MODELING

Following Clarification have been made in the subject tender.

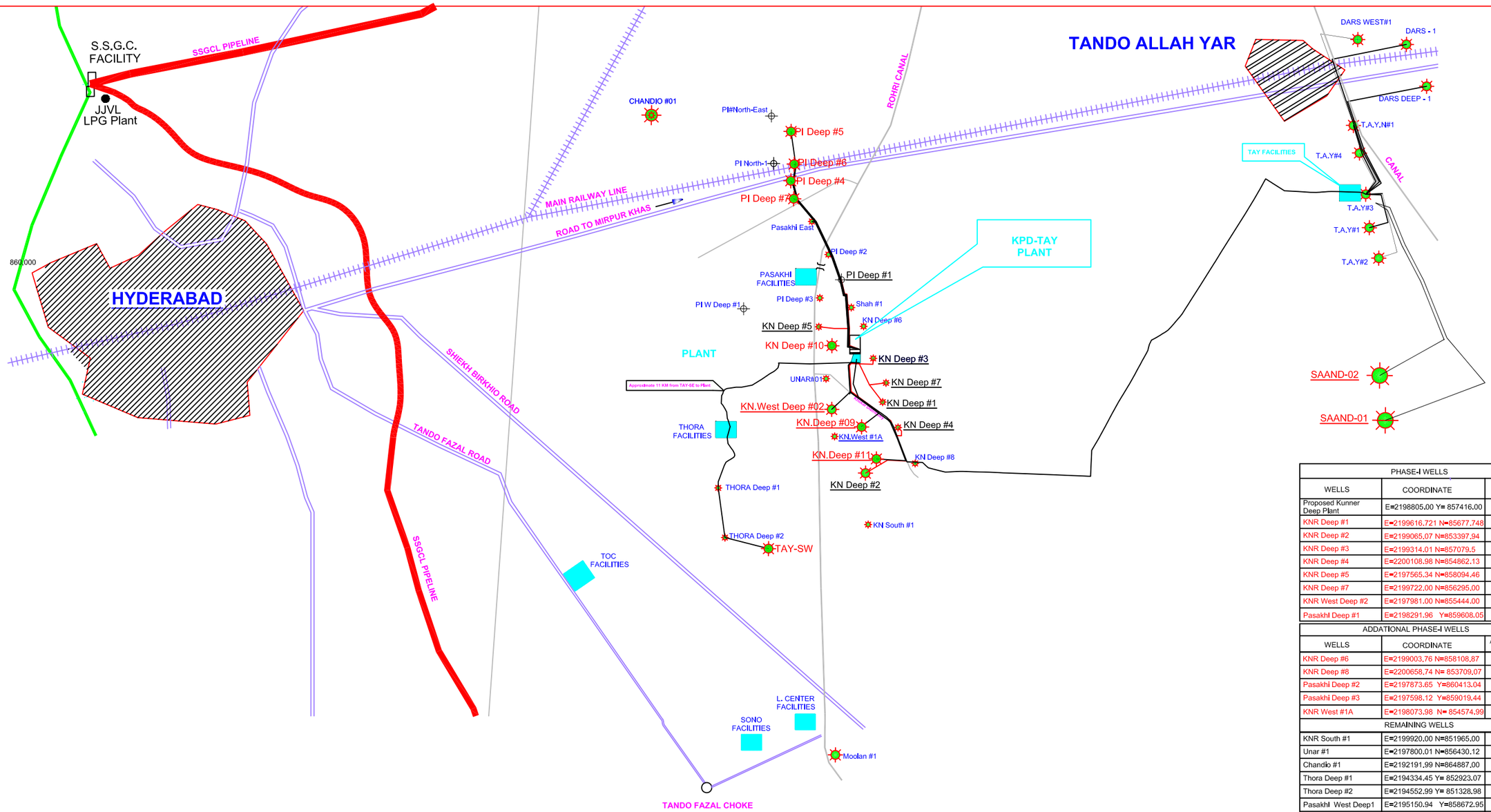
Sr#	Questions for Clarification	OGDCL Reply
1	What is the processing capacity and the turn-down capacity of the KPD-TAY Integrated plant?	Processing Capacity 250 MMscfd Turn Down Capacity 75 MMscfd
2	Please share an existing network diagram of the flowlines, trunk lines, processing facilities and equipment, to get an understanding of the effort required for network modeling? Also, the injection points of various wells in the network and delivery points are to be marked on this diagram?	Diagram is attached
3	Please confirm if OGDCL needs a separate network model for each category (KPD, TAY & Nim and Satellite fields) or one integrated network will serve the purpose?	Separate Network models for KPD, TAY & Nim Fields, and Satellite fields should be built in such a way that it can be integrated later on as per SOW.
4	Is there any compression going on in any of the fields currently? If yes, please provide the type, location in network and details?	At present three (03) well head compressors are in operation at three (03) low pressure wells (TAY-1 LS, Moolan-1 & Chandio-1).
5	Please provide a data availability list covering the following: i. How many production logs available (PLT, PSP etc). Are there reports available? ii. How many PVT samples? And what reservoir levels have been sampled? iii. What is the fluid type of each reservoir? How many detailed laboratory PVT reports exists? Also, please confirm if the reports are in digital format or provided in hard form? iv. How many well tests report available in digital and hard form? Will any digitization be required? v. How many BHP (static / flowing) are available? vi. How many PTAs are to be interpreted? Can existing valid interpretations results be accepted following review? vii. Is core analysis and interpretations (Conventional & SCAL) available for all reservoirs?	i. PSP reports for 7-10 wells are available ii. 10-15 samples are available against the corresponding reservoir iii. Majority of the fields are wet to dry gases (Massive sands) while a few are retrograde condensate (Upper Sands of Lower Goru). PVT report for almost all fields are available (Almost all are Digital scanned copies) iv. More than 50 reports are available. Majority of the reports are in digital format however some may require digitization. v. 30-40 BHPs vi. One (01) initial and One (01) latest to be interpreted, existing interpretation may be accepted after review, but this should be mutually agreed by OGDCL & Consultant and the consultant will have the responsibility of its validity after acceptance. vii. 12 wells have cores with RCA and 1-2 wells have SCAL
6	In technical approach (figure 4), it is mentioned that static and dynamic simulation modeling is required for KPD fields along with some of fields from TAY/Nim JV fields (Pasakhi East, Shah, Unnar, Kunnar South Fields). Please confirm if OGDCL need them to be included in the same model or a separate model will be required since they are part of a separate JV?	These should be included in the same model in such a way that later on they can be separated through sector modeling due to the reason mentioned.
7	Is RTA must for all the wells? Please provide maximum number of wells that can be selected for RTA?	All the wells for single well fields For multi-well fields 2-4 representative wells to be selected based on the total number of wells.
8	It has been mentioned that fine scale should be initialized and history matched; although this can be done but various upscaled realizations can also be run in order to enhance performance of the simulation runs and the best one can be selected to proceed with in consultation with OGDCL	It is a general understanding that upscaled model will have enhanced performance of simulation runs. As OGDCL has access to latest generation of simulator (Intersect) and multi core systems, so, OGDCL prefer to work on fine scaled model for optimal run of these fields to mitigate the heterogeneity issues.
9	Does OGDCL see proper fluid characterization as one of objectives of this integrated simulation study?	Yes, as described in para 3.2.1.1 to 3.2.1.5 (Section 2) AND para 2.2.6.1 to 2.2.6.5 (Section 3) of the TORs
10	Will a black oil approximation of	Our understanding is that the fields selected for

	compositional (gas/condensate) fluid system (if PVT concludes so) be acceptable to OGDCL as this may have significant impact on results?	dynamic modeling are wet to dry gases. Therefore, Black oil model will be fine. However final decision will be taken after joint review of the Basic RE & PVT analysis by consultant
11	Is consultant right in understanding that the simulation type (black oil or compositional) will be decided based on basic RE analysis & PVT findings	Our understanding is that the fields selected for dynamic modeling are wet to dry gases. Therefore, Black oil model will be fine. However final decision will be taken after joint review of the Basic RE & PVT analysis by consultant
12	Please clarify, if tight gas potential evaluation is only required for Kunnar-Pasakhi Deep field?	This is required for all the fields involved in this study Ref para 3.1.2.12, 3.1.3.7 & 3.3.4.4 of section 2 and para 2.2.3.12 of section 3 of TORs
13	Wellhead compression is to be compared with "Front end/Nodal" compression. Will Front end and nodal be separate scenarios, or will OGDCL let us know which one to compare with wellhead compression?	Following Comparison cases are envisaged by OGDCL 1. Front End 2. Wellhead 3. Front End plus Nodal 4. Front End plus Wellhead 5. Front End plus nodal plus Well head
14	Pipesim/ IAM may be used for creating wellbore hydraulic models and integrated network model. Is this acceptable to OGDCL?	PIPESIM/ IAM may be used under/ in accordance with the Software Compatibility clauses given on pg. 47 of the TORs.
15	Will OGDCL identify which exact PEEP model/s need to be used for the study?	1997
16	Will OGDCL be providing pricing estimates for hydrocarbon revenue streams? If not; then what methodology needs to be followed to establish pricing for different products?	OGDCL will provide the pricing estimates
17	Will OGDCL be providing the “Cost Analysis” (i.e. estimates for operating and capital costs) to be used for this study? If not; what methodology needs to be followed?	OGDCL will provide the CAPEX & OPEX estimates
18	What is the granularity level of economics required? Individual field/case level? Integrated model level?	Individual Field cases, JV and Non-JV Cases Integrated cases
19	**PETROPHYSICS CLARIFICATIONS** **SECTION:2 KUNNAR-PASAKHI DEEP GAS FIELDS:** **Reference to section 2.2.1 of Scope of work:**	
	1. How many wells have core available?	12 wells (KPD and TAY)
	2. Are there any analysis/studies already performed and available on cores that are expected to be integrated during the study?	12 RCA & 1-2 SCAL (KPD and TAY)
	3. Do we have Borehole image logs available in these wells? If yes, do we have sedimentary analysis already performed on borehole image logs?	06 wells have FMI/SHDT data available. Two wells have sedimentary analysis. (KPD and TAY)
20	**Reference to section 2.2.3 of Scope of work:**	
	1. Are we expected to perform petrophysical analysis ONLY for Lower Goru sand level?	As mentioned in TORs the complete sequence of Lower Goru and Sembar Fm. wherever applicable.
	2. Do we need to cover other formations (shallower/deeper) while doing petrophysical analysis?	Yes. If logged
	3. Does a volumetric calculation (mineral/rock volumes, porosity, Sw) exist in all the wells (deviated and horizontals) and would it be provided?	Volumetric calculations are available however Independent view of consultant is expected
21	**Reference to section 2.2.4 of Scope of work:**	

	1. As per reference section contractor is expected to evaluate both conventional and unconventional potentials of Lower Goru Formation. Have these fields already been evaluated for unconventional potentials? If yes, is OGDCL going to share that work/information with us?	Independent view of consultant is expected
	2. What type of analyses have been performed on the Cores/SWC considering unconventional potentials?	This is not part of SOW
	3. Are there any analysis already performed/available on cuttings? If yes, what type of analysis are available?	Few analyses are available which will be shared during the study
	4. Do we have any neutron spectroscopy, dielectric or NMR logs data available in these wells? If yes, are they already processed and ready to use?	20 wells have spectral GR data, 2 wells have NMR data, 01 well ECS (KPD and TAY)
22	**SECTION:3 DETAILED SCOPE OF WORK FOR STUDY SUB-PHASES:** **Reference to section 3.1.2.1**	
	1. How many wells have cores available and what kind of analysis are already performed?	12 wells, RCA (KPD and TAY)
	2. Do we have SCAL available for the cored wells? If yes, how many wells?	1-2 wells (KPD and TAY)
	3. Do we have any neutron spectroscopy, dielectric or NMR logs data available in these wells? If yes, are they already processed and ready to use?	20 wells have spectral GR data, 2 wells have NMR data, 01 well ECS (KPD and TAY)

KPD-TAY INTIGRATED DEVELOPMENT PROJECT (Phase- I & II).

SITE LOCATION MAP.



PHASE-I WELLS		
WELLS	COORDINATE	ROUTE DISTANCE
Proposed Kunner Deep Plant	E=2198805.00 Y= 857416.00	00.00 KMs
KNR Deep #1	E=2199616.721 N=85677.748	2.0 Kms
KNR Deep #2	E=2199065.07 N=853397.94	6.25 KMs
KNR Deep #3	E=2199314.01 N=857079.5	1.5 KMs
KNR Deep #4	E=2200108.98 N=854862.13	4.5 KMs
KNR Deep #5	E=2197565.34 N=858094.46	1.9 KMs
KNR Deep #7	E=2199722.00 N=856295.00	2.7 KMs
KNR West Deep #2	E=2197981.00 N=855444.00	2.1 KMs
Pasakhi Deep #1	E=2198291.96 Y=859608.05	2.6 KMs

ADDATIONAL PHASE-I WELLS		
WELLS	COORDINATE	APROXI ROUTE DISTANCE
KNR Deep #6	E=2199003.76 N=858108.87	1.0 KMs
KNR Deep #8	E=2200658.74 N= 853709.07	4.5 KMs
Pasakhi Deep #2	E=2197873.65 Y=860413.04	3.5 KMs
Pasakhi Deep #3	E=2197598.12 Y=859019.44	2.7 KMs
KNR West #1A	E=2198073.98 N= 854574.99	3.5 KMs
REMAINING WELLS		
KNR South #1	E=2199920.00 N=851965.00	7.5 KMs
Unar #1	E=2197800.01 N=856430.12	2.5 KMs
Chandio #1	E=2192191.99 N=864887.00	13.0 KMs
Thora Deep #1	E=2194334.45 Y= 852923.07	11.0 KMs
Thora Deep #2	E=2194552.99 Y= 851328.98	12.5 KMs
Pasakhi West Deep1	E=2195150.94 Y=858672.95	3.8 KMs
Pasakhi East	E=2197343.99 Y=861473.98	4.5 KMs
Moolan #1	E=2198096.94 Y=844353.99	16.7 KMs
Shah #1	E=2198606.99 Y = 858710.98	1.5 KMs
TAY & DARS WELLS		
Proposed Gathering at TAY # 3	E=2215126.00 Y= 862347.00	00.00 KMs
TAY # 1	E=2215242.00 N=861274.00	2.0 Kms
TAY # 2	E=2215543.00 N=860297.00	2.6 KMs
TAY # 3	E=2215126.00 N=862347.00	01 KMs
TAY # 4	E=2214926.00 N=863670.00	1.8 KMs
TAY - N #1	E=2214730.990 N=864556.00	2.8 KMs
TAY - SW #1	E=2195950.10 Y=850973.01	11 KMs
DARS-WEST # 1	E=2214870.00 N=867313.00	5.7 KMs
DARS # 1	E=2216432.00 N=867157.00	7.0 KMs
DARS DEEP # 1	E=2217082.003 N=865812.997	5.8 KMs

0 5 Kms

SCALE

Quantity	Title/Name, designation, material, dimension etc			Article No./Reference	
CAD BY Abid Hussain Shah	Checked by Fasih Akhtar	Approved by Rashid Mehmood	Drawing No. PF-KND-12	Computer Code PFKND12.DWG	updated 26-10-2017

Owner
Oil & Gas Development Company Ltd.
Petroleum Engineering & Facilities dept..
Production Division
ISLAMABAD

Title/Name
LOCATION MAP

Project:
KPD-TAY INTEGRATED DEVELOPMENT PROJECT

Scale
AS SHOWN

Rev.
1