

**PHỤ LỤC 1: PHẠM VI CÔNG VIỆC/
*SCHEDULE 1- SCOPE OF WORK***

1. *General scope of work*

- The Contractor shall carry out detailed engineering design work, including but not limited to mechanical, steel structures, and civil disciplines, based on the like-for-like basic design of the existing STG-3 Package.
- The design scope shall comply with the boundaries defined in the investigation report approved by NSRP.
- Review documents and information provided by PTSC Thanh Hoa including but not limited to the drawings and design concept in Schedule 3 – Project Requirement. Contractor shall refer to documents set out in Schedule 3 – Project Requirement-Design Concept for reference of engineering detailed design.
- Prepare and deliver all deliverables as summarized in Schedule 5 – Project Document Deliverable List. The Project Document Deliverable List shall be developed by the Subcontractor when necessary for performing the Works.
- Ensure all deliverables are reviewed and approved by PTSC Thanh Hoa & NSRP prior to execution.
- Design of the modified system must ensure that it shall be properly connected, integrated and synchronized with the existing systems of NSRP including but not be limited to mechanical, monitoring, control, safety systems
- The detailed engineering work shall be executed in compliance with the requirements in the Annex 1 – Project Deliverable list and Master document List approved by PTSC & NSRP . This scope shall include but not be limited to the following:

2. Site Investigation

- The Subcontractor shall actively coordinate with PTSC TH and third parties during site investigation activities.

3. Structure/Civil Detail design

- The contractor shall perform the detailed civil/ Structural engineering design work in compliance with the requirement in the Annex 2, The SOW shall include but not limited to the following:
- Site survey as necessary to perform the Work including actual condition of existing Civil and Structure facilities including steel structures, reinforced concrete

structures, equipment foundations, shelter foundation, concrete pavement, Ditches, Trenches, Pits, Sumps, manholes.

- A site survey report required to submit for PTSC & NSRP approval, The report shall be addressed to the Conceptual reinforcing of the structures and Tie-In/connection design to existing structure.
- Reviewing all documents and information provided by NSRP including but not limited to the The geotechnical Report, Specifications, Standards of NSRP.
- Based on the above information and document provided, Contractor to provide the engineering design including but not limited to:
- Contractor shall verify existing structural engineering designs of STG#3 shelter and Turbine Generator Foundation as the Annex 1 with input data of new equipment load, new pipe loads, conduct structural analysis, modelling by Staad Pro software in compliance with the NSRP's Specifications and requirements.
- The structure calculation report of its shall be submitted to NSRP for review and approval.
- In case the structural verification report shows failure, contractor shall conduct Re-analysis & Re-design of structure of STG shelter and Turbine Generator Foundation based on the input data collected,
- Analysis and design Tie in/Connection, reinforcing structure design, additional structures, modified structures of STG#3 Shelter and Turbine Equipment foundation.
- Detailed engineering designs of Tie in/Connection to existing structures,
- Detailed reinforcing structure design, additional structures, modified structures if required
- Provide the structural calculations for reinforced concrete, steel structures,
- Provide the Foundation calculation and Detailed engineering foundation design in case some parts added if required.
- Contractor shall revise the existing engineering designs to be aligned with the new equipment and pipeline system if required.
- Design of the modified, reinforced structures shall be properly connected to, integrated, and synchronized with the existing structure facilities.
- Design of the Fire proofing for steel structures.

- Provide the Bill of Material Quantities.
- Contractor to update existing 3D model in according to the updated design.
- All engineering documents shall be submitted to PTSC & NSRP for approval prior to commencement.

4. Mechanical

- The Subcontractor shall update the specifications and detailed design for mechanical works in compliance with the boundaries outlined in the investigation report approved by NSRP, including but not limited to the following items:
 - Overhead Crane
 - Condenser
 - Desuperheater
 - LO/CO Pump
 - Other related equipment

5. Work Split

Stt	Hạng mục	Bên A	Bên B
1	Engineering Survey		
	Survey for the engineering scope of detail design	(X)	X
	Survey report	(X)	X
2	Engineering Responsible during Investigation by 3rd Party		
	Engineering related work (Coordinate, Survey, Working, Reporting,...) during the Investigation by 3rd Party	(X)	X
3	Engineering Detailed Design		
3.1	HAZOP / LOPA / SIL		
	Conduct HAZOP including but not limited: - <i>Define the scope and objectives</i> - <i>Develop the HAZOP team</i> - <i>Break down the system or process into nodes</i> - <i>Identify the process parameters</i> - <i>Apply deviation keywords</i>		

	- Consider the consequences, causes, and safeguards - Document the findings - Review and implement recommendations - The HAZOP reporting document		
3.2	Mechanical Equipment Detail Design		
	Engineering Master Documents Register (EMDR) Submit to get approval		X
	Updated mechanical specification (Overhead Crane, Condenser, Silencer, Lube oil (LO) / Control Oil (CO) Pumps, LO/CO Exchanger,...etc)		X
	Engineering Drawing & Calculation related to the Mechanical Equipments (Overhead Crane, Condenser, Silencer, Lube oil (LO) / Control Oil (CO) Pumps, LO/CO Exchanger,...etc)		X
	Engineering Bill of Material		X
	Weekly / Monthly Report		X
	Shop Drawing	X	(X)
	As-Built Drawing	X	(X)
3.3	Civil/ Structure Detail Design		
	Engineering Master Documents Register (EMDR) Submit to get approval		X
	Updated Engineering Specification for Civil Design (if any)		X
	Updated Loading Data for Civil Design (if any)		X
	Revise the existing engineering design (structure of STG shelter/ turbine generator foundation/ reinforcing structure/ reinforced concrete)		X
	Structural calculation report		X
	Re-analysis & re-design of structure of STG shelter and Turbine generator foundation		X

	Foundation calculation report and detailed engineering foundation design		X
	Analysis and design tie-in/ connection, reinforcing structure design, additional structures, modified structures of STG#6 shelter and turbine equipment foundation		X
	Detailed engineering design of Tie-in connection to existing structures		X
	Detailed reinforcing structure design, additional structures, modified structure		X
	Update existing 3D model in according to the updated design		(X)
	Engineering Bill of Material		X
	Weekly / Monthly Report		X
	Construction Shop Drawing (If needed)	X	
	As-Built Drawing	X	
3.4	Piping Detail Design		
	Engineering Master Documents Register (EMDR) Submit to get approval		
	New tie-in list with existing lines and equipment		
	New tie-in list for Steam turbine and generator		
	New isometrics with Tie-ins.		
	Piping stress analysis report for critical lines		
	Update Isometric Drawing		
	Pipe Support Drawing for new lines		
	Updated existing 3D model		
	Update Piping Specification (If any)		
	Update Line list		
	Update Piping layouts / arrangement		
	Piping stress analysis report		
	Engineering Bill of Material		
	Weekly / Monthly Report		

	Piping Construction Shop Drawing	X	
	Piping As-Built Drawing	X	
3.5	3D Modelling		
	Update existing 3D model in according to the updated design		
3.6	Painting and Insulation Design		
	Updated Specification (if any)		
	Bill of Material		
3.7	Manual / List		
	Installation Instruction Manual	(X)	X
	Operation Manual	(X)	X
	Maintenance Manual	(X)	X
3.8	Other		
	All facilities / software support to the engineering detail design works		X
	Site Office at NSRP during execution of the work	X	
	Engineering Reports Submit & Get Approval with NSRP	(X)	X
	Office for meeting / Audit at Subcontractor Office		X
	Engineering Documents handover to PTSC after complete of Engineering works (1 Native, 1 Original, 2 Hard Copies)		X
	Documents Control during the engineering detail design work	(X)	X
	Coordinate with NSRP for the Engineering issues	X	(X)